Architecting Your PI System

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Agenda

- Basic PI System Architecture
- Disaster Recovery
- Expanding PI System
- Security Considerations
- OSIsoft Cloud Services (OCS)

Basic PI System Architecture

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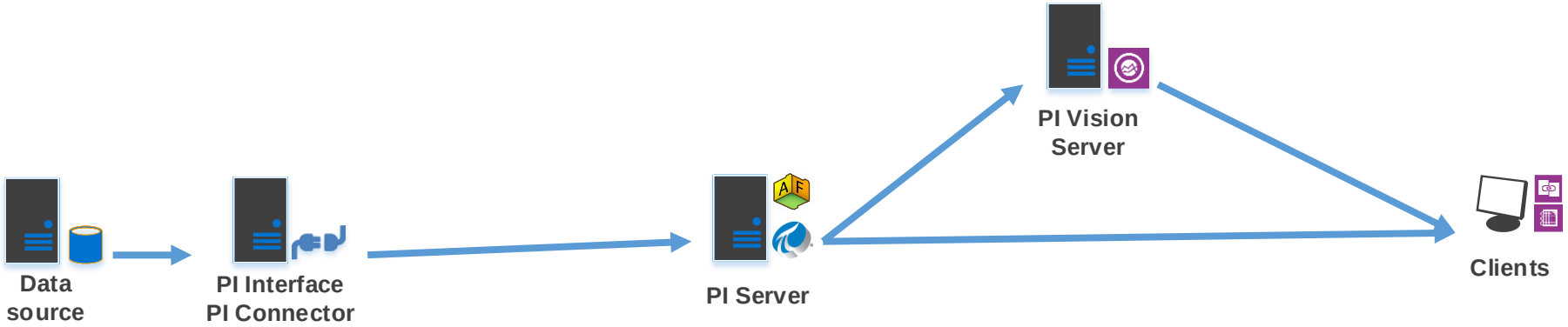


Disaster Recovery

Disaster Recovery

Disaster Recovery (DR) is a set of tools, procedures and policies used to restore a system or environment after an unexpected disruption of service.

What Level of Protection is Needed?

What are Your Current Policies & Needs?

Where are Your Primary and Backup Locations?

Disaster Recovery (DR) and the PI System

- Including PI System into DR Plan
  - Ensure PI System availability and quality in case of emergency
  - PI Backups, Redundant Interfaces and High Availability are NOT stand-alone Disaster Recovery solutions, but they can be components of a DR architecture
  - PI System details need to be included in business continuity plans and documentation

DR Requirements Impact on Architecture

- Scope of Protection
- Time to Recover
- Primary versus Backup Site Design
- Data versus Services

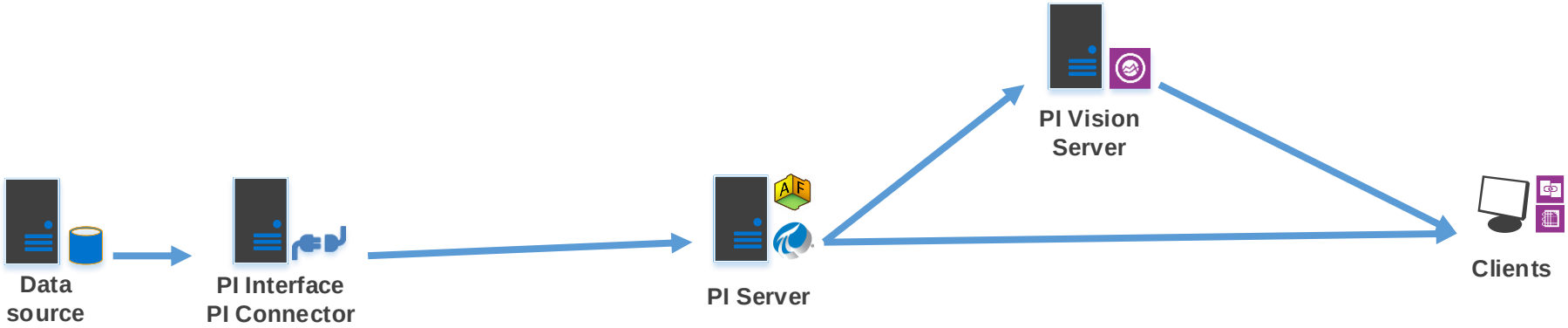
Recent research supports the idea that implementing a more holistic pre-disaster approach is more cost-effective in the long run. Every $1 spent on hazard mitigation saves society $4 in response and recovery costs.

https://nws.weather.gov/nthmp/Minutes/oct-nov07/post-disaster_recovery_planning_forum_uo-csc-2.pdf

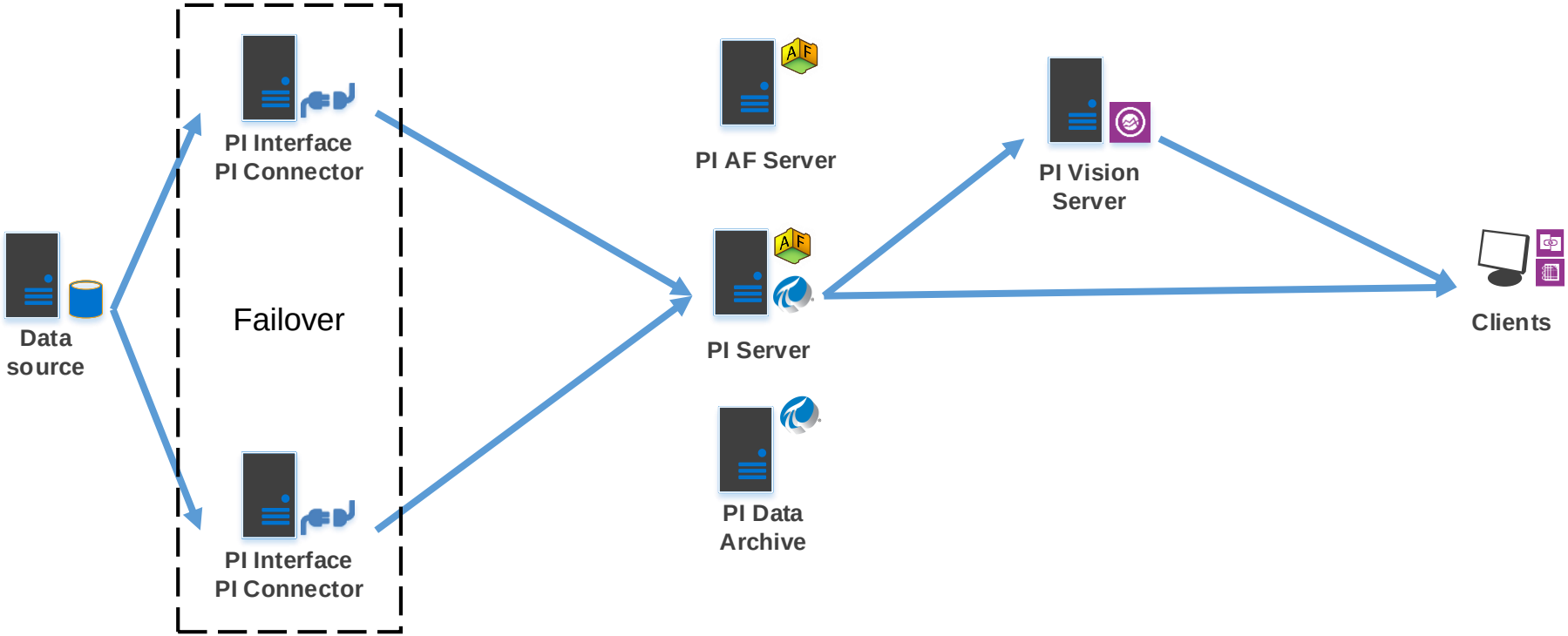
Disaster Recovery Recommended Practices

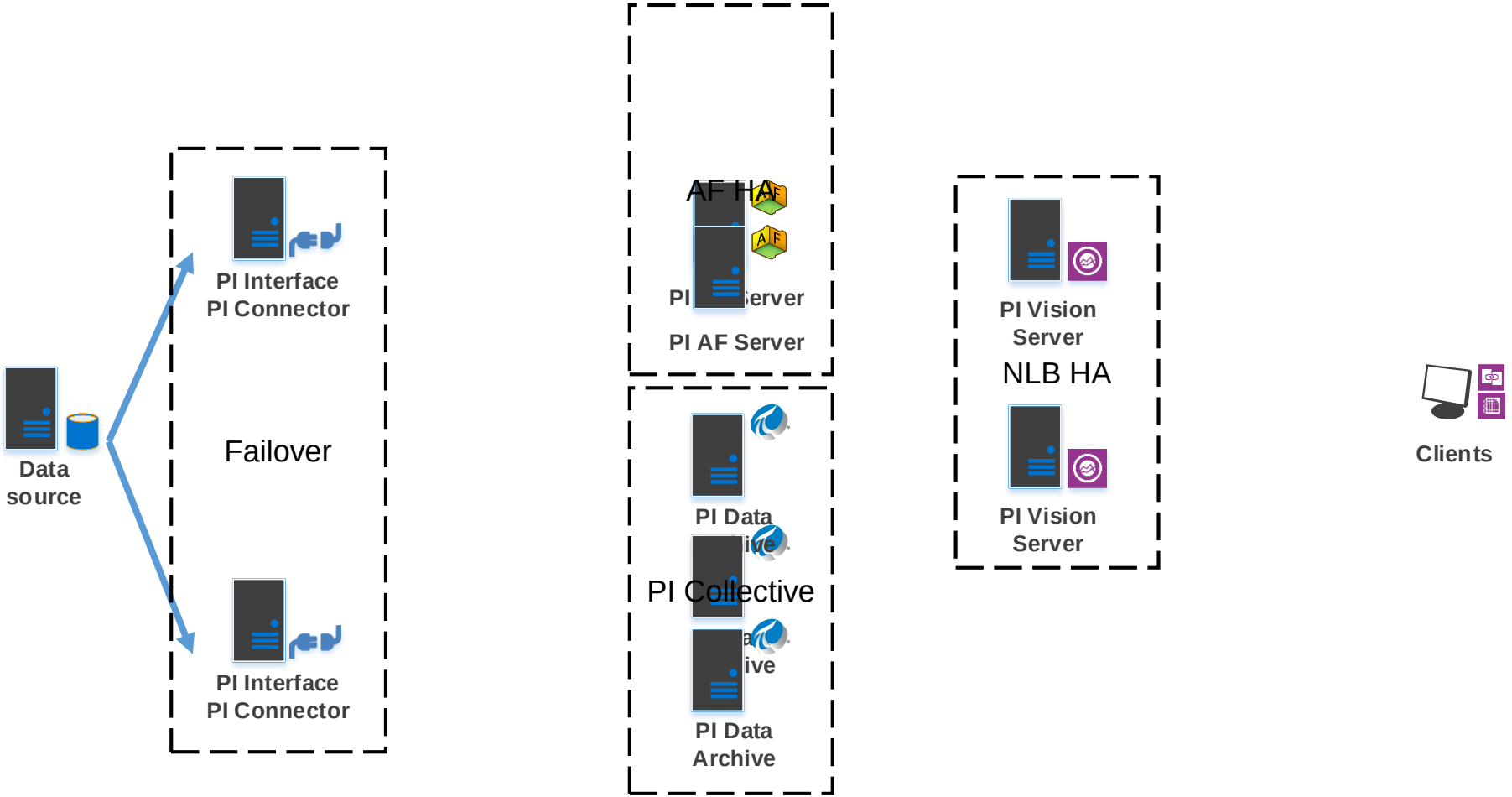
- DR versus High Availability
  - Highly Available (HA) systems are not considered as the complete solution of the Disaster Recovery plan
  - While HA architectures will have an impact on the recovery process, they should be designed and implemented independently of a DR process
- DR versus Data Backups
  - Data backups are also not considered as the complete solution of the Disaster Recovery plan
  - While Data backups may be included in a DR process, they should be designed and implemented independently of a DR process
- DR Documentation
  - The Disaster Recovery and Restoration plans need to be thoroughly documented and shared with everyone involved in both processes
- DR Readiness
  - Every company should hold at least an annual DR simulation, to prove that the tools and servers and process will work in the event of a real emergency

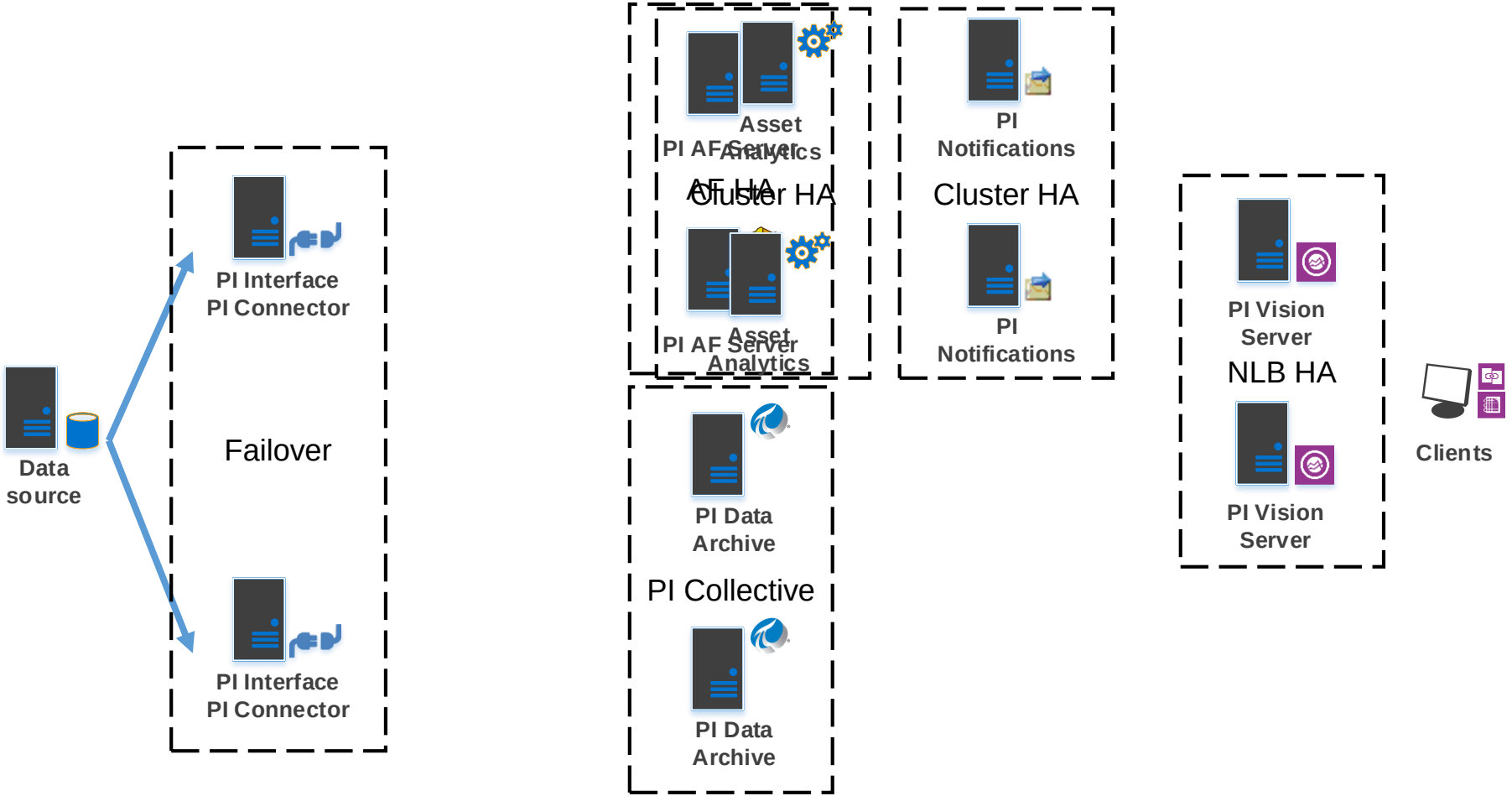
Expanding PI System



Expanding PI System







Data Loss vs Data Availability

	Data Loss	Data Availability
Who cares?	What everyone is concerned about!	What many are concerned about!
Drivers for Concern	No one ever wants to LOSE data!	Availability concerns are driven by the customer's use of the data and how much it's integrated into their business processes.
What Question to Ask	If the PI Interface or PI Server goes down, will I lose data?	If the PI Server goes down, can my end users wait [4 hours] to see their data? What is the business impact of this?
Risk Mitigation Technologies	• Interface Buffering • Interface Failover (Redundancy) • Interface History Recovery • Data Source Failover	• Interface\Connector Failover (Redundancy) • Application Redundancy / High Availability (PI DA Collective, PI AF HA, Asset Analytics, Notifications , PI Vision…)

How much availability do you need?

Category	% Uptime	Downtime (Min/Month)	Downtime (Hrs/Month)	Downtime (Min/Year)	Downtime (Hrs/Year)
1 nine	98.000%	876.00	14.600	10,512	175.20
2 nines	99.000%	438.00	7.300	5,256	87.60
3 nines	99.900%	43.80	0.730	526	8.76
4 nines	99.990%	4.38	0.073	53	0.88
5 nines	99.999%	0.44	0.007	5	0.09

Security Considerations

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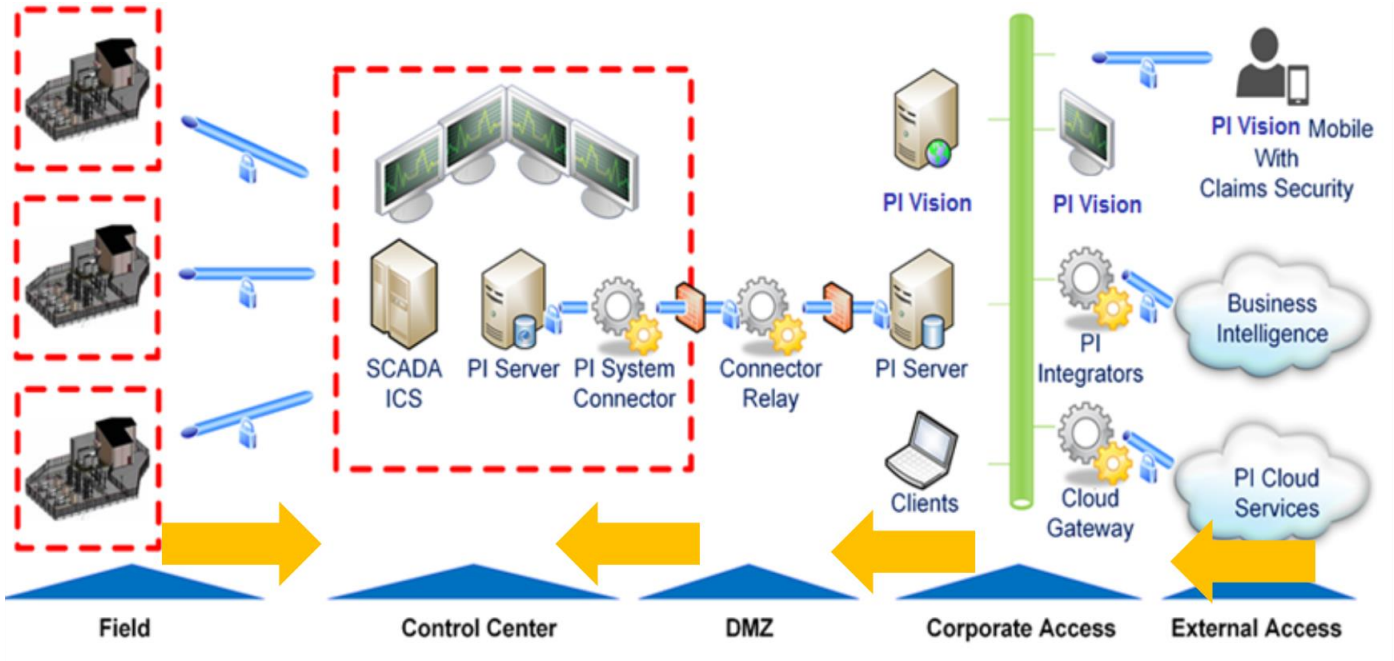
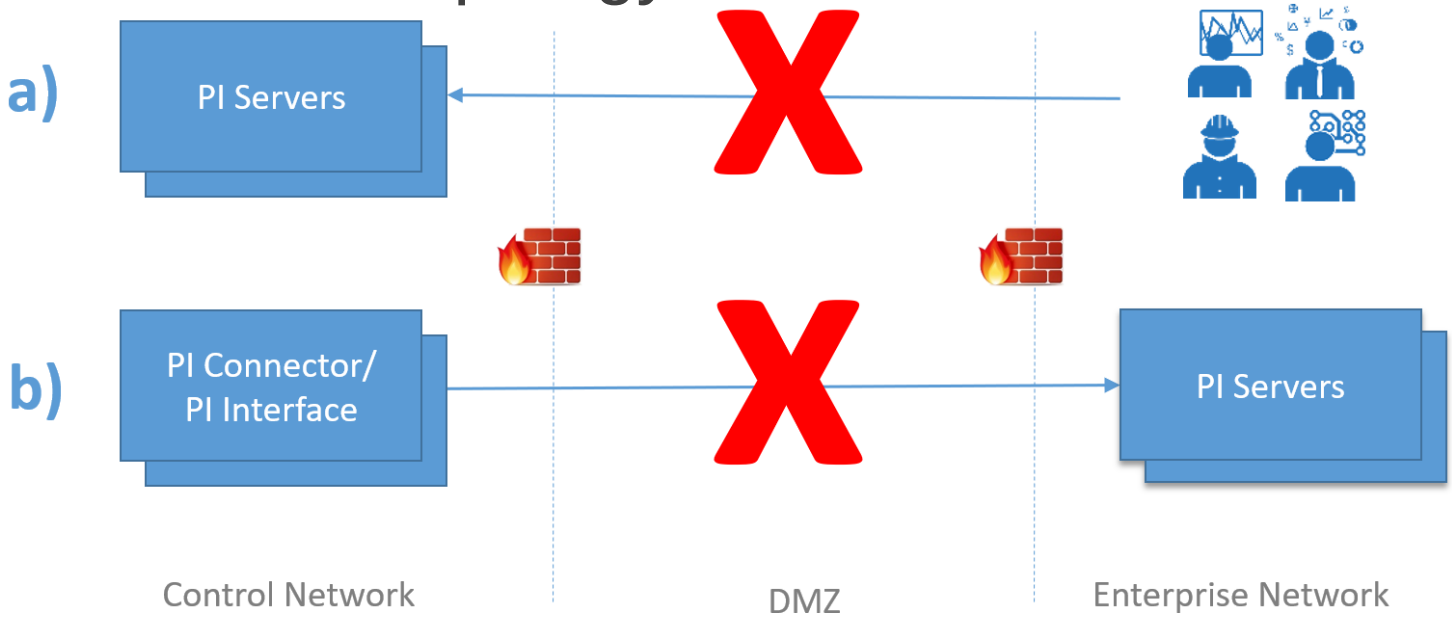


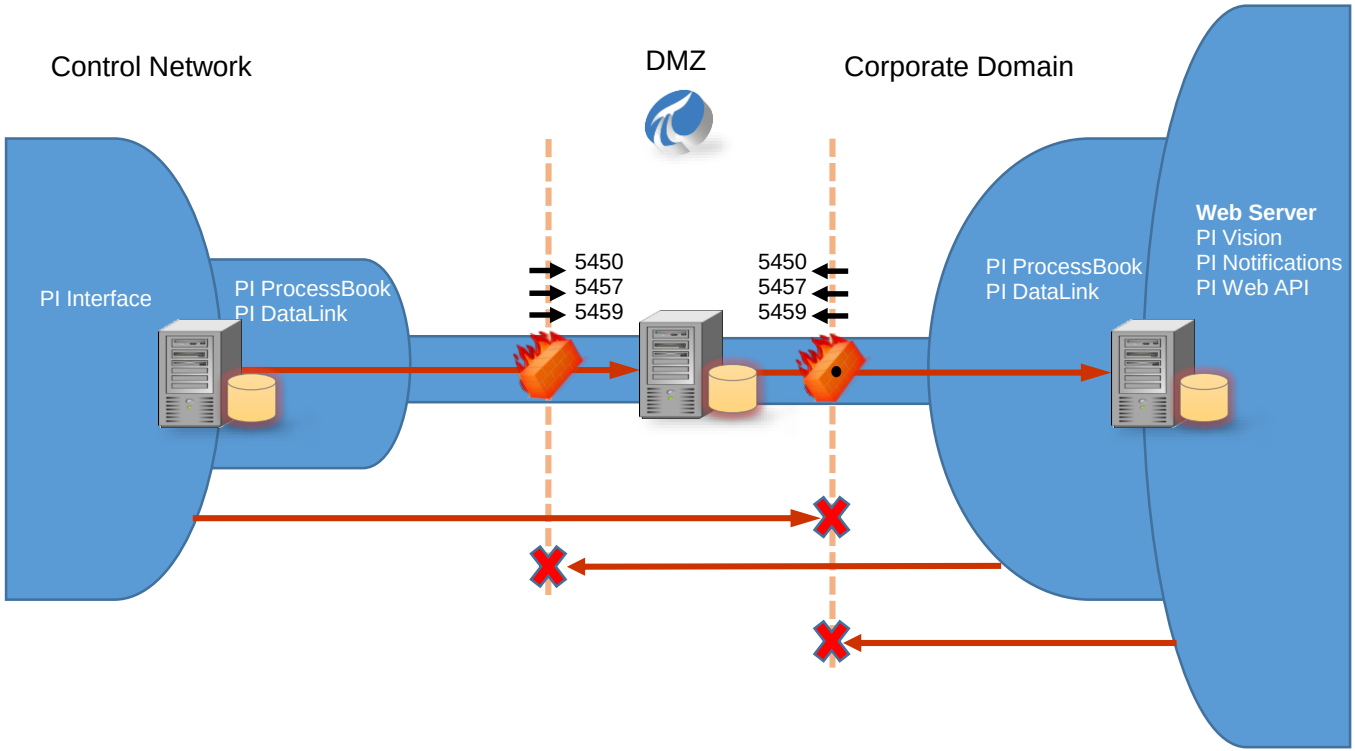
Directions of cyber attacks

Security Considerations

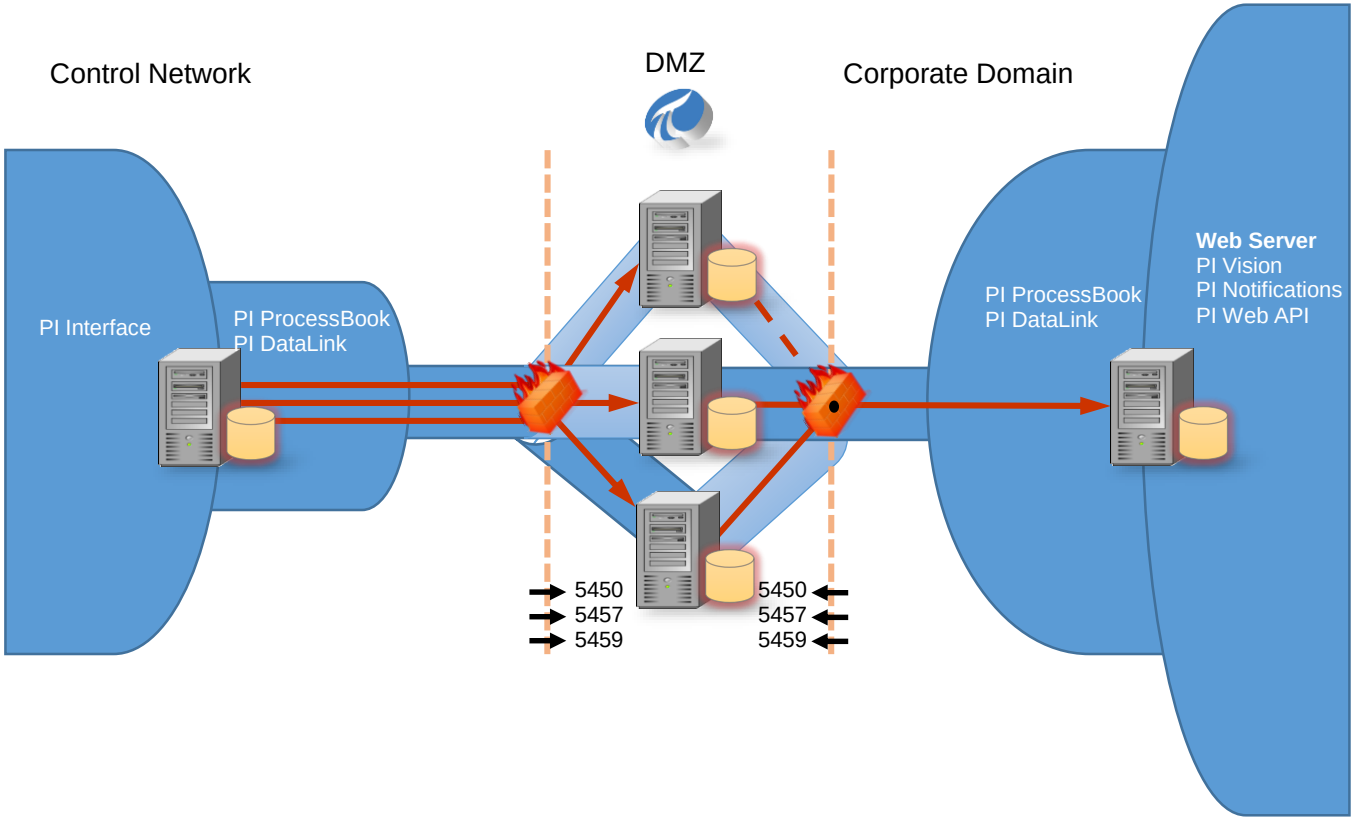
- Undesirable Topology



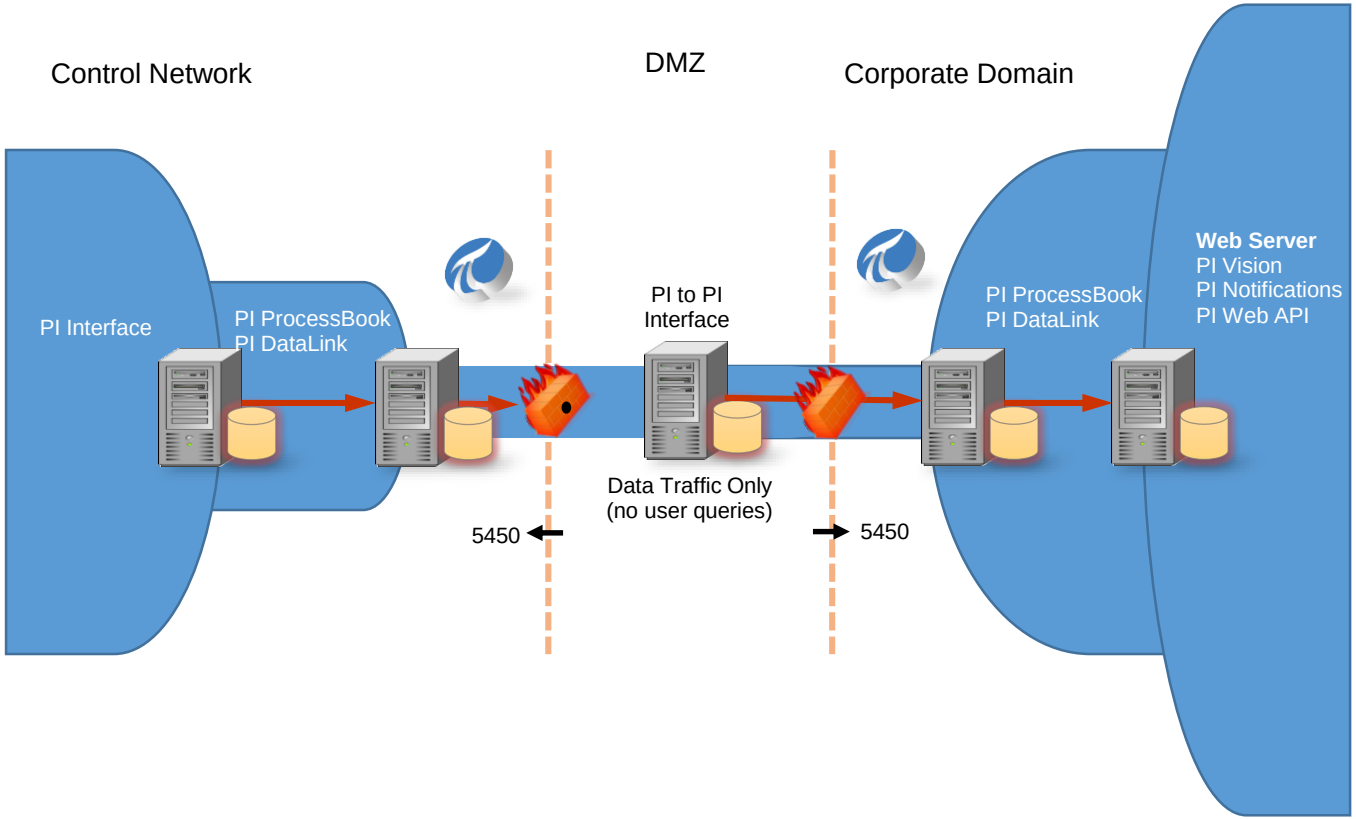
Pattern 1: DMZ with PI



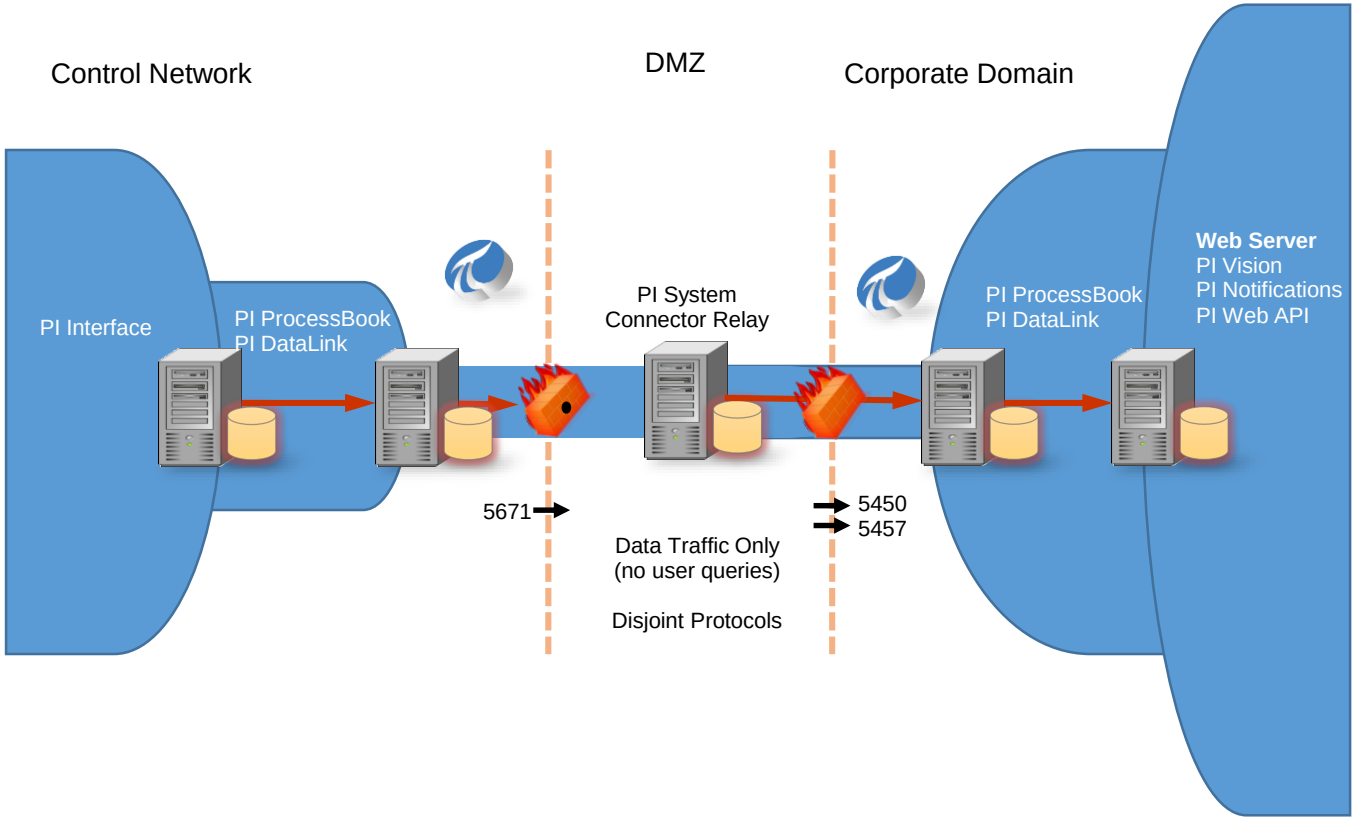
Pattern 2: PI High Availability



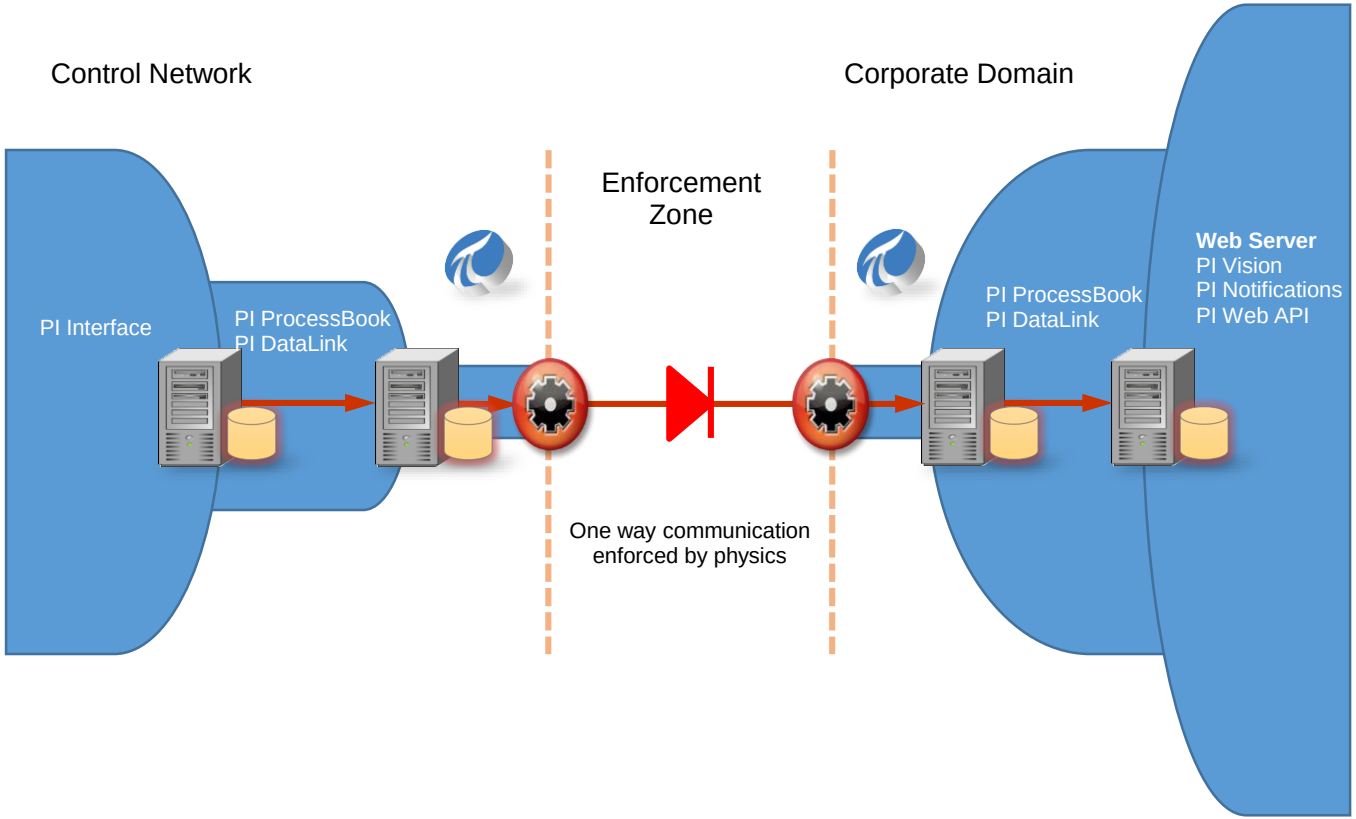
Pattern 3: DMZ with PI to PI



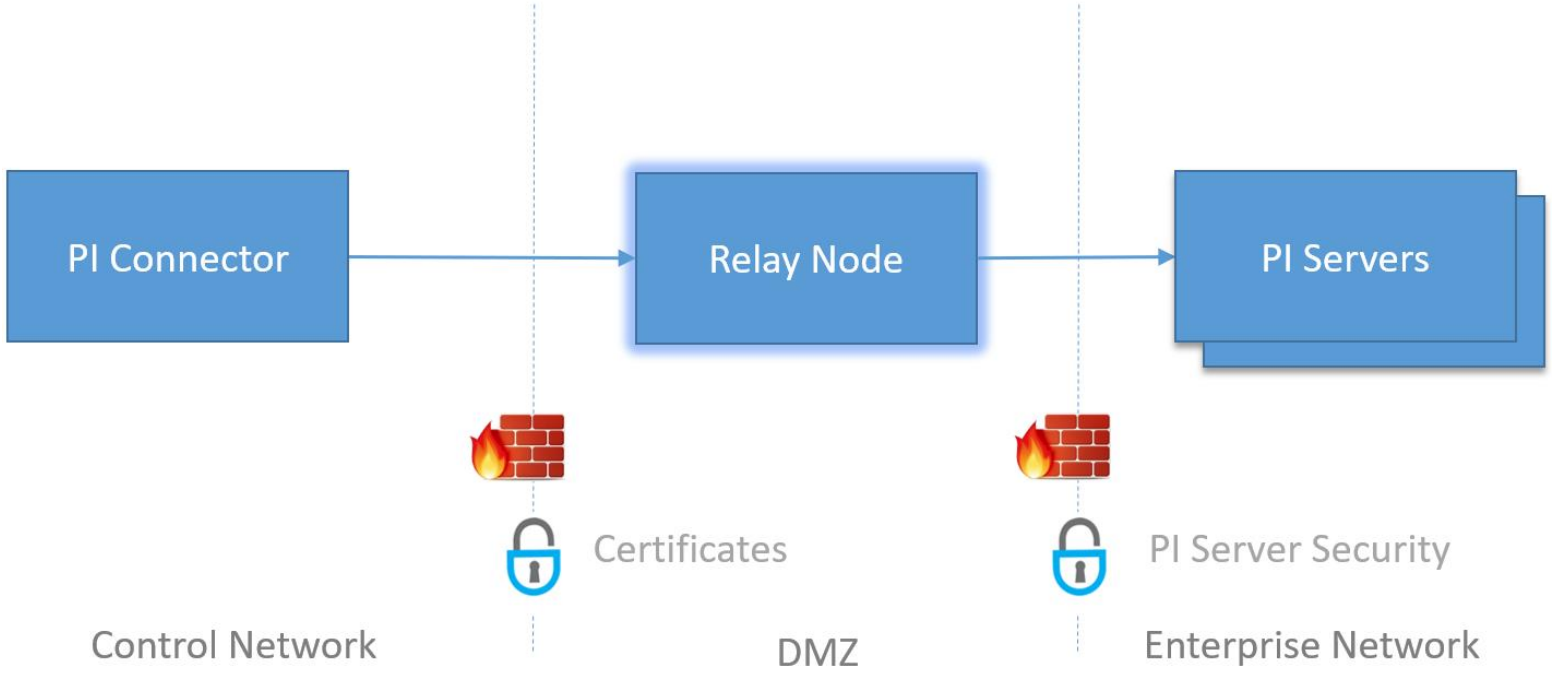
Patter 3: DMZ with PI System Connector



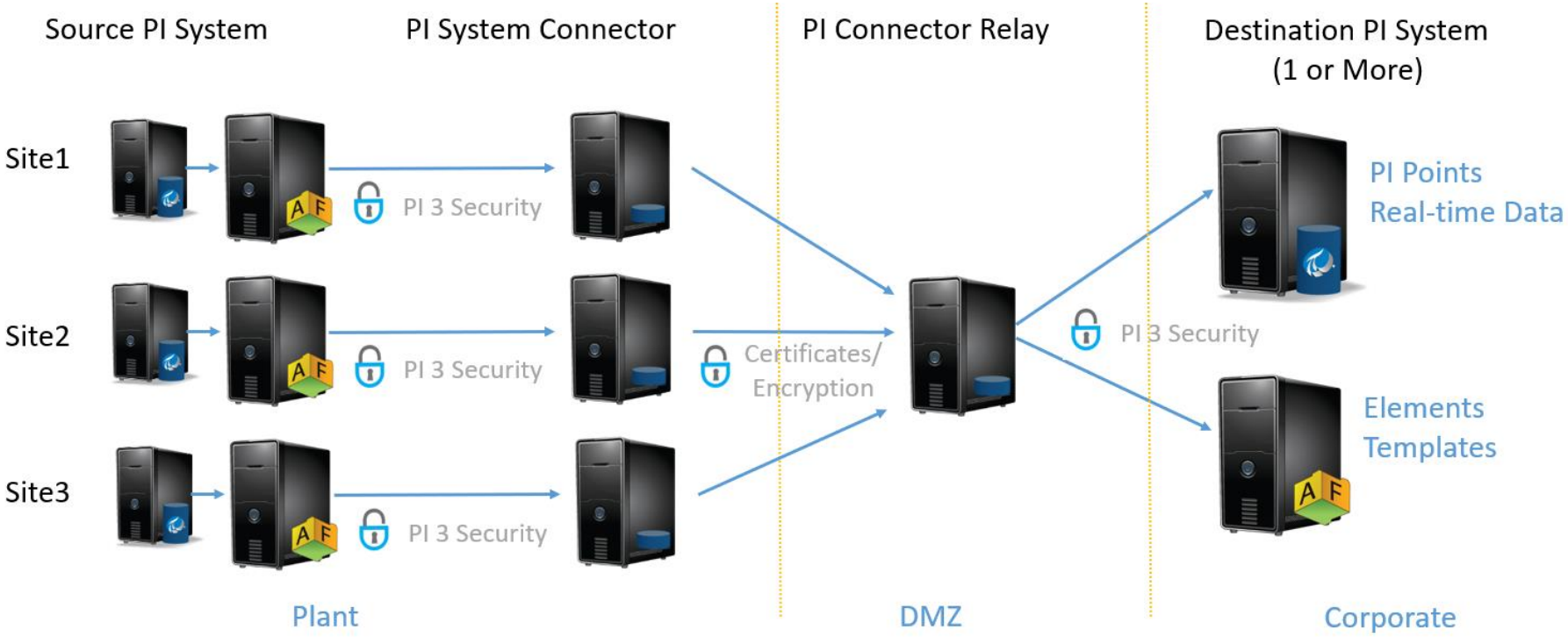
Pattern 3+: Absolute Enforcement



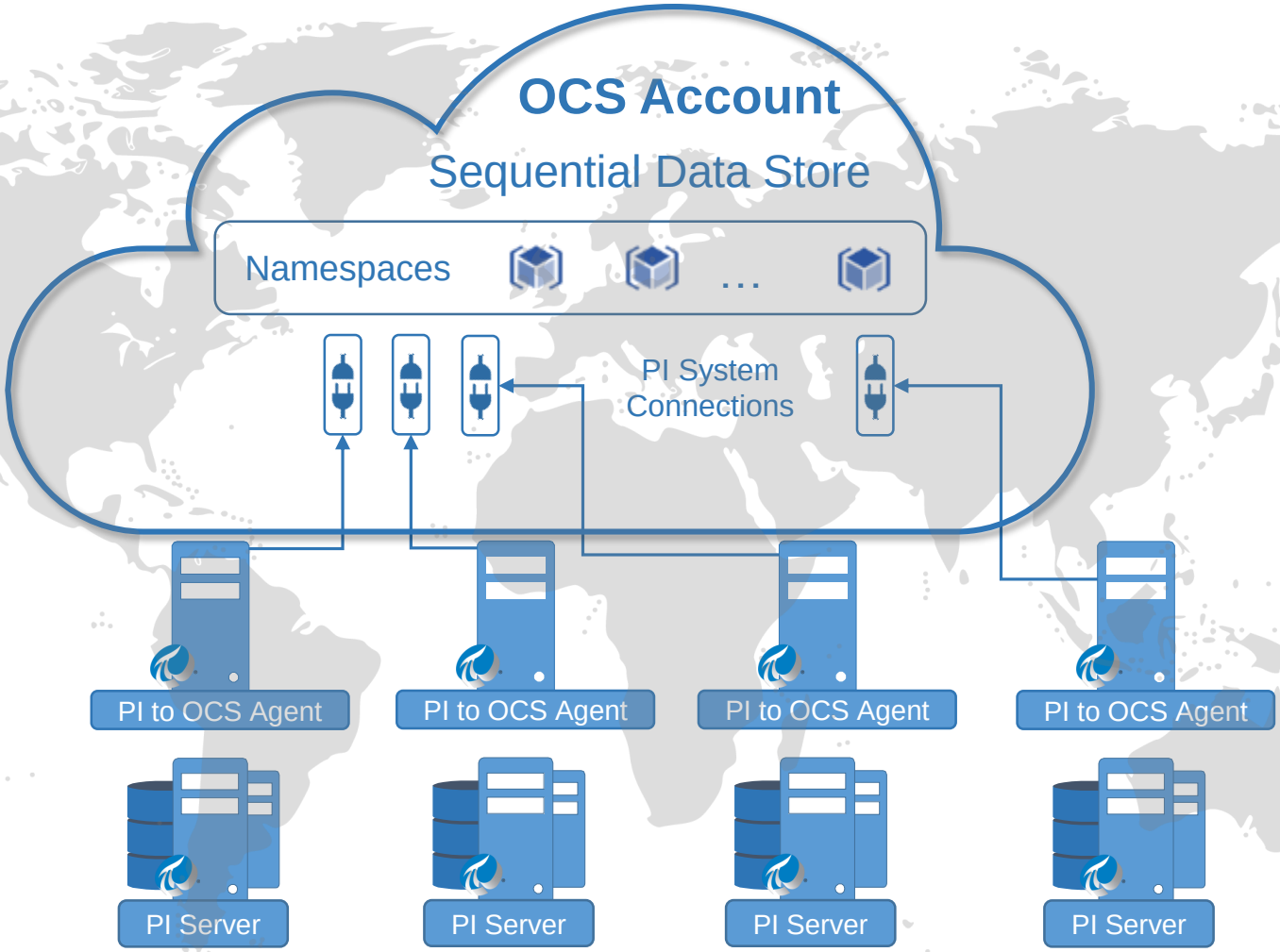
PI Connector Relay



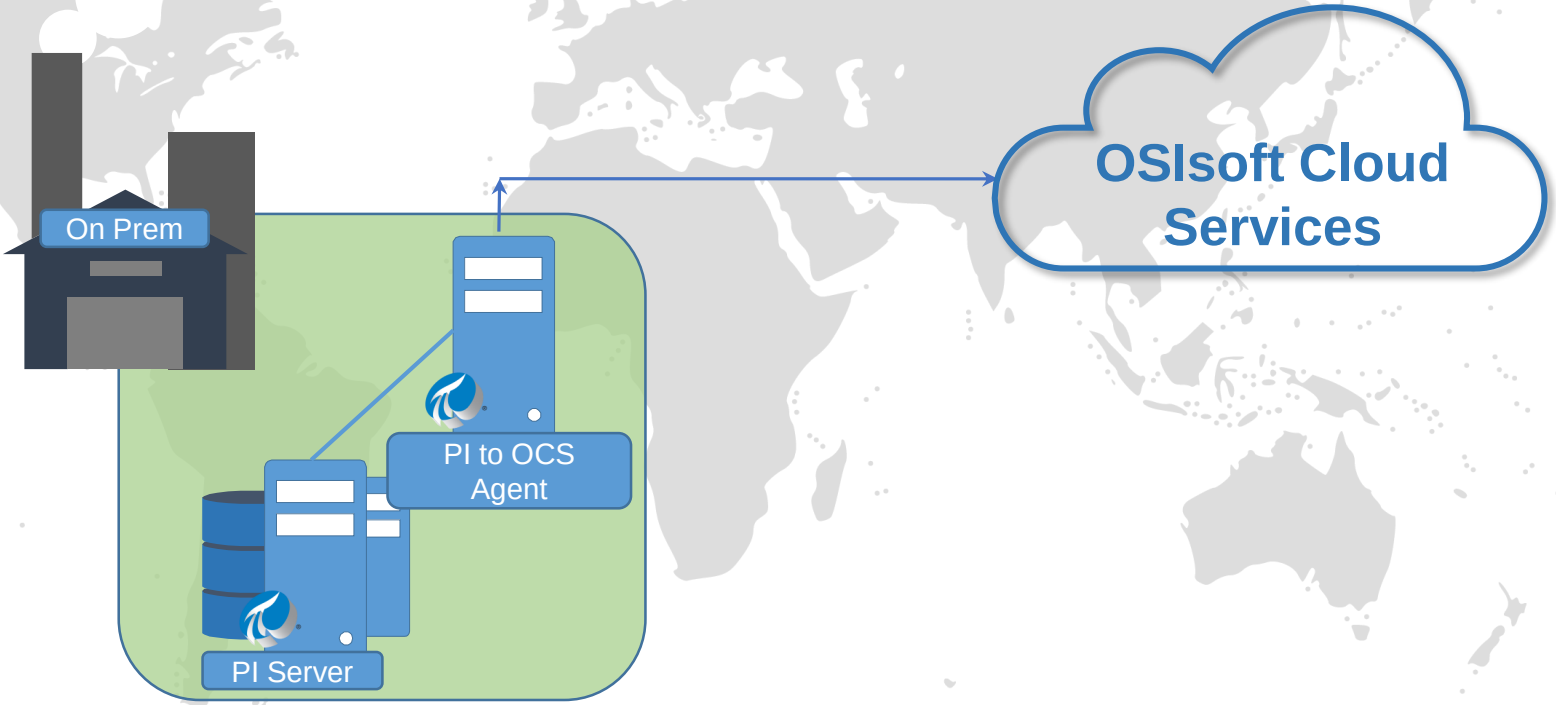
PI System Connector Deployment



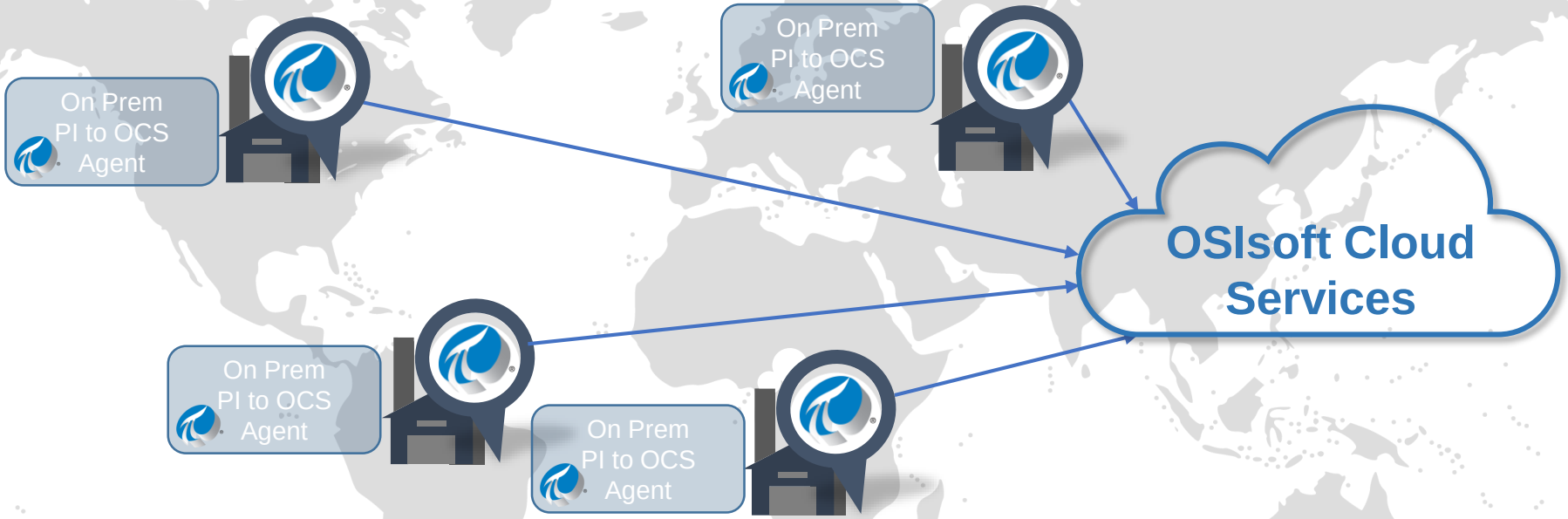
OSIsoft Cloud Services (OCS) Architecture



Recommended Architecture for PI to OCS (Site)



Recommended Architecture for PI to OCS (Enterprise)



Main Outcomes

- No perfect architecture
- Expand as needed
- Plan the desired architecture in advance

Questions?

Please wait for the **microphone**

State your **name & company**

Please remember to…

Complete Survey!

Navigate to this session in mobile agenda for survey