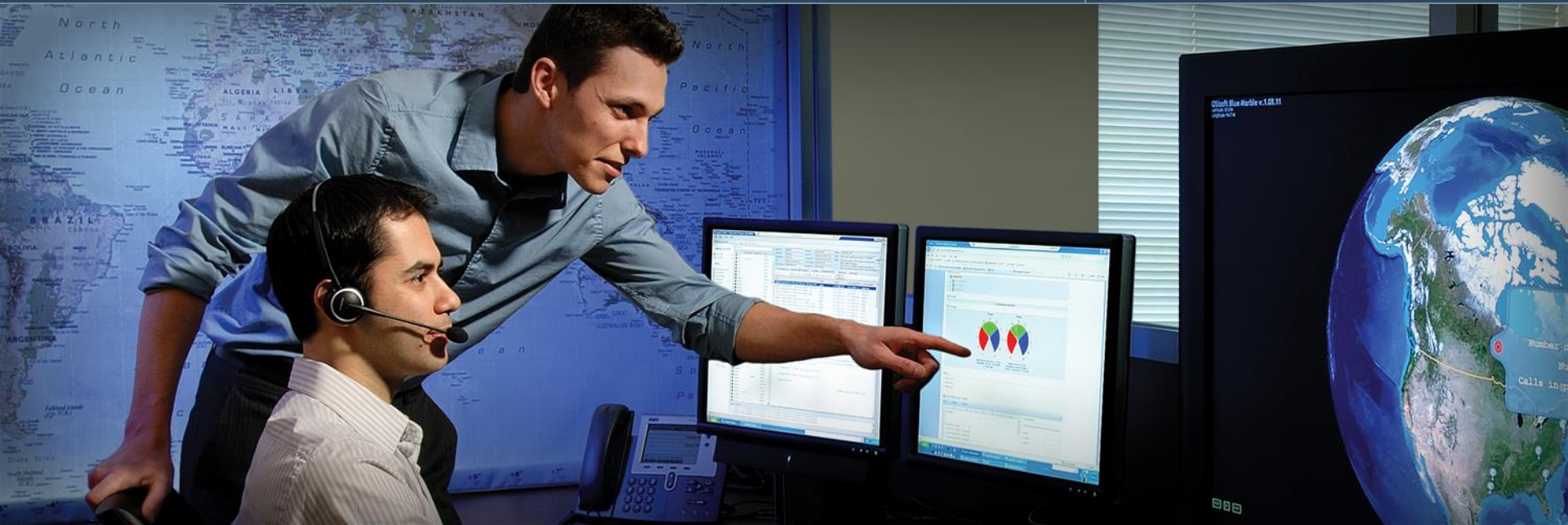




Regional Seminar Series Atlanta



Virtualization and HA PI Systems: Strategies to Keep Your PI System Available, Scalable, and Portable

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Empowering Business in Real Time.

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- Virtualization
 - Server
 - Storage (DAS, NAS, SAN)
 - Application (Clients)
- PI High Availability
 - Highly Available (HA) PI
 - HA PI in a virtual environment

Why Virtualization and PI?



You can realize substantial benefits using the combined strategies of virtualization (storage, server and application) and PI Collectives (HA).

These strategies provide you with:

- Increased reliability
- Reduced hardware and maintenance costs
- Improved scalability

Use them separately or together

Why Now?



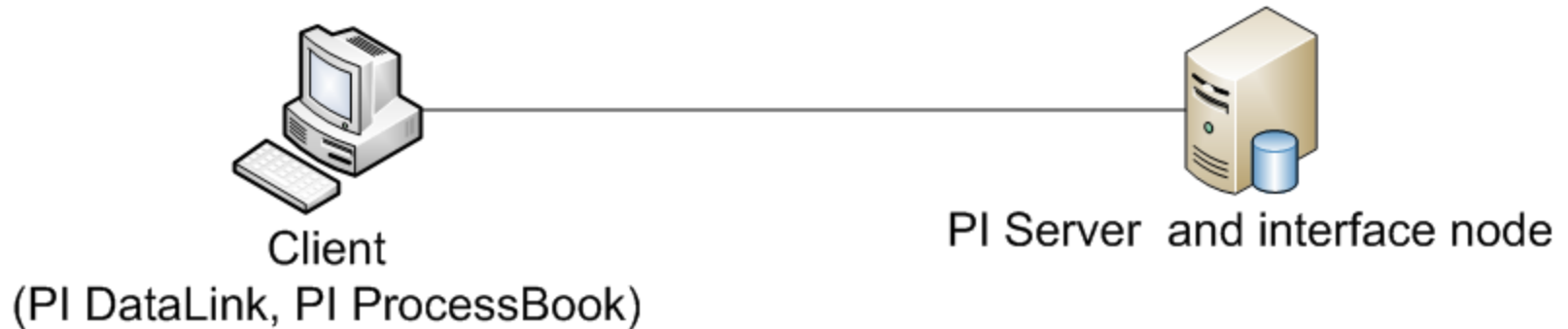
- You need to do more with less
- Your projects need to show immediate ROI
- IT is challenged to increase service levels with less staff
- Virtualization and HA are valuable separately, but better together

Who Needs This?

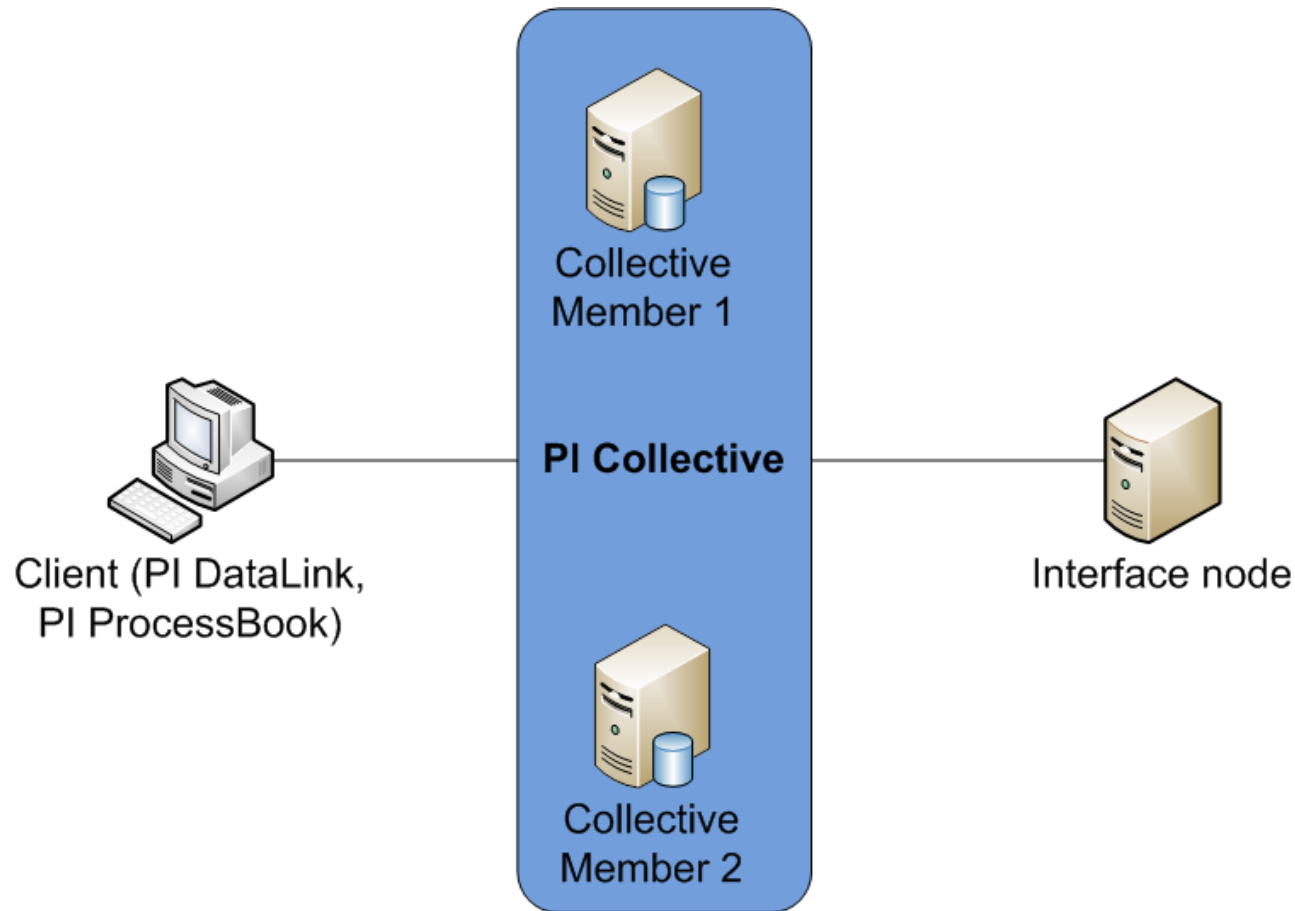


- PI users who cannot afford disruption in service (even for planned maintenance)
- IT organizations looking to consolidate management of computing resources (fewer servers to buy and maintain)
- IT organizations looking to streamline deployment of new tools for the user community (less IT time and resources)
- IT organizations investigating new ways to provide ever-increasing amounts of storage for mission critical systems
- A PI system administrator tasked with scaling PI to more users and other information systems
- Companies investigating virtualized test environments for validating new software purchases

A Simple System

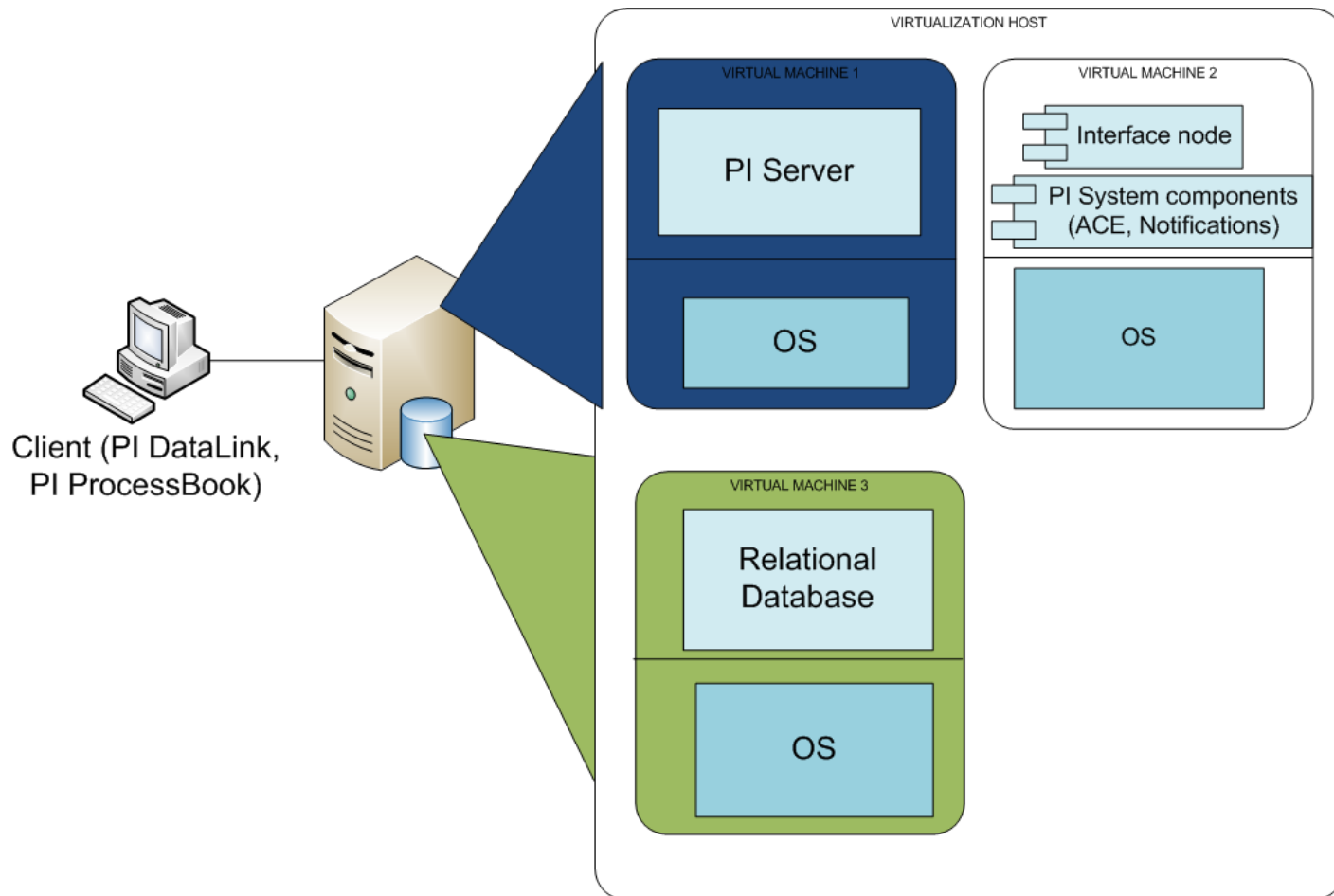


A Simple HA PI System



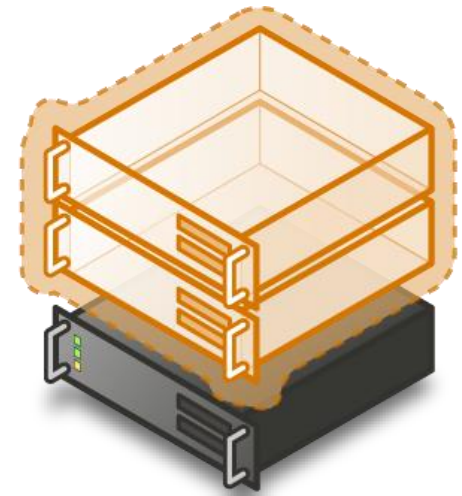
- PI is there all the time - users trust it
- No late night heroics to restore a backup or perform routine maintenance
- Removes fear of a bad backup
- Simple design is robust, low bandwidth and supported by WANs
- Geographical independence (replace PI to PI)
- Support more or specialized users
- Facilitates capacity planning
- Complements virtualization strategies:
 - PI is perfect for monitoring a virtualized environment (HyperV performance counters; VMWare SNMP interface)

A Simple Virtualized System

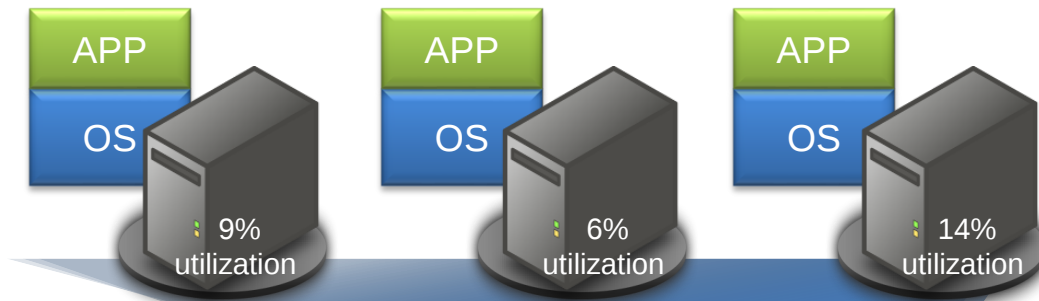


- Servers
- Storage
- Applications

- Instead of having physical machines, virtual servers run on a physical host
- Case Study: AtlantiCare
 - Eliminated need to expand or relocate data center
 - Microsoft® Virtual Server 2005 used to consolidate infrastructure and legacy application servers
 - Consolidation ratio achieved of 33:2

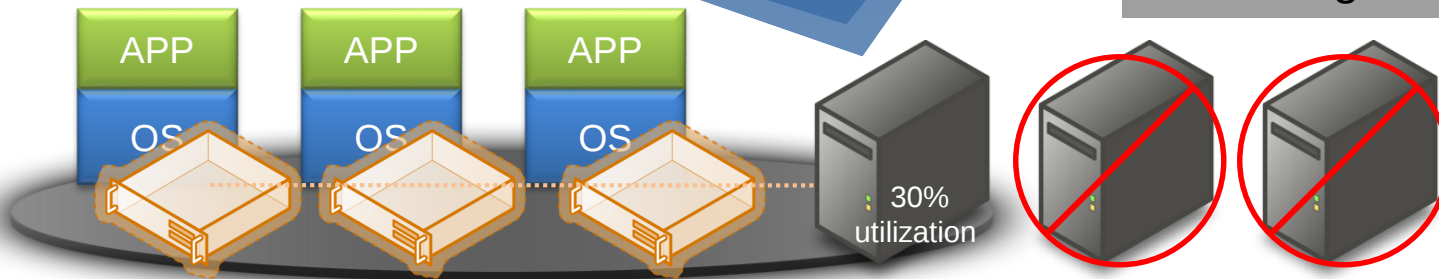


Example: Server Consolidation



Typically server workloads only consume a small fraction of total physical server capacity, wasting hardware, space, and electricity

Through virtualization, these workloads can be consolidated onto fewer physical servers, saving resources and increasing flexibility



Benefits of Server Virtualization*



- Less hardware required (HP went from 85 data centers to 6)
 - up to 35% reduction of annual server costs per user (\$100-\$200K per year per server)
- Better utilization of hardware (HP decreased servers by 40%)
- Reduce power consumption (HP reduced energy by 40%)
- Provide higher availability by supporting redundancy
- Rapidly deliver adaptive and reliable IT services
- Tie diverse components together into a single managed entity
- Storage efficiency can lead to higher storage utilization

*Gillen, A., Grieser, T., Perry, R. 2008. Business Value of Virtualization: Realizing the Benefits of Integrated solutions. IDC.

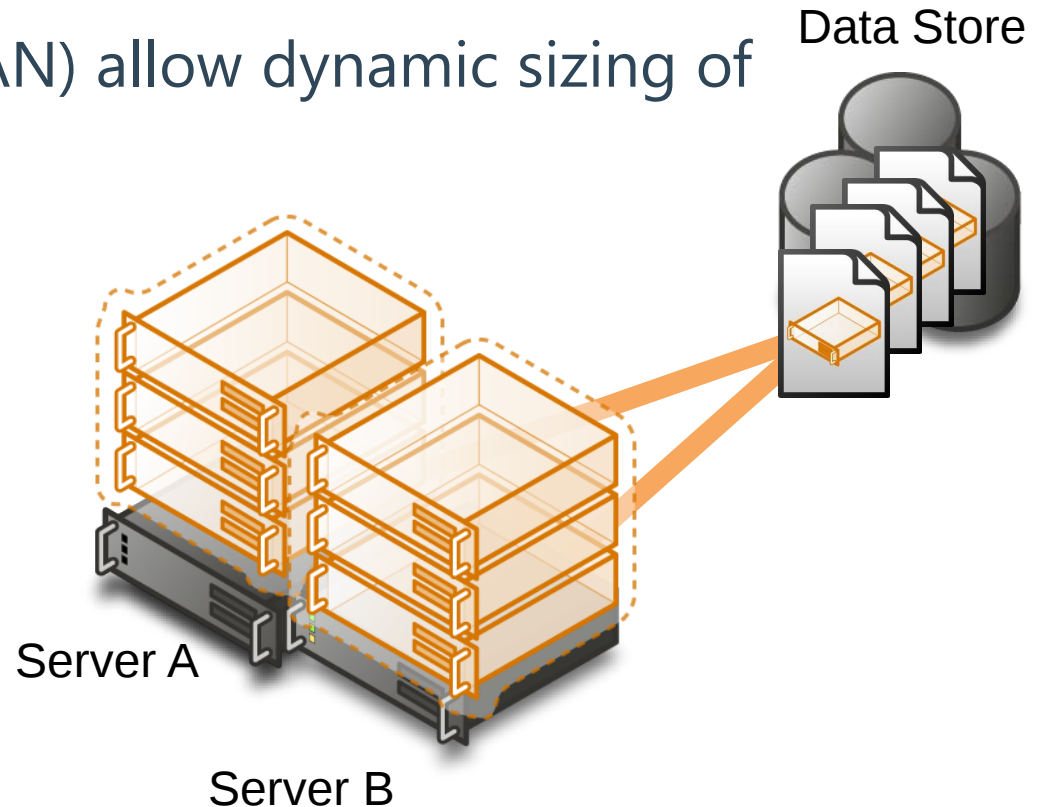
- Validated environments need a test bed (any pharmaceutical company; BMS; Shell)
- Environments that require portability of IT assets (Cargill Deicing Technology - Salt mining)
- Deploying new sites (Rio Tinto)

- **Challenge:**

Grow available storage space without disrupting applications and servers

- **Solution:**

Storage Area Networks (SAN) allow dynamic sizing of available storage

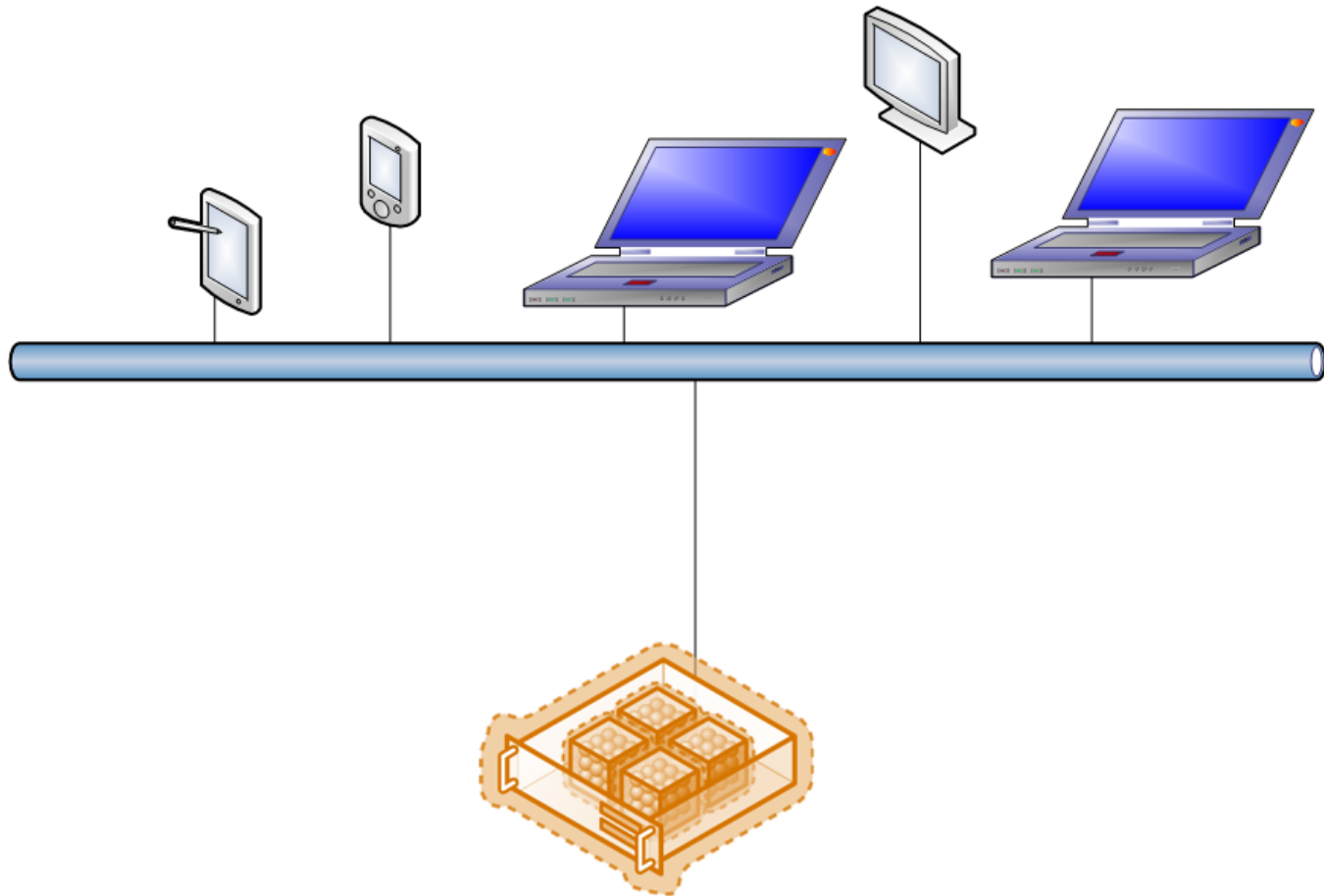


- DAS: Direct Attached Storage (local hard drives)
- NAS: Network Attached Storage (e.g., mapped drives)
- SAN: Storage Area Network, essentially virtual storage

- Additional storage appears to be local to the host so users don't have to know where the files are stored
- Improve the ties between centralized storage and virtual infrastructure
- Provide virtual-machine consistent backups for data stores and the ability to restore virtual machines in a few clicks
- Provide relief from disk subsystem access in virtualized environments (biggest performance hit on virtual host)
- Consolidate disk resources

- Keep more and higher fidelity data online; add or expand PI archive files
- Support aggregated PI Systems; VSS support enables PI backups
- Store PI Client files centrally
- Backup virtualized application and data servers
- Backup virtualized Terminal Server hosts
- Complete system backup storage

Application Virtualization

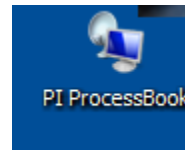


- Customers currently use Citrix or Terminal Server to reduce deployment costs and maintenance for client apps
- Windows 2008 Server offers a service that provides applications over an SSL connection (HTTPS) without client-side deployment (a thin deployment) - Terminal Services Gateway
- Terminal Services Gateway provides URL access to a host (like Remote Desktop connections, without the VPN requirement) or to specific applications on a host (even more secure for those outside the firewall)

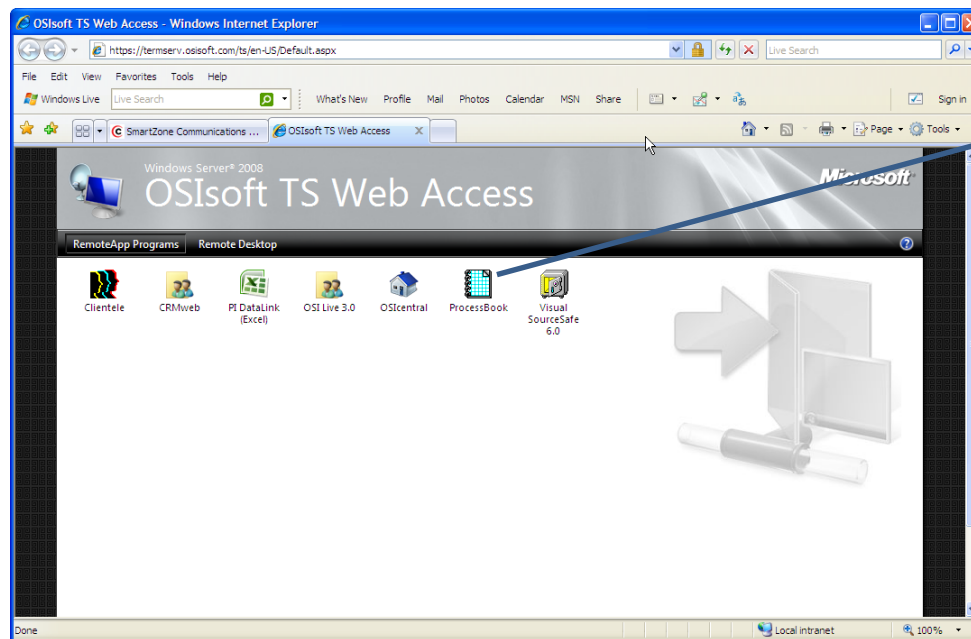


- One point of installation makes deployment simpler
- Access to applications secured
- All users have the same version of the software; no version or compatibility issues
- Casual users do not need to install anything to get started
- Save money on hardware investments by deploying client software in one place

OR

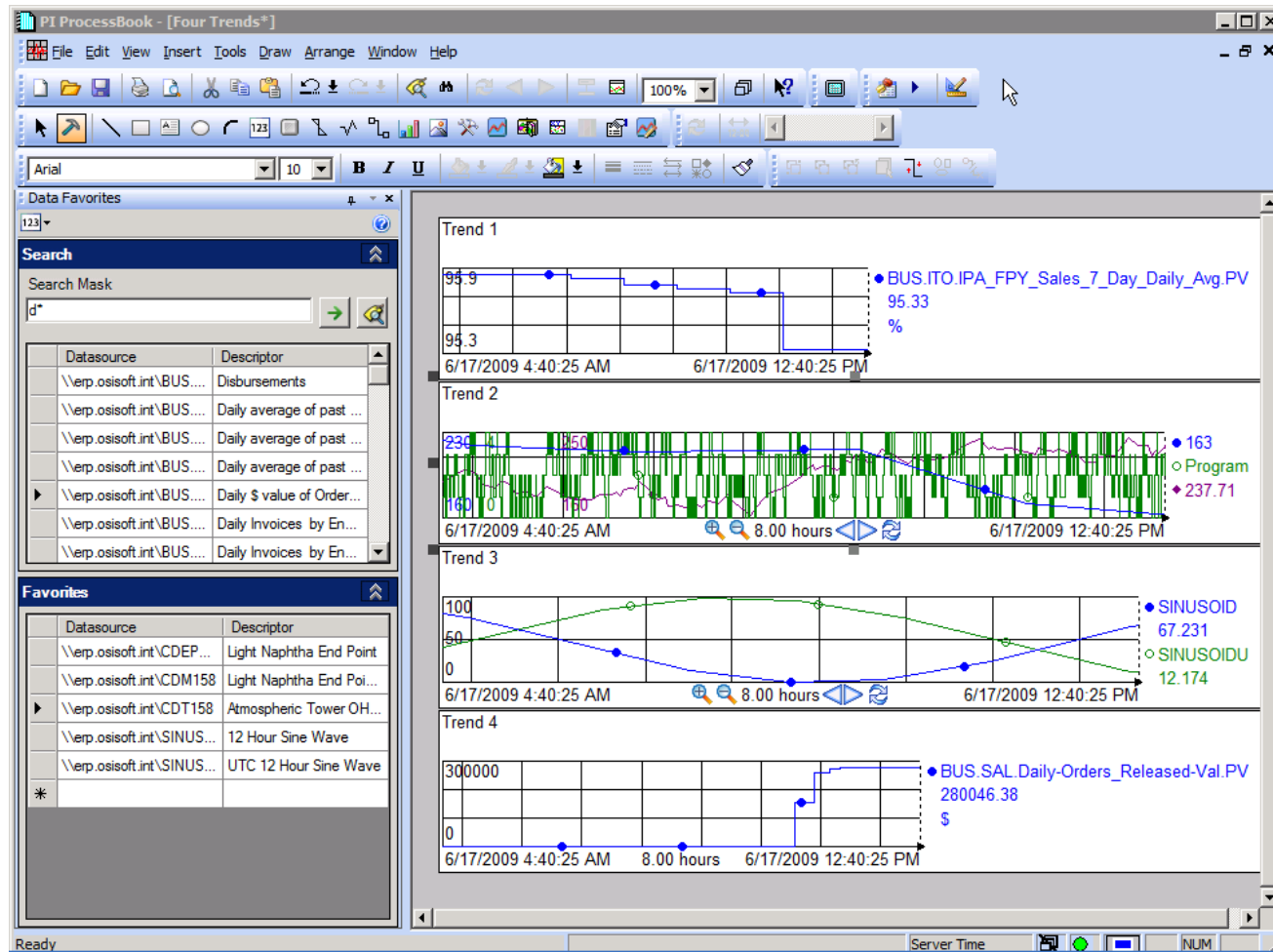


Launch from
Desktop icon



Launch from web
page

PI and Application Virtualization (ProcessBook)



- Environments with casual client users who need low barrier to entry for system access (Inco Limited)
- Terminal Server users (a partial list)
 - Georgia Pacific, Kellogg, SASO, SAPPI Fine Paper, Wacker Chemie, Alcoa, Eli Lilly, ExxonMobil Upstream, Iberdrola, Progress Energy Services
- Citrix users (a partial list)
 - SDG&E , Water Corporation, Amgen, Bayer Material Science, Genmab, PPG, Vaxgen, Katahdin Paper, Celanese Chemicals, Novo Nordisk, Queensland Alumina, Total
- Windows 2008 Terminal Services Gateway
 - OSIsoft

Five Principles for Virtualization Success*



- Treat virtual machines as if they were physical machines
- Invest in Enterprise-level hardware and software
- Do not mix virtual and physical on the same host
- Use qualified Virtualization support personnel
- Test on the target platform

*OSIsoft Center of Excellence

Dynamic system management

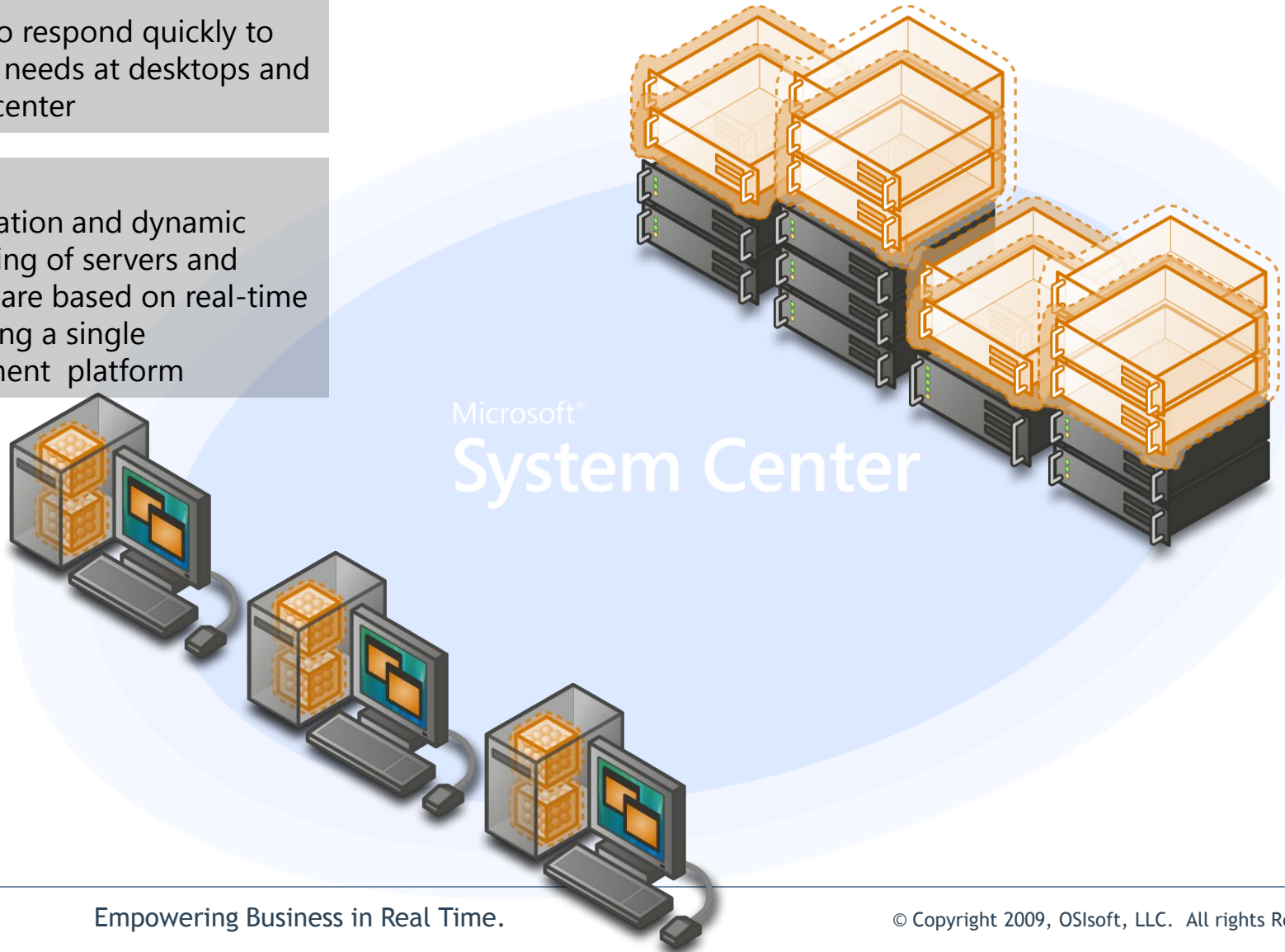


Challenge:

Inability to respond quickly to changing needs at desktops and the data center

Solution:

Live migration and dynamic provisioning of servers and desktops are based on real-time needs using a single management platform

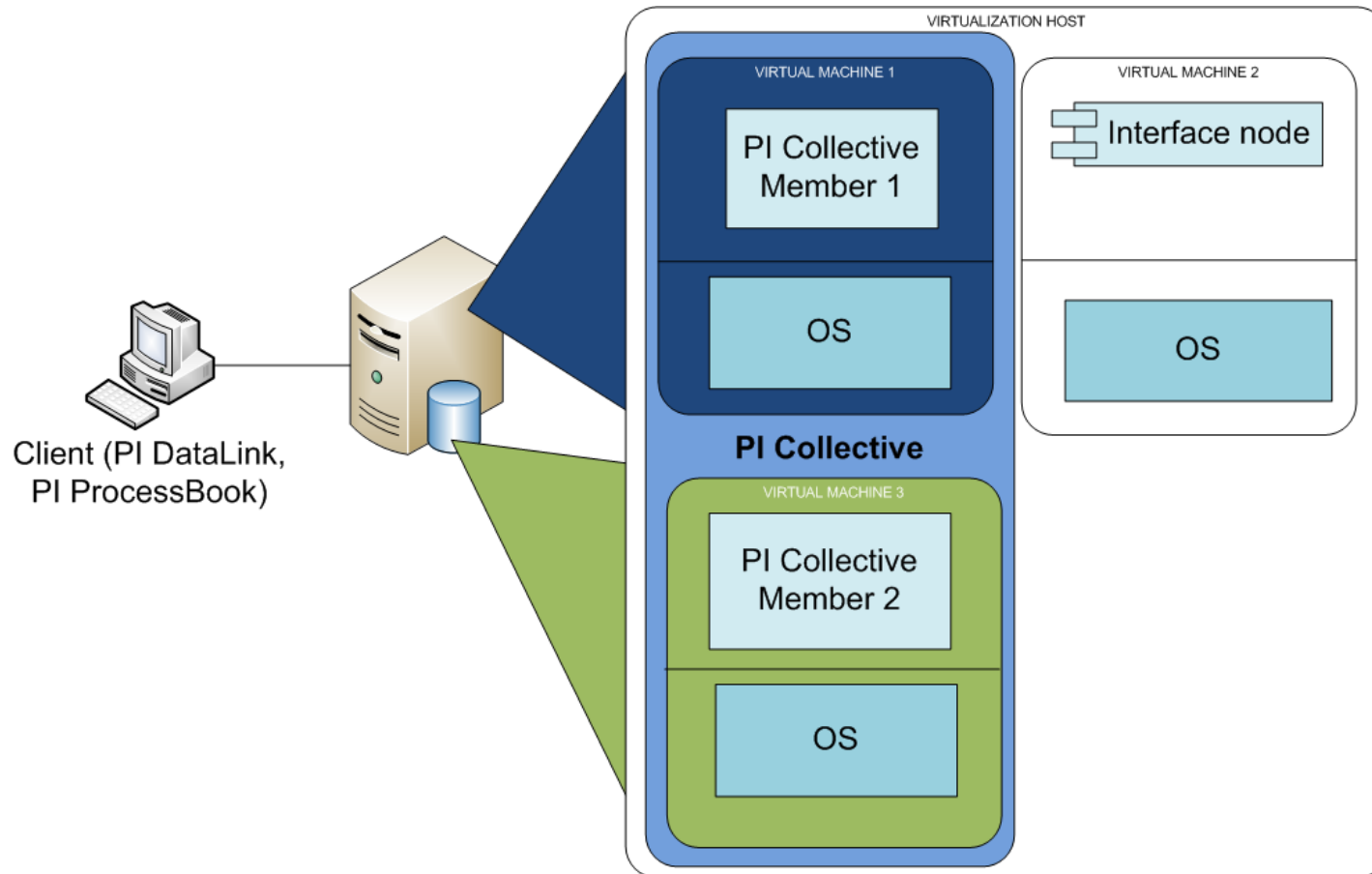


How does HA PI play into virtualization?

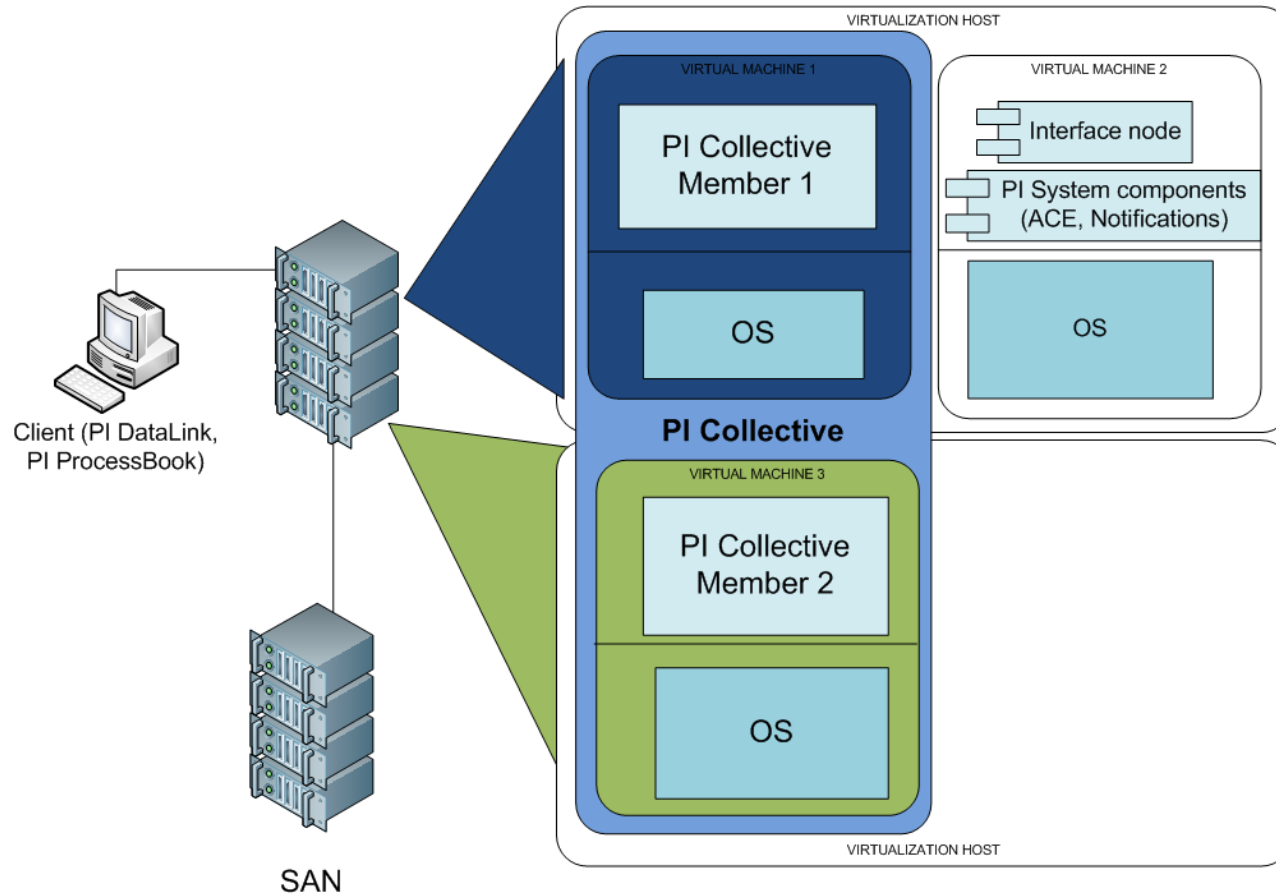


- PI collectives (HA) and interfaces
- Virtualized HA PI

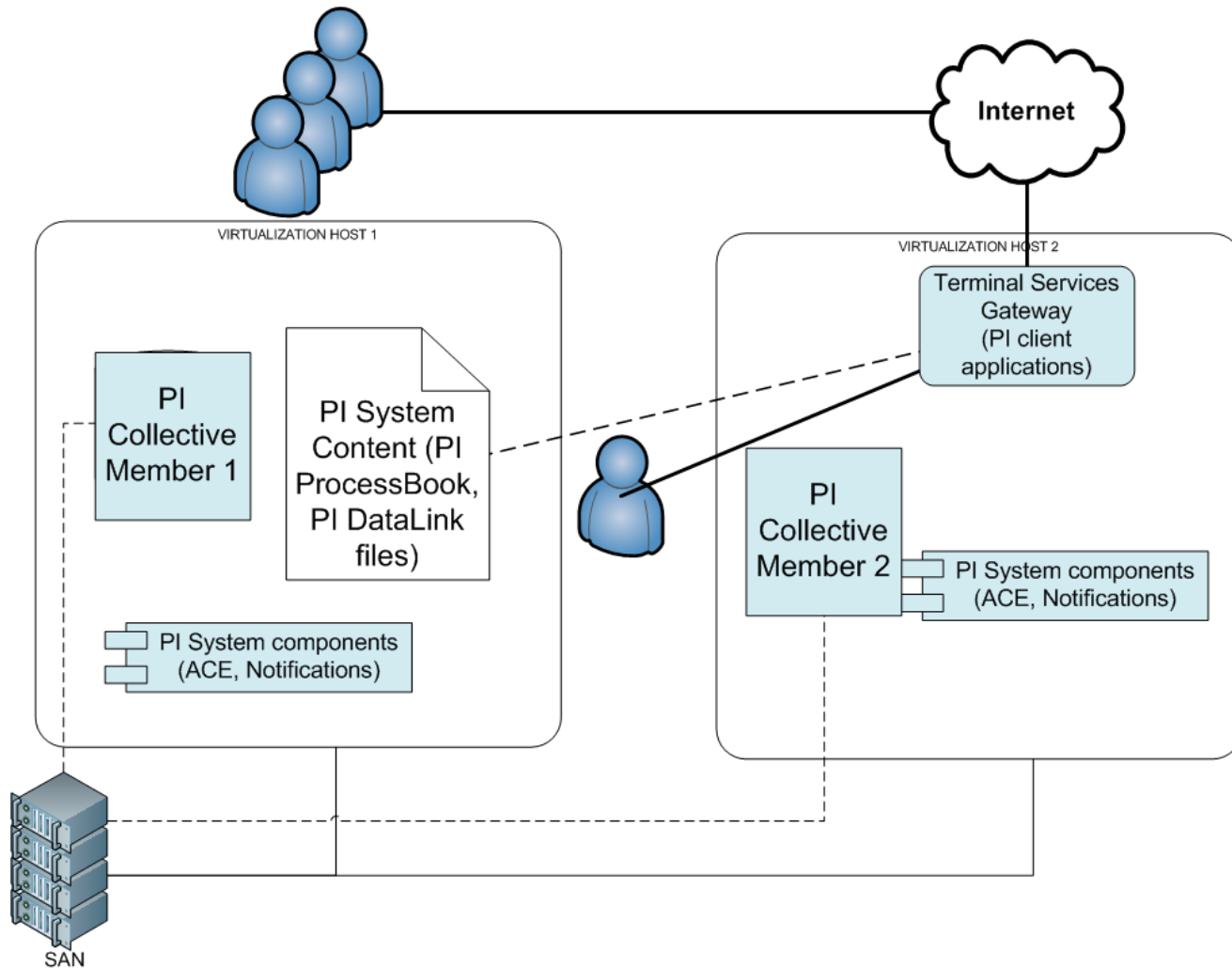
A Simple Virtual HA PI System



Virtual HA PI with SAN



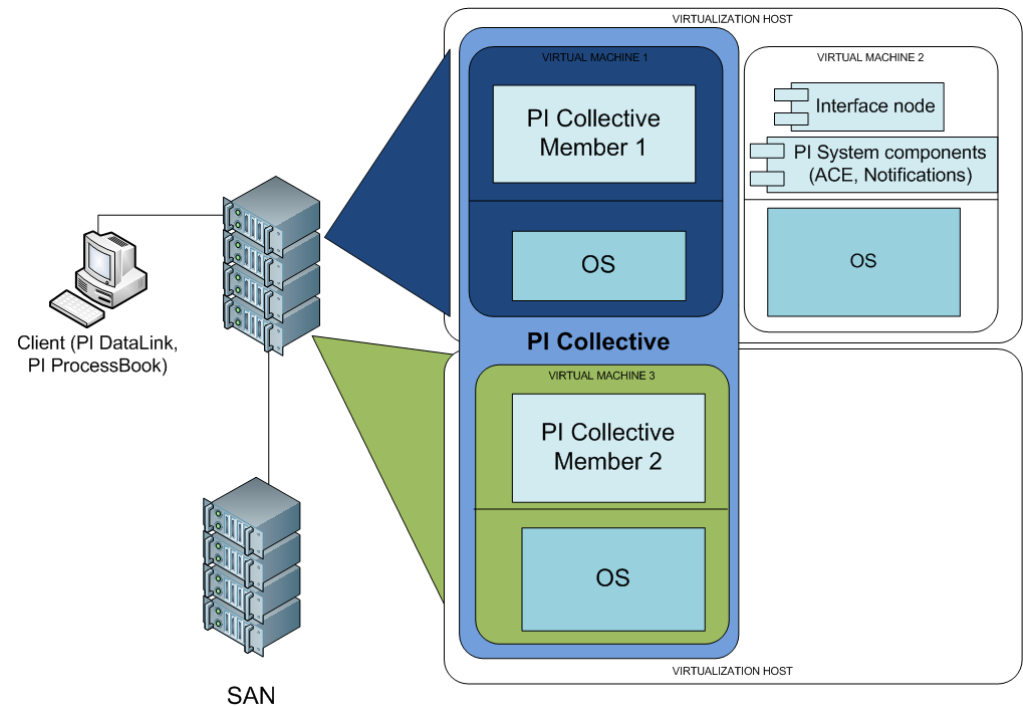
Virtual System including Clients



Recommendation: Virtualized PI System



- Multiple hosts (cluster)
- Collective can be split across hosts
- PI Server components can run as separate virtual machines for scalability and performance
- SAN can offload storage



- Value of HA PI—
 - Availability, Quality of Service (QoS)
 - No data loss
 - Scaling
 - Improved IT management
- Value of virtual machines and SAN
 - Consolidation
 - Scaling and hardware utilization
 - Centralized IT management
- All adds up to higher quality of service for less cost

- PI works as well in a virtual environment as it does on physical hardware
- PI is perfect for monitoring a virtualized environment
- If you are thinking about virtualization, it's a good time to consider the value of HA PI
- If you are thinking about network storage, it's a good time to consider the value of virtualization and PI with SAN support
- If you are thinking about problems with client software deployment, it's a good time to consider the value of Terminal Services Gateway, virtualization and PI

- Whitepapers and Tech Support bulletins on OSIsoft web site
- Vendor web sites
- OSIsoft internal expertise
- Microsoft representatives for Hyper V and Terminal Server Gateway solutions

- Knowledge Base article #3062OSI8
- Learn whether there are plans for (or an existing) virtualization environment in your organization
- Estimate the hardware reduction to be gained by virtualizing your existing server applications
- Estimate the hardware reduction for server applications both with and without a SAN available (more hosted servers per host if data storage is offloaded, for example).
- Estimate the hardware, software and support reduction to be gained by moving your client applications to a hosted environment (e.g., Terminal Server)
- Consider the value of monitoring the virtualized environment with PI

Thank you for your time



- Email your questions to:
ProductManagers@osisoft.com or ccoen@osisoft.com
- Contact your salesperson for more detailed information



Thank you

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Virtualization and HA Details



- No 3rd party software or special hardware for HA PI
- Licensing models
 - One virtual PI server = one real PI server
 - One virtual PI client connection = one concurrent PI client connection
- Virtualization hardware/software
- Maintenance
 - Additional storage, memory, etc., as needed over time
- Virtualization Per user (from IDC)
 - Basic virtualization: \$24.1 (over 3 years); benefit = \$144.9
 - Advanced virtualization: \$23.3 (over 3 years); benefit = \$212.4

When is Virtualization NOT a good solution?



- No one in the organization is familiar with managing virtual environments
- The project is geographically dispersed to the point where there is no benefit of having multiple virtual machines on a single host
- All the equipment being used is identical and it is easier to just clone machines than to manage a new virtual environment
- Cost to start may be prohibitive
- Performance notes:
 - Settings and parameters may be important for performance
 - Sizing the virtual machine appropriately makes a difference
 - Sizing the virtual host appropriately makes a difference

- Available virtual technologies (partial list)
 - Microsoft (Hyper V, in particular)
 - VMware (ESX server, in particular)

- Available Client virtualization examples
 - Terminal Server Gateway (Windows Server 2008)
 - Terminal Server 2003
 - Citrix

- Sample SAN vendors (compatible with virtual technologies)
 - NetApp
 - HP
 - EMC²