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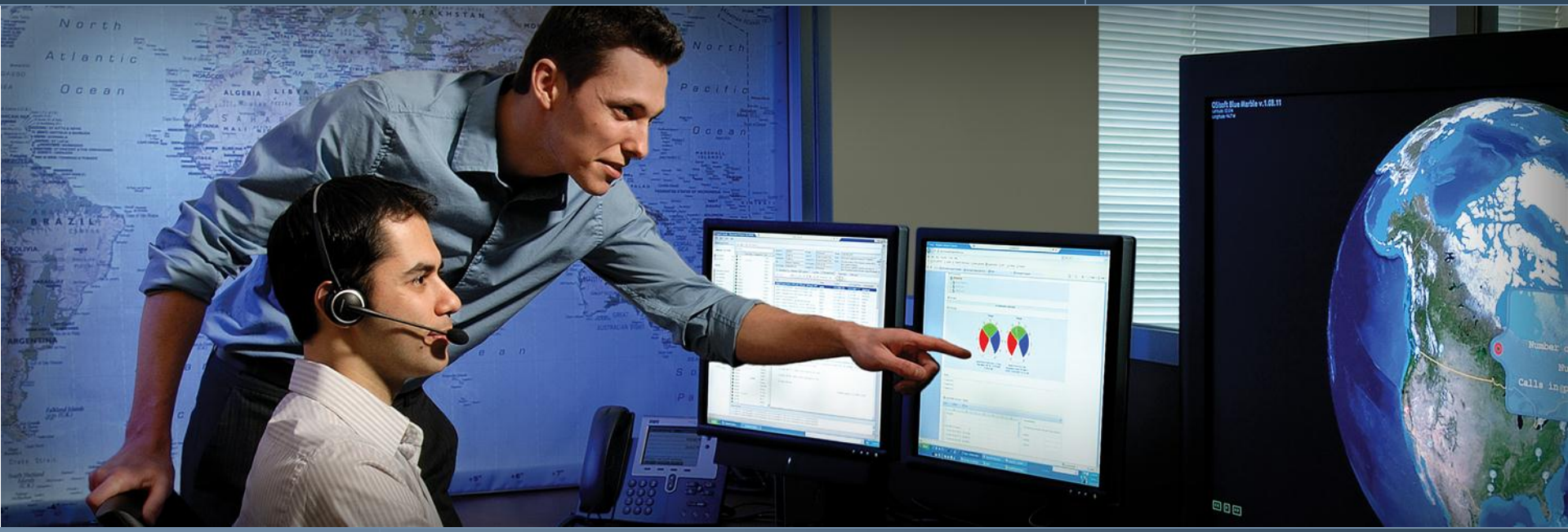
Regional Seminar Series



Architecture and Best Practices Recommendations for PI Systems

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OSIsoft, LLC

Empowering Business in Real Time.

Areas of discussion & Topics Outline

- Visualization
- Notifications
- Asset Framework
- Advanced Computing Engine
- PI Server
- Interfaces

Hardware/Virtualization

Operating System

High Availability

Security

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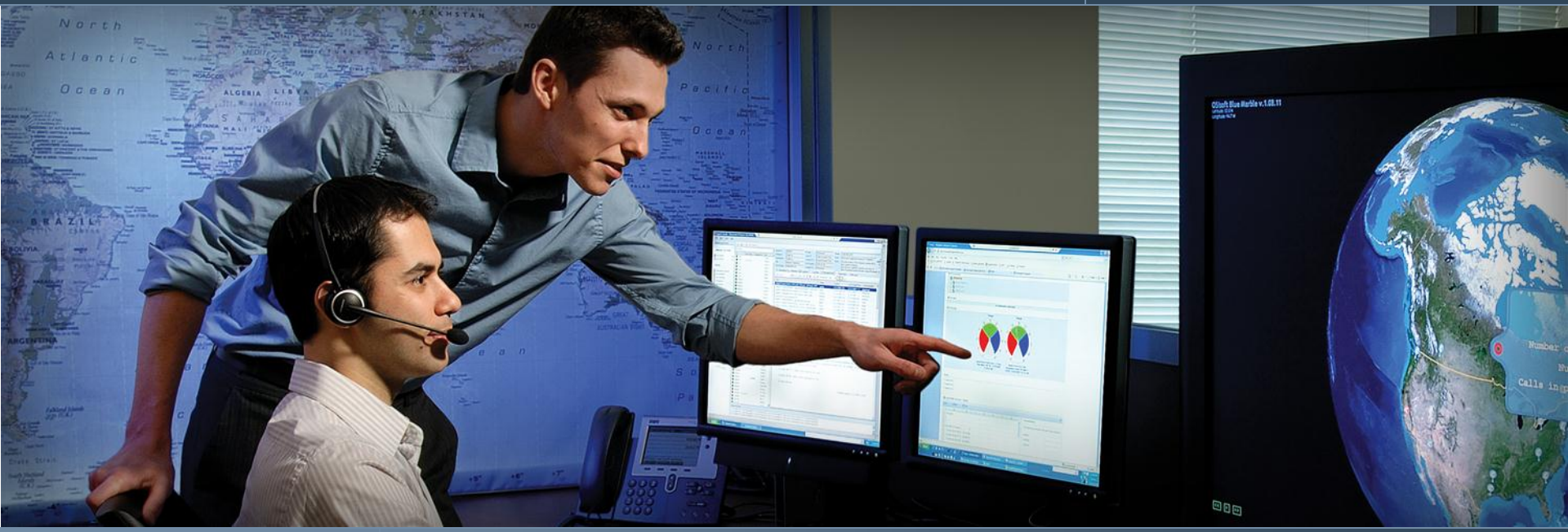

Hardware/Virtualization

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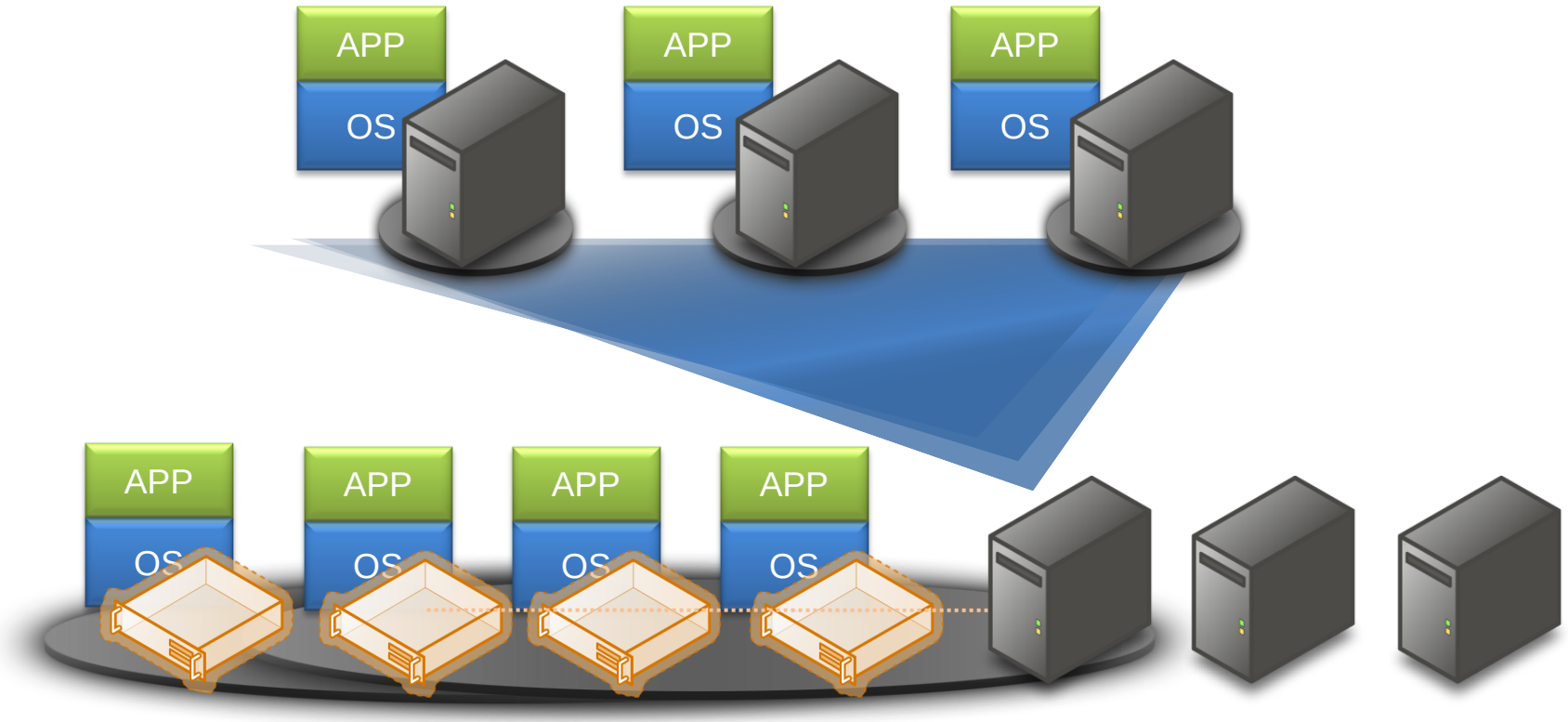
Hardware Virtualization

Overview



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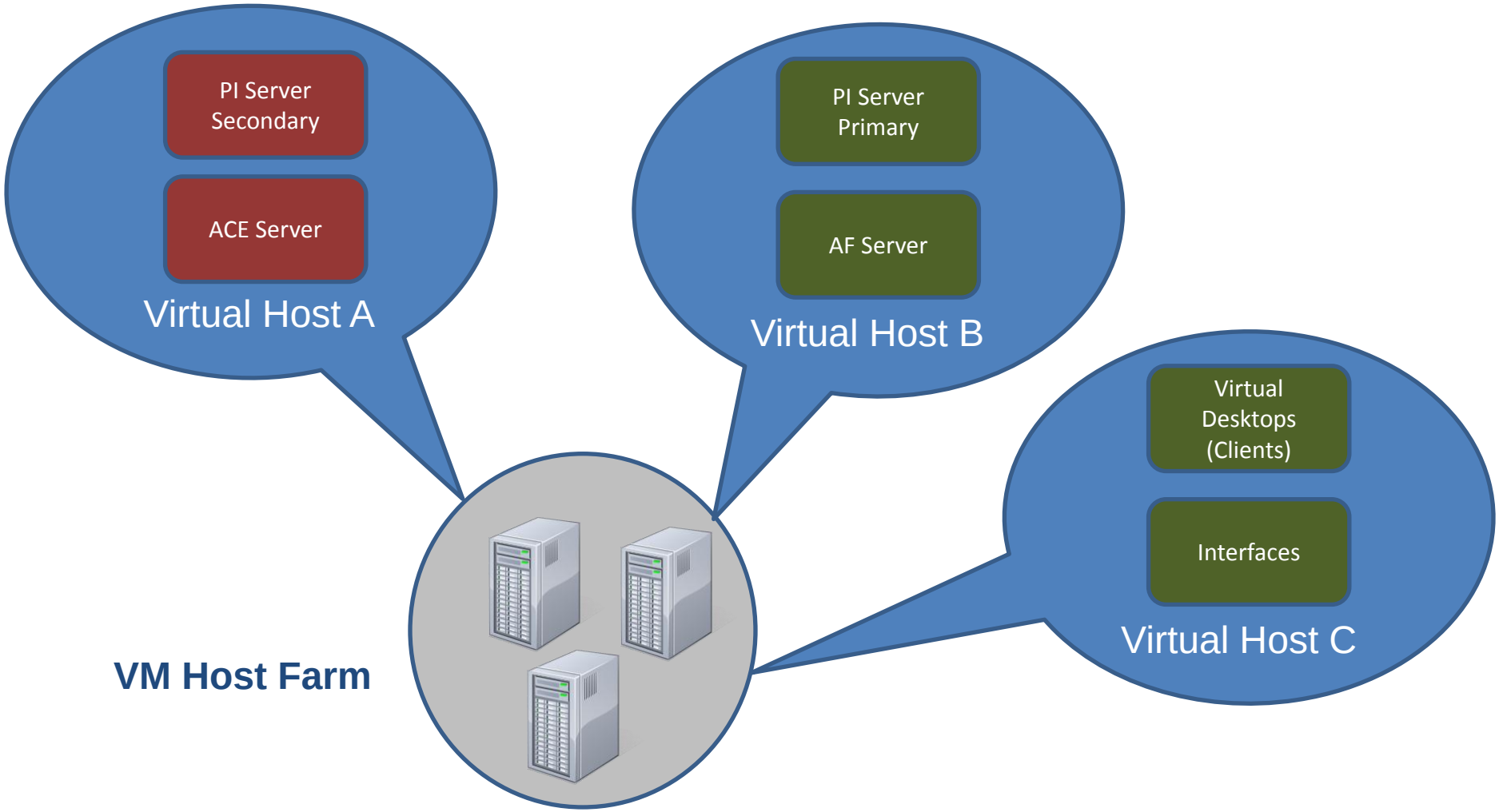
Operating System Virtualization

- Why are OSIsoft customers using Virtualization?
  - Server consolidation
  - Improved availability and provisioning
- OSIsoft supports virtualization
  - OSIsoft Knowledge Base article 3062OSI8
  - Consider shared resources implications

Virtualized PI System



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Operating System Virtualization*

Best practices

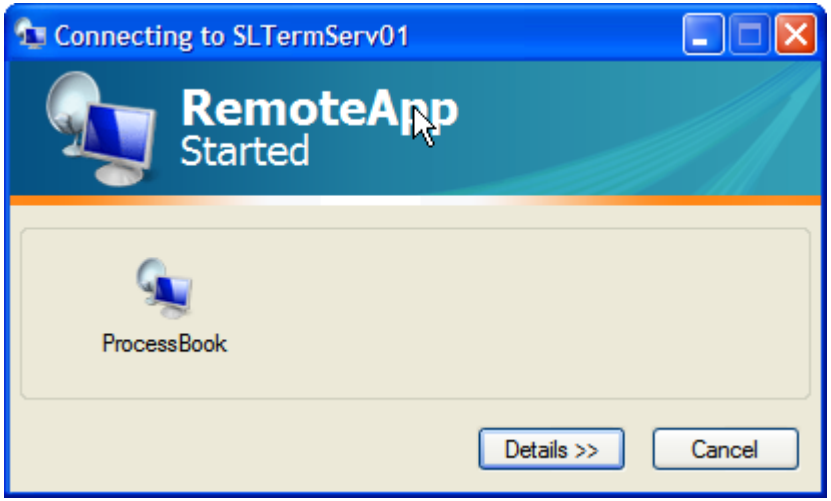
- Treat virtual machines as if they were physical machines
- Invest in Enterprise-level hardware and software
- Do not mix virtual and physical on the same host
- Use qualified Virtualization support personnel
- Test on the target platform

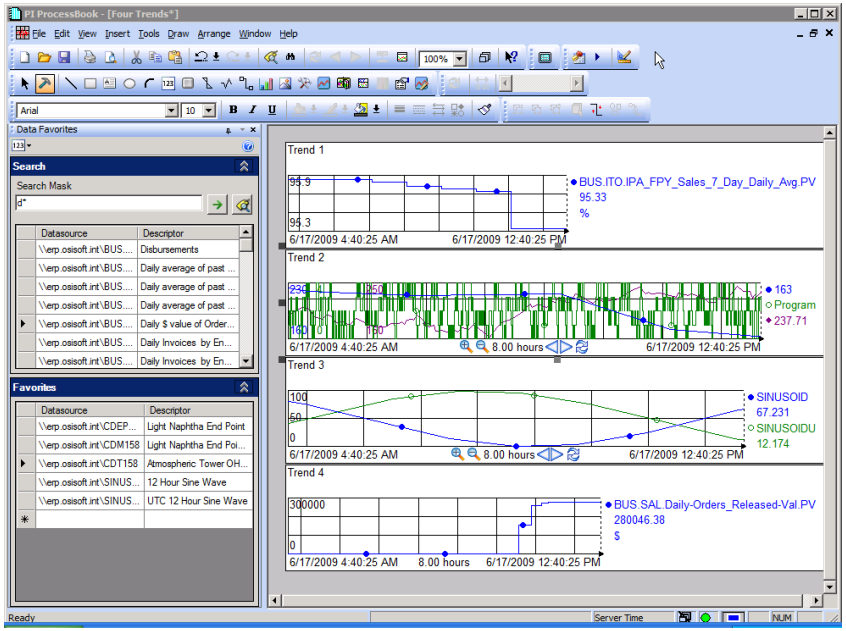
* OSIsoft Center of Excellence

Application Virtualization

Overview

- Applications centrally installed and managed
- Users are remote
- OSIsoft customers are successfully using Microsoft and Citrix virtualization products





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64 Operating Systems

Overview

- Why 64-bit?
  - Access to larger memory footprint
  - Reduce limitation to applications
    - PI ACE contexts was limited due to 32 bit

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PI System 64 bit operating system support

- Several products support native 64-bit operation
  - Examples: PI Server, PI Web Parts, Asset Framework
- Windows compatibility layer enables 32-bit programs to run on 64-bit
  - Example: Interfaces, PI ACE
- Future product releases will support native 64 bit
  - PI ACE, PI Notifications

64-bit Application Support - Exceptions

- Certain components work only with 32-bit versions of applications
- PI System Add-ins for Microsoft Excel
- DataLink for Excel
- RDBMS interface and 64-bit drivers
- PI ActiveView & PI Graphic (SVG) require 32-bit Internet Explorer

PI System 64 bit operating system support

Best practices

- Verify support
  - Release Notes
  - Technical support
- Scenarios to watch out for
  - Applications that are plug-ins or run by another application
    - Microsoft Internet Information Server
    - Office 2010
  - Where 3rd party libraries (dlls) need to run with another application
    - RDBMS interface

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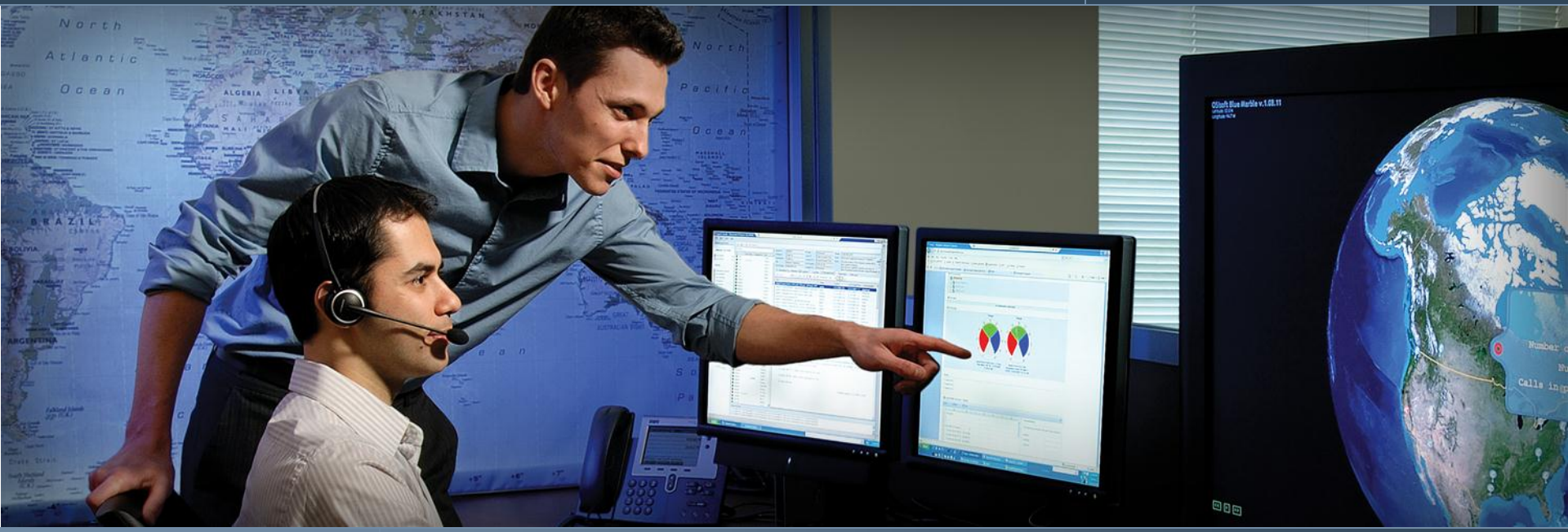

High Availability

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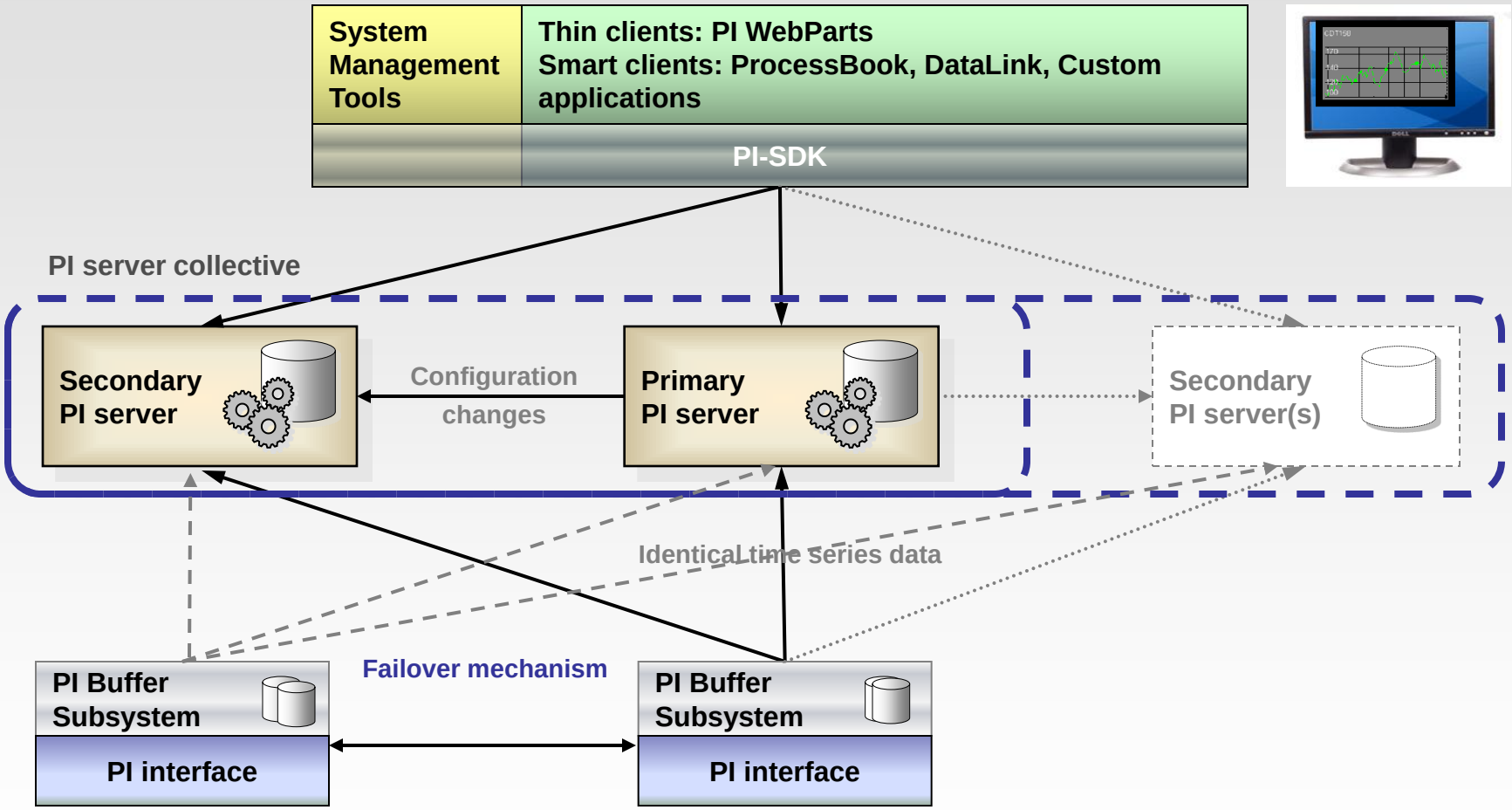
PI Server High Availability (PI HA)

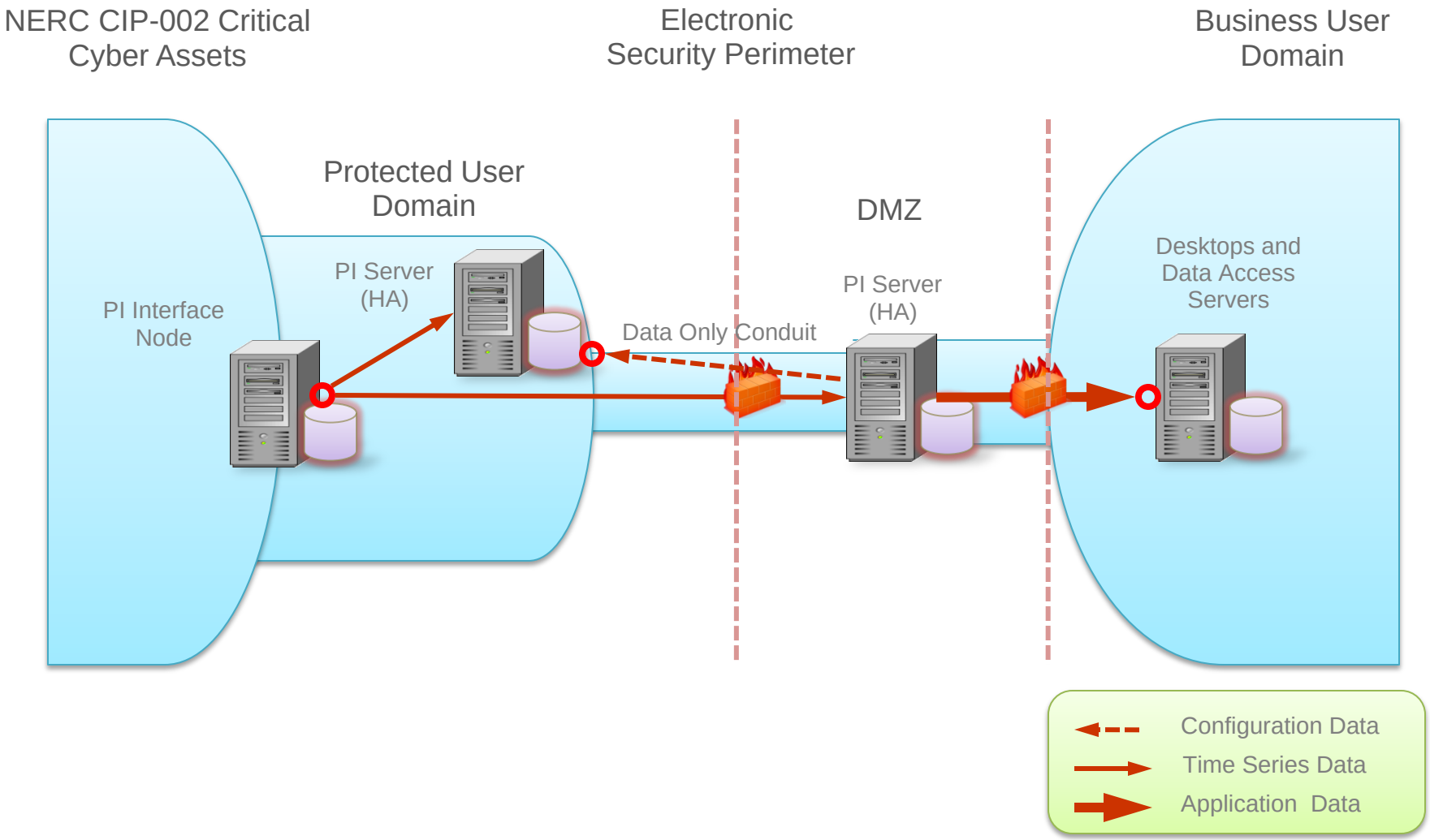
Overview

- Redundancy with multiple PI Servers as one collective
- Goal: Maximize data access for clients

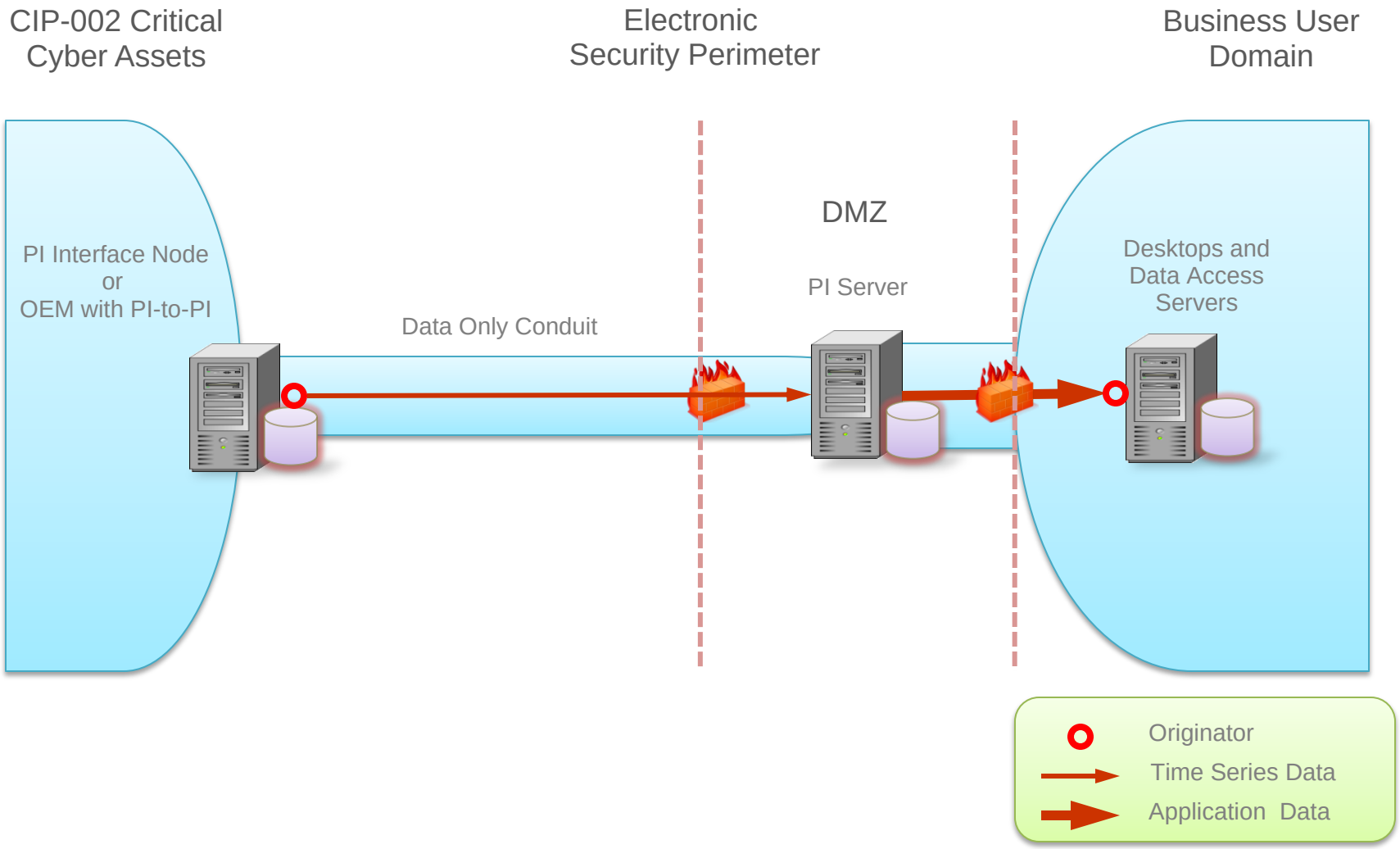
PI Server – High Availability Architecture



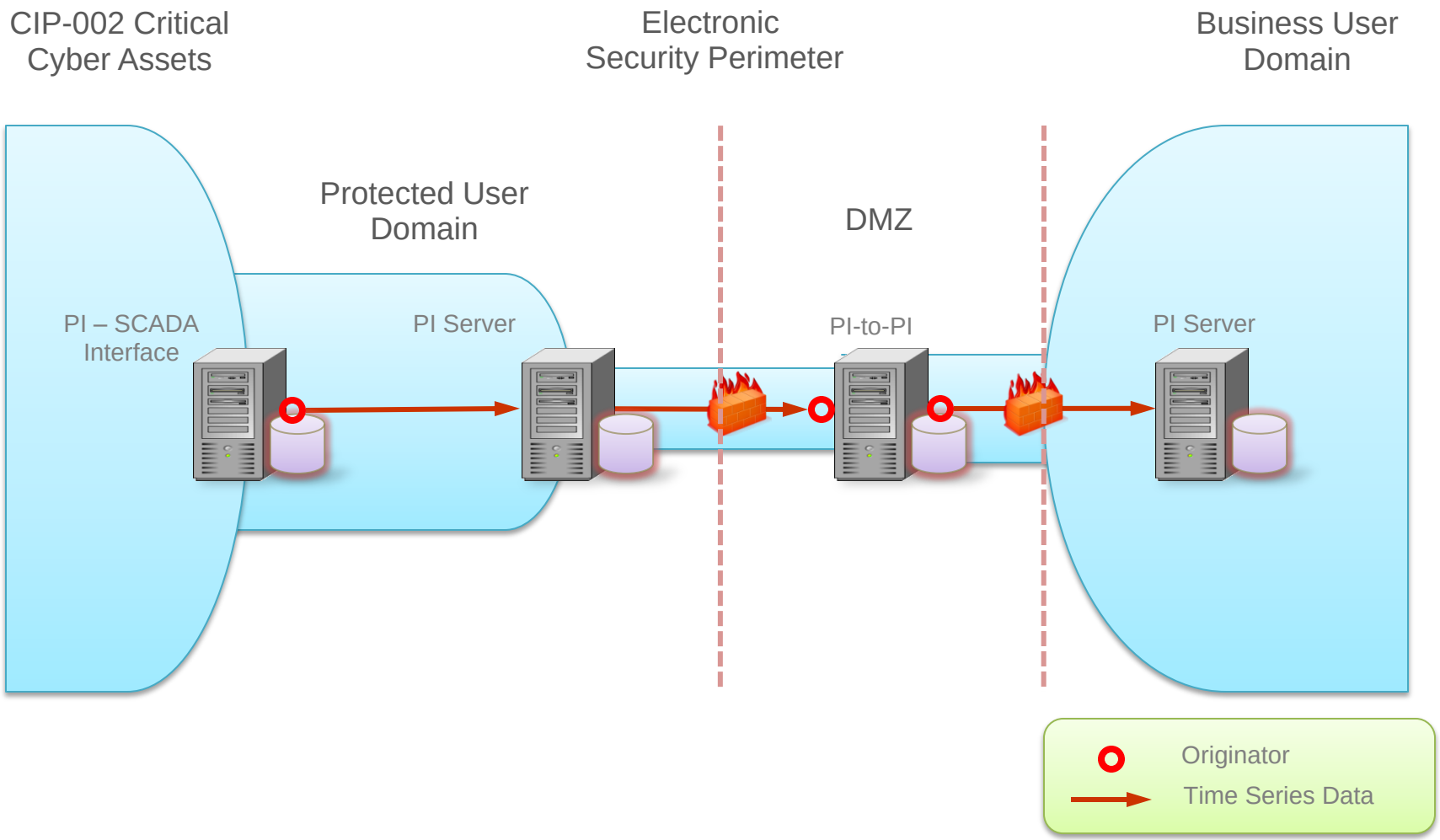
PI HA and security architecture



PI System deployment across security zones



Replication of PI System data



PI Server High Availability

Benefits

- Maintain availability during scheduled maintenance
- Redundancy of data
- Locate PI Server member close to consumers of the data

Best practices

- Implement PI Server High Availability

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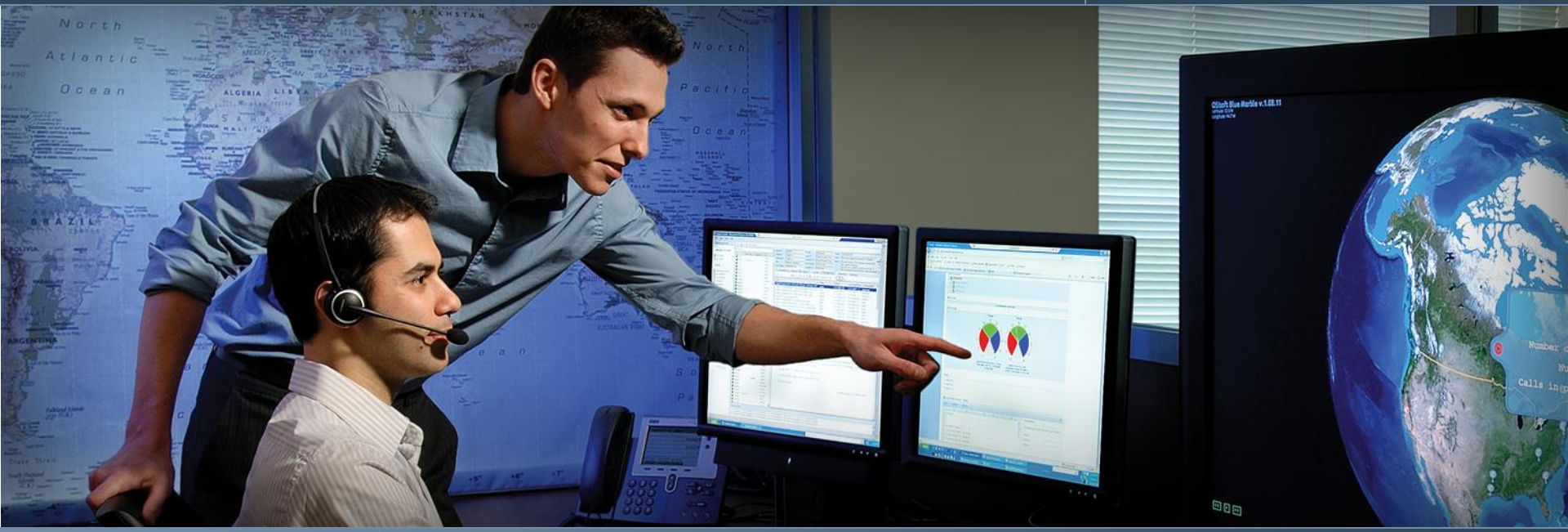

Security

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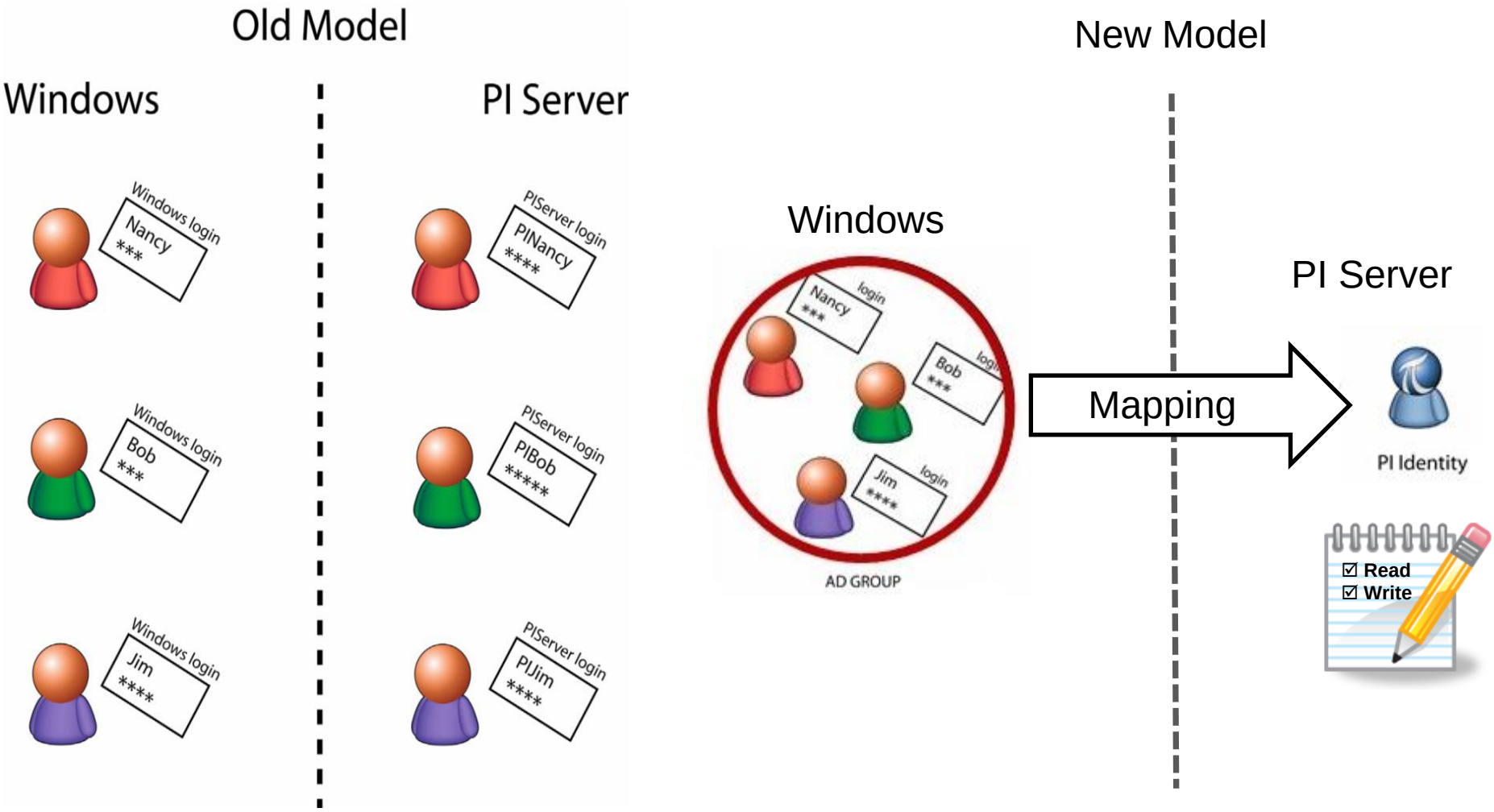
PI Server Security

Overview

- PI Server 3.4.380.36 (2009) introduced support for Windows Integrated Security
- Microsoft Active Directory (AD) integration
- Map AD users to PI Identities
- PI Identities are roles on the PI Server
  - PIOperators, PIEngineers, PISupervisor

Comparing PI Users and PI Identities



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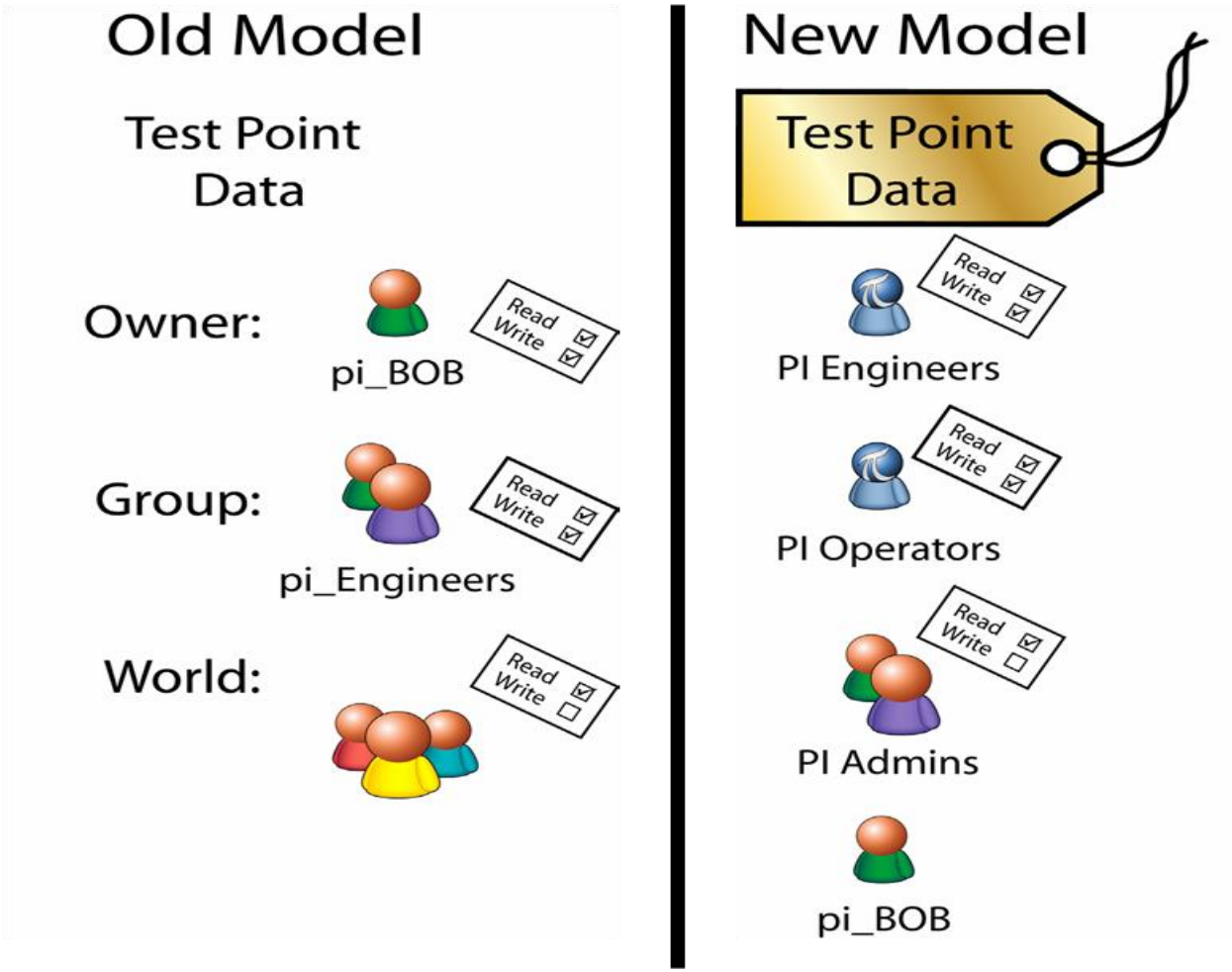
Authorization: Object Level Security Model



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Automatic Backward Compatibility

Tag	dataaccess	datagroup	dataowner
sinusoid	o:rw g:rw w:r	pi_users	bob

Tag	datasecurity
sinusoid	pi_users:A(r,w) | bob:A(r,w) | PIWorld:A(r)

Active Directory Integration

- PI Server must be a member of a domain to leverage Kerberos authentication
- Multiple AD domains must have trusts established or users and groups from other domain cannot be used
  - One-way trusts are supported: the server domain must trust the client domain
- For non-domain accounts, you can use Windows Local Groups from the PI Server machine
  - Passwords have to match for NTLM authentication

PI Identity Planning

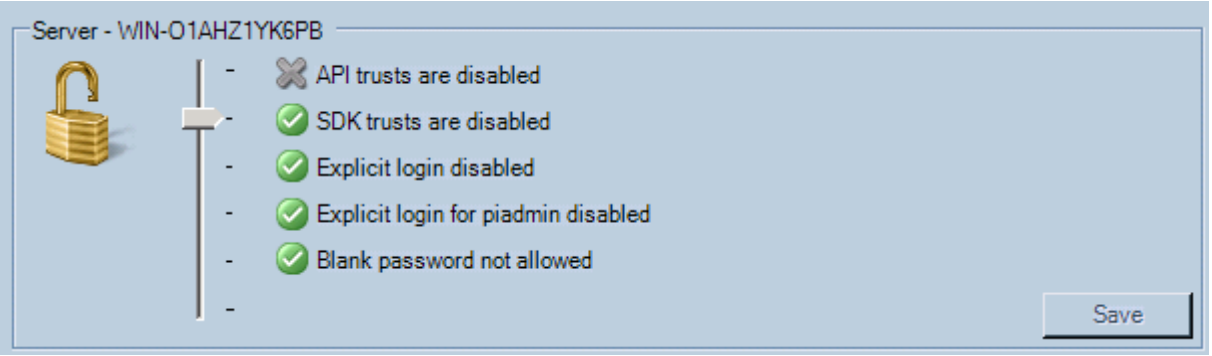
Best practices

- Develop a PI Identity Scheme for your Organization
  - Protect your data
  - Ease of maintenance
  - Organizational separation
  - Standardize
- Consider Kerberos
  - Map AD principals directly
  - Map AD principals to local groups

How to Tighten Security

Best practices

1. Use the new Security Tool to help secure your PI Server
2. Disable or protect the PIADMIN account
3. Disable PI password authentication (Explicit Logins)
4. Secure piconfig by forcing login
5. Retire PI SDK-based Trusts
6. Use Windows Integrated Security



PI Server

Best practices

- Security
- Monitoring!
  - MCN Health Monitor
- Archives
- Backups

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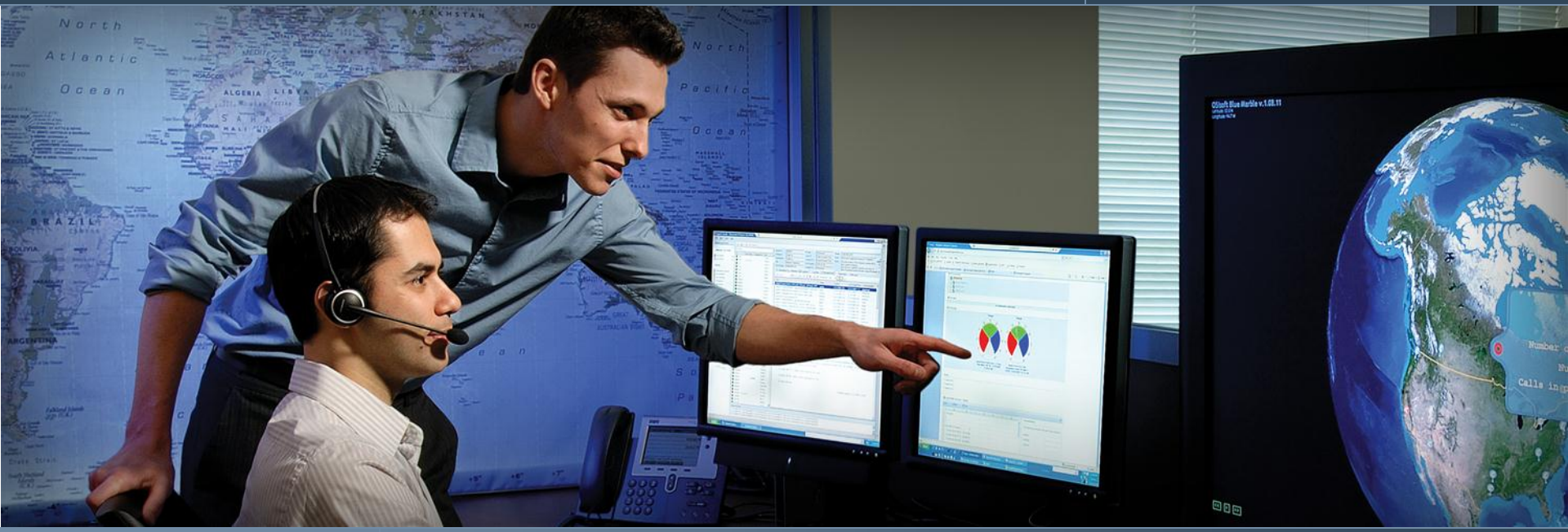

Advanced Computing Engine

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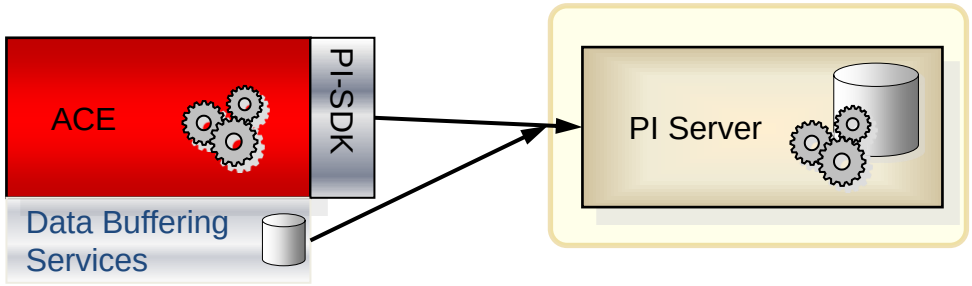
PI Advanced Computing Engine

Overview

- Develop calculations in Microsoft Visual Studio
- Wizards assist configuration
- High availability

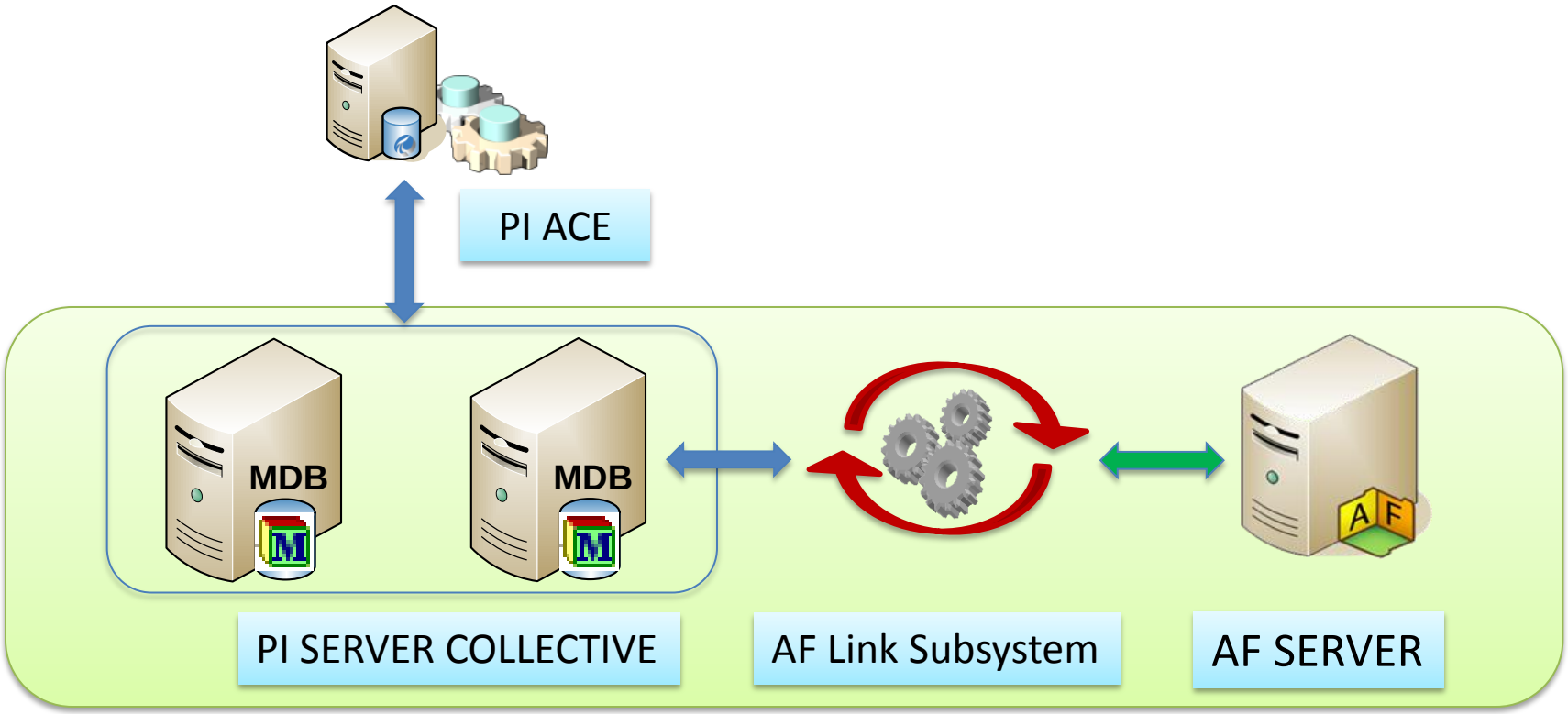


Best practices

- Configure buffering
- Error handling
- Performance Counters

Module database and Asset Framework

- ACE uses the Module Database (MDB) for configuration and calculation metadata
- PI Server 2010 enables Asset Framework (AF) for asset modeling



Areas of discussion & Topics Outline

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