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USERS²⁰¹¹ CONFERENCE



Turning **insight** into **action**.



High Speed Data Collection with FactoryTalk[®] Historian ME

Presented by **Enbridge Pipeline**
Rockwell Automation



What is a PI Server?

... How big ??





What if it is small enough to fit in your hand?

Agenda

- Introduction
- Data collection at Enbridge Pipeline
- Benefits of this new technology
- Future and Next steps
- Product roadmap

Rockwell Automation

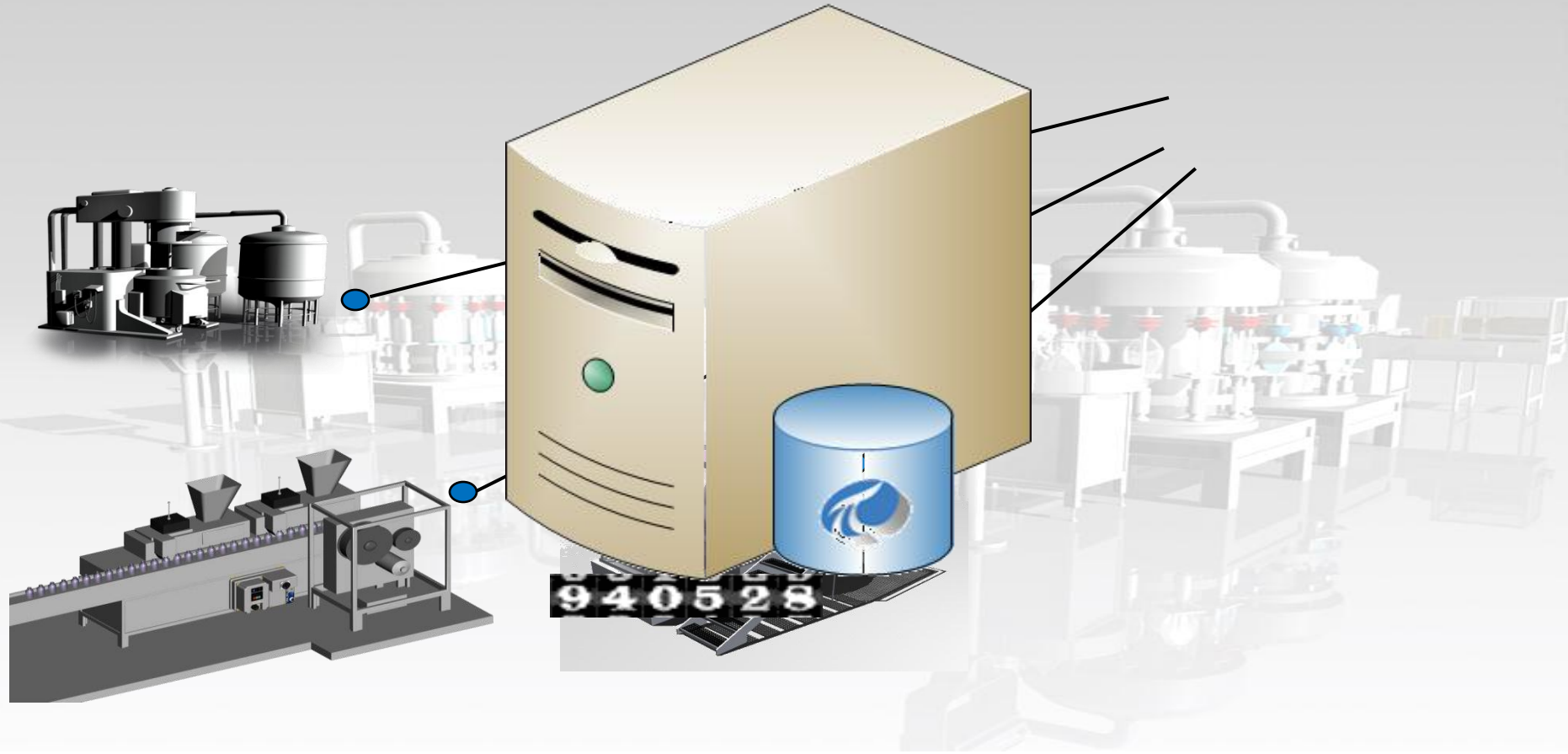


Leading global provider of
industrial power, control
and information solutions

- Industrial Automation
 - Headquarters in Milwaukee, Wisconsin
 - Serving manufacturing customers in 80+ countries
-- emerging markets over 20% of total sales
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- New Embedded Historian Module for ControlLogix
- Capability for high-speed data collection in the backplane

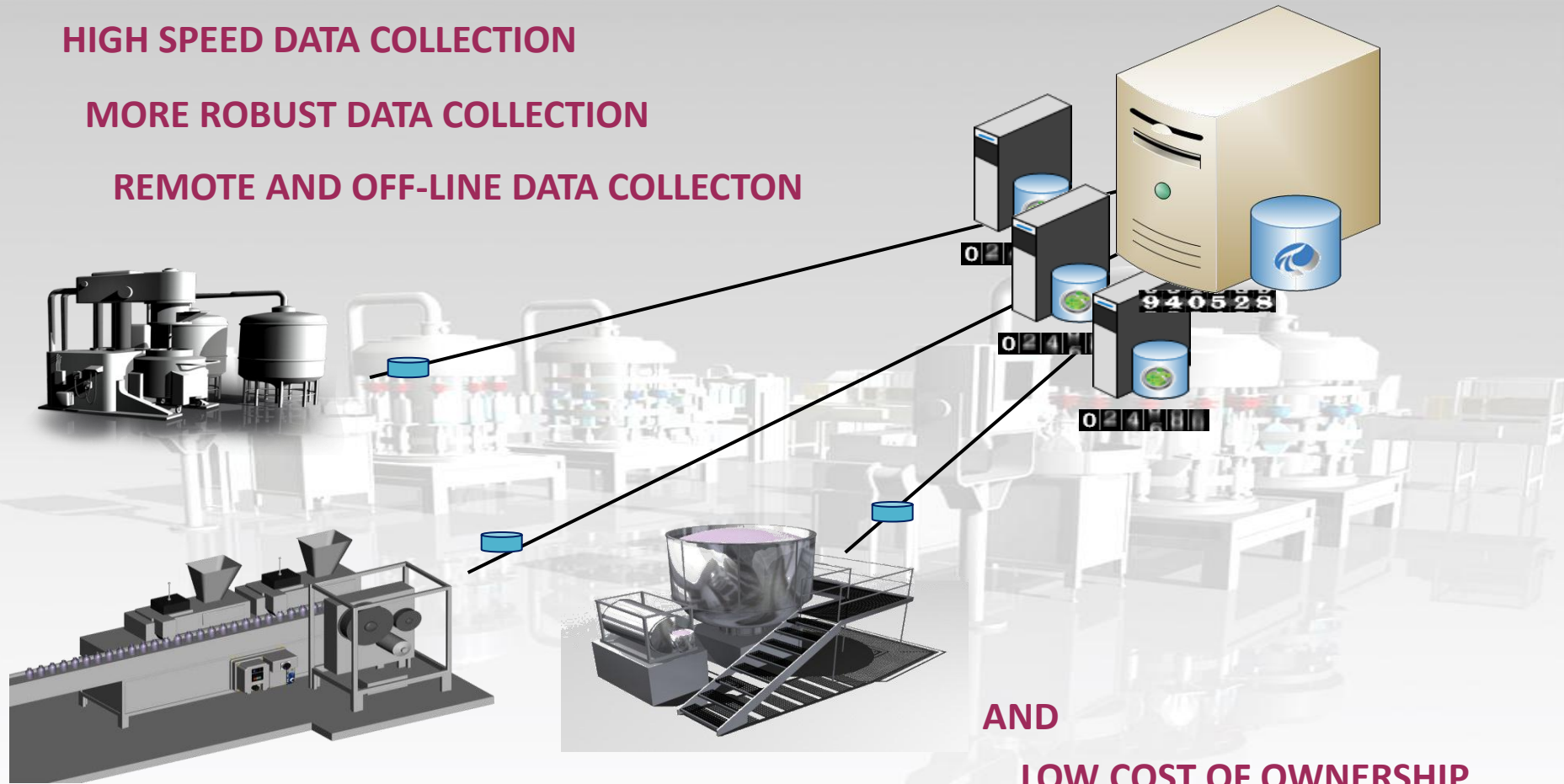




HIGH SPEED DATA COLLECTION

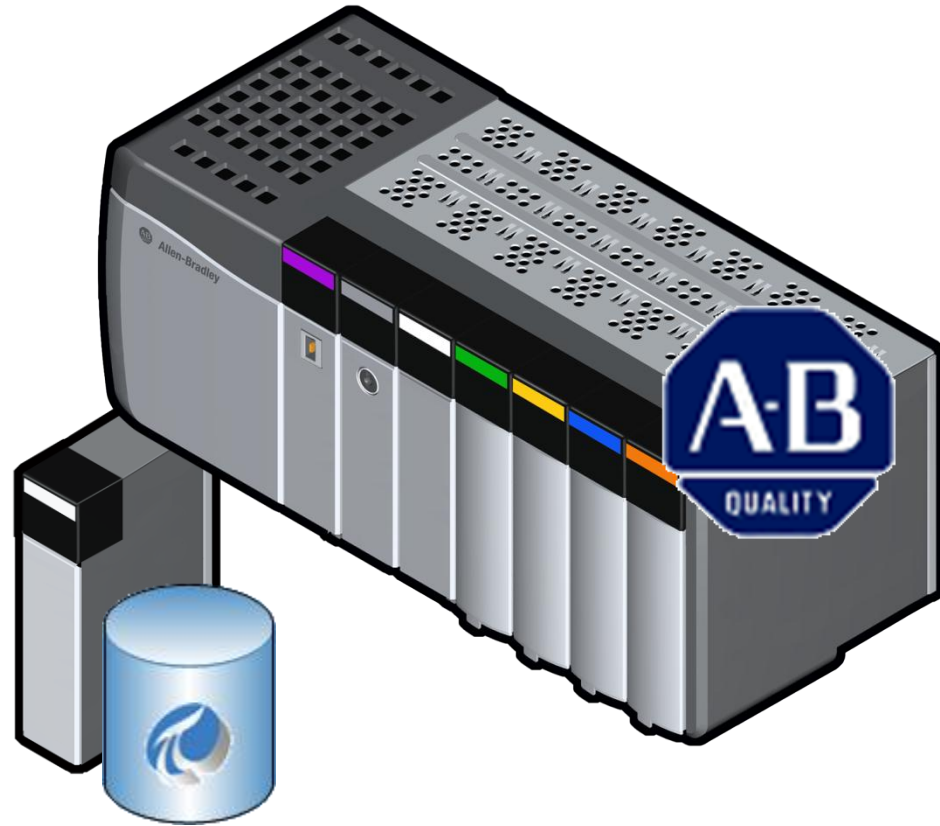
MORE ROBUST DATA COLLECTION

REMOTE AND OFF-LINE DATA COLLECTION

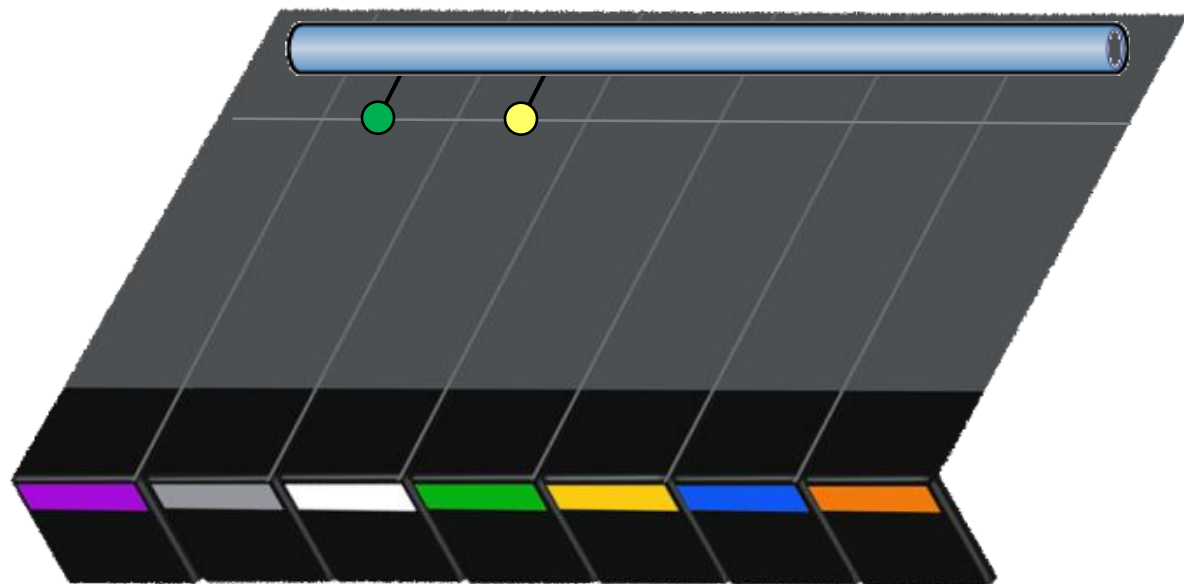


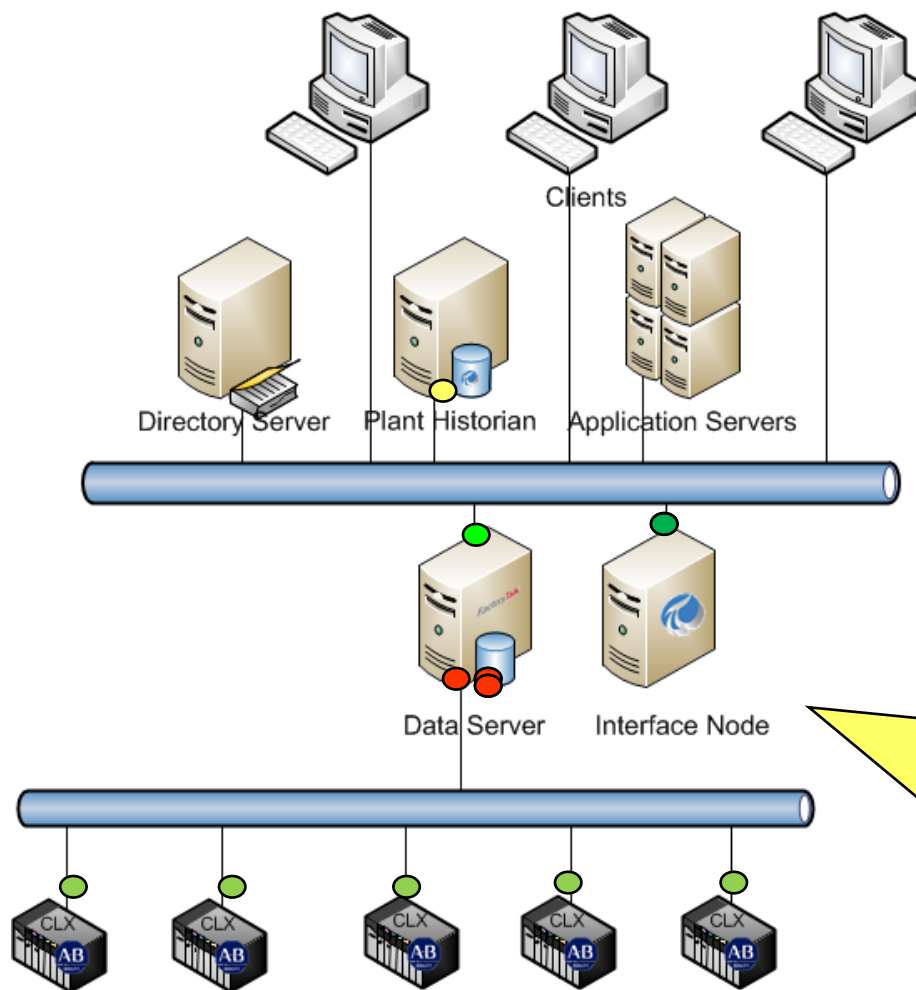
AND

LOW COST OF OWNERSHIP



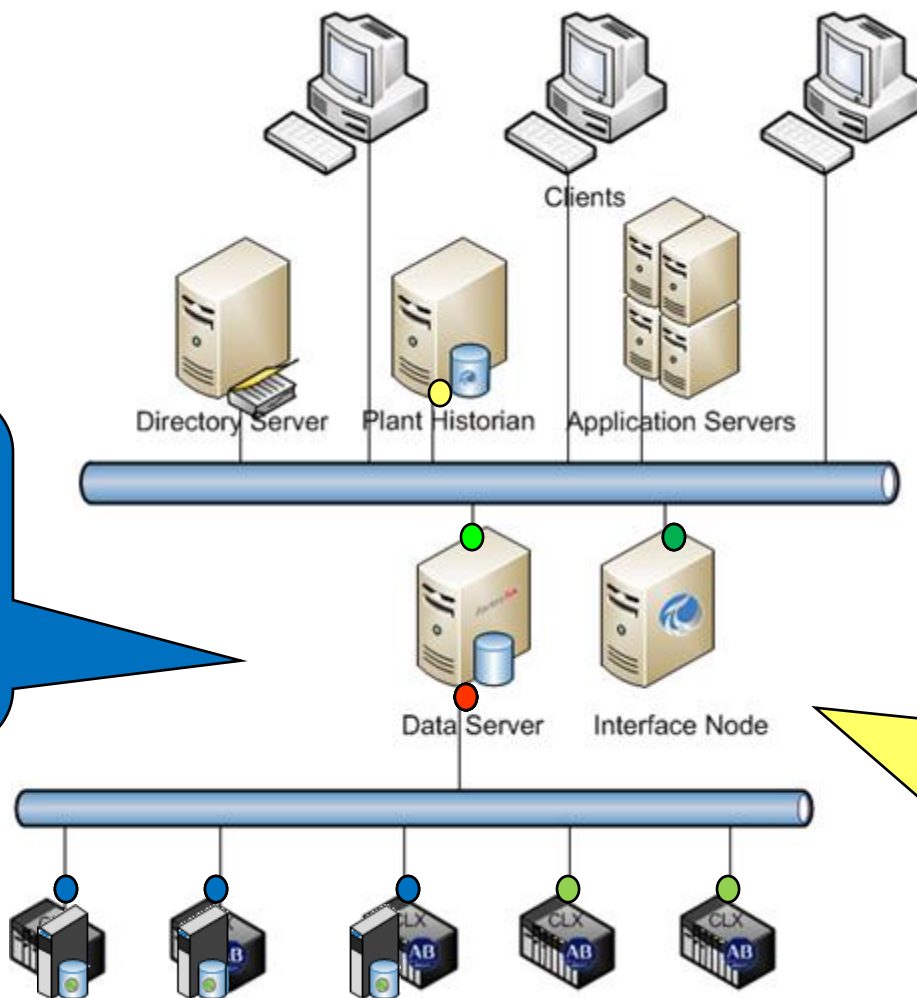






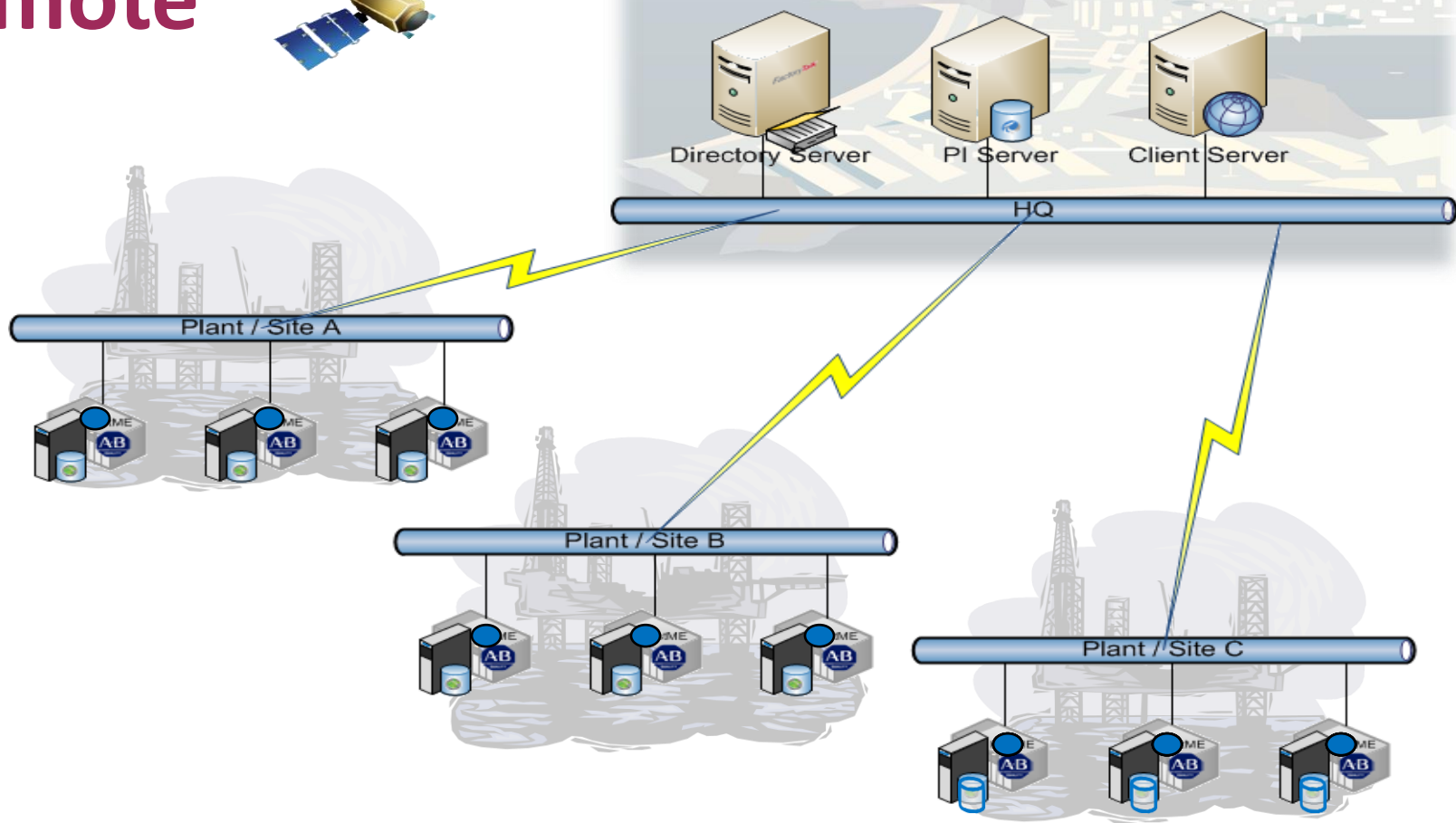
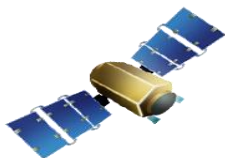
Where traditional data collection is done through interfaces and data servers

**Data Transfer –
transfers archive
data directly
from the ME
module to
Plant Historian**

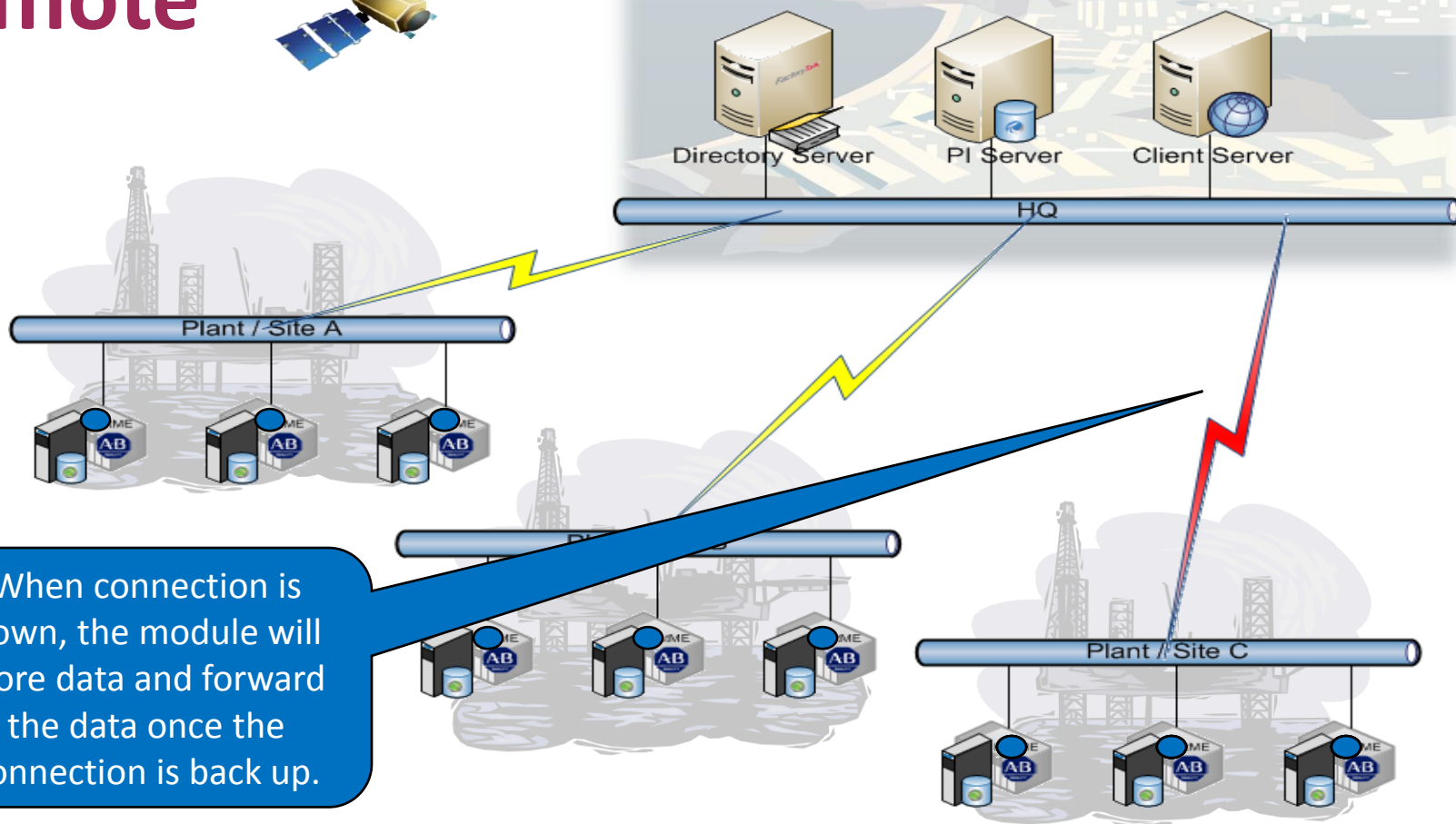
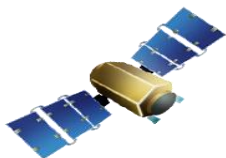


**Where traditional
data collection is
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Remote

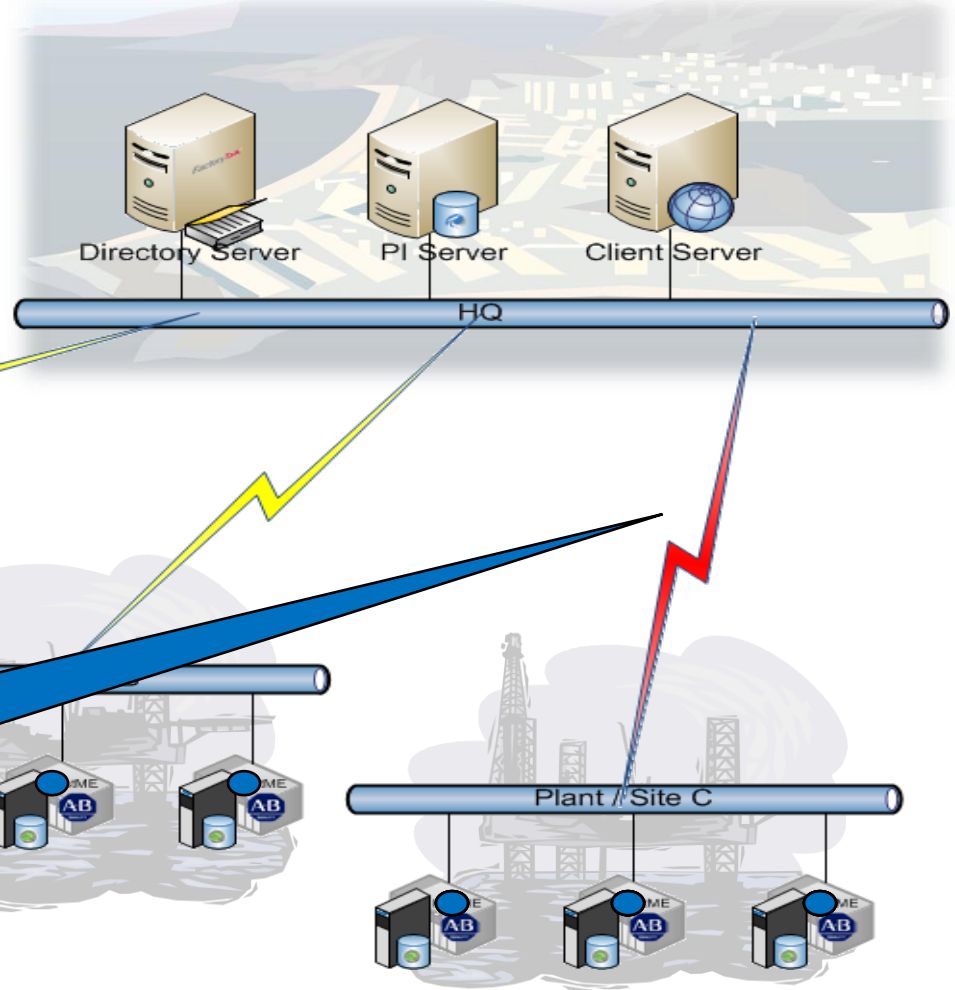
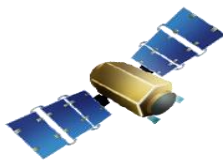


Remote

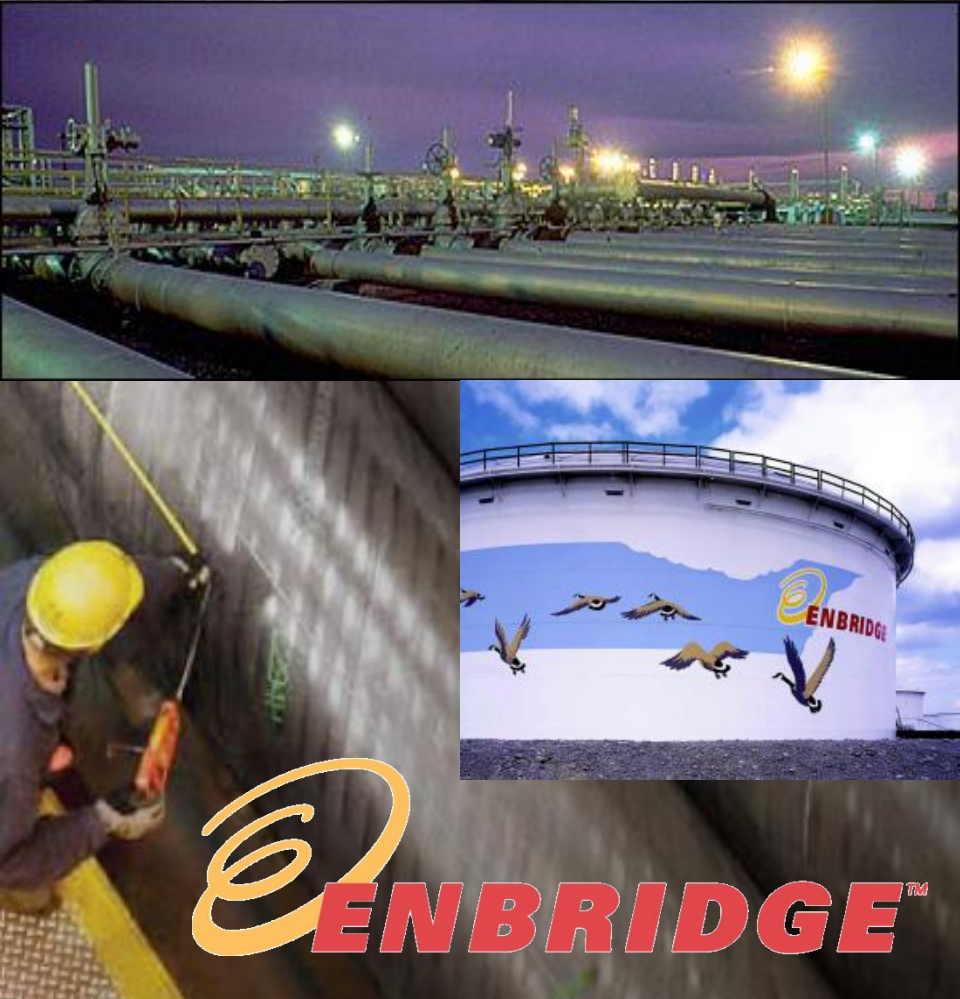


When connection is down, the module will store data and forward the data once the connection is back up.

Remote



When connection is down, the module will store data and forward the data once the connection is back up.



Enbridge U.S.

- U.S. Liquids Pipeline System
- Engineering in Superior
- Pump Stations spread across 9 states
- Remote Control via WAN/Scada System



Challenge – Multiple Data Sources

- Information in various locations throughout the Control System
 - Large amount of info in local PLC only.
 - On site chart recorder
 - Local HMI alarm log
 - Remote PI Server

Challenge – Multiple Versions of the Story

- Local HMI alarms/status at 1 second scan rate
- Local Hi-Speed Chart Recorder
- Remote PI Server subject to SCADA System and WAN scan rate limitations

Challenge – Incomplete Data

- Partial History
 - Remote PI Server subject to network/power outages
 - SCADA system includes only a subset of available data: that which is important to Control Center Operations.

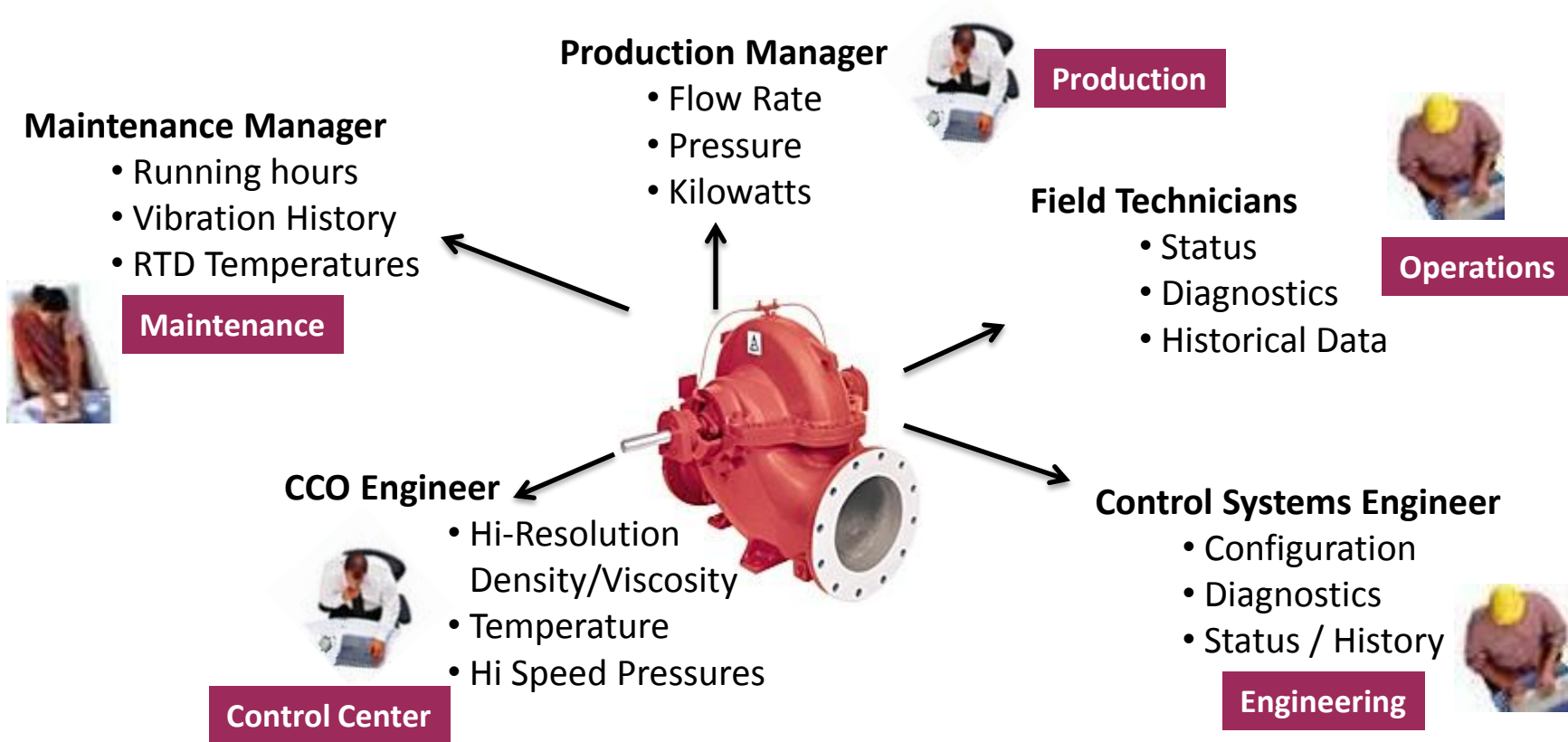
Challenge – Limited Access to Information

- Limited Access
 - PLC info requires Engineering to access
 - Chart recorder data requires Engineering to convert and interpret
 - Local HMI requires Engineering to provide data
 - Remote PI Server has limited access

Challenge – More info & faster updates

- Complete history from PLC
 - Temps, Amps, Volts, Vibration, Gas Levels... things not important to control center
 - No gaps in history due to network/power outages
 - One-second scan rates for more granular data
 - Station configuration information for Engineering to interrogate and run reports

Challenge – Multiple Users of Information

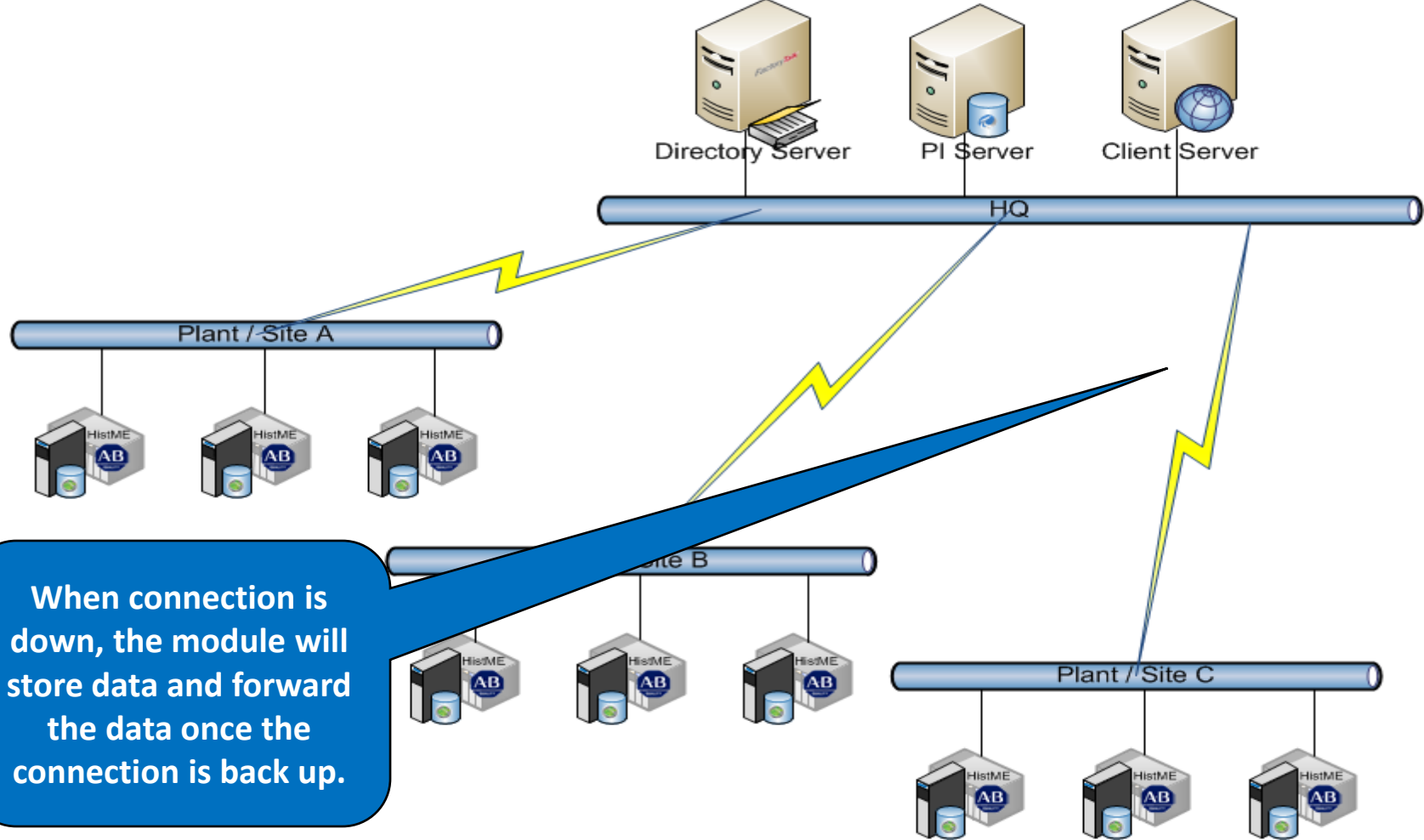


Solution – Distributed Historian (ME)

- PLC Chassis based FactoryTalk Historian ME
- Collect data in real-time at it's birthplace
- Store and forward to Server w/o loss of history due to outages or scan rate
- Simple configuration – up in < 1 hour
- Solid state, no OS, patches,

Solution – Distributed Historian (PI System)

- New PI Server for central access and long term storage
- Historian ME data pushed to the PI Server periodically.
- Scalable storage, horsepower, connectivity.
- Virtual Machine environment



Solution – Unified Access to Information

- Thin Client Platform integrates and provides the data thru a web based reporting and trending tool.
- Data remains distributed, collected in real-time
- Hundreds of data points available thru web browser

Web Based Clients



**Thin Client
Web Server**



**Network Equipment
SNMP Data**



PI Server



Direct PLC Polling



**Historian ME
Modules**



Project Status

- New PI Server running since November.
- 45ea. Historian ME Modules installed, configured, collecting data.
- Another 20+ installed but not yet configured
- Thin Client Server running since January.

Project Roadmap

- 120+ ME Modules by end of 2011
- Assist other Enbridge entity in implementing this Historian solution, 25 more ME modules.
- Tuning Exception/Compression settings to find a balance of performance and resolution

Next Steps...

- Build out Asset model for all stations.
- Evaluate need for multiple servers based on performance
- Migrate to Windows Server 2008 R2 64 bit

Future Plans for Central PI Server?

- Evaluate SNMP connectivity for network equipment
- Evaluate Modbus TCP connectivity for substation relays
- Direct PLC polling for misc. installations

Realized Benefits so far...

- Better representation of operating conditions due to a faster rate of data collection
- Station configuration data previously held in the PLC only is now easily available
- Evaluated 3000hp Pump-Motor history of running temperature – no rebuild needed

Lessons learned...

- The standardized PLC programs in the 135 stations made this project feasible.
- Interest in getting this historical info turned our 3-year project into a 1.5-year project.
- You get to know and test your IT staff.

Back to FactoryTalk Historian ...



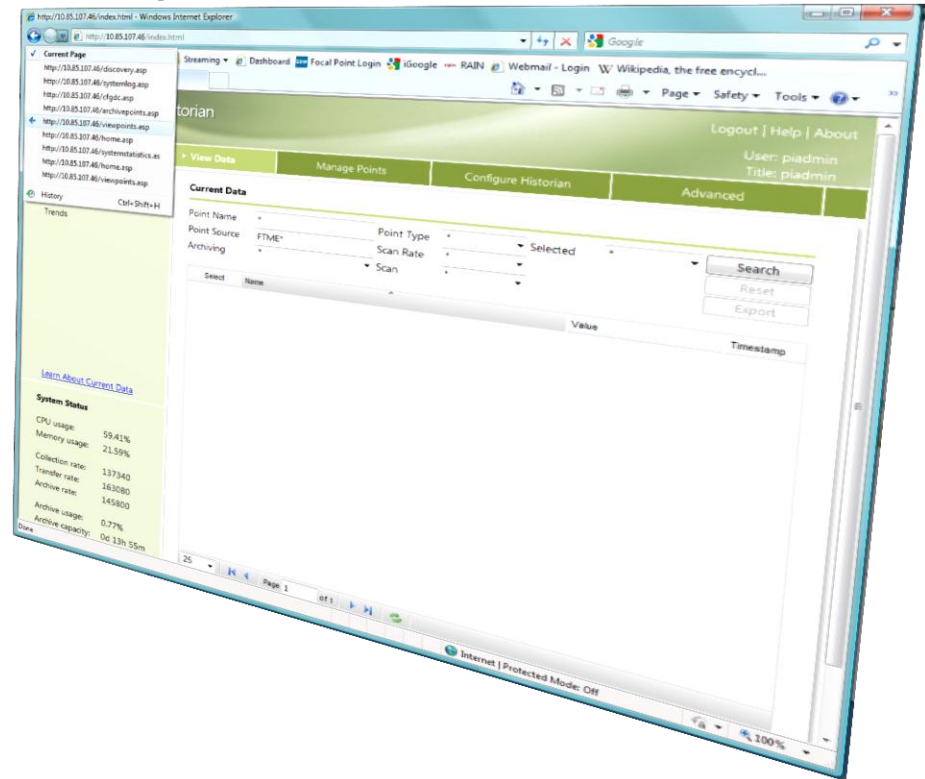
Module specifics

- Backplane connectivity
- 10 millisecond scan rates
- 2500 events / second
- High Speed Data collection utilizes controller trend object
- Very fast
- Very deterministic data collection
- One (1) and Two (2) GB memory sizes
- Store from hours to years
 - Worst case: 4 or 14 hours (1GB vs 2GB)
 - OEM use case for one year
- Most customer applications will need:
 - Plant Historian for long term storage



Fully Operational Browser Functionality for Intuitive & Familiar User Experience

- Forward/back navigation is fully functional
- Establish favorites for quick access to critical information
- Add important displays to Links Bar
- Use Tabs to organize displays in a browser window
- Collaborate with co-workers using active hyperlinks
- Access previously viewed displays using History



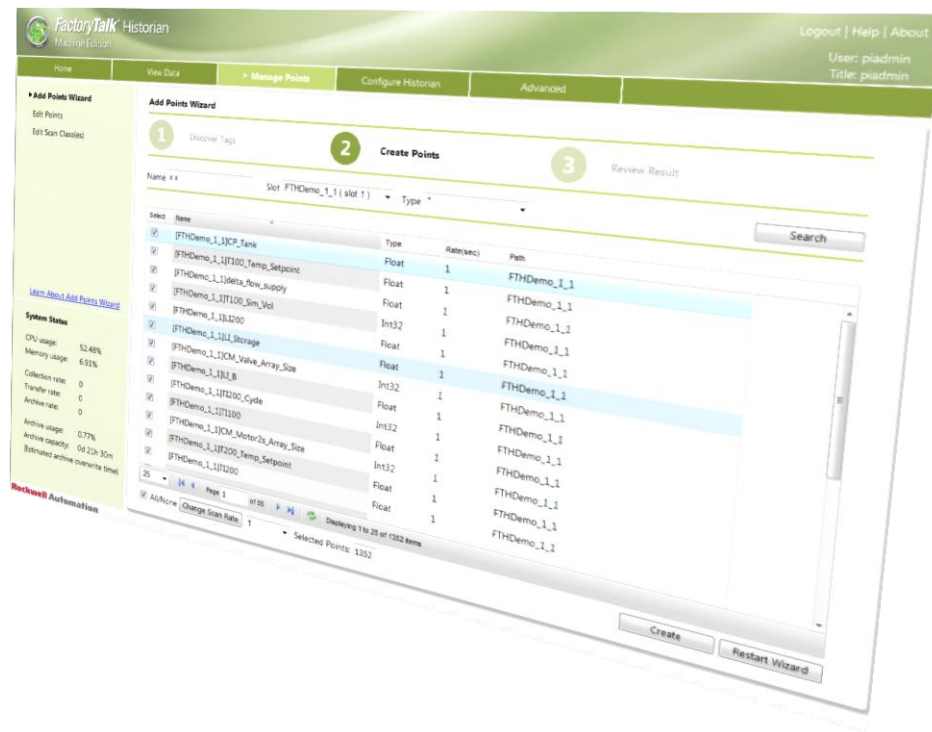
Easy Install and Deployment

- Module is put in empty slot in chassis
- After boot up – it is instantly live and accessible.
- Context specific configuration screens that are easy to understand and easy to use
- Module communicates over backplane, and able to identify controllers and data in the local chassis, thru “Auto Discovery”



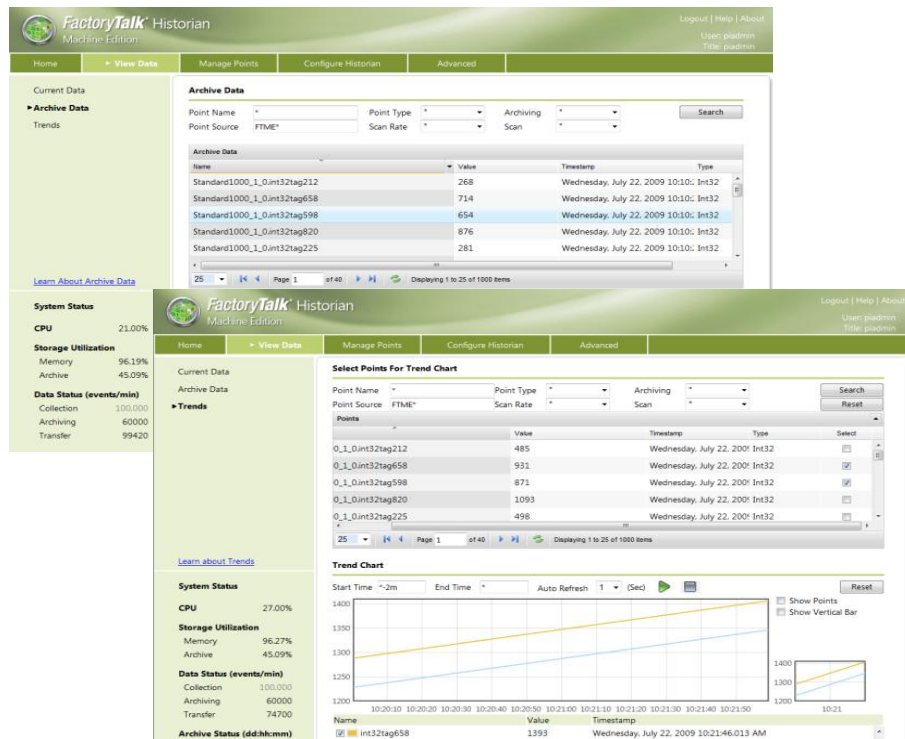
Backplane connectivity is not OPC

- Quick configuration thru Auto Discovery
- Backplane collection speeds down to 10 msec.
- Deterministic collection rates – 50msec is 50msec.



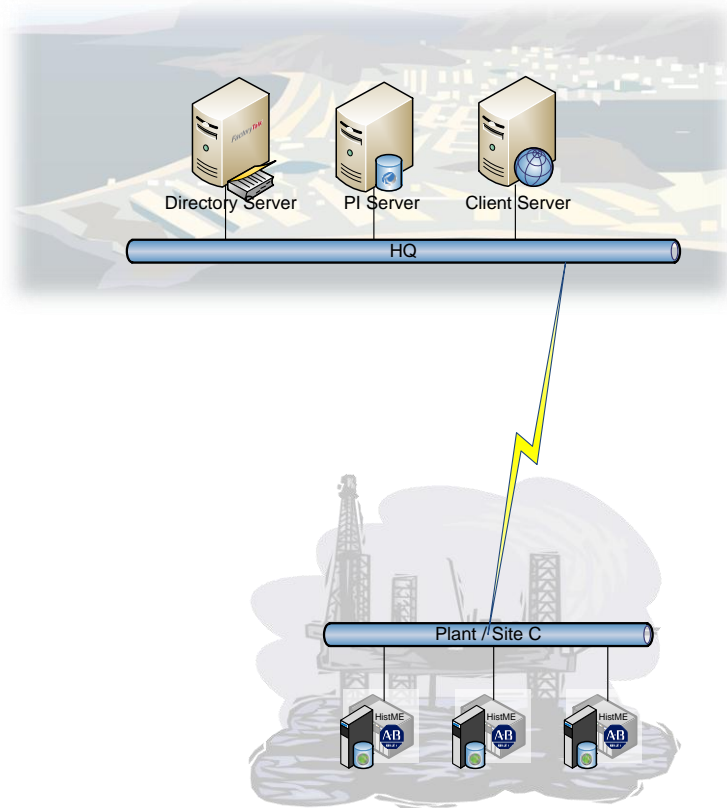
Simple Reporting and Trending

- Tabular report to list values collected for a tag
- Trending of multiple tags in an easy to navigate dialog



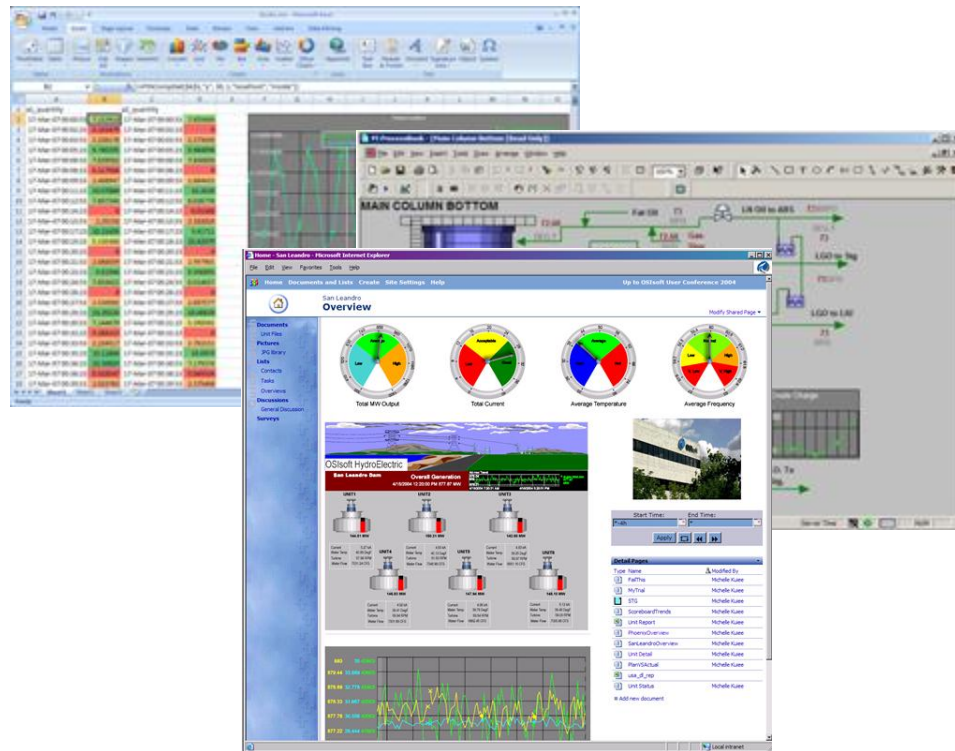
Direct data transfer from ME 2 PI System

- Data Transfer running on the ME module
 - Not PI to PI Interface
 - Configures the Tags on PI Server directly
 - Tag name
 - Tag configuration
 - Compression, scan rate etc.
 - Checks and validates licenses before configuration
 - Transfers data directly from ME archive to PI Server snapshot.
 - No infrastructure in between!



Full PI Server with PI Client access

- All Traditional Historian clients work with FactoryTalk Historian ME
 - PI DataLink
 - PI ProcessBook
 - PI WebParts
 - Other PI SDK clients



Controlling data collection with PLC

- Add-On Profile (AOP)
- Included with the module
- Installed in RSLogix 5000
- Gives access to about 15 inputs and 4 outputs
- Can be used to alarm on unexpected behavior
- Data Transfer not running etc.
- Can be used to control the access to start a batch
- If data runs out before the batch is done – don't start!



The AOP can also be used to control part of the Historian module

- Start and Stop Data collection
 - (set the Historian in “Idle” mode)
- Start and Stop Data Transfer
 - (Control network band width etc.)

Conclusion

- Embedded Historian
- Automatic roll-up to Plant Historian
- Allow for PI System clients to connect
- PI DataLink, PI ProcessBook, etc.
- Include calculations
- Performance equations and totalizers



Historian in your hand !!

For more information

**Rockwell
Automation**

Discover

<http://discover.rockwellautomation.com/Historian>



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Questions

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Thank you

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