

Architecting Your PI System

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Systems Engineer

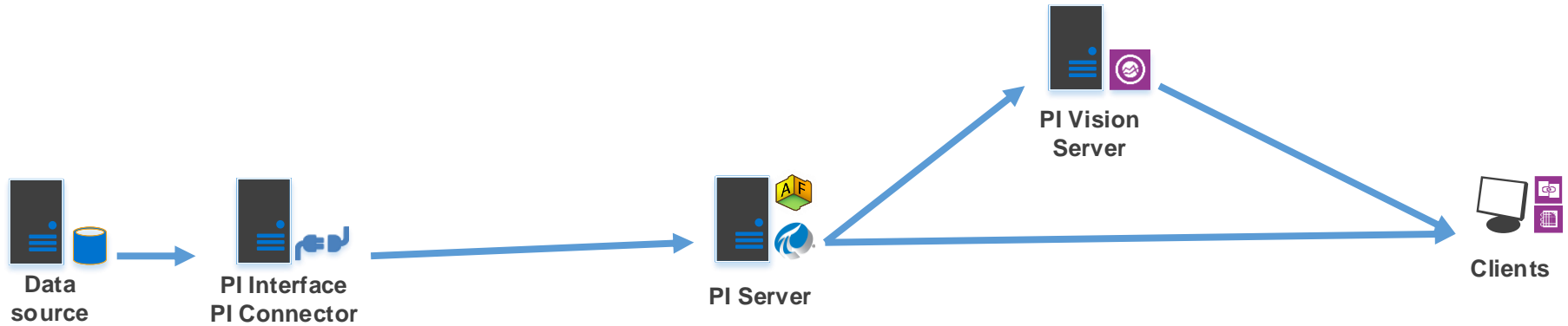


Agenda

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

Basic PI System Architecture

Basic PI System Architecture



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

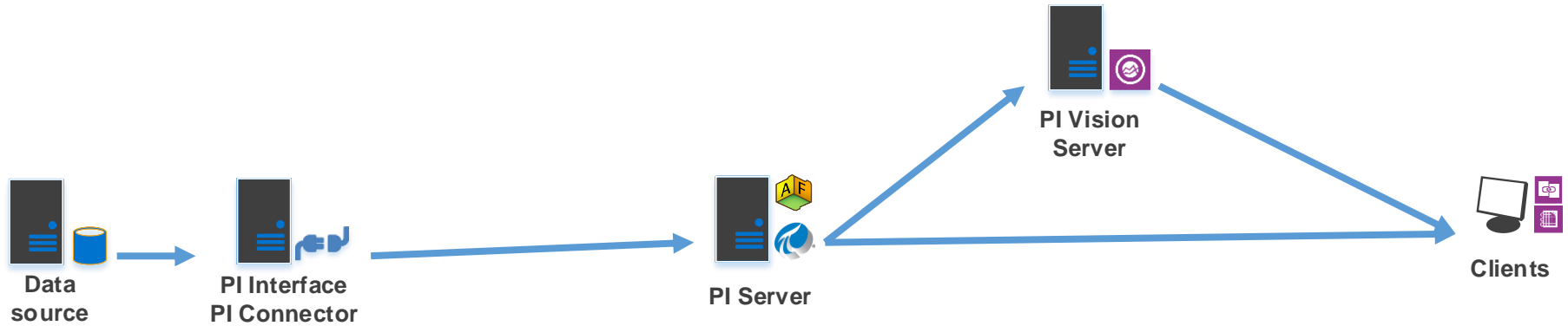
Recent research supports the idea that implementing a more holistic pre-disaster approach is more cost-effective in the long run. Every \$1 spent on hazard mitigation saves society \$4 in response and recovery costs.

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

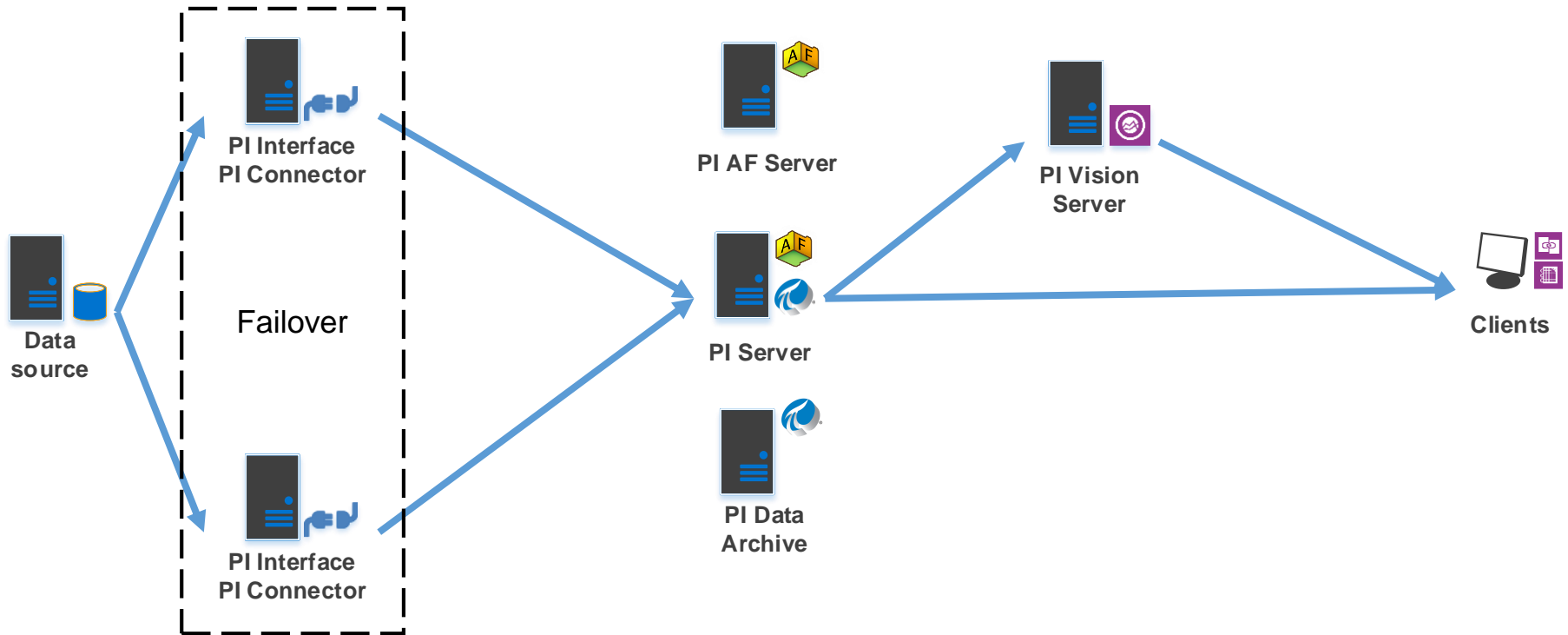
Disaster Recovery Recommended Practices

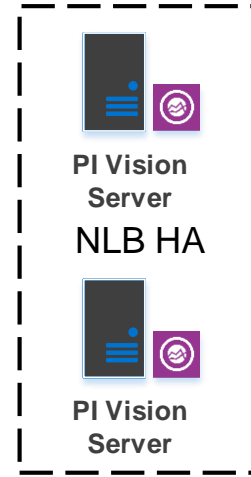
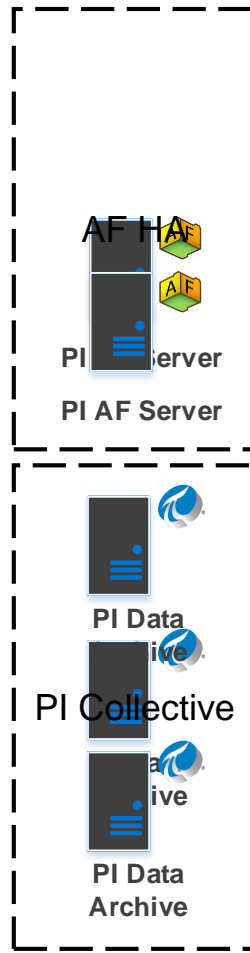
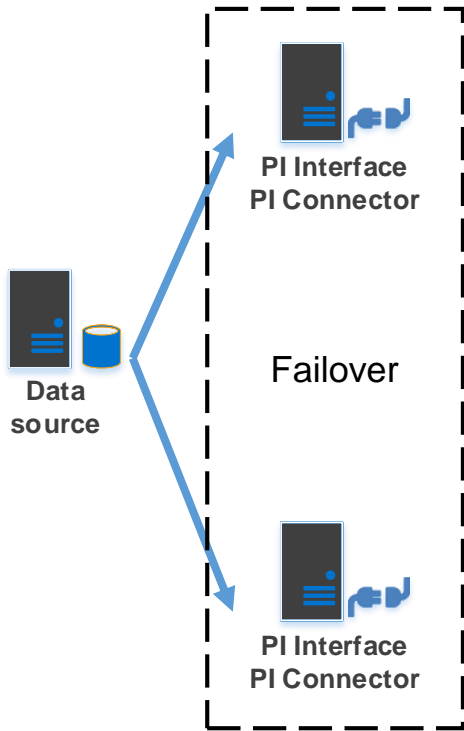
- **DR versus High Availability**
 - Highly Available (HA) systems are not considered as the complete solution of the Disaster Recovery plan
 - While HA architectures will have an impact on the recovery process, they should be designed and implemented independently of a DR process
- **DR versus Data 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

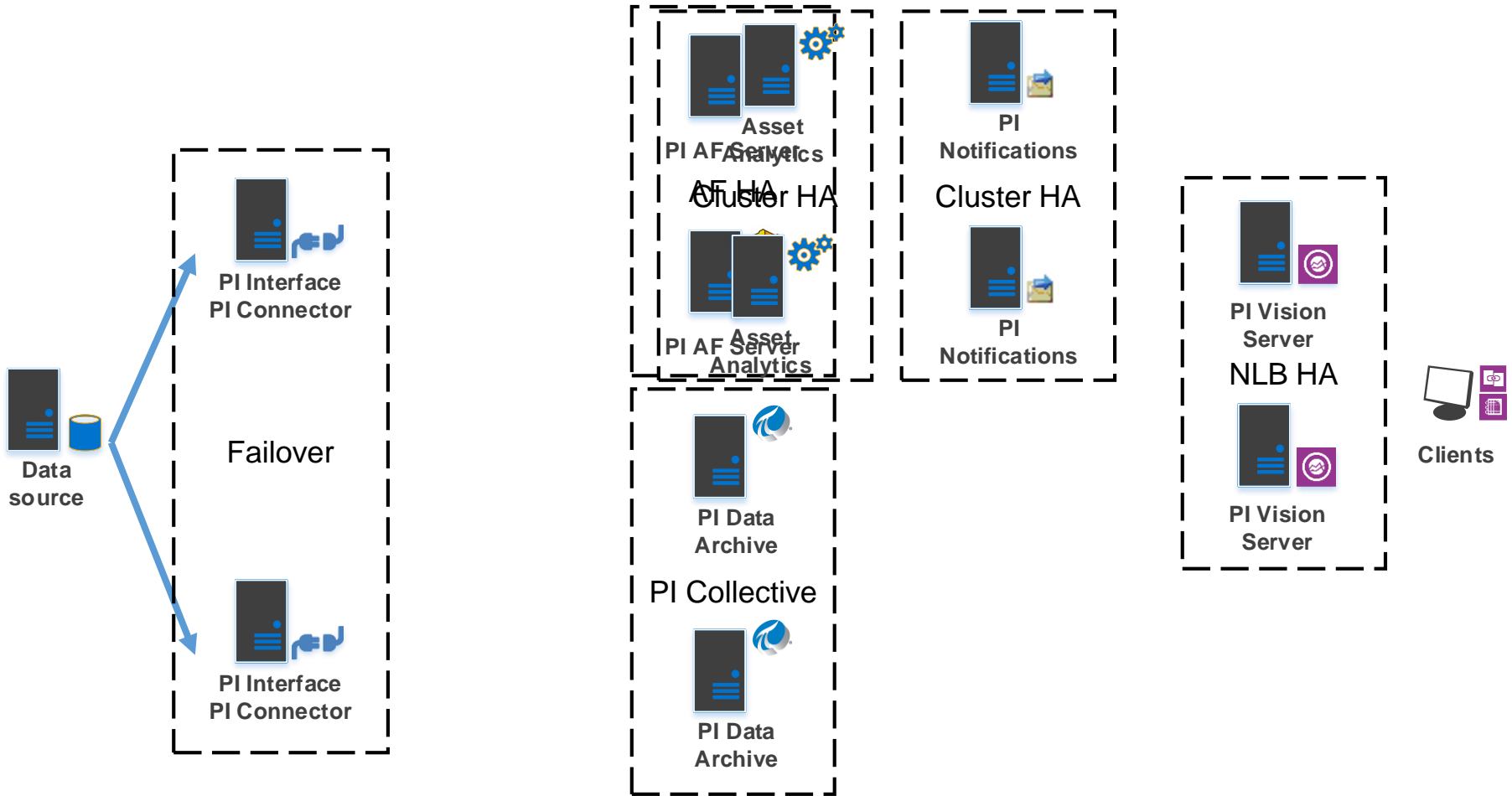
Expanding PI System



Expanding PI System







Data Loss vs Data Availability

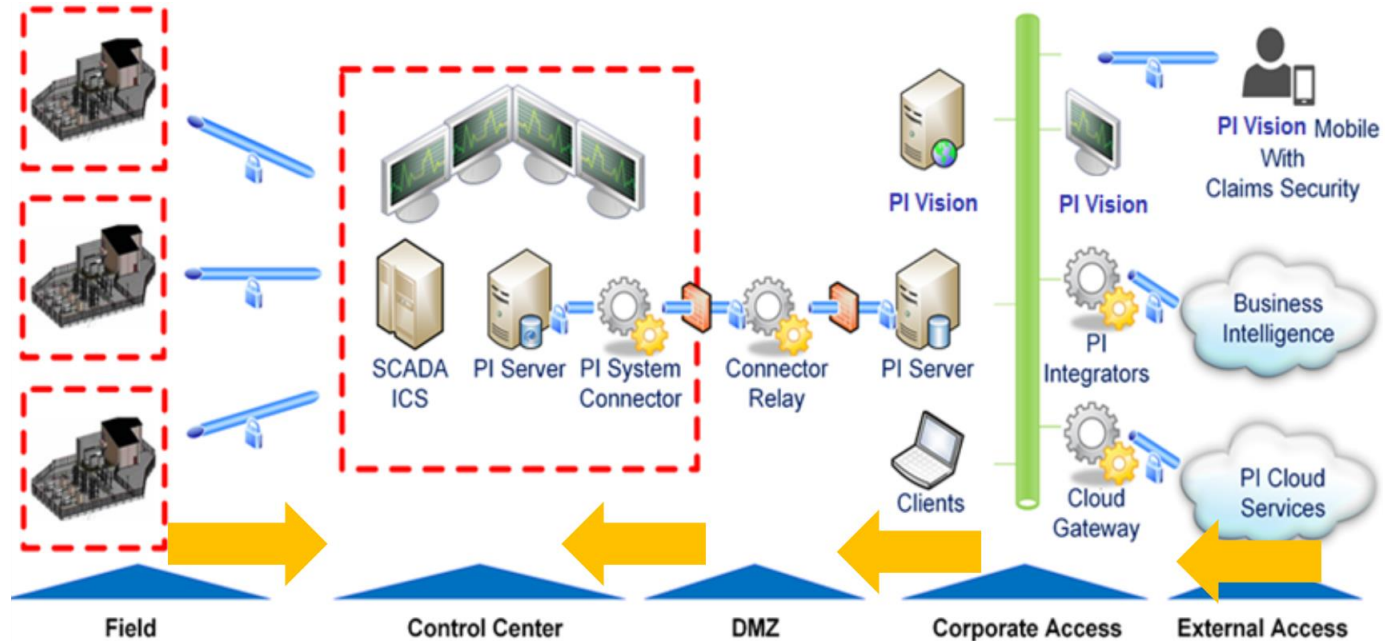
	Data Loss	Data Availability
Who cares?	What <u>everyone</u> is concerned about!	What <u>many</u> are concerned about!
Drivers for Concern	No one ever wants to LOSE data!	Availability concerns are driven by the customer's use of the data and how much it's integrated into their business processes.
What 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	<ul style="list-style-type: none"> • Interface Buffering • Interface Failover (Redundancy) • Interface History Recovery • Data Source Failover 	<ul style="list-style-type: none"> • 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

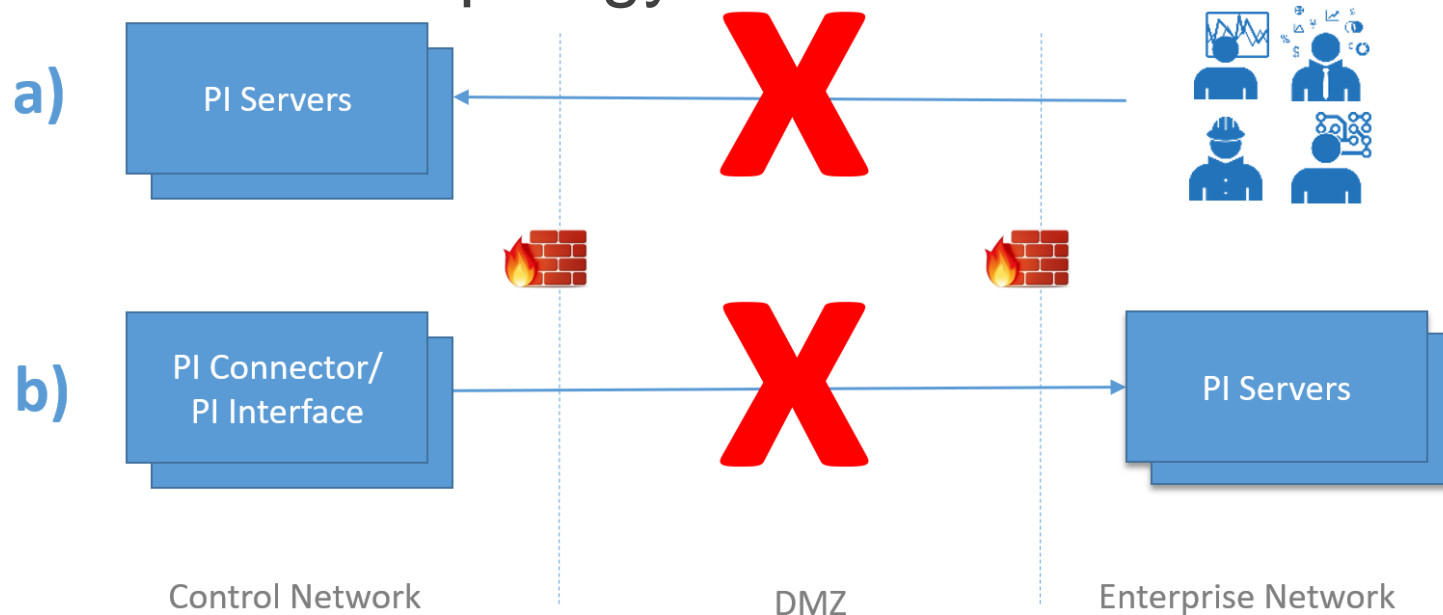
Security Considerations



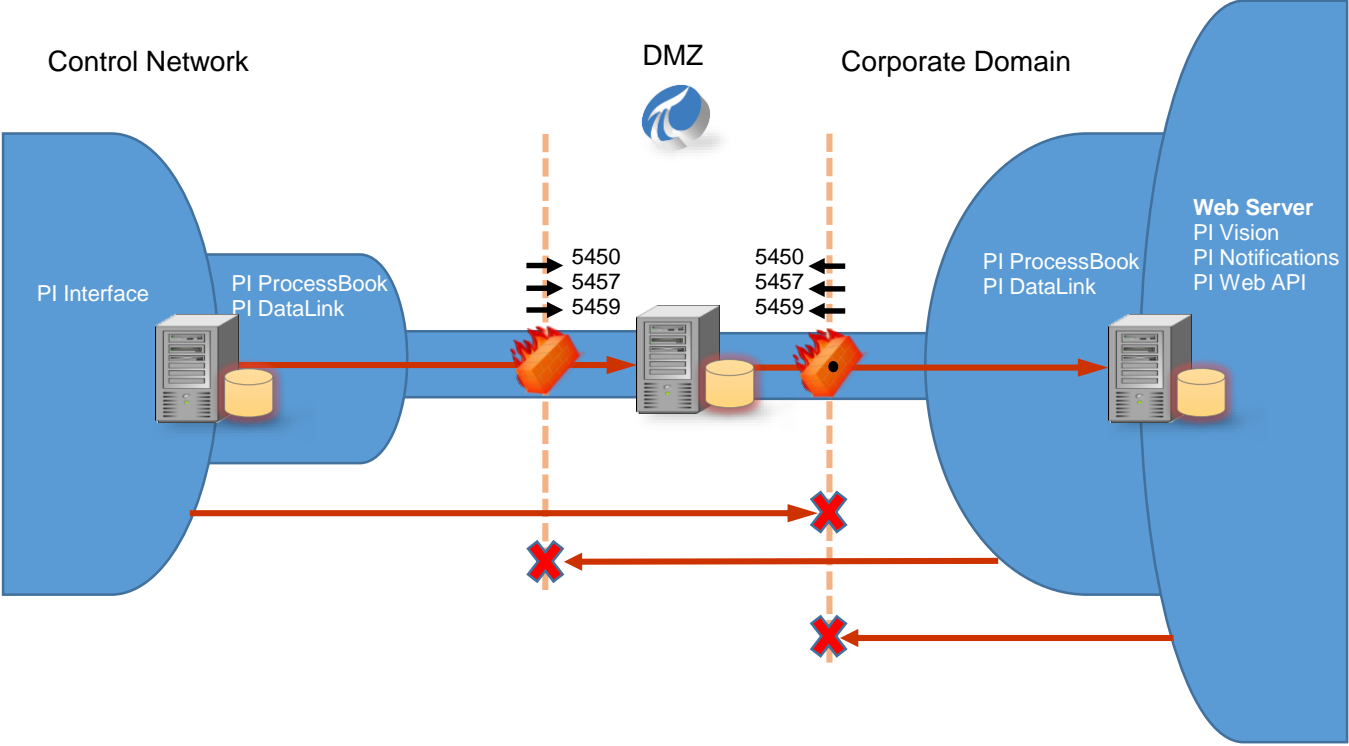
← Directions of cyber attacks

Security Considerations

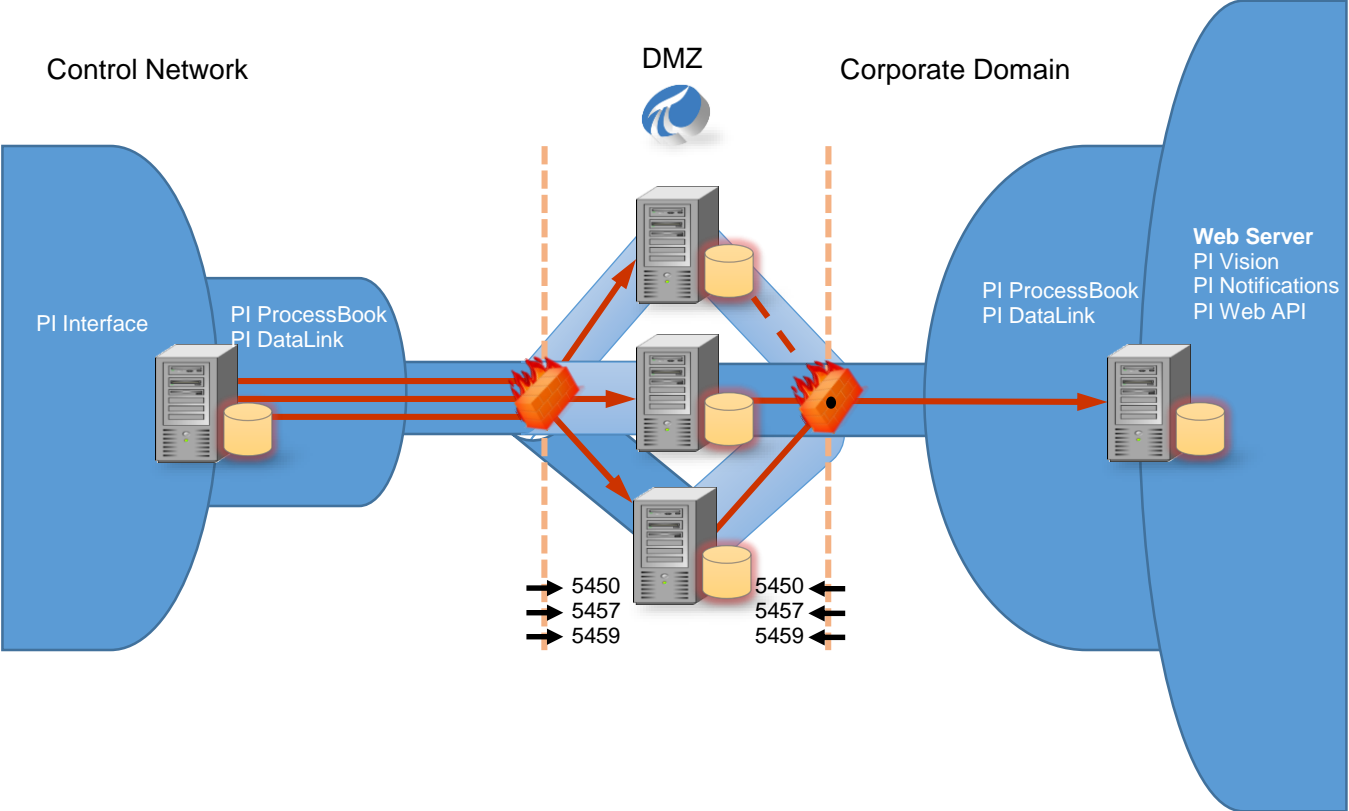
- Undesirable Topology



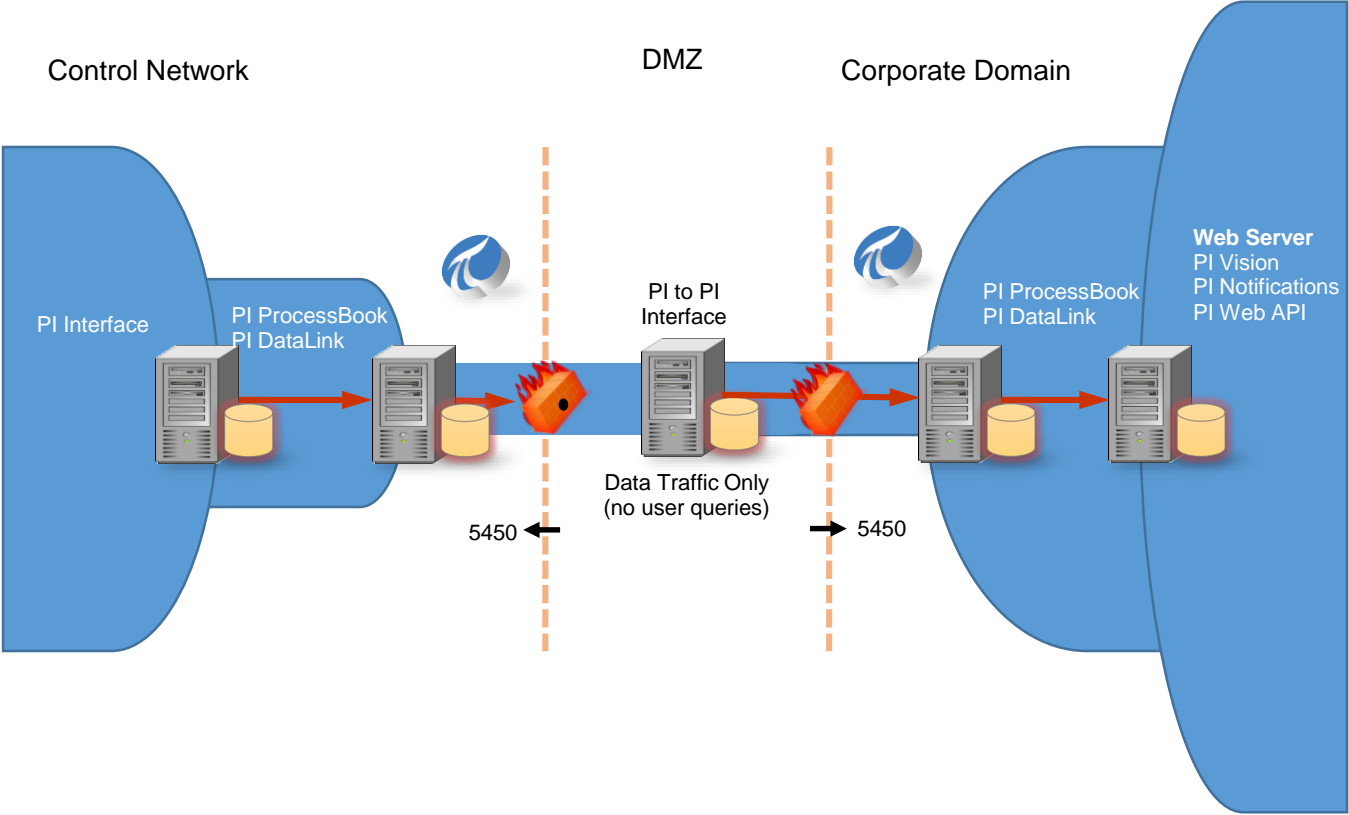
Pattern 1: DMZ with PI



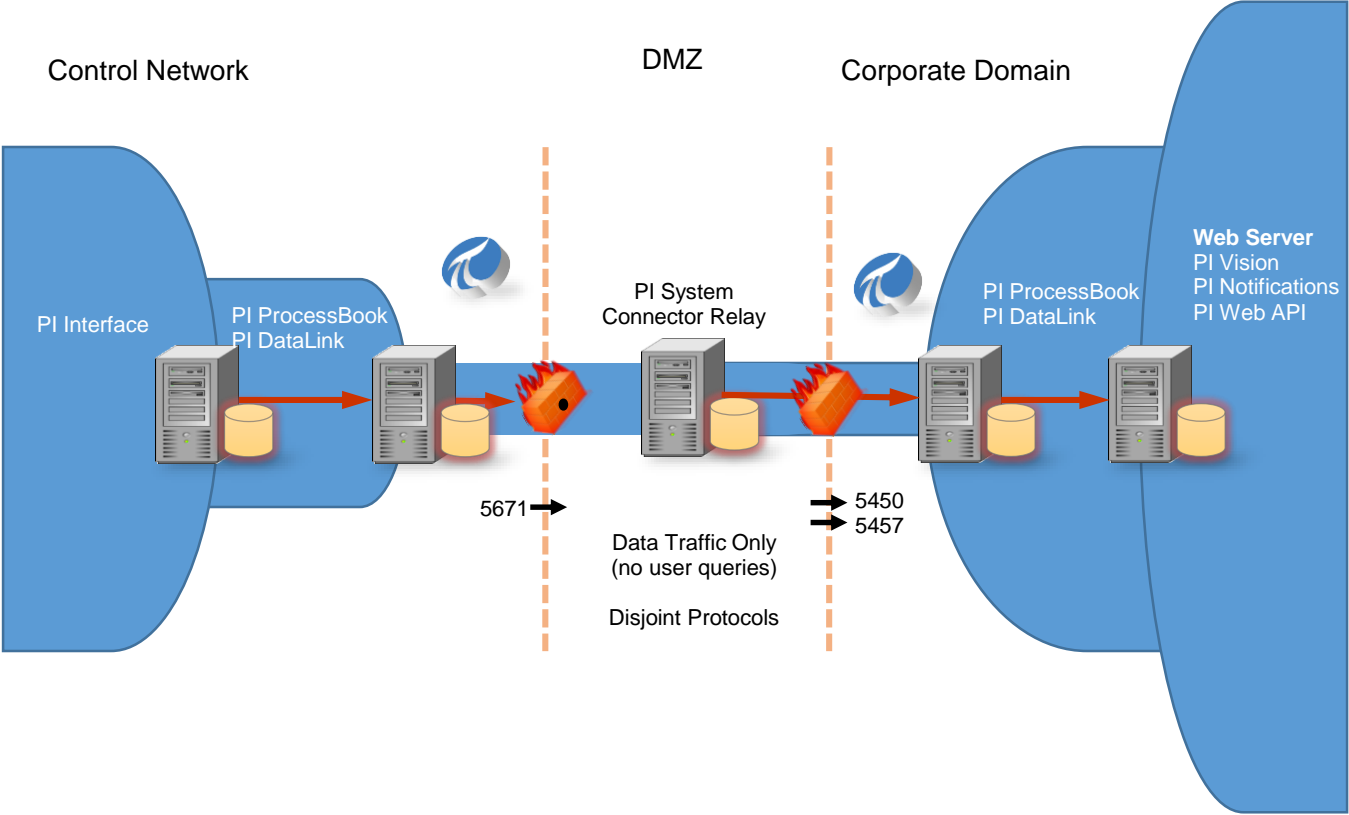
Pattern 2: PI High Availability



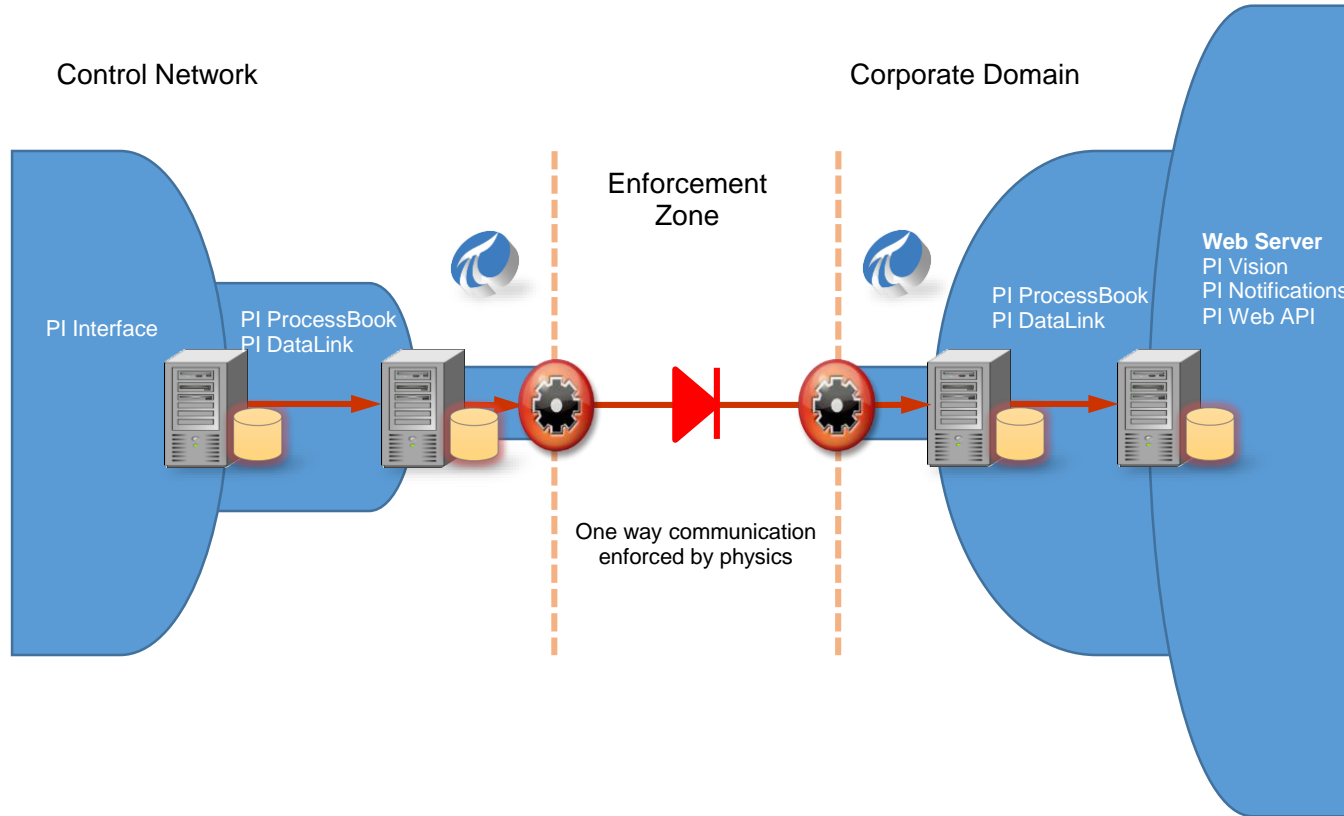
Pattern 3: DMZ with PI to PI



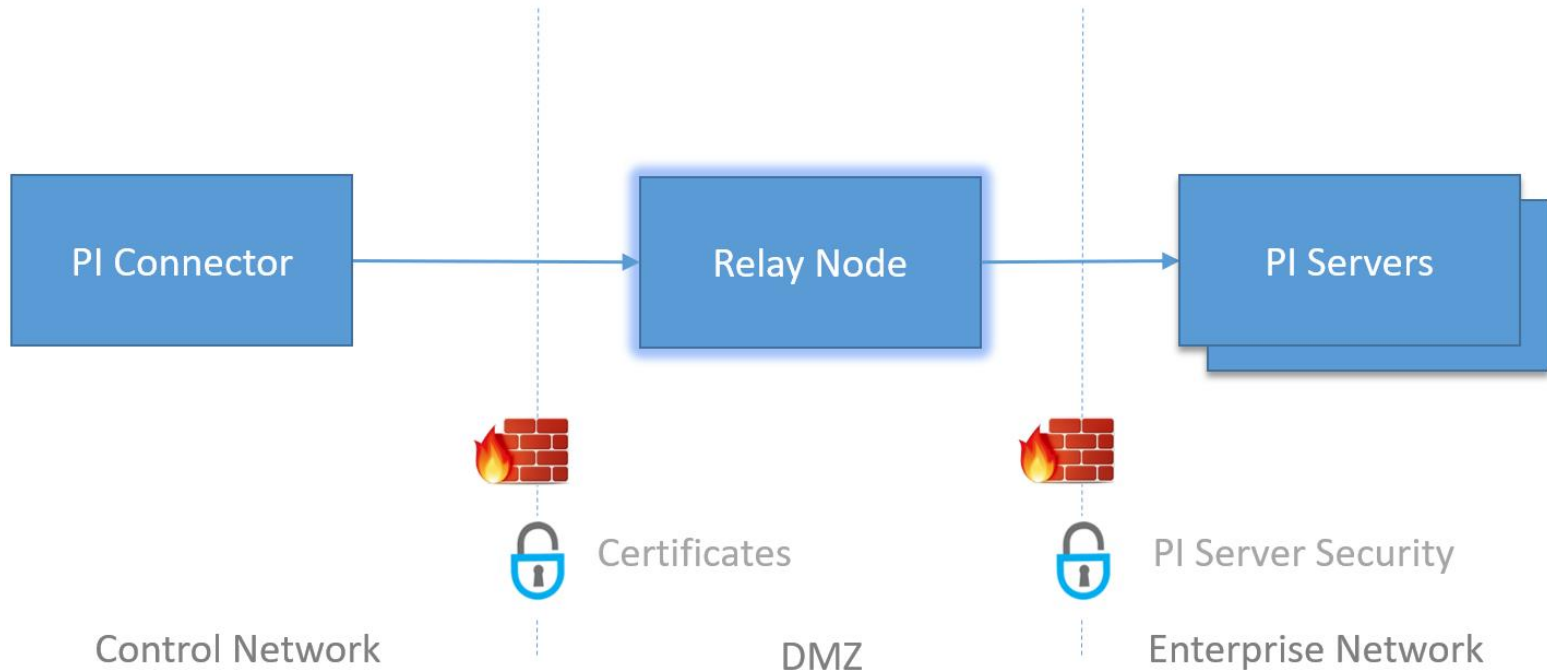
Patter 3: DMZ with PI System Connector



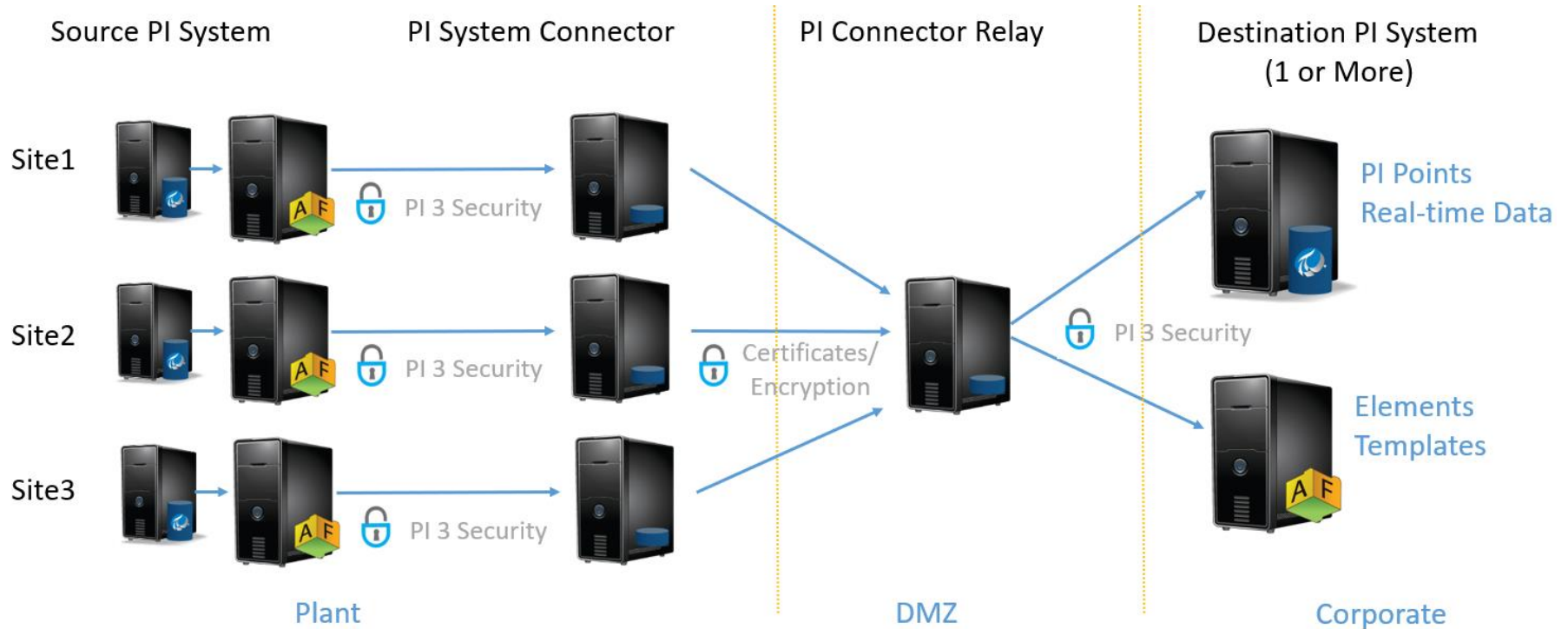
Pattern 3+: Absolute Enforcement



PI Connector Relay



PI System Connector Deployment



OSIsoft Cloud Services (OCS) Architecture

OCS Account

Sequential Data Store

Namespaces



...



PI System Connections



PI to OCS Agent

PI to OCS Agent

PI to OCS Agent

PI to OCS Agent

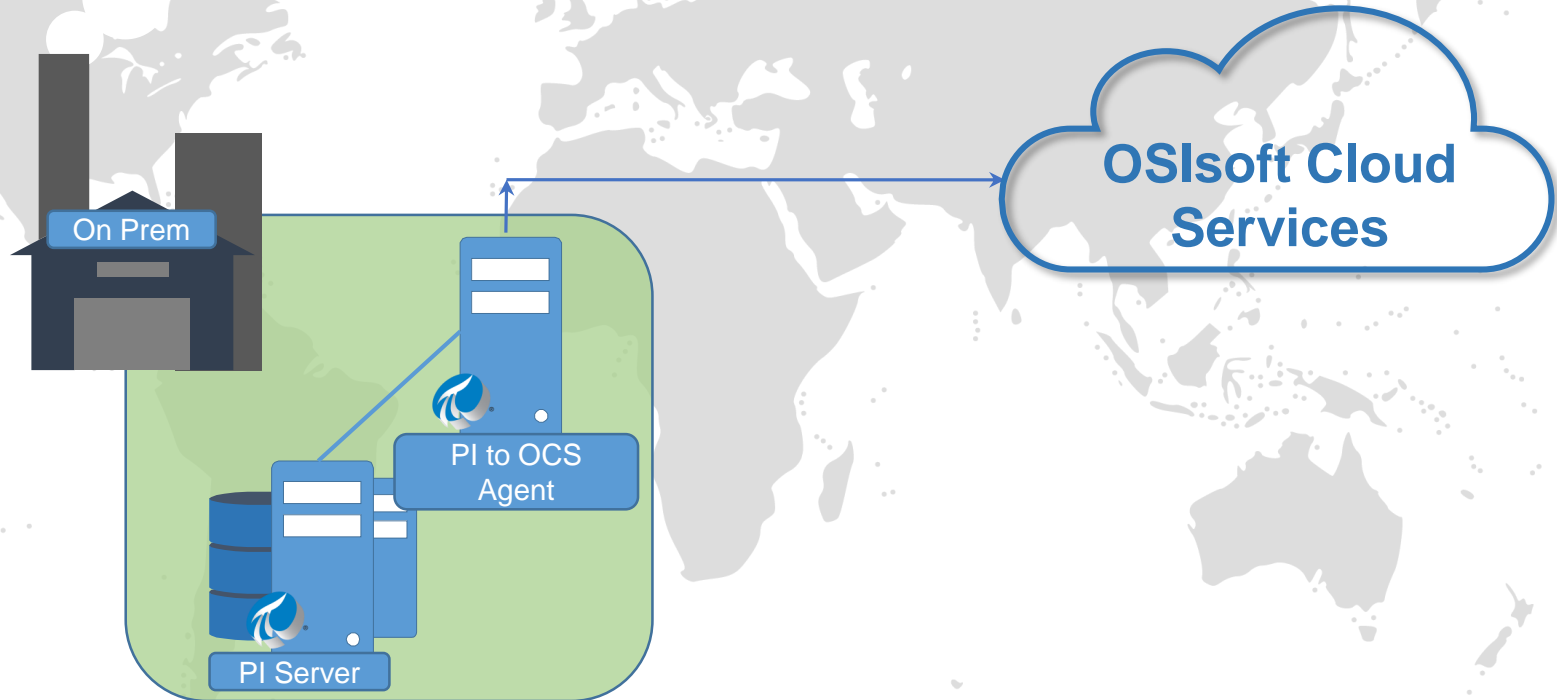
PI Server

PI Server

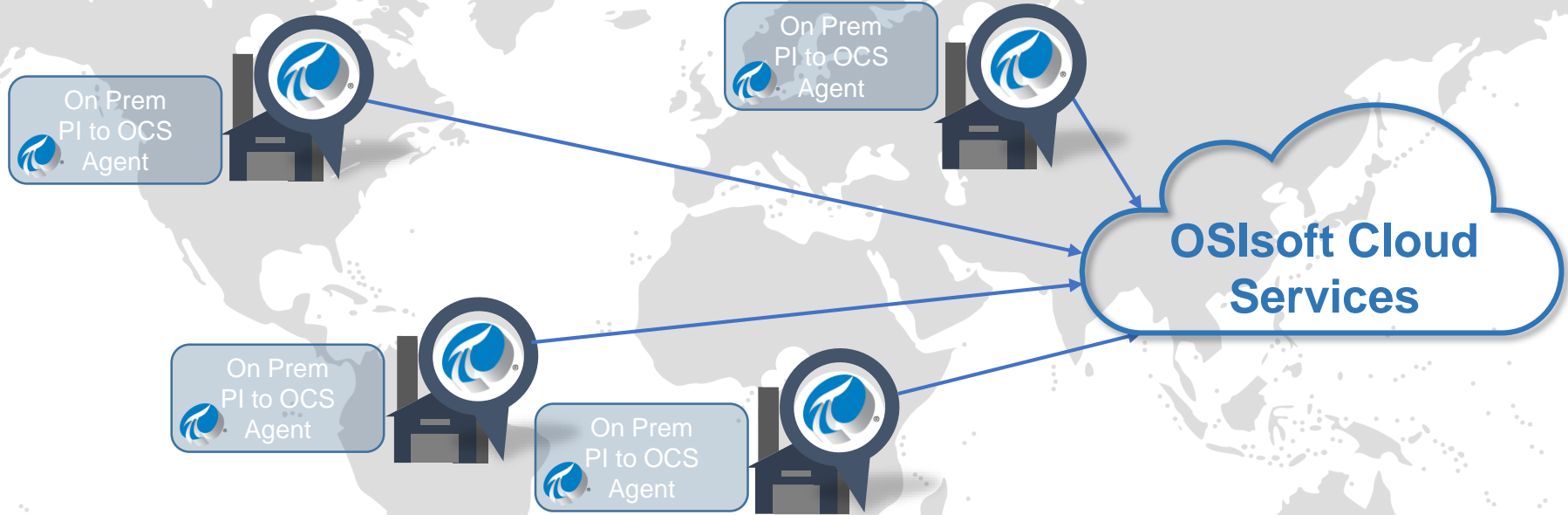
PI Server

PI Server

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

An advertisement for the OSISOFT PIWorld app. The background is dark blue with a subtle pattern. On the left, white text reads "TO DOWNLOAD APP, SEARCH OSISOFT". Below this are two black buttons: "Download on the App Store" with the Apple logo and "GET IT ON Google Play" with the Google Play logo. On the right, a smartphone is shown with the app's logo on its screen. The logo consists of a white stylized atom symbol above the text "OSISOFT PIWorld".

謝謝 KEA LEBONA
 TAPADH LEIBH 고맙습니다
 БАЯРЛАЛАА MISAOTRA ANAO
 DZIĘKUJĘ CI NGIYABONGA TEŞEKKÜR EDERIM GRACIES OBRIGADO شكرا SALAMAT
 DANKIE TERIMA KASIH DANKON TANK TAPADH LEAT
 KÖSZÖNÖM SPASIBO MULŢUMESC
 PAKMET CIZGE OSIssoft.
 GO RAIBH MAITH AGAT PIWorld
 БЛАГОДАРЯ GRACIAS HVALA FAAFETAI
 ТИ БЛАГОДАРАМ MAHADSANID HVALA ESKERRIK ASKO
 TAK DANKE MAHALO IĀ 'ŌE HVALA ХВАЛА ВАМ
 RAHMAT MERCI TEŞEKKÜR EDERIM
 HATUR NUHUN GRAZZI ПAKKA PĒR DANK JE EΥΧΑΡΙΣΤΩ GRATIAS TIBI GRAZIE
 PAXMAT CAĜA FALEMINDERIT ありがとうございます DI OU MÈSI
 СЪМ ОР БАН UA TSAUG RAU KOJ ŏAKUJEM
 WAZVIITA ТИ БЛАГОДАРАМ MATUR NUWUN
 СИПОС