

Advanced technologies for breakthrough applications



Core Technology Update

Vik Nagjee
Friday, June 3, 2011

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Welcome




- High Availability & Disaster Recovery
- Cloud Computing
- Virtualization

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**HIGH AVAILABILITY &
DISASTER RECOVERY**

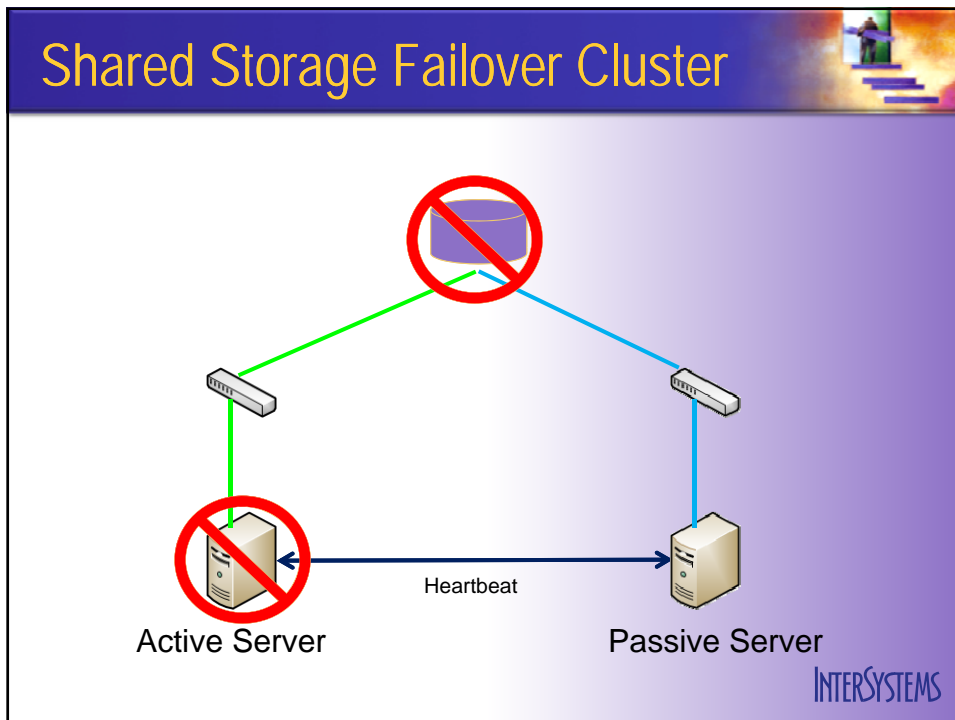
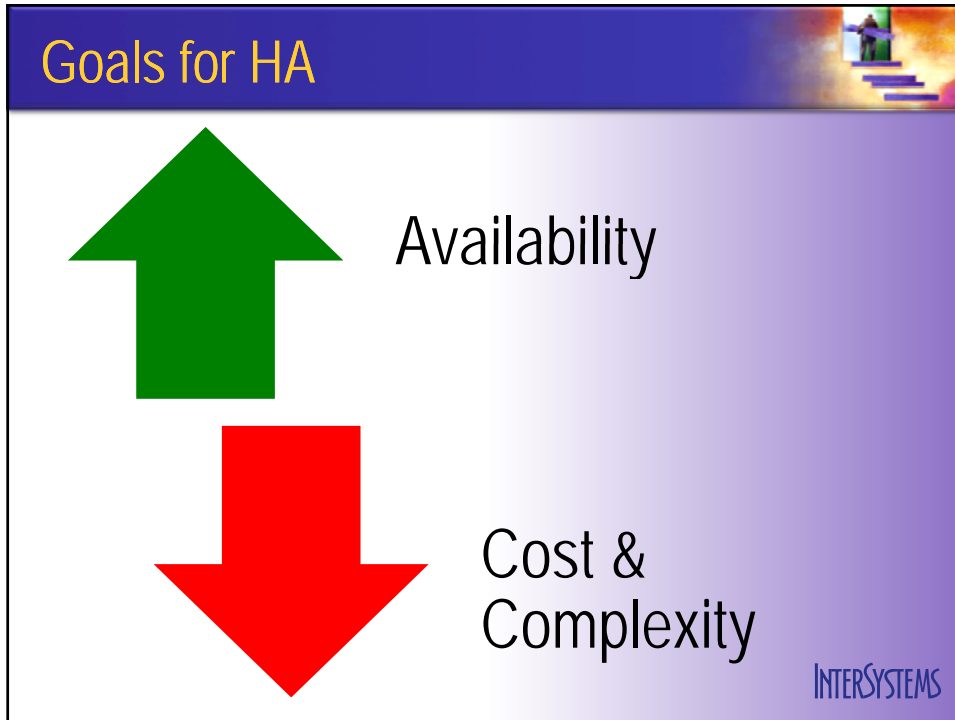
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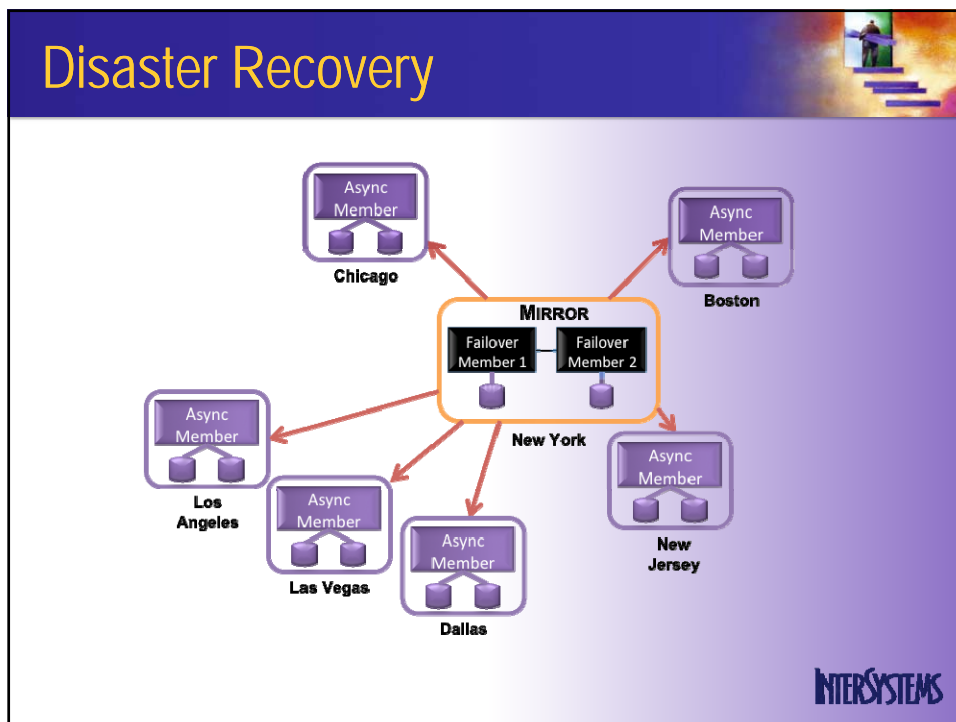
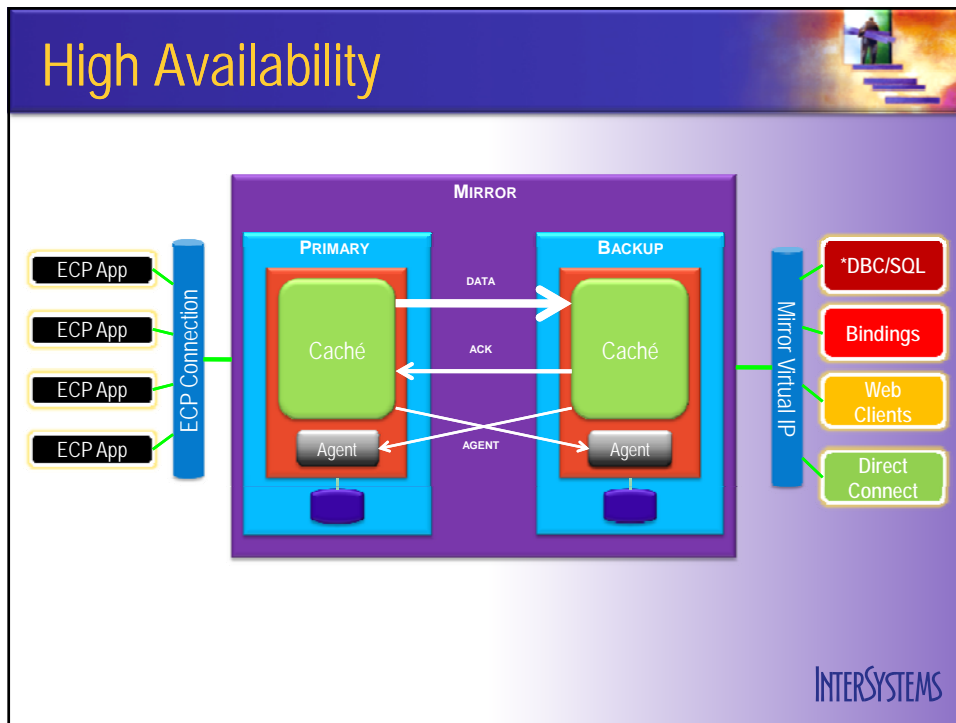


Caché Database Mirroring

Mirroring Demo
MIRRORING DEMO

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Rapid Automated Failover



- Failover process
 - Primary Member fails
 - Backup Member takes over
 - ECP clients pause then resume
 - External applications reconnect
- Seamless Fail back
- Takes seconds instead of minutes

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Minimum Downtime Releases



Most Caché updates can be done
"In Place"
with little or no downtime!

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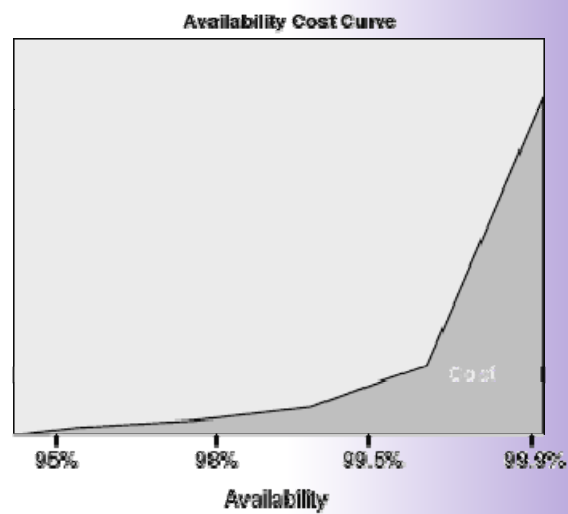
Downtime Cost Examples

Estimated downtime costs (per hour)

- \$42,000 – Gartner
- \$72,000 – Healthcare
- \$6,000,000 -- Global Investment Bank
- \$7,200,000 – PayPal

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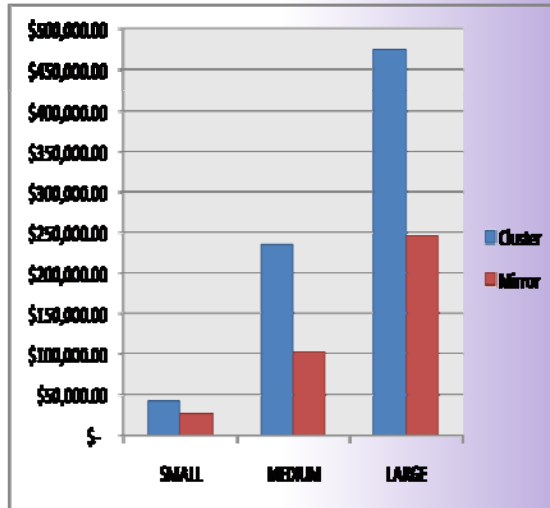
Cost of Availability



Source: Gartner Research

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Cost Savings – Hardware/Software



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Summary



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HA References

<http://www.intersystems.com/ha>

The screenshot shows the InterSystems website header with the logo and tagline "Advanced technologies for breakthrough applications". The navigation menu includes "About Us", "Products", "Industries", "Case Studies", "Developers", "Partners", "Support & Education", and "Communities". A search bar is present. The main content area features a sidebar for "High Availability" with links to "High Availability & Disaster Recovery", "Database Mirroring", "Mirroring FAQ", "For Executives", "For Technology Architects", and "Enterprise Cache Protocol". The main article is titled "Database Mirroring Reduces Costs" and contains the following text:

For over three decades, applications built on InterSystems technologies have used less hardware and required less administration and less maintenance. Database Mirroring extends that ethos to High Availability (HA). Achieve the highest levels of database availability at lower cost and with a simpler-to-manage infrastructure.

The cost of system downtime can range from thousands to millions of dollars, depending on the type and length of outage and the type of system impacted. Availability is critical for economic success, and it is the goal of most organizations to provide maximum availability with minimum downtime, both planned (such as scheduled maintenance) and unplanned (such as software or hardware failure).

To highlight the potential savings, we compared three typical production configurations for a web-based hospital in both clustered and mirrored deployments.
[Learn more ->](#)

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HA References (cont.)

InterSystems HA Guide (product documentation)

The screenshot shows the InterSystems logo and the title "Caché System Administration Guide Achieving High Availability". The navigation path is: Home | Management Portal | Index <> [Documentation] > [System Administration] > [System Administration Guide] > [Achieving High Availability].

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Customers Live (Mirroring)



- MFS
 - Oldest Mutual Fund Company
 - ~30 Portfolio Managers
 - ~\$35 Billion in Transactions
- Indian Health Services: Winslow
 - ~17,000 patients (Native Americans: Navajo Tribe)
 - Inpatient and Outpatient care (24x7x365)
- NEWTEC
 - ERP System (Warehousing, ERP, E-commerce, etc)
 - 2 sites live: CONNEX Handelsgesellschaft & EUROPART
- Kettering Health Network
 - 50 facilities, 1,300+ beds
 - 500,000+ messages/day

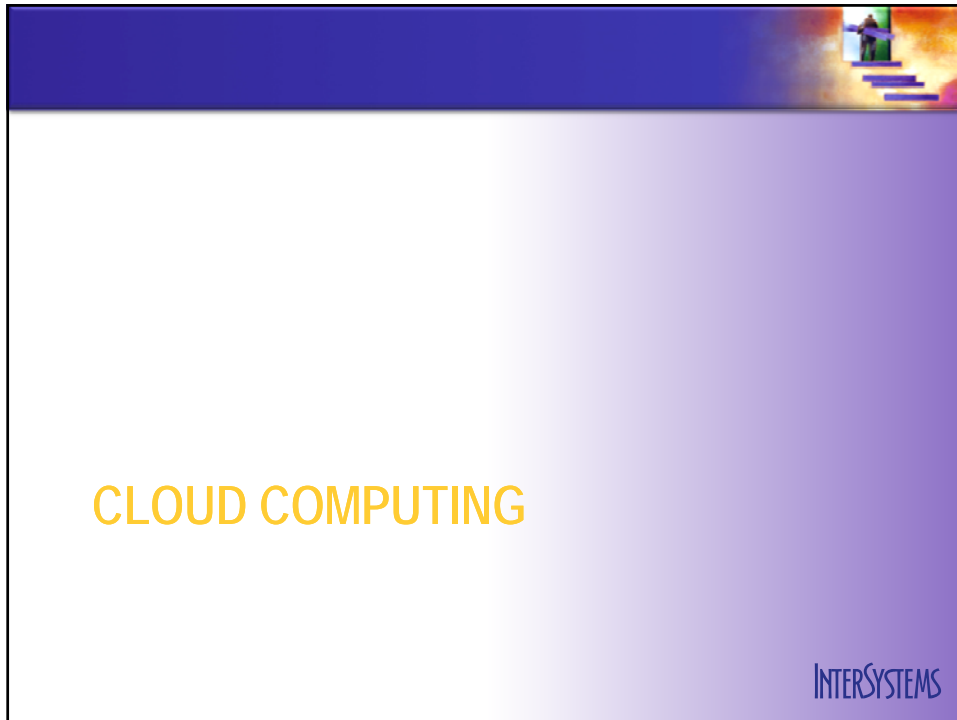
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Customers Planning (Mirroring)



- | | |
|--------------------------------------|----------------------------------|
| • TrakCare | • Netsmart: LA County |
| • Indian Health Services:
Choctaw | • The Veterans
Administration |
| • Indian Health Services:
Phoenix | • MyLab |
| • LKQ | • Ipiranga |
| • Spectrum Health | • PetroBras |
| | • Others... |

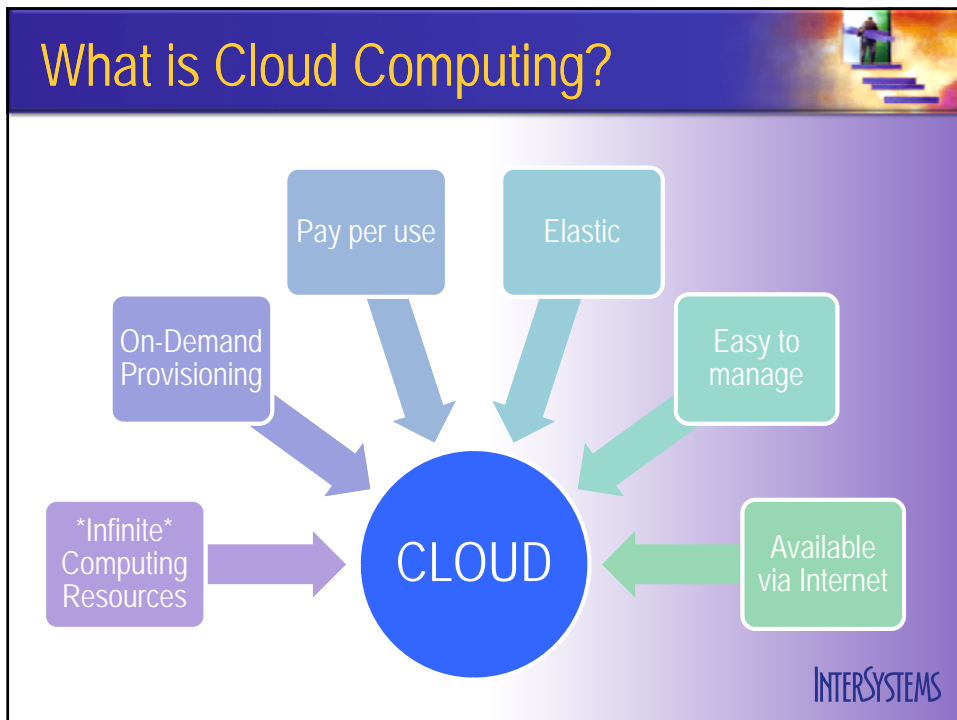
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A presentation slide with a dark blue header and a purple-to-white gradient background. The text "CLOUD COMPUTING" is centered in a bold, orange font. In the top right corner, there is a small image of a person standing on a set of stairs. The "INTERSYSTEMS" logo is in the bottom right corner.

CLOUD COMPUTING

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A presentation slide titled "What is Cloud Computing?" with a dark blue header and a purple-to-white gradient background. The title is in orange text. A central blue circle labeled "CLOUD" is surrounded by six colored boxes with arrows pointing towards it: "Pay per use" (blue), "Elastic" (teal), "Easy to manage" (light green), "Available via Internet" (green), "*Infinite* Computing Resources" (purple), and "On-Demand Provisioning" (dark blue). In the top right corner, there is a small image of a person standing on a set of stairs. The "INTERSYSTEMS" logo is in the bottom right corner.

What is Cloud Computing?

Pay per use

Elastic

Easy to manage

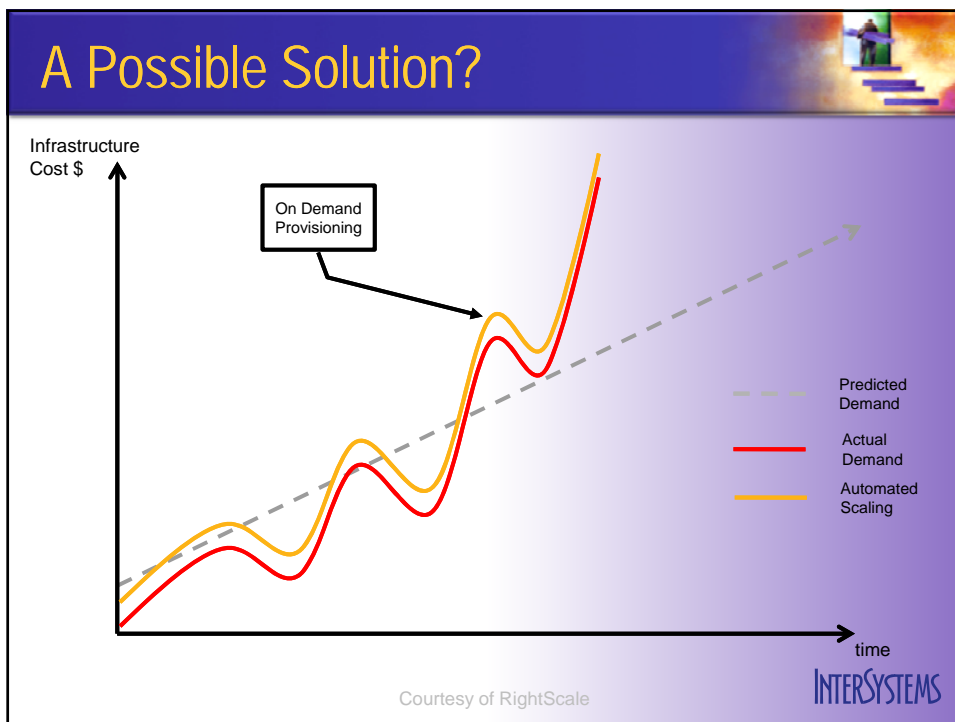
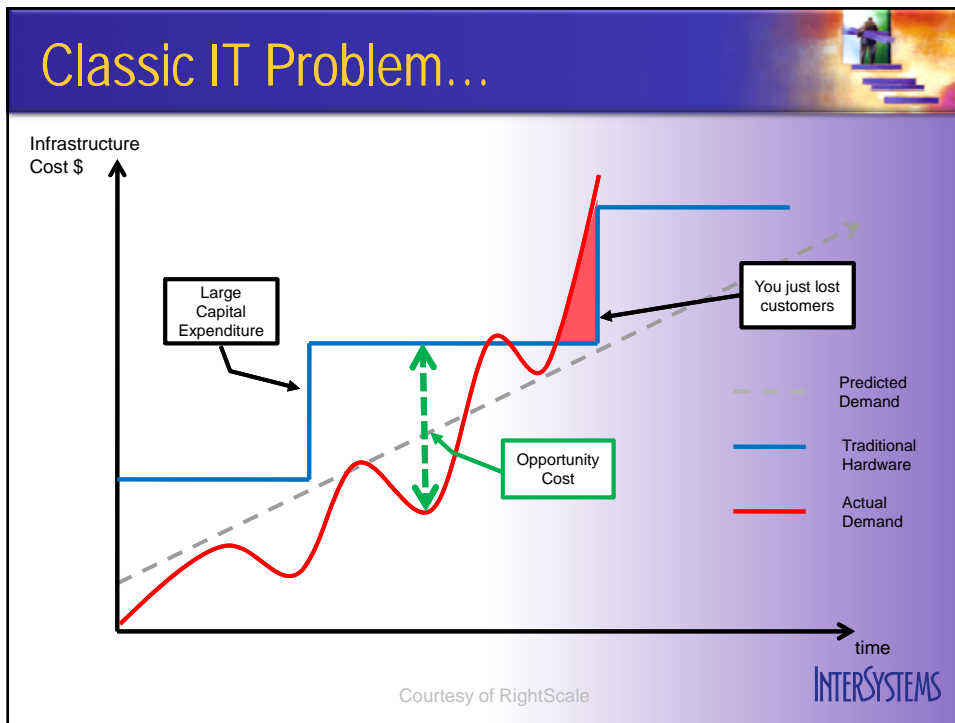
Available via Internet

Infinite Computing Resources

On-Demand Provisioning

CLOUD

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InterSystems' Approach



- Initial focus: Amazon's EC2 platform
- ISC Partnership with RightScale
- Platforms:
 - Red Hat Enterprise Linux (x64) on EC2
 - Windows Server 2008 (x64) on EC2 (RightScale-enabled)
 - SUSE Enterprise Linux (x64) on EC2 (RightScale-enabled)
- Consider Cloud for Development / Testing
 - Production requires planning (we're happy to help!)


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Our Motivation



- Easy Configuration
- Easy Deployment
- Easy Management

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Cloud Computing 

Cloud Demo

Cloud Demo

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VIRTUALIZATION

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General Note

Caché and Virtualization

**InterSystems Products and Virtualization Software
August 3, 2009**

It is InterSystems policy and procedure to verify and release InterSystems' products against operating systems (e.g. Microsoft Windows, RedHat Linux, etc.) and processor types, and not computers (server, workstation, etc.) of various vendors. We consider virtualization software (e.g. Hyper-V, Parallels, VMware, etc.) to be in the same category as a computer.

InterSystems' products released for an operating system are supported if the operating system is used within such a computer.

InterSystems has determined in benchmark and customer testing that virtualization environments running Caché, Ensemble, DeepSee or HealthShare require greater CPU capacity than native installations on the same hardware. We also observed that advancements in chip and virtualization technology are producing constantly improving benchmark numbers.

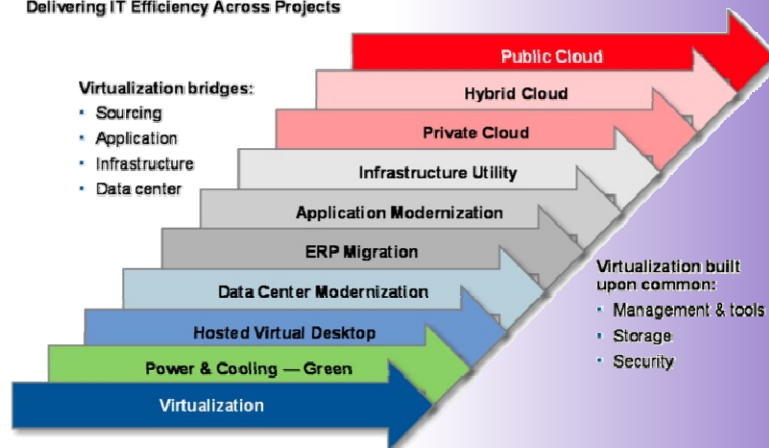
InterSystems recommends that any customers contemplating a deployment into such a platform conduct application specific testing to ascertain what, if any, response time impact will be noticed by users.

From: InterSystems.com/Cache/Virtualization/



Virtualization – What is it?

Virtualization Fabricates Infrastructure & Operations (I&O),
Delivering IT Efficiency Across Projects



Virtualization is an IT scenario that drives many I&O trends.

Source: Gartner (August 2010)



Benefits of Virtualization



- Reduced Hardware (Consolidation)
- Increased Utilization
- “Easy” HA & DR
- “Rapid” deployment
- “Zero Downtime” Maintenance

Virtualization: What does it mean to YOU?

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Common Options



- VMWare ESX/ESXi
- Novell Xen Server
- Microsoft Hyper-V
- IBM PowerHA (lpars, VIOS, micro-partitioning)
- HP VSE (Virtual Server Environment)
- HP OpenVMS Virtualization
- RedHat KVM
- SuSE Virtualization
- Others...

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Performance

- CPU Type
 - Intel Xeon 5500, 5600, 7600, 7600 = good
 - AMD Opteron 6100 = good
 - Others? Not so good...
- Virtualization Software Version
 - VMWare ESX/ESXi 4.0+ = good
 - Others? Maybe OK... (test!)

IMPORTANT:

- Need both CPU type **AND** Virtualization Software Version!

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Configuration

- CPU
 - Intel Nehalem/EX, Westmere/EX series
 - AMD Opteron 6100 series
- Memory
 - Lots & lots = good
 - Oversubscription = bad!
- Disk
 - Virtualized Disk?
 - Raw Device Mapping (RDM)?

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Configuration (cont.)



- Disk
 - VMFS most common – needed for HA
 - RDM may be better for performance (sequential I/O)
- HA features
 - Examples: vMotion, Partition Mobility, Guest Availability, etc.
 - Good shared storage configuration
 - Adequate network bandwidth

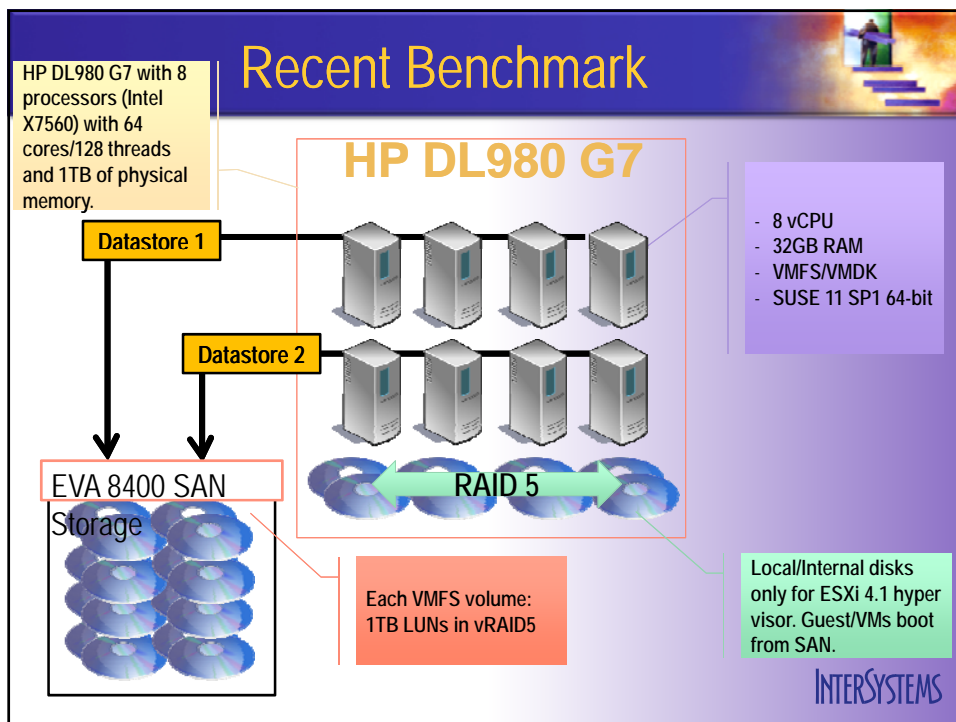
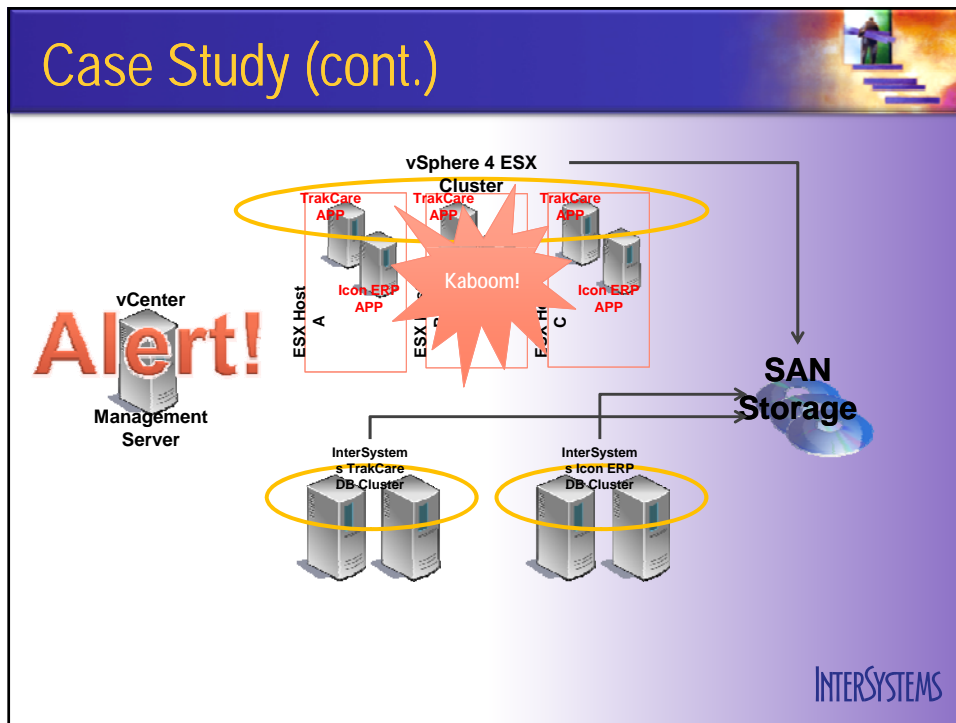
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Case Study



- TrakCare site deployed with VMWare
- 3 node ESX cluster
- Intel X5570 processors
- HP EVA6400 SAN storage
- ESX 4.0

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Benchmark Results

- Excellent performance / scalability
- vCPU = 4: 2,000 users @ ~450,000 GREFs/sec
- vCPU = 8: 4,000 users @ ~850,000 GREFs/sec
- Performance ~EQUAL to bare metal (no HT)

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Virtualization References

- VMWare VMFS/RDM comparison:
http://www.vmware.com/files/pdf/performance_char_vmfs_rdm.pdf
- General "good references":
 - <http://technet.microsoft.com/en-us/magazine/2008.10.higha.aspx?pr=blog>
 - http://www.vmware.com/pdf/Perf_Best_Practices_vSphere4.1.pdf
 - <http://www.redbooks.ibm.com/abstracts/sg247590.html?Open>
 - <http://docs.hp.com/en/5900-0578/ch05s04.html>

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Wrap Up



- Questions?
- Thank you for attending!

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