



IQVIA Hospital Information System and Electronic Medical Records

GCloud 15 Service Definition

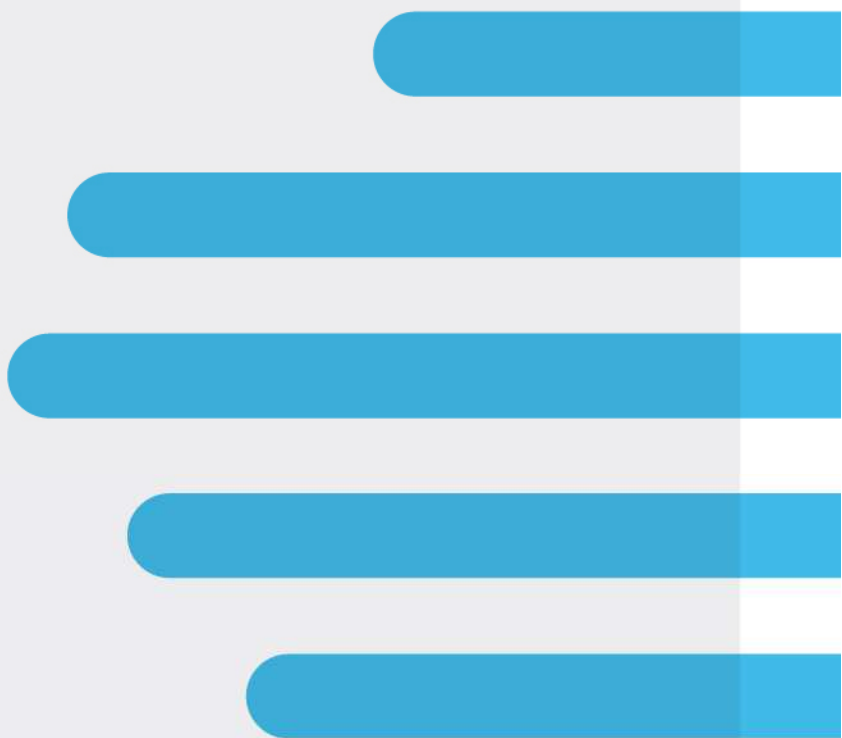


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1. IQVIA HIS Solution Overview

1.1 IQVIA HIS Product Profile

IQVIA HIS is a state-of-the-art, fully integrated hospital information system. It provides healthcare organisations with a full suite of tools for improved clinical tasks and patient administration. It is designed as an integrated, comprehensive application, which offers a full suite of tools for clinical tasks and patient administration.

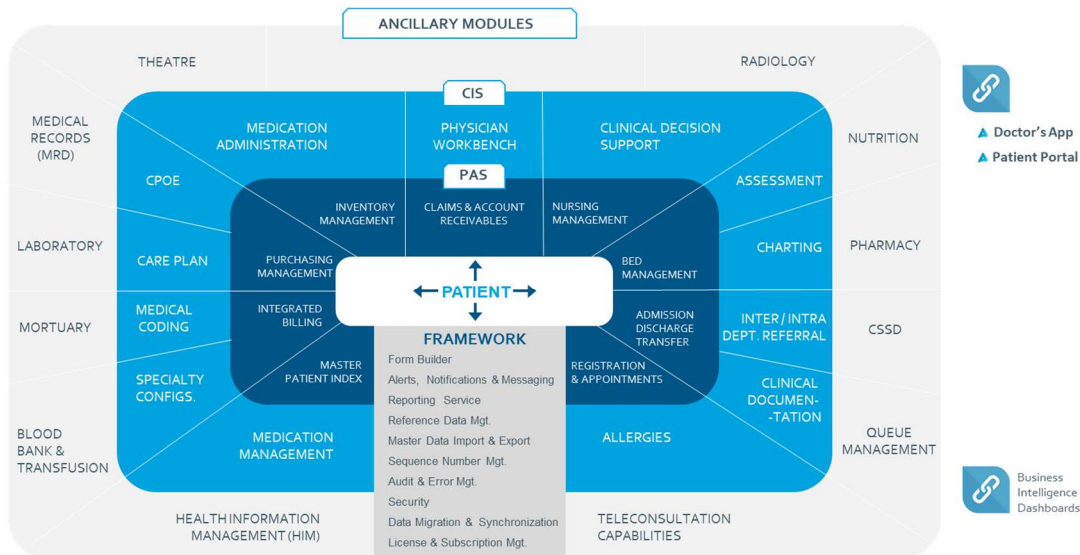


Figure 1: IQVIA HIS Core Components Concept Diagram

1.1.1 IQVIA HIS Patient Administration System (PAS) Modules

The complete Patient Administration System (PAS) modules cover patient management in all areas from administrative, diagnostics to financial functions. All patient movements and

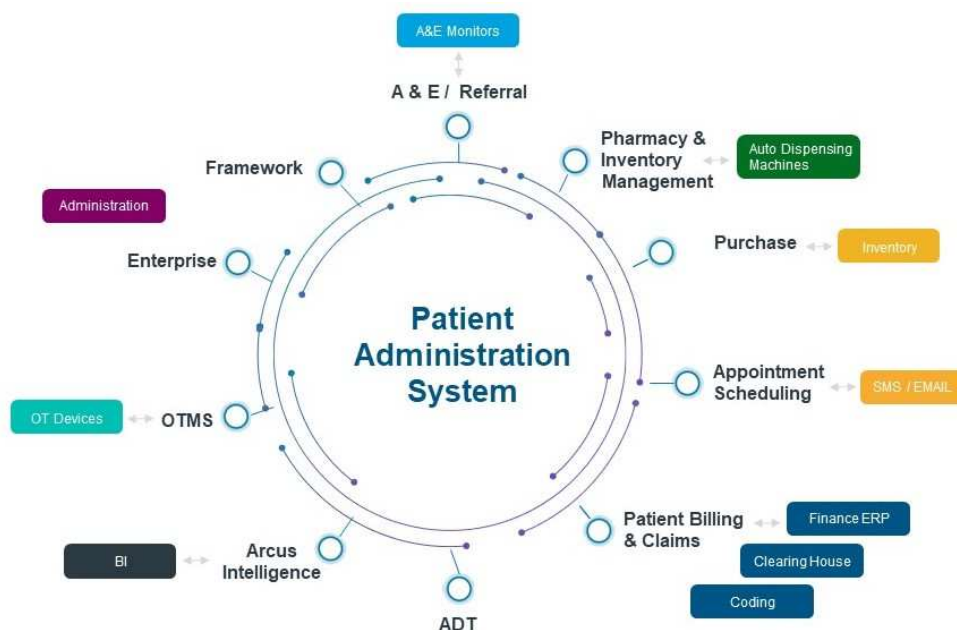


Figure 2: HIS PAS Modules

activities are recorded, and the data arranged in a structured manner for easy extraction to help the hospital run the day-to-day operations.

1.1.2 IQVIA HIS Electronic Medical Records (EMR) Modules

The Electronic Medical Record (EMR) solution for healthcare providers is an out-of-the-box system that is fully compliant with CLIENT Services requirements. The EMR offers a full spectrum of clinical modules, services, and solutions to support clinical documentation done in healthcare facilities. The EMR solution offers various modules namely Computerised Physician Order Entry (CPOE), Doctors' Worklist, Nurses' Worklist, Clinical Notes, Clinical

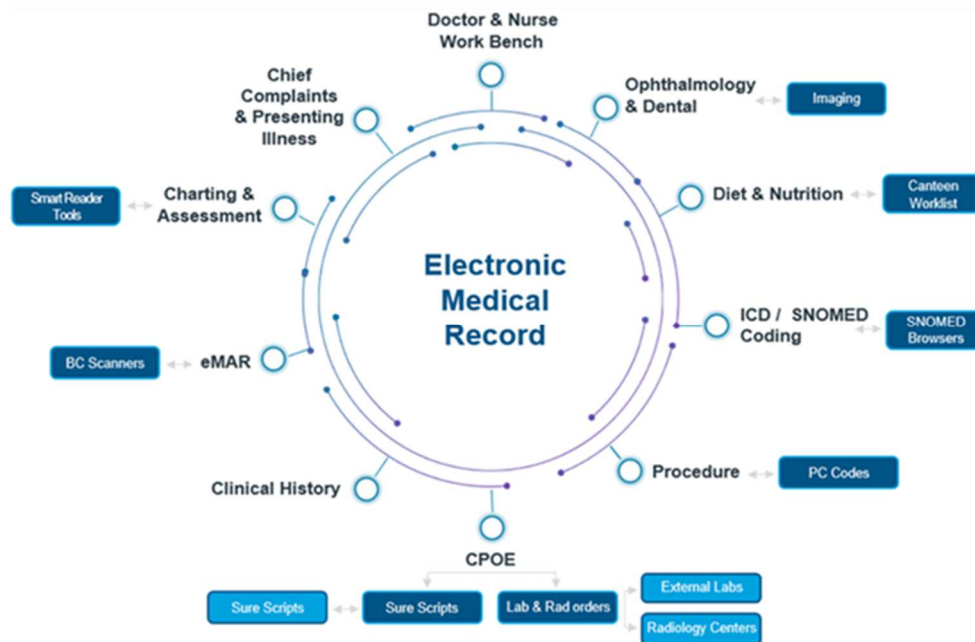


Figure 3 - Figure 3: IQVIA HIS EMR Modules

Forms Builder, Templates, Voice Recognition, and the interface capabilities to connect to ancillary departments and much more.

The core functionalities include:

- Providing accurate, up-to-date, and complete information about patients at the point of care
- Enabling quick access to patient records for more coordinated, efficient care
- Securely sharing electronic information with patients and other clinicians
- Helping providers more effectively diagnose patients, reduce medical errors, and provide safer care
- Improving patient and provider interaction and communication, as well as health care convenience
- Enabling safer, more reliable prescribing
- Helping promote legible, complete documentation and accurate, streamlined coding and billing
- Enhancing privacy and security of patient data

- Helping providers improve productivity and work-life balance
- Enabling providers to improve efficiency and meet their business goals
- Reducing costs through decreased paperwork, improved safety, reduced duplication of testing, and improved health.

1.1.3 IQVIA HIS Integration Capabilities

Applications are interoperable and includes HIS Integration Engine which is built on Mirth open-source platform using HL7 Integration. The HIS Integration Engine cross-platform HL7 interface engine supports all versions of Industry standards bi-directional flow of HL7 messages between systems and applications over multiple transports.

1.1.4 IQVIA HIS Intelligence

IQVIA HIS Intelligence extends the value of HIS & EMR data across the hospital for data analytics purposes. Users are able to set which data elements to analyse and filter to produce the desired output. All outputs can be designed in multiple formats, with drill down features.

Pre-determined dashboards are also provided to give users holistic and updated view of the hospital's operations. Data that can be analysed include patient demographics, clinical, logistics, financials and administrative data. Users can get multiple data angles to assist in more accurate decision and policy making.

1.2 Technology Adopted

1.2.1 IQVIA HIS and EMR

Using the MEAN stack technology, the HIS and EMR offers clients with multiple deployment models and can be accessed from multiple client platforms and devices. The solution is highly configurable, which reduces development costs and faster deployments.

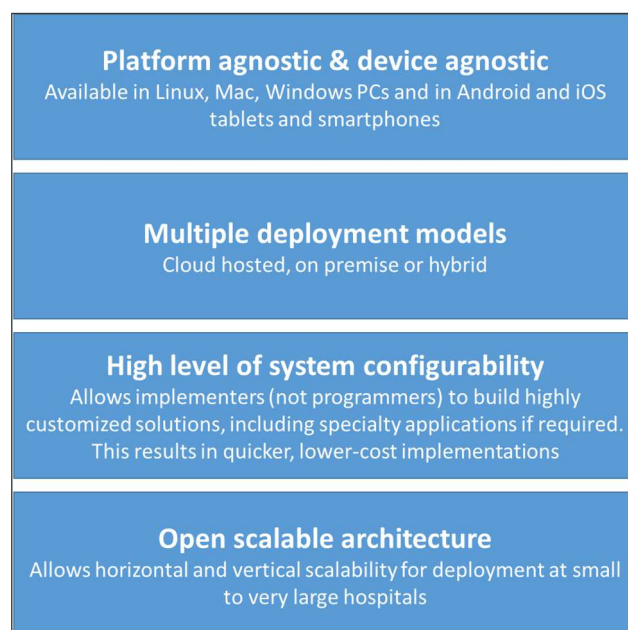


Figure 4: MEAN Stack Technology Benefits

System Architecture

The IQVIA HIS is built using MEAN stack Technology.

The term MEAN stack refers to a collection of JavaScript based technologies used to develop web applications. MEAN is an acronym for MongoDB, Express JS, Angular JS and Node JS. From client to server to database, MEAN is full stack JavaScript.

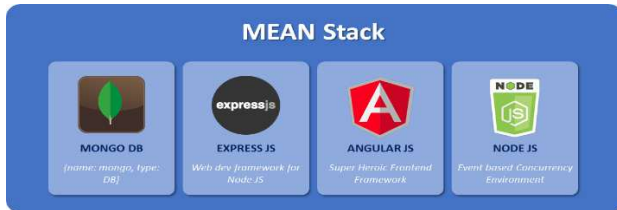


Figure 5: MEAN Stack Technology Components

1.2.2 Integration Engine

This diagram illustrates the main modules within HIS & EMR and the possible 3rd party applications on an Integration Layer (e.g., SAP, Oracle, MS Dynamic AX, and Peoplesoft) and software that it can integrate with. We have had clients who wish to move data between HIS & EMR and their existing applications such as their Financial System/ Enterprise Resource Planning (ERP), Business Intelligence Tool, PACs, or Electronic Document Management System. Another common requirement is to integrate with an existing Laboratory Information System such as Roche. Since the HIS & EMR is HL7 compliant, we have no problems transferring transactional data with other HL7 compliant applications.

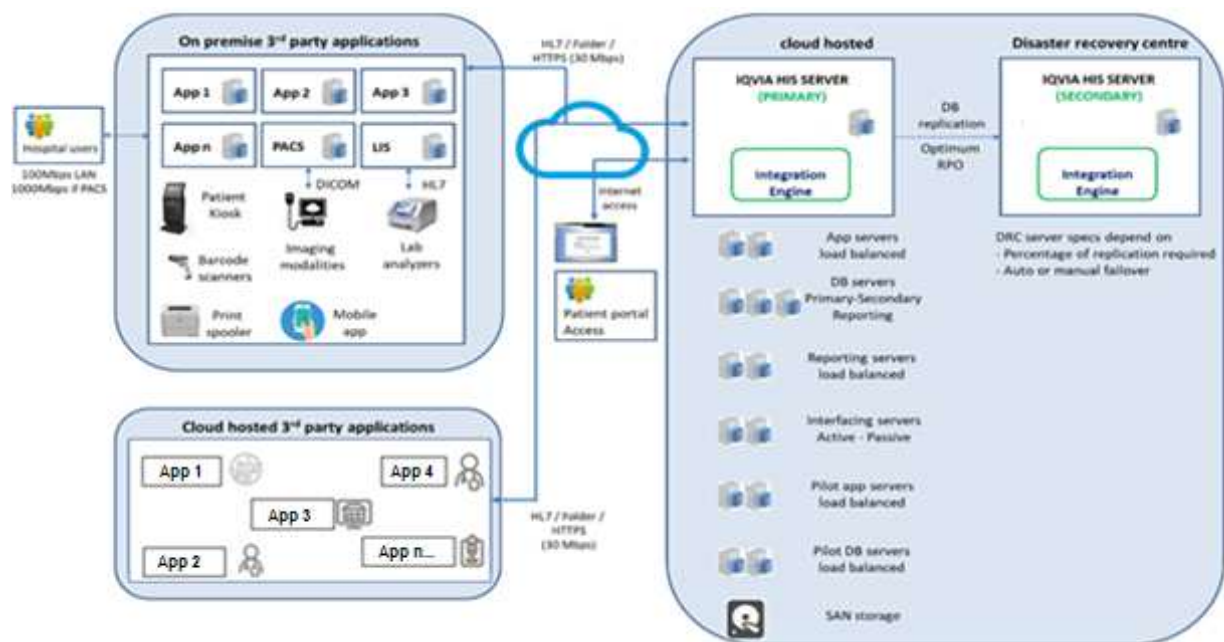


Figure 6: Integration Services

2 IQVIA HIS Solution Details

2.1 IQVIA HIS Modules

Sl.	Module name
IQVIA HIS Modules	
1	Registration
2	Appointments
3	Outpatient Department (OPD)
4	Admission, Discharge, Transfer (ADT)
5	Emergency Room (ER)
6	Pharmacy
7	Inventory Management
8	Billing
9	Revenue Cycle Management
10	Reports
11	Enterprise
12	Framework
13	Queue Management System (QMS)
IQVIA HIS EMR Modules	
14	Order Management
15	Clinical Forms Builder
16	Electronic Medical Record (EMR)
17	Doctor Worklist
18	Nursing Workbench
19	Multi-Disciplinary Plan of Care
20	TPN Plan
21	Oncology Treatment Plan
IQVIA HIS Ancillary Modules	
22	Lab Information System (LIS)
23	Radiology Information System (RIS)
24	Blood Bank Management
25	Operating Room (OR)
26	Central Sterile Services Department
27	Diet & Nutrition
28	Care Plans
29	Medical Record Department (MRD)
30	Information Governance (HIM)
31	Mortuary Management
Mobility Solution	
33	Doctor's App

Table 1: IQVIA HIS Modules

2.2 Patient Administration Modules Description

2.2.1 Registration

Feature group	Description
Patient demographic fields	The system records the following fields as part of the demographic details of the patient. a. Patient Name (First Name, Middle Name, Last Name) b. Title c. Gender d. Date of Birth & Age e. Nationality f. Address including Zip code g. Phone Numbers (at least 2 numbers) h. National ID with validity period i. Religion j. Race k. Preferred Language
Next of kin details	The system allows recording of the next of kin (one or more) details of the patient with the following fields a. Next of Kin Name b. Title c. Relationship with the patient d. National ID/ Aadhar/ ABHA e. Phone Numbers
Title and gender link	The system can default the gender of the patient based on the title selected. For example, the system can default the gender as male if the title is Mr. and gender as female if the title is Ms.
Add on details	System supports the recording of multiple names (nickname, English name, etc.) and multiple addresses (Permanent address, hotel address, etc.) and multiple contact details
Payor details	The system supports capturing of the payor details about the patient including the following fields: a. Payor b. TPA or Payor Office c. Agreement d. Co-pay e. Coverage f. Validity Period g. Comments

Feature group	Description
	h. Payor Rank or Order of Preference.
Payor validations	System supports the following validation of the payor and agreement in the registration process a. Display alerts for payors & agreements based on the master configuration b. Expiry date check for payor, agreement and TPA c. Validity period check for the payor details of the patient
Bulk registration	The system supports registration of multiple patients through an excel file import. The format of the excel file contains the following details a. MRN b. First Name, Middle Name and Last Name c. Date of Birth d. Gender e. Full address including the zip f. Phone Number & Mobile Number g. Referral Code h. Payor Code, Agreement Code and TPA Code During the bulk registration process, the system will check for duplicate patient registration and alert the user
Pre-registration	The system supports pre-registration of the patients using a temporary MRN. This function is used to register patients who have enquired through health promotion programs, marketing programs, etc. The system will allocate a permanent MRN once the pre-registered patient visits the hospital
Automatic MRD Request	During the registration process, if the patient has arrived as a non-appointment patient, the system will automatically issue a file request to the MRD (medical records department). The system also displays the current location of the file in case if the file is not available at the MRD
Printouts	The system supports printing of the patient ID card along with barcode for easy identification during future registration. The system supports printing of visit slip during the outpatient registration process. The format of the visit slip can be customisable as per the hospital requirements
Webcam integration	The system supports the integration of the webcam in the registration function to able to capture the photograph of the patient during the registration function. The system also

Feature group	Description
	supports uploading of the patient photo from a folder in case it is available through a different process
Past visits	During the patient registration process, the system will provide a link to view the past visit details of the patient. This will help the user in ascertaining that the right patient is selected
Validations	The system will alert the user in case the demographic detail of the patient or photograph has not been updated in the last six months. The user can verify with the patient and update in the system if necessary
Audit log	The system supports the audit log view which can be used by the patient to check the audit details of the demographic details, i.e., the user who modified the patient record, date and time of modification, etc.
Revisit	The system supports registration of existing patients by searching based on the patient MRN, Aadhar or name
Patient search	The system supports searching of the patient database based on any of the following fields a. MRN b. First Name, Middle Name and Last Name c. Mobile Number or Phone Number d. Aadhar e. Pin code The search will result in the display of matching patient records with a full display of the demographic detail including the patient photograph
Documents scan	System supports scanning and uploading multiple documents such as Aadhar ID card, previous referral letters, etc. during the registration process
Anonymous patient/encryption of patient details	The system supports tagging a patient as an anonymous patient which means that the patient demographic will be encrypted (except MRN) and will not be visible to ordinary users. Only specific users who have permission to view the encrypted patients can view the full details of the patient record
Appointments	During the registration process, the system provides a facility to alert the user of the patient appointments for the current day and also for the future appointments

Feature group	Description
Duplicate patient alert	The system supports validation for duplicate patients during the registration process based on the Aadhar ID, name and phone number. The system will alert the user of possible duplication of the patient record and will allow the user to override and register if desired
Self-registration	The system supports self-registration by the patients using a simple and friendly user interface which can be used on a tablet device or kiosk or linked to the website of the hospital. The system will capture a reduced subset of the demographic details to simplify the self-registration process.
Transfer mode	System supports recording of the Transfer Mode or the mode in which the patient has arrived at the hospital. Example: 'Wheelchair', 'Ambulance', etc.
Referral details	The system supports recording of the referral details of the patient, both the first-time referral and referral for a specific visit. The system captures the following details during the referral process a. Referring Organisation b. Date of Referral c. Validity period d. Comments
VIP patients	The system supports tagging a patient record as 'VIP' patient along with the type such as politician, sportsperson or movie star, etc. The system displays a VIP icon next to the patient name in the patient banners
Revisit	If the patient has visited the hospital in the last 72 hours, the system will alert the user to mark the visit as a 'revisit' (effect of the previous visit). The user has the option to override the alert and mark this as a new visit
Mandatory fields configuration related	System supports configuration of mandatory fields for any of the following: a. Title b. First name / Middle name / Last name c. Gender d. Date of Birth e. Address f. Phone / Mobile / Email g. Nationality / Religion / Race h. Occupation

Feature group	Description
	i. Marital Status j. Aadhar ID Card k. Enable MRD - To enable automatic MRD file request or not l. Enable multiple OPD visits - To allow multiple OPD visits at the same time
Payor details	The system supports to tie GL details against insurance payors a. Option to scan/upload GL b. GL number c. GL validity based on the number of days/visit d. GL limits

2.2.2 Appointments

Feature group	Description
Create appointments for patients	The function has the capabilities to schedule an appointment for a given patient by selecting the requested date and time from the Appointment Calendar. The masters for creating the calendar, time intervals etc. is available in the Enterprise Module > Appointments functionality, which helps users to create the required calendars for Providers' across all hospitals and facilities in the Organisation. Status Colour codes based on the status namely Arrived, Booked, Cancelled, Confirmed, no show, rescheduled are available in the application
Appointment list	The system supports the current appointment list for the day from the OPD workbench. The appointment list provides the following columns a. MRN b. Patient Name c. DOB / Age d. Gender e. Phone Numbers f. Care provider g. Appointment Date & time h. Appointment Status i. Queue Number j. Comments k. Priority

Feature group	Description
Waitlist booking	The system supports recording of waitlisted patients who can be provided with a booking in case of cancellation of other patients. The system supports automatic allocation of appointment for waitlisted patients in case of free slot opening-up
Multiple cancels	The system supports cancellation of multiple appointments in a single function by the user to facilitate faster management of appointment changes.
Search appointments	The system supports searching of appointments based on the following criteria a. Doctor b. Patient (MRN or name or Aadhar or mobile number) c. Appointment date d. Department
Scheduling types	The system supports definition of appointment schedule for the following types a. Doctor b. Department (Physiotherapy, Emergency, etc.) c. Location (X-ray, CT, Physiotherapy, Dental, Vaccine Room, etc.)
No show appointments	System supports conversion of all appointments at the end of day which are in Booked or Confirmed status into No Show status if the patient did not appear for the appointment
Duplicate alerts	The system alerts the user if the patient has got an appointment with the same doctor or other doctors in the future period. The system allows the user to override the alert and provide an appointment for the patient
Colour coding of appointments	The system supports flexible Colour coding of the appointment based on the status of the appointment
Call centre appointments - Search & book	As an alternative to the calendar view, the system supports a search and book function for the user to search for the next available free slot based on the criteria and then book one or more appointments for the patient. The user can request for one or more slots with a recurrence duration and day pattern. This interface can be used by the call centre users
Cancel schedule	The system supports cancellation of the schedule for one or more dates if appointments are not booked for those dates. The system captures the cancellation reason and comments along with the user who cancelled the schedule

Feature group	Description
Appointment slip	The system supports printing of an appointment slip which contains details about the patient demographics, appointment details such as doctor names, dates, comments, etc. An appointment slip can contain details about multiple bookings for the patient.
Ad hoc schedule	The system supports modification of schedule timings for a specific date or Ad hoc new schedule or withdrawal of the schedule for a specific day in a user-friendly manner. If one or more appointment already exists for the scheduled date, the system will alert the user and prevent modification of such schedules
Multiple reschedule	The system supports rescheduling of multiple appointments in a single operation by the user to facilitate bulk rescheduling in case of doctor schedule has been modified or cancelled
Flexible schedule generation	Based on the schedule definition, the system supports the generation of schedules (release or opening of schedule) for the doctor, department or location for a future duration. The user can generate a schedule for any period such as one day or one week or one month. If the schedule already exists for a specific day or period, the system will alert the user to correct the date or the period
Web-based appointments	The system supports a user-friendly search and booking of appointments directly by the patients from the hospital website. The user interface captures minimum fields from the patient and supports booking of registered patients as well as new enquiries
Multiple appointment sessions timings per day	System supports generation of multiple timings per day. Example: 8 AM to 12 PM 2 PM to 5 PM 6 PM to 8 PM The time interval in between these periods will be highlighted as unavailable
Patient details	The system allows the user to click a free slot from the calendar view and book the appointment for the patient. The patient will be selected by searching the database using the patient MRN, or name or mobile number or National ID. The system captures the reason for the appointment along with comments
Calendar view	The system supports a user-friendly outlook or google calendar like screen which can be used to display the appointments of the doctor for current date, next five days or next one month

Feature group	Description
Overbooking	The system supports overbooking of appointments, i.e. book more than one patient in a specific slot if it is allowed in the schedule definition
Cancel appointment	System supports cancellation of an appointment by the permitted user. Cancellation is possible only if the appointment is in Booked Status. System mandatorily captures the cancel reason or comments during the cancellation process
Appointment orders	The system supports recording of specific orders (such as X-ray or blood test, etc.) which need to be made during the appointment or before the appointment. The user will be alerted when the patient arrives for the appointment about the orders that need to be executed
Appointment status	The system supports the following statuses for the appointments. a. Booked b. Confirmed c. Registered d. Arrived e. Consult Started f. Consult Completed g. Cancelled h. Rescheduled
Audit log	The system maintains the complete audit log of the appointment for every status change or modification, cancellation, rescheduling made to the appointment booking
Reschedule appointment	The system supports easy rescheduling of current and future appointments to a future date or a different doctor. The system records the reason for rescheduling, comments and the user details for audit log purposes
Schedule definition	The system supports definition of a predefined schedule pattern for the doctor or a department or the location. The details captured include the doctor's name, working days, start time, end time, validity period, appointment slot duration, whether overbooking is allowed, whether an online booking is allowed, etc.

2.2.3 Outpatient Department (OPD)

Feature group	Description
Patient list	System supports querying of the patients in the patient list based on the following criteria

Feature group	Description
	a. Department (only those departments associated with the user) b. Patient MRN or Name or Phone Number c. Visit Date d. Care provider
Search & filter by barcode	All the functions in the OPD workbench support the usage of barcode for quick search and filter of the patient
Reassign / Change department	System supports changing the department of the patient by authorised users, in case it is wrongly assigned during the registration process
Patient list - Detail view functions	System supports the following functions from the detail view of the patient list. a. Patient status (Next two status buttons will be displayed, e.g.: Arrive and Screening Complete) b. Assign department / Doctor c. Print documents d. Schedule appointments e. Order f. Print appointment slip
Patient status management	The system supports revert or cancel of the patient status and revert to the previous status
Patient list	System supports patient list function as part of the OPD workbench which lists down the patients registered in the department with the following columns. a. MRN b. Patient Name c. Gender d. Date of Birth / Age e. Department f. Care provider g. Register date-time h. Visit Status i. Visit ID (Seq Number) j. Visit Type k. Priority l. Comments m. Queue Number
Referral list (Consult)	System supports the display of the referral list (Consult) from other OPD departments to the department of the logged-in user.

Feature group	Description
	The user has the option of Arriving the patient or provide an appointment from the referral list
Patient status management	The system supports management of patient status in the OPD from the patient list. The possible statuses are a. Registered (when the patient is registered) b. Arrived (when the patient is received at the OPD) c. Screening Complete (when the nurse completes the screening) d. Examination Start (Optional Step - Once the doctor opens the EMR) e. Examination Complete (when the doctor completes the patient) f. Await Reports (when the patient waits for the results) g. Medical Discharge (when the patient completes the visit) h. Financial Discharge (when the billing is completed)
Order list	System supports the display of all orders raised from and raised to the department, from the OPD workbench. This includes orders raised by the care providers in the department and also referring orders raised from other departments to this department. e.g.: Physical exam and Eye exam orders
Patient status – Timestamp	The system supports complete audit log and timestamp of the various changes to the patient status. The audit log will be visible from the patient list for the OPD user. The columns captured in the audit log are a. Date & time of status b. User c. Care provider d. Status e. Comments
OPD workbench	System supports OPD workbench which provides the following functions a. Patient count & Patient list b. Appointment count & Appointment list c. Orders count & Orders list d. Referral count & Referral list
OPD workbench Interface	System supports an OPD workbench interface from which the nurse or doctor will be able to perform all their OPD related tasks with ease
OPD workbench – Auto-refresh	System supports auto-refresh feature for the OPD workbench. The various counts displayed in the OPD workbench and the

Feature group	Description
	patient list/appointment list will automatically be refreshed in the configured period (e.g.: 3 minutes)
Patient list - Detail view	In the details part of the patient list, the system provides the following information in a single screen/view. a. Patient demographics b. Patient status workflows c. Order details d. Appointment details e. Referral details
Create a visit from the appointment list	System supports the create visit function to register the patient directly at the OPD from the Appointment list. This function is used for patients who arrive through appointments directly at the OPD. The patient status will be changed to 'Arrived'
Schedule appointment	The system supports scheduling of appointments from the patient list. The system will switch to the appointment scheduler module and allow the user to quickly book an appointment for the chosen patient
Patient list - Print documents	System supports the print documents function from the patient list, which is used to print forms, documents that are required to be filled up as part of the OPD process. example: OPD Summary, Medication review sheet, etc.
Assign care provider	System supports assigning care provider to the patient from the patient list in case the care provider is not assigned during the registration process. If the care provider is wrongly assigned during the registration process, the system supports assigning a new care provider by authorised users from the patient list
Specimen collection	The system supports the collection of lab specimen by the OPD nurse and prints the label for the specimen
Print appointment slip	The system supports printing of appointment slip for the patient in case the appointment is given directly by the doctor

2.2.4 Admission, Discharge, Transfer (ADT)

Feature group	Description
Displays current days admission & admission request	The system supports the display of admission requests (raised from OPD & Emergency) to the admission clerk. The following columns are displayed in the admission work list a. Criteria (From Date, To Date and Patient) b. Patient MRN, Patient Name, Gender, DOB and Phone Number

Feature group	Description
	c. Ward, Bed (optional) d. Referring Dept. and Care provider
Inpatient admission	The system supports admission of patients into the IPD by direct admission or from the admission worklist process
Inpatient admission details	The system supports the admission of the patient by capturing the following details. a. Patient details b. Ward c. Bed (optional) d. Primary care provider e. Secondary care providers (multiple) f. Admission diagnosis g. Expected length of stay (Optional)
Captures complaint number & incident details	The system supports recording of the medico-legal case details a. MLC Number b. Accident details c. Escort details
Bed isolation	The system supports making the patient bed as an isolated bed.
Admission to vacant beds	The system allows the user to search for vacant beds based on the following criteria and admit the patients to selected beds. a. Ward b. Bed category
Bed photographs	The system supports the display of the photographs of the beds (uploaded as URL in the master) which can be shown to the patient or next of kin for their choice of beds
Admission to temporary (Non-census) beds	The system supports searching for vacant temporary beds (Bassinets / Non-census beds) and admits patients to those beds
Bed category and room rent	The system supports the display of bed category on the selection of the bed during the admission process. The room rent order sets associated with the bed category is also selected by default and the system allows the user to upgrade or downgrade the room rent package
Bed constraints	The system supports the following constraints while admitting the patient and alerts the user accordingly. a. Gender - If the bed is marked for a different gender or if the other beds in the room are allocated for different gender, the system supports alerts

Feature group	Description
	b. Age group
Wrist band & Admission note	The system supports the generation of the following printouts during the admission process. a. Wrist band b. Admission note
Admission number	The system supports the generation of unique sequence number called 'Admission Number' for the inpatient admissions which is reported as part of the IPD census of the hospitals
Bed allocation	The system supports Bed Allocation as a separate process in case the admission is made without selecting a bed
Cancel ADT functions	The system supports cancellation of all the ADT functions such as a. Cancel Admission b. Cancel Transfer Request c. Cancel Discharge Plan, Medical Discharge and Final Discharge
Housekeeping statuses	The system supports updating the status of housekeeping activities for the beds such as 'Cleaning Required', 'Cleaning Completed', and 'Under Fumigation'
Total hospital bed occupancy census	The system supports the display of all the current bed availability in a tabular chart design indicating the status of the bed. The tabular chart display details are given below. Row: Bed categories Column: Beds grouped by ward. Cell style: Green - Vacant & available, Red - Occupied, Amber - Discharge in process On mouse hover, the system displays the basic details of the patient such as MRN, Patient Name, Age, Gender, Care provider, Admission Date and Length of Stay
Ward view - a graphical representation	The system supports graphical representation of beds in the ward with colour coding for the beds. a. Vacant bed - Green b. Admitted bed - Amber c. Discharge in process - Brown d. Under maintenance – Orange
Ward board bedside Icons	The system displays the following icons in the ward view to alert the nurse. a. Lab reports availability

Feature group	Description
	b. Radiology reports availability c. Patient Allergy d. Alerts e. Hourly charge equipment's ordered f. Isolated bed g. Patient Billing completed h. Occupied multiple beds
Ward board > Patient bed toolbar details	The system supports display of the following details about the patient and the admission when the bed in the ward view is selected. a. Patient banner details along with admission number and admission date b. Primary care provider details c. Secondary care provider details d. List of Beds occupied by the patient d. Bed transfer history
Ward View > Patient bed toolbar function	The system supports the following menu options to launch the functions directly from the bed. a. Order b. Transfer c. Discharge d. Consults e. Print Documents
Ward board	The system supports display of the current patient list in the ward. This display can be used to project in the TV monitor in the nursing stations for providing an overview of the ward to the nurses
Bed transfer	The system supports transferring of a patient from one bed to another bed within the same ward or across different wards
Bed transfer request	The system supports raising a transfer request for transferring the patient from one bed to another bed. The field captured is a. Desired ward b. Desired bed (Optional) c. Bed category
Bed transfer request list	The system supports the transfer request list or queue which lines up all the transfer request on ascending order of date basis. The Nurse or the ward manager can affect the actual transfer by selecting the transfer request, subject to availability of the bed.

Feature group	Description
Lodger beds for patients	The system supports retaining multiple beds for the patients at the same time. This feature can be used to support bed allocation for the patient's next of kin (lodger bed allocation)
Release lodger beds	The system supports releasing the lodger bed so that it can be used for other patients
Temporary beds or bassinets	The system supports creation of temporary beds or bassinets which can be used to transfer the patients too. The temporary beds can host a patient or can host a lodger scenario
Care provider transfer	The system supports changing the primary care provider of the inpatient from one doctor to another doctor. The system maintains the dates for which the doctors were primary care provider for the patient
Transfer to OPD or other departments	System supports temporary transfer of a patient from the ward/bed to an OPD department or ancillary services departments such as X-Ray or Dental or Physiotherapy. The patient will be shown in the bed in the ward view, but the current location will be marked as the OPD department
Bed transfer history	The system provides a function to view the history of bed transfers or movements of the patient in the inpatient encounter. The function details the following columns. a. Date of transfer b. From Bed c. To Bed d. Is Lodger Bed (Two beds scenario) e. Primary Bed of Patient f. Transfer made by
Nursing task list	The system supports patient-level nursing tasks list which can timely executable orders, Medication administration
eMAR	The systems support Electronic Medication Administration (eMAR) where nurses can validate patient MRN using barcode before medication administration. eMAR is colour coded for various status a. Administered b. Current dose c. Discontinued d. Future dose e. Hold f. Late administration g. Not administered

Feature group	Description
Printing patient-related documents	The system supports to reprint patient-related documents like admission stocker, admission sheet etc.
Arriving patient	The system supports arriving patient at ward board which serves as a TAT from time of admission to arrival
IP referral process	The system supports IP referral request for specialist, physiotherapy, occupational therapy etc.
Discharge process	The system supports the discharge process with the following optional steps: a. Discharge plan b. Discharge orders c. Medical discharge d. Final discharge
Discharge orders	The discharge order function can be used as a dashboard for the nurse to monitor the activities associated with the discharge process such as: a. Open orders in process b. Discharge medication c. Diagnosis - whether recorded or not d. Pharmacy returns e. Discharge summary status
Discharge plan	The system supports a function for discharge planning of the inpatient. The tentative date and time of discharge is recorded and communicated to all the other departments to complete the order processing of the patient
Medical discharge	The system supports updating the inpatient status as medical discharge. The pre-requisite for medical discharge is that all the open orders should have been processed or cancelled. Once the patient is updated with medical discharge status, the system locks the order entry and won't allow further order to be placed for the patient
Notification to cashier worklist	Once the patient is updated as medical discharge status, the cashier worklist will reflect the patient record for processing of the inpatient billing
Final discharge	The systems the final discharge function which is used to release the bed from the patient for use by other patients. The bed will be marked as 'Under Cleaning' status

Feature group	Description
Bed assign validation for Isolated bed	The system prompts if a patient is assigned to a room where an isolated patient is admitted (Just notification where user can still process by overriding the notification)
Next occupancy date validation	The system prompts if thru assigned bed is booked against any patient (Just notification where user can still process by overriding the notification)
Add alerts	The system supports to add administrative alerts during the admission process which can prompt and alert other users during patient care
Auto readmission flag	The system supports to auto flag patient re-admission based on the defined parameter e.g. patient getting admitted within 24 hrs. system will prompt patient readmission with 24 hrs. & flags for further clinical analysis
Payor details	The system supports to tie GL details against insurance payors a. Option to scan/upload GL b. GL number c. GL validity based on number of days, visit d. GL limits

2.2.5 Emergency Room

Feature group	Description
ER patient registration	The system supports registration of patients at the emergency department with a minimal entry of fields
After registration > Printing of wrist band, Labels	The system supports printing of wrist bands and patient ID cards during the emergency registration process
ER registration details as captured during registration where the only name is mandatory rest all optional	The system supports capturing of the details of an emergency such as <u>Escort Details:</u> a. Escort By b. Escort Type c. Mode of Arrival d. Vehicle No. e. Address of escort f. Telephone No. <u>Patient condition details:</u> a. Nature of Injury b. Basic Physical Examination Details

Feature group	Description
Payor details	The system supports adding the default payor set up in the configuration as well as a provision for the user to add additional payor details of the patient
Mass casualty registration details	The system supports registering of multiple patients in one step in the event of mass casualty. The details captured are a. No. of Patients (Male, Female, Adult and Children) b. Disaster reference c. Comments The system registers the required number of patients based on a standard naming convention and prints out wristband for all the patients
Payor details	The system adds the default payor to the patients registered in the mass casualty process
ER registration > brought dead	The system supports recording the death details of the patients including the brought dead scenario
Patient list details > Status	The emergency patient list supports the display of the list of patients registered with the emergency department in two widgets. a. Registered b. Triage c. Under Observation
Triaging	The system supports the triage process in the emergency department by capturing the CCHPI, vitals and triage details. The system can automatically determine the 'emergency level' of the patient (Level 1 to Level 5) based on the triage process
ER medical discharge / check out	The system supports check out of the patients from the emergency department with the following outcomes. a. Treated as OP and discharged b. Referred to IPD for admission c. Referred to theatre for surgery
Ambulance request	The system allows requesting of Ambulance services by the OPD, IPD or Call centres. The ambulance can be requested for patients or non-patients (SOS calls) and for pickup from the site or to drop at home
Ambulance allocation	The system supports the allocation of a specific ambulance for the request and allow modify or cancel or complete the request with appropriate details

2.2.6 Pharmacy

Feature group	Description
Dispensing worklist criteria	The dispensing worklist supports search criteria such as from date & to date, patient MRN or name, status and order to department or order number
Dispensing count can be implemented	The system allows for partial dispense. Undispensed quantities are tracked and can be used for future dispense
Third-party drug database	The system supports interfacing with the external drug database such as Medi-Span for drug monograph and integrations such as drug to allergy and drug to drug
OTC sales	The system supports the OTC sales process from the pharmacies that can directly bill the patient and reduce the stock without any orders
Manufacturing of drugs	The system supports the manufacturing of medicines in a two-step process to combine one or more medicines (ingredients) and produce a new medicine. a. Manufacturing Order b. Manufacturing Process
Refill process	The system allows dispensing of OPD prescriptions which are marked for more than 1 refills and have refills remaining to be dispensed
IP fill process	The system supports the IP fill dispensing process for nightly dispensing of continuous orders from the Inpatient wards. Multiple continuous wards can be selected and dispensed in a single click process
Dispense returns	The system allows two steps return process for the medicines and supplies dispensed at the pharmacy. a. Nurse - will initiate the dispense return request b. Pharmacist - will verify & accept the dispense return (stock added back, quantity reduced from patient bill)
Ad hoc label printing	The system allows the pharmacist to perform ad-hoc label printing for an order based on predefined templates for ad-hoc labels
Hold status	The system allows the pharmacist to transition the order into a HOLD status wherein the senior pharmacists or the manager could decide on the further processing for the order
Allergies	The system allows the pharmacist to record the drug allergies of the patient

Feature group	Description
Pharmacy alerts & comments	The system allows the pharmacist to add pharmacy alerts & comments to a patient record which can be viewed and edited from the pharmacy module
Cancel dispense	The system allows the pharmacist to cancel the dispensing that was made. Once cancelled, the order will be recorded to its previous status and the stock will be returned to the store
Dispense without stock	The system allows dispensing of drugs without the stock based on the configuration set at the item level. This will be useful for the cases where the stock is physically available but not recorded in the system as available
Stock deduction	The system deducts the stock for the drug from the pharmacy store based on the quantity dispensed
Prescription printout	The system allows the pharmacist to print the prescription sheet from the worklist. The prescription printout contains the patient information, vitals, allergy information and drug details such as name, dosage, quantity, frequency, instruction and duration
Print labels	The system allows the pharmacists to print drug labels for the entire order from the dispensing worklist. The label contains the patient information and the prescription details such as drug name, code, form, route, frequency, instruction and duration
Partial dispenses	The system supports dispensing of full quantity for the drug or partial quantity for the drug. The remaining quantity can be dispensing subsequently once the stock is available
Manual selection of batches	The system supports manual selection of batches for the drugs during the dispensing process
Auto-selection of batches	The system supports automatic selection of batches based on the FIFO (First in First Out) or FEFO (First Expiry First Out) defined at the pharmacy store level
Drug alerts & interactions - Pharmacy comments	The system displays the alerts & interaction shown during the ordering process along with the reason and comments entered by the care provider. The pharmacist could view the alerts and enter their reason and comments if necessary
Allocate & Dispense	The system supports the single step dispensing workflow called 'Allocate & Dispense' based on the configuration at pharmacy store level
Dispensing worklist	The dispensing worklist details all the pharmacy raised from various OPD & IPD departments. The dispensing worklist separates the OPD & IPD orders into two separate tabs

Feature group	Description
Pharmacy workflow	The system allows defining the workflow steps for the dispensing process at store level. The various steps available for dispensing process are a. Registered b. Allocate c. Check d. Dispense
Pharmacy store	The system allows defining a storage location (store or warehouse) and associating it with the pharmacy department
Drug types	The system allows the drug to be classified as Rx, IV and vaccines. Similarly, the drug can be configured as high alert drug, essential drug, scheduled drug and research drug
Tall Man name	The drug master supports defining the Tall Man naming convention to differentiate a drug from similarly named drugs
Dosage limits	The drug master supports defining the dosage limits for patients, per day and per dosage based on the age group and gender
Drug interactions	The drug master allows defining the a. Drug alert instructions b. Drug to drug interactions c. Drug to diagnosis interactions d. Drug to lab results interactions
Drug master	The system supports defining the attributes of drugs such as code, name, generic, pharmacological group, pharmacological subgroup, Form, Route, Dosage Qty, etc.
Drug groups – Major, minor and sub minor	The system supports definition of drug groups which can be grouped under the parent-child relationship in three levels as major, minor and sub minor drug groups. The drug groups can be used to associate allergens at drug group levels rather than at each drug level

2.2.7 Inventory Management

Feature group	Description
Store master setup	The systems allow creation of stores or inventory locations where the stock will be maintained. The store can restrict the documents to certain inventory functions or allow all functions
Store user restriction	The access to the store can be restricted to named users or allow access to all users

Feature group	Description
Stock allocation policy	The system allows the store to use the FEFO (First Expiry First Out) or FIFO (First in First Out) policy for selection of stock during transfer and dispensing
GST details	The system allows recording the GST related details of the store
Item master details	The system supports definition of item master for Inventory and Non-Inventory items
Item reorder details	The system supports definition of reordering details at the store level as well as item level for each store. The settings defined in reorder details include a. Store b. Minimum Stock Level c. Maximum Stock Level d. Reorder Level e. Reorder Quantity f. Reorder to Max Stock Level (Boolean) g. The formula for reorder level and reorder quantity
Item master - Handling stores	The item master supports the association of items with the stores that handle the item. The handling store can treat the item as a stock item or non-stock item
Item master - Unit of measures	The Item master defines the units of measures (UOM) for base UOM (the units in which stock is maintained), purchasing UOM (the unit in which the stock is purchased/received)
Item master images	The system allows the user to upload images as part of the item master definition. The images are displayed in the other associated functions such as item summary view screens
Item master - Fraction quantities, Batch ID & Expiry dates	The Item master definition allows flags to determine whether to allow fractional quantities, whether to enforce batch IDs and whether to enforce expiry date checks
Item master - Tax code	The system supports association of tax codes for the item master
Vendor details	The system supports creation, update and deactivation of vendors with basic details such as type (manufacturer, distributor, etc.), name, address, contact details, GST details
UOM conversion	The system supports definition of conversion factors for various UOMs, example: 1 Pack = 10 Tablets

Feature group	Description
Set reorder levels using formula	The system supports automatic calculation of reorder levels based on the query from the user and allows the user to set the calculation of reorder levels directly in the item master
Stock request - already in the process check	The system supports the users to raise the stock request of type transfer or Issue to a handling store by recording basic details such as item, quantity and comments
Approval process	The system supports an optional approval process for the stock request by authorised users
Stock request from reorder levels	The system supports populating the stock request based on the reorder levels of the items or based on the stock movement between specified periods
Stock request approval process	The system supports the approval process by an authorised user
Stock transfer	The system supports transfer of stock from one store to another store or department (non-store) based on Stock Request or based on Ad hoc transfer
Stock transfer - Accept step	The system supports optional steps for the receiving store to accept the transferred stock before reflecting the stock in the ledger
Replenishment of stock	The system supports the replenishment process to transfer the stock to sub store or child store by main store-based reorder levels. The items which are not having required stock balances are highlighted separately in the replenishment screen
Stock balance	The system supports display of the current stock balance at a store. The user has the option of filtering the results based on store, item master, include zero quantity, items exceeding max stock level and items less than reorder level
Colour coding of items	The system supports display of colour codes of the items which have expired, or are less than reorder levels or more than max stock levels
Expired stocks	The systems display the expired stocks in a separate tab in the stock balance screen
Stock balance report and stock movement report	The system supports print out of stock balance and stock movement in a report format, from the stock balance screen
Stock ledger	The system supports display of the stock ledger details for selected items. The ledger will display all the transactions for that

Feature group	Description
	item in the store along with opening and closing stock balance for the given period
Stock snapshot	The system allows the users to take a snapshot of the stock balance for a set of items based on store and stock category combination
Stock count entry	The system allows the user to record the 'stock count' based on the physical count or the audit process i.e. record a snapshot of transactions that happened at a particular time so that it can be compared with the physical stock count at a later point in time
Stock count - Approval process	The system supports an optional two-step process for the approval of the stock count process
Stock count - Approval process	The system supports the adjustment of stock balance by authorised users

2.2.8 Billing

Feature group	Description
Automatic bed charges - Last day charges	The system calculates the bed charges on a 24-hour basis from the admission time. For the last day or date of discharge, the system supports the following configuration for the calculation of bed charges. a. Grace Period (e.g.: up to 4 hours no charges) b. Half-day charge (e.g.: up to 8 hours half day charges) c. Full day charge (e.g.: more than 8 hours full day charges)
Automatic bed charges - upgrade bed categories	The system supports the scenario where the admission desk or the cashier can upgrade the patient's bed category while maintaining the same bed charges of the previous category
Automatic bed charges – modifications	The system supports modifications to the bed charges that are generated automatically. The cashier will be able to add/update the bed charges and override them
Automatic bed charges - Multiple bed scenario	The system supports the scenario in billing where the patient is occupying multiple beds, the system can calculate the bed charges for all the beds occupied by the patient
Auto bed charges - Transfer scenario	If the patient is transferred across beds with different bed categories, the system supports the following configuration to determine the bed charges: a. Longest stay bed

Feature group	Description
	b. Bed at midnight c. Prorate basis
Automatic bed charges	The system supports assigning an order set that needs to be repeated for an inpatient based on the bed category on a nightly basis. Example: Room rent, amenities charges, nursing charges, etc.
Allocate bill - Discharge medication	The system supports display of discharge medication (Home medicine) orders in a separate tab or line entry to be able to highlight to the cashier on the limits for discharge medication
Unbilled services	The system supports a screen to view the list of unbilled patients and services (order items) for the OPD & emergency patients. The function displays the following columns a. MRN, Patient Name, Age, Gender b. Department c. Care provider d. Visit ID e. Visit Date & Time f. Visit Status g. Next Amount
Printing provisional bill - Summary / Detailed	The system supports allocation and then printing out of the provisional bill or statement for the patient
Merge next of kin service items	The system supports merging of the patient's next of kin order items into the current bill. This will be useful for merging the baby patient's bill into the mother's bill
Link past visit unbilled services	The system supports inclusion of unbilled order items from the past visit into the current bill and bills them as part of the invoice
Provisional billing for the selected period patient IP stay	The system supports generation of an interim bill based on the given period, mostly for the long-staying patients. The interim bill has the same functions as Generate Bill except that it is generated for a short period and not for the entire duration
Discount allocation by amount/percentage	The system supports giving a special discount or discretionary discount from the Allocate Bill screen, at the billing group level, subgroup level or order item level. Based on the billing parameter, the system will prompt for authorisation (code or password) before providing the discount
Split billing service between payors	The system supports splitting the billing based on the department or care provider or billing group levels

Feature group	Description
Deposit collection by cash / Card / Cheque	The system generates a unique receipt number for the deposits collected and print a deposit receipt for the same
Self-pay billing (Cash / Card)	The system prevents the user from outstanding or credit if the bill type is marked as a receipt in the payor agreement
Package billing	The system displays the entire package as a one-line item in the allocate bill screen and is subject to limits, discounts, splitting across payor as a single line item
Modify payor to add new payors	The system supports modification of the payor of the patient from the Cashier Worklist. The cashier will be able to add / update/ delete payor details of the patient (payor, agreement, TPA, co-pay, etc.) and also set the order of preference for the payor (Payor rank).
Lists all completed invoices	The Invoices tab in the cashier worklist contains the details of all the invoices made in the system. The following columns are displayed in the invoices tab. a. Invoice Number (Unique Sequence number) b. Invoice Date & Time c. Patient MRN, Name, Age and Gender d. Department / Ward e. Care provider f. Invoice Amount g. Payment mode h. Cashier i. Comments
Sequence ID configuration	The system generates a unique sequence number for the bill/invoice and receipt numbers for each type of payments made. The sequence number can be configured differently for cash and credit bills
Payor agreement type (Receipt / Invoice)	The system supports generation of Invoice (Credit bill) or receipt (Cash bill) as defined in the payor agreement
Payor agreement configuration	The system supports creation or uploading of payor agreements in the billing system. The payor agreements are reusable across multiple payors. The following details are recorded as part of the payor agreement a. code (unique) b. name c. active from & active to dates d. bill type (Invoice or Receipt)

Feature group	Description
	e. primary Tariff, Secondary Tariff, Tertiary Tariff f. inclusions & exclusions g. payor discounts h. alerts i. home medicine limits
Cashier worklist - Search criteria	The system supports the following search criteria in the cashier worklist tabs. a. From Date b. To Date c. Patient d. Department e. By me (i.e. logged in cashier)
Hourly charges config	The system supports calculation of the net charges for the order items marked as hourly charges. The system calculates the net charges based on the total hours used and charge per hour
Billing validation for Invoice types	The system prevents the user from entering any cash or receipt details (except for co-pay) to the invoice or credit bill
Deposit consumption	The system supports usage of deposits in the bills/invoice for payment. The amount that is used will generate as a negative entry in the deposits to reduce the deposit available
Billing cancellation	The system generates a printout for the cancelled bill which details the invoice/receipt number that is cancelled
Bill formats	The system supports generation of the summary bill and detailed bill for the invoices and receipts that are generated by the cashier
Deposit adjustment	The system supports display of the deposits available for the patient and allows consumption or adjustment of deposits either partially or fully. The system generates adjustment entry (refund entry) for each of the deposit adjusted in the bill
Currency exchange configuration	The system supports recording of various currencies used in the health organisation and the money exchange rate to be applied for those currencies
Payor related alerts	The system supports recording of operation alert messages in the systems for the payor agreement. These alerts will be displayed in the registration and billing screens when the agreement is used for the patient
Reprint of original invoice / Receipt	The system supports reprint of original invoice/receipt (with word 'Reprint') by authorised users

Feature group	Description
Billed service level display	The system displays the order items in a hierarchical display such as billing group, subgroup and order item levels
Auto allocation of charges to the default payor	The system supports automatic allocation of charges based on the tariff, payor limits, and payor discount as defined in the agreement and special discounts if any provided by the care providers
Revert allocation	The system supports reset feature where the cashier can go back to the auto allocate status and restart the allocation process again
Master setup	The system supports creation or uploading of billing groups and subgroups in the billing system. The billing groups are associated with the tariff and used in the payor agreements
Refund process	The system generates a unique sequence number for the refund receipt and prints out the link to the original receipt number
Default current setup	The system supports receipt of cash payment in different currencies and applies the exchange rate as defined in the currency exchange master setup
Locking of billing process to prevent late charges	The system allows locking of the patient record before the cashier starts the bill generation process. Once the patient is locked, further orders on the patient will not be allowed. The cashier can also unlock the patient in case the cashier wants to release the patient record
Financial alerts on outstanding self-pay / GL update alerts.	The system supports recording of operational alerts on the payor details. The active alerts will be displayed during registration and billing of those patients using the payor
Refund of deposit	The system supports partial or total refund of the deposits made by the patient. A refund receipt will be produced with a unique sequence number and a printout will be produced for the refund receipt
Payor agreement home medicine setup	The system supports specifying the limits for discharge medication in case of OPD & IPD patients. The limits can be defined for billing groups, subgroup or at item level including the max duration, max quantity and max price
Partial / full refund	The system supports partial refund of receipt multiple times for the same receipt up to the payment available from paid for the receipt

Feature group	Description
Auto charge billing events	The system supports definition of orders that need to be charged automatically for OPD / IPD patients when the patient gets registered for a department
Payor policy document at master setup	The system supports attachment of documents (MoUs) that contains details about the agreement. The uploaded documents can be seen from the registration and billing screens
Tariff master setup	The system supports defining the tariff or billing rate for each order item. The following details are captured as part of the tariff for each order item. a. Tariff type (Standard, Insurance, Foreigner, etc.) b. Encounter (Outpatient, Inpatient) c. Order Item d. Billing group e. Billing subgroup f. Unit Price g. Currency h. Active from and active to period i. Min price, max price and cost price
Bill split based on department/ care provider/ billing group	The system supports further splitting of bills based on department or care provider or billing group as desired by the cashier
Splitting of charges	The system supports splitting of charges to multiple payors by the cashier. The cashier can split the charges at a billing group, subgroup and at an item level. Splitting can be based on a percentage or actual amount
Import / export	The system supports import & export of tariffs into the billing system through an excel file format
Discount setup at group / subgroup / item	The systems support defining the payor discounts at billing group level, subgroup level or at the Item level. The discount can be defined at a percentage basis or absolute amount
Multiple payment modes	The system supports receipt of payments in multiple modes such as cash, card, online transfer, etc. In case of cash, the system optionally supports entering the denomination details. In the case of card payment, the system records the following details a. Card number (last 4 digits only) b. Name on card c. Card type (Visa, MasterCard, etc.)

Feature group	Description
	d. Bank name e. Expiry date f. Transaction approval number
Exclusion alerts	The system alerts the cashier on the billing groups or items that are excluded as part of the payor agreement. The excluded items cannot be included as part of the bill for the patient
Details list of medical discharge / Billed invoices/deposits	The system supports the cashier workbench or worklist which contains the details of all the medical discharges, invoices, deposits and credit note details
Agreement config: Inclusions & Exclusions	The system supports specifying the inclusions and exclusions at a billing group, billing subgroups and an item level. In case of inclusions, the system supports specifying the maximum coverage limit and co-pay percentage or amount to be paid by the patient
Payment mode	The system supports selection of payment mode by the cashier while generating a refund receipt. The system checks with the billing parameter for the 'max cash refund' parameter and ensures that the cashier doesn't refund more than the allowed cash limit
Manual allocation	The system supports manual allocation of the order items to the payors of the patient. The cashier can allocate manually the order items at the billing group, subgroup and order item level
Color-coded to identify billed, deposit, cancelled bills	The system supports the following colour coding scheme for the data in the cashier worklist. a. Refunds - Red Colour b. Cancelled bills - Grey Colour
Medical discharge details	The medical discharge tab in the cashier worklist contains the list of patients who have been discharged from the outpatient departments and inpatient wards. The following columns are displayed in the medical discharge list. a. Patient MRN, Name, Age and Gender b. Department (or Ward) c. Care provider d. Admission date & time e. Discharge date & time f. Patient status g. Pharmacy status for the patient

Feature group	Description
Payor master details	The system supports creation or uploading of payor details in the billing system. The following details are captured as part of the payor a. Code (unique) b. Name c. Full address d. Contact details, email id and web URL e. TPAs associated with this payor f. Payor Agreements supported by this payor
Cancel invoice/ receipt based on access rights	The system supports cancellation of invoices/receipts by authorised duration and within the cut-off period given in the billing parameter
Generate bill - Per payor	The system supports generation of one or more bills per payor based on the auto allocation or manual allocation done by the cashier
Prompt past unbilled services	The system displays alert to the cashier in the allocate bill screen if the patient has got any unbilled items from the past visits
System prompt to collect requirement documents	The system supports specifying the list of documents that need to be collected for the patient as requested by the payor and whether the document is mandatory or optional. This list of document names will be displayed in the registration and billing screens for the patients of the payor
Modify item price upon ordering	The system will use the price that is overridden by the authorised care provider from the order entry screen. For such items with overridden price, the system will not pick up the price from the tariff master
Quick link from allocate bill to open orders	The system allows the cashier to add/update/cancel/discontinue order items by launching the order functions from the Allocate bill screen
Global round off setup	The system supports round off of the final net amount to the nearest cents or currency based on the parameter in the billing parameter screen. The round off will be to the ceiling amount or the floor amount
Refund payment mode	The system supports refund of cash receipts/bills either in full payment or in partial payment. The cashier has the option to select one or more order items from the bill and refund them from the bill
Global billing parameters setup	The system supports configuration of billing parameters in the billing system.

Feature group	Description
	a. Default currency (local currency) b. Default payment mode (to default in the billing screen) c. Default payor (to be added for each patient by default) d. Cut off times for Invoice cancellation e. Currency precision f. whether to use tariff as on admission date for IPD patients
Insurance / Corporate master setup	The system support creating and uploading of the third-party administrators (TPA) or the Payor office data into the billing system. The following details are captured as part of the TPA or payor office. a. Code b. Name c. Contact Person Name d. Full Address e. Phone Numbers f. Email ID g. Active From & Active To
Option to reprint payor invoice/ receipt	The system supports reprint of the invoice and receipts from the cashier worklist. The reprints will display the wording 'Reprint' or 'Copy' in the printout
Credit note creation	The system supports generation of credit note which can be given to the patient. The credit note can be raised against an invoice or a visit with the credit amount printed in the credit note
Deposit collection	The system supports collection of deposits from patients for their treatment purposes. The following fields are captured for the deposits. a. Patient MRN & Name b. Deposit type (General, billing group and department) c. Currency d. Deposit amount e. Pay by next of kin f. Comments
Tax code setup for OP / IP	The system supports creation of tax codes that need to be created for the tax compliance and also the rules (applicability & tax percentage) associated with the tax codes

2.2.9 Revenue Cycle Management

Feature group	Description
Pre-Authorisation Details	System allows capturing diagnosis, treatments details, tariff and total amount applied, surgery date & surgeon (if applicable) in the Pre-Authorisation screen
Attach Documents	System supports attaching documents that are required to be submitted to the insurance company
Pre-Authorisation Approval	System supports approval details to be recorded against each item in the request
Amount Revision	System supports 'Enhancements' or revision of the applied amount again from the hospital
Claim Submission	System supports automatic link to the approvals to the Invoices/bills for the patient.
Merge Bills	System allows merging multiple OP Bills into one bill
Generate Invoice	System allows generating invoice based on the payor and grouping claims based on dates
Batch Submission	System supports submission of the claim forms, grouped payor wise, in a monthly or periodical batch process.
Printouts	System allows to take print out of patient-generated bills, Lab & Radiology reports
Cancel Invoice	System allows cancelling the invoice
Covering Letter	System allows generating the covering letter for multiple patient bills
Generate Extracts	System supports generating extracts in report format (XLS) or XML format.
Remittance Details	System supports recording of remittance details or the payment details against each of the claims submitted.
Partial Payment	System supports partial payment or full payment or payment with write off during the remittance process
Record Rejection	System supports recording the rejection details or queries raised by the payor
Resubmission	System allows regeneration and resubmission of the claims either by providing additional details/comments or by changing the treatment details
Dispatch	System allows updating insurance claims dispatched to the insurance company

Feature group	Description
Payor Deposits	The system allows the user to collect deposits from the TPAs and generate a unique receipt number for the deposit.
Transfer Deposit	The system allows the user to Transfer Deposit from one TPA to another TPA.
Cancel Deposit	The system allows the user to cancel the payor deposit from the TPA.
Refund Deposit	The system allows the user to refund the payor deposit in the form of refund receipt.
Payor Credit Note	The system allows the user to issue a credit note to the payor and adjust the credit note for AR payment and also cancel the credit note if required.
Individual AR	The system allows the user to view the outstanding invoices of the individual patients (Self Pay) and collect the AR payment against one or more outstanding invoices.
Multiple Payment modes	The system allows the user to collect payment in one or more payment modes while receiving the AR payment.
Adjust Credit Note	The system allows the user to adjust credit notes of patients while receiving the payment for the outstanding invoices.
Adjust Deposits	The system allows the user to adjust the patient deposits while receiving AR payment for the outstanding invoices.
Cancel AR Payment	The system allows the user to cancel an AR payment received from the patient.
Payor Bills	The system allows the user to view the outstanding invoices of the payor bills (TPA) and collect the AR payment against one or more outstanding invoices.
Statement of Account	The system allows to view and prints out the statement of account of select payor or group of payors with details of opening balance, transactions made and closing balance of the payor.
Ageing	The system allows the user to view and printout the Ageing details of the outstanding invoices based on the individual patient or corporate payor and based on the credit term of the payor.

2.2.10 Reports

Category	Title
Registration	Deceased Patient List
Registration	List of new patients
Appointment	Appointment List

Category	Title
Appointment	Appointment Scheduling *No Show
OPD	Daily OPD census report
OPD	Monthly OPD census report
OPD	Consultation wise visit count
A&E	Daily Census
IPD	Daily Ward Census
IPD	Daily Bed Occupancy Report
IPD	Length of stay
IPD	Company wise Inpatient list
IPD	Discharge List
IPD	IP Registration Report
IPD	IP Utilisation Report
IPD	List of Admission
IPD	List of Pre- Admission
IPD	Overseas IP Patient Report
IPD	Vacant Bed Report
IPD	Ward Transfer Report
Inventory	Stock holding list
Inventory	Summary of total cost of stocks
Inventory	Movement of stocks
Inventory	Slow moving items
Inventory	Near expiry
Inventory	Outstanding stock/PO
Inventory	Stock issue/transfer
Inventory	Supplier list
Inventory	Summary purchase
Inventory	Purchase Request (PR)
Inventory	Purchase Order (PO)
Inventory	Summary Item Ordered
Inventory	Consignment Item
Inventory	Three-way Matching (PO, GRN & Invoice)
Pharmacy	Turnaround time (individual and monthly report basis)
Pharmacy	Number of inpatient/outpatient prescription

Category	Title
Pharmacy	Drug cost
Pharmacy	IP/OP price
Pharmacy	Outgoing Sales of Medication (Prescription Book)
Pharmacy	Drug Allergy Card
Pharmacy	Drug Psychotic total
Pharmacy	Home Med Sheet Report
Pharmacy	Medication Administered Report
Pharmacy	Medication Review
Pharmacy	Narcotic Ledger Report
Pharmacy	Patient Medication Report
Pharmacy	Prescription sheet
Laboratory	Laboratory Result Report
CPOE	Co-sign & Approval Report
Radiology	Turnaround time
Radiology	Patient waiting time
Radiology	Number of cases per referring consultant
Radiology	Number of patients per referring consultant
Radiology	Number of patients per visit type
Radiology	Number of cases per visit type
OT	OT Utilisation
OT	No. of emergency cases
OT	OT Appointment -No. of cases postponed/cancelled
CSSD	IN/OUT of sets/instruments
Diet & Nutrition	Diet Plan Report
Diet & Nutrition	Food Report
MRD	CLIENT Services Reports
MRD	MRD Folder Outstanding Report
MRD	Top 10 Diagnosis Report
MRD	Top 10 Procedure Report
Billing	Collection report
Billing	Revenue Detailed Report: Detailed Sales/Revenue for the month of MM/YYYY
Billing	Discount Given / Credit Note: Detailed Discounts Given for the month of MM/YYYY

Category	Title
Billing	Collection: Detailed payment collected for the month of MM/YYYY
Billing	Doctors Revenue Reports: Detailed doctor's charges for the month of MM/YYYY
Billing	Doctors Payment Reports: Detailed doctor's payment for the month of MM/YYYY
Billing	Debtor: Detailed Debtor by category
Billing	Deposit: Detailed deposit collected for the month of MM/YYYY
Billing	Refund: Detailed Patient Refund for the month of MM/YYYY
Billing	Daily Cash Register Report
Billing	Inpatient Expenses
Billing	Patient Bill History
Billing	Un invoice reports
Account Receivables	Self-pay Ageing *Static
Account Receivables	Debtor Ageing Report - Detailed by category *Static
Account Receivables	Debtor Ageing Report – Summary by category *Static
Account Receivables	Receipts with Unadjusted Amount
Account Receivables	Statement of Account - (Debtor) *Static
Account Receivables	Statement of Account - (Self pay) *Static
Account Receivables	Un-mailed Reports

2.2.11 Enterprise

Feature group	Description
To configure the hospital organisation structure right from enterprise, branches,	System supports creation of organisation (also called as Business Entity) and recording the details of the organisation. The fields captured are a. Code (unique) b. Name c. Type (Hospital, Clinic, Medical Centre, etc.) d. Active From & Active To dates

Feature group	Description
satellite facilities etc.	e. Parent Organisation – in case of branch or group hospital f. Full Address g. Phone Numbers and Web URL h. Photo of the hospital i. GST Details of the hospital
To define all the functional department's organisation wise and set hierarchy	System supports creation and management of departments (also called as Specialties). The following fields are captured for the departments. a. Code (unique) b. Name c. Description d. Phone Extension number e. Directions from registration desk g. Parent department (in case of sub-department or sub-specialty) h. Gender restrictions (in case of OB-GYN or andrology, etc.) i. Age group restrictions (in case of paediatrics or geriatrics) j. OP Registration Permissions k. IP Admission Permissions l. Whether a doctor schedule is followed for registration purpose m. Emergency registration Permissions
To define all physical & virtual locations available under specific organisation & departments available	System supports creating and managing the physical locations such as building, ward, beds, consulting rooms, etc. within the hospital. The system captures the following details a. Code (unique) b. Name c. Description d. Directions to reach e. Phone extension number f. Photograph (of the bed, room, etc.) g. Type (Room, Bed, etc.) h. Parent location (Ward, Room, etc. in case of bed) i. Owning department (in the case of beds).
To create end-user profile, demographics, education details, contact details, qualification & designation	System supports creation of users or care providers of the hospital. Care providers are generally doctors who treat the patients and the rest are users of the system. (Administrative users or clinical users). The following details are captured for the users or care providers. a. Code (unique) b. Name c. Active From & Active To dates

Feature group	Description
	d. Whether care provider, if yes, then OP or IP or Surgery or Radiology or Anaesthetist. e. Qualification Details f. Primary Department / Specialty g. Medical License Number h. Full Address of the user i. GST details k. Photograph of the user l. Departments/wards that the user is associated with. m. Login Details, Roles, etc.
To create organisation-specific referral details connecting with other providers, hospitals and health facilities	System supports creation of master data of referring organisations such as outreach clinics, GPs, referring hotels, newspapers, etc. The following details are captured a. Type (GP Clinic, Hotel, News Paper Ad, Social Media, etc.) b. Code (unique) c. Name of the referring organisation d. Full address e. Phone numbers g. web URL
Helps users create schedule calendars for various resources across the hospital	The system supports definition of a predefined schedule pattern for the doctor or a department or the location. The details captured include the doctor's name, working days, start time, end time, validity period, appointment slot duration, whether overbooking is allowed, whether an online booking is allowed, etc.

2.2.12 Framework

Feature group	Description
Role creation	System supports creation of roles and/or security groups which acts as a template for the user to determine the security privileges of the user. The system supports copy role function to be able to create many roles easily for existing roles. System supports definition of permissions such as create, read, update, delete, print, export which will help hospital administrator and IT departments to create and assign specific roles, permissions and grants to users in various departments across the organisation
Grants & permissions	System supports all the infrastructure required natively for the management of the security of the system such as

Feature group	Description
	a. Secured Items (Data Item) b. Permissions (Create, Read, Update, Delete, Print and Export) c. Roles d. Logins e. Security Policies f. User session management
Access controls	System supports creation of Data items which are used for security management. The data items are of following types a. MODULE (UI modules & Screens) b. Order Items (Categories & Subcategories) c. Dynamic Forms d. Document Templates, Certificates, etc. Each secured item can have one or more associated permissions Create, Read, Update, etc.
Reference values - Combo select values	System supports a master schema for reference data management such as those which are used in combo select in the screens. These are also called as Quick Codes, which help users to create new values in drop-down and search query across the application. The function also does not hinder the set workflow and can help Administrators to create department-specific values without much hindrance. The fields captured are: a. Code b. Description c. Local language description d. Active From & Active To e. Sort Order f. Additional Values (buffer field) g. System defined or user-defined
Organisation security & login Policy definition	System supports management of security policy which is applied at various points of security management in the application. The fields supported are a. Login restrictions (min length, max length, whether require a number or special digits) b. Password restriction (min length, max length, whether require a number or special digits) c. Idle time out period in minutes d. No. of invalid login attempts before the system locks the user automatically. e. Default password for new users f. No of days to force the renewal of the password

Feature group	Description
Customisation of address details based on geographic location	System supports definition of the following data and its geographic association related to the demographic details of the organisation, patient, etc. a. Area / District b. City c. State / Province d. Country e. Zip code
Automatic sequence number reseeding	System supports automatic reseeding (reset to 1 or initial value) of sequence number series based on the configuration a. D - Daily (reseed for the first sequence of the date) b. M - Monthly (reseed for the first sequence of the month) c. Y - Yearly (reseed for the first sequence of the year) d. F - Financial Year (reseed for the first sequence on or after 1 st April)
Sequence ID management	System supports the definition of master data for Sequence ID formats and generation of unique sequence numbers based on the master data. The fields captured are a. Code (Unique) b. Name c. Initial Value d. Running Value (Current Sequence generated) e. Display Format f. Reseed Period (D, M, Y, F) g. Sequence digit length h. Active from and to date
Application wide audit trail and log details	The audit log will be stored in a secured database and will use check digit validation to ensure that the data is not tampered by any technical user
Audit log view	System supports querying of audit log based on the a. Date & Time b. User ID c. Patient ID and view the details of the audit records logged in the system

Feature group	Description
Data upload & extract options for important masters identified in the application	System supports import and export of data in Excel format for the following datasets. <u>a. Framework</u> Address Master Secured Items Permissions Reference Values <u>b. Clinical Data Masters</u> Diagnosis Master Chief Complaint master Procedure Master <u>c. Order Configuration</u> Age Master Frequency Master Sig Code master Order Items Order Categories <u>d. Billing Configuration</u> Billing Groups Tariffs Payors Payor Agreements TPAs
Audit trail and management of logs for major transactions across the application	The system supports audit logs which are created for each creation (create) and modification (modify) to all datasets. The system captures the following detail as part of the audit log a. URL (URL from which the data was created or updated) b. User ID c. Organisation ID d. Date & time of the audit log e. Post audit data f. Patient ID - in case of patient-related data
Error management	The system records all the errors and exception occurring during the runtime operations of the application in a log file in the server. The error logs can be published to external applications which can handle real-time alerts and resolution of error events
Multiple logins from the same device	The system supports multiple login sessions from the same device by using multiple instances of the browser
Internationalisation	The system supports the internationalisation of the entire application including the labels, combo selections and all

Feature group	Description
	master data. When the user chooses a different language, the entire UI legends will be displayed in that chosen language
GUI metaphor	The system supports a framework for the development of the GUI Screens. The Framework will be based on the HTML5 / Angular JS / Single Page Application design with Google Material design concepts

2.2.13 Queue Management System (QMS)

Feature group	Description
Queues / tokens	System has the provision to create Queues and tokens for various processes like consultation, Billing, Laboratory, Diagnostics and Pharmacy
Queue / Token number	System allows to generate queue and token number to manage the OPD visits and the queue of other processes
Normal / Special Tokens	System allows to generate normal or special tokens; this is can be configured based on the hospital requirement
Call for next token	System allows call the next token number of the pre-registered patients by clicking on next token option
Display of token number	System allows to display the token number on the LED screen; System displays the token number for 20 seconds for each call and will display for a maximum of 3 calls
Tokens on Hold	Systems puts the token number on hold if the patient doesn't show up even after 3 calls
Recalling the tokens on Hold	System calls the tokens on hold after every 10 minutes for a maximum of 3 times
Verification of token number	System verifies the token number with the date and time of generation for that particular day
Token number in doctors work list	Doctor to view patients scheduled for the day along with the token number in their work list and have an option to call the patient based on the token number
Billing Queue	In billing counter (Cashier Worklist), patient token numbers will be called based on the time of the order
Lab, Radiology & Pharmacy Queue	For laboratory, radiology, pharmacy etc. token numbers will be called based on the time of payment collected for the service
Referral doctor Queue	If a patient is referred to another doctor for consultation, the patient's name will appear in the queue of the referred department

2.3 Electronic Medical Records (EMR) Modules Description

2.3.1 Order Management

Feature group	Description
Order Item details	The system supports defining order items with the following attributes: a. Code b. Name c. Description d. Min Qty e. Max Qty f. Order Category g. Order Subcategory h. Type i. Is Confidential Item j. Is Authorisation Request k. Is Co-sign Required l. Is special Approval required m. Active From & Active to Dates
Order Result Item	System supports definition and uploading of result items for the various order items. The Order result items capture the following attributes: a. Code b. Result Item Name c. Type (Numeric, Reference Data, Textual, etc.) d. UOM e. Min & Max ranges for age groups & gender f. Display Order
Frequency Master details	The system supports creation of the frequency master data with the frequency times as exact time of day, STAT, PRN, every N day, Specific days of week, etc.
Co-sign orders	The system supports co-signing of orders by care providers based on the master setup configuration in the order item
Orders requiring authorisation	System supports authorisation of orders based on the configuration in the master setup. Those orders that require authorisation will be changed to the status 'Authorisation Required' upon ordering
SIG code	The system supports definition and uploading of SIG codes which are used during medication ordering process

Feature group	Description
Order subcategory	The system supports definition and uploading of order subcategories under the order categories
Order route map	The system supports definition and uploading of order route map which is used to route the orders to respective servicing departments. The fields recorded in the route map are - Order Category - Order Subcategory - From Department - Days of Week - From Time & To Time - Priority - Order to Department
Age master	The system supports defining age group masters such as neonatology, paediatric, adult, geriatric, etc.
Order sets	The system supports placing of orders through predefined order sets. Once the order set is selected, the system will place all the order items inside the order set as individual order items and keep a flag that these were placed using the order sets
Lab orders	The system allows the users to order the lab investigations, the preferred specimen and enter any instructions for the phlebotomist and the lab
Payor coverage information	The system supports the check whether the order item is covered by the payor, extent of coverage, etc. and choose an appropriate payor based on the payor rank
Order alerts types	The system displays the following alerts based on the configuration in the order item master and drug master. - Duplicate alert check - Min and max quantity check - Dosage limit alert checks - Drug diagnosis interaction check - Drug allergy interaction check - Drug to drug interaction check
Order sets	The systems support definition of order sets which is a combination of individual order items. The attributes recorded for order set are - Code (unique) - Name - Description - Order Category - Order Subcategory (optional)

Feature group	Description
	f. List of Order Items e. Tick sheet (whether to display order set as tick sheet) g. Allow duplicate (whether to allow same order items multiple times in the order set) h. Package Billing (whether the order set can be billed as packages)
Order category - Role permission	The system supports assigning order categories and subcategories to the security role. The restrictions on which user can order which category of order items can be achieved using this function
Order types	The system supports the following order types based on the encounter of the patient. a. Daily order b. Continuous order (Only for IPD patients) c. Discharge medication (Only for IPD patients) d. Brought from outside (Only for IPD patients)
Package orders - Inclusion & Exclusion	The system allows authorised users to include or exclude order items into the package
Order type	The system supports recording of order type such as: a. Self-Order b. On Behalf of Order (Record care provider and comm mode (phone, verbal, etc.)) c. Based on Protocol. In case of Self Order, the system will use the logged in user's role for permission check and in case of on behalf of order, the system will capture the Care provider on whose behalf this order is entered and check the care providers role permission
Order entry function	The system supports a unified order entry function which can be used to enter orders of all order category and subcategory. Example: lab, radiology, medicine, DF, etc. from the same screen
Equipment usage orders / Hourly charges	The system supports placing orders for equipment charges such EKG monitor, infusion pump, etc. The system supports Start / Stop feature for those orders and calculates the usage based on the duration
Order priority	The system supports assigning a priority to the order such as 'Routine' or 'STAT'. When the order is finally placed, it will be split into one or more orders based on the priority
STAT orders colour coding	The system supports display of STAT orders in red colour and cancelled orders in grey colour

Feature group	Description
Order category	The system supports creation and uploading of Order Categories such as lab, radiology, medicine, diet, doctor fees, etc.
Order search & Filter	The system supports searching of order items based on the following criteria. a. Order category b. Order subcategory c. Order item name
Order entry function	The system supports two types of two types of order entry. a. Simple interface (shows the orders in one or two lines with summary details) b. Detailed interface (full featured order entry screen with order details shown in grid format)
Order instructions	The system displays the order instructions configured in the order item master, during the order process. Based on the configuration, the systems allow certain instructions to be modified by the ordering user. Example: a. Ordering Instruction b. Execute Instruction c. Nursing Admin instruction d. Patient Instruction
Tick sheets	The systems support a user-friendly tick sheet interface which displays the order sets similar to the paper-based format. The user can select one or more order items from the tick sheet and place the order
Favourite orders	The system allows the user / care provider to create a list of favourite orders and allow them to add from the place orders from the favourite list option. The favourite orders will be grouped automatically by order category and subcategory
Order status management	The system supports the following statuses for the orders: a. Ordered (upon raising the order) b. Authorisation Required (for those requiring authorisation) c. Executed d. Cancelled e. Discontinued The Lab orders will have additional statuses as given below: a. Specimen Collected b. Specimen Accepted c. Specimen Rejected d. Test Executed

Feature group	Description
	e. Report Entered f. Report Reviewed g. Report Authorised The Radiology orders will have additional statuses as given below: a. Registered b. Executed c. Report Entered d. Report Reviewed e. Report Authorised The medicine orders will have the additional statuses as given below: a. Registered (Optional) b. Screened (Optional) c. Allocate d. Verified (Optional) e. Dispense
Medicine orders	The system supports ordering of medicines based on the tradename or generic name of the drug
Tapering doses	The system supports ordering of medicines in tapering doses based on the configuration in the drug master. The order quantity will be sum of individual tapering doses. The tapering dose detail will be printed in the prescription, however for the pharmacy, the order will be shown as single line with the total quantity
TALL Man identifiers	The system supports display of Tall Man character identifiers which are used to clearly distinguish a medicine name from other similar sounding names
Medicine orders - IV medicines	The system supports placing of IV medicine orders and allows the user to enter the drip rate and duration, etc.
Sliding scale	The system support ordering of medicines in sliding scale dosages based on the configuration in the drug master. The system will display the sliding scale to the care provider and allow change to it based on the patient condition
Drug monograph	The system supports display of drug monograph for medicine orders based on the information received from the third-party external drug database (e.g. Medi-Span)
Order alerts – Third-party external Drug	The system supports interfacing with the third-party external drug database for order alert checks (e.g. Medi-Span). Through this, the system supports the following interaction:

Feature group	Description
Database interface	a. Drug to Allergy Alert b. Duplicate Therapy Alert c. Drug to Drug Interaction d. Drug to Diagnosis Alert e. Drug Dosage Limits In case of an interaction that is severe, the order will not be allowed to be placed without overriding comments. In case of mild & moderate interactions, an alert message will be shown to the user
Auto quantity calculation	The system supports automatic calculation of quantity based on the frequency and duration for certain configured form of medicines such as tablets, capsules, etc. For other form of medicines such as syrup and bottle, the quantity will be defaulted to 1
IV admixtures	The system supports ordering of fluids which are used as IV admixtures to make the medicine into solvent
Compatible fluids	The system supports automatic prompting and ordering of compatible fluids for IV injections based on the configuration in the drug master
Compounding medicine orders	The system supports placing orders for compound medicine by select the final product name and by recording instructions to the pharmacist
Stock information	The system supports display of the 'logical quantity' of the stock available at the pharmacy or sub store during the order process. If the sufficient quantity is not available, then the system can stop from placing the order (based on configuration)
Refill orders	The system supports ordering of medicines with refill quantity, i.e. the number of times it can be refilled in future. This is used for OPD patients who come to pharmacy for long term medication
Radiology orders	The system supports ordering of radiology investigations. The system captures laterality, associated diagnosis and instructions for the technician and radiologist
Lab top-up orders	The system allows the user to specify whether the previously collected specimen needs to be used for this order. This is to avoid recollection of specimen from the blood and reuse the same specimen which was collected earlier
Order routing	The system defaults the order to department (servicing department) based on the order route map. The user will have the option of changing the servicing department if necessary

Feature group	Description
Order price information	The system supports display of order price information such as unit price, payor discount and net price if the user has got necessary permission to view the order price
Override price	The system supports overriding of the order item price by users / care providers who have the necessary permission to do so. The system records a flag that the price was overwritten by the user and will not be changed in the billing module
Repeat orders	The system supports repeat orders in a user-friendly fashion, i.e., to repeat the orders from the previous visit or from the same visit. The system copies all the attributes of the previous order including quantity, duration and instructions and change the duration for the current period
Package orders	The system supports ordering of packages for the patients and then ordering individual order items from the packages. The package tab displays the list of order items allowed in the package, the quantity allowed, quantity already ordered, etc.
Vaccine schedule & Orders	The system supports display of predefined vaccine schedule and order of vaccines from the schedule. The vaccine schedule is shown as a separate tab with the details of vaccines already administered, missed, etc.
Discharge medication orders	The system supports ordering of medicines as discharge medication orders. The home medicine orders are indicated with the tag 'Discharge Medication' to the pharmacy and charged at OPD Tariff
Order entry - credentials to save	The system supports authorising the user through login id & password combination before saving the orders
Order entry - Splitting of orders	The system supports entry of all categories of orders together through the order entry screen. However, once the orders are placed, the system will split the order as per the logic of One Order per 'order to department' and Priority combination
Order profile - Various categories	The system supports display of the order profile in the following tab formats or filter formats: a. All b. Medicine c. Lab d. Radiology e. Supply f. Diet g. Doctor fee

Feature group	Description
Order profile	The system supports a function of order profile which can be used to view the current and past orders of the patient in a user-friendly manner. The columns shown in the order profile screen are: a. Order Item Code b. Order item name c. Order Date & Time & Duration d. Order Number e. Status f. Frequency g. Dosage h. Quantity i. Order Category j. Order Subcategory k. Price Information (for authorised users) l. Order Type m. Comments
Order history	The system supports display of order history in chronological format from the order profile screen. The system displays the following columns for order history. a. Date & Time of event b. Status c. User / Care provider d. Comments
Continuous orders	The system supports placing continuous orders for medicines without specifying the end date. The system would repeat the order daily at mid night until the order is closed. The system support closing the continuous order to stop it from repeating on daily basis
Order Profile - Continuous orders - Close order	The system supports stopping of continuous orders from the order profile screen. Once stopped, the continuous orders will not repeat for the next day
Order profile - Continuous orders	The system supports a separate display tab for continuous orders. The continuous orders are displayed in tree view format with parent orders at the top and child orders at the bottom
Cancel order	The system supports cancellation of orders from the order profile screen by authorised users. The cancellation of order can be done only if the order is in 'Ordered' status and not processed further. The system captures cancellation reason and comments while cancelling the order

Feature group	Description
Drug stock information	The system provides a link which the user can click to view stock levels available in various pharmacies and sub stores in the hospital
Discontinue orders	The system supports discontinuation of orders from the order profile screen by authorised users. The discontinue order can be done in any status and it impacts billing for the order
Order profile - Upload documents	The system supports uploading of support documents (consent forms, external reports) to orders from the order profile screen. The system displays availability of such upload documents and the user can download to view the document
Order profile - Icon alerts	The system supports display of various icons for order alerts (duplicate check, drug allergy check, etc.) and on click of the icons, the system displays details about the alert and the override comments given by the ordering care provider
Order Details	The system records the following details for the order: a. Order code (From order item master) b. Item name (From order item master) c. Frequency (Defaulted from order item master, user can change) d. Quantity (Defaulted from order item master, use can change between min & max qty) e. Start date (Defaulted to current date) f. End date (Defaulted to current date) g. Duration (Use can change - affects the end date) h. Priority (Defaulted to routine. user can change) i. Dosage & UOM (Defaulted from order item master) j. Payor (Selected based on billing module, coverage and payor rank) l. Unit price (Determined based on billing module) m. Discount (Determined based on billing module) n. Net price ((Unit price - Discount) * quantity)

2.3.2 Clinical Forms Builder

Feature group	Description
Form templates > EMR data	The system supports displaying, recording of clinical data such as CCPHI, diagnosis, orders, etc. in the forms as well as save them from the forms into the EMR respective schema
Form template > Confidential forms	The system supports marking certain forms as 'Confidential'. Such forms are available for data entry only for those users who have privilege to use the form

Feature group	Description
Medical certificate - Unique ID	The system supports generation of a unique sequence identifier for the medical certificate and embedding the ID into the document and also to search based on the sequence ID
Form template - attributes	The system supports the concept of data attributes which are used to input the data and also display the data. The following type of data are supported. a. Heading b. Label c. Text Input d. Combo Select e. Date Field f. Time field g. Text Area h. Checked List box I. Radio List Box k. Switch
Clinical notes	The system supports recording of clinical notes based on predefined templates or ad hoc notes
Forms	The system allows recording of clinical data through the forms interface. The forms can be recorded, viewed, and modified by the care providers
Medical certificates - Templates	The system supports configuration of different types of medical certificate templates such as medical certificate, fitness certificate, etc. based on the department / specialty formats
Form templates - Confidentiality	The system supports creation of forms that are confidential in nature and need to be accessed by users who have necessary permissions
Form builder	The system supports an intuitive form builder which can be used to create, update and publish the form templates
Trending of observations graph	The system supports plotting of the observations into a line graph. The care provider can select and view one or more vital panels side by side
Form template status & Versioning	The status of the forms is unpublished and published. The form templates are assigned version numbers which are increased automatically upon each status change

Feature group	Description
Image library store standard anatomical images for clinical annotation	Systems supports uploading of the images of body parts into a master schema and to be used in the EMR. The fields captured are: a. Department (Optional) b. Type (reference domain) c. Code (unique) d. Name e. Image data (uploaded image content) f. Active from and to dates
Growth chart	The system supports the standard growth chart based on the WHO recommendations for paediatrics patients
Form templates	The system supports creation of form templates with sections and attributes defined as per the requirement of the department
Form templates - Import & Export	The system supports export and import of form templates and associated sections and attributes. This feature is used to export forms from one system (test) and them import into another system (live) during the upgrade process
Forms	The system supports the creation, update and view of forms from the forms module in the EMR
TPR Chart	The system supports the standard temperature, pulse, respiratory rate chart of the IPD observation module
Observation - Configuration	The system supports creation of vitals framework using the order management framework. Many observation panels for vitals can be setup in the master configuration
Medical certificates - Merge EMR data	The system supports automatic merging (like Mail Merge) of the medical record data such as patient demographics, vital signs, diagnosis, prescription, etc. into the template to produce a final output format
Form templates	System supports form builder capabilities to build dynamic forms and associate them to various order items, clinical documents and workflows. The form template consists of: a. Title b. Sections c. Attributes inside the sections
Diagnosis groups	System supports grouping of diagnosis into diagnosis groups which can be displayed as 'Tick sheets' in the EMR for easy use for the care provider. One or more diagnosis groups can be created and associated to the departments.

Feature group	Description
	For example, Orthopaedics department can have diagnosis groups based on Knee, Shoulder, Spine, Arm, etc.
Diagnosis master	System supports loading of the diagnosis master data such as ICD 9 or ICD 10. System supports coexistence of multiple coding schemes such as ICD 9 and ICD 10. The fields captured are: a. Coding Scheme b. Code c. Description d. Parent Code / Chapter e. Is Notifiable f. Is Parent Code g. Active from & active to period
Charting of vitals	The system supports charting of Vital signs into a tabular format (pivot format)
Forms - Prefilled forms	The system allows the user to save a filled form data into 'Prefilled form' template. When the user selects a prefilled form template, the form is loaded along with the saved data to enable the user to complete it quickly
Procedure master	System supports definition and uploading of the procedure master codes such as CPT or ICP etc. The fields captured are: a. Coding scheme b. Code (unique) c. Name d. Description e. Active From & To period f. Planning type (Elective or emergency) g. Procedure severity type (Major or minor) h. Body sites allowed - i . Checklists / templates
Chief complaints Master	The system supports uploading of codes used for capturing the chief complaints from the patients. The system also supports grouping of chief complaints based on the specialties or departments
Trending	The system supports trending of the observation values in a line graph and allows the care provider to choose the time period and observation values to include in the chart / graph
Forms usage in other modules	The forms could be used in other modules such as Order Management or Operating Room or Radiology depending on the needs of those modules. The create, update and view scenarios

Feature group	Description
	will be launched directly from those modules in such a usage scenario
Form template - status	The system supports the pilot and published statuses for the form templates. The forms in published status will be available for usage in the EMR
Charting of vitals panel	The system supports charting of the vital signs in a tabular / grid format and allow the user to choose the time period and the observation to be charted
Form template - Sections	The system supports the following type of section definition in the forms. a. Dynamic section - The attributes in this section are dynamically defined by the user in the template b. Predefined section - The predefined sections are the datasets supported by the system by default. The following datasets are including in the predefined sections. 1. CCHPI 2. Medical History 3. Allergies 4. Alerts 5. Diagnosis 6. Orders 7. Vitals 8. Examination
Medical history groups	System supports grouping of diagnosis codes into medical history groups which are displayed in the medical history related forms. The medical history groups can be associated to departments
Form templates - Scripting	The system supports basic scripting (using JavaScript) which can be used to provide a behaviour for the forms. The support for scripting is mainly, a. To update the value and visibility based on the input for other fields b. To be able to calculate scores which can be used for pain score assessment
Observation formula	The system supports setting up of formula in the observation master for derived observations. For example, BMI, BSA could be automatically calculated based on height and weight

2.3.3 Electronic Medical Records (EMR)

Feature group	Description
Patient search	The system supports search searching based on the actual name or based on synonyms (alias names). The system also supports explicit searching based on 'Starts with' and 'In-between' conditions
Patient banner details	The system supports very comprehensive details on the patient banner which is very vital for the patient care management which includes a. Patient MRN b. Patient Image c. Patient DOB d. Patient risk alerts e. PACS & DMS link f. Allergies - Flashing for attention g. Diagnosis (ICD 10) h. Visit details - Visit ID, Location and Payor details i. Vitals sign - Last taken vitals
Allergies in patient banner	The systems display the allergy icon and the allergen details in the patient banner in the EMR View. The patient banner will be displayed in all clinical related screens to the care provider
PACS viewer hyperlink	The system supports configuration of a hyperlink to launch the online PACS viewer (if available) for the care provider to quickly launch the PACS and view the studies related to the patient
DMS hyperlink	The system supports configuration of hyperlink to the external document management system which the care provider can click and view the list of scanned documents uploaded in the DMS for the selected patient record
EMR view - Various sections	The system supports display of following medical record data in the EMR View. a. CCHPI b. Medical History c. Charting d. Allergies e. Alert f. Examination g. Diagnosis h. Orders i. Result j. Clinical Documents k. Forms

Feature group	Description
	l. Medical Documents m. Referrals
Summary view - Current visit & past visits	The summary view displays the current visit data by default. There will be provision to list all the past visits of the patient and select one or more past visits and see all the data as next pages in the screen
Summary view - Current visit & past visits	The system supports a quick timeline to view the patient hospital journey associated to specific episode
Alert details	The systems support recording of alerts about the patients at different workflows in the application. The following details are captured as part of the Alert record a. Type (Administrative, Clinical and Financial) b. Alert Message (supports at least 255 characters) c. Status (Active / Inactive) d. From & To Date period e. All Departments or Specific Departments
Alert types	The system supports recording alert messages in the patient medical record. The various types of alerts are a. Administrative: shown in register screen, patient arrival screen, go to EMR screen, dispensing screen, lab screen, x-ray screen and billing screen. b. Clinical: shown inside the EMR and in the CPOE order screen c. Financial: shown in the billing related screen
Allergy types	The system supports recording of allergy details of the patient from the EMR. The following allergy types are supported. a. Drug Allergy (Generic, Trade Name, Drug Group or Free Text) b. Food Allergy c. Other Allergy (Environment, pollution, etc.)
Allergy Details	The system captures the following details as part of the allergy record. a. Allergy Type b. Allergen (Code and Name) c. Symptoms d. Status (Active / Inactive) e. Comments f. Onset Date g. Closure Date h. ADR Score

Feature group	Description
Naranjo algorithm	The system supports the Naranjo algorithm for ADR Scoring. Based on the Naranjo score, the system automatically updates the ADR as a. Definitive ADR b. Doubtful ADR c. Possible ADR d. Probable ADR
CCHPI - Past CCHPI	The system supports display of chief complaints from the past visits of the patient in a reverse chronological order
Chief complaint & History of present illness (CCHPI)	The system supports capturing the Chief Complaint and History of presenting illness of the patient. The fields captured are: a. CC - one or more, coded from CC Master b. HPI - free text with provision to record up to 10 lines of data
CCHPI - Favourites	The system supports the favourite list for chief complaints which the care providers can create themselves and use them
CCHPI - Repeat	The system supports repeat CCHPI feature in which the care provider can click on the past chief complaints and repeat them for the current visit. The system flags the record as repeat CCHPI
CCHPI - Templates	The system supports a tick sheet like template-based interface for the doctor to click and select a list of predefined / frequency used chief complaints.
Medical history	The system supports recording of past medical history details of the patient inside the EMR. The details captured are a. Disorder code and name b. Duration c. Comments
Medical history templates	The system supports creation of various templates for different departments or at a hospital level to capture the past medical history
Family History	The system supports capturing of the medical history of the next of kin members of the patient. The details captured are a. NOK relationship b. Disorder code & name c. Comments
Social history	The system supports recording of social history of the patient in the medical record. The details are a. Smoking (Status, usage and frequency) b. Alcohol consumption (Status, usage and frequency) c. Drug abuse (Status, usage and frequency)

Feature group	Description
Examination templates	The system supports recording of examination details of the patient through one of the predefined templates. The templates can be created according to the department / specialty
Image annotation	The system supports using images from standard image repository and adding lines, notes on top of the images using the annotation feature
Live photograph	The system supports capturing of live photograph (using tablet or mobile device) and add annotation (markings, notes) on top of the photograph as part of the examination records
Diagnosis templates	The system supports creation of templates or tick sheets for various departments and the care providers can record diagnosis from the templates or tick sheets
Primary Diagnosis	The system supports configuration whether to allow only one Primary diagnosis or more than one primary diagnosis and whether to make primary diagnosis as mandatory to place certain orders
Diagnosis coding schemes	The system supports codification of data using the locally defined coding scheme as well as industry standard coding schemes such as ICD9, ICD 10, and SNOMED
Repeat diagnosis	The system supports the user to repeat the past diagnosis to the current visit from the diagnosis screen. The system maintains a flag to note the repeat diagnosis for the patient
Diagnosis records	The system supports recording the diagnosis details of the patient as part of the medical record. The details captured as part of the diagnosis are: a. Code b. Disorder name c. Whether primary or not d. Encounter stage e. Status (active or inactive) f. Comorbidity g. Comments h. From & To dates i. Severity
Cancer staging	The system supports recording of the cancer staging details when the cancer related diagnosis is recorded
EMR audit Log	The system supports display of audit log in the various functions of EMR such as CCHPI, medical history, diagnosis, etc.

Feature group	Description
Referral - Consult request	The system supports referral request or consult request by one care provider to another care provider in the OPD process. Such consult request will be sent to the OPD workbench for further workflow
Referral - Surgery request	The system supports requesting for surgery by the care provider by providing the procedure code, name and diagnosis
Referral - Admission request	The system supports request for IPD admission by the care provider. During this process, the care provider can optionally select a ward or bed, record admission diagnosis and place admission orders
Death details	The system supports recording a patient as 'Deceased' along with details of date & time of death, the care provider who confirmed it and the reason for death. Once the patient is marked as 'Deceased', the patient banner will be highlighted in 'Grey' colour and further recording of orders will be restricted to authorised users. The system supports provision to revoke a deceased status by authorised users in case it has been done by mistake
Lab reports	The system supports display of lab reports in the following format. a. Report / PDF format - this is the print format of the report b. HL7 Interface format - this is the format in case the lab results is received through the interface
Cumulative result	The system supports viewing of the lab results in a cumulative / tabular format as well as in a graph (Line graph) format. The care provider can choose the date period and the lab results to be viewed and plotted in the graph
Lab reports - Preliminary report	The system supports display of the preliminary reports (results that are not approved) in the EMR. The status 'Preliminary' will be highlighted to the care provider while viewing such reports
Radiology reports	The system supports provision to view the radiology reports that are approved for the patient
Confidential result	The system supports display of confidential lab results to authorised users who have the necessary privilege to view such confidential results
IPD EMR - Chief complaints, history, examination	The system supports features to record the CCHPI, medical history and examination of the inpatients

Feature group	Description
IPD EMR - Daily orders, continuous orders and progress notes	The system supports display of the clinical information for the Inpatients in one chart displaying the following data: a. Daily Orders b. Continuous Orders c. Progress Notes
Lab reports	The system supports display of the lab reports of the inpatients along with the cumulative results and charting
IPD EMR - Radiology results	The system supports display of the radiology reports of the inpatients

2.3.4 Doctor's Worklist

Feature group	Description
Doctor Worklist	Doctor worklist allows care provider to view widgets covering Outpatients, Appointments, Inpatients, Referrals (OP/IP), Co-sign / Approval, Doctor fee & monthly census, Lab results, Radiology results.
Outpatient widget	Outpatient widget will display the registered patients for the day. This widget will have below mentioned fields. a. Patient MRN b. Patient Name c. Gender/Age d. Visit Time e. Status f. Comments g. VIP Icon Click on the patient Name link system will redirect to the patient EMR
Appointment Widget	Appointment widget will display the appointment patients for the day. This widget will have below mentioned fields. a. Patient MRN b. Patient Name c. Gender/Age d. Visit Time e. Status f. Comments g. VIP Icon

Feature group	Description
Inpatient Widget	Inpatient widget will display the current inpatients for the care provider. This widget will have below mentioned fields. a. Patient MRN b. Patient Name c. Gender/Age d. Visit Time e. Ward/Bed Click on the patient Name link system will redirect to the patient EMR
Consult/Referrals widget	Consult/Referral widget will display the IP/OP consult request. This widget will have below mentioned fields. a. Patient MRN b. Patient Name c. Gender/Age d. Care provider e. Department f. Comments.
Co-sign / Approval	Co-sign / approval worklist will list all the orders placed on behalf of doctors. Care provider can mark it as co-signed / approved.
Doctor Fee Widget	Doctor fee widget will display the doctor fee collected for the care provider
Summary Patient count and Doctor fee	System supports to display the patient count and doctor fee for that care provider in tabular format
Lab Report Widget	Lab report widget will display the Lab reports of the patients. This widget will have below mentioned fields. a. Patient MRN b. Patient Name c. Lab No d. Lab order e. Time of Authorisation System supports to view the lab results from the widget
Radiology Report Widget	Radiology report widget will display the radiology reports of the patients. This widget will have below mentioned fields. a. Patient MRN b. Patient Name c. Radiology No d. Radiology order

Feature group	Description
	e. Time of Authorisation System supports to view the Radiology results from the widget

2.3.5 Nursing Workbench

Feature group	Description
Nursing workbench	The system has a dedicated nursing module which helps the nurses to complete all their activities related to a patient from admission to discharge in one screen.
Tabs in Nursing workbench	The nursing workbench has tabs like assessment, nursing diagnosis, plan of care, charting, eMAR, forms and tasks.
Assessment tab	The assessment tab in nursing worklist has provision to pre-define the required assessment form in the nursing app settings which will auto populate to capture the data. Different forms can be pre-different for adults, paediatrics, Neonatal patients
Nutritional screening	The system has the provision for the nurses to do nutritional screening for patients from the nursing workbench. Nutritional assessment forms and re-assessment forms can also be pre-defined in the nursing workbench screen.
Nursing diagnosis scheme	The system has the define required diagnosis coding scheme for nurses using the nursing app setting. The coding scheme defined in the app setting will load in the nursing diagnosis tab in nursing workbench.
Plan of care & Medication administration	The nurse has the provision to administer checked in medicines from the eMAR tab, create plan of care based on the physician and nursing diagnosis, and also complete the tasks assigned for the patient from the nursing workbench.

2.3.6 Multi-Disciplinary Plan of Care

Feature group	Description
Care plan Creation	System has provisions to create care plan and care pathways using the care plan master. These care plans can be restricted to Encounter & Department, pulled across visits, CDR, Department & diagnosis specific,
Care plan duration	Care plan durations can be preconfigured in the system so when the start date is entered the system will automatically calculate the task frequency and end date.
Goal configuration	The system allows the user to create multiple goals either during according to the protocol thereby enabling the user to find out

Feature group	Description
	whether the patient's goals are met or not met. Diagnosis mapping can also be achieved in the system.
Intervention	The system has the provision to modify the existing pathway through intervention where the system allows the user to make and record deviations in the protocol. The system also has the provision to add task as intervention and the tasks can be mapped to order.
Task Delegation	The care plan activities shall be designated as tasks and will be displayed in nursing worklist, the same will be updated once when a nurse executes the task.
Multi-disciplinary care plan	The system has the provision to create multi-disciplinary care plan. There is physician care plan, nurses care plan, other care plan in the system. Based on the diagnosis captured by the care provider, the doctor creates the care plan and based on the goals captured by the doctor, the nurse and others can create their own care plan.
Nursing Diagnosis	The system shall allow nurses to capture Nursing Diagnosis in the care plan.
Treatment Plan	The system allows the user to create treatment for all plans by adding goals and interventions. The plans and interventions can be added individually or can be picked up from the care plan master.
Past care plan	The system has the provision to view the past care plans and the present active care plans in a single screen.
Care plan Summary	The system has the provision to display the Name of the care plan, diagnosis, intervention, goals, start date and end date in the visit summary, Discharge summary, etc.
End care plan	The system has the provision to automatically cancel all upcoming tasks when a care plan is cancelled.

2.3.7 TPN Plan

Feature group	Description
Total Parenteral Nutrition creation	The system has the provision to create Total Parenteral Nutrition (TPN) for patients. TPN Master screen helps to create pre-defined TPN plans which can be used against patients while placing TPN orders.

Feature group	Description
TPN order	The system has the provision to add TPN orders through the TPN tab in EMR. The TPN order screen allows the user to add the required calories, volume and the route for administration.
Charting during TPN order	The system has the provision to record height and weight before placing the orders from the TPN screen. This will help the user to determine the right dosage required for the patient.
TPN order / order set / dosage / frequency	The system has the provision to create TPN as separate order items or create an order set and add for a patient. The user can also pre-define the dosage, but also has the option to edit the dosage for every frequency. The user will also be able to select the days against each item and send the order for preparation.
TPN Profile	The system has the provision to view the TPN orders created for the patients in the TPN profile screen. From this screen, the TPN plan created can be marked as 'END Plan' when the required amount of nutrition is achieved for the patient even before the actual end date.
TPN preparation	The system has the provision to dispense all the items placed required for the TPN and send the items to preparation worklist. From the preparation worklist, the final output item is dispensed and sent to the ward for administration.

2.3.8 Oncology Treatment Plan

Feature group	Description
Oncology Treatment Plan	The system has the provision to create oncology treatment plan for patients. This function has provision to add new OTP, see active treatment plans and past plans.
Pre-defined oncology treatment plans	The system has the provision to pre-define oncology treatment protocols with the help of care plan master. The user can either add a pre-defined plan directly or modify the items as required.
Oncology treatment cycles	The system has the provision to define the number of treatment cycles required each CDR plan. The user can define the start date & cycles required. Based on the information provided, the system calculates the end date automatically.
Edit & Re-calculate dosage	The system has the provision to edit, duplicate and re-calculate the dosages for the medicines added in each cycle. Orders can be placed directly from the treatment plan and sent to the

Feature group	Description
	pharmacy for dispense. The user can also forward the plan to other users like doctors, nurses or technicians.
Oncology medicine preparation	The system has the provision to dispense all the items added in each treatment cycle and send the items to preparation worklist. From the preparation worklist, the final output item is dispensed and sent to the ward for administration.
End Treatment plan	The system has the provision to end the treatment plan anytime before the pre-defined end date.

2.4 Ancillary Modules Description

2.4.1 Lab Information System (LIS)

Feature group	Description
Trending of results	The system supports graphical trending of past lab results of the patient in numeric format.
Cumulative results	The system supports the cumulative results function which displays the past results of the patient in a tabular format for easy analysis by the lab personnel.
HL7 message interface	The system supports HL7 messaging interface in case the HIS needs to be interfaced with an external LIS system for order results processing.
Confidential results	The system supports security permission for the confidential results and allows viewing / printing of such confidential results by users with appropriate permissions.
Approval of results	The system supports approval of results by designated users and supports insertion of scanned signature automatically in the report if necessary.
Review of results	The system supports review of results and first level approval (status: Reviewed) for the results from the analyser through the interfacing and manual entry.
Report templates	The system supports usage of templates for quick results entry for large textual results (pathology)
Derived results	The system supports automatic derivation of result parameters based on the formula set up in the master configuration.
Manual results entry - Normal ranges	The system supports marking a result as High, Low or Normal based on the normal range configuration set up for the test. High or Low results will be displayed in Red colour in the screen and printed with a ** or HLN in the report.

Feature group	Description
Manual results entry	The system supports manual entry of results for the following types of test. a. Numeric and short texts (e.g.: Clinical Lab) b. Large Textual results (ex: Pathology) c. Grouped / Tabular (ex: Microbiology)
Lab analyser interfacing	The system supports both unidirectional & bidirectional interfacing with equipment's direct or through a LIS middleware software.
Lab worklist - Colour coding	The system supports Colour coding of the lab orders based on the priority and statuses. - Stat - Red Colour - Result reported - Blue Colour - Result approved - Green Colour
Lab worklist - Details	The lab worklist allows the user to search based on date, department, patient, order number and status.
Lab work list – Restrictions	The lab worklist restricts the user to view and process only those tests for which the user has got permission to access, based on the order subcategory level configuration.
Lab work list	The system displays all the lab orders in the Lab Work List in separate tabs for a. Outpatient & inpatient orders b. Specimen Collected / Accepted, Specimen in processing, Results reported
Specimen review	The specimen supports the review process by the lab technician and provides the option to accept the collected specimen or reject it. The specimen rejected will be sent back to the Specimen collection process.
Specimen barcode label	The system prints the bar-code labels for each specimen upon collection of the specimen. The label contains the Order Number in the Barcode format and the following information in text format. a. MRN, patient name, gender, age b. Specimen code c. Test code (Comma separated)
Specimen collection	The system supports collection of specimens for all the tests in the order or for partial list of tests in the order. If more than one test requires the same specimen, the system will consolidate the specimen and use the same one for those tests.

Feature group	Description
Specimen configuration	The system supports configuration of various specimen types used in the lab. The fields captured include type, container type, suggested volume, collection site, associated Tests, specimen handling instructions, etc.
Test result parameters	The system supports configuration of the test result parameters using the order result Item function in the Order Management module
Lab tests	The system supports configuration of the tests and its attributes using the order item framework in the Order Management module.

2.4.2 Radiology Information System (RIS)

Feature group	Description
Diagnostics work list	The system displays all the radiology orders in the Diagnostics Work List in separate tabs for a. Outpatient & Inpatient orders b. New, InProgress, Complete & All
Report modification and audit log	The system supports modification of approved reports by designated radiologist. Such modifications are logged in the audit log and the user will be able to identify the modification history of the report.
Report review & approval	The system supports review and approval of reports by designated radiologists. During the approval process, the system allows modification to the report if necessary.
PACS viewer	While entering the report, the system supports easy navigation to the PACS viewer for display of the pictures based on the accession number.
Past reports	While entering the report, the system allows easy navigation to past radiology reports of the patient.
Normal or abnormal status	The system supports reporting an investigation result as 'Normal' or 'Abnormal'. This field is used to flag the status to the ordering care provider and also for statistics purposes.
Report entry	The system supports manual entry of reports by the radiologist. The user interface is similar to the word editor supporting predefined templates and standard features such as bold, italics, underline, font changes, etc.
Radiologist allocation	The system supports automatic allocation or manual allocation of radiologist for reporting the orders.

Feature group	Description
Execute the order	The system supports the Execute function which is used to update the order status as 'executed' and record the following details such as technical name, date & time of execution, modality and comments.
Diagnostics scheduling	The system supports scheduling of diagnostics orders based on the availability of the modalities. The scheduling function is similar to the features described in the Appointments module including booking, rescheduling, cancellation, etc.
Register step	The system supports the register function from the diagnostics worklist, which is used to update the order status as 'registered', reflecting that the radiology department has acknowledged the order.
Diagnostics worklist - Colour coding	The system supports Colour coding of the radiology orders based on the priority and statuses. Stat - Red Colour Result Reported - Blue Colour Result Approved - Green Colour
Diagnostic worklist - Details	The diagnostics worklist allows the user to search based on date, department, patient, order number and status.
Diagnostics worklist - Restrictions	The diagnostics worklist restricts the user to view and process only those investigations for which the user has got permission to access, based on the order subcategory level configuration.
Radiology workflow steps	The system supports configuration workflow steps for processing the diagnostics investigations by the radiology departments. The supported workflow steps are a. Register b. Scheduling c. Execute d. Report Entry e. Reports Approval.
Diagnostics order entry	The system supports ordering of the diagnostics or radiology orders through the CPOE / Order entry framework.
Configuration / Setup of radiology investigations	The system supports configuration of the various diagnostics investigations through the Order Configuration framework.

2.4.3 Blood Bank Management

Feature group	Description
Donor Registration	The system must support donor's pre request form details such as First Name, Last Name, Gender, Date Of Birth, Mobile No, etc.
Sample List	The system must list all the blood donors of that current day. The staff needs to be able to also search for existing donors in the system
Vital Signs	Blood bank staff needs to be able to check the donor's pulse, BP, etc. and enter the results in the system
Sample Collection	Blood bank staff needs to be able to also check the donor's blood group and enter the results in the system
Assessment	Donor needs to be able to fill in the questionnaire/ acknowledgement form before donating his/ her blood to the hospital
Blood Collection	The details of the blood collection such as volume collected, UOM, blood bad type, date & time, etc. needs to be able to be captured by the blood bank staff in the system
Screening Result	Results (and values) of the tests conducted on the blood components collected needs to be entered
MO Approval	The staff needs to be able to either accept or reject the blood collected
Add To Storage	Blood bank staff needs to be able to segregate the blood components and add the volume collected against each blood component collected and also add it in the hospital's blood storage
Print Documents	All documents associated with a donor such as admit sticker, blood collection sample, blood donation certificate, donor id card, etc. needs to be viewed and printed
Manage Donor Status	The blood bank staff needs to be able to note and update the statuses of a donor starting from when he/ she arrives to the time the entire cycle completes
Donor Tracking	The current status along with the history of the statuses of the donor needs to be viewed
Donor Listing	The system needs to be able to list all the blood donors saved. The staff also needs to be able to search for specific donors in the system
Modify Details	The system needs to be able to update/ modify the existing details of a donor

Feature group	Description
Arrive	The staff needs to be able to update the status of the donor as arrived once he/ she physically arrives at the blood bank department/ section of the hospital
Summary	A summary of the donor's visit is required
Stock Summary	Available WBC, RBC, FFP, Platelet and Cyto count needs to be displayed blood group wise
Component Master	Different components of the blood need to be added (if it doesn't exist in the system), modified or deleted (if it already exists in the system)
BM Settings	Default values for the various parameters available in the hospital's blood bank needs to be set
Donor – Transfusion matching	a. Transfusion details b. Adverse reactions c. Cross Matching d. Donor Sign Off
Blood bank reports	a. Stock Register – Blood Group wise, component wise grouped. b. Blood Bank Issue register – for a period with recipient & Donor details c. Donor Register d. Donations Register e. List of Rejected Blood report f. Donor profile history reports – all donations done with screening results etc. g. Transfusion register h. Adverse reactions register

2.4.4 Operating Room (OR)

Feature group	Description
Surgery request creation	The system allows the doctor to refer a patient to surgery using the surgery request function, by selecting one or more procedures, the surgeon details and the anaesthetist details
Queues all the surgery request by date	The OR manager will be able to view the list of surgery requests from the various OPD and IPD departments based on a date range, department and care provider filters. The user will be able to schedule the surgery or cancel the request from the surgery request list, by select appropriate options

Feature group	Description
Creating OR rooms with defined slots	The system allows the OR management to create OR Rooms and to create session timings of the OR Rooms and generate schedule for a given period of time in the future
Procedure details	The system allows the OR management to book the OR for a patient surgery by providing the details of the procedure, type of surgery, criticality, timings, surgeon details, anaesthetist details
Procedure duration	The duration of the surgery will be calculated from the standard duration set in the procedure master
Procedure booking status	The system allows the OR manager to confirm a surgery booking or cancel it or reschedule it to a different date or different OR. In the case of cancel and reschedule, the system captures the reason for the cancel or reschedule of the surgery.
Calendar view	The system supports display of all the ORs in a department together as a group view for a particular date
Calendar view legends colour coding	The system displays the OR Booking in different colour schemes, based on the status of the booking
OR worklist view	The system provides a display of all the booked and confirmed surgery bookings in the OR workbench. The user can filter the record by department, patient, date range and status
OR worklist functions	The OR workbench function will be used by the OR manager, Surgeon, Nurse, Anaesthetist to record the data about the surgery. a. OR Manager – Confirmation b. Nurse - Orders, Vitals, OR Records and Upload Consent Form - Surgeon - Surgery Notes and View Consent Form - Anaesthetist – Checklist and Anaesthesia details
OR worklist status	The system supports updating of the patient status from the OR workbench. The status is typically configured as given below. a. In PICU b. In OR c. In Recovery d. In Post Op ward

2.4.5 Central Sterile Services Department (CSSD)

Feature group	Description
CSSD Store setup	The system supports identification of the departments as Sterile Units and CSSD Stores (Storage Units). The supports creation of multiple Sterile Units & multiple Storage Units
CSSD item master flag	The system supports identification of a supply item as a 'CSSD Component'
CSSD tray setup	The system supports definition of different types of tray and recording the CSSD Components & quantities required as part of the tray, whether washing is mandatory or packing is mandatory or Autoclaving is mandatory, etc. The system supports specifying the list of consumables that need to be replenished as part of the packing process. The system supports specifying the default expiry period for the sterility and the need flag to recycle the tray through the sterile unit again
CSSD tray statuses	The system supports following Statuses for the trays: a. Unclean b. Sterilisation Request c. Sterilisation Registered d. Washing Completed e. Packing Completed f. Autoclaving Completed g. Clean h. Sterile Expired
CSSD tray request from other service locations	The system supports requesting of trays by the Operating Rooms to various CSSD Stores. This process is similar to the stock request or indent process
CSSD tray issue from CSSD store.	The system supports issue of Trays for CSSD Stores to the Operating Rooms
CSSD item discrepancy review	The system supports recording of discrepancies in trays, i.e., the CSSD component items that are missing from the trays
Tray write off	The system supports writing off the entire tray after its validity period is completed. Once written off, the tray will be removed from the CSSD Stock
Sterilisation request process	The system supports requesting of sterilisation service for unclean trays

Feature group	Description
Sterilisation statuses	Once the trays are received at the sterile unit, the system supports registering of the tray and capturing the IN time
Sterilisation statuses	The system supports capturing the start and end time for the washing, the technician who as involved, washing type, etc.
Sterilisation statuses	The system supports capturing the start and end time for the packing the technician who as involved, consumables packed, etc.
Sterilisation statuses	The system supports capturing the 'Sterile Equipment', start & end time of autoclaving, the technician involved, etc.
Sterilisation statuses	The system supports dispatching the sterilised trays to the CSSD Stores
CSSD tray utilisation	The system supports recording the usage of trays on the patients, i.e., the consumption process
CSSD tray preparation	The system supports creating multiple quantities of the trays. This process is similar to GRN or opening stock where the trays are newly assembled for the first time and added to the CSSD Stock. Once the tray is prepared for the first time, the tray will be in 'Unclean' Status
CSSD tray stock view	The system supports viewing and alerting of the trays that are about to expire its sterility period.

2.4.6 Diet and Nutrition

Feature group	Description
Lists all new admitted patients for dietician review	The system supports the diet worklist which can be used the dieticians to record the orders and diet plan for the patients
New patients	The diet work list supports separate display for new patients (for which the assessment is not yet completed) and inpatients for whom the assessment is completed
Diet assessment	The system supports the function for the dietary assessment of the patient by the dietician. The function can be used to capture the food allergy data, anthropometric data and nutritional requirement of the patient
Diet plan	The system supports record of the prescribed diet plan for the patient

Feature group	Description
Diet orders	The system supports ordering of diet items for the patient, by selecting the order item and the frequency (example: Breakfast, Lunch, etc.). The system will check for food allergy of the patient
Orders for next of kin	The system allows ordering of diet and nutrition items for next of kin of the patients (relatives). The orders for the NOK will not be checked for food allergies and will not be displayed in the diet chart of the patient
Food allergy check	The system checks for Food allergies while placing e diet orders for the patient
Patient feeding Status	The system allows marking the feeding status of the patient such as NPO (Nil Per Oral) or tube feeding. The system will not allow diet orders for the patients when the patient is in the NPO status
Diet chart	The system provides the diet chart of the patient as a tabular chart with seven days view. The diet chart can be printed by the user if necessary
Ward wise diet ordering	The system supports selection of multiple patients in the ward and placing the diet orders for all of them as a single step function
Label for diet orders	The system allows printing of the labels for the diet orders and also the consolidated manifest from the kitchen worklist
Kitchen worklist	The system provides the kitchen worklist which displays the diet order as a summary tab and detailed tab. The summary tab provides a pivot table with count of order items displayed ward wise
Delivery of diet orders	From the details tab of the kitchen worklist, the user will be able to mark the order as 'Executed'

2.4.7 Care Plans

Feature group	Description
Care plan Creation	System has provisions to create care plan and care pathways using the care plan master. These care plans can be restricted to Encounter & Department, pulled across visits, CDR, Department & diagnosis specific,
Care plan duration	Care plan durations can be preconfigured in the system so when the start date is entered the system will automatically calculate the task frequency and end date.
Goal configuration	The system allows the user to create multiple goals either during according to the protocol thereby enabling the user to

Feature group	Description
	find out whether the patient's goals are met or not met. Diagnosis mapping can also be achieved in the system.
Intervention	The system has the provision to modify the existing pathway through intervention where the system allows the user to make and record deviations in the protocol. The system also has the provision to add task as intervention and the tasks can be mapped to order.
Task Delegation	The care plan activities shall be designated as tasks and will be displayed in nursing worklist, the same will be updated once when a nurse executes the task.
Multi-disciplinary care plan	The system has the provision to create multi-disciplinary care plan. There is physician care plan, nurses care plan, other care plan in the system. Based on the diagnosis captured by the care provider, the doctor creates the care plan and based on the goals captured by the doctor, the nurse and others can create their own care plan.
Nursing Diagnosis	The system shall allow nurses to capture Nursing Diagnosis in the care plan.
Treatment Plan	The system allows the user to create treatment for all plans by adding goals and interventions. The plans and interventions can be added individually or can be picked up from the care plan master.
Past care plan	The system has the provision to view the past care plans and the present active care plans in a single screen.
Care plan Summary	The system has the provision to display the Name of the care plan, diagnosis, intervention, goals, start date and end date in the visit summary, Discharge summary, etc.
End care plan	The system has the provision to automatically cancel all upcoming tasks when a care plan is cancelled.

2.4.8 Medical Records Department (MRD)

Feature group	Description
File storage location	The system supports defining one or more MRD storage locations in the organisation. The storage locations can store files based on the MRN Number range or based on the file generation date or based on the file types
MRD file types	The system allows defining the file types that are managed in the MRD storage such as OPD chart, IPD chart, dental chart, x-rays, etc.

Feature group	Description
Automatic generation of medical record	Based on configuration, the system supports automatic generation of medical record such as OPD Chart based on the new patient registration process
Manual generation of record	The system supports manual generation of records (such as dental chart, etc.) by authorised users and based on the MRN of the patient
Inpatient charts	The system supports configuration option to create new volume for the patient IPD chart on each IPD admission or to maintain one IPD chart and one volume for all admissions
New volume upon IPD admission	Based on the configuration, the system can automatically generate a new volume upon IPD admission for the patient
Manual generation of new volume	The system supports manual generation of new additional volumes for the existing charts of the patient. The volumes will be uniquely identified using the MRN number and volume number or admission number
Issue files - multiple requests	While issuing files, if there are more than one file request for that file, the system will display the list of file requests and allow the user to choose one of them
MRD file search criteria	The system supports searching for the files based on the MRN or the patient name and displays the current location of the file along with options to view the file movement history
Accept the files issues	The system supports a function to accept the files received at various departments through the MRD file issue process
Outstanding files	The system supports a function for the MRD users to query outstanding files that ought to be returned back to the MRD department
Merge patient MRD files	The system supports the merging of two different patient records into one. This function can be used if two different files are opened for the same patient in different MRN or different names
Merge specific encounter	The system allows the user to merge a particular visit or encounter (Patient A) with that of another patient (Patient B). All the details in that encounter will be merged from patient A to Patient B. This is useful in case the visit was created with wrong file
Unmerge to revert back	The system allows the user to revert back merge or unmerge of records back to two different MRD files

Feature group	Description
Automated file request for OPD	The system supports generation of automated file request for the walk-in (non-appointments) patients registered with the OPD
Manual file Request	The system supports one or more file requests by authorised users and care providers by searching based on the patient MRN or name. The user will have to record the reason for request such as 'Follow-up' or 'Research' etc.
Auto print of MRD slip	The system supports automated printing of the MRD slip (File request slip) based on configuration at the MRD department level. The number of copies to be printed can be configured at the MRD department level
Appointment list	The system supports bulk issue of MRD files based on the appointments list for the department
Issue of files	The system supports issue of one or more file (based on file request or without request) by scanning the barcodes in the files
File movement history	The system displays the movement and status of the select file in table format, including requests, issues, etc.
Filter transfer between departments	The system supports transfer of files from one department to another department outside the MRD
Return files to MRD	The system supports the function for the various departments to return one or more files back to the MRD department
File request list	The system supports the MRD worklist which contains the list of file requests that need to be issued to the departments. The automated requests & manual file requests are separated in two tabs
Choose primary record	The system allows the user to choose the primary record to maintain in case of patient merge. The systems allow to choose the name, address, photograph, phone numbers, email address and national ID to make as primary
Cancel file Request	The system supports cancellation of one or more file requests by authorised users

2.4.9 Information Governance (HIM)

Feature group	Description
Check deficiencies in Patient	Allows the IG user to capture the deficiency in the medical records and to send notification to the respected user.

Feature group	Description
demographics and clinical details	
Deficiencies notification for Care provider	Allows the IG user to capture the deficiency patient details will be displayed as a notification with reason in the Deficiency records widget of medical director & HOD
Check deficiencies of Diagnosis (Coding details)	Allows the IG user to capture the deficiency in capture of diagnosis and notify the care provider.
Check deficiencies in Consent forms	Allows the IG user to capture the deficiency in capture of consent forms and notify the nurse.
Check deficiencies in OR records, Procedure details, Discharge planning and Discharge summary	Allows the IG user to capture the deficiencies during discharge planning/ summary, OR records, Procedure details and notifies the nurse.
Record Completion Notifications	Allows the care provider to update the medical records deficiency status to as completed after updating the records.
Accept/ Reject Changes	Allows the IG user to Accept or Reject the updates changes done by the care provider.
Locking of EMR	Allows only authorised users to access the patient EMR.
Request for EMR access	Allows the care provider to raise a request for EMR access.
EMR Access Approval/Rejection	Nurses/ Care providers can request the IG user for Approvals to access EMR of Other patients.
Patient information Request	The patient affairs department can raise a request to IG requesting for patient reports like discharge summaries, Lab results etc. which shall be printed and handed over to the patient.

2.4.10 Mortuary Management

Feature group	Description
Deceased / Body part registration	The system has the provision to register new deceased or an existing patient who is deceased. The system also has the provision to register as whole body or body part(s).
Mass Mortuary Registration	The system has the provision to do mass registration in the mortuary in case of mass casualty.
Death record	The system displays death record details like date& time, reason, department, care provider, brought death / died outside

Feature group	Description
	hospital / died inside hospital etc., The system also allows to show religion specific alerts
Next of Kin details	The system allows the user to capture the NOK details and relationship during mortuary registration / admission. The same will be displayed in the corpse handover screen as well.
Body / Body part storage	The system has the provision to store body / body part in identified freezer after mortuary admission is completed. The system prints body tag and freezer tag during this process
Mortuary Management	System has provisions to assign freezer, schedule autopsy (post-mortem), capture autopsy details and corpse handover.
Freezer assigning and personal belongings details	The system allows the user to assign freezer for the deceased during admission and during post admission. Also, the user has the option to capture the identification marks and personal belongings of the deceased in the mortuary admission screen
Post-mortem	The system has the option to enable post-mortem option from the death record screen. The system also allows to select it as MLC or clinical post-mortem
Body release / Body part	The system has the provision to release the body/body part to NOK / Police / Third party along with the deceased's belongings after financial discharge is completed
Release of unclaimed body part	The system has the provision of releasing unclaimed bodies to third party or to the police, once financially discharging the patient
High risk body management	The system has the provision to mark the deceased as high risk while registering the patient with the necessary documentation. This has information like informing district health officer, decontaminate body etc., An alert indication will be displayed in the mortuary worklist

2.5 Mobility Solutions

2.5.1 Doctor's App

Feature group	Description
Operating System	Doctor's app supports both Android and iOS OS
Login to the application	The app allows the doctors to log to the doctor's workbench using login id and password / fingerprint / face recognition or native authentication

Feature group	Description
Doctor's Workbench	The app allows the doctors to view the list of patients in OPD, IPD, Referrals, A&E, Appointments and also to view the lab and radiology reports of their patients
View EMR	The app allows the doctors to view the EMR of the patient by clicking on the patient name in their work list
View all visits	The app allows the doctors to view current and previous visit details of their patient
Notifications	The app allows push notifications for every new entry into the doctor's app

3 INTEGRATION WORKFLOW OF IQVIA HIS WITH THIRD PARTY SOLUTIONS

This section provides a brief overview of IQVIA HIS and its interfacing architecture with the third-party healthcare administrative and clinical systems as well as the back-end systems such as SAP, PeopleSoft, Microsoft Dynamics, etc.

3.1 Integration Standards

This diagram illustrates the main modules within IQVIA HIS and the possible 3rd party applications on an Integration Layer (e.g. PACS, DMS, ERP, Mobile App etc.) and software that it is able to integrate with. We have had clients who wish to move data between IQVIA HIS and their existing applications such as their Enterprise Resource Planning (ERP), or Electronic Document Management System (DMS). Another common requirement is to integrate with an existing Laboratory Devices Control System such as Roche. Since IQVIA HIS is HL7 compliant, we have no problems transferring transactional data with other HL7 compliant applications.

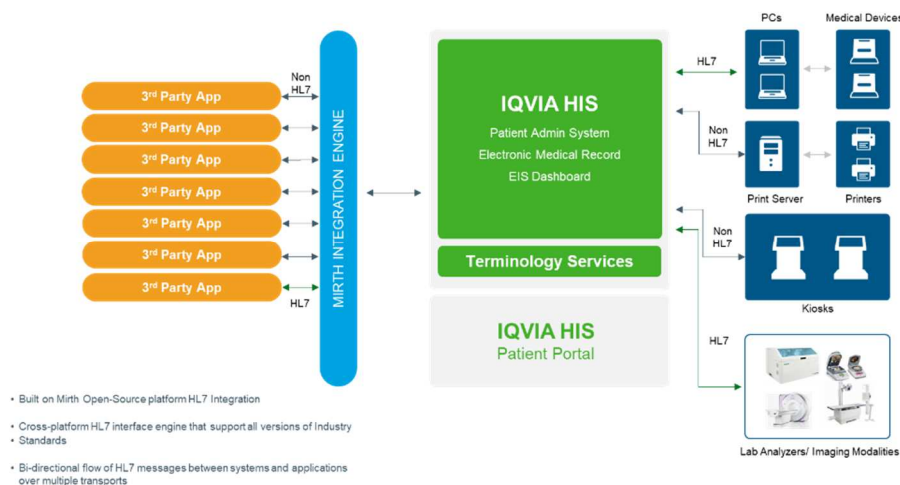


Figure 7: Proposed Integrated Solution Architecture

3.2 Integration to Third Party Healthcare Apps using HL7 Messaging

Structure Base Type	Supported Trigger Events
ADT^A01	A01 - Admit Patient Notification A04 - Register Patient A08 - Update Patient Information A13 - Cancel Discharge Event
ADT^A02	A02 - Patient Transfer Event
ADT^A03	A03 - Discharge Event
ADT^A05	A05 - Pre-Admit Patient (Reserve Bed Functionality) A28 - Add Person Information A31 - Update Person Information
ADT^A06	A06 - Change Outpatient to Inpatient

Structure Base Type	Supported Trigger Events
ADT^A09	A09 - Patient Departed – Tracking A10 - Patient Arrived (Tracking) A11- Cancel Admit Patient Notification
ADT^A12	A12- Cancel Patient Transfer Event
ADT^A17	A17 - Swap Patients
ADT^A20	A20 - Bed Status Update Note: This event type is for reporting purposes only and subject to change
ADT^A21	A25 - Cancel Pending Discharge (Revert Medical Discharge) A14 - Pending Admit (Admission Request) A27 - Cancel Pending Admit (Cancel Admission Request)
	A29 - Delete Person Information
ADT^A30	A30 - Merge Patient Information (Patient ID Only) A47 - Change Patient Identifier List. Note: Facility will select either one of the Message types
ADT^A39	A39 - Merge Patient (Patient ID) A40 - Merge Patient Identifier List. Note: Facility will select either one of the Message types. A37 – Unmerge
ORM^O01	O01 - Used for Medication Orders
RDE^O11	O11 - Pharmacy / Treatment Encoded Order
OMP^O09	O09 - Pharmacy/Treatment Order Message
ORU^R01	R01 - Unsolicited Transmission of an Observation Message. Note: R01 used for lab, radiology, transcriptions and other orders, and for observations
MDM^T01	T11 - Document Cancel Notification
MDM^T02	T02 - Original Document Notification and Content T04 - Document Status Change Notification T08 - Document edit notification
VXU^V04	V04 - Unsolicited Vaccination Record Update

Table 2: Integration to Third Party Healthcare Apps using HL7 Messaging

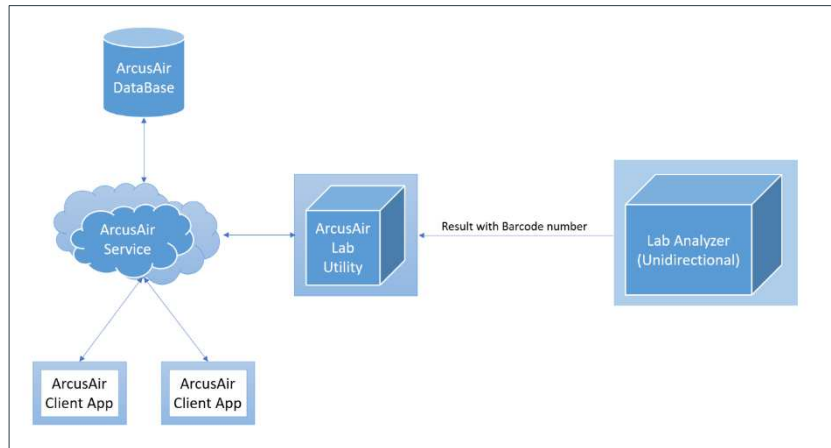
3.3 Integration to LIS

Integration of IQVIA HIS to LIS automate the specimen/ sample processing (by sending of orders and receiving results), which reduces the manual work and avoids human errors, while reporting investigation results.

3.3.1 Unidirectional Interface

- Nurse/ Doctor creates Lab order in HIS.

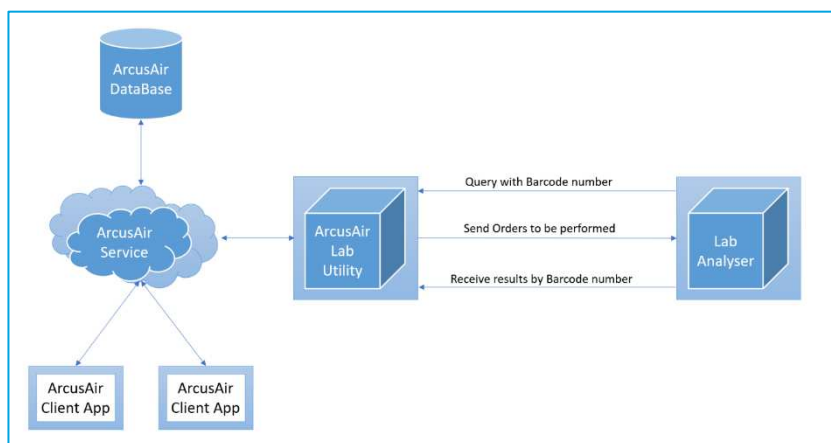
- Nurse prints the Specimen Label with Accession Number (barcoded) and collects specimen and records in HIS.
- Once the specimen reaches the Lab, it is accepted by the Lab user, and recorded in LIS
- Default/ Manual order is processed in the Analyzer for the barcoded sample.
- Once the result is performed, it is transmitted to HIS through the HIS interface utility.



- All the results received from the interface are listed in the Review Result screen for the Lab user to verify.
- Upon verifying the result in HIS, the result status is updated as Report Authorised and gets displayed in the patient's EMR.

3.3.2 Bidirectional Interface

- Nurse/ Doctor creates Lab order in HIS.
- Nurse prints the Specimen Label with Accession Number (barcoded) and collects specimen and records in HIS.
- Once the specimen reaches the Lab, it is accepted by the Lab user, and recorded in LIS.
- Lab user places the barcoded specimen in the Analyzer.
- Upon Analyzer reading the Accession Number (barcoded), it sends a query message with the Accession Number to HIS utility for the work list.
- Interface utility fetches the orders created for the Accession Number and relays that information to the Analyzer.
- Once the result is performed, it is transmitted to HIS through HIS interface utility.
- All the results received from the interface are listed in the Review

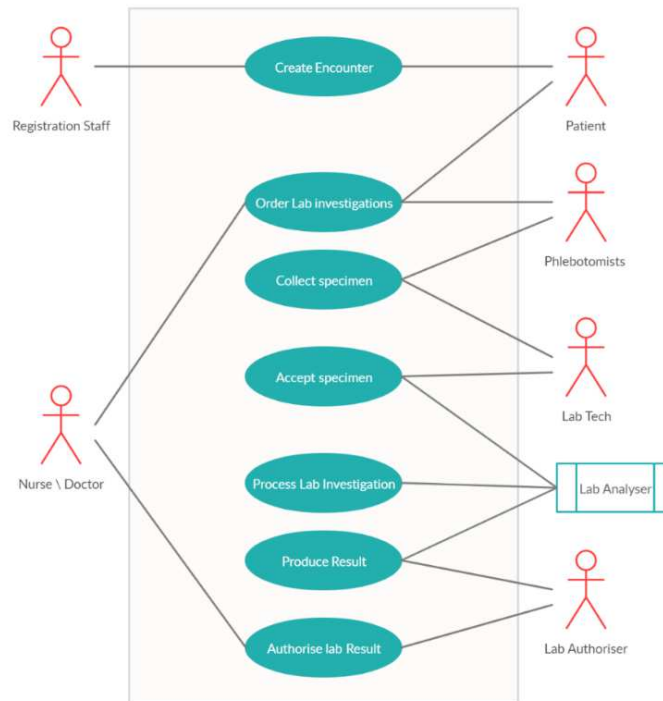


Result screen for the Lab user to verify.

- Upon verifying the result in HIS, the result status is updated as Report Authorised and gets displayed in the patient's EMR.

Use Case Diagram

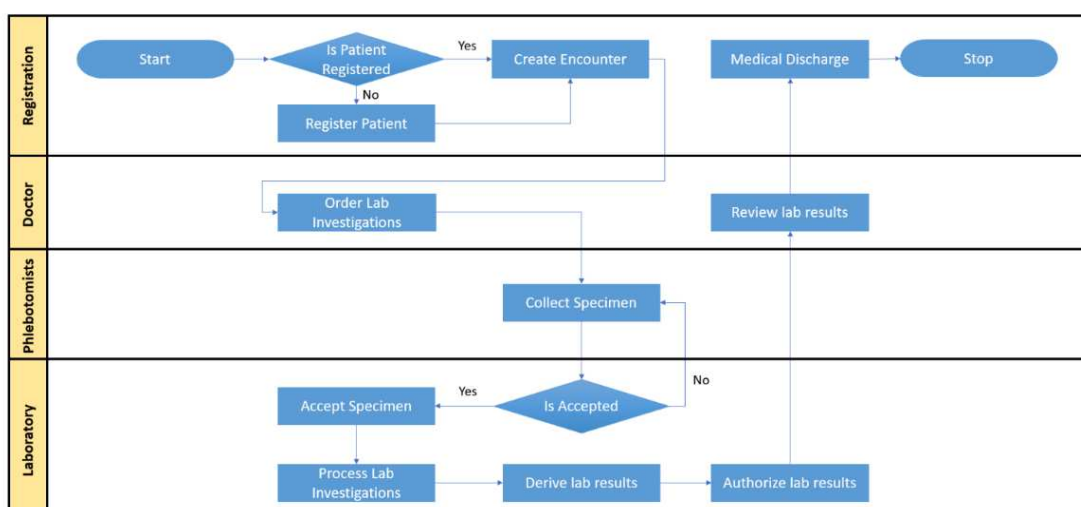
The following use case diagram depict the integration between HIS and LIS systems



3.3.3 Transport Mechanism

HL7 are the most commonly used message formats to exchange information between HIS and LIS. During the Business Requirements Study (BRS) the details of the attributes, workflow and sample message exchanges will be shared.

Workflow



3.4 Integration Experience

3.4.1 RIS / PACS Integration Experience

Vendor	Comm. Protocol
Medsynaptics	HL7
BJC	HL7
Variant – Aria	HL7
J.F Advanced Medical Co Ltd	HL7
Infinitt	HL7
Carestream	HL7 v2.8
AGFA	HL7
Mediff	HL7
Siemens PACS	HL7
GE PACS	HL7 v2.8
Direct integration with CT, Xray & Ultrasound Equipment	DICOM
Phillips	HL7 v2.8

Table 3: RIS / PACS integration experience

3.4.2 Lab Analysers' Integration Experience

Analyzer Model	Data Flow
A25 Random Access Analyzer	(Proprietary / ASTM format) Unidirectional
A15 Random Access Analyzer	(Proprietary / ASTM format) Unidirectional
Abbott M2000RT	(Proprietary / ASTM format) Unidirectional
ABX Micro E60	(Proprietary / ASTM format) Unidirectional
ABX Pentra ES 60	(Proprietary / ASTM format) Unidirectional
ABX Pentra 400	(Proprietary / ASTM format) Bidirectional
ABL 80	(Proprietary / ASTM format) Unidirectional
ABL 800	(Proprietary / ASTM format) Unidirectional
AIA-360	(Proprietary / ASTM format) Unidirectional
AL 80	(Proprietary / ASTM format) Unidirectional
Architect i1000	(Proprietary / ASTM format) Bidirectional
Architect i2000	(Proprietary / ASTM format) Bidirectional
AQT90 Flex	(Proprietary / ASTM format) Bidirectional
AU 400	(Proprietary / ASTM format) Bidirectional
AU 480	(Proprietary / ASTM format) Bidirectional
AU 5800	(Proprietary / ASTM format) Bidirectional

Analyzer Model	Data Flow
BD Phoenix M50	(Proprietary / ASTM format) Unidirectional
Biolis 24i	(Proprietary / ASTM format) Unidirectional
BIORAD D10	(Proprietary / ASTM format) Bidirectional
Bio rad IH500	(Proprietary / ASTM format) Unidirectional
Bio-Rad Evolis	(Proprietary / ASTM format) Unidirectional
BioRad - Variant II	(Proprietary / ASTM format) Unidirectional
Cobas Integra 400	(Proprietary / ASTM format) Bidirectional
Destiny Plus	(Proprietary / ASTM format) Bidirectional
Diasorin Liaison	(Proprietary / ASTM format) Bidirectional
Dimension EXL 200	(Proprietary / ASTM format) Bidirectional
Dimension RXL 200	(Proprietary / ASTM format) Bidirectional
Daytona (Randox)	(Proprietary / ASTM format) Bidirectional
Evolis Twin Plus	(Proprietary / ASTM format) Bidirectional
GEM 3000	(Proprietary / ASTM format) Unidirectional
ISE 4000	(Proprietary / ASTM format) Unidirectional
Microsom Walk Away 96 PLUS	(Proprietary / ASTM format) Unidirectional
MiniCap	(Proprietary / ASTM format) Bidirectional
MiniVidas	(Proprietary / ASTM format) Bidirectional
Mission U120	(Proprietary / ASTM format) Unidirectional
Nova	(Proprietary / ASTM format) Unidirectional
Ruby Cell Dyn	(Proprietary / ASTM format) Bidirectional
Siemens Centaur XP	(Proprietary / ASTM format) Bidirectional
Siemens Expand Plus	(Proprietary / ASTM format) Bidirectional
Stago Compact	(Proprietary / ASTM format) Bidirectional
Stago Compact Max 2	(Proprietary / ASTM format) Bidirectional
Stratus CS200	(Proprietary / ASTM format) Bidirectional
Sysmex CA 1000	(Proprietary / ASTM format) Bidirectional
Sysmex CA 1500	(Proprietary / ASTM format) Bidirectional
Sysmex KX 21	(Proprietary / ASTM format) Unidirectional
Sysmex XP 100	(Proprietary / ASTM format) Unidirectional
Sysmex XT 1800	(Proprietary / ASTM format) Bidirectional
Sysmex UX 2000	(Proprietary / ASTM format) Bidirectional
Sysmex XE 2100	(Proprietary / ASTM format) Bidirectional

Analyzer Model	Data Flow
Sysmex XN 10	(Proprietary / ASTM format) Unidirectional
Sysmex XN 1000	(Proprietary / ASTM format) Bidirectional
Sysmex XN 3000	(Proprietary / ASTM format) Unidirectional
Sysmex XT 4000	(Proprietary / ASTM format) Bidirectional
Sysmex UF 1000i	(Proprietary / ASTM format) Bidirectional
Tecan Freedom Analyzer	(Proprietary / ASTM format) Unidirectional
Uriscan Pro 2	(Proprietary / ASTM format) Unidirectional
UriSys 1100	(Proprietary / ASTM format) Unidirectional
UriSys 2400	(Proprietary / ASTM format) Unidirectional
Ves Matic Cube 30	(Proprietary / ASTM format) Unidirectional
VES Matrix Cube 80	(Proprietary / ASTM format) Bidirectional
Vidas	(Proprietary / ASTM format) Bidirectional
Vitros 4600	(Proprietary / ASTM format) Bidirectional
Vitros 5600	(Proprietary / ASTM format) Bidirectional
Vitros 250	(Proprietary / ASTM format) Bidirectional
XS-8001	(Proprietary / ASTM format) Bidirectional
Abbott C4000	(Proprietary / ASTM format) Bidirectional
ABL 800 Basic (Blood Gas Analysers)	(Proprietary / ASTM format) Unidirectional
Acl Elite pro	(Proprietary / ASTM format) Bidirectional
ACL TOP	(Proprietary / ASTM format) Unidirectional
Advia 2120i	(Proprietary / ASTM format) Unidirectional
AQT 90 Flex	(Proprietary / ASTM format) Unidirectional
Beckman Coulter Access 2	(Proprietary / ASTM format) Bidirectional
Beckman Coulter DXH 500	(Proprietary / ASTM format) Unidirectional
BECKMAN COULTER UNICEL DXH800	(Proprietary / ASTM format) Bidirectional
Cell Dyn Emerald 18	(Proprietary / ASTM format) Unidirectional
Cell Dyn Emerald 22	(Proprietary / ASTM format) Unidirectional
Cell Dyn Ruby	(Proprietary / ASTM format) Unidirectional
Cobas 6000 -C501	(Proprietary / ASTM format) Bidirectional
Cobas B221	(Proprietary / ASTM format) Bidirectional
Cobas C111	(Proprietary / ASTM format) Bidirectional
Cobas C311	(Proprietary / ASTM format) Bidirectional

Analyzer Model	Data Flow
Cobas C501	(Proprietary / ASTM format) Bidirectional
Cobas E411	(Proprietary / ASTM format) Bidirectional
Cobas U411	(Proprietary / ASTM format) Unidirectional
Biorad Evolis twin plus	(Proprietary / ASTM format) Unidirectional
GEM 4000	(Proprietary / ASTM format) Unidirectional
Helena SAS3 & SAS4	(Proprietary / ASTM format) Bidirectional
Microscan Walk Away 96 Plus	(Proprietary / ASTM format) Unidirectional
ORTHO VISION	(Proprietary / ASTM format) Bidirectional
Siemens Dimension EXL200	(Proprietary / ASTM format) Bidirectional
Siemens Dimension Xpand	(Proprietary / ASTM format) Bidirectional
Siemens Dimension Xpand Plus	(Proprietary / ASTM format) Bidirectional
Siemens Stratus CS200	(Proprietary / ASTM format) Unidirectional
Stago Compact Max2	(Proprietary / ASTM format) Bidirectional
Stago Sta Compact	(Proprietary / ASTM format) Bidirectional
Stratus CS 200	(Proprietary / ASTM format) Bidirectional
Sysmex XN-1000	(Proprietary / ASTM format) Bidirectional
Sysmex XP 300	(Proprietary / ASTM format) Unidirectional
Sysmex CA600	(Proprietary / ASTM format) Bidirectional
Sysmex KX 2IN	(Proprietary / ASTM format) Unidirectional
Sysmex XT2000	(Proprietary / ASTM format) Unidirectional
Tecan evolyzer	(Proprietary / ASTM format) Bidirectional
Tecan Freedom	(Proprietary / ASTM format) Unidirectional
Variant II	(Proprietary / ASTM format) Unidirectional
Vitek2	(Proprietary / ASTM format) Unidirectional

Table 4: Lab Analysers' Integration Experience

3.4.3 LIS / Middleware Integration Experience

Vendor	Comm. Protocol
HC Lab	HL7
Roche	HL7
RAX	HL7
MLAB	HL7
TD-Synergy	HL7
Blood Bank (KKU In-house)	HL7

EGIS	HL7
Sukraa	HL7
TD Nex Labs	HL7

Table 5: Lab/ Middleware Integration Experience

3.4.4 Backend Systems Experience

Vendor	Comm. Protocol
SAPR3	ATSM
Sap HANA	ATSM
SAPB1	ATSM
JDE	ATSM
Peoplesoft	ATSM
Microsoft Dynamics	ATSM

Table 6: Backend Systems Experience

3.4.5 Other Interfaces

Interface System/Name	Type/Description
CRS – MOH KSA	Client Registry - HIS fetches the basic patient data from the MOH client registry system
Sick Leave – MOH KSA	HIS posts the sick leave details to the MOH Sick leave portal
LDAP	User will login using the windows credentials and login credentials are validated in the LDAP server
Mawid CAS – KSA	Central appointment systems allow the user to book an appointment for the patient
Medi-Span	Drug Information Database
Pay U	Payment Gateway
Pay Maya	Payment Gateway
Med Express	Pharmacy system
MKS Medic	EEG
Ara Tech Bis	RFID
GE MUSE	ECG
ASTA	Smart Kiosk
QMS	Token/Queue
Philips ICCA	CCIS
Welch Allyn	Vital Monitors
LATIMAX	Automated Dispensing Unit / Pharmacy Robot

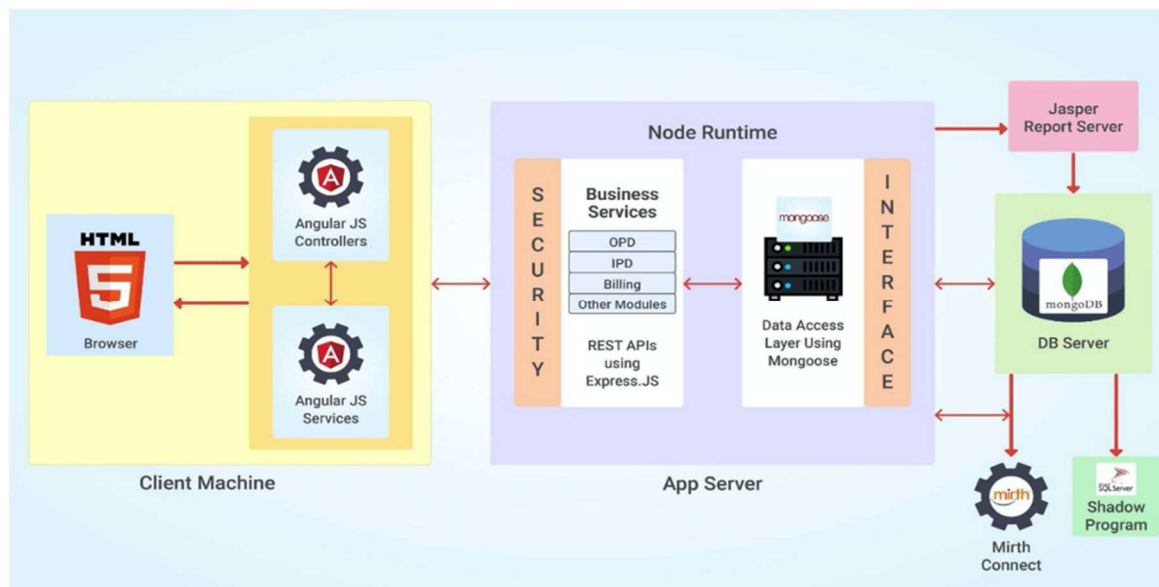
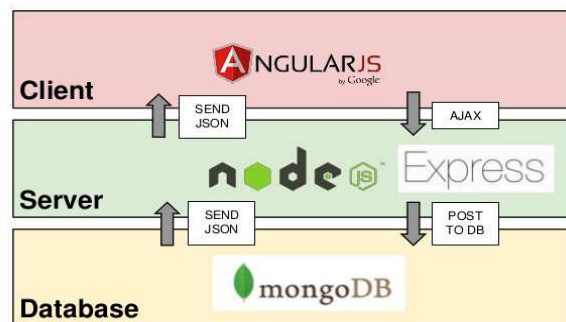
Interface System/Name	Type/Description
Philips ISCV	Cardiovascular
Verifone / Ingenico Terminals	Credit Card Terminals
DocuWare	Document Management System
Encore Med	Patient Portal

Table 7: Other Interfaces

4 SOLUTION ARCHITECTURE & DESIGN

4.1 Logical Architecture

The MEAN Stack



The table below provides details about the various layers in the logical architecture of the IQVIA HIS:

No	Tier	Details
1	Presentation layer	Presentation layer is developed with Angular JS which is an open source web application framework. Angular JS is a structural framework for dynamic web apps. It uses HTML as the template language and lets programmers extend HTML's syntax to express the application's components clearly and succinctly. Angular's data binding and dependency injection happens within the browser, making it an ideal partner with any server technology.
2	Application layer	The application layer is built using Node JS platform.

No	Tier	Details
		Node JS is a platform built on Chrome's JavaScript runtime for easy building of fast and scalable network applications. Node JS uses an event-driven, non-blocking I/O model that makes it lightweight and efficient, perfect for data-intensive real-time applications that run across distributed devices. Node JS is an open source, cross-platform runtime environment for developing server-side and networking applications. Node JS applications are written in JavaScript and can be run within the Node JS runtime on OS X, Microsoft Windows and Linux. Node JS also provides a rich library of various JavaScript modules which simplifies the development of web applications using Node JS to a great extent.

4.1.1 Advantage of Angular JS



- No need to use observable functions; Angular analyses the page DOM and builds the bindings based on the Angular-specific element attributes. That requires less writing, the code is cleaner, easier to understand and less error prone.
- Data binding occurs not on each control or value change (no change listeners) but at particular points of the JavaScript code execution. That dramatically improves performance as a single bulk Model / View update replaces hundreds of cascading data change events.
- Extended features such as dependency injection, routing, animations, view orchestration, and more.
- Supported by Google and a great development community.

4.1.2 Advantage of Node JS



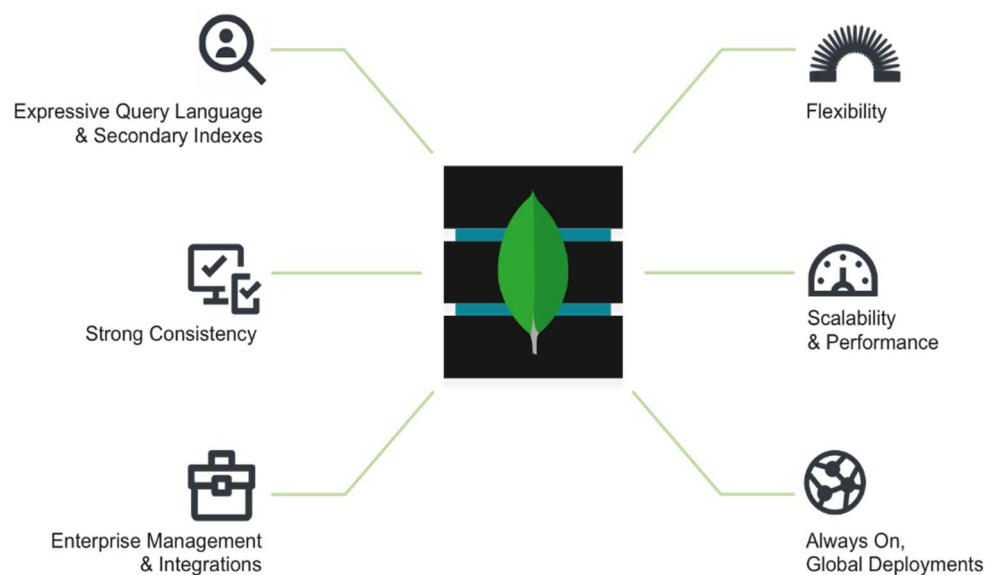
- All APIs of Node JS library is asynchronous, that is, non-blocking. It essentially means a Node JS based server never waits for an API to return data. The server moves to the next API after calling it and a notification mechanism of events of Node JS helps the server to get a response from the previous API call.
- Being built on Google Chrome's V8 JavaScript engine, Node JS library is very fast in code execution.
- Node JS uses a single threaded model with event looping. Event mechanism helps the server to respond in a non-blocking way and makes the server highly scalable as opposed to traditional servers which create limited threads to

handle requests. Node JS uses a single threaded program and the same program can provide service to a much larger number of requests than traditional servers like Apache HTTP server.

- Node JS applications never buffer any data. These applications simply output the data in chunks.

4.2 Data Architecture

It is developed using MongoDB which is a document database that provides high performance, high availability, and automatic scaling.



4.2.1 Advantage of MongoDB



- Provides high performance data persistence. In particular,
 - Support for embedded data models reduces I/O activity on database system.
 - Indexes support faster queries and can include keys from embedded documents and arrays.
- Supports a rich query language to support read and write operations as well as:
 - Data aggregation
 - Text Search and Geospatial Queries.
- Supports High Availability using Replication
 - Automatic failover and
 - Data redundancy.
- Horizontal Scalability

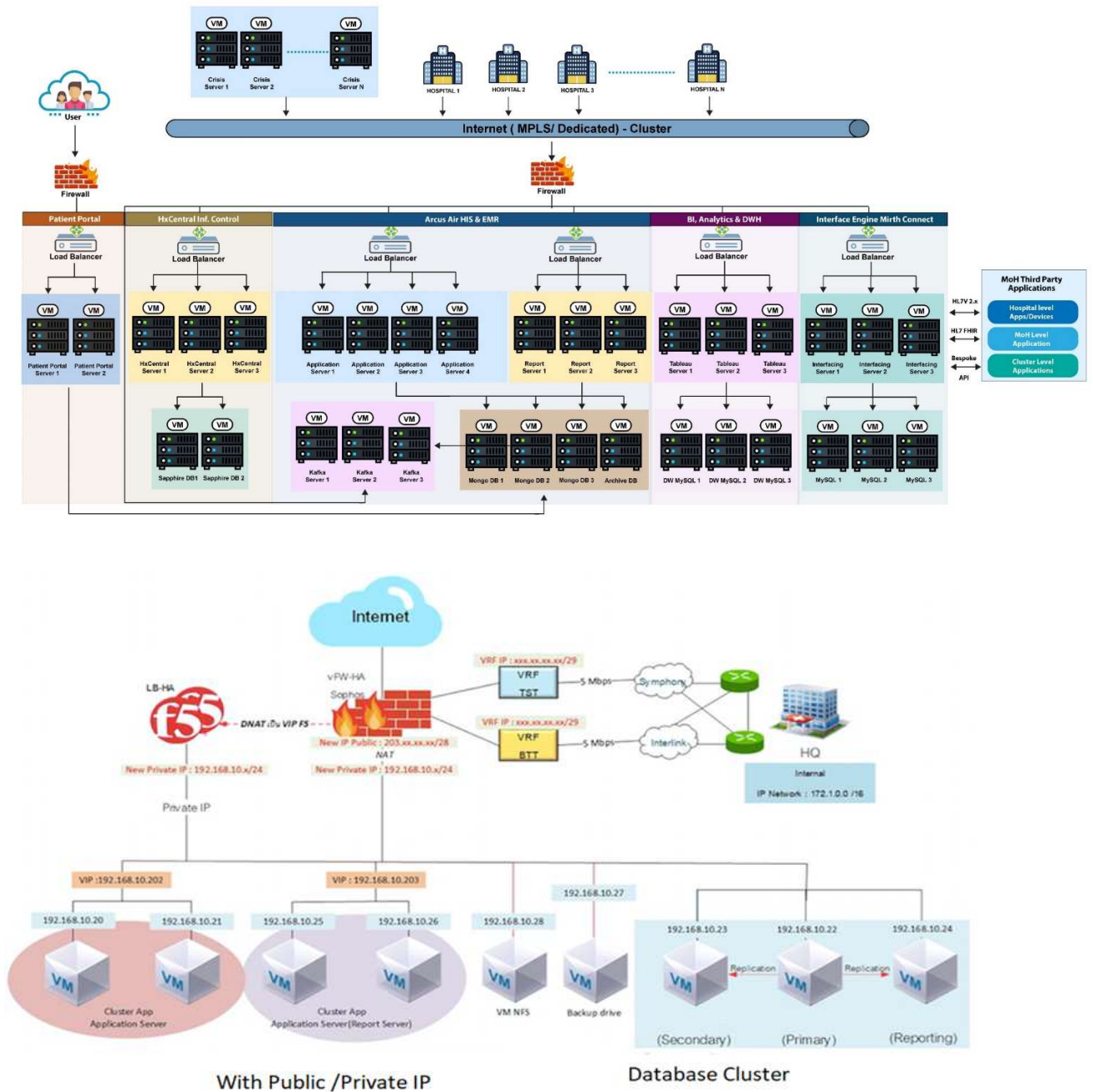
- In addition to Vertical scalability MongoDB also provides horizontal scalability as part of its core functionality
- This feature enables to handle VLDB without compromising on performance or response times.
- Using Sharding Technology distributes data across a cluster of machines.
- Tag aware Sharding allows for directing data to specific shards, such as to take into consideration geographic distribution of the shards.

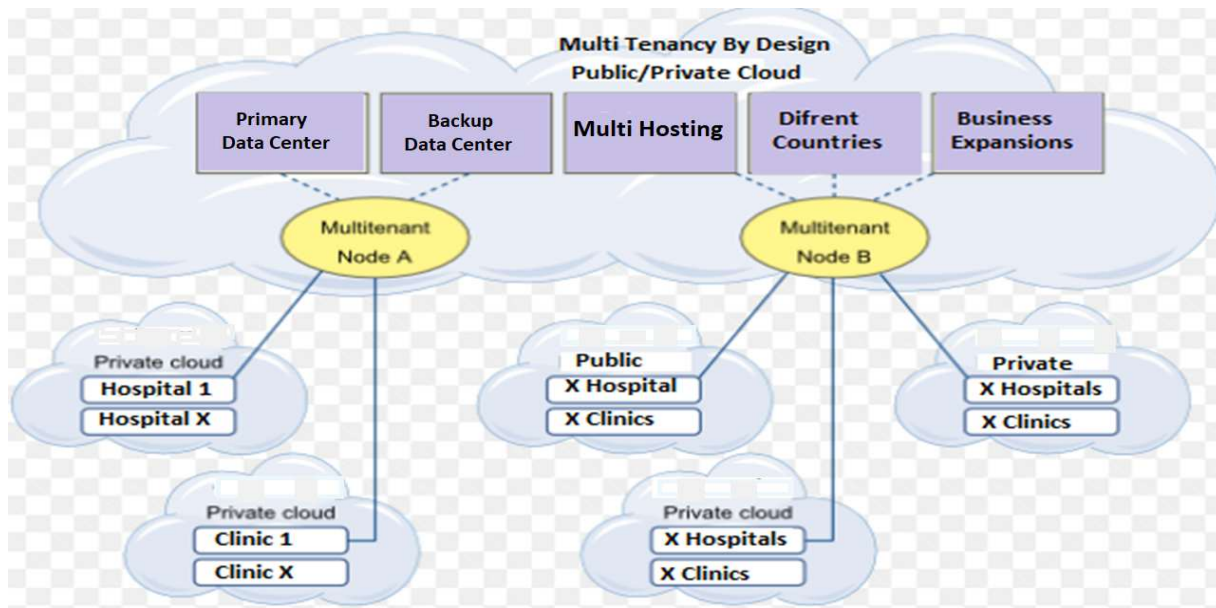
4.2.2 Technology Advantage



- HTML5 & JavaScript have emerged as the most popular programming language over Java or C# in recent years.
- One Language (JavaScript & JSON) is used all the way from User Interface screens to the database level.
- Performance – NodeJS is very fast among the application server technologies
- Support – MongoDB is the leading NoSQL database provider. Google supports AngularJS & NodeJS. NPM (Node Package Manager) is the largest ecosystem for development.
- Platform Agnostic – Can be hosted in Unix, Linux or Windows platforms.
- Cloud ready – Can be readily hosted in Amazon AWS or Microsoft Azure cloud platforms.
- Device Agnostics – Works in PCs, Laptops, Tablets and Mobiles platforms, in both Android & iOS devices.
- Responsive GUI – User friendly, fast and responsive GUI using AngularJS and HTML5.
- Open source-based stack there by better industry support and lower TCO on infrastructure
- Easier development cycle compared to Microsoft technologies.
- The technology stack is becoming the choice for all new developments and large projects across leading corporations.

4.3 Deployment Architecture





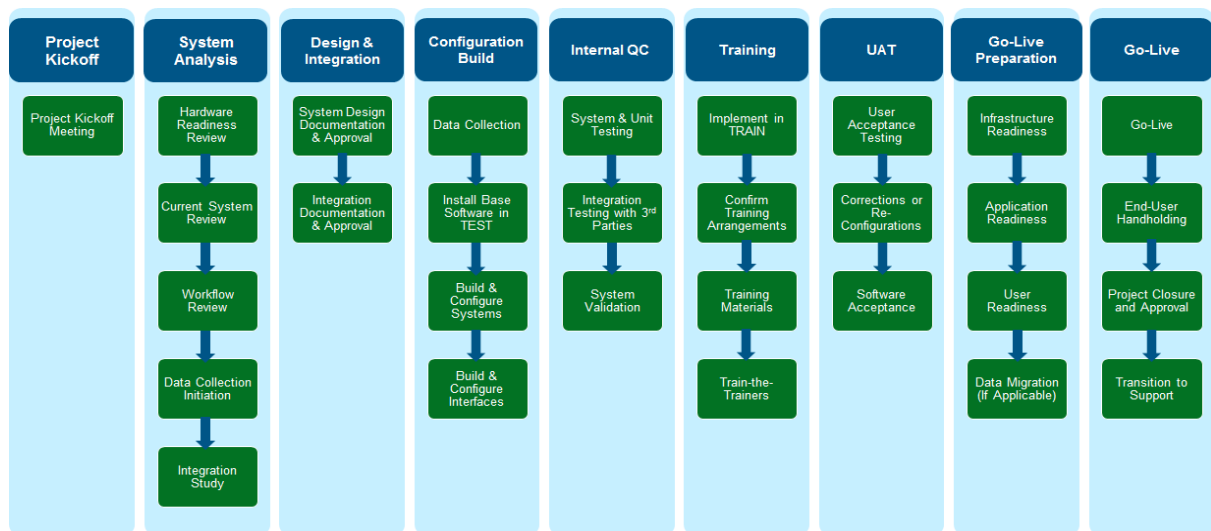
5 IMPLEMENTATION METHODOLOGY

5.1 Approach

IQVIA's Software Implementation Methodology is a set of procedures and practices to ensure the effective implementation of our solutions.

IQVIA understands that every implementation differs, therefore, our methodology includes high-level activities and procedures leaving room for flexibility at the task level allowing the Implementation team to customise the process based on the needs of the project.

IQVIA adopts a 9-stage Implementation Methodology



5.2 Project Kick-off and Planning Phase

This is a project event that is scheduled with CLIENT Services to officially announce the commencement of the project.

This meeting introduces the members of the project team, their roles and responsibilities in the project. The Project objectives, high-level scope and the project timelines are discussed.

Teams involved during this stage are:

CLIENT Services	IQVIA
- Project Sponsor - Project Manager - Departmental Heads - Subject Matter Experts - Core-Users	- Project Manager - Solution Lead/ Architect - Integration Lead/ Architect - Business Lead/ Analyst

Documents to be Delivered:

- *Project Management Plan*

5.3 System Analysis and Requirement Gathering Phase

The System Analysis stage starts the Execution phase of the project. During this stage, the hardware readiness, current system (either the legacy application or manual process), existing workflow and future workflows are reviewed and documented.

System Analysis consists of:

- Current System Analysis and Workflow Review
- Interfaces Study and Discussion
- Configuration Data Collection

The Current System Analysis and Workflow Review (Future System Analysis) sessions are led by our Solution Architect with participation of CLIENT Services Subject Matter Experts and Core-users.

During the Current System Analysis, CLIENT Services current practices, policies and workflows (legacy system or manual process) are discussed and documented.

The purpose of the Workflow Review (Future System Analysis) stage is to understand and incorporate the requirements and needs of CLIENT Services, enhance and map the As-Is workflows to our application processes. The Future System Analysis sessions will be initiated by demonstrating the vanilla application to CLIENT Services Subject Matter Experts/ Core-users. It should be noted that at this stage, the application is not configured to CLIENT Services requirements. The purpose of this demonstration is to make CLIENT Services Subject Matter Experts/ Core-users familiarise the application's out-of-box functionalities and capabilities, which would be helpful during the Future System Analysis discussions.

After concluding the Future System Analysis discussions, Solution Architect will produce Future Workflow Document (To Be Document), proposing the future workflows and the interface touch points with 3rd Party solutions. The Future Workflow Document will be discussed and finalised with CLIENT Services Subject Matter Experts, Core-users and the Solutions Architects of the 3rd Party Solutions.

After finalising the Future Workflow Document, our Interface Architect will initiate interface discussions with 3rd Party solutions. For the CLIENT Services implementation, the interface discussions will be in a separate Interface Stream. During this stream, the workflows and interface touchpoints are discussed in detail and will produce an Interface Model document.

During the Configuration Data Collection Stream, which runs in parallel to the Interface Stream, our Solution Architect will review and discuss with CLIENT Services Subject Matter Experts/ Core-users and Solution Architects of other 3rd Party solutions on the configuration data that needs be collected for our application. After these discussions, IQVIA submits the finalised Data Collection Templates (DCT) for data collection, and CLIENT Services provides the data requested, per the Project Schedule.

Teams involved during this stage are:

CLIENT Services	IQVIA
• Subject Matter Experts • Core-Users • Solution Architects – 3rd Party • Integration Architects – 3rd Party • Project Manager	• Solution Lead/ Architect • Integration Lead/ Specialist • Business Lead/ Analyst • Project Manager

Document to be Delivered:

- *BRS Study document*

5.4 Design & Integration Phase

The purpose of this stage is to finalise the Application Design and the Interface Model.

Our Solution Architect will prepare and submit the Design Document to CLIENT Services, which details the future workflows, optimised As-Is workflows, interface touchpoints, application functionalities, business rules, “Stop, Start & Continue” processes and design decisions for the application.

During the Design Review sessions, our Solution Architect will walk through the Design Document with CLIENT Services SMEs and Core-Users. The output of the Design Review sessions will be the finalisation and sign-off of the Design Document.

The Interface Model document that was produced during the System Analysis - Interface Stream, details the interface touch points & trigger events, format & specifications of interface messages, design decisions and other technical aspects of the interfaces.

Our Integration Architect will walk through the Interface Model document with Integration architects of the 3rd party solutions. The output of the Interface Review sessions will be the finalisation and sign-off of the Interface Model document.

Our Business Analyst/ Implementation Consultants, assisted by the Solution and Integration architect, will modify/ update the product-ready Test Scripts for the System Validation, for covering various test scenarios based on the Functional Design and Interface Model Document.

Teams involved during this stage are:

CLIENT Services	IQVIA
• Subject Matter Experts • Core-Users • Integration Architects – 3rd Party • Project Manager	• Solution Lead/ Architect • Integration Lead/ Specialist • Project Manager

Document to be Delivered:

- *Analysis and Design Plan Document*

5.5 Configuration, Development and Customisation Phase

The main activities during this phase are:

- Installation of the base software (software that is not customised) at the CLIENT Services environment
- Collection of configuration/ customisation data from CLIENT Services
- Build/ customisation of the application and the interface components.

The base software will be first installed on the Non-Production domain during the Current System Analysis stage and on the Production domain before the Go Live Preparation stage.

Before these activities, our Infrastructure & Security Lead conducts review meetings with the Infrastructure team to ensure that the domains meet the recommended specifications and pre-requisites. The base software installation is typically an offsite activity, provided CLIENT Services IT & Security policies permits remote access to the domains.

The Application Build/ Configuration will commence after the Design Document sign-off and upon receiving the Configuration Data from CLIENT Services. These are offsite activities conducted by our Implementation Team.

The Interface Build and Configuration will commence after the Integration Model sign-off. These are offsite activities conducted by our Implementation Team.

Teams involved during this stage are:

CLIENT Services	IQVIA
• Infrastructure Team • Project Manager	• Infrastructure & Security Lead • Business Analyst Lead • Solution Lead/ Architect • Project Manager

Document to be Delivered:

- *Development and Allocation Plan Document*

5.6 Internal Quality Check / Testing Phase

This stage ensures that the solutions and interface components are tested and validated before releasing the application for User Acceptance Testing. To ensure the quality of the Application Build, various testing, including Unit Testing, System (Functional) Testing, Interface Testing and an end-to-end System Validation are conducted by Implementation Team. As part of the System Validation, the Implementation Team will conduct a demo of the application to CLIENT Services using various test scenarios. The testing will be conducted in CLIENT Services TEST domain.

Prior to the Internal QC stage, the Project Manager conducts planning meetings with the Solution Architect, Business Analyst/ Implementation Consultants and the QC team to plan for the successful testing. Following testing activities are covered as part of the Internal QC:

- Unit Testing is to ensure that the configuration data received from CLIENT Services matches to the application requirements.

This testing is conducted in parallel with the Build/ Configuration activities and is performed by our QA team assisted by the Business Analyst/ Implementation Consultants.

- System (Functional) Testing is the standalone functional testing of the application, conducted after the configuration of the application.

This testing is conducted in parallel with the Build/ Configuration activities. This testing is performed by our QC team assisted by the Solution Architect.

- Interface Testing is conducted with the 3rd Party applications after completing the Interface Build/ Configuration and the Unit & System Testing.

This testing is based on the Interface Model document, covering all the aspects of the interfaces. This testing consists of our QA team, Business Analyst/ Implementation Consultants and 3rd Party Application team. CLIENT Services must ensure the availability of representatives from the required 3rd Party systems.

The Integration Architect leads the testing and assists the Business Analyst/ Implementation Consultants to create test cases and scenarios.

- Solution Validation is conducted after the successful completion of the above Testing. The System Validation consists of two parts:

(1) End-to-end testing of the integrated application covering the application functionalities and the interface touchpoints with 3rd Party applications

(2) Demo of the application to CLIENT Services after the successful completion of part (1).

Our Business Analyst/ Implementation Consultants use various scenarios (based on the Test Scripts available) as guidelines and walkthrough the application using the Start-End processes. Any discrepancies found during this testing are tracked and Corrective actions are implemented.

Our team also discuss and plans for the Preventive measures. The failed Test Scripts are re-run to ensure the validity of the corrections.

The releases are version controlled before releasing the application to CLIENT Services domain.

- IQVIA uses automation performance testing application (JMeter) to test and simulate load and stress test cases, IQVIA Performance testing strategy include below phases:
 - Workload Modelling: To understand the cases to be simulated and design the needed test cases to cover all scenarios.

- Script Development: Prepare and develop performance test scripts.
- Environment Setup: Prepare the simulation setup (Machine, Applications, Test data) that simulates real environment.
- Test Execution: Execute the performance test scripts on the prepared environment.
- Reporting: Prepare the execution report that summarises the results to be shared with stakeholders.
- Continuous Performance Delivery: to provide continuous feedback, performance test scripts can be added as part of Continuous Integration process.

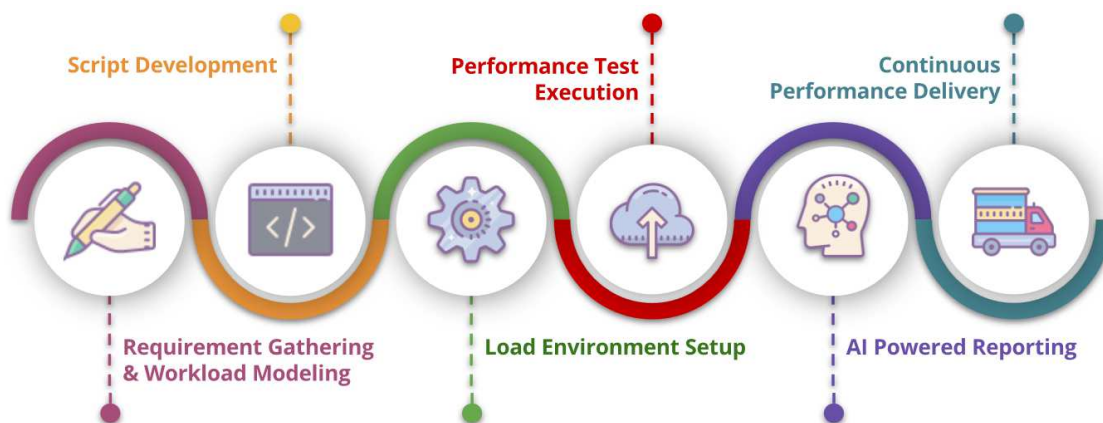


Figure 8: Performance Testing Methodology

Teams involved during this stage are:

CLIENT Services	IQVIA
• Infrastructure Team • Integration Architects – 3rd Party • Project Manager	• Business Lead/ Analyst • Development Lead/ Developer • QA Lead/ Engineer • Solution Lead/ Architect • Integration Lead/ Specialist • Project Manager

Documents to be Delivered:

- Documents pertaining to Test Results

5.7 Training and Workshops

IQVIA assigns Trainers to conduct training on the Application to ensure that the users can use the solutions efficiently, per the functional role and responsibilities. Administrative/ Super-User training is also provided. The training is according to the Training Agenda

provided by IQVIA. IQVIA training method is Train-the-Trainers, which is training a representative group of end-users, who then lead and train the remaining end-users.

IQVIA adopts Train-the-Trainer method, which we believe will help CLIENT Services towards their Continuous Learning strategy and programs. The CLIENT Services typically evaluates and identifies their Trainers from the SMEs and Core-Users groups based on their training capabilities and their level of participation in the project implementations. These Trainers then train the End-Users as part of the Go Live Preparations or new Users joining the organisation.

Training is covered in two stages:

- (1) For selected Super Users/ Champions who will participate in the User Acceptance Testing phase. This training is conducted prior to the start of the UAT
- (2) For all the identified SMEs and Core-User groups who will function as the Super Users/ Champions and as Trainers who are responsible for training the End Users. This training is typically conducted after the successful completion of the UAT.

IQVIA training is classroom-based and covers two major areas:

- Application Functionality
- Application Administration

The Training Agenda, Materials, Schedules will be discussed and agreed with CLIENT Services prior to the training. CLIENT Services responsibility is to make sure that the users attend these sessions. Contingency Plan will be covered in each training session.

As part of the Training Planning, our Trainers will closely work with the IQVIA PM, Solution Architect and CLIENT Services project team to ensure that all the training requisites are met, and expectations are discussed and understood in order to plan for a successful training.

The purpose of the Application Functionality training is to ensure that the trainees are fully educated in the functional aspects of the application, its interactions with other 3rd Party applications and the role-based functionalities. The training will be based on the Design Document and the trainees will receive hand-on opportunities during the training sessions. Each trainee will receive a set of role-based tasks that needs to be completed in the application, to ensure that the theoretical knowledge can be translated to practical knowledge.

The Application Administration training is provided to those trainees that are identified by CLIENT Services as Super-Users/ Application Administrators. The purpose of the Application Administration training is to ensure that the trainees are fully educated in the configuration and administration aspects of the application. Each trainee will receive a set of configuration/ administrator-based tasks that needs to be completed in the configuration-area of the application, to ensure that the trainee is confident and aware of the concepts. The trainees will be requested to complete a class-room based Exam to evaluate their competency. Our Trainer will also distribute Training Evaluation Forms to evaluate the training sessions, topics and the training environments. The Training Manual are provided during the training sessions.

Teams involved during this stage are:

CLIENT Services	IQVIA
• Core-Users • Subject Matter Experts • Project Manager	• Business Lead/ Analyst • KT Lead/ Training Consultant • Project Manager

Documents to be Delivered:

- *Training Plan*
- *User Manuals and*
- *Knowledge Transfer Plans*

5.8 User Acceptance Testing (UAT)

During this stage, the CLIENT Services Core-Users and Subject Matter Experts conduct the end-to-end testing of the solutions, including functional and technical (security testing). If defects are identified, it is prioritised and planned for correction. IQVIA will submit Test Scripts to the CLIENT Services as a guideline for testing. If required, CLIENT Services can create additional Test Scripts and Test Scenarios.

- **Functional Testing**

The purpose of the Functional User Acceptance Testing is to confirm that the application is functioning as per the agreed Design Document and is conducted after the Internal QA and the Train-the-Trainer stages. The UAT is conducted by CLIENT Services Core-Users and Subject Matter Experts using the Test Scripts, assisted by our Business Analyst/ Implementation Consultants.

Our Business Analyst/ Implementation Consultants works with the Solution and Integration architects to develop the Test Scripts CLIENT Services Core-Users and SMEs can create additional Test Scripts and Test Scenarios in collaboration with the Business Users.

The Test Scripts consist of workflow scenario, process steps, expected outcomes and application behaviour. The tester can document Pass/Fail, Issue Priority Indicator and other comments.

- **Technical (Security) Testing**

This comprises of Vulnerability Assessment and Penetration Testing.

Vulnerability Assessment testing will be done to view security status of the systems to any known vulnerabilities. Automatic scans will be used to carry out a series of checks on every system/application to understand their configuration in detail and detect any vulnerability.

Penetration Testing is where intrusion simulations are carried out using different attack scenarios and combining manual techniques with automated tools.

Note: IQVIA will contract through CLIENT Services third-party specialist organisation to provide vulnerability assessment and remediation report.

The UAT will have various steps:

- **Planning:** Our PM conducts meetings with CLIENT Services Project Team, Solution Architects, Integration architects and 3rd Party applications to confirm the UAT dates, the readiness of UAT test data and TEST domains, readiness of 3rd Party solution and domains, developments and coverage of Test Scripts and other details.
- **Test Script Readiness:** IQVIA will develop and submit the Test Scripts to CLIENT Services. If required, CLIENT Services can create additional Test Scripts.
- **Selecting the UAT Team:** Identification & confirmation of CLIENT Services UAT team and 3rd Party Solutions' UAT team. The UAT team should be familiar with the Application and should attend the Train-the-Trainer sessions.
- **Execution of UAT:** CLIENT Services team will execute the UAT based on the UAT Scripts and will be assisted by our Business Analyst/ Implementation Consultants. During the UAT execution, the team will mark each Test Case as Pass or Fail. The failed Test Cases will have a Priority Indicator set by the tester.
- **Issue Correction:** Each day, the Business Analyst/ Implementation Consultants conducts UAT review meeting with CLIENT Services Project Team to review the UAT results and re-confirms the Priority Indicators. Corrective Actions are taken for Priority 1 & 2 issues.

The Business Analyst/ Implementation Consultant will review the Priority 3 & 4 Issues with the Solution Architect to create a schedule for correction, which will be discussed with CLIENT Services Project Team. The failed Test Cases are re-run after correction.

- **Application Acceptance:** This is the final stage of the UAT in which CLIENT Services provides the Application Acceptance sign-off based on the Acceptance Criteria documented in the Project Plan.

Error Severity Levels

Below is the IQVIA Standard Severity Level indicator that is suggested to be applied for User Acceptance Testing.

- **Defect Priority**
 - Priority 1: showstopper issue – cannot Go Live with this defect
 - Priority 2: defects that are affecting a frequently used area of software
 - Priority 3: usually can be corrected by re-configuring the software
 - Priority 4: defects that are affecting a less frequently used area of software.

Teams involved during this stage are:

CLIENT Services	IQVIA
• Core – Users • Subject Matter Experts • Integration Architects – 3rd Party • Project Manager	• Business Lead/ Analyst • QA Lead/ Engineer • Solution Lead/ Architect • Integration Lead/ Specialist • Project Manager

Documents to be Delivered:

- *Acceptance Criteria Document*

5.9 Go Live Preparation and Phase Publishing

During this stage, regular Go Live Preparation meetings are conducted to verify that all the necessary preparations are made for a successful Live operation of the project. Infrastructure and Application readiness reviews are conducted. End-User training is conducted by CLIENT Service's SMEs/ Core Users during this stage. This stage includes the following:

- Production hardware and environment readiness assessment
- Confirming key resources/ super-users training status complete across all functional areas
- High severity software issues as defined by the Test Plan resolved and updated in production environment
- Go-Live support roster published
- Go-Live Issue escalation procedure published

Teams involved during this stage are:

CLIENT Services	IQVIA
• Core - Users • Subject Matter Experts • Project Manager	• Business Lead/ Analyst • Project Manager

Documents to be Delivered:

- *Application and Publication Plan*
- *Full documentation of all technical and operational aspects of the system and its branches, such as databases and others, and the delivery of comprehensive user guides*
- *Utility Sustainability Plan Document*

5.10 Data Migration

As per brief given by CLIENT Services leadership only clinical data would be migrated from across sites and legacy HIS. The process of Data Migration and associated timeframes are

considered as a separate activity within the Go-live Preparation – a high level overview is presented here, since providing a detailed plan requires a very thorough analysis and study of the current CLIENT Services systems, datasets and their integrity and most importantly, CLIENT Services business requirements towards data migration.

Highlighted below, is a summary of our approach that is used and the methodology that IQVIA uses in the process of data migration. The concepts and methodologies are industry standard as applied to a healthcare environment.

Depending on the situation and business requirements, IQVIA adopts multiple approaches to Data Migration. Since, in a hospital environment, data migration consists of a variety of data (demographic, clinical accounting and the like), various technical and business questions need to be answered by hospitals and health authorities before embarking on specific strategies for data migrations.

Typically, as part of the IQVIA HIS solution implementations, the type of data to be migrated in relation to the Patient demographics, Appointments, Health records, Invoices, AR balances etc. needs to be established before embarking on a Data Migration Strategy. This, in combination with the type of data and the integrity of data available in the current systems in CLIENT Services would determine the approach and time required for the data migration process.

Some of the sample questions that loom large before deciding on the type of data migration strategies that need to be adopted are e.g.:

1. Is all historical data required to be migrated or is historical data require to be summarised or only migrated from a specific date? Or for HIS, does only balance data require to be migrated at go-live.
2. What is the state-based rules/regulations associated with storage of patient's accounting data? Are the rules different for nationals and expatriates?
3. Are the current systems being used amenable to data culling and migration; Can their data integrity be clearly established and mapped to data requirements currently/in the new system?
4. Can data integrity, especially related to all clinical data sources be clearly established?
5. How does data migration tie in with the hospital and health care Centre implementation and rollouts and what will be the impact of each further rollout on the 'incremental' data migration.

Basically, there are two different strategies and two different approaches to data migration can be used. And they differ mainly in the way migration is progressed.

One is reflected by big bang migrations which means migrating data as fast as possible but within the obligatory system downtime, and another are incremental/ trickle migrations which are significantly slower but can be held in parallel with regular work of hospital/ health care centre employees and systems.

Properly prepared data migration consists of a batch of processes, preceded with deep analysis of needs and requirements. Migration plan, concretised during the preparation,

allows not only to understand what must be done, but also to verify if everything is the way it was meant to be in the end.

Migration Planning	Source Data Preparation	Data Mapping	Migration Development	Trial and UAT	Go Live
Aims & objectives	List all data sources	Data mapping	Build conversion tools	Run trial migrations	
High level functional requirements	Define data quality metrics	Gap analysis	Build load tools	UAT	
Non functional requirements	Define data remediation processes		Build reconciliation tools	Feedback	
Migration strategy	Prepare cleansed data store		Build reporting	Optimisation	
Reconciliation strategy			Migration cookbook	Transitional processes	
Identify data owners & build team			Unit test		
Data migration plan					
Strategy & approach document					

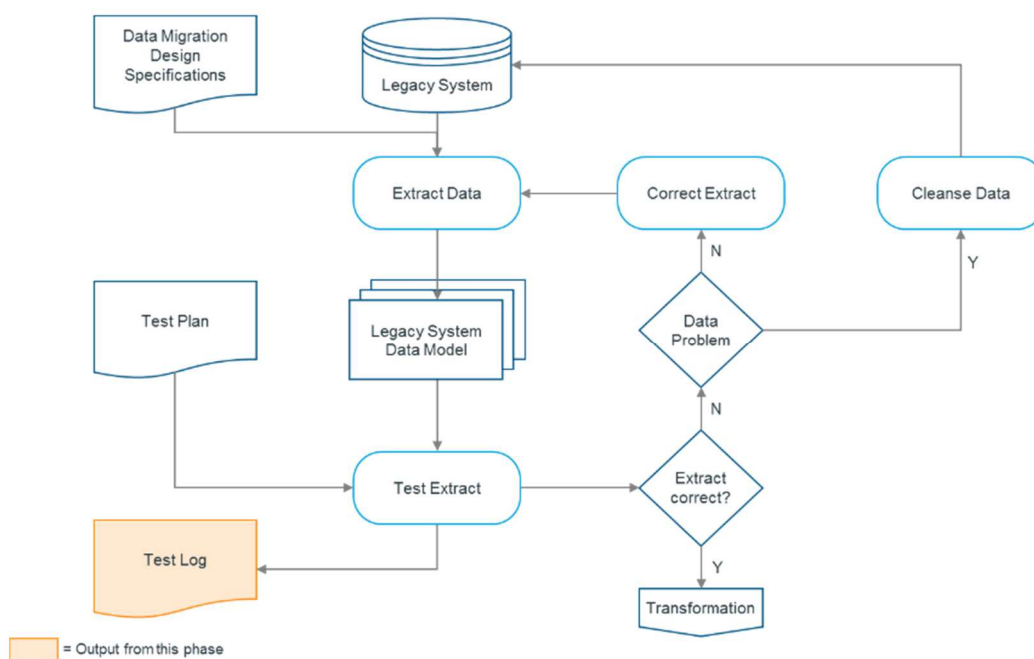
The various steps for data migration are detailed below:

- Migration Planning

This phase helps plan patient demographics and cash transaction data for migration to HIS database by defining objective, strategy, stakeholders, planning, and execution process.

- Source Data Preparation

During this phase data to be migrated from source is prepared for migration with tasks such as defining data quality expected, error and exceptions resolutions, data cleansing etc.



- Data Mapping

This phase offers insight into gaps between source and destination data sources with respect to schema, types, constraints, rules, default constants etc.

- Migration Development

Migration phase executes all migration readiness stages such as data conversions, reconciliations and tests preparation.

- Trial & User Acceptance

Trial migration would be executed to compare results with expected objectives and data quality metrics. If any optimisation measures are adopted. With approved outcome, rest of data is migrated.

Documents to be Delivered:

- *Transfer Mechanism Plan*

5.11 Go-Live

Go-Live is that day when the solutions are in Live operation. IQVIA will deploy Business Analyst/ Implementation Consultants to provide handholding to the end-users during the Go-Live. Go-live activities include:

- Define the Go-live date and time and inform all users
- Review and Update support strategy and communication process during Post Go-Live Stabilisation support
- Distribute the support resources required
- Manage Support calls, logs, issues tracking
- Daily system round for monitoring users and their feedback
- Monitor correct operation for printing forms, reports, labels and barcodes
- Monitor message / interface / error log operation
- Install fixes as output of support feedback
- Go-Live Issues log tracking and update daily to ensure closure.

Beyond this we will provide annual maintenance and support based on the standard support model, with option for onsite support.

5.12 Post Go-Live Hypercare Support

IQVIA will provide Post Go-Live Hypercare support for all facilities for a specified duration to ensure the seamless adoption of the new system. Hypercare period would allow for a smooth transition period from implementation resources leading the project to Support Services resources who will be supporting and assuring your success going forward.

The main purpose of this service is to closely monitor the customer service, data integrity and smooth running of the implemented applications. This will entail continuous availability of business and technical consultants with the required specialisation. The resources deployed in this phase will work closely with CLIENT Services to track and resolve any production issues during this period. Any high priority issues would either be resolved or will have a plan for resolution before transitioning to the support period. Our hyper care strategy is defined at the proposal stage, and it addresses the challenges faced by customers 24x7. Dedicated team of expert resources are deployed 24x7 to address following challenges:

- Provision of omnichannel L1 support and integrated ticketing system.
- Immediate assistance
- Address initial operational issue.
- Diagnose and resolve client issues related to product deployed and associated services.
- Work around support for issues which are identified during peak hours.
- Resolve user queries related to product and associated processes.
- L2 support for issues with a quick turnaround.
- Knowledge base assistance
- Dealing with data integration issues

After the post go-live support is over, the support will be moved to the standard product AMC mode details for which would be mentioned in contract.

6 TRAINING PLAN

This stage will cover the Training of each hospital users. The list of users against each user group would need to be identified by CLIENT Services facilities and communicated to IQVIA, upon confirmation of the Training schedule. CLIENT Services needs to provide training rooms with projector facilities and adequate workstations for the period of the training.

The courses would be conducted in as 'near-live' an environment as possible and would be done in a 'training' database environment, consequent to which the users can continue to practice in this environment up to the time of live operations. There will be following types of training:

- Workflow Training
- Super User (Champion User) Training
- End User Training (To be conducted by CLIENT Services)
- Directorates/ Clusters Training
- Contingency/ Business Continuity Plan Training
- Refresher sessions
- Backoffice and IT training

6.1 Workflow Training

Before starting the training, workflow awareness sessions, workshops and training will be provided to each department to enable staff to understand and adopt the new workflows prior adopting the system. To address any gaps or misalignments between the current state and the future state, we will:

1. Focus mainly on viewing the end-to-end workflow for every module
2. Compare future state workflow with department current state workflow
3. Identify gaps and misalignment between current state and future state
4. Address and understand how to cover/work around the identified gaps
5. Provide documentation of future operational workflows - post implementing the system

6.2 Super User (Champion User) Training

This will be a detailed training at the hospital level, for selective users (10% of the department staff to be distributed to cover all shifts) on more advanced functions. CLIENT Services will identify the Champion Users from each department before the start of the phase. There will be two rounds of training for the Champion Users. This training is usually provided in a classroom format with soft and hard copy training documentation provided. The objective of this training is to:

- Prepare certain individuals in every department/ role/ shift to be the first line of support when it comes to questions and issues related to the system. They will be prepared to support staff post go-live, and provide training whenever is needed.

Each super user will go through the following as part of their training plan:

1. Super users training sessions
2. Go through practice scenarios in the practice lab
3. Shadowing our support team during the go-live support period, to learn, observe and practice on how the support team is addressing issues, questions and provide training to struggling users.

We will target a competency score post attending this level of training to be at least 75%. The training will cover common questions and how to provide support for struggling users, be on the Train the Trainer approach and prepare champion users to provide training at the hospital level.

Super User (Champion User) Training Plan

The Super User Training consists of in-depth functional level training followed by practical sessions. A typical training day will be for 2 hours of classroom type training followed by 2 hours of practical sessions.

No.	Training Modules	Target Trainees
1	Appointment and scheduling	OPD and front desk
2	Admission, discharge, and transfer	Registration and front desk
3	Accident and emergency module	ER
4	Nursing EMR Nursing task management Medication administration	Nursing
5	Order Management Radiology order Pharmacy order Laboratory order Nursing order Procedures Surgery	Nursing
6	Electronic Medical Record CPOE EMR Clinical Noting & Documentation	Doctors
7	Medical Records Management	Medical Record Department
8	Pharmacy Dispensing	Pharmacists
9	Inventory Management	Store Managers

No.	Training Modules	Target Trainees
10	Operating Theatre Management System & CSSD	Surgical Department
11	Diet & Nutrition Assessments Diet Orders	Dieticians
12	Billing Deposits Outpatient Billing Inpatient Billing	Billing, Cashier Staff
13	Mobility Doctors App	Doctors

6.3 End Users Training – Pre-Go Live

End user training will be conducted by CLIENT Services.

6.4 Directorates / Clusters Training

IQVIA can deliver overall 5 working days of training for CLIENT Services Cluster users, IQVIA will provision 2 days extra if needed.

6.5 Contingency / Business Continuity Plan Training

As part of the revision sessions, the users will go through the contingency plan on how to react in case of system outages and how to utilise the downtime machines. This will cover how to communicate downtime, roles and responsibilities, actions during and after downtime, reviews and impact/issues assessment and identification.

6.6 Refresher Sessions

Before go-live, we will carry out rehearsal scenarios in each department with the department staff. Post go-live, there is a period of time – based on the on-site support scope – during which our team will provide support to the hospital staff and address the need of struggling users, provide one to one training whenever is needed, monitor adoption, address specific issues related to the system, integration, data migration and workflows. Super users will be shadowing the support team, during the support period when our team will be leading the support and coaching the super users on how to provide support later. The objective with this approach is to prepare the hospitals to be independent and be able to operate the system using their internal capabilities and avoid having irrelevant support tickets raised from the hospital.

6.7 Backoffice and IT Training

This training will be provided for IT personal, Level 1 support and to selective individuals who will be acting as master controller in the hospital, managing Backoffice functions and main functionalities for amendments/changes in the system. The training will cover technical aspects, support, back-office functions, high level on understanding integration.

If there were no internal capabilities cover the needed skills within the hospital, then we will report this as part of the resource gaps to the CLIENT Services.

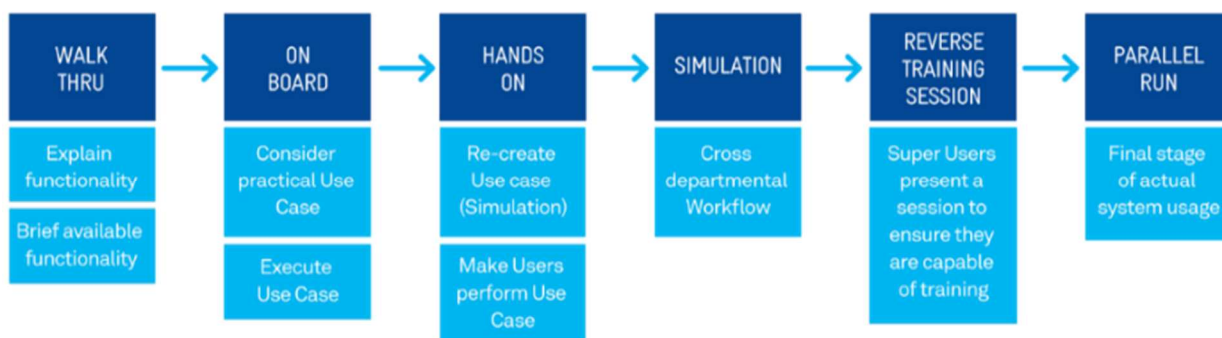
6.8 Training Facilities

CLIENT Services will be responsible for providing the following:

- Training rooms to accommodate classroom style training for all staff.
- Training equipment (PCs and peripherals as required), e.g., webcam, scanner, printer.
- CLIENT Services to provide the complete environment HW, OS and any DB licenses required, IQVIA to provide the training literature

6.9 Training Stages

The following diagram shows the main stages of Training:



7 PROJECT MANAGEMENT METHODOLOGY

7.1 Introduction

IQVIA project management methodology is based on the Project Management Institute's (PMI) Project Management Body of Knowledge (PMBOK) guidelines, which is a worldwide recognised standard for project management. Key features of IQVIA project management approach include:

- A staged project lifecycle, with each stage having defined objectives, tasks and deliverables.
- Proactive issue, risk and resource management.
- Involvement of CLIENT Services management team and stakeholders at the appropriate time and place during the project.
- Maintaining good communication channels between the project, project management, and the rest of the organisation.

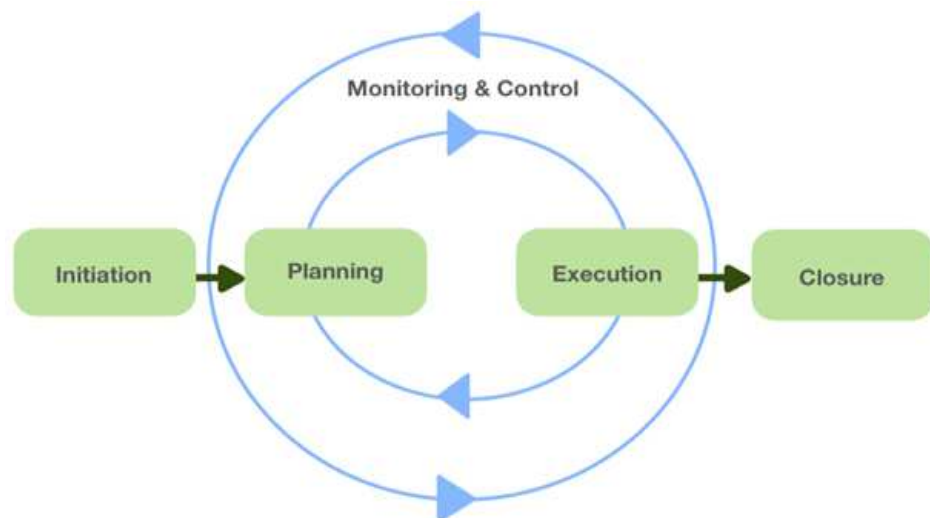
Our staffs are certified to implement the PMBOK guidelines and certified as Project Management Professional (PMP) from PMI.

7.2 Project Management Activities/ Deliverables

Activities

IQVIA will analyse the project environment and CLIENT Services requirements to develop a holistic Project Management Plan.

The project management process groups as depicted in the diagram are described below:



Project Initiation: During this phase, IQVIA identifies its Project Manager and the Project Team.

The Project Manager with assistance from the team members creates the Project Charter, defining the following:

- Project Scope
- Initial Timelines
- Initial Project Stakeholders
- Project Requirements

- Project Constraints

- **Planning:** this is a combined project phase between IQVIA and CLIENT Services, and will produce the Project Plan, mutually agreed and signed-off. During this stage, the Project Scope, Requirements, Project Schedule are reviewed and baselined. The project is divided into various project phases and planned accordingly - the complexity and the project requirements drive the decision to divide the project into phases.

The planning phase will produce the Project Management Plan, comprising of:

- Scope Management
- Schedule Management
- Quality Management
- Communication Plan
- Risk Management Plan and
- Change Control Plan
- **Execution:** During this phase, the project work is executed as defined in the Project Plan and following IQVIA's Implementation Methodology, described in the previous sections.
- **Monitoring & Control:** The processes in this stage ensure that the project is monitored regularly, the project status is communicated to the stakeholders, risks are identified and mitigated, and any changes to the baselined documents (project schedule, scope etc.) are controlled via the Change Requests. Review meetings are held regularly between IQVIA and CLIENT Services.
- **Project Closure:** This stage verifies that the project's objectives are met, and the project is signed-off. Support Stage is commenced (provided there is a Support Contract in place) after the Project Closure.

Project Management Documentation Deliverables include:

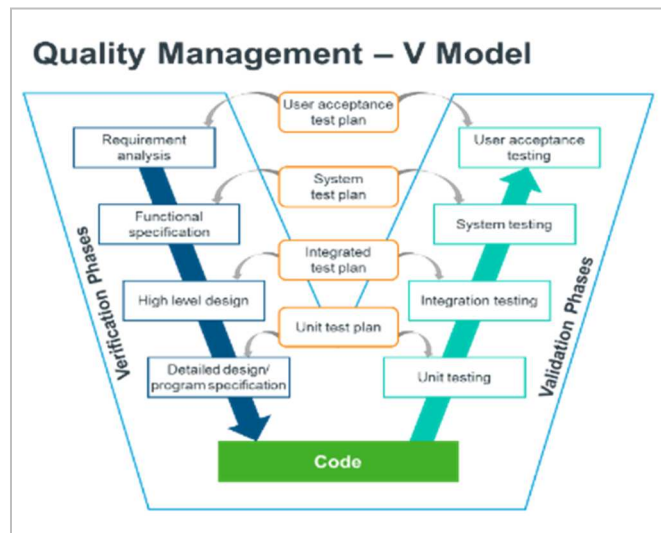
Project deliverables		SDLC Phase	Responsibility
1	Project Charter	Initiation	IQVIA
2	Project Management Plan	Planning	IQVIA
3	Communication Plan	Planning	IQVIA
4	Project Implementation Plan	Planning/ Execution	IQVIA
5	Project Risk Register	Planning/ Execution	IQVIA
6	Project Schedule	Planning/ Execution	IQVIA
7	Issue Log	Execution	IQVIA
8	Project Status Report	Execution	IQVIA
9	Project Meeting Minutes	Execution	IQVIA

Project deliverables		SDLC Phase	Responsibility
10	Change Request	Execution	IQVIA
11	Project Closure Report	Handover/ Closure	IQVIA

7.2.1 Quality Assurance

IQVIA's objective of the Quality Assurance Process is to ensure the quality, completeness, and relevance of all testing performed to validate and verify that a release is fit for purpose. IQVIA strategy is to utilise the V Model standard depicted in the diagram below

Within Development is responsible for Unit Testing, Quality Business Unit will be responsible for Alpha Testing and Release Management is responsible for Beta Testing.



The following identifies the quality-related responsibilities of the IQVIA project team:

Project Team Role	Quality Assurance Responsibilities
IQVIA Project Manager	- Creates and executes project plan and revises them as appropriate to meet changing requirements - Plans and follows the project schedule closely to ensure timely delivery - Ensures standard of project deliverables by providing complete and current documents - Mitigates or escalates risks arise during project execution - Manages daily operation of the project and acts as a single point of contact to CLIENT Services
IQVIA Development Lead	- Ensures standard of the software system and technical design fully supports the requirements - Ensures project documents (User requirement, system design, technical design, test plan, etc.) are complete, current and meet changing requirements - Ensures software is tested with good quality and well-kept in the development repository - Acts as support contact to CLIENT Services upon completion of the system implementation

Project Team Role	Quality Assurance Responsibilities
	Ensure best coding practices are adhered to across all modules and functions
IQVIA Developers	- Ensures modules or functions developed fully supports the requirements - Ensures modules or functions developed passes unit test - Follows best coding practices

7.2.2 Communication Plan

The Communication Plan intends to ensure timely and appropriate generation, collection, dissemination, storage, and disposition of all project-related information. The plan identifies the communication requirements for each project participant and establishes the communication framework for collecting and distributing project information. The plan also establishes a common understanding of the processes to be used for project information distribution, review, and control during the project, the format, and frequency of status reports and review meetings, follow-up procedures, a process for resolving issues on time, and the project escalation plan.

The Communication Plan addresses:

- Communication requirements from IQVIA to CLIENT Services
- Communication requirements from CLIENT Services to IQVIA

Knowledge areas	Process groups				
	Initiating	Planning	Executing	Controlling	Closing
Project Integration Management	Develop Project Charter Develop Preliminary Scope	Develop Project Management Plan	Direct and Manage Project Execution	Monitor and Control Work Integrated Change Control	Close Project
Project Scope Management		Scope Planning Scope Definition Create WBS		Scope Verification Scope Control	
Project Time Management		Activity Definition Activity Sequencing Activity Resource Estimating		Schedule Control	

Knowledge areas	Process groups				
	Initiating	Planning	Executing	Controlling	Closing
		Activity Duration Estimating Schedule Development			
Project Cost Management		Cost Estimating Cost Budgeting		Cost Control	
Project Quality Management		Quality Planning	Perform Quality Assurance	Perform Quality Control	
Project HR Management		Human Resource Planning	Acquire Project Team Develop Project Team	Manage Project Team	
Project Communications Management		Communications Planning	Information Distribution	Performance Reporting Manage Stakeholders	
Project Risk Management		Risk Management Planning Risk Identification Qualitative Risk Analysis Quantitative Risk Analysis Risk Response Planning		Risk Monitoring and Control	
Project Procurement Management		Plan Purchases and Acquisitions Plan Contracting	Request Seller Responses Select Seller	Contract Administration	Contract Closure

7.2.3 Risk Management Plan

Project risk is always in the future. A risk is an uncertain event or condition that, if it occurs, has a positive or negative effect on at least one project objective: scope, schedule, cost, and quality.

The purpose of Risk Management is to increase the probability and impact of positive events and decrease the probability and impact of negative events in the project.

IQVIA's Project Management Methodology will be aligned with that of CLIENT Services. PMO Handbook incorporates risk identification, assessment, quantification, contingency planning, and controlled execution of those plans as part of the program and project management processes. By using these processes and tools, risks, or events that both IQVIA and CLIENT Services need to be aware of that will possibly affect the project can be identified as early as possible.

Identified risks are evaluated to determine their impact and likelihood of occurring. Contingency plans and strategies are established to monitor potential risks to avoid their occurrence and to manage the impact of risks that are realised as the project progresses. Any changes in the project (including Scope revision, Implementation Schedule changes) must undergo the Risk Review process.

Risk Management Planning consists of the following stages:

- Risk Identification
- Risk Qualification and Impact Analysis
- Risk Response Planning
- Risk Monitoring and Control

7.2.3.1 Risk Identification

As part of this initial phase of risk identification, risks will be identified within the project and classified into the following categories:

- Technical, quality and performance,
- Resource and schedule,
- Organisational,
- External (Legal, contractual, shifting CLIENT Services goals, regulatory shifts, natural disasters, etc.).

7.2.3.2 Risk Qualification and Impact Analysis

After the risk identification, risk qualification and impact analysis will be performed. Risk qualification will be one of the following three:

- Low: Minimal or low impact (less than 10%) to the project costs and schedules
- Medium: Impact of between 10% to 60% to the project costs and schedules
- High: More than 60% of the estimated impact to project costs and schedules

7.2.3.3 Risk Response Planning

As part of the risk response planning, appropriate mitigation actions and strategies will be planned for each of the risks. This is a collective activity between IQVIA and CLIENT Services.

7.2.3.4 Risk Monitoring and Control

Risk Review, monitoring, and control will be an intrinsic part of the project control mechanisms and will be discussed, reviewed, and updated periodically, as part of the project review meetings held with CLIENT Services.

The below project risks and their respective mitigations are typically associated when undertaking a project of this size and complexity.

Risks	Severity	Impact	Actions / Mitigation
Scope Management: Project scope creeps resulting in project over-run or failure to meet initial objectives	Medium	Quality & Time	• Ensure the project definition, business requirements documented in the Project Management Plan are formally approved and signed off • Distribute scope statements to all stakeholders for confirmation • Adopt an agile methodology with a prototyping approach to absorb some of the scope creeps
Time Management: Unable to establish the business requirements in time due to: Delays in reviews, and approvals	High	Time & Quality	• Have focused and structured workshops/ sessions to gather the requirements • Communicate via Status Reports and escalate
Communication Management: Communication gaps between teams during the various project stages that may: Lead to non-availability of CLIENT Services resources impact timely delivery of the changes to the stakeholders	High	Time	• Discussions need to happen between all the stakeholders to define a communication matrix and strategy around it. • It needs to be to-the-point, simple, accurate and well-directed to create clarity.
Procurement Management: Delay in delivery of hardware and their	Medium	Time	• Pre-load equipment upon confirmation of BOM from customer

Risks	Severity	Impact	Actions / Mitigation
peripherals that may impact the various project stages and the commissioning date			Establish escalation channel to equipment manufacturers directly
Resource Management: Without the relevant resources to work on the project (vendor and CLIENT Services), it would incur additional cost due to delay or quality of delivery	High	Quality, Time & Cost	- Form a strong project team with the appropriate subject matter and technical skills to execute the project. - Bring in certified project management experts to manage the project
Training and Knowledge Transfer Management: Insufficient trained staff/ lack of attendance Staff has not absorbed training Staff does not know system as designed	High	Quality & Cost	- Effective Training to be provided - Effective Knowledge transfer to be done
Change Control Management: Any change or addition in scope during system requirements or development phase that will impact the implementation timeline and cost.	High	Time & Cost	Strong PMO to be established and manage all the changes through the change control process.
Organisation Change Management: Resistance to new processes by staff Staff not committed Inadequate stakeholder support Corporate culture causing delays and procrastination	High	Quality & Cost	- Change management agents working with Communication/Sensitisation Group - Trainings and briefings to selected staff and stakeholders
Leadership oversight: Lack of leadership oversight may create a negative impact on the delivery of Project and implementation	High	Quality, Time & Cost	Leadership from all the stakeholders is essentially required. Hence need to ensure the attendance of the leadership in weekly, monthly meetings etc.

7.2.4 Issue Management

All projects generate issues, and these can quickly escalate out of proportion without a formal issue management process. Any situation that remains unresolved beyond an agreed-upon period needs to be tracked as an issue. This could be a problem discovered by the technical team, a missed milestone, a failed acceptance test, a change order disposition that cannot be agreed upon, etc.

The following issue identification, reporting, review, and resolution process has been established for the project.

- Communication and Resolution
- New issues and changes to the issues will be included in the weekly reports
- Logging
- Changes to the issue log will be included in the weekly reports.
- Escalation

IQVIA takes a positive, proactive approach to project management, to plan and structure the work at high-quality levels. At times, however, there are circumstances (project issues) that were not anticipated and can, if not addressed, affect the success of the engagement. Typically, an engagement issue is a circumstance that needs IQVIA or CLIENT Services management (outside of the implementation team) awareness or focus on a problem that has lingered longer than allowable.

IQVIA's philosophy is that the timely resolution of issues is critical to maintaining control of the engagement, achieving the project schedule and costs, and maintaining high customer satisfaction. The purpose of the escalation process is to ensure that issues and problems are properly managed and resolved in a timely and efficient manner; not to place blame. The escalation process provides a mechanism to alert higher levels of management attention to those issues not being resolved.

Either the IQVIA delivery team or the CLIENT Services team can initiate or raise an issue related to the engagement. Escalation levels are as follows:

- Initially, the issue will be raised to the respective team leader (if applicable).
- If the issue cannot be resolved at this level, it should be escalated to the Project Manager(s).
- If the issue is not resolved within a predetermined period or falls outside the authority of the Project Manager(s) to resolve, it will be raised to the PMO to report it into the Joint Project Steering Committee for resolution.
- Certain internal IQVIA issues may need to be escalated to the IQVIA Management/ Project Sponsor for resolution.

7.2.5 Status Reporting

The delivery team will report weekly on the work done and the remaining effort to completion of the tasks. Different levels of status reporting are as follows:

- Weekly Status reporting by the IQVIA PM to the CLIENT Services PM
The weekly reports will provide progress, any issues identified and risks – to be handed over by the PM of IQVIA to the PM of CLIENT Services in a weekly status meeting to explain the contents of the report and to receive the latest status information from CLIENT Services.
- Bi-weekly Status reporting by the IQVIA Project Implementation Group
The bi-weekly reports will provide a) any domain related aspects requiring decisions, any issues and risks as identified by the Subject Matter Expert (Product Owner) b) any technical and integration aspects requiring decisions, any issues and risks as identified by the Solution Architect – to be handed over to the PM in bi-weekly status meeting to explain the contents of the report.
- Monthly Status reporting by the IQVIA/ CLIENT Services PMO to the Steering Committee
The monthly reports will provide any process or procedure changes requiring decisions, any issues that impact time and costs - to be handed over to the Steering Committee members in a monthly status meeting to explain the contents of the report.
- Monthly Status reporting by the IQVIA PM to the IQVIA Management
The monthly reports will provide areas of concern and any escalations related to time, resources and costs - to be handed over to the Management of IQVIA in a monthly status meeting to explain the contents of the report.

7.2.6 Meeting Facilitation and Documentation

Regular meetings include the following:

- Weekly Status meeting between IQVIA Delivery Team Leads/ PM and CLIENT Services Information Specialist/ PM
- Bi-weekly Status meetings with the IQVIA Project Implementation Group - led by IQVIA Solution Architect/ PM
- Bi-weekly Status meeting with the IQVIA Project Implementation Group – led by IQVIA Subject Matter Expert/ PM
- Monthly Steering Committee meeting
- Monthly Status meeting between IQVIA PM and Management.

Meetings will be prepared with a Meeting Agenda. The meeting results will be documented in Meeting Minutes. IQVIA suggests that approval of the minutes is sought from all parties. Action Items and Decisions from the minutes will be transferred to the “Action Item Log Form”.

For ease of distribution within the teams, documents shall be provided hardcopy to the distribution list plus in softcopy to the project managers.

Some of the weekly and bi-weekly meetings may be held on-line, but there must be at least 1 face-to-face meeting in an elapsed. Monthly meetings must be held face-to-face.

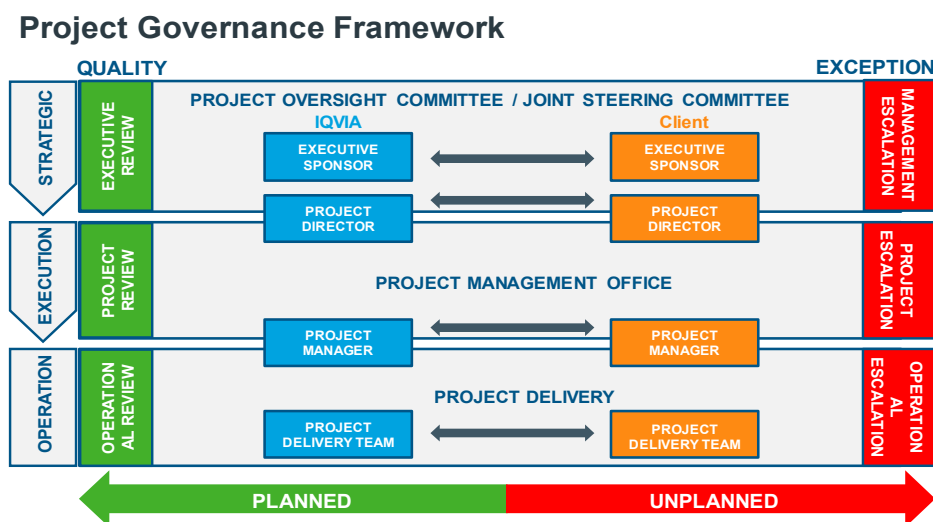
7.3 Project Governance Framework

With emphasis on project governance, IQVIA has put in place an established framework to manage project deliverables, escalation and changes.

It defines a baseline structure and framework upon which respective IQVIA teams will continue to refine based on client's environments. It describes how IQVIA will interact and support the Clients' business.

Another primary purpose of establishing the proposed project governance framework is to strengthen CLIENT Services and IQVIA partnership at all levels in both organisations, thus jointly managing the overall project implementations, deliverables and oversights.

IQVIA have introduced and implemented the below governance framework in projects ranging from small to medium, and large to complex projects' accounts.



The project governance structure has been organised into three major levels:

7.3.1 Strategic – Project Executive Committee / Steering Committee

At the highest level, IQVIA proposes to set up a Project Executive Committee comprising of senior leaders from both companies. This focuses on the strategic relationship and business alignment between CLIENT Services and IQVIA. Thus, IQVIA proposes that this committee meets at least once a month upon contract award to ensure the strategic directions and expectations are aligned and executed by the project teams. This Project Executive Committee will assess and provide the decision on matters related to escalation raised, and their decision will be deemed final.

Another important aspect or role of the Project Executive Committee is to approve or reject for any major change during the project phase. Critical change information will be

communicated by respective Project Directors to the Project Executive Committee during project steering committee meeting.

The Project Executive Committee will be responsible for assessing the impact of major changes to CLIENT Services IT alignment with its business strategy.

Ensuring that project do not meet with major impacts, the Project Executive Committee will work towards giving as much notice as possible for major changes (if any). IQVIA will monitor and track project progress, quality; issue resolution and provide updates regularly to CLIENT Services team to ensure all milestones/ deliverables are met as agreed during the planning stage.

Level	Roles of the Project Executive Committee	Proposed members of the Project Executive Committee
Strategic	Review IT initiatives, Balance Scorecard Performance review, overall project status	CLIENT Services Executive Sponsor(s) IQVIA Executive Sponsor(s) CLIENT Services Project Director IQVIA Project Director
	Discuss and approved Change requirements outside the scope of the project	
	Handle any disputes and escalations from Execution level or Operational level	
	Provide strategic direction for the project	
	Review and endorse major project milestones	
	Review and endorse major project decisions that are critical in the delivery of project targets and objectives	
	Review and ensure timely resolution to inter department issues raised by the Management Committee	
	Approves changes in scope, resources or schedule	

7.3.2 Execution – Project Working Committee

To manage the project deliveries and timelines, IQVIA proposes to set up regular project meetings to be led by project directors from both CLIENT Services and IQVIA. Together with the respective project managers from both companies under the jurisdiction of the Project Management Office from the Project Working Committee. Key objectives are to review the overall project milestones and facilitation of any management decisions/ attention that is needed to pass down to all the project members.

The Project Working Committee has a sub-committee called the Change Control Board (CCB) to investigate and finalise all changes to the contracted scope of services and send to Steering Committee for approval.

Level	Roles of the Project Executive Committee	Proposed members of the Project Executive Committee
Executive	Manage overall progress and deliverables of Project	CLIENT Services Project Director IQVIA Project Director CLIENT Services Project Manager(s) IQVIA Project Manager(s)
	Prioritise issues, resolve or escalate them to Steering Committee for major decision	
	Manage coordination between working teams / taskforce	
	Manage and resolve project management issues	
	Manage and resolve cross-functional issues raised by the various project teams / taskforce	
	Manage and track progress and deliverables	
	Monitor quality of deliverables	
	Provide timely information for management reporting	

7.3.3 Operational – Project Management Office

Led by both CLIENT Services and IQVIA Project Managers with their respective project team members, commonly known as the Project Management Office provides a platform to consolidate, escalate and manage the project progress, ensuring the overall project deliveries and timelines are met.

One of the key functions of this operational layer of governance is to manage changes derived from scope variables or change requests. An important role in any project, where major changes such as new functions, modules or services are to be introduced, the change control procedures will be adopted and followed.

Proposed members of the Project Management Office for this proposal include:

- CLIENT Services Project Manager(s)
- IQVIA Project Manager(s)
- CLIENT Services and IQVIA Project Lead(s)

7.3.4 Key Success Factors

The Project Governance framework is a key foundation that will positively impact the project and ultimately the collaboration between stakeholders and teams that will determine the success or failure of the any governance models.

7.3.5 Standard Project Milestone and Deliverables

Applies to	Project Phase	Milestone	Deliverables
Overall Project	Project Initiation Phase	Contract Signature	Signed Off Contract
			Project Charters
		Project Kick Off	Kick off Presentation
	Project Planning Phase	Completion of Requirement Study	Project Management Plan
			Baselined Project Schedule
			Functional Requirements Document
			Interface Requirements Document
			Business Intelligence and Reporting Requirement Document
	Project Execution	Solution Development and Readiness	Complete Build
			Complete Integration & Interfacing
	Project Closure	Documents Consolidation & Project Closure	Project Lessons Learnt
			Project Closure Document(s)
			Project Closure Presentation / Meeting
Facility-specific	Project Execution - Solution deployment	Complete Data Collection & Configuration	Data Collection and Configuration Document
		Super User Training	Training Plan & Schedule
			Training Acceptance/ Sign Off Document
		User Acceptance Testing Completion	Testing scripts
			Testing plan Document
			UAT Acceptance Document
		End User Training	Training Plan & Schedule
			Training Acceptance/ Sign Off Document
	Closure Implementation Completion	GO LIVE	
		Phase Closure	Phase closure / sign off Document (COC)

7.4 Responsibility Matrix

The Responsibility Matrix (RACI chart) is a responsibility assignment matrix showing who is Responsible (R), Accountable (A), needs to be consulted (C) or Informed (I) for program and project management deliverables in the matrix. Projects or programs are frequently challenged late in delivery because the PM has not involved the appropriate stakeholder groups until the last minute. By not engaging with these groups at the correct time the project may be delayed, severely impact the program, cause another project to be affected as scarce resources are redeployed or in worst case, be prevented from delivering and fail.

Phase/Activity	IQVIA	CLIENT Services
TYPICAL SOLUTION DEPLOYMENT PROJECT (IQVIA, CLIENT Services)		
Project Initiation/ Planning		
Define Detailed Scope of Work and Project Schedule (Gantt Chart)	R	C, A
Define Business Analysis Plan including Activities, Timeframes, Resources	R	I
Define Training, Logistics, Knowledge Transfer Plan including Activities, Timeframes, Resources	R	I
Define Solution Design, Development and Deployment (incl. UAT) Workstream Plan including Activities, Timeframes, Resources	R	I
3P (Subcontractor) Scope of Work Review and Approval (from relevant Workstream) including Activities, Timeframes, Resources	R	I
Define Assumptions	R	I, A
Define Dependencies	R	R, A
Define Risks, Issues, Assumptions	R	C, A
Define Project Management Plan	R	C, A
Project Kick-off Meeting	R	R, A
Project Delivery		
Setup Necessary Environments (e.g., Dev, Test, Prod, Trng)	R	C, A
Submit necessary Software Licenses, Documentation	R	C, A
Define Business Analysis Workflow/Use Cases	R	C, A
Define Data Collection Worksheets (DCWs)	R	C, A
System Interfaces Requirements and Design	R	C, A
CLIENT Services contracted 3P interfaces (e.g., Hardware, Networking, Systems, Licenses etc.) as per Project Timeframes	C, I	R, A
Solution Design, Build, Customise, Integrate, Document	R	I, A
Solution QA	R	C, I

Phase/Activity	IQVI A	CLIENT Services
Installation and Configuration of IT environments, Application, Databases	R	C, A
Training Plan (Training Schedules, Locations, Attendance/Certification, Training Material)	R	C, A
Training Execution	R	R, A
UAT CLIENT Services Plan (including Criteria, Use/Test cases, Data Sources, Scripts)	R	C, A
UAT	R	R, A
Data Migration Plan and Migration Scripts	R	C,A
Parallel Run Plan	R	R, A
Deployment to Production and Production Configuration	R	C, A
Pilot Go Live/Parallel Run	R	R, A
Knowledge Transfer	R	R, A
Post Go-Live Handholding, Hypercare	R	C, A
Handover to Support	R	R, A
Project Tracking and Control		
Report / Flag Missing CLIENT Services Dependencies	R	R, A
Report Delays on Activities and Reasons (to be submitted sufficiently in Advance) vis-à-vis Baseline (all Streams)	R	R, A
Project Weekly Meeting (Internal, CLIENT Services)	R	R, A
Project Weekly Report / Meeting	R	R, A
Project Steering Committee Meeting	R	R, A
Project Plan Baseline, Updated Issues, Risks	R	C, A
UAT Issue Resolution	R	C, A
Change Request Identification and Initiation	R	R, A
All Project Deliverables Submissions, Approvals, Signoffs	R	C, A, R
Project Closure Review	R	R, A
Support		
Define Support Management Plan and get approval from CLIENT Services	R	C, A
Incident Request	I	R, A
Incident, Problem Resolution	R	R, A
New Releases	R	R, A

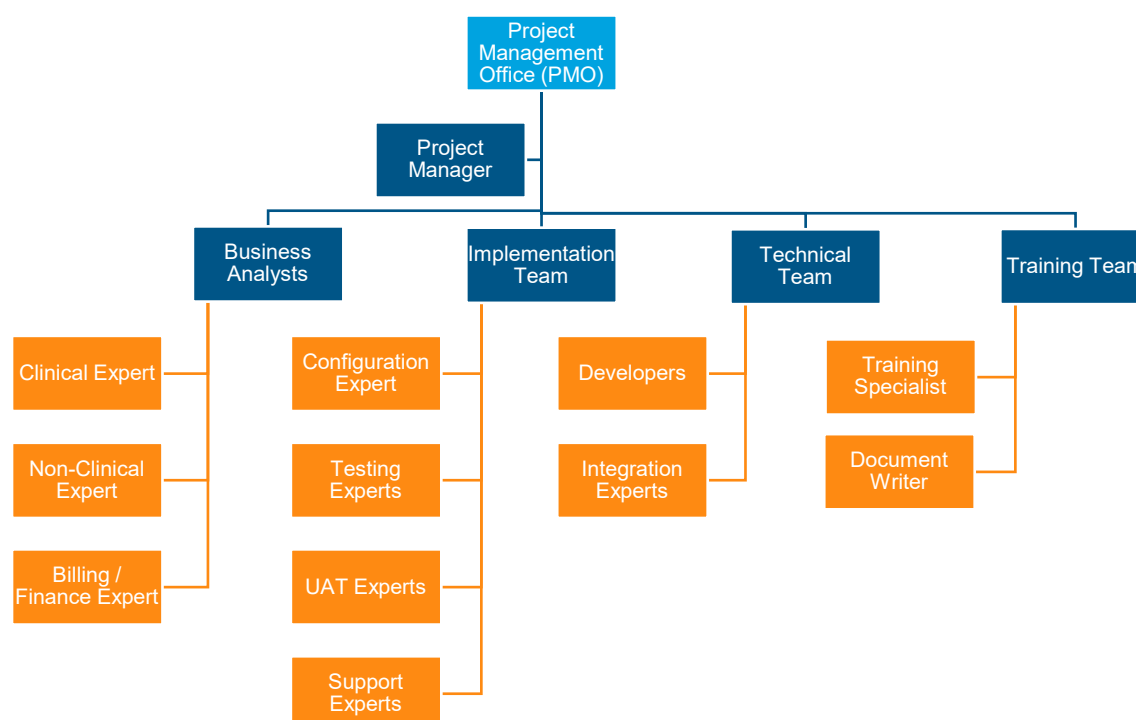
Phase/Activity	IQVIA	CLIENT Services
SLA Escalation Processes (e.g., Critical Issues etc....)	R	R, A
SLA Reporting	R	A, I
SLA Periodic Review Meetings	R	A, I
CRs		
CR Requests	I, R	I, R
CR Estimations	R	A, C, I
CR Approval from CLIENT Services	I	R, A
CR Internal Development, QA, Documentation, Testing (and Results)	R	C, I
CLIENT Services UAT	R	R, A

7.5 Project Implementation Timeline

IQVIA will analyse the project environment and CLIENT Services requirements to develop a holistic Project Management Plan. This will be provided for case-to-case opportunity basis.

8 PROJECT ORGANISATION

8.1 Project Organisation Structure



8.2 Project Team Roles

8.2.1 IQVIA Project Team Roles and Responsibilities

The below table summarises the roles and responsibilities of IQVIA's implementation team:

Role	Responsibilities
Team (Across All Facilities)	
PMO	• Overviews and provide direction to the projects • Set project standards and policies
Project Director	• Leads the project at strategic and tactical level • Provides advisory services on project approach and integration to broader activities • Facilitate effective executive and Project Board governance • Provide direction, guidance and coaching to the Program Manager/ Project Manager and broader project team
Program Manager	• Project manage the different clusters and their interdependencies to ensure program objectives are achieved within estimated time and costs • Make effective utilisation of shared resources across clusters • Ensure deliverables are aligned across the clusters

Role	Responsibilities
Project Coordinator	• Provide administrative and management support role for project teams • Support project team members to undertake any project content activities, of detailed or time-consuming tracking or repetitive nature • Support the logistics of travel arrangements and the travelling team
Subject Matter Expert	• Lead the solution design for the entire project • Work with domain and technology architects, to build the solution design and its deployment • Support the infrastructure architect for the infrastructure design and deployment
Business Analyst	• Leads current system and future system analysis • Conducts business assessment and gather the business requirements • Documents the requirements with support from Functional Leads • Supports in UAT activities
Data Migration Specialist	• Manage data in a structured and organised manner, to ensure data integrity moving from the legacy system into the new system. • Setting up the staging database and pre-Loading data into it through basic validations • Retrieval of data from the target for validations • Ensuring the functional validity of records • Data Loading & Finalisation
DB Team	• Creates and maintains the databases required in PROD, DR, STAGE, DEV/TEST environments • Performs the capacity planning required to create and maintain the databases. • Perform database tuning and performance monitoring • Plans and recommends backup and recovery of the database • Provides technical support to application development teams • Assists with impact analysis of any changes made to the database objects • Troubleshoot problems regarding the HIS databases & applications

Role	Responsibilities
Implementation Team (per Facility)	
Project Manager (Facility level)	• Work closely with CLIENT Services Project Manager to implement and deliver the project • Develop, manage & control Project management plan, implementation plan & schedule and other project documents • Build and maintain the relationship with the project stakeholders • Manage project schedule, project team, and communication • Monitor risks and implement risk mitigation strategies as appropriate • Manage project conflicts • Control project budget • Ensure project standards and policies are applied and followed in the projects
Functional Lead - Clinical	• Responsible for deployment of the clinical applications including clinical notes, charting, order management, computerised physician order entry, drugs administration and other specialised clinical modules. • Supports system and integration testing • Provides necessary inputs and clarifications to Development team • Assist CLIENT Services Project Team in creating UAT test cases • Prepares UAT Test Scripts • Work with CLIENT Services Project Team to track issues identified in UAT • Coordinates plans & work with the implementation team during various stages of the project
Functional Lead - Non-clinical	• Responsible for deployment of non-clinical modules that cover end-to-end patient management from administration to ancillary modules. • Supports system and integration testing • Provides necessary inputs and clarifications to Development team • Assist CLIENT Services Project Team in creating UAT test cases • Prepares UAT Test Scripts

Role	Responsibilities
	• Work with CLIENT Services Project Team to track issues identified in UAT • Coordinates plans & work with the implementation team during various stages of the project
Functional Lead - Billing / Finance	• Responsible for deployment of billing and financial functions • Supports system and integration testing • Provides necessary inputs and clarifications to Development team • Assist CLIENT Services Project Team in creating UAT test cases • Prepares UAT Test Scripts • Work with CLIENT Services Project Team to track issues identified in UAT • Coordinate plans & work with the implementation team during various stages of the project
Integration Specialist	• Implement the integration solution based on the design developed by the Integration Lead • Develop and update integration testing documentation • Execute integration testing • Coordinate with 3rd Party resource for integration configuration and implementation
Configuration & Test Lead	• Review process workflow with CLIENT Services Project Team through Solution Architect/ Technical Lead • Configure the system as per defined process workflow • Prepares Master Data Collection Worksheet • Coordinate with Development on fixing software issues • Identify test requirements from specifications, map test case requirements and design test coverage plan • Works with Integration Architect and executes migration scripts. • Troubleshoot and resolve implementation issues during the post-Go Live support period • Isolate, replicate, report defects and verify defect fixes • Hand-hold and support users during the post-Go Live support period
Training Lead	• Work with CLIENT Services Project Team through the Project Manager to develop a Training plan • Develop and maintain the training schedules

Role	Responsibilities
	• Develop training status reports • Review the Training Documents • Supervise the delivery of the training as per the Training Topics • Assess the training process and optimise it
Training Consultant	• Execute the Training plan • Prepare Training Documents • Deliver the training as per the Training Topics
Technical Team	
Solution Lead/ Architect	• Finalises the system design • Conduct system and data analysis • Develop high-level application design and product specifications • Works with Integration Architect on the Integration Design and Workflows • Directs the creation of Solution Design Document • Provide necessary inputs and clarifications to the Development team • Support in system testing
Integration Lead/ Architect	• Develop low-level application design for integrations. • Design the integration solution based on the requirements • Call for and decide on all integration related matters. • Support in integration testing • Coordinate with 3rd Party resource for integration configuration and implementation • Directs the creation of Integration Model Document
Development Team	• Configure and incorporate CLIENT Services Project requirements • Resolve issues during the implementation
QA Lead	• Review functional and design specifications to ensure full understanding of individual Deliverables • Identify test requirements from specifications, map test case requirements and design test coverage plan • Identify potential quality issues per defined process for further action • Ensure validated Deliverables meet functional and design specifications

Role	Responsibilities
	Generate testing reports and maintain scenario library
Document Writer	Analysing technical and functional documentation content with a variety of internal teams to create concise system related documentation and communications that will be distributed to users.

8.2.2 Client Project Team Requirements (During Implementation)

Skill sets/ Roles required from the CLIENT Services-side during the Project Implementation.

Role	Responsibilities
Project Manager	- Work closely with IQVIA PM to implement and deliver the project - Develop, manage & control Project management plan, implementation plan & schedule and other project documents - Build and maintain the relationship with the project stakeholders - Manage project schedule, project team and communication - Monitor risks and implement risk mitigation strategies as appropriate - Manage project conflicts - Control project budget - Ensure project standards and policies are applied and followed in the projects
Solution Lead	- Works closely with the IQVIA Solution Lead - Conducts business assessment on the proposed solution - Reviews the system design - Reviews the high-level application design and product specifications - Monitors and reviews system and integration testing - Provides necessary inputs and clarifications to IQVIA team - Coordinate plans & work with the IQVIA solution lead during the implementation period - Reviews the Integration Design and Workflows - Reviews the Solution Design Document
Infrastructure Lead	Works closely with IQVIA team to ensure the proper planning and implementation of the infrastructure requirements.

Role	Responsibilities
	• Reviews infrastructure and management solutions with a keen focus on scalability, observability, automation, reliability, security, and quality. • Reviews the tools and frameworks utilised to automate and monitor the applications and infrastructure. • Reviews infrastructure monitoring, logging reports and alerts. • Reviews new releases deployments.

9 KEY ASSUMPTIONS AND DEPENDENCIES

9.1 Key Assumptions

There could be events and circumstances that might occur during the project life cycle that need to be anticipated for successful project implementation and completion.

The following key assumptions in defining the implementation scope of IQVIA HIS proposal.

9.1.1 Solution Design and Deployment

- Where there are multiple facilities of client, the Business Requirements Study (BRS) will be performed once involving all hospital representatives.
- All requirements those are clearly defined and signed-off within the build stage or feedback provided during demo and UAT will be assumed to be covered within the scope. Any requirements after UAT sign off will be subject to Change Request.
- Solution workflows will be standardised to all facilities (where multiple), while configurations and interfaces can change depending on the specific requirement of each facility.
- The IQVIA HIS EMR solution and associated applications will employ an Enterprise Design and build for client, there is a single instance deployment in a virtualised environment.

9.1.2 Configuration

- The Configuration activities are as below:
 - User Set up
 - Master Data configuration
 - Integration Configuration

9.1.3 Third-party Application Integration

- Standard integration scenarios, as in the scope of work, will be provided. Additional integration effort will go through the change request control process.
- For interface touch points study, design confirmation and testing, it is assumed that respective vendor resources are available.
- Application supports message tasks to trigger SMS/ email via SMS gateway provided by Infrastructure Provider. We have standard library to trigger SMS/email based on certain events. For any new trigger points, we will analyse during the business requirement study and propose the solution based on technical feasibility.

9.1.4 Device Integration

- Client will facilitate to ensure that the Host Integration Manuals are made available and adequate support is provided by the Vendor of the lab analysers to IQVIA in timely manner

- Integration readiness (such as but not limited to network readiness, machine readiness, vendor support, valid support contract from vendor) should be confirmed at least two weeks before the start of integration activities as per the agreed project schedule and timeline
- For interface touch points study, design confirmation and testing, it is assumed that respective vendor resources are available.

9.1.5 Data Migration/ Conversion

- Data migration into HIS will be from a predefined file format. NEOM Project Team should extract data from the source system into this predefined format.
- The uncoded or locally coded data will not be mapped to SHC codes. They will be loaded as it is.
- The data set for migration is fixed as:
 - Patient Demographics
 - Diagnosis
 - Alerts and Allergies
 - Masters (Like drugs list, Lab test list, Users, departments etc.)
 - EMR should be exported as PDF and attached to EMR record of patient using third party DMS system (Document Management System)
- If the vendor is unable to extract, they can provide data as one PDF per visit and it will be uploaded into IQVIA HIS

9.1.6 Go-Live Preparation

- Before the start of training, Production environment must be ready (hardware provisioned, virtual machines prepared, required software installed, master files uploaded and integration with LDAP is completed...etc.) in order to validate user access to production environment to make sure they have access to HIS on its real environment.

9.1.7 Go-Live/ Post Go-Live Hypercare Support

- Where Hypercare support is proposed, the support is considered for 3 shifts are considered for 24 x 7 support.
- After the post go-live hyper care support is over, the support will move to the on-going L2 and L3 support which is the standard maintenance contract mode.

9.1.8 Deliverables

- All deliverables are in English. In case of any deliverable required in any other language for reasonable limited number of components, we will translate only after Client's Project Manager has signed off on the final English version of each such deliverable.

- The scope of work is limited to the deliverables listed for each area in this proposal. Any changes to the project scope, timeline, assumptions to go through a change request control process.
- Any delay on part of Client Project Responsible in timely delivery of documents / information / access to key personnel / required resources may impact timely completion of project. Impact on the project deliverables and timelines will be updated and shared with the related stakeholders. IQVIA shall not be responsible or liable on any consequences for such possible delays.

9.1.9 Reports

- System comes with standard reports widely used in the region. Any customer specific reports requirement will be analysed during Business Requirements Study.

9.1.10 Project Schedule

- No additional duration is assigned to Milestone/ Deliverable Sign Offs. Hence, the Deliverable reviews, revisits, and closures should be included/ considered within the stated durations or revisited accordingly while baselining the project schedule post award.

9.1.11 System Access

- Single VPN access to the Data Centre environment will be available for performing technical related activities.
- Remote access shall be provided by client for remote installation, implementation and support in case team travel is restricted due to COVID-19 pandemic situation.

9.1.12 Hardware, OS, Database, Integration Engine, Other 3rd party tools

- The hardware and software sizing provided by IQVIA in the client specific proposal is tentative and as per the standard requirements and best practices. The final hardware and software requirements will be the outcome of the respective project implementation phase and hence, may be subject to change.
- Unless agreed by IQVIA in the proposal, any coding or medical library subscription (related to medical libraries like drug database and decision support, clinical pathway, order sets, ICD-10, LOINC etc.) is to be provided by client. IQVIA is responsible to integrate/ interface with these medical libraries to the offered systems within the project timeline.

9.2 Dependencies

- Clear Communication between Client and IQVIA regarding Purpose of Contract, Scope of Work and Requirements
- Stable Infrastructure facilities – Fail-safe Infrastructure, Stable Networking.
- Dedicated Resources, Project Team availability as and when required, including but not limited to Client PM, current IT environment (infrastructure, application systems), knowledgeable personnel, functional experts.

- Training and capacity building for the sustainability of the system.
- Effective transfer of knowledge to Solution owners and operators.
- Outreach to the various stakeholders and mentoring during the rollout.
- Change Management within Client to effectively function with the new Business Processes and Rules.
- Completed and successful acceptance testing procedures.
- Schedule adherence and in-time approvals as per the Project Plan and Schedule.
- Timely supply of the Master and Configuration data for Application to function correctly.

9.3 Exclusions

- Unless agreed, no facility-specific workflow study is considered. In case, such study needs to be taken up for any specific site, it would be considered a change request.
- Any changes to the requirements after the Design & Integration stage of the project, for which additional effort is required. In such case it would be considered a change request.
- Documentation of SOPs (Standard Operating Procedures) whether as part of the Application-related business processes, IT Operations, IT Support or Disaster recovery. IQVIA will not be responsible for the development of processes for the restoration of the Application Software in the event of any disaster or extended outage.
- Development of security guidelines and policies – this is to be provided by MEDANTA for implementing in the solution.
- Data migration from an external application or system that is not specified in the scope of work in this document.
- Data extraction from legacy systems and cleansing activities is not covered in the scope of work of this project.
- Integration with an external application or system that is not specified in the scope of work in this document.
- Integration work on the third-party vendor's side is excluded and is the vendor responsibility.
- Integration to laboratory instruments that are not capable to send HL7 or XML data out, are excluded.
- Integration with devices that are not specified in the scope of work in this document.
- Procurement and maintenance of hardware, other than already supplied as part of this Project/ Proposal and required by proposed solution to operate.
- Procurement and maintenance of non-specified third-party software licenses (including, Operating Systems, Databases, MS Office etc.) other than already supplied as part of this Project/ Proposal.

- Hardware, Operating Software, Network Support i.e., any non-application support and management.
- Any DNS or Domain Registry issues outside the direct control of IQVIA or its Subcontractor including DNS and Registry propagation issues and expiration.
- SLAs: IQVIA will not be liable for any failure to meet a service level where the failure is due to:
 - a Force Majeure Event.
 - any acts or omissions of the Client, including any failure or delays to aid or access to any site where required by us for the purpose of achieving the service level; or
 - the Client (or any third party) network, systems, software or equipment.
 - if the standard operating environment of the IQVIA HIS environment is altered, or any third-party application is installed in the IQVIA HIS servers without our prior approval.
 - maintenance and monitoring of third-party operating software and database are not performed, resulting an impact in IQVIA HIS performance.

Backing up of the database and freeing up hard disk space on a regular basis, if not performed, IQVIA will not be responsible for loss of data. If data is lost, IQVIA may assist to restore the data from the storage media. IQVIA will advise on backup procedures during the training activity.

Contact IQVIA

For further information about this service please contact us at:

email: nhssolutions@iqvia.com

visit: www.iqvia.com/uk-nhs-solutions