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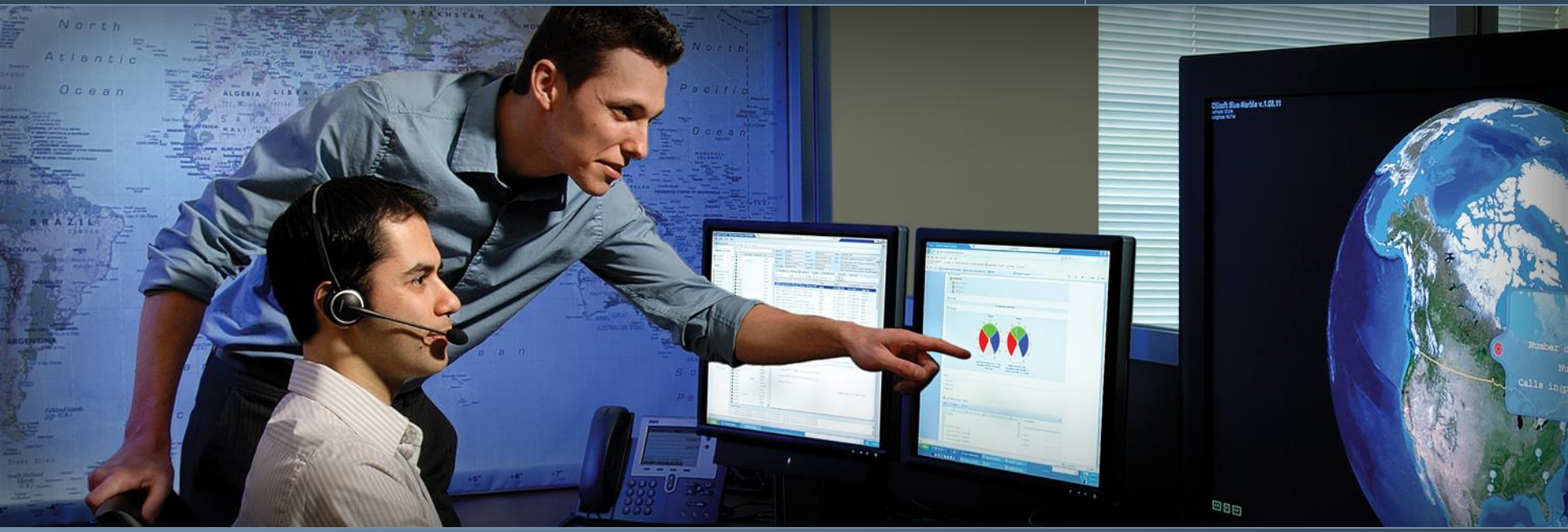

Virtualization and HA PI Systems: Strategies to Keep Your PI System Available, Scalable, and Portable

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Overview

- 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

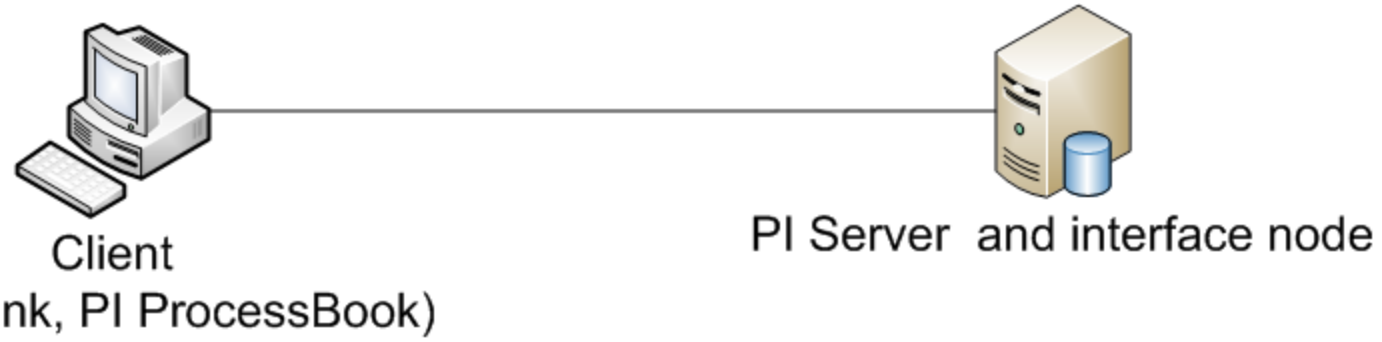
Why Now?

- 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

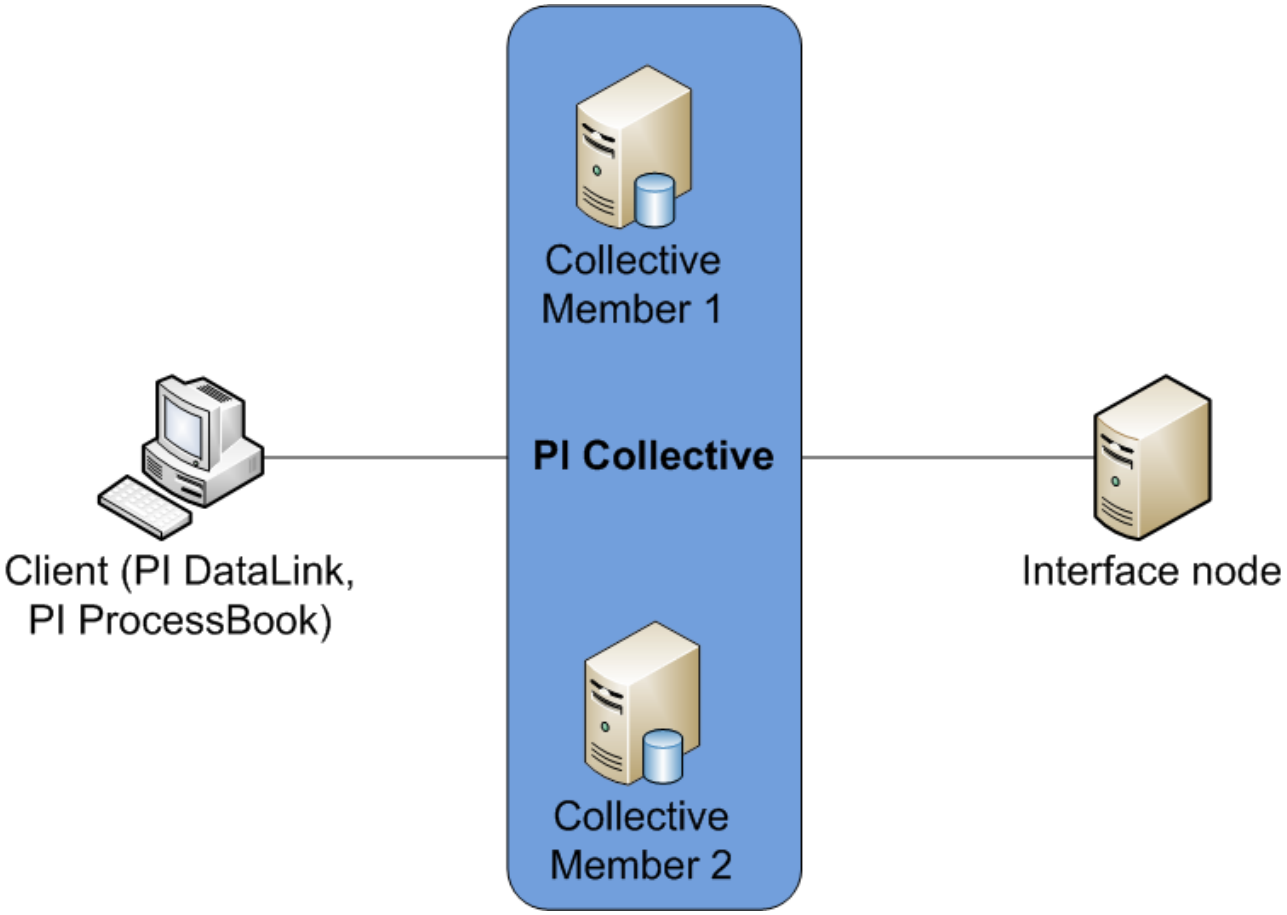
Who Needs This?

- 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



Built-in Benefits of HA PI

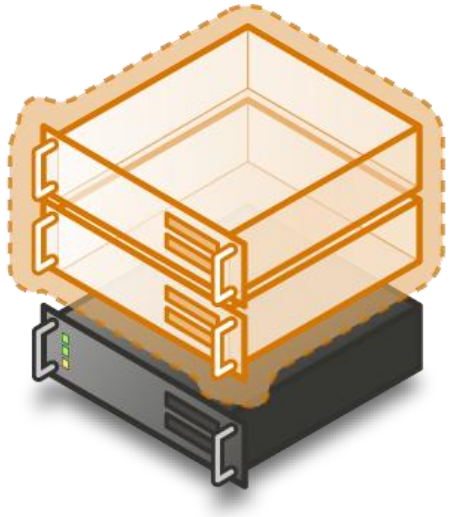
- PI is there all the time – users trust it
- No late night heroics to restore a backup or perform routine maintenance
- Removes fear of a bad backup
- Simple design is robust, low bandwidth and supported by WANs
- Geographical independence (replace PI to PI)
- Support more or specialized users
- Facilitates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

Virtualization

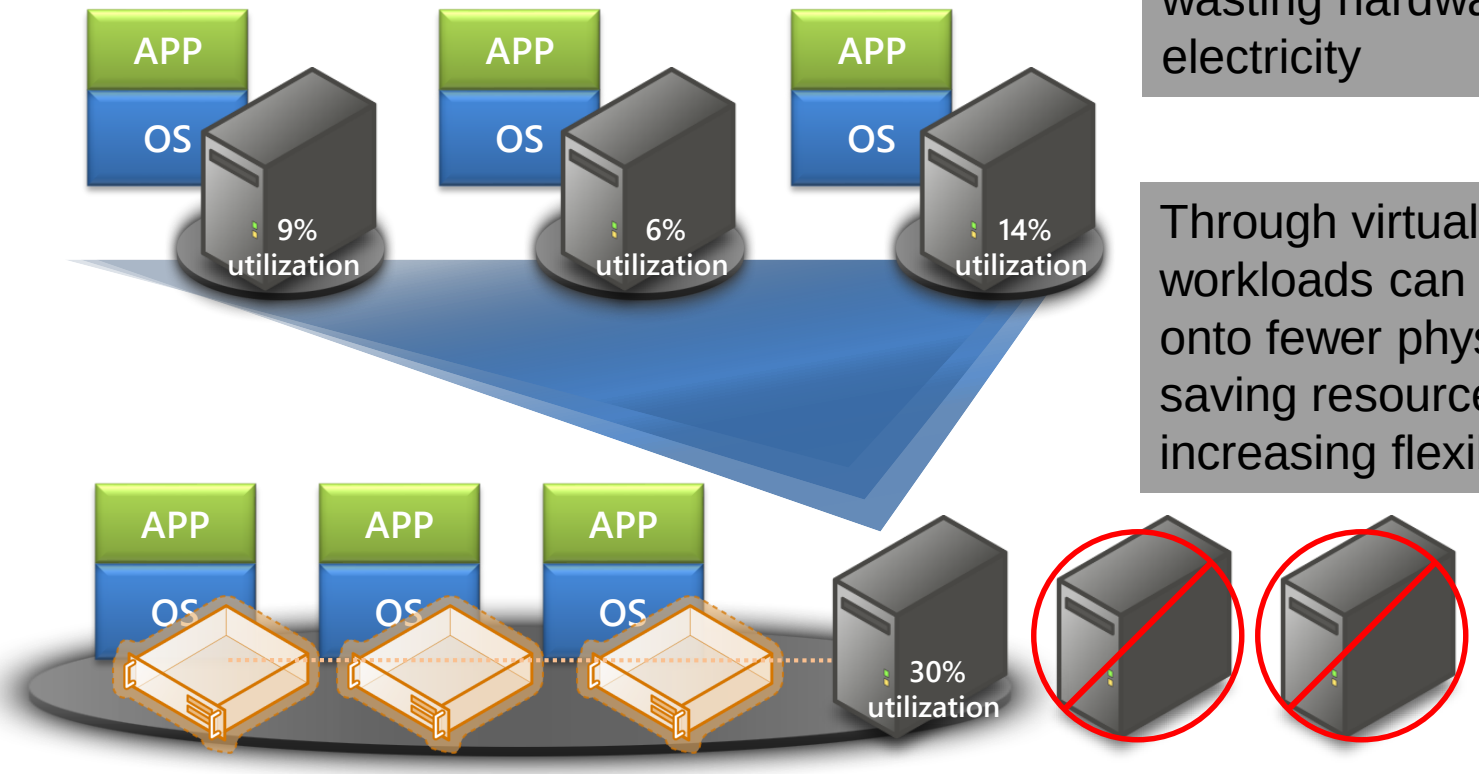
- Servers
- Storage
- Applications

Server Virtualization

- 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

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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.

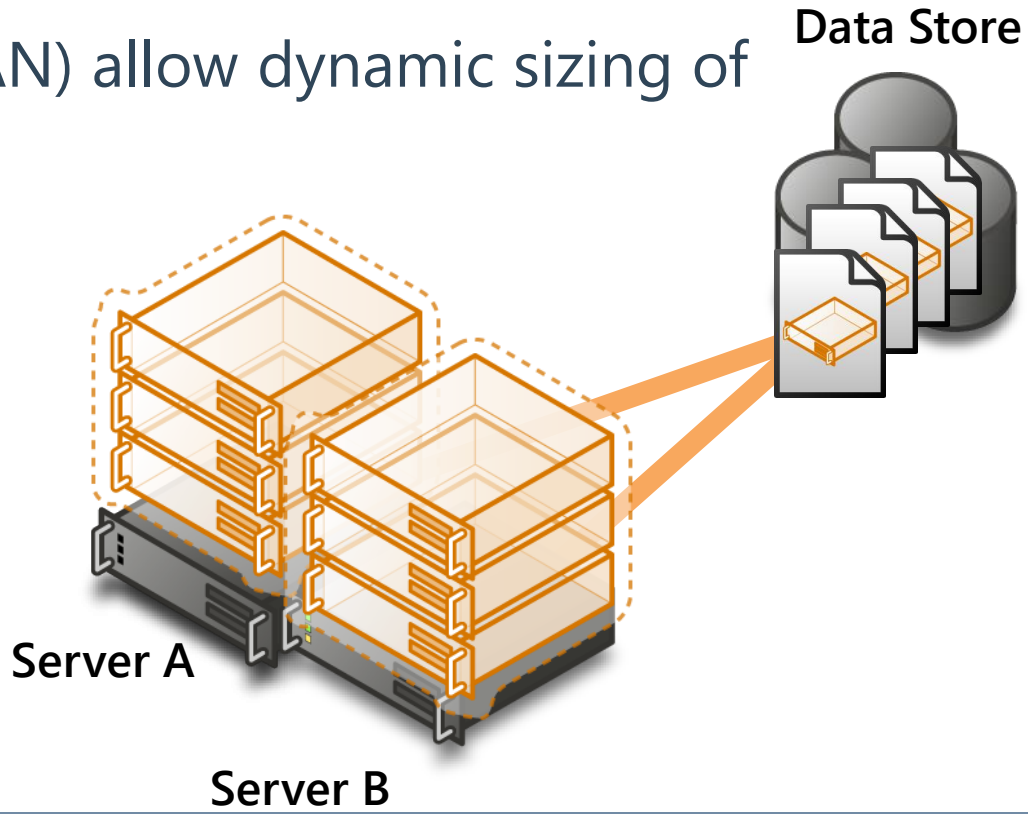
PI and Server Virtualization

- 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)

Storage Virtualization

- **Challenge:**
  Grow available storage space without disrupting applications and servers

- **Solution:**
  Storage Area Networks (SAN) allow dynamic sizing of available storage



Storage Types and Virtualization

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

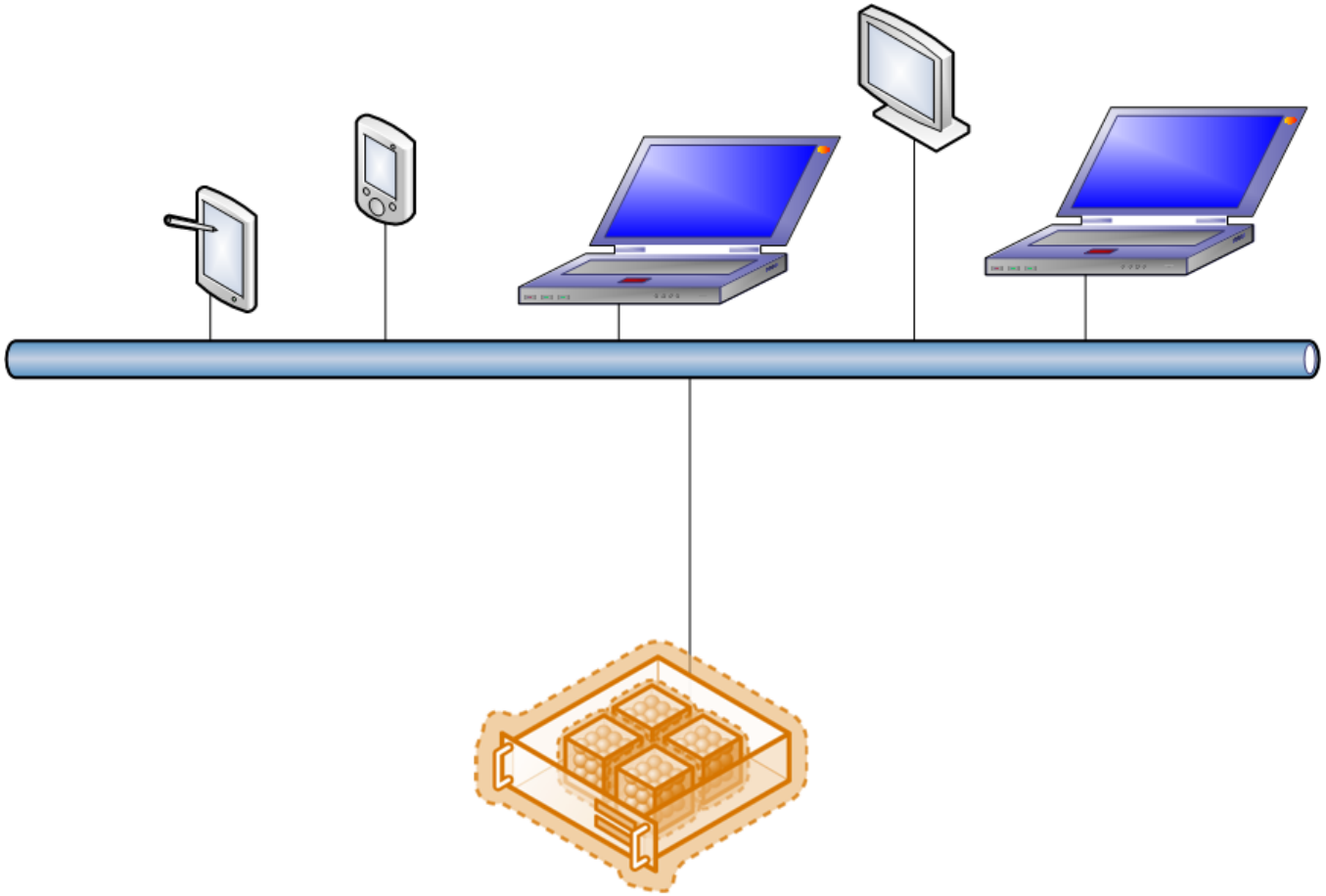
Benefits of SAN Technology

- 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

PI and Storage Virtualization

- 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



Application Virtualization

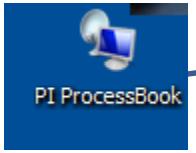
- Customers currently use Citrix or Terminal Server to reduce deployment costs and maintenance for client apps
- Windows 2008 Server offers a service that provides applications over an SSL connection (HTTPS) without client-side deployment (a thin deployment) – Terminal Services Gateway
- Terminal Services 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)

Benefits of Application Virtualization

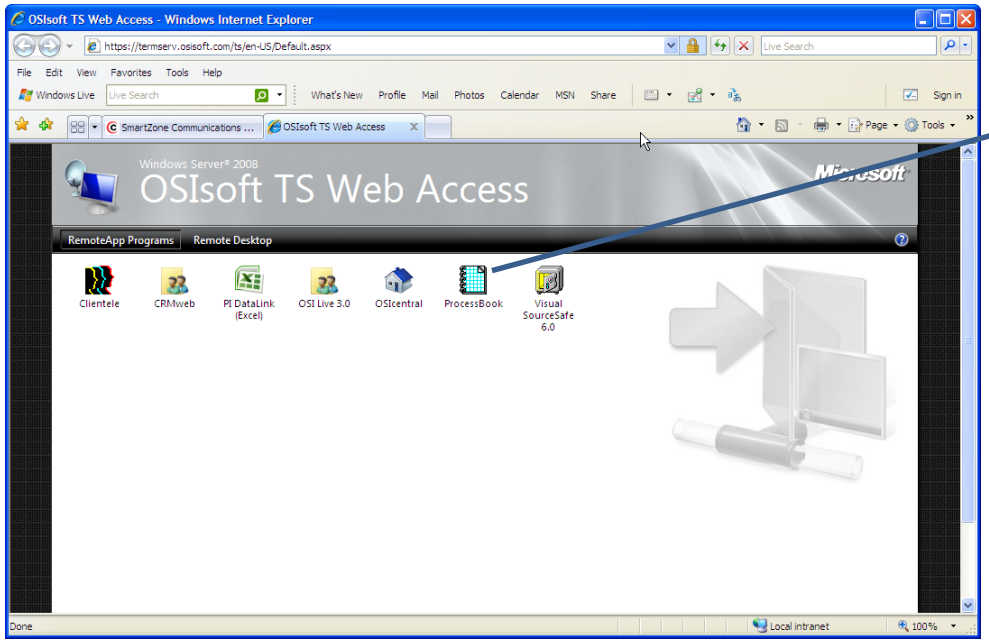
- One point of installation makes deployment simpler
- Access to applications secured
- All users have the same version of the software; no version or compatibility issues
- Casual users do not need to install anything to get started
- Save money on hardware upgrade investments by deploying client software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

PI and Application Virtualization (ProcessBook)

OR



Launch from Desktop icon



Launch from web page

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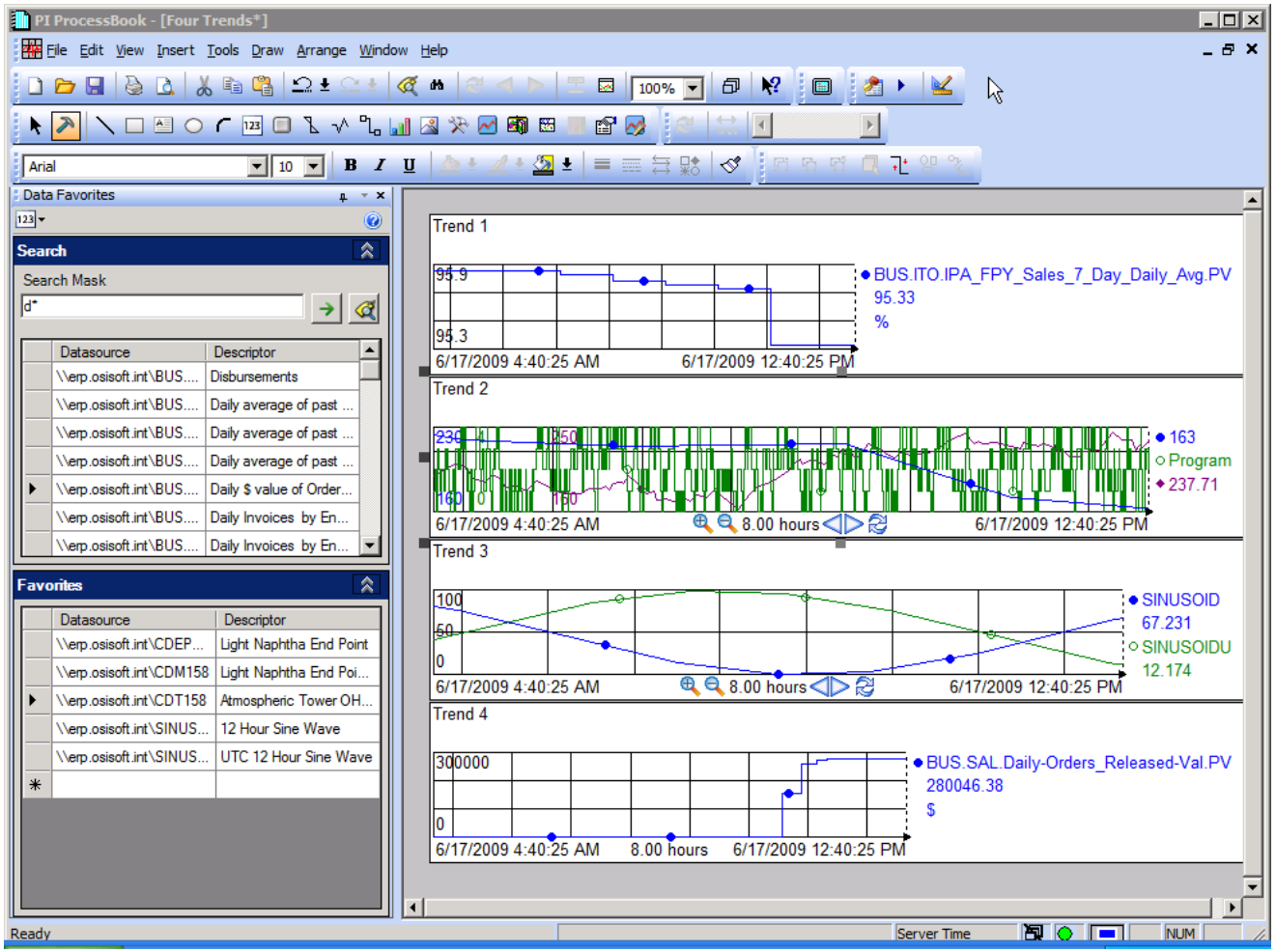
PI and Application Virtualization (ProcessBook)



Value now. Value over time.

PI and Application Virtualization

- 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

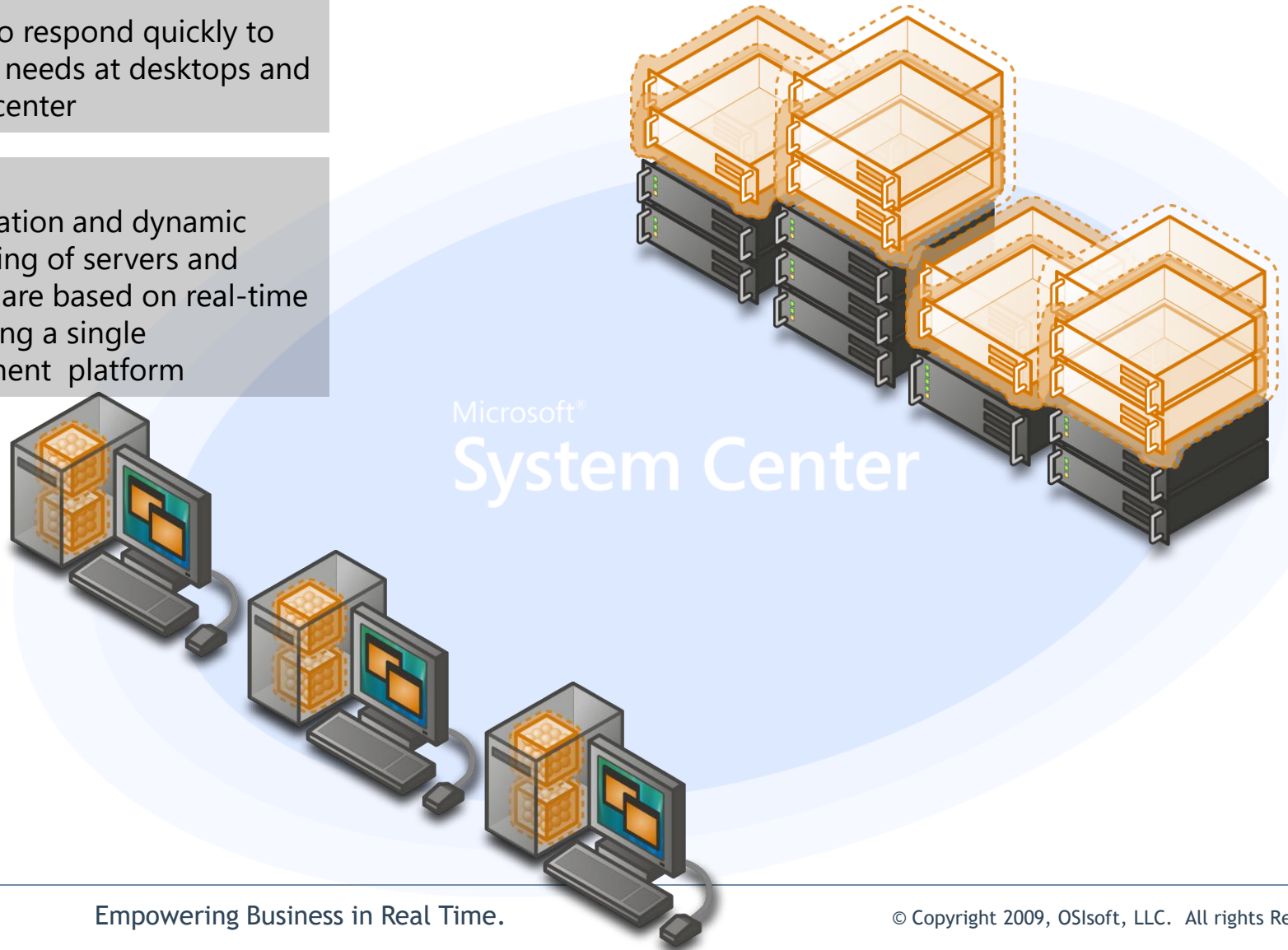
Dynamic system management

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



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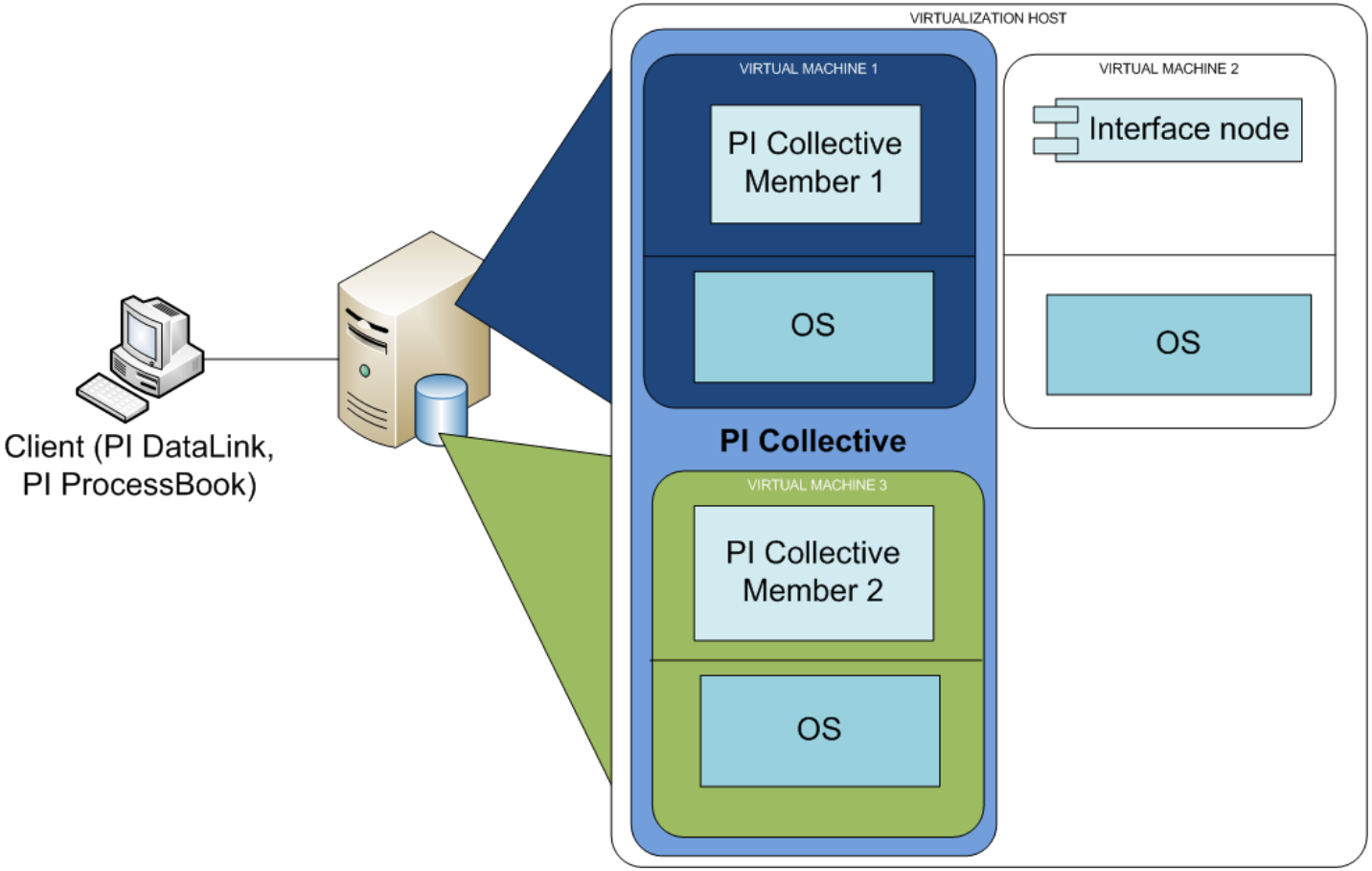
How does HA PI play into virtualization?

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

A Simple Virtual HA PI System



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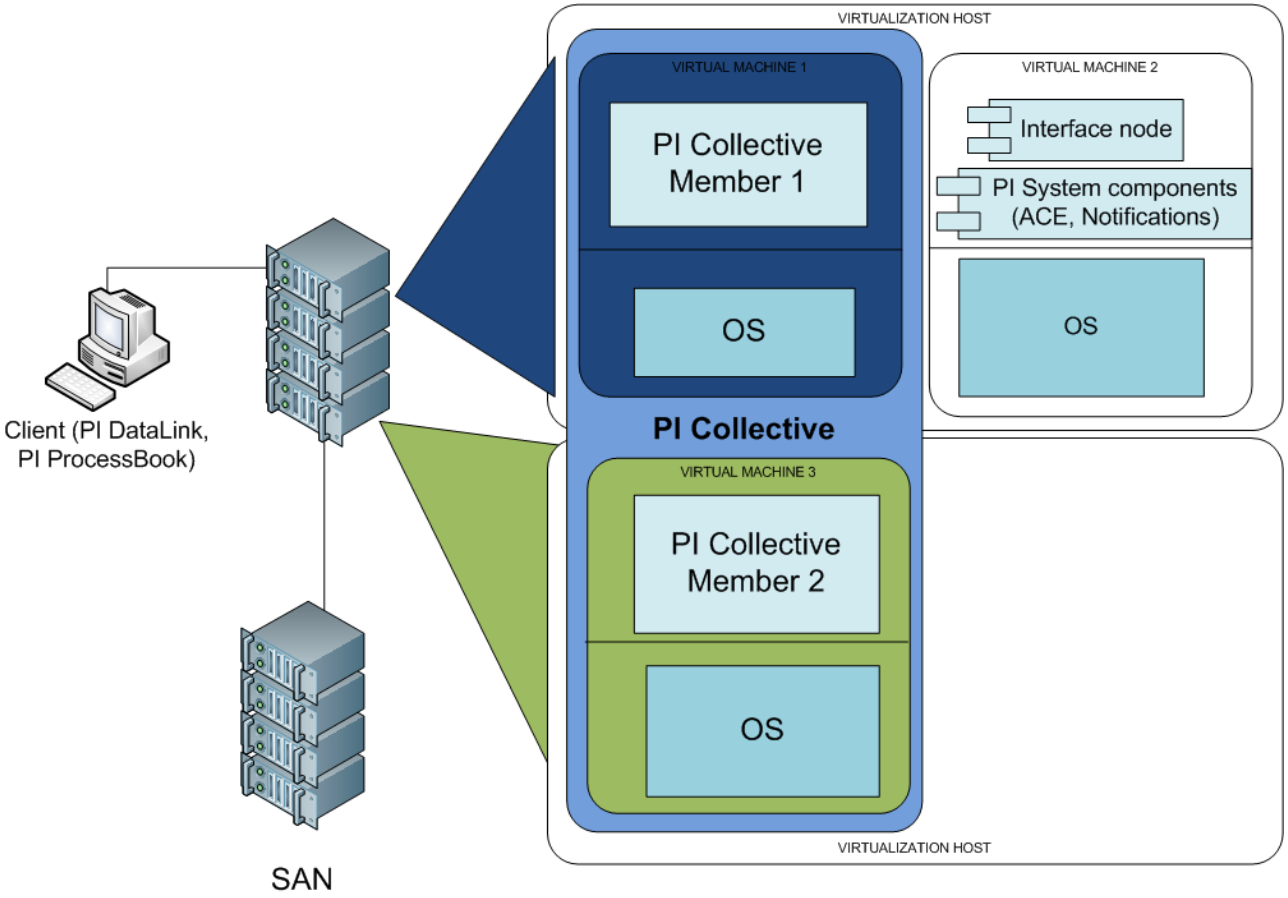
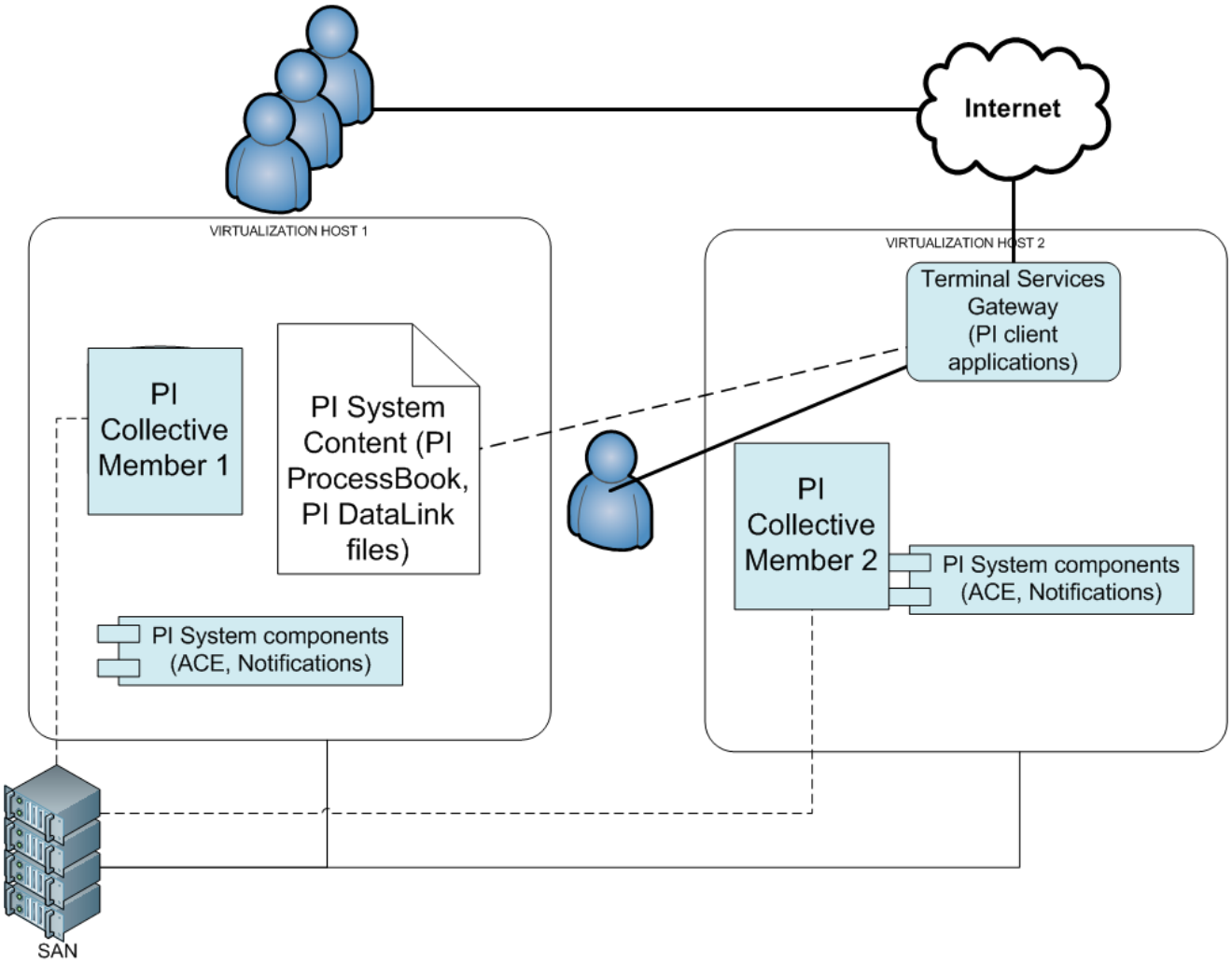
Virtual HA PI with SAN

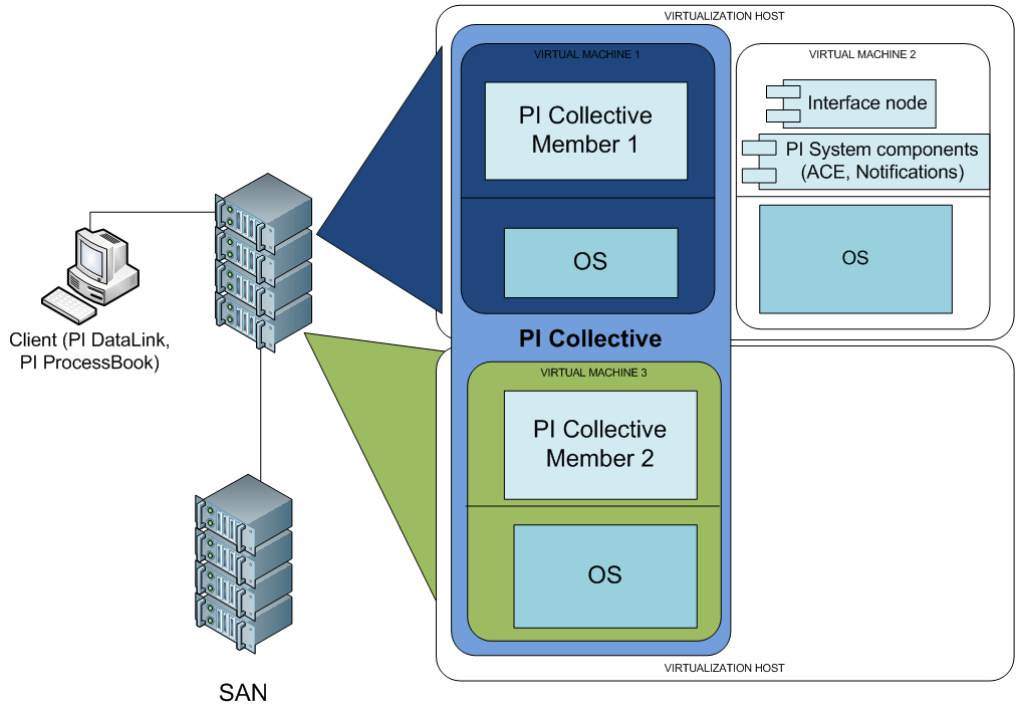


Virtual System including Clients



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



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Benefits of PI in a Virtualization Project

- 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

Benefits: PI in a Virtualization Project

- 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

More Information

- 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

Next Steps

- 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: ProductManagers2@osisoft.com
- Contact your salesperson for more detailed information

Thank you

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