



Lexmark<sup>TM</sup>  
Healthcare

# Some is not enough - Healthcare Content in Context

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With a background in healthcare informatics spanning 12 years. Dominic Kirkman was the Lead Solution Architect for the NHS England PACS and RIS Programme prior to working for Lexmark. Dominic is a great advocate of the adoption of standards and has supported the Integrating Healthcare Enterprise (IHE) as a Connectathon Monitor assuring vendors comply with standards.

# Presentation Overview

- What do I mean, Healthcare Content in Context.
- Could data visualization be different in the future.
- Enabling Innovation in Healthcare
- Lexmark's view of the challenges facing healthcare
- Enabling the EPJ.

# What do I mean, Healthcare Content in Context?

“Data” with meaningful meta data ... “A set of data that describes and gives information about other data.”



Clinical User Context



Patient context?

- Patient Name
- DOB
- Patient ID



Patient Context

Data context?

- Document Classification/Type
- Document Creation Date
- Originating Organisation/Department











David (8 month and 10 day)  
John (2 years and 3 month)

Mother: Teacher  
Father: Financial advisor  
Parents: Married

Last Anderson P

First David Boy

Birth 5 January 2009

Age: 8 month and 10 days

Patient nb: 3

#### Appointments

#### Forms

Meeting (Doctor)  
Full status (Doctor)  
Assistant  
Billing  
Reports  
Statistics

#### Sheets

O: Neurologic  
O: Vascular  
O: Cardiac  
O: Respiratory  
O: Abdomen  
Exams  
Radiology  
Summary  
Patient documents  
Letter

SOAP Sum. T  
R-V T, P, PC  
Admission Agenda

#### Meetings

Meeting	Date	Time
2 month checkup	5 Mar 09	2m.0d
1 month checkup	5 Feb 09	1m.0d
Respiration problem	22 Jan 09	17d
10 days checkup	13 Jan 09	8d
Control for return at home	9 Jan 09	-4d
Birth	5 Jan 09	0d

#### Diagnosis

General ☒  
My Diagnosis ☐  
Social ☐

#### New documents

- Abdomen palpat  
- 15 Sep 2009  
- Cardiac auscul  
- 15 Sep 2009

#### To Do

Send checkup

Assist: 1

Doc: 0

#### Notes

Father ask many questions, add 10 minutes to consultation

Current doctor: Dr Herman

Menu 1 Menu 2 Menu 3 Search

## Digestive

### Digestive inspection

Normal

### Digestive auscultation

Normal abdomen noises

### Digestive palpation

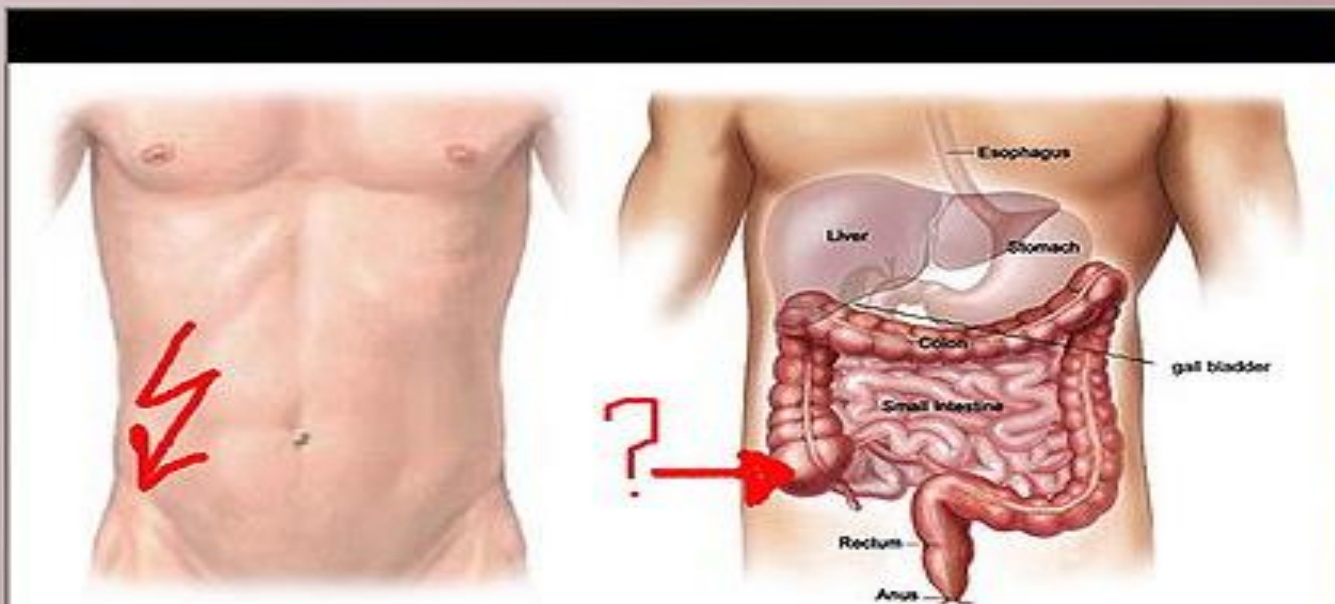
Little pain on the right lower area

Thursday, 22 Jan 2009

### Liver

No hepatomegaly.

### Rectal

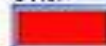


Page 1/1

Draw ☒

Mark ☐

Color



Pen

8

Documents  
manager



Previous page

Next page

# Could visualisation be different in the future?

## Visual refinements

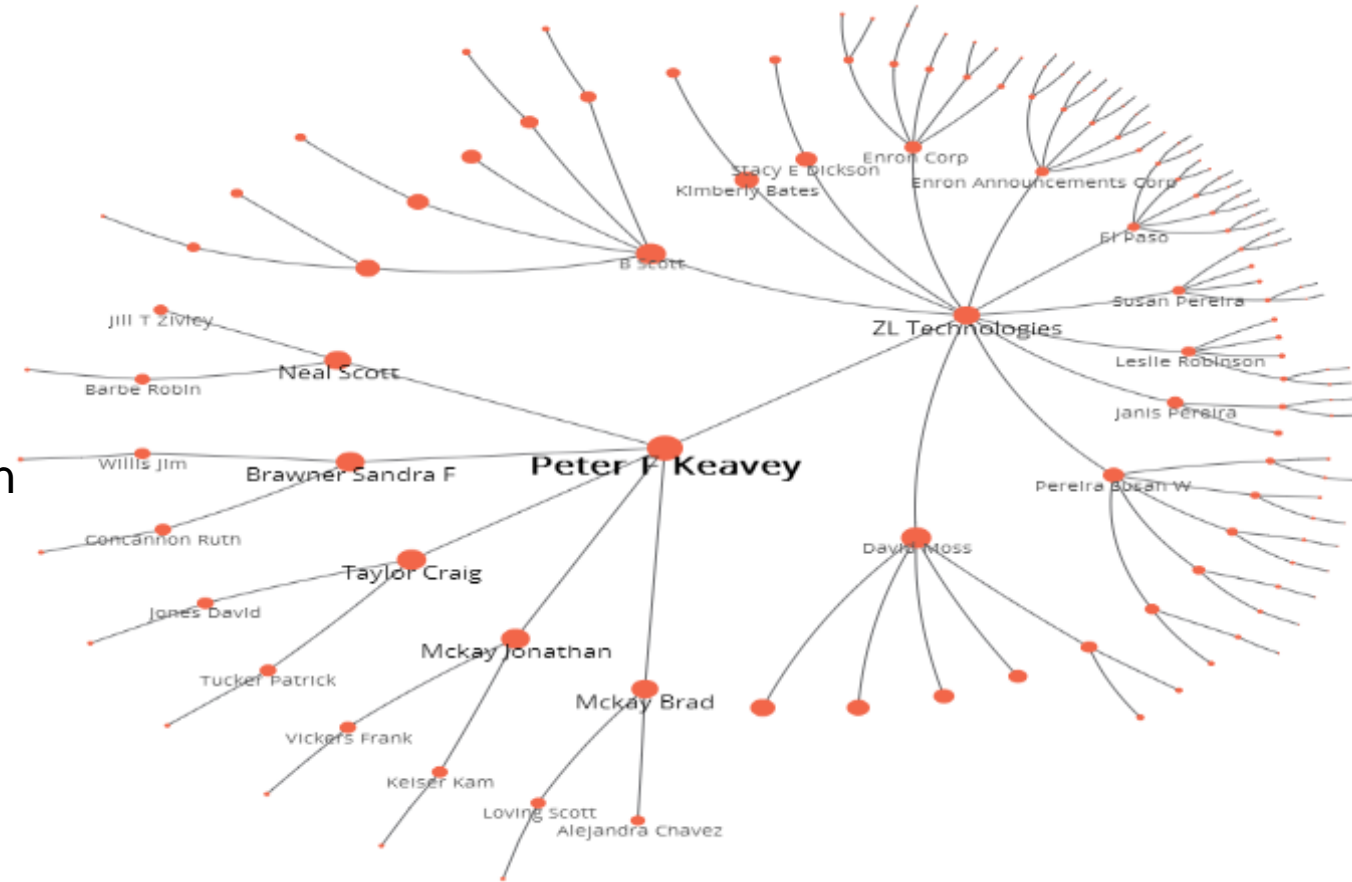
- Timeline
- Information maps

## Contextual refinements

- Faceted navigation with automatic categorization
- Categories/taxonomies
- Metadata
- Entities
- Stemming

## Precision results

- Results viewed based on cognitive style







David (8 month and 10 day)  
John (2 years and 3 month)

Mother: Teacher  
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Parents: Married

Last Anderson P

First David

Birth 5 January

: 8 month and 10 days

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Forms

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Current doctor:

# Digestive

Digestive inspection

Normal

Thursday, 22 Jan 2009

Liver

No hepatomegaly.

## DMS Content

Pretreive 4

Global 1



Patient: 31700536

Clinical Notes - Progress Note



6

New Documents Since Last Visit



3

Tasks



45

Documents from HIE



[View all](#)



Mother: Teacher  
Father: Financial advisor  
Parents: Married

Last	Anderson
First	David
Birth	5 January 1980

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Forms

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## Meetings

- month checkup
- month checkup
- expiration problem
- days checkup
- control for return at home

Diagnosis	
General	<input checked="" type="checkbox"/>
Diagnosis	<input type="checkbox"/>
ial	<input type="checkbox"/>

Notes
<p>her ask many questions, add sultation</p>

**Y** Current doctor

## Digestive

### Digestive inspection

Normal

## Thursday, 22 Jan 2009

**Liver**

No hepatomegaly.

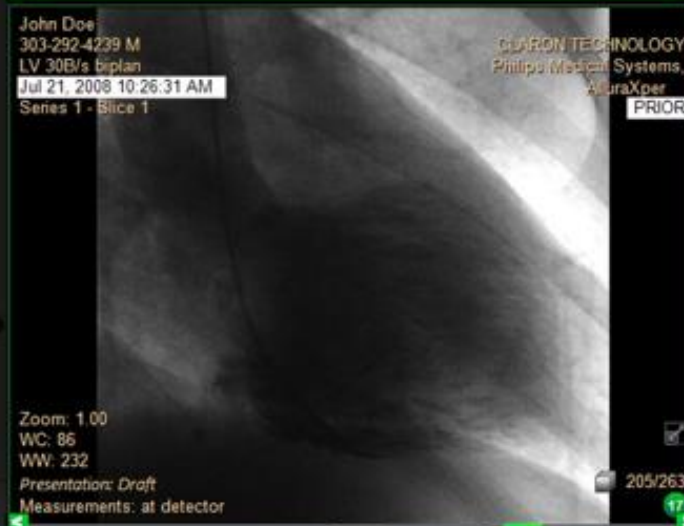
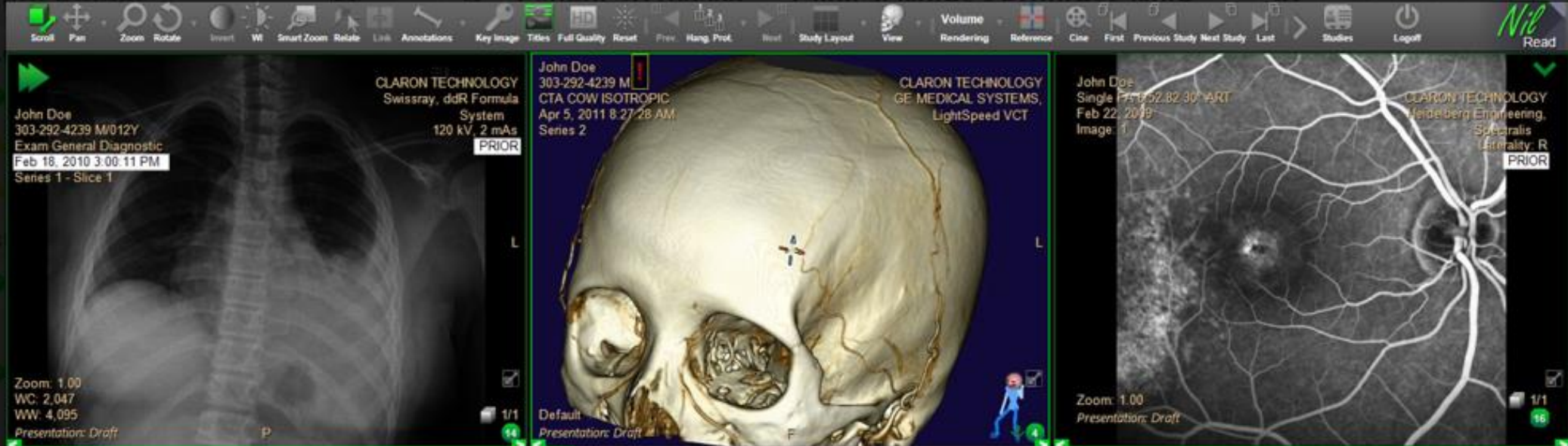
## DMS Content

Patient Education

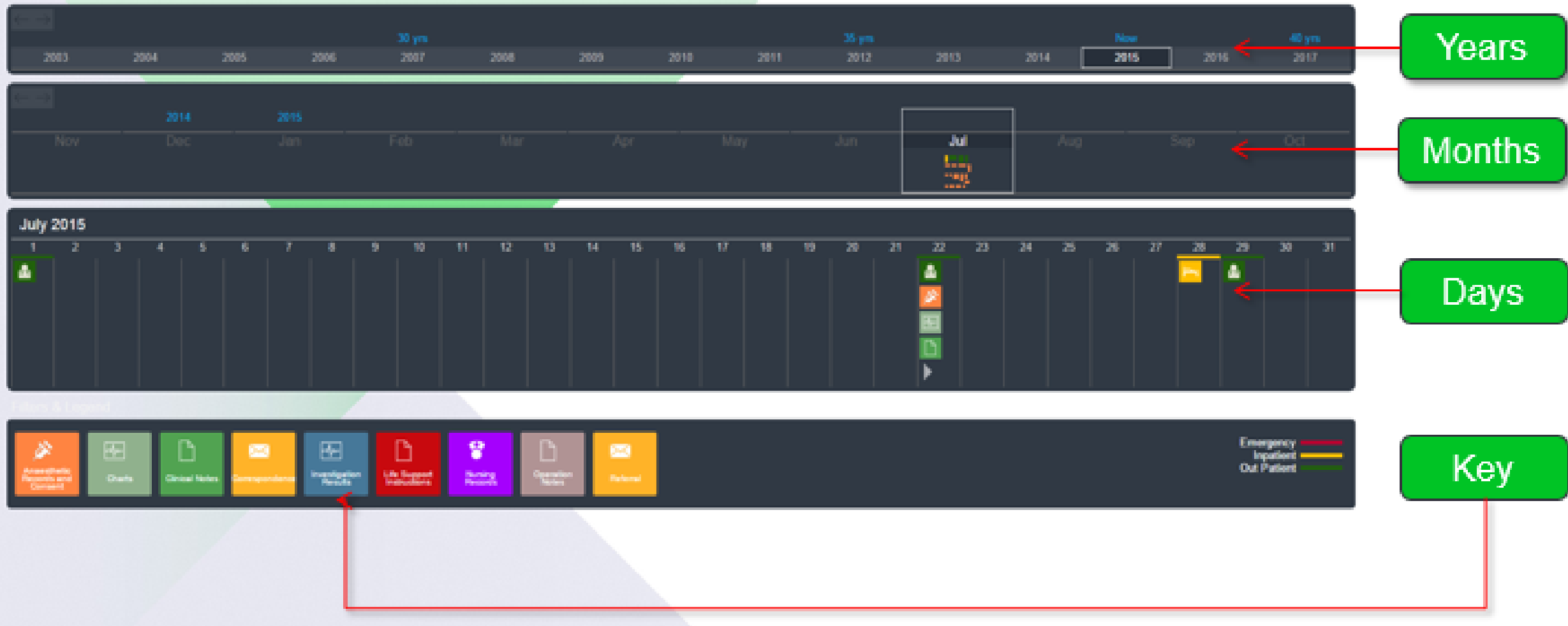
Patient 31700536

Clinical Notes - Progress Note

205

[illegible]

# Timelines





# Enabling Innovation?

What if data were open, accessible and standards based?



Dispatch centers publish open APIs.....Get the data you need in the format that best suits your needs. Choose from CSV, TSV, JSON, or XML.

# Look what is happening with standards in healthcare..

<http://wiki.hl7.org/index.php?title=FHIR>

Fast Healthcare Interoperability Resources (FHIR, pronounced "Fire") defines a set of "[Resources](#)" that represent granular clinical concepts. The resources can be managed in isolation, or aggregated into complex documents. Technically, FHIR is designed for the web; the resources are based on simple XML or JSON structures, with an http-based RESTful protocol where each resource has predictable URL. Where possible, open internet standards are used for data representation.

<http://www.ihe.net/>

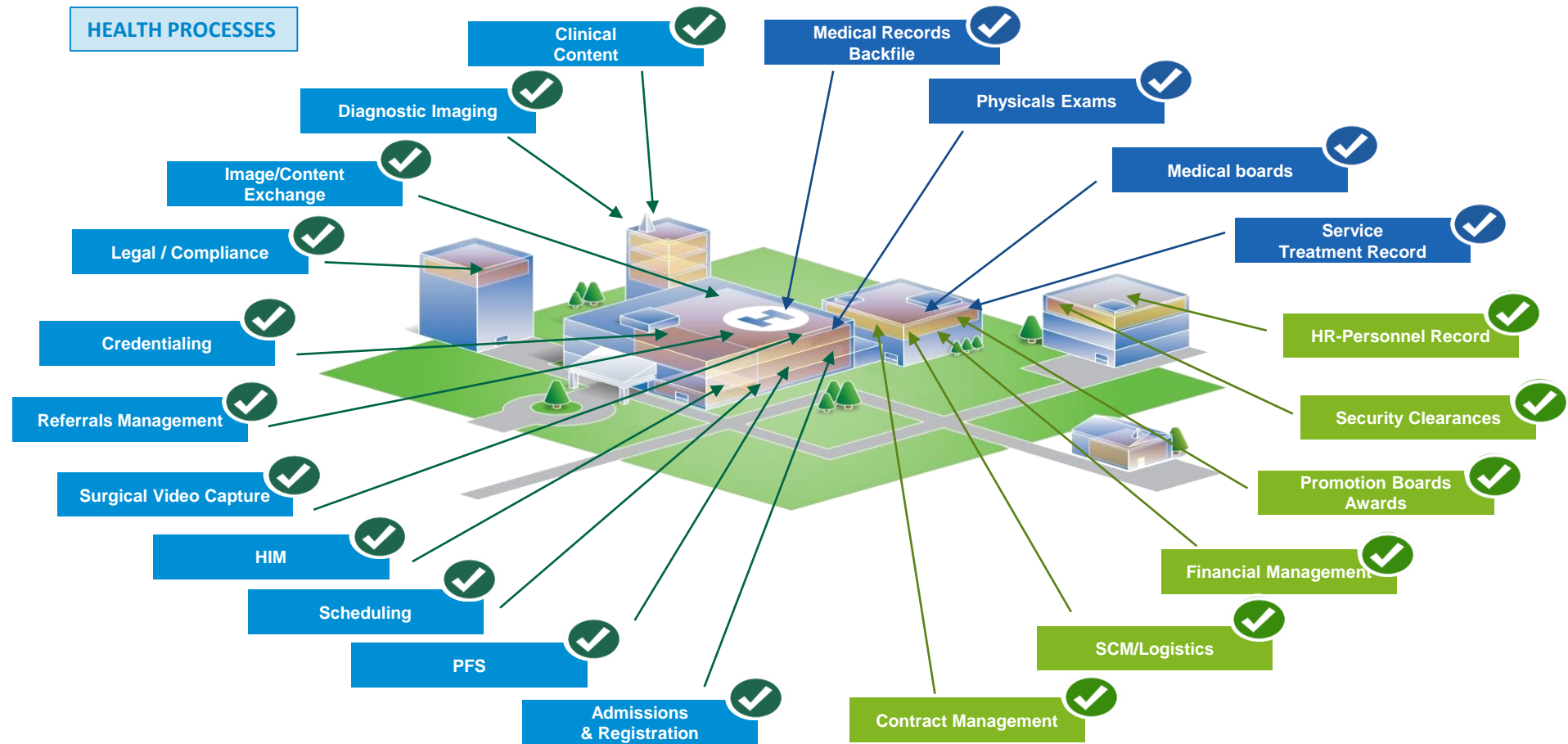
IHE is an initiative by healthcare professionals and industry to improve the way computer systems in healthcare share information. IHE promotes the coordinated use of established standards such as DICOM and HL7 to address specific clinical needs in support of optimal patient care. Systems developed in accordance with IHE communicate with one another better, are easier to implement, and enable care providers to use information more effectively.

XML, The MINT Leadership team is currently working as part of DICOM WG-27 to define RESTful DICOM standards that incorporate the benefits achieved by MINT into the DICOM standard. WADO-RS, QIDO-RS, and STOW-RS are the first three initiatives. These will all be incorporated as part of MINT 2.0

Healthcare Informatics can benefit from innovations taken from the rest of the IT world and resources, if our data is store in open and accessible formats...Say no to vendor lock in!

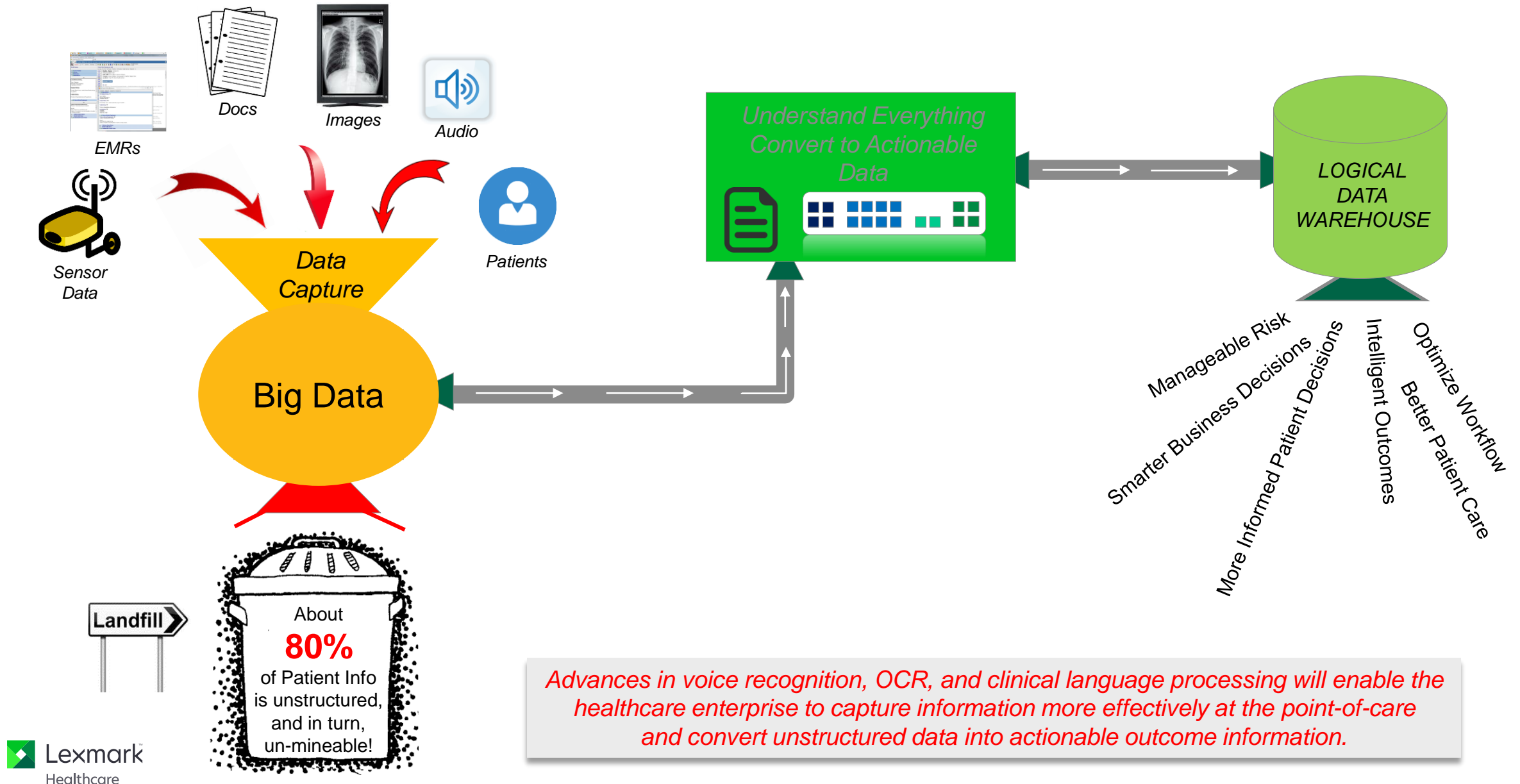


# All Healthcare Content in context....



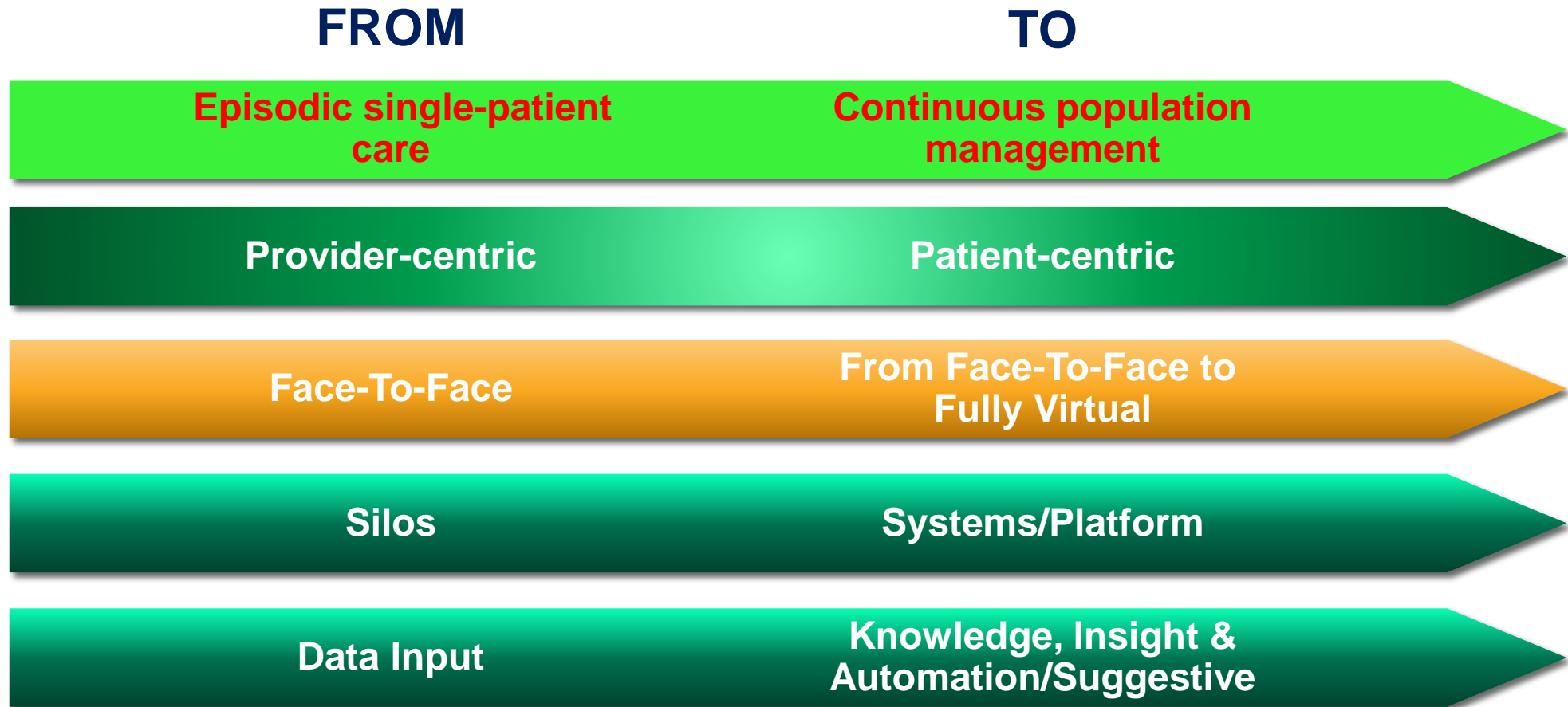
Back to the more immediate  
challenges Facing Healthcare!

# Healthcare's Data Conundrum

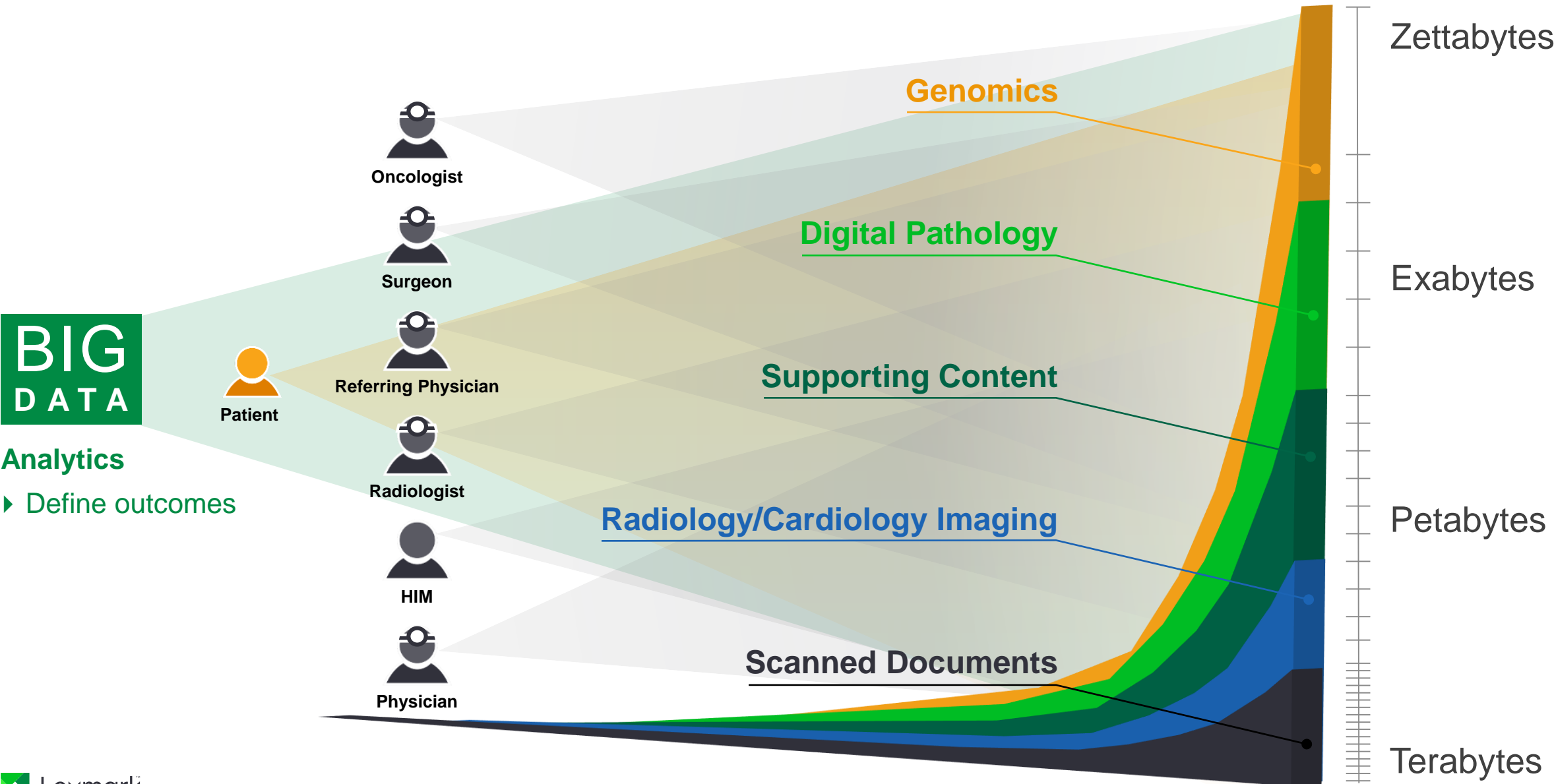




# Health IT Worldwide is in the Midst of a Major Shift...



# Industry Driver #1: Unprecedented demand for information



# Industry Driver #2: Redefining Departmental PACS, CPACS etc

The Separation of the PACS Components (IHE Actors) into Enterprise Imaging



## Viewing Component

- ▶ Diagnostic
- ▶ Clinical
- ▶ Specialized
  - Multiple sub specialties
- ▶ Zero Weight Technology
- ▶ Server Side Rendering
- ▶ 3D Core Design



## Workflow Component

- ▶ Modality worklist
- ▶ Physicians worklist
- ▶ Exam state
- ▶ Dictation
- ▶ Credentialing
- ▶ Physician load balancing
- ▶ Analytics
- ▶ Image Exchange/Sharing



## Archiving (Content Manager)

- ▶ Secure storage, distribution, routing, canonical data models
- ▶ Migrations, PID resolution,
- ▶ Data security, data preservation, data separation
- ▶ All content location services (DICOM and other content)
- ▶ Centralized ILM Console



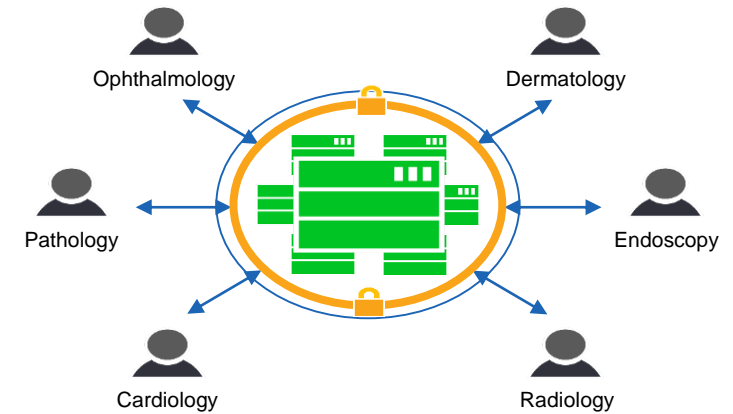
# The Journey to Healthcare in Context through the Vendor Neutral Archive

True VNA solutions logically centralize patient, clinical and business content into **one** standards-based location and assure interoperability.



## BEFORE

- ▶ Limited access for clinicians
- ▶ Departmental silos
- ▶ Access controlled by applications
- ▶ Vendor **lock** and **block**
- ▶ Migrations every 5, 8, and 15 years

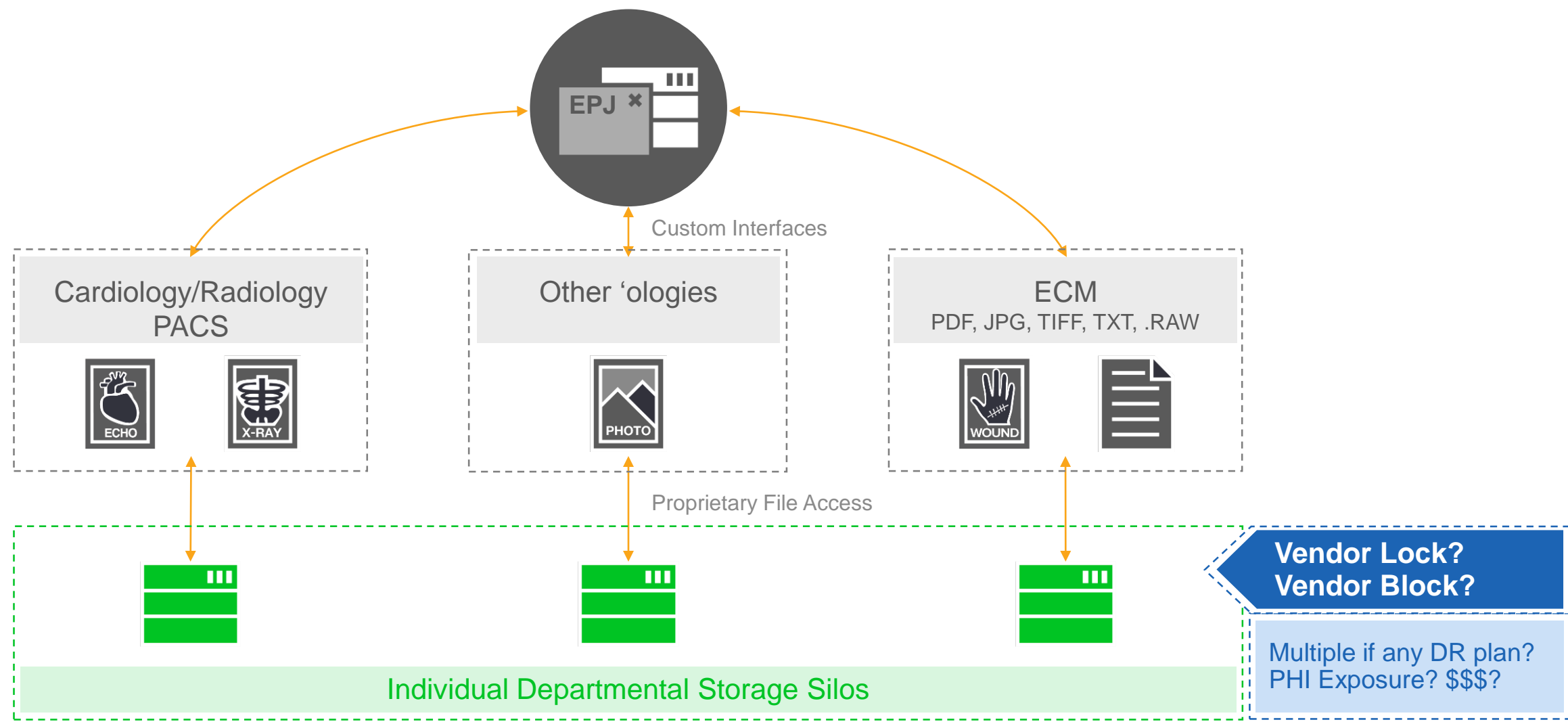


## AFTER

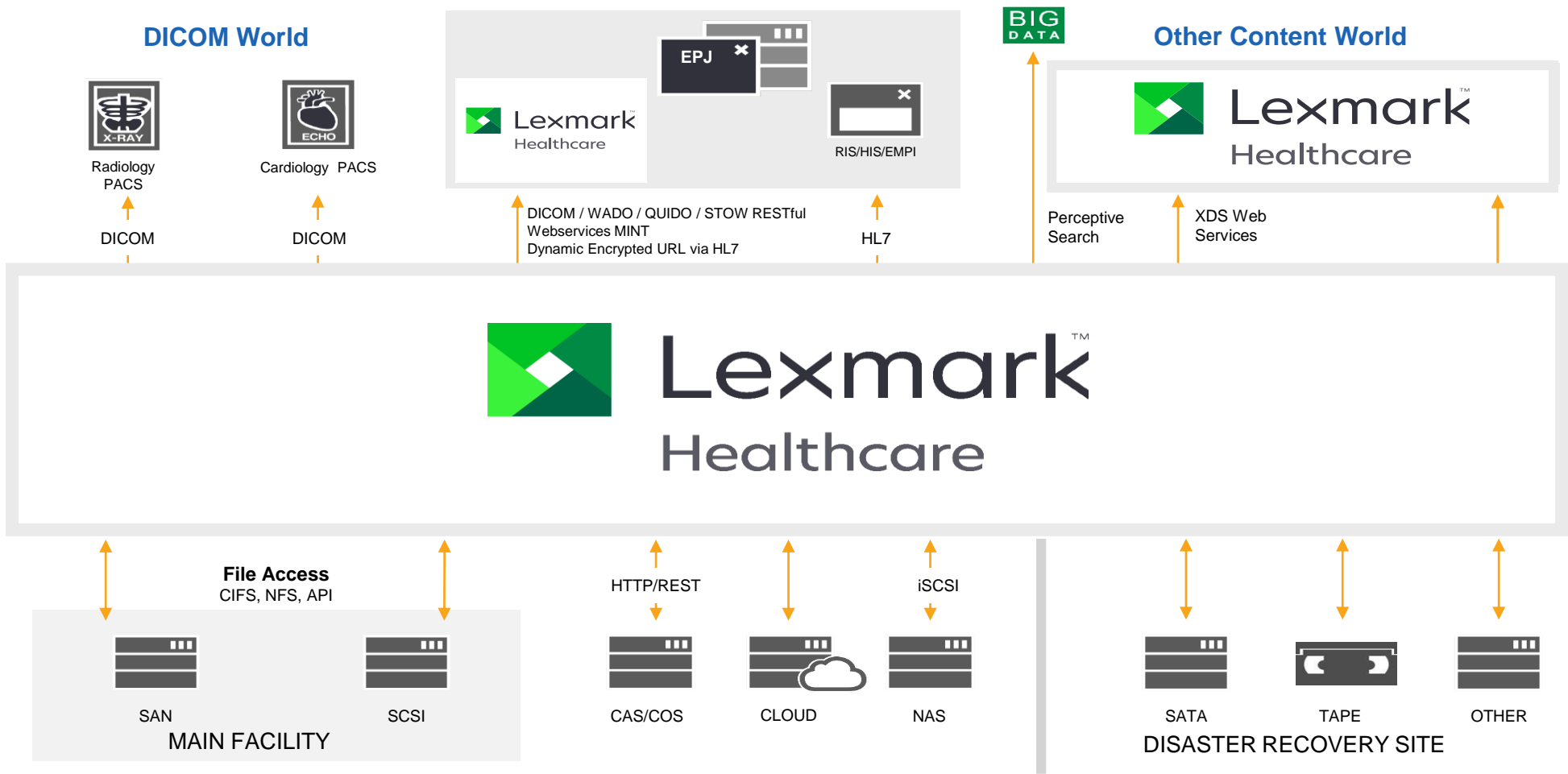
- ▶ Single point of access for clinicians
- ▶ EPJ integration for access control
- ▶ Consolidated storage focus
- ▶ Single DR plan, supporting a BC plan for multiple applications
- ▶ Simplified migrations with cost removal
  - Disk to disk
  - App to app
  - Data refresh
- ▶ **Added security limits PHI exposure**

# Today's Environment

Silos of vendor *locked* and *blocked* information



# Lexmark's Healthcare Content Management System



Thank You!

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