



# Nama-HIS

## Enterprise Healthcare Solution

May 2022



# Our Offering Healthcare solution



# Our Healthcare Offerings



## Automation Consulting

- Business Consulting
- Vendor Mapping
- Requirement and Gap-Fit Analysis
- Product Customization
- Implementation and Maintenance Support
- AI adoption

## Business Solutions

- Hospital Automation solution
- Remote Medicine & Homecare
- Portal Solutions
- Patient Kiosk and Self Help Information System
- Patient Relationship Management System
- Integration and Interfacing Engine
- Knowledge Management

## Operations and Integration

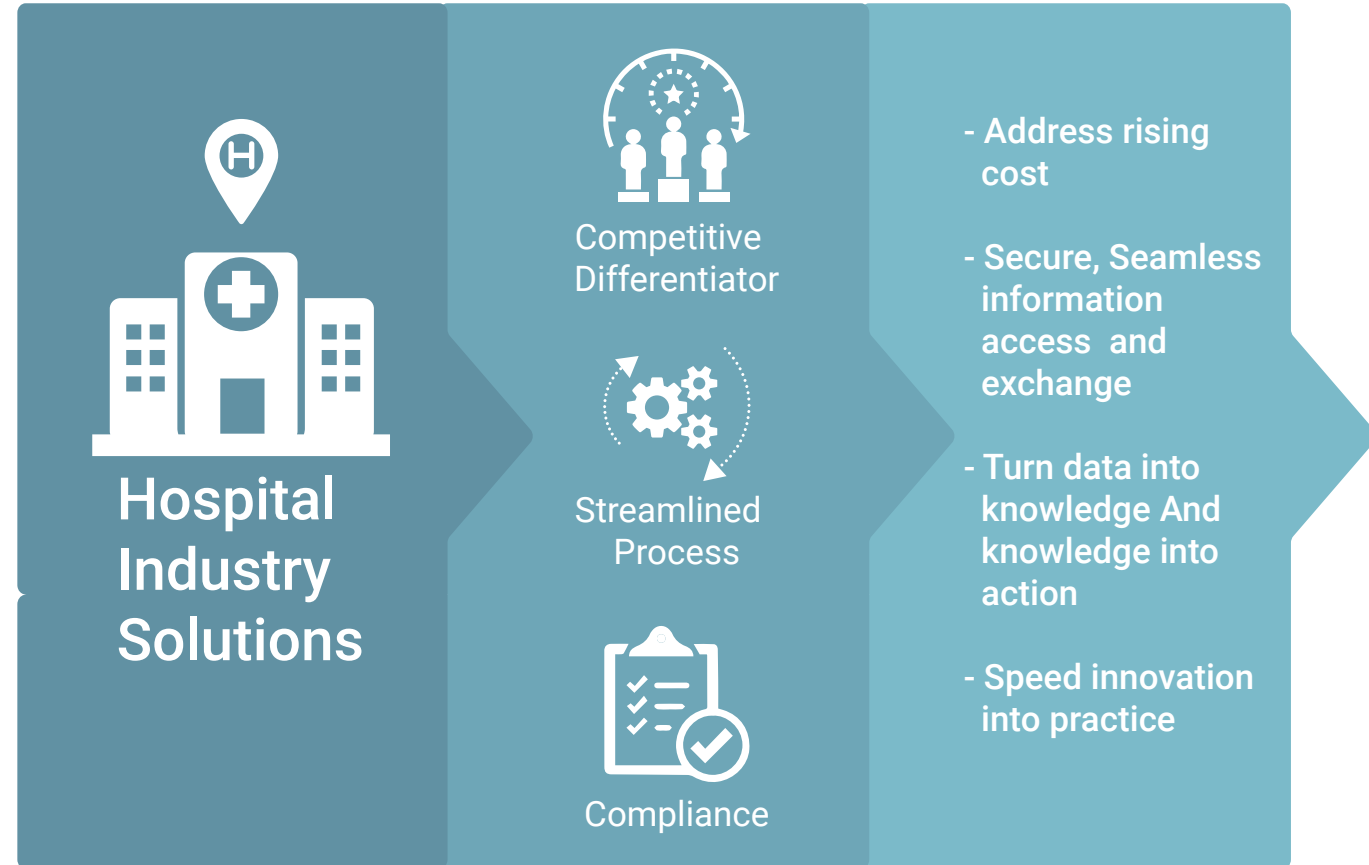
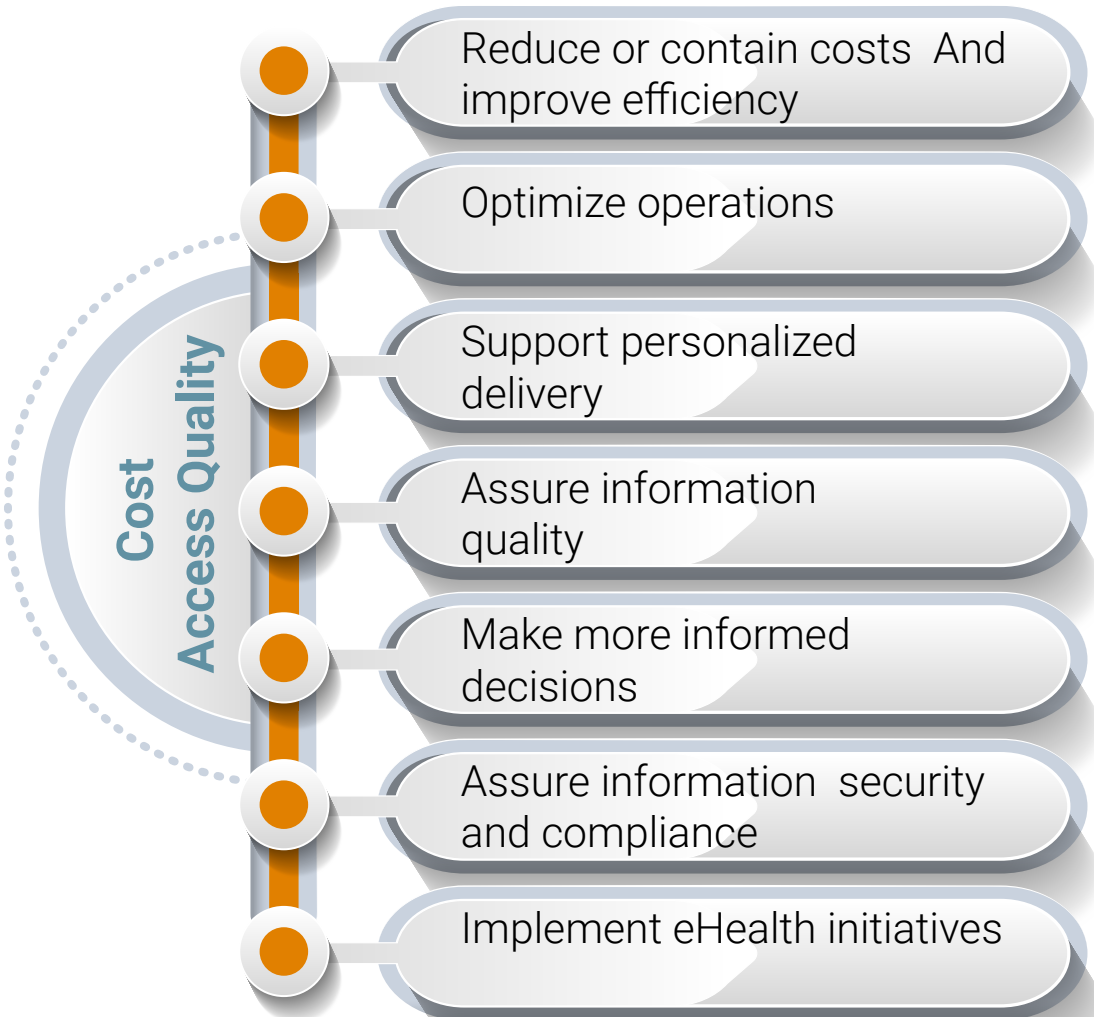
- BPM
- IT Infrastructure & Managed Services
- Systems Integration
- Enterprise Interoperability Solutions
- Support Services
- Training

## Value Added Services

- IT Consulting
  - BPR
  - Gap-Fit Analysis
  - Patient Relationship Management
- Product Customization, Development and Maintenance
- Migration
- IT Managed Services
- Business Intelligence
- Run And Maintain

- Healthcare Domain Expertise
- End-to-End Integrated HealthCare Offerings
- Standards and Compliance – HL7, HIPAA, SNOMED CT, ICD9, ICD10, CPT, DICOM, LOINC, CDA
- Healthcare IT Managed Services

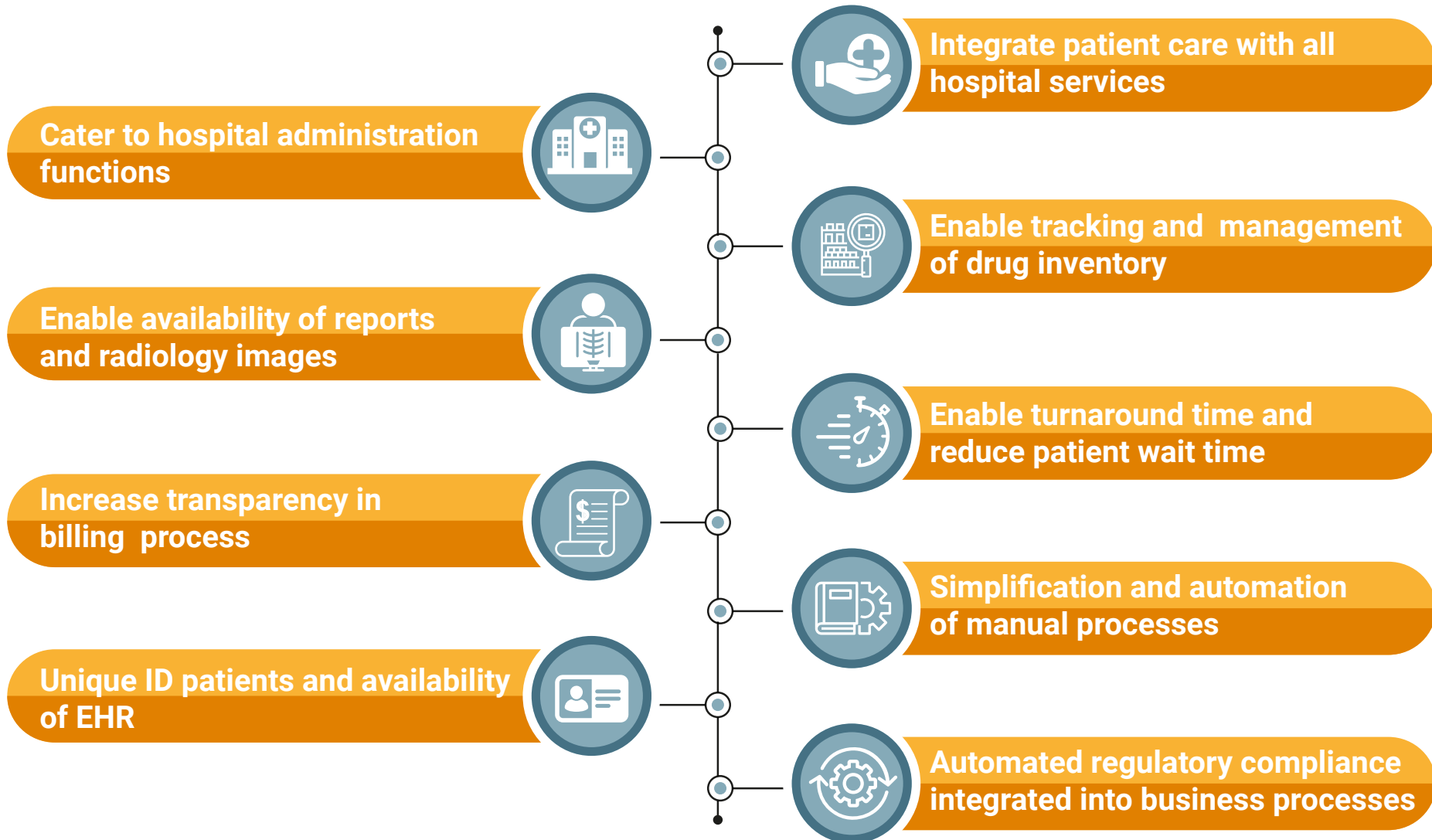
# Our USP



- NAMA is Helping Healthcare Clients Transform Addressing Cost, Access and Quality



# Our Solution meets the key objectives of the project



# Our System Modules – Hospital Automation system



## Patient Administration

- Patient Registration
- Appointment Scheduling
- Admission Discharge and Transfer
- Accident and Emergency Management
- Bed & Wards Management



## Clinical Suite

- Doctor's Workbench
- Nursing Workbench
- Order Entry(CPOE)
- AI Based Clinical Documentation



## Clinical Support Suite

- Operation Theatre
- LIMS
- RIS
- Blood bank & Transfusion Medicine
- Medical Records Dept (MRD)
- Pharmacy Management System
- Healthcare Packages



## Material Management Suite

- Inventory
- Supply and Procurement
- Pharmacy Management System
- Equipment Maintenance System
- Fixed Assets



## Revenue Management Suite

- Patient Billing
- Insurance and Contracts Management
- Claims Management
- Finance



## Tools

- Forms Designer
- Workflow Engine
- Rules Engine
- Enterprise Infrastructure Monitor: Java melody



## Analytics

- Analytics
- Custom Robotic Chatbots

# Technology





# Technology Stack – Hospital Automation system



Enterprise applications, Portals : Liferay

Business Services: Spring Web services

Angular, JSF, Facelets, CSS, HTML

Rules engine: Drools

Single Sign-on: LDAP

Workflow engine: jBPM

Spring Webflow

Spring

Search: Hibernate search, Elastic Search

Application server: Jboss, tomcat

Messaging: JMS, RestFul

ORM: Hibernate

Database: Oracle

Operating system: Linux, Windows

Management tools, profilers, Monitors(Javamelody, NAGIOS)

Mules/Mirth for Integration

HAPI (HL7 Engine), Velocity Mapper (XML generator for IHE)

Springs security

# Functional Solution Designed

Quick implementation, easy rollout, ease of use and training



## Design Principles

01

**Business Process Management**

02

**Configurable Workflow**

03

**Rules Management**

04

**Standard Functional Models**

05

**Enterprise service bus (ESB)**

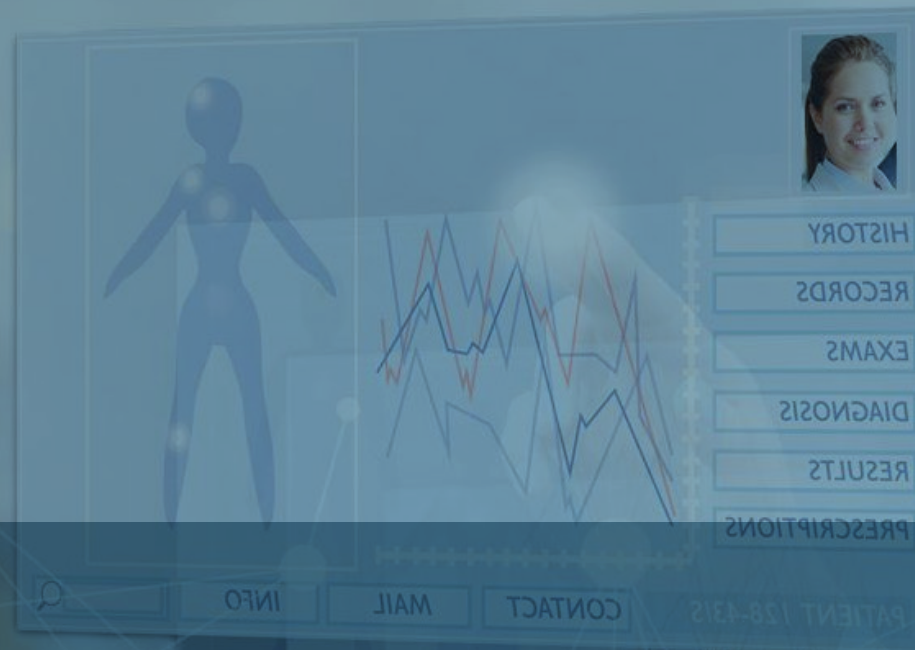
06

**Service based communication**

- COTS applications.
- Customizations and Configurations - Workflow and rule based solution.
- Intuitive user interface with minimum screens for ease of use and quick learning
- SOA and HL7 based integration - Ease of integration with external systems and devices
- Master data management for ease of managing facility data

# Module details

# Patient Administration System





# Patient Registration



The Patient Registration module captures all the demographic details of the patient and also allows the user to record the Social Security Number (SSN) of the patient. The SSN will be used by all the users to access his record in the future. The registration screen will capture all details of the patient like his personal information, contact details, details of the Next of Kin, and Biometric details. It also captures all information with respect to his Insurance Policy like the Eligibility; Policy and Payment details.




- Patient Registration
- New Born Registration
- Patient Merge/Unmerge
- System provides appropriate Prompts and Reminders at various stages of registration
- Can generate embossed/computer-readable





- identification cards, adhesive labels and patient folder front sheets.
- Patient Search
- External registration for walk-in patients
- Online registration

# Appointment Scheduling

The Appointment Scheduling module can be used effectively to optimize the scheduling of patient appointments, staff, and other resources throughout the healthcare enterprise. The Module facilitates viewing of time slots for doctors and nurses for appointment allocation. It enables the employee at the scheduling desk to answer all appointment related queries posed by the patient. The patient's appointment with the doctor can be scheduled, rescheduled or cancelled directly or through telephone.

- 
- An icon showing a calendar grid with a blue circle containing a white plus sign overlaid on it.
- Reminders
  - Cancellations with reasons
  - Repeat appointments
  - No show capture
  - Links with EMR to allow Doctor to record history, physical examination, investigations and other clinical details/observations & view them
  - Appointments with non-physician healthcare professionals

- 
- An icon showing a calendar grid with the word 'Appointments' written in white on a black banner across the top.
- Specified resources to be associated with an appointment (personnel, equipment etc.)
  - Alerts if there are conflicting appointments
  - Schedule diagnostic procedures etc. at time of making outpatient appointment
  - Allows scheduling of surgical procedures from the clinic

- 
- An icon showing a calendar grid with a clock face overlaid on it.
- Standard Package Orders associated with clinics.
  - User defined slot definition (new / follow-up), follow up after 30 days
  - Appointments & consultations between departments e.g. Imaging and OPD, or between doctors with cross-viewing of records
  - Appointment Calendar
  - Appointment Transfer & Swapping

# Admission, Discharge & Transfers

The ADT module takes care of the Admission, Transfer and Discharge of the Patient. The module helps to track the progress of the patient in terms of movement, stay and care delivery. The module operates individually and tracks patient status through interaction with relevant modules like Bed and Wards Management.



- Patient Request for Reservation
- Patient Transfers (Inter and Intra-Ward) Transfer
- Patient Admission – Direct
- Consultant Transfers
- Patient Admission – Planned
- Patient Discharge



# Bed & Ward Management

The Bed & Ward Management Module enables authorized Personnel to have a graphical view of each and every bed/ward across wards in the hospital in order to gauge and confirm the precise status of all operations relating to bed management like Bed Enquiry, Bed Census and Bed Maintenance. The module also helps to classify beds in terms of ICU, PICU/SICU, Isolation, Trolley and Bassinet. It provides a well-defined methodology of bed reservation and bed allocation for multiple rate categories.



- On-line Bed Status / Census
- Housekeeping notification after discharge
- Auto change of bed status, post Admission, Discharge or Transfer
- Collection of Samples
- Pre-Admit and Bed booking



- Bed Transfer/ Swapping
- Consumable Issue
- Drug Return Request
- Consumable Return
- Creation / maintenance of Wards/Beds/Cots Master File

# EMR

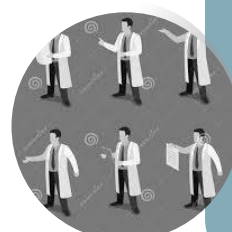
**Module details**  
**EMR**




# Doctor's Workbench

The Doctor's Workbench module helps to track all the episodes of care for a patient and enable the updating of every such episode in the EMR. It also helps to arrange, assort and record all patient specific clinical information and facilitates the order placing for the patient, prescription of drugs etc. The General Medical Examination which is an integral part of the patient case sheet includes the Chief Complaint, History of Presenting Illness, Past Medical History, Drug History, Allergies, Family History, Social History, Review of Systems, General Physical Examination, Vital sign and Diagnosis for the patient.

- 
- DWB Landing Screen
  - Patient Chart
  - Patient Details – List and Scheduler View
  - Allergy Recording
  - Surgeries and Insurance Details
  - Visit Management

- 
- Orders Status, Results, and Authorization
  - Episode Management
  - Physician Referrals
  - Vital Signs
  - Physician Forms
  - Patient Referrals

- 
- Discharge Summary
  - Vaccination Chart
  - Print and copy of current medication list
  - Consulted Patients
  - Personal Tasks
  - Symptom Recording



# Nursing Workbench

Nursing workbench is a comprehensive module that provides the facility for the nurses to maintain thorough patient care. It works in conjunction with Doctors work bench, lab, dietary, pharmacy, radiology modules. The Nursing Workbench module caters to the requirements of nurses in the ward or clinic to attend to all aspects of patient care. The module enables nurses to record the following details of the patient



- Birth Notification Details
- Nursing notes
- Patient care
- Patient forms
- Vital signs
- Patient preferences
- Fluid balance chart
- Additional orders
- Drug administration chart



- Allergy recording
- Nursing procedures
- Update birth notification details
- Track Referrals
- Chart lists and Roster Management
- Creation of memos/reports
- Scheduling requests
- View Nursing Protocols
- View dietary instructions entered by the doctor

# CPOE



The Computerized Physician Order Entry module allow orders for patient services to be entered and electronically transmitted from the point where the order originates to the point of patient services thus minimizing delays/Medical Errors, eliminating lost paper, and making information accessible to other providers Drug orders, IV Fluid orders, Consumable orders, Laboratory Orders, Radiology orders, Procedure orders, Package orders, Diet orders, Nursing procedure, Blood request form, and Miscellaneous orders for both inpatients and outpatients.



- Drug Orders
- Nursing Procedure
- IV Fluid Orders
- Blood Request Form
- Consumable Orders
- Miscellaneous Orders
- Laboratory Orders
- Order Sets



- Radiology Orders
- Tick-sheets
- Procedure Orders
- Alerts
- Package Orders
- My Favorites
- Diet Orders

# Electronic Health Record

The Electronic Medical Record (EMR) is the central repository for holding the entire medical records of the patient. It stores data in an organized and structured manner so that a clinician or any other clinical user is able to easily access clinical data based on his role, security rights and on need basis. EMR captures almost all the vital information needed by the doctor during the course of Patient Episode. The repository is highly secured and access to the information in the EMR depends upon the access rights given to the user. The clinical data repository contains various event groups.



Chief Patient Complaint  
SOAP (at the time of follow up visit)  
History of Presenting Illness,  
Progress Notes for the patient  
Past Medical History of the Patient  
Prognosis Notes for the patient  
Drug History of the Patient  
Dietary details of the patient  
Allergies  
Referral Details  
Review of Systems



- Transfusion reactions on the patient
- Family History
- 'Pharmacy Orders' and 'clinical orders' placed by doctor from order communication,
- Social History
- All Laboratory related details (investigation results, readings, lab technician comments),
- General Physical Examination of the patient
- All radiology related details (radiologist reports) gets updated into the EMR,
- Diagnosis

The background of the slide features a collage of financial data visualizations. On the right, a hand in a white glove points towards a blue bar chart that shows an increasing trend. A white arrow is drawn over the bars, pointing upwards and to the right. The background also includes a line chart with a dashed line and a solid line, both showing fluctuations. A large, semi-transparent blue area covers the middle of the slide, providing a backdrop for the title text.

# **Module details**

## **Revenue Management System**



# Billing

The Patient Billing and Accounting module provides a comprehensive integrated billing system. It maintains charges for the various services provided by the Hospital / Clinic for In-patients and Outpatients. It provides different charges for various types of patients based on eligibility criteria (for example - Military, Civilian, Insurance patients) and can generate split bills, single and interim bills. Settlement of bills can be done in local and foreign currency, cash and credit mode. The inbuilt security system provides access to authorized administrators to operate the billing system, enter discounts, refunds and cancellations. This module tracks balance amounts and generates various revenue statements that are integrated with the Patient ledger module.



- Bill Adjustment
- Deposit
- Billing Landing Screen
- Refunds
- Invoice
- Termination of Packages
- Settlement
- Bed Charge Calculation



- Credit Note
- Generic Orders
- Debit Note
- OP to IP Conversion
- Incentive Definition
- Doctor Reward Points
- Cost Driver Definition

# Insurance & Claims Management



The Insurance Module provides the facility to record contracts between the hospital and insurance companies and define eligibility criteria for billing the patient. It records and validates all coverage and non-coverage rules and rates to be applied based on the agreement between the hospital and insurance companies. This module forms the basis of a contract management system. The Claims Management provides the facility of bundling up multiple claims into one or more batches and track the information with the Payers including TPA and Insurance companies. The Claims Management is tightly integrated with the Accounts Receivable.



- Pre-Authorization Landing Screen
- Eligibility Definition
- Pre-Authorization Cost Estimation/Approvals
- Claims Dispatch
- Claims Reconciliation
- Claims Re-dispatch

A photograph of a medical professional, likely a doctor, wearing a white lab coat over a light blue shirt and a dark blue patterned tie. A green stethoscope is draped around their neck. They are holding a large blue folder or clipboard. The background is slightly blurred, showing other people in medical attire, suggesting a hospital or clinic setting. A semi-transparent blue horizontal band is overlaid across the middle of the image, containing the text.

# **Module details**

## **Clinical Support system**



# Pharmacy

The Pharmacy module acts as a drug information system useful for dispensing and stock control functions of the pharmacy department. As a centralized drug information system, this module maintains complete drug formulary with information on the generic name, the trade name, standard dosages, contra-indications, interactions, physical and chemical characteristics, etc. It supports various drug classifications and indexes and interfaces with eBNF /Unit dose and other drug databases like Martindale, Drug DB.



- Drug Pending Orders
- Patient Drug Profiles (Patient Drug History)
- Return Requisitions
- Discharge Prescriptions
- Bar-coding for stock selection from the pharmacy.
- Drug Classification
- Transfer items between stores, imprest and sub-stores.
- Alerts

# Laboratory



It is a user-friendly system providing for smooth running of the various departments of the LAB performing specimen transfer, storage, request and processing events and documenting real-time history of specimen with built in security features for easy access to the authorized users. <Name> provides special features to enable the user to conveniently view, share, analyze and communicate information across the board between various care providers. It provides a wide variety of reports for health care professionals. It also provides various MIS reports, surveillance reports etc to enhance the quality of care provided to the patient by the institution.



- Sample Collection
- Sample Recollection
- Result Entry
- QC Result
- Manual entry of numeric results
- External Samples,
- Specification of normal ranges - linked to age and gender
- Referred out Samples
- Results back to patient EMR



- Inventory Control,
- Manual/scanned entry of outsourced specimens by scanner
- Instrument Maintenance
- Specimen tracking
- Specimen reception with time frames
- Re-ordering of corrupted specimens
- Accession number allocation
- Lab Staff Mapping
- Equipment Result Mapping



# Operating Room/Theatre

The OT module enables the Scheduling & Confirmation of surgical procedure for a patient, checklist validation, surgeons', anesthetists' and nurses' notes, diagnoses, investigations and post-operative care. This module extensively takes care of all the aspects of Operation Theatre starting from OT Scheduling to OT Billing. The system has the facility to enter the Surgeon Notes and capture the Operative Chart.



- Operating Room and Recovery Room log
- Anesthesia Techniques
- Theatre Scheduling by room
- Equipment Details
- On-line Theatre Lists (with fields for additional information)
- Operating Room details



- Anesthetic record
- Surgeon Notes Templates
- Surgery Activity Reports by - -
- Surgeon, Procedure
- Roles
- Standard procedure durations
- Procedural Times
- Kit Types
- Checklist Items

# Emergency Care

The Accident & Emergency module offers patient tracking and an intuitive presentation of patient diagnosis and clinical events for the emergency department. It provides basic emergency department functionality, including quick admits, triage, tracking and patient history as well as a graphical reference to patient location and order status.



- A & E Registration
- Clinical Assessment
- A & E Admission
- Triage and assignment of patient priority
- Emergency Assessment
- Merge temporary registration to actual registration

# Blood Bank

The Blood Bank module handles all the blood transfusion details, including documentation, recipient & donor issues, cross matching, and stocking and related administrative as well as technical aspects.



- Donor Registration
- Assign expiry date
- Recipient Landing Screen
- Record the blood unit entry
- Cross Match / Investigation
- Complete audit trail of the blood unit
- Stock level updating of the blood bags
- Blood group determination of the recipient
- Sub unit information


# Module details ERP Systems





# Finance and Accounting

The Financial Suite is a comprehensive & integrated module enabling the finance manager to efficiently manage finances of an organization.

This suite has basic tools of accounting & modern analytical reports to give an edge to the finance department in effectively managing and controlling finances adhering to India's regulations. From user- defined Chart of Accounts to configurable MIS reports, the finance module encompasses all the required features from BRS to budgeting, voucher approvals to multiple currencies

- 
- Chart of Account segments
  - Budgeting
  - Accounting periods closure – month and year end by sub ledger
  - Budgeting and forecasting for both revenue and expense and capital budgeting
  - Consolidated financial statements (PL, BS & CF)
  - Credit/ Debit Note entries
  - Vouchers

- 
- Approval process on the system, enter, edit, review and approve through the system
  - Journal produced for each transaction for approval purpose (no manual journal)
  - Verify budget on line
  - Recurring Journals
  - Bank reconciliation on screen
  - Records payable by item category (capital, medical, consumables)

- 
- Recurring payments
  - G/L Auto update
  - Ageing Analysis
  - Payment options – cheques/direct transfer/cash only etc.
  - Various outstanding balances (Checks, promissory notes, cash, etc.)
  - Allows part delivery of goods
  - Allows part payment



# Inventory and Purchase

The inventory module has been developed to include all the business processes of inventory management of a back-office organization. All required inventory control features such as batch & bin tracking, expired items tracking, re-order level, min & max quantities are present here. Planning features such as suggested order quantities, vendor to item cross-referencing are very well mapped here. Apart from the stock transaction documents such as stock request/indents, issues, transfers, returns, reservation, adjustments, stock taking there are a host of power packed features such as user configurable reports, user configurable document printing etc



- Item tracking
- Stock returns
- Stock Taking
- Stock Reservation
- Destruction Certificate Document
- Packing List
- Stock Adjustments
- Stock Ledger



- Stock Transfers
- Stores Management
- Stock Request
- Consumption Entry
- Stock Receipt
- Goods Receipt Note
- Orders Processing and approving

# Procurement

The Supply & the Procurement modules mainly deal with purchase documents or through an elaborate tendering cycle. The complete purchase cycle from the purchase requisition till receiving of goods are comprehensively covered here. Certain salient features such as sorting of vendors based on prices, configurable payment & delivery terms are also present. Sales & distribution activities, which are part of the supply module, are well defined in the module.



- Payment terms
- Request for Advertisement (Tender Cycle)
- Supplier Profile
- Bid Data Sheet (Tender Cycle)
- Classification of Local Agent and linking foreign suppliers
- Tender Invitation document (Tender Cycle)
- Supplier Contact
- Bid Document (Tender Cycle)
- Customer Profile



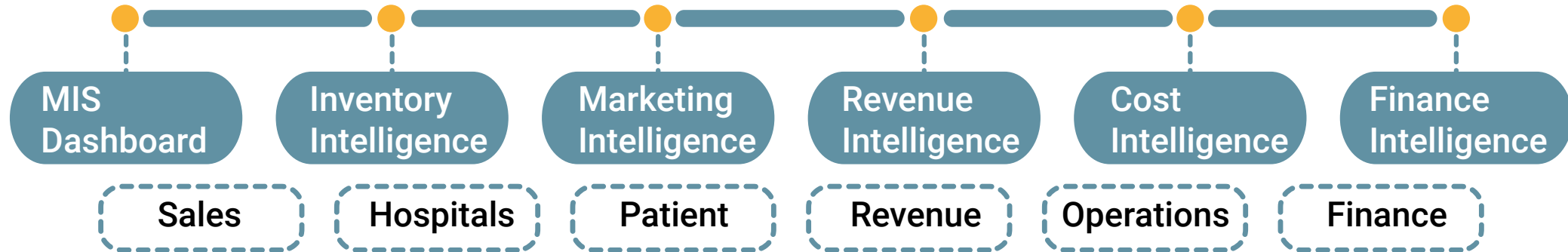
- Unifying bid data (Tender Cycle)
- Customer Contact
- Purchase Requisition
- Price Matrix for Customers
- Purchase Order - Register
- Purchase Receipt
- Sales Quotation
- Goods Receipt Note
- Orderings materials and services and distribution management

# Module Analytics

# Analytics Framework

## Decision making for Healthcare

### Applications



### Healthcare Domain Areas



### Enablers



Our BI framework consisting of best practices, business content and enablers for FastTrack solution implementation

- Provision to create a dashboard view of key process data and KPIs for decision making
- Gives automated alerts and reminders for milestone completion
- Uses historical and real time data to identify problem areas through management reports
- Packaged analytic application

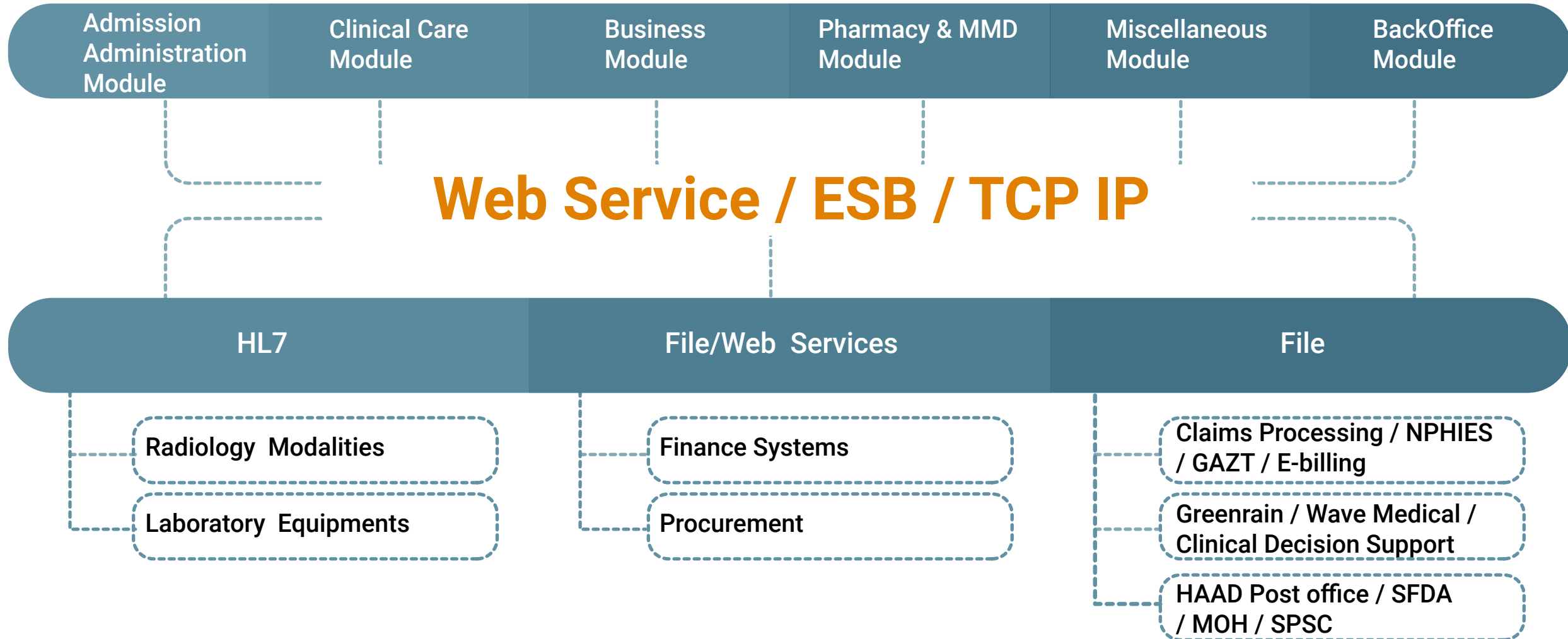




# About the Solution

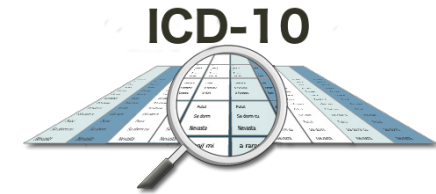
## Others

# Detailed Integration Architecture





# Clinical Standards, Compliance, Codes and Partners



# Key design principles



- Simple and friendly user interface design that fits the mental model of the user
- Personalizable
- Proactive, always reminding the user what tasks are pending
- A powerful Search capability
- Web portal with Single sign on capability

## Access and Interface

“must be user friendly, intuitive, and equipped with help”



- Design ensures no single point of failure
- Redundancies have been provided for at the Network, Server, and Data Storage levels
- Automatic failovers for DB servers

## High Availability

“should be available for %99.5 of the planned uptime”



- Virtualization has been planned to use, which will give an edge to scale systems as and when required
- Both Vertical scalability (through memory, CPU or storage addition) and horizontal scalability (Server additions) supported.
- Individual sub-systems have the capability to scale based on current and future growth requirements

## Scalability

“must support scalability to provide continuous growth to meet the requirements and demands of HMS”

Key design principles of our solution shall help create a robust & scalable solution

# ...Key design principles



- Light-weight design and robust, Open Source platform ensure high performance
- Server sizing done based on average as well as peak load considerations
- Vertical application partitioning ensures that a heavy load on one application (e.g. Web Portal) does not impact performance of other applications

## High Performance

“should provide fast and steady response times. should not be affected with growing volumes”



- SOA based integration solution to ease management of all integrations
- Seamless handling of inbound and outbound HL7 messages from any system that has similar capabilities for exchange of electronic health information.

## Interoperability

“must seamlessly integrate with other legacy applications”



- Technology stack is open source and has manpower requirements easy to fill.
- Centrally deployed Application, Software stack is chosen based on support availability and product roadmap to comply with current and future needs
- Coding standards and design patterns are chosen to ensure high configurability and low maintenance

## Manageability

“must have versioning features to track and document and process revisions made”

Key design principles of our solution shall help create a robust & scalable solution

# Benefits of Our solution



- **Rediction in overall cost of care:**  
The system helps capture clinical record easier & faster, ensure the right clinical record is captured, reduces medical and clinical error, reduces litagation and AI assisted system.
- **Latest Technology:**  
The system is built using contemporary technology
- **Great User Experience:**  
The system has intuitive user interfaces and this results in better user experience
- **Configurable Workflows:**  
The system enables easy configuration of hospital-specific-workflows
- **In-Built Designer:**  
Software application's inbuilt designer tool, empowers hospital's IT team to design flexible forms and reports. And this limits dependence on vendor-team
- **In-Built Workflow Engine:**  
Software Application's inbuilt flexible workflow engine enables hospital's IT team to do the business rules configuration, without having dependency with application development team

## ... Benefits of Our solution



- **Efficient workflow** through the entire patient visit cycle **reduces** patient waiting time, increases patient **satisfaction**, **improves** entire patient experience
- **Integrated System:** Fully integrated solution enables easy inter-branch transactions like patients, blood products, assets, etc. The system's configurability (workflows, rules) enables effective automation of all hospital business functions like emergency, triage, etc.
- **Built-in Robust & flexible EMR :** with configurable schemes, which ensures that Hospital IT can change the clinical templates as per the evolving requirements
- System is highly configurable, **N-tier Software Application**, scalable as per the requirement
- **Cloud based & Mobility:** The system can be hosted in a cloud environment, mobile enabled which allows users to use the system while on the move
- **Multi-Tenancy :** features for all required modules
- Integration with **Artificial Intelligence** and **Robotic Bots**

# System Benefits



## Integrated Interoperability

**Integrated:** The entire Application feature is integrated and resides on a single database.

## Portability Flexibility

**Interoperability:** RHIS has the Ability to integrate with other vendor products, databases, operating system, networks and application. HL7 compatibility

## Consistent

**Portability:** The RHIS has the ability to move the data across different platforms.

## Distributable Maintainable

**Flexibility:** RHIS has inbuilt Workflow engine, Report designer, Forms Designer, Customization Tool, Define Views tool and other tools using which the system can be configured and/or modified as per each clients requirements. Adding to the list mentioned above, an integrated Rules Engine is getting added to RHIS Suite. Along- with the vast set of parameters, RHIS will provide enormous flexibility to the client.

## Modular Plug & Play Easy to use

## Secure

## Robust

## Frugal

**Adherence to International Healthcare IT Standards:** RHIS is developed in close proximity to International IT and Healthcare Informatics Standards, like ICD10/9-, CPT4, SNOMED, HL7, TCP/IP etc.

## Open system

## Healthcare IT Standards

**Modular Plug and Play:** The design of the system facilitates rapid and correct response to changing needs at hospitals. The modular form of system has the flexibility to add modules as and when required

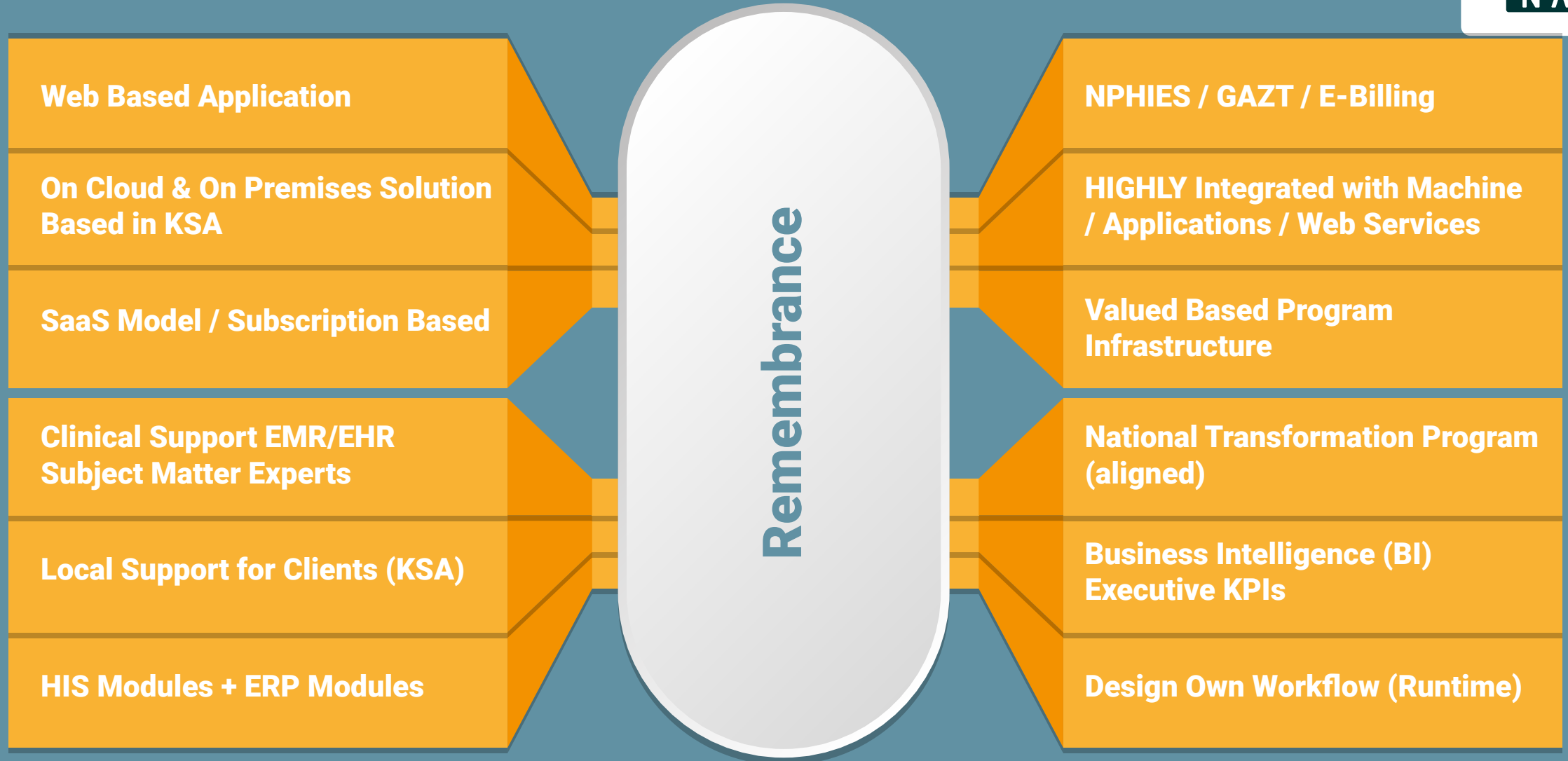
## Disaster recovery

## Stable

**Open System:** Every view and document data can be easily exported to XML, HTML, XLS and CSV format. Also, there are 'copy from' and 'import from' features available within the system.



# Remembrance...!!!



A blurred background image showing medical professionals in a clinical setting. In the foreground, a person in blue scrubs is holding a stethoscope. In the background, another person in blue scrubs is visible, and further back, a person in a white lab coat and tie is holding a clipboard. The image has a blue tint and a semi-transparent dark blue overlay.

**Let us work together to exploit the potential of  
smart and efficient artificial intelligence technology**

**Thank you**