



Interoperability and Innovation: The SOA Expressway for Healthcare

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Ed IT



Integration and Interoperability

- Integration

- the act of forming, coordinating, or blending into a functioning or unified whole.
 - A layered concept, typically integration either requires putting a new layer on top of existing layers (Adding a Hub to integrate spokes or a Web Portal) or making one peer a dominant one for the integrated functionality

- Interoperability

- The ability of two or more systems or components to exchange information and to use the information that has been exchanged.
 - A peer-to-peer concept, typically interoperating systems continue to behave independently, but can interoperate when needed based on agreed upon metadata, SOA or Web Services is more aligned to interoperability

**Interoperability provides reuse and costs benefits,
Prior to XML & SOA, Integration was lot easier to achieve**

Aspects that can reduce Interoperability

Technology Nuts & Bolts

- Messaging, Transport, Data formats, Language, Platforms

Driving Usage Model

- Centralized view only versus exchange

Privacy & Access

- Identity, Security, Authorization, Auditing

Semantics

- Context & terminology

Ambiguous Data unfit for use

- Master Data

Other Technical attributes

- Locality and Temporal consistency

Regulated & Multi-segment verticals such Healthcare & Education require *interoperable* distributed systems

Why Service Oriented Architecture

SOA is about a loosely coupled exchange of messages between services

- Loosely coupled across Time, Location, Identity, Security, Languages & environments, Platforms & middleware stacks

Reduce cost through reuse

- Build applications faster
- Use existing business logic rather than rewriting each time
- Minimize cost of maintenance and upgrade by allowing incremental updates

Increase agility to better align IT and the Business

- Allow rapid change through business process management and composition tools
- Allow incremental updates to enterprise applications
- Minimize change cycles with business granular interfaces

Reduce the risk, fragility and complexity of integration by improving interoperability through standards

- Reduce investment in and risk of brittle proprietary integration techniques and technologies
- Reduce frequency of data error caused by duplication

The Health Interoperability Problem

Problem

- *Islands of data* within and outside healthcare sites make work *costly & inefficient*
- *Point to point* solutions continue proliferate, creating more islands & *increasing costs* to switch to better models
- *Inefficient* data transfer
- *Limited Functionality* - moving data from a → b

Opportunity

- Establish *data interoperability* across healthcare domains and organizations at Regional and National level
- *Simplify cost & complexity* thru the creation of *canonical workflows & service container integrated with security*
- Implement *value-added capability* by *attaching Intel/Partner services to data*

Interoperability & the Health Information Exchange (HIE)

A (platform) architecture which provides the basis for a secure regional or nation-wide health information exchange network, which will be enabled by the general adoption of a set of specific, critical tools including technical standards for exchanging clinical information, explicit policies for how information is handled, and uniform methods for linking information accurately and securely.

Connecting for Health Framework - 2006

The Electronic Health Record (EHR)

Linking Protected Health Data (PHI) for all HIE participants – be they Patients, Providers, Payors, Pharma and Government agencies in either a Peer-to-Peer or Persisted Data Information Model

“Barriers to Implementation”

My Data is Not Secure	<ul style="list-style-type: none">• Lack of Trust re: <i>PHI Exchange</i>• <i>Policy, Legislation, Regulation</i>	Improve Information Security, Audit ability & Access Control
Too Hard	<ul style="list-style-type: none">• The <i>industry</i> is too complicated• Too many standards to integrate• Others have <i>failed before</i>• <i>Too costly</i> - cannot <i>afford it</i>• Already <i>over-burdened system</i>	Provide multi-segment platform & industry enabling for HIE's
Won't Work	<ul style="list-style-type: none">• Too many <i>stakeholders</i> to integrate• Adds to <i>my workflow cost/burden</i>• How can I trust <i>Content</i> is <i>accurate</i>• On different <i>standards, coding,</i>	Provide scalable Technologies, Platforms & Solutions to address interop
Can't Afford it	<ul style="list-style-type: none">• <i>Costs</i> too much to build• How can it be <i>sustained?</i>	HIE Services, Extensibilities & Cost Recovery Models



About SOA Expressway



Powerful Healthcare Information Gateway Solution

- INTEGRATE hospital systems, CONNECT to HINs/HIEs, SECURE information sharing
- Broad support for standards e.g. HL7, EDI, X12, HIPAA and IHE and many others

100% Codeless Integration

- Simple and intuitive visual tool for data mapping and workflow logic

High Performance Runtime

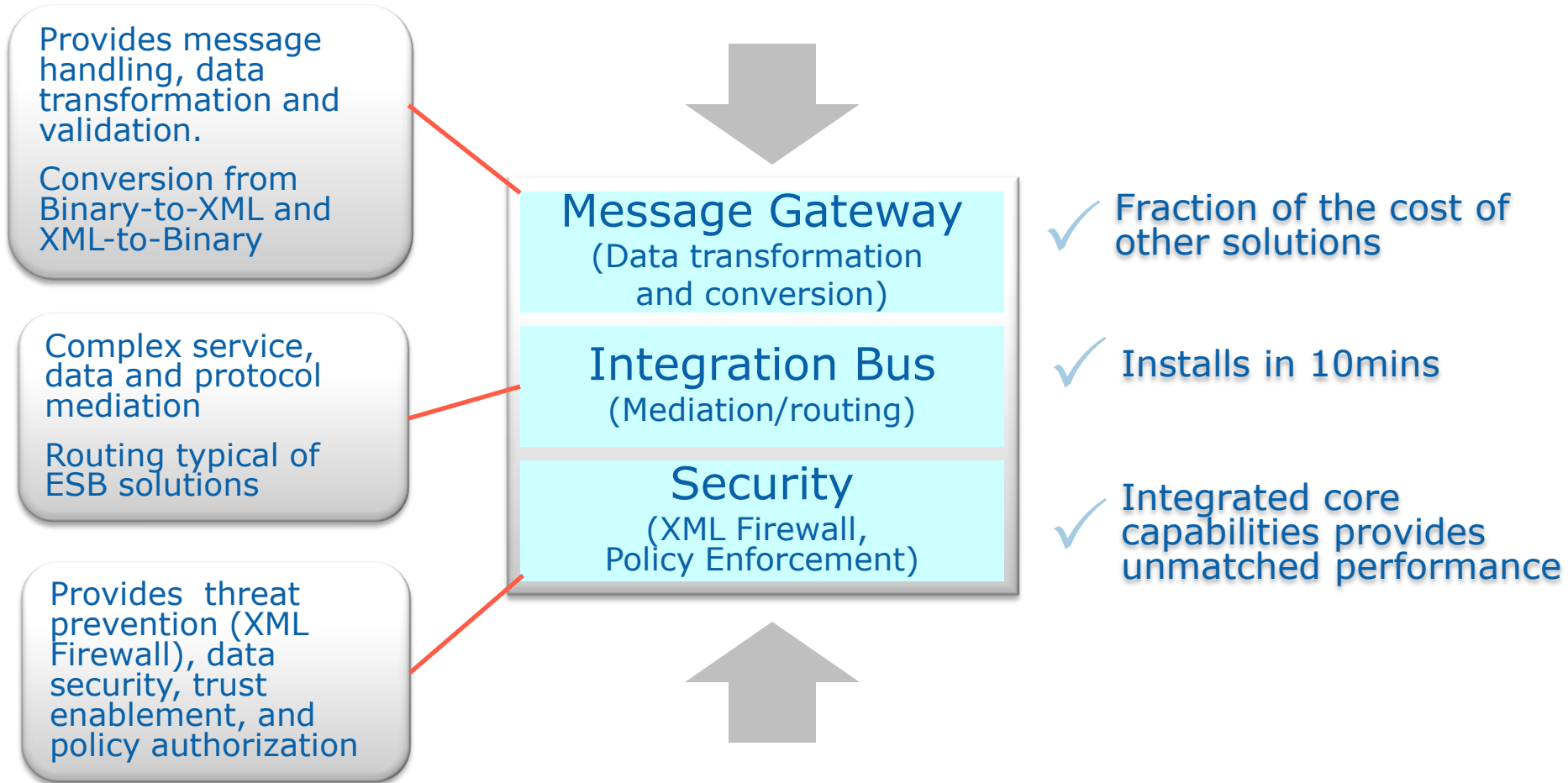
- Optimized for Intel Multi-Core. Scales on standard Intel servers
- Market leading message processing performance

Soft-Appliance

- Software delivers appliance-like manageability, upgrade flexibility and Management/Monitoring
- Protects, Secures, Governs, & Accelerates transactions

Open Architecture Fits Cleanly into Existing Investments

SOA Expressway collapses the stack



Case Study



Medical Center Background

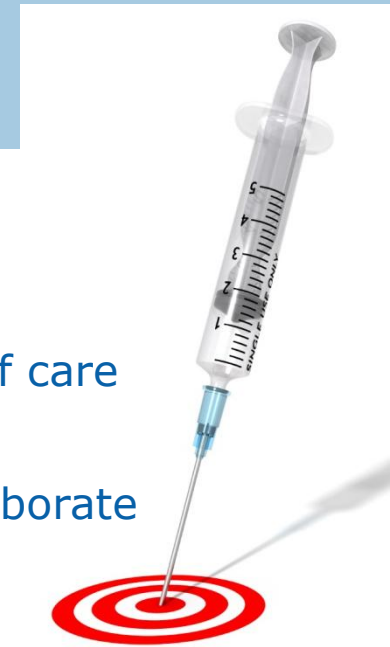
- 673-bed regional care, not for profit teaching hospital
- Major referral and treatment center for northern NJ
- 300,000 outpatient visits and 25,000 admissions annually

Top level Objectives

- Single look and feel for clinicians
- Interoperability between partner institutions
- Comprehensive patient record
- Flexible and scalable platform



Objectives by Solution



Provider Solution

- Give clinicians web-based access to EMR Lite/PHR at point of care
- Integrate patient information between community partners
- Allow clinical and administrative users of the system to collaborate
- Create closer ties with affiliated physicians by offering:
 - Workflow improvement
 - Value added services like e-prescribing and patient referrals
 - Monitoring to promote increased revenue opportunities

Patient Solution

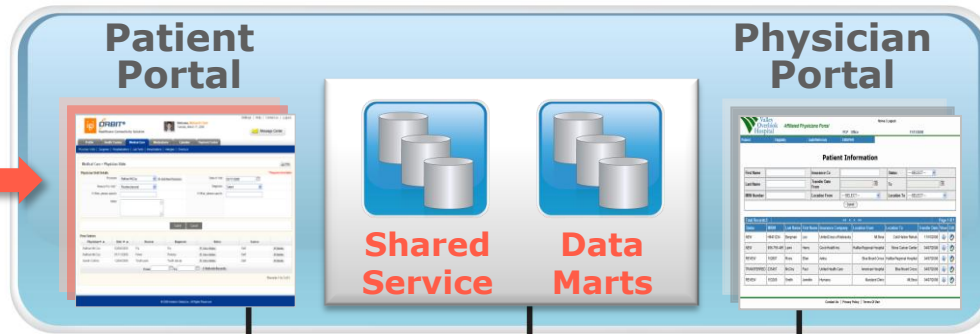
- Provide a HIPAA compliant patient centric solution
- Create a patient-centric tool, allowing disparate systems to be viewed as one
- Aggregate patient demographic, events, and clinical results into one PHR

Community Solution

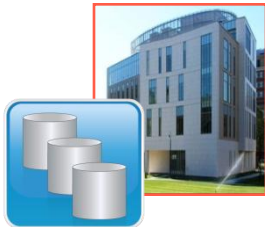


Allow for interoperability among legacy ambulatory EMR systems

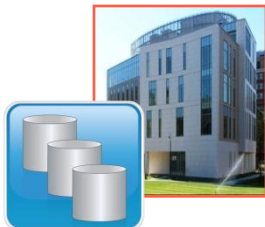
- Deploy meaningful clinical value in less than 6 months
- Offer an affordable, cost-effective and highly-valued solution
- Use an open architecture product reducing development costs
- Trade Clinical data with NJ Medicaid to show Statewide interoperability



Newark Beth Israel Medical Center



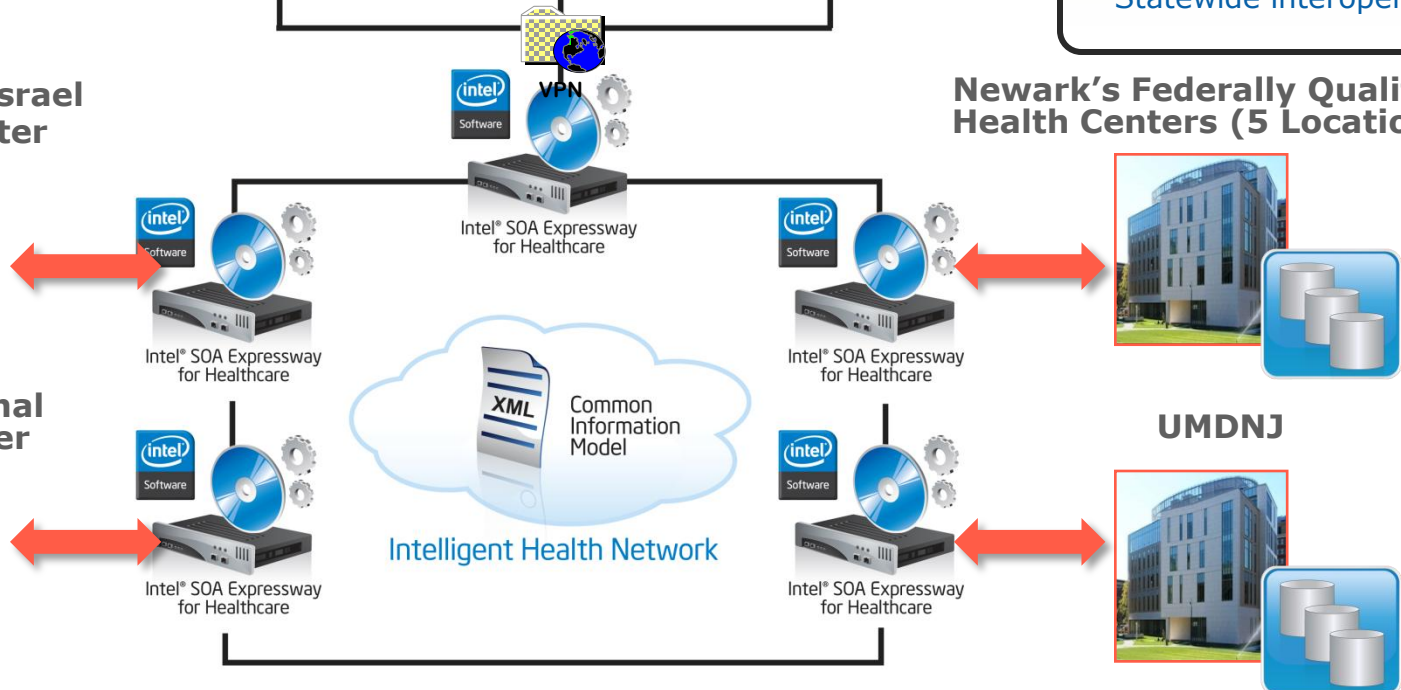
Trinitas Regional Medical Center



Newark's Federally Qualified Health Centers (5 Locations)



UMDNJ



UK National Health Service - Largest HIE Project in the World



50+ million patients with life-long healthcare records

- Linking with 250 hospitals
- 1.4m providers (doctors, nurses, scientists) 10,000 systems, 40,000 sites

For the National Service Provider (NASP) "Spine"

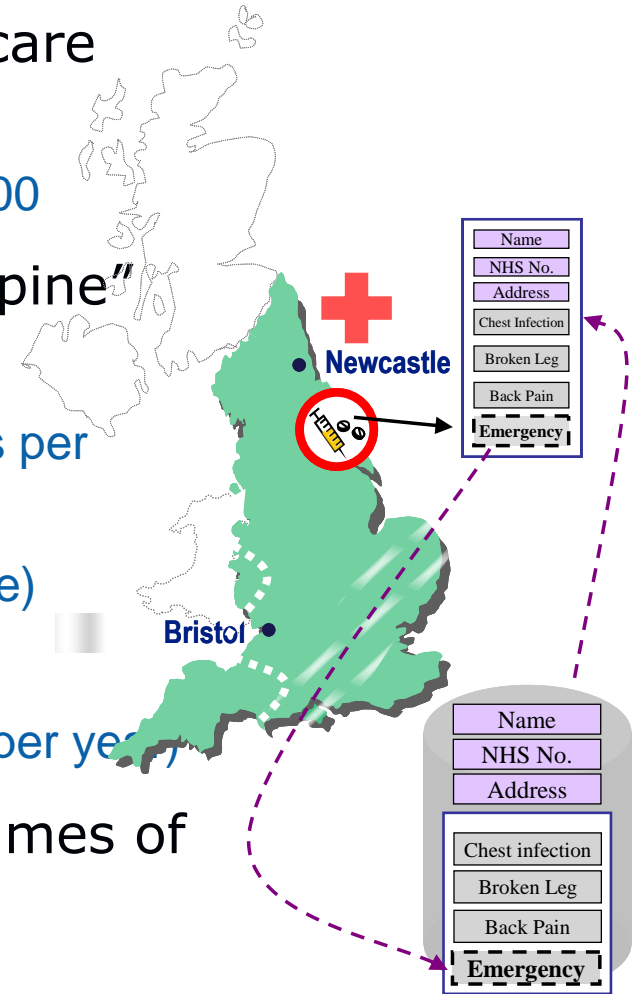
- 2007 – **3 billion transactions per year**
- 2010 - **6 billion transactions per year**
- Due to peak usage approximately 420 messages per second (4–6x hourly average)
- Response SLA – 0.2 seconds
- Available 99.9% (44 minutes per month downtime)
- Failover in 30 minutes

For the Local Service Providers (LSP's)

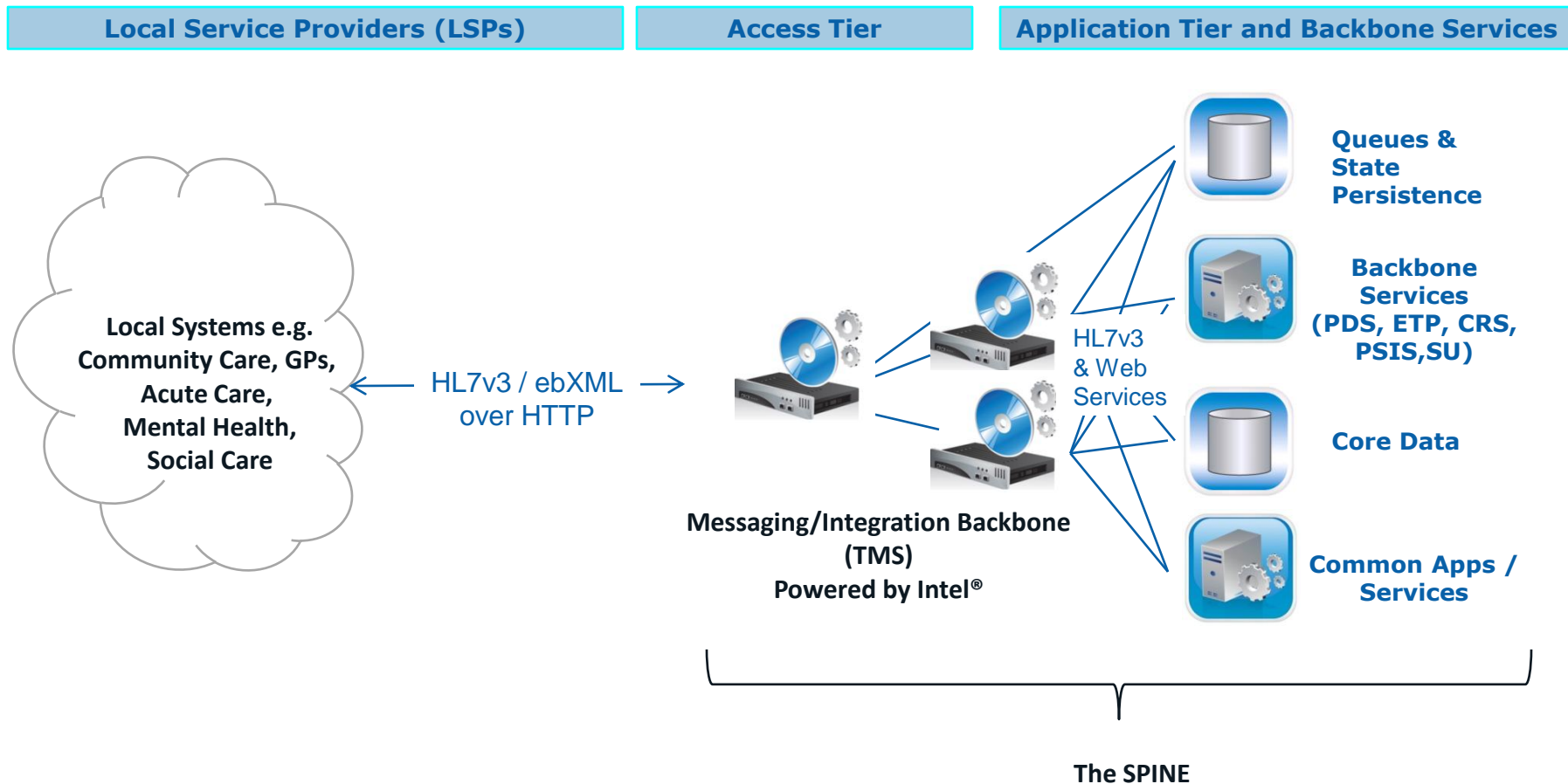
- Each has a lot of local messages (10bn to 12bn per year) and shares some with the NASP

There are 5 LSP and therefore the total volumes of messages per year is:

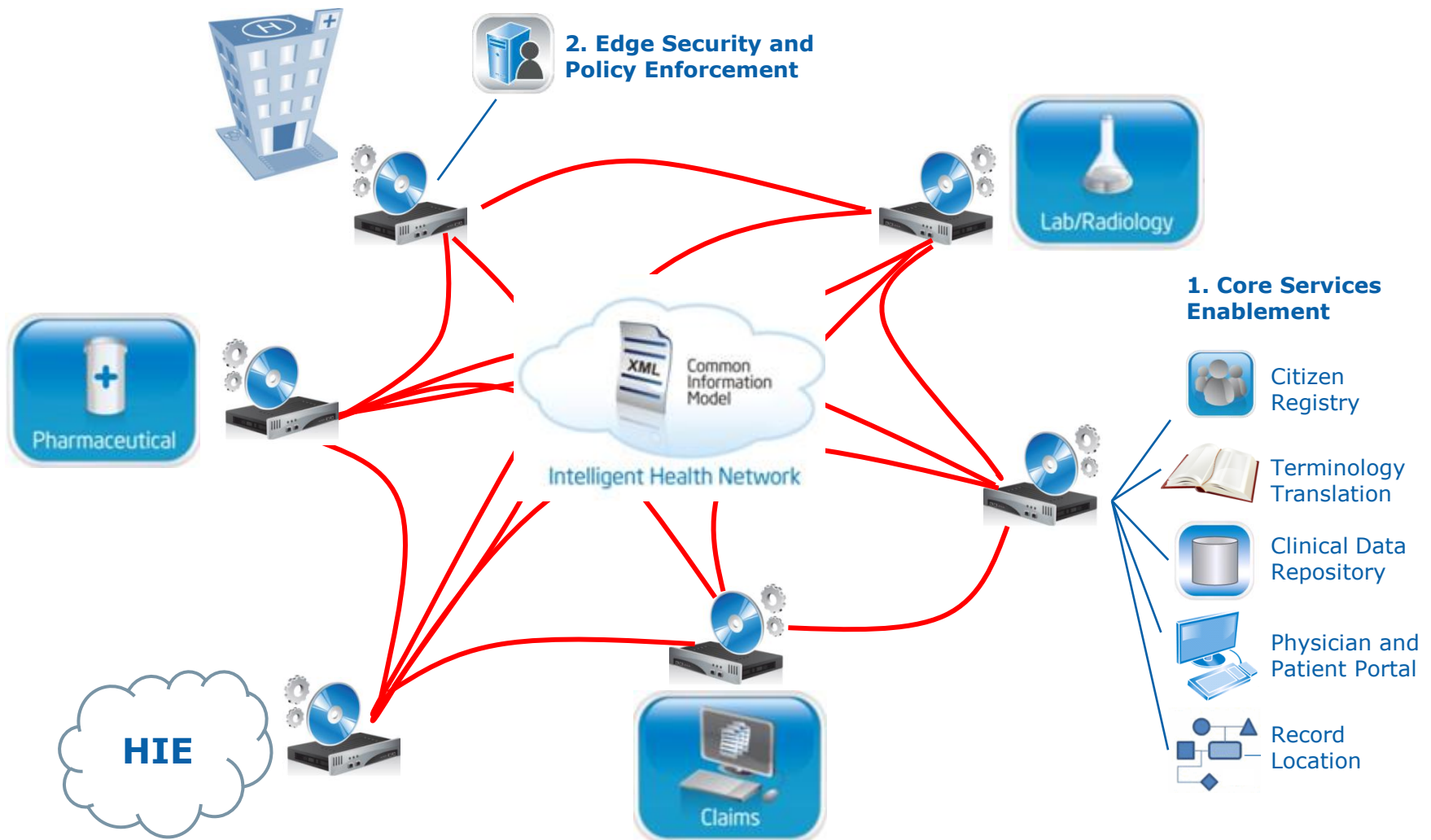
- **56 billion to 66 billion messages per year**



Another view...



Enable a Secure, Federated Health Information Network



5 HIE Architectural Principals

Simplifying Interoperability;

- Provide platform architectures and ingredients which address data & semantic interoperability issues between disparate EMRs, data formats, messaging & interface standards & other HIE (networks)

Address architecture, infrastructure, software and services - together;

- The industry needs a fast and flexible way to evolve legacy platforms over-time and to establish configurability in terms of cost and capability

Deployable either inside an industry segment or as a shared “network”;

- Provide solutions which integrate both within and interoperate across healthcare organizations & industry segments

Support legacy systems, current and evolving standards in healthcare data representations;

- In order to support the largest breadth of use cases and to provide a bridge between the current AS-IS and proposed TO-BE states within an HIE

Scalable from small-to-large scale healthcare environments;

- In terms of cost, complexity, utility and adaptability

SOAE-H and Supporting Services

Question: How does SOAE-H capabilities & services such as legacy integration, controlled healthcare terminology, master patient index, audit and security extend into K-12 education?

Problem in Healthcare	Similar In Education?
Data & Transport Standards HL7 v2.x, EDI, NCPDP, HL7 v3.x, CDA/CCD... HTTP, MLLP, FTP, JMS	Data & Transport Standards Spreadsheets, Flat files, Text, PDF, EDI, XML, ??, HTTP, FTP
Patient & Physician Master Person Index	Student & Teacher Master Person Index
Healthcare Terminology Normalization	Terminology challenges in interoperating Education records?
Dynamic addition of new producers and consumers of data	Prepare not just for the mandate but beyond
Security Patient Privacy, HIPAA, De-identification, Data encryption, Authorization & Audit	Security Student Privacy, FERPA, De-identification, Data Encryption, Authorization, Audit & ?

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IGI Demo

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Access ALL Enterprise Data

Unstructured

- Microsoft Word
- Microsoft Excel
- PDF
- PowerPoint
- OCR
- Word Perfect
- ASCII reports
- HTML
- EBCDIC
- Flat (Text) files
- RPG
- Print Streams
- AFP
- Post Script
- DJDE

Semi-structured

- HL7
- HIPAA
- AL3
- EDI-X12
 - EDI-Fact
- EDI(AAR/UCS/WIN S/VICS)
- COBOL
- SWIFT
- NACHA
- BAI
- FIX
- CREST DEX
- TeleKurs
- IATA-PADIS

Complex XML

- ACORD
- ISO 20022
- RosettaNet
- SEPA
- FIXML
- FpML
- OAGi
- MISMO
- IFX
- SWIFT MX
- TWIST
- LegalXML
- ebXML
- XBRL