



# Planning for SNOMED CT adoption in a Health Information Exchange (HIE)

John Hatem – Director, Healthcare Product Strategy  
October, 2012

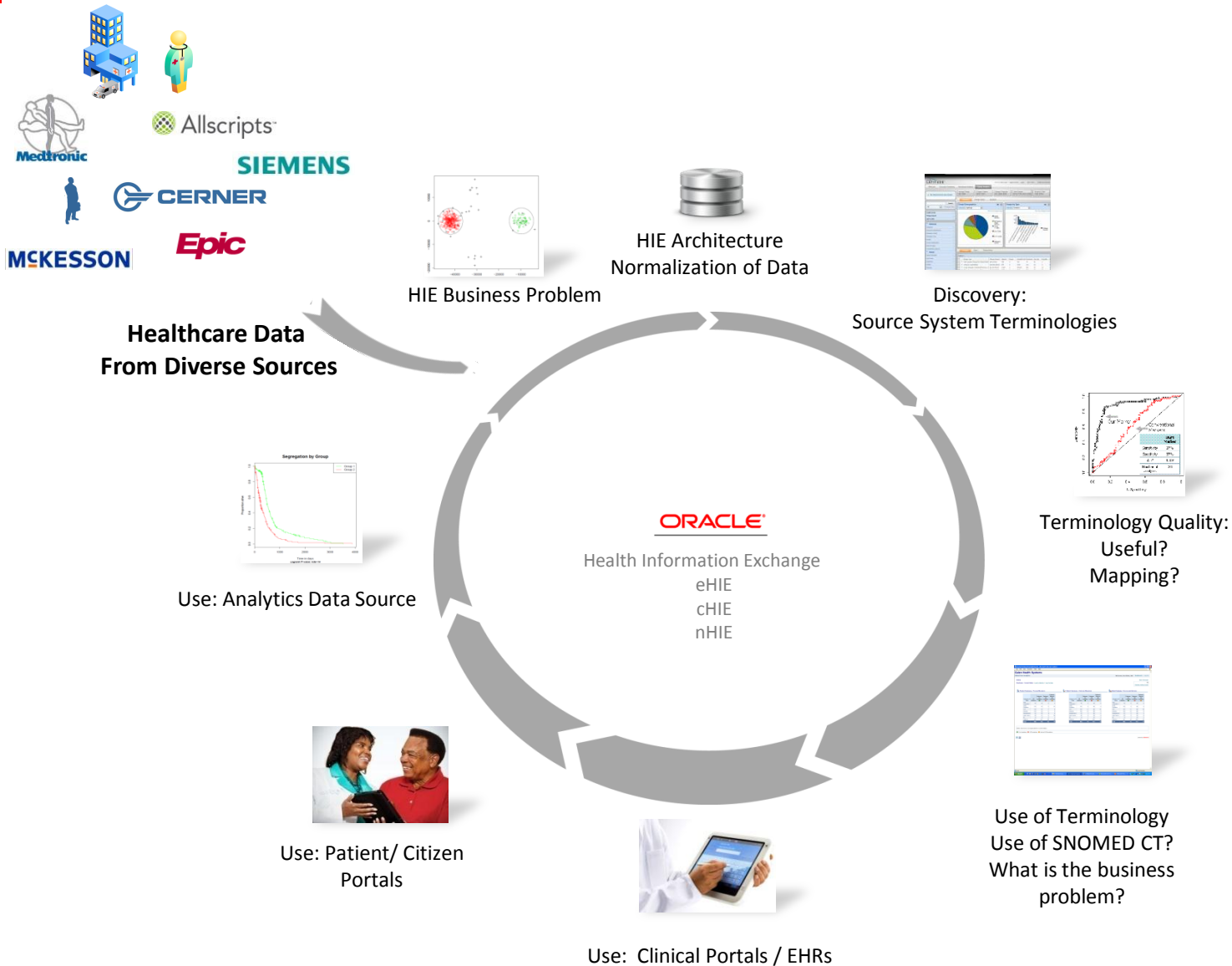
# Agenda

- Health Information Exchange – Description
- HIE Business Problems – Some Examples
- HIE Terminology Challenges
- Best Practices and Lessons Learned

The background features a perspective view of a grid of lines, creating a sense of depth and movement. A solid red horizontal band is positioned across the middle of the image. The text 'Health Information Exchange' is centered within this red band in a white, bold, sans-serif font.

# Health Information Exchange

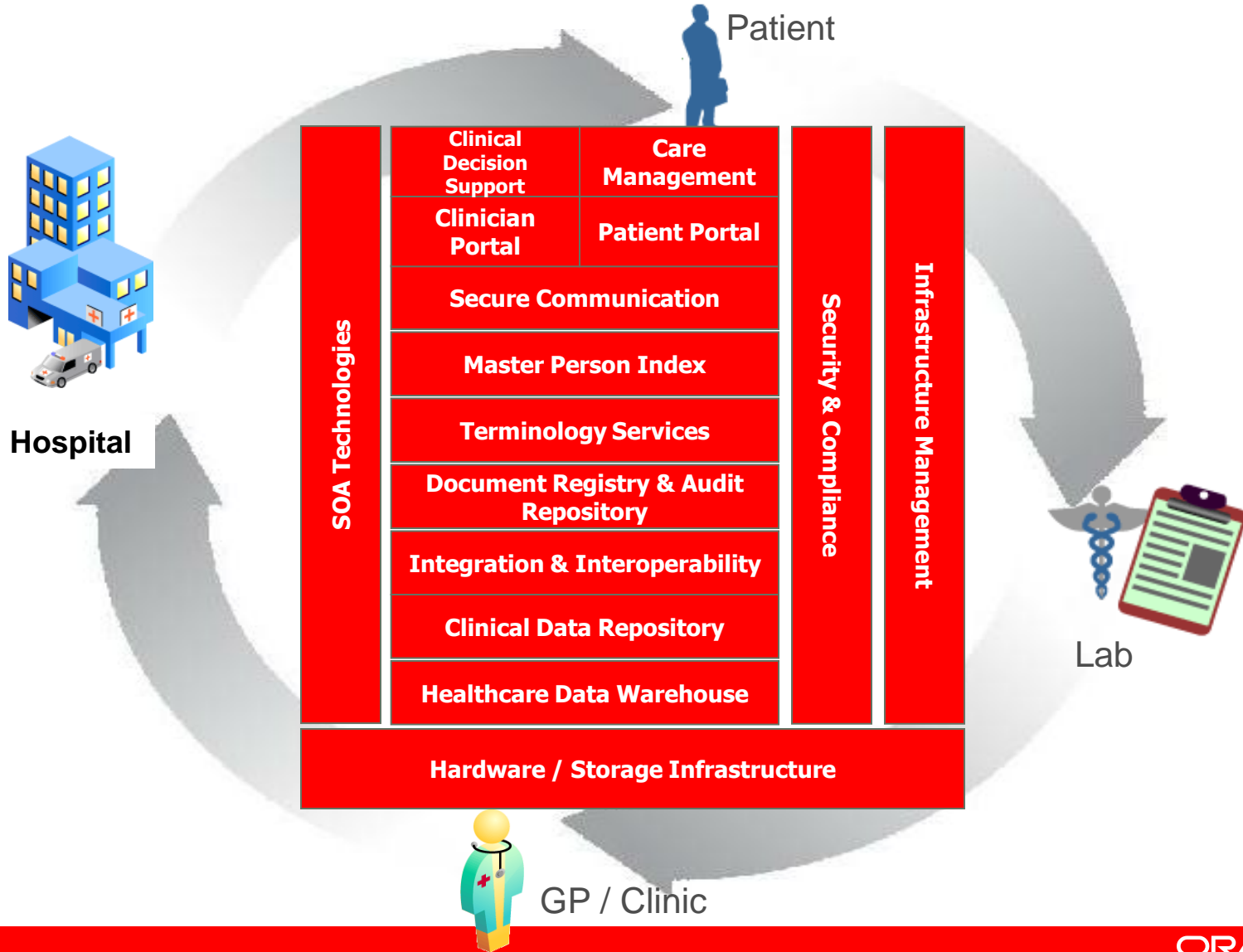
# Health Information Exchange



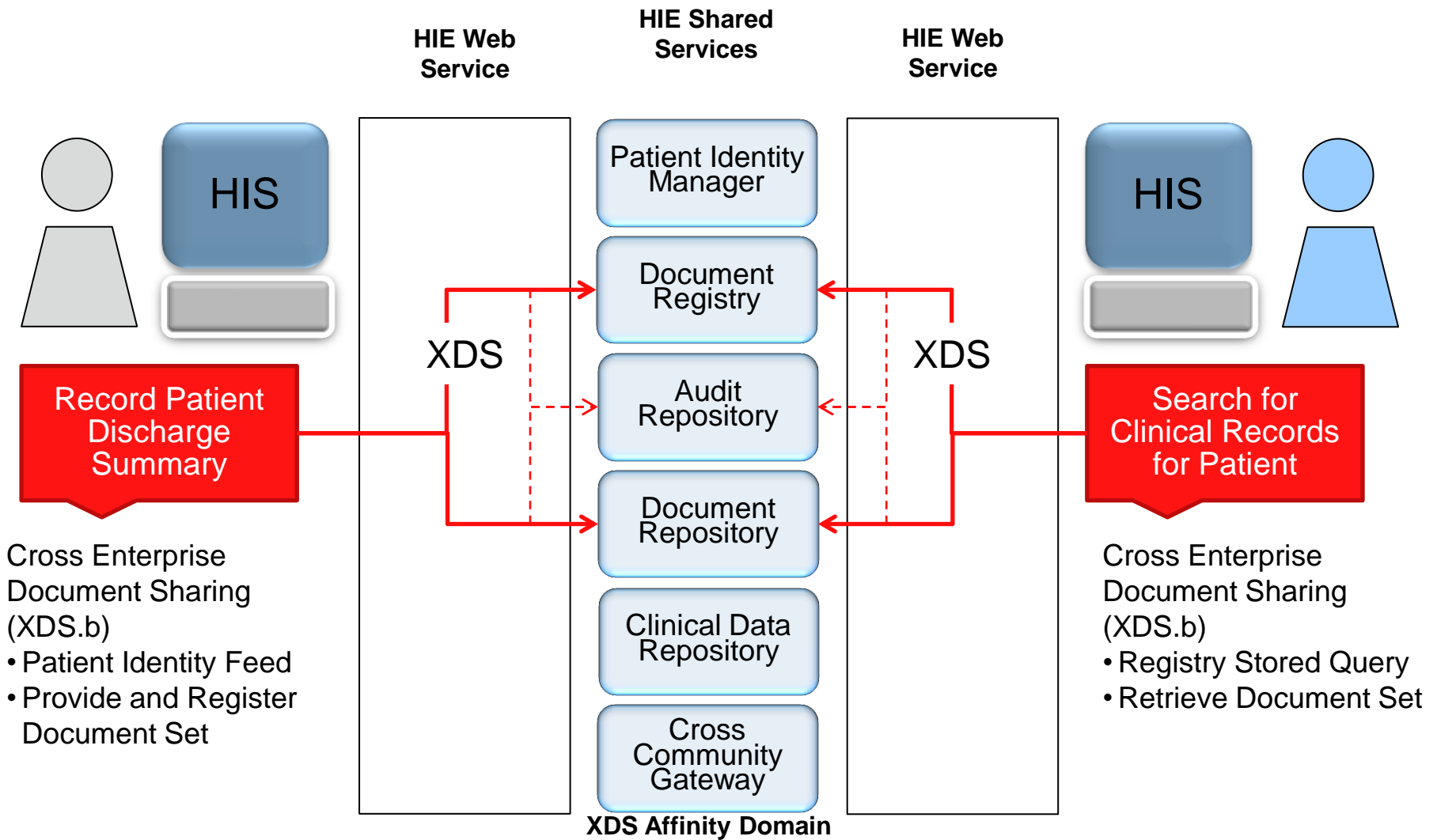
# Health Information Exchange Questions

- HIE Business Problem (s) Description
- Normalization of Data and HIE Architecture
- Discovery Source System's Terminologies
- Data Quality and Terminology
- Use of Terminology
- Use of Clinical Portals - EHRs
- Use of Citizen / Patient Portals
- Healthcare Analytics

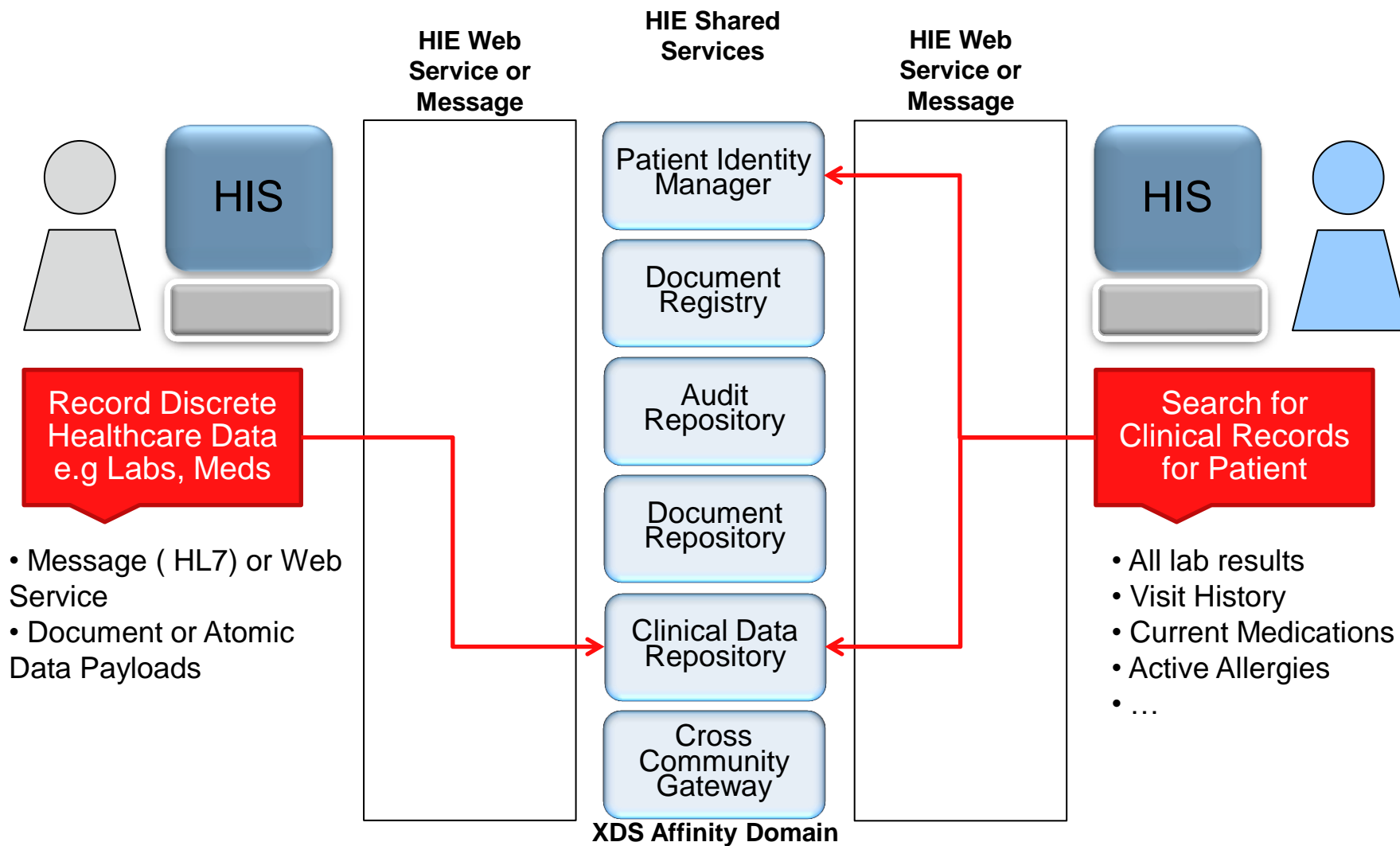
# Health Information Exchange Components



# Store / Retrieve Clinical Document Use Case

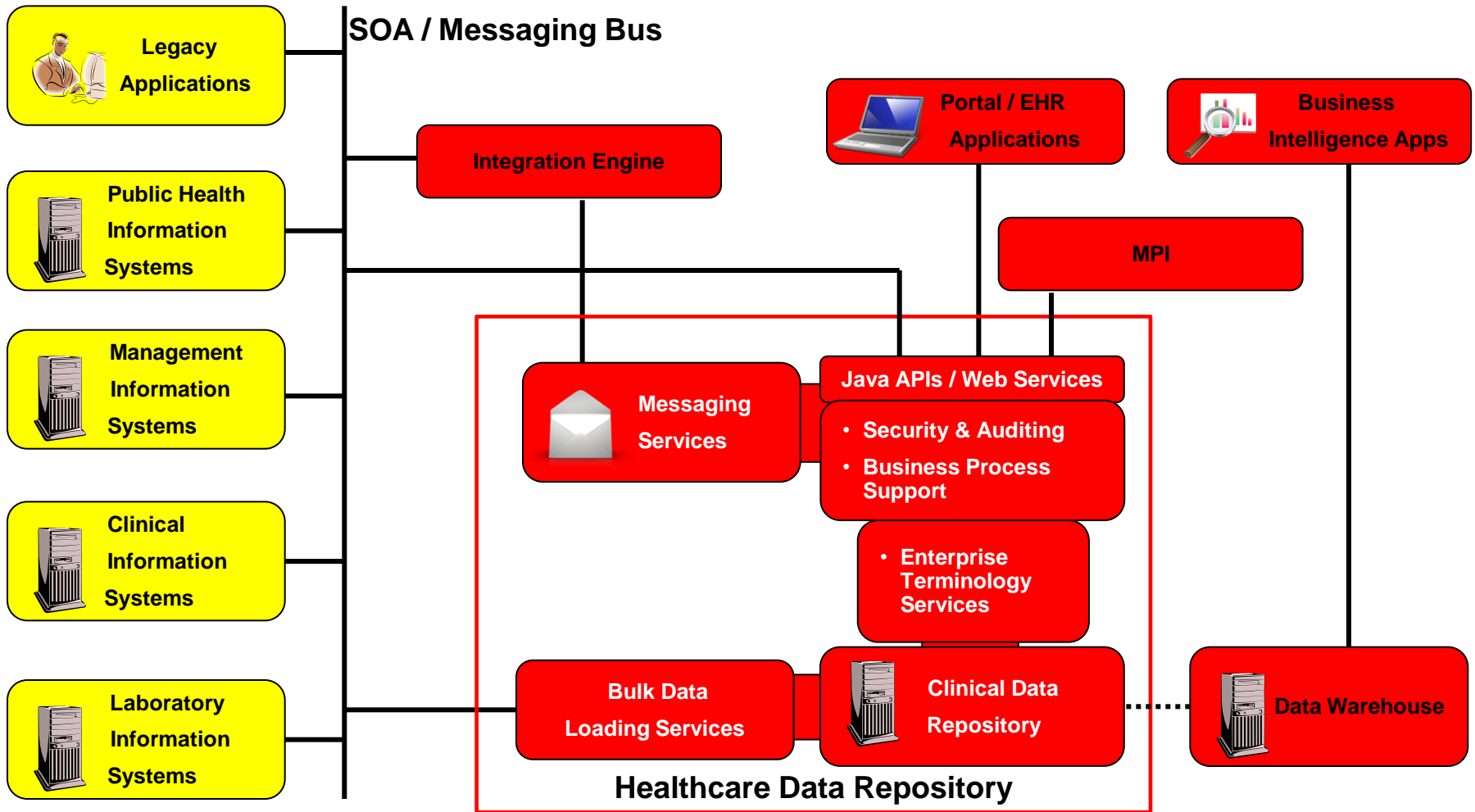


# Store / Retrieve Atomic level Data Use Case





# Health Information Exchange Architecture



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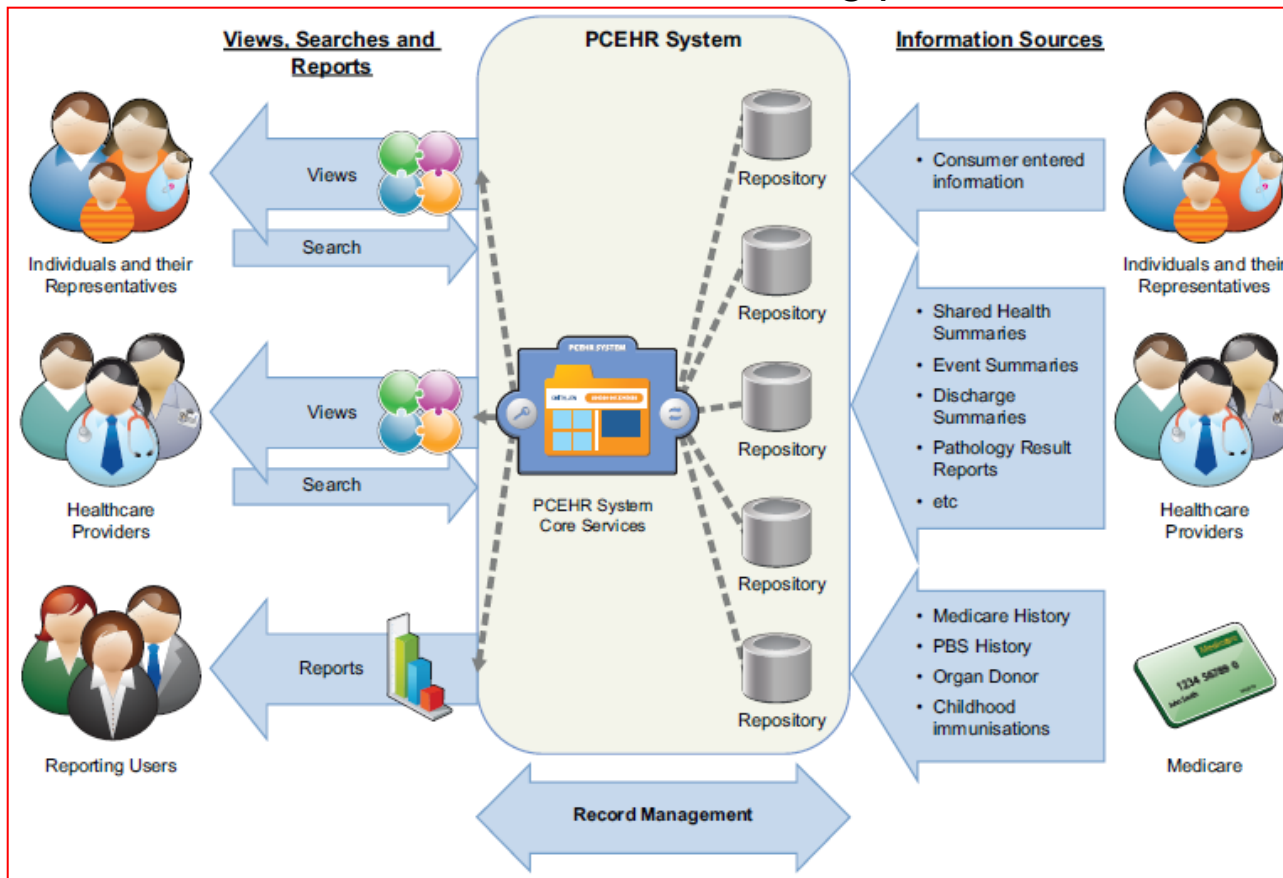
# HIE Business Problems

# HIE Business Problem Examples

- Create a longitudinal record for the patient from data that exists within a healthcare community or enterprise or nation
- Provide secure access to all patient data to clinicians where the source of the data is the HIE setting - community, or enterprise or nation
- Provide secure access to summarized patient data for patient driven decisions
- Create a high quality source of clinical data to help with analytic decisions that range from
  - improving the quality of care
  - providing required reports e.g. meaningful use
  - providing data for benchmark reports
  - aiding personalized medicine efforts
  - helping identify patient cohorts

# Australia has emphasized that they are deploying a Personally Controlled EHR system (PCEHR)

- Opt-in system with a focus on security and consent management
- One National Health Records Index and one National Health Records Repository
- Based on national & international standards, using proven, world-class technology



# Inova Health System

## Oracle for EMR and EHR

### Inova Health System

- Complex provider network
- Serving 1 million+ lives per year
- 4,000 affiliated physicians

EMR

### Solutions

- Oracle Enterprise Healthcare Analytics
- Oracle Healthcare Transaction Base
- Oracle Healthcare Master Person Index

### Results

- Enterprise longitudinal view
- Consolidation of siloed processes and systems
- Extended integrated view of patient through ambulatory care/clinics

### Customer Perspective

*"The rapid advancements in molecular science, widespread adoption of electronic medical records coupled with healthcare reform including changes in reimbursement models mean that successful healthcare systems in the future will need to transform themselves into information management organizations. At Inova we are committed to investing in the next generation of integration and analytics solutions that will enable us to deliver on the promise of personalized, predictive and more participatory medicine for our patients and community."*

- Geoff Brown, SVP and CIO

### Agency Overview

- Community serving 1.2 million lives across 8 municipalities
- 12,000 care-gives including 2488 clinicians
- 8 hospitals with 3,000+ acute beds and 2,500 medical staff

### Solutions

- Oracle Healthcare Transaction Base
- Oracle Identity Management & Master Person Index
- Clinician Portal

### Results

- Clinicians having updated, unified clinical view of patients
- Patients benefiting from improved quality of care and reduced adverse events
- Achieved significant cost savings
- SOA infrastructure supporting integration, development and operation of spectrum of healthcare applications

EHR

***Customer information is provided under non-disclosure for research purposes. Please contact Kimberly Jacobson of Oracle Analyst Relations to secure interviews or permission to publish customer names***

ORACLE

# Canada is developing EHR and HIE capabilities through projects like ConnectingGTA in Toronto

**What is ConnectingGTA?** ConnectingGTA will integrate electronic patient information from across the care continuum and make it available at the point-of-care to improve the patient and clinician experience. The project will leverage and build on existing local, regional and provincial investments. It will also deliver robust, scalable and re-usable building blocks to exchange clinical data across the **Greater Toronto Area (GTA)** and accelerate the delivery of electronic health records (EHRs).

**What data will be available via the ConnectingGTA?** Starting with clinician identified priority data, the project will leverage health care organizations' and provincial ehealth registries and repositories as sources to provide access to the following data: clinical reports (CCAC, discharge, emergency department and visits and encounters), diagnostic imaging, drug information and lab results (as source information becomes available).

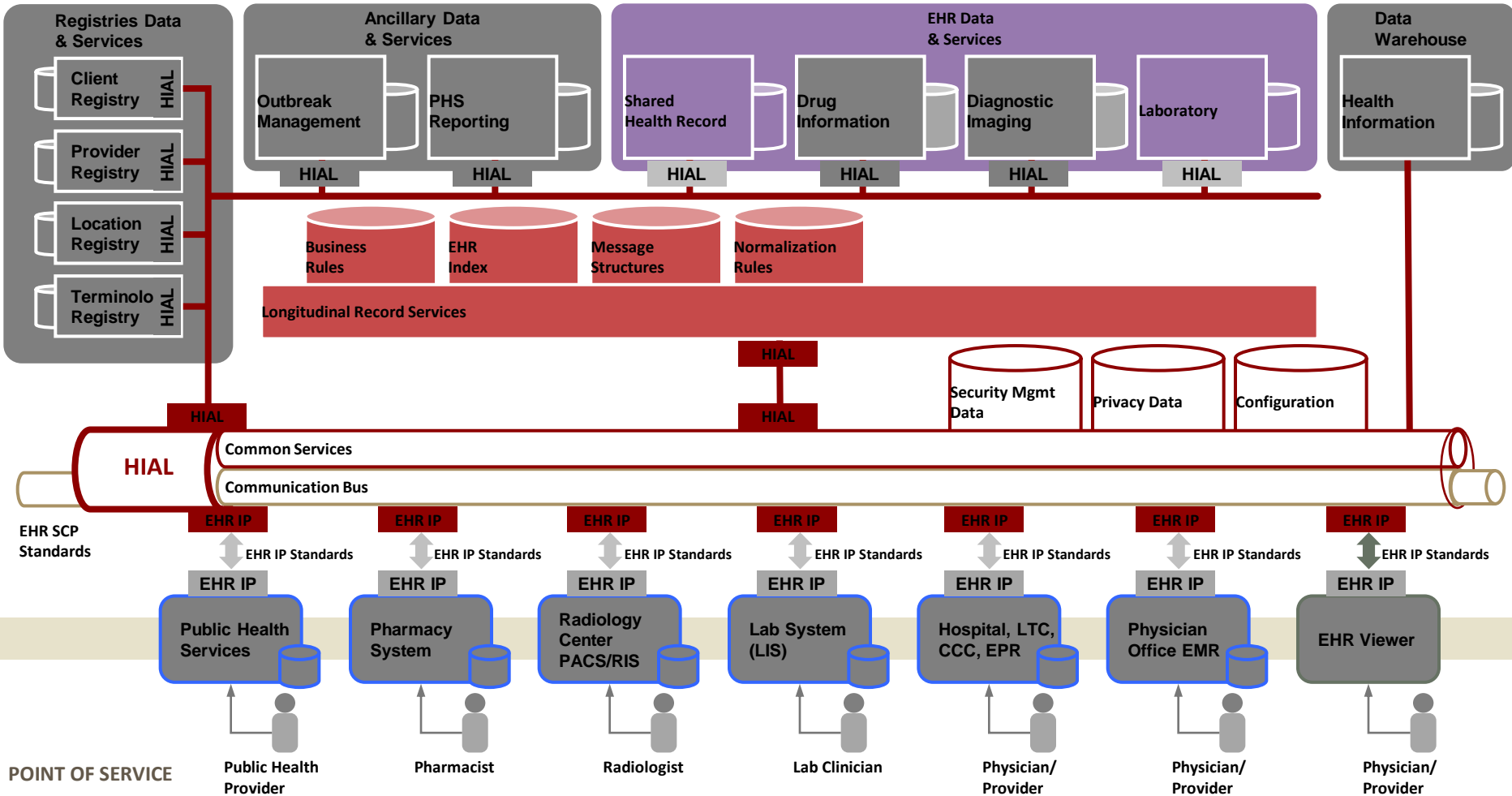
**Who will benefit from ConnectingGTA?** ConnectingGTA will provide better access to information for approximately 700 health care organizations and associated clinicians, resulting in better care for 6.3 million residents in the GTA or 47% of Ontario's population<sup>1</sup>. With reliable and secure access to patient health information at the point-of-care:

- Patients will receive better, timelier and more coordinated care
- Clinicians will be able to initiate more timely treatment, improve productivity & better collaborate w/peers
- Health care organizations will be able to make the best use of their investments and resources to improve efficiency and capacity
- Our health care system will see improvements in coordination of services and capacity

Source: [https://www.ehealthontario.ca/portal/server.pt/community/frequently\\_asked\\_questions/2496](https://www.ehealthontario.ca/portal/server.pt/community/frequently_asked_questions/2496)

# With cGTA, Canada is using a consistent IT framework while reflecting regional health IT priorities

## JURISDICTIONAL INFOSTRUCTURE





# The Bureau of Health in Guangzhou, China has deployed a regional health information exchange

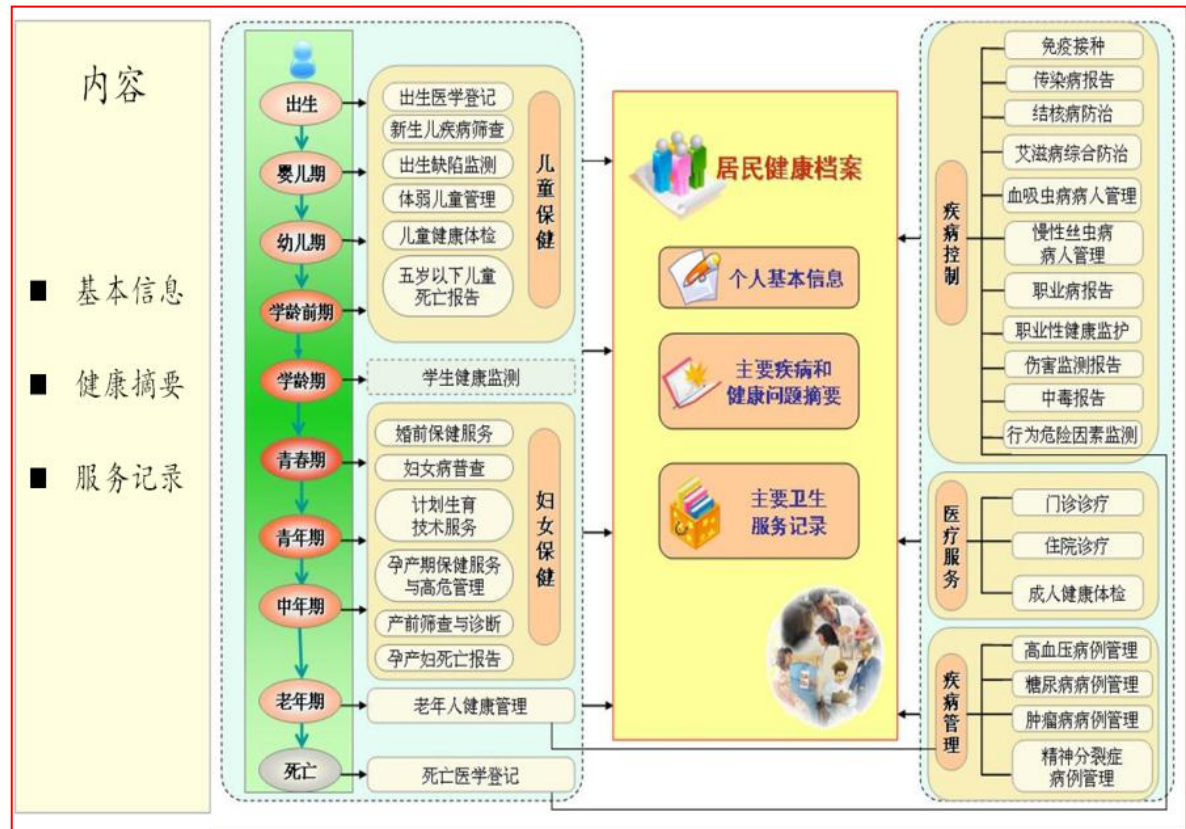
## Objective

Establish a standards-based, collaborative health IT platform

- Treatment card
- Centralized access to clinical test results

## Approach

Phased approach to achieve a complete citizen EHR (initial “go live” occurred Oct 2011)



**Phase One:** Establish a centralized EHR platform based on an open architecture

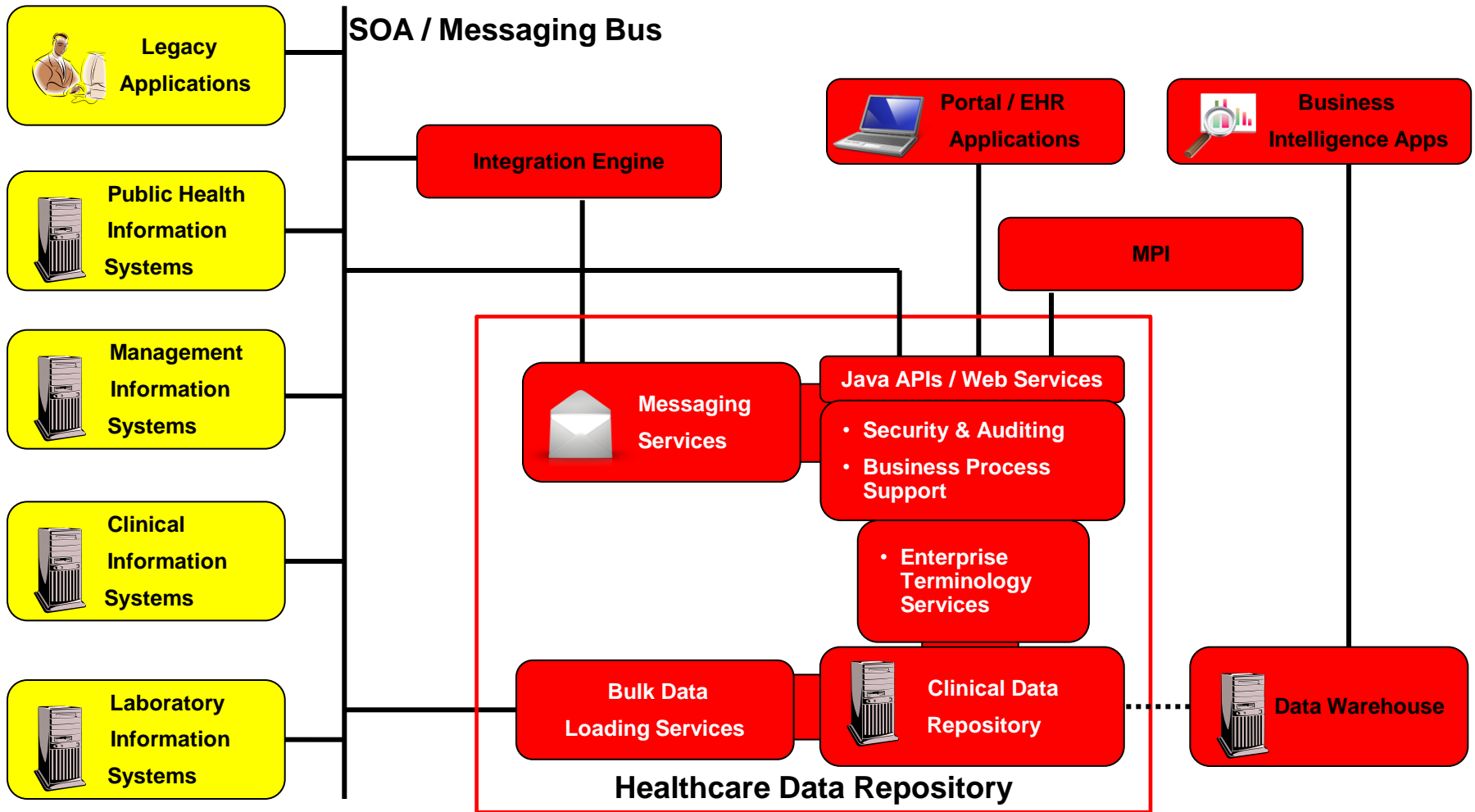
- Integrate data from 5 districts and 15 hospitals for over 13,000,000 citizens
- Define EHR governance models to be used among the community stakeholders





# **HIE Terminology Challenges** **“ where does the terminology come into play? ”**

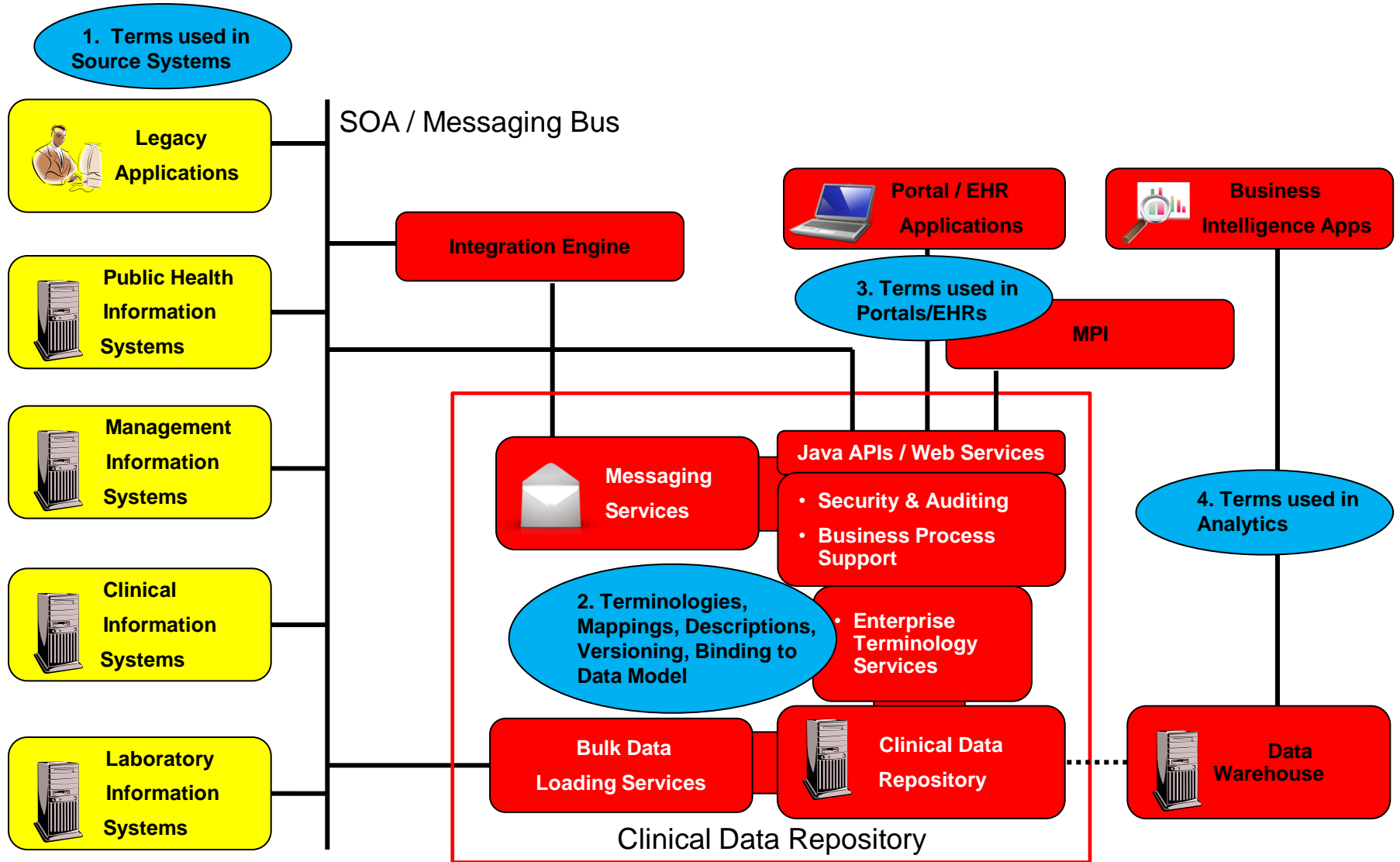
# Health Information Exchange Architecture



# Where do we find the challenges?

- Source systems use of terminology
- HIE terminology services including
  - Storage of all terminologies, including descriptions, synonyms, preferred terms, etc.
  - Version control
  - Storage of any mappings
  - Classifications – Relationships – Hierarchies
  - Binding to clinical data model coded attributes
  - Free text to code services, NLP services
  - Subsets, value sets
- Terms used in Clinical /Patient Portals and EHRs
- Terms used in analytics – applications, reports
- **KEY: 100's of sources with unmapped semantically equivalent content**

# Health Information Exchange



# HIE uses of SNOMED CT

- From previous diagram here is what our experience has been regarding the use of SNOMED CT
- 1. Source Systems – currently the volume of data that comes in from source systems that is coded in SNOMED CT in HIEs is small
- 2. HIE centralized terminology services
  - > 65% (and growing) currently install SNOMED CT in their terminology server
  - Mappings are frequent, but not always the same content is being mapped to SNOMED CT – conditions/problems, allergies, diagnoses, parts of CDA documents.
  - Free Text to SNOMED expressions
  - Creation of value sets composed of SNOMED CT codes
- 3. Portals / EHR applications are using SNOMED CT in some of their data entry screens, and in some cases they are using mapping services to recode their data so that it uses SNOMED CT concepts. Creating new views/versions of existing data.
- 4. Analytics reports increasingly require SNOMED CT codes

# Source System Terminology Challenge

- During terminology discovery process
  - Make sure you look at the details when you find out that your source system “uses” a “known” terminology.
    - Many times the known terminology has been ‘repurposed’ by the department or system that it is being used with.
    - The repurposing may be changed to such an extent that it hasn’t been maintained and updated in many years, or
    - It may have been ‘edited’ or essentially “hacked up” such that it no longer has any relationship to the original source terminology.
    - We have seen new concepts added to these terminologies, reuse of concept ids, merging of concepts from multiple versions with no version control, etc.
  - Decision Point
    - Do you update the terminology in the source system and get it in perfect working order? or
    - Do you just accept it and treat it as a local terminology and not as a ‘known’ vocabulary? There are other options.
    - If you don’t address this issue, you WILL have data quality issues.

# Source System Terminology Challenge

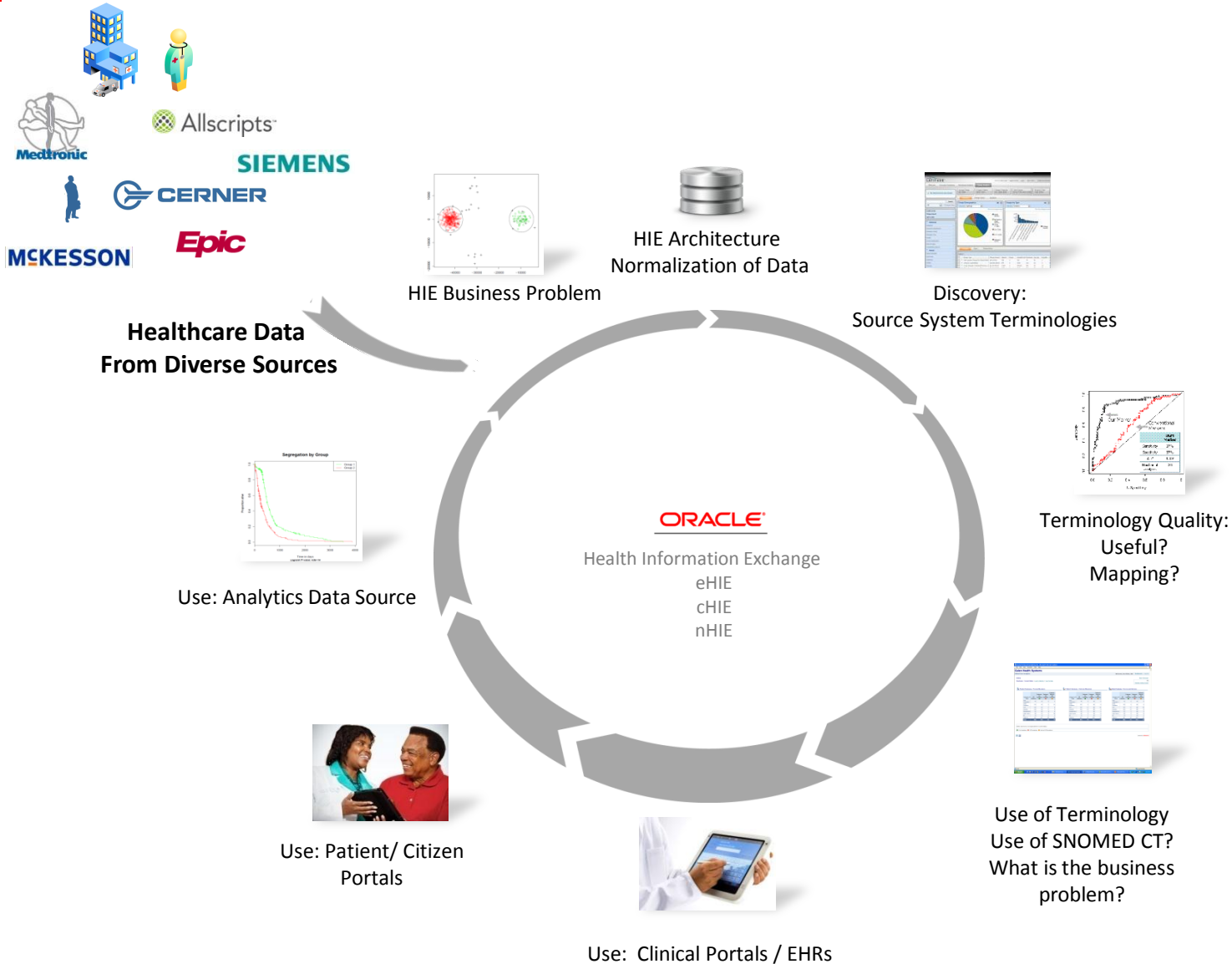
- A source terminology is reportedly ‘concept’ based with codes and descriptions for all concepts in the terminology
  - Look really closely at the coded data. Some common patterns/problems we have seen:
    - There are Ids for each concept, but hundreds, maybe thousands share the same identifier. In other words the Ids are not unique.
    - The quality of the source terminology may be such they allow end users to create a new concept directly through their clinical end user interface – turning essentially free text into concepts with unique ids
    - This sounds great until you discover that no one knows if these “concepts” are really new concepts, descriptions, synonyms or pre-coordinated expressions or something else.
  - Decision Point
    - Do you scrub or otherwise clean up all source terminology data before you start to use the data associated with these codes?
    - Do you treat some of the ‘coded’ data as ‘free text’? In some cases that is all you can do, or use terminology expertise and/or NLP engines to codify the data.

# What would help adoption of SNOMED CT in an HIE?

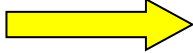
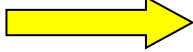
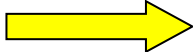
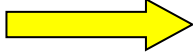
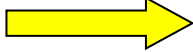
- Mapping tools for generating mappings between local or custom or proprietary terminologies and SNOMED CT.
- Easy to use search tools for identifying what concepts in SNOMED CT may be useful for addressing a specific clinical domain content area.
- Tools for codifying free text into SNOMED CT codes that can be applied to clinical structures like CCD, Discharge Summary or other clinical documents.
- Implementable value sets comprised of SNOMED CT concepts that can be plugged in and used by EHR applications.
- Universally available mappings between SNOMED CT and ICD9 and ICD10 and other standards based terminologies
- Publically available library of who is using SNOMED CT and how they are using it
- Published SNOMED CT extensions in a common format?



# Health Information Exchange



# The “hard questions” in healthcare are fundamentally information challenges

- What works  • Validated evidence
- Why it works  • Mechanism of action
- Who it works for  • Precision medicine
- What works best  • Comparative effectiveness
- When should it be used optimally  • Best practice guidelines, standard-of-care

Adapted from Dr. George Poste; The Biodesign Institute, June 2008

## But ... to answer those questions we need

- “Clean”, strongly coded data – high quality
- Terminology tooling that supports
  - searching for subsets of relevance
  - mapping from local vocabularies to standards based terminologies – identifying and documenting semantic relationships
  - ‘free text’ to coded data. A lot of healthcare data still exists in free text
- Terminology bindings to clinical data models
- Terminology Governance
- Terminology Expertise in healthcare organizations

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# **HIE Best Practices and Lessons Learned**

# Standards Adoption / Compliance

Healthcare interoperability enabled by standards

- Technology Standards
  - web services, messaging, authentication, security
- Content Standards
  - HL7 CDA R2, CCD, Consolidated CCD
- Terminology Standards
  - SNOMED CT, LOINC, ICD-9/10, RxNorm, etc.

# Technology

Supporting today's requirements and tomorrows vision

- Technology architecture and application that supports standards chosen and is extensible and scalable
- Ensure the team is sufficiently trained on the technology
- Leverage template environments to allow repeatable provisioning  
Development / Test / Performance / Production / Disaster Recovery
- Security and Privacy – data at rest, in motion, in use and disposed
- Anticipate issues. Ensure scenarios, tools, diagnostics, and environments have been exercised before they are needed

# People

The right team is critical to success

- Application and technology expertise
- Healthcare domain expertise – messaging, terminologies, coding, etc.
- End user participants: Clinicians, patients, etc.
- Existing systems expertise – technology, data content and usage
- Solution architects – H/W, storage, DB, middleware, applications, networking, security
- Program Management

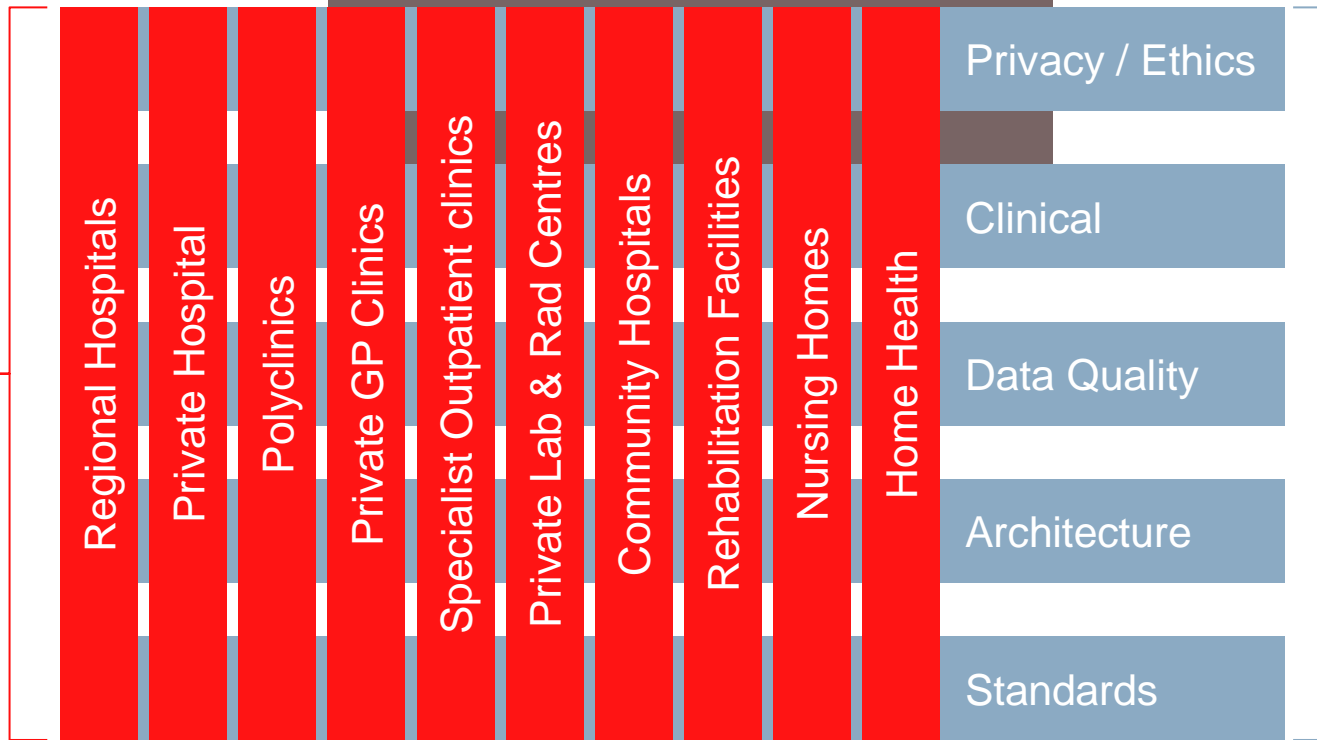
# Governance

Health IT Steering Committee

EHR Steering Committee

Program Office

Management Organisation and  
Committee Structure



Work Groups

ORACLE



# Change Management and Adoption

- Effective, early engagement of clinicians
- Align performance objectives, policy & funding, and incentives
- Detailed change plans integrated with Program Plan
- Clinician involvement in lifecycle
- Integrate clinical workflow
- Flexible training
- Post-rollout review



# Lessons Learned

- Design application and technology to serve the clinical workflow, not the workflow to fit the technology
- Validate data format and content compliance as close to the source systems as possible
- Clean and strongly coded data is required for rapid value to be achieved through analytics
- Terminology governance is critical
- Be thinking of volumes of data and data lifecycle management early to plan for the future

# Thank You!

