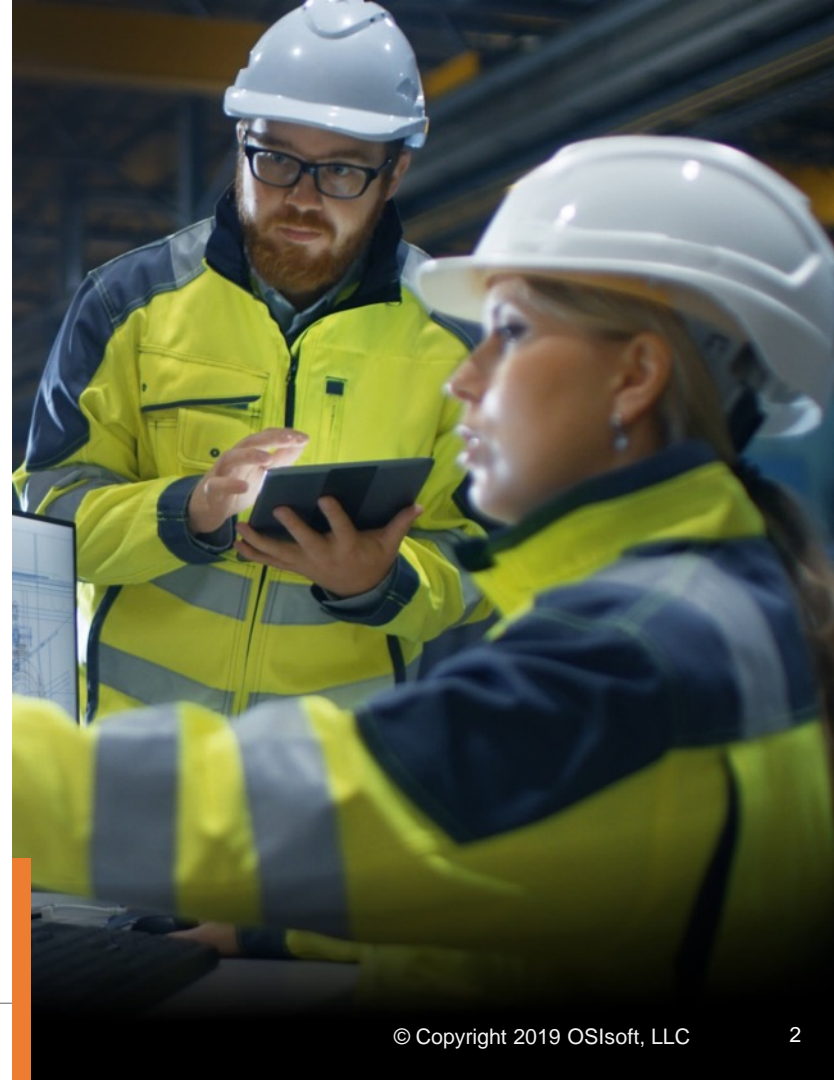


Secure Data Infrastructure for Critical Railway Operations



AGENDA

- Introductions
- Security challenges in rail
- Learning from other critical infrastructures
 - Use case – STM
 - Other architectures & resources
- Q&A - panel discussion



Introductions



**Matthew Miller – OSIssoft
Transportation Industry Principle**



**Maxim McKay – OSIssoft
Business Advisory Services &
Transportation Industry Champion**

**Jesus Molina, PhD – Waterfall Security Solutions
Director of Business Development**



**Andrea Roy & Cedric Vallee- Alizent
Director of Business Development & OSIssoft PI Analyst**



Q&A Panel

Partnerships delivering secure railway solutions...



OSIsoft

- ✓ Leading real-time software data infrastructure
- ✓ Supporting 65% of Fortune 500 Operating Companies
- ✓ Gold Standard for Critical Infrastructure Monitoring

ALIZENT
ASSET INTERACTIVE

- ✓ Global System Integrator - 8 offices - millions of assets
- ✓ Over 20 years experience in monitoring critical assets
- ✓ Common customers-Transportation, Manufacturing & Utilities

 **WATERFALL**[®]
Stronger Than Firewalls

- ✓ Global leader in cyber security appliances
- ✓ Strong Integration with OSIsoft products
- ✓ Used by leading utilities and critical infrastructures

Security Challenges

Digital Transformation is Changing Industry

Greater Operational Efficiency



Xcel Energy **saved \$46 million** and improved renewable integration with real-time data visualizations and weather forecasting.

“Smart” Products & Data-Driven Services



Caterpillar helps transportation giants **save up to \$1.5 million** per ship per year through after-market services for fuel reduction and maintenance.

And Make Operations Data an Asset Everyone Can Use in Real Time



Network Engineer
“Can we increase the overall capacity?”



Control Room Operator
“The process is like a baby – you have to watch it.”



Operations Manager
“What is the forecast of productivity?”



Data Scientist
“Can we find new savings with machine learning?”



Reporting Analyst
“I need to combine data from 3 sources in 1 report.”



Maintenance Engineer
“I need to know the moment it goes out of tune.”

Proven Business Results

ASSET HEALTH



ENERGY EFFICIENCY



NETWORK OPTIMIZATION



ON TIME TRACKING



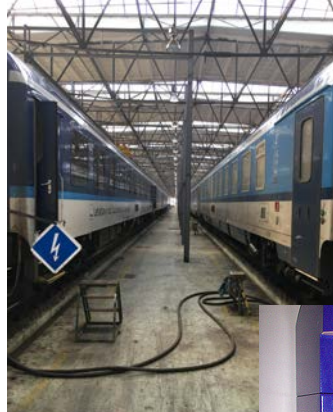
REGULATORY COMPLIANCE



SAFETY



Security Challenges in Rail



Operations Technology (OT) Systems

CRITICAL SYSTEMS

- Transmission & Distribution SCADA
- Plant DCS
- PLCs
- Environmental Systems
- Other critical operations systems



Limit direct access to critical systems while expanding the value use of information.



← Security Perimeter

Information Technology (IT) Systems

Limit direct access to critical systems while expanding the value use of information.



Business Systems



- ERP
- CMMS
- Planning/
Scheduling
- Accounting
- Engineering
- Communications
- Customer Service

Learning from others

Use Case - STM

Société de Transport de Montréal

STM Overview

Société de Transport de Montréal

- Public company – Operator of the public transit system in Montreal: Metro and Bus services. Operates 4 underground train lines, totalizing 68 stations, 220 bus lines and 1771 busses
- 2nd largest urban transit network in Canada, after Toronto Transit Commission
- Montreal Metro is the largest in Canada in terms of passenger traffic, and 3rd in North America in terms of daily passengers, after New York and Mexico
- En 2016, 416,2 millions passenger-trips

Command Center

Until 2012



Today



OPALE Project Description

(Optimisation des Processus et Activités à L'Entretien)



- OPALE project objective was to increase the level of control over fixed asset maintenance
- Software application at the Command Center were not fit for the maintenance team needs
- Project deliverables:
 - New maintenance process and procedures
 - SAP-PM
 - Data infrastructure

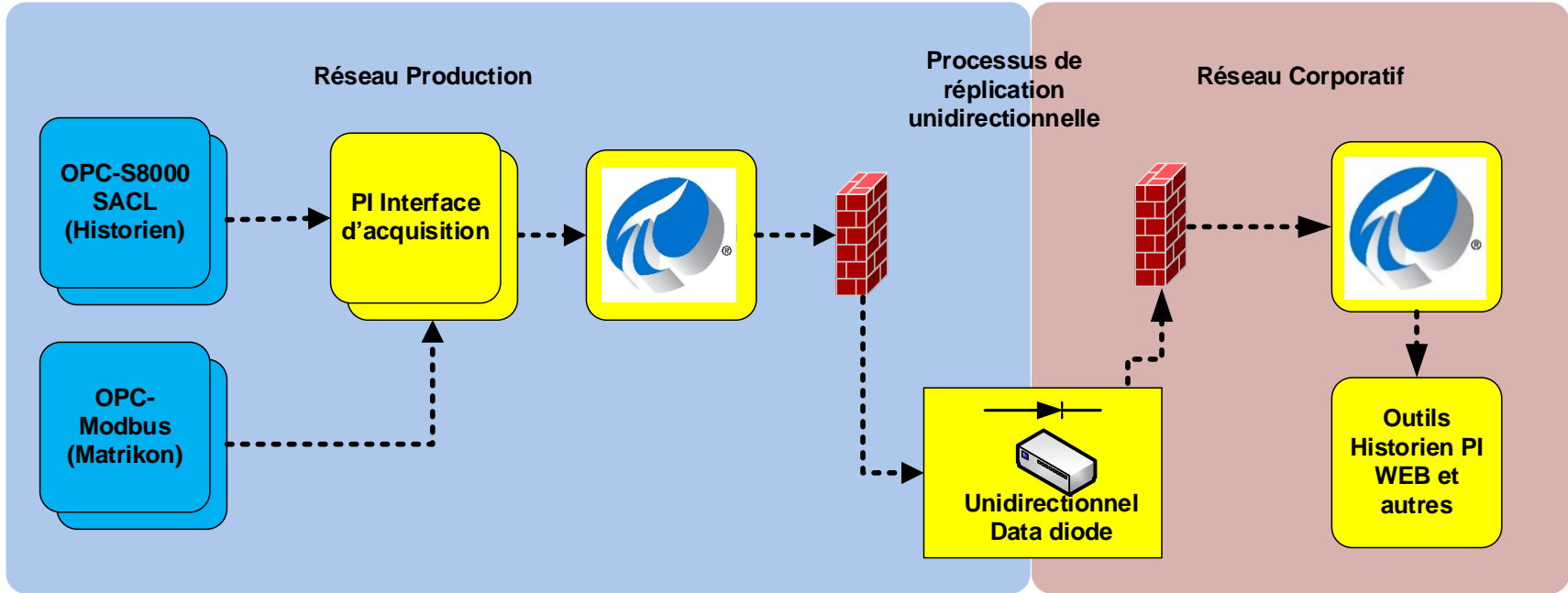
OPALE Project Description

Context



- No data collected by Maintenance on fixed equipment
- Restricted access to fixed assets status and alarm management
- Hard to generate reports and KPIs
- Difficult to diagnose field equipment issues
- No visibility on real-time process, other than through Command Center
- Command Center is not designed for flexibility needed by maintenance

PI System Architecture

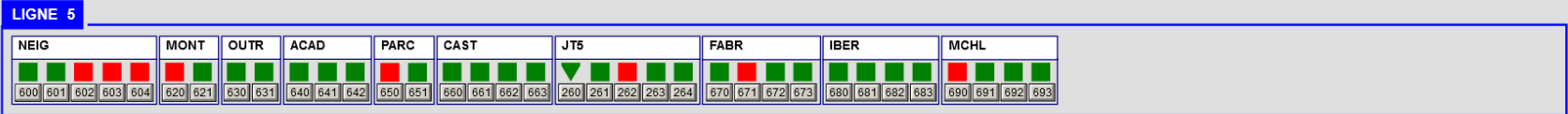
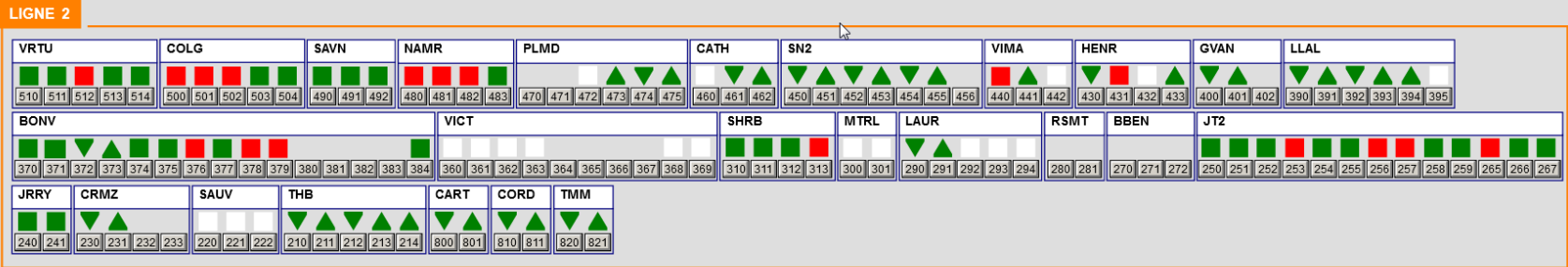
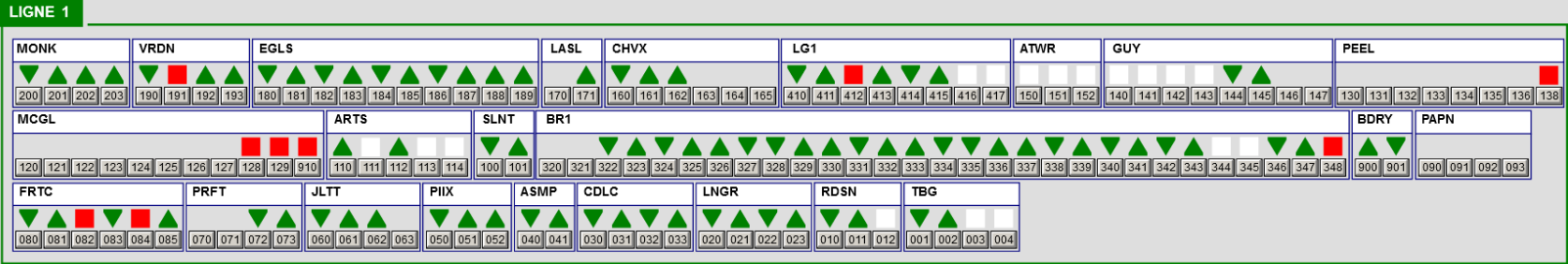


Architecture is not fully HA , but is built for robustness and stability.

Escalators Fleet-Wide Monitoring

ESCALIERS MECANIQUES

2017-10-11 21:44:34



Légende: Perte terrain; En problème; En fonction;

Escalators Fleet-Wide Monitoring

Details display – Escalators



ESCALIERS MECANIKES

2017-10-12 07:56:58

Ligne: 1
Station: BDRY

Escalier: L1900
Modèle: CNIM2

Statut:



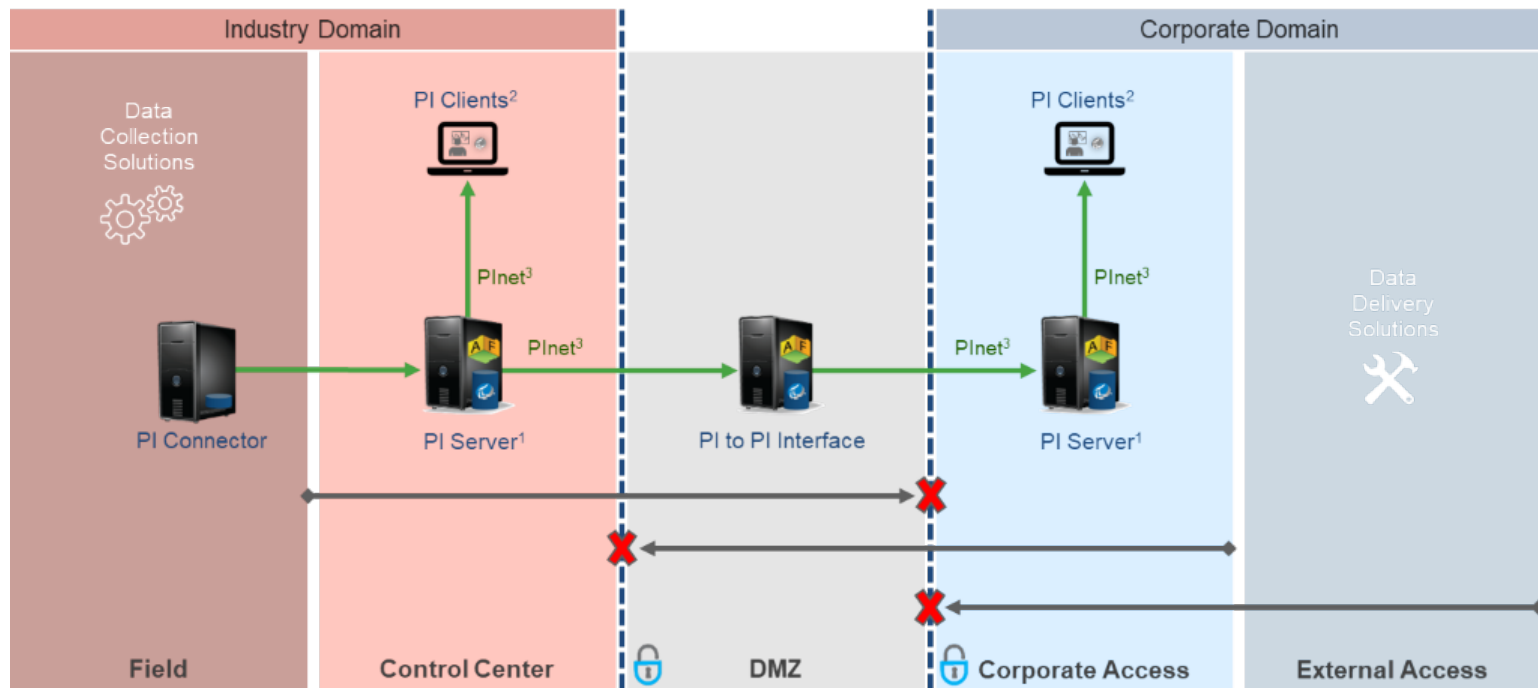
NOMINAL

RETOUR

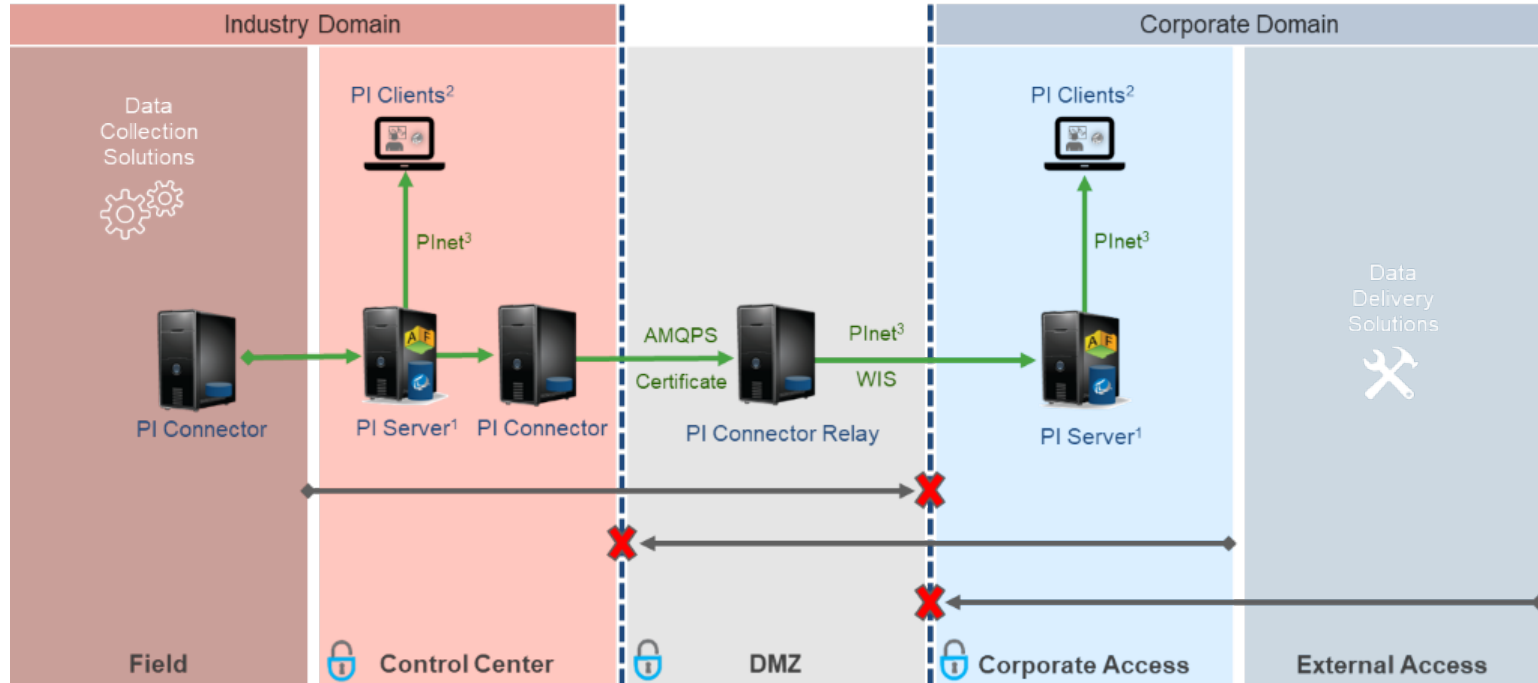
Arrêt et verrouillage 1948-CM0303-EM-GEN-GEN-11900-EMAC		Affaissement de marche 1948-CM0303-EM-GEN-GEN-11900-EMAM		Frein Électronique 1948-CM0303-EM-GEN-GEN-11900-EMFE		Usure garniture frein de service 1948-CM0303-EM-GEN-GEN-11900-EMGS	
Arrêt par la fosse ou la balustrade 1948-CM0303-EM-GEN-GEN-11900-EMAF		Arrêt automatique 1948-CM0303-EM-GEN-GEN-11900-EMAA		Levée frein service 1948-CM0303-EM-GEN-GEN-11900-EMFS		Variateur de fréquence 1948-CM0303-EM-GEN-GEN-11900-EMVF	
Arrêt sans verrouillage 1948-CM0303-EM-GEN-GEN-11900-EMAN		Arrêt baladeuse 1948-CM0303-EM-GEN-GEN-11900-EMAB		Levée frein d'urgence 1948-CM0303-EM-GEN-GEN-11900-EMFU		Vitesse Escalier 1948-CM0303-EM-GEN-GEN-11900-EMVE	
Pompe lubrification basse pression 1948-CM0303-EM-GEN-GEN-11900-EMBP		Arrêt corde, panneau 1948-CM0303-EM-GEN-GEN-11900-EMAP		Levée de marche & Recul de plaque peigne 1948-CM0303-EM-GEN-GEN-11900-EMFP		Vitesse main courante droite 1948-CM0303-EM-GEN-GEN-11900-EMVD	
Vitesse veille non fonctionnelle 1948-CM0303-EM-GEN-GEN-11900-EMVND		A.S.I. Alimentation 1948-CM0303-EM-GEN-GEN-11900-EMAI		Main courante dérapée 1948-CM0303-EM-GEN-GEN-11900-EMMD		Vitesse main courante gauche 1948-CM0303-EM-GEN-GEN-11900-EMVG	
Validation terrain: Testé en RS1		Bas niveau d'huile lubrification 1948-CM0303-EM-GEN-GEN-11900-EMNL		Peigne soulevé 1948-CM0303-EM-GEN-GEN-11900-EMPS			
		Bas niveau d'huile réducteur de vitesse 1948-CM0303-EM-GEN-GEN-11900-EMRV		Perte alimentation 1948-CM0303-EM-GEN-GEN-11900-EMPA			
		Cache volant moteur 1948-CM0303-EM-GEN-GEN-11900-EMCV		Plinthe déplacée 1948-CM0303-EM-GEN-GEN-11900-EMPD			
		Chaîne de marche brisée 1948-CM0303-EM-GEN-GEN-11900-EMMB		Plot de blocage chaîne de marche 1948-CM0303-EM-GEN-GEN-11900-EMMB			
		Chaîne principale brisée 1948-CM0303-EM-GEN-GEN-11900-EMMP		Présence de marche 1948-CM0303-EM-GEN-GEN-11900-EMPM			
		Changement de mode de fonctionnement 1948-CM0303-EM-GEN-GEN-11900-EMMF		Relais chaîne de sécurités 1948-CM0303-EM-GEN-GEN-11900-EMCS			
		Clé bloquée 1948-CM0303-EM-GEN-GEN-11900-EMCB		Surcharge moteur 1948-CM0303-EM-GEN-GEN-11900-EMSM			
		Clé bloquée avec bouton d'arrêt 1948-CM0303-EM-GEN-GEN-11900-EMSB		Tension main courante 1948-CM0303-EM-GEN-GEN-11900-EMTM			
		Baladeuse ou A.S.I. communication 1948-CM0303-EM-GEN-GEN-11900-EMAS		Trappe caisson fosse 1948-CM0303-EM-GEN-GEN-11900-EMTF			
		Contacteur principal 1948-CM0303-EM-GEN-GEN-11900-EMCP		Twido M.C. Vitesse Défaut 1948-CM0303-EM-GEN-GEN-11900-EMTV			
		Entrée main courante 1948-CM0303-EM-GEN-GEN-11900-EMEM		Twido Tapis ou communications 1948-CM0303-EM-GEN-GEN-11900-EMTC			

Architecture Options

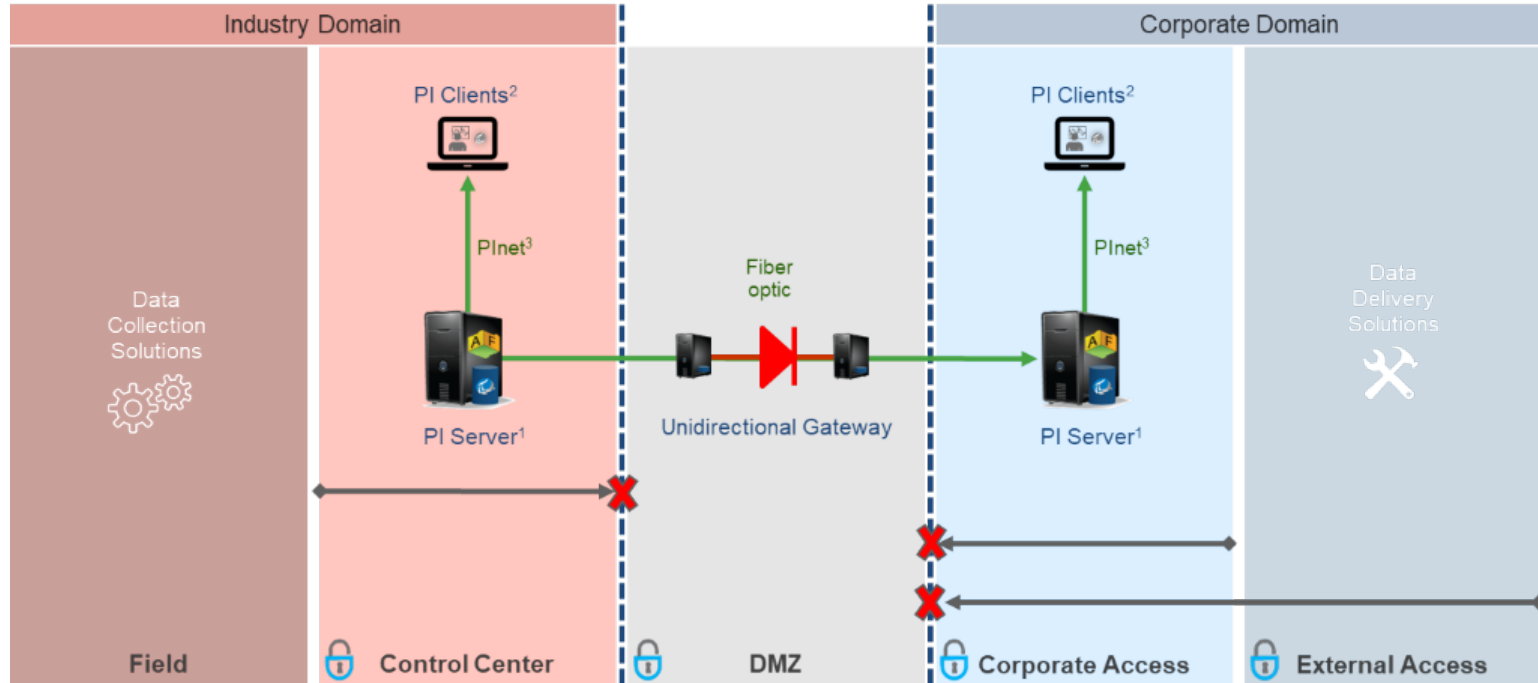
Data Replication Through DMZ



Data Relay through DMZ



Uni-directional Gateway Physical Isolation



Applicable Security Standards

- **NIST (National Institute of Standards and Technology, USA)**
- **NIST has also published a Guide to Industrial Control Systems (ICS) Security**
- **European Union Agency for Network and Information Security (ENISA)**
- **NERC CIP (North American Electric Reliability Corporation)**
- **UIC (International Union of Railways)**
- **Rail Delivery Group (RDG)**
- **Agence nationale de la sécurité des systèmes d'information (ANSSI)**
- **American Public Transportation Association (APTA)**

Q&A Panel

Q&A Panel



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Project Manager - Alizent



Nick Kingsley
Managing Editor
Railway Gazette Group

Want more information?

- **Copy of today's Presentation**
- **Secure Data Infrastructure for Critical Railway Operations Whitepaper**
- **OSIsoft/Waterfall Presentation and Roundtable at Rise of IoT and Big Data in Rail**
May 25-28th in Munich Germany – Special 20% discount voucher offered to todays attendees!
- **Go to our websites**
 - www.osisoft.com
 - www.waterfall-security.com
 - www.alizent.com
- **Email one of us!**

THANK YOU

