



M.I.M.
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PHR and Interoperability.

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The Safety Crisis is Global

World Health Organization
Patient Safety Initiative

- Incidence of Adverse Medical Events¹:
 - Australia 16.6%
 - United Kingdom 11.7%
 - Denmark 9.0%
 - USA 5.4%
- Deaths from preventable medical errors²:
 - OECD Nations 400-700 per million citizens
 - USA 160-360 per million citizens





What is PHR?

A personal health record or PHR is typically a **health record** that is **initiated and maintained by an individual**. An **ideal PHR** would provide a **complete and accurate summary of the health and medical history of an individual** by **gathering data** from **many sources** and making **this information accessible online to anyone** who has the **necessary electronic credentials to view the information**.

PHRs can contain a diverse range of **data** but usually include information about:

- allergies and adverse drug reactions,
- medications (including dose and how often taken) including over the counter medications and herbal remedies,
- illnesses and hospitalizations,
- surgeries and other procedures,
- vaccinations,
- laboratory test results,
- and family history.

In addition to storing an individual's personal health information, some PHRs provide added-value services such as **drug-drug interaction checking** or **electronic messaging between patients and providers**.

One of the **principle distinguishing features of a PHR** is the **platform** by which it is delivered. The types of platforms include: paper, **personal computers**, the internet, and portable devices.



PHRs are not the same as EHRs

The latter are **software systems** designed for **use by health care providers**. Like the data recorded in paper-based medical records, the data in EHRs are **legally mandated** notes on the **care provided by clinicians to patients**. There is **no legal mandate** that compels a **consumer or patient** to store her **personal health information** in a PHR.

Quiz



What does this picture represent?

- A. Man playing saxophone
- B. Pretty woman
- C. I need glasses

Sharing information is difficult!

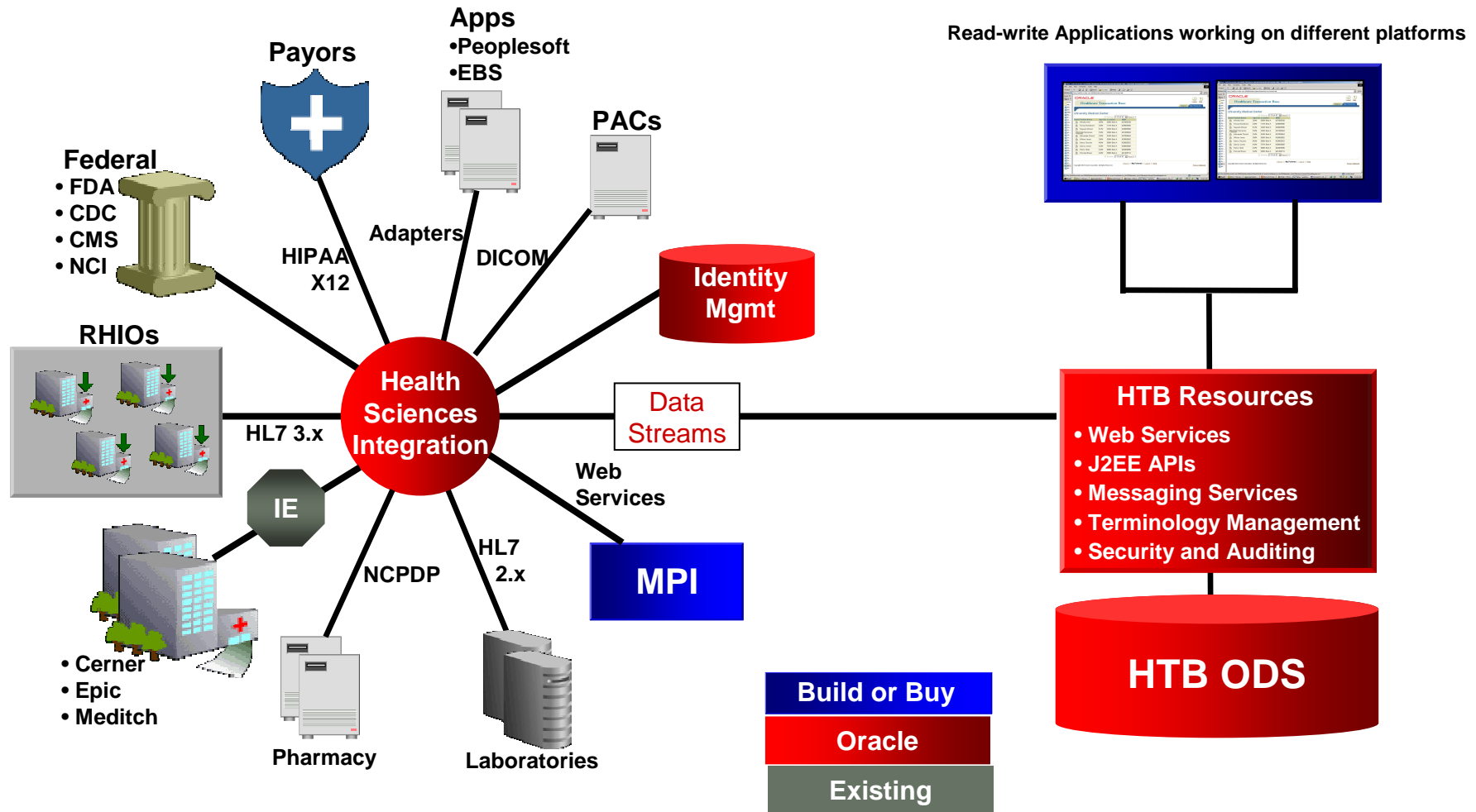


Understanding interoperability in healthcare

- Connectivity – Information can be exchanged over a common medium
- Syntactic interoperability – Structure to the information
- Semantic interoperability – Information is understood by everyone

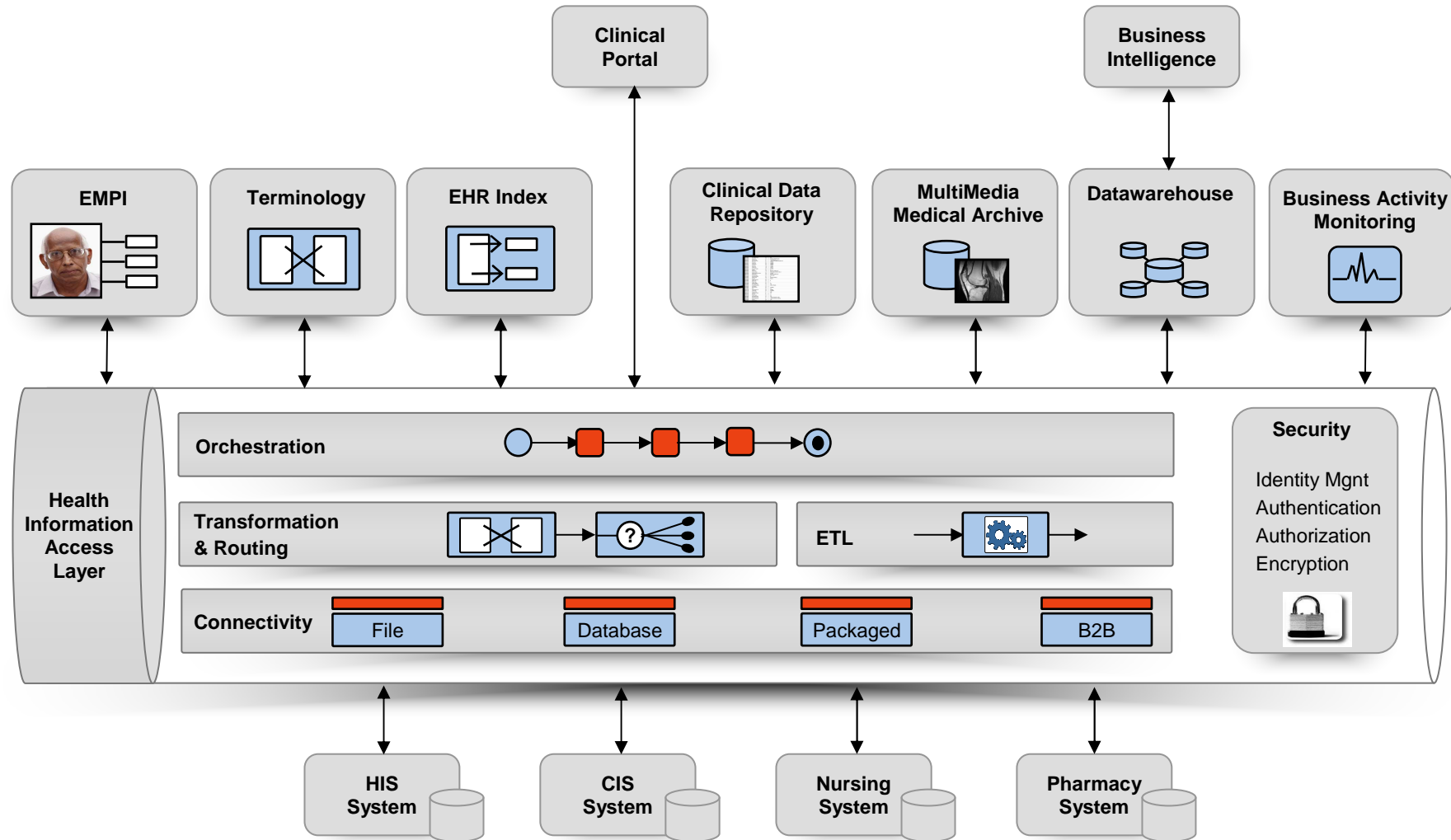
Oracle HTB Integration Architecture

Healthcare Portal



Oracle Health Solution

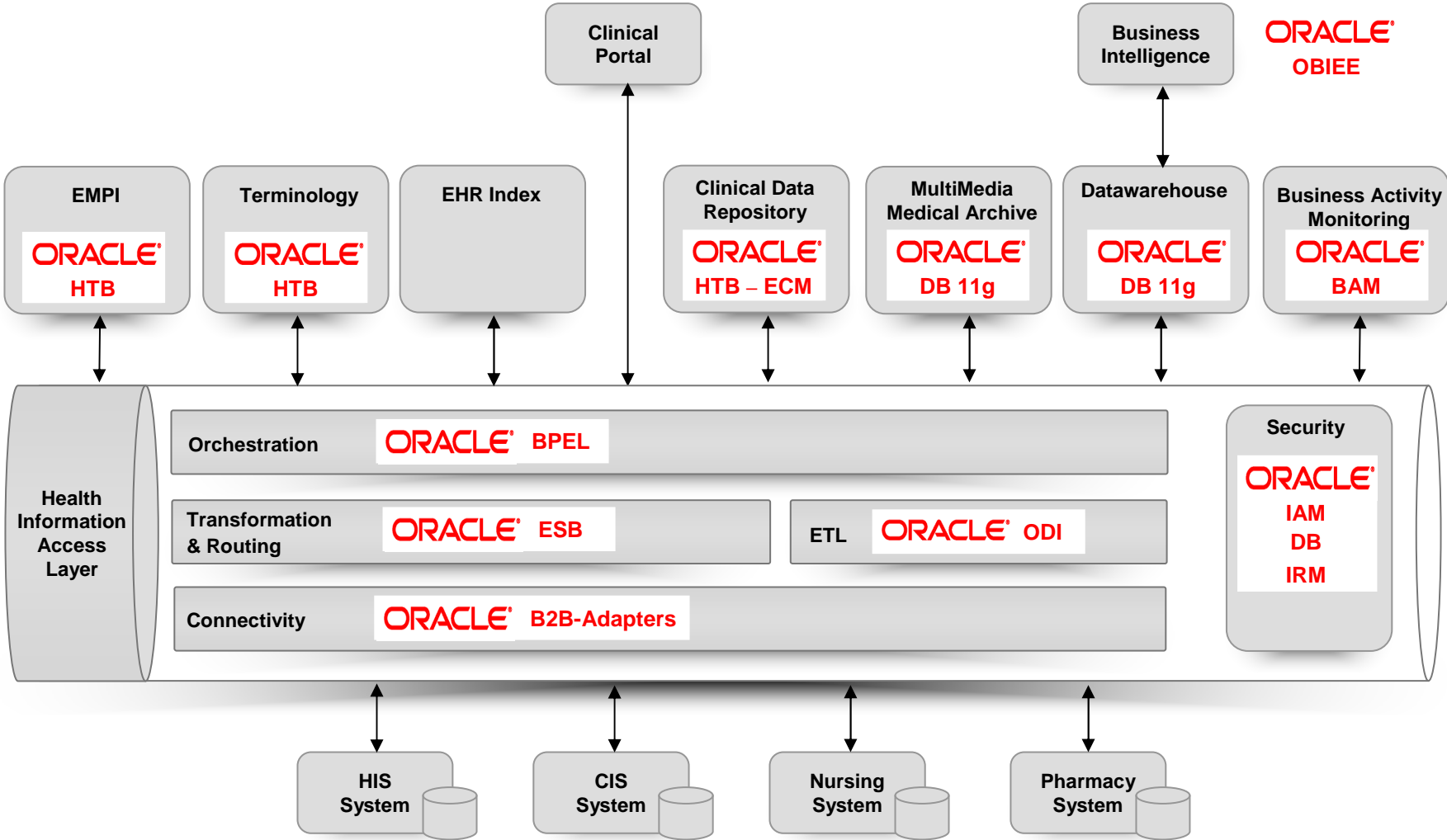
Architecture Blueprint





Oracle Health Solution

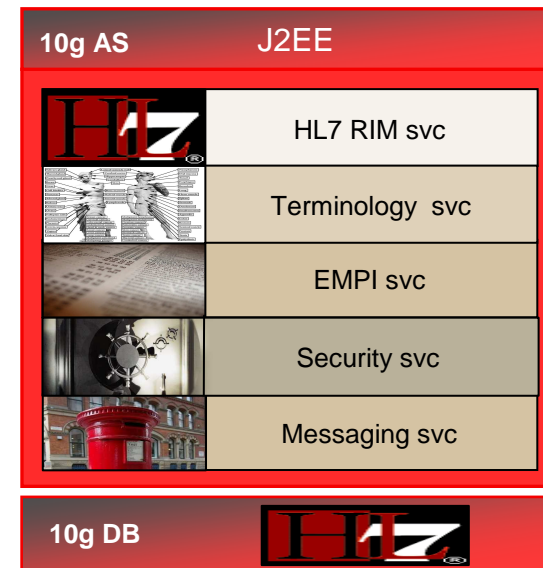
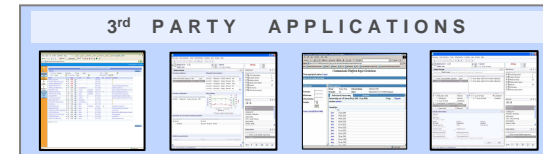
Oracle Product Map



Oracle HTB

Overview

- HL7 v3 standards based **platform**
 - **Normalized healthcare information repository**
 - Representation of information across healthcare domains
 - **Common infrastructure services**
 - Data interchange
 - Medical terminologies
 - Reduce time spent searching for data
 - Master Person Index
 - Security & Audit
 - **Allows you to build healthcare applications**
- Based on **Oracle technology** foundation



Healthcare Transaction Base



Oracle HTB

Why HL7v3?

- **Internationally** accepted and adopted standard
- **Holistic perspective** to healthcare
 - Instead of focusing on individual healthcare domains
 - Covers clinical and administrative information exchange
 - Enables interoperability through and between healthcare organizations
- **Reduces optionality**
 - Reduces the cost of maintenance
 - Enables syntactic as well as **semantic interoperability**

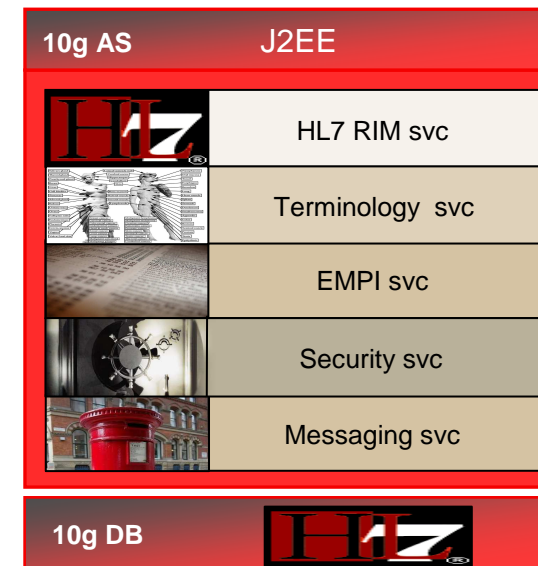
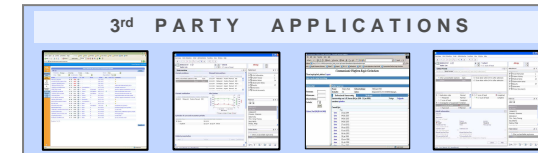


An implementation of HL7v3, enables to achieve meaningful sharing of information!

Oracle HTB

Benefits

- Overall view across care settings
 - Complete and up to date information
- Future proof
 - Standards based
 - New terminologies without intrusion
- Improved quality
 - Harmonization of heterogeneous data
 - Reduce errors due to wrong identification
- Secure
 - Compliant with regulations
- Integrated with existing systems



Healthcare Transaction Base



HSGBU

HTB Project References and in Progress

References

SON DURETA
CHILDREN'S HOSPITAL
Stockholms läns landsting
SharedHealth
Transforming Care
CMS Centers for Medicare & Medicaid Services
biobank^{uk}
Improving the health of future generations

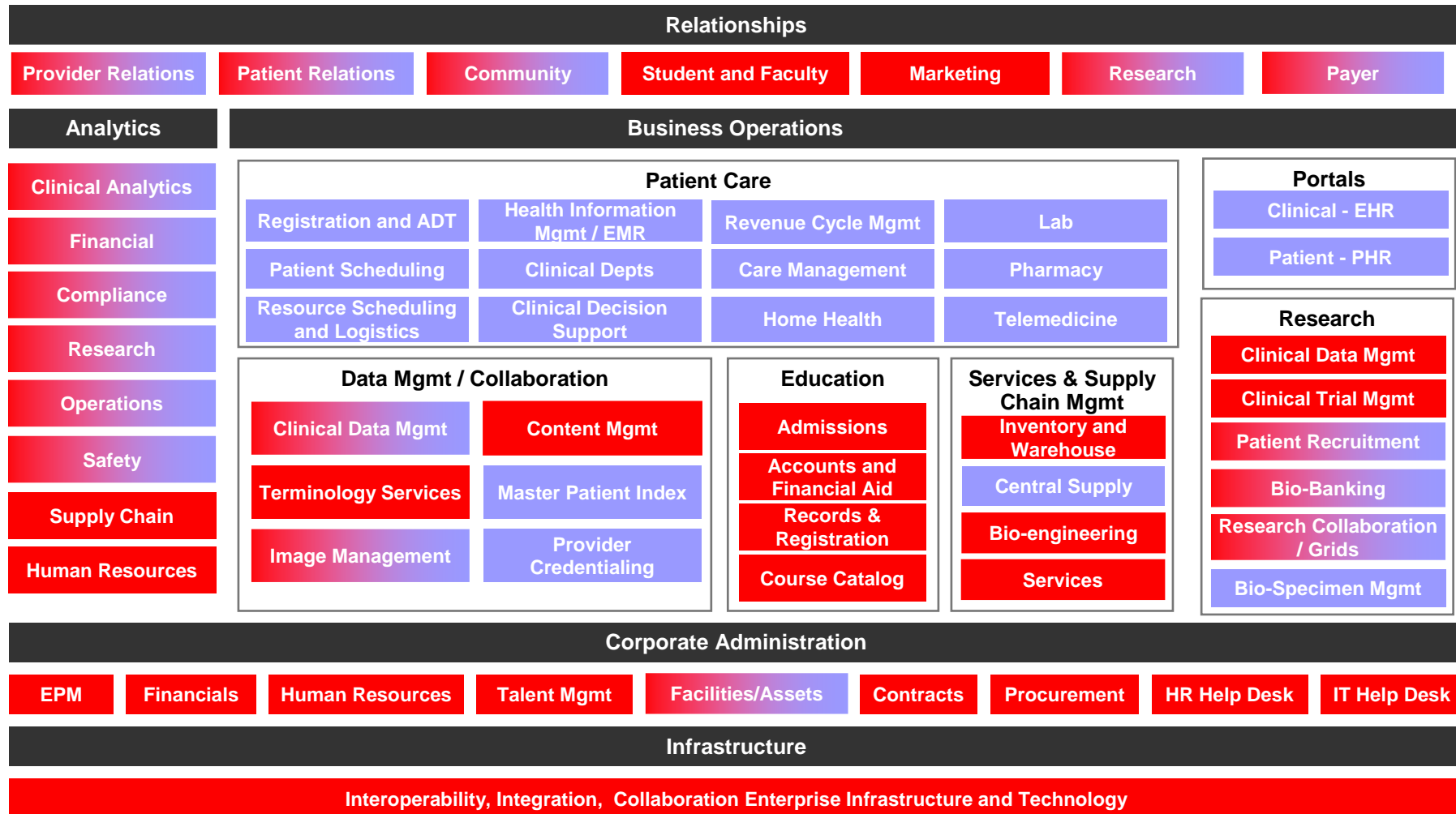
In Progress

DANA-FARBER
CANCER INSTITUTE
Agence de la santé
et des services sociaux
du Bas-Saint-Laurent
Québec
Microprogrammes
Informatique de la santé
availity[®]
Patients. Not paperwork.
CALIFORNIA
PRISON HEALTH CARE
RECEIVERSHIP CORP.

Oracle Healthcare Provider Footprint

Complete. Open. Integrated.

■ Oracle
 ■ Partner



Oracle's Leadership in Healthcare

Healthcare Transformation

- ONCHIT RFP Response: Interoperability Consortium
- A partner/participant in NHIN 1 and 2 Architecture Prototype
- **Enterprise Healthcare Intelligence Focus**

Extensive Partner Network

- Top HC ISV's that run on Oracle infrastructure



World Class Technology

- Recognized as Middleware Leader by Gartner and Forrester
 - Integration/Portal/ Security/Identity Mgmt./ Application Development
- IDC: Oracle #1 in Biz Intelligence

Leading in HC Applications Financial, HR, SC, CRM

- KLAS 2007: PSFT ERP #1 Recommended Solution for providers
 - Rated top healthcare vendor

Oracle Interoperability References

Quebec DSEIQ

CUSTOMER OVERVIEW

- Province of Quebec, Canada, Population 7,546,131, Universal, free healthcare, Province is comprised of 17 administrative regions. Each administrative region of Québec is responsible for providing all services essential to promoting and maintaining excellent quality of life for its citizens, including health care services

CHALLENGES/ OPPORTUNITIES

- Disparate clinical point of care systems
- Lack of longitudinal view of patient clinical data
- Need for standards-based solutions for clinical data interchange and reuse

SOLUTIONS

- Orion Health-Oracle Solution
- Oracle Healthcare Transaction Base
- Oracle Fusion Middleware (BPEL, HC Adapter)
- Oracle Application Server
- Oracle Database
- Orion Health Rhapsody, Concerto and Soprano

CUSTOMER PERSPECTIVE

“To foster and accelerate the development and adoption of electronic health information systems with compatible standards and communications technologies on a pan-Canadian basis, with tangible benefits to Canadians. To build on existing initiatives and pursue collaborative relationships in pursuit of its mission.”

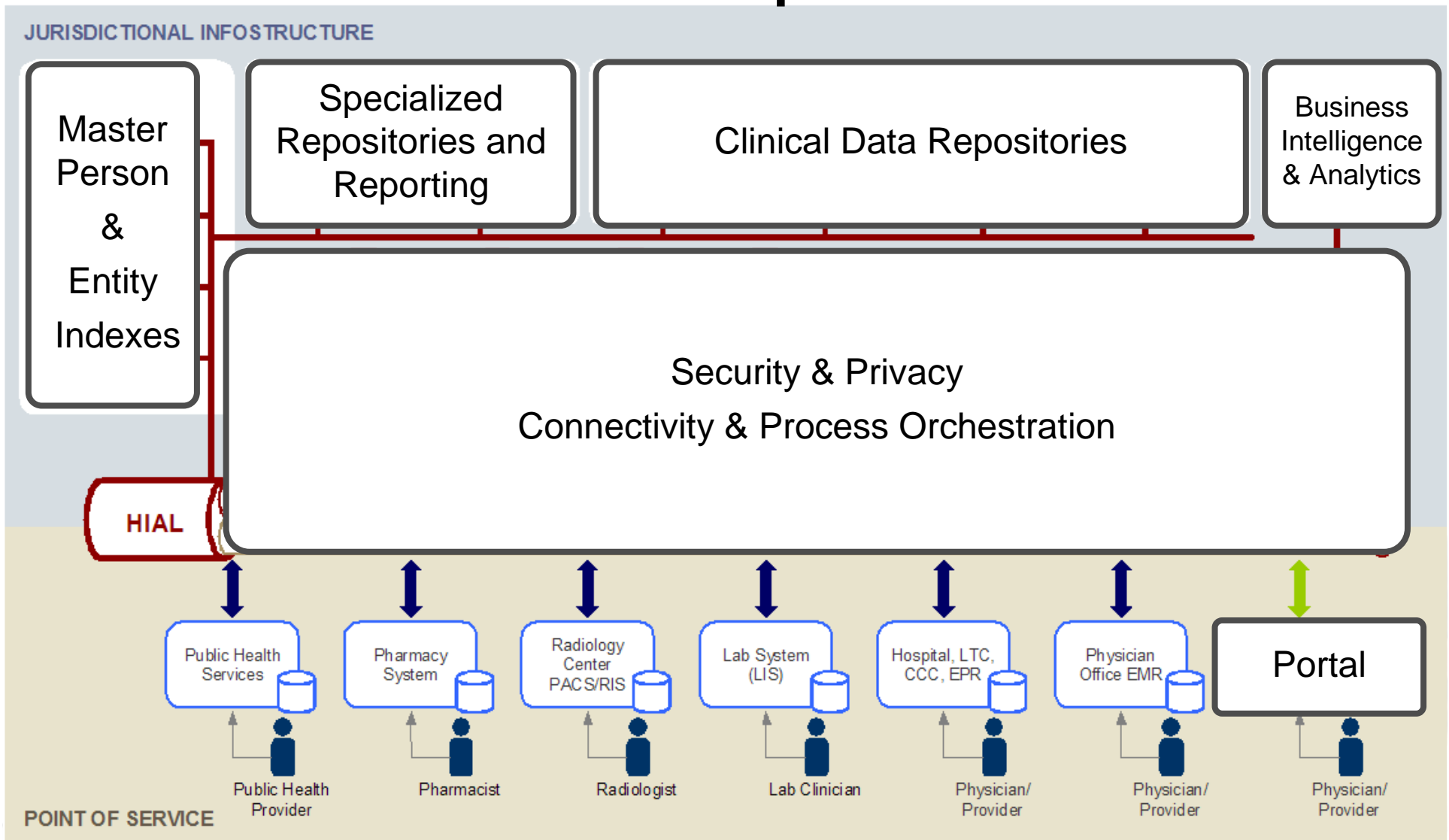
Canada Health Infoway

RESULTS

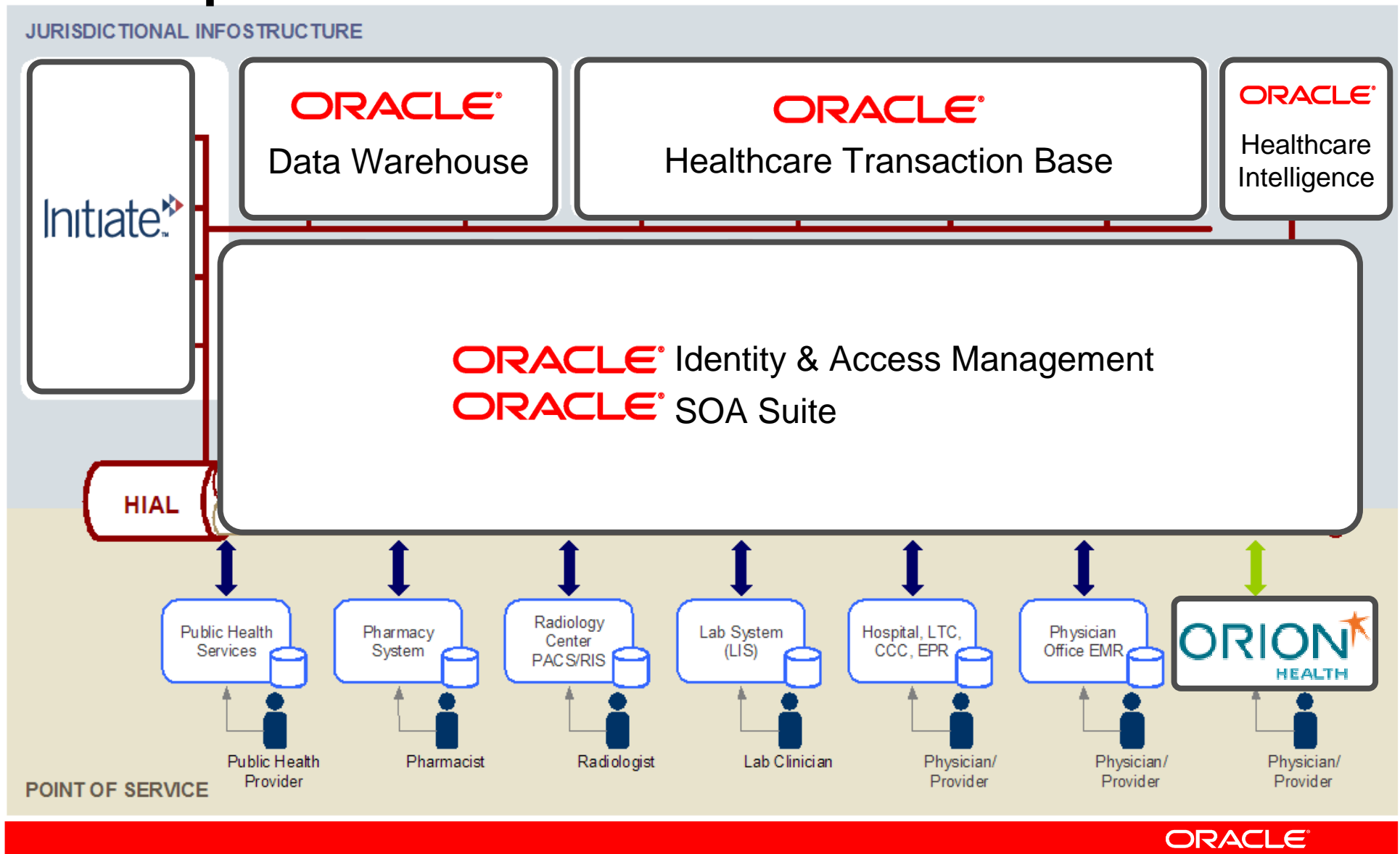
- Integrated and relevant clinical data is stored in a comprehensive standards-based repository
- Clinicians can search and view information and order tests electronically through a clinical web portal
- An electronic display shows up-to-date patient health information
- The solution is currently being deployed in the Quebec City Region and will be rolled out to the other administrative regions
- The record is available electronically to authorized health providers and the individual anywhere, anytime in support of high quality care



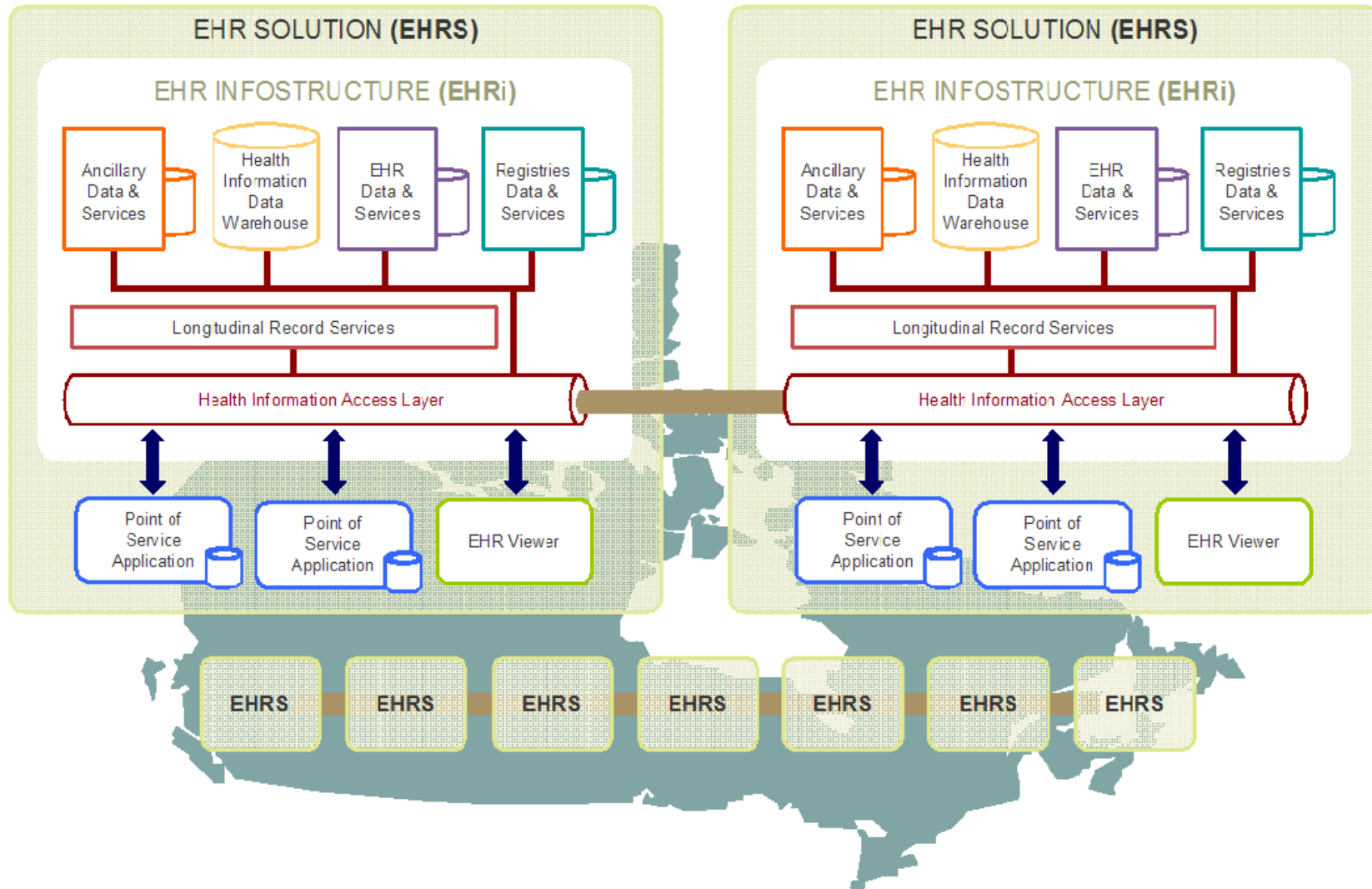
EHR Architecture – Open Standards Based



Open Standards Based Products



EHR Architecture – Long Term Vision





Oracle HTB References

UK Biobank



OVERVIEW

- The UK Biobank project collects biological samples and data on the medical history and lifestyles of up to half a million participants aged between 40 and 69 and monitors their health changes over a 30-year period
- The results will help researchers understand the biology of health and disease and could lead to the prevention and cure of many later-life disorders

CHALLENGES

- Build a secure repository to protect the confidential medical, health, and lifestyle data collected on participants and ensure that access to it is restricted to authorized parties
- Create a single, consistent electronic record for each individual that complies with the Health Level 7 Version 3 protocol for the format, content, and exchange of data

SOLUTION

- Oracle HTB provides the infrastructure and tools necessary to create a scalable healthcare information repository



RESULTS

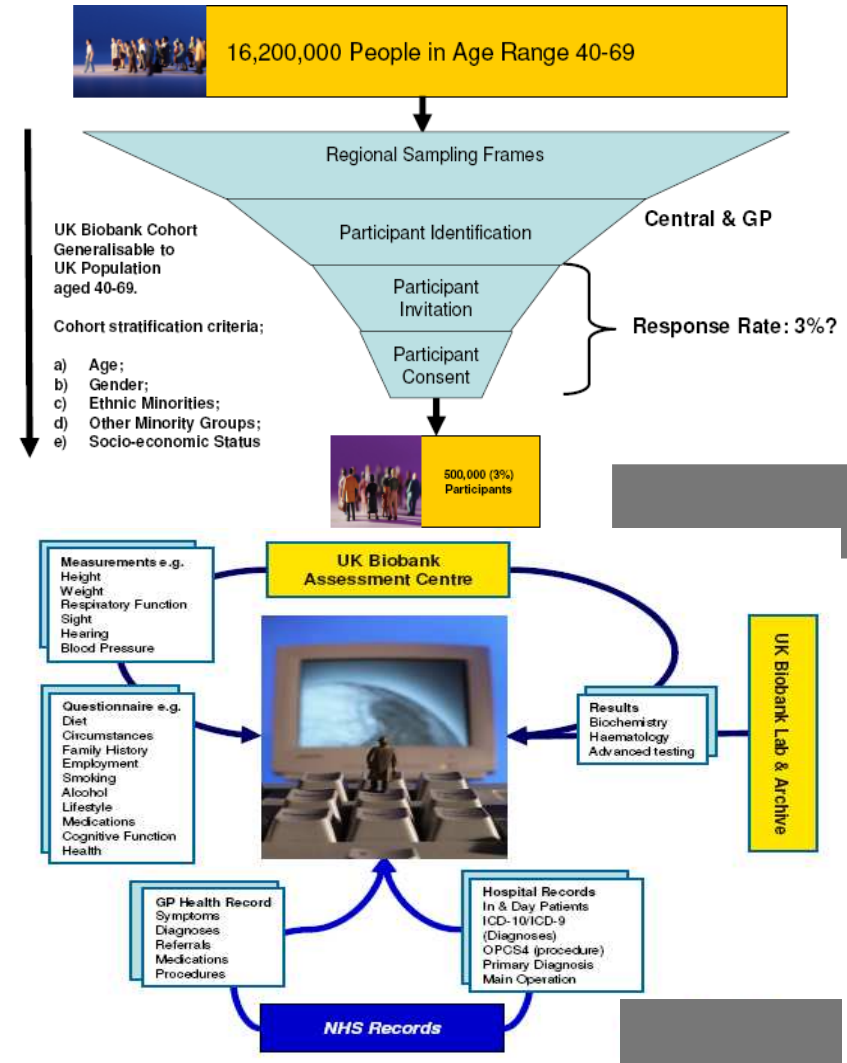
- **Established a repository for facilitating collection, storage, and electronic sharing of data**
- **Record participant data collected in assessment centers in England, Wales, and Scotland and provide a single comprehensive view of information**
- **Entered test results and noted health changes, such as the onset and progression of diseases like cancer, heart disease, and dementia during the 30 year study**
- **Data can only be accessed and updated by authorized stakeholders**

Oracle HTB References

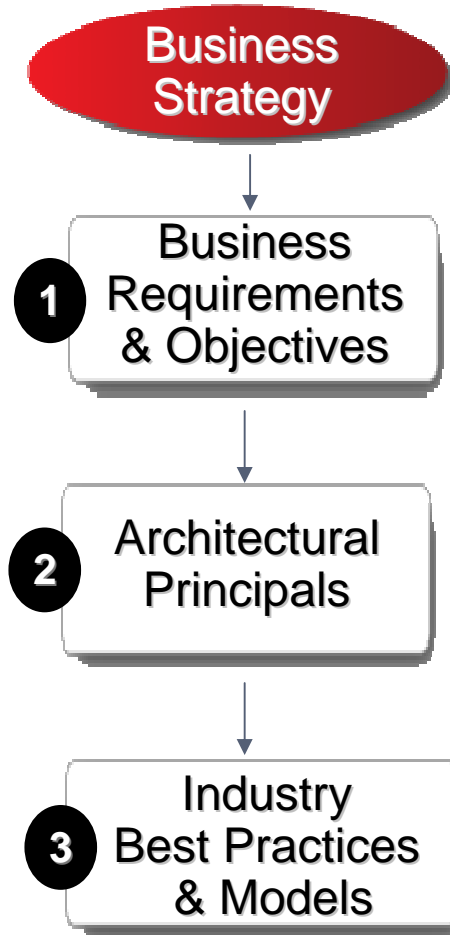


UK Biobank

- Invited 500 000 people in age range 40 - 69 to participate
- Dedicated assessment centers throughout UK
 - Explicit broad consent
 - Detailed lifestyle and health questionnaire
 - Physical measurements
 - Collection of blood and urine samples
- Follow-up participants health
 - Time span of 20-30 years
 - Information from multiple sources
 - Medical records
 - Biological samples
 - Environmental information



One of the nation's largest public/private health information exchanges (HIE).



- Improve the quality of health care by securely connecting medical information across a patient's network of health care providers
- Engage and empower patients with access to their own health information

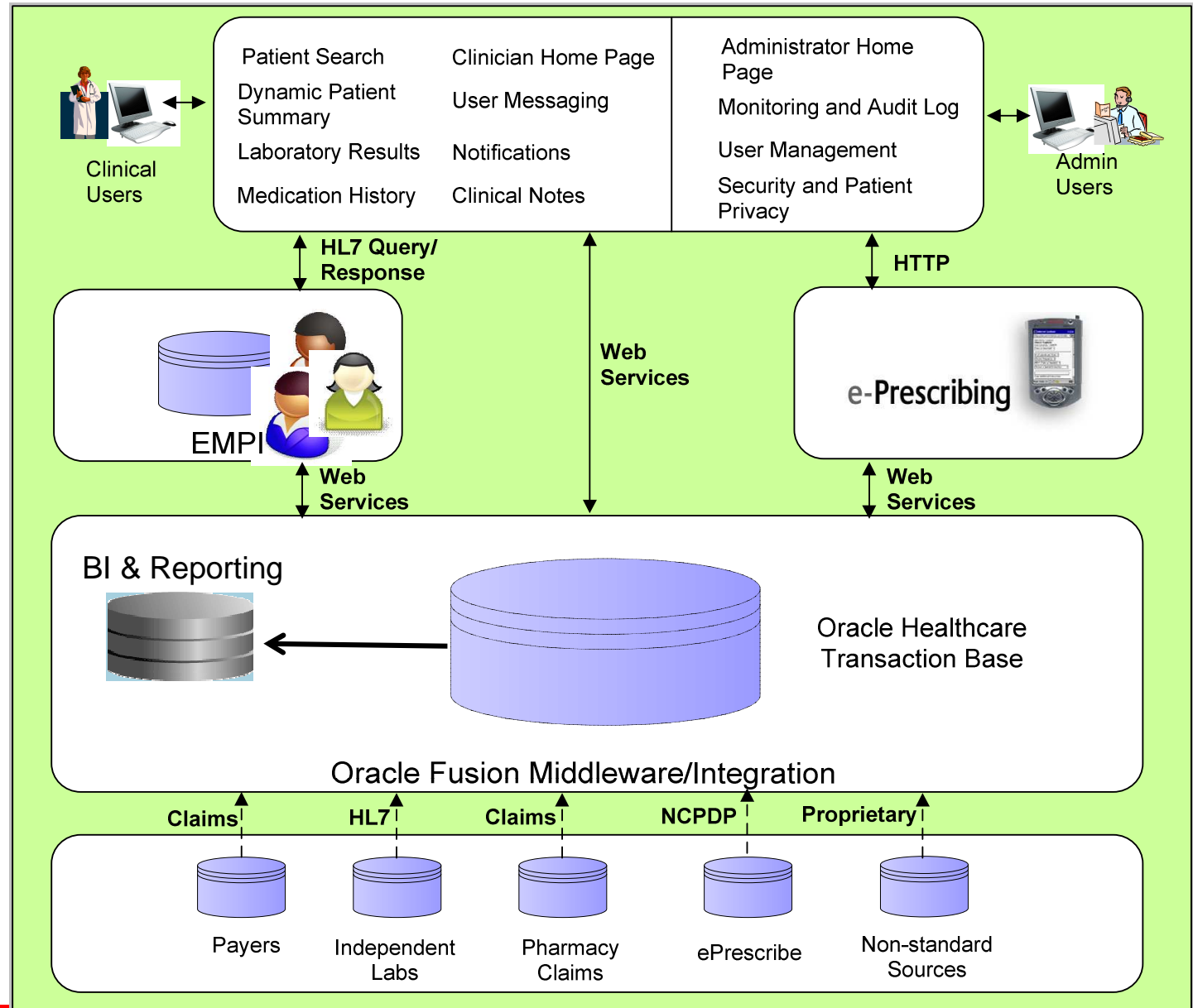
- Offer health solutions that are flexible, innovative and interoperable in all health delivery environments (SAAS)
- Provide real-time, consistent view of patient, provider and medical records

- **Flexible, High Performance, SOA based on standards**
 - **Business:** Interoperable with **all healthcare standards**
 - **Information:** Provide single **multi-use repository** that services multiple applications
 - **Technology:** **Use technology standards.**

- Adopted HL7 Reference Information Model (RIM)
- Clinical Xchange supports multiple healthcare data exchange standards including:
 - Continuity of Care Document (CCD)
 - HL7 v2 & v3 messaging
 - NCPDP for ePrescribing
 - HIPAA EDI for claims

	Former State	Current State
Business Model Architecture	<ul style="list-style-type: none"> Proprietary vendor lock-in 	<ul style="list-style-type: none"> B2B plus B2C Health Care Consumerism Hosted SAAS
Information Architecture	<ul style="list-style-type: none"> Non-extensible & proprietary data model 	<ul style="list-style-type: none"> Single source-of-truth Healthcare Transaction Base (HTB) repository Based on HL7 RIM
App./Services Architecture	<ul style="list-style-type: none"> Non-customizable application - not optimized for Shared Health clients 	<ul style="list-style-type: none"> Service enabled application endpoints
Integration Architecture	<ul style="list-style-type: none"> Inefficient point to point architecture Periodic flat file 	<ul style="list-style-type: none"> Enterprise Service Bus (ESB) J2EE and SOA based architecture Real time HL7 & NCPDP messaging
Security Architecture	<ul style="list-style-type: none"> No end to end security strategy 	<ul style="list-style-type: none"> End to end access management, identity provisioning and role management Enforced HIPAA security standards
Data Mgmt Architecture	<ul style="list-style-type: none"> Stovepipe databases 	<ul style="list-style-type: none"> Centralized HTB database storing documents and records and fed by source systems in near real-time Federated option provided

HIGH LEVEL LOGICAL ARCHITECTURE





Oracle HTB References

CSC Scandihealth – Clinical Suite



OVERVIEW

- Leading healthcare IT company in Scandinavia, developed 4 generations of healthcare systems since 1972, next generation of EHR systems is based on HTB

CHALLENGES

- Healthcare data is often organized by point of delivery, making it hard to track a patient's medical history, splintering the view clinicians have of the patients they treat
- Improve quality of care by providing clinicians with consistent and timely information
- Achieve better team coordination when treating a patient and avoid misunderstanding by providing standards-based clinical workflows and treatment protocols
- Integration with existing IT systems to enable incremental deployment and spread investment costs
- Need to have secured and fully auditable access to patient data, compliant with regulatory obligations



SOLUTION

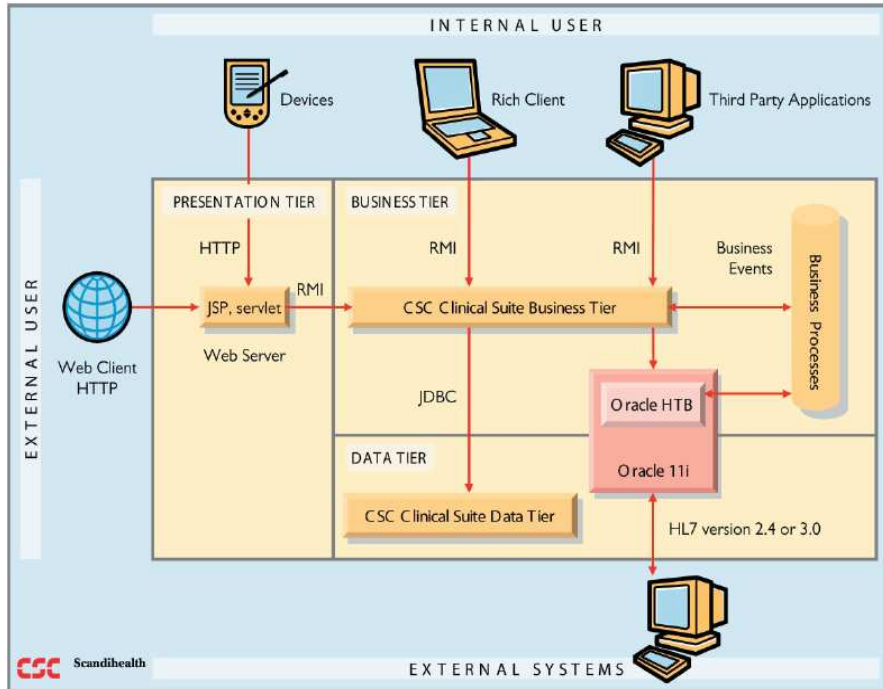
- CSC Clinical Suite based on Oracle HTB and Oracle BPEL Process Manager

RESULTS

- **Clinical Suite provides a single, accurate patient record, that can be maintained in real time in the surgery, consulting room and administrative office**
- **At the same time as updating the patient record, clinicians can use Clinical Suite for order entry**
- **Clinical Suite automates the workflows between healthcare processes, making it easier for clinicians to cooperate in treating patients**

Oracle HTB References

CSC Scandihealth – Clinical Suite



FUNCTIONAL TIERS		CSC CLINICAL SUITE COMPONENTS			
Direct Care	<ul style="list-style-type: none"> - Care mgnt - Clinical decision support - Operations mgnt, comm. 	Clinical Monitoring	Observation	Standard Plans	
		Problem	Work List	Allergies	
		Intervention	Order Entry	Guidelines	
Supportive	<ul style="list-style-type: none"> - Clinical support - Analysis, reporting - Administrative, financial 	Patient	ADT	Referral	
		Reports/Letters	Consent	Waiting List	
Information Infrastructure	<ul style="list-style-type: none"> - EHR security - EHR information mgnt - Care management - Directory services - Interoperability - Business rules - Workflow 	Security	Terminology		
		Workflow Manager	User Help		
		Configuration Tools			
System Administration		Profiling	Admin. Tools	Organization	
		Session Control			
Integration		ADT	Medication	Microbiology	
		Clinical Chemistry	Radiology	...	



Oracle HTB References

Orion Health – Hospital Universitario Son Dureta

OVERVIEW

- Largest health facility in Spain's Balearic Islands, operating 900 beds and employing 3600 people across 5 facilities, hosting the islands' reference laboratory, used for specialist tests that cannot be performed elsewhere

CHALLENGES

- Different IT systems (LIS, RIS, HIS, ...) operate independently, clinical data is stored in a multitude of formats and terminologies vary between departments
- Doctors in emergency only receive information on paper from triage zone, orders are made on paper and handed to lab and radiology, doctors need to wait for test results to arrive on paper
- The current systems cannot be adapted to store new types of information



SOLUTION

- Clinical web portal with electronic whiteboard for the emergency department based on Orion Concerto
- Integration of systems through Orion Rhapsody
- Clinical data repository based on Oracle HTB

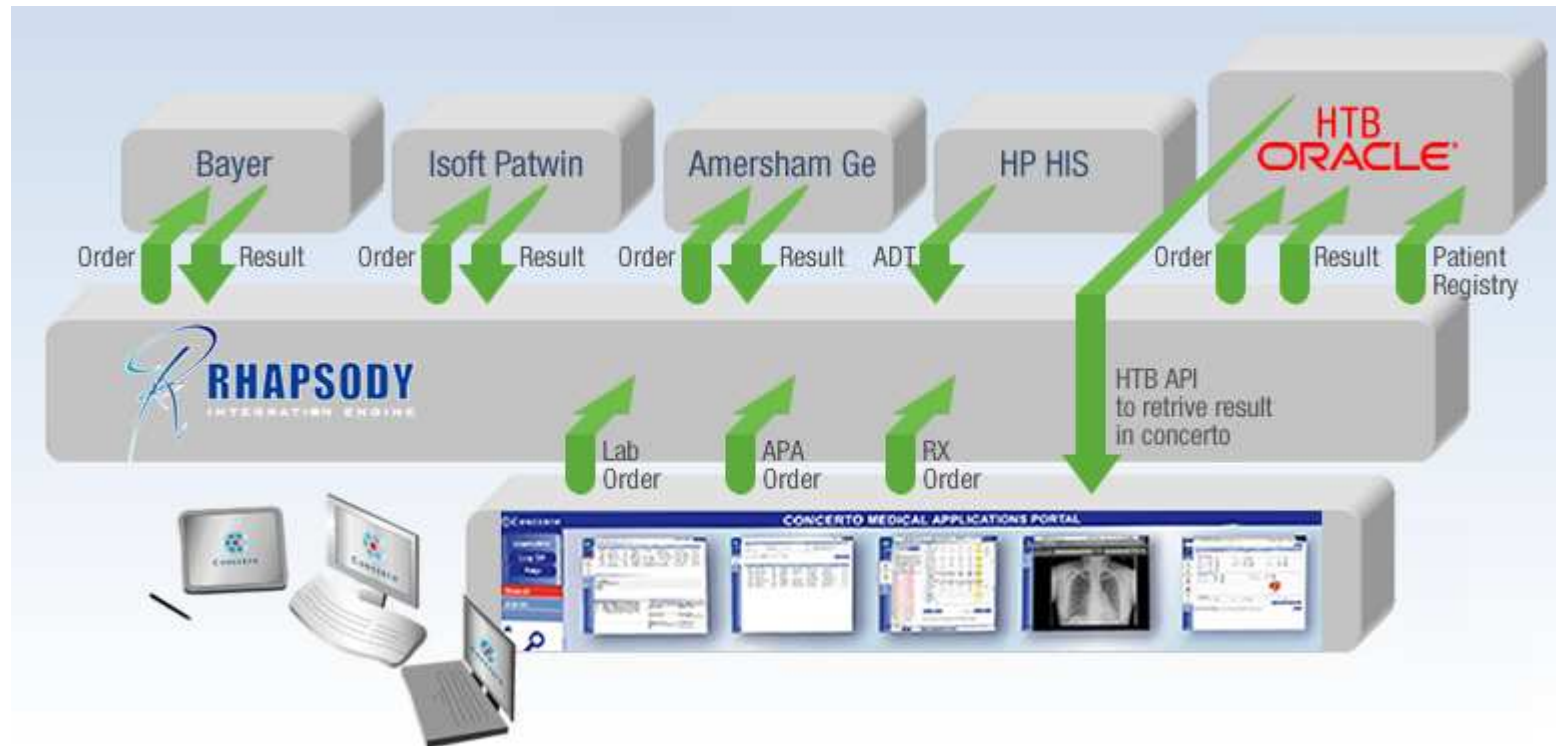
RESULTS

- The hospital's various existing systems are integrated and relevant clinical data is stored in a comprehensive standards-based repository
- Clinicians can search and view information pertinent to their daily tasks and order tests electronically through a clinical web portal
- An electronic whiteboard solution displays up to date information about patients currently in the emergency department

Oracle HTB References



Orion Health – Hospital Universitario Son Dureta





Oracle HTB References

Stockholm County Council

OVERVIEW

- Stockholm County Council provides healthcare services to 1.9 million citizens in the county of Stockholm in Sweden, which represents 20% of the county's population

CHALLENGES

- Consolidate and centralize patient information – held in approximately 35 non-interoperable systems and 500 databases across the region – into a single repository, accessible by multiple systems
- Develop a single, longitudinal electronic healthcare record for every patient, enabling a consistent 'continuum of care' throughout the patient's lifetime
- Provide healthcare personnel with rapid access to a patient's medical history

SOLUTION

- Created a single repository of patient data stored in HTB
- Introduced a SOA architecture to facilitate the consolidation of legacy applications



RESULTS

- **Enhanced quality of healthcare data and accelerated speed of access**
- **Ensured that patient data and terminology held in the repository comply with the HL7 data standard for access and use by heterogeneous systems**
- **Guaranteed patient data structure, accuracy and security**
- **Financed the implementation of HTB and associated services entirely from within the existing IT budget**



Oracle HTB References

Stockholm County Council

The GVD system

