Hitachi Data Systems

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HITACHI in Healthcare

INNOVATE WITH INFORMATION™

Understanding the challenges
……and delivering innovative solutions

Raj Singh – Healthcare Solutions Consultant
Ari Heinio – Solutions Architect

Philosophy

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Philosophy
phi·los·o·phy ; noun, plural phi·los·o·phies
Def: a system of principles for guidance in practical affairs. a system of principles for guidance in practical affairs.

“ Everyday we make life a little more worth living”

- Mr. Namihei Odaira, Founder Hitachi

Hitachi's commitment to Healthcare

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Essential services from the data center: Reliable, efficient storage designed for clinical and workflow data applications to provide information at the point of care

Hitachi Data Systems

Control and monitor access to buildings, equipment and confidential patient records: Hitachi VeinID biometrics

Hitachi High Technologies

Maintaining a clean, constant environment Hitachi Air Conditioning

Training and presenting to staff, digital signage, ultrathin displays, projectors & Hitachi Starboard

Hitachi Software Engineering

Viewing activity within the brain: Optical topography

Hitachi Optical Topography

Advanced cancer treatment Hitachi proton beam therapy

Hitachi Medical Systems

Testing and analyzing in the laboratory and surgery

Hitachi Plant Technologies, Ltd.

Advanced diagnostics: Hitachi MR, CT and ultrasound Specialist solutions for Elastography and sonography

Hitachi Medical Systems

Advice on management, and change in the organization

Hitachi Consulting

Track, trace and monitor with integrated RFID technology

Hitachi RFID

What keeps Healthcare customers awake at night?

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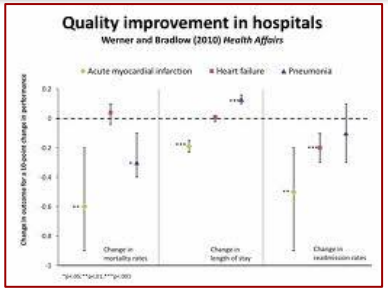

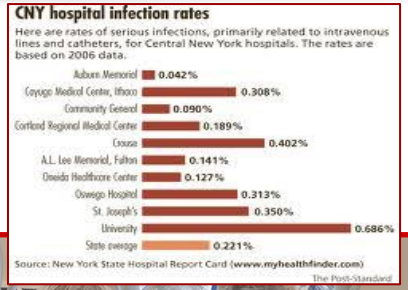

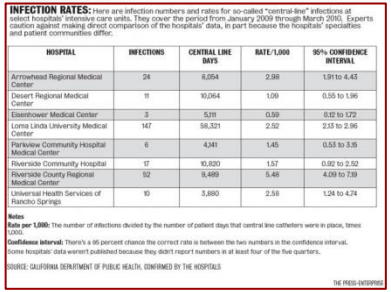

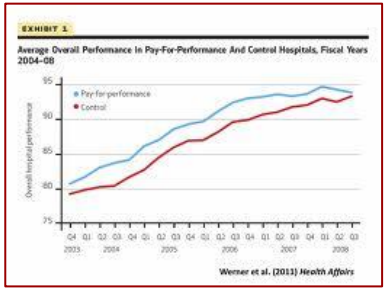

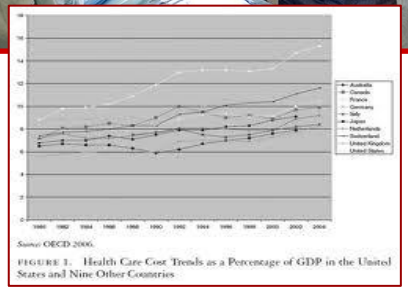

Trends that transform the healthcare ecosystem

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Trends

- Evidence based medicine
- Standardization
- Key Performance Indicators
- Independent “quality checks and audits”

Trends

- New role of payers as gatekeeper and “director” of healthcare spend
- Publication of KPF’s
- Dashboarding / Balanced Scorecards
- “Costs of care provided” in analogy with “COGS”

Improve Patient Safety

Improve Quality of Care

Increase Transparency of Care

Reduce Costs of Care

Trends

- Seamless chain of care
- Clinical pathways
- Next generation PACS
- Next generation EMR/EHR

Trends

- Combination of clinical research, teaching and care at Academic Hospitals
- e-health solutions
- regional/national EMR/EHR
- Patient portals

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Understanding the Healthcare Challenges

Clinical Data Is Growing at Extraordinary Rates

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The amount of healthcare data being generated quadruples every two years

* National Institutes of Health, 2014

MASSIVE DATA VOLUMES

Imaging Data	Clinical Data	Genomics Data
11 PB	115 PB	200 PB
2011	2016	2018

Many decisions are made at a departmental level without consideration for the enterprise, and so creating disparate information silos

A Growing Demand for Access……
……to All Relevant Patient Data

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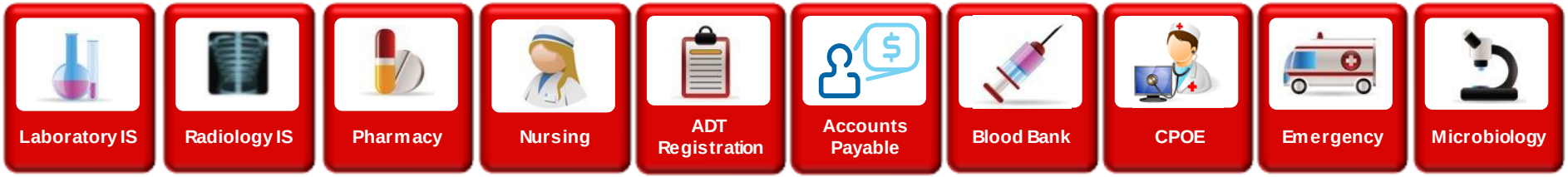

For the Healthcare Enterprise It Means

- A single point of access for healthcare staff
- A patient-centric view of information
- Access to the data needed to make patient care decisions
- Infrastructure to implement healthcare transforming technologies

Evolving Regulatory Requirements

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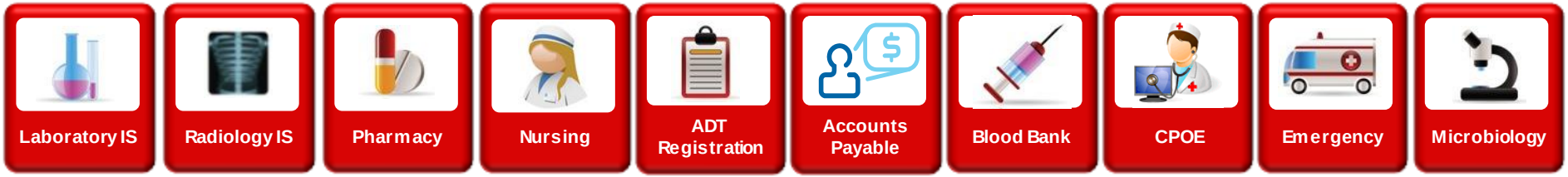

For the Healthcare Enterprise It Means

- Medical needs and even geographical requirements could require data be stored for 30+ years.
- Complicated management of data destruction policies
- Data encryption and security becomes more difficult with data mobility

Challenges in Healthcare

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HEALTHCARE COSTS…

- Growing and unsustainable
- Aging population
- Inefficiencies
- A lack of quality management
- Chronic disease management accounting for 60% of spending

DATA GROWTH…

- Due to technological advancements
- Digitization of systems
- Retention requirements for compliance
- Research needs

DATA AVAILABILITY…

- Managing data silos
- Multiple proprietary data formats
- Exposure during Data Migrations
- Security for Data Integrity
- Remotely inaccessible

DATA ANALYTICS…

- Multiple data sources
- No central indexing
- Focus on data archive and not Value of Information
- Proprietary data formats
- Lack of supportive infrastructure

Hitachi: Delivering on the Vision of IT Agility

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"Organisations are looking at ways to cut costs, better utilise assets, and reduce implementation and management time and complexity. Virtualization addresses all of these concerns."

Gartner

A successful thought leader in storage technology

The world's only vertically-integrated storage company

Focused on delivering a vision for Healthcare that is:

- Virtualised
- Automated
- Cloud-ready
- Sustainable
- Open

Information……at the Point of Care

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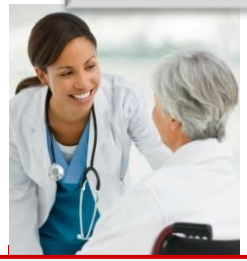
To Provide the Right Data in the Right Place at the Right Time
to improve delivery of High-Quality Patient Care



EPR

Hospital Information Systems
- Patient Administration
- Community-wide Scheduling
- HR & Staffing Functions
- Finance & Administration

Clinical Information Systems
- Laboratory Information Systems
- Pharmacy Systems
- Quality Outcomes & Abstracting
- Clinical Research Systems

Point-of-Care Systems
- Patient Care Systems
- Order Entry (OE)
- PACS & Radiology
- Cardiology

Electronic Prescribing

Disparate Data Silos That Neither Share…… ……nor Integrate

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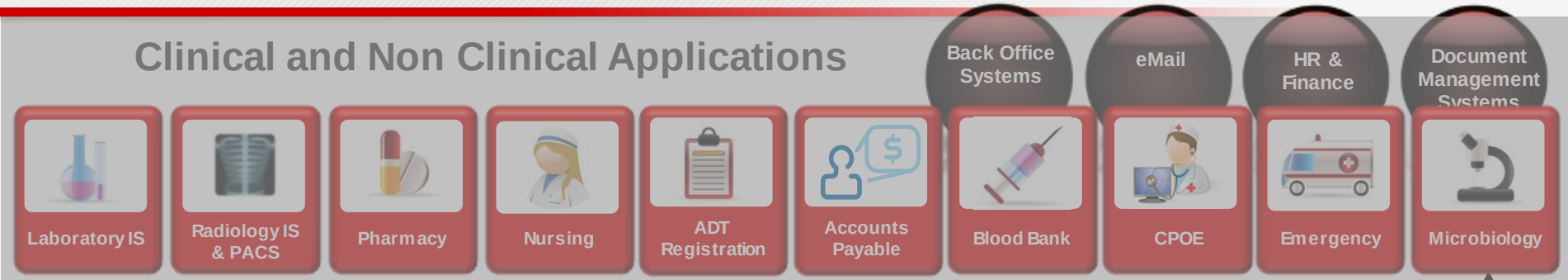

Challenges

- Departmental systems with islands of storage and access points
- No Patient-Centric view of information
- Integrating services require complex and multiple data interfaces
- Legacy system lock-in
- Complex data management & low utilisation leads to higher cost of ownership

How to eradicate Silo's to enable integration…… ……And why is Storage Virtualisation so important?

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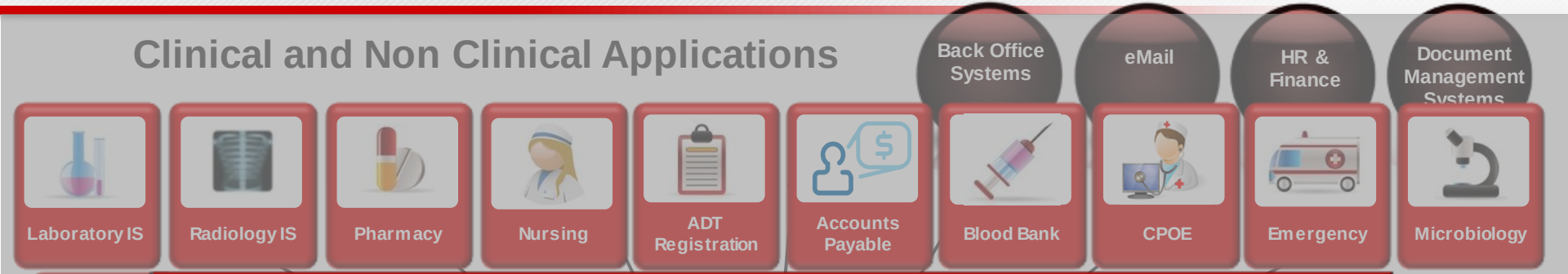

Resultant Benefits

- Placement of data becomes "application independent"
- Vastly improves utilisation of existing assets
- Facilitates data sharing for existing and new hospital applications
- Provides non-disruptive migration paths
- Reducing cost and complexity across multiple disciplines (ROI & ROA)
- Simplifies management of storage assets

How to cope with that growing mountain of data

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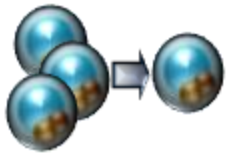
Hitachi Content Platform - Preserve, Protect & Optimise

Protection

Policies to enforce document retention, authentication & file replication combine to secure valuable digital assets



De-Duplication & File Compression

Enables greater storage efficiencies, scalability and enhances TCO

Immutability and Retention

Write once, read many file system

Shredding

Guarantees the contents of an object are permanently removed (scrubbed)

Encryption of Data at Rest

Transparently encrypts all content, metadata and search index

Single Archive Name Space

Open and easy to navigate with standard tools and applications

Our Healthcare Vision

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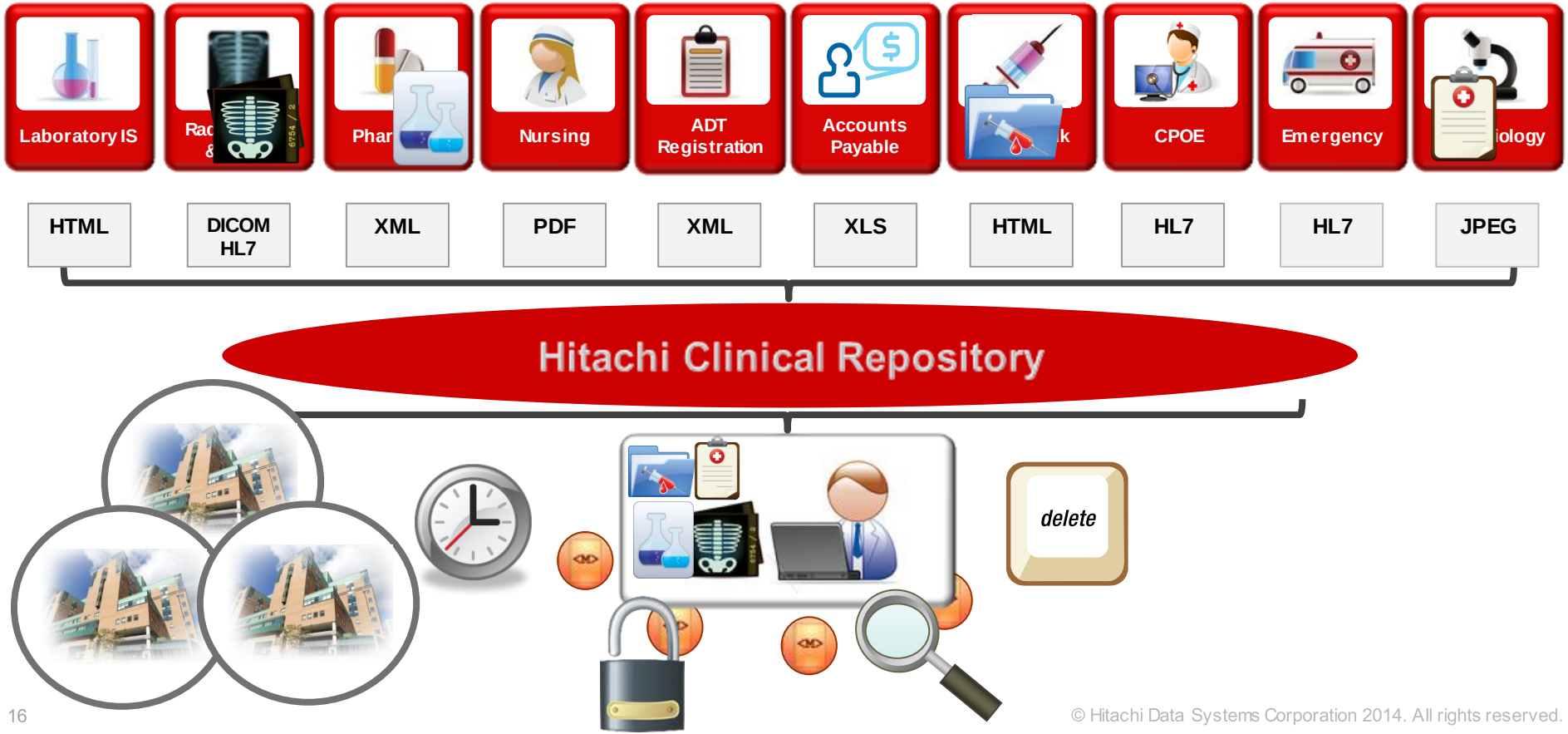

Hitachi Clinical Repository

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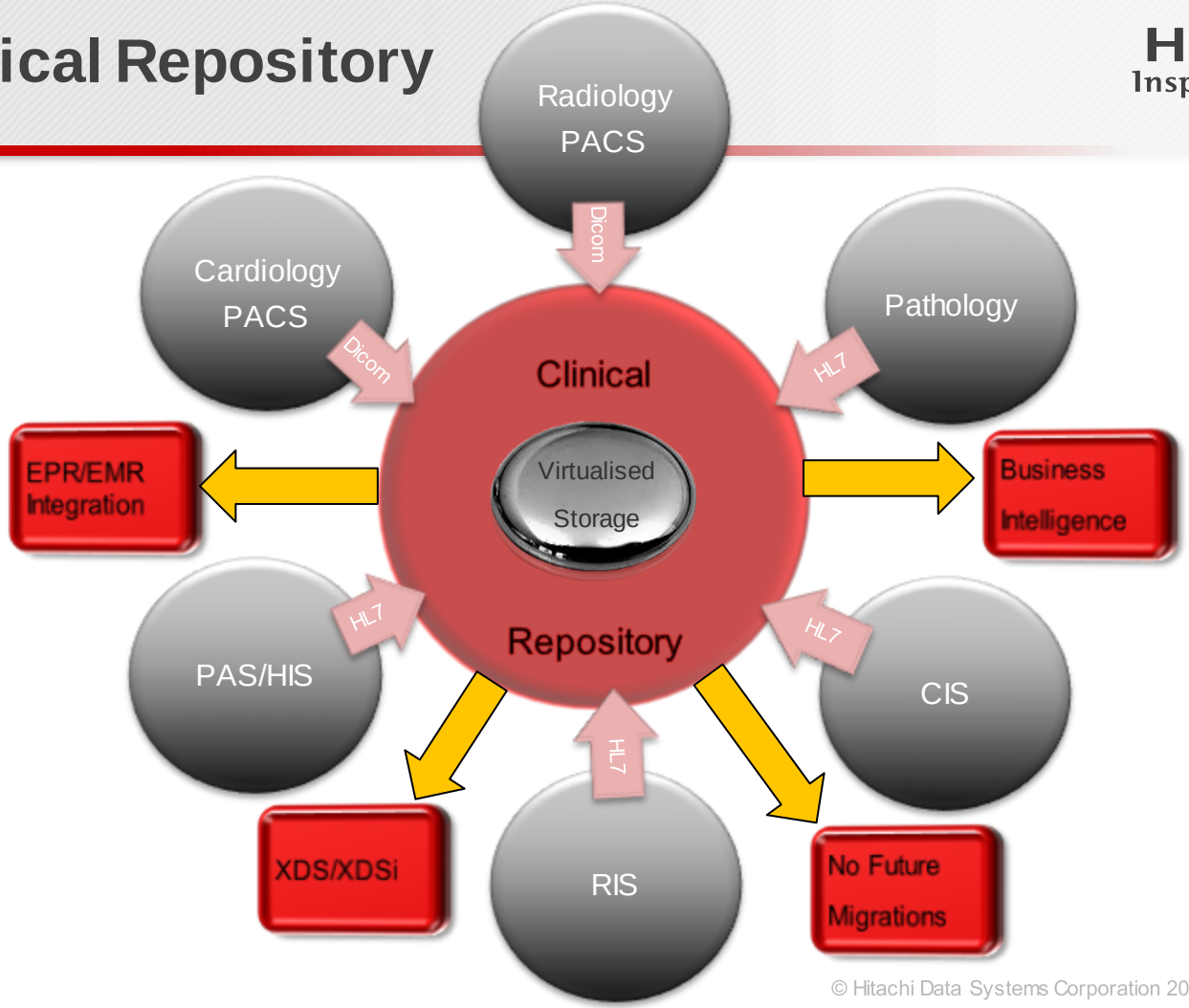

Hitachi Clinical Repository

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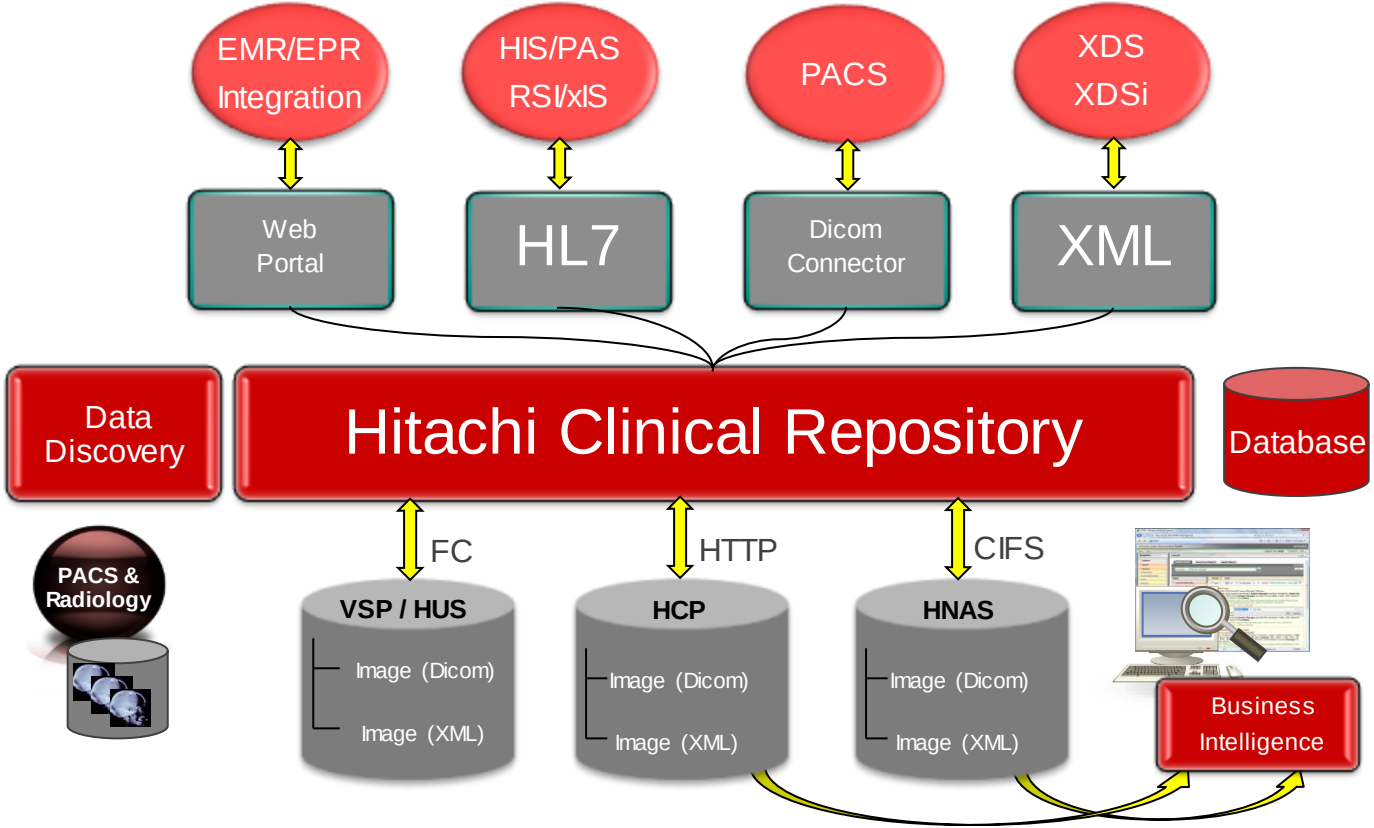
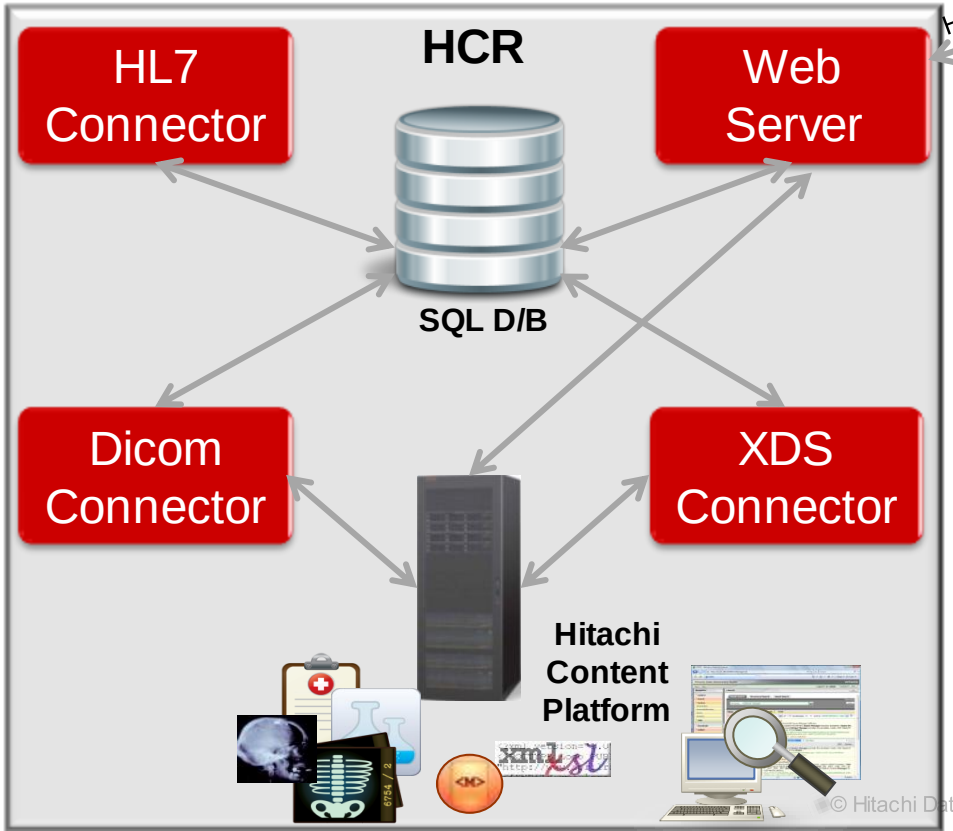


HCR – Process Overview

EPR/EHI



B

→ ADT Create
→ ADT Update
→ ADT Merge
← ORU Image Availability

Image Review Option

a) Thumbnails
b) Jpegs (fast, not diagnostic)
c) Full Dicom (Part10 data)
d) Dicom via ActiveX viewer

A

Dicom 3.0

→ C-Store
→ C-Find
→ C-Get/C-Move
← Storage Commit

C

XDS.b/XDS-I.b Option

← Provide & Register (REP)
→ Provide & Register (Source)
← Retrieve (REP)
← Register (REP)

Single Unified Patient Record

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Store, share and view any type of medical image/report

- acquired from any type of device
- independent of manufacturer
- anywhere within the hospital\clinic, or remotely
- using a completely open standards approach

CIFS/NFS/

WebDAV/http

DICOM
Digital Imaging and Communications in Medicine

HL7

XDS/XDSi

IHE

Turning Data into Information…….. ……..into future opportunity

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- Full Clinical & Non-Clinical Repository – to re-purpose otherwise “silent” data
- Continuous Cloud Infrastructure with performance & availability – to underwrite SLA’s
- Standards based architecture DICOM/HL7/IHE supporting all Image & Data Types
- Highly Scalable, Vendor/Application Neutral Long Term Repository
- Enabler for remote and mobile user access, anywhere, anytime
- Reducing integration, operational and maintenance costs
- Data Discovery & Migration – value add services!
- Turning Data → Information…

Information → leads to better decision making…

Delivering Effective Data Management to improve patient outcomes!

File = bytes transformed to a known format

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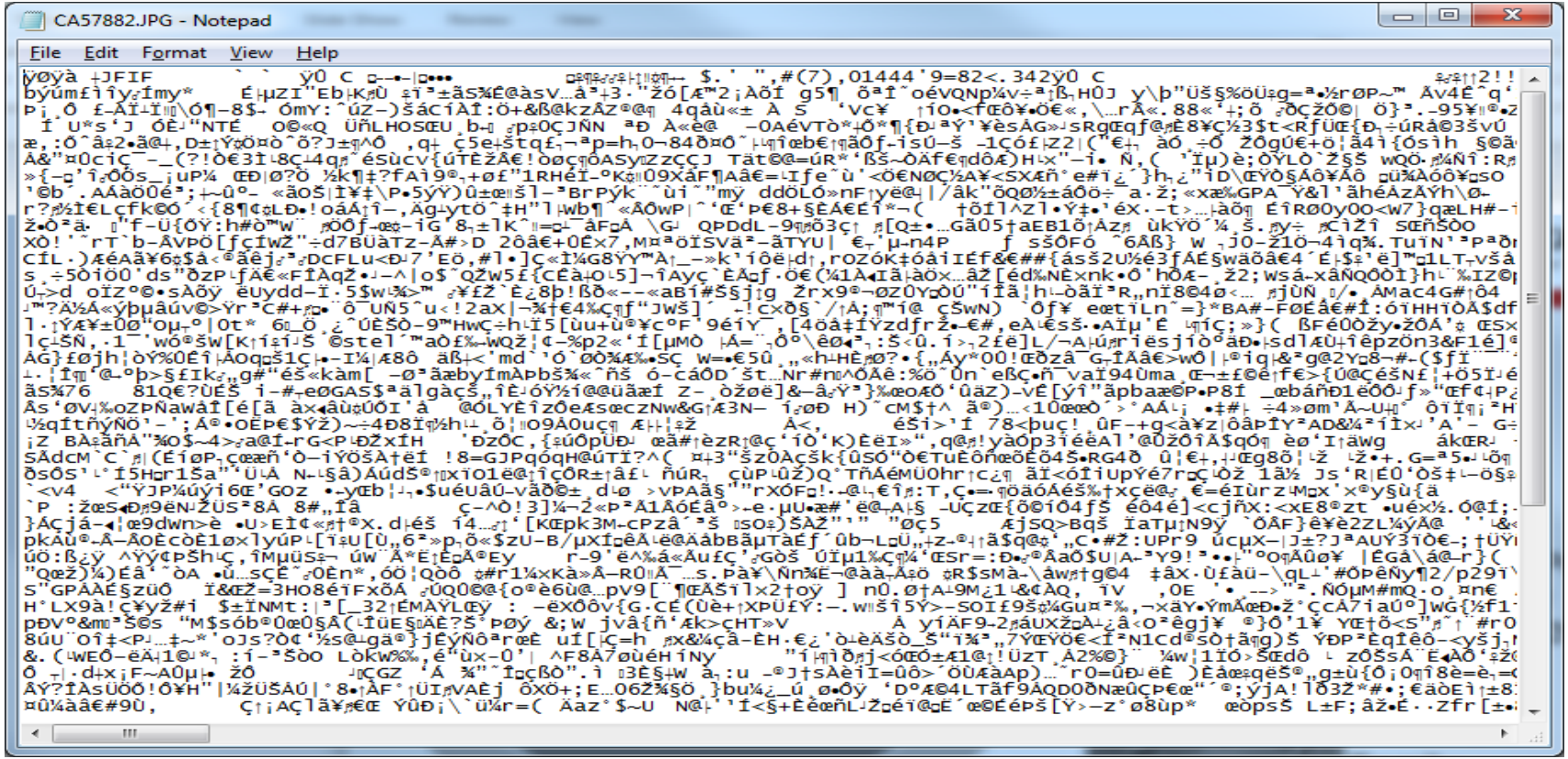
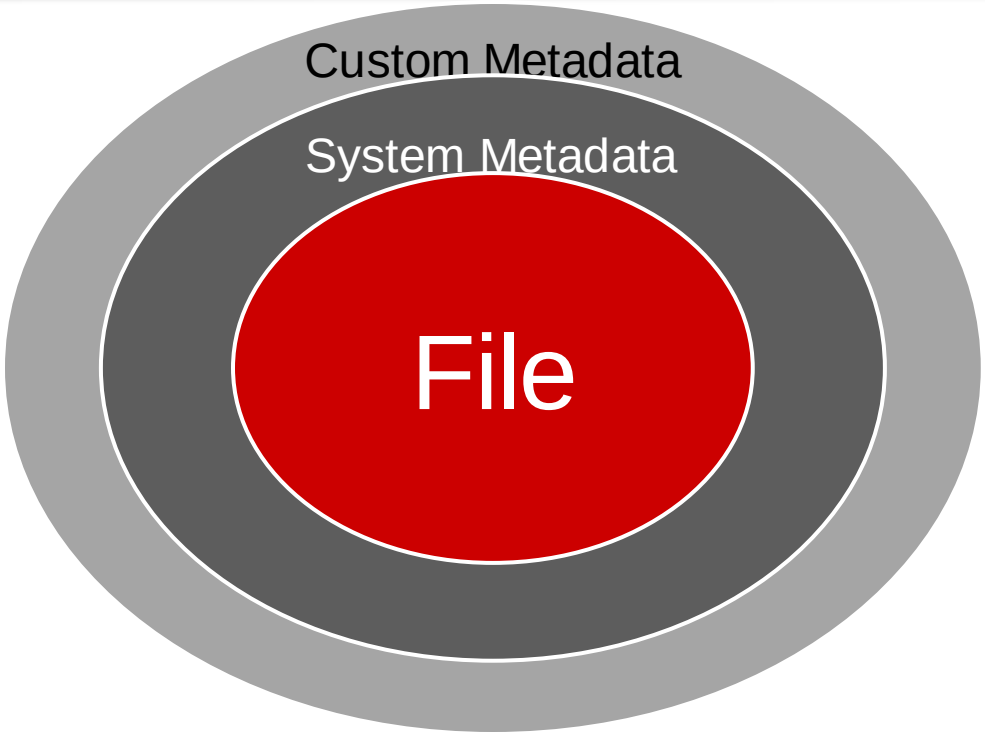


Object = files transformed to information



File + Metadata = Object

Example:
? JPG
File = Picture

S
- 228.JPG
- , 2010
- uly 4, 2010

C
- niö
- Category: Family
- Retention: Do not delete
- Place Taken: Karkkila, Suomi
- Time: 29.1.1961
- Allow sharing: Yes

Transform flat data to information database

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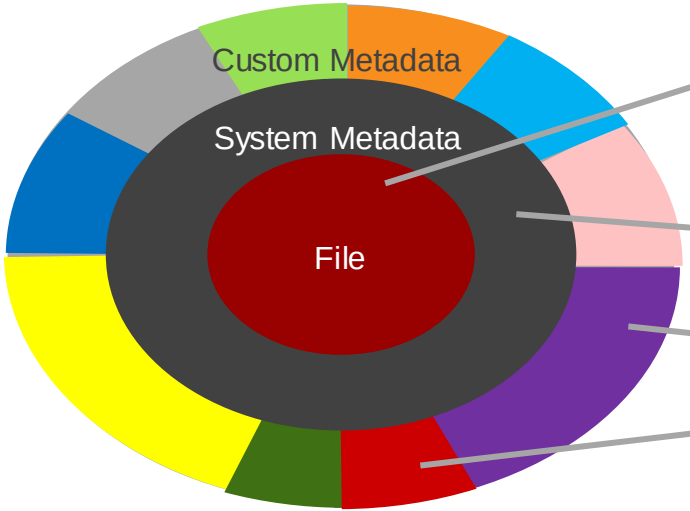
- Multiple custom metadata fields
  - Enable apps and users to store their unique metadata separately from one another



File + Metadata = Object

File Class = Image

System Metadata
- Filename: NZ219983.JPG
- Created: January 4, 2012
- Last modified: January 4, 2012

Custom Metadata Annotation 1
- Subject: Tibia fracture
- Place Taken: ABC Hospital
- Department: Emergency Room
- Patient ID: 547968840

Custom Metadata Annotation 2
- Subject: Physical Therapy Consult
- Place Accessed: XYZ Therapy
- Insurance: PDQ #13342
- Patient ID: 547968840

Hitachi data discovery suite v3.1

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New architecture

- Solr – open-source search platform from the Apache Lucene project
- Lucene – open-source search engine – Apache project
- Hadoop – used for scale-out indexing and load balancing

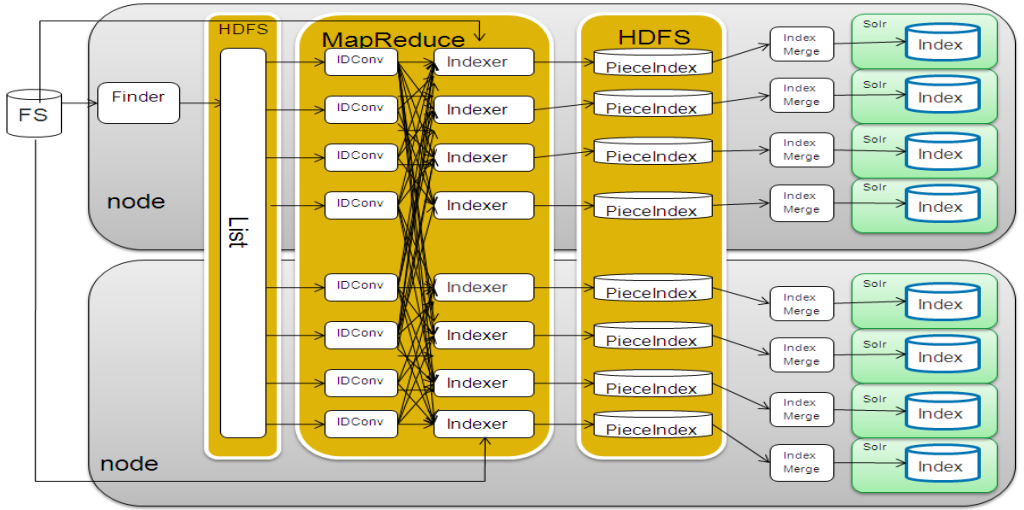
- Index load balancing

- 200 million objects per node

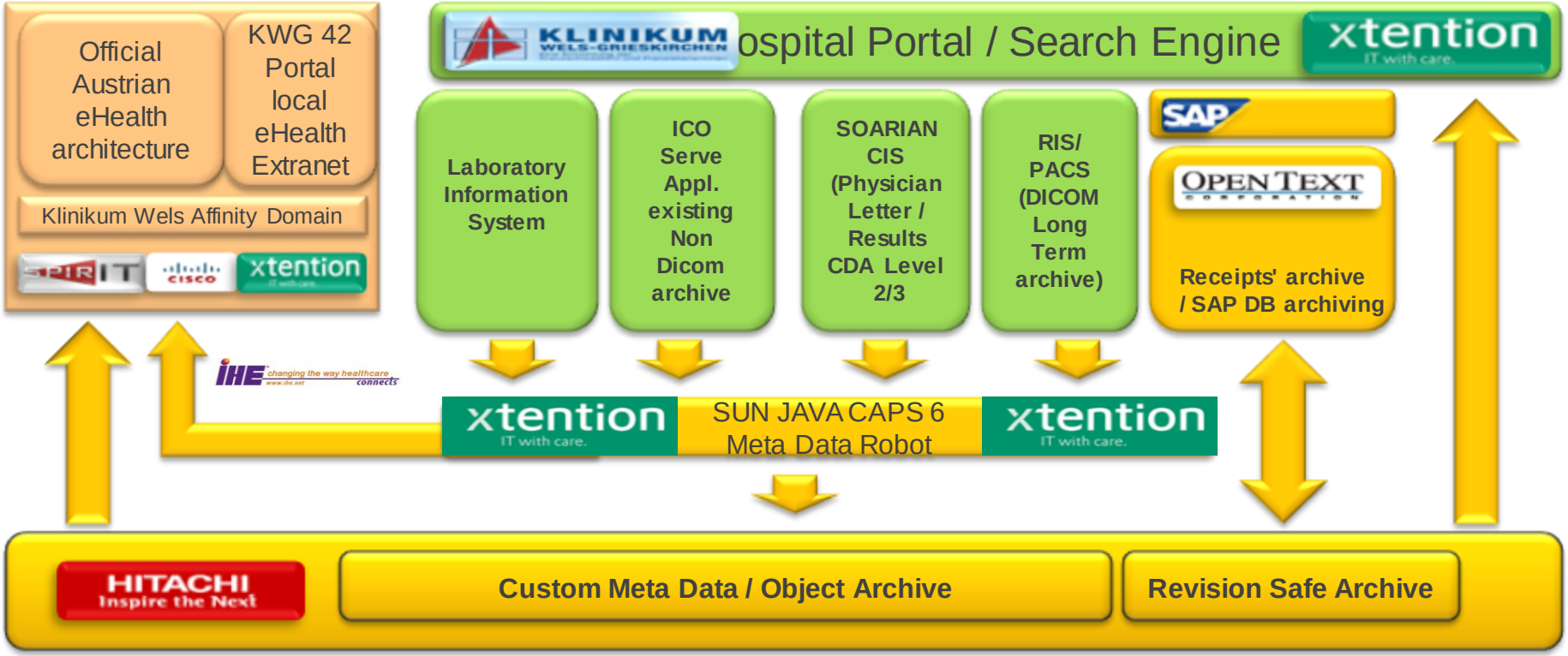
- Search user interface separate from administration

- New security role

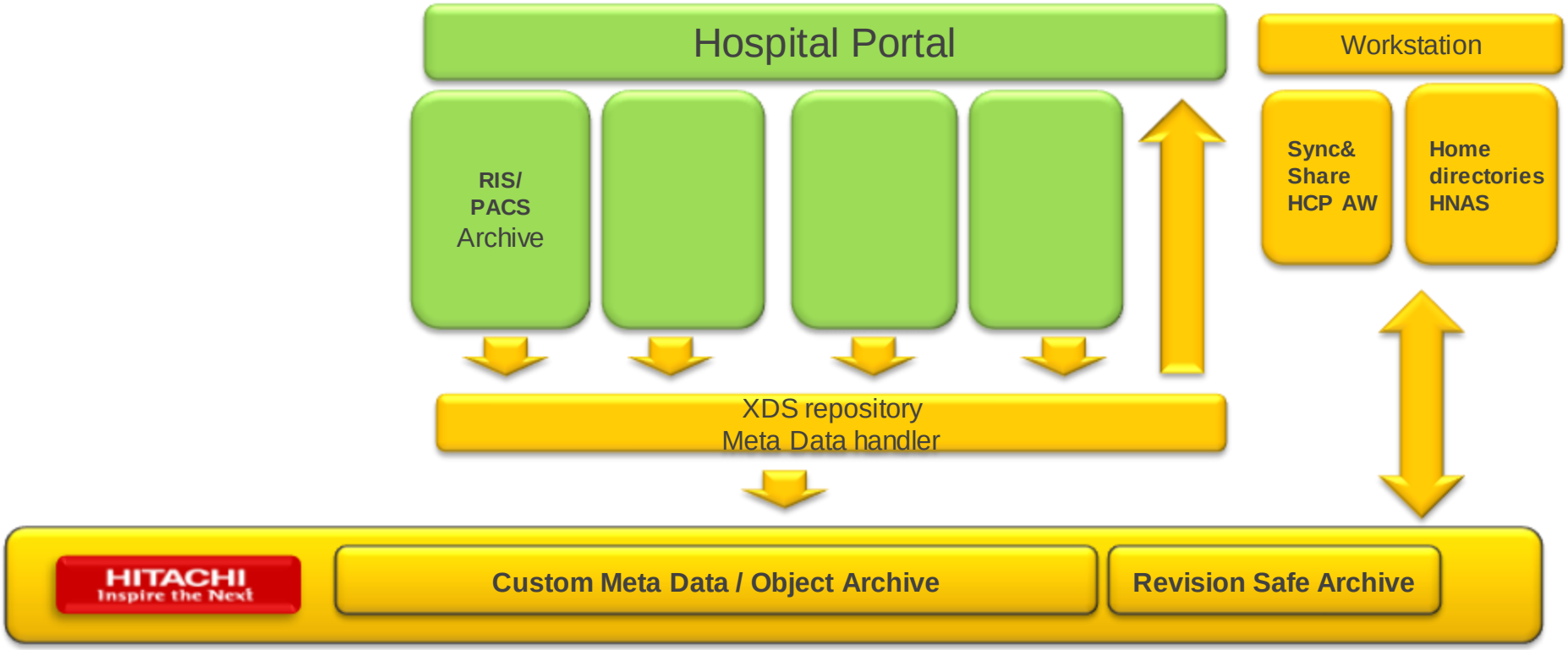
- Models:
  - Appliance



After 6 years our customer looks like this



Where are we now?



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Questions and Discussion

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Thank You

Title

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HLS: Understanding the Market Drivers

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POPULATION HEALTH

Shift from disease management to population health management

$1.5 - $2B Market by 2018

CHRONIC DISEASE

64% of deaths

80% of costs

Obesity and chronic disease accounts for $3 out of every $4 spent on healthcare in US

THE $1000 GENOME

Ushering in new era of personalized and predictive medicine

$100M 2001

$1000 2014

MASSIVE DATA VOLUMES

Imaging Data 11 PB 2011

Clinical Data 115 PB 2016

Genomics Data 200 PB 2018

MASSIVE UNTAPPED OPPORTUNITY

3000+ Hospitals in US without VNA today. Market growing at 56% CAGR

< 20% penetration in clinical analytics today

- Expected to rise to 50% by 2016

$7B Genomics Market.

29 Public Gene libraries that would gain new efficiencies if moved to Cloud

Source: FROST & SULLIVAN

Evolution of Clinical Informatics

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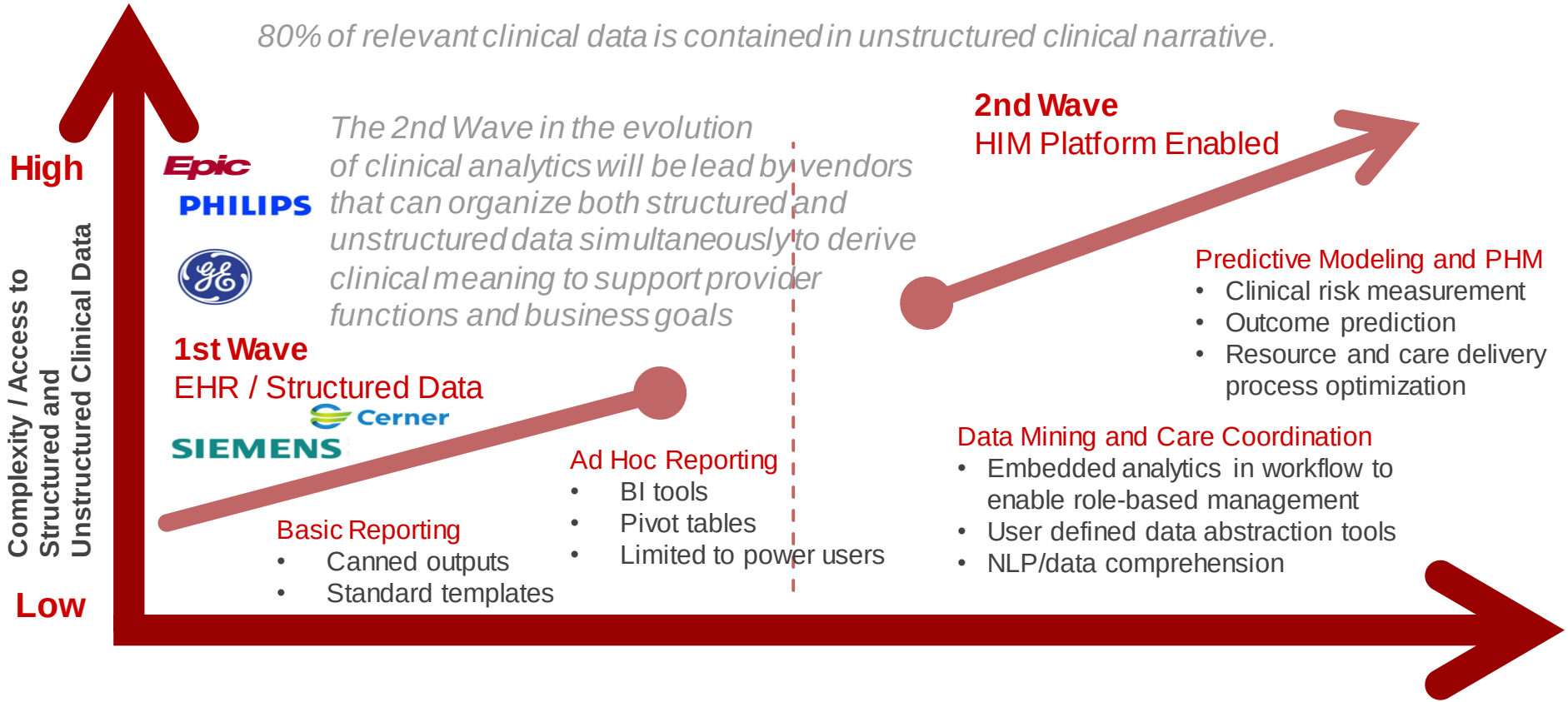

What is Connected Health?

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health 2.0 doctor caregivers outcomes cloud EMEA extended care treatment genomics outcome mobile EMR PPO care HIPAA IDN's coverage team personalized medicine heart modality meaningful use research insurance er

Connected health is a model for healthcare delivery that uses technology to provide healthcare remotely.

Connected health aims to maximize healthcare resources and provide increased, flexible opportunities for consumers to engage with clinicians and better self-manage their care.

Connected Health Strategy

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The Case For Connected Health

Nations around the world are making significant efforts to adopt Healthcare information technology as a path toward “Connected Health”. The goals are straightforward and simple – higher quality, more accessible and cost effective Healthcare.

Connected Clinical Practice

Destination: Clinical Efficiency

Adopt Healthcare technology to realize “early value” benefits for physicians and patients.

Connected Communities

Destination: Shared Knowledge

Create a seamless access across the continuum of care for all clinical data and information.

Connected To Patients
Connected To Analytics

Destination: Care Transformation

Analyze clinical behavior, change that behavior, increase quality and access at a lower cost.

The 3 Keys to Connected Health

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There is a universal challenge faced by service providers, payers, and governments to manage increasing demands to keep citizens healthy, care for them when they are not, and do so within a framework of limited or declining resources. Connected Health solutions from Hitachi Data Systems and its partners can drive improvements critical to both societies and economies in the following areas.

1 Manage

Seamlessly manage data of all types and sizes with the simplicity of HCR- integrating relational data such as patient records, and unstructured data (e.g., x-rays, emails and patient notes.)

2 Enrich

Enrich data by combining asset data with actionable rich metadata from source, departmental and enterprise systems. Integrating and tagging asset data with third party data sources.

3 Insight

Gain actionable insights from enriched data. Enabling business insights, establishing data based evidence based medicine and research pathways to support and grow your business understanding.

Hitachi Clinical Respository

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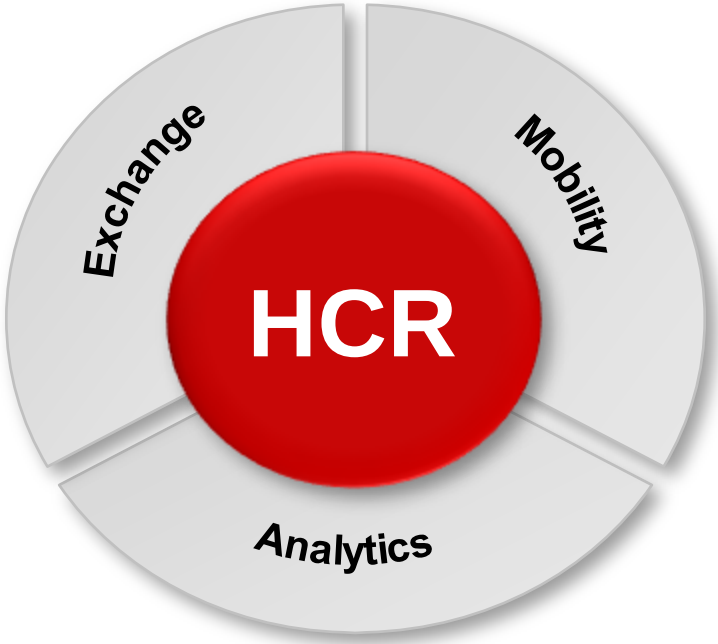
Clinical Data Exchange

The integration and aggreation of patient data from across the enterprise creating a unified view and access to ALL of a patients clincial data. Creating a connected Health enterprise.



Medical Data Mobility

The extension of clinical data sources across organizations, communities and patients enabeling seemless access to source trusted clinical data.

Clinical Data Analytics

The creation of analytical reports and tools that aid in decreasing risk, enhancing productivity and better serving patient outcomes all from source system data and in realtime.

HCR Technology Stack (Function)

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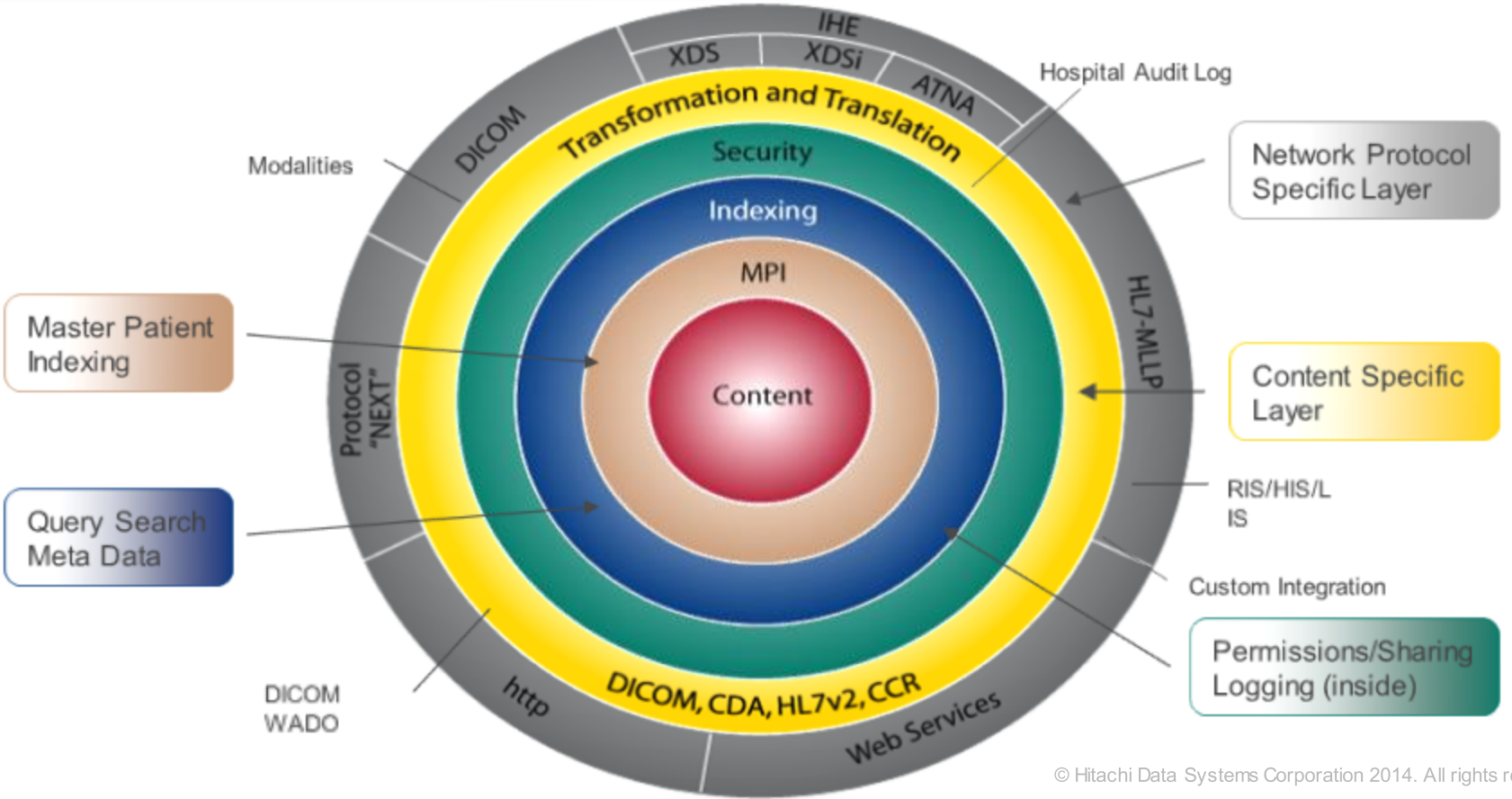

Big Data Impacts on Healthcare Worldwide

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1 Treatment Planning

Wide variations exist in use of health services, outcomes, and costs. Big Data opens the door to comparative effectiveness research to improve outcomes and lower costs.

2 Social Health Services Planning

Big Data provides the opportunity to uncover best practice patterns for delivery of community services in keeping with desired health and financial outcomes.

3 Waste & Fraud Detection

From identifying fraudulent claims to decreasing unneeded or inefficient services, Big Data can be used to improve the financial and operational outcomes of the delivery system.

4 Population Health Management

As care models shift from managing episodes of care to managing the health of populations, Big Data can help define best practices for managing specific populations

5 Surveillance & Health Management

Big Data may improve the ability to proactively monitor and manage the outbreak and spread of infectious disease at the community and global level.

6 Improved Medical Research

From the practical application of genomics, to the development of new drug and medical devices, Big Data has the potential to make development processes more agile and efficient.