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EHRS BLUEPRINT
an interoperable EHR framework

SOA in the pan-Canadian EHR

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Outline

- Infoway
- EHR Solution
- EHRS Blueprint Overview
- Services Oriented Architecture
- Business Case
- Key Messages

Mission

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.

Vision

A high-quality, sustainable and effective Canadian healthcare system supported by an infostructure that provides residents of Canada and their healthcare providers timely, appropriate and secure access to the right information when and where they enter into the healthcare system. Respect for privacy is fundamental to this vision.

Goal

By 2010, every province and territory and the populations they serve will benefit from new health information systems that will help transform their healthcare system. Further, by 2010, 50 per cent of Canadians and by 2016, 100% of Canadians will have their electronic health record available to their authorized professionals who provide their healthcare services

Shared Governance Facilitates Collaboration

Canada Health Infoway is an independent not-for-profit organization, whose Members are Canada's 14 federal, provincial and territorial deputy ministers of health.

Electronic Health Record

An electronic health record (EHR) provides each individual in Canada with a secure and private lifetime record of their key health history and care within the healthcare system.

The record is available electronically to authorized healthcare providers and the individual anywhere, anytime in support of high quality care.

This record is designed to facilitate the sharing of data across the continuum of care, across healthcare delivery organizations and across geographies.

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Patient Receives Care Across Care Providers & Settings

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Patient Clinical Information is "Shared" Among Care Providers & Settings

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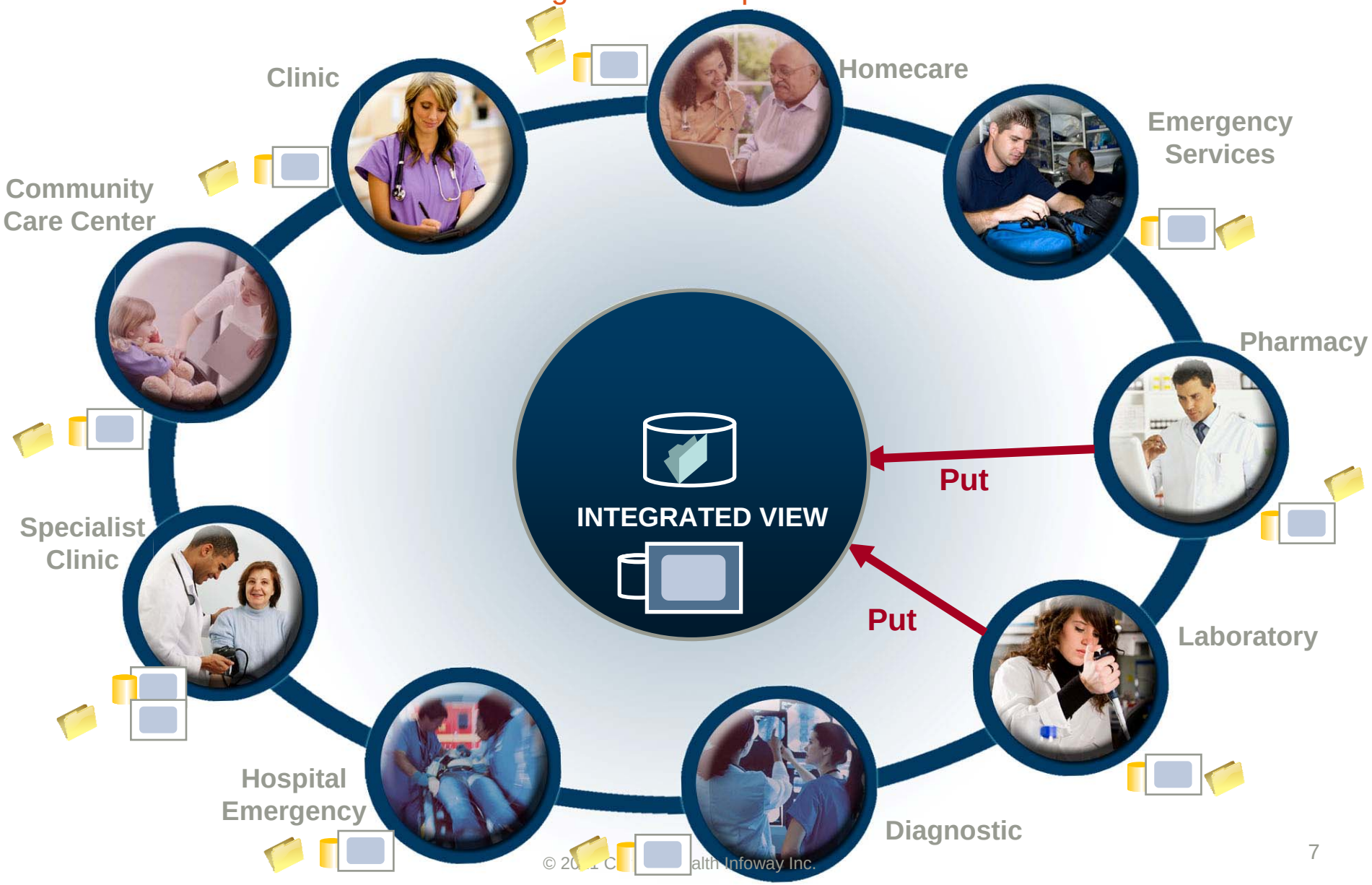
Clinician systems “put” relevant data for sharing into interoperable EHR



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Clinician systems “list” and “get” desired data from interoperable EHR for display and use

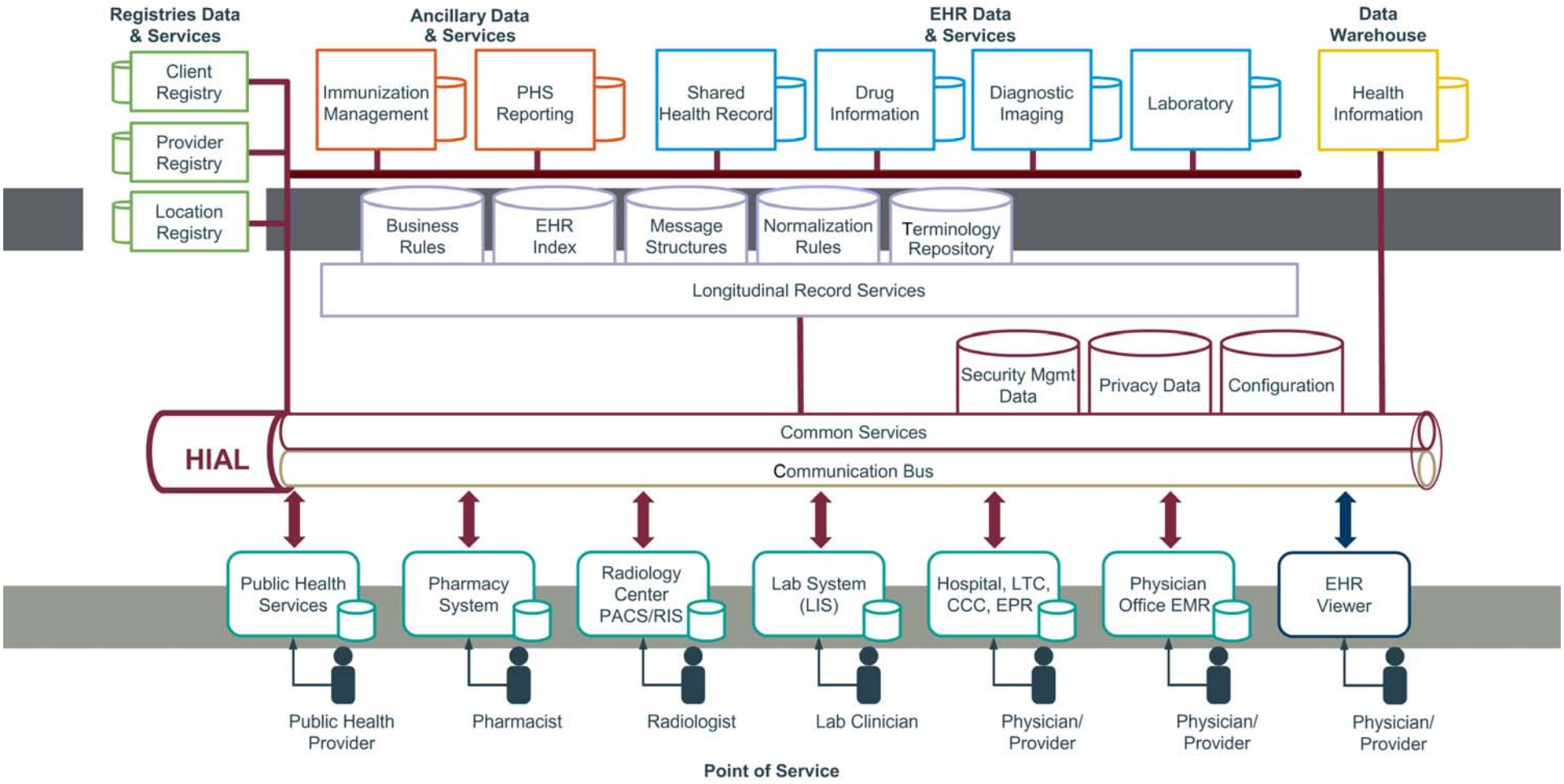
Integrating Health IT Systems: Key Challenges

- Protecting Privacy
  - Governance, accountability & data custodianship
  - Controlling access
  - Managing & applying consent directives
  - Trust relationships & contracts
- Discovery & availability of data
  - Discovery capability
  - Availability in electronic format
  - Timeliness
- Harmonization
  - Data structures (format)
  - Vocabularies (encoding, normalization)
  - Semantics
  - Behaviours
- Heterogeneous technology environments
- Number of organizations, connection points & systems
  - National interoperability
- Costs inherent to integration

Standards-based EHR Solutions

EHR Architecture

Jurisdictional Infostructure



SHOW: All | Without POS | POS only | Above the HIAL | HIAL only

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EHR Infostructure

The **EHR Infostructure** is a collection of common and reusable components in the support of a diverse set of health information management applications. It consists of software solutions for the EHR, data definitions for the EHR and messaging standards for the EHR.

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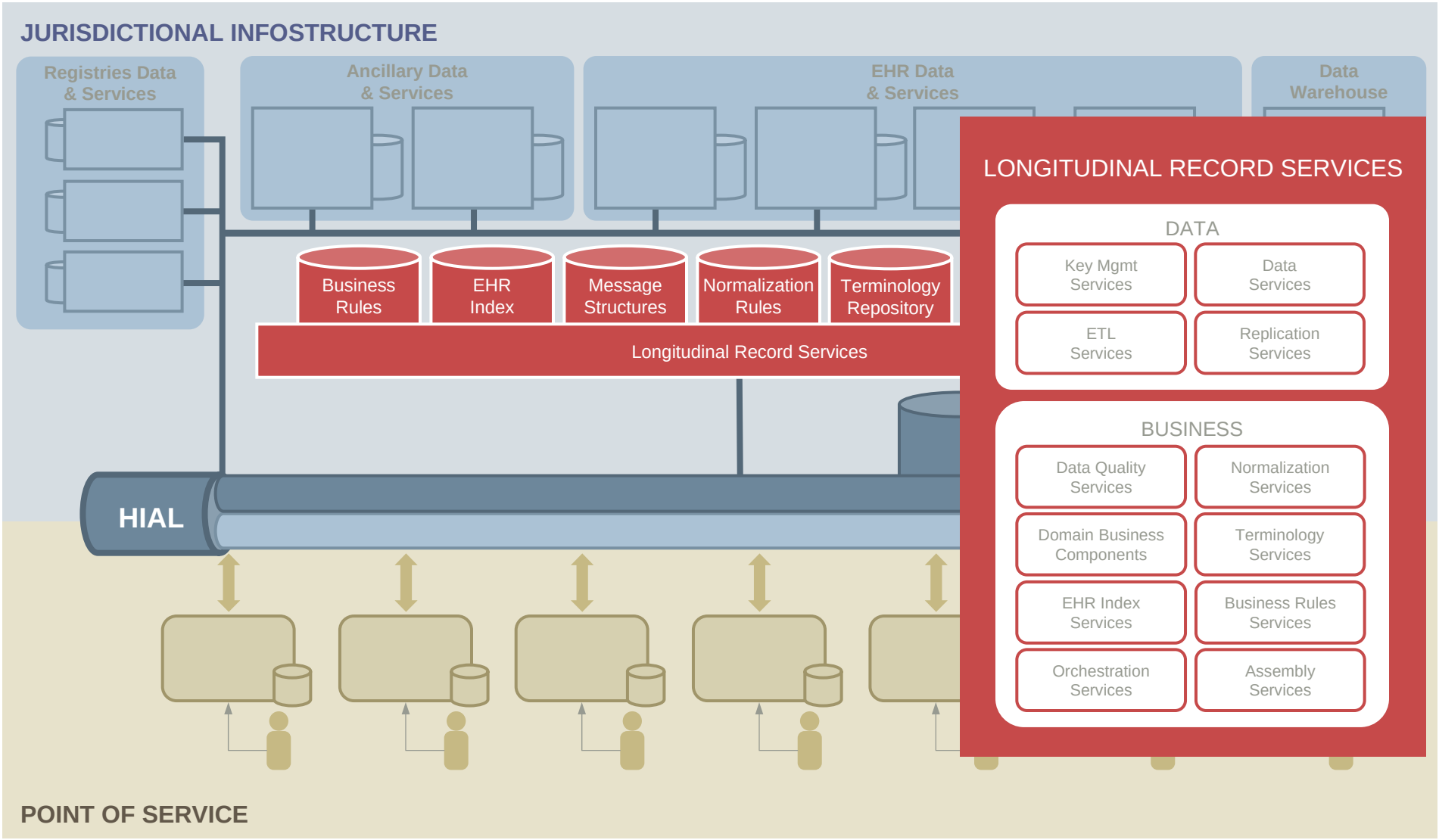
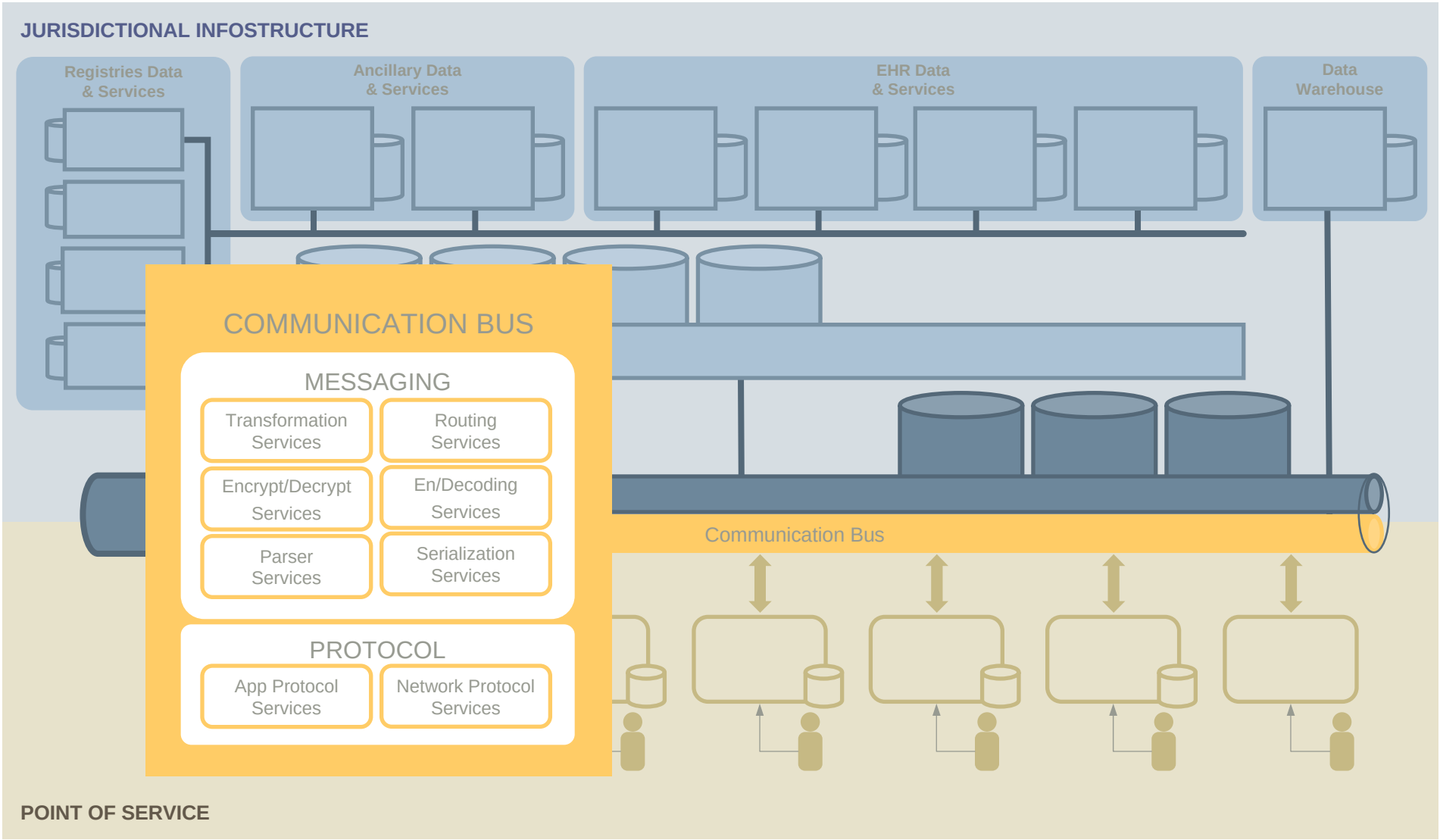
EHR Infostructure: Longitudinal Record Services



EHR Infostructure: Communication Bus



EHR Infostructure: Common Services

JURISDICTIONAL INFOSTRUCTURE

COMMON SERVICES

INTEROP
- Interoperability Services
- Search/Resolution Services

INTEGRATION
- Service Catalogue Services
- Broker Services
- Mapping Services
- Queuing Services

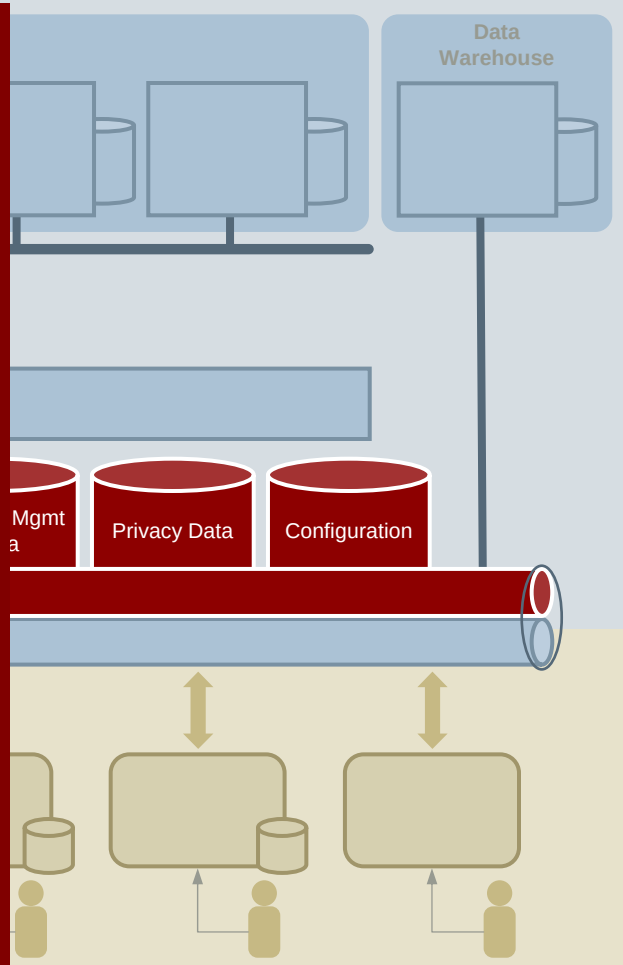
CONTEXT
- Caching Services
- Session Mgmt Services

PRIVACY & SECURITY
- Identity Protection Services
- Anonymization Services
- Consent Directives Mgmt Services
- Identity Mgmt Services
- User Authentication Services
- Encryption Services
- Access Control Services
- Secure Auditing Services
- Digital Signature Services
- General Security Services

SUBSCRIPTION
- Alert/Notification Services
- Pub/Sub Services

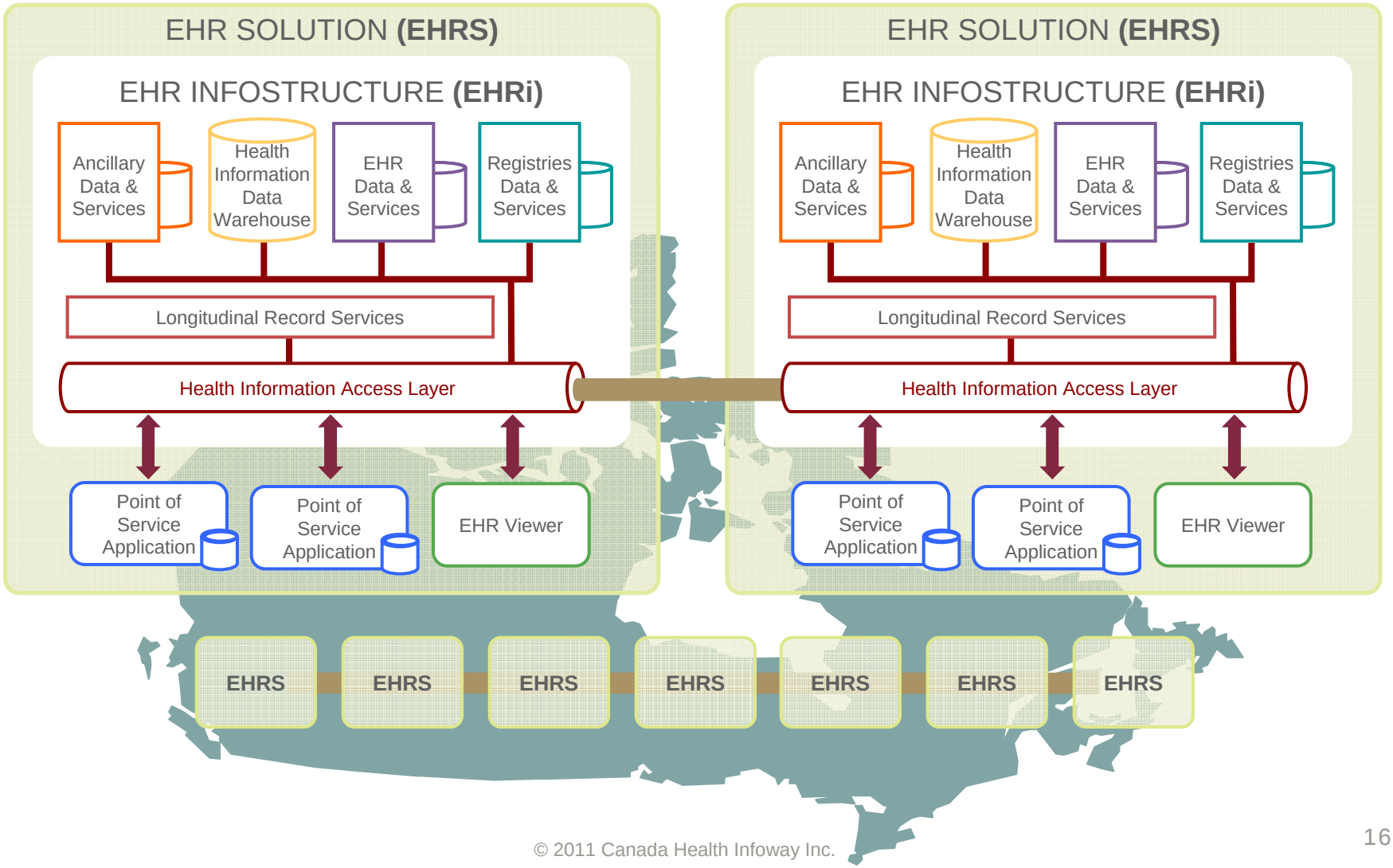
MANAGEMENT
- Management Services
- Configuration Services
- Policy Mgmt Services

GENERAL
- Auditing Services
- Log Mgmt Services
- Exception/Error Handling Services



POINT OF SERVICE

Pan-Canadian EHR Infostructures as Peers
Distributed, Federated, Message Based



Business Case for SOA

Service Oriented Architecture as an Enabler

Application of SOA in EHR Infostructure Solutions

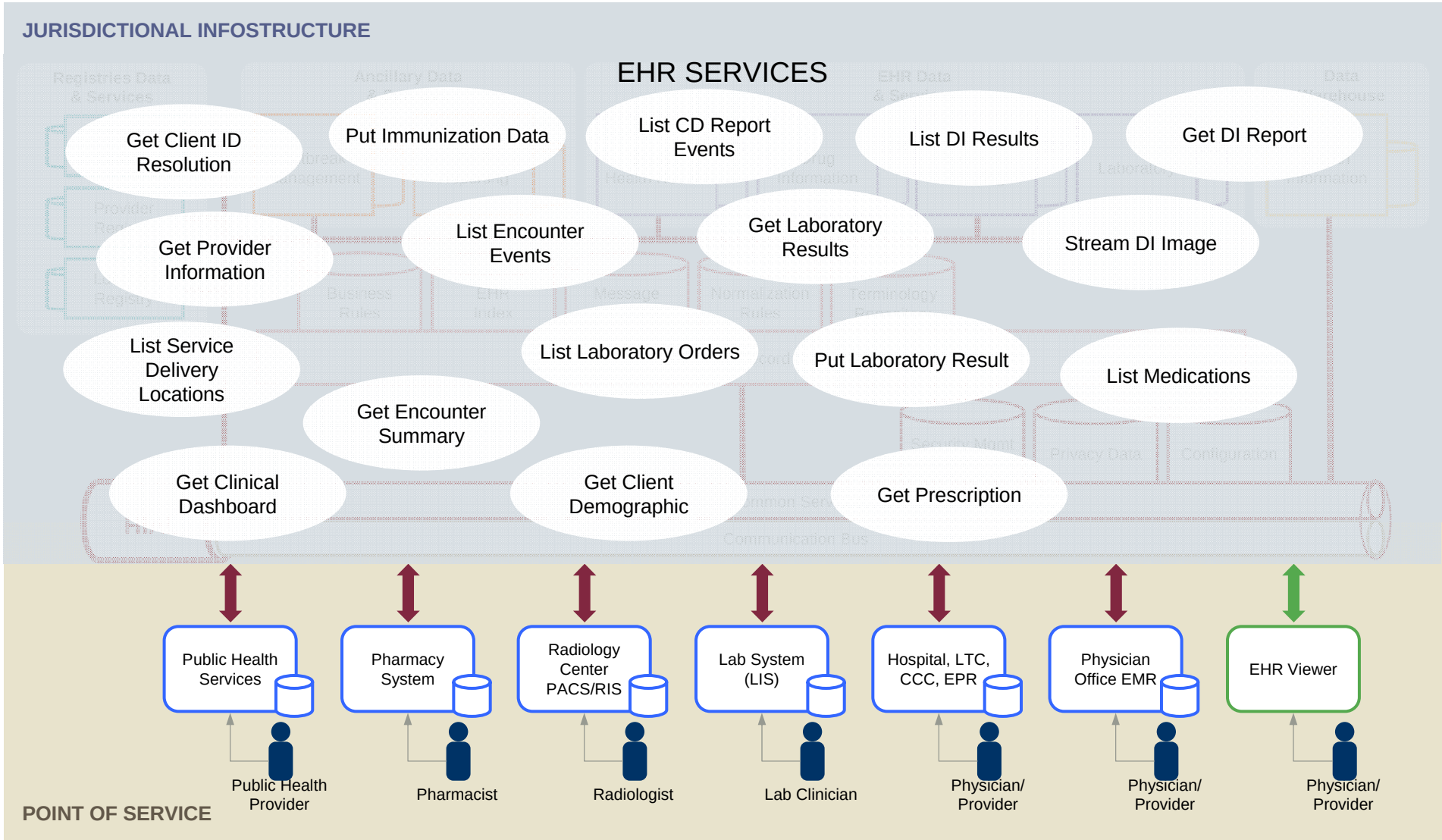
- Repurpose legacy applications to offer services as part of SOA-based EHR Infostructure
- New breed of services to enable coordinated transactions in an EHR Infostructure (e.g. Longitudinal Record Services)
- Use of commercially available solutions to enable components of EHR Infostructure

Service Oriented Architecture as an Enabler

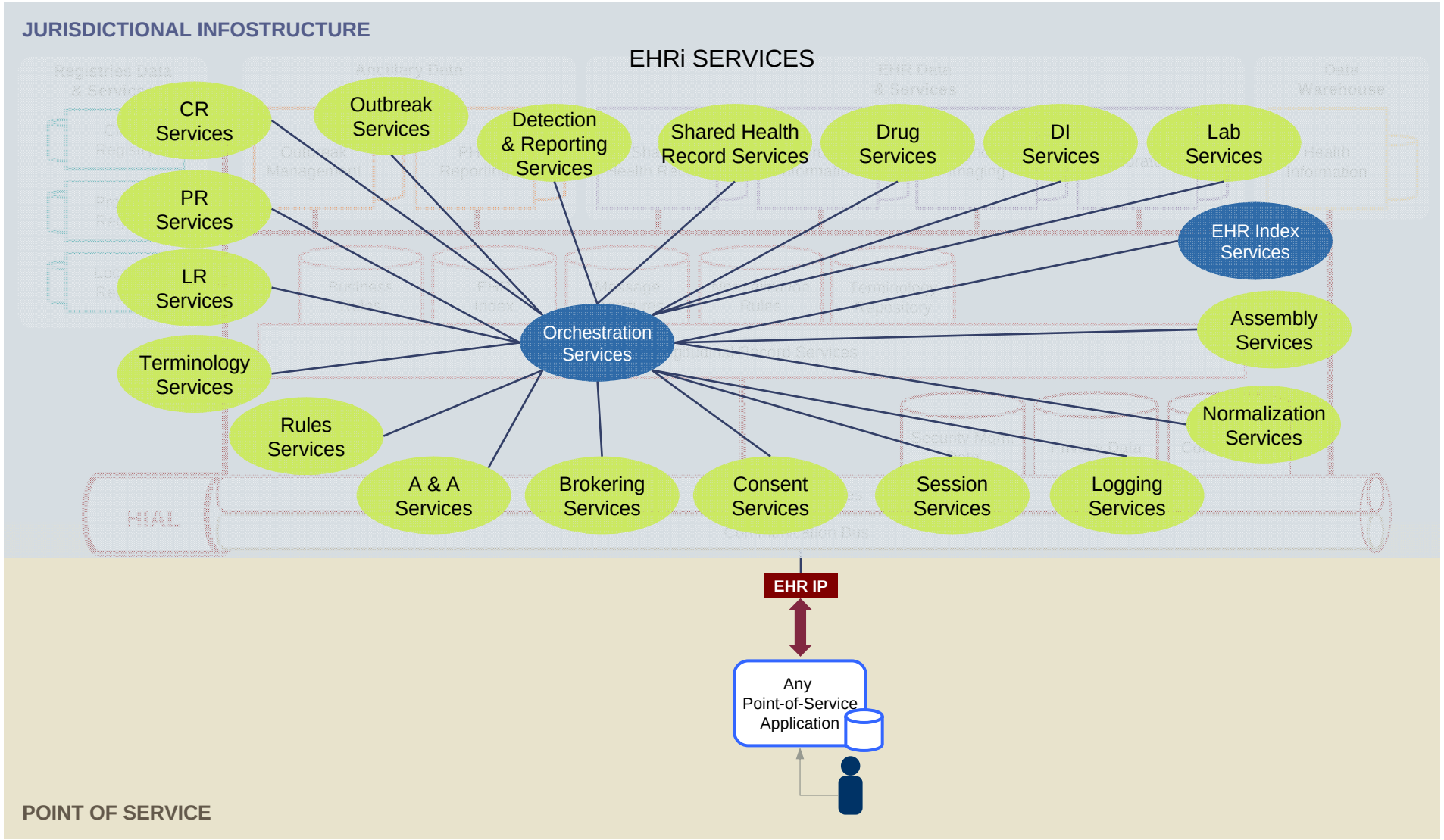
The HIAL as an Application Abstract Layer

- Each jurisdictional HIAL deployed will have different
  - Physical deployment model
  - Some interfaces which are unique to that implementation
- HIAL acts as an abstraction of the EHR such that applications see the EHR in a consistent way across EHR implementations
- Services within an EHR Infostructure to optimize scalability, maintainability and functional flexibility
- Not all ESB services are exposed and standardized

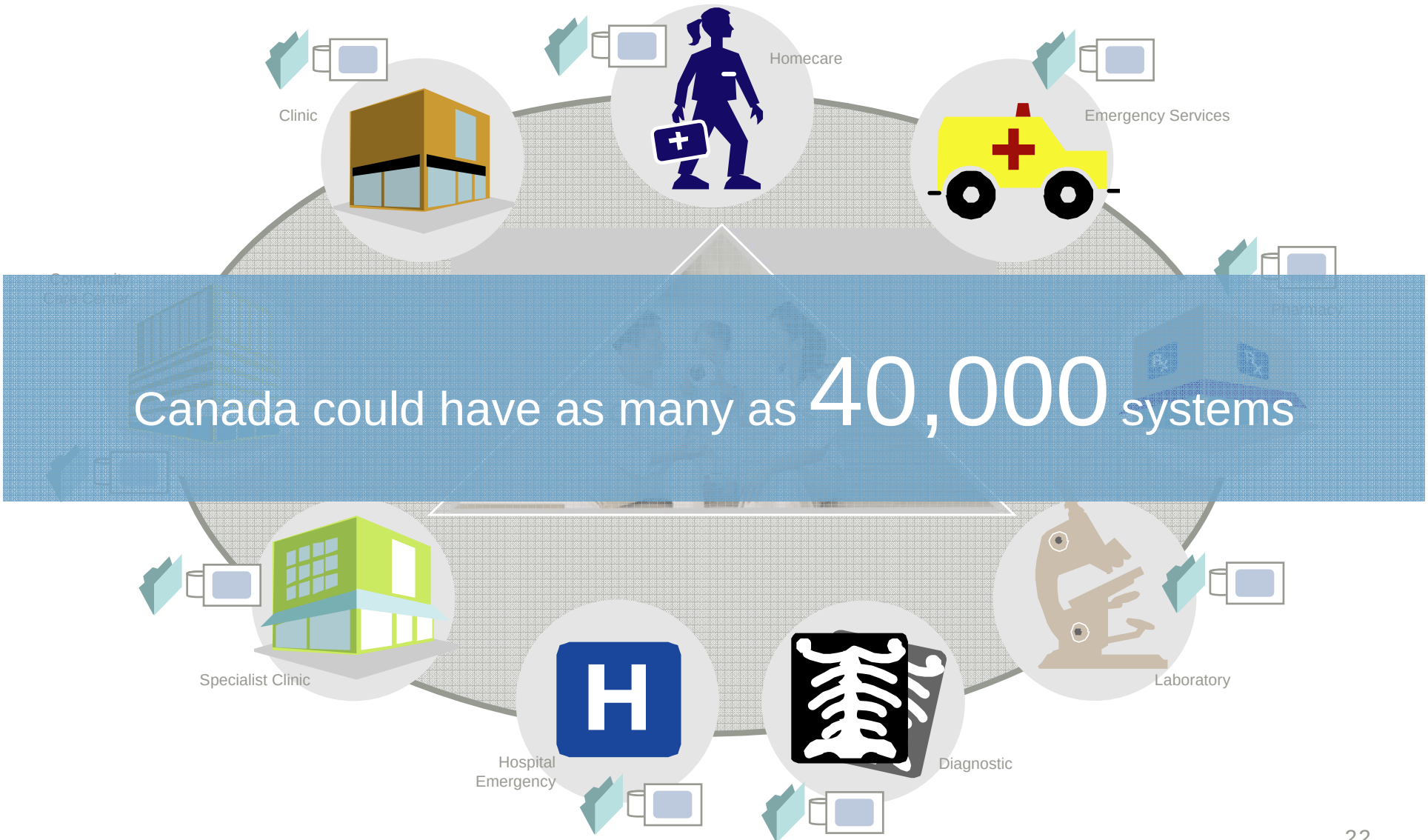
First Type of Abstraction: The EHR as Services



Second Type of Abstraction: Generic Application

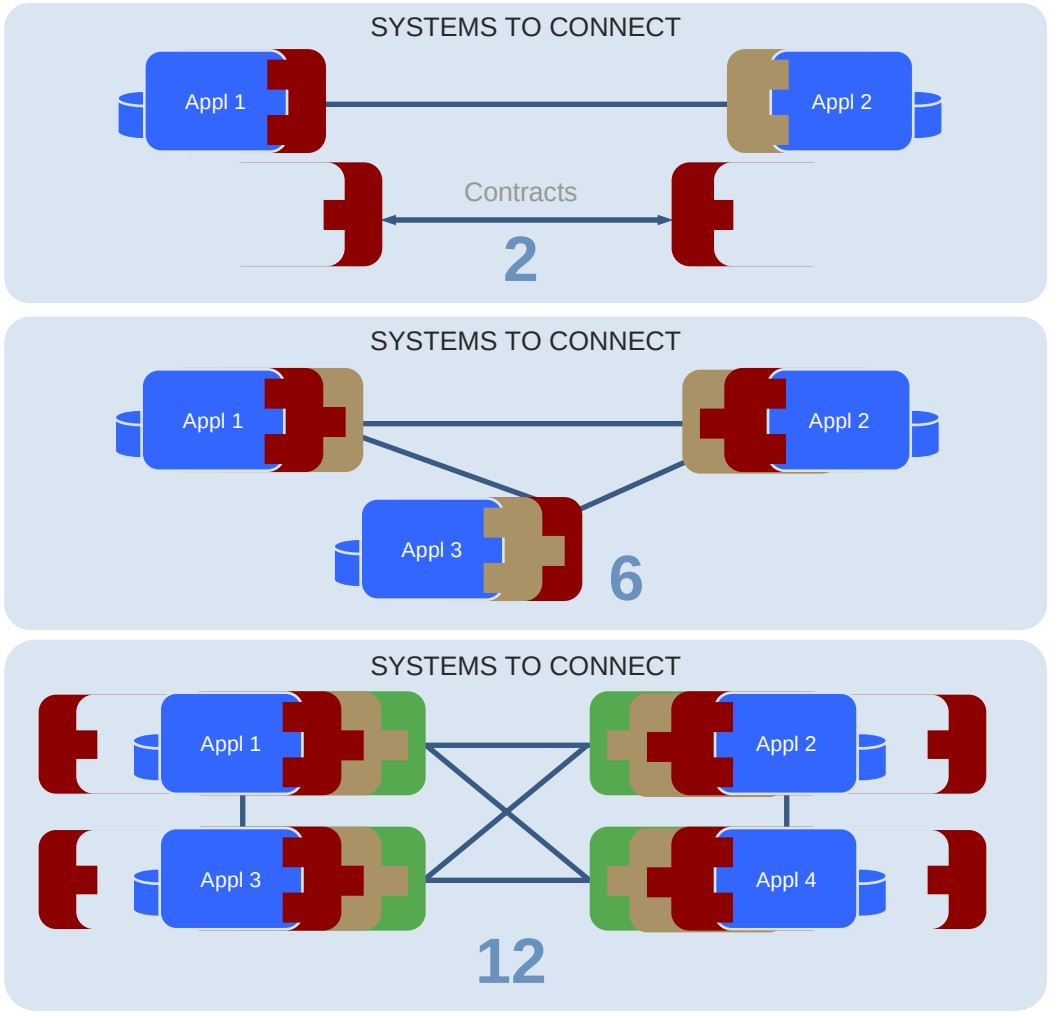


Number of Systems to Integrate



Canada could have as many as **40,000** systems

Point-to-Point Connectivity



Potential Interfaces = N (N-1) = 1.5B

Costs basis

- Cost of one integration
  - Simple = $32K; Medium = $95K; Complex = $190K

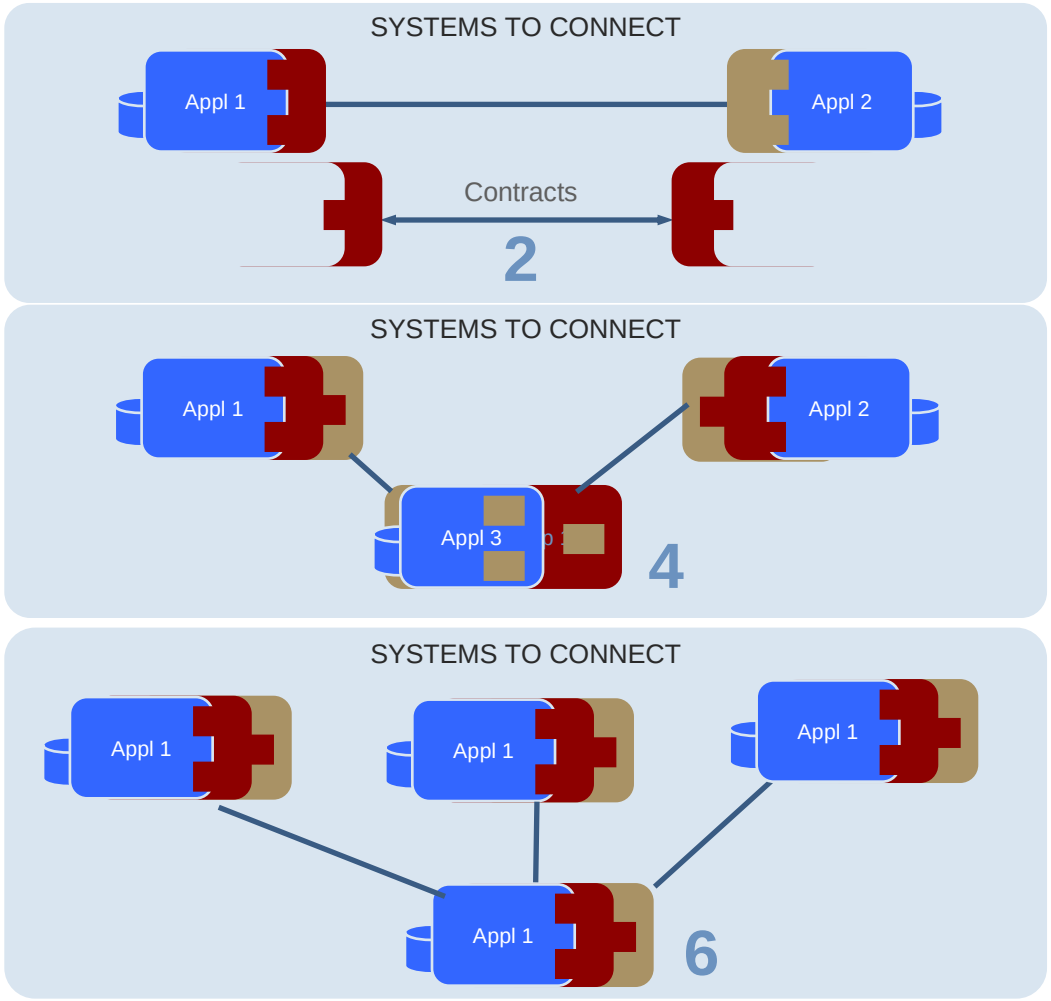
Futile approach

- 38,783 systems in Canada
- Simple = 4,527; Medium = 20,081; Complex = 14,175
- A theoretical upper limit of the number of integration points but still an exponential challenge

➢ **183.9 T $CDN**

➢ **We need a more cost effective approach**

Hospital Networks Approach



Potential Interfaces = 2.1M

Costs basis

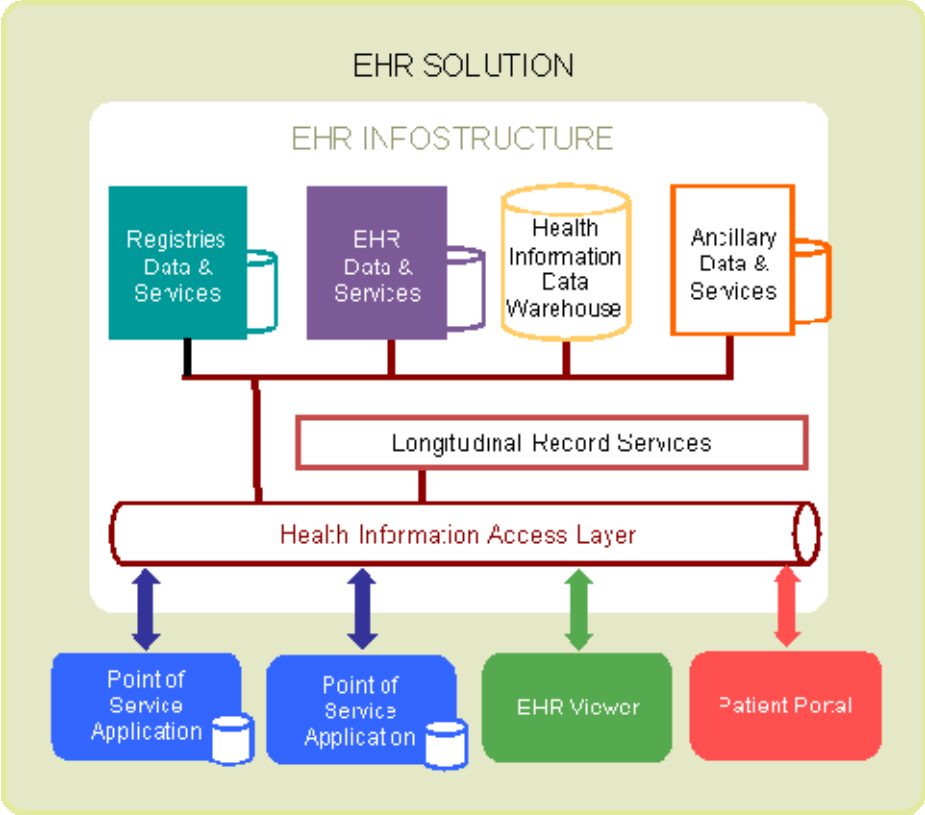
- Cost of one integration
  - Simple = $32K; Medium = $95K; Complex = $190K

Hypothesis

- 1,126 Hospital networks, each includes 71 systems to integrate and group (EAI) in 44 points of integration
- 1,892 (44 x 43) integrations per network totalling 2.1 M (1,126 x 1,892) integrations in Canada

- **68.2 B $CDN (if Simple – 32K)**
- **202.3 B $CDN (if Medium – 95K)**
- **Significant reduction in interfaces and cost, but we still need a more practical approach**

EHRS Blueprint Approach



Potential Interfaces = 19k

Costs basis

- Cost of one integration
  - Simple = $32K; Medium = $95K; Complex = $190K

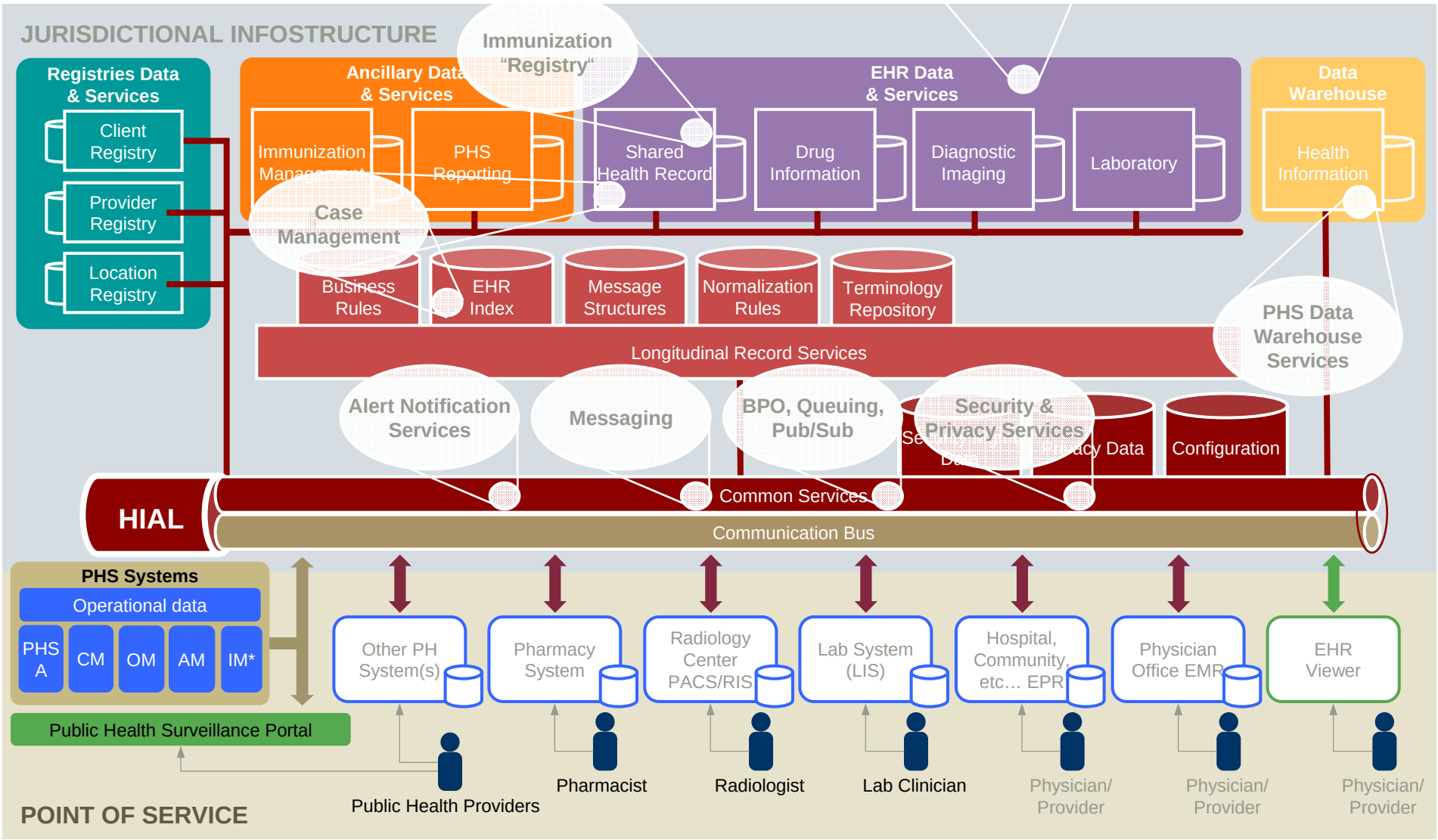
Hypothesis

- All hospitals/long term care organizations use an integration engine and count as 1 integration point
- Simple = 4,575; Medium = 8,134; Complex = 6,597
- 19,306 integration points
- Assuming existence of standardized interface and protocols

➢ **2.2 B $CDN**

➢ **The most cost effective approach!**

EHRS Serving Public Health Service Delivery



In Conclusion

Key Messages and Lessons Learned

- Separate the business problem from the solution
  - Define the business architecture first
  - Conceptual, logical, technical and deployment architectures must support the business
- Find the patterns
- Our ESB creates an Application Abstraction Layer
  - Some of the internal services can be hidden
  - We did not identify and specify well those that needed to publicly exposed and what detailed services they would support
- Evolve your SOA deployment over time
  - No monolithic footprint
  - Maturity path
  - Migration path
  - Govern, maintain and enhance

Key Messages and Lessons Learned

- It is about *Systems Interoperability* not *Systems Integration*
- Only cost effective scenario to handle degree of application integration required
- Maximized ability to deliver proper response time and consistent access to data across thousands of source systems
- Maximized ability to apply privacy and security policies in a harmonized and consistent fashion
- Enables evolutionary path to semantic harmonization of health information across service delivery points
- Enables high degree of scalability from local health services integration, to regional, provincial or territorial and cross-jurisdictional
- Enables high degree of flexibility in reconfiguration of health services delivery networks

Thank you!

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