

Extending TransCanada's PI System infrastructure with the AWS Cloud

Presented By:

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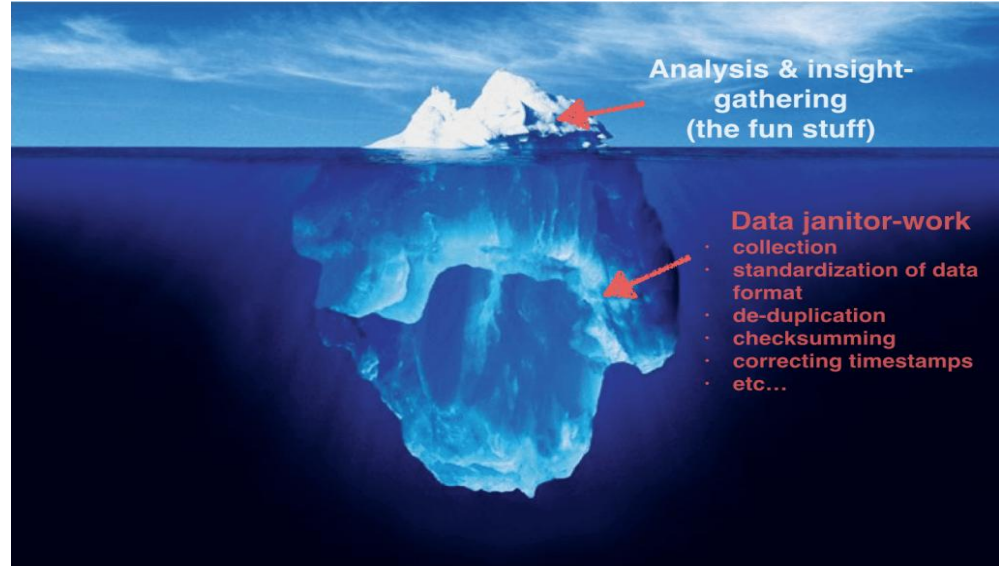
Data Science is the Tip of an Iceberg

50-80%

of a data scientist's time
is spent on data prep

1%

of data collected is
analyzed



An effective Enterprise Data Management strategy is
necessary to be successful

Extending Infrastructure

Advanced
Analytics

Dynamic
Compute
Platform

Edge
Processing

An effective Enterprise Data Management strategy is
necessary to be successful

Extending Data Management

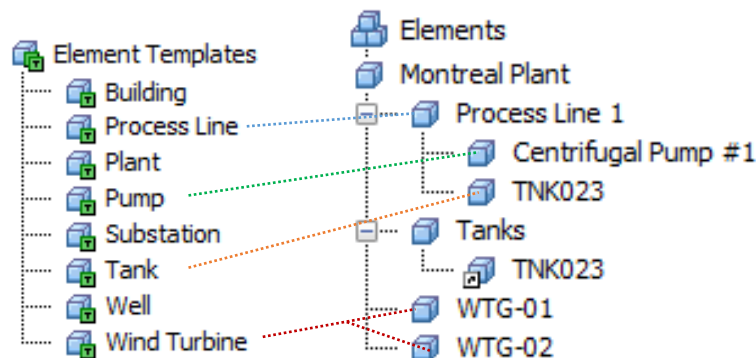
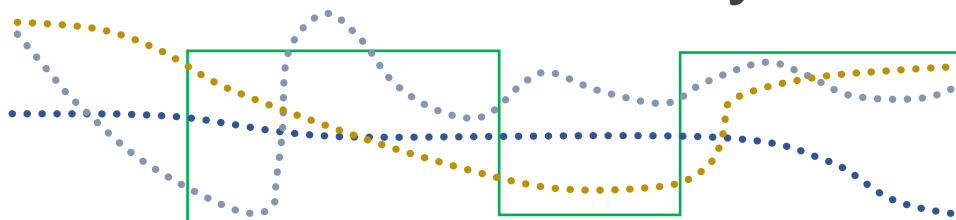
Challenges and Opportunities

Advanced Analytics

- Combine data from many sources and applications
- Large variation in resources – training to production
- Many libraries - R, Python, Tensor Flow
- Time series data is challenging
- Context is critical to time series data analysis
- Data Engineering and Data Science are different

PI System + PI Integrator + AWS Cloud = Complete Analytics

Ingredients for successful IoT Analytics



Element Attributes

Last Maintenance
Model
Status
Speed
Temperature

Event Frame Attributes

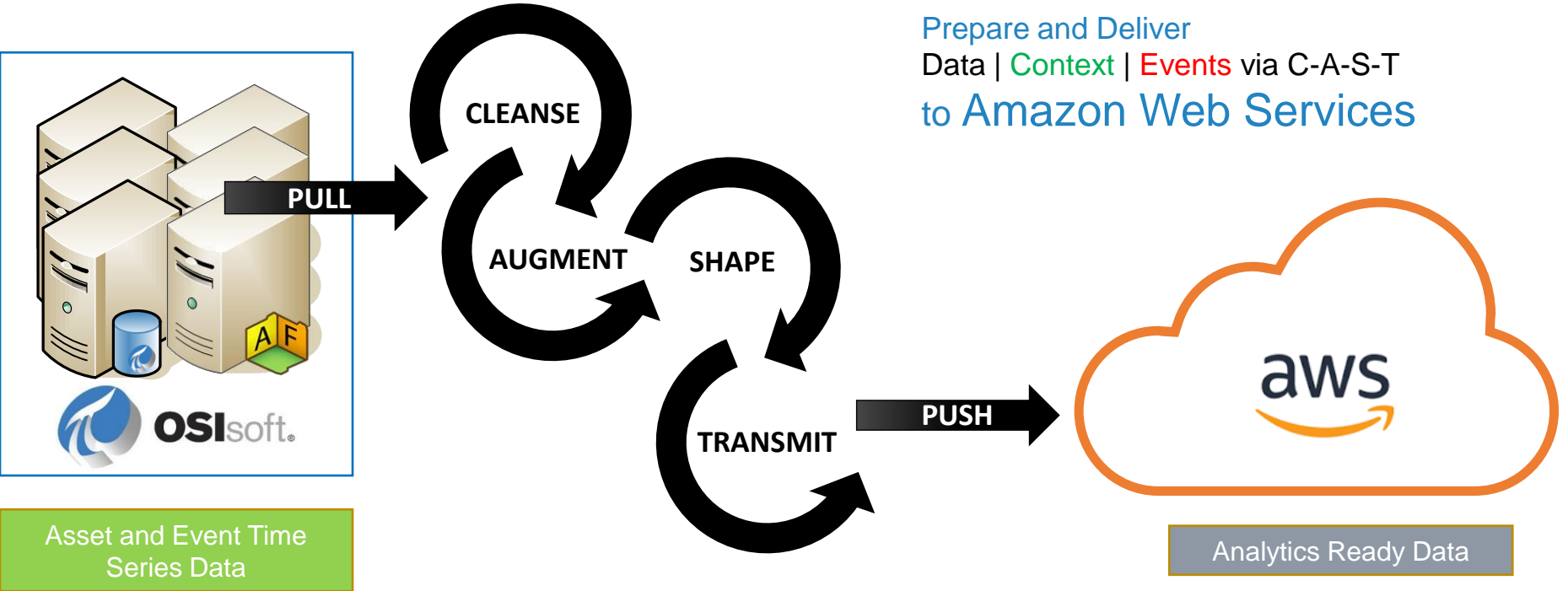
Pressure.Avg
Product Loss
Reason Code
Temp.Max

Process Excursion Startup Downtime

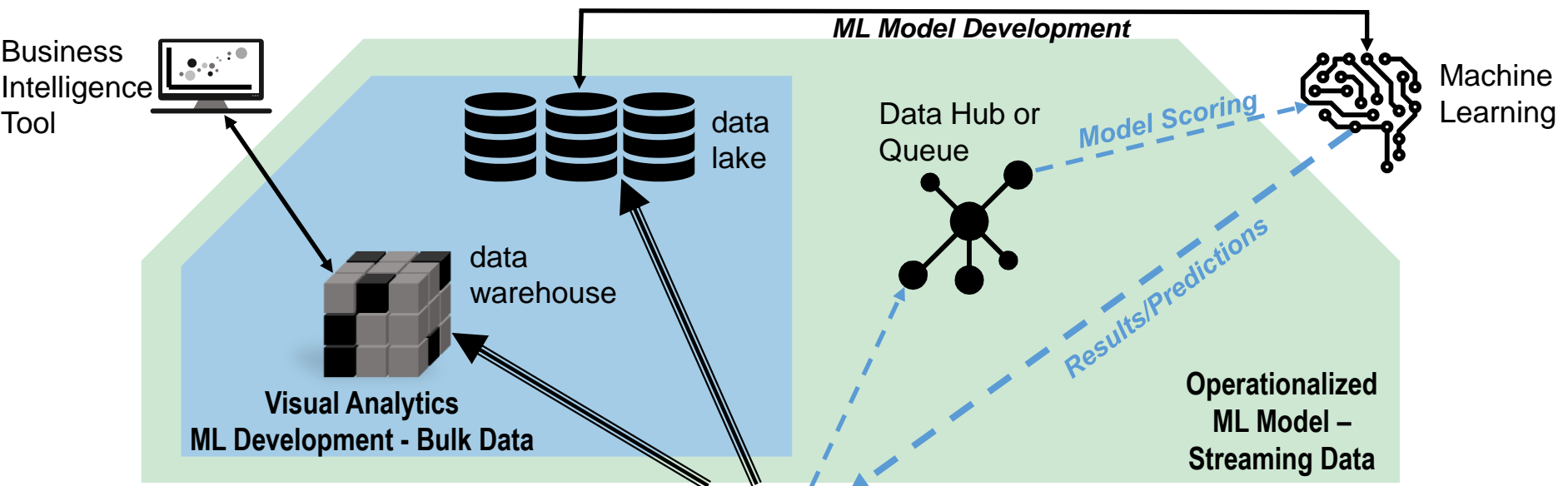
Shift Shutdown Batch

Environmental Excursion Grade Change

PI Integrator for Business Analytics



Advanced Analytics Patterns



OSIsoft[®]

Enterprise Operations Infrastructure



Assets



Automation Systems



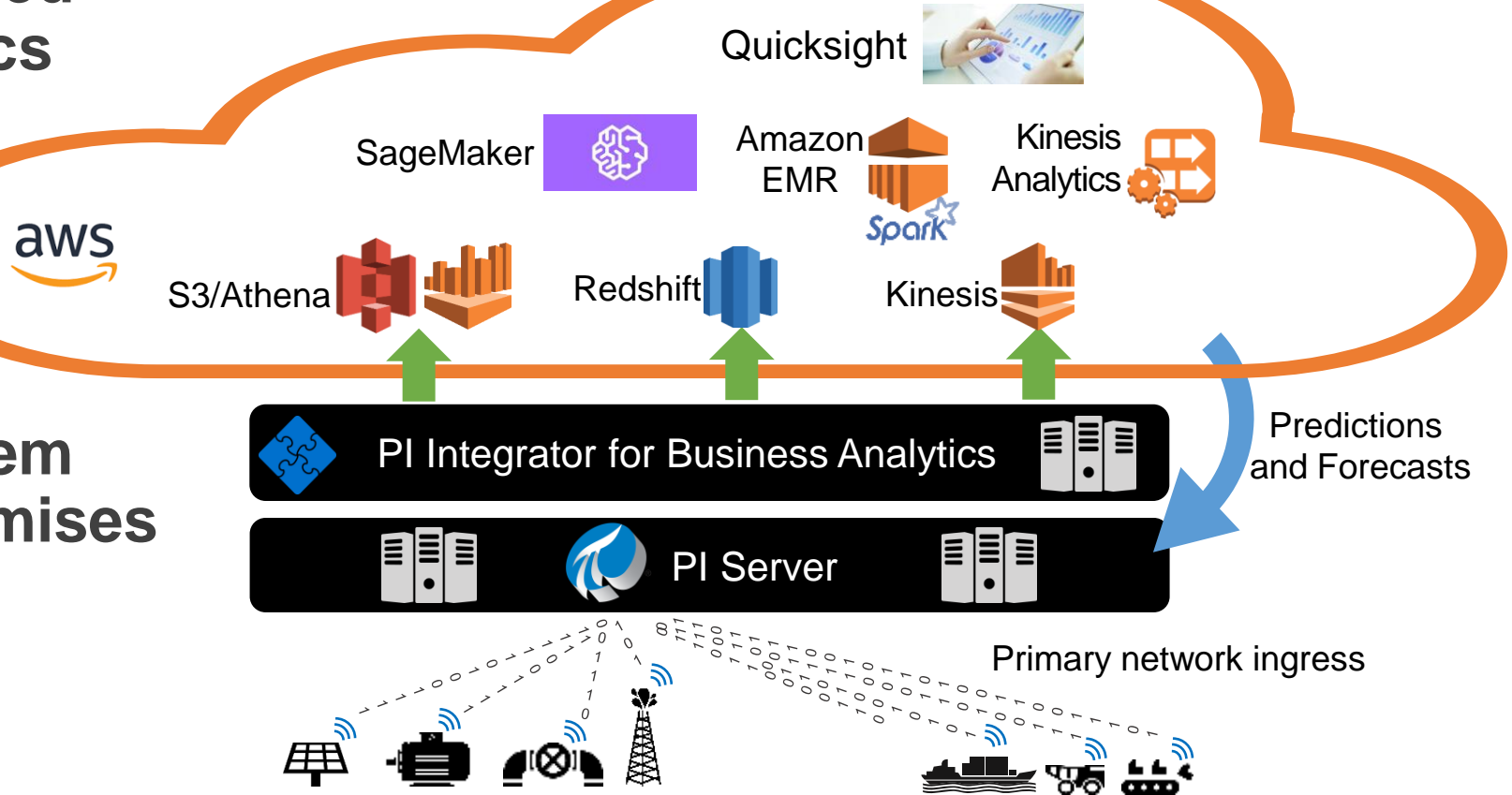
Edge Devices / Sensors



IoT solutions

Advanced Analytics in AWS

PI System On Premises



A wide-angle photograph of an industrial gas processing facility at sunset. The sky is filled with dramatic, colorful clouds in shades of purple, pink, and blue. In the center, a tall, slender distillation column rises above a complex network of pipes, walkways, and storage tanks. To the right, a tall, thin smokestack is visible. The foreground is a dark, flat area, possibly a parking lot or a paved road. The overall scene conveys a sense of industrial scale and environmental context.

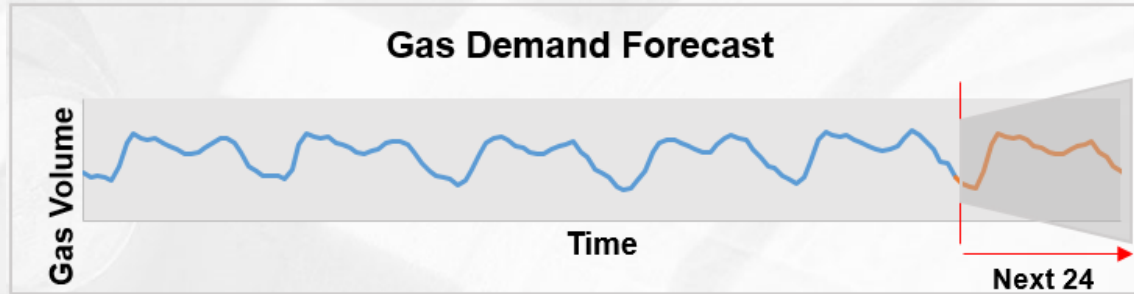
Improving Gas Day Demand Forecasting

Integrating OSIsoft PI AF with AWS Machine Learning



TransCanada

Improving Gas Day Demand Forecasting



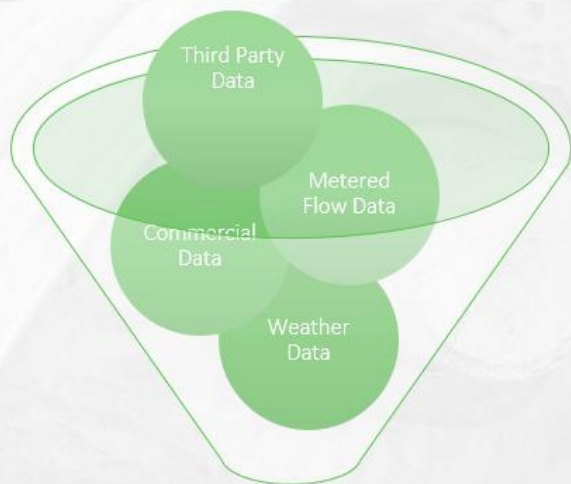
Challenge

- Commercial operating decisions are made based on daily demand forecast.
- More accurate forecasting provides for optimal use of our assets and more flexibility for our customers.
- Current method of forecasting does not take full advantage of historical weather and load demand data.

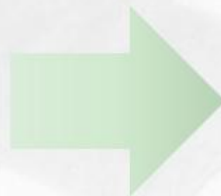
Objectives

- Fully utilize the data we have on hand to produce more accurate forecasts by modeling system performance against historic weather conditions.
- Utilize cloud-based machine learning platforms to minimize up-front investment and on-going costs.
- Leverage key technology partnerships to prove out the concept in rapid fire fashion. Fail Fast, Succeed Fast.

Navigating the Sea of Data



**PI Asset
Framework**



**PI Integrator
for AWS**

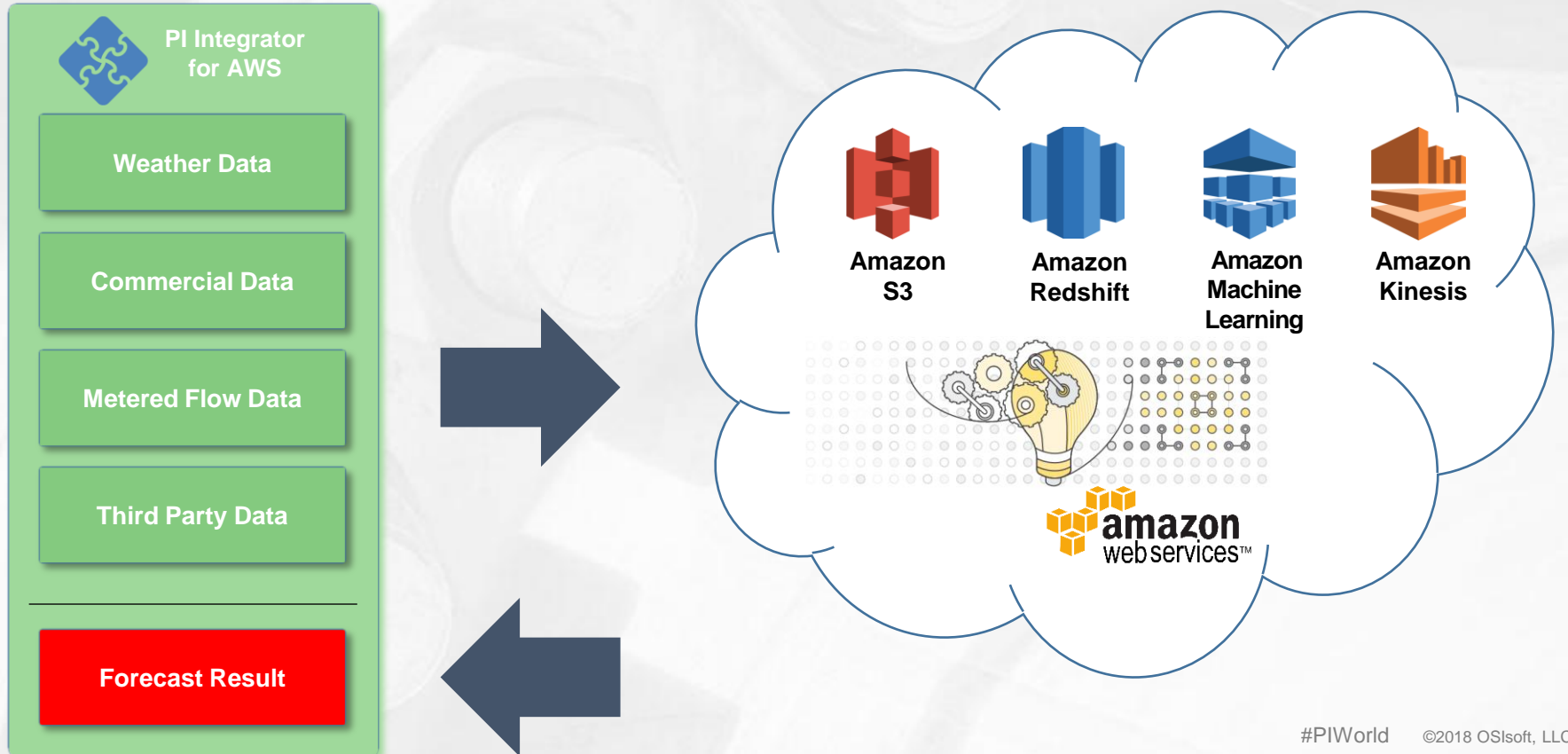
Weather Data

Commercial Data

Metered Flow Data

Third Party Data

Feeding the Machine



Improving Gas Day Demand Forecasting

Where are we in the journey?

- Phase I complete! Integration of PI AF and AWS S3 is in place.
- Phase II underway. Development of Machine Learning Models in progress.
- Currently focused on one market area to prove value.

Desired Outcomes

- Short term
 - Improved accuracy of demand forecast for an individual market area.
 - Understand the total cost of ownership of this approach. (People, Process & Technology)
- Long term
 - Scale out to all market areas and assets. Optimize our commercial operations through innovation.
 - Increase our competency in using new tools and techniques to solve existing business challenges.

Extending the Enterprise

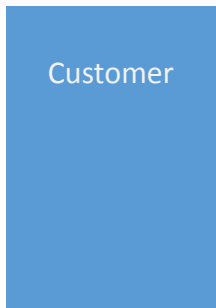
Challenges and Opportunities

Dynamic Compute Platform

- Movement from private data centers to public cloud
- Customers focus on delivering value to business
- Cost of cloud decreasing steadily
- Cloud is global
- Pay for what you use
- Expand and contract resources anytime
- Centralized administration

OSIsoft Offerings at Each Level

On Premises

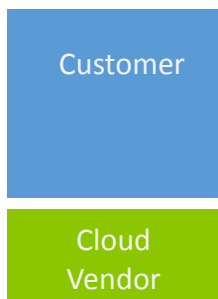


***Integrate** with other
cloud platforms*

Achieved TODAY with...

PI Server +
PI Integrators

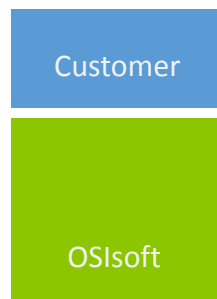
Infrastructure (as a Service)



*Make PI System
"Cloud Friendly"*

Reference Architectures,
Quick Starts, Scripts,
CloudFormation

Platform (as a Service)



*Offer a **Platform for**
Customer & Partner **Apps***

Achieved TOMORROW with...

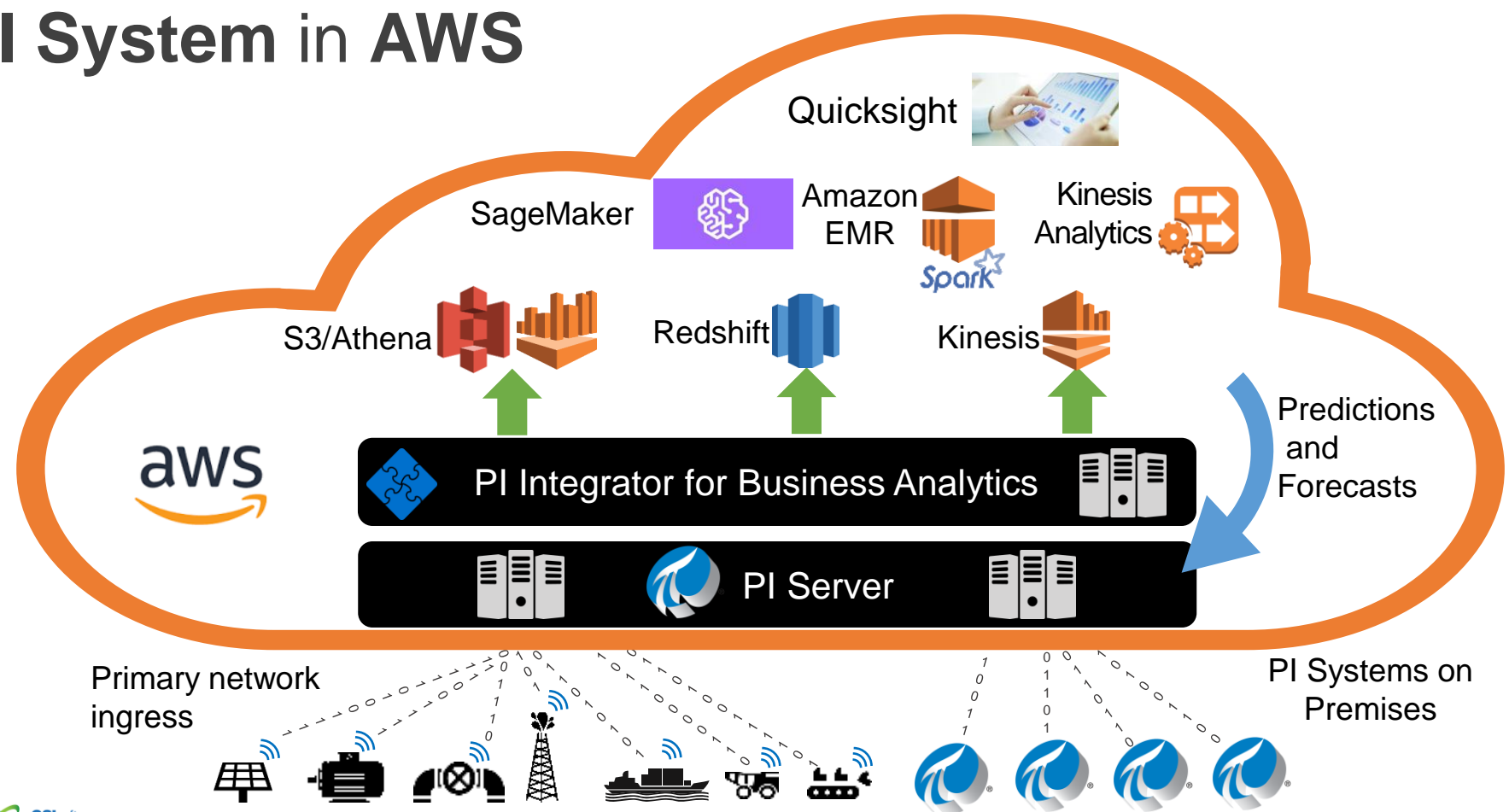
OSIsoft Cloud Services (OCS)

Software (as a Service)



*Deliver native, multi-tenant,
& complementary **Cloud**
Services*

PI System in AWS



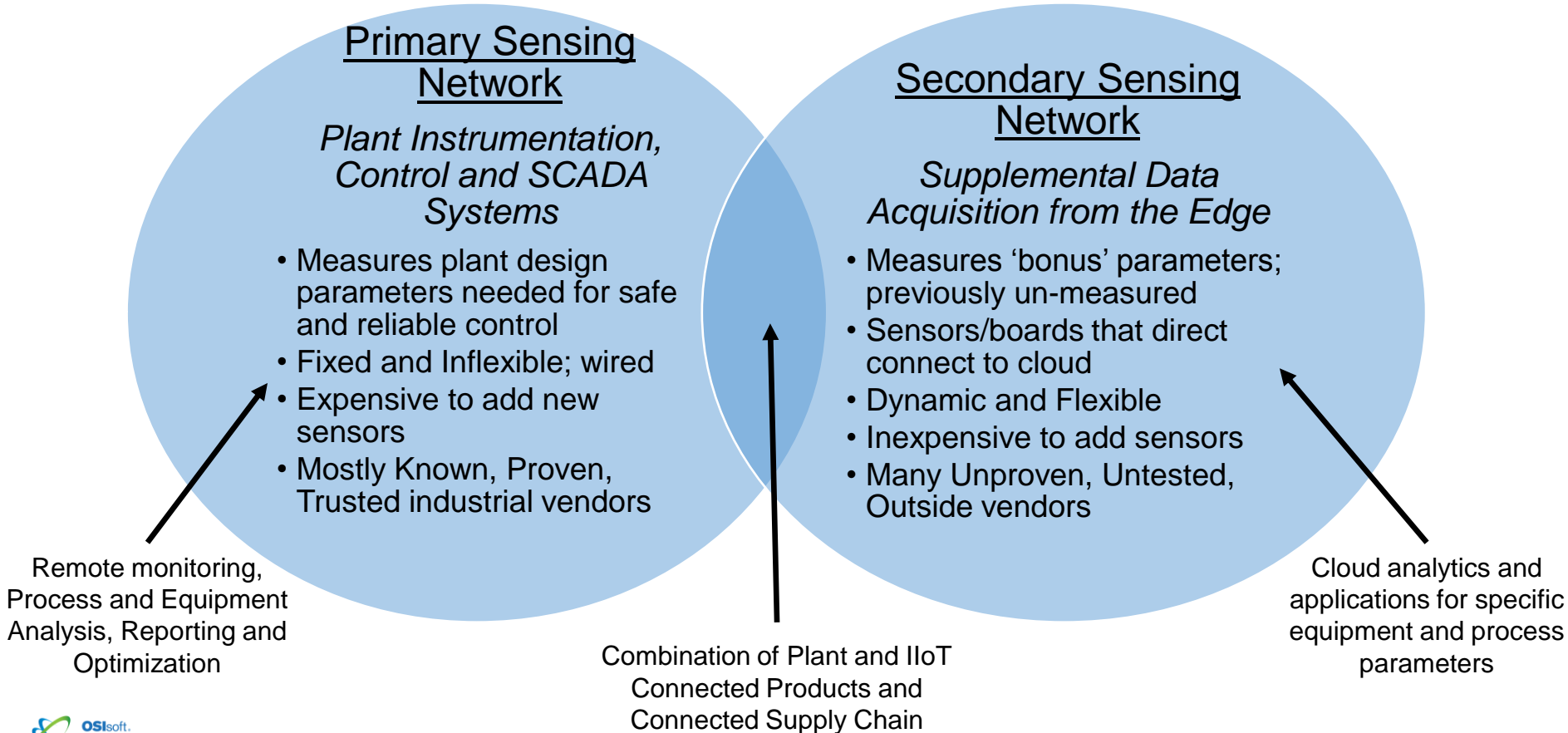
Extending Data Reach with Edge Processing

Challenges and Opportunities

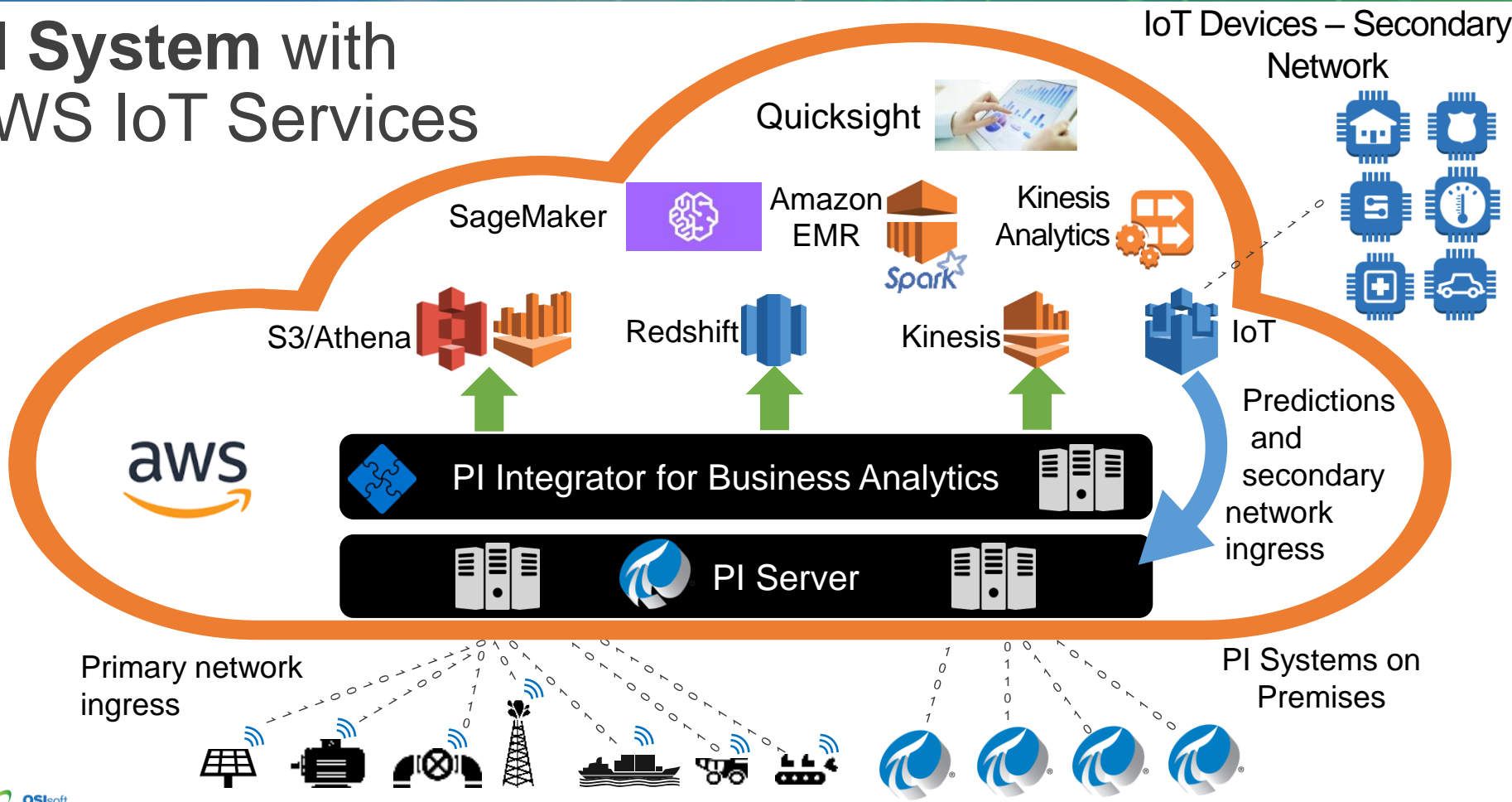
Edge Processing

- Billions of new sensed devices
- Security is a must have
- Devices need latest software/firmware
- No Operating System present
- Edge Analytics – Operationalizing ML

The Promise of Industrial IoT



PI System with AWS IoT Services



Learn more...



Talks

Better Data Quality for
Better Data Science with
the PI System
Tuesday 14:45

Product Talk:
Actionable Insights
with PI Integrators
Thursday 15:30



Product Booth

Visit the Data
Integration Booth
In the Product Expo

Visit the AWS Booth
In the Product Expo



Hands-On Lab

Apply Predictive
Machine Learning
Models to Operations
Thursday 10:40

Contact Information



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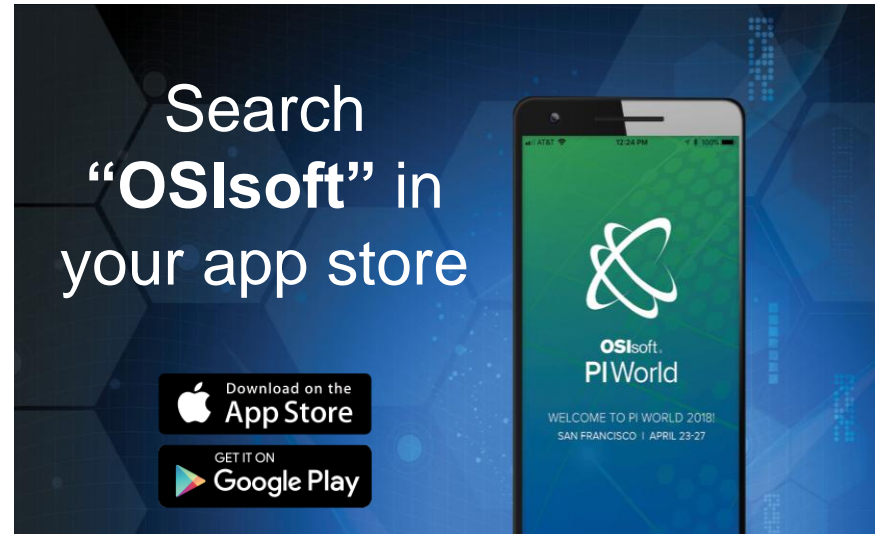
Questions?

Please wait for
the **microphone**

State your
name & company



Please rate this session in the mobile app!



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 TAPADH LEIBH 고맙습니다
 БАЯРЛАЛАА MISAOTRA ANAO
 DZIĘKUJĘ CI NGIYABONGA TEŞEKKÜR EDERIM GRACIES
 OBRIGADO شڪرا SALAMAT
 DANKON TANK TAPADH LEAT
 DANKIE TERIMA KASIH
 KÖSZÖNÖM
 СПАСИБО
 PAKMET CIZGE
 GO RAIBH MAITH AGAT
 БЛАГОДАРЯ GRACIAS
 МАНАДСАНИД
 ТИ БЛАГОДАРАМ
 TAK DANKE
 RAHMAT
 HATUR NUHUN
 CẢM ƠN BẠN
 WAZVIITA
 FALEMINDERIT
 DANK JE EΥΧΑΡΙΣΤΩ GRATIAS TIBI
 AČIŮ SALAMAT MAHALO IĀ 'ŌE TAKK SKALDU HA
 GRAZZI PAKKA PĒR
 PAXMAT CAĞA
 SĪPAS JI WERE TERIMA KASIH
 UA TSAUG RAU KOJ
 ТИ БЛАГОДАРАМ
 СИПОС
 MULTUMESC
 FAAFETAI
 ESKERRIK ASKO
 HVALA ХВАЛА ВАМ
 TEŞEKKÜR EDERIM
 GRAZIE
 DI OU MÈSI
 ĎAKUJEM
 MATUR NUWUN



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THANK YOU



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