AHMEDABADMUNICIPALCORPORATION– MEDICAL EDUCATIONTRUST(AMC-MET)

BID FOR SELECTION OFANAGENCYFORIMPLEMENTINGAN

INTEGRATEDHOSPITAL INFORMATION SYSTEM,CORE COMPUTE INFRASTRUCTURE & IT INFRASTRUCTURE

AT

PROPOSED LG, SHARDABEN , NAGRI HOSPITAL, DENTAL COLLEGE, S.B.B. COLLEGE OF PHYSIOTHERAPY, CHC & UHC HEALTH CENTRES IN AHMEDABAD

DISCLAIMER

The information contained in this Short Tender Notice or subsequently provided to Bidder/s, whether verbally or in documentary form by or on behalf of the Ahmedabad Municipal Corporation – Medical Education Trust (AMC-MET) or any of their representatives, employees or advisors (collectively referred to as — AMC-MET Representatives), is provided to Bidder(s) on the terms and conditions set out in this Short Tender Notice and any other terms and conditions subject to which such information is provided.

This ShortTender Notice is not an agreement and is not an offer or invitation by the AMC-MET RepresentativestoanypartyotherthantheentitieswhoarequalifiedtosubmittheirProposal(Bidders).

Thepurpose ofthisShortTender NoticeistoprovidetheBidderwithinformationtoassisttheformulationof theirProposal.

ThisShortTenderNoticedoesnotpurporttocontainall theinformationeachBiddermayrequire.

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EachBiddershouldconducttheirowninvestigationsandanalysisandshouldchecktheaccuracy,reliability and completenessof theinformationinthisShort TenderNoticeand wherevernecessary,obtainindependent advicefromappropriatesources.

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TheAMC-METRepresentativesmayintheirabsolute discretion,butwithoutbeingunderanyobligationtodo so,update,amendorsupplementtheinformationinthisShortTenderNotice.

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2. IMPORTANT CLARIFICATION

"AMC-MET" standsfor Ahmedabad Municipal Corporation– Medical EducationTrust

"Vendor" or"Bidder"standsfortherespondent totheTenderdocument.

"Tender"standsfortherequest forproposaldocument.

"Recipient"or"Respondent"or"Bidder"standsfor towhomtheTender documents issuedby the AMC-MET.

"Offer"standsforresponsetoTenderdocumentsubmittedbyrecipienttotheAMC- MET.
"ARI"stands forAuthorizedRepresentativeinIndia.

3. GENERALTENDER DETAIL

AhmedabadMunicipalCorporation–MedicalEducation Trust (AMC-MET)manages LG Hospital (1550 beds), Shardaben Hospital (1040 beds) Nagri Hospital (120 beds)&Dental College, S.B.B. College of Physiotherapy, CHC & UHC Health Centers in Ahmedabad

. These Hospitals deliver high-volume, multispecialty healthcare services.

To support digital transformation, AMC-MET invites proposals for a comprehensive digital health infrastructure covering:

- On-Premise Data Centre + Hybrid Cloud DR
- Networking and Communications (LAN/WAN. Wi-Fi, MPLS/SD-WAN)
- Enterprise IT Security Infrastructure
- Support for HIS/EMR, PACS, LIS, RTLS, Telemedicine, ERP, and other critical systems.

The solutions should ensure scalability, security, compliance, high availability, and interoperability with NDHM/ABDM standards. AhmedabadMunicipalCorporation– MedicalEducation Trust (AMC-MET) invites sealedbidfrom eligible bidders for providing anIntegrated Hospital Information Systems,Core Compute, Networks, IT Infrastructureand Cyber Security forImplementing at LG, Shardaben , Nagari Dental College, S.B.B. College of Physiotherapy, CHC & UHC Health Centers in Ahmedabad, Gujarat. Tenderdocument maybe downloadedfrom websitehttps://tender.nprocure.com/(hardcopiesof thetenderdocument will not beprovided)

IMPORTANTDETAILSREGARDINGTENDER		
1.	Date of commencement of Bidding Process.	24/03/2026
2.	Last date &time for receipt of queries from vendors for Clarifications	01/04/2026 up to 4.00 PM IST
3.	Pre-bid meeting Online	02/04/2026 3.00 PM IST
4.	Last date and time for download of Bidding Documents from the site	07/06/2026 5.00 PM IST
5.	Last date and time for online bid submission	08/06/2026 3.00 PM IST
6.	Last date and time for physical bid submission (Technical solution document should be submitted in physical mode to the communication address mentioned below. Price bid should be submitted online only.)	08/06/2026 3.00 PM IST
7.	Date and Time of Technical Bid Opening	08/06/2026 5.00 PM IST
8.	Place of opening of Bids	Administrative Office, AMC Medical Education and Trust GF, Smt. NHL Municipal Medical College SVP Hospital Campus Ellisbridge Ahmedabad 380006, Gujarat

9.	Address for communication	As above
10.	Tender Fees	Rs.18000/- + 18% GST (Non-refundable)(*through Demand Draft only* in favour of "AMC Medical Education Trust" payable at Ahmedabad).Without tenderFee,tenderwillbe strictly rejected
11.	EarnestMoneyDeposit(EMD)	A.Rs. Forty Lakhs Only-should besubmittedintheformof DDor BGon orbefore lastdate of bidsubmission. B.Infavour of "AMCMedicalEducation Trust"payable atAhmedabad. Incase ofBG,it shouldbe valid for180daysafterfromthedate of
12.	Solvency Certificate	The Tenderer must submit a solvency certificate fromaNationalizedBank/scheduledBankofanAmountof Rs xxxxx/- (40 % of Total estimated cost of tender)BankSolvencyshallnotbeolderthan one-year period.
13.	ContacttoBidders	InterestedBiddersarerequestedtosendtheir e-mailto dydiramcmet@gmail.com in case of any Clarification

Note:

a) TechnicalBidswillbeopenedonline,and technicalsupportingdocumentswill beopened inphysicalformbutCommercialbidwillbe openedonlineonly.Biddersmayview the details throughtheirterminal using theirn-procurementregistrationlogin.Online technicalbids shouldcontainonly scannedcopy ofEMDandTender fee(DDor bank guarantee). Original EMDandTenderfeedocumentalong with technicalresponse shouldbesubmittedinphysical formonly asgivenin thebelow sections.

b)Only technicalsupportingdocumentsshould begiveninphysicalform.However, CommercialBidshould besubmitted onlyonlineinourn-procurementsystem.

4. ELIGIBILITY CRITERIA FOR PARTICIPATION IN TENDER

Sl. No	Eligibility Criteria	Attachments
1	The bidder should be a registered company in India under Company Act 1956 and Amended company Act -2016.	Please provide necessary documents.
2	The Bidder shall have a minimum average annual turnover of not less than INR **37.5** Crore (Rupees Thirty Seven Crore Fifty Lakhs), calculated over the immediately preceding three (3) completed financial years prior to the date of submission of the bid. The annual turnover figures for each of the relevant financial years and the corresponding average annual turnover shall be certified by a Chartered Accountant, clearly indicating the turnover for each year considered for evaluation.	1. Provisional / Audited balance sheet & Profit / Loss Account of last 3 financial years 2022-23,2023-2024 and 2024-2025 for the India business. 2. Bidder must provide original CA certificate for the same. 3. Bidders to submit the last 3 Years Audited Financials, signed by the Auditors.
3	In cases where the Primary Bidder aligns with a specialized work agency (Sub-Contractor / Secondary Bidder) to meet any eligibility, technical, financial, or compliance requirements of the tender, the Primary Bidder shall be solely responsible for obtaining, verifying, and submitting all required certificates, documents, and compliances from such agency. The Primary Bidder shall enter into a valid MoU with the specialized work agency, clearly defining the scope of work and responsibilities. A copy of the signed MoU shall be submitted along with the bid and	1. Provisional / Audited balance sheet & Profit/ Loss Account of last 3 financial years 2022-23,2023-2024 and 2024-2025 for the India business. 2. Bidder must provide original CA certificate for the same. 3. Bidders to submit the last 3 Years Audited Financials, signed by the Auditors. 4. Signed MOU.

	shall remain valid for the entire contract period.Any non-compliance, delay, or deficiency on the part of the specialized work agency shall be entirely attributable to the Primary Bidder, and the Client shall not be liable for the same.	
4	The Bidder should have experience in development & implementation of Hospital Information System application for at least 3 Hospitals instances in the last 7(Seven) years – inGovt. Departments/Urban Local Bodies / Corporate hospitals of > 500 beds (either as a single hospital deployment OR single instance deployment for multiple hospitals of the network).	1. The Bidder shall provide minimum 3 such work orders / Certificates from the users showing the cost of project, at least one of them must be Rs. 300,00,000 (Rs. 3 Cr.) or above. 2. Deployment of the 500+ Bed HIS Instance can be at a Single Hospital Site OR can be a Single Instance being
5	The bidder should have 24 hours * 7 days a week * 365 days support infrastructure in place to deliver services to the AMC-MET.	The Bidder should provide detail of support infrastructure including the types of roles/employees deployed along with their experience levels. Bidder to provide support documentation in detail.
6	The bidder should have experience in integrating Hospital Information System (HIS) with Government websites / applications	(1) Self Declaration to Be Submitted at the Time of Bid Submission, and (2) Submission of Valid Certification Proofs at the Time of Start of the Project and During Project Implementation.
7	Bidder must Submit Technical Documents clearly showing the implementation methodology and design including the PMO Process	Please provide necessary documents.
8	The bidder's product should be mobility ready (responsive user interface) Android & iOS mobile operating Platforms devices of various screen sizes. (Handheld Devices)	Please provide proof in customer letter head of having implemented cloud-based or On-premises solutions in their hospital.
9	The bidder should have implemented the following integrations with the bidders HIS at a minimum of 2 hospital in the last 7(Seven) years 1. Third party RIS-PACS 2. Drug Database	1. Please provide proof in customer letterhead of having implemented the Integration in their hospital (should contain integration details, number of beds). 2. Integration criteria mandatory for PACS – RIS and International codes for disease, procedure

	3. Queue Management System 4. International codes for disease, procedure and other structured protocol management	and other structured protocol management 3. Integration criteria optional for Drug Database and Queue Management System
10	The Bidder should have demonstrable experience in the design, supply, installation, configuration, testing, commissioning, and successful implementation of each of the following systems in Private Sector or Govt. Departments/Urban Local Bodies / Corporate hospitals of > 500 beds (either as a single hospital deployment OR single instance deployment for multiple hospitals of the network). The specialized work agency must have implemented these systems in at least one (2) hospital during the last 7 (Seven) years from the date of submission of the bid: 1. Core Compute Infrastructure – Including servers, storage systems, virtualization platforms, and associated data center components. 2. Active Network Infrastructure – Including LAN, WAN, Wi-Fi, network switches, routers, firewalls, and other related active networking components. 3. IT Infrastructure – Covering end-user computing devices, system integration, data centre setup, structured cabling and overall IT infrastructure management. 4. Cyber Security Systems – Including perimeter security, endpoint security, intrusion detection and prevention systems, security monitoring, and compliance with applicable security standards.	The Bidder shall provide minimum 2 such work orders / Certificates from the users showing the cost of project, at least one of them must be Rs. 600,00,000 (Rs. 6 Cr.) or above. The hospitals where the HIS systems were implemented may be Government, PSU, or Private Healthcare Institutions or private sector. For other scopes of work, the experience shall be from any Government Department or Public Sector Undertaking (PSU).
11	The Bidder / Specialized work agency must possess valid certifications relevant to the implementation of the following systems. All certifications shall be valid as on the date of bid submission. **1. Hospital Information System (HIS)** · ISO 9001:2015 – Quality Management System, ISO/IEC 27001 – Information	(1) Self Declaration to Be Submitted at the Time of Bid Submission, and (2) Submission of Valid Certification Proofs at the Time of Start of the Project and During Project Implementation.

	Security, ABDM compliance , PMJAY empanelment, HL7 FHIR compliance, ISO22301,CMMi,Tier-III,HIMSS 6 or Higher,CERT-In compliance & VAPT certification **2. Core Compute Infrastructure** · ISO/IEC 27001 – Information Security, ISO/IEC 22301 – Business Continuity, OEM authorization for servers/storage, Virtualization platform certification, UL/CE, FIPS 140-2, IEEE 802.3 & IEEE 802.3ba , **3. Active Network Infrastructure** · ISO/IEC 20000-1 – IT Service Management, ISO/IEC 27001 – Information Security, OEM network certification (Switching/Routing/Wi-Fi), Structured cabling standards compliance **4. IT Infrastructure** · ISO 9001:2015 – Quality Management, ISO/IEC 20000-1 – IT Service Management, ISO/IEC 11801 and ANSI/TIA-568, ITIL certification **5. Cyber Security Systems** · ISO/IEC 27001 – Information Security, ISO/IEC 27701 – Privacy Management, CERT-In compliance, VAPT by CERT-In empanelled auditor, OEM cyber security certification	
12	If the bidder is currently blacklisted/debarred (in the duration of this tender document), the bidder will not be eligible for participation in this tender.	Self-Certificate/Undertaking is to be provided on Rs. 300/- stamp paper in notarized form.
13	The bidder should not be involved in any litigation which threatens solvency of company	Undertaking to be provided of 20% of the estimate contract value
14	**HIS Product Architecture:** • Usage of micro services architecture and support API integrations with state and national health portals. **Note:** Refer FRS& TRS details of HIS in **Sectionno.20.1.5 Page No. 145**. This section	Bidder must submit the HIS technical architecture document covering all the points that are mentioned here or self-declaration.

	contains module / department wise functional requirements followed by the technical requirements. • Deploy only on HTTPS (128-bit SSL certificate) and cloud-based implementation • Support different type of deployment architectures like centralized or a distributed architecture • Use the emerging technologies with AI capability	
15	**Health Standards:** Adopt the standards and guidelines recommended by Ayushman Bharat Digital Mission (ABDM), 2019 and Electronic Health Record (EHR) Standards of India 2016, issued by Ministry of Health & Family Welfare, GoI. This is to ensure seamless and boundary less interoperability of health applications	Bidder must submit the supporting documents for the points mentioned or self-declaration.
16	**Compliance**ABDM: HIS solution shall adhere and be compliant with the latest standards and guidelines as specified by National Health Authority, Govt. of India (NHA) as part of its Ayushman Bharat Digital Mission (ABDM) programNABH: HIS solution shall adhere to the latest standards released by NABH for HIS and EMR systems as part of its Digital Health Standards	Bidder must submit the supporting documents for the points mentioned or self-declaration.
17	**Core Compute** HCI & High-Density Compute Strategy: Proof of "Leader's" Gartner standing, 5-year roadmap, and verified datasheets for Dual Intel 8480+ CPUs, 1.5TB DDR5 RAM, and Dual NVIDIA L40S GPUs. Automated DR & Clinical Continuity: Evidence of DR Orchestration licenses for one-click migration, 1:1 hardware parity (Primary to DR), and automated IP/VMSwitch modification runbooks. Healthcare Compliance & Database SLA: Submission of ABDM INF-01/02 and NABH	Bidder must submit the supporting documents for the points mentioned.

	IMS-03 compliance letters, and a signed OEM commitment for 5-Year Critical Database Patching.	
18	**Infrastructure:** Physical Infrastructure & Thermal Compliance: Audit of Modular UPS certifications, Rack-level environmental sensor specs, and ASHRAE Class A2 / Energy Star hardware compliance.	Bidder must submit the supporting documents for the points mentioned.
19	**Networks** : Network Fabric & Storage Optimization: Verification of 100G Spine-Leaf/EVPN architecture and 100G RoCE v2 (RDMA) backend support with ultra-low latency buffers . Govt Peering & External Connectivity: Proof of NKN/GSWAN BGP integration capability, APNIC/IRINN registration plan, and physical route maps for carrier diversity (Railtel/Path B).	Bidder must submit the supporting documents for the points mentioned.
20	**Cyber Security**, Vault & Hardening: Submission of FIPS 140-3 certificates, evidence of Air-gapped WORM/S3-Object Lock hardware, and Standalone physical DC architecture without SAN/NAS links.	Bidder must submit the supporting documents for the points mentioned.

TheBiddershouldhavenecessaryarrangement/agreement/certificationwithGoogle/Apple etc. foruploadingtheMobilitybasedApplicationon therespectivestoresatnoextracost totheAMC- MET.

TheBidder MustSubmittheaboveproofsofpoints12& 13intheabovetablealongwithFormat3 attachedwiththetender.Alltheaboveproofwillhave tobesubmittedinthe beginningoftheresponse document withclearindexation.

5. PURPOSE OFTHISTENDER

ThisRequestforProposal(RFP)isintendedtocaptureAMC's Integrated Hospital Information Systems, Core Compute, Networks IT Infrastructureand Cyber Security relatedrequirements towards scope definition& solution guidelines for selection of right solution, deploy and maintain the hardware,systemssoftwareandapplications requiredtosupporthospital'sbusinessactivitiesand processes.Theobjectiveoftheentireactivityistoselectasetoftechnologicallyprovensolutions andtoselecta partnerforimplementingtheintegratedHealthcareITSolutionwhichwill encompassthefollowinginformation and communications technology hardware and software components

- **1. Health Information System (HIS)**

  The HIS serves as the core functional layer, designed as a modular ecosystem. The overall objective of the project is to bring all health applications on a single platform and to link the health record of patient with his / her unique identity i.e., Aadhaar/ ABHA number. Further the project is aimed to deliver below mentioned objectives: -

  - To design, develop, implement an integrated health application on a micro services - basedarchitecture,development of new functional modules, developAPIintegrationswithstate and national health portals and maintain the HIS application.
  - Facilitate exchange of clinical and administrative (patient level- granular & aggregate) data among health information systems, electronic health records acrossparticipating organizations/hospitals for improving quality of care and evidence-based decision making.
  - Provide patients and healthcare provider's access to the patient-level clinical information from a single application to improve care quality and ensure continuity of care.

- Provide patients and healthcare provider's access to a centralized storage of imaging studies generated at public and private healthcare facilities.
- Providenational,state,districtlevelaggregateinformationonhealthparamet ersreadily available for identifying disease/ conditions requiring immediate attention, crafting timely health systems response and better coordination of public health activities.
- Provideintegration with administrative and operational applications deployed soastoprovideaunifiedworkexperienceforadministratorsandoperational staff.
- Facilitateinsuranceclaims processmanagement acrossmultiple insurance providers through a single application to be undertaken through clinical data exchange and automated billing.

- **Microservices Architecture:** Decomposition of hospital functions into independent services (e.g., Registration, Lab, Pharmacy, Billing). This allows for independent scaling and updates without system-wide downtime.
- **Unified Patient ID Integration:** Deep integration with **ABHA (Ayushman Bharat Health Account)** and Aadhaar to ensure a "Single Version of Truth" for patient identities across the national footprint.
- **Clinical Decision Support System (CDSS):** Built-in logic engines to assist doctors with drug-to-drug interaction alerts, allergy warnings, and evidence-based treatment protocols.
- **Interoperability Standards:** Full compliance with **HL7 FHIR** standards to facilitate the seamless exchange of Electronic Health Records (EHR) between different healthcare providers.
- **Telemedicine & Patient Portal:** Integrated modules for remote consultations and a secure interface for patients to download their reports and manage appointments.

2. Core Compute Infrastructure

The underlying horsepower required to run the HIS micro services and manage massive datasets.

- **Scalable Virtualization:** Use of hypervisors or container platforms (Docker/Kubernetes) to maximize hardware utilization and provide high availability.
- **High-Performance Databases:** * **Relational (SQL):** For structured billing and administrative data.
    - **Non-Relational (NoSQL):** For unstructured clinical notes and diverse telemetry data.
- **Storage Management:** Specialized storage for **PACS (Picture Archiving and Communication System)** to handle heavy DICOM image files (X-rays, MRIs) with rapid retrieval speeds.
- **Redundancy:** N+1 redundancy across all critical hardware components (Power, Cooling, UPS) to ensure 99.99% uptime.

3. Networks

The connectivity framework ensuring data flows securely between the bedside, the lab, and the data center.

- **Software-Defined Networking (SDN):** Allows administrators to manage the network via software, enabling quick reconfiguration for emergency capacity.
- **VLAN Segmentation:** Logically separating hospital traffic (e.g., separating guest Wi-Fi from the surgical department's critical data stream) to prevent congestion and enhance security.
- **Dedicated Leased Lines:** High-speed, point-to-point connections between major regional hospitals and the central data center to minimize latency.
- **Load Balancing:** Distributing incoming HIS traffic across multiple servers to prevent any single point of failure during peak hours.

4. IT Infrastructure

The physical touchpoints and foundational hardware deployed at the facility level.

- **Smart Endpoints:** Deployment of thin clients, specialized medical tablets, and high-resolution diagnostic monitors for radiologists.
- **IoT & Medical Device Integration:** Gateway infrastructure to capture data directly from bedside monitors, ventilators, and infusion pumps into the HIS.
- **Printing & Scanning:** Thermal printers for wristbands/labels and high-speed document scanners for digitizing legacy paper records.
- **Asset Management:** RFID or Barcode-based tracking for high-value medical equipment and pharmaceutical inventory.

5. Cyber Security

The protective shield ensuring patient confidentiality, data privacy, and system integrity.

- **5.1 Architecture & Access Control**
- Zero Trust Architecture (ZTA): The core guiding principle where no user, device, or application is trusted by default, regardless of whether they are inside or outside the hospital network.
- Identity & Access Management (IAM): * Integration with Aadhaar/ABHA for secure patient authentication.
    - Mandatory Multi-Factor Authentication (MFA) for all healthcare staff and administrators.
    - Role-Based Access Control (RBAC) to ensure users only access data necessary for their specific function.

5.2 Data Protection & Privacy

- End-to-End Encryption:
    - At Rest: AES-256 encryption for all stored clinical records, imaging studies, and personal identifiers.

- In Transit: TLS 1.3 protocols for all data moving across the network to prevent "Man-in-the-Middle" attacks.

- Compliance: Strict alignment with national and international regulations, including the Digital Personal Data Protection (DPDP) Act, DISHA, and HIPAA standards.
- Immutable Audit Logging: Comprehensive, tamper-proof logs of every access, modification, or exchange of patient records to ensure full accountability and forensic readiness.

5.3 Threat Management & Response

- Security Operations Center (SOC): A 24/7 monitoring hub utilizing AI-driven Extended Detection and Response (XDR) to identify and neutralize anomalies or unauthorized access in real-time.
- Security Orchestration, Automation, and Response (SOAR): Implementation of automated tools to instantly respond to common threats (e.g., brute-force attacks or suspicious IP activity) without requiring manual intervention.

The fundamental purpose of this initiative is

- AssetThin Deployment& CentralizedArchitectureon aprivatecloud
- Toprovide topclassquality healthcaretothepatientsalignedwithcompliancewithNABH, NABL and JCI standards.
- Empowerment to theusers to work efficiently,and in a timelyfashion,
- to reducemedicationerrors
- Provide high quality care outcomes
- Centralized management controlandlocalized decisionacrossourfacilities
- Availabilityof patientinformationonlineforallthe usersconcurrently
- Informationexchangeacross thegroupofhospitalson acommonformat
- Completeandcorrectness in billingoperations
- EMR coverageforallthehospitalservices
- Online,on demandreports forcompleteOperationalandManagementInformation

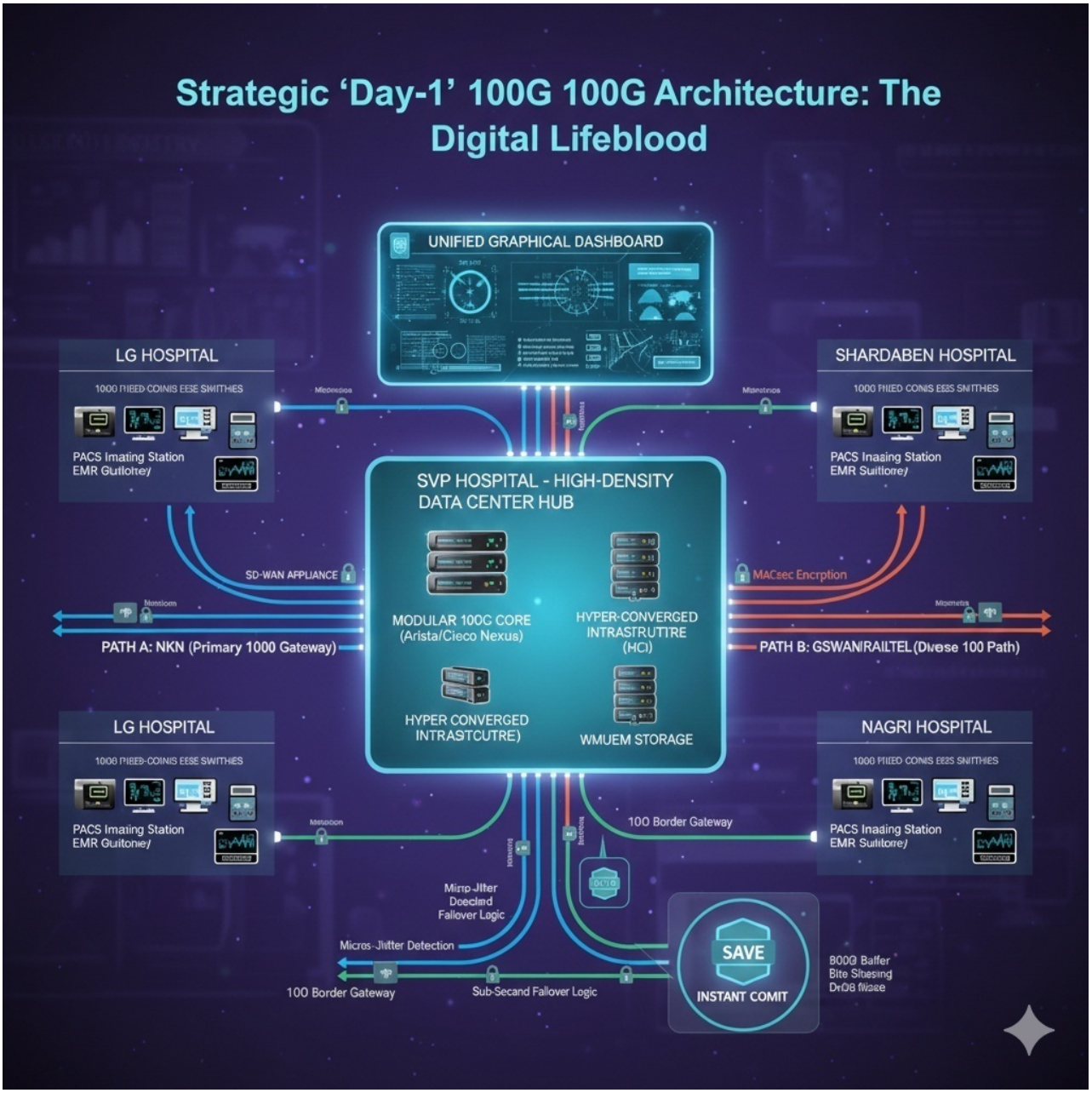
- "Less paper"initiative withdigital hospitalapproach
- Providean enterprisefocus on systems&solutions
- Deliver anintegratedsolutionbased on StateofArt technology aligned withbusinessneeds.
- Bringallthe workflows &operations into thesystemandavoidoverheads.
- Sustain operationalexcellenceandlowertheoverallcost ofoperations.
- Developprocesseswithflexibilitytoindividualdepartment/processneeds
- Adherenceto standards
- Disease,ProcedureandDrugcodestandards
- Centralized MasterData& Real-timeavailability locally.
- Patient monitoringfromanywherebased onaccess rights
- Tosupport aconnected Patient-ProviderEcosystemtodeliverRemote Healthcare services(T- health,M-health,Home care)
- Warehousetheacquired dataforclinical trialandresearch purposes.

6. APPROACH DETAILS

The Digital Lifeblood – A 100G Vision for AMC-MET Healthcare

In the AMC-MET "Digital Lifeblood" vision, the **Hospital Information System (HIS)** is not a software deployment—it is the core clinical operating system of the entire municipal healthcare ecosystem. Every patient interaction, every clinical decision, every diagnostic order, and every statutory report flows through HIS.

Therefore, the HIS architecture is designed not as an IT application but as **mission-critical public health infrastructure**, engineered on a **Day-1 Native 100G fabric** at **SVP Hospital** to guarantee performance, resilience, and equity of care for decades.



1. The Vision: Transforming Public Healthcare through Hyper-Connectivity

The Ahmedabad Municipal Corporation Medical Education Trust (AMC-MET) is embarking on a landmark digital transformation. At the heart of this initiative is a groundbreaking vision: to bridge the gap between world-class technology and affordable healthcare for the common man.

In alignment with the Prime Minister's **Ayushman Bharat Digital Mission (ABDM)** and the **Digital India** program, AMC-MET is building a "**Healthcare Information Highway**." This architecture ensures that a patient at Nagri, LG, ,Shardaben,Dental College, S.B.B. College of Physiotherapy, CHC & UHC Health Centers has the same instant access to specialized AI-driven diagnostics and expert consultations as they would at a global private facility. By leveraging high-capacity 100G pipelines from Day 1, we ensure that life-saving imaging (PACS), real-time Tele-Medicine, and Electronic Health Records (EHR) move at the speed of thought—entirely free of cost to the citizens.

2. Strategic "Day-1" 100G Architecture

Unlike traditional deployments that scale over time, the AMC-MET WAN is engineered as a **Native 100G Fabric from Year 1**. This "Big Bang" implementation ensures the infrastructure is ready for the next decade of medical innovation without requiring mid-cycle hardware replacements.

- **High-Density Hub:SVP Hospital** serves as the central "**Nerve Center**," utilizing 100G QSFP28 interfaces to aggregate clinical data from across the trust (LG, Shardaben, Nagri, Dental College, S.B.B. College of Physiotherapy, CHC & UHC Health Centers) & also support also support AMC CHC / UHC Health Centre's.
- **Carrier-Neutral Redundancy:** Every hospital is a "Fortress of Connectivity." By utilizing **NKN (National Knowledge Network)** as the primary 100G gateway and **GSWAN/Railtel** as the diverse secondary 100G path, we eliminate the risk of isolation.

- **Intelligent Orchestration:** Using **SD-WAN Intelligence**, the network "senses" congestion. If a fiber cut occurs on a city road, the system automatically reroutes critical clinical traffic to the diverse secondary fiber path in under one second.
- **100G Architecture: The HIS/EMR Data Highway**

By deploying 100G from Day 1, AMC-MET eliminates the data bottlenecks that typically plague public healthcare systems.

The Data Flow: From Bedside to Backbone

When a clinician at Shardaben, LG, Nagri , Dental College, S.B.B. College of Physiotherapy, CHC & UHC Health Centersupdates a patient's EMR or triggers an HIS order, the data follows a high-velocity path:

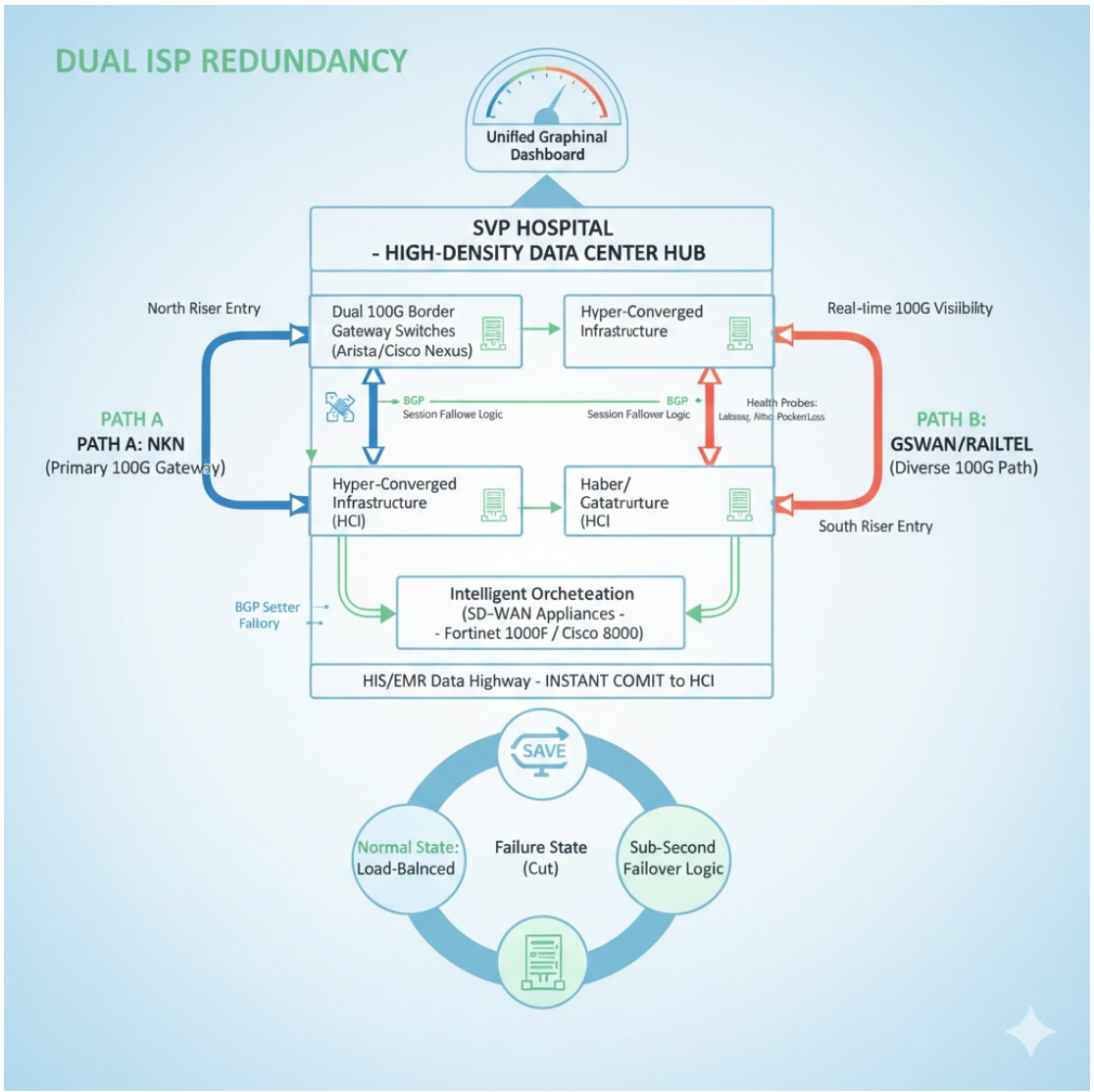
1. **The Clinical Edge:** Data is ingested at the bedside via high-speed VLANs, immediately hitting the **100G Border Gateway**.
2. **SD-WAN Intelligence:** The system evaluates the health of the NKN and GSWAN/Railtel paths, selecting the path with the lowest "Micro-Jitter" for instantaneous database handshakes.
3. **The 100G Transit:** Data traverses the backbone at near-light speed. In a 100G environment, "**serialization delay**" is effectively reduced to zero.
4. **Deep Buffer Processing:** As data arrives at the **SVP Hospital DC Hub**, the switch's **Deep Buffers** handle the bursty nature of the traffic. This ensures critical HIS database packets are never dropped, even during simultaneous 4K PACS image transfers.
5. **HCI Integration:** Data is committed to the **Hyper-Converged Infrastructure (HCI)** in the SVP Data Center. The "Save" button reacts as if the server were located in the same room.

3. Architecture with Dual ISP Redundancy

The proposed architecture features a hub-and-spoke topology with **SVP Hospital as the primary Data Center (DC) hub**. All hospitals connect via 100G links to the providers. For redundancy, each site has dual last-mile connections to two different ISPs, terminating on separate border gateway switches.

Architectural Components of the Dual ISP Design

- **Diverse Entry (Path A & Path B):** Two geographically separate entry points (e.g., North and South risers) ensure a single localized incident cannot take down both 100G links.
- **Dual 100G Border Gateway Switches:** Utilizing Arista/Cisco Nexus class switches cross-connected to both ISPs. If one hardware unit fails, the second immediately takes over BGP sessions.
- **SD-WAN Intelligence (The "Hitless" Handover):** Sitting behind the border switches, the SD-WAN appliance (Fortinet 1000F / Cisco 8500 class) performs continuous health probes.
    - **Normal State:** HIS/EMR traffic is load-balanced across the most stable 100G path.
    - **Failure State:** If the primary NKN fiber is cut, traffic shifts to the secondary path in sub-second time, keeping OT or OPD sessions active.



4. Primary Data Flow: The 100G Clinical Highway

Normal traffic flows from spokes to the SVP DC hub over primary paths. To complement the architecture, the operational mechanics focus on high-speed data mobility and the "Gold Standard" of data protection: **Immutability**.

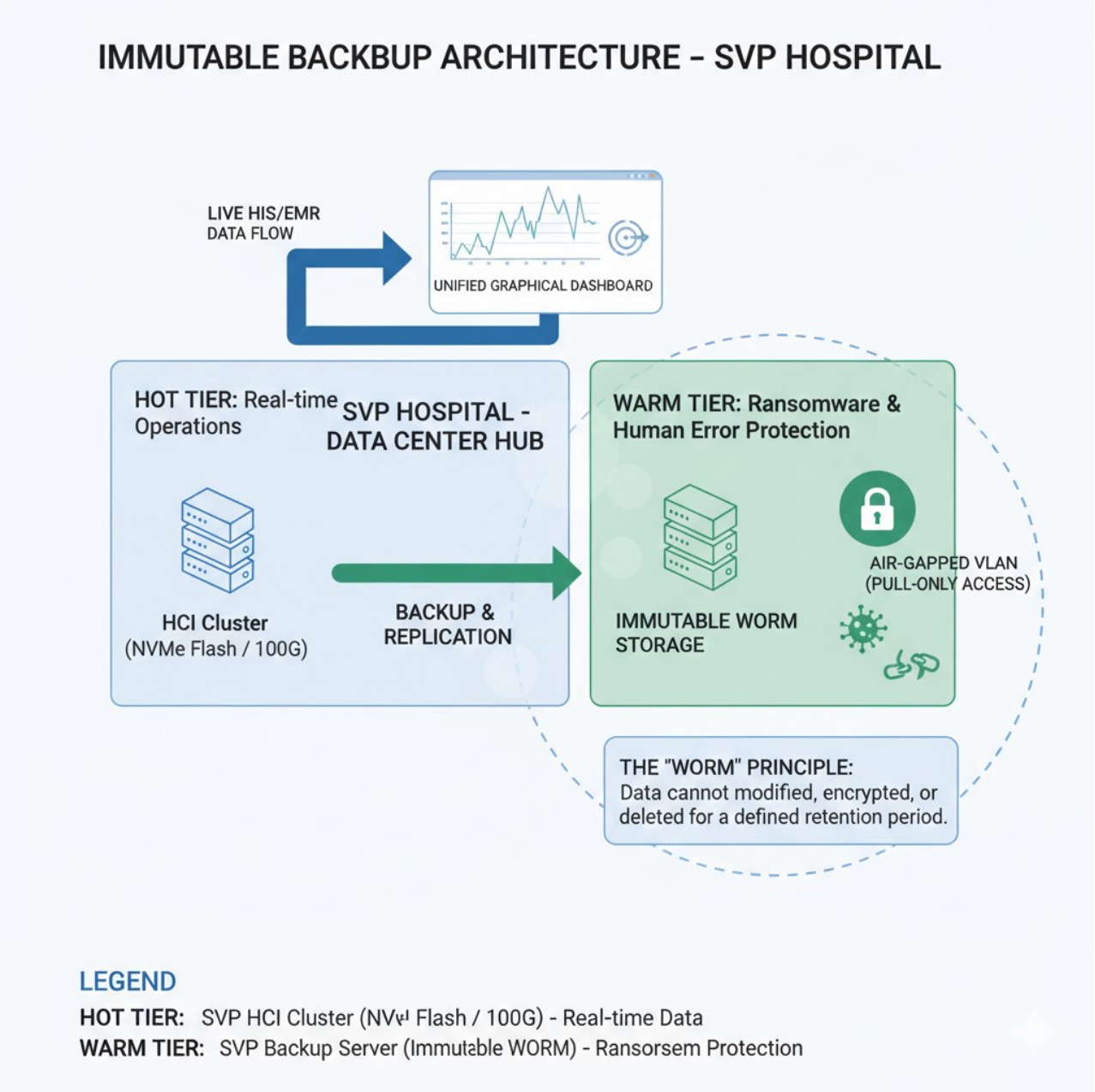
- **Ingress & Processing:** High-resolution 3D MRIs or patient records captured at spokes are transmitted via the 100G SD-WAN Edge.
- **Path Selection:** Optimal 100G path selection based on real-time latency.
- **DC Landing:** Data arrives at the **SVP Hospital DC Hub** and is ingested by the HCI. Full-volume database synchronizations occur in real-time, ensuring the **Unified Graphical Dashboard** reflects operations with sub-second accuracy.

5. Immutable Backup at SVP Hospital (On-Premise)

To combat the rising threat of ransomware in healthcare, the **SVP Hospital Data Center**Implements**Immutable Storage** for all HIS and EMR data.

- **The "WORM" Principle:** Data is written using **Write-Once-Read-Many (WORM)** technology. Once a backup is committed to the immutable tier, it cannot be modified, encrypted, or deleted by any user—including those with administrative privileges—for the defined retention period.
- **Air-Gapped Logic:** The immutable backup sits on a separate, hardened VLAN with strictly controlled "pull-only" access, ensuring that even if the primary production environment is compromised, the "**Golden Image**" of the hospital's data remains pristine and recoverable.

Tier	Location	Technology	Purpose
Hot	SVP HCI Cluster	NVMe Flash / 100G	Real-time Operations & Dashboards
Warm	SVP Backup Server	Immutable WORM	Ransomware & Human Error Protection



6. The Command Center: Unified Graphical Intelligence

The pinnacle of this 100G vision is the **Unified Clinical Operations Dashboard** at SVP Hospital. By interconnecting all facilities at 100G, AMC-MET aggregates real-time data into a single "**Single Source of Truth**."

A New Era of Administrative Precision

Administrators gain a "**God's Eye View**" of the city's medical services in real-time:**Live Patient Load:** Heat maps across SVP, LG, Shardaben, NagriDental College, S.B.B. College of Physiotherapy, CHC & UHC Health Centres showing real-time registrations and emergency admissions.

- **Surgical Efficiency:** Live tracking of OT utilization and post-op bed availability.
- **Resource Orchestration:** Instant visibility into pharmacy stock and blood bank reserves, allowing proactive movement of supplies.
- **Clinical Outcomes:** Real-time ABDM compliance metrics and EMR completion rates.

Technical Synergy: Traditional 1G/10G links suffer from "Data Lag." In our **Native 100G Fabric**, the latency is so low that the dashboard is a live reflection of the hospital floor, enabling **Predictive Governance**.

7. QoS Class Mapping: Prioritizing Life over Logic

The system implements a **Platinum-Tier Quality of Service (QoS)** engine to ensure medical data always takes the "Express Lane."

Traffic Class	Applications	DSCP Marking	Priority	Design Logic
Critical Clinical	HIS, EMR, Real-time Vitals	EF / CS5	**Platinum**	Guaranteed zero-drop; 100G Line-Rate access.
Medical Imaging	PACS (DICOM), AI-Diagnostics	AF41	**Gold**	Jumbo Frame support for rapid image transfer.
Voice & Video	Tele-Medicine, Remote ICU	EF	**Gold**	Ultra-low jitter/latency (<5ms).
Administrative	ERP, Email, HRMS	AF21	**Silver**	Secure, isolated bandwidth for operations.
Public Services	Guest Wi-Fi, Patient Portals	BE	**Bronze**	Dynamic throttling to protect clinical traffic.

8. Native 100G Deployment

To protect the government's investment, all facilities start with 100G-ready hardware and transceivers, removing "Pay-as-you-grow" complexity in favor of "**Available-on-Demand**."

Hospital Facility	Bandwidth	Infrastructure Standard	Capability
SVP Hospital (DC)	**100 Gbps**	**Modular DC-Core**	Core Aggregation & AI-HCI Ready
LG Hospital	100 Gbps	Fixed-Config 100G Edge	Large-Scale PACS & EMR Handling
Shardaben Hospital	100 Gbps	Fixed-Config 100G Edge	Large-Scale PACS & EMR Handling
Nagri Hospital	100 Gbps	Fixed-Config 100G Edge	Specialized High-Res Imaging

Hardware Specification Standards:

- **Performance:** Minimum **3.2 Tbps** switching capacity (e.g., Arista 7060X or Cisco Nexus 9336C).
- **Buffering:Deep Packet Buffers (minimum 32MB)** are mandatory to prevent drops during bursty PACS transfers.
- **Encryption:** Support for **MACsec (802.1AE)** for hardware-level encryption between sites.

9. Monitoring, SLA & Digital Governance

The SI shall deploy a Centralized Command Center at **SVP Hospital**:

- **Real-time 100G Visibility:** Uptime health of NKN and GSWAN/Railtel links.
- **Proactive Resilience:** Automated alerts for jitter/packet loss.
- **ABDM Integration:** Full audit trails of data uptime for National Health Authority mandates.
- **Analytics:** NetFlow / IPFIX for traffic analytics and SIEM integration.

To maintain this high-performance vision, the SI shall deploy a **Centralized Command Center** at SVP Hospital:

- **Real-time 100G Visibility:** Dashboards showing the health of NKN, GSWAN, and Railtel links across all sites.

- **Proactive Resilience:** Automated alerts for jitter or packet loss before they impact the clinical staff.
- **ABDM Integration:** Full audit trails of data uptime to comply with National Health Authority mandates for Digital Health.
- Centralized NMS and WAN monitoring from SVP Hospital DC
- SLA tracking for latency, jitter, packet loss
- NetFlow / IPFIX for traffic analytics
- Quarterly capacity and performance review
- Integration with SIEM for security visibility

While the core vision of this RFP is a **Native 100G Day-1 Deployment** to prevent technical debt, this section outlines the strategic **Operational Phasing** for service expansion. This ensures that while the "pipes" are 100G from the start, the hospital's digital services (AI, Tele-health, and Research) are onboarded in a controlled, high-stability manner.

Section 9: Phased Growth & Service Onboarding

The AMC-MET 100G WAN is built as a **"Living Infrastructure."** The hardware capability is delivered at maximum capacity in Year 1, but the utilization of this massive bandwidth will follow a three-stage strategic roadmap. This prevents "operational shock" and allows the medical staff to adapt to high-velocity digital workflows.

9.1 Phase I: The "Stability" Foundation (Months 1–6)

The primary goal is the seamless transition of core life-safety systems to the new 100G fabric.

- **HIS & EMR Migration:** Transition of all database traffic from legacy links to the 100G NKN/GSWAN fabric.
- **Zero-Lag PACS:** Implementation of 100G "Line-Rate" imaging, allowing radiologists to pull massive DICOM studies in under 2 seconds.
- **Security Baseline:** Deployment of the Section H Security stack and activation of **Immutable Backups** at the SVP Hospital hub.

9.2 Phase II: The "Intelligence" Layer (Months 7–18)

Once the foundation is stable, the network will begin utilizing the 100G capacity for advanced clinical intelligence.

- **AI-Assisted Diagnostics:** Real-time streaming of imaging data to AI servers for automated preliminary reporting (e.g., rapid detection of brain hemorrhages or chest anomalies).
- **Unified Dashboard Maturity:** Integration of non-clinical data (Pharmacy, HRMS, and Power/Utility monitoring) into the Graphical Command Center.

9.3 Phase III: The "Innovation & Research" Horizon (Year 2+)

The final phase leverages the 100G scale to position AMC-MET as a national leader in medical research.

- **Genomic Sequencing Data:** Capability to move and process massive genomic datasets over the NKN 100G backbone for personalized medicine.
- **Robotic & Remote Surgery Trials:** Testing of low-latency surgical robotics and AR/VR-assisted medical training, made possible by the sub-5ms latency of the 100G WAN.
- **Expansion to Satellite Clinics:** Onboarding of smaller dispensaries and community health centers into the 100G hub via 10G/25G "Leaf" connections.

9.4 Growth Capability Matrix

Feature	Day-1 Commissioning	Year-5 Capability	Scaling Logic
Backbone Speed	**100 Gbps**	100 Gbps (Native)	No hardware change required.
Data Residency	**Local HCI Cluster**	**Hybrid Cloud (S3)**	**Automated Tiering as data grows.**
Security Throughput	**Initial Traffic Load**	Full Deep-Packet Inspection	License-based scaling on existing NGFW.
Node Capacity	**3 Hospitals**	Up to 32 Facilities	Modular 100G port availability on DC Core.

9.5 Investment Protection Guarantee

By implementing a **"Capability-First"** rather than a **"Capacity-First"** model, AMC-MET ensures that:

1. **No Forklift Upgrades:** All chassis, fiber, and transceivers provided by the SI in Year 1 are utilized through Year 5 and beyond.
2. **Stable OPEX:** ISP port charges are optimized from Day 1, with the SI providing 5-year maintenance on the 100G hardware at zero additional cost.
3. **Flagship Status:** The network remains "State-of-the-Art" throughout its lifecycle, easily accommodating future government mandates.

7. USAGERELATEDINPUTS

HospitalName	NumberofBeds	NumberofFootfall Per day
LG Hospital	1550	3000
Shardaben Hospital(New)	1040	2500
Nagri Hospital	120	500
Total Nos.	**2710**	**6000**

8. APPLICATION&PLATFORMREQUIREMENTS

8.1Application development platformrequirements

- Developed applicationshouldbereliable, scalable, robustand readily deployablewithminimumcustomizationincompliancewithallsecurity features.
- Thesolutionshould be designedwithredundancy inmindtoensurenoimpact by failureofoneormore components/serversorsoftware.
- Wireframe(Design, lookandfeel) of theapplicationdeveloped/tobedevelopedfortheAMC HOSPITALSwillbe approvedby theAMC-MET.

8.2Supportrequirementsfor enhancementsand troubleshooting

- Thevendorwillprovidesupportfortroubleshootingandenhancementsintheservicesduringthe contract period.Enhancementwouldinclude inclusionofall newbrowser/handset/devices/mobile platformOScomingin themarketwithin12 monthsoftheirlaunch andnewmarket/industry relatedfunctionalities.
- Allrequiredsupport&servicesforimplementation,smoothoperationandmaintenanceofallthe componentsof thePlatformdeveloped/tobedevelopedwillbepart of theProject.
- Thevendorwillhavetoincludeversionupgradeandenhancementsinservicesonaccountofindustry dynamicsasapart oftheAnnualMaintenance.Any developmentwork ofsuch typewillbecarriedout by thetechnicalteamof vendorat noextracost.
- Trainingatvariouslevels,fromadministrativetoenduserlevel,mustbeprovidedbythebidderatno extracostas perAMC-MET’s requirementatanytime during thecourseofimplementation&support periodof1+4years.
- Allchangerequestsbeingsenttoyouposttheapprovalfromthe AMC-MET /ARCHIMEDES OFFICEof withinthefirst6monthsofthephasedGo-live planshall bedeliveredby thevendoratno additionalcost.

8.3Hardware, Software, Manpower &Support

- ThebiddershouldprovidedetailsoftheHardware,Softwareplatformandmanpowerrequiredfor deployingtheproposedsolution.
- The bidderhas toensurethatallinterface/licenserequiredconnecting toalltheoperatingsystemswill beprovidedby thevendorin thenameof AMC-MET.

8.4Integration Requirements

Thebiddermustintegratewithbelowproposedapplicationsaspartofitsoverallsolution/product deploymentstrategy.The biddercantie upwiththirdpartiesorcanhave thebelowapplicationsaspart ofits ownproduct

- Third party RIS-PACS
- Drug Database
- Queue Management System
- International codes for disease, procedure and other structured protocol management Ex.: ICD-
- 10, SNOMED-CT, CIMS
- Communication channel (E.g. SMS, e-mail, WhatsApp Business etc…)
- Third party appointment systems
- PMJAY
- Ayushman Bharath Digital Mission

8.5SecurityAspects

- TheapplicationshouldconfirmtothesecurityrequirementsoftheNationalIntegratedHealthMission, MinistryofHealth,GovernmentofIndiaandprovidesuchregulatoryrequirementsat noadditional cost toAMC-MET duringthewarranty andO&Mperiod.
- The Vendor will have to ensure continual security of the product. Any developmentactivityfor incorporatingsecuritymeasureswill bea partof thecontractandshould beincludedwithoutanycost implication totheAMC-MET.
- Atanystageoftenderprocess/implementationstage,ifitisfoundthatbidderhasenteredwrong details/fakeinformation forgettingextramarksorextra benefitinTechnicalpart,then theAMC-MET reservestherighttoforfeit/invoketheEMD/BankGuaranteesubmittedbythebidderandterminate the contract.

9. INSTRUCTIONTO BIDDERS

9.1Approved BanktoAMC-MET

LIST OFBANKSFORTENDERFEE, EARNESTMONEYDEPOSIT (E.M.D.), SECURITYDEPOSITAND PERFORMANCEGUARANTEE.

Tender Fee mustbeinformofDemandDraftonlyof followingbanks only

EarnestMoney Deposit/SecurityDeposit/Performance guarantee shallbeinformofDemand DraftorBankGuaranteeonlyof followingbanksonly.

(1) **AllNationalizedBanks**includingthePublic-SectorBank-IDBI Ltd.

(2) **PrivateSectorBanks**authorized by RBI to undertakeStateGovernment
AXIS Bank /ICICI Bank /HDFC Bank

(3) **CommercialBanks** - Kotak MahindraBank /YesBank /IndusInd Bank/RatnakarBank/Karur Vysya Bank/ DCB Bank /INGVysya Bank

(4) **Co-Operative and RuralBanksof Gujarat-** TheKalupur Commercial Co-OperativeBank Ltd/ RajkotNagrik SahakariBank Ltd/ The Ahmedabad Mercantile Co-OperativeBank Ltd/The MehsanaUrbanCo-OperativeBank Ltd/Nutan Nagrik SahakariBank Ltd.

CONDITIONS – In caseof bank guarantee,it shouldbefrombranchat Ahmedabad oftheabove mentionedbanks orit should beextendableorencashablefromtheAhmedabadbranch.

9.2COST OFBIDDING

TheBiddershall bearall thecostsassociatedwiththe preparationandsubmissionofits bidandAMC- MET, willinnocaseberesponsibleorliableforthesecosts,regardlessoftheconductoroutcomeof thebidding process.

9.3BIDDING DOCUMENT

TheBidderisexpectedtoexamineallinstructions, forms, terms andconditionsand technical specificationsintheBiddingDocuments.Failuretofurnishallinformationinadetailedwayasrequired intheBidding Documentsorsubmissionofa bid notsubstantiallyresponsiveto theBiddingDocuments ineveryrespectwill beat theBidders' riskandmayresultintherejectionofits bidwithoutany further referencetothebidder.Biddershouldstrictlysubmitthebidaspertender failingwhichbidwillbe rejectedasnon-responsive.

9.3.1 Site Visit

Before attending the pre-bid meeting, the bidder shall mandatorily visit all hospital & CHC & UHC Health centers locations covered under the scope of work to understand the site conditions, building readiness, operational workflows, and IT infrastructure requirements. If there is existing IT infrastructure, Hospital Information System (HIS), or core compute environment currently in place, the site visit shall be undertaken to study the proposed clinical and administrative operations, with special emphasis on patient flow across OPD, IPD, Emergency, Diagnostics, Laboratory, Radiology, Pharmacy, Billing, Discharge, and other ancillary services.

During the site visit, the bidder shall assess departmental layouts, patient movement patterns, registration and billing touchpoints, clinical workflow requirements, data capture points, queue management needs, and system integration requirements for effective HIS design and implementation. In addition, the bidder shall evaluate IT infrastructure requirements including data center and server room space, racks, servers, storage, virtualization platforms, network architecture (LAN/WAN/Wi-Fi), bandwidth requirements, cybersecurity components, power supply, UPS, precision cooling, earthing, structured cabling pathways, and other related civil and MEP interfaces.

All costs, expenses, and risks associated with the site visit, including travel, accommodation, logistics, manpower, and incidental expenses, shall be borne entirely by the bidder. The Client shall not provide any reimbursement or compensation for the site visit.

9.3.2 Shop Drawing

The drawings shall be prepared strictly based on actual site conditions, finalized patient flow, and approved operational workflows, applicable national and international standards, and prevailing best industry practices. The bidder shall ensure full coordination with hospital architectural, civil, electrical, HVAC, fire safety team and other relevant MEP services of hospital while preparing all shop drawings and layout drawings.

All shop drawings and layout drawings shall be submitted within the timelines defined in the approved project schedule and shall be executed only after obtaining written approval from the AMC-MET.

9.4AUTHENTICATIONOFERASURES /OVERWRITING ETC.

Anyinter-lineation,erasures,oroverwritingshallbevalidonlyiftheperson(s)signingthebidinitial(s)them.

9.5AMENDMENT OF BIDDING DOCUMENTS

Atany time prior to the lastDate andTime forsubmissionof bids, theAMC-METmay, foranyreason, modify theBiddingDocuments throughamendmentsisat thesole discretionoftheAMC-MET.All amendmentsshall beuploadedontheAMC-MET'swebsitehttps://tender.nprocure.com/andwillbe bindingonallwhoareinterested in bidding.

Inorder toprovideprospectiveBiddersareasonabletimetotakeamendmentsifany,intoaccountin preparingtheirbid,theAMC-METmay,atitsdiscretion,extend thedeadlineforsubmissionof bids.

9.6CONTACTING THE AMC-MET

Anyeffort bya bidder toinfluence theAMC-METinevaluation ofthe bid,bidcomparison orcontract awarddecisionmayresultintherejectionoftheBidders'bid.Purchaser'sdecisionwillbe finaland withoutprejudiceand will bebindingonallparties.

9.7AMC-MET'S RIGHT TO ACCEPT OR REJECT ANYBIDORALLBIDS

Thepurchaserreserves theright toaccept orrejectanybid andannulthebiddingprocessorevenreject allbidsatany timeprior toawardofcontract,withoutthereby incurring any liability to the affected bidder or bidders orwithoutanyobligationtoinformtheaffectedbidderorbiddersaboutthe grounds fortheAMC-MET'saction. TheAMC-METreservestherighttoacceptorrejectany technology/solutionproposed bythebidder.TheAMC-METreservesthe right toselectmorethanone bidderkeepinginview ofitslargerequirements.

9.8MODIFICATIONANDWITHDRAWAL

Bidsoncesubmittedwillbetreated,asfinaland nofurthercorrespondencewillbeentertainedonthis. Nobidwillbeallowedtobemodifiedafterthesubmissionofbid.Nobiddershallbeallowedto withdrawthebid,ifbidder happenstobesuccessfulbidder.

9.9REVELATIONOFPRICES

Thepricesinanyformorbyanyreasonsshouldnotbedisclosedinthetechnicalorotherpartsofthe bid except in thecommercial bid.Failuretodosowillmake thebidliable to berejected.

9.10TERMS ANDCONDITIONS OFTHEBIDDING FIRMS

The bidding firmsare notallowed toimpose theirown terms andconditions to the bidandifsubmitted will not be consideredasformingpart oftheirbids.

Bidderhastostrictly comply with thetermsand conditionsmentioned intheTender.

9.11LOCAL CONDITIONS

Thebiddermustacquaint himselfwith thelocalconditions and factors, whichmayhaveanyeffecton theperformanceof thecontractand/orthe cost.

9.12CLARIFICATIONS OFBIDS

Toassistintheexamination,evaluationandcomparisonofbids theAMC-METmay,atits discretion,ask thebidderforclarification. Theresponseshouldbeinwritingandnochangeinthepriceorsubstanceof thebidshall besought, offered orpermitted.

9.12.1 PRE-BID MEETING

- A prospective bidderrequiringany clarification of the bidding documentsmay notify theAMC-MET in writingor by Mail at the AMC-MET addressindicatedin the invitation for Bid. TheAMC-MET will respond toany request forclarification, which hereceives prior to holdingof Pre-Bid Meeting.
- The purposeof the meetingshall be to clarify issuesand to answer questions on anymatter that may have beenraised by the prospectivebiddersinwritingandreceived by theAMC-MET office.
- Any modification of thebid document,whichmay becomenecessary asaresult of thebid queries, will bemadebytheAMC-MET exclusivelythroughtheissueofanAddendum pursuant torelevant clause.
- Any queriesduringthepre-bidorpost thepre-bidmeeting(prior totechnical bidopening) should besent to dydiramcmet@gmail.com.Thepre-bid meetingisscheduled**on02/04/2026 at 3.00 PM.**
- Itisnon-mandatory forall bidderstoattendpre-bidmeeting.After24 hoursof pre-bidmeeting, querieswillnot beentertained.
- Thebiddermaynominateonlymaximumof tworepresentativestoattendthepre-bid meetingon theirbehalf.

9.13BIDEARNEST MONEY

Bidder hasto submit the BidEarnest Money ofRs.4000000 (FortyLakhOnly)shouldbe submittedin theformof DemandDraftorBankGuarantee(BG)favoringAMC-MET,Ahmedabadandfillingallthe detailsasperFormat8.TheBGshouldbesubmittedatthetime ofbidsubmission.Incaseof unsuccessful bidder, EMDwillbereturnedoncompletionoftender processandnointerestwillbe payable on EMD amount.TheEMDwillbereturnedtothesuccessfulbidderuponsubmission ofPerformanceBankGuarantee.ThevalidityoftheBankGuaranteesubmittedaspartofBidEarnest

Moneyshould beat least180 daysfrom thedateof submission of thebid.

9.14DEADLINE FORSUBMISSIONOFBIDS

Bidsmustbesubmitted notlaterthan thespecifieddateandtimementionedintheBidDocument.If specifieddateofsubmissionofbids being declaredaholidayfortheAMC-MET,the bids willbereceived up to the specifiedtimein the nextworking day.TheAMC-METmay, atitsdiscretion,extendthis deadlineforsubmissionofbidsbyamendingthe biddocumentsinwhichcaseallrightsandobligations oftheAMC-METandbidders, previouslysubjectto the deadline,will thereafter besubjecttothe deadlineextended.

9.15PERIODOF VALIDITYOFBIDS

Bidshallremainvalidfor180daysfromlastdateofsubmissionofbidprescribedbyAMC-MET.

Abid validforshorterperiodisliabletoberejectedbyAMC-MET.Thebiddersmayberequiredtogive consent fortheextensionof the periodofvalidityofthe bid,ifso desired byAMC-METinwriting or by fax.RefusalofsuchconsentwouldnotforfeittheBidSecurity andgrantingofrequestwill notallowthe biddertorevise/ modifyhis bid.

9.16LATE BIDS

Any bidreceived by theAMC-METafter thedeadlineforsubmissionof bid will berejected.

9.17BIDCURRENCY

ThePricesinthebiddocumentshallbeexpressedin IndianRupees(INR)only.

9.18LANGUAGE OFBID

Thebidspreparedbythebidderandallcorrespondenceanddocumentrelatingtothebidsexchanged by thebidderandAMC-MET,shallbewritteninEnglish.

Thebiddocumentsshallbesignedoneachpagebytheauthorizedrepresentativeofthebidderand authoritylettershould beattachedalongwiththe bid.

9.19BIDDING PROCESS (TWO STAGES)

Forthepurposeofthepresentjob,atwo-stagebiddingprocesswillbefollowed.Theresponsetothe present tender will besubmitted in twopartseachin separateenvelopeclearly marked:

9.19.1 TechnicalBid(PART1)

ThebidderswillhavetosubmitonlytheEMDandTenderfeescannedcopyaspartofthetechnicalbid inonlineformthroughAMC-METe-procurementsystem.Theothersupporting documents(including vendorresponse&originalEMD andTenderFee)will havetobesubmittedinphysicalform.

TECHNICAL BID (Envelope I)

The first partof the technical bidshould bea separateenvelopecontainingtheEMDand

Tender fee originalsasperthe format anddetailsprovidedearlierinthedocument.

TECHNICAL BID(Envelope II)

The bidderwillhave tosubmitthetechnicalsupporting documentsinsealedenvelopes,duly superscribing'Proposal**forproviding Integrated Hospital Information Systems, Core Compute, Networks, IT Infrastructureand Cyber SecurityforAMC-MET, Ahmedabad.'**Technical supportingdocumentswillalsocontainall the documents(including Annexure)as perShortTenderNotice.All thepagesofthetenderincludingannexureshouldbe duly signed andsealed.

- TheTechnicalresponseforalltheinfrastructurerequirementsshallalsobewithis responseandnotaseparateone.
- Apartfrom theHISsystem,QMS,PACS-RIS,thevendorhas toprocureandsupplyICD-10, CIMS,SnomedCTetc andhencehehastobidfortheseinthetech-commercial bidding process

TechnicalSupporting Documentsshouldnotcontainany pricingorcommercialinformationatall. Technicalsupportingdocumentswithany commercialinformation will berejected.

Inthefirststage,onlythefirstenvelopecontainingtheEMDandtenderfeewillbeopened.Only those bidders who have submitted the required documents/instruments as perthe specification will be eligibletoparticipatein thetechnical bidevaluationstage.

Ifenvelopedoes notcontainabovetheEMDand tenderfee,theoffershallnot beconsideredvalidand shallstandrejectedandotherenvelopesshallnotbeopenedandshall besent backto theaddress mentionedinthebidenvelope.

AMC-METmaywaiveathis discretionanyminorinformalityor non-conformity orirregularity in aBid, whichdoesnotconstituteamaterial deviation, providesuchwaiver, doesnot prejudiceoraffectthe relativerankingofanyBidder.ItmaybenotedthattheAMC-

METreservestherighttotakefinal decision about responsivenessof thebidderanddecision cannot bechallenged bythebidder.

TheBidder,whoseTechnicalBidsarereceivedin the secondenvelopeshallbe furthershortlistedafter undertakingdetailedexerciseof evaluationasgiveninthebelow sections.

Attheendoftechnicalevaluationandthe Bidsshall beclassified astechnicallyresponsiveand technically non-responsive.Technicallyresponsivebidsmay ormaynotbepre-qualified,aswilldepend onthemarksscoredbythe bidder.A Biddermaybequalified/rejectedfor thesolutions/services offered.

Asubstantiallyresponsivebidisonewhichconformstoalltheterms,conditionsandrequirement sof the biddingdocuments,without material deviationorreservationandincludes the amendments and changes,ifany, requestedbytheAMC-METduring theevaluation of thebidder'stechnicalproposal.

The bidshallcontainnointerlineations, erasuresoroverwritingexceptasnecessary tocorrecterrors madeby theBidder,inwhichcasesuchcorrectionsshallbedulyconfirmedundersignature/initialsof theperson(s) signingthebid.

9.19.2 COMMERCIAL BID (PartII)

Underthesecondstage, theCOMMERCIALBIDofonly thosebidders,whosetechnical bids are responsive,will be opened. Commercial bidsshouldbesubmittedinonline formonlythrough e- procurementsystem.

9.20SUBMISSIONOFBIDS

Biddersarerequired tostrictlysubmit their bidsinelectronicformusingthee-procurementsystemat https://tender.nprocure.com/oftheAMC-METbyusingtheirdigitalcertificatesofauthorizedsignatory.

Alltheinterestedbiddersshouldregisterthemselvesin the eprocurementsystem https://tender.nprocure.com/forsubmitting the bidsonline,if they havenotdoneearlier. Bidsreceived after closingof the bidin the e-procurementsystem are summarilyrejectedwithoutanyreason. The commercial bidshould besubmittedonlineonly.

Allthetechnicalsupportingdocumentsshouldbesubmittedmanuallybeforethefinaldate&timeof bidsubmissionat the followingaddress:

AdministrativeOffice,
AMC Medical Education and Trust
GF, Smt. NHL Municipal Medical College
SVP Hospital Campus, Ellisbridge Ahmedabad 380006, Gujarat

9.21OPENING OFBIDS

Allthe bidswillbeopenedat the date, timeandlocationsmentionedinRFP(as per tenderschedule). Thereisnoneedforanybidderrepresentativetoattend thetechnicalopeningof bids.

The biddersnames,modifications,bidwithdrawalandthepresence orabsenceofrequisiteBid Securityandsuchotherdetails,asAMC-METattheirdiscretion,may considerappropriatewillbe emailed to thebiddersafter thebidopening,if necessary.

9.22EVALUATIONANDAWARD CRITERIA

After opening of the technical bids, all the documents and annexure (except commercial documents/offer) will be evaluated first by the AMC-MET. First, received bids will be evaluated based on the eligibility criteria. Technical bids of only those bidders satisfying the eligibility criteria will be evaluated. Bidders are expected to produce the documentary evidence expected in a separate section in order to easily quantify and check for the eligibility criteria.

Only those bidders satisfying the technical requirements and accepting the terms and conditions of this document shall be short-listed for further steps. AMC-MET may also visit and inspect the onsite / development centers and other installation of the bidders.

AMC-MET will determine to their satisfaction whether the bidder selected as having submitted the best evaluated responsive bid is qualified to satisfactorily perform the contract.

- AMC-MET will select the highest scoring bidder by giving 70% weightage on the technical methodology/Technical Score and 30% weightage to the Financial Scoreas per clause 12 & Page no 63.
- Comparison of Financial Score shall be done by the formula as under;

Financial Scoring of the Bidder (FS) = LB (Price Bid Amount of Technically Qualified Bidder with Lowest Bid) / (Price Bid Amount of the Bidder) * 100

The lowest Price Bid of technically qualified bidder with highest technical score will receive the maximum score of 100 marks; however, it will be given weightage of 30 %.

Example 1:-

Bidder 1 Technical Score = 75 (As per the QCBS System), Total Maximum Cost = Rs. 995 (Price Bid)

Bidder 2 Technical Score = 82, (As per the QCBS System), Total Maximum Cost = Rs. 1005 (Price Bid)

Bidder 3 Technical Score = 79, (As per the QCBS System), Total Maximum Cost = Rs. 970 (Price Bid)

So the Lowest bided technically qualified vender is “Bidder 3”

The FS of the "Bidder 1" will be = 970/995*100 = 97.49

The FS of the "Bidder 2" will be = 970/1005*100 = 96.52

The FS of the "Bidder 3" will be = 970/970*100 = 100.00

The bidder score will calculate like;

Bidder 1 (70% of 'Technical Score' + 30% of 'Financial Score') = (75*70% + 97.49*30%) = 81.75

Bidder 2 (70% of 'Technical Score' + 30% of 'Financial Score') = (82*70% + 96.52*30%) = 86.36

Bidder 3 (70% of 'Technical Score' + 30% of 'Financial Score') = (79*70% + 100*30%) = 85.30

Based on this exercise, the highest scoring bidder will be selected and the committee will further negotiate and finalize the price for contract.

However, because of clarifications obtained on their technical data, if AMC - MET desires to modify any of the stipulation/condition, he will write to all the bidders with a request to submit their price tags for such changes in a separate sealed envelope; which shall be opened and evaluated along with their original financial statements.

9.22.1 TECHNICAL BID SCORING SHEET

TECHNICAL BID SCORING SHEET				
ID	**Criteria Description**	**Marking System (Objective & Descriptive Quantifiers)**	**Min Score**	**Max Score**
1	**Avg. Annual Turnover**	**Qualifier:** CA Audit Certificate for last 3 FY. **Disqualified:** Turnover < 37.5 Crore. **Score 12:** 37.5–50 Crore. **Score 13:** 50–62.5 Crore. **Score 14:**>62.5-75 Crore. **Score 14:**>Above 75 Crore.	12	15
2.1	**Hospital Experience & Healthcare Expertise**	**Qualifier:** HIS Implementation Experience in Government / Corporate Hospitals either in Single or Multiple Hospitals Network + Healthcare Expertise. **Disqualified:**< 3 implementations (>=500 beds) **Score 7:** 3 to 5 implementations (>=500 beds) + 100% Positive Client Quality Affirmation. **Score 8:** 6 to 8 implementations (>=500 beds) + 100% Positive Client Quality Affirmation. **Score 10:**> 8 implementation& one implementation with 3 Cr. (>=500 beds) + 100% Prior Client Affirmation confirming zero-downtime & successful ABDM integration.	7	10

2.2	**Experience in large Hospital**	**Qualifier:** Performance Merit Certs from Medical Superintendent (MS), Dean of Hospital or Competent Authority. **Score 3:** If one hospital> 1000 Beds + Valid Completion Certs. **Score 4:** If one hospital> 1500 Beds + Valid Completion Certs. **Score 5:** If one hospital> 2000 Beds + Valid Completion Certs.	3	5
2.3	**Integrating HIS with Government websites / application**	**Qualifier** Integrating Hospital Information System (HIS) with Government websites / application **Score 3:** 1–2 Projects + Valid Completion Certs. **Score 5:** 3+ Projects + Prior Client Affirmation	3	5
2.4	**Global Certifications & Standards**	**Qualifier:**Certified copies of ISO 9001, 27001,22301/CMMi/Tier-III/HIMSS 6 or Higher **Score 3**: Minimum 3 ISO Certs from listed requirement. **Score 5:** Full set (ISO 22301, Tier-III design, CMMi Level 5) +HIMSS 6 or Higher + International Quality Excellence Awards.	3	5
3.1	**HIS Architecture & TRS Coverage**	**Qualifier:** TRS Functional "Yes" + Microservices Cert. **Disqualified:** TRS < 90% or Monolithic Architecture. **Score 12:** TRS 90-95% + Microservices/API/SSL + Basic Demo. **Score 15:** TRS 96-100% + Native AI Diagnostics + Verified Auto-scaling logs + Successful Live Tech Demo.	12	15
3.2	**Health Standards & Interoperability**	**Qualifier:** ABDM (Ayushman Bharat Digital mission)/EHR Sandbox Integration Certificate. **Score 4:** Basic ABDM 2019 Milestone 1 & 2. **Score 5:** Full ABDM Milestone 3 + EHR 2016 + HL7 FHIR/DICOM Cert + Proven boundaryless data flow certs from 2+ sites.	4	5
3.3	**Compliance & Global Quality**	**Qualifier:** NABH Digital Standards Compliance Audit Report. **Score 4:** Basic NHA/ABDM standard compliance. **Score 5:** Full NABH & JCI Digital Health alignment + 100% TRS Match + Quality Implementation Feedback from 3+ Global References.	4	5
4.1	**HCI Compute Strategy**	**Qualifier:** BOQ Match % + Gartner Standing Cert. **Disqualified:** BOQ Hardware Match < 60% or TRS < 90%. **Score 4:** 100% BOQ Match (Intel 8480+/1.5TB RAM/L40S GPU). **Score 5:** Exceeds BOQ Specs by > 25% + 100% TRS Coverage + Verified Performance Merit Certs from OEM. **(Verification of HCI-Based Compute Solution, 5-Year Product Roadmap, and Technical Datasheets Supporting Enterprise-Grade Compute Capacity)**	4	5

4.2	**SDDC Automation & Clinical Continuity**	**Qualifier:**Must possess an enterprise-grade Backup Orchestration license and provide a formal Restoration Drill Certificate verifying successful data recovery within the last six months.. **Disqualified:**Automatic rejection for any reliance on manual restoration processes or a Technical Readiness Score (TRS) falling below the 90% threshold. **Score,Criteria** **Score 1:** Basic backup schedules in place; manual restoration required; inconsistent RPO/RTO tracking. **Score 3:** 100% Bill of Quantities (BOQ) Match: Backup infrastructure matches production capacity. Automated restoration workflows with a Technical Readiness Score (TRS) of 100%. **Score 5:** RPO-0 (Continuous Data Protection): Proven near-zero data loss. Zero-Touch Restoration: Fully automated recovery testing. Evidence: Documented non-disruptive Restore Drill Certs from 2+ prior clients showing 100% success rate.	3	5
4.3	**Facility Infrastructure & PUE**	**Qualifier:** Tier-III Design Cert + Green DC Award. **Disqualified:** Non-Modular UPS or Non-LSZH Cabling. **Score 3:** 100% BOQ Match + Modular UPS N+1. **Score 5:** Concurrent Maintainability (Tier-III) + PUE < 1.4 + Lithium-Ion Energy Storage + Quality feedback certs from Facility Managers. **(Audit Compliance for Modular UPS, Concurrent Maintainability, Structured Cabling, and Secure Rack Infrastructure)**	3	5
4.4	**Spine-Leaf Fabric & Network QoS**	**Qualifier:** 100G RoCE v2 Support Cert + OEM QoS Cert. **Disqualified:** No 100G/RoCE Support or TRS < 90%. **Score 3:** 100% BOQ Match + EVPN-VXLAN Architecture. **Score 5:** Port Latency < 1.5µs + 100% TRS Coverage + Zero-Packet Loss documentation during peak load PACS imaging tests. **(Evidence of Scalable Network Architecture Supporting High Throughput and Low Latency for Critical Applications)**	3	5
4.5	**CyberSecurity, Vault & Hardening**	**Qualifier:** FIPS 140-3 L3 Cert + WORM Hardware Cert. **Disqualified:** No Air-Gap Vault or No FIPS 140-3 Compliance. **Score 3:** 100% BOQ Match + SSL Decryption. **Score 5:** AI-NDR Integration + Physically Air-Gapped Cyber Vault + 100% TRS + Zero-Breach Certification from previous 3 deployments. **(Evidence of Encryption Compliance, Secure Backup/Immutability Mechanism, and Perimeter Security Controls)**	3	5

4.6	**SD-WAN & Path Diversity**	**Qualifier:** ASIC-Hardware SD-WAN Cert + Path A/B Cert. **Disqualified:** Soft-SDWAN (Non-ASIC) or Single Path. **Score 3:** 100% BOQ Match + ASIC SD-WAN Hardware. **Score 5:** Hitless Failover (< 10ms) + Dual Physical Route Diversity certificates from different Connectivity Partners. **(Evidence of SD-WAN Solution with Failover Capability and Physical Path Diversity for WAN Connectivity)**	3	5
4.7	**Govt Peering & 5-Yr SLA Reliability**	**Qualifier:** BGP AS3461 Peering Cert + 5-Yr SnS MAF. **Disqualified:** No BGP Peering capability or No 5-Yr OEM SnS. **Score 3:** BGP + 5-Year SnS MAF. **Score 5:** 99.999% SLA Uptime + 100% TRS Coverage + 5 years of verified incident logs + Quality Merit Certs from Govt. Health Depts. **(ABDM INF-01/02 Compliance and Signed OEM Commitment for 5-Year Critical Database Patching)**	3	5
	TOTAL BID SCORE		**70**	**100**

Evaluator Guidance

1. **Mandatory Compliance:** Bidders must score at least **70% in each individual section** to be considered technically qualified.
2. **Product Demonstration:** Bidders may be asked to perform a Proof of Concept (PoC) to verify the,
    - ✓ 100G RDMA line speed
    - ✓ N+2 failover capabilities
    - ✓ Project completion certificate / letter from the customers
    - ✓ Certifications copy
3. **All-Inclusive Rates:** Any bid that lists "hidden costs" or fails to provide the "Blended Rate" as defined in the global instructions will be penalized or disqualified.
4. **Part Code Verification:** The evaluator must cross-reference the provided BoQ Part Codes with the PCIe Gen5 and RoCE v2 requirements to ensure no legacy hardware is being proposed.

9.23COMMERCIALBIDS

Thecommercial bidsfor only thosebidderswillbeopenedwho havequalifiedonthebasisoftechnical evaluationandreviewedto determinewhetherthecommercial bids aresubstantiallyresponsive. Commercialbids thatarenotsubstantiallyresponsiveareliable tobedisqualifiedatAMC-MET's discretion.

Toassistintheexamination,evaluationandcomparisonofprice proposals,theAMC-METmay,atits discretion,askanybidderforclarificationoftheirbidsincludingbreak-upofprices/rates.Therequest forclarificationand theresponseshallbeinwritingorby cable,but nochangeinthepriceorsubstance ofthe bidshallbesought,offeredorpermittedexceptasrequired toconfirm thecorrectionof arithmetic errors discoveredby theAMC-METintheevaluationofthebidsinaccordancewithrelevant clause.

Subject tothisclause,nobiddershallcontacttheAMC-METonany matterrelating toits bidfromthe timeofopeningofpriceproposals tothetimethecontractisawarded. Ifthebidderwishesto bring additionalinformationtothenoticeof theAMC-MET,itshoulddosoin writing.

AnyeffortbythebiddertoinfluencetheAMC-METinitsevaluationofpriceproposals,bidcomparison orcontractaward decisions may resultin therejection of thebidder's bid.

9.24COMPARISONOF PRICE PROPOSALS

- TheAMC-METwillevaluateand compareonly the bids determinedtobesubstantiallyresponsivein accordancewithrelevantclause.
- Ifadiscount hasbeenoffered inany PriceProposal,suchdiscount will beappliedpro-rataagainst eachitem, theAMC-METreservestheright toreject,at itssolediscretion,any orallevaluated Price Proposalsandif necessary, willcall forsubmission of new PriceProposals. Inordertoallow comparisononacommonbasis,eachPriceProposalwill be carefully scrutinizedinaccordancewith therelevant clauses.
- TheAMC-METreserves theright toaccept orrejectany variationordeviationandotherfactors, whichareinexcessof therequirements of thebiddingdocumentsorotherwiseresultintheaccrual of unsolicited benefitstotheAMC-MET,maynot betakenintoaccount in bid evaluation.
- Theestimated effectof thepriceadjustmentprovisions of the ConditionsofParticularApplication, appliedovertheperiodofexecutionof the Contract,shallnot betaken intoaccount in bid evaluation.
- Ifthebid of thesuccessful bidderissubstantiallybelow theAMC-MET estimatefor thecontract,the AMC-METmayrequire thebiddertoproducedetailedpriceanalysistodemonstrate theinternal consistencyof thoseprices.

9.25NOTIFICATIONOF AWARD

- Priortotheexpiryoftheperiodofbidvalidity,theAMC-METshallnotifythesuccessfulbidderin writingby registeredletter,(hereinaftercalled“LetterofIntent”)orby faxtobeconfirmedby the originalletter byregisteredmailbytheAMC-MET.Thisletter(hereinafterandintheconditions of contractcalled“LetterofIntent”)shall namethesumwhichtheAMC-METwillpay theSelected bidderinconsideration ofexecutionandcompletionoftheworksby theselected bidder as prescribedby thecontract.
- TheWork Order/letterofintent reachingtheselected biddershallconcludethecontractandtime of performanceandshallstartrunningfrom thedateof issueof Work Order.
- Theselectedbiddershallstartimplementingtheproductwithin2days(orwithinthespecified numberof days) aftertheissuingof theletterof intent bytheAMC-MET tothesuccessfulbidder.

9.26SIGNING OF CONTRACT

- Atthetimeofnotificationofaward,theAMC-METshallsendtothesuccessfulbidder,theContract Agreement provided in these Bidding Documents, incorporating all agreements between the parties.
- WithinThirty(30)days of receiptoftheContractAgreement,thesuccessful biddershallsignanddate theContractAgreementandreturnittotheAMC-MET.Extensionofthetimecontainedinthis clauseshall beatthesolediscretionoftheAMC-MET.Failure onthe partofBidder to sign the contractagreementwithinthe prescribed timeshallempower theAMC-METto cancel the Letter of Acceptance and takeappropriate actionagainst thecontractincluding forfeiture of the‘EMD”and securitydepositandblack listingof the bidder.
- Thepersontosignthe ContractAgreementshallbethepersonasdescribedinrelevantclause.
- ItshallbeincumbentuponthesuccessfulbiddertopaystampdutyontheContractandallother legalchargesfor preparationoftheContractAgreement,asrulingonthedateofexecutionofthe ContractasspecifiedintheConditionsof Contract.

9.27SECURITYDEPOSIT

Theselectedbiddershalldeposit5%oftheagreedcontractpriceintheformofbankguaranteefrom anyBankmentionedinthesection9.1(infavor ofAMC-MET,Ahmedabad)asperinitialsectionatthe timeofissuanceLOI/WOasasecuritydepositwithin3days.TheSecurityDepositshallbevalidupto 180daysaftercompletionoftheworkandwhichcanbe releasedaftersuccessfulandsatisfactory completion of thework.

9.28AMC-MET USE OFBIDDER’S DOCUMENTS

TheBidder’s Documents andother DesignDocuments made by(oron behalfof) thecontractcanbe used,copiedorcommunicatedtoathirdparty by(oronbehalfof)theAMC-METforpurposes noother thanthosepermitted underthissub-clause.

9.29MANAGEMENT MEETINGS

EithertheAMC-METRepresentativeortheBidder'sRepresentativemayrequiretheothertoattend a managementmeeting.Thebusiness ofeachmanagementmeetingshall be toreviewtheanticipated arrangementforworkandtoresolveanymattersraisedinaccordancewiththisSub-Clause.The AMC-METRepresentativeshallrecordthebusinessofmanagementmeetingsandprovidecopiesofthis record tothoseattendingthemeeting and totheAMC-MET.Theresponsibility ofthe partiesforany actionstobe takenshallbeincludedinsuchrecordandshall,ifnotagreedinaccordancewith the Contract,be decided bytheAMC-METRepresentative.

TheBidder'sRepresentativeshall notifytheAMC-METRepresentativeattheearliestopportunityof specific likelyfutureevents orcircumstances,whichmayadversely affect the work.

9.30UNFORESEEABLE DIFFICULTIES

PreliminarydatageneratedbytheAMC-METis available for theguidanceofthebidder.However, the AMC-MET does not take anyresponsibilityofits correctness.The biddershall carryoutindependent additionalinvestigationsandsurveys tocollect the datarequired toexecute.

9.31 SETTLEMENT OFDISPUTES

9.31.1 Any disputeor differencearisingbetween thepartiesunderthisContract,astotheirrespective rightsorobligationsin terms hereof or connectedherewithorincidental heretoorastothe interpretation of anyof thetermshereof,shallunlessitisamicably settled, besettled by arbitrationinaccordance withtheprovisionsof ArbitrationandConciliationAct,1996as amended fromtimetotime.Thevenueof theArbitrationshall beAhmedabad.TheArbitration shallbe bythesolearbitratorandin theevent, partiesareunabletoagreeon appointment of the solearbitrator,eachparty shallappoint onearbitratorand thetwoarbitrators shallappointthird arbitrator.

9.31.2 Incasethetwoarbitratorsarenotabletoagreeonthethirdarbitrator,thesameshallbe appointedasper. theIndianArbitrationand Conciliation Act 1996asamended from timetotime.

9.31.3 The decisionofany twoofthethreearbitrators shallbefinalandbinding.The partiesagreethat thedecisionandanyawardrendered by thearbitratorsinconnectionwitha Disputeshallbe final andbindingon theParties.

9.31.4 Thearbitrationexpensesshallbeborneaspertheawardofarbitrationifsameare giveninthe awardof arbitrationelsesameshallbeborneby thelosingparty.

9.32ADDRESSING COMPLAINTS

Persons/agencies/firm/anylegalentity,ONLYwhohas participatedinthebidprocessthroughonline submissionandtenderfee,may complaininwritingafter opening of technical bids and beforeopening ofpricebidsonly. Anytypeofcomplaint received afteropeningof pricebidwill betreatedasa pressure techniqueon theauthorityand fraudulent practice,whichattracts debarmentfor5years or blacklisting (whichalsoincludesstraightawayfilingofcomplaintwithoutanyinvestigation).Ifcomplaintisnot made

A) Inwrittenwith properaddressand details

B)Byany other entitywhohas participatedinthe bidprocess

Thecomplaintwillbestraight away filed/discardedwithoutany investigationandexplanation.

9.33FORCE MAJEURE

9.33.1 Force Majeureishereindefined asany cause whichisbeyond thecontrolofAMC-METor SELECTEDBIDDER, asthe casemaybe,which theycould not foreseeorwithareasonableamount of diligence couldnot have foreseen andwhichsubstantially affectsthe performanceof the Contract,suchas:

- Natural phenomena, including but not limited to floods, droughts, earthquakes and epidemics;
- ActsofanyGovernment,domesticorforeign,includingbutnotlimitedtowar,declaredor undeclared,priorities,quarantines,andembargoes.

9.33.2 Providedeitherparty shallwithinfifteen(15)days from theoccurrenceofsuchacausenotifythe otherin writingofsuchcauses.

9.33.3SELECTEDBIDDER orAMC-METshallnotbeliablefordelaysin performingtheirrespective obligationsresultingfromany ForceMajeurecauseasreferred to/ definedabove.

9.34COMPLETIONOFTHE CONTRACT

Onthe dateofContractCompletionoriftheContractis terminated,all theproductinstallations, worksandequipment placedunderthe Bidder'sresponsibilityshallbehandedoverto theAMC-MET,atnocost,ingoodworkingorder. TheAMC-METmayperformanyinspections,testsor expertappraisalsheshallconsidernecessarywithaview tocheckingthattheproductisworking accordingtothespecifications.

9.35Specialized Work Agency (Sub-Contractor)

The project shall be delivered exclusively by the **Primary Bidder**, who maintains sole accountability for the end-to-end execution of the scope of work. While the Primary Bidder may engage specialized work agency to fulfill specific service requirements, the Primary Bidder remains the single point of contact. The financial proposal submitted by the Primary Bidder must be all inclusive, incorporating the costs of all products and services provided by any engaged specialized work agency.

9.36Ownership of Material

All documents/ information / materials submitted in response to this RFP shall become the propertyofAMC-MET.

10.Format1: Bid Form

(To besubmitted on letterheadof the Bidder)

To Dated,2026. Ref:**ProposalforIntegrated**

Hospital informationsystems, Core Compute, IT Infrastructure and Cyber Security againsttender

No……dueforopeningon .

DearSir,

HavingexaminedthetenderdocumentofIntegrated Hospital informationsystems, Core Compute, IT Infrastructure and Cyber Securityasdetailedinthe tender document, Terms &Conditions and scope of procurement, Specifications etc., and having understoodtheprovisionsandrequirementsrelatingtotheprocurementandallotherfactorsgoverning the tender, Weherebysubmitouroffer for thetenderdocumentinaccordancewithtermsandconditions andconfirm ouracceptancetoexecute theorder within the time periodspecifiedin the tenderdocument, attheratesquoted byusin theaccompanyingfinancialBid.

Weaccept theRFP documentandifwefail tocompletethedelivery aspertheorder,weagreethat, AhmedabadMunicipalCorporation–MedicalEducationTrust(AMC-MET)shallhavefullauthority toforfeit theearnest money/PerformanceSecurity andcancelourorder withnoobligationontheirpart.

Weconfirm having depositedearnestmoney ofINR……../-inoriginalasoffline.We havesuccessfully executedordersofsimilarnatureandwehavesufficientexperienceandfinancialstrengthinhandling ordersof thisvalue.

Wehavesufficientqualifiedmanpowerandnecessarymaterialsandaftersalessupporttoexecutethe orderefficiently inthespecified timeschedule.

Thequotedratesshall bevalid for180days fromthelastdateof submissionof thebid.

Wefurtherconfirm thatallcontents ofthe tenderdocumenthave beenread, understoodandsignedand thereisnodeviation/discrepancy.

Signatureof theBidder

Withstamp anddate

11.Format2: Bidder'sProfile

(TobesubmittedonletterheadoftheBidder)

TECHNICALPROPOSALSUBMISSIONFORM

Section1:Organizational Details/Personaldetails		**Ref.Page**
1.1 Nameof theFirm/ Organization/Individual		
1.2Addressof theHeadOffice		
1.3Addressof theProjectOffices		
1.4Telephone,Fax andEmail details		
1.5Nameand Designation of theAuthorized Representativeofthe tenderer towhomall the referencesshallbemade		
1.6Address,phone,fax andemailof theAuthorized Representative		
Section 2:Subject Area		
2.1AreaofExpertise:		
Section 3:RegistrationDetails		
3.1Registrationno.anddate:		
3.2PAN/TANcardnumber details		
3.3GSTregistrationNo.		

3.4Anyotherregistration		
Section 4: Experience &Profile		
4.1Summaryofsimilarprojectsexecutedsuccessfullyinthepastyears;focusingon brief descriptions ofassignmentsandexperienceinsimilar conditions.		
(i)Projecttitle		
(ii)Sourceof funding		
(iii) Implementingpartners(ifany)		
(iv) Projectduration		
(v) Project budget		
(vi) Project brief		
4.2ExperienceinintegratedHospitalInformation Systemproductimplementation		
Section 5: Earnestmoney deposit(BidSecurity)andvalidity		
5.1Validityof Offer(notlessthan180days)		
5.2 Detailsof Earnest moneydeposit/BG		
(i)Amountof DD/BG		
(ii)DD/BGnumber		

(iii) Issue Date		
(iv) Nameof theIssuingBank		
(v) NameoftheIssuingBranch		

Signature oftheBidder withStampandDate

12.FORMAT 3:DECLARATION REGARDINGCLEANTRACK

(TobesubmittedonletterheadoftheBidder)

To Dated --------,2026

AMC-MET,

Ref: “Selection of Service provider for Integrated Hospital informationsystems, Core Compute, IT Infrastructure and Cyber Security” against tender No
...../Dated dueforopening on_____

DearSir,

I havecarefullygone throughtheTerms& Conditions contained in theRFPDocument. I hereby declared that my companyhasnot beendebarred/blacklisted.
OR
I hereby declared that my companyhasbeendebarred/blacklistedby…….
forthe period of…….yearsstarting from date…….

Inaccordancewith theabovewewouldlike to declarethat:

1. Wearenotinvolvedinanylitigationthatmayhaveanimpactofaffectingorcompromisingthe delivery ofservicesasrequiredunderthisassignment.
2. Theinformationprovidedinthetenderdocumentistrueandnofalserepresentationhasbeen made.

Yoursfaithfully,

(Signatureof the Bidder)

Printed Name

Designation
Date:

BusinessAddress:

Place:
Date: Bidder’s signaturewithseal.

FORMAT 4: PROJECT EXPERIENCE

(Tobesubmittedonletterheadofcustomerseparatelyforeverysimilarkindofproject)

Sl. No.	Item	Details
	GeneralInformation	
1	CustomerName/GovernmentDepartment	
2	NameoftheContactPersonandContact detailsincludingemail-id.	
	BriefDescriptionofscopeofProject	
3	ContractValueoftheproject(inLacs)	
4	Totalcostoftheservicesprovided(bythe Bidder)	
	ProjectDetails	
5	Nameoftheproject	
6	StartDate/EndDate	
7	DateofGo-Live/ Commencement	
8	Current Status (work in progress, completed,ongoingsupport)	
9	ContractTenure	

SignatureofCustomer:

NameofCustomer:

SealofCustomer:

13.FORMAT 5:PERFORMA FORAGREEMENT(DRAFT VERSIONONLY)

(TobeexecutedonStamppaperasperlegalrequirement)

THISAGREEMENTmadeonthe dayof 2026betweenAMC-MET, Ahmedabad,GujaratofonepartandM/s_____ _____ having itsregisteredofficeat_____ _____ [hereinaftercalled"Serviceprovider(SP)"]of theotherpart.

WHEREASAMC-MET has desired forSelectionofServiceProvider forIntegrated Hospital informationsystems, Core Compute, IT Infrastructure and Cyber SecurityaspertheScopeofwork&specificationsgivenin theRFPdocument,referredbelow,and has accepted a Tender by the SP (Wide LOI/WO no ---------- - dated ---------) for the sum of
(Contract Pricein Words and Figures) (hereinafter called "the Contract Price").

WhereastheSPhasacceptedtheofferofAMC-METWideLetterno-----dated-----inresponsetothe LOI/WO no----- dated -----issued byAMC-MET.

NOW THIS AGREEMENTWITHNESSETHASFOLLOWS:

1. InthisAgreementwordsandexpressions shall havesamemeanings as arerespectively assignedto themin theConditions ofTenderreferred to.

2. Thefollowing documents shallbedeemedtoformandbedeemedto form andberead and construed as part of thisAgreement,

   a. Request forProposal(RFP), i.e. Tender No.:..... b.

   AllCorrigendumreleasedtotheaboveRFP

   c. Bidproposalsubmitted by M/s <<_>

3. Inconsideration of thePaymentstobemade by AMC-METtotheSPashereinaftermentioned,the SP hereby covenants withAMC-MET toprovide thegoods andservicesandtoremedydefects therein inconformityin allrespects withtheprovisions oftheRFPdocument.

4. AMC-METhereby covenantstopaytheServiceProviderinconsiderationof theprovisionsof the goods andservicesand theremedyingofdefectstherein theContractPriceorsuchothersumas may becomepayableundertheprovisionsof the Contractat thetimesandin themanner prescribed in RFP document.

5. Thefollowingterms&conditionsshallapplyinadditiontotheterms&conditionsgivenintheRFP document and shall override the conditions given in the RFP document No.

Signedandsealedthis dayof _,20_at_.(Signature)

Fullname,designationandofficialaddress withstamp

(Signature)

Fullname,designationandofficialaddress withstamp

WITNESSNO. 1
Fullname,designationandofficialaddress with stamp

WITNESSNO. 2
Fullname,designation
andofficialaddresswithstamp

14.FORMAT 6:COMMERCIALBID LETTER

(TobesubmittedonletterheadoftheBidder)

Nameof theBidder:

To Dated ----------,2026

Subject:SubmissionofCommercialBidagainsttenderNo…….datedforIntegrated Hospital informationsystems, Core Compute, IT Infrastructure and Cyber SecurityforAMC-MET hospital,Ahmedabad.

DearSir,

HavingexaminedtheRFPdocument, thereceiptofwhichis herebydulyacknowledged, we,the undersigned, offer to implement, as a Service Provider for integrated Hospital information systemapplicationinAMC-MET hospitalpremises,Ahmedabad forAMC-MET.

TomeetsuchrequirementsandtoprovideservicesassetoutintheRFPdocument,weherewithsubmit ourcommercialproposalfor thesumof[Amount in wordsand figures],summarizingourcommercial proposalasperFormat7: DetailedCommercials

Ourfinancialproposalshall be binding upon ussubjectto themodificationsresulting fromcontract negotiations,uptoexpiration of thevalidity periodof theproposal.

Weunderstandthatyouarenot boundtoaccept any proposalyoureceive. Terms: -

1. ThePricesmentionedinFormat 7areinclusiveof alltaxesincludingGST.
2. Priceshallbevalid foraperiodof180 days fromthedateofsubmissionofbid.
3. TheGSTandotherduties &Taxes, ifany, will not becharged separatelytotheAMC-MET.
4. The financial bid is liable to be rejected in absence of Format 7: Detailed Commercials. Place:Bidder’s

signature withsealDate:

15.FORMAT 7:DETAILED COMMERCIAL BID FORMAT

To,

Secretary,AMC-MET,Ahmedabad,

Subject:Price bidfor theRFPforIntegrated Hospital informationsystems, Core Compute, IT Infrastructure and Cyber SecurityforAMC-MET hospital,Ahmedabad.

Sir/Madam,asunder-

Withreferencetotenderdocumentforimplementationofour product,wesubmitour commercial bid

FORMATFORCOMMERCIALBID-

The bidder shall use the following format for the submission of the Commercial Bid. All rates must be **all-inclusive** (covering hardware, software, installation, and comprehensive maintenance/support for the specified period) as per the General Instructions.

Project Name:Integrated Hospital information systems, Core Compute, IT Infrastructure and Cyber Security for AMC-MET hospital, Ahmedabad.
Hospital: AMC-MET

#	Description	Quantity	UoM	Unit Price	Total Price (Sub-Total)	Appl. Tax (GST %)	Grand Total
A	**Software Product Licenses (Incl. 1 Year Support)**						
1	Hospital Information System (HIS)	1	Lot				
2	PACS - RIS, Imaging Solution	1	Lot				
3	Drug Database Subscription	1	Lot				
4	ICD-10 Database	1	Lot				
5	Snomed CT Database or equivalent	1	Lot				
	Sub Total (A)						
B	**AMC/CMC for Product Licenses (Years 2 to 5)**						
1	HIS Maintenance (Post 12 Months Go-Live)	4	Years				
2	PACS - RIS Maintenance	4	Years				
3	Drug Database Updates (Periodic/6-monthly)	4	Years				

4	ICD-10 Database Maintenance	4	Years				
5	Snomed CT Database Maintenance	4	Years				
	Sub Total (B)						
C	**Implementation & Integration Charges**						
1	HIS Deployment & Customization	1	Lot				
2	PACS - RIS Imaging Implementation	1	Lot				
3	Drug Database Integration	1	Lot				
4	Lab Modality Integration (Specify Qty)	1	Lot				
5	Kiosks & Other Equipment Integration	1	Lot				
	Sub Total (C)						
D	**External Application Integration Charges**						
1	Financial Accounting Integration	1	Lot				
2	HRMS Integration	1	Lot				
3	Token Numbering System Integration	1	Lot				
4	CRM Integration	1	Lot				
5	Payment Gateway(s) Integration	1	Lot				
6	Insurance Portal (ABDM-linked) Integration	1	Lot				
7	Legacy Application Integration (AMC-MET Existing)	1	Lot				
	Sub Total (D)						
	Sub Total (A Through D) - (1)						
E	**Core Compute (DC & DR)**						
1	High-Perf HCI Nodes (8 Primary)	8	Nos				
2	Specialized Nodes (GPU AI / PDC / Mgmt)	4	Nos				
3	SDDC & Windows Datacenter Licensing	1	Lot				
4	Immutable Cyber Vault (1.1PB WORM)	1	Lot				
5	DB Cluster (HIS/ERP) & Backup SW	1	Lot				
	Sub Total (E)						
F	**IT Infra (Passive & Facility)**						
1	45U Smart Rack Integrated Micro Data Center	2	Lot				
2	Cabling (Copper/Fiber/Trays) & Tools	1	Lot				
	Sub Total (F)						
G	**Networks (Active Components)**						
1	100G Core, Spine & Leaf Fabric	10	Nos				
2	Access/Floor Switches & OOB Mgmt.	44	Nos				
3	Transceivers (100G/25G/10G) & Trunking	1	Lot				
4	SD-WAN, NAC & Visual NMS	1	Lot				
	Sub Total (G)						
H	**Cybersecurity Solution Suite**						
1	100G Hyperscale NGFW (DC & DR)	2	Nos				
2	Border Switching & SSL Decryption	1	Lot				
3	Sec Ops (SIEM/SOAR/Vulnerability)	1	Lot				

	Sub Total (H)						
I	**WAN Edge (SD-WAN & Routing)**						
1	100G SD-WAN Appliance & Licenses	1	Lot				
2	Signal Normalization & Riser Fiber	1	Lot				
	Sub Total (I)						
J	**Connectivity Links (5-Year Cost)**						
1	GSWAN & Railtel 100G High-Availability	1	Lot				
2	IP Resource & APNIC Memberships	1	Lot				
	Sub Total (J)						
	Sub Total (E through J) - (2)						
	Grand Total (1 and 2)						

The Grand Total shall be calculated, and the final financial score shall be derived based on the QCBS (Quality and Cost Based Selection) methodology, as per Clause No. 9.22& Page no 43.

Commercial Submission Instructions:

1. **Blended Unit Rates:** Each line-item price must include delivery, installation, commissioning, and warranty support for 5 years.
2. **Zero-Cost Items:** If an item is bundled within another cost, the bidder must mark it as "Included."
3. **Taxes:** All taxes must be listed clearly. In the event of a discrepancy, the base rate will be used for evaluation, and the current statutory tax rates will apply.
4. **Validity:** The commercial quote must remain valid for **180 days** from the date of technical bid opening.

Scope Expansion and Discretionary Rights

"The **AMC Medical Education Trust (AMC-MET)** reserves the absolute right to expand the scope of the project at any time during the contract period as it deems necessary. Any such expansion, including the provision of additional services or infrastructure, shall be subject to **additional costing** as determined at the sole discretion of AMC-MET. The final commercial and operational framework for the expanded scope will be finalized based on **mutually agreed terms** between the AMC-MET and the Primary Bidder."

Total ConsolidatedCostinwords:_____

Note:

1. Pricesshouldbeinclusiveallduties,Taxesetc.,includingGST.Thispricewillremainvalidfor180 days.AMC METwillconsideranychangesintax bycentral/state government after bidsubmission date.

2. Thecommercialbid mustbesubmittedonlineon https://tender.nprocure.com/,If thecommercial bid issubmittedinphysical format then bidwillbeconsideredasdisqualified forwhichEMD willbe forfeited.

DECLARATION

I /Weagree to keep thisoffervalid for180(OneEighty) daysfrom thedateof submission of thebid. We shallalsobeagreeable toextend thevalidityof thebid,ifsodesiredbytheAMC-MET.

I /Weagree andundertake toabide byallthe termsand conditionsof thebid document.In witness thereof,I/Wesubmit this Bidunderandinaccordancewiththe termsof thebiddocument.

I /Weagree tomakedeductions of TDSasperrules fromthepayments.

Yoursfaithfully,

Date: (Signatureof theAuthorized Signatory)

Place: (NameanddesignationoftheAuthorizedSignatory)

NameandsealofBidder/LeadFirm

[PROPOSALS MUST BEINSEALED SEPARATEINNER ENVELOPEMARKEDFINANCIAL PROPOSAL]

16.FORMAT 8:PERFORMANCE BANKGUARANTEE

<Location/Date>

<Name><Designation><Address><PhoneNo.s><Fax No.s><emailid>

Whereas,<<name of the supplier and address>>(hereinafter called "theBidder") hasundertaken, in pursuanceofcontract no.<<insertcontract no.>>dated.<<insert date>>to provideservicesasService providerforIntegrated Hospital Information Systems,Core Compute & IT InfrastructureatAMC-MET,AhmedabadforAMC-MET,(hereinafter called"thebeneficiary")

Andwhereas ithas beenstipulatedbyinthesaidcontractthat theBiddershall furnishyouwithaBank guarantee byarecognizedBankfor thesumspecifiedthereinassecurity forcompliancewithitsobligations inaccordancewiththe contract;

Andwhereaswe,<<nameoftheBank>>aBankingcompanyincorporatedand havingitshead/ registered officeat<<address oftheregisteredoffice>>andhavingoneof itsofficeat<<addressofthelocaloffice>>haveagreed togivethesuppliersucha Bank guarantee.

Now,therefore,weherebyaffirmthatweareguarantorsandresponsible toyou, onbehalfofthesupplier, uptoatotal ofRs.<<insertvalue>>(Rupees<<insertvalue inwords>>only)andweundertaketo payyou, uponyourfirstwrittendemanddeclaringthesuppliertobeindefault underthecontractandwithoutcavil orargument,anysumorsumswithinthelimits ofRs.<<insertvalue>>(Rupees <<insertvalueinwords>> only)asaforesaid,withoutyourneeding to proveor toshowgrounds orreasons foryour demandof the sumspecified therein.

Wehereby waivethe necessityofyourdemandingthesaiddebitfromtheBidderbefore presentinguswith thedemand.

Wefurtheragreethatnochange oradditionto orother modificationof the termsofthecontractto be performedthereunder orofanyofthecontractdocumentswhichmay bemadebetweenyouandthe Biddershallinany way release usfromany liability underthisguarantee andwehereby waivenoticeofany suchchange,additionormodification.

ThisGuaranteeshallbevaliduntil<<Insert date>>. Notwithstandinganythingcontained herein:

I.Ourliability underthisBankguaranteeshallnotexceedRs<<insertvalue>>(Rupees<<insertvaluein words>>only)

II. ThisBank guaranteeshallbevalidupto<<insertexpirydate>>

III.Itisconditionofourliabilityforpaymentoftheguaranteedamountoranypartthereofarisingunder this Bank guarantee that we receive a valid written claim or demand for payment under this Bank guaranteeonor before<<insertexpiry date>>failingwhichourliabilityundertheguaranteewill automatically cease.

Date:
Place:

Yours faithfully,

(Signatureof theAuthorizedSignatory)(Nameanddesignation of theAuthorized Signatory)Seal

17.FORMAT 9:DECLARATION

(OnCompanyletterheadonly)

DECLARATION

The undersigned, having readtheTerms andConditionsofsetoutintheattacheddocument, herebyoffers to providetheservicesat the pricesquoted,inadvancewiththespecifications statedandsubject toTerms andConditionssetoutorspecifiedinthedocument.WesubmitourProposal,whichincludesthis Technical proposal, underaseparateenvelopeand financialproposal online. Weconfirmthatalltheinformationand statements madeinthisProposalaretrueandacceptthatany misinterpretationcontainedinitmay leadto our disqualification. Our Proposal is binding upon us and subject tothe modifications resulting from Contractnegotiations. WeunderstandAMC-METis not boundtoaccept any Proposalitreceives.

Nameof authorizedrepresentative:

Title:

Postaladdress:

Date:

TelephoneNo.:

EmailAddress:

MobileNo.:

Signature**:**

FORMAT10:AUTHORIZATIONLETTER

(Representative AUTHORIZATION Letteronthe Letterheadof theBidder)

Date:..... Ref:.....

To,
<< Nameofauthority>>

<< Department>><<Address>

Ms./Mr.....isherebyauthorized tosign relevantdocumentsonbehalf of the company/firmin dealingwith tender reference No.....She/Heisalsoauthorized to attendmeetings andsubmittechnicalandcommercialinformationasmayberequiredbyAMC-METinthe courseofprocessingabovesaidapplication. Ms./Mr.....isherebyauthorizedto make technicalpresentation onbehalfof the company.

(Proof of above twopersons asemployeeof thecompanytobeenclosed)Thankingyou,

RepresentativeSignature

.....

Authorized Signatory

.... Signatureattested

18.FORMAT11: ORIGINAL EQUIPMENT /PRODUCTMANUFACTURERAUTHORIZATION

(TobesubmittedonletterheadoftheBidderandneedthesamefromeveryotheroutsourcedpartnerbiddertocompletethis

project/tenderrequirements)

To Dated --------,2026

AMC-MET,

Ref:"SelectionofService provider forIntegrated Hospital informationsystems, Core Compute, IT Infrastructure and Cyber SecurityforAMC-MET hospital",AhmedabadagainsttenderNo...../Dated dueforopening on___

DearSir,

I /Wehave carefully gonethroughtheTerms&ConditionscontainedintheRFPDocument.
I / We hereby have fully authorized M/s._____ (Primarybidder companyname should be mentioned here) represented by Mr. / Mrs. _____ with designation as (Detailedaddresswithcontactinformation)tobidforourProducts/Solutionagainst theaforesaid tenderasaNon-ExclusivePartner.

I/Weherebyconfirmthatthesolutionprovidedasapartofthebid/ submissionagainsttheaforesaid tender has beenverifiedby us forits totality, technically&functionally andconfirmthatitmeetsallthe requirement as perthistendernorms.

Yoursfaithfully,

(Signatureof the Bidder)

Printed Name

Seal

Designation
Date:

BusinessAddress:

Place:
Date: Bidder's signaturewithseal.

19.DETAILED SCOPE OFWORK

TheAgreementwill haveaninitialscopeoftheIntegrated Hospital informationsystems, Core Compute, IT Infrastructure and Cyber SecurityforAMC-MET hospital,Ahmedabad, deploymentforthehospitalwith support&maintenance periodof5years.ThelengthofthetermtowhichAMC-METwouldagreeis dependentuponamongotherthings,theBidder'spositionsonpricingflexibilityandAMC-MET'sright toemploythird parties formanagingtheinternalITorganization.

The following guiding principles outline AMC-MET's key requirements f o r the selection andengagement of andrelationshipwith,the Bidder: Timeisof theessencetoAMC-MET.

- **AMC-MET seeks firm and definitive implementation timeline for deployment of the proposedsolutionsuch thatnew application goesLive as perthe agreeddate.**
- **Biddermustbeabletocommittheimplementationtimelinesandrequiredtoprovide right effortwith resourcesas requiredtomeetthe committedimplementationplan.**

AMC-METisinterestedinabidder whowouldbeastrategic alliancepartner.

- AMC-METseeks areputedplayerin theHospitalIT products /servicesbusiness
- Bidder must be able to provide / commit to continuous improvements with continuous developmentbased on futureroadmap
- Biddershallbeproactiveinbringingcreativeideas/approachaspartoftheirsolutiontowards operationalefficiency andminimizingthemedicalerrors.
- Biddermustbeopen&transparenttoprovidealltherequiredinformation/trainingtoAMC-METpersonals&itsconsultants foreffectiveutilizationofHISfor day today operationand reporting.
- Biddermustbeablecommittheapplicationbaseperformanceoverthenext5yearswith proposedgrowthexpectation.
- Biddershouldleveragetechnologyandscaletocontinuouslyimproveservicequalityduringthe maintenance period.

- Biddershouldbecommitted to thehigheststandards ofquality andregulatorycompliance
- AMC-METexpectstheselectedbiddertodemonstrateyear-on-yearcontinuousimprovements throughupgradesandimprovementsaspart oftheproductimprovementplans

19.1Techno - FunctionalBid

19.1.1 Againstallthefunctionalrequirements,thebidderisrequiredtofillinresponsesfroma Dropdown boxchoosingoneof thethree options,namely

- SUPPORTED
- NOTSUPPORTED
- CUSTOMIZATION

Thebidderwillnotbeallowedtorespondtothefunctionalrequirementswithanyotherresponse otherthan the three options given.

- Allresponsesmarked as“Supported”needstobedelivered fortheproject,i.e. beforeGo-Live**.**

Thebidderthentakestheprintoutofalltheannexuresandwillsignoff onALLthecompletedsheets andaffixtheorganizationstamp.ItisappreciatedthattheseAnnexures areproperlybound/filedand submittedinsealedcoverswithproperindexation.TheTechno–FunctionalResponsewillNOT be acceptedinanyother form/formatotherthantheonesprovidedasAnnexurestothisbidding documents.

19.2TechnicalProposalResponseFormat

AMC-METrequiresthe Biddertopreparetheproposalresponseaspertheguidelinesandstructure givenbelow.ShouldtheBidderwishtoprovideadditionalinformation,sameshallbeappendedtothe

specificsectionoftheproposaltowhichitpertainsorreferencedintherelevantsectionandinclud ed asanappendix.

Amoredetaileddescriptionoftheinformationtobe providedineachsectionis providedbelow. The biddercanaddAnnexuresto provideadequate details andeachof theseannexuresis to beclearly

mentionedintheTableofContents;Also,specifictemplates/sheetstobeusedforresponsetothe RFP:

19.2.1ExecutiveSummaryofSolution (briefoverviewofthe response,providing highlightsof the solution(s), approachandpricing)

19.2.2 Biddersolutionoverview–

- Bidderbackground&history
- Experiencein theHIS implementation,specifically inHealthcare
- Clientreferences –Please provideforreferencesfromsimilarbusiness/sizefromyour clientele.
- Solution Differentiators
- Quality ManagementandComplianceProcess(Providea description of writtenstandardsand proceduresfor:

  -HIS implementationincludingtesting,golive

  -IncidentandProblemManagement

  -ChangeManagement&Controls

  -Training

  -Document review andapproval
- Escalation matrix-withtimelines (3Levels)
- AMC-MET's Requirementunderstanding
- Scopeunderstanding
- ScopeExclusions ifany
- ProposedSolution–
- SolutionOverview
- Solution Differentiators

- TechnologyPlatform
- Architecture
- Deploymentplatformandapproach
- FunctionalModules
- DeviceIntegration
- Application IntegrationApproach

  Deliverables (Documentations, Software, User manuals, Technical documents, DataStructures)
- Implementation Approach
- Implementation Methodology
- ProjectManagement andcoordinationstructure
- Implementation KPI's
- TeamstructureandResponsibilities(Providefortentativepeopleprofilesassigned tothis project)
- Implementation Timelines
- Proposedinitiativetoadheretotimelinesanddeliverablequality
- ApproachforDeployment testing,integration
- ApproachforperformanceTesting
- ApproachforUAT,Go-LiveandPostGolivesupport
- ApproachforTransition/Handover
- ApproachforTrainingandevaluationofits effectiveness.
- LocalPresenceforimplementationandlongtermsupport
- Valueadditionbased onpast experience
- Application Support,MaintenanceandDevelopment
- Scopeof proposedApplication MaintenanceSupport
- Clientsitesupport
- Remoteapplicationsupport
- Support methodology andmanagement approach
- OngoingProductimprovementSupport Program
- Productimprovementandsupport process
- ClientsiteReleaseandinstallationmanagementprocess

- Continuous PerformanceImprovement/Cost Reduction
- Termsandconditions
- Assumptions
- Dependencies(Fromclient,others)
- Risks andproposedapproachformitigation /management
- Any Exceptions(Functionalandnotfunctional)
- PricingProposal(as per theattachedannexure)
  - TermsandConditions
  - Allapplicablelocaltaxes & levies
  - Appendix/Optionalinformation

Alldocumentationbeingprovidedhastobecurrentandrelevanttothedeployedinstanceat AMC-METandnotany genericdocuments.

19.2.3 Forms/Formatstobeused by thebidder(Sealed,SignedandonOrganizationLetterheads)

19.2.3.1Organization Detailssheet

19.2.3.2References sheet

19.2.3.3Certifications withproof

19.2.3.4ProjectApproach Methodology

19.2.3.5ProjectDelivery & ImplementationPlan(Macro&MicroSchedules)

19.2.3.6RequiredCloudInfra(Hardware,OS,DB,Security,Connectivity etc.) todeliveraFIVE9'sSLA

19.2.3.7Deviations ifany

20.TECHNOFUNCTIONAL REQUIREMENTS

1. Project Overview and Scope of Supply

AMC-MET is engaging in this RFP process to identify potential bidders to provide an integrated HIS solution required to automate all department operations. The bidder is responsible for project management, implementation, integration, customization, training, change management, testing, and maintenance on a turnkey basis.

Sl. No.	Scope of Supply	Detailed Description
1	Supply of Hyper-Converged Infrastructure	1. HIS/ EMR 2. Hyper-Converged Core Compute; 3. Standalone Rack Servers (Business Apps); 4. Standalone Rack Servers; 5. Cybersecurity; 6. Backup Software, UPS, Racks, Cables;
2	Implementation Services	System Study, Requirement understanding and mapping, Configurations
3	Testing & Support	Alerts (SMS/Email), Performance Testing, UAT, Pre/Post Go-Live support
4	Training	End User Training, Admin Training, Database/Report Generation, User Manuals
5	Warranty	5 Years from the date of Go-Live
6	Upgrades	Free upgrades/releases for issues; Paid upgrades for new modules

2. Supply, Implementation, Deliverable & Training Scope

The Bidder will be responsible for providing a full range of IT Compute Infrastructure supporting the Hospital Operations, with the proposed solutions during the Warranty Period of 5 years.

These services should include, but not be limited to, the following details mentioned in the below section.

The Scope of Work document needs agreement & sign off from all stakeholders with the Hospital IT Team, Application Vendor Teams and then activity on the project will commence.

General Instructions to the Bidders

- The bids have to be complete in all aspects including the required Infrastructure.
- The Infrastructure provided in this document is indicative only and the respective bidders are to use these guidelines and arrive at the Final BoM / BoQ based on their product and also the required transactional load.
- The bidders will also have the option of consolidating the required infrastructure and proposing a hyper converged solution or a generic converged solution, as appropriate. The preferred technology deployment is on the Hyper Converged Technology Platform. It is also assumed that:
    - The Hyper Converged solution stack shall be configured with a 60% Replication / Redundancy factor, i.e., RF 2 Sizing.
- All the OEM to note that **EACH BID** based on the technology being offered will be associated with **One System Integrator**. For Example – If an OEM wants to propose both, Converged and Hyper Converged Technology Bids (further referred to as Platform's), they are to do so with the below guidelines:
    - There will be Separate Bids with complete compliance to the Tender Guidelines and Framework for every Platform being proposed.
    - Each of this bid will be with One Single Partner who will have the OEM Authorisation form in Original.
    - You cannot use the same Partner for multiple bids.
    - Bids will be rejected if the OEM authorization forms are not provided in original.
    - All Bids from the same OEM will be rejected if there are multiple OEM Authorisation Forms for the same Technology Platform solution issued to Multiple SI's.

- Deviations from the base specifications as mentioned in this document depending on the Technology Platform being provided, shall be documented separately as a part of the technical bid, by the bidder on this Letter Head.

- All the proposed Server & Storage infrastructure (excluding the Workstations) will be with a default **5 – 5 – 5 Onsite Warranty** with a committed SLA as:
  - For HCI Servers:
    - i. Mean Time to Arrive Onsite for a Service Call – Within 4 Hours.
    - ii. Mean time to Replace / Repair – Within 8 Hours.
  - For Standalone Servers:
    - i. Mean Time to Arrive Onsite for a Service Call – Within 4 Hours.
    - ii. Mean time to Replace / Repair – Next Day Replacement.
- All the Servers to Network Switches and to the SAN Switches are on a Fully Redundant – Fault Tolerant connection mode which in other words are also termed as **NSPOF (No Single Point of Failure)** Configuration & Deployment.
- IP KVM Switch and console for every rack with a Rack Mounted TFT Screen, Keyboard and Mouse.
- All the proposed racks have to be 42U, Standard Server & Storage Rack with inbuilt cooling and PDU's. These are fully self-contained racks with Power, Cooling, Cable Management, Heat Management, Security and other features Rack must be fitted with an Online UPS and should have SMF Batteries inbuilt to deliver a minimum of 10-minute backup. The UPS System should be manageable and should be capable to send out SMS Alerts for various state changes. The UPS will have a Dual Power Input source too and should be available with an OEM Standard 5- 5 – 5 Year Onsite Warranty.
- Based on the number of Servers, the Bidder to propose the Backup Agents required for all the Hardware / Infrastructure components mentioned in this annexure.
- The required version of the Operating System and Database Licenses must be estimated in totality and firmly proposed along with the Hardware. Unless specifically mentioned in the specifications, the vendor is free to size the same as per their solution and then bid for the same.

- All prices being proposed as a part of the Commercial Bid Process shall be including all Local Taxes / Levis / Duties and is **FOR Delivery – Installation – Warranty Support at site**.

3. Implementation Services – Scope of Work

The Scope of Work document is agreed & signed off with the Hospital IT team and then the below said activity is carried out:

- Setup the Racks
- Unpack and mount the servers after assembling them
- Install the KVM and the Onboard Server Utilities first
- Configure all Virtual Servers
- Install the OS and the DB as per the Deployment Document signed off
- Install the Domain Controllers, DNS, DHCP and other Management Servers
- Install the Antivirus & Backup Servers
- Install the Application & Database Servers for High Availability & Failover
- Install and configure the SAN and the NAS
- Create, Configure and Assign the LUNs to various Hosts
- Network Termination, Dressing, Tagging etc
- Document the entire deployment including Configuration Screen Shots etc.
- Enable OEM Warranties and Support
- Knowledge Transfer to the Hospital IT Team – System Administration, Management and Sustenance
- Manage OEM Support under the Warranty Period
- **System Testing:**
    - These tests shall rigorously exercise all functions and devices, both individually and collectively, and shall verify the correct functional operation of all hardware and software.[1]
    - These tests shall as a minimum include the following:

      i. Automatic Switchover of VMs in case of failure.

      ii. Verification of all user interfaces.

iii. Verification of model maintenance capabilities.

iv. Verification that the open system standards and design guidelines required by the Work Statement have been met.

- Performance Testing:

  i. These tests shall verify that the specified performance requirements are met for the system under test.

  ii. Simulation shall be provided by the Supplier, if necessary, to create the operating conditions for the different scenarios. Training and preparation of training material.

  iii. Change Management.

  iv. Load Testing.

  v. User Acceptance Testing (UAT).

  vi. Go-Live.

  vii. Post Go-Live Stabilization.

  viii. Post Implementation Support.

- The Infrastructure Vendor will work with the Application Software Vendor to Deploy the Applications & Database as envisaged and will provide all necessary support in deploying the Application Software.
- The details of the activity to be carried out are as follows:

Deployment Planning

- Creating a detailed project implementation plan.
- Freezing all the configuration parameters with-respect-to design.
- Freezing all elements in the final SOW and official sign-off.
- Creating implementation document with configuration templates.
- Creating site pre-requisite checklists to ensure site readiness before starting implementation activities.
- Review meeting and site readiness sign-off.
- Sign-off implementation plan.

Implementation

- Verifying all the hardware / software components with respect to the final BoM shipped to the customer location.
- Power on self-test on all the hardware.
- Verify the software versions / feature sets.
- Upgrade to recommended software version, if required.
- Mounting the devices on the Rack.
- Connecting all the cables.
- Ensuring end to end connectivity.

Deploying Rack Servers & Storage

i. Mounting Servers on Rack.

ii. Power on the Servers.

iii. Updating latest firmware.

iv. Configuring Management Stack advanced version.

v. Configured HBA for Boot from SAN.

vi. Fine tune Server Installation as per practices.

vii. Mounting SAN Storage on Rack.

viii. Cabling between Hosts and storage.

ix. Powering on the SAN Storage.

x. Configuring Management Port.

xi. Creating the Raid Level as per requirement.

xii. Configuring Boot OS LUN.

xiii. Configuring LUN's & Volumes.

xiv. Configuring SAN zoning.

xv. Mapping to Hosts.

xvi. Download the Firmware package for SAN storage.

xvii. Update the firmware by selecting appropriate firmware package.

xviii. Verify the storage firmware.

xix. Verify the LUNs presented through both controllers on servers.

xx. Fine tune Storage Installation as per best practices.

OS & Database Installation & Configuration

i. Installing the Operating System.

ii. Configuring the OS (IP, Host Name, Etc.,).

iii. Installing OS security, OS patches & hot fixes online.

iv. Configuring Failover HA as per best practices.

v. Configuring Disk Groups / LUN's / Volumes to be mapped onto the hosts.

vi. Testing Server Failover.

vii. Fine Tune the entire setup.

Please Note That:

- All the equipment will be delivered within 6 – 8 weeks from the date of the work order and the same shall be commissioned – tested – ready to go live within 4 weeks from the date of the delivery acceptance at site.
- The Bidder is responsible to work along with the IT Team of **AMC-MET** and the Business Application Software vendors of **AMC-MET** to implement the envisaged Healthcare IT Solution and the Implementation Signoff shall only be done when the provided Infrastructure and the Business application software are demonstrated end to end in totality.
- As a part of the Technical Bid, the Bidder has to provide the Detailed BoQ (with Part Code etc.) in MS Excel format. This should have the details of all the Hardware, OS, DB and System Tools as per the Technical Requirement mentioned in this document and the final BoQ. However, this sheet should not have any Commercial Information in it. Any commercial information included in the technical bid shall automatically disqualify the bidder from the bidding process. This is a mandatory submission, and the Technical Bid will be rejected in totality if this document is not provided for in the Technical Bid Submission.
- The Bidder has to give a self-declaration on his letter head that they have factored in all components required to provide the envisaged solution to **AMC-MET** and any missed out component to complete the solution will solely be on the Bidder's account

and not on **AMC-MET**. The bidder will make good of any missed-out components within the project timelines and shall be penalized for delays as per the Penalty Clause for this project.

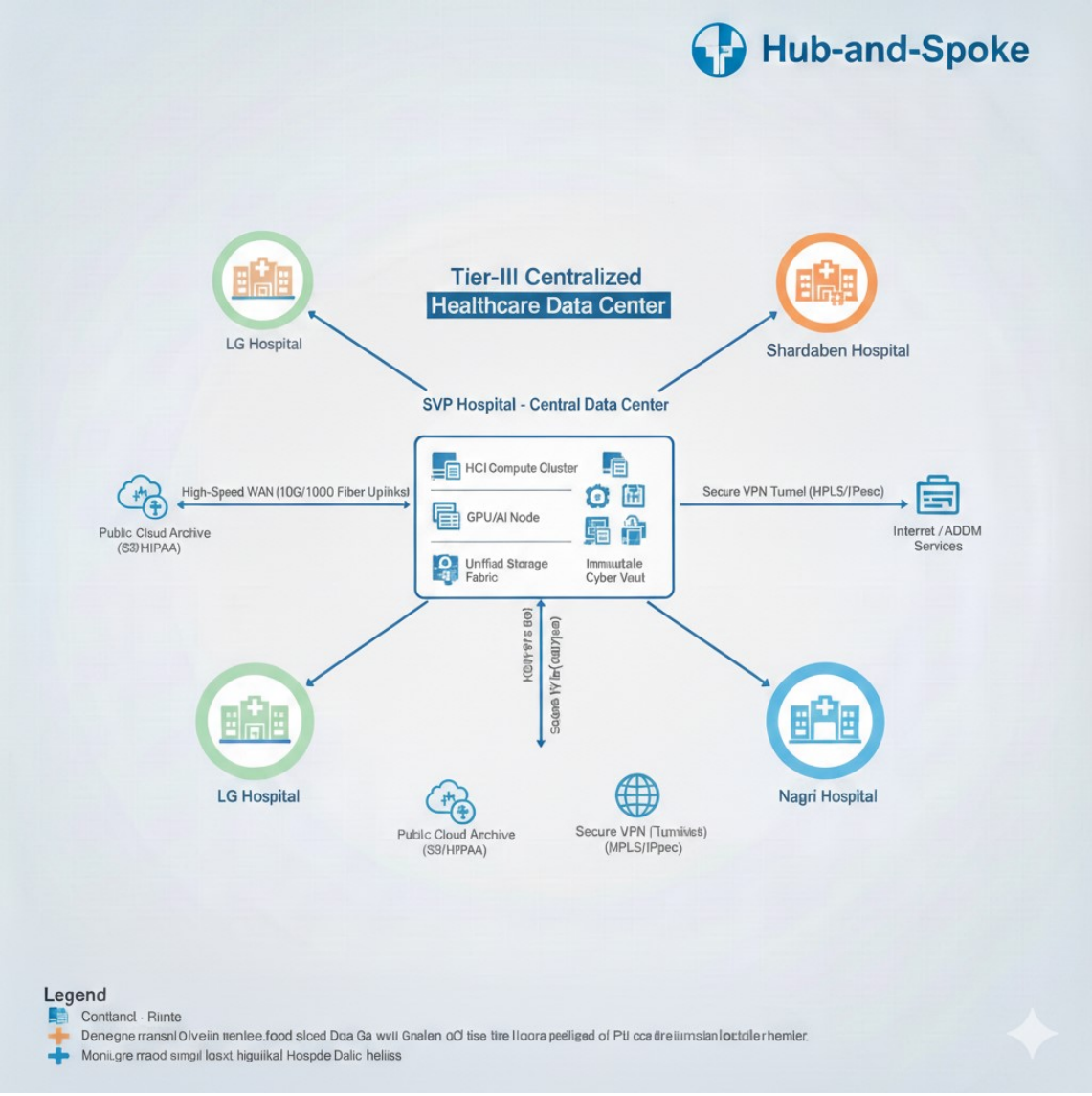
20.1 Detailed Component Modules

20.1.1 Core Compute, Data Center

1. Project Objectives

The primary objective is to establish a **Tier-III compliant, high-availability Centralized Data Center (DC)** located at **SVP Hospital**. This infrastructure is engineered to support the 24/7 mission-critical nature of healthcare services for the **LG, Shardaben, Nagri, Dental College, S.B.B. College of Physiotherapy, CHC & UHC Health Centers.**

The architecture provides a secure, scalable foundation for the Ayushman Bharat Digital Mission (ABDM) and NABH standards, hosting clinical applications including HIS, PACS, EMR, LIS, and RIS via a modern **Hyper-Converged Infrastructure (HCI)** and **Software-Defined Data Center (SDDC)** model.



2. Expected Project Outcomes

- **99.98% System Availability:** A Tier-III concurrent maintainability design at the SVP hub ensuring no single point of failure across compute or storage tiers.
- **Centralized Performance:** High-speed connectivity from satellite hospitals (LG, Shardaben, Nagri) to the SVP core, ensuring zero performance degradation for clinicians.
- **Ransomware Immunity:** Implementation of an immutable data architecture to ensure patient records remain unchangeable and recoverable.
- **Unified Management:** Single-pane-of-glass orchestration for all three hospitals from the central SVP command center.

Implementation Services – Scope of Work (SOW)

This Scope of Work (SOW) is a binding agreement between the Infrastructure Vendor and the IT Teams of SVP, LG, Shardaben, Nagri , , Dental College, S.B.B. College of Physiotherapy, CHC & UHC Health Centers

Phase 1: Project Planning & Design Freeze

- **Project Implementation Plan (PIP):** Creation of a detailed timeline covering the central DC setup and site integration.
- **Design Freeze:** Formalizing configuration parameters (IP, Host Names, VLANs) for the virtual instances across all hospital sites.
- **SOW Sign-off:** Finalization of all elements in the SOW and official sign-off.
- **Site Readiness:** Review meeting and formal sign-off on rack space, power, and cooling at the SVP location.

Phase 2: Physical Installation & Hardware Staging

- **Inventory Verification:** Verifying all Hardware/Software against the approved BoM.
- **Rack Management:** Professional rack setup, mounting of HCI nodes, GPU nodes, and the IP-KVM consoles at SVP.
- **Power-On Self-Test (POST):** Component-level health checks for all physical nodes.

- **Firmware Optimization:** Updating the latest firmware for Servers, Storage, and 100G Fabric Switches.
- **Network Infrastructure:** Professional termination, dressing, and tagging of all 100G/10G/1G cables.

Phase 3: Storage & D2D2D Configuration

- **Storage Deployment:** Physical mounting and cabling of the Storage/Vault arrays.
- **LUN Orchestration:**
    - Configuring RAID levels as per hospital requirements.
    - Creating LUNs for the 10TB Production Set, 10TB Backup Set, and 80TB Archive Set.
    - Configuring secure SAN Zoning.
- **Storage Hierarchy (D2D2D):** Implementation of deduplication, snapshots, and immutable WORM logic (Disk-to-Disk-to-Disk) to protect clinical data.

Phase 4: Virtualization & System Deployment

- **SDDC Stack:** Installation of the Virtualization layer and Advanced Management Utilities.
- **Core Management Servers:** Deployment of the Standalone Primary Domain Controller (PDC), ADCs, DNS, and DHCP.
- **Virtual Server Build-out:** Provisioning of the virtual instances (HIS, PACS, LIS, etc.) across the HCI fabric.
- **Operating Systems & DB:** Installation of RHEL/Windows and Database clusters (MongoDB/Postgres) including security hardening.
- **Observability Stack:** Deployment of monitoring tools (Prometheus, Grafana, Nginx Proxy, APM, and ELK).

Phase 5: Application Support & Collaboration

- **Application Collaboration:** The Infrastructure Vendor will work with the Application Software Vendors of LG, Shardaben, and Nagri to ensure the healthcare solution is demonstrated end-to-end. This includes supporting the deployment of Node JS, Report Server, and Database environments.

Phase 6: Rigorous Testing & Acceptance

- **A. System Testing:**
    - **HA Failover:** Automatic switchover of VMs in case of node failure within the SVP cluster.
    - **User Interface:** Verification of management interfaces and dashboards.
    - **Standards Compliance:** Verification of open system standards and ABDM design guidelines.
- **B. Performance & Load Testing:**
    - **Simulated Scenarios:** Creating operating conditions for high-traffic hospital scenarios across all three satellite sites.
    - **Load Testing:** Verifying the All-Flash tier under peak clinical demand.
    - **UAT & Go-Live:** Formal User Acceptance Testing followed by Post Go-Live stabilization.

Phase 7: Knowledge Transfer & Support

- **As-Built Documentation:** Delivery of the entire deployment documentation, including configuration screenshots and SOPs.
- **Knowledge Transfer (KT):** Training the IT Teams on system administration and sustenance.
- **Warranty Management:** Enabling 5-year OEM warranties and managing 24x7x4hr on-site support.

Mandatory Compliance & Delivery Terms

- **Timelines:** Equipment delivery within 6–8 weeks; Commissioning within 4 weeks from delivery.
- **Total Integration:** Sign-off is granted only when the infrastructure and the Business Applications are demonstrated in totality across all sites.
- **Technical Bid Submission:** Bidders must provide a detailed BoQ (with Part Codes) in MS Excel.

- **Self-Declaration:** The Bidder must factor in all components for the solution. Any missed components required for completion will be at the Bidder's account.

3. Functional & Technical Requirements (Aligned to Section E BOQ)

This comprehensive technical write-up is aligned with the Bill of Quantities (BOQ) and provides the necessary detail for a robust Request for Proposal (RFP). It emphasizes the design philosophy, technical requirements, and long-term sustenance of the centralized infrastructure.

Functional & Technical Infrastructure Requirements

Server Farm & High-Performance Compute

- **Primary HCI Cluster:** Deployment of 8 enterprise-grade Hyper-Converged Infrastructure (HCI) nodes. These servers are the engine for mission-critical hospital workloads (HIS, EMR, PACS, ERP), featuring Dual Intel Xeon Platinum 8480+ processors and 1.5TB DDR5-4800 RAM. High availability is ensured through redundant 2000W Platinum PSUs and hot-swap NVMe Gen5 SSDs to provide ultra-high IOPS, effectively eliminating clinical latency.
- **AI & 3D Visualization:** A specialized compute node equipped with NVIDIA L40S GPUs to facilitate heavy 3D medical rendering, digital pathology, and AI-driven diagnostics. This dedicated silicon offloads rendering from the general compute cluster to satisfy NABH INF-01 imaging compliance.
- **Future Scaling:** The framework includes pre-negotiated unit rates for expansion nodes, ensuring cost-parity and predictable scaling as clinical data volumes grow over a 36-month horizon.
- **Enterprise Virtualization & SDDC Stack**
- **SDDC Logic:** A unified Software-Defined Data Center (SDDC) stack virtualizing compute, storage, and networking. This enables advanced features like High Availability (HA) and Distributed Resource Scheduler (DRS). Crucially, it facilitates micro-segmentation, allowing the IT team to isolate sensitive clinical data from public-facing services.
- **Platform & Database Licensing:** Unlimited VM deployment via Windows Server Datacenter licensing, including Software Assurance and Azure Hybrid Benefit. The

infrastructure supports multi-site clustering for HIS/ERP databases via Always-On Availability Groups, ensuring perpetual data access and 5-year security patching support.

- **Storage Fabric & RDMA Interconnects**
- **HCI Backend Fabric:** A dedicated 100G RDMA (RoCE v2) network acting as the "circulatory system" of the cluster. These high-speed switches provide non-blocking data paths and sub-millisecond latency required for high-volume imaging traffic and real-time database synchronization.
- **Management & Visibility:** Dedicated appliances for Data Center Infrastructure Management (DCIM) and centralized syslog/NMS validation. This is paired with Remote IP-KVM Console Switches providing secure, BIOS-level out-of-band access independent of the operating system.
- **Data Protection & Immutable Cyber Vault**
- **Immutable Cyber Recovery Vault:** The hospital's "Last Line of Defense" against ransomware. This features a 1.1PB usable pool utilizing Hardware-level WORM (Write Once Read Many) and S3-Object Lock. Once patient data is written to this vault, it cannot be modified or encrypted by unauthorized entities.
- **Multi-Tiered Backup Orchestration:** Centrally orchestrated software simplifies complex recovery into "one-click" tasks. It supports application-aware backups and "Instant VM Recovery," restartable directly from backup storage. Long-term HIPAA compliance is managed via Public Cloud S3 Archives with automated lifecycle policies.

Implementation & 5-Year Sustenance Framework

The project includes a comprehensive 5-year sustenance and validation framework to maintain the design philosophy throughout its lifecycle.

- **SLA Driven Resiliency:** A strategic local inventory containing 10% of critical Field Replaceable Units (FRUs)—such as NVMe SSDs, PSUs, and Transceivers—is maintained on-site to meet aggressive Recovery Time Objectives (RTO) and eliminate logistics delays.
- **OEM-Backed Support:** All hardware includes a 5-year comprehensive sustenance framework with 24x7x4hr on-site warranty and AMC/CMC support.

- **Compliance & Audits:** Mandatory annual asset inventory updates to audit all licenses, hardware serials, and capacity utilization.
- **Validation & Commissioning:** Includes formal stress testing, load balancing verification, and the delivery of "As-Built" documentation and SOPs for emergency failovers.
- **Resilience Testing:** Mandatory quarterly Primary DC failover drills to certify that RTO/RPO targets remain achievable by hospital staff.
- **Knowledge Transfer:** Structured training for the IT team covering HCI administration, storage management, and disaster recovery orchestration.

Critical Technical Alignment

To fully achieve the design philosophy, the following must be validated during technical evaluation:

1. **HCI Witness/Quorum:** Deployment of a lightweight witness service (Cloud or 3rd Site) to prevent "Split-Brain" scenarios in the database cluster.
2. **External Hardware Security Module (HSM):** Required for secure digital signing of medical reports and e-prescriptions to meet ABDM Level-3 compliance.
3. **Data Reduction Guarantee:** A contractual requirement for a minimum 3:1 deduplication/compression ratio on the 1.1PB Backup Vault to prevent premature capacity exhaustion.

6.6.1 CORE-COMPUTE INFRASTRUCTURE REQUIREMENTS

Standalone Servers and Technology Platform

Section E - Bill of Quantities in Scope:

Sl No	Item Description, Design Philosophy & Audit Directives	Qty	Implementation Options	Minimum Tech Spec (BOM)	Certifications	Healthcare Compliance (ISO/NABH/ABDM)	Pricing Category (Summary E)
E.1	Primary HCI High-Performance Compute Node: Enterprise node for HIS/PACS. Philosophy: Eliminate clinical latency. Instruction: Configure RDMA (RoCE v2). Audit: Tier-III N+1 node redundancy.	8	Nutanix NX, Dell VxRail, HPE SimpliVity	Dual Intel Xeon Platinum 8480+ (64C/128T); 1.5TB DDR5-4800 RAM; 8x 15.36TB NVMe Gen5 SSDs; Quad-Port 100G RoCE v2 NICs.	Energy Star, UL/CE, FIPS 140-2	ISO: A.12.1.1; NABH: IMS-03; ABDM: INF-01	1. High-Perf HCI Nodes
E.2	GPU Visualization & AI Node: Specialized server for 3D PACS/AI. Philosophy: Dedicated silicon for rendering. Instruction: Optimize for digital pathology. Audit: NABH INF-01 compliance.	1	NVIDIA OVX, Dell XE9680, SuperMicro	Dual Intel Xeon Gold 32C; 2x NVIDIA L40S 48GB GDDR6 GPUs; 512GB DDR5 RAM; 2x 1.92TB NVMe Boot.	NVIDIA Certified, CE/FCC	ISO: A.12.1.1; NABH: INF-01; ABDM: INF-01	2. Specialized Nodes
E.3	SDDC License: Full-stack virtualization (Hypervisor, SDS, SDN). Philosophy: Unified 100G fabric orchestration. Instruction: Implement micro-segmentation. Audit: SDDC 100G stack resilience.	8	Nutanix Ultimate, VMware VCF, Azure Stack	Enterprise Plus/Ultimate License; Includes Distributed Firewall, Micro-segmentation, and 5-Year Support.	Common Criteria EAL4+	ISO: A.13.1.1; NABH: IMS-IT; ABDM: INF-01	3. SDDC & Windows Lic.
E.4	Windows Server Datacenter OS: Unlimited VM licensing.	1	Microsoft Windows Server 2022/2025	Datacenter Edition (Core-based licensing for physical cores); Includes Software Assurance for 5 years.	ISO 19770-1 (SAM)	ISO: A.12.3.1; NABH: IMS-IT; ABDM: INF-01	3. SDDC & Windows Lic.

	Philosophy: Cost-predictable scaling. Instruction: Include Software Assurance and Azure Hybrid Benefit. Audit: Standardized OS Platform.						
E.5	Enterprise Database Cluster: High-availability HIS/ERP data management. Philosophy: Perpetual data availability. Instruction: Configure Always-On Groups. Audit: NABH DB Cluster compliance.	1	Oracle Ent, MS SQL Ent, EDB Postgres	Enterprise Grade Licensing; Multi-core optimization; Includes 5-year Critical Patch & Security Support.	FIPS 140-2	ISO: A.12.3.1; NABH: IMS-03; ABDM: INF-01	5. DB Cluster & Backup SW
E.6	Management & DCIM Appliance: OOB management and syslog. Philosophy: Isolate mgmt from production traffic. Instruction: Deploy in HA. Audit: Centralized Syslog/NMS validation.	2	Dell R660, HP DL360, Lenovo SR630	1U Rack Server; 2x 16C CPU; 256GB RAM; 2x 960GB SAS SSD (RAID 1); Redundant PSUs.	CE/UL, Energy Star	ISO: A.12.4.1; NABH: IMS-IT; ABDM: INF-01	2. Specialized Nodes
E.7	Immutable Backup & Cyber Vault: Air-gapped, WORM storage. Philosophy: Last line of defense. Instruction: Enable Hardware WORM and S3-Object Lock. Audit: Mandatory Cyber Vault.	1	Dell PowerProtect, Pure FlashBlade, Cohesity	1.1PB Usable (post-dedupe); Hardware-level WORM; S3-Object Lock; 100G connectivity; Immutable Snapshots.	SEC 17a-4, FIPS 140-3	ISO: A.12.3.1; NABH: IMS-IT; ABDM: INF-04	4. Immutable Cyber Vault
E.8	Enterprise Backup Software: Policy management for cross-site restore. Philosophy:	1	Veeam VUL, Commvault, NetBackup	Universal License (VUL); Support for Physical/Virtual/Cloud; 5-Year 24x7 Maintenance & Support.	ISO 27034	ISO: A.12.3.1; NABH: IMS-IT; ABDM: INF-01	5. DB Cluster & Backup SW

	One-click orchestration. Instruction: Enable Instant VM Recovery. Audit: Primary Backup Framework audit.						
E.9	100G HCI Backend Fabric: RDMA switches for SDS communication. Philosophy: Non-blocking storage circulatory system. Instruction: Optimize for RoCE v2. Audit: Tier-III Storage Fabric.	4	NVIDIA Spectrum-3, Cisco Nexus, Arista	32-Port 100G QSFP28; Non-blocking line-rate; RoCE v2 Optimized; Ultra-low latency buffers.	IEEE 802.3ba	ISO: A.13.1.1; NABH: IMS-03; ABDM: INF-01	6. HCI Fabric & Cloud
E.10	Remote IP-KVM Console: BIOS-level secure remote access. Philosophy: Emergency access independent of OS. Instruction: Integrate with LDAPS. Audit: Secure Console Access (A.12).	4	Vertiv Avocent, Raritan, Aten	16-Port High-Density IP-KVM; 4-Concurrent Remote User sessions; Virtual Media Support.	FIPS 140-2 Level 1	ISO: A.12.1.1; NABH: IMS-IT; ABDM: INF-01	2. Specialized Nodes
E.11	On-Site Critical Spares Kit: Strategic inventory for aggressive RTO. Philosophy: Eliminate logistics delays. Instruction: Maintain 10% local buffer of FRUs. Audit: SLA Driven Resiliency.	1	OEM Certified Parts	5yr 24x7x4hr On-site support; 10% local inventory of SSDs, PSUs, Fans, and Transceivers.	ISO 9001	ISO: A.17.1.1; NABH: IMS-IT; ABDM: INF-01	1. High-Perf HCI Nodes
E.12	Primary Domain Controller (PDC) - Standalone: Philosophy: Physical air-gapped root auth. Instruction: Part 2 Component. No SAN/NAS connectivity. Audit: Secure BIOS & Local	1	Dell R760, HPE DL380, Lenovo SR650	Standalone Physical Server (2U); 2 x Intel Xeon-Silver 4110 (8-Core); 64 GB RAM; 2 x 1 TB SAS (10k RPM) RAID 1.	FIPS 140-2	ISO: A.12.1.1; NABH: IMS-IT; ABDM: INF-01	2. Specialized Nodes

	Auth.						
E.13	Top-of-Rack (ToR) Management Switches: Philosophy: High-availability management fabric. Instruction: Part 3 Component. HA Mode. Audit: Switching capacity validation.	2	Cisco Nexus, Aruba, Juniper	24-Port HA Pair; Autosensing 1G/10G SFP+ & QSFP+; Switching Capacity >1.25 Tbps; Latency <3 µs.	IEEE 802.3	ISO: A.13.1.1; NABH: IMS-03; ABDM: INF-01	6. HCI Fabric & Cloud
E.14	Tiered Storage Hierarchy Implementation: Philosophy: D2D2D (Disk-to-Disk-to-Disk). Instruction: Part 3 Logic. Multi-tier data lifecycle. Audit: RPO/RTO Parity.	1	Integrated Solution (Nutanix/Dell/Veeam)	Tier 1: 10TB RAW All-Flash (Prod); Tier 2: 10TB RAW SSD (Local Backup); Tier 3: 80TB RAW Nearline/iSCSI (Archive).	ISO 27001	ISO: A.12.3.1; NABH: IMS-IT; ABDM: INF-01	5. DB Cluster & Backup SW

COMPUTE INFRASTRUCTURE REQUIREMENTS

Servers on Virtualized Technology Platform

This descriptive document outlines the **Virtual Computing Requirements** for the healthcare enterprise. Each instance is designed to run on the high-performance HCI fabric, leveraging the **All-Flash Production Set** for high-IOPS clinical workloads.

To provide this in a format ready for a Word document, I have structured the content with clear headers, bolded resource specifications, and detailed technical descriptions. You can copy and paste the following directly into your document.

Master Virtual Server Infrastructure: Clinical & IT Operations

Deployment Model: 8-Node High-Availability HCI Cluster

Total Provisioned Resources: 2,000 vCPU | 6,528 GB RAM | 71,000 GB NVMe Storage

Part 1: Clinical Core & Application Clusters

1. HIS Application Cluster

- **Resources:** 128 vCPU, 512 GB RAM, 6,000 GB Storage
- **Software Stack:** RHEL 9 / Windows Server 2025 (Node.js Environment)
- **Description:** Hosts the primary application logic for the Hospital Information System. This cluster is scaled to handle extreme concurrent clinical sessions across all hospital departments, ensuring zero-latency response times for doctors and nurses.

2. HIS Database Cluster

- **Resources:** 192 vCPU, 768 GB RAM, 9,000 GB Storage
- **Software Stack:** RHEL (MongoDB Enterprise) / Windows Server (MS SQL Enterprise)
- **Description:** The "Source of Truth" for all patient Electronic Medical Records (EMR). It is optimized for massive IOPS and high-speed retrieval, placed on the "Platinum" storage tier to manage heavy concurrent read/write operations.

3. PACS/RIS Image Cluster

- **Resources:** 192 vCPU, 768 GB RAM, 15,000 GB Storage

- **Software Stack:** RHEL / Windows Server 2025 (Postgres / Imaging Logic)
- **Description:50% Storage Tier Priority.** Manages medical imaging logic and metadata. Designed for high-speed ingestion of heavy DICOM files from modalities like CT, MRI, and X-ray, providing instantaneous image loading for radiologists.

4. Clinical Reporting Cluster

- **Resources:** 128 vCPU, 512 GB RAM, 2,000 GB Storage
- **Software Stack:** Ubuntu / Windows Server 2022 (Tomcat, Jasper Reports)
- **Description:** A dedicated, resource-intensive instance for PDF generation, Jasper analytics, and ABDM-compliant clinical reporting. This prevents performance degradation on the primary application servers during month-end or peak discharge hours.

5. UAT / Training Cluster

- **Resources:** 128 vCPU, 512 GB RAM, 2,000 GB Storage
- **Software Stack:** RHEL / Windows Server 2022
- **Description:** A full-scale sandboxed replica of the production environment. It is used for User Acceptance Testing (UAT) of new software patches and for onboarding clinical staff without risking the integrity of live patient data.

Part 2: Infrastructure & Management Clusters

6. Identity & AD Cluster

- **Resources:** 96 vCPU, 192 GB RAM, 1,200 GB Storage
- **Software Stack:** Ubuntu (BIND9) / Windows Server (ADDS)
- **Description:** The primary authentication hub for the hospital. It manages directory services and DNS, facilitating "Tap-and-Go" login capabilities for clinicians moving between bedside terminals and consultation rooms.

7. LIS & Modality Interface Cluster

- **Resources:** 64 vCPU, 128 GB RAM, 1,200 GB Storage
- **Software Stack:** RHEL (Mirth Connect) / Windows Server 2022

- **Description:** The HL7/ASTM protocol bridge. It manages the real-time data flow between laboratory machines and the HIS, ensuring test results are automatically attached to the correct patient file.

8. Infrastructure Management Cluster

- **Resources:** 64 vCPU, 128 GB RAM, 1,200 GB Storage
- **Software Stack:** Ubuntu (Ansible) / Windows Server (SCCM/WSUS)
- **Description:** The data center "Control Tower." It manages the orchestration of the virtualized environment, automated OS patching, and global cluster configurations for the 8-node HCI system.

9. Backup & Recovery Node

- **Resources:** 64 vCPU, 128 GB RAM, 2,000 GB Storage
- **Software Stack:** RHEL 9 / Windows Server 2025 (Veeam/Commvault)
- **Description:** Orchestrates Disk-to-Disk-to-Disk (D2D2D) backup policies. It manages snapshots and data migration to the air-gapped Immutable Cyber Vault to protect against ransomware.

10. Security & XDR Cluster

- **Resources:** 96 vCPU, 256 GB RAM, 2,000 GB Storage
- **Software Stack:** Ubuntu / Windows Server (Crowdstrike/SentinelOne)
- **Description:** Centralized security management console. It performs real-time threat hunting and manages endpoint security health (EDR/XDR) for all clinical workstations and servers.

11. General Utility & NTP

- **Resources:** 48 vCPU, 96 GB RAM, 800 GB Storage
- **Software Stack:** CentOS Stream / Windows Server 2022
- **Description:** A flexible utility host providing local NTP (Network Time Protocol) to ensure all medical devices and server logs are perfectly synchronized for legal and clinical auditing.
-

Part 3: Observability, Edge & Additive Services

12. WAF & Load Balancer Tier

- **Resources:** 64 vCPU, 128 GB RAM, 800 GB Storage
- **Software Stack:** Nginx Plus / Windows Server (ARR)
- **Description:** The Security Edge. It handles SSL Termination, Web Application Firewall (WAF) rules, and traffic distribution to protect backend clinical nodes from external or internal spikes.

13. Observability (Metrics) Cluster

- **Resources:** 96 vCPU, 384 GB RAM, 4,000 GB Storage
- **Software Stack:** RHEL (Prometheus/InfluxDB) / Windows Server 2022
- **Description:** The Metric Scraper. It pulls real-time performance data from every server and 100G network switch every 15 seconds to identify hardware or performance anomalies.

14. NOC Visualization Cluster

- **Resources:** 64 vCPU, 128 GB RAM, 800 GB Storage
- **Software Stack:** Ubuntu (Grafana) / Windows Server 2022
- **Description:** Provides a centralized visual "NOC" dashboard for the IT command center, correlating clinical application health with underlying physical server metrics.

15. App Performance Monitoring (APM)

- **Resources:** 96 vCPU, 256 GB RAM, 2,000 GB Storage
- **Software Stack:** Ubuntu / Windows Server (Elastic APM/SkyWalking)
- **Description:** Code-Level Tracing. It monitors the Node.js/Java environments to identify specific bottlenecks in code or slow database queries before they affect clinical end-users.

16. Log Analytics (SIEM/ELK)

- **Resources:** 128 vCPU, 512 GB RAM, 10,000 GB Storage
- **Software Stack:** RHEL (Elasticsearch) / Windows Server (Splunk)
- **Description:** Audit Compliance Cluster. Centralized repository for all system and application logs, critical for HIPAA/ABDM forensic analysis and long-term audit retention.

17. PACS AI Rendering (GPU Cluster)

- **Resources:** 128 vCPU, 512 GB RAM, 4,000 GB Storage
- **Software Stack:** Ubuntu (CUDA) / Windows Server 2025 (NVIDIA L40S)
- **Description:Additive Component.** Powers AI-driven diagnostic assistance and high-speed 3D reconstruction using specialized vGPU mapping to the Section E.3 hardware.

18. Medical IoT Management Cluster

- **Resources:** 96 vCPU, 192 GB RAM, 2,000 GB Storage
- **Software Stack:** Ubuntu IoT / Windows Server 2022
- **Description:Additive Component.** Manages and secures connected medical devices (smart pumps, cardiac monitors, etc.) within their dedicated VLAN segments.

19. DR Orchestration Node

- **Resources:** 64 vCPU, 128 GB RAM, 800 GB Storage
- **Software Stack:** RHEL (Nutanix Leap) / Windows Server (SRM)
- **Description:Additive Component.** Manages automated failover/failback logic between the Primary DC and the DR site to ensure continuity of care during a disaster.

20. VDI Management Tier

- **Resources:** 96 vCPU, 256 GB RAM, 1,200 GB Storage
- **Software Stack:** Ubuntu / Windows Server 2025
- **Description:Additive Component.** Orchestrates Virtual Desktop Infrastructure, enabling clinicians to access their roaming profiles from any terminal across the campus.

21. Pharmacy & RCM Cluster

- **Resources:** 64 vCPU, 128 GB RAM, 2,000 GB Storage
- **Software Stack:** RHEL / Windows Server 2022
- **Description:Additive Component.** Dedicated logic for Pharmacy Inventory management, automated drug dispensing integration, and Revenue Cycle Management (RCM) billing.

Highlighting the N+2 redundancy and the 2:1 vCPU over subscription ratio:

Sl. No.	Enhanced Cluster / Instance Name	Cores (vCPU)	RAM (GB)	Storage (GB)	OS Options (Linux / Windows)	Clinical Priority & Remarks
1	**HIS Application Cluster**	128	512	6,000	RHEL 9 / Win Server 2025	Core hospital logic; high concurrency.
2	**HIS Database Cluster**	192	768	9,000	RHEL (Mongo) / Win Server (SQL)	Core patient records; High IOPS.
3	**PACS/RIS Image Cluster**	192	768	15,000	RHEL / Win Server 2025	**50% Storage Tier:** High-speed imaging.
4	**Clinical Reporting Cluster**	128	512	2,000	Ubuntu / Win Server 2022	Resource-heavy PDF & Analytics.
5	**UAT / Training Cluster**	128	512	2,000	RHEL / Win Server 2022	Sandboxed replica for testing.
6	**Identity & AD Cluster**	96	192	1,200	Ubuntu / Win Server (AD)	Primary Auth & Directory services.
7	**LIS & Modality Interface**	64	128	1,200	RHEL (Mirth) / Win Server 2022	Lab equipment HL7 interfacing.
8	**Infrastructure Mgmt Cluster**	64	128	1,200	Ubuntu / Win Server (SCCM)	Orchestration and fleet patching.
9	**Backup & Recovery Node**	64	128	2,000	RHEL / Win Server 2025	Snapshot management & Cyber Vault.
10	**Security & XDR Cluster**	96	256	2,000	Ubuntu / Win Server (XDR)	Real-time endpoint threat hunting.
11	**General Utility & NTP**	48	96	800	CentOS / Win Server 2022	Distributed time sync & scripts.

12	**WAF & Load Balancer Tier**	64	128	800	Nginx Plus / Win Server (ARR)	High-bandwidth traffic management.
13	**Observability (Metrics)**	96	384	4,000	RHEL / Win Server 2022	Millions of clinical system metrics.
14	**NOC Visualization Cluster**	64	128	800	Ubuntu / Win Server 2022	Command Center telemetry display.
15	**App Performance (APM)**	96	256	2,000	Ubuntu / Win Server 2022	Code-level trace for Node.js/Java.
16	**Log Analytics (SIEM/ELK)**	128	512	10,000	RHEL (Elastic) / Win Server (Splunk)	Compliance auditing and log storage.
17	**PACS AI Rendering (GPU)**	128	512	4,000	Ubuntu (CUDA) / Win Server 2025	**Additive:** 3D Rendering and AI.
18	**Medical IoT Mgmt Cluster**	96	192	2,000	Ubuntu IoT / Win Server 2022	**Additive:** Smart-device monitoring.
19	**DR Orchestration Node**	64	128	800	RHEL / Win Server (SRM)	**Additive:** DR failover logic.
20	**VDI Management Tier**	96	256	1,200	Ubuntu / Win Server 2025	**Additive:** Brokers for clinical VDI.
21	**Pharmacy/RCM Cluster**	64	128	2,000	RHEL / Win Server 2022	**Additive:** Inventory and Billing logic.
SUM	**TOTAL ALLOCATION**	**2,000**	**6,528 GB**	**71,000 GB**		**(6.5 TB RAM / 71 TB Storage)**

Consolidated Resource Utilization Summary

Hardware Context: 8 Physical Nodes | Total Physical Cores: 1,024 | Total RAM: 12,288 GB (12 TB)

This table calculates the aggregate demand on physical 8-node HCI cluster providing an estimate of the compute overhead and the available headroom for N+1 or N+2 failure scenarios.

Virtual Resource Aggregation & Physical Mapping

Sl. No.	Virtual Instance Group	Total vCPU	Total RAM (GB)	Total Storage (GB)	Primary Workload Type
01-5	Clinical Core (HIS/PACS/UAT)	672	3,328	31,500	Database & Imaging Logic
06-12	Infra & Mgmt (AD/LIS/Sec/Backup)	344	1,056	8,600	Orchestration & Security
13-16	Observability & Analytics (Logs/APM)	344	1,312	17,000	Monitoring & Big Data
17-21	Additive (AI/IoT/DR/VDI/Pharm)	440	832	13,900	High-Perf Rendering & IoT
	Total Aggregate Demand	2,000	6,528	71,000 (71 TB)	Enterprise Workloads

HCI Cluster Physical Mapping & Headroom Analysis

This table evaluates how the aggregate demand fits into your 8-node physical cluster (N+1 and N+2 scenarios).

Metric	Cluster Total (Physical)	Aggregate Demand (Virtual)	Ratio / Utilization	Failure Scenario Headroom
Compute	1,024 Cores	2,000 vCPUs	1.95:1 (v:p)	N+2 Stable: Even with 2 nodes down, the ratio only climbs to 2.6:1, well within the "High Performance" 3:1 limit.
Memory	12,288 GB	6,528 GB	**53.1% Used**	**N+2 Resilient:** If 2 nodes fail, RAM usage rises to **71%**. System remains fully operational without swapping.
Storage	~122.8 TB (Raw)	71.0 TB	**~57% (Usable)**	**Critical Guardrail:** Includes the 50% PACS/Clinical allocation. Leaves ~15% for metadata/snapshots after failure.

Virtual Server Platform and the **Data Protection Strategy**

1. Data Protection Strategy & Lifecycle (D2D2D)

We will implement a robust **Disk-to-Disk-to-Disk (D2D2D)** backup methodology. This architecture ensures that data exists in three distinct states, providing rapid recovery for operational errors and air-gapped security for catastrophic or ransomware events.

- **Primary Production Write (Tier 1):** All active clinical data from HIS (MongoDB), PACS (Postgres), and the Monitoring Stack (Prometheus TSDB) will be written to the **Production Set (10 TB RAW All-Flash/SSD)**. This tier is optimized for sub-millisecond IOPS to eliminate clinical latency.
- **Synchronous/Near-Instant Copy (Tier 2):** Simultaneous with or immediately following the primary write, data is replicated to the **Disk-to-Disk Backup Set 1 (10 TB RAW All-Flash/SSD)**. This set is utilized for "Instant VM Recovery," allowing the hospital to resume operations within minutes in the event of a Virtual Machine or OS-level corruption.
- **Tertiary Archive & Cyber Vault (Tier 3):** The final level of protection involves a secondary copy to the **Proposed Disk-to-Disk Backup Set 2 (80 TB RAW Nearline/iSCSI)**. This tier is physically or logically separated from the primary production fabric to ensure long-term retention and protection against site-wide issues.

2. Backup Methodology & Orchestration

The backup environment will be a combination of **Incremental & Full DB backups** apart from **OS Snapshots**, managed as follows:

- **OS & Application Snapshots:** Consistent snapshots of the Virtual Machine (VM) states will be taken at the hypervisor level. This includes the **Reverse Proxy (Nginx)** configurations, **Grafana** dashboards, and **HIS/PACS** application binaries, allowing for a "Point-in-Time" rollback of the entire environment.
- **Database-Level Backups:**

- **Incremental Backups:** Frequent transaction log and incremental backups (e.g., every 15–60 minutes) will be performed for the **MongoDB** and **Postgres** databases to minimize Data Loss (RPO).
- **Full DB Backups:** Periodic full database dumps will be orchestrated during low-traffic windows (typically daily) and stored on **Backup Set 2** for long-term historical recovery.

- **Observability Data Retention:** The **Prometheus** and **ELK/Log Aggregator** data will undergo automated lifecycle management, where aging logs and metrics are compressed and moved from the high-speed Production Set to the 80 TB Archive Set.

20.1.2 IT Infrastructure & Facility Technical Matrix

1. Project Objectives

The primary objective of the IT Infrastructure & Facility module is to provide a standardized, high-reliability environment that ensures the physical and operational integrity of the Core Compute and Network stack. This framework focuses on the **"Life Support"** systems of the infrastructure, utilizing an **Integrated Micro Data Center (Smart Rack)** model for the Centralized Hub at SVP Hospital and resilient edge distribution for satellite locations.

The design ensures that power, cooling, and connectivity are concurrently maintainable, allowing for 24/7 clinical operations without interruption.

2. Expected Project Outcomes

- **Decoupled Infrastructure Resilience:** Utilization of room-neutral Smart Racks with integrated DX cooling and modular UPS to ensure 99.98% uptime regardless of ambient room conditions.
- **100G Fiber Backbone:** Achievement of laser-optimized connectivity (OM4) and armored campus-wide fiber (OS2) to support high-bandwidth PACS imaging and real-time HIS data.
- **Zero-Trust Physical Security:** Implementation of biometric MFA handles on server enclosures and lockable distribution racks to secure patient data at every physical touchpoint.

- **Asset Transparency:** Continuous visibility via DCIM (Data Center Infrastructure Management) for real-time thermal mapping and asset inventory accuracy.

3. Functional & Technical Requirements

- **3.1 Integrated Micro Data Center & Power**
- **Smart Rack Enclosures:** Deployment of 45U Integrated Micro Data Centers. These units are "room-neutral," featuring integrated **7kW DX cooling** and **10kVA modular UPS** systems. This design ensures that mission-critical servers are protected from dust, moisture (IP54/NEMA-12), and power fluctuations without requiring a dedicated Tier-III room build-out.
- **Edge Distribution Racks:** A hierarchy of 15U Intermediate and 9U Wing-level racks ensures that network connectivity is distributed across hospital floors with local security (lockable panels) and integrated power distribution units (PDUs).
- **3.2 High-Bandwidth Passive Infrastructure**
- **Laser-Optimized DC Fabric:** Implementation of **OM4 Multimode Fiber** for intra-rack and inter-row links. This "Fiber-First" approach provides the 100G RDMA readiness required for the HCI storage backend.
- **Armored Campus Backbone (OS2):** Use of burial-grade, rodent-resistant 12-Core Single Mode fiber to provide resilient inter-block connectivity across the hospital campus.
- **10G Copper Foundation:** CAT-6A U/FTP shielded cabling with LSZH (Low Smoke Zero Halogen) jackets to support future-proofed 10G speeds for clinical workstations.
- **3.3 Infrastructure Management & Security**
- **DCIM & Thermal Mapping:** Integrated sensors within the Smart Racks provide real-time thermal mapping. This data is fed into the DCIM platform to identify hotspots before they impact server performance.
- **Physical Security:** Biometric MFA handles on the primary enclosures ensure that only authorized IT staff can access physical clinical hardware, complying with **ISO 27001** and **ABDM INF-01** standards.
-

4. Passive Infrastructure Implementation Framework

The bidder shall supply, install, test, and commission a complete Passive Network Infrastructure.

- **Standard Compliance:** All components must meet ANSI/TIA-568 and ISO/IEC 11801 standards.
- **Performance Warranty:** A **25-Year OEM-backed warranty** is mandatory, covering channels, components, and bandwidth compliance.
- **Testing Protocol:** * **Copper:** Mandatory Fluke Performance Certification for all CAT-6A links.
    - **Fiber:** Bidirectional OTDR testing and Power Meter testing for every core, including Link ID and Pass/Fail status reports.

5. Technical Specification Summary

Item Description & Design Philosophy	Qty	Minimum Technical Specification	Compliance (ISO/NABH)
Smart Rack Micro Data Center (Integrated compute housing)	2	45U IP54 Enclosure; 7kW DX Cooling; 10kVA Modular UPS; Biometrics.	ISO: A.11; ABDM: INF-01
Intermediate Distribution Rack (Floor-level connectivity)	15	15U Glass Door; 600mm Depth; 1U 6-Port PDU; High-volume fan kit.	NABH: IMS-03
CAT-6A U/FTP Cable (10G high-bandwidth copper)	60	305m Box; LSZH Jacket; 600MHz; Solid bare copper.	ISO: A.11
12C SM Fiber (OS2) (Armored campus backbone)	3000m	Armoured G.652.D Fiber; LSZH; Dual window 1310/1550nm.	ABDM: INF-01
12C MM Fiber (OM4) (100G RDMA readiness)	1500m	50/125 Laser Optimized; 100G ready; Ultra-low insertion loss.	ISO: A.13.1.1
24-Port CAT-6A Panel (High-density termination)	45	1U Angled; Shielded; Rear Cable Manager; Keystone jacks.	UL-1863
Rack Labeling System (Asset tracking)	1	UV-Resistant Polyester; Industrial Adhesive; Barcode support.	ISO: A.12.1.1
Dual Meet-Me-Rooms (Physical redundancy)	1	Redundant ISP Entry; 4x 4-inch HDPE conduits; Splice trays.	Tier-III Standard

6. Recommendations for Alignment

To ensure the infrastructure meets Tier-III design intent, the following must be validated:

- **PUE Efficiency:** The Smart Rack units must maintain a Power Usage Effectiveness **(PUE) of <1.4** within a non-controlled room environment.
- **Grounding & Bonding:** All racks and trays must be integrated into a common grounding busbar to prevent electrostatic discharge (ESD) from damaging high-speed NVMe storage.
- **Seismic Safety:** Although these are integrated racks, they must be anchored to the base slab to meet regional seismic safety requirements.

Would you like me to create the "Pre-Commissioning Checklist" for the Passive Infrastructure to ensure the fiber and copper links meet the 25-year warranty standards?

Section F - Bill of Quantities in Scope:

Sl No	Item Description, Design Philosophy & Audit Directives	Qty	Implementation Options	Minimum Tech Spec (BOM)	Certifications	Compliance Standards (ISO/NABH/ABDM)	Pricing Category (Summary F)
F.1	**45U Smart Rack Integrated Micro Data Center:** All-in-one high-density compute. **Philosophy:** Decoupled site infrastructure (Room-neutral). **Instruction:** Integrated DX Cooling & modular UPS. **Audit:** PUE <1.4 validation in non-DC environment with FSS, Biometric sensors integrated, DCIM Software: Asset management platform. Philosophy: Centralized DC visibility. Instruction: Real-time thermal mapping. Audit: Asset inventory accuracy audit.	2	Vertiv , Rittal ,Schneider	42U Enclosure; 7kW Dedicated DX Cooling (Split-system); 10kVA Modular UPS; Biometric MFA; NEMA-12/IP54 Sealing.	UL, CE, Energy Star	ISO: A.11; NABH: IMS-03; ABDM: INF-01	2.Smart Racks

F.2	15U Intermediate Rack: Floor-level distribution including PDU. Philosophy: Resilient edge connectivity. Instruction: Glass door for visibility. Audit: Floor-level IDF distribution check.	15	Netrack, Schneider	Glass Door; 600mm Depth; 1U 6-Port PDU; High-volume fan kit; Lockable side panels.	EIA-310-E	ISO: A.11; NABH: IMS-03; ABDM: INF-01	RACK
F.3	9U Wing Mount Rack: Compact wing-level access including PDU. Philosophy: Minimal footprint edge. Instruction: Lockable panels for local security. Audit: Compliance with Wing distribution standards.	25	Legrand, Netrack	450mm Depth; 5-port PDU; Lockable side panels; 19" standard mounting; Powder-coated GI.	ISO 9001	ISO: A.11; NABH: IMS-03; ABDM: INF-01	RACK
F.4	CAT-6A U/FTP Cable: 10G high-bandwidth copper. Philosophy: Future-proofed 10G speeds. Instruction: LSZH Jacket required. Audit: Mandatory Fluke Performance Certification.	60	CommScope, Panduit	305m Box; LSZH Jacket; 600MHz; Full 10G Copper support; Solid bare copper conductors.	ETL, UL Listed	ISO: A.11; NABH: IMS-03; ABDM: INF-01	4. Cabling & Tools
F.5	12C SM Fiber (OS2): Armoured campus backbone. Philosophy: Inter-block resilience. Instruction: Burial-grade armouring. Audit: OTDR testing for every core.	300 0m	Sterlite, Corning	Armoured Jacket; G.652.D Fiber; LSZH; Dual window 1310/1550nm; Rodent/Water resistant.	ITU-T G.652.D	ISO: A.11; NABH: IMS-03; ABDM: INF-01	4. Cabling & Tools
F.6	12C MM Fiber (OM4): Laser-optimized DC fabric. Philosophy: 100G RDMA readiness. Instruction: Use for intra-rack links. Audit: RDMA storage fabric optimization check.	150 0m	CommScope, Corning	50/125 Laser Optimized; OM4; 100G ready; LSZH; Ultra-low insertion loss.	TIA/EIA-568-C.3	ISO: A.11; NABH: IMS-03; ABDM: INF-01	4. Cabling & Tools
F.7	24-Port CAT-6A Panel: Angled copper termination. Philosophy: High-density cable management. Instruction: Shielded with rear managers. Audit: Managed patch distribution audit.	45	Panduit, CommScope	1U Angled; Shielded; Fully Loaded; Rear Cable Manager; High-retention keystone jacks.	UL-1863	ISO: A.11; NABH: IMS-03; ABDM: INF-01	4. Cabling & Tools

F.8	MM OM4 Patch Cord: High-bandwidth duplex jumpers. Philosophy: Low-loss server connection. Instruction: LSZH rated cords only. Audit: Cable label and path verification.	300	Corning, Panduit	50/125; LSZH; 3m; LC-LC Duplex; Low Insertion Loss (<0.2dB); Ceramic ferrules.	IEC 61754	ISO: A.11; NABH: IMS-03; ABDM: INF-01	4. Cabling & Tools
F.9	Cable Tray Systems: Wire mesh raceways. Philosophy: Path segregation. Instruction: GI Mesh, powder coated. Audit: Data/Power separation audit.	1	Legrand, Valrack	GI Wire Mesh; Powder Coated; 300mm width; Mounting brackets; Grounding hardware.	IEC 61537	ISO: A.11; NABH: IMS-03; ABDM: INF-01	4. Cabling & Tools
F.10	Fiber LIU/Panels: Termination units. Philosophy: Managed fiber distribution. Instruction: Splice trays included. Audit: High-density termination audit.	1	CommScope, Corning	Rack Mount Tray; 24/48 Port; Splice trays included; Front management; Pigtail kits.	TIA-568	ISO: A.11; NABH: IMS-03; ABDM: INF-01	4. Cabling & Tools
F.11	Cable Management Acc: Labeling and routing. Philosophy: Asset identification. Instruction: Use industrial labels. Audit: Asset ID and labeling audit.	1	Panduit, Legrand	RoHS Ties/Velcro; Laser Labels; Cable Socks; Floor markers; Port ID tags.	RoHS	ISO: A.11; NABH: IMS-03; ABDM: INF-01	4. Cabling & Tools
F.12	Vertical Cable Mgrs: High-density routing. Philosophy: Optimal airflow routing. Instruction: 6-inch double-sided. Audit: High-volume routing check.	1	Vertiv, Netrack	High Density; 6-inch width; Double sided; Fingers for cable protection; Slam latches.	ISO 9001	ISO: A.11; NABH: IMS-03; ABDM: INF-01	4. Cabling & Tools
F.13	Workstation Faceplate: Scalable user ports. Philosophy: User-side modularity. Instruction: Dual/Quad port shutters. Audit: User connectivity scalability audit.	1	Panduit, CommScope	Dual/Quad Port; Angled; Shutters included; Icons/Labels; Flame-retardant plastic.	UL	ISO: A.11; NABH: IMS-03; ABDM: INF-01	4. Cabling & Tools
F.14	Rack Labeling System: Asset tracking. Philosophy: Identification compliance. Instruction: UV-	1	Brady, Dymo	Polyester Vinyl; UV Resistant; Industrial Adhesive; Clear-coat protection;	UL Listed	ISO: A.11; NABH: IMS-03; ABDM: INF-01	5. DCIM & Audit

	resistant polyester. Audit: Labeling and asset ID audit.			Barcode support.			
F.15	Dual Meet-Me-Rooms: Physical redundancy. Philosophy: ISP diversiy. Instruction: Redundant conduit entry. Audit: ISP redundancy audit.	1	Facilities	Redundant ISP Entry; 4x 4-inch HDPE conduits; Splice trays; Dedicated power.	Tier-III	ISO: A.11; NABH: IMS-03; ABDM: INF-01	4. Cabling & Tools

20.1.3 Network Infrastructure & Security Technical Matrix

1. Project Objectives

The primary objective of the Network Infrastructure and Security module is to establish a high-speed, "non-blocking" digital nervous system for the hospital ecosystem. By adopting a modern **Spine-Leaf Architecture**, the design eliminates the congestion typical of legacy networks. This ensures that massive PACS imaging files and real-time EMR data move seamlessly across the campus, providing a secure, compliant foundation for ABDM and NABH digital mandates.

2. Expected Project Outcomes

- **Predictable Low Latency:** A non-blocking fabric ensuring sub-millisecond switching for critical HIS/LIS database transactions and high-speed PACS rendering.
- **Zero-Trust Micro-segmentation:** Granular isolation of clinical systems, medical IoT (infusion pumps, monitors), and guest Wi-Fi to prevent the lateral spread of cyber threats.
- **Medical IoT Security:** Automated profiling and authentication of all connected medical hardware via Network Access Control (NAC), ensuring only authorized devices access the patient data VLAN.
- **High-Speed Resilience:** Redundant 100G paths ensuring that critical clinical services remain active even in the event of a primary fiber link failure.

3. Functional & Technical Requirements

- **3.1 Core Fabric & High-Speed Connectivity**
- **High-Density Spine-Leaf Core:** Deployment of 100G/25G high-density switches to create a redundant, non-blocking fabric. This architecture is designed to handle "bursty" traffic from digital pathology and high-resolution radiology scans without dropping packets.
- **HCI Optimized Storage Networking:** Dedicated Leaf switches supporting **RoCE v2** (RDMA over Converged Ethernet) to provide the ultra-low latency required by the Hyper-Converged storage layer, ensuring the "Virtual SAN" heartbeat remains uninterrupted.
- **3.2 Perimeter & Internal Security**
- **Granular Internal Segmentation:** High-throughput internal firewalls isolate "East-West" traffic. This ensures that a compromise in a public-facing service (like Guest Wi-Fi) cannot reach the core clinical database or patient records.
- **Identity-Based Access Control:** Radius/NAC systems provide 802.1X authentication for all wired and wireless entry points. The system automatically profiles connected devices (e.g., MRI machines vs. staff laptops) and dynamically places them into isolated security zones.
- **3.3 High-Performance Trunks & Optical Backbone**
- **100G Optical Fabric:** A comprehensive kit of 100G SR4/LR4 optics and MPO-12 high-density fiber trunks to connect the fabric at line-rate speeds.
- **Diverse Path Resilience:** Implementation of redundant physical fiber routes to ensure that the 100G backbone remains active even in the event of a physical cable cut on the primary route.
- **3.4 Management & WAN Optimization**
- **Out-of-Band (OOB) Management:** An independent management network allows IT staff to access and recover network equipment via serial console even if the main production network is unresponsive.

- **SD-WAN Cloud Steering:** Optimized routing for Public Cloud S3 traffic, ensuring that off-site clinical archives are updated efficiently without saturating the primary internet bandwidth used by hospital staff.

4. Implementation & 5-Year Sustenance Framework

- **Proactive Optical Spares:** An on-site emergency kit of 100G transceivers and standby access switches is maintained to meet 4-hour restoration SLAs for critical network paths.
- **Annual Security Validation:** Mandatory annual Vulnerability Assessment and Penetration Testing (VAPT) by certified auditors to maintain ISO 27001 and NABH compliance.
- **Expert Commissioning:** Formal delivery of Low-Level Designs (LLD), configuration workbooks, and automated fabric deployment to ensure a "clean-build" handoff.
- **OEM-Backed Continuity:** 5-Year OEM Software and Support (SnS) ensuring 24x7 hardware replacement and immediate access to critical security patches.

5. Critical Technical Alignment Recommendations

To ensure the network meets the mission-critical design intent, the following must be validated:

- **Loop Prevention:** Edge switches must have BPDU Guard and Loop-Protection enabled to prevent hospital-wide outages caused by accidental user-end cabling errors.
- **MPO Polarity:** Ensure MPO-12 cables are verified for "Type-B" polarity to support standard 100G QSFP28 transceiver interconnectivity.
- **WPA3 Encryption:** Mandatory enforcement of WPA3 for all medical Wi-Fi networks to meet the latest ABDM security standards for mobile EMR tablets and handheld devices.

6. Technical Specification Summary

Item Description & Design Philosophy	Qty	Minimum Technical Specification
Spine Core Switch (Non-blocking fabric)	2	32-Port 100G QSFP28; Low-latency; EVPN-VXLAN support.
HCI Leaf Switch (Storage optimized)	4	48-Port 25G SFP28 + 6-Port 100G; RoCE v2 Support.
Internal Segmentation Firewall	2	20Gbps Threat Inspection; AI-based lateral threat detection.

Network Access Control (NAC)	1	802.1X Auth; Automated Device Profiling; Guest Management.
100G MPO Trunk Cables	12	MPO-12 Female to Female; Type-B Polarity; OM4 LSZH.
100G SR4 Transceivers	24	QSFP28 100G-SR4; MPO Interface; 100m over OM4.
SD-WAN Gateway	2	1Gbps Encrypted Throughput; Application-aware routing.

Section G - Bill of Quantities in Scope:

Sl No	Item Description, Design Philosophy & Audit Directives	Qty	Implementation Options	Minimum Tech Spec (BOM)	Certifications	Healthcare Compliance (ISO/NABH/ABDM)	Pricing Category (Summary G)
G.1	Core Backbone Switch (DC): Central nervous system.	2	Cisco, Arista	32-Port 100G QSFP28; 6.4Tbps; EVPN-VXLAN.	Common Criteria	ISO: 27001; NABH: Yes	1. 100G Core Fabric
G.2	Spine Switches: High-speed fabric core.	4	Cisco, Arista	48x 25G SFP28 + 6x 100G QSFP28 Uplinks.	CE, UL	ISO: 27001; ABDM: INF-01	1. 100G Core Fabric
G.3	Leaf Switches (HCI Optimized): Specialized storage.	4	Cisco, Arista	32-Port 100G; RoCE v2 optimized; PFC.	IEEE 802.1Q	ISO: 27001; NABH: IMS-IT	1. 100G Core Fabric
G.4	Edge Access (Floor): Stackable PoE+ for floors.	40	Cisco, Arista	48-Port 1G PoE+; 740W PoE Budget.	802.3at	ISO: 27001; ABDM: INF-01	2. Access/Floor Mgmt
G.5	Out-of-Band Switch: Isolated mgmt network.	4	Cisco Nexus	24-Port 1G; Non-blocking for IPMI/KVM.	CE	ISO: 27001; NABH: IMS-IT	2. Access/Floor Mgmt
G.6	100G QSFP28 SR4: Intra-DC core transceivers.	32	OEM	100G Multimode (MPO); 100m over OM4.	MSA	ISO: 27001; NABH: IMS-IT	3. Transceivers
G.7	100G QSFP28 LR4: Long-range DCI transceivers.	8	OEM	100G Single-mode; 10km range; Dual LC.	MSA	ISO: 27001; NABH: IMS-IT	3. Transceivers

G.8	25G SFP28 SR Transceiver: Server-to-leaf optics.	80	OEM	25G Multimode; 850nm VCSEL; 100m range.	MSA	ISO: 27001; ABDM: INF-01	3. Transceivers
G.9	10G SFP+ SR Transceiver: Access-to-spine optics.	60	OEM	10GBASE-SR; 850nm; 300m range.	SFF-8431	ISO: 27001; ABDM: INF-01	3. Transceivers
G.10	MPO-12 Trunk Cables: High-density fiber trunks.	20	CommScope	MPO-12 to MPO-12; OM4; LSZH; Type B.	TIA-568	ISO: 27001; NABH: IMS-IT	3. Transceivers
G.11	Network Mgmt Tool (NMS): Visual monitoring.	1	Cisco, Arista	SNMP v3; NetFlow; Topology Mapping.	ISO 27001	ISO: 27001; ABDM: INF-01	4. SD-WAN/NAC/NMS
G.12	SD-WAN / WAN Opt: Cloud & Site optimization.	2	Silver Peak	10G throughput; AES-256; Dynamic Path.	FIPS 140-2	ISO: 27001; ABDM: Yes	4. SD-WAN/NAC/NMS
G.13	Radius/NAC Server: Medical device auth.	2	Cisco ISE	802.1X; Profiling for Med-IoT; HA Pair.	Common Crit	ISO: 27001; ABDM: INF-02	4. SD-WAN/NAC/NMS
G.14	Internal Segmentation FW: VLAN isolation.	2	Fortinet	40G/100G Interfaces; 20Gbps Threat Insp.	ICSA Labs	ISO: 27001; ABDM: INF-02	4. SD-WAN/NAC/NMS

20.1.4 Cybersecurity & Unified Threat Management

1. Project Objectives

The primary objective of the Cybersecurity & UTM module is to establish a **Defense-in-Depth architecture** that safeguards the hospital's digital ecosystem while ensuring strict compliance with the **Digital Personal Data Protection (DPDP) Act 2023**.

This framework provides a multi-layered shield—covering the perimeter, endpoint, cloud, and identity layers. The design is engineered to meet **ABDM Level-3** security requirements and the National Data Governance Policy, ensuring that Patient Health Information (PHI) is protected by military-grade encryption and that the hospital fulfills its legal role as a "Data Fiduciary."

2. Expected Project Outcomes

- **DPDP Act Compliance:** Technical controls for data principal rights, consent management, and mandatory breach notification within legal windows.
- **Ransomware Immunity:** Deployment of XDR (Extended Detection and Response) to detect and "rollback" unauthorized encryption attempts at the workstation and server levels.
- **Zero-Day Threat Prevention:** Utilization of AI-driven Sandboxing to neutralize unknown malware before it enters the clinical network.
- **Sovereign Data Protection:** Strict alignment with Indian data localization mandates, ensuring sensitive clinical data remains within protected national boundaries.

3. Functional & Technical Requirements

- **3.1 Perimeter & Application Defense**
- **Next-Gen Firewall (NGFW) Fabric:** High-performance NGFW clusters providing deep packet inspection. These units enforce SSL/TLS 1.3 decryption to inspect encrypted traffic for hidden threats, acting as the primary "Border Guard" for the hospital network.
- **Web App & API Security (WAF):** A specialized firewall to protect patient portals and ABDM health exchange gateways. It specifically guards against unauthorized data scraping and API-based leaks, which is a critical requirement for DPDP compliance.

- **3.2 Endpoint & Identity Governance**
- **Managed EDR/XDR:** Advanced behavioral agents on clinical nodes that move beyond traditional antivirus. They provide forensic analysis and automated incident containment to prevent the "unauthorized processing" of patient data.
- **Identity & Privileged Access (IAM/PAM):** A unified suite ensuring only authorized personnel can access sensitive systems. This satisfies "Purpose Limitation" and "Storage Limitation" principles by restricting access based on clinical necessity and recording all administrative actions.
- **3.3 Data Protection & Security Intelligence**
- **Data Loss Prevention (DLP) & Encryption:** Integrated tools that classify data and prevent unauthorized transfer of records. This serves as the primary control for preventing "Personal Data Breaches" under Indian law.
- **SIEM/SOAR & Log Management:** The "Security Brain" of the hospital. It ingests logs from all devices to detect patterns of exfiltration and automates the response to stop a breach in milliseconds, providing the logs necessary for mandatory 72-hour breach reporting.

4. Implementation & 5-Year Sustenance Framework

- **Continuous Risk Assessment:** Monthly automated vulnerability scans paired with annual **CERT-In empaneled VAPT** (Vulnerability Assessment and Penetration Testing) to identify and remediate security gaps.
- **Lifecycle Compliance Audits:** Regular mapping of technical controls against ISO 27001, NABH IMS-03, and DPDP Act schedules to ensure the hospital remains audit-ready and legally protected.
- **Incident Response & Coordination:** Configuration of security telemetry to export logs in formats compatible with national cybersecurity coordination centers for rapid incident reporting.

5. Technical Specification Summary

Component	Design Philosophy	Minimum Technical Specification
Perimeter NGFW	Zero-Day Prevention	High-performance cluster; AI-Sandbox; SSL Inspection; 10G+ Throughput.
Internal WAF	API & Portal Defense	Specialized Web Application Firewall; Bot Mitigation; API Security.
EDR/XDR Agent	Endpoint Resilience	Behavioral Detection; Ransomware Rollback; 24/7 Forensic Logging.
IAM/PAM Suite	Identity Sovereignty	Multi-Factor Authentication (MFA); Privileged Session Recording.
SIEM/SOAR Platform	Threat Intelligence	Centralized Log Aggregation; Automated Incident Response Playbooks.
DLP Engine	PHI Safeguarding	Data Discovery; File-level Encryption; USB/Cloud Transfer Blocking.
VAPT Services	Proactive Defense	Annual Ethical Hacking; Monthly Vulnerability Management Reports.

6. Recommendations for Implementation

To fully achieve the Security Design Philosophy, the following must be validated:

- **Consent Artifact Integration:** Ensure the security stack can log and store "Consent Artifacts" as required by the DPDP Act for every instance of data processing.
- **Hardware-Based Encryption:** Validate that the encryption modules are FIPS 140-2/3 certified to meet the highest standards of data-at-rest protection for medical records.
- **Automated Rollback:** Confirm the XDR solution can demonstrate a successful file restoration after a simulated ransomware attack without manual backup recovery.

Section H - Bill of Quantities in Scope:

Sl No	Item Description, Design Philosophy & Audit Directives	Qty	Implementation Options	Minimum Tech Spec (BOM)	Certifications	Healthcare Compliance Standards (ISO / NABH / ABDM)	Pricing Category (Summary H)
H.1	Next-Gen Firewall (NGFW) - Core: Perimeter & Segment defense. Philosophy: "Never Trust, Always Verify." Instruction: Configure 10Gbps Threat Inspection with SSL Decryption. Audit: Perimeter breach simulation and segment isolation check.	2	Fortinet, Palo Alto, Checkpoint	25G Interfaces; 10Gbps Threat Inspection; AI-Sandbox; SSL/TLS 1.3 Decryption; IPS/IDS; Botnet Protection; 1M+ Concurrent Sessions.	ICSA Labs, FIPS 140-2	ISO: 27001; NABH: Yes; ABDM: Yes	1. 100G Hyperscale NGFW
H.2	SIEM/SOAR & Log Mgmt: Unified Monitoring & Compliance. Philosophy: Centralized security intelligence. Instruction: ABDM/HIPAA dashboard integration. Audit: Log retention and incident response time (RTO) audit.	1	Splunk, QRadar, LogRhythm	500 EPS / 1TB Storage; Compliance Reporting (ABDM/HIPAA); Automated Incident Response (SOAR); Machine Learning analytics.	ISO 27001	ISO: A.12,13,17; NABH: IMS-03; ABDM: INF-01	3. Sec Ops
H.3	Web App Firewall (WAF): ABDM Gateway Security. Philosophy: Shielding public-facing interfaces. Instruction: Mitigate OWASP Top 10. Audit: API security and DDoS resilience testing.	2	F5, Cloudflare, Imperva	Layer 7 Protection; ABDM Gateway Sec; API Defense; OWASP Top 10 mitigation; DDoS Shielding; Virtual Patching.	PCI-DSS	ISO: A.12,13,17; NABH: IMS-03; ABDM: INF-01	2. Border Switching & SSL
H.4	Vulnerability Management: Continuous Gap Analysis. Philosophy: Proactive risk identification. Instruction: Monthly internal/external scans. Audit: Remediation tracking and patch aging report.	1	Tenable, Qualys	Monthly Risk Scanning; Asset Discovery; Remediation Tracking; Patch Prioritization; Dashboard for CISO.	CVE	ISO: A.18; NABH: IMS-03; ABDM: INF-01	3. Sec Ops
H.5	Penetration Testing (VAPT): Regulatory compliance. Philosophy: External validation of defenses.	4	CERT-In Agency	Annual VAPT Report; Network, Application, and Wi-Fi testing; External/Internal Pen-Testing; Social	CERT-In	ISO: A.12,13,17; NABH: IMS-03; ABDM: INF-01	3. Sec Ops

	Instruction: Annual CERT-In audit. Audit: Executive summary and proof of remediation for high/critical risks.			engineering tests.			
H.6	CSPM (Cloud Sec Posture): S3/Cloud Security. Philosophy: Secure the Hybrid-Cloud Tier. Instruction: Alert on S3 bucket exposure. Audit: Cloud compliance drift and bucket configuration audit.	1	Prisma Cloud, Wiz	API-based AWS/Azure Audit; S3 Bucket exposure alerts; Compliance drift monitoring; DevSecOps links; IAM visibility.	OEM Standard	ISO: Yes; NABH: No; ABDM: Yes	3. Sec Ops

Section [I & J]: 100G WAN Infrastructure & Demarcation Protocol

1. Scope Overview

While the Internet Service Providers (NKN / GSWAN / Railtel) provide the "last-mile" fiber up to the building entry point (Minimum Point of Entry - MPOE), their responsibility typically terminates at the Distribution Point (DP) or basement. To ensure the 100G WAN link is "Data Center Ready," redundant, and capable of wire-speed performance, the **System Integrator (SI)** shall be responsible for the "Demarc Extension"—the critical bridge between the building entry and the Data Center Rack.

2. Demarcation & Responsibility Matrix

Entity	Responsibility Scope
AMC-MET	Formal application to NKN/GSWAN/Railtel; Payment of statutory one-time/recurring port charges.
ISP (NKN/GSWAN/Railtel)	Delivery of fiber to the building basement/MPOE; Provision of the physical hand-off (LC connector).
Contractor (SI)	**Turnkey Implementation:** Internal conduit mapping, vertical/horizontal fiber pulling, termination (LIU), supply of terminal equipment (SD-WAN/Switch), and 100G logical configuration.

3. Technical Requirements

3.1 Passive Connectivity Layer

The SI shall provide the infrastructure to terminate "loose" ISP fiber into a professional rack environment:

- **High-Density LIU:** 1U Rack-mount Light Interface Units with LC-Adapter plates (2 Nos per site for dual-path redundancy).

- **100G Fiber Jumpers:** High-quality OS2 Single Mode Patch Cords (LC-to-LC) for connecting LIUs to the active equipment.
- **Angled Patch Panels:** To manage the bend radius of high-speed 100G fiber, standard plastic trays are prohibited; angled panels must be used.

3.2 Path Redundancy & Physical Security

To eliminate a single point of failure, the SI must implement:

- **Dual-Entry Conduits:** Path A (Primary) and Path B (Secondary) must not share the same physical pipe or riser. The SI shall install separate internal PVC/EMT conduits from the basement to the Data Center floor.
- **Internal Fiber Integrity:** Bidders must ensure Path A and Path B follow physically diverse routes within the building to protect against localized disasters (e.g., a riser fire).

3.3 Out-of-Band (OOB) Management

To ensure remote troubleshooting capability during a total WAN link failure:

- **Console Server:** A dedicated 4-port serial console server (e.g., Avocent/Perle) must be provided to allow remote access to the "Console Port" of the Border Gateway Switch/SD-WAN appliance via an independent management network.

4. Terminal Equipment & Logic (The "Brain")

At each hospital facility (LG, Shardaben, and Nagri), the SI shall provide "Data Center Grade" electronics capable of wire-speed Layer-3 routing (BGP).

- **Border Gateway Switches:** These must handle 100 billion bits per second without latency. Modern switches (e.g., Arista/Cisco Nexus) are required for their non-blocking switching capacity and high port density (allowing concurrent connection of WAN, HCI, and Storage).
- **SD-WAN Intelligence:** An SD-WAN appliance (as specified in Section I) shall be integrated to automatically switch traffic paths if the primary NKN link fails or fluctuates.

5. Detailed Bill of Quantities (BOQ)

SECTION I BOQ: WAN Infrastructure & Demarcation Layer - SI Scope

Sl No	Item Description, Design Philosophy & Audit Directives	Qty	Implementation Options	Minimum Tech Spec (BOM)	Certifications	Compliance (ISO/NABH/ABDM)	Pricing Category (Summary I)
I.1	High-Density Fiber Termination (LIU): Philosophy: Modular termination. Audit: Loss $<0.3\text{dB}$.	2 Nos	Rackmount 1U	24-Port LC-Duplex loaded with OS2 pigtails/trays.	IEC 61754	ISO 27001	2. Signal Normalization & Riser Fiber
I.2	SD-WAN Hardware Appliance (100G): Philosophy: Automated "hitless" failover between NKN & GSWAN. Audit: Sub-second path switching.	1 Unit	Fortinet 1000F / Cisco Cat 8500	2x 100G QSFP28 slots, 13Gbps Threat Protection, Hardware SD-WAN ASIC, Dual PSU.	ICSA Lab, FIPS 140-2	NABH (Uptime)	1. 100G SD-WAN Appliance & Licenses
I.3	SD-WAN 5-Year License Bundle: Philosophy: Unified Security + SD-WAN. Audit: Real-time traffic steering logs.	1 Lot	FortiGuard Ent. / Cisco DNA	5-Year 24x7 Support, IPS, Antivirus, Application Control, and SD-WAN Orchestrator.	MeitY Listed	ABDM (Continuity)	1. 100G SD-WAN Appliance & Licenses
I.4	Managed Media Converter: Philosophy: Signal normalization. Audit: Remote SNMP monitoring active.	3 Nos	Chassis Based	10/100/1000Base-TX to 1000Base-FX (SFP Slot).	CE, FCC Class A	ISO 9001	2. Signal Normalization & Riser Fiber
I.5	Internal Armoured Backbone Fiber: Philosophy: Protect riser runs. Audit: OTDR trace required.	300m	OS2 12-Core SMF	LSZH Jacket, Steel Tape Armouring, 9/125 Micron.	ITU-T G.652.D	ABDM	2. Signal Normalization & Riser Fiber
I.6	100G Interconnects (DACs/Patch): Philosophy: Lossless patching. Audit: Length-matched.	1 Lot	Passive DAC / OS2	4x QSFP28 DACs (100G) and 8x OS2 LC-LC Cords.	SFF-8665	ISO 9001	2. Signal Normalization & Riser Fiber

I.7	Dual-Path Redundant Conduits: Philosophy: Geographic separation. Audit: Visual path check.	1 Lot	HDPE / EMT Pipe	2-inch fire-rated piping for Path A and Path B.	IS:14930	NABH (Safety)	2. Signal Normalization & Riser Fiber

SECTION J BOQ: WAN Connectivity & Recurring Expenditure - AMC-MET Scope

Sl No	Item Description, Design Philosophy & Audit Directives	Qty	Implementation Options	Minimum Tech Spec (BOM)	Certifications	Compliance (ISO/NABH/ABDM)	Pricing Category (Summary I)
I.1	High-Density Fiber Termination (LIU): Philosophy: Modular termination. Audit: Loss $<0.3\text{dB}$.	2 Nos	Rackmount 1U	24-Port LC-Duplex loaded with OS2 pigtails/trays.	IEC 61754	ISO 27001	1. GSWAN & Railtel 100G HA
I.2	SD-WAN Hardware Appliance (100G): Philosophy: Automated "hitless" failover between NKN & GSWAN. Audit: Sub-second path switching.	1 Unit	Fortinet 1000F / Cisco Cat 8500	2x 100G QSFP28 slots, 13Gbps Threat Protection, Hardware SD-WAN ASIC, Dual PSU.	ICSA Lab, FIPS 140-2	NABH (Uptime)	1. GSWAN & Railtel 100G HA
I.3	SD-WAN 5-Year License Bundle: Philosophy: Unified Security + SD-WAN. Audit: Real-time traffic steering logs.	1 Lot	FortiGuard Ent. / Cisco DNA	5-Year 24x7 Support, IPS, Antivirus, Application Control, and SD-WAN Orchestrator.	MeitY Listed	ABDM (Continuity)	1. GSWAN & Railtel 100G HA
I.4	Managed Media Converter: Philosophy: Signal normalization. Audit: Remote SNMP monitoring active.	3 Nos	Chassis Based	10/100/1000Base-TX to 1000Base-FX (SFP Slot).	CE, FCC Class A	ISO 9001	1. GSWAN & Railtel 100G HA
I.5	Internal Armoured Backbone Fiber: Philosophy: Protect riser runs. Audit:	300m	OS2 12-Core SMF	LSZH Jacket, Steel Tape Armouring, 9/125 Micron.	ITU-T G.652.D	ABDM	1. GSWAN & Railtel 100G HA

	OTDR trace required.						
I.6	100G Interconnects (DACs/Patch): Philosophy: Lossless patching. Audit: Length-matched.	1 Lot	Passive DAC / OS2	4x QSFP28 DACs (100G) and 8x OS2 LC-LC Cords.	SFF-8665	ISO 9001	1. GSWAN & Railtel 100G HA
I.7	Dual-Path Redundant Conduits: Philosophy: Geographic separation. Audit: Visual path check.	1 Lot	HDPE / EMT Pipe	2-inch fire-rated piping for Path A and Path B.	IS:14930	NABH (Safety)	1. GSWAN & Railtel 100G HA

6. Performance Guarantees & Compliance

- **Throughput Mandate:** The Terminal Equipment at each facility must support a minimum non-blocking switching capacity of **3.2 Tbps** and full L3 routing for up to **1M IPv4 routes**.
- **Security Alignment:** To prevent the WAN from being throttled, the Security stack (covered in Section H) must maintain near-line-rate speeds (e.g., Palo Alto 5400 or Checkpoint Quantum Force) for encrypted medical data.
- **Failover Requirement:** The SI must demonstrate a "hitless" failover. In the event of a fiber cut on Path A, the SD-WAN/Border Switch must re-route traffic to Path B in **less than 1 second** without dropping active HIS/PACS sessions.

7. Specific Scope of Work (SOW) Paragraph for SI

The Bidder (SI) shall be responsible for the end-to-end internal fiber engineering. This includes the 'Demarc Extension' involving the supply and installation of all conduits, armored fiber, and termination hardware required to extend the ISP hand-off from the MPOE to the designated rack. The SI shall conduct a physical site survey to map two geographically diverse internal paths and provide an 'As-Built' fiber map upon completion.

Comments and Instructions to Bidders Applicable to all Sections:

The unit rates quoted for each item shall be all-inclusive. This includes, but is not limited to: the cost of hardware/software, Annual/Comprehensive Maintenance Contracts (AMC/CMC) for the specified duration, and all Professional Services (such as installation, configuration, and training). The bidder shall ensure that no additional costs are deferred to separate line items or future service agreements. While rates must be presented as blended, the Seller shall provide a detailed price breakdown upon request for audit or internal accounting purposes.

Manpower Requirements Core On-Site Implementation Team					
Role ID	**Designation**	**Core Responsibility**	**Count**	**Qualification**	**Experience**
M.1	Project Lead (Infrastructure)	Single point of contact; NABH/ABDM audit compliance; Managing site-prep vendors	1	B.E./B.Tech (IT/EEE/CS) / PMP preferred	10+ years in DC/Hospital IT projects
M.2	DC Facilities Engineer	Smart Racks, Cooling (Split DX), Biometrics, VESDA, Novec, Leak sensors	1	B.E./Diploma (Electrical/Mechanical)	6–8 years in Data Center commissioning
M.3	Network Fabric Architect	100G Spine-Leaf, RoCE v2 for HCI, EVPN-VXLAN	2	B.E./B.Tech + CCNP/CCIE preferred	8–12 years in Enterprise/DC networks
M.4	Cybersecurity Specialist	NAC (RADIUS), Firewall segmentation, VAPT remediation	1	B.E./B.Tech + CEH/CISSP/Firewall OEM Cert	6–10 years in Network Security
M.5	Structured Cabling Lead	Cat6A & MPO-12/OM4 fiber trunks, Fluke testing, labeling	1	Diploma / Certified Cabling Specialist	5–7 years in DC/Enterprise cabling
M.6	Electrical / Fit-out Mason	Conduiting, cable laying, trenching, heavy lifting	4	ITI / Skilled Trade Certification	5+ years in industrial/DC projects
		Total	10		
M.7	IT Engineer	IT Infrastructure	4	Diploma/Any Graduation / B. Tech	3+ years in IT Field. This team is required after implementation IT Infrastructureof Support period till 5 yearsat Site.

Note:

1) The above manpower indication is only for the implementation period and not for the warranty support period.
2) Since the implementation would be carried out on a phased manner i.e., hospital by hospital, implementation team remains the same and they will move to all the 3 hospitals one after the another.

SECTION E: CORE COMPUTE & STORAGE

Key Design Parameters Retained

- **Network:** All implementations **MUST** support the 100G Spine-Leaf backend to handle the high IOPS of All-Flash NVMe storage.
- **Redundancy:** N+2 node resilience for the Primary DC (allowing two simultaneous node failures without service interruption).
- **ABDM Compliance:** Every storage and backup option includes WORM/Object Lock to meet the 10-year data integrity audit requirements.

Key Highlights of the Permissive Design

- **Infrastructure Agility:** Implementation options now include all "Magic Quadrant" leaders, allowing the procurement team to leverage competitive bidding between Dell/HPE/Cisco and Nutanix/VMware.
- **100G RoCE Connectivity:** Primary compute is standardized on 100G interfaces to support high-density medical imaging (PACS) and rapid database replication between DC and DR.
- **Hybrid Cloud Strategy:** By reallocating the tape budget to Managed Cloud Backup, the hospital gains a "Geographic Air-gap" that is infinitely more reliable than physical media.

Key Compatibility & Design Corrections

- **RoCE v2 Hardware Offload:** To achieve 100G Line Speed without the overhead of standard TCP/IP teaming, RoCE v2 (RDMA) NICs are specified. This allows storage traffic to move directly from one server's memory to another's across the 100G fabric.
- **PCIe Gen5 Bus:** A single 100G port requires roughly 12.5 GB/s of bandwidth. To prevent internal server bottlenecks, the BOM mandates PCIe Gen5 slots for the NICs.
- **NVMe-over-Fabric (NVMe-oF):** For storage expansion units, NVMe-oF is specified to ensure that "expanded" storage maintains the same 100G line-speed performance as primary nodes.
- **No Teaming Overhead:** The design assumes a Single-Stream 100G flow per port. Redundancy is handled by the HCI software stack (Multipathing) rather than legacy Ethernet bonding.

Critical Enhancements for 100G Line Speed

- **Eliminating Teaming Bottlenecks:** Traditional LACP/Teaming introduces overhead. By using RDMA (RoCE v2), the HCI software treats the two 100G ports as independent active paths, ensuring a single VM can hit 100Gbps on a single thread.
- **Buffer Alignment:** Leaf Switches must have Deep Buffers (32MB+) to handle 100G micro-bursts when a single node pushes full line rate.

Compatibility Checklist: Core Compute ↔ Networks

- **NIC Type:** Dedicated QSFP28 NICs required.
- **Cabling:** NICs must connect to Leaf switches using 100G DAC Cables.
- **Switch Logic:** Switches must be configured with PFC (Priority Flow Control) to support lossless Ethernet for RDMA.

Audit & Design Remarks

- **Zero-SPOF Enforcement:** Every server uses dual 100G NICs connected to independent Spine-Leaf switches. Virtualization and DR Orchestration ensure no single node failure stops clinical operations.
- **Modernized Backup:** The removal of Tape in favor of On-Prem S3 and Cloud S3 provides "Instant Recovery" capability meeting Tier-III and ABDM standards.

SECTION F: FACILITIES & PASSIVE IT INFRASTRUCTURE

This section details the physical environment required to support the high-end compute stack. It is designed for a 2026-standard Tier-III Data Center.

Critical Design Notes

- **Tier-III Certification:** Includes Concurrent Maintainability. Any UPS or AC unit can be taken offline for service without the Core Compute losing power or cooling.
- **High-Density Ready:** Intelligent PDUs and Aisle Containment are sized to handle the 400W–600W TDP of modern processors.
- **Passive 100G Backbone:** All fiber is OM4/OS2 to ensure future core switch upgrades to 100G/200G do not require re-cabling.

Technical Pillars for Hospital DC

- **The "Passive" Backbone:** Use of CAT-6A and OM4 Fiber. CAT-6A is mandatory for 10Gbps over copper in 2026 standards.
- **Environmental Safeguards:** VESDA (Very Early Smoke Detection Apparatus) and Leak Sensors are included to detect potential electrical fires up to 2 hours before visible smoke occurs.

- **Smart Management:** Intelligent PDUs allow for remote power cycling of specific servers, essential for remote DC or DR site management.

SECTION G: NETWORKS

This section covers the Network Fabric, utilizing a high-performance Spine-Leaf architecture optimized for 100G HCI connectivity.

Network Architecture Insights

- **High-Speed Fabric:** 100G Spine switches ensure Core Compute nodes communicate with zero congestion for real-time PACS imaging.
- **Operational Readiness:** IPAM, DNS, and NMS are mandatory to prevent IP conflicts. A PTP Grandmaster ensures all hospital logs are synced to the millisecond—a legal requirement for forensic audits.
- **HCI Connectivity:** 100G DAC (Direct Attach Copper) cables support redundant dual-homed connections for all nodes.
- **No Fibre Channel:** The architecture is 100% Ethernet. All storage traffic (East-West) utilizes RoCE v2.

SECTION H: CYBERSECURITY

This section defines the Advanced Zero-Trust Cybersecurity Architecture, shifting from perimeter defense to "defense-in-depth."

Critical Cybersecurity Pillars

- **Ransomware Defense:** XDR and Backup Ransomware Protection provide a dual-layer defense, ensuring backup data remains immutable.
- **Medical Device Security:** Provides specialized visibility into clinical OT protocols (DICOM/HL7) for MRI and CT machines that standard firewalls cannot inspect.
- **Identity Orchestration:** Moves away from passwords to a robust IAM/PAM/MFA ecosystem, mandatory for Tier-III certification.

- **Compliance (ABDM):** HSM (Hardware Security Module) and DLP (Data Loss Prevention) address Indian data sovereignty and patient privacy regulations.

OPERATIONS & SUPPORT

- **Clinical Continuity:** Annual DR drills are mandatory to ensure the hospital can failover to the DR site within defined RTO/RPO limits.
- **Residency Support:** Two on-site engineers provide immediate "boots-on-the-ground" support for hardware swaps and physical cable issues.
- **Compliance Bridge:** Specialized roles act as the bridge between IT and clinical operations to maintain NABH and ABDM certifications.

Technical Requirement Specification

Section E - Technical Requirement Specification:-

Sl No.	Description	Bidder Response (Yes/No)
A	**OEM STRATEGIC STANDING**	
1	Does the proposed HCI solution originate from a vendor currently recognized in the Gartner Magic Quadrant "Leader's" category?	
2	Is the solution truly hypervisor-agnostic, providing native support for at least two Gartner-leader platforms (AHV, ESXi, or Hyper-V)?	
3	Has a detailed 5-year technology roadmap been provided demonstrating future-ready integration for AI and Hybrid-Cloud?	
B	**PRIMARY COMPUTE PERFORMANCE (E.1, E.3)**	
4	Do the Primary Nodes (E.1) feature Dual Intel Xeon Platinum 8480+ processors to provide a total of 128 threads per node?	
5	Is the system equipped with a minimum of 1.5TB DDR5-4800 RAM per high-performance node to eliminate memory bottlenecks?	
6	Do the GPU Nodes (E.3) include Dual NVIDIA L40S 48GB cards for high-speed 3D PACS and Digital Pathology rendering?	
7	How does the proposed high-clock CPU architecture specifically address the elimination of clinical latency for HIS applications?	
C	**STORAGE ARCHITECTURE & RESILIENCE**	
8	Is the primary production storage tier based exclusively on MLC-SSD/NVMe Gen5 technology for maximum IOPS?	
9	Is the HCI software overhead calculated separately to guarantee that 100% of the promised resources are available to the VMs?	
10	Can the architecture sustain a triple-failure scenario (2 SSDs in one node + 1 failure elsewhere) without data loss?	

11	Does the system support hot-swapping of drives with zero measurable impact on the performance of running clinical VMs?	
D	**DATA OPTIMIZATION (INLINE)**	
12	Are Deduplication and Compression performed "Inline" and in real-time rather than as a post-process task?	
13	Is Global Deduplication applied across the entire cluster namespace to maximize storage efficiency?	
14	Does the E.17 model support automated tiering from All-Flash production to SSD backup and Nearline archive tiers?	
E	**AUTOMATION & MANAGEMENT**	
15	Does the system include automated resource reclamation tools to identify and eliminate "VM Sprawl"?	
16	Can the system auto-provision resources based on workload demand using predefined healthcare application templates?	
17	Does the management console provide a unified Web-GUI for cluster, storage, and networking operations from a single pane?	
F	**SITE MIGRATION**	
18	Do the Installed nodes provide 1:1 performance parity (64C CPU/1.5TB RAM) when migrated to different Data Centre?	
19	Is the system capable of "One-Click" orchestrated migration between Primary, Secondary, and DR sites?	
20	Are automated Runbooks provided to recover Virtual Servers in a specific, clinical-priority sequence?	
21	Does the failover process include automated IP address and VMSwitch modification for target subnets?	
22	Can failover be tested on an isolated network "bubble" while production remains live at the primary site?	

23	Is there a documented "Failback" orchestration process to return workloads to the Primary DC seamlessly?	
G	**CYBER SECURITY & VAULT**	
24	Does the Immutable Cyber Vault utilize air-gapped, WORM-enabled storage to prevent ransomware encryption?	
25	Does the solution comply with hardware-level S3-Object Lock mandates for absolute data immutability?	
26	Is the Standalone Domain Controller (E.15) hosted on physical hardware with zero connectivity to SAN/NAS?	
27	Is the entire HCI environment certified for FIPS 140-3 for all data at rest?	
H	**NETWORK FABRIC**	
28	Does the HCI backend fabric utilize 100G RDMA/RoCE v2 for non-blocking, low-latency communication?	
29	Can the bidder guarantee a minimum 10Gbps data transfer rate across all internal cluster resources?	
30	Do the fabric switches provide ultra-low latency buffers ($<3\mu s$) to support high-performance SDS?	
31	Are the Management Switches configured in HA Mode with a minimum capacity of 1.25 Tbps?	
I	**HEALTHCARE COMPLIANCE (NABH/ABDM)**	
32	Does the solution adhere to ISO A.12, A.13, and NABH IMS-03 standards for healthcare data integrity?	
33	Is the infrastructure fully compliant with ABDM INF-01/02 for digital health records?	
34	Will the bidder provide a Tier-III N+1 node redundancy verification report during commissioning?	
J	**SLA & SUPPORT**	
35	Is 5-Year Critical Patch & Security Support specifically included for the Database Clusters (E.6)?	
36	Is the 5-year 24x7x4hr On-site support contract backed directly by the OEM?	

37	Will a 10% inventory of critical spares (SSDs, PSUs, Fans) be maintained physically at the hospital DC?	
38	Are future expansion nodes price-locked for 36 months to ensure predictable scaling?	
39	Does the bidder support Azure Hybrid Benefit and Software Assurance licensing for the clinical workloads?	
K	**VIRTUALIZATION RIGOR (ADDITIONAL)**	
40	Does the system support a heterogeneous mix of Guest OS, including Windows, Linux, and legacy Unix?	
41	Are snapshots application-consistent specifically for high-transaction SQL and Oracle databases?	
L	**PHYSICAL COMPLIANCE**	
42	Does all server hardware carry Energy Star and UL/CE certifications for hospital safety?	
43	Is the server hardware certified for ASHRAE Class A2 operating temperature compliance?	
M	**MONITORING & ALERTS**	
44	Does the system provide real-time health monitoring with automated, direct OEM-connected service alerts?	
45	Does the management platform use Machine Learning (ML) for predictive capacity planning of storage/compute?	

Section F - Technical Requirement Specification

Sl No.	Description	Bidder Response (Yes/No)
1	**SUPPLIER QUALITY & STANDING**	
1.1	**OEM Partnership:** Is the bidder a Tier-1/Platinum Authorized Partner for the proposed UPS (F.1) and Cabling (F.5-F.7) OEMs?	
1.2	**Engineering Competency:** Does the implementation team include at least one Certified Data Center Professional (CDCP) or Uptime Institute accredited specialist?	
1.3	**Project Experience:** Can the bidder provide evidence of 2+ similar Tier-III Data Center deployments in a Healthcare/NABH regulated environment?	
1.4	**Post-Installation Support:** Is the bidder committed to a 4-hour onsite response time with a 24x7 local helpdesk?	
2	**MODULAR POWER QUALITY**	
2.1	**Concurrent Maintainability:** Does the team have competency in UPS design to allow for the replacement of a 50kW power module while the system remains online (Zero-Downtime)?	
2.2	**Battery Safety & Intelligence:** Does the team have competency in monitoring the Li-Ion cabinets or a dedicated BMS (Battery Management System) with cell-level temperature monitoring?	
2.3	**Efficiency Rating:** Is the team experienced in UPS certified for >96% efficiency in double-conversion mode to minimize operational heat?	
3	**SMART RACK & SECURITY INTEGRITY**	
3.1	**Biometric Governance:** Are the rack biometric sensors (F.2) integrated into a centralized DCIM for ISO:A.11 access log reporting?	
3.2	**Thermal Certification:** Are the perforated doors certified for a >75% open area to support high-density HCI airflow?	

3.3	**Environmental Awareness:** Are all 12 Smart Racks equipped with calibrated temperature/humidity sensors at both the intake and exhaust levels?	
3.4	**Structural Rigidity:** Are the wing-mount racks made of high-grade Powder-coated Galvanized Iron (GI) to prevent electromagnetic interference and corrosion?	
4	**PASSIVE NETWORK & 100G FABRIC**	
4.1	**10G Copper Integrity:** Does the CAT-6A feature a central spline to eliminate Alien Crosstalk (AXT) during 10G transmission?	
4.2	**Fabric Readiness:** Is the 12C MM Fiber OM4 Laser-Optimized specifically to support 100G RDMA storage fabric (RoCE v2)?	
4.3	**Backbone Resilience:** Is the SM Fiber burial-grade armoured with a rodent-resistant jacket for campus-wide reliability?	
4.4	**Transmission Quality:** Are all fiber patch cords certified for an Insertion Loss of <0.2dB with documented test reports per cord?	
4.5	**Connector Density:** Are the copper panels angled to ensure a safe bend radius for high-speed 10G cables within the 45U racks?	
5	**CERTIFICATION & COMPLIANCE (NABH/ISO)**	
5.1	**Signal Validation:** Does the bidder commit to providing Fluke Channel Test reports for every Copper link and OTDR traces for every Fiber core?	
5.2	**Fire Safety:** Are all cables (Fiber/Copper/Patch) certified as LSZH (Low Smoke Zero Halogen) to meet hospital safety codes?	
5.3	**Healthcare Standards:** Does the design documentation explicitly map to NABH IMS-03 (Reliability) and ABDM INF-01 (Foundation)?	
5.4	**Sustainability:** Does the physical infrastructure carry Energy Star or LEED-compliant certifications for the hardware components?	

Section G - Technical Requirement Specification: -

Sl No.	Description	Bidder Response (Yes/No)
1	**SUPPLIER STANDING & PROFESSIONAL SERVICES**	
1.1	**Expertise:** Is the bidder a "Gold" or "Elite" partner for the proposed Switching and Firewall OEMs?	
1.2	**Design Rigor:** Does the bidder provide a dedicated Network Architect (CCIE/equivalent) for the HLD/LLD Design Service?	
1.3	**Fabric Competency:** Can the bidder demonstrate a successful **EVPN-VXLAN** deployment in a production environment?	
1.4	**Audit Readiness:** Is the bidder prepared to provide a CERT-In empaneled auditor for the annual VAPT?	
2	**CORE FABRIC & DCI PERFORMANCE**	
2.1	**Spine Throughput:** Do the Core Switches provide a minimum non-blocking switching capacity of 6.4Tbps?	
2.2	**Site Parity:** Are the DR Core Switches identical in firmware and hardware specs to ensure seamless failover (RTO/RPO parity)?	
2.3	**HCI Optimization:** Do the Leaf Switches support **Priority Flow Control (PFC)** and ECN for lossless RoCE v2 RDMA traffic?	
2.4	**Buffer Depth:** Do the DCI-facing switches feature deep buffers to handle synchronization bursts without frame loss?	
3	**SECURITY & SEGMENTATION QUALITY**	

3.1	**Zero-Trust Logic:** Does the Internal Firewall support 20Gbps+ of deep-packet threat inspection for East-West traffic?	
3.2	**IoT Protection:** Does the Radius/NAC provide automated profiling and 802.1X authentication for medical IoT devices?	
3.3	**WAN Optimization:** Does the SD-WAN solution (G.14) utilize Forward Error Correction (FEC) to optimize S3 archive sync over lossy links?	
3.4	**Management Isolation:** Are the Out-of-Band switches (G.15) physically and logically segregated from the clinical data plane?	
4	**TRANSCEIVERS & PASSIVE CONNECTIVITY**	
4.1	**Optic Reliability:** Are all 100G/25G transceivers industrial-grade with **Digital Diagnostics Monitoring (DDM)** support?	
4.2	**High-Density Trunking:** Are the MPO-12 Trunk cables factory-terminated and polarity-tested (Type B) for 100G fabric links?	
4.3	**Signal Integrity:** Do the LC-LC Patch Cordsutilize Grade A connectors with a certified loss of <0.25dB?	
4.4	**Optical Spares:** Is a 100G/25G "Emergency Spares Kit" (G.18) maintained on-site to ensure zero-MTTR for core links?	
5	**OPERATIONAL CONTINUITY & COMPLIANCE**	
5.1	**Clinical Resilience:** Do the Edge PoE+ Switches (G.5) have a power budget of 740W+ to support high-density medical workstations?	
5.2	**"Break-Glass" Access:** Does the Console Server (G.16) provide LTE/4G failover for secure serial access during a total network collapse?	
5.3	**Dark Fiber Diversity:** Can the bidder prove physical route diversity for the redundant campus dark fiber (G.27/28) to prevent single-point excavation failure?	
5.4	**Healthcare Standards:** Does the proposed network NMS (G.13) provide real-time SLA reporting for NABH IMS-IT compliance?	

Section H - Technical Requirement Specification: -

Sl No.	Description	Bidder Response (Yes/No)
1	**PERIMETER & WAN INTEGRITY**	
1.1	**Zero-Throttling Core:** Do the NGFWs support >50Gbps of *Threat Prevention* throughput (not just firewalling) for 100G PACS traffic?	
1.2	**BGP Convergence:** Can the Border Gateway Switches (H.2) achieve sub-second (<1s) BGP failover for NKN/GSWAN peering?	
1.3	**Crypto-Acceleration:** Does the solution include dedicated hardware for SSL/TLS 1.3 decryption to inspect DICOM/HL7 streams without latency?	
1.4	**Path Diversity:** Can the bidder prove physical separation of ISP risers (NKN vs. GSWAN) through dual HDPE conduits to the DC rack (H.11)?	
2	**ENDPOINT & IDENTITY GOVERNANCE**	
2.1	**Ransomware Rollback:** Does the EDR/XDR (H.5) support automated "One-Click Rollback" to restore clinical workstations after an attack?	
2.2	**MDR Support:** Is the EDR/XDR license backed by 24x7 Managed Detection & Response (MDR) for proactive threat hunting?	
2.3	**Privileged Access:** Does the PAM suite provide full session recording and automated password vaulting for all administrative logins?	
2.4	**Biometric Integration:** Does the IAM suite support Biometric API integration for clinical logins to meet hospital-wide MFA mandates?	
3	**APPLICATION & CLOUD SECURITY**	
3.1	**Clustering Elasticity:** Does the Hyper-Scale Clustering (H.3) allow for a "Stitched" fabric where nodes can be added without IP changes?	

3.2	**WAF API Shielding:** Does the WAF provide specific protection for ABDM/API portals against OWASP Top 10 and Bot attacks?	
3.3	**Virtual Patching:** Can the WAF/NGFW perform "Virtual Patching" to shield unpatched medical legacy systems from known vulnerabilities?	
4	**INTELLIGENCE & AUDIT COMPLIANCE**	
4.1	**Unified Logging:** Does the SIEM ingest and correlate logs from Nutanix (HCI), Arista (Network), and the NGFWs?	
4.2	**ABDM/HIPAA Dashboards:** Does the SIEM provide out-of-the-box compliance dashboards for ABDM and HIPAA audit reporting?	
4.3	**Vulnerability Tracking:** Does the VM tool provide automated remediation tracking reports specifically for the CISO?	
4.4	**Regulatory VAPT:** Is the annual VAPT performed by a CERT-In empaneled agency covering Network, App, and Wi-Fi?	
5	**SUPPLIER STANDING & OEM COMPLIANCE**	
5.1	**Specialization:** Is the bidder certified in "Network Security Specialization" or equivalent for the proposed NGFW/SIEM?	
5.2	**HSM Security:** Does the decryption hardware include a FIPS 140-3 validated Hardware Security Module (HSM)?	
5.3	**Standardization:** Are the Border Switches Common Criteria certified for resilient government peering?	

Section I - Technical Requirement Specification: -

Sl No.	Description	Bidder Response (Yes/No)
1	**SD-WAN & FAILOVER LOGIC**	
1.1	**Hitless Failover:** Does the SD-WAN hardware support sub-second "hitless" path switching between NKN and GSWAN without dropping active sessions?	
1.2	**Hardware ASIC:** Does the appliance feature a dedicated SD-WAN ASIC to ensure threat protection doesn't degrade WAN throughput?	
1.3	**Orchestration:** Does the 5-Year License include a centralized orchestrator for real-time traffic steering and application-aware routing?	
1.4	**Regulatory Listing:** Is the SD-WAN/Security bundle **MeitY Listed** for government/healthcare data sovereignty compliance?	
2	**PHYSICAL PATH DIVERSITY & RIGOR**	
2.1	**Geographic Separation:** Can the bidder prove that the Dual-Path Conduits follow different physical routes (Path A & Path B) to prevent a single excavation cut?	
2.2	**Fire-Rated Infrastructure:** Are the conduits fire-rated (IS:14930) and correctly sealed to meet NABH safety and ABDM infrastructure standards?	
2.3	**Armoured Protection:** Does the internal backbone fiber (I.5) feature corrugated steel tape armouring to protect against rodent damage and mechanical stress?	

2.4	**LSZH Compliance:** Is the fiber jacket certified Low Smoke Zero Halogen (LSZH) for indoor hospital safety?	
3	**TERMINATION & SIGNAL INTEGRITY**	
3.1	**Low-Loss Termination:** Is the LIU (I.1) factory-loaded to ensure an end-to-end insertion loss of <0.3 dB per LC-Duplex port?	
3.2	**Modular Flexibility:** Is the LIU (I.1) a sliding 1U modular design that allows for future expansion without disturbing existing fibers?	
3.3	**Managed Media Conversion:** Are the converters (I.4) chassis-based and SNMP-managed to allow for remote link-status monitoring?	
3.4	**Lossless Patching:** Are the 100G Interconnects length-matched and SFF-8665 compliant to prevent signal skew in the 100G fabric?	
4	**AUDIT & COMPLIANCE**	
4.1	**OTDR Validation:** Does the bidder commit to providing bidirectional OTDR traces for the 12-core SMF backbone (I.5)?	
4.2	**Path Audit:** Will the bidder provide a "As-Built" site map showing the visual path check of the redundant conduits?	
4.3	**Uptime Reporting:** Can the SD-WAN system generate uptime reports specifically formatted for NABH / ABDM continuity audits?	

Section J - Technical Requirement Specification:-

Sl No.	Description	Bidder Response (Yes/No)
1	**GOVERNMENT BACKBONE INTEGRATION**	
1.1	**NKN BGP Compliance:** Does the bidder have experience configuring BGP peering with AS3461 (NKN) using IPv4/IPv6 dual-stack?	
1.2	**GSWAN Hand-off:** Is the bidder capable of terminating a 100Gbps high-availability fiber port from the GSWAN State Headquarter ?	
1.3	**Sovereign Monitoring:** Does the proposed solution allow real-time traffic monitoring via the GEXTEL dashboard for state-level audits?	
1.4	**Govt Security Standards:** Will the GSWAN link be implemented following the GITS/DST Gujarat security audit guidelines?	
2	**CARRIER DIVERSITY & SLA**	
2.1	**Backhaul Resilience:** Does the Railtel 100G option (J.3) utilize a physically diverse route (Railway-aligned fiber) to avoid common-trench failures with NKN?	
2.2	**Uptime Commitment:** Is the bidder committed to a 99.95% uptime SLA for the managed backhaul, verified by monthly carrier reports?	
2.3	**MEF Certification:** Are the termination interfaces MEF 3.0 compliant to ensure standardized carrier-grade Ethernet delivery?	
3	**IDENTITY GOVERNANCE & IPAM**	
3.1	**Persistent Identity:** Will the bidder manage the registration of /24 IPv4 and /48 IPv6 blocks directly in the AMC-MET name (J.4)?	

3.2	**WHOIS Integrity:** Does the bidder guarantee that the hospital's IP resources will be correctly registered and visible in the APNIC/IRINN WHOIS database?	
3.3	**Resource Portability:** Are the assigned IP blocks "Provider Independent" (PI) to ensure the hospital retains its IP identity even if ISPs are changed?	
4	**MANAGED SERVICES & UPTIME**	
4.1	**Zero-Touch Ops:** Does the SI scope include 24/7 proactive monitoring with an automated incident response system (ITS)?	
4.2	**Quarterly Drills:** Does the bidder commit to performing a quarterly physical failover test (Path A to B) during low-traffic clinical hours?	
4.3	**ABDM Compliance:** Does the WAN management plan explicitly address the ABDM "Continuous Availability" mandate for the National Health Stack?	
4.4	**Performance Audit:** Will the bidder provide an annual performance audit report detailing BGP stability and bandwidth utilization trends?	

20.1.5 Functional Requirement Specifications of HIS

The functional requirement specifications stated below are the minimum features that the solution suggested for HIS should have. This indicative functional requirement has been provided here to be used by the Selected Bidder. The Selected Bidder shall deploy the readily available Product or develop the System Requirement Specifications (SRS) documents where all the processes, procedures and existing templates should be studied in detail by the Selected Bidder. Selected Bidder should independently design / customize the solution as may be required to support the business operations. The Selected Bidder shall be required to coordinate with appropriate committee(s) for the detailed system study and interact with the different users of the departments for preparation of SRS and related design documents. As part of the solution, the Selected Bidder shall also ensure adherence to EMR/ EHR or electronic health card as per standards laid down by Govt. of India.

The following sections contain the department/module wise requirements for HIS modules.

20.1.5.1 Master Patient Index

Patient Registration

ThePatientRegistrationsystemplaysacrucialroleingatheringcomprehensiveandpertinent patient information, serving as a fundamental step in establishing an Electronic Medical Record (EMR) for improved and efficient healthcare delivery. The system captures essential demographic details and other relevant information about the patient, facilitating the generation of a Unique Health Identification Number (UHID). The UHID serves as a distinct identifierforthepatientwithinthehealthcarefacility. It canbecreatedusingvariousmethods suchasassigningauniquenumber,generatingabarcode,orutilizingaQRcode.Toenhance interoperability and streamline data integration.

Birth Registration

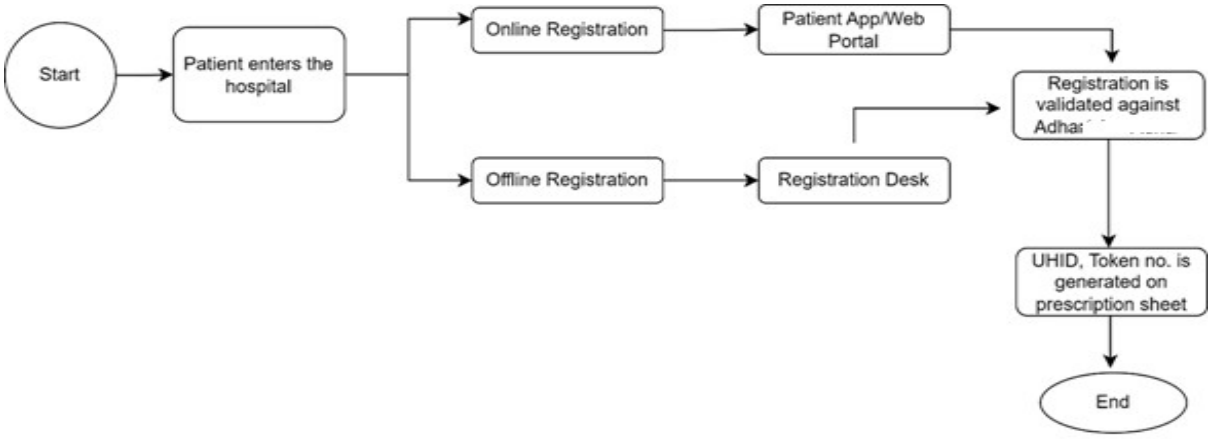
The Birth Registration Module in an Integrated Hospital Management System is designed to facilitate the registration and documentation of births that occur within the hospital. It automates and streamlines the birth registration process, ensuring accurate and efficient record-keeping. Here are the key features and functionalities of the Birth Registration Module:

- **BirthDataCapture**
- **ElectronicBirthCertificateGeneration**
- **IntegrationwithCivilRegistry**
- **DocumentManagement**
- **ReportingandAnalytics**

- **DataSecurityandPrivacy**

Birth Registration Module in an HIS, hospitals can streamline the birth registration process, reduce paperwork, ensure accurate record-keeping, and enhance overall efficiency in managing births within the hospital. It helps in complying with legal requirements, simplifying administrative tasks, and maintaining a reliable and comprehensive birth registry.

IndicativeProcessMap



FunctionalRequirements

FollowingaretheFunctionalRequirements(FR)envisagedfortheMaster Patient Index system including but not limited to:

Sl No	Functional RequirementsofPatientRegistration and Birth Registration	Supported Yes/No
01	There shall be provision of a registration facility should be available for users through web portal.	
02	ThereshallbeprovisionsystemtoallowtheregistrationofapatientbylinkingwiththeAadhaarIDofthepatient.IncaseAadhaarIDisnotavailable, the user should be able register using Aadhaar ID in the system	
03	The system should have the capability to capture Photograph of the patient. Thephotographofthepatientshouldbecapturedusingcameradeviceslinked to the system.	

Sl No	Functional RequirementsofPatientRegistration and Birth Registration	Supported Yes/No
04	There shall beprovisionin system which provides provisionto searchpatient based on various search criteria like Name, Phone number, Aadhaar ID / ABHA number and any other unique identifier	
05	There shall be provision in the system which cater the slot management system,wherepatientsaregivenslotsfortheirvisitandautonotificationfacility to the patient, if the given slot is changed from the management side.	
06	It is mandatory that the registration records shall be validated and authenticated against the Aadhaar and Aadhar database through integrationandAadhaarorABHAnumbermaybeusedasone of the unique identifiers to search the patient in HIS.	
07	Thereshallbeprovisionofmodificationinpatientdemographicsshallbe allowed with role-based access control.	
08	Oncepatient'sregistrationiscompletethroughPatientApp,WebPortalor Registration desk, Unique ID (UHID) shall be generated for the Patient.	
09	ThereshallbeprovisioninthesystemwhichallowstomergemultipleUHIDto primary UHID of the patient. Once linking of UHID/s are done with primary UHID,EMRofthepatientshouldbearrangedsequentially.Itshouldalsohave provision to unmerge UHIDs.	
10	The system shall have the option to collect payment for registration fees attheregistrationcounter.The system shall have the option to collect payment using UPI QR codes or any other means of digital payment or cash.	
11	If the patientuses the mobile app to register, then if the patientis an out-of-state patient, the mobile app shall be able to collect the payment using UPI.	
12	ThereshallbeasystemofsendingnotificationviaSMS/appalerttothe patient with details of registration.	
13	The system shall have the provision to upload any scanned medical records of the patient at the time of registration or at any other time when the patient bringsthemedicalrecordsforlinkingwiththeUHIDofthepatient.Thisfacility should be available in the web portal.	
14	The system shall be able to generate the necessary analytics and present dashboards on the turn-around-time of registration creation based on role-based-access-privileges.	
15	There shall be provision of sending notification to facility in charge, if some patient was admitted in any AMC managed hospital and is unable to get OPD slipasthepatientisadmittedonsystem.Immediatedischargeshouldbedone to get His / Her OPD registration.	
Birth Registration		
16	Module shall capture the newborn details and record must link with parents' record.	
17	Systemshallhaveonlinefacilitytoapplyforbirthcertificatethroughpatient portal or site.	

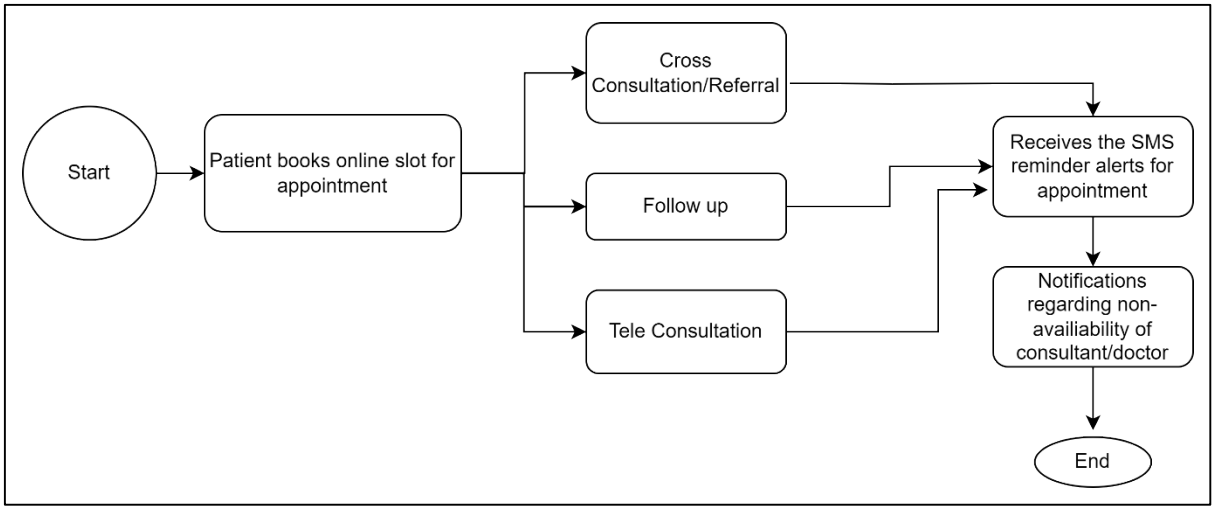
Sl No	Functional RequirementsofPatientRegistration and Birth Registration	Supported Yes/No
18	Integrationwithgov.portalforbirthdetails.	
19	Systemshallhaveprovisionforprintfacilityforbirthcertificatethroughthe patient portal or site.	

20.1.5.2 Appointment Scheduling

Oncethepatientregistrationprocessiscompleted,thepatientwillhaveanoptiontoschedule anappointmentfordoctors.Herearesomekeyfunctionalitiesthatanappointmentscheduling system should offer:

- **PerformOffline/OnlineAppointmentScheduling**
- **ViewDoctor'sAvailability.**
- **ViewOPDTimings.**
- **ManageDoctor'sRoster.**
- **ViewAppointmentDashboard.**
- **SendappointmentSMS/WhatsAppnotification.**

IndicativeProcessMap



Functional Requirements

FollowingaretheFunctional Requirements(FR)envisagedforthepatient appointment system including but not limited to:

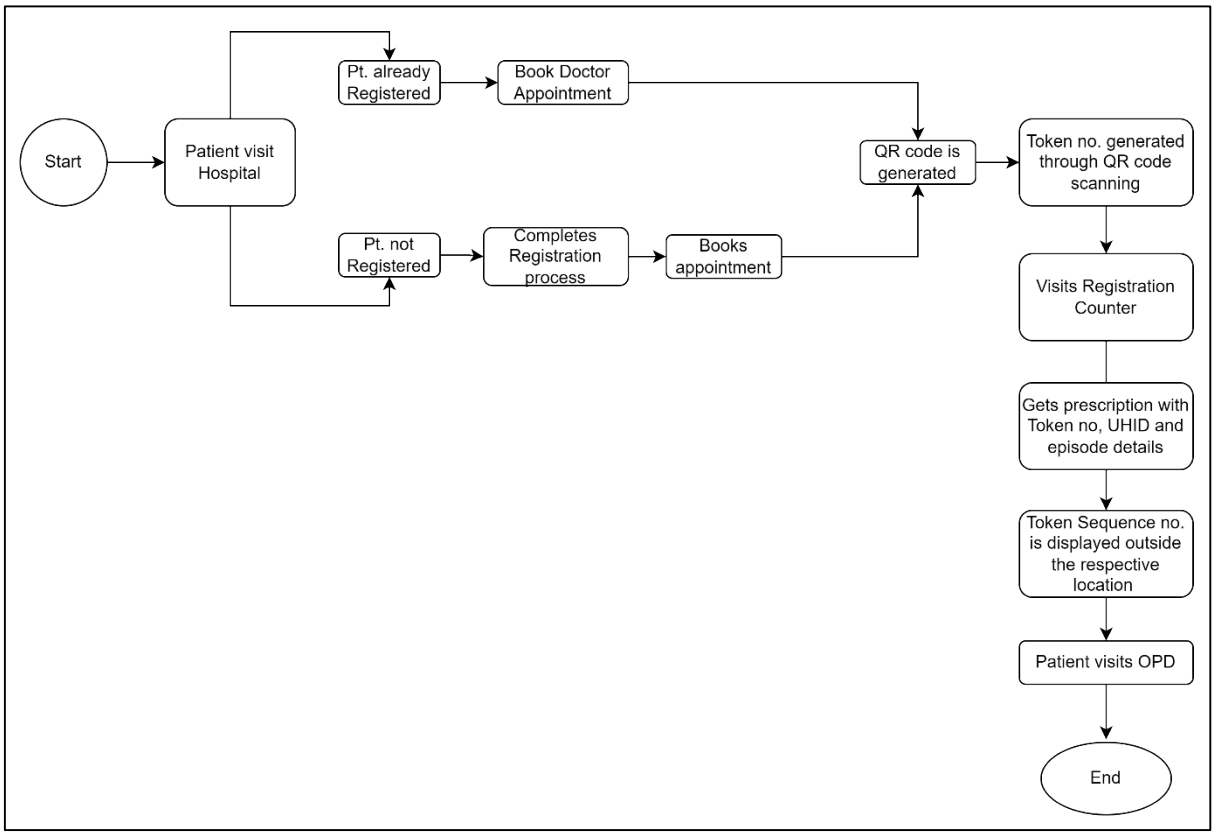
Sl No	Functional RequirementsofAppointmentScheduling	Supported Yes/No
01	After completing the registration process user can book for a consultation service with the doctor through the Web Portal or at the Appointment Counter.	

02	Thesystemshouldhavetheprovisiontodisplayalltheavailable&unavailable time slots of a department / unit / doctor on the same screen while booking appointment. It should also indicate if the slot is a in-person consultation.	
03	The system should mark the visit as “follow-up” visit if the previous visit was the first visit with the doctor.	
04	The system should allow for booking of appointment at the department / unit levelordoctorlevel.Thisoptionshouldbemadeavailableasperconfiguration parameters.	
05	Thereshouldbeprovisiontoallowoverbookingatslotlevelasperthe configured settings.	
06	The system should allow viewing of the number of providers/doctors in the OPD,theirOPDschedule,availableslotsandavailableroomsforallocatingto the patients	
07	The systemshould allowforthe generationofaQR codewith alltherelevant details of the booked appointment.	
08	Thesystemshouldallowforthecheck-inofthepatientwhenthepatientvisits the registration counter to confirm his / her arrival for the appointment on the day of the appointment.	
09	The systemshould allowforthecheck-inofthepatientwhenthepatient uses themobileapptoconfirmhis/herarrivalfortheappointmentonthedayofthe appointment by using geo-fencing methods of location tracking.	
10	ThesystemshouldallowfortheprintingoftheOPDsheetwithdetailsofpatient demographics,UHID,TokenNo,Episodedetailsattheregistrationcounter.It should also include the QR-Code with the details of the patient in the OPD sheet.	
11	The system should have the provision to automatically send notification via SMS alert with details of the appointment.	
12	The system should also allow for the booking of appointments for Lab investigations, Radiology studies, Minor / Major procedures as per configurations defined in the Masters of HIS	
13	ThesystemshouldsendnotificationviaSMS/app alertwiththedetailsofthe booked appointment.	
14	ThesystemshouldsendnotificationviaSMS/appalertwiththedetailsofthe check-in activity.	
15	The system should have the provision to send a reminder alert on the day of the appointment (if the appointment was made for a future date) via SMS / mobile app alert with the details of the appointment.	
16	The system should be able to generate the necessary analytics and present dashboards on the turn-around-time of appointment creation based on role-based-access-privileges.	

Queue Management

QueueManagementModulestreamlinesthephysicalstateofthepatientqueueandreduces wait timefor direct patient interactiondepartments. Thesystem has the capability of tracking thestatusofthedoctor'savailabilityinOPD,throughwhichtheexactwaittimeofeachpatient can be obtained. The system can manage the priority patient allotment in OPD. The system capturesloginti me,historytakingtimeandtimerequiredforeachconsultationtocalculatethe wait time of each patient, this analysis helps the hospital to strategize queue management effectively.

Indicative Process Map



FollowingaretheFunctional Requirements(FR)envisagedforthequeue management system including but not limited to:

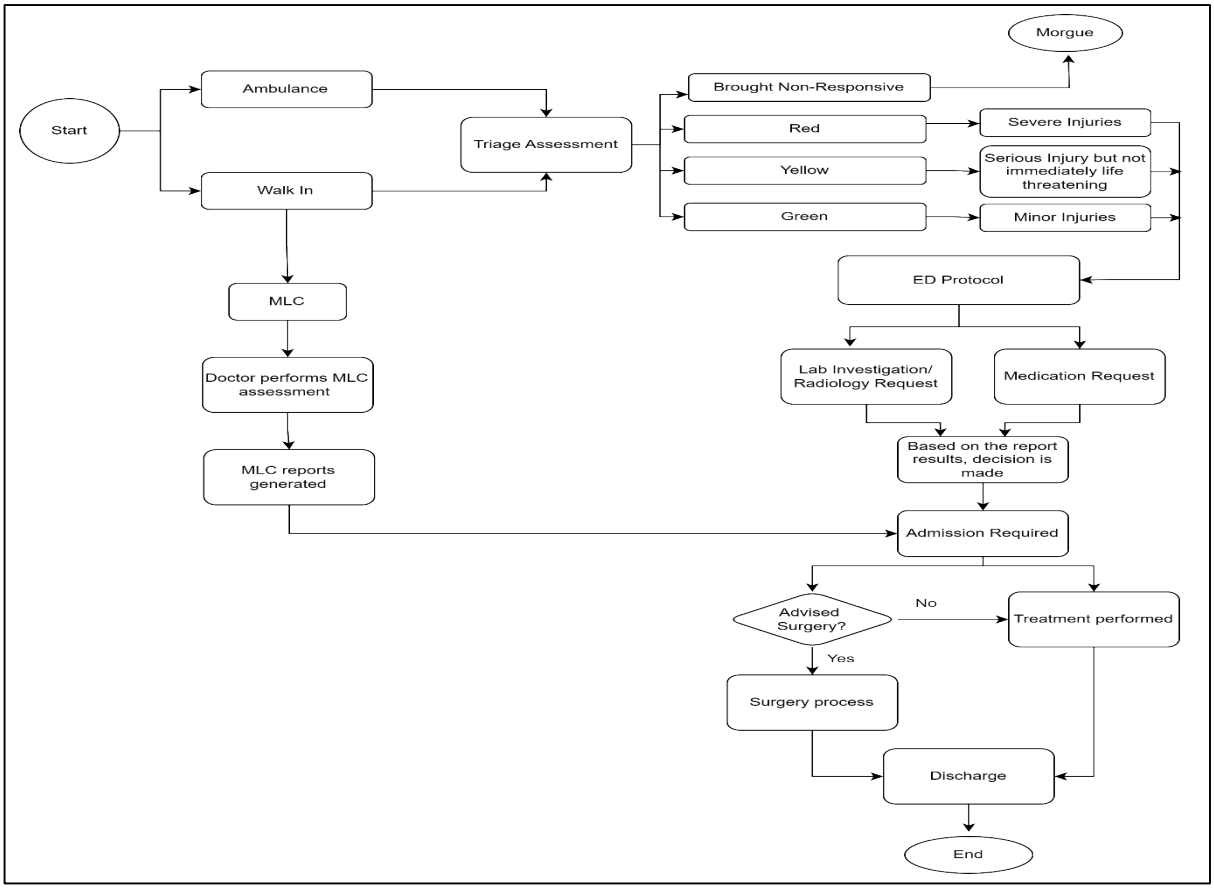
Sl No	Functional RequirementsofQueueManagement	Supported Yes/No
01	The system shall have the provision to automatically generate a token for a patient who has checked-in to avail any service in the facility.	
02	The system shall have the provision to integrate with a token display system, if installed, and display details of the queue with the queue position as per configuration settings.	
03	The system shall have the provision to display the token number along with the records of the worklist of the service provider. (Masked Token Number)	

Sl No	Functional RequirementsofQueueManagement	Supported Yes/No
04	The system shall have the provision to allow the user in the service provider department to call a patient in the worklist. This activity should allow for the automatic update of thetoken details in the token display system and patient mobile app.	
05	The system shall update the status of the token as consumed when the user has confirmed the completion of activity on the patient.	
06	The system shall have the provision to send notification to the patient mobile app when the token number is called.	
07	In case of no-show of the patient, the token number shall be taken out of the activequeueandmovedtoarecallqueue.Thetokensintherecallqueueshall be called as per defined system configuration settings.	
08	Thesystemshallhavetheprovisiontoallotthetokentoapatientwithanexpiry till the end of services in the current day.	
09	Ifthepatientavailsmultiple services withina single day,thenthesametoken shall be inserted into different services queues for rendering of services.	
10	The system shall record date and time details of the when the token was generated / inserted in a queue, when it was called, and when it was consumed.	
11	The system shall be able to generate the necessary analytics and present dashboards on the turn-around-time of queue management based on role-based-access-privileges.	
12	Forthefreeservices,thesystemshouldhavecapabilityofautogeneratingthe bills and send to the respective counter and the copy of the bill to the patient on mobile or WhatsApp/Link, along with printing facility if required	

20.1.5.3 Emergency Department

An emergency department also known as an accident and emergency department (A&E), emergencyroom(ER),emergencyward(EW)orcasualtydepartment,isamedicaltreatment facility specializing in emergency medicine, the acute care of patients who present without priorappointment;eitherbytheirownmeansorbythatofanambulance.Duetotheunplanned natureofpatientattendance,theEDprovidesinitialtreatmentforabroadspectrumofillnesses and injuries, some of which may be life-threatening and require immediate attention.

Indicative Process Map



FollowingaretheFunctional Requirements(FR)envisagedfortheEmergency Management system including but not limited to:

Sl No	Functional RequirementsofEmergencyManagement	Supported Yes/No
01	The system shall have the facility to register a patient who has arrived in the Emergency Department with minimal identification details (Name, Gender, Age, Aadhaar ID / ABHA number (if available) and generate the UHID if not registered in the system.	

Sl No	Functional RequirementsofEmergencyManagement	Supported Yes/No
02	The system shall have the facility to record other demographic details of the patient post creation of the UHID.	
03	The system shall have the facility to register a non-responsive patient with unknown name which can later be updated when demographic details are made available. However, the UHID should be created with minimal information.	
04	The application shall have multiple provision like selection of data using drop down option, conversion of handwritten text to machine readable format, conversion of speech to machine-readable format and other methods which shall assist the user in creating medical records.	
05	ThesystemshallcaptureaccuratebedavailabilityinEmergencyDepartment.	
06	The system shall have the provision to display the EMR templates related to conducting Triage assessment to the nurses.	
07	Thesystemshallallowthetriagenursetoassignthepatienttotheappropriate zone (Red, Yellow, Green or as per system configuration) based on the presenting clinical conditions of the patient.	
08	Thesystemshalldisplaythecurrentbedoccupancywithdetailsofpatient information to the triage nurse and details of vacant beds in each zone.	
09	ThesystemshallhavethefacilitytomapdoctorswithemergencyOPD/wards as per their weekly working schedule	
10	ThesystemshallhavethefacilitytomapnurseswithemergencyOPD/wards as per their weekly working schedule	
11	Thesystemshallhavethefacility tomapresidentswithemergency OPD / wards as per their weekly working schedule	
12	The system shall have the facility to allow the care givers to create the appropriate EMR records required during assessment and treatment of the patient using pre-defined templates.	
13	The system shall have the facility to allow for ordering of services (labs, radiology, procedures, medications, etc.) for the caregivers during the treatment of the patient in Emergency Department.	
14	The system shall display a worklist of patients admitted in each zone of the emergency department with the current status (pending, in-progress, completed) of ordered services.	
15	The system shall have the facility to display the EMR record of each patient from the worklist of the emergency department.	

Sl No	Functional RequirementsofEmergencyManagement	Supported Yes/No
16	Thesystemshallhaveaprovisionofdischargealertsystembasedonstandard admission durations tonotify the concerned authority if a patient stayslonger than expected	
17	The system shall have the facility to display the current on-duty doctor / residents for each of the medical and surgical specialties of the health institution.	
18	The system shall have the option to create a cross-consultation request for assigned doctor / resident of other medical and surgical specialties of the health institution.	
19	Thesystemshallhavethefacilitytosendanotificationautomaticallyto themobile fortherequesteddoctor/residentwhenacross-consultationrequest is created.	
20	Thesystemshallhavethefacilitytoautomaticallycalltherequesteddoctor / Residentviaaphonecallwhentherequestdoctor/residenthasnot acknowledged the cross-consultation request.	
21	Thesystem shallhavetheabilitytotransferpatientfromtheemergencyward tootherwardsofmedical/surgicalspecialtiesbasedontherequestfromthe attending doctor.	
22	Thesystem shallhavetheabilitytotransferpatientfromtheemergencyward to other healthcare facility based on the request from the attending doctor.	
23	The system shall have the facility to generate an electronic digitally signedPDF copy of the EMR records generated in the emergency ward.	
24	The system shall have the facility to discharge a patient from the emergency ward with a discharge summary created in the system.	
25	Thesystemshallhavethefacilitytotakeaprintoutofthedischargesummary in a pre-defined format.	
26	The system shall have the facility to conduct OP services in the emergency department which can be configured as per system settings.	
27	Thesystemshallhavethefacilitytoscheduleafollow-upconsultationin emergency OP for any follow-up procedure / consultation.	
28	Thesystemshallhavethefacilitytoscheduleafollow-upconsultationin regular OP for any follow-up procedure / consultation.	
29	The system shall have the facility to scan and upload any external medicalrecords brought by the patient.	
30	Thesystemshallhavethefacilitytocollectpaymentforanyservicesrendered to the patient, if applicable.	
31	The system shall have the facility to mark a patient as a medico-legal casewith reasons for marking as MLC.	
32	Thesystemshallhavethefacilitytocreatetherequiredmedicalrecords defined for MLC case management as per state medical council norms.	
33	The system shall be able to integrate with the State Police Department IT System for the electronic transmission of MLC reports through Medical Jurist in the hospital.	

Sl No	Functional RequirementsofEmergencyManagement	Supported Yes/No
34	Thesystemshallhavethefacilitytouploadmultiplephotographstakenof patients marked as MLC which should become part of the EMR record.	
35	There shall be provisionof raisingmedical emergency code alert (Code Red, Code Blue, Code Grey, Code Pink)	
36	An automatic alert shall be sent when an emergency code is initiated with all the details (Ward, Patient Details)	

20.1.5.4 IPD Management

The Inpatient Department (IPD) management module within a hospital management system isspecificallydesignedtohandleallactivitiesandfunctionsrelatedtoinpatientmanagement. Thismoduleautomatesadministrativetasksandprovidesseamlessaccesstoothermodules, resultinginimprovedpatientcare.Herearesomekeyfeaturesandfunctionalitiesthattheipd module should encompass:

-AdmissionandWardManagement

-BedandWardAvailability

-SurgicalManagement

-MedicationandNursingManagement

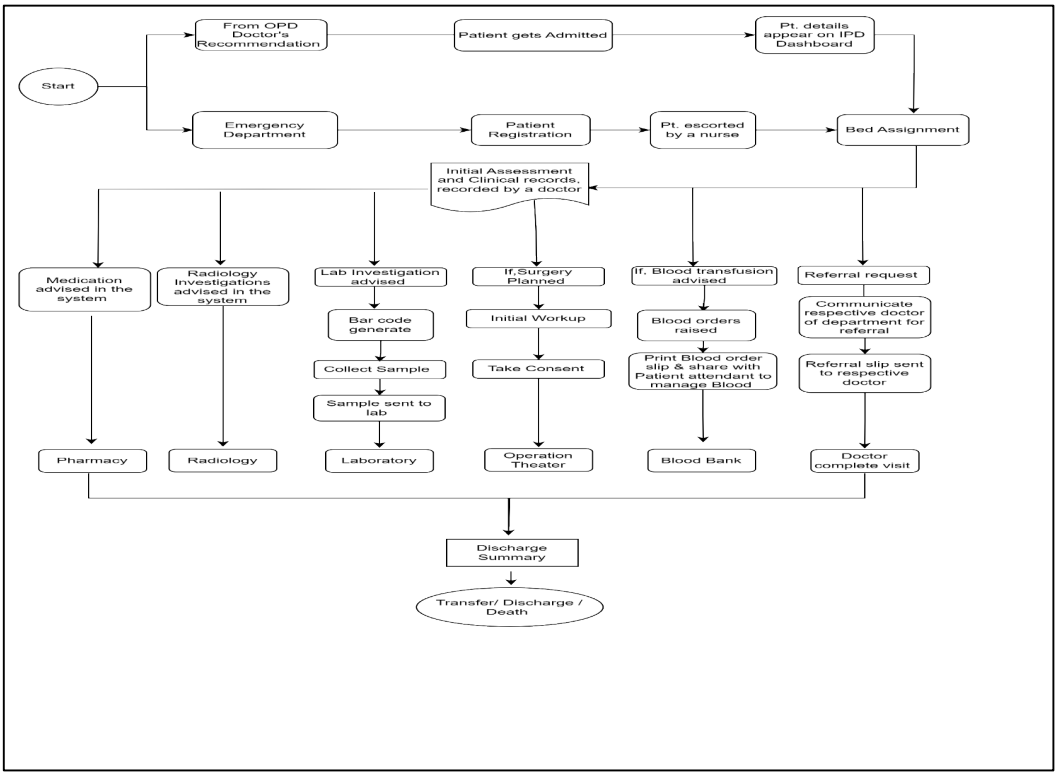
-ChargeSlipGeneration

-VisitTracking

-Follow-UpVisitsandMultipleAppointments

By incorporating these functionalities, the IPD module streamlines the management of inpatient activities and provides a comprehensive overview of their stay. It enhances efficiency, accuracy, and accessibility of patient data, ultimately leading to improved patient care and outcomes.

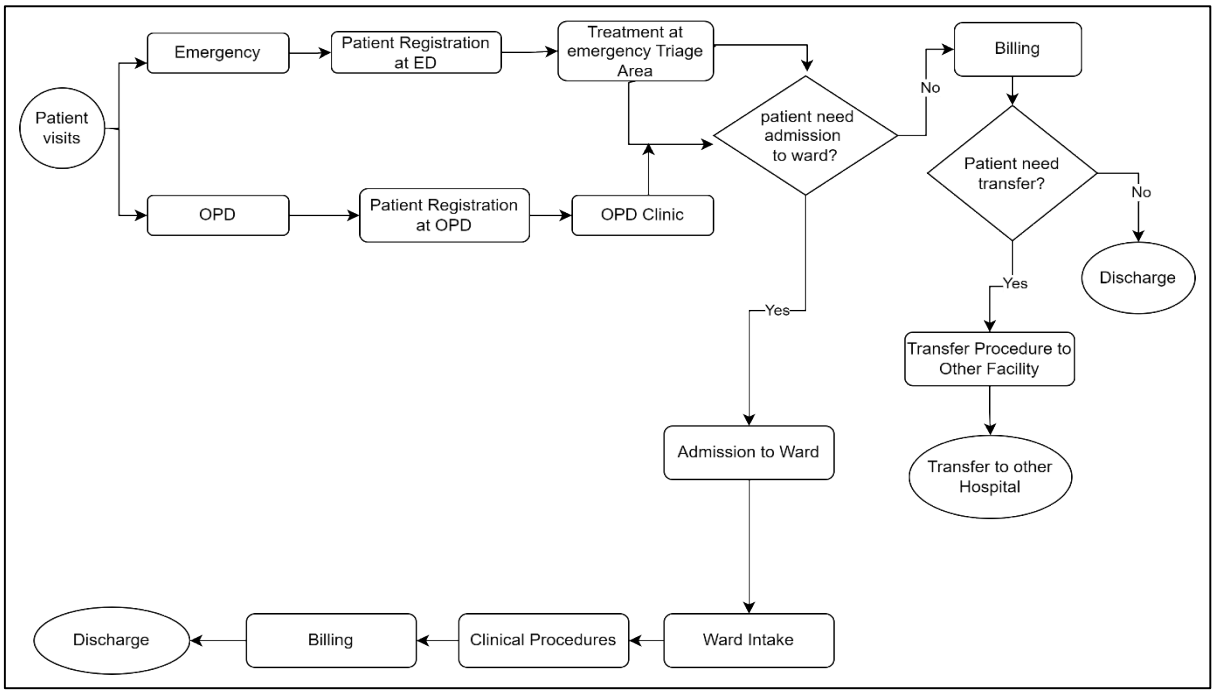
Indicative Process Flow



1. ADT Management

The admission, discharge, and transfer process is one of the most essential hospital workflows.Theadmission,discharge,andtransferprocessstoresvaluablepatientinformation likethemedicalrecordnumbers,ages,names,andcontactinformationofpatients.Thepatient information within an ADT system can be shared if the need arises. It will allow other health carefacilities and programsto have accessto valuable and, attimes,life-saving information. Admission-transfer-discharge systems areusedby healthcarefacilities totrackpatients from their moment of arrival at the institution until departure. The departure can be by either transfer, discharge, or death.

Indicative Process Map



Functional Requirements:

Following are the Functional Requirements (FR) envisaged for the ADT module including but not limited to:

Sl. No	Functional RequirementsofADTModule	Supported Yes/No
01	The system shall have the IPD Dashboard withcomplete patient details in unit wise. (UHID, name, age, gender, Diet, diagnosis, Status of investigations, procedure, radiology, blood bank, Payer category etc.)	
	EmergencyAdmission	
02	Thesystemshallhavethefacilitytodisplayadashboardofthecurrentstatusof bedoccupancyofthebeds/unit/wardassignedtoEmergencyDepartment.	
03	Thesystemshallhavethefacilitytodisplaythecurrentstatusofbedoccupancy ofanyward/unitinthehealthcarefacilitywithsearchfacilityofwardtype/ specialty.	

Sl. No	Functional RequirementsofADTModule	Supported Yes/No
04	Thesystemshallhavethefacility toassignavacantbedtoapatient basedon theadmissioncriteria.Itshouldalsocapturedetailsoftheadmittingdoctor,date and time of admission, reason for admission, etc.	
05	The systemshallcapturetransfersofpatientsfromonedepartmenttoanother department,ensuringproceduresareappropriatelydocumented	
	ElectiveAdmission	
06	Thesystemshallhaveprovisionofintegrationwithvariousschemes	
07	Thesystemshallhavethefacilitytoassignapatientrequiringadmissionfora futuredateintoawaitinglistfortheward/unit.	
08	Thesystemshallhavethefacilitytoviewthelistofpatientsassignedfor admissionforaward/ unit.	
09	Thesystemshallhavethefacilitytosendnotificationtothepatientfor confirmationofadmission.	
10	Thesystemshallhavethefacilitytoconfirmtheadmissionofapatienton receivingconfirmation.	
	PlannedDischarge	
11	Thesystemshallhavetheprovisiontomarkapatientfor discharge.	
12	Thesystemshallhavetheprovisiontogenerateadischargechecklistlinkedto thepatient.	
13	Thesystemshallhavetheprovisiontosendnotificationtoallconcerned departmentsforclearanceforthe“markfordischarge”patient.	
14	Thesystemshallhavetheprovisiontoupdatethedischargestatusto “Dischargecompleted”ongettingclearanceofalldischargeactivities.	
15	Thesystemshallhavetheprovisiontoupdatethestatusofbedto“Cleaning required”afterdischargeprocessiscompleted.	
	DischargeagainstMedicalAdvice	
16	Thesystemshallhavetheprovisiontomarkthedischargeas“DAMA”if required.	
	DeathDischarge	
17	Thesystemshallhavetheprovisiontomarkthedischargeas“Death”ifrequired. The system should have the provision to create the necessary documentation required to process a death discharge	
	PatientTransfer	
18	Thesystemshallhavetheprovisiontoinitiatethetransferofpatientfromone ward/unittoanotherward/unitofthehealthcarefacility.	
19	Thesystemshallhavetheprovisiontoacceptthetransferofpatientfromone ward/unittoanotherward/unitofthehealthcarefacility.	
20	Thesystemshallhavetheprovisiontorecordalldetailsofthetransferofpatient withinthehealthcarefacility.	

Sl. No	Functional RequirementsofADTModule	Supported Yes/No
21	Thesystemshallhavetheprovisiontorecordalldetailsofthetransferofpatient toanotherhealthcarefacility.	

2. Ward Management

Hospital bed/ward management plays a crucial role in streamlining the process of bed assignmentandtransferwithinahealthcarefacility. Herearesomekeyfeaturesandbenefits of an effective bed/ward management system:

-GraphicalRepresentation

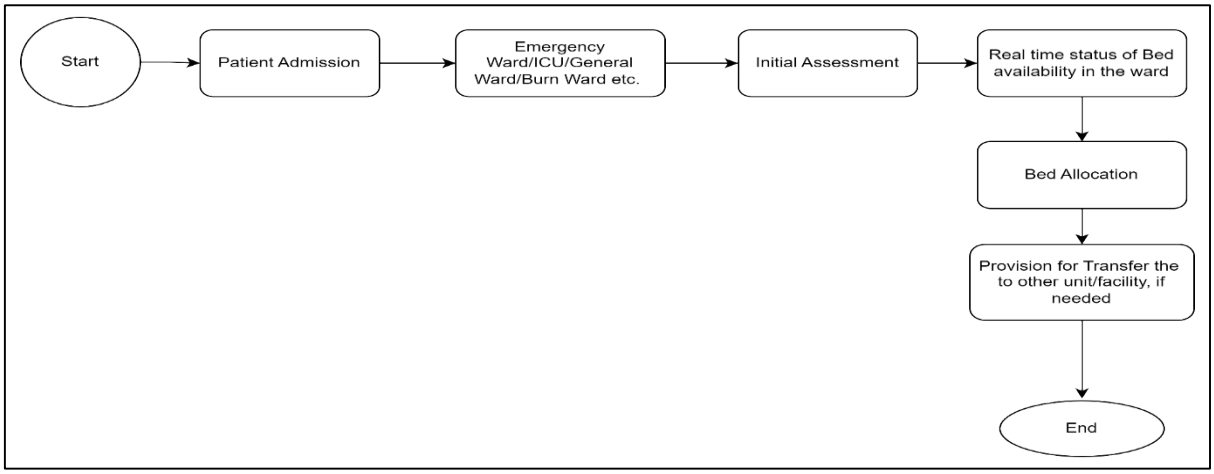
-Real-TimeUpdates

-ClassificationandCategorization

-CentralizedInformation

By incorporating these features, a bed/ward management system enhances the efficiency of bedallocation,reducesmanualprocesses,andprovidesreal-timebedavailabilityinformation. Thisultimatelyleadstobetterresourceutilization,improvedpatientflow,andenhanced overall hospital management.

Indicative Process Map



Functional Requirements:

Following are the Functional Requirements (FR) envisaged for the Ward Management module including but not limited to:

Sl No	Functional RequirementsofWardManagement	Supported Yes/No
01	Thereshallbeprovisiontogeneratebarcodedforwristbands, labels.	

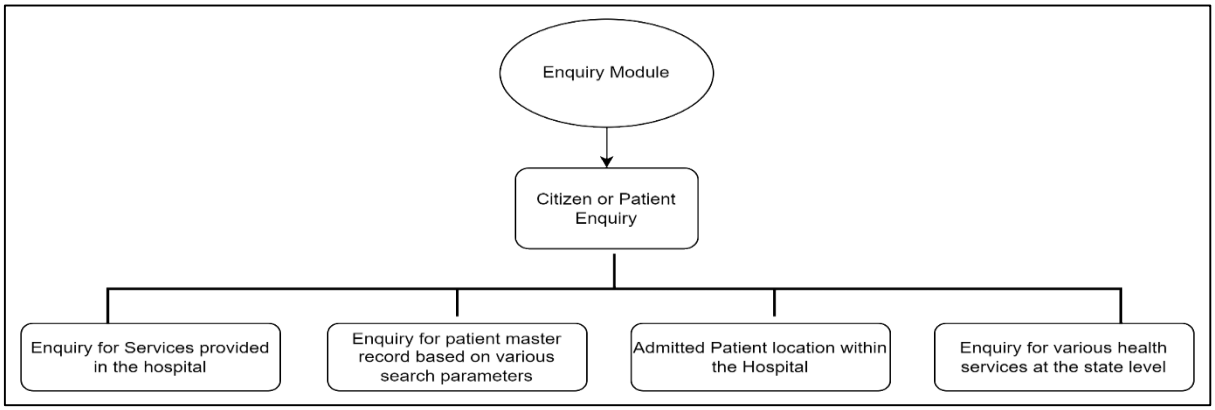
Sl No	Functional RequirementsofWardManagement	Supported Yes/No
02	Thereshallbeprovisionforreadingthebarcodegeneratedforthepatient	
03	Thereshallbeprovisiontoraisedrugordersfor patient	
04	Thereshallbeprovisiontodisplayifitemsreceivedanditemsrequestedare not matching.	
05	There shall be provision to display list of pending items with remarks if any mentioned in pharmacy module for reason of delay.	
06	ThereshallbeprovisiontodisplayiftherequestedDrugisnotapartof Patient Entitlement.	
07	Thereshallbeprovisiontoraiseadrugreturnrequestforpatients	
08	There shall be provision to issue stock/drugs from sub-store to patient, with option to display & select the list of alternative drugs, if ordered drug is not available.	
09	There shall be provision to raise a request for MRD folder. Request to be auto generated for services as defined in Service master. Also, provision to acknowledge on receiving the file.	
10	ThereshallbeprovisiontoraiseaBloodUnitRequestforPatient.	
11	Thereshallbeprovisiontocapturerequestfordischargeofpatienti.e.,Mark for Discharge by nurse based on verbal orders given by the doctor.	
12	ThereshallbeprovisiontoraisearequesttoCSSDdepartment:	
13	Thereshallbeprovisiontoraiseadietaryrequestforpatientorpatient companion/Attendant	
14	Thereshallbeprovisiontoraisearequestforlinen,acknowledgeonreceiving & issuing to patient and then return.	
15	There shall be provision to raise a request for cross referral of Inpatients to other specialty Consultants	
16	There shall be provision for nurse to view the list of admissions floor/ wing wise.	
17	ThereshallbeprovisiontogeneratePatient'slistbedwiseforeachfloorwise, with new admissions for the day to be displayed.	
18	Thereshallbeprovisiontoraisearequestforroom Maintenance.	
19	ThereshallbeprovisiontoraiseRequestasRoutine/Urgentfordiagnostics, Bedside procedures & Other services/ packages/ bundles for inpatients.	
20	ThereshallbeprovisiontoraisearequestforAmbulanceandforfooddirectly from the IPD ward dashboard.	
21	Thereshallbeprovisiontofilteroptionoflaboratoryinvestigation components for doctors	

Sl No	Functional RequirementsofWardManagement	Supported Yes/No
22	Thereshallbeprovisionfortrendanalysisforchroniccondition	
23	Thereshallbeprovisiontodrugsearchbysalt,notbyitsname,oranyother suitable method	
24	There shall be provision of introducing speech to text in doctors' notes, so that time is saved (Explore the possibility)	
25	Thereshallbeprovisionfordaycaremodelifrequired.	
26	There shall be provision of alert to be generated if the referral consultation request has not been processed within the defined time limit	

20.1.5.5 Patient Search

The Patient Search Module in a Hospital Information System (HIS) facilitates the managementand handling of inquiries or queries received from patients, potential patients, and otherindividuals. It serves as a communication interface to address various types of inquiries andprovides timely responses.

IndicativeProcessMap



MinimumFunctionalRequirements

Following are the minimum Functional Requirements (FR) envisaged for the Patient Search module including but not limited to:

FRCode	MinimumFunctionalRequirementsofPatient SearchModule	Supported Yes/No
01	The enquiry module shall provide information about all hospital departments, blocks, and facilities, including details about emergency services, surgery, pediatrics,obstetricsandgynecology,cardiology,radiology,bloodbanketc	
02	The system shallhave the facility to check theavailability of doctors and staff members. It provides details about their weekly schedules and current locations within the hospital.	
03	Thesystemshallhavethefacilitytoaccesscomprehensiveinformationabout each department, specialty, unit, ward, and outpatient department (OPD).	
04	The system shall have the facility to view the cost details associated with medical consultations, procedures, surgeries, diagnostics, and other treatments.	
05	Thesystemshallhavethefacilitytoviewdetailedinformationaboutadmitted, referred,discharged,anddeceasedpatients.Thisinformationishandledwith strict confidentiality and is only accessible to authorized personnel within the hospital.	
06	Patients shall be able to check the updated status of their allocated beds through the enquiry module and provides real-time information on bed availability and assigns beds to admitted patients.	
07	Patientsshallbeabletoaccessinformationaboutmedicalconsultations, diagnostics, surgeries, therapies, and other healthcare services provided.	

FRCode	MinimumFunctionalRequirementsofPatient SearchModule	Supported Yes/No
08	Thesystemshallhavededicatedsectionforpatientstoprovidetheirfeedback. Patients can share their experiences, suggestions, or complaints, which are valuable for the hospital's continuous improvement.	
09	The system shall have facility to display upcoming events, health tips, and notices organized or ongoing within the hospital. Patients can stay informed about health-related events, educational sessions, and other activities.	
10	The System shall provide comprehensive information about the process of organ donation. Patients can learn about the requirements, regulations, and procedures involved in becoming an organ donor.	
11	ThesystemshallbefacilitytogeneratedynamicManagementInformation System (MIS) reports as per need.	

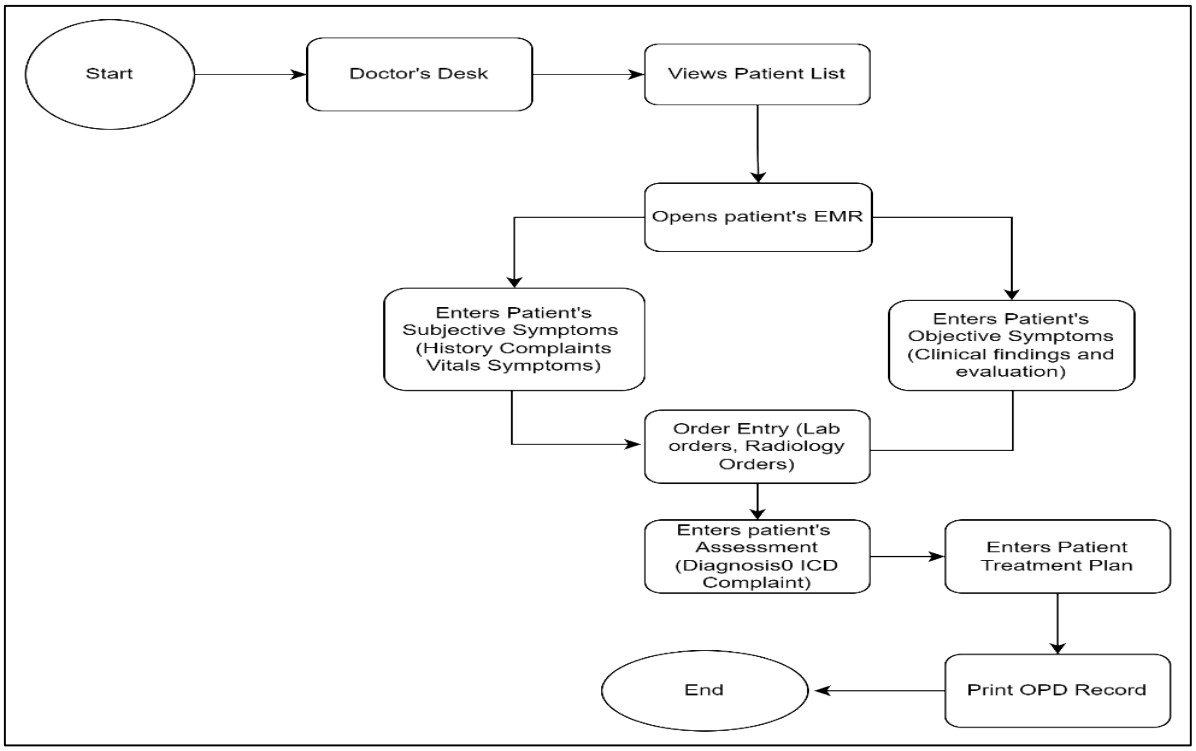
20.1.5.6 Doctor’s Desk

The Doctor's Desk serves as the central point of interaction between doctors and patients, encompassing their entire medical history in a chronological manner. Here are the key features and components of a Doctor's Desk dashboard:

- **PatientOverview**
- **MedicalHistory**
- **VitalsandAllergies**
- **LabandRadiologyResults**
- **MedicationHistory**
- **DocumentsandAttachments**
- **NotesandAnnotations**

Byconsolidatingallrelevantpatientinformationintoacomprehensivedashboard,theDoctor's Desk allows doctors to quickly access and review key details about the patient's medical history.Thishelpsinmakinginformeddecisions,providingpersonalizedcare,andenhancing overall patient management.

Indicative Process Map



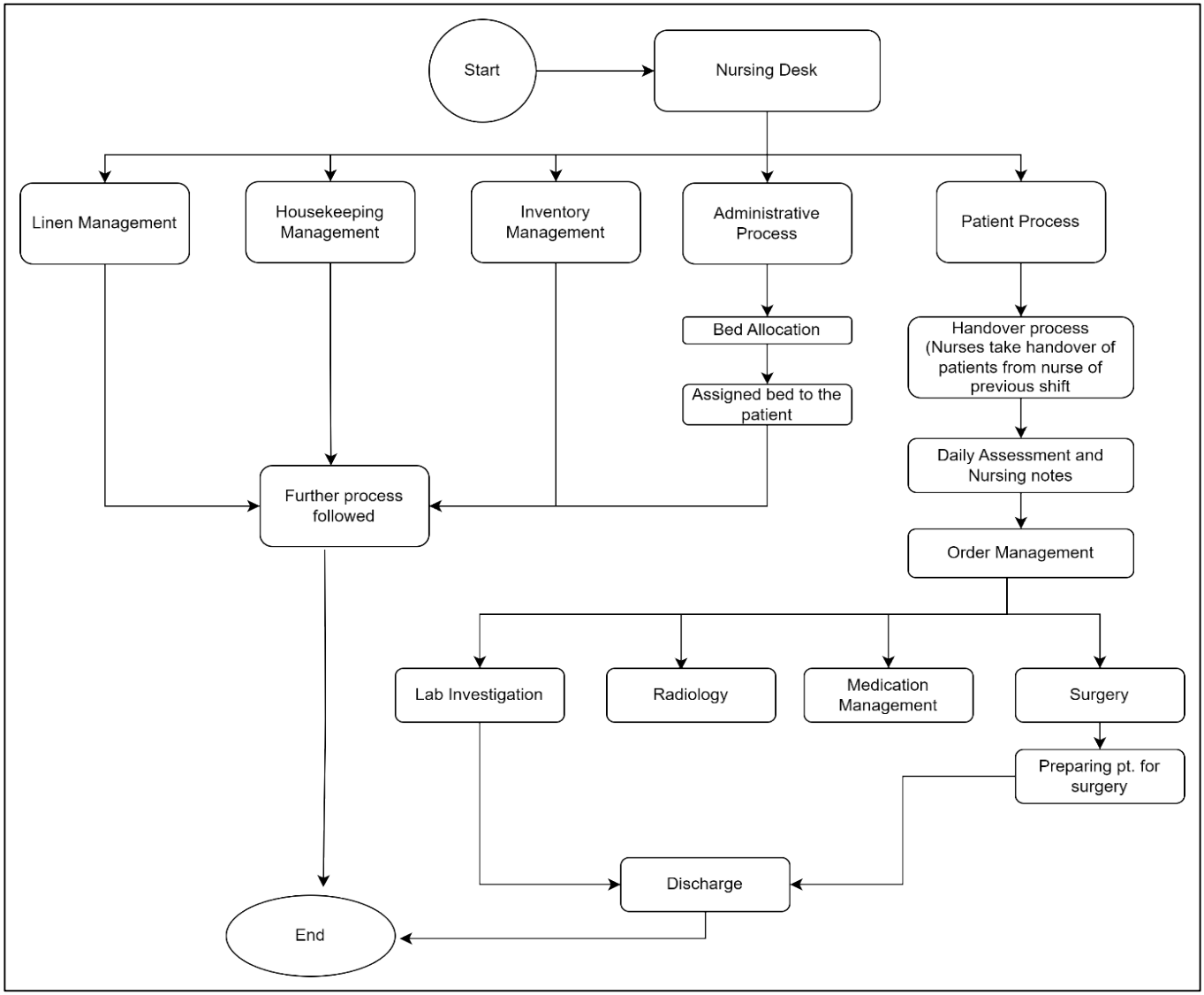
Following are the Functional Requirements (FR) envisaged for the doctor's desksystem including but not limited to:

Sl No	Functional RequirementsofDoctor'sDeskModule	Supported Yes/No
Common Functions		
01	The system shall have the provision for the doctor to view the daily workload in a calendar format.	
02	Thesystemshallhavetheprovisionforthedoctortoviewthecompletemedical record of the patient in multiple display options – chronologically, medical record type wise, visit wise, etc.	
03	There shall be a provision of screening, so that patient is screened for their vitals by resident of nursing staff and then to the treating doctor. The credentials of resident should be different from the treating doctor but should be linked to the worklist of the treating doctor.	
04	The system shall provide a list of medical record templates to the doctor for creation of new medical records. These medical record templates should be department-specific / unit-specific and displayed accordingly.	
05	The system shall have medical record templates that capture details such as medical history, subjective analysis, objective analysis, allergy records, and provisional and confirmed diagnosis.	

Sl No	Functional RequirementsofDoctor'sDeskModule	Supported Yes/No
06	The system shall have the provision for the doctor to create medical records using the configured medical record templates.	
07	Thesystemshallhavetheprovisionforthedoctortoplaceinvestigationorders like lab orders, radiology orders, other diagnostic test orders, OP procedure orders, admission requests, discharge requests, prescription orders, etc. ***Theapplicationshallhavemultipleprovisionlikeselectionofdatausing drop down option, conversion of handwritten text to machine readable format, conversion of speech to machine-readable format and other methods which shall assist the user in creating medical records.***	
08	Thereshallbeprovisionofselectingthesymptomsshouldbethere,butdonot mandate to cross of select the symptoms which are not there.Unselectedsymptomsshouldbetakenasnosymptoms.	
09	The system shall have the provision for the doctor to order for any major procedures like surgery request with relevant details required for booking of OT and requests to other support departments like CSSD, Diet, Anesthesia, etc.	
10	The systems shall have the provision for the doctor to view the status of the orders placed for each patient.	
11	The systems shall have the provision for the doctor to view the results of the orders placed for each patient.	
12	ThesystemshallhavetheprovisiontorecordSNOMED-CTcodefor procedures and where applicable.	
12	The system shall have the provision to record ICD code for provisional andconfirmed diagnosis.	
13	There shall be provision of having predefined order set customized for every doctor.	
14	Thesystemshallhavetheprovisionforthedoctortoviewthetrendanalysisof lab results of the patient.	
15	Thesystemshallhavetheprovisionforthedoctortoraiseacross-consultation request for another doctor, transfer care to another doctor.	
16	The system shallhavethe provisionforthedoctortoviewcross-consultations requests received, transfer of patient requests, etc.	
17	Thesystemshallautomaticallyrecordthestarttimeandendtimeofeachvisit (OPD/IPD) along with the name and login ID of the doctor.	
18	Thesystemshallhavetheprovisiontoallowforresidentsallottedtoadepartment to view the patients assigned to a consultant / doctor.	
19	The system shall have the provision for the resident to perform all functional features configured for the doctor as per allowed privileges.	
20	Thesystemshallhavetheprovisionforthedoctor/residenttocreateany relevant medical certificates as requested by the patient.	

Sl No	Functional RequirementsofDoctor'sDeskModule	Supported Yes/No
21	Themobileappprovidedforthedoctor/residentshallhaveallfeatures mentioned above as per the configurations and clinical settings.	
22	The system shall have the provision for the doctor to view the patient care journey, detailing all interactions and treatments the patient has undergone chronologically. This includes past consultations, surgeries, diagnostics, medications, and follow-up notes.	
23	The system shall have the provision to cross-reference patient records with other relevant medical data for comprehensive analysis. This feature will enable doctors tolink the patient's historicaldatawith newentries,ensuringa holistic view of the patient's medical history. This includes cross-referencing labresults,radiologyreports,previousconsultations,treatmentplans,andany other relevant medical documentation.	
OPDFunctions		
24	The system shall provide a list of patients who have availed appointment for OPD services for the given department / unit / doctor as configured.	
25	Thesystemshallhavetheprovisionforthedoctortoelectronicallycallapatient for OPD consultation.	
26	Thesystemshallhavethe provisionforthedoctorto markthepatientas "Not seen"ifthecalledpatienthasnotreportedforOPDconsultationandshould automaticallymovethepatientfromthelistofactivepatientstoaseparatetab for "Not seen" patients.	
26	The system shall have the provision for the doctor to mark the OPD consultation of a patient as "Completed" and should automatically move the patient from the active list to another tab containing the "Completed" patients.	
27	The system shall give priority to patients who are sent for investigations such as CTandMRI.The patient shallnot haveto standin thequeueagain forthe same	
28	The system shall automatically set the medical records created in the OPD consultation as read-only once the status of the OPD consultation is set as "Completed".	
29	Thesystemshallhavetheprovisionforthedoctortoupdatethemedicalrecord after the status has been set as "Completed" if required.	
30	There shall be provision of seeing patient seeing other doctor if the treating doctor is not available through a barcode systemwithin the same department	
31	The system shall have provision of alert generation for theunseen patients in the ward – to monitor if each and every patient in the ward is reviewed by nurses and residents.	
32	There shall be provisionof marking patient withsomespecial notes by doctor which should be visible only to the treating doctor. (Not Applicable to all doctors)	
33	There shall be provision of customization of set of investigation tests should remain with user as per their clinical practice.	
IPDFunctions		

Sl No	Functional RequirementsofDoctor'sDeskModule	Supported Yes/No
34	Thesystemshallhavetheprovisionforthedoctortoviewtheadmittedpatients in department / unit / doctor wise.	
35	Thesystemshallhavetheprovisionforthedoctortomarkanadmittedpatient for discharge.	
36	Thesystemshallhavetheprovisionforthedoctortoscheduleasurgeryforan admitted patient.	
37	Thesystemshallprovidedetailedreportsoninformationregardingabsconded and discharged patients	
38	The system shall have the provision for the resident to execute all functional features of the system in IPD as per allowed privileges.	



Nursing Management

The Nursing management module serves as a vital tool for developing and implementing care plans to enhance the quality of patient care. Here are some general features typically found in a Nursing Desk module:

- PatientOverview
- **CarePlanManagement:**Assessments,interventions,goals,andexpected outcomes.
- DocumentationandCharting:
- **CommunicationandCollaboration:**Messaging,alerts,andnotifications.
- ReportingandAnalytics

Byincorporatingthesefeatures,theNursingmanagementmodulesupportsnursingstaff indeveloping andimplementingeffectivecareplans,optimizingpatientcare,andpromotingpositivep atient outcomes.

Indicative Process Map

Functional Requirements

Following are the Functional Requirements (FR) envisaged for the nursing managementsystem including but not limited to:

Sl No	Functional RequirementsofNursingManagement	Supported Yes/No
01	The systemshallallowthenursingstafftoviewthelist of admittedpatients in their respective department / unit as per allowed privileges.	
02	Thesystemshallallow thenursing staffto view thelistofpatients thatare pending for intake process.	
03	The system shall allow the nursing staff to conduct the intake process (initial assessment, vitals, general condition, etc.) for the patients in the pending intake list.	
04	The system shall provide a daily duty roster to ensure everyone is aware of their duties, and reports shall be sent to the nursing superintendent for necessary action."	
05	Thesystemshallallowthenursingstafftoviewthemedicalrecord of the admitted patient.	
06	The system shall allow the nursing staff to create medical records using pre-configuredmedical record templates for nursing assessments, daily progress notes, etc.	
07	The system shall allow the nursing staff to view the status of pending orders like lab orders, radiology orders, diagnostic orders, procedure orders, medication orders, etc.	

Sl No	Functional RequirementsofNursingManagement	Supported Yes/No
08	Thesystemshallallowthenursingstafftorecorddetailsofmedication administration performed on each admitted patient.	
09	Thesystemshallprovidevisiblealertstothenursingstaffonpendingactivities for each admitted patient.	
10	Thesystem shallescalatependingalertstohigher management nursingstaff on pending activities for each admitted patient using a resolution time escalation matrix.	
11	There shall beprovisionof complaint trackingsystem shouldbeadded under nursing management.	
12	ThesystemshallallowthenursingstafftoviewthemedicalchartsforIV administration, input/output charts, trend of vitals, etc.	
13	Thesystemshallincludehandovermanagementwithtimestampdetailsin each respective unit of the department within the health facility	
14	The system shall allow the nursing staff to place orders for clinical and non-clinical services delivered to the admitted patient.	
15	The system shall allow the nursing staff to raise indents for requesting medicines, blood product request, diet orders, linen items, surgical consumables, etc.	
16	Thesystemshallallowthenursingstafftocoordinatetheactivitiestofulfillthe discharge process for each patient.	
17	The system shall allow the nursing staff to view the billing charges for each admitted patient.	

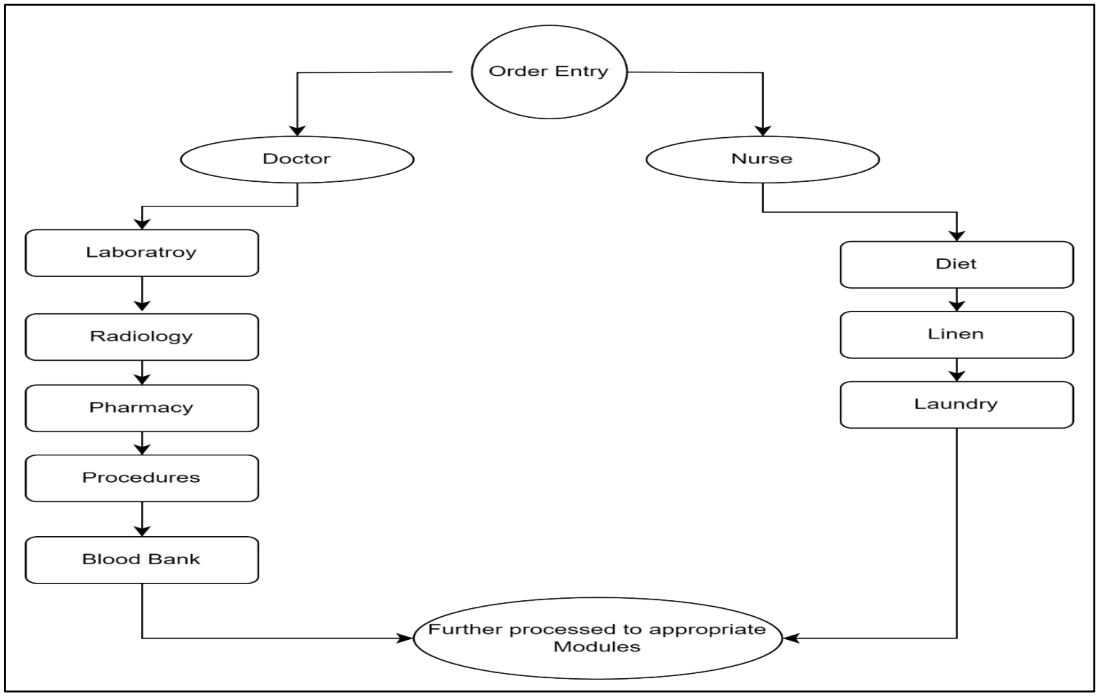
20.1.5.7 Order Entry (CPOE)

The Computerized Physician Order Entry module is an essential component of hospital management systems that enables doctors to electronically enter and send medication and investigation orders instead of relying on traditional paper-based methods. Here are the key features and benefits of the CPOE module:

- **Electronic Order Entry**
- **EnhancedAccuracyandSafety**
- **Decision Support:** Drug interaction alerts, dosage range checking, and allergy warnings.
- **OrderWorkflowManagement:**Routingorderstotheappropriate departments.
- **IntegrationwithPharmacyandLaboratory**
- **OrderDocumentationandRetrieval**
- **AuditTrailandAccountability**

ByimplementingtheCPOEmodule,hospitalscanimprovetheaccuracy,efficiency,andsafety of medication and investigation order management. It reduces errors, enhances decision support,facilitatesorderprocessing,andensurescomprehensivedocumentationandretrieval of orders for improved patient care.

Indicative Process Map



MinimumFunctionalRequirements

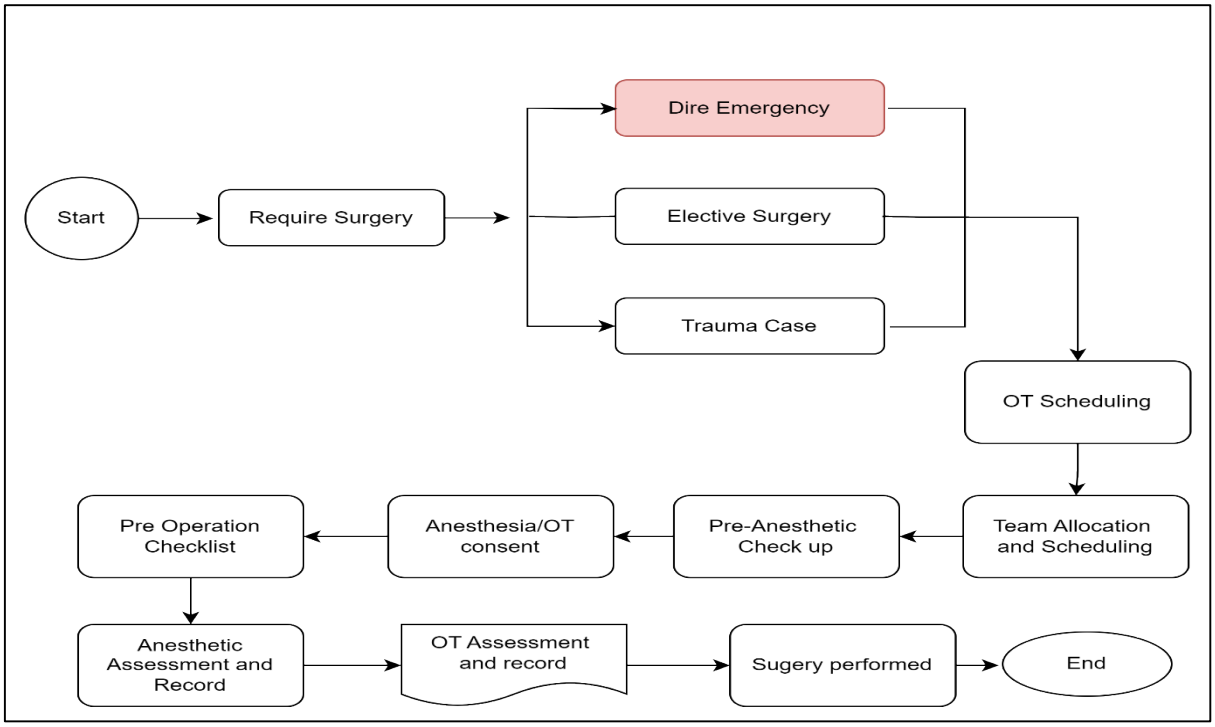
Following are the minimum Functional Requirements (FR) envisaged for the CPOE module including but not limited to:

FRCode	MinimalFunctionalRequirementsofCPOE	Supported Yes/No
OR/01	Themoduleshallhavefacilitytoorderforlnvestigationsandservicesfor patients. Stat / urgent is required.	
OR/02	Themoduleshallhavefacilitytoalertsorpromptregardingallergytodrugs.	
OR/03	Themoduleshallhavefacilitytoprescribedrugstopatientsandprovideoption to print documents such as progress note, prescription, service order, etc.	
OR/04	Themoduleshallhavefacilitybedisplaymedicationhistoryi.e.,drugsadvised to patient and provision to define alternative drugs.	
OR/05	ThemoduleshallhavePop-Upfacilityforduplicateorders.	
OR/06	Themoduleshallhavefacilitytodefinefavoriteorderitems.	
OR/07	Themoduleshallhaveprovisionforrequestrequisitionforadmissionand configurable templates and form for notes and discharge summary.	
OR/08	Thesystemshallhaveprovisiontousedigitalsignature.	
OR/09	Thesystemshallhaveprovisiontotagsensitivediagnosissuchas HIV.	
OR/10	ThesystemshallhavefacilitytoassignICDcodeforprovisionalandconfirmed diagnosis.	
OR/11	ThesystemshallhavefacilitytoassignSNOMED-CTcodeforproceduresand other applicable areas.	
OR/12	Thesystem shallhavethefacilitytoprovisionfororderssetslinkedtoICDand SNOMED-CT codes.	

20.1.5.8 OT Management

Operation Theatre module caters to the scheduling of operation theatres, surgery team, patient tracking, operation theatre consumable management, accounting and Operation theatre roster and notes.

Indicative Process Map



MinimumFunctionalRequirements:

FollowingaretheminimumFunctionalRequirements(FR)envisagedfortheOTmodule including but not limited to:

FRCode	MinimalFunctionalRequirementsofOTManagement	Supported Yes/No
OT/01	Thereshallbeprovisiontodoschedulingofsurgeryfrom OT&modifyor cancel booking.	
OT/02	Thereshallbeprovisiontore–schedulebookedslotsforothertime/date	
OT/03	ThereshallbeprovisiontodefineOTslotsbasedonDr./Specialtyassignedto each OT.	
OT/04	ThereshallbeprovisionforOTbookingwithoutRegistrationofpatient	
OT/05	There shallbe provisionto definetheatre unavailability. Oncetheatremarked as unavailable, same shall be reflected in all booking screens.	
OT/06	Thereshallbeprovisionofcapturingtheconsumablesusedduringthesurgery.	

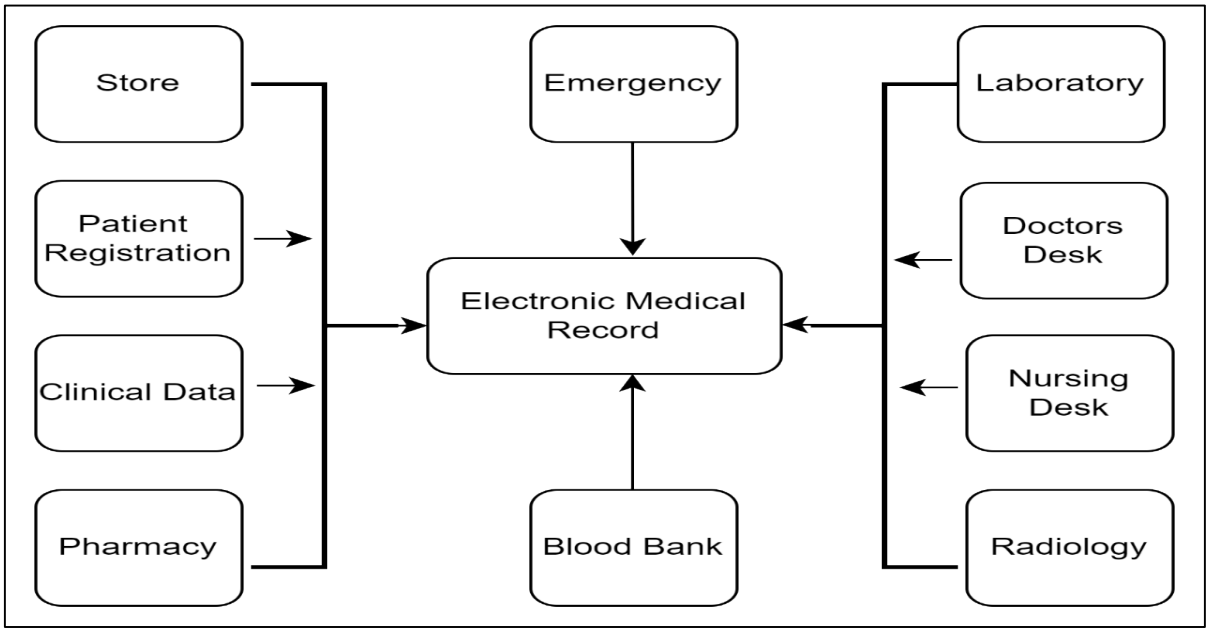
FRCode	MinimalFunctionalRequirementsofOTManagement	Supported Yes/No
OT/07	There shall be provision of sending back items which are not used during surgery to the store through nursing staff and verified at the level of treating doctors and scrub nurse	
OT/08	Thereshallbeprovisiontogeneratewaitinglistorvirtuallistfor OT	
OT/09	Thereshallbeprovisiontocapturenameoftheanesthetistatthetimeof scheduling.	
OT/10	Thereshallbeprovisionof cateringGrave/Direemergencyprocedure, whose authority shall lie with the department HOD.	
OT/11	Thereshallbeprovisionofslotbooking,iftheOTtableisnotbookedorslotis notoccupiedthenitshallbecancelledwithin(45Mins)(Systemshallgenerate notice for this incidence)	
OT/12	Thereshallbeprovision todefine the dutyscheduleofanesthetists, junior medical staff, nurses, & attendants.	
OT/13	There shall be provision to shall generate alerts for the Unit - anesthetists, junior medical staff, nurses, & attendants who are required to perform the operation. It shall be shown in the Work List of the concerned Doctors &Nurses.	
OT/14	There shall be provision to define deposit charges for OT as per the surgery grade, time & specialty.	
OT/15	There shall be a provision of keeping slot system for elective surgeries and dividing the patients into first and second half as per the need.	
OT/16	Thereshallbeprovisionofpatientandrelativeconsentform, whichcapability of capturing sign, thumb impression	
OT/17	Thereshall be provision to generation ofchecklistofPre,During and Post surgery shall generation through the system.	
OT/18	There shallbeprovisionshallof capturingtransfer in andtransfer outtimefor surgery.	
OT/19	There shall be provision of capturing surgical notes through speech to text, scribble to text.	
OT/19	ThereshallbeprovisionofcapturingAnesthesianotesthroughspeechtotext, scribble to text.	
OT/20	There shall be provision to define equipment charges based on classification of equipment.	
OT/21	There shall be provision of Concept of Emergency charges to be added to surgeon fee e.g.: Doctor comes on a Sunday to perform a surgery due to emergency.	
OT/22	ThereshallbeprovisiontodefineOTpackages	
OT/23	Thereshallbeprovisiontofeaturetodisplaylistofscheduledsurgeries/ tentative admission list as on a date in medical records department module.	

FRCode	MinimalFunctionalRequirementsofOTManagement	Supported Yes/No
OT/24	ThereshallbeprovisiontogenerateanOTlistonedaybeforesurgeryanddo rescheduling ifrequired,thengenerateaOTList in themorning onthedayof surgery (reflecting surgeries as per rescheduling done), & then generate OT list for the day on the next day reflecting any emergencies taken in between etc.	
OT/25	There shall be provision of option to select the consent form specific to the surgery with a unique bar-code number (system generated) along with the patient details for patient consent with manual signature.	
OT/26	Thereshallbeprovisiontoperformpreopchecklist	
OT/27	There shall be provision to perform and capture 'Time out' before procedure-before the start of surgery/procedure in operating room to confirm the right patient, right surgery on right body site.	
OT/28	ThereshallbeprovisiontomarkarrivalofInpatientfromwardtoOT/ Department & capture Reason for delay in patient transfer	
OT/29	There shall be provision to capture end time of surgery with exit from OT to recovery room and from recovery room to patient bed location.	
OT/30	Thereshallbeprovisiontodefinesurgeonsas Primarysurgeon,assistant surgeon, 2nd assistant surgeon etc.	
OT/31	Thereshallbeprovisiontochangetheprocedurescheduled	

20.1.5.9 Electronic Medical Record (EMR)

An electronicmedicalrecord(EMR)is adigitalversion of all theinformation typically findin a provider'spaperchart:medicalhistory,diagnoses,medications,immunizationdates,allergies, lab resultsanddoctor'snotes. EMRs areonline medicalrecords of thestandardmedicaland clinical data, mostly used by for diagnosis and treatment. Comprehensive and accurate documentationofapatient'smedicalhistory,tests,diagnosisandtreatmentinEMRsensures appropriate care throughout the provider's clinic. EMRs are more thanjust a replacement for paper records. They effectively allow communication and coordination among members of a healthcare team for optimal patient care

Indicative Process Map



Minimum Functional Requirements:

Following are the minimum Functional Requirements (FR) envisaged for the Electronic Medical Records (EMR) module including but not limited to:

FRCode	MinimalFunctionalRequirementsofEMR	Supported Yes/No
EMR/01	Thesystemshallhavetheprovisiontodefineclinicalrecordtemplatesfor collecting medical information about a patient during the OP visit and IP visit.	
EMR/02	The system shall have the provision to define clinical record templates for creating medical documentation pertaining to different medical and surgical specialties/departments of a healthcare facility.	

FRCode	MinimalFunctionalRequirementsofEMR	Supported Yes/No
EMR/03	Thesystemshallhavetheprovisiontosearchpatientnamewise,HID,Mobile number or any other means.	
EMR/04	The system shall have integrated patient EMR viewer that provides a cross-disciplinary where a patient focused View of clinical information stored in Clinical Data Repository is provided.	
EMR/05	ThesystemshallbeabletodisplayEMRrecordseithervisit-wise, chronological order, medical record type wise or any other grouping method.	
EMR/06	The system shall have the provision to display a time-based view of health episodesthathaveoccurredinthepatienthealthjourney.Itshallbearranged on an earliest to latest episode list. The facility user shall be able to click on any episode and view the activities and reports pertaining to the episode.	
EMR/07	The system shall have the provision to provide access to information in the form of result data, text documents, scanned documents, images, and waveforms from interfaced medical devices, as well as integrated clinical systems.	
EMR/08	ThesystemshallhavetheprovisiontomaintainanICUmonitoringchartinthe system to monitor the hourly/daily update of vitals.	
EMR/09	The system shall have the provision tocreate monitoring interval schedule to monitor vitals for a patient admitted in a healthcare facility.	
EMR/10	The system shall have the provision to record the vitals of a patient admitted in the health care facility according to the monitoring interval schedule set for the patient.	
EMR/11	Thesystemshallhavetheprovisiontodisplaytheclinicalinformationfor differenttypesofdatagroupslikeclinicalsummary,history,observations,etc.	
EMR/12	The system shall have the provision to create medicine administration scheduletoadministermedicationstopatientsadmittedinahealthcarefacility for all types of medications.	
EMR/13	Thesystemshallhavetheprovisiontorecorddetailsofadministrationof medication prescribed to patients admitted in the healthcare facility.	
EMR/14	The system shall have provision to create EMR templates specific to clinical departmentsandassignthesametotheworkflowsoftheclinicaldepartments. The systemshallhavethe provision forthehealthcare professionaltosignall EMR documents using digital signature (DSC). The EMR templates shall be defined using the inputs from end-users during requirement study.	
EMR/15	Facilitytoattach scanneddocumentstopatientrecordswhichmightinclude photographs, reports and other relevant documents and must include all necessary tools and mechanisms that will facilitate the process.	

20.1.5.10 Patient Billing

The Billing is a critical component of a comprehensive Hospital Management System that handles financial transactions, invoicing, and billing processes within a healthcare organization. It ensures accurate and efficient management of financial records. The Billing module allows to manage all the financial/billing of the patients and charge for the services they were provided by the healthcare facility. This module to be integrated with Reception of the healthcare facility for bill collection, pharmacy, OTC, wards management module and doctor station for details of tests.

Functional Requirements

Following are the Functional Requirements (FR) envisaged for the Billing module including but not limited to:

FR Code	MinimalFunctionalRequirementsofPatient Billing	Supported Yes/No
1	Ability to maintain Bed Type Master - Every bed will be attached to a particular bed type. The schedule of charges will be classified as per the bed type.	
2	Ability to maintain Corporate Master for tariff -This is where a new corporate is created	
3	Ability to maintain Corporate Type - This is whether the corporate is a company or TPA or insurance etc. This will be selected when a new corporate is being created	
4	Ability to maintain a base tariff which is the rate charged to OPD patient. All other category of rates will be based on the base tariff	
5	Ability to maintain Ward Master- This will be connected to location master	
6	There has to be a provision of entering rates for service items which will be applicable on future date.	
7	Ward level charge slip should be generated automatically during bed side procedure entry	
8	System should have the provision for calculating Half day charges.	
9	System should have provision to configure multiple Bill Formats/Templates (Details Bill, Summary Bill, Credit Bill, Package Bill etc..)	
10	There should be a provision in the system to print the Bill Summary/Details Bill at any point of time	
11	The System should capture Episode wise (Multiple Visits) Events and integrate in EMR	
12	The System should have provision for maintaining Multiple rate cards in a way that they can be used at point of billing and can easily be mapped to various credit/Cash parties	
13	The System should allow periodic Modification of Rate cards based on authorized access	
14	Ability to maintain Location Master - which are floor where the wards are located	
15	Ability to maintain Bed Master - Beds will be connected to Rooms	
16	Should have a provision for tariff priority. When configuring the rates of a corporate the tariff will be prioritized in the following manner- The company tariff will be first priority and then the base tariff will be the second priority. This is useful when in case of CGHS the service does not exist in the CGHS tariff then on a priority basis the rate of the base tariff will be picked up	
17	Rate master configuration should have exclusive facility configuring whether the discounts are available on IP or OP and on what category of services	

FR Code	MinimalFunctionalRequirementsofPatient Billing	Supported Yes/No
18	The System should have facility to maintain List of non-admissible charges respect to services & pharmacy based on Insurance company & TPA agreements	
19	The System should have provision to display the current Bill to a patient at any given time	
20	Ability to maintain corporate wise Tariff Master and should be integrated with contract module of CRM	
21	Ability to maintain Room Master - Rooms will be connected to the wards	
22	The System should show the changed assigned doctor name to the IP in the final bill	
23	System should have a provision of copying one company tariff to another. This will avoid duplication of effort in creating the new tariff master	
24	In case of OPD consultations there are situations when the repeat visit within a specified time period is not charged by specific doctors. The system should allow to configure the days so that the follow up visit charges gets automatically calculated and charging happens accordingly. (Excluding Sundays/Holidays)	
25	The System should capture Pre-requisite for Investigation and Procedure on the charge slip/bill. Those print out should be done automatically at the time of generating bill in OPD/IPD	
26	While crossing the estimated amount the System should create an alert	
27	The System should have a run time billing provision	
28	The system should not allow a closed bill to not be opened. However, a new bill can be linked to it if required.	
29	Ability to display/SMS/eMAIL the daily bill to the patient after the cut-off time.	
30	System should give flagging option in the bill to allocate discounts if any item-wise.	
31	The system should allow giving discount on the bill on an item level, category level as well as on the entire bill	
32	All discount & bill cancellation should follow proper approval matrix and super user should get notification for approval	
	Hospital Facilities and Rate Cards (HFRC)	
33	The System should provide provision for applying different rates for investigation services based on bed categories	
34	The System should allow additional charges in the bill for privileged floors	
35	Provide facility to Maintain and Edit Master Data for Service Groups and each service should have one to one mapping for Billing purpose based on authorizations	
36	Provide facility to quick view and print all bills	
37	The system should have different templates for Cash and Credit Bills. Credit Bills should clearly articulate the name of company towards which bill is raised	
38	The System should have provision for entering any billing charges manually ******* Limited to Consumables only (System Control Issue; Recommendation: The Input should come from User Department against which the OPD Billing Should receive money; This should come automatically from the sub store)	
39	The System should have Flexibility to allow different doctor charges depending on master rate card	
40	The system should have facility to pre define All surgeon charges, anaesthetist, OT charges etc in the rate list for a specific patient category/ bed category and Link it to the Billing document	

FR Code	MinimalFunctionalRequirementsofPatient Billing	Supported Yes/No
41	The system should have provision to roll back any line item in billing with Remarks and authorization before finalization of the Bill	
42	The System should have provision for charging service charge (Configurable based on bill to bill basis) on all non-consumable/ non-pharmacy services above Package charges except for Doctor Fees	
43	The software should have the flexibility to add a Miscellaneous service with a remark/ narration and the applicable department (to be used for Sunday/holiday/emergency in night patients) where the rate shall be editable and changes can be made by authorized staff only	
44	The System should have facility to charge additional investigation charges – in case the test is sent outside the hospital with the details of the vendor	
45	The System should have provision to capture Patient name, date and time of transfer between wards so applicable ward charges could be levied	
46	The system should provide flexibility to include hospital base rates, if the services are not included in credit party tariff	
47	The system should have provision for billing Doctor charges based on Patient Categories (OPD, Spl. Clinic Patient etc..)	
48	The system should have provision for capturing billing remarks in case of bill cancellation as well as Part Payments	
49	The system should provide facility for cauterization charges based on O.T. category	
50	The system should have 2 separate configurations for Burn Dressing and Dressing Charges in case of burn patient's dressing	
51	The system should show discount/refund in final bill as well as corresponding bills	
52	the system should show the balance of the patient in final bill as well as corresponding bills.	
53	The system should maintain the same Bill amount in Bill Summary, Bill Details amount and Final Bill for all Bills	
54	The System should provide facility to clearly declare various charges like Ambulance charge/Blood/OT charges/OT Instrument & materials charges in Bill Summary	
55	The system should automatically club all OT expenses under one head	
56	The system should have functionality for online reporting for interpretation of reports	
57	The System should incorporate all hospital and centre schedule of charges with all service wise & Department wise notes, so that tie-up with different corporate can be taken care of.	
58	The System should display all available packages along with Service details & Conditions.	
59	The System should provide Police station information as a mandatory field in case of MLC registration	
60	The System should allow to define Surgery categories and Billing and other corresponding services should be based on these Surgery categories	
61	The System should also have provision for surgery charges based on Time for Surgery. (Base Cost for minimum time and additional cost for additional time)	
62	The System should provide provision for giving Manual discounts on the entire bill as well as individual billing items and package based on Authorizations and should accompany with Remarks	

FR Code	MinimalFunctionalRequirementsofPatient Billing	Supported Yes/No
63	The System should not allow to levy bed charges if the discharge certificate is obtained before 12 noon.	
64	The System should not allow any changes in service tax, even in case of a waive off	
65	The system should have provision to calculate Service tax on Net value of Bill (Customizable components)	
66	The System should have provision for a method so that waiting time between patient interfaces can be calculated---- TAT	
67	The system should have a provision for calculating fees for a surgery based on a predefined logic when multiple surgeons are involved	
68	The System should provide facility to raise credit note on the miscellaneous service and do a debit note for the correct service for correct revenue allocation purposes within 72 hours	
69	The System should allow to rectify the Miscellaneous Service Head/Rate before finalization of the Bill	
70	The system should have facility to levy equipment charges based on Fixed fee in case of Hospitals and on Actual for Surgeons	
71	The System should have provision for charging Service Charges (Configurable based on bill-to-bill basis) based on Ward categories for a Patient being transferred from or to OT	
72	The System should have facility for a patient in ICU / Nursery / NICU to retain his/her room, so for same Patient ID multiple beds will be booked and charged	
73	The System should provide option to exclude/include service tax in any bill.	
74	The system should have provision to consider a different rate list for credit bills (where rates are a pre-defined percentage of Hospital rates) and not take them as discounts	
75	The system should have facility to copy the mother’s address as the baby's address and the baby's bill should be automatically raised in the package cost/or based on Mother's Occupied Bed (whichever applicable)	
76	System should generate interim bills automatically based on system configuration (number of days from admission). It should be the same Bill Number with Draft or Interim as Watermark	
77	The system should allow to view and print interim bills based on date parameters	
78	The system should have provision for handling loss in service tax for waived patients	
79	The system should display and printable the complete medical file (history) before Issuance of Final Bill - EMR	
80	The System should be able to shown list of State, District, Police Station & Pin code at least for all eastern India regions	
81	The System should provide the billing details of first unit rather than “other charges head” in final bill settlement at another unit. The System also enlist all the non-medical consumptions of patient to be enlisted in bill settlement rather than having a single head	
82	The System should have a provision for Preconfigured list of charges for a Patient Category (Ex: CCU patients)	
83	System should allow configuration for Various Packages with package types (Open/Closed)	

FR Code	MinimalFunctionalRequirementsofPatient Billing	Supported Yes/No
84	System should have provision to make retrospective change on Billing category for a patient post admission and same should reflect in Billing (Ex. A CGHS patient admitted as General patient and later when he shows required credentials, there must be provision to change the Billing Category)	
85	The system should display the bills by summary for non-taxable items, VAT applicable items, service tax applicable items and non-admissible items.	
86	The system should provide facility to modify/edit all Business Rules by relevant authority and display them in a single screen	
87	The System should maintain an audit trail for all Credit & Debit notes are created. The System should allow Authorized person to do this. For making Credit / Debit notes the System should provide two steps, one is for making Debit / Credit notes & another is an authorization	
88	The system should have provision for noting denomination of the notes received by the cashier, so that the money receipt amount can be tallied with denomination amount, in case of cash receipts	
89	The System should be able to calculate the list of Telephone calls + WIFI done by IPD patient from his / her room. This type of charge should be reflected in the final bill and there should be interface with the EPBX system	
90	The system should have the provision to revert back to cash in case management decides not to provide CGHS rates with retrospective effect from the day of admission of patient	
91	Provide facility to store and print the scanned copies of rate tariffs and agreements - View to all and authorization based for printing	
92	The System should capture the user's name, time stamp for every Print. The System should allow printing Duplicate Bills with watermarks as Duplicate or to print same bills multiple times (with proper authorization only)	
	Advances & Deposits (AD)	
93	The System should have provision to collect advances by multiple mode of payments for one advance in 1 Bill (Ex: partial by Credit/Cash)	
94	The System must be able to accept advances without patient being admitted against room booking	
95	The system should allow Configuration of Advance Type, Amount of Advance, Mode of Payment of Advance	
96	The system should allow to receive deposits before surgery. The billing clearance for surgery should be based on user receiving advance as decided. System should automatically configure the advance deposited and generate OT/Cath clearance for any procedure and also allow direct printing option to the Ward sister/Floor Co-ordinator.	
97	The system should have configuration for collecting advances under multiple advance heads. The system must automatically convert the IP Booking advance to IP advance at the time of admission.	
	OP Billing (OP)	
98	The System should have configuration for Consultation Fees based on the grade of the doctors, nature of consultation (General/ Specialty) and also based on first consultation and follow up consultation	
99	The System should allow adjustment for advances against the Bill, give discounts and Create a Consolidated Bill for multiple instances	

FR Code	MinimalFunctionalRequirementsofPatient Billing	Supported Yes/No
100	The System should allow Discounts based on Authorizations with Remarks	
101	The System should provide facility to create a no Charge Bill/Complementary Bill by authorized Users with remarks	
102	The System should have the ability to automatically charge anything out of package on rates specified in billing master. Anything inside the package must not be charged and must not be displayed on bill.	
103	The System should allow to display the Cost of Individual Items in a package for internal Use	
104	The System should allow configuration of multiple sittings and visits for a treatment	
105	Configuration of Discount master for Discount Types with predefined range for each discount type	
106	The System should have configuration for Scrolls - the system should have flexibility to deposit cash on Batches	
107	System should show outstanding amount if any patient misplaces the bill and comes to collect the report (OP)	
108	System should have provision of manually adding other charges, such as in case of consultants who perform surgical procedures in Minor O.T and where charges (Surgeon's) are variable.	
109	The System should allow multiple mode of payments (Cash, Cheque, Credit cards, Debit Cards, E Transfers, third party payment, Pre paid or Post-paid cards)	
110	The System should allow generating credit Bills for Cash patient categories for Authorized roles only	
111	The System should have a functionality to transfer OPD Bills to IPD Bills in case a patient has to be admitted after tests (This is a System Control Issue and to be handled in IP Billing only if the patient is admitted on the same day "only")	
112	The System should have capability to generate different series Bills based on Bill Type	
113	The System generated Bills must have Columnar billing summary for non – taxable items, GST applicable items	
114	The System Generated Bills must display GST number and PAN number	
115	The System should have a provision at the time of Billing to check the Registration number of doctors coming as patients against a third-party database/in-house database (of Doctors and Registration Number) to give appropriate discounts. This type of discount should be preconfigured and linked to discount master	
116	The System should allow Post Bill Discounts by means of Credit Notes and should display on bill print	
117	The system should able to generate a bill of combination of pharmacy (Medication & Consumables) and investigation (Lab., Rad., Minor Procedure etc...)	
118	The system should be able to print advance and credit note along with ledger as and when demanded by patient	
119	The System should have the provision to print the prescription for an OPD Bill along with the Bill	
	Day Care Billing (DC)	
120	The System should allow editing of Rates only by Power Users (Authorized users)	
121	The System should allow to print Advance Details for the patient/stakeholders	

FR Code	MinimalFunctionalRequirementsofPatient Billing	Supported Yes/No
122	The System should allow adjustment for advances against the Bill, give discounts and Create a Consolidated Bill for multiple instances	
123	The System should allow Discounts based on Authorizations with Remarks	
124	The System should not generate any separate bill series for this billing type –the admitted patients shall get IP bill while those treated as OP shall get OP bill.	
125	The System should give a warning If the charge slip amount is more than the advance/authorized amount/sum of advance & authorized amount when both are provided	
126	**The System should allow multiple mode of payments (Cash, Cheque, Credit cards, Debit Cards, E Transfers, third party payment, Pre paid or post paid cards)**	
127	The System should allow Post Bill Discounts by means of Credit Notes with reference to Final Bill	
128	The System should have provision to generate a Payment Voucher for each Credit Note	
129	The System generated Bills must have Columnar billing summary for non – taxable items, GST applicable items	
130	The System Generated Bills must display GST number and PAN number	
131	The System should have facility to show Consumable items – Non discountable items and outsourced investigation separately in the Final and detailed bill.	
132	**The System should consider all patients as Day Care Patients if the time frame for admissions does not include a night stay**	
133	**The system should have provision to incorporate Business Rules for defining Day care Patients in System**	
	IP Billing - Cash (IP)	
134	The System should allow editing of Rates only by Power Users (Authorized users)	
135	The System should have a Configurable Discharge template	
136	For packages, the system should be able to display the list of items included in the package.	
137	Packages should have predefined List of Allowed Consumables and Procedures. Anything else should be chargeable	
138	The System should give a warning If the charge slip amount is more than the advance/authorized amount/sum of advance & authorized amount when both are provided	
139	The System should have capability to generate different series Bills based on Bill Type (IP/OP/Cash/Credit)	
140	The System should provide provision for accommodating Multiple Payers in a Bill	
141	The System should allow to print Advance Details for the patient/stakeholders	
142	The System should allow adjustment for advances against the Bill, give discounts and Create a Consolidated Bill for multiple instances	
143	**The System should allow multiple mode of payments (Cash, Cheque, Credit cards, Debit Cards, E Transfers, third party payment, Pre paid or post-paid cards)**	
144	The System should allow Discounts based on Authorizations with Remarks	
145	The System should prepopulate Cash/Credit, Pharmacy Cash/Pharmacy Credit based on Bill Type. But these can modify with proper authorizations	
146	There should be provision in the system to allocate different bed category as billing category. This facility will be used in case of non-availability for asked bed category by the patient party	

FR Code	MinimalFunctionalRequirementsofPatient Billing	Supported Yes/No
147	In the above case, at the time of bed transfer the user should be able to only change the room no. and not the billing category. The billing category should get changed automatically depending on the bed category selected	
148	The System generated Bills must have Columnar billing summary for non – taxable items, GST applicable items	
149	The System Generated Bills must display GST number and PAN number	
150	The system should have provision to give Custom discounts for Services or group of services based on Management decisions	
151	The System should have a Provision to change of OT grade / doctor's name / Surgeon's name / waiver of doctor's fees (when doctor himself ask for)	
152	The System should have facility to show Consumable items – Non discountable items and outsourced investigation separately in the Final and detailed bill.	
153	The system should show Admitted Time Stamp and Discharged/Expired Time Stamp (From Doctor's Death Certificate Report)	
154	The System should not allow any refund against that patient until approved by authorized personal, in case the Final Bill "Balance Due" value is 0	
155	System should be able to calculate mark up on various services as per the room category selected	
156	System should allow Only power users to downgrade the room after admission. In case of downgrade the charges should be levied for the particular class from the day of downgrade. However, in case of upgrade all charges must be billed on upgraded category since the day of admission	
157	System should show outstanding while for a patient and should provide a remark of the Outstanding Amount in the current Bill	
158	System should provide facility to change applicable rates for all transactions for a patient, in case of any change in Patient Credit Category	
159	The system should be able to generate the break-up of packages that are pre-defined in the system.	
160	The system should be able to display non-admissible items for corporate as per pre-defined master in OT/Cath lab clearance.	
161	Every highly Priced Medical Consumable should have a set List of supportive consumables that should not be charged	
162	Every high-cost injection should have a set List of supportive consumables (E.g. Cotton, gauge, normal consumables or disposables like swab, normal tablets, etc.) that should not be charged in the same Req. No. However, the system should allow the user to override this list.	
163	The System should allow Post Bill Discounts by means of Credit Notes with reference to Final Bill	
164	The System should have provision to generate a Payment Voucher for each Credit Note	
165	The System should provide facility for doctor joint admission	
166	The system should not allow final Bill generation before review of the Bill. The reviewer Details (employee user ID, name, audit date and time) for every Bill should be captured.	
167	System should give a notification in case of any Cheque Bounce/Returns to the Billing Desk	
168	**The system should be to able print advance and credit note along with ledger as and when demanded by patient**	

FR Code	MinimalFunctionalRequirementsofPatient Billing	Supported Yes/No
	IP Billing - Credit (IPC)	
169	The System should allow editing of Rates only by Power Users (Authorized users)	
170	The System should allow to print Advance Details for the patient/stakeholders	
171	The System should allow adjustment for advances against the Bill, give discounts and Create a Consolidated Bill for multiple instances	
172	The System should allow Discounts based on Authorizations with Remarks	
173	The system should have provision to collect advance amount and adjust against credit parties.	
174	The system should have provision to enter co – payment break up between multiple payers of the bill and displayed on the BILL	
175	The system should provide facility to capture authorization details from credit payers, scan and store multiple copies	
176	The System should consider multiple authorizations from Credit Parties for a patient as multiple entries	
177	The system should show Admitted Time Stamp and Discharged/Expired Time Stamp (From Doctor's Death Certificate Report)	
178	System should show outstanding while for a patient and should provide a remark of the Outstanding Amount in the current Bill	
179	System should have a workflow to capture the Credit Claim (Insurance/Corporate) status - Payer workflow	
180	All Reports for credit patient should be available to the Billing team. The Billing team should be able to select the documents that can be printed/email to corporate/insurer. This process should be integrated with the Payer workflow System	
181	The system should have a discount type master with the assigned discount rates. The user at the time of billing will select the discount type and the rate would get automatically populated	
182	The System should give a warning If the charge slip amount is more than the advance/authorized amount/sum of advance & authorized amount when both are provided	
183	The System should allow multiple mode of payments (Cash, Cheque, Credit cards, Debit Cards, E Transfers)	
184	The System should prepopulate Cash/Credit, Pharmacy Cash/Pharmacy Credit based on Bill Type. But these can modify with proper authorizations	
185	The system should have provision to capture TDS (if any)	
186	The System should have facility for disallowance from credit payers; the user shall be able to choose if the disallowed amount has to be written off or made outstanding on the patient. The Write off should be allowed per service and should be treated as a discount – and should have provision to be incorporated in the doctor’s account as well.	
187	The System should have capability to generate different series Bills based on Bill Type (IP/OP/Cash/Credit)	
188	The System should be able to print pre – configured cover note for credit payers. The cover note template may vary from one payer to the other	
189	The System should have provision to generate a Payment Voucher for each Credit Note	

FR Code	MinimalFunctionalRequirementsofPatient Billing	Supported Yes/No
190	The System generated Bills must have Columnar billing summary for non – taxable items, vat applicable items and service tax applicable items	
191	The System Generated Bills must display Service Tax number and PAN number	
192	The System should have facility to show Consumable items – Non discountable items and outsourced investigation separately in the Final and detailed bill.	
193	The System should have provision to maintain TPA wise Service wise allocated amount list while handling TPA patient. This type of list should be maintained automatically - For IPD as well as Pharmacy	
194	The System should have provision to send an alert to the patient about the received approval amount from TPA/corporate.	
195	For TPA/corporate patients, when the bill is sent to the TPA/corporate the system should display it as "outstanding" in the account.	
196	When the cheque is received from TPA/corporate, the outstanding bill will be closed in the system.	
197	System should be able to calculate mark up on various services as per the room category selected	
198	System should allow Only power users to downgrade the room after admission. In case of downgrade the charges should be levied for the particular class till the day of downgrade. However, in case of upgrade all charges must be billed on upgraded category since the day of admission	
199	System should automatically convert the Corporate Patients from Individuals to Corporate Account	
200	The System should have provision to send an alert to TPA, nurse & billing department for Patient Admission, Transfer & Discharges	
201	The System should allow Post Bill Discounts by means of Credit Notes with reference to Final Bill	
	Additional Requirements (AR)	
202	Ability to refund (full/partial) advance payment if patient is not admitted, after deducting cancellation charges.	
203	Ability to track payments and mode of payments (cash/cheque/TPA/corporate) made by customers retrospectively	
204	System should have provision to make retrospective change on Billing category for a patient post admission and same should reflect in Billing (E.g. A CGHS patient admitted as General patient and later when he shows required credentials, there must be provision to change the Billing Category). Further, there should be provision to revert back to Cash in case Management decides not to provide CGHS rates.	
205	There should be provision in the system to allocate different bed category as billing category. This facility will be used in case of non-availability for desired bed category by the patient party . However, at the time of bed transfer (from upgraded bed to desired bed), the user should only change the room no. and should not be able to modify the billing category from the wards.	
206	System should be able to auto-generate the break-up of packages, which can be pre-defined in the system.	
207	System to have feature to edit admission details with respect to entering a) Policy Number b) Name of insurance company c) ID card no	

FR Code	MinimalFunctionalRequirementsofPatient Billing	Supported Yes/No
208	For closed packages, any increase of bill above the package price has to be discounted to bring it down to the package price. The person reviewing and finalizing the bill should be required to adjust this discount under appropriate heads.	
209	System to track planned/tentative admission cashless authorisation status. Same needs to be linked to IP no at the time of admission. There should be provision for revising estimates under the same sequence.	
210	Ability to generate Corporate/TPA short payment report	
211	Ability to register new doctor at admission desk and corresponding notification should be sent to Marketing	
212	Ability to auto- transfer outstanding patient bills to Corporate/ TPA Account	
213	Ability to debit TDS/processing fee, etc when payment is received from Corporate/TPA and credit remaining amount to the hospital.	
214	Details of Medicines/Consumables be auto-generated as soon as final detail bill printed.	
215	The system should capture payments received from different Corporate in any given period.	
216	Ability to maintain details in the system about bills despatched to different Corporate/TPA on a daily basis.	
217	At a given time every day (say 3 pm), list of all patients wherein the interim bill exceeds the advance given and also all patients wherein interim bill exceeds 80% of the billing estimate given to the patient should be generated.	
218	Packages should have predefined List of Allowed Consumables and Procedures. Anything else should be chargeable. For Corporate cases sometimes we have to give the list of items included in package. System should be able to generate such reports.	
219	System should automatically display the non-admissible items for each Corporate as per pre-defined master in the OT/Cath lab clearance process.	
220	The bill should include break-up of amount charged for the doctor/consultant under the head 'doctor's fee' and 'visiting charges'. The system should auto-calculate the break-up of doctor's fee into fee for admitting doctor and fee for performing doctor and the referral fee for referring doctor, but this break-up should not be printed in the bill.	
	IP/Day Care Package (PC)	
1	Ability to create a package: 1. Category-wise (E.g. Radiology, Cardiology) 2. Sub-category-wise (E.g. CT scan) 3. Service-wise	
2	Ability to define a package (Service items include: bed charges, investigation, pharmacy, doctor visits etc.) loosely (Item-wise Total amount is mentioned only) or tightly (Number of specific test procedures are also mentioned)	
3	Ability to define the tariff of a package.	
4	Flexibility to define no restriction (on Amount/ Number of services) package. (To accommodate CGHS/WBHS guidelines)	
5	Ability to capture package start and end date.	
6	Ability to define package duration.	

FR Code	MinimalFunctionalRequirementsofPatient Billing	Supported Yes/No
7	Provision to have exclusion list (of investigations, medicines, consumables, disposables) in a package.	
8	Ability to schedule various services configured under a package.	
9	For a package where only total amount is specified, ability to bill the patient additionally when this limit is crossed.	
10	Ability to bill the patient additionally when the limit on pharmacy is crossed.	
11	For a package where number of specific procedures are specified, ability to bill the patient additionally when this limit is crossed.	
12	Ability to configure a follow-up for another consultation and notify the patient.	
13	Integrate with billing module.	
14	Ability to capture package creation and termination date time.	
15	Ability to assign doctors for a package depending on the specialization for consultation service.	
16	Ability to copy one package to create a new package.	
17	Ability to notify the patient when the limit is crossed in both the cases.	
18	A package, that is used, cannot be deleted, but it'll get obsolete after termination period.	
19	System should have the provision to price a package on foreign currency and take payment accordingly.	
	OPD Package (OPD)	
1	Ability to accommodate different types of health check-ups like Master health check-up, Diabetic health check-up, Cardiac health check-up etc. in Preventive health check-up master.	
2	Ability to define and maintain the list of companies that have Corporate Tie-up with the Hospital.	
3	Ability to define the Tariff for the Corporate, like the Eligible Services, Bed Types, Procedures etc.	
4	Ability to create custom clinical templates to capture the various clinical details based on health check-ups from the master template. It includes drug prescription, diet and activity advice, follow up, referral consults, and all investigation results in an easy to read format.	
5	Ability to see the various parameters in a package with the package cost without generating the bill.	
6	Ability to take print out of various package without generating a bill.	
7	Ability to sign off electronically for each consultant entering clinical data.	
	General Requirements - Costing (GRC)	
1	Ability to capture the following as core activities: (indicative list and not limited to) • Patient registration • Interview and physical examination • Imaging study (e.g. USG) • Laboratory study • Diagnostic test • Perform medical procedures • Administration of vaccines • Administrative activities (For patients)	
2	Packages should support discount and surcharges	

FR Code	MinimalFunctionalRequirementsofPatient Billing	Supported Yes/No
3	Functionality to define and capture packages.	
4	Ability to assign authorized persons at decision points along the path of workflow or value stream map to authorize the activities associated with a service.	
5	Identify and capture all income-making departments.	
6	Ability to capture the following as direct cost items: (indicative list and not limited to) Drugs and medical materials Chemical reagents and diagnostic materials Medical equipment used once Fuel, oil, gas for medical equipment Stationery Bed Other materials Consulting services Other benefits	
7	Functionality to group all the resources consumed by major cost category (labour, supplies, materials, equipment and overhead) to capture all direct and indirect costs associated with performing a service.	
8	Provision to calculate EBITDA for individual departments and specialities (E.g. cardio).	

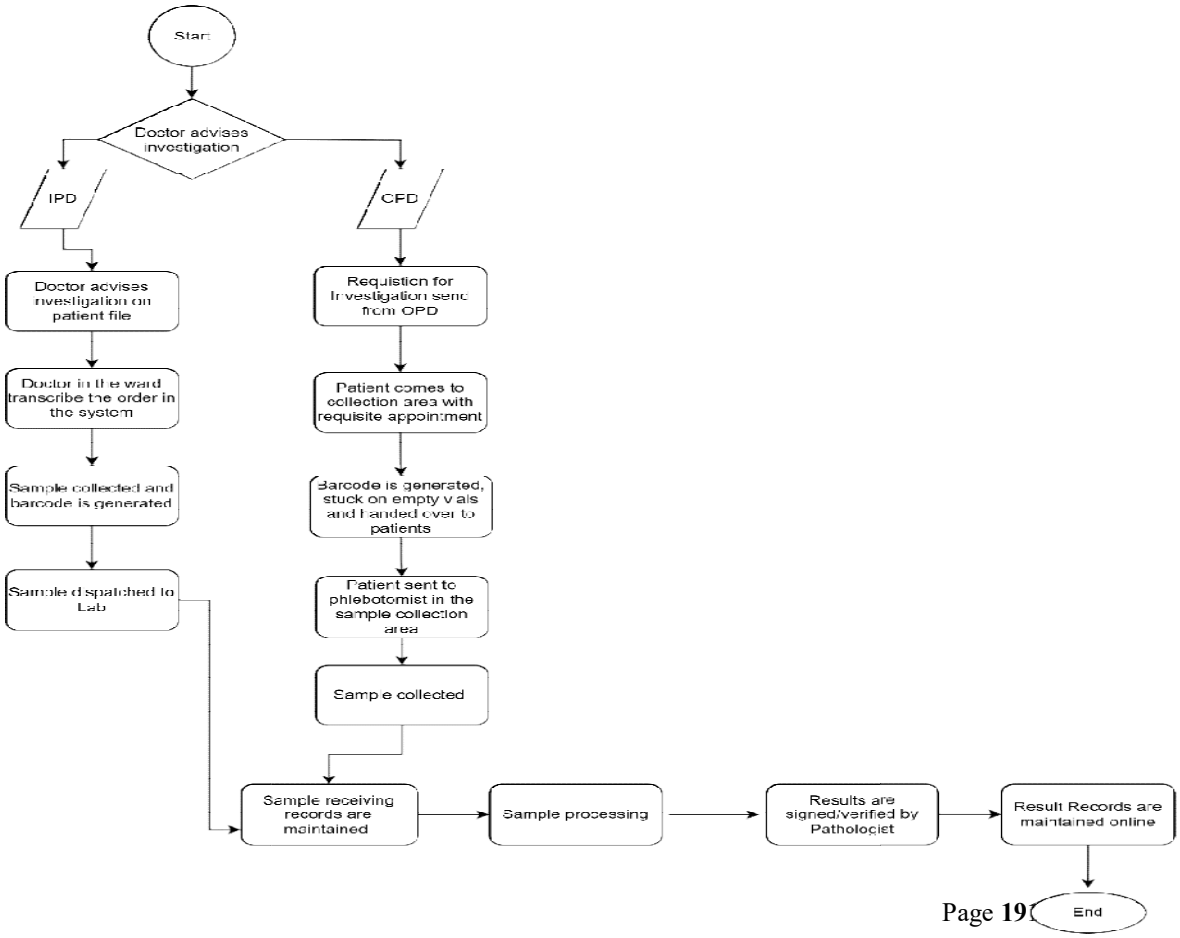
20.1.5.11 Laboratory Management

The Laboratory module is a crucial component of hospital management systems, as it automates the entire process of investigation requests and result delivery to the respective departments or doctors. Here are the key features and functionalities of the Laboratory module:

- **Request Management**
- **TestDisciplines:**TheLaboratorymodulesupportsawiderangeoftests.
- **TestGroupingandSampleType**
- **SampleNumberGeneration**
- **Result Entry**
- **HoldandRecallofLabtestreport**
- **ResultApproval**
- **Result Delivery**

Byutilizingthesefeatures,theLaboratorymodulestreamlinestheentiretestingprocess, from requestmanagementtoresultdelivery.Itensuresefficienthandlingofinvestigationrequ ests, accurate recording of test results, and timely delivery of results to facilitate prompt medical decision-making and patient care.

Indicative Process Map



Functional Requirements

FollowingaretheFunctional Requirements(FR)envisagedforthelabmodule including but not limited to:

Sl No	Functional RequirementsofLaboratoryManagement	Supported Yes/No
01	ThesystemshallhavethecapabilitytosupportPatientRegistration functionality, i.e., Quick Registration Details & Detailed Registration Details	
02	The system shall have the capability to support uploading the scan copy of TRFs (if any), Lab Form, Prescription of the patient available, corresponding to the Specimen No/ Lab No, for viewing at various stages.	
03	Thesystemshallhavethecapabilitytosupportaddition,modification& deletion of Test/ Profile/ Panel for Patients.	
04	Thesystemshouldhavethefunctionalityforrecollectionofsamplesforwhich samples are rejected	
05	Thereshallbeprovisionofqueuemanagement/SlotassignmentinLabservices, Token system to be introduced.	
06	The system shall have the capability to support Patient & Request merge functionality, when patient or requests have been incorrectly entered into the system.	
07	The system shall support Request tracking functionality using Patient ID/ SampleIDetc.,allowingtheadditionorviewingofdetailsofapatient'srequest record, such as Panels/ Profile/ Test ordered/deleted/modified, results changed and so on.	
08	The system shall havethe functionality torecord/view/edit internalcomments corresponding to a Patient in its lifecycle of the sample	
09	The system shall have the functionality to inform the date and time of report availability to the patients depending on the services availed by SMS/email.	
10	The system shall have the functionality to configure the number of bar codes to be printed per sample, as per sample collection policy	
11	Thesystemshallhavethecapabilitytoacceptordertransactionsfromanother information system through HL7 interface	
12	Thesystemshallhavefunctionalitytoretrievepatientrecordsbypartialname (first/ middle/last name), mobile number, Patient ID, location wise, Aadhaar, etc.	
13	ThesystemshallhavethecapabilityofBarcodeprintingwhilesample collection/ Specimen Label Printing as required	
14	ThesystemshallhavethecapabilitytosupportBarcode-pre-printedand printed post registration (both) to complete the sample processing workflow.	

Sl No	Functional RequirementsofLaboratoryManagement	Supported Yes/No
15	The system also shall provide the functionality to allow repeat printing of barcode on requirement (if the earlier one is damaged/ lost/ to be added in a new tube)	
16	The systemshallhavethe functionalityto createabatchand printa bar code for that batch of samples, being sent to the Receiving Point/ Location.	
17	The system shall have the functionality to select option for sending report to patient via e-Mail during Registration.	
18	Thesystemshallhavethecapabilitytoadd-onatesttothesamesample,with or without billing based on various scenarios	
19	ThesystemshallhavecapabilityofgeneratingbillsofLabfromsourcehospital irrespective of final test or diagnostic center.	
20	Systemshouldprovideinformationoflocationofroomorlaboratorywherethe test is going to be conducted.	
	SampleCollectionandDistribution	
21	The system shall have the capability to support the Specimen Receipt functionalityallowingreceivingsinglespecimens,eitherbyscanningabarcode or by entering a specimen number.	
22	The system shall have the capability support re-routing Specimen Dispatch / Receipt functionality enabling Panels/specimens rerouting to an alternate lab for testing in the case where the usual performing lab is unable to complete the testing.	
22	The system shall support Turn Around Time (TAT) functionality for tracking and monitoring of sample receipt and distribution	
23	The system shall have the capability to support Specimen/sample, receipt/ dispatch/statustrackingfunctionality displaying allthetracking informationon an individual specimen/sample with the date, time and responsible user for each action.	
24	The system shall support Outstanding Lists & labels functionality displaying the Collection Lists/ Labels for outstanding batches/ samples and enables receipt of these batches/ samples with/ without collection date and time update.	
25	ThesystemshallsupportBarcodescanningfunctionalityenablingscanningof bar code to reflect receipt	
26	Thesystemshallprovidetheabilitytoupdatesampleacknowledgementstatus for the requisitions displayed	
27	The system shall have the ability to track the status of the sample in its complete lifecycle based on the Bill No / Barcode id/ Patient Id or single bar code generated during Patient Registration.	
28	Thesystemshallhavethefunctionalitytohandleremotelyregisteredsamples, notto appear intheworklist till it arrivesin thesample receipt area oftheLab	

Sl No	Functional RequirementsofLaboratoryManagement	Supported Yes/No
29	The system has shall have functionality to record and view/ add internal comments from Registration / Sample Receipt / Sample Acknowledgement stage	
30	Thesystemshallhavethefunctionalitytoprovideaprompttoshowthesample quantity,typeofcontainer,specialhandlingremarkstobepopulated/collected as part of sample collection.	
31	Thesystemshallhavethefunctionalityforgeneratingpendinglistwhichneed to be highlighted based on various criteria as required.	
32	The system shall have the capability to support rejection of batch/ individual sample through bar code scanning or entering bar code number	
33	The system shall have the capability to display samples-in-transit/ Pending receipt, at any point of time based on various criteria like location/ lab name.	
34	Thesystem shallhavethecapabilitytosupportrejectionof sample, providing reason in the comments throughout the sample lifecycle and rejection comment need to be popped up as alerts in the system	
35	Thesystemshallhavethecapabilitytosupportcreationofanappropriate workflow, in case of rejected/ repeat collection of samples	
36	The system shall have the capability to display samples-in-transit/ Pending receipt, at any point of time based on various criteria like location/ lab name/ collection center/ Referral Hospital name etc.	
37	The system shall have the functionality to display the type of tube and the number of tubesrequired for collection ofthe sample, depending on thetests to be conducted	
Testing		
38	Thesystemshallidentifythosetestswhichareorderedfromemergency department and shall be catered in the priority. (Minimum turnaround Time)	
39	Thesystemshallhavecapabilityofreagentmanagement.	
40	The system shall have the capability totakeresults directly basedon defined criteria from the Instrument application which are capable to communicating with the system bi-directionally	
41	The system shall have the capability to provide an option to enter result manually, for tests performed in Instruments which are able to communicate bi-directionally	
42	Thesystemshallhavethecapabilitytoimport/exportgraphs/diagrams/ demographic details of patients from other sources/ applications.	
43	The system shall not accept any abnormal value recorded in result entry like “0” in any field and provide pop up alert flagging the abnormal value.	
44	The system shall have the capability be enabledto interface unidirectional / directionally with Lab equipment’s/instruments listed. Apart from the integration with the equipment’s, it enables Accepting/Transmitting results, sending results for Validation, results changing, holding, deleting, repeating, rerunning etc.	

Sl No	Functional RequirementsofLaboratoryManagement	Supported Yes/No
45	ThesystemshallprovideanoptiontotheUserifhe/shewantstorecordrepeat test values in the result entry screen.	
46	The system shall provide the option to record manual result entry for tests,performed in the instruments, in a single screen.	
47	The system shall have the capability to support sample storage & archival processintermsofautomatingthelocationdetailsandotherassociateddetails for traceability	
48	Thesystemshallhavethecapabilitytoprovide optionto recordresults for multiple tests for a single person in one department in one instance.	
49	The system shall provide the option to enter the Test results in a batch, with respect to the tests performed in that batch. This functionality can be customized as per department needs.	
50	Thesystemshallprovidetheoptiontotracksampleswhichneedtobe processed again due to any reasons.	
51	Thesystemshallprovidethefunctionalityto tracetheoriginalresult,ifthe result is changed subsequently	
52	Thesystemshallhavethefunctionalitytostoreimagesthataregrabbedfrom microscope and option to put that as part of report	
53	The system shall facilitate Histopathology workflow result entries along with generating worksheets with slide no	
54	The system shall provide the functionality for automatic calculations of testresults derived from other field results.	
55	ThesystemshallhavethecapabilitytosupportQuerytoviewthePanel/profile details using Lab no, patient id, Bar Code number etc.	
56	ThesystemshallhavethecapabilitytoprovideWork-Listfunctionalityallowing listing of test requests waiting to be performed. It shall also support viewing outstandingtasksbasedonselectiveparameterslikelabs,users,departments etc.	
57	The system shall have the Turn Around Time (TAT) functionality allowing for tracking&monitoringofsamplesinvariousstagesofsamplelifecycleincluding testing.	
58	The system shall have the capability to provide Request Entry functionality enablingresult entry- panel(entry and Change),display result entry(general entry), work-list result entry etc.	
59	The system shall provide vertical Result Entry functionality enabling to enter details of test results for an entire panel/profile, using a vertically formatted scrolling result entry form.	
60	ThesystemshallprovidehorizontalResultEntryfunctionalityenablestoenter details of test results for an entire panel/profile (to a maximum of 12 items), using a horizontal	

Sl No	Functional RequirementsofLaboratoryManagement	Supported Yes/No
	formatted result entry form.	
61	The system shall have the functionality toview/ enter/ authenticate results by Patient/ Test/ Group/ Panel/ Category/ Department depending on the type of workflow followed in the laboratory	
62	Thesystem shallhavethefunctionalitytogeneratecriticalvaluealarm based on result entry	
63	Thesystemshallhavethecapabilitytosupportinterdepartmentandintra department sample sharing work flow for performing testing of samples	
64	Iftherearemultipleteststobeperformedonasinglesampleandpartialtesting has been completed, rejection/ acknowledgement can be supported by the system,forrestofthetestsifthesampleisnotsufficienttotest/repeattesting has been ordered	
65	The system shallhave the functionality toprintaliquot labels whenmorethan one test is drawn in the same collection tube.	
66	ThesystemshallhavethecapabilitytosupportSplitSample&takingthe samples for testing as per the process flow of the Lab after splitting.	
67	The system shall provide the flexibility to perform tests based on PrimaryBar Code (If necessary, based on Secondary Bar code, if any)	
68	ThesystemshallhavethecapabilitytosupportSerology,Cytology,Cytogenetics workflow to complete end to end testing of the samples	
Validation		
69	The system shall have the capability to provide Panel details in terms of elaboration in the validation screen if other tests are ordered by the same patient, details of the patient demographics etc. In cases where the sample involves tests in other departments as well, in the validation screen of the systemcanhavetheother department result also, forviewtothepersonwho is validating the result, to correlate the result.	
70	Thesystemshallhavetheprovisionofconfigurationofreferencerange mapping is specific to the machine used for testing.	
71	The system shall have the capability to show the sample receipt time & date in the result validation screen	
72	The system shall feature a simple Validation screen that allows validation of each specimen after searching basedonspecimen number, i.e., single panel validation."	
73	The system shall have the capability to display Test Results in Graphical format and option to display graph for co-relation of 2/3 tests results need to be in place.	

Sl No	Functional RequirementsofLaboratoryManagement	Supported Yes/No
74	The system shall haveshown in thevalidation screen, thenumber of records left for validation.	
75	The system shall ensure through access control that Result entry and changing result entry can be strictly available to the department people only. No other department people have the capability to record results/ change resultsforother departments.Forchangingvalidatedresults,theright canbe restricted only to the HODs/ Supervisors.	
76	The system shall have the capability to maintain the audit trail of all changes performed in the results post those are recorded.	
77	Thesystemshallhaveprovisionofauto-certificationforallthosestandard reports that fall into normal range.	
78	Thesystemshallprovidetheoptionthatwhilevalidatingtherecord,thescreen canmentionsomewhereinthescreenfromwhichlocation/labandwhichuser has recorded the result. If there have been any changes in the result value, the screen shall also show the list of people who has edited the record.	
79	Thesystem shallprovideanoptionthat whilevalidationofaresultrecord,the validationexecutiveshallhavetheoptiontoviewPatientdemographicdetails, contactnumberoftheperson,his/herphysician'scontactnumber,onpressing some key, rather than going to different windows completely	
80	The system shall provide the functionality that reports of a department is appearing in the validation list of the department only. Moreover, the reports once validated in a level will not appear in that level again.	
81	The system shall have the functionality to place the records in FIFO (without priority of department) for validation queue, irrespective of departments	
82	Thesystemshallprovidethefunctionalityofdisplayingfulldetailsofresultsfor individual panels by request number.	
83	The system shall provide Validation functionality enabling reviewing and releasing of results. There shall be two types of validation possible in the application, i.e. single request validation & general validation.	
84	The system shall have the capability to generate Worklist based on different parametersliketests,patientdemographicsetc.aregeneratedfortheuserto track details.	
85	Thesystem shallhavethecapabilitytoprovideResult Acceptance/ Rejection functionality of the application allows accepting / rejecting result entry in the validation screen.	
86	Thesystemshallallowresultsvalidationinvolvingdifferentinterfacesfor validation - single panel, multiple etc.	
87	Thesystemshallhavethecapabilitytosupportauto-validationprotocolbased on CLS guidelines	
88	Thesystemshallallowmodificationpostapprovalasperrightsbased	

Sl No	Functional RequirementsofLaboratoryManagement	Supported Yes/No
89	The system shall havethe functionality that report shall be available tosingle user while time of verification or approval	
90	Thesystemshallhavethefunctionalitythattheresultsfallingunderpredefined criteria's, general validation shall be performed (batch validation)	
91	Thesystemshallsupportrejectorrecollectfeatureonverificationandapproval screen	
92	The system shall have provision of identifying outliers (Abnormal Values) of results and shall notify the laboratory in charge.	
Reporting		
93	The system shall provide anoptiontogenerateReport invariousformats like html, pdf, word, tiff, .gif etc., non-editable formats.	
94	The system shall provide optionto integrate results involving multiple tests in multiple locations/ labs/ departments to provide one view to the customer on results obtained.	
95	The system shall provide the option to search the patient lab data using the searchcriteriaandoptiontoreprintthelabreportshallbetherebasedonrole-based access.	
96	Thesystemshallprovideflexiblereportinginvolvingreportscreation&customization	
97	Thesystemshallhaveprovisiontostorelabreportswiththepatientrecordfor future reference by the Patient	
98	ThesystemshallsupportcustomizedreportingneedsasperGovernment regulations during epidemic like during Swine Flu, Dengue etc.	
99	Thesystemshallhavethefunctionalitytoprintthebarcodesonthereportsof the Patient as well while reporting.	
100	The system shall havethe facility toprint report with images attached forthat test	
101	The system shall have the capability to place digital signature for all people who are validating a panel containing multiple tests (more than one doctor validating the report) in the reports	
102	ThesystemshallprovidethefunctionalitytouploadtheReportsoverthe Internet & e-mail reports.	
103	Thesystemshallprovidefunctionalitytohandlerules-basedreportrouting.	
104	Thesystemshallhavethecapabilitytoprintmultipledepartmentreportsinone page, if required	
105	Thesystemshallhaveprovidedfunctionalitytoenableresultentryfor qualitative result entry through work-list result entry	

Sl No	Functional RequirementsofLaboratoryManagement	Supported Yes/No
106	Thesystem shallhavethecapabilitytosupport Result Reportingfunctionality to report the results after validation is complete, based on various grades defined for the respective tests.	
107	ThesystemshallhavethecapabilitytoprovideReporttemplatesfor descriptive reports	
108	The system shall have the capability to support web reports & reports overmobile app for the performed tests after results are published	
109	ThesystemshallprovidetheoptiontoaddAntibioticstothemasterlistforthe culture antibiotic sensitivity etc. by the authorized lab user.	
110	The system shall have the capability to perform configuration of a test in the application enabling User to create a new test, recording details for the test and mapping them to Parameters.	
111	ThesystemshallprovidethefunctionalitytoconfigureReferenceRangeswith respecttoPatient'sage/genderandequipmentandassociatedinterpretation.	
112	Thesystemshallhavethefunctionalitytoenabletheuserstocreatethelistof units. And subsequently, the Units need to be mapped to samples and parameters through the application.	
113	The system shall have the capability to capture the list the organism names which are used for Microbiology Culture reports. The application shall also provide the functionality to capture the source for mapping of Organism Antibiotics and capturing list of Antibiotics. The system shall be able to map the organism to source & Antibiotics.	
114	Thesystemshallhavetheeasytoset-upfunctionalitiesanduseflexiblerules like if any test result reaches a specific value, additional panel/ test is added to panel based on rule.	
115	ThesystemshallprovidethefunctionalityenablingrecordingoftheReference and Delta Ranges.	
116	The system shall provide the ability for result parameter creation involving creationofparametersforresultsreporting.Resultname,resulttypeandunits etc.	
117	ThesystemshallallowUnitsCreationinvolvingcapturingtheconversionfactor while creating unit - conventional unit name & S.I. unit name	
118	The system shall allow creating Package/ Profile definition to define Packages/Profiles (Packages/Profiles are group of tests) and mapping of the same to tests	
119	Thesystemshallhave thecapabilityforSecuritymanagement/role-based access management for the users	
120	The system shall have the capability to maintain table of lab-defined panic,delta and reference result ranges based on age and sex.	

Sl No	Functional RequirementsofLaboratoryManagement	Supported Yes/No
121	Thesystemshallhave thecapabilityto supportRegulatory compliance for current regulatory requirements	
122	Thesystemshallprovidethefunctionalitytodefinemasterhierarchyinvolving Package>Profile->Test->Parameters	
123	ThesystemshallhavethefunctionalitytodefinetheScheduleMasterindetail	
124	The system shall have the capability to support Lab wise configuration testmaster's to run the business.	
125	Thesystemshallhaveincorporatedallthestandardreportingformatsof Integrated Health information portal (IHIP – L Format).	

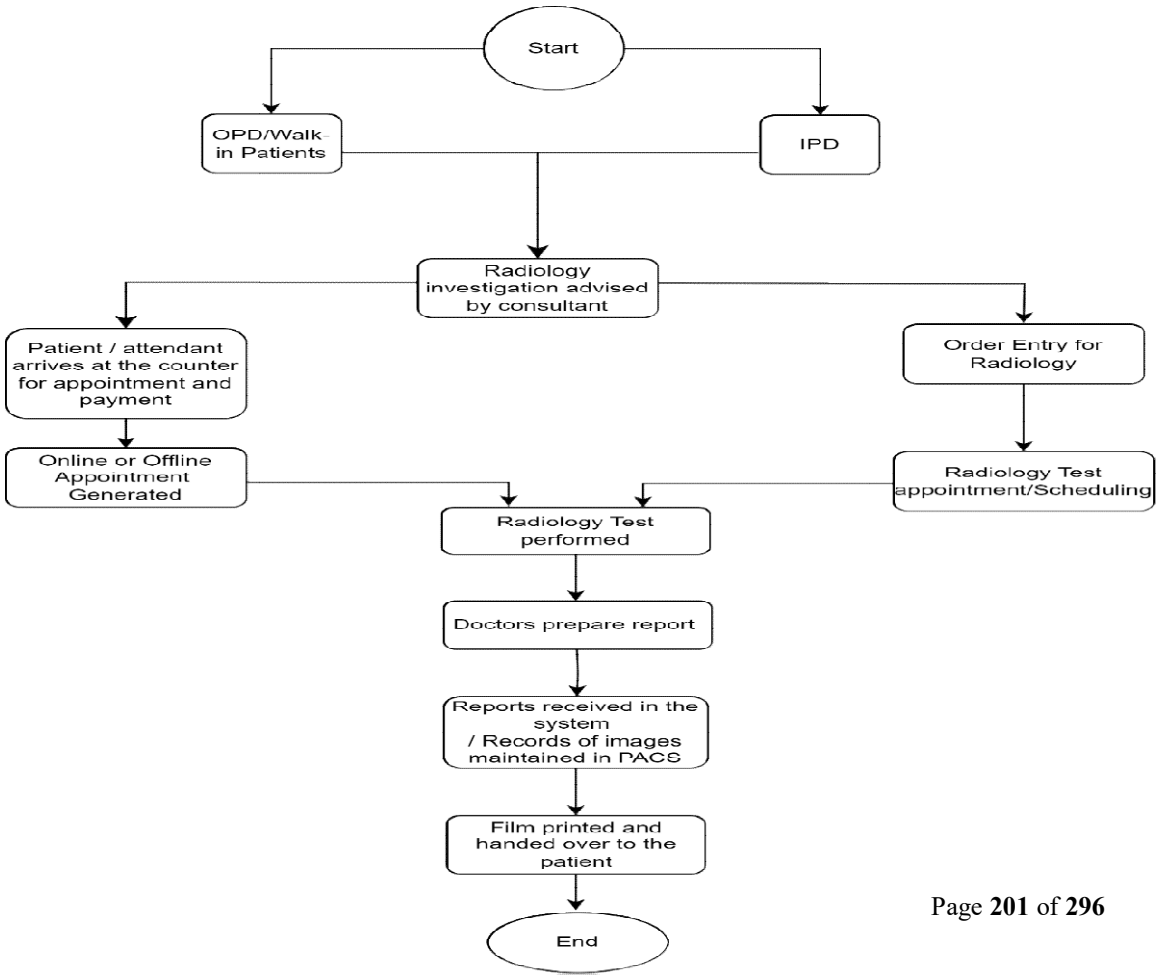
20.1.5.12 Radiology Management and PACS

TheRadiologyManagementmoduleisacriticalcomponentofhospitalmanagementsystems that specifically caters to radiology services such as X-ray, scanning, ultrasound, CT scans, MRI, and more. Here are the key features and functionalities of the Radiology Management and PACS module:

- **ServiceManagement**
- **ResourceScheduling**
- **TestOrderandTracking**
- **ResultManagement**
- **ReportGeneration**
- **IntegrationwithPatientRecords**
- **BillingandDocumentation**

By incorporatingthesefeatures,theRadiologyManagementmoduleenhances theefficiency and effectiveness of radiology services within the hospital. It facilitates resource scheduling, test order management, result tracking and reporting, and seamless integration with patient records, ultimately contributing to better patient care and diagnosis.

Indicative Process Map



Radiology Information System (RIS)

Functional Requirements of RIS

FollowingaretheFunctional Requirements(FR)envisagedfortheradiologymodule including but not limited to:

Sl No	MinimalFunctionalRequirementsofRIS	Supported Yes/No
01	The module shall be HL7 complaint and provision of maintaining a service master with records of all the tests conducted and functionality of generating different MIS reports	
02	Themoduleshallprovideinvestigationorderingprocess.Anysuggestionsand recommendations of Radiology investigations bythe doctor shall bereflected in the Radiology management system	
03	Themoduleshallprovideradiologytestappointment/schedulerforscheduling radiology test for patients	
04	The system shall be capable of interfacing with the PACS and incorporating Radiology management facilities.	
05	The system shall have provision to allow tests to be performed only after the billing is done.	
08	Schedulingofpatientappointmentsisrequired	
09	User shall beabletocreatemultiplestudyordersandscheduletheordersfor different modalities	
10	Usershallbeabletomarkpatientsundervariouscategorieslike MLC,HIVetc and generate a report of such patients	
11	UsershallbeabletoadContrastinformationforany study	
12	Usershallbeabletoaddchargesforanystudyandgenerateinvoice& collection reports	
13	Usershallbeabletogeneratestatisticalreports	
14	Shallbeabletoprint/scanpatientconsentformsforvariousstudies	
15	Usershallbeabletoscan&attachpriorreportsasDICOM file	
16	Worklistshalldisplaystatusofthestudyinreal-time	
17	AutomatedCriticalResultsAlertsystemisrequired	

Sl No	MinimalFunctionalRequirementsofRIS	Supported Yes/No
18	PACSshallincludehistopathologyimagesandOTpicturesalso.	

Picture Archiving and Communication Systems (PACS)

Functional Requirements of PACS

FollowingaretheFunctional Requirements(FR)envisagedfortheradiologymodule including but not limited to:

Sl No	MinimalFunctionalRequirementsof PACS	Supported Yes/No
PACS/GR	**General Requirements**	
1	Support system-wide authentication of users through the use of a unique user-ID and password for each user.	
2	Integration with EMR.	
3	Support for the DICOM 3 standard for communication within the PACS (archive, modalities, and workstations) and between PACS and image processing subsystems.	
4	Ability to support 4 basic functionalities: Imaging modalities, a secured network for transferring patient information, workstations/tablet/mobile devices for interpreting and reviewing images and finally archiving the information in storage and retrieval of images and reports.	
5	Provision to have support for non-DICOM equipment's also.	
6	The PACS system should be compatible with the current imaging systems used in the hospital.	
7	Capture DICOM measurements from modalities and incorporate into a structured report format for future data mining.	
8	Workflows and interfaces are implemented according to FDA, HIPAA, IHE criteria RIS-PACS bidirectional, HL7, VNA and DICOM based.	
9	Ability to capture images from various medical imaging instruments, including ultrasound (US), magnetic resonance (MR), positron emission tomography (PET), computed tomography (CT), endoscopy (ES), mammograms (MG), Digital radiography (DR), computed radiography (CR) ophthalmology, cath lab, Nuclear medicine etc.	
10	Ability to calculate TAT (Min, Max, Avg etc.) for different types of radiology areas.	
11	Ability to cater to areas beyond radiology; cardiology, oncology, gastroenterology, and even the laboratory are creating medical images that can be incorporated into PACS.	
12	Ability to keep the records live for a specified time.	
13	Database capacity is scalable to store 7 years of exam information based on the annual procedure volume.	
14	Database is backed up and verified by a procedure that does not take the database out of service or significantly impact the database.	
15	Provide sufficient storage capacity to provide access to production image and store it for an appropriate retention period accessible without going to archive.	
16	Will not store any image in the storage system with non-reversible compression before the diagnosis of the exam (including the image) is complete.	

Sl No	MinimalFunctionalRequirementsof PACS	Supported Yes/No
17	Provide a means for notifying the system administrator in the event of a failure in the storage and archive system.	
18	Provide a means for notifying the physician in the event of PACS reporting is verified by the clinician.	
19	Provide complete redundancy including mirroring and hot swappable technology for fail-safe operation without interruption.	
20	Standardized user GUI, regardless of type of workstation.	
21	Provide facility to prepare reports.	
22	Support all types of templates.	
23	Support user configurable Intelligent Display Layout (hanging protocols). Note configuration requirements, options and accuracy tracking.	
24	Enable users with the proper privileges to print or burn CD's for exams on any printer or CD burner connected to the network.	
25	Supports image import from CDs from other systems.	
26	System needs to have image retrieval (search criteria) optimization.	
27	Support 3D applications.	
28	The billing system should automatically queue the patient for all modalities. Patient radiology is done as per this scheduling.	
29	Ability to facilitate image editing.	
30	Provide an audit trail of user updates to exam tracking data.	
31	Feature to integrate Patient Clinical information, Clinical history with the PACS Text Area. Text Area must be customizable according to user requirement.	
32	Provision to have embedded window within the PACS to access HIS and other clinical information portals.	
33	Enterprise Web distribution of Images and Reports must be Browser and Platform independent	
34	PACS and RIS Client applications must be validated for Latest release of Client Operating Systems and Internet Browsers.	
35	Embedded reporting Window/Editor within the PACS to avoid multiple windows and Pop-ups opened while reporting studies.	
36	Speech Recognition for Reporting.	
37	PACS clients (Diagnostic Workstation) should have access to a uniform and complete patient list with all study information, independent of the current storage location.	
38	PACS application should use a lossless data compression for archiving the original data	
39	PACS application should provide statistics about the total numbers of patients, examinations, series and images	
40	PACS application should provide a daily log files with a list of archived images per modality and patient	
41	Should support Remote System administration	
42	PACS application should store and distribute overlays, annotations etc. found and captured during the study review. Are all changes to the original data (annotations, key objects, presentation states) automatically synchronized/transmitted to the enterprise distribution based image distribution.	

Sl No	MinimalFunctionalRequirementsof PACS	Supported Yes/No
43	Should provide users with the facility to query the database by using different search criteria in the work list like patient name, age, examination day, time, modality, etc.	
44	The enterprise distribution server should support encrypted data transfers (SSL or VPN)	
45	System should support unlimited DICOM modalities integration.	
46	User access should be role based authorization and access should be provided based on user id and password	
47	Remote support activities have to be logged.	
48	Audit trail of user logins and inputs are captured.	
49	Provice access to archive to users depending on their rights	
50	Should be integrated with a directory service (LDAP, ADS, NDS) and reuse the existent user profiles	
51	PACS application should provide facility to review the usage of the PACS workstations (DWS and CWS) with export to excel feature	
52	Support for multiple operating systems (Windows, Linux, MAC etc.).	
53	Provision for cloud storage.	
54	Support video-conferencing for live and archived information.	
55	Ability to send images as an attachment in an email.	
56	The system administrator should be able to monitor remote support activities including all data transfers.	
PACS/IHE	**Support to below Integrating the Health Enterprise (IHE) workflows**	
1	Scheduled Workflow (SWF)	
2	Patient Information Reconciliation (PIR)	
3	Consistent Presentation of Images (CPI)	
4	Presentation of Grouped Procedures (PGP)	
5	Access to Radiology Information (ARI)	
6	Key Image Note (KIN)	
7	Post-Processing Workflow (PWF)	
8	Reporting Workflow (RWF)	
9	Evidence Document (ED)	
10	Portable Data for Imaging (PDI)	
11	Basic Security (SEC)	
12	Consistent Time Client (CT)	
13	Cardiac Catheterization Workflow (CATH)	
14	Simple Image & Numeric Report (SINR)	
15	Radiation Exposure Monitoring (REM)	
16	Support PACS RIS integration workflow and PACS EHR integration	
17	The PACS database should be held fully synchronized with the RIS database (patient/study updates or merges, etc.)	
18	Diagnostic reports are automatically transferred to the PACS and available to all enterprise users.	
19	Single images can be transferred into the report and EHR	

Sl No	MinimalFunctionalRequirementsof PACS	Supported Yes/No
20	Need to ensure integration of DICOM Modality Work list between the acquisition modalities and the EHR or RIS	

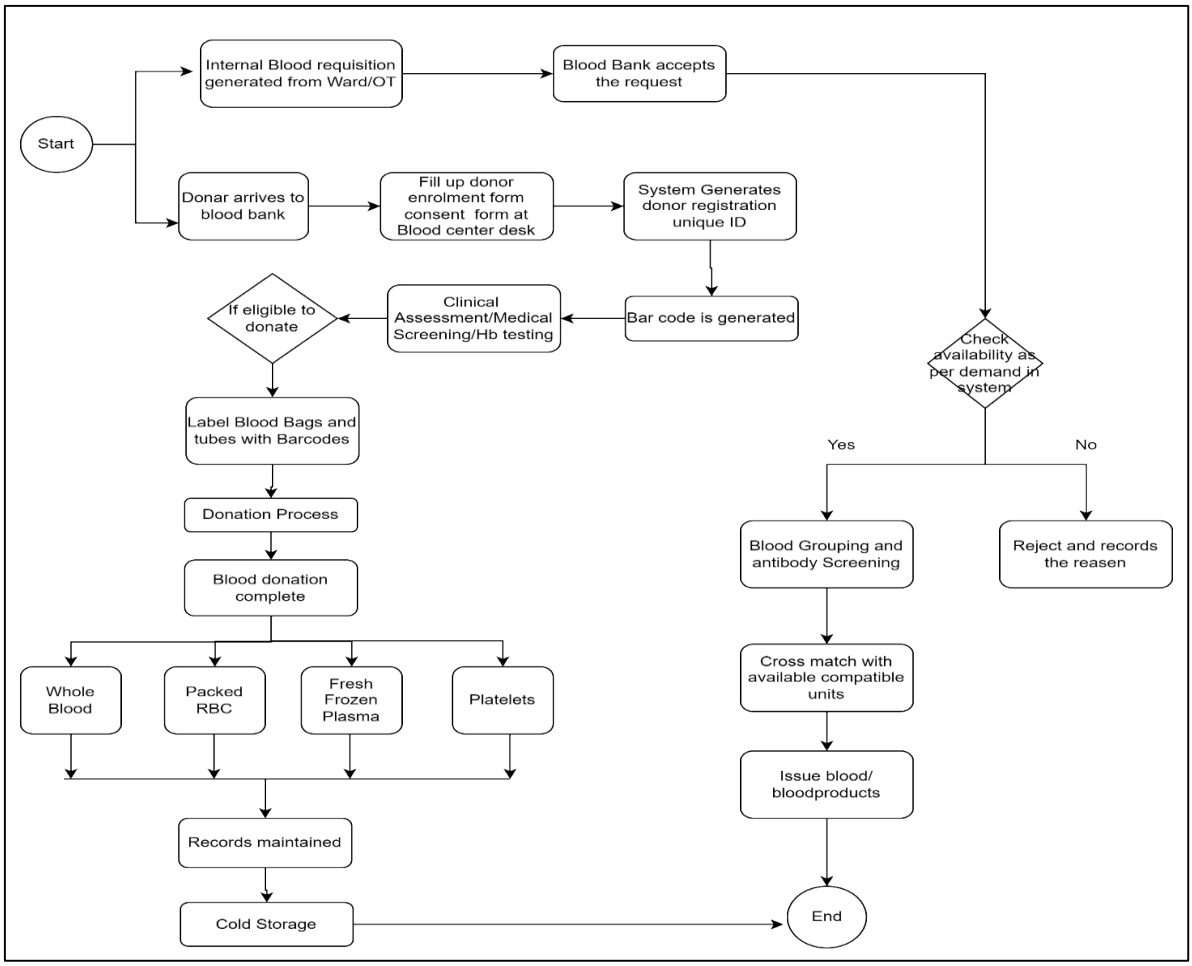
20.1.5.13 Blood Bank Management

The Blood Bank Management module is a critical component of hospital management systems, specifically designed to handle various functionalities related to blood bank operations. Here are the key features and functionalities of the Blood Bank Management module:

- **BloodRequisitionManagement**
- **BloodCollectionandDonationManagement**
- **BloodTransfusionProcess**
- **DonorandRecipientManagement**
- **BloodInventoryManagement**
- **QualityControlandSafetyMeasures**
- **ReportingandAnalytics**
- **IntegrationwithHospitalSystems**

By incorporating these features, the Blood Bank Management module streamlines and optimizes blood bank operations. It ensures efficient management of blood requisitions, donation processes, blood transfusions, and inventory control, ultimately contributing to patient safety and effective healthcare delivery.

Indicative Process Map



Functional RequirementsforBloodBank

Following are the Functional Requirements (FR) envisaged for the blood bank module including but not limited to:

Sl No	MinimalFunctionalRequirementsofBloodBank	Supported Yes/No
01	Thesystemshallprovideafacilitytoconfigurebloodgroupsandvariousblood components	
02	The system shall include a facility to capture physical and disease-related detailsofadonorinadvance,aswellastocapturethepost-donationcondition of the donor.	
03	Thesystemshallincludeafacilitytocapturedetailsaboutvariouscomponents that each blood unit is broken into	

Sl No	MinimalFunctionalRequirementsofBloodBank	Supported Yes/No
04	Thesystemshallprovideafacilitytodisplaywaitingpatients/attendants outside the blood bank for queue management.	
05	Thesystemshallincludeprovisionforprofessionaldonoridentificationthrough biometric.	
06	Thesystemshallprovideafacilitytocapturetestresultsinformationforblood group tests and Serology tests.	
07	Thesystemshallmanagequarantineandstock,markingExpiryDatesforboth whole blood and blood components.	
08	Thesystemshallincludeafacilityforraisingrequestsforbloodorblood components by doctors.	
09	Thesystemshallcapturedataforcrossmatchingandde-crossingblood samples for efficient inventory management.	
10	The system shall include a facility to capture data for issuing and returningblood components, including returned bag information.	
11	The system shall provide a facility for capturing and issuing blood in mass,particularly useful during camps and special program events.	
12	Thesystemshallgeneratereportsprovidingdetailssuchasbloodissued, discarded, returned bags, and donation details.	
13	Thesystemshallhaveprovisionofautomationthroughbarcodeforpreventing the incorrect blood transfusion	
14	Thereshallbeprovisionfordashboardtomonitorthatinventorystatusofblood bank of other hospitals to expedite patient treatment.	
16	There shall be a provision of updatingplasma stock in HIS when it issold.	
17	The system shall provide a facility to issue blood from the Blood Bank to the Blood Storage Centre and receive back unused units.	
18	ThesystemshallincorporateRFIDtagsandBarCodesatthetimeofgenerating blood bags during blood collection.	
19	Thereshallbeprovisionofgeneratingthecertificatestothedonorsand acknowledgement messages.	
20	ThesystemshallintegratewithE-Rakhtkosh.	
21	ThesystemshallhavecapacitytogenerateMISReportsasper need.	
	BloodDonationCamp	
22	Thereshallbeaprovisionofcreatingarequestfororganizingablooddonation camp through citizen App to a particular hospital and to the nodal officer of Blood Bank	
23	There shall be provision of calendar display for the organizers regarding the availability of slots for blood donation camp. The organizers shall at least request 7 days prior to the camp.	
24	There shall be provision of forwarding the request to the drug controller for approvalshallbesentonlinethroughthesystemwithaprefixedchecklistwith the details of Camp.	

Sl No	MinimalFunctionalRequirementsofBloodBank	Supported Yes/No
25	Thereshallbeprovisionofformingtheblooddonationcampteambythenodal officer and assign the duties to the staff.	
26	There shall be provision of sending notification to the organizers regardingscheduling of blood donation camps.	
27	There shall be provision of raising request to the partners for organizing the blood donation camp due to shortage of blood or any other requirements.	
28	Thereshallbeaprovisionofinbuildchecklistforthestaffforthelogistics required in the blood donation camp to avoid last minute logistics issue.	
29	Thesystemshallprovideaself-registrationlinkorbarcodeforqueue management at the blood donation camp.	
30	The system shall digitize the medical screening checklist for the donor, issue thebloodbag,andprovidethedonorwiththeresultsofthemedicalscreening.	
31	Thesystemshallprovidedonorswitharecognitioncertificatedigitallyfromthe department after donating blood.	
32	The system shall send reminder messages to donors for their next donation date, scheduled after 3 months.	
33	The system shall have the capability to assign a vehicle for a blood donation camp, with requests sent to the transport department.	
34	The system shall send individual donor records to E-Rakhtkosh, with current integration focusing on sending camp details and logistics information.	

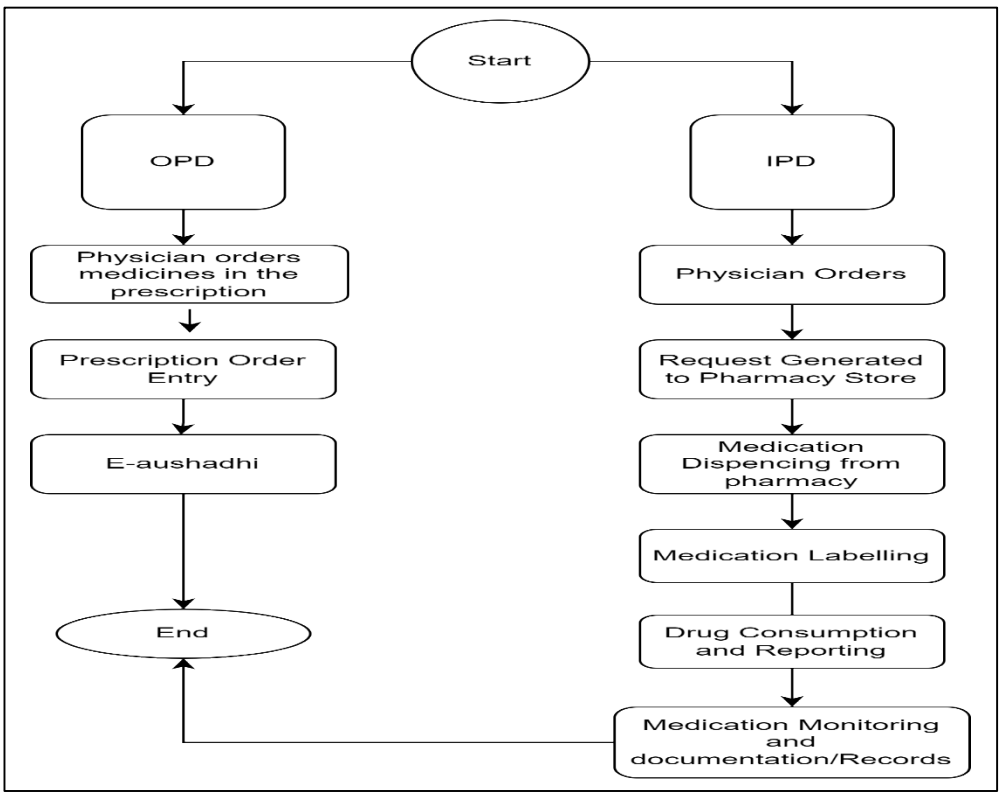
20.1.5.14 Pharmacy Management

The Pharmacy Management module is a vital component of hospital management systems as itoverseesthecomprehensivemanagementofdrugsandmedicalconsumablesessential for patient treatment. Here are the key features and functionalities of the Pharmacy Management module:

- **DrugandConsumableInventory**
- **RequisitionManagement**
- **StockManagement**
- **SupplierandVendorManagement**
- **MedicationDispensing**
- **BillingandInvoicing**
- **DrugInformationandDrug-DrugInteractions**
- **ReportingandAnalytics**

By incorporating these features, the Pharmacy Management module streamlines the processes related to drug and medical consumable management within the hospital. It ensures the availability of necessary medications, facilitates accurate dispensing, and contributes to effective inventory control and cost management.

Indicative Process Map



Functional Requirements

FollowingaretheFunctional Requirements(FR)envisagedforthepharmacy module including but not limited to:

Sl No	Functional RequirementsofPharmacyManagementModule	Supported Yes/No
01	Thesystemshallhavecapabilitytocapturecompleteltem Details(like expirationdate,availablestock,batchno.etc)forInpatientorOutpatient Requests	
02	Thesystemshallhavetheprovisionofl ssuingofdrugstoinpatientsand outpatients.	
03	ThesystemshallhavecapabilitytocaptureexpirationDateTrackingand HighlightingforDrugsneartoexpirationdate.	
04	Thesystemshallhavecapabilitytocaptureshowingalternate DrugDetails.	
05	Thesystemshallhavecapabilitytoshow Color-codedalertsfordrugs expiringwithin3monthsor6months.	
06	ThesystemshallhavecapabilitytogenerateindentbasedonMinimumStock Levels/Optionofreorderlevelforthegeneration ofAutoIndent.	
07	Thereshallbeprovisionofcreatingmultiplepharmaciesandlinkthemto specificwardsorOPDs.	
08	Thereshallbeprovisionofrecordingthepartial DrugDispensingifany drug islessornotinstock	
09	Provisionofautomaticupdateofstockassoonasadrugisissuedtoa patient.	
10	Thesystemshallhavecapabilityofaddingandremovingormodifyingthe druglist.	
11	ThereshallbeprovisionofshowingDrugConsumptionReportingfor inpatientandoutpatient	
12	ThereshallbeprovisionofqueueManagementDisplayoutsidePharmacy	
13	Thereshallbeprovisionofreturningdrugsto DrugWarehousesandtothe supplier.	
14	ThereshallbeprovisionofdrugTransferfromoneDrugWarehouseto anotherDrugWarehouse.	
15	Thereshallbeprovisionofcondemningdrugsinthesystem.	
16	ThereshallbeprovisionofbudgetAllocationtohospitals,Drugwarehouses, andhealthfacilities.	
17	ThereshallbeprovisionofhavingdynamicMISReportingfacility	
18	Thesystemshallhavetheprovisionforintegrationwithe-Aushadhi.	
19	Thesystemshallbepreventingtheentryofexcessivedispensingquantity whilecreatingapharmacybill.	
20	Thereshallbeprovisionofdefiningtheupperlimitofmedicineisdefined whiledispensingofmedicine.	
21	Thesystemshallhaveprovisiontorecordtheconsumptionofcontrastdye, mappedtothepatientwiththequantityused.	

Sl No	Functional RequirementsofPharmacyManagementModule	Supported Yes/No
22	Thesystemshallhaveprovisionoftrackingnarcoticdrugsfromsupplytothe end user.	
23	All Pharmacies shall be mapped with all Govtschemes,Patient billing has to bedone in their respective schemes.	
24	Pharmacyinvoicesraisedunderanyschemeshallbemadeavailablethrough the system.	
25	Dashboardtoshowthestatisticsrelatedtoinvoicespertainingtothevarious schemes	

20.1.5.15 Material Management

TheMaterialManagementSuiteisacrucialcomponentofhospitalmanagementsystemsthat focuses on efficient inventory storage, packaging, protection, and movement within the warehouse. The suite consists of five modules, each serving specific functions to ensure effective material management. Here are the descriptions of these modules:

- **StoreandInventoryManagement**
- **AssetManagementModule**
- **ProcurementManagement**

ByincorporatingthesemodulesintotheMaterialManagementSuite,hospitalscanstrea mline their inventory processes, optimize material storage and distribution, enhance procurement efficiency, and effectively manage fixed assets. This results in improved inventory control, reduced costs, enhanced resource utilization, and ultimately, better overall hospital management. Materials & Management suite is further organized into five modules:

Store and Inventory Management

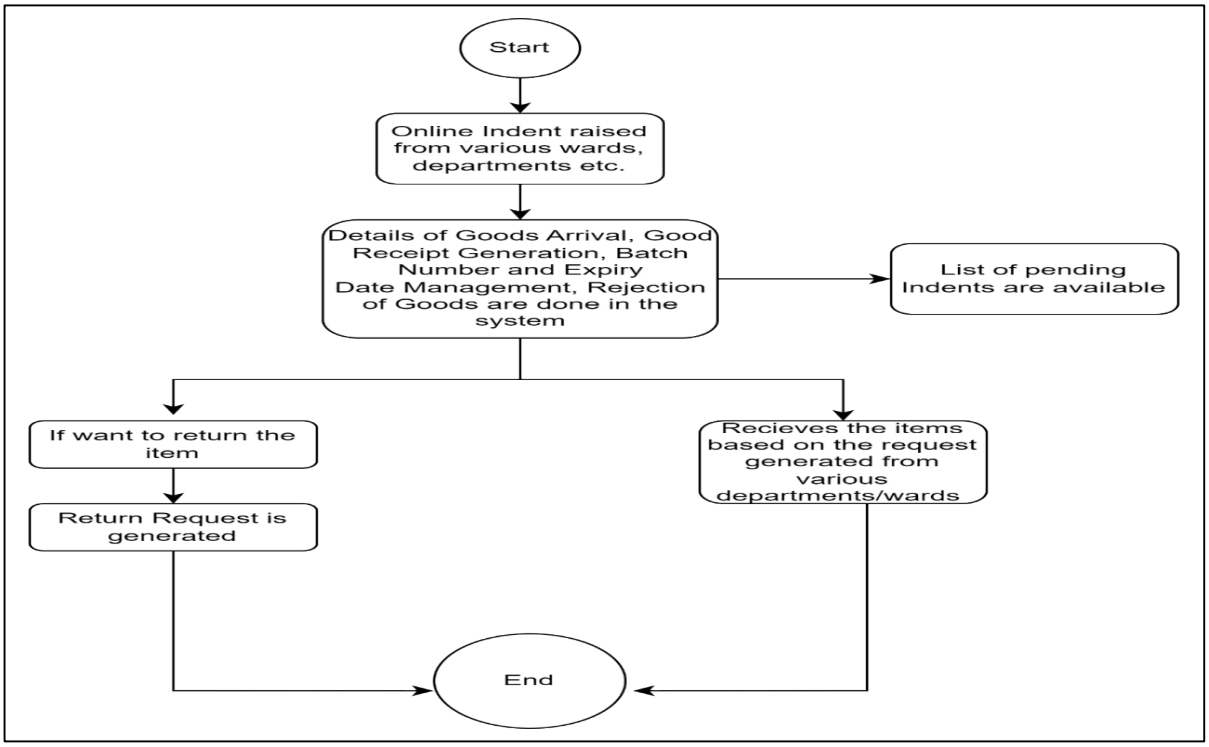
Astockcontrolsystem,alsoknownasaninventorycontrolsystem, isasetofprocessesand tools used to manage and maintain inventory levels within a store or business. Its main responsibilities include:

- **InventoryTracking**
- **ReorderPointManagement**
- **SupplyChainIntegration**
- **Demand**

Forecasting Reporting and Analysis

While store management involves various aspects of running a store, including employee management and customer service, a stock control system specifically focuses on the management and maintenance of inventory levels. Both are important for the smooth operation of a store and ensuring customer satisfaction.

Indicative Process Map



Functional Requirements

FollowingaretheFunctional Requirements(FR)envisagedfortheinventorymodule including but not limited to:

Sl No	Description	Supported Yes/No
01	Systemshallhaveprovisiontotrackautoindentandonlinerequestfrom various departments and list of available pending intends	
02	Systemshallbeabletotrackallrequeststhroughaseparateuniquestore ID.	
03	StoresSetup: (a) ItemMaster (b) GenericNameMaster (c) UnitMaster (d) ItemType:Master (e) ItemClassMaster (f) KitMaster	
04	The system shall provide the facility to raise indents for procurement for a durationof3months,withautomaticindentgenerationonemonthpriortomeet the vendor's turnaround time (TAT) of 28 days.	
05	Systemshallprovidefacilityofreturningitemstothestore.	

Sl No	Description	Supported Yes/No
06	The system shall provide functionalities for managing goods arrival details, generating goods receipts, managing batch numbers and expiry dates, and handling the rejection of goods.	
07	The system shall maintain a ledger that includes the opening balance, total receipts, total issues, closing balance of items, and details of item condemnation and auction	
08	Thesystemshallfacilitateinter-hospitalitemsharingonaneed-basedbasis	
09	ThesystemshallprovideintegrationwithE-Aushadhiformanagementof medicine stock	
10	Thesystemshallhaveprovisionofmanagingnewhardwareinandoutof inventory and also have the capability of return management.	
11	ThesystemshallprovideintegrationwithE-Upkaranformanagementof medical assets.	
12	ThesystemshallhaveadefinedlistofitemsfortheEssentialDrugList(EDL) andNon-RestrictedDrugs(NRD).Anynewdrugadditionsshouldbemanaged through an online mechanism.	
13	The system shall generate dynamic Management Information System (MIS) reports	
14	The system shall include a comprehensive tender management module as part of the HIS portal, enabling users to create, manage, and track tenders efficiently.	
15	Systemshallprovideagrievanceredressalmechanismforreportingany substandard medicines or consumables.	
16	Thesystemshallhaveprovisiontodefinereorderlevelsforitemsatall stocking locations	
17	Systemshalltrackassetpurchasesandmaketheirmaintenancelifecycle available.	
18	Systemshalltrackdelaysinitemdeliveryandapplypenaltiestothe supplier accordingly.	
19	Systemshallhaveaprovisionofdashboardfeaturesthatdisplaysnon-moving stock, near expiry stock, fast-moving stock, and other relevant inventory metrics	

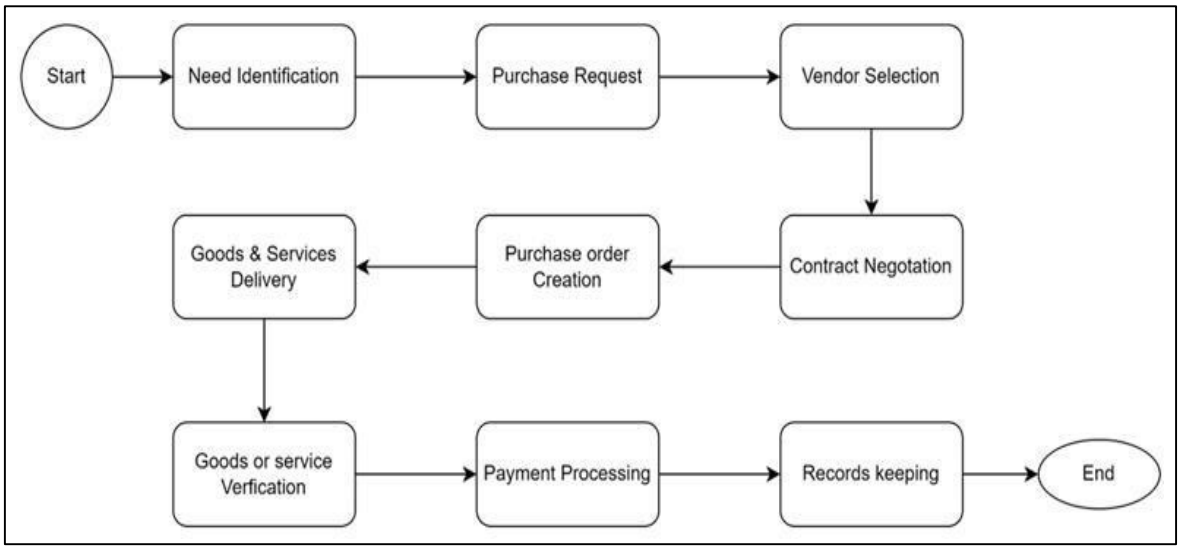
20.1.5.16 Procurement Management

The Procurement Management Module is a vital component of the Integrated Hospital Management System (HIS), designed to streamline and automate the procurement processes within the hospital. This module ensures efficient, cost-effective, and transparent acquisition of goods and services, thereby supporting the hospital's operational and clinical needs. The main functions and features of the Procurement Management Module include:

- SupplierManagement
- PurchaseRequisitionandApproval
- PurchaseOrderManagement
- ContractManagement
- ProcurementAnalyticsandReporting
- IntegrationwithFinancialSystems
- RegulatoryCompliance

By incorporatingtheProcurementManagementModule intotheMaterialManagement Suite, hospitalscanachievegreaterefficiencyintheirprocurementprocesses,reducecosts,ensure timelyavailabilityofnecessarymaterials,andenhanceoveralloperationaleffectiveness. This modulesupportsthehospital'sgoalofprovidinghigh-qualitypatientcarethroughefficientand effective material management.

Indicative Process Flow



Functional Requirements

FollowingaretheFunctional Requirements(FR)envisagedfortheinventorymodule including but not limited to

Sl No	Description	Supported Yes/No
01	System Shall have capability of recognize different types of PurchaseOrders (PO), such as ▪ RegularOrders ▪ Local/EmergencyPurchase ▪ RateContractorders(RC) ▪ Others,such as ▪ SingleItem-SingleDelivery Date ▪ SingleItem-MultipleDeliveryDate ▪ MultipleItem-SingleDeliveryDate ▪ MultipleItem-MultipleDeliveryDate	
02	SystemShallextractimportantdetails,suchas ▪ PO/InvoiceDetailsautomaticallyfromVendors/Supplier master item ▪ ItemMaster ▪ Bid	
03	SystemShallhaveprovisiontoshowotherimportantpurchaserelateddetails, such as. ▪ UnitPrice ▪ TotalPrice ▪ GSTCalculation ▪ OtherTax& Duties ▪ Discounts ▪ DeliveryTime/Frequency ▪ Others	
04	SystemshallhaveaprovisionforattachingspecificationstothePurchase Order (PO)	
05	System Shall be able to issue multiple orders against single item and single order against multiple items	
06	System Shall have provision for creating PO in special cases without PI and able to rise multiple currency orders.	
07	SystemShallhaveprovisionforspecificationssuchas; ▪ DeliveryLocationoptions ▪ Listofinspectionstobecarriedout ▪ InspectionProcedures ▪ VariousReceiptRequired ▪ GSTRelatedinformation	

Sl No	Description	Supported Yes/No
	▪ CheckMeasurement ▪ Others	
08	System Shall haveprovision of linking cost center withthePO onwholeor at PO line item	
09	SystemShallprovidequickviewofcostincurredin ▪ Itemwisepurchase ▪ DepartmentWisepurchase ModuleWisepurchase	
10	FacilitytotrackthePOby- ▪ ItemName ▪ Vendor/SupplierName ▪ POreferencenumber	
11	SystemShallbeabletrackVendors/Suppliersorderacceptance	
12	SystemShallbeabletocaptureHolidaySchedule/Calendar	
13	SystemShallhaveproperdeliveryschedules.Such as ▪ QualityBased ▪ Item Based ▪ RateBased ▪ QuotaBased ▪ TimeBased ▪ PartPaymentbased OtherCombinationsbased	
14	ProcurementManagementshallhaveatleastthefollowingfunctionalities: ▪ PurchaseRequest&Approvals ▪ QuotationManagement&Approvals ▪ PurchaseOrder&Approvals ▪ DifferenttypesofPurchases(RateContract,Normal,Consignmentetc.) ▪ GoodsReceiptNotes(GRN) ▪ Invoices&3-wayInvoicecheckspriortopayment	
15	Systemshallbecapableofregularlyupdatingvariousheadersandsub-headers with the latest prices.	
16	Systemshallhavethecapabilitytotrackwarranties,relatedclaims,or liquidationdamages,aswellasmonitorexpensesagainstbudgetallocations.	
17	System shall track performance guarantee, bid bond details and provide all necessary alerts, notification to all stakeholders involved in this process	
18	Systemshallbeabletogenerateletterstovendors/suppliersfor accelerating/delaying the delivery	
19	Systemshallincludethecapability totrackandutilize custom dutyexemption certificates for each order during customs clearance and to monitor banned items.	

Sl No	Description	Supported Yes/No
20	Shallhaveprovisionformatchingthebills/invoicewithPO&abletotrack reference of bill entries and payment of custom duty	
21	Shallbeabletorefund&Dutyrelatedrefundclaims	
22	SystemhaveprovisionofAutomaticallygeneratestockstatementofimported material lying in store	
23	SystemShallhaveprovisionforapprovals,suchas ▪ SingleApproval ▪ Multipleapprovals ▪ Onlineapprovals ▪ Neededmanualapprovalonly ▪ Supportinghierarchicalapprovaluptopre-definedlevels ▪ OtherApproval	
24	Systemshallhavetheprovisiontorecordthedetailsoflocalpurchaseofitems / goods/ service.	

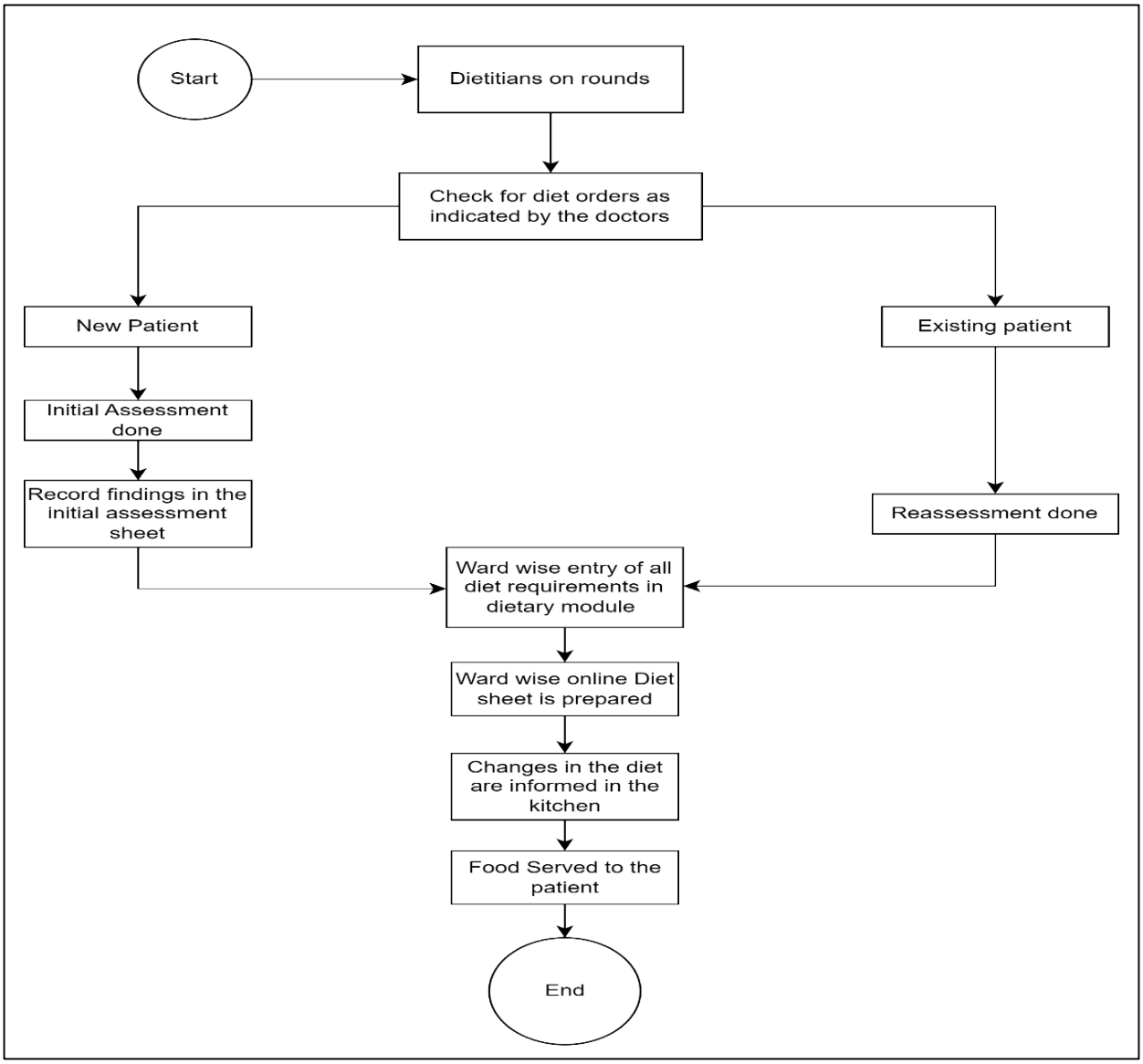
20.1.5.17 Diet & Kitchen Management

The module designed for kitchen management serves a crucial role in providing meals to inpatients based on the dietary instructions prescribed by the dietician. Here are the key functionalities and benefits of such a module:

- **DietPrescription**
- **MealSchedulingandCustomization**
- **RecordingofMealOrders**
- **AlertsandNotifications**
- **InventoryandConsumableManagement**
- **EfficiencyandAccuracy**

Overall, the kitchen management module optimizes the process of providing meals to inpatients. It streamlines diet prescription, meal customization, inventory management, and communication, leading to improved patient satisfaction and efficient kitchen operations.

Indicative Process Map


Start
Dietitians on rounds
Check for diet orders as indicated by the doctors
New Patient
Existing patient
Initial Assessment done
Record findings in the initial assessment sheet
Reassessment done
Ward wise entry of all diet requirements in dietary module
Ward wise online Diet sheet is prepared
Changes in the diet are informed in the kitchen
Food Served to the patient
End

Functional Requirements

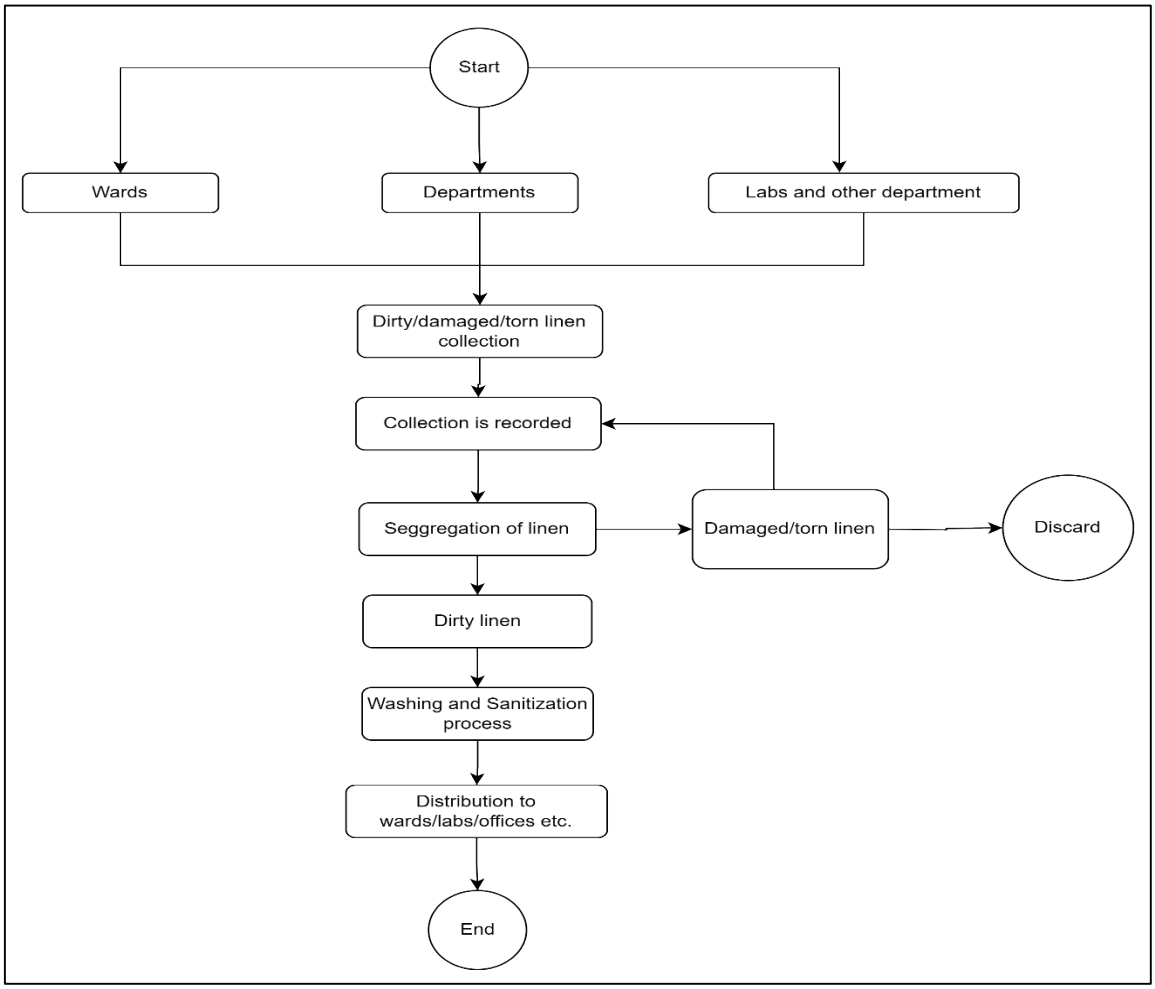
FollowingaretheFunctional Requirements(FR)envisagedfortheDietmodule including but not limited to:

Sl No	MinimalFunctionalRequirementsofDietModule	Supported Yes/No
01	NutritionalAssessmentofPatientsfacility	
02	Facilitytorecorddetailsliketypeofdietanddietitemstaken,caretaker details, time of administration	
03	Shallmaintainthedietaryhistoryoftheadmittedpatient	
04	System shall generate ward-wise diet sheets specifying the number and typesofdietsrequiredforeachward andFloorwiseandalsohaveprovision of cancellation of diet request	
05	Systemshallincludeaprovisiontodiscardfooditemsandcapturethe relevant reason for their discard.	
06	Systemshallprovideaprovisionfornursestoraisedietrequestsforpatients online between 12 am and 6 am, specifying the number of patients on RT feed and requesting Full/Soft diets as needed.	
07	ProvisiontoupdateDietsheetofpatientwhileonroundsusingamobileapp or tablet.	
08	ProvisiontocaptureFooddeliverydetails.	
09	Trackthetimetakentoservethefoodat Inpatientfloors	
10	Provision to generate floor wise admission list & to intimate Floor Dietician about new admission via SMS.	
11	Provisiontogeneratedailydietsummary.	
12	Provisiontogeneratereportoffoodwastage.	
13	Provisiontoraiseindentagainstdiscardeditem.	
14	Systemshallhaveprovisionofautomaticallycountttheno.ofpatienton Confirmed Admission shall.	
15	Systemshallbeoptionfororderingdietforpatientundersupervisionof medical student as part of his/her exam assessment.	
16	Systemshallincludeafacilitytodisplaydetailsofthecurrentkitchenvendor	
17	Provisionofreal-timepatienttransferinthesystemcausesdiettobe delivered to other patients rather than the intended patient.	
18	Diet requests shall be recorded under the patient's nameand made visible tothedieticianandthekitchenvendorresponsibleforpreparing/distributing the diet.	
19	Provisiontodefinemeal&dietspecificationgroups.	

20.1.5.18 Linen & Laundry Management

TheLinen&Laundryserviceinahospitalplaysacriticalroleinensuringanadequatesupply ofcleanandwell-maintainedlinenforvarioususerswithinthefacility.Thebasictasksinclude sorting, washing, extracting, drying, ironing folding, mending and delivery. A reliable laundry service is of utmost importance to the hospital. In today's medical care facilities, patients expectlinentobechangeddaily.Anadequatesupplyofcleanlinenissufficientforthecomfort andsafetyofthepatientthusbecomesessential.Theterm'hospitallinen'includesalltextiles usedinthehospitalincludingmattresses,pillowcovers,blankets,bedsheets,towels,screens, curtains, doctors' coats, theatre cloth and tablecloths. Cotton is the most preferred and frequently used material. The hospital receives all these materials from different areas like Operation Theatres, wards, outpatient departments and office areas. The OT linen materials needspecialcaresinceithastobewashed&sterilizedcarefully.Thesystemshallbeableto maintain a Linen data base.

Indicative Process Map



Functional Requirements:

FollowingaretheFunctional Requirements(FR)envisagedfortheLinen&Laundry Management module including but not limited to:

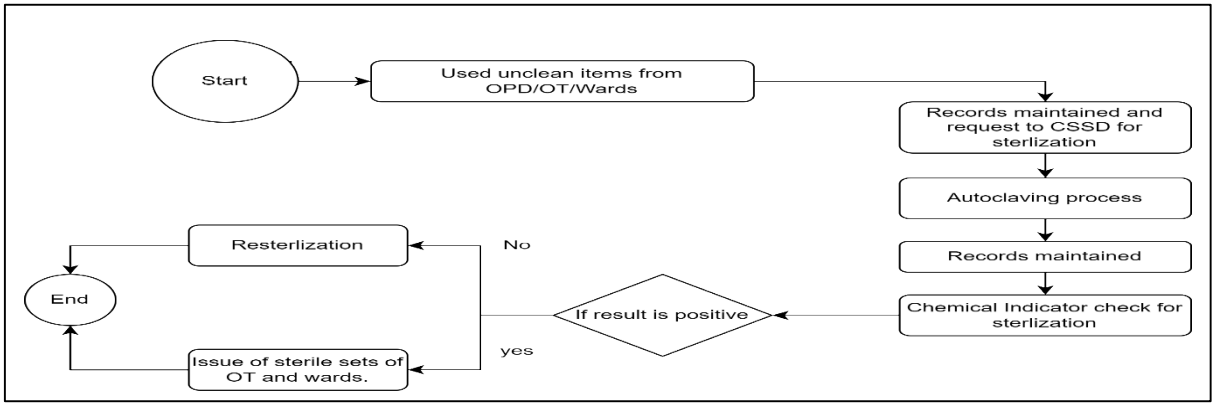
Sl No	MinimalFunctionalRequirementsofLinenandLaundry	Supported Yes/No
01	System shall provide functionality to capture data on new linen received from tailors or vendors. It shall update inventory status separately of ward and hospital levels. Additionally, the system shall support different classifications and nomenclatures for various types of linen and laundry items.	
02	Systemshallcaptureandmaintainlineninventorydataatthefloorlevel	
03	System shall have provisions to capture linen condemnation decisions made by the condemnation committee. It shall also provide an option to initiate procurement of new linen to replace condemned items	
04	System shall provide a provision to capture daily stitching accounts, detailing the materials issued to tailors, quantities used, and the progress of linen production	
05	System shall enable laundry supervisors to issue materials to tailors for the production of various types of linen	
06	Systemshallhaveprovisionstocalculateandrecorddailyandmonthly consumption of chemicals and consumables used in laundry operations.	
07	Systemshallhaveanoptiontocaptureandmanagespecialrequestsmadeby nursesordepartments, suchasrequestsfor extra-largesizepatient uniforms or accommodations for a child admitted in a male ward.	
08	Systemshallprovideaprovisiontoissuelinenagainstloss.Linenissued against loss shall be appropriately deducted from the laundry stock inventory	
09	Systemshallincludeprovisionstocaptureandrecorddetailsofnewlystitched linen sent for internal washing, including date of sending, type of linen, quantity, and any specific instructions or requirements.	
10	System shall have provisions to capture and record details of each washing load, including type of linen, quantity, washing parameters (such as temperature and cycle), Chemical and any special instructions	
11	System shall provide a provision for the laundry authority to enter details of new linen received from vendors into the system to update the current stock inventory	
12	System shall include provisions for users to lodge complaints about linen, detailing issues such as quality, cleanliness, shortage of linen or any other related concerns.	
14	SystemshallhaveprovisionsforreceivingcomplaintsaboutlinenfromCustomer Care, nurses, or directly from patients.	

Sl No	MinimalFunctionalRequirementsofLinenandLaundry	Supported Yes/No
15	System shall have provisions to maintain detailed information about linen vendors, including contact details, service agreements, delivery schedules, and quality assurance metrics	
16	System shall have the capability to track linen from its source (vendor or internal production) through the laundry process, and to distribution back to the originating source (ward or department)	
17	System shall have provisions for RFID tracking of linen, enabling real-time monitoringoflinenlocation,usagehistory,andinventorylevelsthroughoutthe facility.	
18	SystemshallHaveprovisionsforintegrationwiththeEffluentTreatmentPlant (ETP), facilitating automatic data exchange	
19	Systemshallhaveprovisionstodisplaythenamesofdeliveringandreceiving personsfortrackingpurposes,ensuringaccountabilityandtraceabilityoflinen movements	
20	Ownstocktrackingfunctionalityshallalsobedevelopedforlinen.	
21	System shall include rental functionality to manage the rental of linen items, including tracking inventory, issuing rentals, recording returns	
22	Systemshallhaveprovisionstoescalatecomplaintstohigherlevelsofauthorityiftheyaren otresolvedattheinitiallevelwithinaspecifiedtimeframe	

20.1.5.19Central Sterile Services Department (CSSD)

The Central Sterile Supplies Department manages information pertaining to of sets of sterile supplies to any department in the hospital that requires sterile supplies. The CSSD Module provides facilities to enter details of drums, packs and trolleys. Packs can be assembled or broken down into components as required. The assembly operation will automatically decrease the stock of the components and increase the stock of the pack. Similarly, dismantling the pack will do the reverse. The system will be linked to the OT Scheduling systemtoenablerequiredtraystobepreparedandsenttotheOTsbasedonthescheduleof surgeries.ThesystemwillbelinkedtothePatientBillingSystemtoenableautomaticcharging based on items used.

Indicative Process Map



Functional Requirements:

Following are the Functional Requirements (FR) envisaged for the CSSD management module including but not limited to:

Sl No	MinimalFunctionalRequirementsofCSSD	Supported Yes/No
01	Thereshallbeprovisiontorecordday-by-dayautoclaveprocessofdrumsand trays to sterilization department, maintained by wards or other patient care / reporting units, etc.	
02	There shall be provision to record and track the items/ articles/ tools/ instruments are used in OT, OPD, IPD and Emergency, as required. These items /articles/ tools need to be sterilized after usage. shall	
03	After usage for medical procedure, the items/ articles/ tools/ instruments are taken to Auto Clave lab for sterilization. The details of these items/ articles/ tools/ instruments shall be entered in the system and status shall be updated	
04	Auto clavemachine operator after collecting items/ articles/ tools/ instruments puts them into the machine for sterilization. Entry shall be made into system regarding details of items/ articles/ tools/ instruments and the status shall be updated	
05	Afterascheduledtime,theoperatortakesitems/articles/tools/instrumentsout of Auto clave machine and update the status in the system. An alert shall be generatedforstaffnursetocollectorreceiveitems/articles/tools/instruments, as	

Sl No	MinimalFunctionalRequirementsofCSSD	Supported Yes/No
	applicable	
06	Thereshall beprovision to updatethestatus datainthesystem bystaff nurse collects items/ articles/ tools/ instruments and arrange them for use in concerned OT / Minor OT or other departments as applicable. shall	
07	There shall be provision to raise a request for sterilized set by departmentssuch as OT, ICU	
08	The system shall have provision tracking sterilization request received fromvarious departments	
09	Oncethenumberofnon-sterilizedequipmentgobelowasetmarginalertshall be generated for Department Head	
10	Thereshallbeprovisiontodisplaythecurrentquantityavailableofmaterialwith user & CSSD	
11	There shall be provision to print Expiry date stickers at the processing timebased on packing material.	
12	Thereshallbeprovisiontoacceptpartialreceivingwithinset.	

20.1.5.20 Incident & Risk Management

The Incident & Risk Management module in an Integrated Hospital Management Systemfocuses on identifying, tracking, managing, and mitigating various incidents and risks withinthe hospital environment. It helps ensure the safety of patients, staff, and visitors whileminimizingpotentialrisksandadverseevents.Herearethekeyfeaturesandfunctionalitiesofth e Incident & Risk Management module:

- IncidentReporting
- RiskAssessmentandMitigation
- InvestigationandRootCauseAnalysis
- CorrectiveandPreventiveActions
- DocumentationandReporting
- ComplianceandRegulatoryRequirements

By Incident & Risk Management module, hospitals can proactively identify and manageincidentsandrisks,ensuringasafeandsecureenvironmentforpatients,staff,an dvisitors.Itenables effective incident reporting, investigation, risk assessment, and implementation ofcorrective measures, ultimately enhancing patient safety and improving overall healthcarequality.

Functional Requirements

Following are the Functional Requirements (FR) envisaged for the Incident & RiskManagement module including but not limited to:

Sl No	Functional RequirementsofIncidentandRiskManagement	Supported Yes/No
01	Systemshallhaveprovisionforstafftoreportincidents	
02	Systemshallcapturedetailssuchasthenatureoftheincident,location,date and time, individuals involved, and any relevant information required for investigation and analysis.	
03	There shall be provision of incident analysis to identify possible risks and mitigationplansonadashboardwhichcategorizestypesofincidentsandrisk for process improvement in future,	
04	Trackingtheprogressofactionplansandensuringtheirtimelycompletion.	
05	Systemshallprovideacentralizedrepositoryforstoringincidentreports, investigation findings, action plans, and related documentation.	

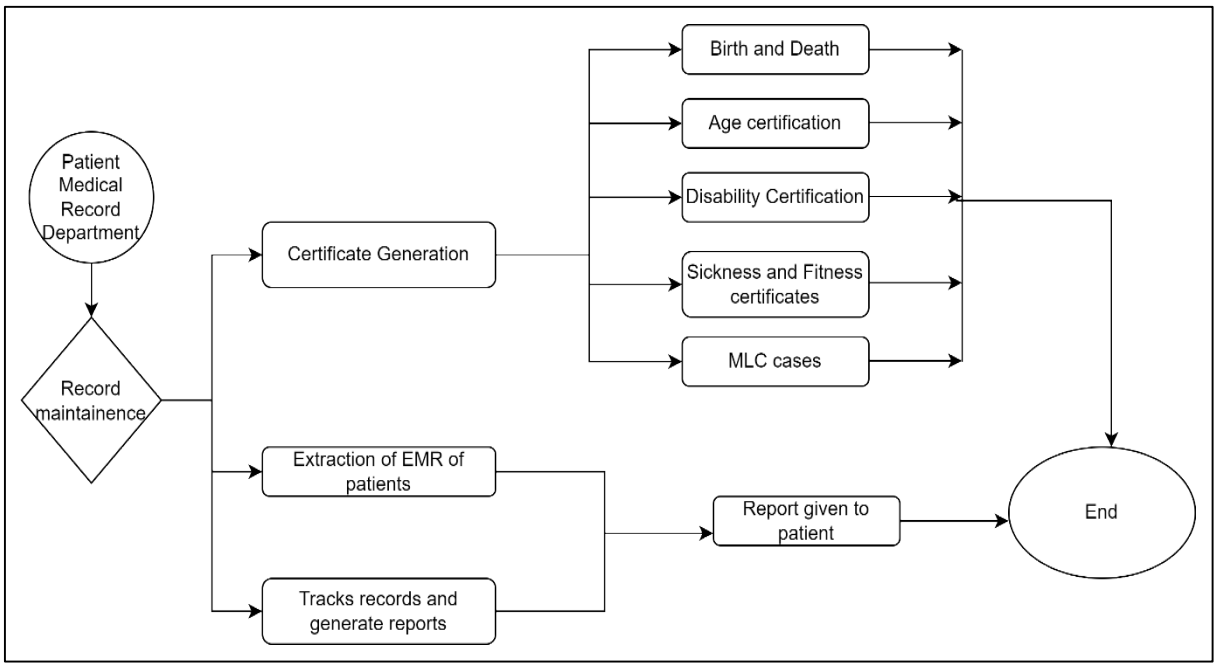
20.1.5.21 Medical Record Department

The Medical Records Department module in an Integrated Hospital Management System isdesigned to manage and maintain patient medical records throughout the healthcare facility.It focuses on ensuring the accuracy, availability, and confidentiality of patient healthinformation. Here are the key features and functionalities of the MRD module:

- **ElectronicMedicalRecords(EMR)**
- **RecordCreationandMaintenance**
- **DocumentImagingandScanning**
- **RecordIndexingandRetrieval**
- **RecordTrackingandMovement**
- **ReleaseofInformation**
- **DataSecurityandConfidentiality**

By MRD module in an HIS, hospitals can effectively manage patient medical records,improve accessibility to patient information, and enhance the overall efficiency and quality ofhealthcare services. The module promotes the transition from paper-based records toelectronicrecords,streamliningrecordmanagement processes,andfacilitating betterpatientcare coordination.

Indicative Process Map



Functional Requirements

Following are the Functional Requirements (FR) envisaged for the MRD module including but not limited to:

Sl No	Functional RequirementsofMedicalRecords	Supported Yes/No
01	System shall facilitate the automation of records related to patient care (outpatient, inpatient, births, deaths, etc.) and their storage in a systematic manner within the Record Room.	
02	System shall have provision for certificate generation like Birth certificates, Deathcertificates,agecertificates,Disabilitycertificates,SicknessandFitness certificates,MLCcases,etc.andmaintainingrecordsofCertificatesissuedby hospitals. System shall have provision at doctor's desk including auto e-sign of concerned person.	
03	SystemshallhaveprovisionforIntegrationwithportalslikeIHIP,PCTS, Cancer Registry, Dialysis registry etc.	
04	System shall have provision for the patient to create a request for release of medicalrecords,MROtoprocesstherequest,initiatetherequesttopatientto makeonlinepayment,andthenreleasingthemedicalrecordstothepatient.	
05	Extractionofreportsformats shallbepre-definedandconfigurableinHIS	
06	SystemshallhaveprovisionforpaymentofchargesthroughUPI when patient request for the EMR	
07	Systemshallhaveprovisionofuploadingthescannedmedicaldocuments shall be there.	
08	System shall have provision with details regarding the certificates like Permanent Disability Certificate can be mapped to Aadhar which further reflects in HIS	
09	The system shall allow doctors desk module to fetch the various certificates like Cause of Death, MLC, Sickness and fitness etc.	
10	The system shall provision for extraction of EMR of patient using their credentials/identitydetails.Modificationofpatientdetailsafterauthorizationof competent authority available.	
11	System shall have provision for tracking of records and generating reports linkedtosystemusagereports,inwardandoutwardreports,stampinformation reports, Court case reports, MLC cases etc.	

20.1.5.22 User Management

UsermanagementinanIntegratedHospitalManagementSysteminvolvestheadministration and control of user accounts and permissions within the system. It ensures that the right individuals have appropriate access to the system's functionalities and data based on their roles and responsibilities. Here are some key aspects of user management in an HIS:

- **UserRegistration**
- **UserRolesandPermissions**
- **AccessControl**
- **PasswordManagement**
- **UserActivityLogging**
- **UserDeactivationandTermination**

User management in anHIS is crucialformaintaining data integrity, ensuring security, and optimizing system usage. It provides administrators with the necessary tools and controls to manageuseraccounts,assignappropriaterolesandpermissions,andmonitoruseractivities within the system. By effectively managing user accounts and access, hospitals can protect patientinformation,ensurecompliancewithdataprivacyregulations,andmaintaintheoverall integrity and security of their HIS.

Functional Requirements

Following are the Functional Requirements (FR) envisaged for the user management module including but not limited to:

Sl No	Functional RequirementsofAdministration	Supported Yes/No
01	The system shall have the facility to create user by SSO ID	
02	The proposed solution shall support unlimited creation of user accounts. There shall be no restriction on the number of users created in the system.	
03	IfSSOIDisnotavailable,thesystemshallallowforback-propagationofdetails to create the SSO ID for the user.	
04	Thesystemshallhavethefacilitytoassignuserroles,departments,storesand hospitals.	
05	Thesuperadminroleshallhavetheprovisiontomaintainthemasterdata required at the overall application level.	
06	Thehierarchyofuser rolesshallbeasfollows:SuperAdmin >HospitalAdmin >Department>Sectionoffice>Office>FirmAdmin.	
07	TheHealthFacilityAdminshallhavetheprovisiontoassignrolesand responsibilitiesrequiredfortheusersofeachhealthfacility.	
08	There shall be provision of managing master data required for configuring the various services in a health facility shall be handled by the facility admin	

Sl No	Functional RequirementsofAdministration	Supported Yes/No
09	Theprivilegesassignedtotheuser shallberevokedwhentheuserhasleftthe health facility.	
10	The system shall have the provision to generate audit log reports of any user configured in the system.	

20.1.5.23Technical Requirement Specifications for HIS and PACS

20.1.5.23.1 Use of Emerging technologies in HIS

The Selected Bidder isrequired toadopt andusethecapabilities of emerging technologiestoautomateroutineworkflows,assistindiagnosticinvestigations,reducer epetitive workflows resulting in enhanced productivity of the end-users of HIS.

Someoftheuse-casesof emergingtechnologytobeimplementedinHISarelisted below:

- Conversion of free-written text into orders (For e.g., Free-written doctor and nursing notestobeconvertedintolaborders,radiologyorders,procedureorders,admission requests, referral requests, pharmacy orders, etc.)
- AutomaticgenerationofInpatientDischargeSummaryfromdoctornotesandother medical records
- Conversionofhand-writtenpaper-basedmedicalrecordsintomachine-readable medical records
- SmartandIntelligentchatbotfor patient-centricserviceslikesearchingforhealth facilities, health services, appointment scheduling, etc.
- SmartandIntelligentchatbotforStudent-centricserviceslikesearchingforacademic learning material, hostel allotments, information about courses, etc.
- DetectionofpresenceofabnormalitiesfromX-Raysandotherimagingstudies.

However,theabovelistisnotanexhaustivelistthatrequiretobedeployedinHIS.Any other use-case that shall be identified during the requirement study of HIS shall also form part of the requirement scope of HIS to be fulfilled by the Selected Bidder.

20.1.5.23.2 Integration with External Applications / Systems

To fulfil the vision of an Integrated Health Information System, HIS shall facilitate the seamless exchange of operational and medical information by API-integration with

various stateandnationalhealthportalsandapplications.Thelistofapplications/systemsthatrequire tobeintegratedwithHISislistedbelow.However,thisdoesnotrepresenttheexhaustive list of systems and applications that have to be integrated with HIS. Any new system / device / applicationsthat areidentifiedfor integration duringtheprojectlifecycle shallrequire to be integrated with HIS by the Selected Bidder.

UnifiedPayments Interface (UPI) - For health institutions with huge footfall, it is important to have increased speed of transaction with accuracy. Therefore, digital paymentsystemneedstobeintroducedinHIStosmoothenthepaymentprocess. Apart from reduced time in transaction, a facility can also view real time cash flow. HIS will integrate with UPI provided by NPCI toprovide digital payment services to all stakeholders in the system.

DigitalSignature Integration – A digital signature is a digital code (generated and authenticated by public key encryption) which is attached to an electronically transmitted document to verify its contents and the sender's identity. Integrated digital signature would make the process of verification smoother. Documents generated in HIS shall be signed digitally before publishing the document in the system.

SMS/WhatsApp/e-Mail Integration – Introducing SMS/WhatsApp/e-mail in the system would ease the access of the essentials documents by the user and maintain privacy of the content. Communication with the end-users shall be in the form of SMS / e-Mail / WhatsApp communication.

Note: Web Services / APIs for integration of the above-mentioned software applications will beprovidedbycompetentauthoritytotheSelectedBidderandtheSelectedBidderwouldbe required to consume / absorb these services into the HIS Software Solution.

20.1.5.23.3 3 Standards and Frameworks to be adopted by HIS Solution

HealthStandards

To ensure seamless and boundary less interoperability of health applications,itisproposedtoadoptthestandardsandguidelinesrecommendedby Ayushman Bharat Digital Mission (ABDM), 2019 and Electronic Health Record (EHR) Standards of India 2016, issued by Ministry of Health & Family Welfare, GoI and other standards adopted by the healthcare industry for standardization of data elements.

The standards and guidelines relevant to HIS solution for various aspects are outlined below and covers aspects of identification, clinical terminologies, disease coding, investigations, interoperability, data privacy and security, patient safety, quality of services, access management, etc. Adoption of these standards shall standardize process of data collection, storage, access, presentation, and exchange at all levels of service delivery in a meaningful way.

Based on current best industry standards, following standards and guidelines are recommended to be adopted in HIS solution.

Recommended Scopeof Standards	Purpose	Standards/ Guidelines	ApplicationwithinHIS
Identification&Demographics	Person Identificationand Land Region Codification	The Metadata and Data Standards (MDDS)	It will enable capturing of demographic information of patients, health institutes, etc throughauniqueidentifierina defined format which will be shared electronically between HIS Solution and other external health system in a standardized manner.
Syntactic Interoperability (Messaging/ Document standards)	StructuredClinical Information Exchange	FHIRRelease4	It will enable information centric workflows. This will be used to exchange health care information electronically between HIS Solution services and other external health system to support clinical decision.
	Imaging	DICOM PS3.0-2015c	It will enable image centric workflows in file structure and communicationprotocol.Itwill beusedtoretrievestore,print, and transmit medical images between HIS Solution and other external health system
Semantic Interoperability (Code sets / Vocabularies)	Disease Coding System	WHOICD10/11	It will allow HIS practitionerstoelectronically classifydiseases,otherhealth problems and vitals related to morbidityinconsistentmanner across health facilities of the state using HIS Solution
	Lab Coding System	LOINC	This will allow for a standardizedwaytoidentify &exchangelaboratory

Recommended Scopeof Standards	Purpose	Standards/ Guidelines	ApplicationwithinHIS
			observations in consistent manneracrosshealthfacilities of the state using HIS Solution
	StillImages/Documents Audio/ Video	StillImage:JPEG Document/Scan:P DF A-2 Audio:MP3/OGG Video:MP4/MOV	Itwillenablehealthfacilitiesof the state using HIS solution to store, access, and store health information in various formats/types.
	Prescription	Pharmacy Practice Regulations, 2015 Notification No. 14-148/2012-PCI as specified by PharmacyCouncilof India	Healthcare professionals across various health facilities using HISSolutioncandigitally sign and issue a prescription to patient post consultation
E-Prescription	Consent Management	ISO/TS17975:2015 Health Informatics (Principles and data requirements for consentinthecollection, UseorDisclosure of personal health information)	It will allow an informed data sharing process between patient & healthcare professionals of the state about how personal health information is processed across health facilities using HIS Solution
Consent	Consent Framework	Electronic Consent Framework Technology Specifications v1.1) with its subsequent revision(s)published by MeitY.	Itwillallowexchangeofhealth information based on defined consentartefactslikeownerof data, type of data fields, purposeofdataaccess,digital signature, etc. across health facilities using HIS Solution
	Security	DigitalCertificate,TLS / SSL, SHA-256, AES-256	It shall enable safe transmission of sensitive patient record over internet in encrypted format between HIS Solution and other external health system

Recommended Scopeof Standards	Purpose	Standards/ Guidelines	ApplicationwithinHIS
Privacy &Security	AccessControl	ISO22600: 2014Health informatics PrivilegeManagement andAccessControl (Part 1 through 3)	It will enable communication and use of health information between HIS Solution and other external health system based on privileges and access controls
	Track amendments	ISO27789:2013 Health informatics - Audit trails for Electronic Health Records	Through this, document history or trail for every health record will be maintained in terms of creation, access, amendments, etc. thus improvingtransparency across health facilities using HIS Solution
AuditLog	Safetyof Electrical- Medical Equipment	IS/ISO/IEEE11073 HealthInformatics-Standards and related ISO standards for medical devices	It will ensure only medical equipment which like X rays, scans, etc. which have safety certification against physical, chemicalandradiationhazard are used for patient care across health facilities using HIS Solution
PatientSafety & Data Quality	Standardizationof Treatment/Care&Reporting	Standard Treatment Guidelines – STG, guidelines for COVID 19, etc.	It will improve treatment outcomeatacrosscentersand departments using HIS Solution by enabling health practitioners to follow and practice standardized treatment processes.
	Standardizationof Treatment/Care&Reporting	Telemedicine Guidelines – releasedbyNCISM & NCH	It will allow healthcare practitioners to deliver standardized health services via telemedicine by defining norms & protocols for consultation,diagnosis, informed consent, medical records, health advice, etc. across health facilities within the state using HIS Solution.

20.1.5.23.4 Application Specific Standards

- TheSelectedBiddershallensurethatHISconformstoopenstandardsandshall adopt a modular approach. The solution shall have strongrobust integrationbetween thecore businesssolutions andtheoverallengine shallhave interoperabilityfeatures withdifferentsystemsandplatformsandavoidanytechnologyortechnologypr ovider lock-in.
- Specific OEM products may only be used when necessary to achieve scale, performance, and reliability. Every such OEM component / service / product / framework/ pre-existingproductor workmust bewrapped in a vendor neutralAPI so thatatanytimetheOEMproduct canbereplacedwithoutaffectingrest ofthesystem
- The solution shall conform to industry standards wherever applicable and shall be appliedtoallaspectsoftheproposedsolutionandnotlimitedtodesign,develop ment, security, interoperability, mobility, testing, installation, and rollout.
- An indicative list of standards has been proposed below. However, the list is for reference purpose and is not to be treated as exhaustive.

Component/Application/ System	Prescribed Standard / framework (where applicable)
Application security design and development	OpenWebApplicationSecurityProject(OWASP)Top 10 Principles
BiometricframeworkBioAPI 2.0	ISO/IEC19784-1:2005
DocumentEncryption	PKCS
DigitalPreservation	ISO14721:2012
DigitalSignature	RSA/NISTStandards
Font standards for UNICODE data storage	ISO/IEC14496-OFF(OpenFontFormat)
IFEGTechnicalStandards	WSDL2.0
Information Access/Transfer Protocols	SOAP,REST,HTTP/HTTPS
InformationSecurity	ISO 27001:2013
Interoperability	WebServices,Openstandards
ITInfrastructureManagement	ITIL/EITM
MobilityStandards	ISO12812
Operations	ISO9001

Component/Application/ System	Prescribed Standard / framework (where applicable)
Operational Integrity &Security Management	ISO27001,ISO 22301(Latest)
Portal Development	W3C,GIGW
ProjectDocumentation	IEEE/ISO/CMMi
ScanneddocumentsTIFF	Resolutionof600x600pixels
ServiceManagement	ISO 20000:2018
Support for PKI based Authentication and Authorization	In accordance with IT Act 2000, as amended in 2008, using Digital Certificates issued by Certifying Authorities
WebContentAccessibility	WCAG 2.0
WorkflowDesign	WFMC/BPMStandard

ABDM-CompliantSystem

TheHISsolutionshalladhereandbecompliantwiththelateststandardsandguidelines asspecifiedbyNationalHealthAuthority,GovtofIndia(NHA)aspartofitsAyushmanBhar at Digital Mission (ABDM) program.

TheHISsolutionshallbecapableofprovidingthefollowingfunctionality:

- CreationofABHAnumber
- CompliancetoM1,M2andM3milestonesofABDM.

CompliancetoNABHDigitalHealthStandards

The HIS solution shall adhere to the latest standards released by NABH for HIS andEMR systems as part of its Digital Health Standards.

20.1.5.23.5 Data Analytics and Dashboards

RealTimeManagementInformationSystem(MIS)andDashboard:

EachuseroftheHISsolutionshallhaveacustomizeddashboardviewwiththefollowing features-

- Activitiespending
- Activitiesassigned
- AnalyticsReports
- AnyotherfeaturesidentifiedduringtheSRSstudybytheselectedbidder

An indicative list of the KPIs is listed below. This list shall be reviewed during the SRS study and enhanced according to the requirements of the end-users.

- Overallperformanceofhospital
- Outpatient Statistics – number, age and gender distribution, geographical

area of residence, specialty

- Inpatient Statistics – number, age and gender distribution, geographical area of residence, specialty
- Hospital Profile and Future Requirements - Compile a detailed hospital profile supported by relevant data. This profile shall include current capabilities, patient demographics, service utilization rates, and performance metrics. Outline future requirements to meet projected growth.
- Future Plans and Benchmarking - This involves assessing current resources, identifying gaps through statistical analysis, and devising solutions to address these gaps.
- FacilitytogeneratereportsforWard-wisedayandnightstatusof patients
- BedOccupancyRate–overallandbyspecialty
- AverageLengthofStay–overallandbyspecialty
- TurnoverInterval–overallandbyspecialty
- Surgery statistics
- Major,minor,andtotaloperations–overallandbyspecialty
- NumberofMedico-LegalCases
- Referrals–overallandby specialty
- MortalityRateofPatients–overallandbyspecialty/unit/ward
- MaternalMortalityRate
- InfantMortalityRate
- Causeofdeath–overallandbyspecialty
- NetDeathRateofHospital–overallandbyspecialty
- RevenuegenerationthroughUserCharges
- ExpenditureincurredonpatientsexemptfromUserCharges
- Facilitytogeneratereal-timeMISreportondifferentfunctionalareasofHIS
- Any other descriptive and predictive KPIs that are identified during the SRS study by the selected Bidder.

20.1.5.23.6 System Management and User Management

TheHISSoftwaresolutionshallbeaccessible to

- Officeuseratheadofficewithauser role
- AnyotherdesignatedandauthorizedbyAMC

UserManagement

The system shall allow (admin user) creation and management of office user with relevant details by using the SSO id of the user.

ThesystemshallprovidefacilitytoblockorunblockanyofficeuserwithinHIS

Thesystemshallallowadminusertocreate/modifyuserandrolesandprivilegesforaselected user.

DesignationMaster

Thesystemshallhavefacilitytocreatenewdesignation.

UserRole

Thesystemshallprovidefacilitytocreateuserroleas desired.

AssignRoletouser

Thesystemshallallowsystemtoassignuserroletoeachuserasperrequiredprivileges

Additional Requirements

SystemWideFunctionalities

- Web Application and Web Portal shall be modular in design and shall be designed using modular and reusable programming techniques for ease of maintenance.
- Web Application and Web Portal shall have the capability to format output to support HTML, XML, text for data exchange/integration with various entities involved in the process.
- Web Application and Web Portal shall be designed to permit easy insertion of new modules and new enhancements.
- Web Application and Web Portal shall have the capability to complete all requests (e.g., store, retrieve, update, etc.) without any data loss.
- WebApplicationandWebPortalshallmaintainanauditloginofeachtransaction.
- WebApplicationandWebPortalshallhavethecapabilitytodefineandmodifyCli ent's access privileges.
- WebApplicationandWebPortalshalluseopensystems,standard-basedarchitecture tomeetfunctionalrequirementsandtointer-operatewithexistinginformationsystems.
- Data inputs to the Web Application and Web Portal shall be validated prior to being processed.
- Input data shall be validated for out-of-range values, missing or incomplete data, and unauthorized or inconsistent control data.
- WebApplicationshallpreventunauthorizedusersfromaccessingthesystem.
- RegisteredusersinWebPortalandWebApplicationshallbeallowedtolog-ononlyto those functions which they are authorized to access and use.
- The logon process shall deny access based on the authentication message received from SSO application.
- The password management system shall include non-display of the password when being entered.
- WebApplicationandWebPortalshallhavethecapabilitytosearchandanalyze payment transactions for enforcement purposes.
- TheSoftwaresolutionshallbecapableofgeneratingeventnotificationsandinter facing withE-mailsystemandmustsupporte-mailtriggersaspartofthesolution'sworkflow.

- Theproduct/project/applicationshallnotbespecifichardwaredependent.
- Audittrailshallbemaintained;alldeleted&editedrecordsshallbetraceableand copy ofalleditions/deletionsshallbeavailable.Theaudittrailshallbepreservedinsecurely and No user other than authorized shall be allowed to modify audit record.

20.1.5.23.7 Proposed Security Architecture

- EnvisagedsecurityarchitecturefortheHISSoftwaresolutionisprovidedbelow:
  - UserLevelSecurity:Restrictedareasoftheapplicationshallonlybeaccessible through pre-defined user access rights.
  - DevelopedSoftwaresolutionshallbedeployedonlyonHTTPS(5128-bitSSL certificate to be deployed by the Selected Bidder on the Servers for the entire project duration)
  - Application-Level Security: Application shall have Role based access, encryption of user credentials and storing of user credentials for users in separate repositories.
  - Application-level security controls shall be provisioned in the application for following
    - PreventSQLInjectionVulnerabilitiesforattackondatabase.
    - PreventXSSVulnerabilitiestoextractusernamepassword.
    - Secure Authentication and Session Management control functionality shall be provided.
    - PreventSecurityMIS-configurationVulnerabilities.
    - Prevent Failure to Restrict URL Access Vulnerabilities (By providing authentication and authorization for each sensitive page, use role-based authentication and authorization and make authentication and authorization policies configurable
    - PreventInsufficientTransportLayerProtectionVulnerabilities
    - PreventinvalidatedRedirectsandForwardsVulnerabilities
  - Apartfromtheabove:
    - To design web portal & application software, SI shall make use of eSAFE: e-Governance Security Assurance Framework Guidelines for Implementation of Security Controls issued by the Department of Electronics and Information Technology (DeitY), Ministry of Communications & IT (MCIT), Government of India".

20.1.5.23.8 Web Application Performance Metrics

TheHISsolutionisexpectedtomeetthefollowingapplicationperformancemetrics.

Item	PerformanceStandard/ResponseTimes
ScreenNavigation:field-to-field	<5 milliseconds
ScreenNavigation:screen-to-screen	<3 seconds
ScreenRefresh	<2 seconds
Screenlistbox,combobox	<2 seconds
Screengrid–25rows,10 columns	<3 seconds
Reportpreview–(allreports) –initial page view (if asynchronous)	< 60 seconds in most instances. It is understood thatcomplicated/largevolumereportsmayrequire a longer period
Simplesearch–singletable,5fields, 3conditions –withoutscreen rendering	<3secondsfor100,000rows
Complex search – multiple joined table (5), 10 fields, 3 conditions – without screen rendering	<5secondsfor100,000 rows
Server-side validations / computations	<2 milliseconds
Client-sidevalidations/computations	<1 millisecond
Loadingpages	<3 seconds
Savingarecord	<5 seconds
Batchprocessingper100records	< 120 seconds
Login,authentication,andverification	<5 seconds
Dailybackups–maximumduration	4hours(on-linepreferred)
TotalRestore–maximum duration	8 hours

20.1.5.23.9 Summary of Expected Support in the HIS and PACS

HIS

Following table contains the details of recommended / expected support from the proposed HIS:

Sl No	Description
1	The proposed software shall be **Independent of the Platform** (Ex.: MS Windows, Mac OS, Android, etc.)

Sl No	Description
2	The proposed software shall be **Independent of the End Point Client Device** (Ex.: MS Windows, Mac OS, Android, etc.)
3	The proposed software shall support and adhere to **Software Multi-Tenancy Protocol** standards
4	The proposed software shall have a Role Based Access Control system?
5	The proposed software shall have the capability to define Master Data at Parent Organization Level and use the same at Child Organization Level
6	The proposed software shall have the Export - Import capability for all Master Data (preferably from & into *. XLXS or *.CSV file format)
7	The proposed software shall support Two Level Approval Process for Master Data Upload / Update
8	The proposed software shall have Single Sign On capabilities with other applications (either as Slave or Master)
9	The proposed software shall have the ability to create Clinical Data Forms Dynamically
10	The proposed software shall support Touch Friendly fatures to be used on various Handheld and Smart Devices? (Tablet PCs)
11	The proposed software shall support Bulk Registrations (in the event of Mass Casualty or Natural Disasters or Camps)
12	The proposed software shall support Closed Loop Medication Administration in totality
13	The proposed software shall support Generation - View (as per the Role) of the Audit Logs & Audit Trails on all screens & modules in the software
14	The proposed software shall support Multiple Doctor Consultations in the same OPD visit to be booked
15	The proposed software shall support to set Priority for Patient based on Patient Condition.
16	The proposed software shall have the capability to Define Wait & Turn Around Time for various Process & Services and provide for Visual Indicators for breach of these, If any
17	The proposed software shall support setting up of Clinical Alerts with Visual Indicator Alerts
18	The proposed software shall provide for Role Based Dashboards (pre-configured)
19	The proposed software shall provide for viewing the patient encounters in a Time-Line View
20	The proposed software shall support Co-Signing of Reports and other Clinical Documents
21	The proposed software shall support capture of the Verbal Orders from Doctors and provide for a workflow to signoff subsequently
22	The proposed software shall support Multi Currency transactions
23	The proposed software shall have configurable Business Rule engine, inbuilt
24	The proposed software shall have a Configurable Workflow Engine, inbuilt
25	The proposed software shall have a separate Report Builder, inbuilt
26	The proposed software shall support integration with Google calendar, iCal, Outlook Calendar or any other commonly used Calendar System
27	The proposed software shall have te capability to allow Only One Login instance for the same user
28	The proposed software shall have the solution to support the storage of the Scanned Files - Images - Photographs etc (File Data) outside the core production database and into a separate file store
29	The product has to be Cloud Based – Cloud Ready, Open Source based integrated Hospital Information System.

Sl No	Description
30	The proposed software shall have the capability to Interface with other External Solutions / Systems / Platforms with HL7 V2.x and / or FHIR (Fast Healthcare Interoperability Resources) standards
	• Speciality EMR
	• Nurse Call System
	• ICU Management System
	• LIS
	• RIS
	• PACS
	• CRM
	• HRIS
	• ERP (including Batch integration with Tally)
	• International Codification Standards & Protocols
	• Drug DB
	• Queue Management System
	• Insurance Portal
	• Payment Gateway
	• RFID System
	• Barcode Systems
	• IVR's
	• Webcams
	• Patient Portal (for Online Appointments, Report Retrieval etc.)
	• Label Printers
	• Card Printers
	• Handheld / Mobile Devices
	• Medical Equipment
	• Bidirectional with SMS Gateway
	• Bidirectional with email (SMTP / IMAP) Gateway
	• Aadhar (UID)
	• Prepaid & Post-Paid Cash Cards
	• 3rd Party Mobile Applications
	• Natural Language Processing
	• 3rd Party BI & Analytics Tools
	• Voice Recognition Applications (Native & External)
	• Handwriting Recognition Applications
31	The proposed software shall support the following Queue Management functionalities
	• Alerts for SLA Breach via SMS
	• Deliver Queue & Token numbers from a Kiosk or Unmanned Station
	• Allow End Customers (Patients) to request for a Delay / Postponement / Cancellation of their Tokens
	• Allow Patients & Users to choose options like "MRI", "X-ray", etc, but then for these to aggregate into a single queue stream like "Imaging" for the various imaging rooms together

Sl No	Description
	• Allow Users to service multiple Queue Streams
	• Allow urgent cases into a priority stream so that it is seen before others without significant disruption to workflow, e.g. "Urgent X-ray" places the patient ahead in the "Imaging" queue
	• Dashboard View of all tickets, terminals and waiting times should be available in near real-time for management review

PACS

Following table contains the details of recommended / expected support from the proposed PACS:

Sl No	Description
1	The proposed software shall be **Independent of the Platform** (Ex.: MS Windows, Mac OS, Android, etc.)
2	The proposed software shall be **Independent of the End Point Client Device** (Ex.: MS Windows, Mac OS, Android, etc.)
3	The proposed software (PACS & Viewer) approved by US FDA
4	The proposed software shall use any **ActiveX** component in the PACS or in the Viewer? ActiveX free systems would be preferred
5	The proposed software shall support and adhere to **Software Multi-Tenancy Protocol** standards
6	The proposed shall have a Role Based Access Control system?
7	The proposed shall have a Role based assignment to Specific Procedures and Specific Modalities
8	The proposed shall support Role Based Case Forwarding at User Level
9	The proposed shall have the capability to define Master Data at Parent Organization Level and use the same at Child Organization Level
10	The proposed shall have the Export - Import capability for all Master Data (preferably from & into *. XLXS or *.CSV file format)
11	The proposed shall support Two Level Approval Process for Master Data Upload / Update
12	The proposed shall have Single Sign On capabilities with other applications (either as Slave or Master)
13	The proposed shall support Touch Friendly features to be used on various Handheld and Smart Devices? (Tablet PCs)
14	The proposed shall support Generation - View (as per the Role) of the Audit Logs & Audit Trails on all screens & modules in the software
15	The proposed shall support integration into Multiple EMR - HER - HIS - LIS in the same instance
16	The proposed shall support to set Priority for Patient based on Patient Condition.
17	The proposed shall have the capability to Define Wait & Turn Around Time for various Process & Services and provide for Visual Indicators for breach of these, If any
18	The proposed shall use Vendor Neutral Archival at the core of its Archival Services
19	The proposed shall provide for Role & Modality Based Dashboards (pre-configured)

Sl No	Description
20	The proposed shall support integration to the Equipment Providers Modelist Worklist (MWL) for seamless push of Demographic & Procedure Data with Scheduling Information to the Imaging Modalities
21	The proposed shall support Co-Signing of Reports and other Clinical Documents
22	The proposed shall support Dual Radiologist Signoff
23	The proposed shall support generation of Addendum Reports
24	The proposed shall have configurable Business Rule engine, inbuilt
25	The proposed shall have a Configurable Workflow Engine, inbuilt
26	The proposed shall have a separate Report Builder, inbuilt
27	The proposed shall support Integration with Google calendar, iCal, Outlook Calendar or any other commonly used Calendar System
28	The proposed shall have te capability to allow Only One Login instance for the same user
29	Maintain **document integrity and security** of published radiology test reports i.e., System should not allow ad hoc modification of report by unauthorized users (other than radiologist) and save all files in PDF Format
30	The proposed system highly secured with ability to **limit a user to view data relevant to the user's department and role** only
31	The proposed system allow User should to **tag interesting cases** for easy future reference Ex.: Teaching Folders etc
32	The proposed system support **DICOM 3.0 Standards**
33	The proposed system store data in **lossless compression using non-proprietary format**.
34	The proposed shall provide for a Universal Image Viewer which can view any DICOM based files from any Radiology & Imaging modalities?
35	The proposed shall support Image Capture from Non-DICOM Modalities using 3rd Party convertors
36	The proposed shall support Advanced Key Words based search of Images & Reports
37	The proposed solution support **Management - Tracking - Reporting of Inventory and Consumables**
38	The proposed shall support the following critical features and functionalities
	• MIP
	• MPR
	• MinIP
	• Measurements
	• Cineloops
	• 2D & 3D Reconstruction
	• Fusions between images from different modalities
	• Bidirectional integration with 3rd Party / External Workstations like Myrian, Terra Recon, etc
	• Surgery Planning tools
39	The proposed shall have the capability to Interface with other External Solutions / Systems / Platforms with HL7 V2.x and / or DICOM 3.x standards
	• LIS
	• HIS
	• CRM
	• HRIS

Sl No	Description
	• Queue Management System
	• 3rd Party Diagnostic Grade Monitors
	• 3rd Party Review Grade Monitors
	• External CD / DVD Robotic Burners
	• External Film Scanners
	• Barcode systems
	• Label Printers
	• Card Printers
	• Handheld / Mobile Devices
	• Medical Equipment
	• Bidirectional with SMS Gateway
	• Bidirectional with eMail (SMTP / IMAP) Gateway
	• Aadhar (UID)
	• Prepaid & Post-Paid Cash Cards
	• 3rd Party Mobile Applications
	• Natural Language Processing
	• 3rd Party BI & Analytics Tools
	• Voice Recognition Applications (Native & External)
	• Handwriting Recognition Applications

20.1.5.23.10 Expected Project Outcomes (HIS)

Theexpectedoutcomestobeachievedfromtheprojectareasfollows:

- Availability of online Electronic Medical Record (EMR) of individuals linked to their Aadhaar Card / ABHA Number after proper verification process.
- Efficientprocessesofregistrationofpatientsforoutpatient/inpatientcareatthe Hospitals.
- Real time HIS for improved decision making for improving access, effectiveness and efficiency of medical care provided by hospitals.
- Improve patient experience by promoting proactive, user friendly and efficient system for patients, staff, doctors & faculty.
- Streamlined and simplified processes at each healthcare facility at all levels, enabling transparency, availability, efficiency, and quality.
- Enabledataandfact-baseddecisionmaking,administrationandoverallgovernance.
- Judiciousutilizationofavailableresourceswithanaimtoincreaseefficiencyin healthcare service delivery.
- Establishmentof a system of inventory management of Medical Equipment and their management.

- Establishmentofasystemofinventorymanagementof Drugsandtheirdistributionto patients based on recommendations of the treating doctor(s).
- Improvingtransparencyinfunctioningandefficiencyofmedicalcareservicesforbetter monitoring by Department of Medical, Health and Family Welfare.
- EfficientandtransparentservicedeliverymechanismthroughWebPortal,Payment Gateway, and SMS.
- Extendedreachtoallstakeholders(residents,governmenthospitals,etc.)
- Maintainasinglesourceoftruthforcitizenrecordwhichwillincludeauniquepersonal healthdigitalrecordsystemtomakeitpossibleforthepatientstobeuniquelyidentified, provide access to the Personal Health Record, provide control & authorization for access to their own health information as per the detailed technical specifications provided.
- Hospital Information System (HIS) platform with referral support across AMC MET multiple healthcare facilities in Ahmedabad, including LG Hospital, Shardaben Hospital, Nagri Hospital, Dental College, S.B.B. College of Physiotherapy, and CHC & UHC Health Centers. The system should enable seamless patient referral management, allowing patients to be referred and transferred from one hospital or center to any other hospital within the network without any limitations.
- The platform should support smooth data sharing, easy access to patient records, and effective coordination between all facilities to ensure continuity of care. It should also provide referral tracking, sharing of medical reports, and efficient communication between referring and receiving hospitals. The overall objective is to establish an integrated healthcare ecosystem that improves operational efficiency, reduces delays in patient management, and enhances patient outcomes across all centers.

20.1.5.23.11 Indicative Manpower Requirements for HIS Implementation

Sl No	Designation / Role	No of Members	Qualification	Experience	Skills
1	Project Director (HIS)	1	B. Tech, MBA, PMP Certification	15 – 20+ Years	Large & Multiple Projects Implementations (HIS), Stakeholders Management etc
2	Project / Implementation Manager (HIS)	1	B. Tech, PMP Certification	12 – 15+ Years	HIS Knowledge, User Management, Project Management Tools etc
3	Project / Implementation	2	B. Tech	8 – 10+ Years	HIS Knowledge, Team Management

	Leads				
4	Subject Matter Experts (SME) / Functional Consultants	3	Any Graduation / B. Tech, MBA in Healthcare	4 – 6+ Years	Thorough knowledge in Hospital workflows, HIS Knowledge etc
5	Implementation Consultants / Engineers	6	Any Graduation / B. Tech	3 – 5+ Years	HIS Knowledge
6	Project Coordinator	1	B. Tech	10 – 12+ Years	Strong HIS Knowledge, Team Management, Ensuring smooth operations, and coordinating effectively with the AMC-MET
	Total	**14**			
7	Support Engineers	**4**	Any Graduation / B. Tech	3 – 5+ Years	HIS Knowledge. This team is required after warranty support and during Annual Maintenance Support period for 4 years at Site

Note:

3) The above manpower indication is only for the implementation period and not for the warranty support period.
4) **Project Coordinator** to be seated in the AMC-MET office during the implementation stage for close monitoring of HIS activities and vendor coordination. Reports to higher authorities and ensures smooth communication between hospital departments and the HIS/IT team throughout the implementation phase.

5) Since the implementation would be carried out on a phased manner i.e., hospital by hospital, implementation team remains the same and they will move to all the 3 hospitals one after the another.

20.2 ReportsCategories

Sl No	Description
1	MISUnified Real Time Dashboards and ReportsforSeniorManagement(CXO's)
2	MISReportforeachDepartments/Module (Dashboard,KPIand StatisticalData)
3	OperationalTransaction Reports
4	ExceptionReports
5	QualityandPerformanceReports
6	Regulatory Reports
7	FinancialReports

20.2.1 A Hospital Information System (HIS) should provide below dashboards:

CM/MC Dashboards

- **Hospital-wise**
    - No of Outpatients
    - No of Inpatient Admissions and Discharges
    - No of Emergency Admissions
    - Bed Occupancy Rates
    - Mortality Rates
    - Birth Registrations
    - No of Medico-Legal Cases (MLC)
    - Surgery Statistics
    - Patient Complaints Statistics
- **Turnaround Time (TAT)**
    - Outpatient Waiting Area
    - Inpatient Admissions till Bed Allocation

- Emergency
- Laboratory
- Radiology
- Outpatient Pharmacy

- **Revenue**
  - Outstanding Payments
  - Hospital-wise / Department-wise Collections
  - Revenue Vs Expenses

Core Clinical Dashboards

- **Patient Admissions & Discharges**
  - Daily/weekly admissions, discharges, transfers
  - Bed occupancy rates
- **Emergency Department**
  - Patient wait times
  - Triage category distribution
  - Average length of stay in ER
  - Current ER Volume
  - No of Medico-Legal Cases (MLC)
- **Outpatient Services**
  - Appointment scheduling and cancellations
  - No-show rates
  - Specialty-wise patient load
- **Inpatient Care**
  - Length of stay by department
  - Readmission rates
  - Patient outcomes and recovery trends

Operational & Resource Dashboards

- **Bed Management**
    - Real-time bed availability
    - ICU vs general ward occupancy
- **Staff Utilization**
    - Doctor/nurse workload distribution
    - Shift coverage and overtime
- **Equipment & Inventory**
    - Availability of critical equipment (ventilators, dialysis machines)
    - Pharmacy stock levels and expiry alerts
    - Supply chain efficiency

Clinical & Physician Dashboard

- Patient Vitals Monitor
- Pending Lab/Radiology Results
- Infection Control
- Medication Administration Record (MAR) Compliance
- Mortality & Morbidity Rates

Operation Theatre

- Theatre-wise Occupancy Rate
- Specialty-wise Operations including Major / Minor
- Surgery Statistics

Nursing

- Real-time Vitals
- Bed occupancy and patient acuity levels
- Scheduled vs. completed doses
- Missed or delayed medications
- Nurse-to-patient ratios

Pharmacy & Inventory Dashboard

- Stock-Out Alerts
- Expiry Tracking
- High-Value Asset Tracking

- Narcotics Reconciliation

Financial Dashboards

- **Revenue Cycle**
    - Billing vs collections
    - Insurance claims status
    - Outstanding payments
    - Claim Denial Rate
    - Payer-wise Revenue
- **Cost Management**
    - Department-wise expenditure
    - Medication and consumables cost tracking
- **Others**
    - Patient payment methods (insurance, cash, government schemes)
    - Revenue Vs Expenses

Quality & Compliance Dashboards

- **Clinical Quality**
    - Infection rates (e.g., hospital-acquired infections)
    - Mortality rates
    - Patient safety indicators
- **Regulatory Compliance**
    - Accreditation status
    - Audit readiness metrics
- **Patient Satisfaction**
    - Feedback scores
    - Complaint resolution times

20.3Device Integration

Sl No	Description	Modules/Location
1	BiometricDevice&Webcam	Registration
2	BarcodePrinter	Registration,Lab,Nursing
3	BarcodeReaders	Allmodules
4	DocumentScanner	MRD,BillingAdmission
5	Barcode/ RFID	MaintenanceModule/Fixedassets
6	Public displayunits, Token printersetc.	QueueManagementSystem- Allpatientwaitareas/ depts.
7	LabInstrumentsIntegration	Laboratory
8	Imagingmodalities	Radiology
9	Kiosks,Handhelds	Enquiry/Customer information

20.4Standardand Compliance

Sl No	Description
1	ICD10/11
2	ICPM(InternationalClassification of Proceduresfor Medicine)
3	HL7InterfaceEngine
4	HIPPA Compliance
5	CPT,Snomed
6	DrugDatabaseInterface(MIMS/ CIMS)
7	NABH&NABL
8	JCI

20.5Architecture Overview

TheenvisagedHISArchitectureshallbeCloudReady– CloudBased,OpenStackTechnology,Multi-Tier/Multi-Layeredanddevelopedinawell-structuredapproachtomeetthecurrentand futureneeds in mindwithfollowingaspectsinconsideration example,

- ModularandPlug&Play
- Standard Interfaceadapters foreaseofintegration
- Workflow configuration
- MasterData drivenwithmakerandcheckervalidations.
- Personalization (orientedbased on userandtheirrole)
- Uploadanddownload toolsinterface
- BackupandRestoretools anditsinterface

20.6PhysicalLayers

- ClientWeb browserORClientApp
- WebServer/ApplicationServer/CloudEnabled &CloudReady
- DatabaseServer

20.7LogicalLayers

- Presentation Layer
- Business Layer
- Database Layer

20.8Architectureand TechnologyFeatures

- Administration Tools
- Application Maintenance Tools
- Performance Monitoring Tools
- Architecture components
- Application andDataSecurity
- AuditServices
- Configuration
- Alerts
- ExceptionLogging
- Globalization/Localization
- Workflow
- FormDesigner
- Report Designer
- Graphs and Charts
- HL7Interface
- Devices Interfaces

21.DEPLOYMENT REQUIREMENTS

The followingkeyobjectivesneedto beconsideredwhile designingandproposing thedeployment configurations.Thisisonlyanindicativeandbiddersarerequestedtoprovidebetteroptionifany based on theirexperienceandcurrent technologytrends,

- HighAvailability
- HighPerformance
- Maintainability
- LoadBalance
- Scalabletomeet thebusinessgrowth

22.DATA WAREHOUSE POSSIBILITIES

AMC-METhas plannedtoimplementthe datawarehousetools/systemasanextensiontotheHISfor multiplepurposeslike,

- Creation ofManagement data-mart,ClinicalManagement,OperationManagementand Revenue Management
- TrendAnalysis
- ManagementInformationReporting
- Enduser customReporting
- Forecast&projections basedonthepasttrendas thedatawarehouse would beessentialitemforAMC-MET toseparate thecritical,informationaland decision support datafrom daytodaytransactional data.

AMC-METisexpectingtheBiddertoprovidethe detailedinformationon:

- Architecture support
- DatabaseConnectivity
- Availabilityof DatabaseStructureandDesign
- Flexibilitytochange/Addadditionaldatatables/fields asrequired
- TechnicalDocumentationsupport

23.PERFORMANCE REQUIREMENTS

AMC-METexpects theBidder toprovide the followingapplicationperformanceparametersbasedon theirapplicationarchitecture,Deployment server/ platform/configurationandapplication design etc.

Application response time refers to behaviorof the various parameters and their timings of the applicationfromtheusabilitypointofview.This includes the pageloadtime,screennavigation,menu navigation,lookupresponsetime,transactioncommitmenttime,reportgenerationetc.With95% usersloadedonthesystemthetargetresponse timesare asgiven below:

-Menunavigation <2sec

-Screenopening <2sec

-Look upresponsefrom DBtables<5sec

-Screen navigation <2sec

-Transactioncommitment <3sec

-Simple&MediumQuery <5sec& 10 sec respectively

-Simple&MediumReportgeneration <10sec&20sec respectively

The biddershould bringinindustrystandard performancemeasurementtoolslikeLoadrunner,etc.to conductthetest.Thetestwouldbedoneinofficehours.Licensecostforperformancetools,ifany,will havetobeborneby thebidder.

24.OTHERDETAILS

AMC-METisengaginginthisRFPprocesstoidentifypotentialbidderstoprovideallofttheintegratedHIS solutionthatisrequiredtoautomateallthedepartmentoperations.

The biddershall be responsible forthe complete projectmanagement, implementation, integration, customization, training, changemanagement,testingandmaintenanceserviceoftheentiresolutionon a turnkey basis. Thescopeofwork isdetailed below but not limited to thesame.

Sl No	Scope of Supply	DetailedDescription
1	**Supplyof Licensefor IntegratedHISas per therequirements CIMS,SnomedCT,ICD10**	HIS Softwarelicensetomeetthecomplete requirements related OperationalDepartments/Modules Deploymentoptionshallbesuitableforthishospitalwithhigh performanceandavailability
2	**Supplyof alltheHW andsoftware requirementsfor deployment–Private Cloud ona Public Infrastructure**	RecommendedHardwareserversrequiredfor theproposeddeployment configuration Deploymentplatformrelated Softwareanditsassociatedtools includingoperatingsystem,database, reportingandintegrationtools etc.for thesuppliedhardware.
3	**Implementation services**	System Study,Requirementunderstandingandmapping,Application customization/ configurationsReportingrequirementsstudyforoperati onal,managementand statutoryneedsSRS buildand Signoff fordeployment Developmentofmodule/ featuresas requiredtoprovidetheoverall solutionIntegration of Medical/ Engineering/ ITEquipment(asapplicable)andtestingfor readinessforuseIntegration of ALLApplicationModulesandDevicesOperationalReport configurationMISreportconfiguration

Sl No	Scope of Supply	DetailedDescription
4		Alertsand EventsconfigurationforSMS/Email /WhatsAppBusiness master Data Preparation, Uploading into the system/configuration Application Setup and configuration Deployment of overallsolution andtestingFunctionalTestingforindividualModules Integration Testingwillall scope of servicesPerformanceTesting and conformance UserAcceptanceTestingEndUsersTraining PreGo-LiveTestandPreparednessforGo-Live Post Go-LiveOn-Site supportfora min. of 6months
5	**Training**	EndUserTraining(UserDepartments)ApplicationAdministration TrainingApplicationMaintenanceTrainingDatabaseandReport GenerationUser Manuals
6	**WarrantySupportafter Go-Live**	Warrantysupportfor the1+4yearsfromthedate of Go- Live
7	**UpgradesandReleases**	reeupgrade/ releasesfor theexistingissues/featurePaid upgrade fornewModule/Features

25.SUPPLY OF LICENSES

The proposedHealthcareITSolutionproductshallsatisfy therequirementsasspecifiedin technicalandfunctionalrequirementsSectionofthisbiddocument.Biddershallalsosupply anyothertools&accessoriesrequiredtomaketheproposedHealthcareITSolutioncomplete as perrequirement.

Thebiddershall:

- Supply user licenses for transaction, employee service, and technical & systemadministrationfor theoffered Healthcare ITSolution.
- Supplylatestversion of database tosupport theofferedSolutionplus anyother software,toolsandapplication.

Also,twosetsofProductDocumentation,onehardcopyandonesoftcopytobesupplied alongwithlicensesandshallinclude but notlimited tofollowing:

- Technical manuals
- Installationguides
- Usermanuals&AVtutorials
- System administratormanuals
- ToolkitguidesandTroubleshootingguides

Alltheabovedocumentsmentionedoranyotherstandarddocumentationfortheproduct shouldbeincludedinthecost of thelicense.

Allthe tools, accessories,softwareandmediasupplied under thecontractshallbeoriginal copiesandwarrantedagainst damagesfor1+4yearsfrom thedateofinstallationandwill bereplaced withoutanycostin-caseof damages.

26.IMPLEMENTATIONSCOPE

TheBidderwillberesponsible for providing a fullrangeofservicesinimplementationof offeredintegratedHISsolutionincludingintegration&supportingthe operationofthe proposed solutions during andpostimplementation period of3years. These services shouldinclude, but not belimited to, thefollowing:

- PreparingProjectCharter
- HardwareandITcommunicationrequirementsizing
- Support forProcurement
- Operational guarantee
- Implementation of HealthcareITsolution
- Trainingandpreparation of trainingmaterial
- Change Management
- Productconfiguration andcustomization
- ProductIntegration
- DataMigration
- UnitTesting
- SystemTesting
- IntegrationTesting
- LoadTesting
- UserAcceptanceTesting(UAT)
- Go-Live
- PostGo-LiveStabilization
- PostImplementationSupport

27.TRAINING SCOPE

Intheresponsedocument tothistender,Biddershouldexplicitly mentionabout:

- Theapproachandplan for trainingforapplicationusersalongwiththetimeframe, givingthenumberof daysfor which,eachtypeoftrainingwillbe provided
- Trainingonbasicsystemadministration andtroubleshootingtoITTeam

28.DELIVERABLES

Thelistofexpecteddeliverablesaregiveninthebelow.The biddercanprovideadditional deliverablesifneeded.

28.1Project Plan

TheProjectis deemedtostartfromthe dateoftheLetterofIntentbetweenAMC-METand thesuccessfulbidder.Notwithstanding the detailsprovidedtothebiddersinthebidding formatetc.,thebelowneeds tobesubstantiatedandcoveredindetailasapartofthe project planbeingsubmittedby thebidder.

28.2General

- ProjectTeamOrganizationStructure/PMO
- Currentstateassessmentreportsubmission
- Project Chartersubmission
- ProjectInceptionreportsubmission

28.3Infrastructure

- FinalBoM forthe Hardware&otherinfrastructure

28.4Applications

- FinalLicensesizingand delivery
- Currentstateassessmentreport
- MasterDatapreparation
- Testbed deployment

- Application test plan
g
- Performancetest plan
- Training plan
- Cutoverplan
- Support planand
- Go-Liveplan

28.5Resources

TheBidderhasand willatalltimesmaintainenoughresources(includingemployees, capacity, labour,andmaterials)toprovidetheServices toAMC-METasrequired.

28.6Inception Report / Project Charter

- ScopeofWork,Exclusion,Timelines
- Assumptions,Constraints
- Understandingof thedeliverables
- Quality Assuranceplan
- Escalation Matrix
- Humanresourceengagement forimplementation& support
- Communication Plan
- Risk Management andMitigationPlan
- KeyStakeholdersandtheirrolesandresponsibilities
- Projectmanagementmethodology,Approach
- Project ChangeManagement
- Acceptance Criteria
- IssueHandlingProcedureetc.

28.7Maintenance Support Plan duringwarrantyand postwarranty

TheBidderwillprovidecomprehensivewarranty forallapplicationunderscopeofwork for aperiodof1+4yearsstarting fromcommissioningoftherespectiveapplication(i.e.after "Go-Live").

Fromtheendofthewarranty period,theBidder willprovideAnnualTechnicalSupportof theentire system. AMC-METreservestherighttoterminateannualtechnicalsupport anytime if thebidderfails tomeettheagreedcriteriaforthesame.

Thesewarrantytermsalsoapplytodevelopmentandallotherperipherysystemsalong withproductionenvironment.Thisnecessarilywillinclude

- Bug fixingof applicationsystem
- Periodic health checks /preventivemaintenanceof thesystems&proactive rectification measure
- Troubleshooting
- Supplyof allsystemsoftwareupdatesandpatches
- Supplyandinstallation ofSecuritypatchesand bugfixes
- Theofflinesupportshouldhave:
  - Experienced,certified andqualified serviceengineers
  - 24x7x365nationaltelephonicsupport

28.8Audit and QualityControl

The HealthcareITSolutionBidderwill be responsibleforminimizing projectriskthrough periodicreviewsof theimplementationproject.Itisto provideanindependentand objectiveviewof theimplementationproject, identifyanyriskstothe projectgoalsand recommendappropriatecorrectiveactionbyconductingreviewsinthefollowingareas.

Theaimof thereviews istoinvestigate thefollowingareasof theimplementation:

- Application,technicalandprojectmanagement
- ITinfrastructure
- Organizational changemanagement
- Sustained supportand benefitsachievement

Thereviewsshall takeplaceduringthedifferent milestonesof the projectimplementation dependingonthe need, deliverablesand projecttimelines.As apartofthe bidyouare required tosubmit yourillustrativeprocesstosubstantiateyourbid.

AMC-MET,atits owncostand discretion, may alsohireindependent/external audit firms toundertake thisactivity onitsbehalf.

Thesolutionauditcoverstheapplicationdesignand businessprocessparameters.The objectiveofthisexerciseistoreviewthebusinessmodelproposedandconfiguredin systemalongwithall the operational controlmechanism.Thereview teamalso needsto

makesuitablerecommendationstowardsuseoffunctionalitiesandfeaturesandshares thepracticesfollowed in otherimplementations.

Thetechnology auditisananalysisofthetechnicalimplementationcomponentsand operationalprocedures, suchassecurity, backup, performancemanagement, printing,and desktop operations.

Thedesignaudit helps to determinewhetherthe designandimplementationadheres to provenstandards,suchas upwardcompatibilitywherecustom developmentsor enhancements tothesystemsare planned. The feedback providedwillmainlydealwith ways andmeans of optimizingthecustomdevelopmentstoachievebetter performance.

28.9Implementation Team

Thecompositionoftheimplementation teambeing deployedforour project playsavery importantpart in theevaluation ofyourbid.Various parameters like

- CertifiedDomainExperts,
- Hands onExperiencedResources,

- Specific Experience to the relevant business / specialty etc. are some of the vital parameters being evaluated in your bids. Details of the team members being assigned for this project have to be provided along with relevant details are to be provided in the Organization Details.

28.10 Bidder capabilities

Biddersshould demonstrateastrongability todeliverthequiredsolutionandservicesto meetorexceedthe definedscopeandservicelevelrequirementsasdetailedin this RFP. Biddercapabilitieswillalsobeexamined throughreferencechecksbasedontherecent businessexperienceof theBidderinprovidingcomparableservicestoothercustomers.

28.11 Cost of Services

Theoverallfinancialcosts toimplementand maintaintheproposed solutionwillbe evaluatedagainstAMC-MET developed base financialsaswell asagainst the other Bidder proposals.

28.12 Quality and Compliance Capabilities

ThematurityandrobustnessoftheBidder'squalitysystemwillbeevaluated,aswellasbidderexperiencewithauditsandvalidatedsystems.

28.13 Implementation Approach and Transition Services

Theapproachtoimplementationand transitioning after theGolive/Supportand Maintenanceaswellas theabilityoftheBidder toaccommodateanacceleratedtimeline will beconsidered. AMC-MET will evaluate theBidder'sabilityand approach plantoperformservicetransitionswithminimal disruption to the usercommunityandwith minimalrequired system(s) downtime.

28.14Source Code Ownership and Handover:

After successful implementation and Go-Live, the complete source code shall be handed over to AMC-MET.The ownership of the source code shall be transferred to AMC-MET. This shall include all modules, custom developments, configurations, integrations, reports, APIs, interfaces, middleware components, database schema, stored procedures, scripts, and all related technical documentation developed under.

29. PRICINGANDPAYMENT

29.1 Overview

1. AlltheQuotedPriceswillbeinINR onlyandhencetheInvoiceswillalso beinINR
2. Paymentswillonly bereleasedagainsttheMilestonebased Invoicesonly
3. ThePaymentwillbereleasedwithin 30 Daysof theSubmission& Certificationof each of the Invoice
4. EachoftheInvoiceneeds tobeaccompanied withtheAcceptance/ Delivery / Installation Certificate(as the casemaybe) whichis duly signed bythecompetent authority/person

29.2Payment against Services

Milestonebased paymentmodel

Plan and approach is to prioritize pre-requisites like the Core Infrastructure in the first 6 months, followed by a phased HIS Module Deployment (Basic vs. Advanced) through the remaining 12 months.

1. 18-Month Parallel Execution Roadmap

- Phase 1: Foundation & DC Build (Months 1–6)
- Infrastructure (Sections E, F, G): Physical Data Centre build, HCI installation, and Network cabling.
- Security (Section H): Perimeter firewall and Identity management setup.
- HIS Preparation (Section A): Master Data collection and Core Module (Registration/OPD) mapping.
- Phase 2: Core Clinical& Integration (Months 7–12)
- HIS Phasing: Go-live for OPD, Pharmacy, and Billing.
- Integration (Section D): Financial Accounting and HRMS handshake.
- Advanced Infra: backup strategy testing.
- Phase 3: Critical Care & Optimization (Months 13–18)
- HIS Phasing: IPD, OT, Nursing, and EMR (The most complex part).
- Security: SIEM/SOC monitoring and final VAPT audit.

- Closing: Final UAT, staff certification, and handover to support.

2. Detailed Payment Schedule (Base Prices Only)

A. Software & Implementation

Milestone	Percentage	Timeline	Prerequisite
Advance	10%	Month 1	Signed Contract & Project Charter.
License Delivery	30%	Month 3	Delivery of Keys & Base DB Installation.
Phased Go-Live 1 (OPD)	20%	Month 9	Basic modules (Reg/OPD/Billing) live.
Integration Success	15%	Month 12	HRMS/Finance/Lab integration complete.
Phased Go-Live 2 (IPD/EMR)	15%	Month 16	Clinical modules (Nursing/OT/EMR) live.
Final Acceptance	10%	Month 18	Stability report & Final Sign-off.

B. Core Compute & DC

Milestone	Percentage	Timeline	Prerequisite
Advance	10%	Month 1	High-Level Design (HLD) approval.
Hardware Delivery	50%	Month 4	Servers/Storage arrived and unboxed.
DC Commissioning	20%	Month 6	HCI/VMware live; Sandbox ready for HIS.
Backup Test	20%	Month 12	Successful automated backup.

C. Network & Passive Infra

Milestone	Percentage	Timeline	Prerequisite
Advance	0.1	Month 1	Site survey & cabling layout approved.
Material Supply	0.5	Month 3	Switches, APs, and cabling on-site.
Passive Readiness	0.2	Month 5	Rack/Cabling complete; CRAC/UPS live.
Active Readiness	0.2	Month 7	VLANs, Wi-Fi, and NMS configured.

D. Cybersecurity Suite

Milestone	Percentage	Timeline	Prerequisite
Advance	10%	Month 2	Security policy and architecture sign-off.
Software/HW Supply	40%	Month 5	Firewalls/EDR licenses delivered.
Security Hardening	30%	Month 8	Environment hardened for first HIS test.
Post-Audit Release	20%	Month 17	Final VAPT and Compliance audit clear.

3. Prerequisite Checklist for Parallel Execution

Section	Must be ready BEFORE starting
Section G (Passive)	Must be 80% complete before Section E (Compute) hardware is racked.
Section E (Compute)	Virtualization layer must be live before Section A (HIS) configuration.
Section D (Network)	LAN/Wi-Fi must be certified before User Training starts in Month 8.
Section H (Security)	MFA and Firewall rules must be active before External Integrations (Section D).

4. Effort Estimate (Total 18 Months)

- Program Management: 1 dedicated lead for the full 18 months.
- Infrastructure: High intensity in Months 1–6; Maintenance thereafter.
- Clinical Implementation: Escalates from Month 4 to Month 16.

This would list the specific technical requirements the vendor must meet at each milestone before you release the payment.

Payment Terms: Bed Capacity

Payments under this contract shall be calculated and processed strictly based on the number of **Commissioned Beds**. However, the Authority provides a **Minimum Guaranteed Payment** equivalent to the current number of **Operational Beds**, as officially determined and notified by the **AMC Medical Education Trust (AMC-MET)**. Any scaling of services or billing beyond this minimum guarantee shall only be applicable for additional beds that are formally commissioned and certified as functional by the AMC-MET administration.

29.3Post Go-Live Support

- Tobedelivered‘On-site’
- GeneralShift/BusinessHourssupport
- **Minimum oftwoL1 andone L2 resourceto beplaced inphase 1**
- **Minimum of FourL1 andone L2resource to beplaced inphase 2**
- **Minimum of SixL1 andone L2resource to beplaced inphase 3**

  - Responsible(alongwith AMC-METITTeam)for:
    - EndUserSupport
    - EndUserTraining/Retraining
  - InterfacebetweentheAMC-MET and the Bidder’s Supportteamon changemanagementandBugFixdocumentation, testingandrelease.
  - Support to configureandtestforadditionalreportrequirement
  - Report to theITHead forallday today ITOperationalSupporttasks.
  - Tobedelivered‘off-site/Remote’24*7
  - Remoteconnectivitythroughapproved applications likeWebexor GoToMeeting

- PostGoLiveSupport ismustfor6months and then it is handed backto theSupportOps teamforroutinesupport fromMonth 7 to Month36

29.4Commercialsfor Post Go-Live Support

- IncaseofPerpetualLicensing,thesupportchargeforYear1isincludedinthebase pricingitself.AnnualMaintenance ContractisapplicablefromYear2onwards.

30.PRODUCTRELATEDTERMSANDCONDITIONS

30.1Scopeof HealthcareITSolution

Unless otherwiseexpressly limitedinthecontract,the Contractorsobligationsinvolve performingalltheworkasmentionedintheScopeofwork sectionofTenderinaccordance withthe plans,procedures,specifications,andany otherdocumentsspecifiedinthe ContractandtheAgreedDetailed ProjectPlan.

TheContractorshall,unlessspecificallyexcludedintheContract,performallsuchwork and/orsupplyallsuchitems,servicematerials notspecificallymentionedintheContract but thatcan be reasonablyinferredfromtheContract as beingrequired forattainingGo-LiveOperationalAcceptanceoftheHealthcareITSolutionasifsuchworkand/oritems andMaterialswereexpressly mentionedintheContract.

Thedateofcommencementoftheprojectshallbethe“EffectiveDateofContract”.The Contractor shall immediately proceed with the supply / development, installation, Implementationandintegrationof the HealthcareITSolutioninaccordancewith the time schedulespecified in theAgreedDetailed Project Plan.

TheContractorshall achieveGo-LiveOperational Acceptanceof theHealthcareITSolution orSubsystem(s)inaccordancewiththetimeschedulespecifiedintheAgreed&Detailed ProjectPlan,or withinsuchextendedtimeto whichtheContractorshall beentitled.

30.2Copyright

UnlessotherwiseexpresslystatedinthisAgreementshall beconstruedas grantingorshall be deemedtogranteither partyany right, titleorinterestinany data, documents,reports,concepts,processes,inventions,Services,writings, designs,software, applications,platforms, pathways,markers,codes,algorithms,results, procedures,plans, tradesecrets,knowhow,brandsorothermaterials,includinganyimprovements theretoor anyderivationsormodifications based thereon(“IntellectualProperty”),wheresuch

IntellectualPropertyisproprietaryto,usedoroperatedunderlicenseby orotherwise controlledbyanyotherpartyandwhetherornotsuch

IntellectualPropertyis protected underany patent,copyright, design, trademarkoranyotherequivalent right,grantorlaw, oranyapplicationinrespectthereof(“IntellectualPropertyRight”)andwhetherornot suchIntellectualProperty isconfidential.

TheIntellectualPropertyRightsin theHealthcareITSolutionbaseproductsandstandard materialsshallremainvestedin the ownerofsuchrights.AMC-METshallbegrantednon- exclusive,non-transferable, and paiduplicenseto use theHealthcareITsolution base productsandstandard materialsincludingmodifications theretoforthepurposesagreed herein.TheIntellectualPropertyRightoftheotherelementsoftheHealthcareIT Solution shallbeexclusively withAMC-MET.

AMC-MET’sContractual rightsto usetheHealthcareITSolutionbaseproductsmaynotbe assigned, licensed,orotherwise transferredvoluntarilyexceptinaccordance with the relevantlicenseagreement.

Allrightsincluding theIntellectual propertyrightssubsistinginanymaterialincluding any tools,utilitiesormethodologies belonging totheContractorandusedtoperformthe obligations underthis Agreementandanyadditionalor newinventions madeinthecourse ofperformanceofserviceshereunder by theContractorshallremainvestedinthe Contractor.

AtthesametimetheContractoracknowledgesthatanyAMC-METdataorsystemsthat theContractorreceives,generatesorotherwiseaccessesshallatalltimes remainthe propertyofAMC-MET(oritscustomers)andthatContractorwillnotacquireanyrights, titleorinterestsinsuch dataorsystems.TheContractorwillusecommerciallyreasonable measuresinaccordancewithindustrypracticesandthesensitivityofmaterialprovidedto ittosecureAMC-MET’s dataandsystemstowhichtheContractorhasaccessand, upon AMC-MET’sreasonablerequest,willprovideAMC-METwith acomplete summaryofsuch practices. Inaddition, theContractorshallcomply withany specific data handlingmeasures required byAMC-MET.

30.3Confidential Information

NothingcontainedinthisContractshallgranttheRecipientany right, titleorinterestinthe Discloser'sConfidential Information,exceptthe limitedrightto usesuchConfidential Information solelyforthepurposesspecifiedpursuanttoandinaccordancewiththis Contract.

TheRecipientacknowledgesandagrees that theDiscloser isnotmakingandshall not be deemedtohavemadeanyrepresentationsorwarrantiesregarding theaccuracyor completenessofany ConfidentialInformationorany othertypeofinformation furnishedin accordancewiththisContract.

AMC-MET and the Contractor shall each keep confidential and shall not, without the writtenconsentoftheother partyto thisContract,divulge toanythird partyany documents, data,or otherinformationofaconfidential nature, that hasbeenmarked "Confidential"NeitherAMC-METnortheContractorshall,not, withoutthe priorwritten consent fromthe other party, useany ConfidentialInformationreceivedforany purposeother thanthe operation, maintenanceandfurtherdevelopmentof the HealthcareITSolution.

30.4Project Plan

InclosecooperationwithAMC-METand basedonthePreliminaryProjectPlanincludedin the Contractor'sbid, the Contractor shall develop a Project Plan encompassing the activitiesspecifiedinthe Contract.

TheContractorshall formallypresent toAMC-METtheProjectPlaninaccordancewiththe TechnicalRequirements aspartof the InceptionReport. The projectplanshallincludea PERTchartdescribingtheactivities,resourcesrequiredonthetimeforcompletion.The plan alsoshallbringout thecriticalareasneedingcontinuous attentionofAMC-MET.

Ifrequired,theimpact ontheImplementationScheduleofmodificationsagreedduring finalizationofthe Agreed DetailedProjectPlanshall beincorporatedintheContract by amendment.

TheContractorshallundertake tosupply, install,implement,integrate, commissionand ensure the go-live and stabilizationofthe Systemin accordancewith theAgreed Detailed ProjectPlanandtheContract.

The Progressand other reports specified shall be prepared by the Contractor and submitted to AMC-METintheformatandfrequencyspecifiedintheAgreed Detailed ProjectPlan.

ChangestotheProjectPlan,ifrequired,shall bemadewith themutual consentofAMC- METand theContractor.

30.5Design &Development

TheContractorshallexecutethebasicand detaileddesignand theimplementation activities necessary for successful installation of the system in compliance with theprovisions oftheContractorwhere notsospecified,inaccordancewithgoodindustry practice.

TheContractorshallberesponsible forany discrepancies,errorsoromissionsinthe specifications,andothertechnical documentsthatit hasprepared,whethersuch specifications, drawings,andotherdocumentshavebeenapprovedby theProject Coordinatorornot, providedthatsuch discrepancies,errors,oromissionsarenotbecause ofinaccurateinformationfurnishedinwriting to theContractor byoronbehalfofAMC- MET.

TheContractorshallprepareandfurnishtotheProjectCoordinatorthedocumentsas specifiedin theTechnicalRequirementsfor theProjectCoordinator'sapproval orreview.

Within five working days after receipt by the Project Coordinator of any document requiring theProjectHead'sapproval, the ProjectHeadshalleitherreturnonecopyof the document totheContractorwithitsapprovalendorsedonthedocumentorshallnotifythe Contractorinwritingofitsdisapprovalofthedocumentandthereasonsfordisapproval andthemodificationsthattheProjectHeadproposes.

IftheProjectHeaddisapproves the document, theContractorshallmodifythedocument andresubmititfortheProjectHead's approval. IftheProjectHead approves thedocument

subjecttomodification(s), theContractor shall maketherequiredmodification(s),and the document shallthen bedeemedtohavebeenapproved.

TheProjectHead'sapproval,withorwithoutmodificationofthedocumentfurnishedby theContractor,shallnotrelieve theContractorofany responsibilityorliabilityimposed uponitbyanyprovisionsoftheContractexcept totheextentthatanysubsequentfailure resultsfrommodificationsrequired by the ProjectCoordinatororinaccurateinformation furnishedinwritingtotheContractorbyoronbehalf ofAMC-MET.

TheContractorshall notdepartfromanyapproveddocumentunlesstheContractorhas first submittedto theProjectHead,an amendeddocument andobtained theProject Head's approvalof the document.

30.6Product Upgrades

Atany point duringperformanceoftheContract,should technologicaladvancesbe introduced bytheContractor forSubsystemsoriginallyofferedby theContractorinitsbid andstill tobedelivered,theContractorshallbe obligatedtooffertoAMC-METthelatest versionsoftheavailable Subsystemhavingequalorbetterperformanceorfunctionalityat thesameorlesserunit prices.

During performanceof theContract,theContractorshalloffertoAMC-MET allnew versions, releases, andupdates oftheHealthcareIT Solution,as wellas related documentationandtechnicalsupportservices,withinamonthoftheiravailability fromthe Contractortootherclientsof theContractorinthesamegeographicalarea.In nocasewill theprices forthisSoftwareexceedthosequotedby theContractorinthePriceSchedule forminitsbid.

DuringtheWarrantyPeriod, unless otherwisespecifiedin the Attachment to the General TermsandConditionsAMC-METmayrequiretheContractortoprovideatnoadditional costtoAMC-METall newversions,releaseswithinamonthof theiravailability from the Contractortootherclients oftheContractor.

AMC-METmayatits discretionintroduceall newversions,releasesorupdatesofthe Softwareprovidedthatthenewversion,release,orupdate does notadverselyaffect the HealthcareITSolutionoperationor performanceorrequireextensivereworkingofthe Healthcare ITSolution. In cases where the new version, release, or update adversely affectstheHealthcareITSolutionoperationor performance, orrequiresextensive reworkingoftheHealthcareITSolution,the Contractorshallcontinuetosupportand maintaintheversionor releasepreviouslyinoperationforaslongasnecessarytoallow introductionofthenew version,release,orupdate.In nocaseshalltheContractorstop supportingormaintainingaversionorrelease oftheSoftwarelessthan36monthsafter AMC-METreceivesaproduction-readycopyofasubsequentversion,release,orupdate.

AMC-METshall useall reasonableendeavorsto implement anynewversion,release,or update,subject tothe36-monthgap.

30.7InspectionandTests

AMC-MET or its representative shall after providing the Contractor with reasonable advance written notice, havetherighttoinspect and/ortest any componentsofthe HealthcareIT Solution,toconfirmtheirgoodworkingorderand/orconformitytothe Contractat thepoint ofdelivery and/orat theProjectSite.

Shouldtheinspectedor testedcomponentsfailtoconformto theContract,AMC-METmay rejectthecomponent(s), andtheContractorshallwithina periodof5(five)workingdays eitherreplace therejectedcomponent(s),ormakealterationasnecessarysothatitmeets the Contractrequirements free ofcost toAMC-MET.

Incase thetesting &inspectionatanystagerevealthattheequipment, material,and workmanshipdonotcomplywiththespecificationsandrequirements, thesameshall be removedby theContractorattheirownexpenseandriskwithinthetimeallowedbyAMC- MET.

30.8Installationof theHealthcare ITSolution

As soon as the Healthcare IT Solution or any Subsystem has in the opinion of the Contractor, been deliveredandinstalledinaccordancewiththeAgreed DetailedProject Plan,theContractorshallsonotifyAMC-MET in writing.

TheProjectHeadofAMC-MET shallissuean InstallationCertificate, statingthat the HealthcareITSolution, ormajorcomponentorSubsystem(ifInstallationAcceptanceby majorcomponentorSubsystemisspecifiedintheContract),hasachievedInstallationby the date of theContractor'snotice,ornotify the Contractorinwritingofany defectsand / ordeficiencies,including,butnotlimitedto,defectsordeficienciesintheinteroperability orintegrationofthevariouscomponentsand/or SubsystemsmakinguptheHealthcareIT Solution.TheContractorshalluseallreasonableendeavors topromptlyremedyanydefect and/ordeficiencies that theProjectHead has notifiedtheContractorof.TheContractor shallthenpromptlycarryoutre-testingofthe HealthcareITSolutionorSubsystemand,

notifyAMC-METinwriting,whenithasrectified the defectand/ordeficienciesthatthe Project HeadhasnotifiedtheContractorof.

30.9User Acceptanceand Go-live OperationalAcceptance

TheContractorshall conductUserAcceptanceTestsas mentionedinScopeofWork.The Testsshall becommencedby theContractoras specifiedintheAgreed DetailedProject Plan.AMC-METshallsupplytheoperating&technicalpersonnelandallmaterialsand informationreasonablyrequired toenabletheContractor tocarryoutitsobligationswith respecttoUserAcceptance.TheUserAcceptanceTestsshallbetheprimaryresponsibility oftheContractor. TheContractorshallremedyany defectand/ordeficienciesto successfully conduct theUserAcceptanceTests.

TheContractorshallconductGo-liveOperationalAcceptanceTests asmentionedin TechnicalVolumeofTender(ScopeofWorkchapter).TheTestsshallbecommencedby theContractoras specifiedintheAgreedDetailedProjectPlan.AMC-METshallsupplythe operating &technical personnelandallmaterialsandinformationreasonablyrequiredto enable the Contractor tocarryoutitsobligationswithrespecttoGo-LiveOperational AcceptanceTests.TheGo-LiveOperational AcceptanceTestsshallbetheprimary responsibility oftheContractor.TheContractorshallremedyany defectand/or deficienciestosuccessfullyconducttheGo-Live OperationalAcceptance Tests.Production use(go live)of theHealthcareIT Solutionor Subsystem(s)shall notcommence prior to the successfulcompletion ofGo-LiveOperationalAcceptanceTests.

AftersuccessfulUserAcceptanceandGo-live OperationalAcceptance Tests,theContractor willapply toAMC-MET toissuePreliminaryUserAcceptanceCertificate.Within5(five) workingdays ofreceiptofContractor'sapplication,AMC-METwillissuePreliminary AcceptanceCertificate.

30.10 Commissioningof theSolution

TheContractorshallconductCommissioningTests.TheTestsshallbecommenced by the Contractorasspecified intheAgreedDetailedProjectPlan.AMC-METshallsupply the operating &technical personnelandallmaterialsandinformationreasonablyrequiredto enablethe Contractorto carryoutits obligationswithrespecttoCommissioning.

TheCommissioning AcceptanceTests(andrepeatsofsuch tests)shallbe the primary responsibilityoftheContractor, butshallbeconductedwiththefullcooperationofAMC- MET duringCommissioningof theHealthcare ITSolution(orSubsystem[s]ifspecified in the Contract), toascertain whethertheHealthcare ITSolution(orSubsystem[s])conformsto theTechnicalRequirementsandmeets thestandardofperformancequotedin the Contractor's bid, including,butnotrestricted to,the functional and technicalperformance requirements.TheCommissioningAcceptanceTestsshall beconductedinaccordancewith the test scripts provided by AMC-MET. At AMC-MET's discretion, Commissioning AcceptanceTests mayalsobe performedon upgradesand newversionreleases thatare addedorfield-modifiedafter CommissioningAcceptanceof theSystem.

TheContractorshalluseallreasonableendeavorsto promptlyremedyanydefectand/or deficienciesand/orotherreasonsforthefailureoftheCommissioningAcceptanceTest thatthe ProjectCoordinatorhasnotified theContractor.Oncesuchremedieshavebeen madeby theContractor,itshall notifyAMT-MEC,andAMC-MET,withthefullcooperation oftheContractor,shalluseallreasonableendeavorstopromptlycarryoutretesting ofthe CommissioningTests.

AftersuccessfulCommissioning tests, theContractorwillapply toAMC-METtoissue CommissioningCertificate.AMC-METwillissue CommissioningCertificatewithin5(five) working days ofreceiptofContractor's application.

30.11 Performance Guarantee ofthe solutionand FinalAcceptance

TheContractorshallconductPerformanceBenchmarkingof thesolutionasmentioned TechnicalVolumeofTender(ScopeofWorkchapter).TheTestsshallbecommencedby theContractoras specifiedintheAgreedDetailedProjectPlan.AMC-METshallsupplythe operating&technicalpersonnel&allmaterials, informationreasonablyrequiredtoenable theContractortocarryoutitsobligationswith respecttoPerformance Guaranteeof the solution.

Aftersuccessful PerformanceGuarantee tests, theContractorwillapplytoAMC-METto issuePerformanceGuaranteeCertificate.Within5(Five)working days ofreceiptof Contractor's application,AMC-METwillissuePerformanceGuaranteeCertificate.

TheSolutionwillbetakenasfinallyacceptedafterobservingAvailability Performanceand ResponseTimePerformanceofthesolutionattheendofPerformanceGuaranteePeriod asmentioned in theTechnicalVolumeofTender(ScopeofWork chapter).

30.12 Defect Liability

TheContractorwarrants thattheHealthcareITSolution,including allSubsystemandother Servicesprovided,shall befreefromdefectsinthedesign,engineering, andworkmanship includinglatentdefectsthatpreventtheHealthcareITSolutionand/orany ofits componentsfromfulfillingtheTechnicalRequirementsorthatlimittoamaterialextent theperformance,reliability,orextensibility oftheHealthcareITSolutionand/or Subsystems.Commercial warranty provisionsofproductssupplied under theContractshall applytotheextentthat theydonot conflict withtheprovisionsof thisContract.

TheDefectLiability Periodshallbe3yearsaftercompletion ofPostGo-liveof theproject.

IfduringtheDefectLiabilityPeriodany defect,shouldbe foundin the designand workmanshipoftheHealthcareITSolution and otherServicesprovided by theContractor, theContractorshallpromptly,inconsultationandagreementwithAMC-MET,andatits

solecost,repair,replace,orotherwisemakegood(astheContractorshall,atits discretion,determine)suchdefectaswell

asanydamagetotheHealthcareITSolutioncausedbysuch defect.Any defectiveSubsystemthathasbeenreplacedby theContractorshallremain the propertyof theContractor.

IftheHealthcareITSolutionorSubsystemcannotbe usedby reasonofsuchdefectand/or makinggoodofsuchdefect,theWarrantyPeriodfortheHealthcareIT Solutionshall be extendedbya periodequal to the periodduringwhich the HealthcareITSolutionor Subsystemcould notbe usedbyAMC-METbecauseofsuch defectand/ormaking goodof suchdefect.

The warranties provided herein are in lieu of all other warranties, both express and implied,andallotherwarranties,includingwithoutlimitation thatof merchantability or fitnessforintended purposeisspecifically disclaimed.

Atany point oftime duringtheperiod of thecontract,if thebidderfailsto

a) Continuously for4 weeks, failtomeet theSLA
b) Decidesnot toprovidesupport fortheupkeepof thesolutionasper theagreement
c)Decidestoterminatetheagreement forreasonsbestattributed tothebidder's business.

AMC-MET hasalltheright torecoverthemoneypaid to thebidderagainstthis project,in totality andwithliquidated damages.

30.13 PerformanceGuarantee

The Contractorguaranteesthat, once theGo-Live Operational Acceptance andStabilization Acceptance Certificate havebeenissued, theHealthcareITSolutionrepresentsa complete, solutiontoAMC-MET'srequirementssetforthintheScopeofWorkand itconformstoall otheraspects oftheContract.If, forreasons entirelyattributabletotheContractor, the HealthcareITSolutiondoesnotconformtothe ScopeoftheWorkordoesnotconformto allotheraspectsoftheContract, theContractorshallatitscostandexpensemakesuch changes,modifications,and/oradditions to the HealthcareITSolutionasmaybe necessary

toconformtotheScopeofWorkandmeetallfunctionalandperformancestandards.TheContractor shall notify AMC-MET upon completion of the necessary changes, modifications,and/or additionsandshall

requestAMC-METtorepeattheGo-Live OperationalAcceptanceTests until theHealthcareITSolutionachievesGo-LiveOperational Acceptance.

IftheHealthcareIT Solution(orSubsystem[s])fails to achieve Go-LiveOperational Acceptance,duetoreasons entirely attributabletotheContractor,AMC-METmayconsider terminationof the ContractandforfeitureoftheContractor's performancesecurity compensation fortheextracosts& delays likelytoresult from thisfailure.

30.14 IntellectualPropertyRightsWarranty

TheContractorhereby representsand warrantsthat:

- TheHealthcareITSolutionhasbeensupplied,installed,tested,andaccepted;
- Useof theHealthcare ITSolution isin accordance withthe Contract;and
- Installation of theSoftwareandMaterialsprovidedtoAMC-MET

inaccordancewith the Contractdoes notandwillnotinfringeanyIntellectualProperty Rights heldbyany third party andthattheContractorhasall necessaryrightsoratitssole expenseshall havesecuredinwritingalltransfersofrights andotherconsentsnecessary to maketheassignments,licenses,and othertransfersofIntellectualPropertyRightsandthe warrantiesset forthintheContract,and forAMC-METtoownorexerciseallIntellectual Property Rightsas providedin theContract.Withoutlimitation, theContractorshallsecure allnecessarywrittenagreements,consents,and transferofrights fromitsemployeesand otherpersonsorentitieswhoseservicesare used fordevelopmentof thesystem.

30.15 IntellectualPropertyRights Indemnity

The Contractor shall indemnify and hold harmless, AMC-MET and its employees and officers fromandagainstanyandalllosses,liabilities,andcosts(includinglosses,liabilities, andcostsincurredindefendingaclaimallegingsuchaliability),thatAMC-METorits

employees orofficers maysufferas aresultofanyinfringementorallegedinfringementof any IntellectualPropertyRightsby reasonof:

- Installation of theHealthcareITSolution bythe Contractorortheuseofthe Healthcare ITSolution,includingtheMaterials.
- Copyingof theSoftware andMaterialsprovided by the Contractorin accordance withtheAgreement.
- andsuchindemnity shallnotcover

AnyuseoftheHealthcareITSolutionincluding theMaterials,other thanforthe purpose indicated by or tobereasonably inferredfromtheContract,

Anyinfringementresulting fromtheuseof the HealthcareITSolution,orany productsof theHealthcareITSolutionproduced thereby inassociationorcombinationwithany other goods orservicesnotsuppliedbytheContractor,wheretheinfringement arisesbecauseof suchassociationorcombinationand not becauseof use ofthe HealthcareIT Solutioninits ownright.

Useofasupersededor alteredreleaseoftheHealthcareITSolutionor anymodification thereoffurnishedunderthisAgreementincluding,butnotlimitedto,AMC-MET's failureto usecorrections,fixes,orenhancements madeavailableby the Contractor;

Modificationof theHealthcareITSolution,whichis based onAMC-MET'sMaterial;

Anychange,notmadebytheContractor,tosomeoralloftheHealthcareITSolutionor any modification thereof.

Thecode maintenance &management protocolsagreedfor the"ProductionApplication Code&Database"isto bereplicatedtothecodeparkedintheEscrowaccountsuchthat the code underEscrow isusableandrelevant on theday it isownedbyAMC-MET.

30.16 Other Remediesand Indemnification

Ifeither partysuffersanyliability, loss,claim,settlement, payment,interest,award, judgment,damages(including punitivedamages),fine,fee,penalty,orothercost,expense orcharge(includingreasonableattorneyfees,otherprofessionalfees,

disbursementsand litigationexpenses)(“Loss”)asadirectresultofanybreachormisrepresentationbythe otherpartyunderorinanywayinconnectionwiththisAgreement,thenthepartyin breachormakingthemisrepresentationshallindemnify theother partyondemand to the fullextent of theLosssuffered.

Standard Penalty & Liquidated Damages (LD) Clause

1. Liquidated Damages (LD) for Delay

In the event of a delay in delivery of services/goods beyond the stipulated timeline, the Primary Bidder shall be liable to pay Liquidated Damages.

- **Rate:** A sum equivalent to **0.5% to 1% of the contract value per week** (or part thereof) of delay.
- **Cap:** The total amount of Liquidated Damages shall be subject to a **maximum ceiling of 10%** of the total contract value.
- **Application:** LD is applicable if the delay is attributable to the contractor. CVC notes that "granting delivery extensions in a routine and casual manner" is a vigilance lapse; therefore, extensions must only be granted upon bona fide requests with the recovery of LD.

2. Risk Purchase Clause

If the Primary Bidder fails to deliver the scope of work even after the maximum LD period, or if the service is found to be deficient:

- The Department reserves the right to cancel the contract and procure the services from an alternative source at the **risk and cost** of the Primary Bidder.
- Any price difference between the original contract and the new procurement shall be recovered from the Primary Bidder's pending bills or Performance Bank Guarantee (PBG).

3. Performance Bank Guarantee (PBG) Forfeiture

- The PBG (typically **3% to 10% of the contract value**) shall be liable for forfeiture in full or part if the Primary Bidder fails to fulfill contractual obligations or breaches the Code of Integrity.
- CVC guidelines state that "non-recovery of penalties" by officials is considered a serious irregularity.

4. Banning and Debarment (Blacklisting)

As per the **CVC Guidelines on Debarment**, a bidder may be debarred from participating in any procurement process for a period **not exceeding three (3) years** for:

- Breach of the Code of Integrity (collusion, bribery, etc.).
- Supply of sub-standard materials or total abandonment of work.
- Submission of false/forged documents (relevant for international partners demonstrating Indian presence).

Key Compliance Note

"Any failure by the international partner or third-party company to meet service levels shall be treated as a failure by the **Primary Bidder**. The Primary Bidder shall be solely responsible for the payment of all penalties and Liquidated Damages incurred."

30.17 ChangestotheHealthcare ITSolution

AMC-METshall havetherightto propose totheContractorfrom timeto timeduring the performance oftheContracttomakeanychange,modification,addition, ordeletion to,in, orfrom theHealthcareITSolution(interchangeablycalled“Change”), providedthatsuch Change fallswithinthegeneral scopeoftheHealthcareITSolutionanddoesnotconstitute unrelatedwork, andis technically practicable, taking into accountboththe state of advancement ofthe Healthcare ITSolution and the technicalcompatibilityofthe Change envisagedwith the natureof theHealthcareITSolutionasoriginallyspecifiedinthe Contract.

TheContractormay fromtimeto timeduringitsperformanceofthecontractpropose to AMC-MET(withacopytotheProjectHead)anyChange thattheContractorconsiders necessaryordesirable toimprove thequalityorefficiencyof theHealthcareITSolution. AMC-METmayatits discretionapproveorrejectany change proposedbytheContractor. TheContractorshall not be heldresponsibleorliable foranyresultantconsequences from suchrejectionofany changeproposedbythe Contractor.

IfAMC-METproposesany changes,itshallsend totheContractora“RequestforChange Proposal,”requiringthe Contractortoprepareandfurnish totheProjectHead,assoonas reasonably practicablea“ChangeProposal,”whichshallinclude thefollowing:

- Briefdescription of theChange;
- ImpactontheTime forAchievingGo-LiveOperationalAcceptance;
- Estimatedcostof theChange;
- EffectonFunctionalGuarantees(ifany);
- Effectonany otherprovisions of theContract.

Thepricingof any Changeshallas faraspracticable,becalculatedin accordancewiththe ratesincludedintheContract.IfthenatureoftheChangeissuchthattheContractratesareine quitable, thepartiestotheContractshallagreeforamutuallyacceptableprice for valuingthe Change.

IftheContractor proposesanychanges, theContractorshall submit totheProjectHead, a written“Application forChangeProposal,”givingreasons forthe proposedChangeand includingtheinformationspecifiedabove.UponreceiptoftheApplicationfor Change

Proposal,the partiesshallfollow theproceduresoutlinedin thecontract,exceptthat the words “ChangeProposal”shallberead as“Application forChangeProposal.”

30.18 Pricesfor Servicesnot in theContract

PriceschargedbytheContractorforServices,ifnotincludedintheContract,shallbe agreed upon in advance by the parties (including, but not restricted to, any prices submittedby theContractorinthePriceBid) andas faraspracticable, becalculatedin accordancewiththerates andpricesprovided bythe Contractorin thePriceSchedule.

30.19 Extensionof Time forAchievingGo-Live OperationalAcceptance

Thetime(s)for achievingGo-LiveOperationalAcceptancespecifiedintheScheduleof Implementationshall beextendedif theContractorisdelayedorimpededinthe performanceof anyof its obligationsunder theContract by reasonofanyof thefollowing:

- Any Changein theHealthcareITSolutionasprovided in thecontract
- Any occurrence of ForceMajeure as providedincontract
- Delayinprovidingcoreteam,inavailabilityofdevelopmentresourcesandgrantof acceptanceforrecommendation of “Gap Analysis”.
- Any other matter specifically mentioned in the Contract; by such period as shall be fair and reasonable in all the circumstances and as shall fairly reflect the delay or impedimentsustained by theContractor.

30.20 ExtensionsandWaivers

Anyparty may,by writteninstrument,extendthetimefortheperformanceofany ofthe obligationsorotheractsofanyotherpartyowedtotheformerparty andwaiveany inaccuraciesinsuchotherparty'srepresentationsandwarrantiesin this Agreementorthe performanceofanyoftheobligations,covenantsorundertakingsofsuchotherparty under this Agreement, to the extent applicable to the party issuing such written instrument.

30.21 Termination

AMC-METmayatanytimeterminatetheContractforanyreasonbygivingtheContractor aninetydays(90)noticeoftermination.Uponreceiptofthenoticeoftermination, the Contractorshalleitherassoonasreasonably practicalor uponthedatespecifiedinthe noticeof termination

- Ceaseallfurtherwork,exceptforsuchworkasAMC-METmayspecifyinthenotice of termination for the sole purpose of protecting that part of the Healthcare IT Solutionalreadyexecuted,orany workrequiredtoleave thesiteinacleanandsafe condition
- In addition, the Contractor, subject to the payment specified in the contract, shall
- Deliver to AMC-MET the parts of the Healthcare IT Solution executed by the Contractorupto thedateoftermination
- To the extent legally possible and appropriate, assign to AMC-MET all right, title, and benefit of the Contractor to the Healthcare IT Solution, or Subsystem, as at the date of termination, and, as may be required by AMC-MET
- Deliver to AMC-MET all non-proprietary drawings, specifications, and other documents prepared by the Contractor as of the date of termination in connection with the Healthcare IT Solution
- In the event of termination of the Contract, AMC-MET shall pay to the Contractor
  thefollowingamounts:

- The Contract Price, properly attributable to the parts of the Healthcare IT Solution executed by the Contractor as of the date of termination
- The cost of satisfying all other obligations, commitments, and claims that the Contractor may in good faith have undertaken with third parties in connection with the Contract
- AMC-MET, without prejudice to any other rights or remedies it may possess, may terminate the Contract forthwith in the following circumstances by giving a notice of termination and its reasons in any of the following circumstances,
- The other party is in material breach of any representation, warranty, obligation or covenant under this Contract and such other party has not cured such material breach within thirty(30) calendar days of receiving notice to cure such breach from the party seeking to terminate this Contract;
- If the Contractor becomes bankrupt or insolvent, has a receiving order issued against it, compounds with its creditors, or, if the Contractor is a corporation, a resolution is passed or order is made for its winding up (other than a voluntary liquidation for the purposes of amalgamation), a receiver is appointed over any part of its undertaking or assets, or if the Contractor takes or suffers any other analogous action in consequence of debt
- The other party is found by a court of competent jurisdiction to be guilty of any crime and is subject to a sentence of imprisonment or is found by a court of competent jurisdiction to be guilty of any fraudulent activity (whether or not such fraudulent activity results in imprisonment).
- If the Contractor assigns or transfers the Contract or any right or interest therein in violation of the contract
- If the Contractor, in the judgment of AMC-MET, has engaged in corrupt or fraudulent practices in competing for or in executing the Contract, including but not limited to willful misrepresentation of facts concerning ownership of
-

Intellectual Property Rights in, or proper authorization and / or licenses from the owner to offer, the hardware, software, or materials provided under this Contract

- If the Contractor
  - Hasabandonedorrepudiated theContract
  - Has without valid reason failed to commence work on the Healthcare IT solutionpromptly.
  - Persistently fails to execute the Contract in accordance with the Contract or persistently neglects to carry out its obligations under the Contract without just cause
  - Refuses or is unable to provide sufficient Materials, Services, or labor to execute and complete the Healthcare IT Solution in the manner specified in the Agreed Detailed Project Plan at rates of progress that give reasonable assurance to AMC-MET that the Contractor can attain Operational Acceptance of the Healthcare IT

Solution by the Time for Achieving Go-Live Operational Acceptance as extended; then, AMC-MET may, without prejudice to any other rights it may possess under the Contract, give a notice to the Contractor stating the nature of the default and requiring the Contractor to remedy the same. If the Contractor fails to remedy or to take steps to remedy the same within 5 (five) working days of its receipt of such notice, then AMC-MET may terminate the Contract forthwith by giving a notice of termination to the Contractor.Upon receipt of the notice of termination, the Contractor shall, either immediately or upon such date as is specified in the notice of termination

- Ceaseall further work, except forsuch workas AMC-METmayspecify in the notice of termination for the sole purpose of protecting that part of the Healthcare IT Solutionalready executedoranywork requiredtoleavethesiteinacleanandsafe condition

- Deliver to AMC-MET the parts of the Healthcare IT Solution executed by theContractorupto thedateof termination,subject to thereceipt ofpayment
- To the extent legally possible, assign to AMC-MET all right, title and benefit of theContractortothe HealthcareITSolution orSubsystemsasat thedateof termination
- Deliver to AMC-MET all drawings, specifications, and other documents prepared by the Contractor as at the date of termination in connection with the Healthcare IT Solution.
- All AMC-MET data(DB Architecture, DB Schema, Data Structures, Sequential Relationships,RawDB, MDFandLDFetc.) tobehandedback toAMC-METintwo separatesoft formats,andaformal written acceptancetobeobtained

TheContractorshall be entitled to bepaidtheContractPriceattributabletothe portionof theHealthcareITSolutionexecutedasatthedateoftermination.Any sumsdue toAMC- MET from theContractoraccruingpriorto thedateofterminationshall bedeductedfrom theamount tobepaid totheContractorunderthis Contract.

IfAMC-METcompletes theHealthcareITSolution, thecostofcompleting theHealthcareIT SolutionbyAMC HOSPITALSshallbedetermined.Ifthe sumthattheContractorisentitled tobe paid,plusthereasonablecostsincurredbyAMC-METincompleting theHealthcareIT Solutionexceeds theContractPrice,theContractorshallbeliable forsuchexcess.Ifsuch excessisgreaterthan thesumsdueto theContractor,theContractorshallpaythe balance toAMC-MET,andifsuchexcessislessthanthesumsduetotheContractor,AMC-MET shall paythe balance to theContractor.

AMC-MET andthe Contractorshallagree, inwriting,on the computation describedaboveandthe manner inwhich anysums shall be paid.

Thecode maintenance &management protocolsagreedfor the“ProductionApplication Code&Database”isto bereplicatedtothecodeparkedintheEscrowaccountsuchthat the code underEscrow isusableandrelevant on theday it isownedbyAMC-MET.

30.22 Assignment

TheContractorshallnot,without theexpress priorwrittenconsentofAMC-MET,assignto any thirdparty the Contract or any part thereof, or any right, benefit, obligation, or interest therein or there under,except that the Contractorshall be entitledtoassign either absolutelyorbywayof chargeanymoniesdue andpayabletoitorthatmay becomedue andpayabletoitunder theContract.

31.SERVICE LEVELAGREEMENT(SLA)

TheIntegrated Hospital Information Systems, Core Compute & IT Infrastructure productsupplied by thebiddershould havea monthlyuptime ofat least99.5%. Uponissuanceofawardofcontract, thesystem integratorneedstodeploytheresourceswithrequired skillsandexperiencewithina periodof2 weeks from theintimationbytheAMC-MET.

TheSLAwillbe based onthefollowing parameters:

a) Achievement of timelines andmilestonesasperagreedplan

b) Systemuptime

c) Meantimetoarriveandmeantimetoresolvesupport tickets

The substantiation of the SLAs w.r.t penalty and quantification will be done mutually between the selected bidder and the AMC-MET at the time of signing the contract.