



**Driving Innovation
Through the Information
Infrastructure**

SPRING 2011

Taming Explosive Data Growth with Scale-Out NAS

Practical Examples from Healthcare & Life Sciences



Pete Brey

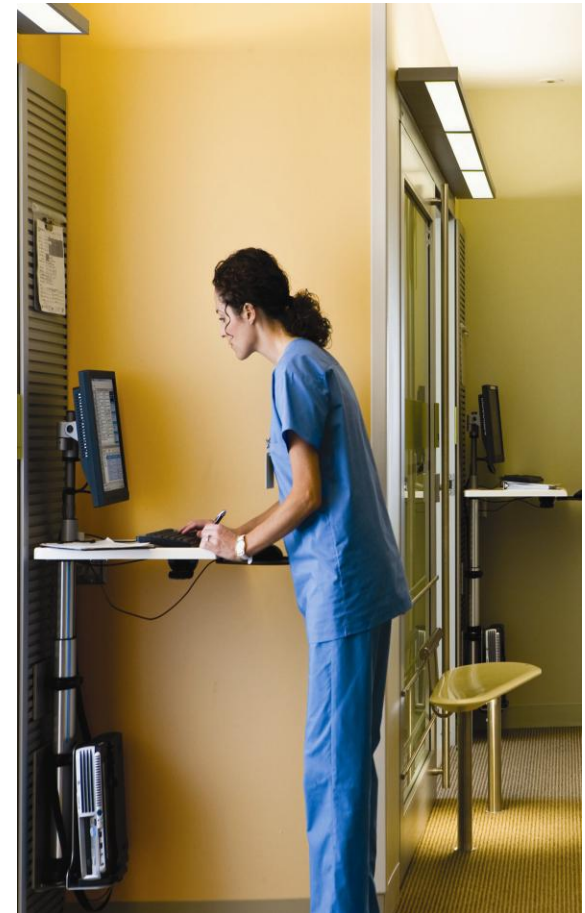
Worldwide Business Development Manager
Hewlett Packard Storage

Objective

Participants in this session will learn about key applications in the Healthcare and Life Sciences industries that are driving explosive data growth.

This session will examine key use cases and challenges doctors, researchers, and IT organizations deal with every day.

With this background, this session will explore common storage solutions which have been employed by the industry to deal with these challenges.





4-7 KM

The average walking distance of a nurse during a typical shift



19%

The average proportion of time a nurse spends on direct patient care on the active nursing part of a shift

Healthcare Quality Challenges

- Quality patient care is job #1
- Information accuracy and availability at heart of the issue (single source of truth)
- Doctors: Accuracy and availability of information
- Nurses: Seeking information, persons or assets, reduce productivity waste
- Information Management and Access: Healthcare lagging behind other industries

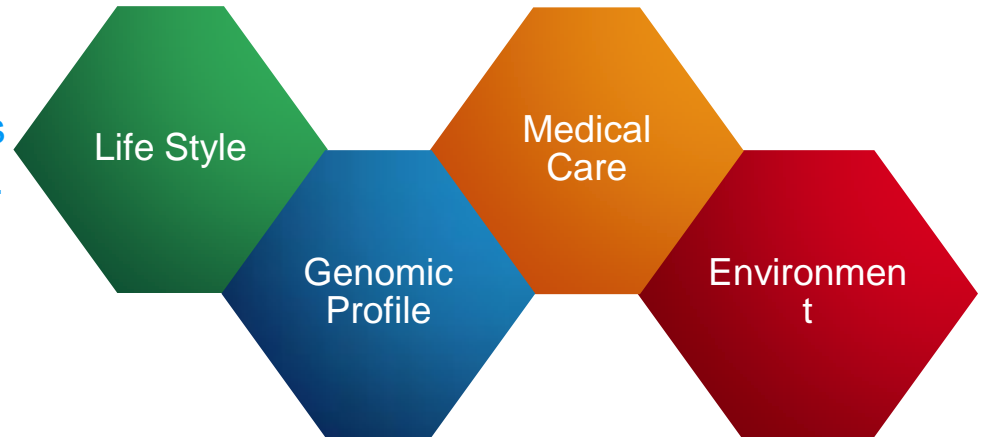
Unsafe Care	More than 150,000 deaths from medical injuries each year (Harvard)
Ineffective	Less than 50% compliance with reasonable guidelines (RAND Corporation)
Inappropriate	Greater than 30% variation in total costs by geographic area (Dartmouth)
Low Quality	U.S. not rated in the top 30 health care systems world-wide (Commonwealth)



Health & Life Sciences Industry Revolution

Data → Information → Insights → Empowerment

An individual's wellness is influenced by four factors...



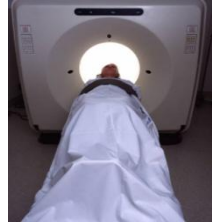
... driving innovation and collaboration across the value chain



- Convergence of science + technology + lifestyle
- ~~\$100K~~ ~~\$10K~~ \$1K personal genome
- "N=1" individual wellness and empowerment
- Consumers, not patients
- Technology expectations
- Accountable health management
- Regulatory environment; payment reform

Healthcare & Life Sciences Apps

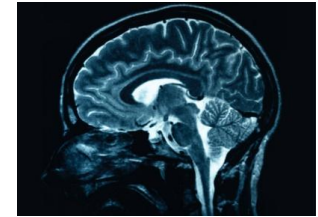
driving extreme data growth



Computerized Tomography



X-Ray



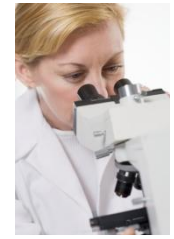
MRI



Mammography

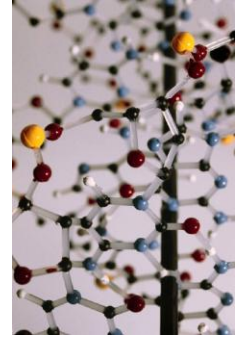


Pharmaceuticals

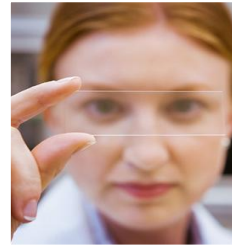


Cancer Research

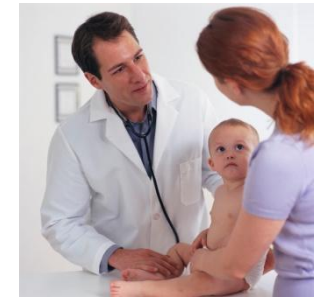
Genetic Engineering



Agriculture Engineering



Digital Pathology



Personalized Medicine

Anatomy of Healthcare & Life Sciences Storage

Primary sources of data growth:

1. Medical Imaging

Picture Archiving and Communication System (PACS)

Radiological Information System (RIS)

Diagnostic imaging from **modalities**

- Computerized Tomography (CT) Scan
- Magnetic Resonance Imaging (MRI)
- Nuclear Medicine
- etc...

2. Patient Records

Electronic Medical Records (EMR) - single site

Electronic Health Records (EHR) - multi-site

Healthcare Information Exchanges (HIE) – portable medical records

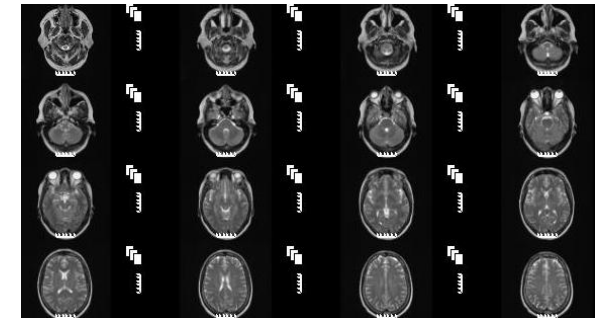
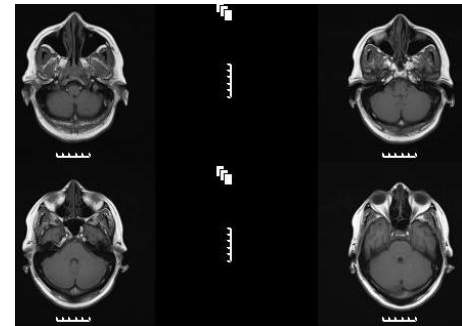
3. Genomic Research Data

DNA data produced by gene sequencers

High Performance Compute environments for analysis

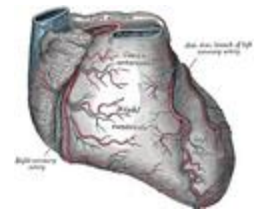
Typical Scenarios

Multidetector CT	Avg CT Exam Size
4 Slice CT	60 MB
16 Slice CT	250 MB
64+ Slice CT	900 MB



Heart Volume Visualization

1 TB



U.S. Regulatory Factors Driving Data Growth

1. HIPPA

(Health Insurance Portability and Accountability Act)

- Access control
- Data availability & retention



2. Hi Tech Act

- Stringent rules regarding privacy breach
- Encryption of in-flight and at-rest data

3. Meaningful Use

- Financial incentives available from government
- Defines objectives providers must meet for incentives

Typical Storage Challenges

Historical Challenges

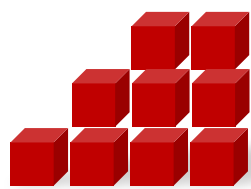


Runaway
Storage
Costs



Proprietary
Systems

Emerging Challenges



Scale

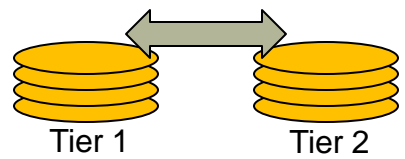


Availability

Typical Storage Solutions

Tiered Storage

High performance tier – short term cache
Archive tier – cost effective bulk storage



Encryption

In-flight
At-rest

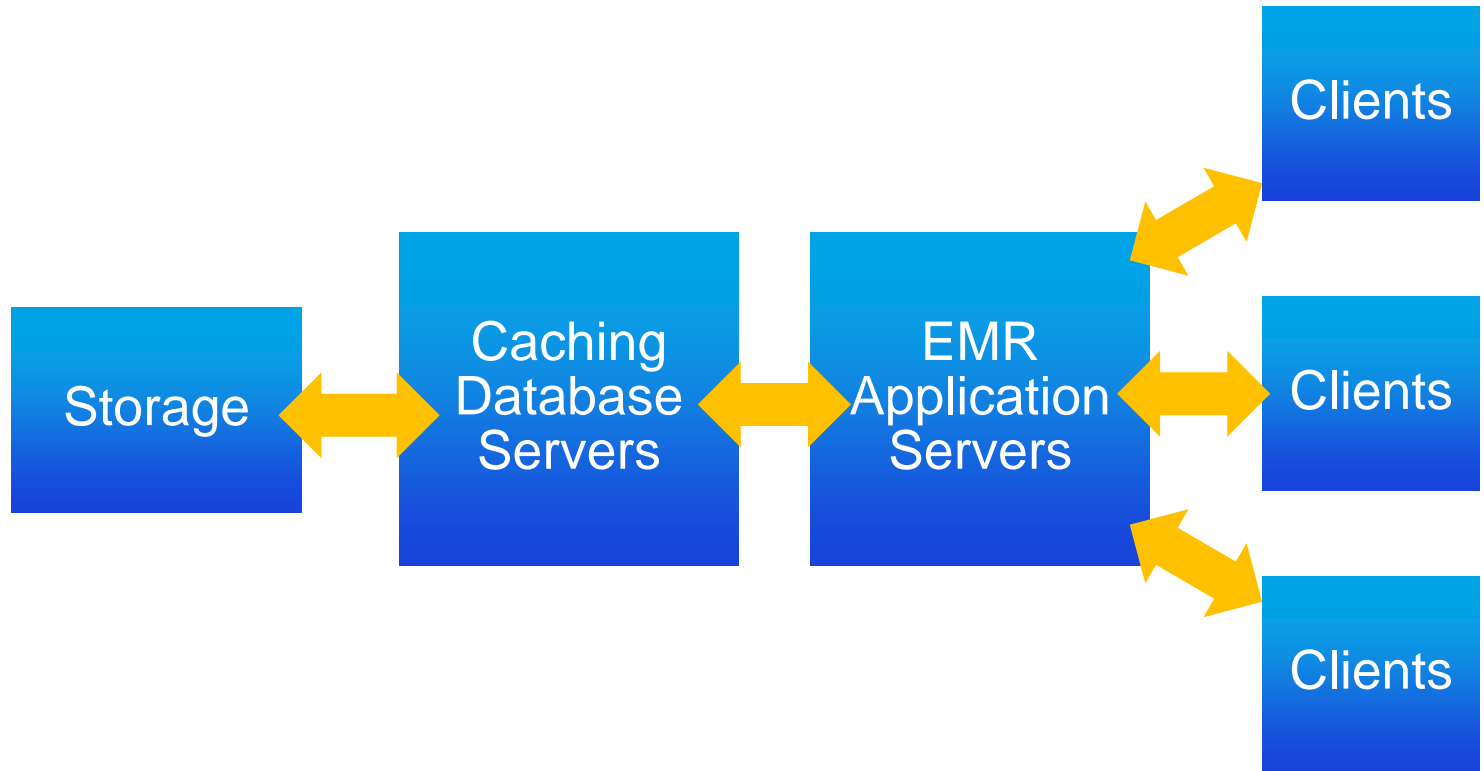


Cloud Storage

Collaboration
Archive solution

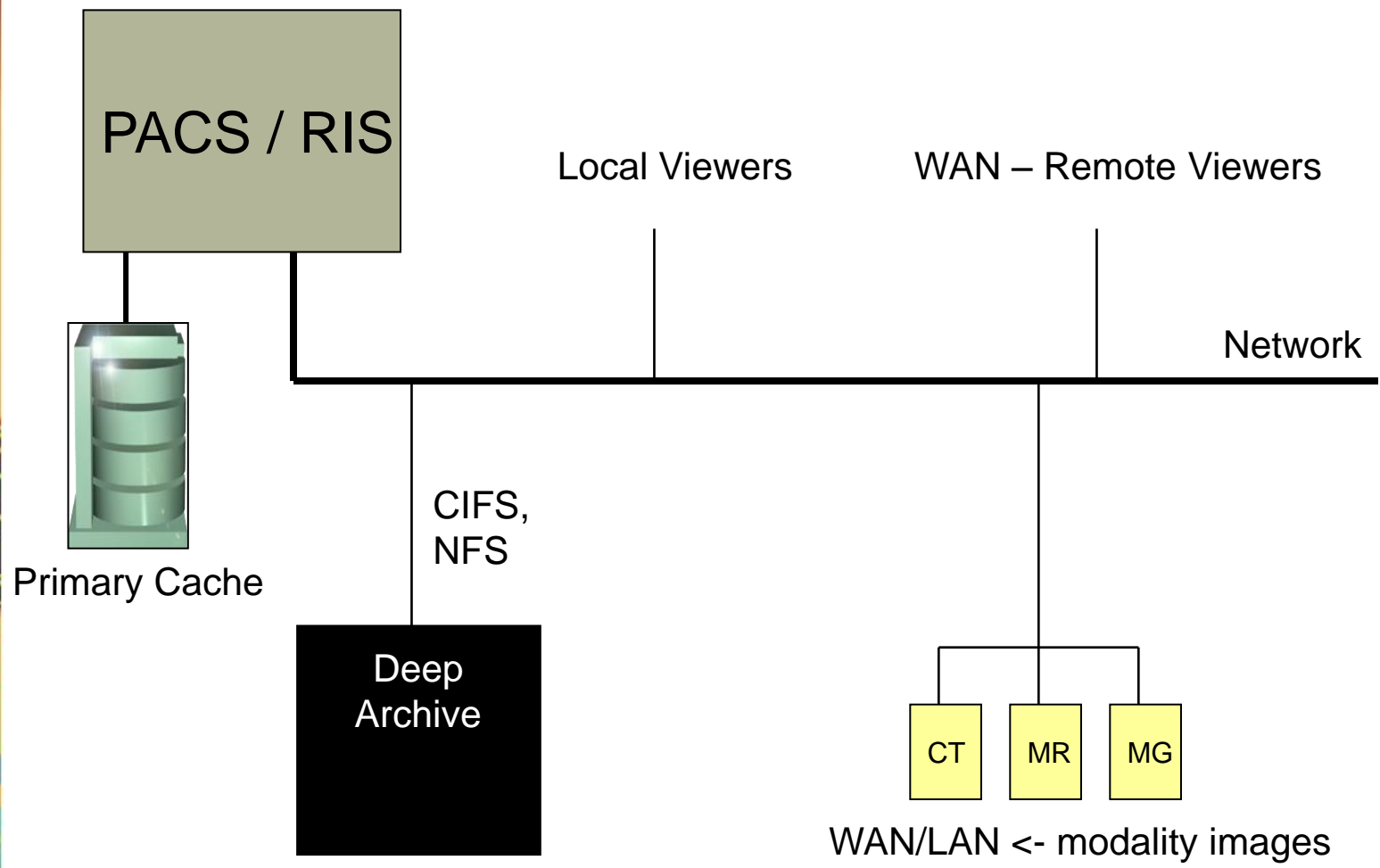
Healthcare applications

High Level Reference EMR Architecture



Healthcare applications

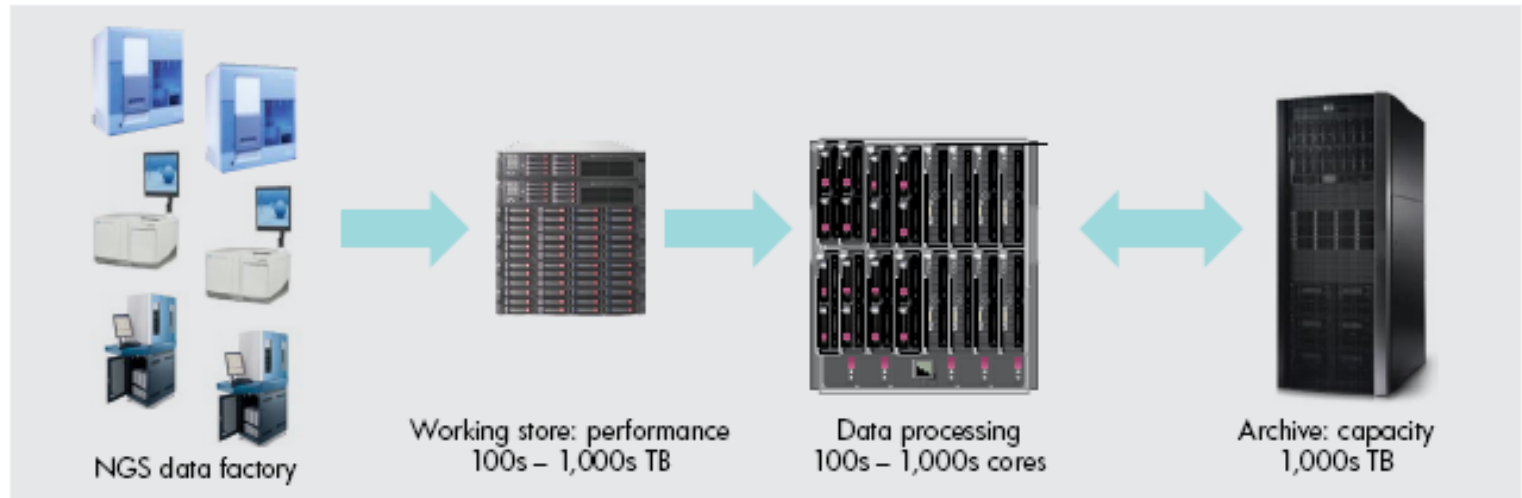
PACS High Level Reference Architecture



Scale Out Storage for Life Sciences

Optimize the storage and retention of data

High-throughput Sequencing Dataflow

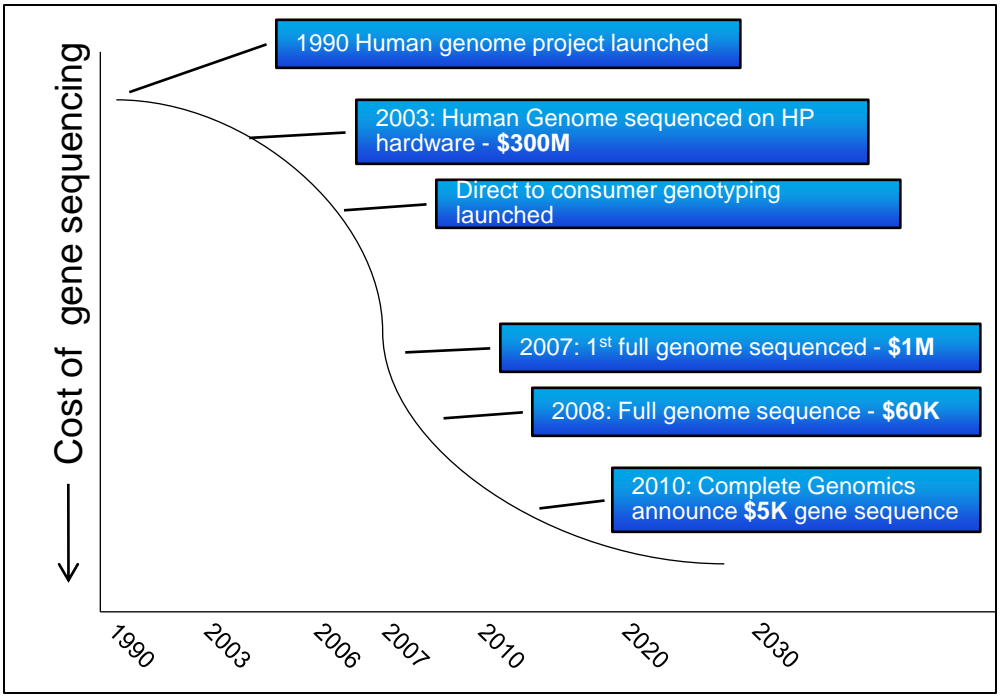


The \$1K Genome Opportunity

Entry point to personalized medicine

- A genome is the genetic material required for organism to function: chromosomes; genes; and DNA
- Genetic testing reveals important changes or alternations that may cause illness or disease

- **Diagnostic testing**
to confirm a diagnosis
- **Pre-symptomatic testing**
family history of genetic conditions
- **Carrier testing**
genetic disorders (e.g. sickle cell anemia or cystic fibrosis)
- **Prenatal testing**
detect abnormalities (e.g. spinal bifida and Down syndrome)
- **Newborn screening**
gene abnormalities that cause specific conditions, which if found early can be treated right away





The \$1KGenome Opportunity

Entry point to personalized medicine

Why is the \$1KGenomic test important?

Ignite broader adoption and application of a consumable service

Researchers	Enables ambitious genomic research to understand relationship between genes and disease
Consumers	Allows access to genetic self-knowledge about predisposition and risk for specific diseases
Healthcare	Personalized medicine based on genomics: predisposition, prognosis and response to treatment

Accelerating Strategy-in-action

Life Sciences Research



"We are applying our understanding of genetic expressions to a patient's propensity to respond to specific medications, which creates a direct link between the science and personalized treatment."
 -- Dr. Lynn Vogel, VP and CIO MD Anderson

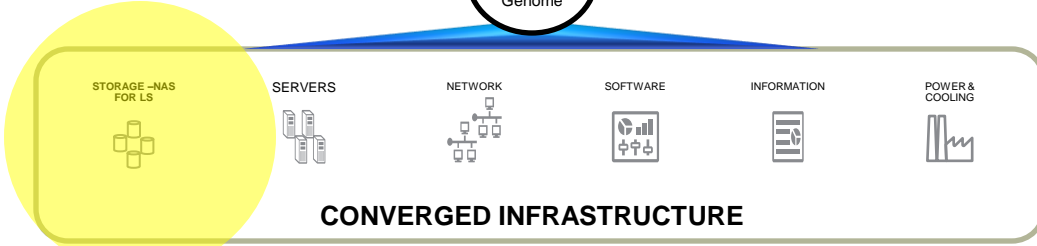
MD Anderson Cancer Center
 World leading cancer research center

Personalized Medicine



Partners Healthcare

Data Integration, Analytics, Reporting





Questions