IBM Grid Medical Archive Solution

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Agenda

• Healthcare Market – the growing need for Medical Imaging Data
• GMAS Overview
• Customer Examples
• Getting Started
Healthcare has two types of data requiring different strategies:

1. **Transactional Data**
   - **Application**
   - **Infrastructure**
   - **Data Store (DB)**
   - Database Records
     - Patient Medical record & demographic data

2. **Fixed Content Data**
   - **Application**
   - **Infrastructure**
   - **Data Store (Files)**
   - Files
     - Medical Images, Audio files, Video files
Medical Imaging – yesterday

- Most images were simple x-rays
- Radiology departments relied on film and paper reports
- Loss of images could be up to 25%
- Communication of images between hospitals was limited

Then came new modalities (imaging devices)....
Medical Imaging Modalities

- X-ray
- Ultrasound
- Computed Tomography (CT)
- Cath Lab
- MRI
- Mammography
Medical Imaging – today

- Large increase of fixed content data volumes
  30 PB in 2003 to 192 PB by 2006 (CAGR 86%)*

- Increasing number of hospitals have PACS
  (Picture Archiving and Communication Systems)

- The digitization has been driven by radiology departments or government health programs

- The data volume per procedure is growing:
  - 2D x-Ray (CR/DR) ~30MB/exam
  - 2D Mammogram ~120MB/exam
  - 3D MRI >150MB/Exam
  - 3D CT series of 500 slices >1 GB/ exam

- ....and it has to be stored for 30 years or more

The rapid growth of fixed content healthcare data is a strategic issue

**Cardiology**
- Average file size: 40mb
- Growing demand
- $2.4B in Modalities in 2006

**Pathology**
- In next 5 years – massive driver for storage in hospitals

**Other Healthcare Applications**
- HIS, RIS
- Forms Automation
- Document Imaging
- Dictation/Annotations
- Media files
- Research (e.g. microscopy)

**Radiology**
- Average file size: 40mb
- Small Hospital: 50,000+ Studies
- Large Hospital: >500,000

**Cardiology**
- Average file size: 500mb
- Growing demand

**Pathology**
- Average file size: 40mb
- Small Hospital: 50,000+ Studies
- Large Hospital: >500,000
Healthcare Value of Medical Imaging

- **Clinical benefits of new digital imaging technology**
  - 64 slice CT scanners are becoming common – faster/better diagnosis
  - Functional MRI – show brain structure *and* brain activity
  - Molecular imaging using high powered MRI
  - PET/CT – Used in cancer diagnosis and therapy

- **Research & Development benefits of digital imaging technology**
  - PET/CT and SPECT can assist the drug development process
  - Combining phenotypic, genotypic and imaging information into one comprehensive patient view
GMAS Overview
IBM’s Grid Medical Archive Solution (GMAS) is a multi-site, multi-tier, multi-application fixed content enterprise storage virtualization platform.
GMAS Storage Virtualization

**Before GMAS**

- App 1
- App 2
- App 3
- App 4
- ... App 10

**Location 1**

**Location 2**

**Loc 3**

**After GMAS**

- App 1
- App 2
- App 3
- App 4
- ... App 10

**GMAS Solution**

**“Siloed” architecture:**
- Unable to share resources across applications
- Requires application downtime for maintenance
- Manual administration, upgrades & conversions
- Inherently vulnerable to storage failures

**“Virtualized” infrastructure:**
- Collapses silos into a single shareable storage pool across applications
- Enables maintenance, support & data conversion without application downtime
- Enables automated upgrades & data conversions
- No single point of failure
GMAS Architecture

Application Layer

- **AdminNODE**: System x node
- **GatewayNODEs**: System x node
- **ControlNODEs**: System x node
- **ArchiveNODEs**: System x node + Tivoli
- **StorageNODEs**: System x node

Communication:
- **HTTP**
- **TCP/IP**

Storage Media:
- **Archival Media**
- **Spinning Media**
Overall GMAS Business Benefits

- **Enhanced Application Performance**
  - Timely access to data across sites & storage tiers

- **Real Time Business Continuity and Lifetime Data Protection**
  - Protection from data loss & application downtime

- **Easy Extensibility and Scalability**
  - Across all medical disciplines, applications and locations

- **No Vendor Lock-in**
  - Supports all storage manufacturers

- **Decreased Total Cost of Ownership:**
  - Improved storage utilization
  - Consolidated storage infrastructure
  - Optimized price performance beyond acquisition
  - Lights out administration
Customer Examples
UHCS Augusta

Challenge:

- Address the exponential growth of Cardiology imaging and other fixed content data
- Establish an enterprise-wide storage layer to increase flexibility and eliminate vendor lock-in
- Leverage rather than eliminate existing investments and technologies in storage infrastructure
- Cost effectively establish baseline technologies for image sharing across the enterprise & the region as a whole

Solution:

- IBM’s Grid Medical Archive Solution (GMAS):
  - Single bundled offering including Software, Hardware, Services and Support
  - Built on IBM DS4100 Storage, System x Intel Servers and Bycast software
  - Leverages existing EMC storage investment
  - Easily expandable to 2nd location for off-site replication

Business Benefits

- Elimination of hardware vendor ‘lock-in’
- Inherent real time business continuity / disaster recovery
- Improved application resiliency
- Leveraging of existing storage investments
- Improved ease of expansion to new clinical sites
- Cost effective entry point & improved TCO

“We were looking for a storage platform that would improve organizational flexibility, reduce administration and optimize our storage utilization. IBM’s GMAS solution provided us the best combination at a competitive price.

William Colbert, Vice President/CIO, University Hospital
Generations+

**Challenge:**
- Enable secure sharing of images across 3 distributed major NYC hospitals
- Improve enterprise wide storage utilization and Philips Medical’s PACS system resiliency and uptime
- Establish a real time disaster recovery strategy for medical images

**Solution:**
- Deploy IBM’s Grid Medical Archive Solution to link together Philips PACS across all 3 hospital sites and deliver storage virtualization and increased utilization across a wide area network. The project includes the following technologies:
  - IBM’s Grid Medical Archive Solution
  - Philips EasyAccess PACS
  - IBM System x Intel servers, IBM Storage and Bycast software

**Business Benefits**
- *Real time disaster recovery with automatic fail over*
- *Improved PACS application resiliency, uptime and scalability*
- *Decreased hardware obsolescence*
- *Improved storage utilization across all sites*
- *Easier storage upgrades*

*60 TB Multi Facility Solution deployed in less than 30 days*
Provincial Health Services Authority

**Challenge:**
- Delivering Cancer and Pediatric care for Province of British Columbia (Pop. 4M)
- Seamless access to images across Province
- Integrate with existing multi-vendor PACS
- Geographically dispersed facilities

**Solution:**
- Provincial grid in production since 2002
- Links 40+ hospitals with 1,500+ users
- 60TB at 5 Data Centers, distributed DR
- Less than 1 FTE to operate and maintain
- Stentor, Agfa, GE, McKesson, Siemens, …

**Solution Business Benefits**
- Timely access to patient data
- Reduction of avoidable medical procedures
- Increased resiliency and uptime
- Images accessible via EHR
- Enhanced clinical collaboration

*In full production for over three years with no downtime*
Getting Started
GMAS Entry Edition

- **What it is:**
  - Grid Medical Archive Solution made easy
  - Pre-built, Pre-priced solution. Includes all hardware, software, services.

- **Provides NFS/CIFS interface**
  - Industry Standard Open Access – NAS-like interface
  - Utilize NFS or CIFS to store and retrieve Medical data

- **Provides “protected” storage**
  - All data is on RAIDed disk and replicated between Nodes
  - Digital Signature & Non-erasable, Non-rewriteable
  - Self-healing capabilities

- **Provides redundant “control” function**
  - Redundant control, replicated between GMAS Nodes
  - Complete redundancy, no single point of failure
  - Redundant components at LAN/WAN connected sites
What is the first step? Document data & storage requirements, estimate 3-5 year TCO and deliver a pilot project …

Working production pilots average 3 to 5 weeks to deploy
GMAS Summary

- GMAS is an IBM strategic storage grid solution for multi-site hospitals. GMAS Entry Edition is a storage solution for single-site hospitals.

- GMAS can also be used as a storage grid solution for ALL Fixed Content Data such as lab results, doctor notes, audio files, video files, email, etc.

- IBM has a complete Virtualization strategy that includes server virtualization, storage virtualization and virtualization management software.