



Magnus Hammar | ABB Users Group, Anchorage | Feb. 24-25, 2016

System 800xA Extended Automation

The power of integration: electrical, automation and telecommunications

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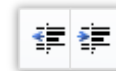
- (First list level for Bulletpoint 01), Arial 18pt
 - (Second list level for Bulletpoint 02), Arial 18pt
 - (Third list level for Bulletpoint 03), Arial 16pt

(Fourth level for running text), Arial 18pt

Highlight 01 (Fifth list level), Arial 18pt, bold

Highlight 02 (Sixth list level) Arial 18pt, bold, 2nd blue

**Switch from one to another list level via
„Increase Indent“ or „Decrease Indent“
Buttons, or use: ALT+Shift+Left or Right**



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for a better world™



System 800xA

Proven track record

- > 9000 800xA systems (3.1- 6.0)
- 65,000 AC 800M controllers
- 50,000 operator stations
- > 30 million+ S800 I/O channels
- > 50 million Tags
- ABB delivers Control Technologies to more than 100 countries serving utilities and all process industries.



Version	Year	Market Penetration, Operational Systems											
		Marine	Crane	Pulp&Paper	Metals	Cement	Mining	Power	Oil&Gas	Chem	Food&Bev	Pharma	Water
2	2002												
3	2004												
4	2005												
5	2007												
5.1	2011												
...	...												

System 800xA Versions ...the climb

- Control Diagrams Editor
- Application Change Mgt
- Ethernet/IP
- S800 High Density IO
- Virtualization of Clients
- Whitelisting
- Embedded Video
- High Performance Graphic elements
- Mobility Guide

- Maintenance Workplace
- Alarm/Alarming
- Aspect Link
- Graphic
- MultiSystem – Asset Optimization

- Process Improvements - Live List and Server
- Performance in IEC 61850
- On Add

v6

Functionalities
embedded in 6.0

- IEC 61131 Engineering
- Connectivity for Harmony and Melody
- Foundation Fieldbus
- Redundancy on all levels
- 21 CFR p11 Support
- Profibus, HART
- ABB Drivebus Integration
- Embedded Asset Optimization

2013

2012

2012

2011

2010

2006-8

2005

2004



FP4

FP3

FP2

FP1



5.1



5.0

4.1

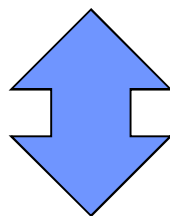
3.1

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ABB System 800xA (E**x**tended **A**utomation)

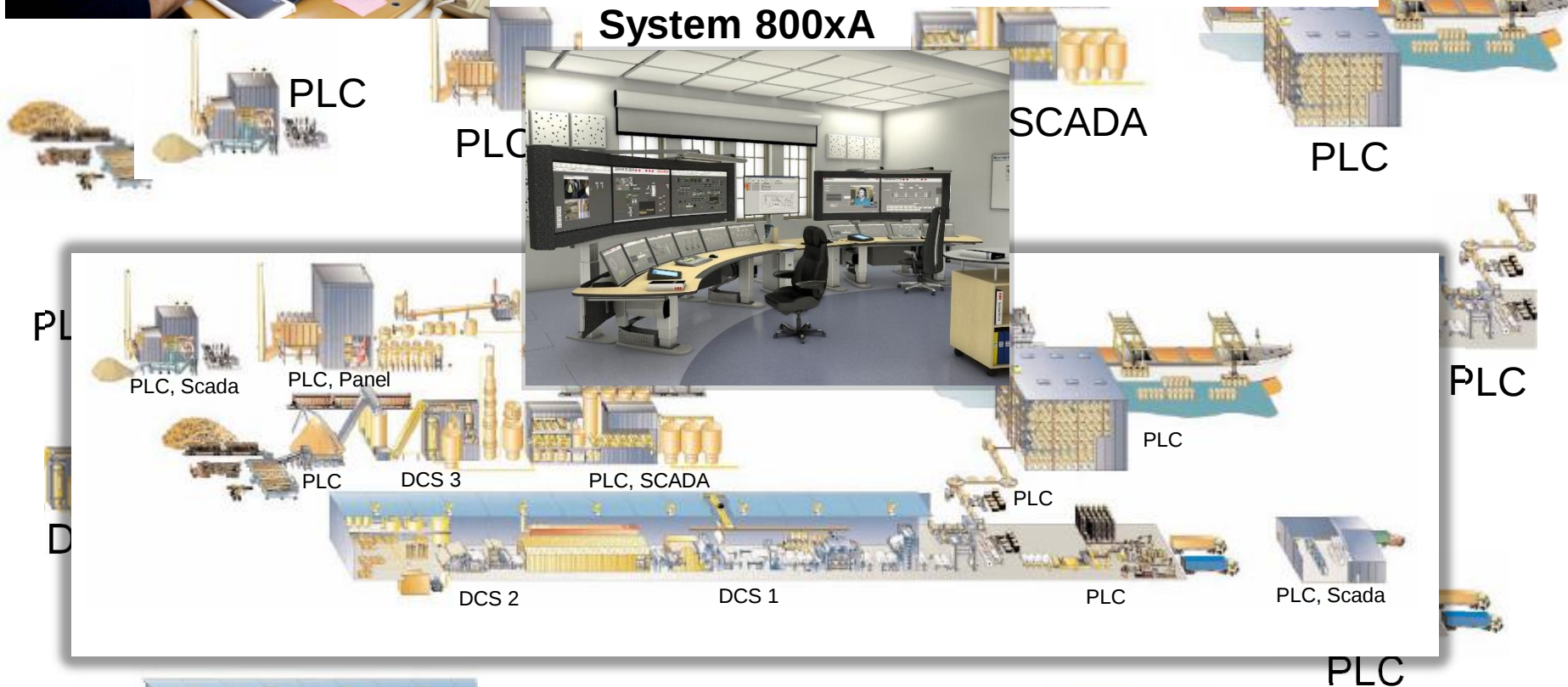
- 800xA Introduction
- 800xA Integrated Process, Power (Electrical) & Telecom
- 800xA Integrated Enterprise Asset Management
- 800xA integrated Safety
- 800xA Integrated Alarm Management
- 800xA Operator Effectiveness
- 800xA Integration to 3rd party systems
- 800xA Integrated Security



Level 3 and Level 4

Wide Information Access

System 800xA

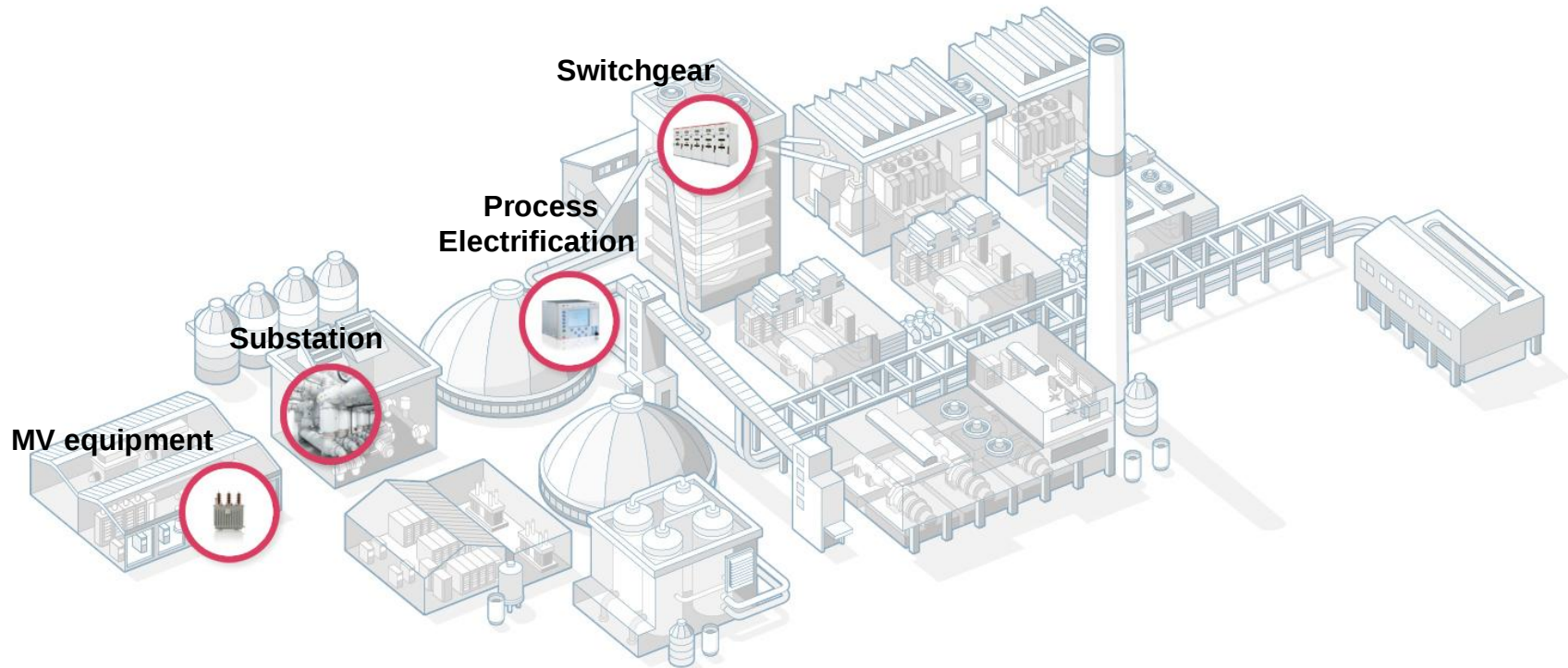


Plant wide Integration

ADA

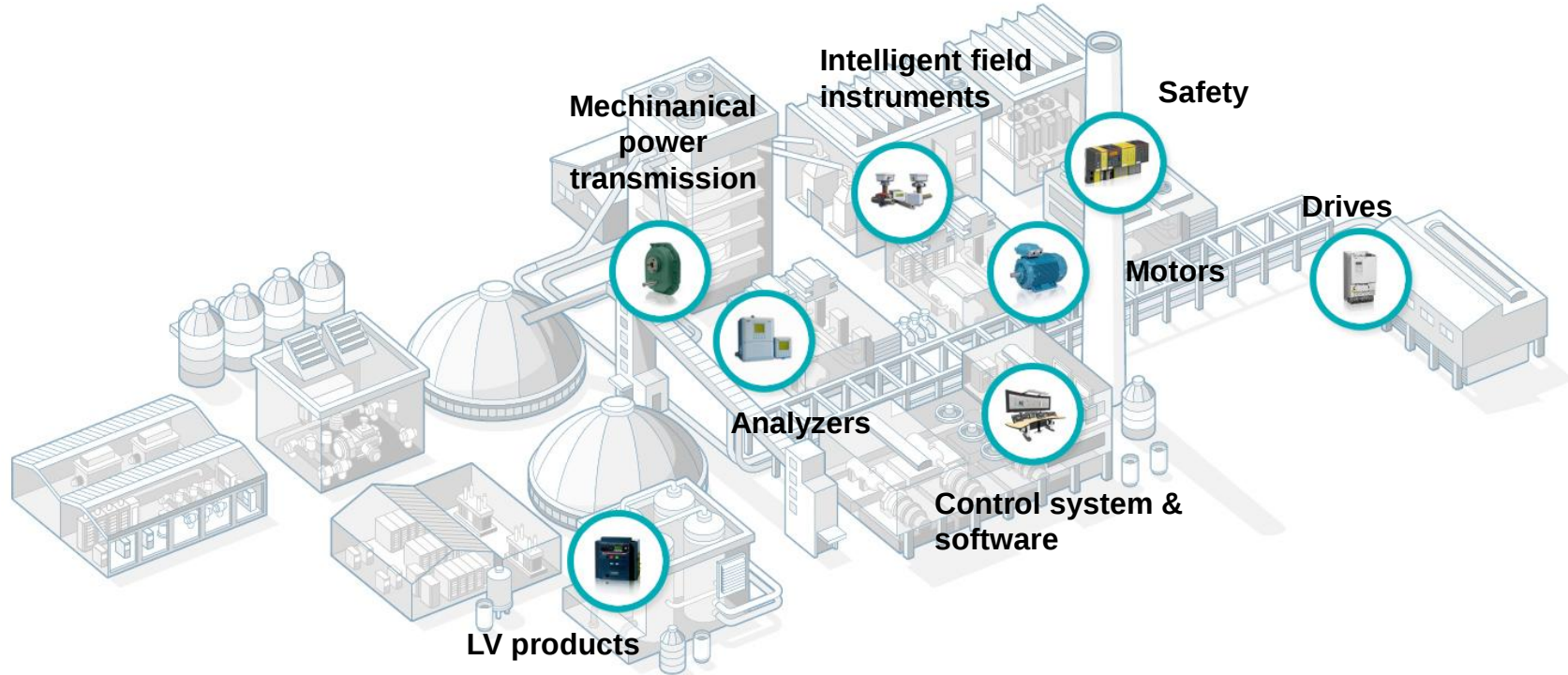
The power of integration

Every Process facility requires power....



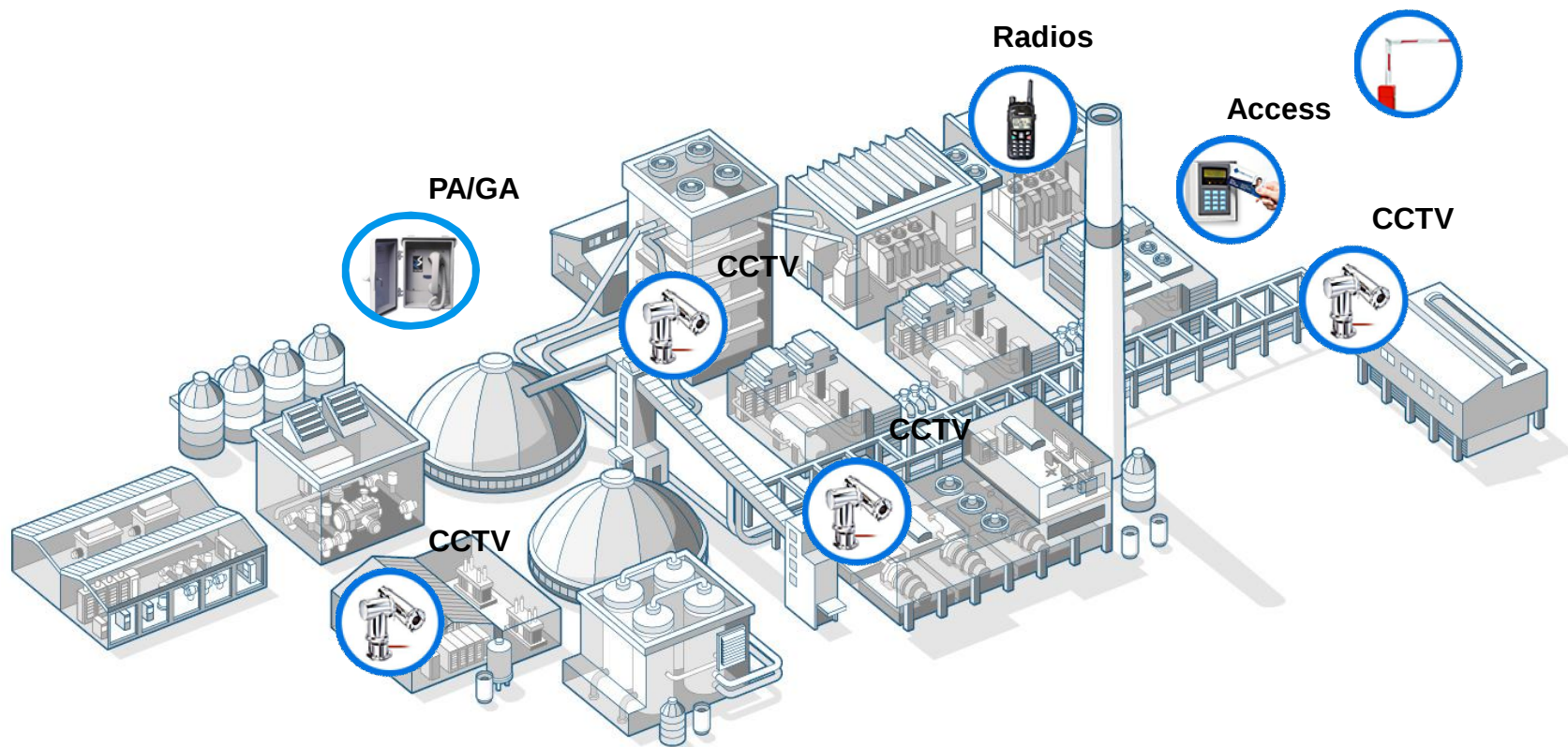
The power of integration

Every Process facility requires automation....



The power of integration

Every Process facility requires telecoms....



Traditional customer approach: Separate systems for power, automation and telecoms

800xA -> All integrated into one system, all
data consolidated into one interface

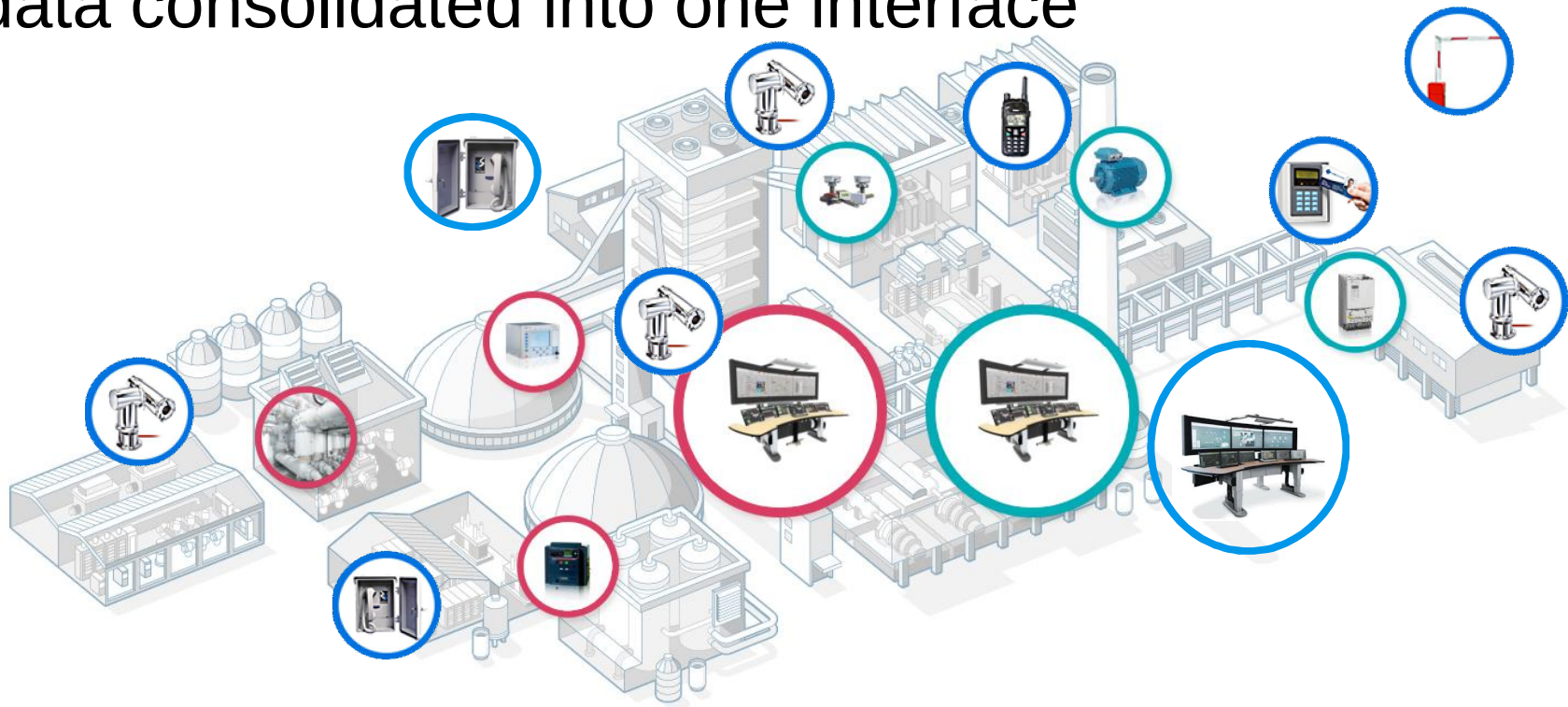
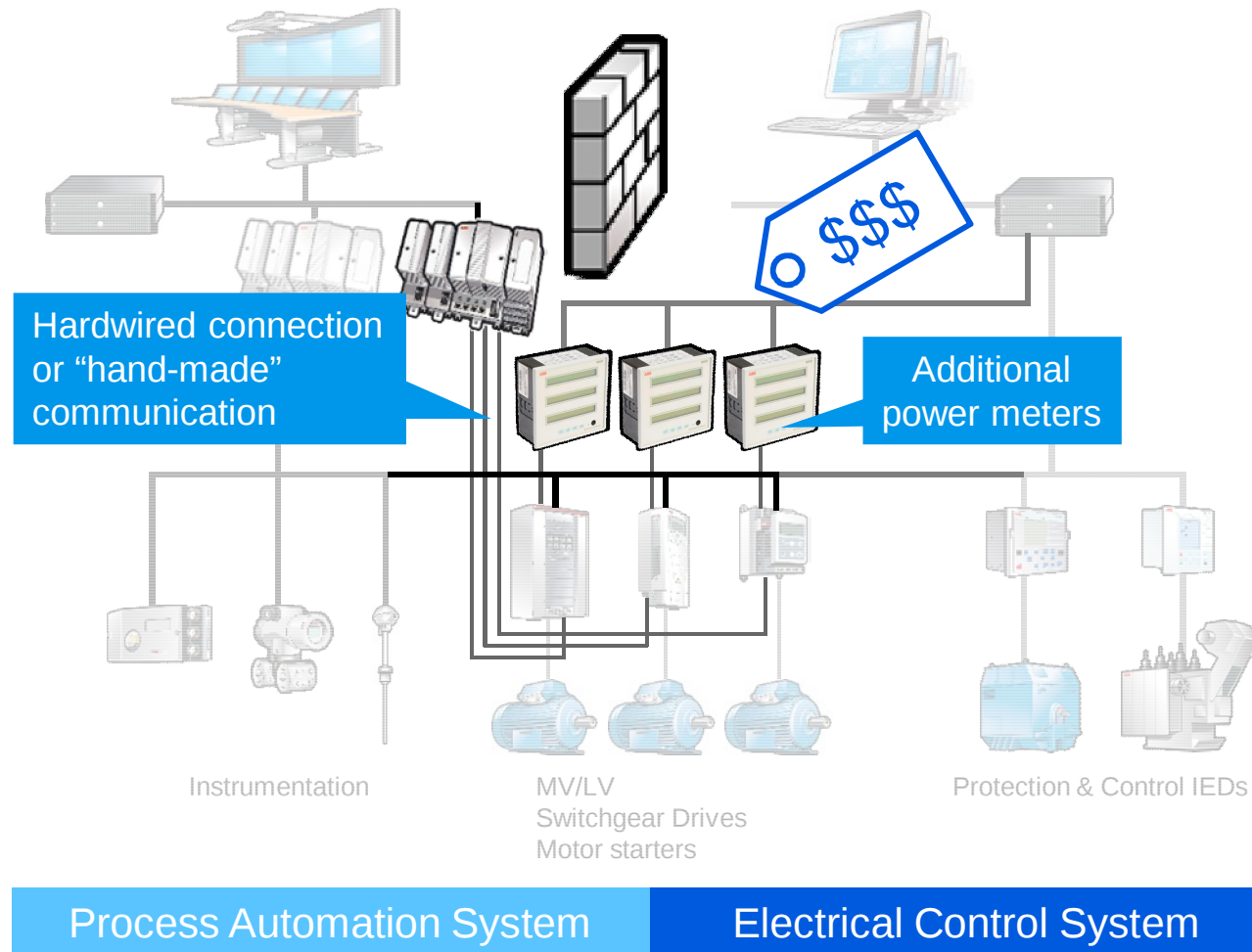


ABB System 800xA (E**x**tended **A**utomation)

- 800xA Introduction
- 800xA Power and Electrical Integration
- 800xA Integrated Enterprise Asset Management
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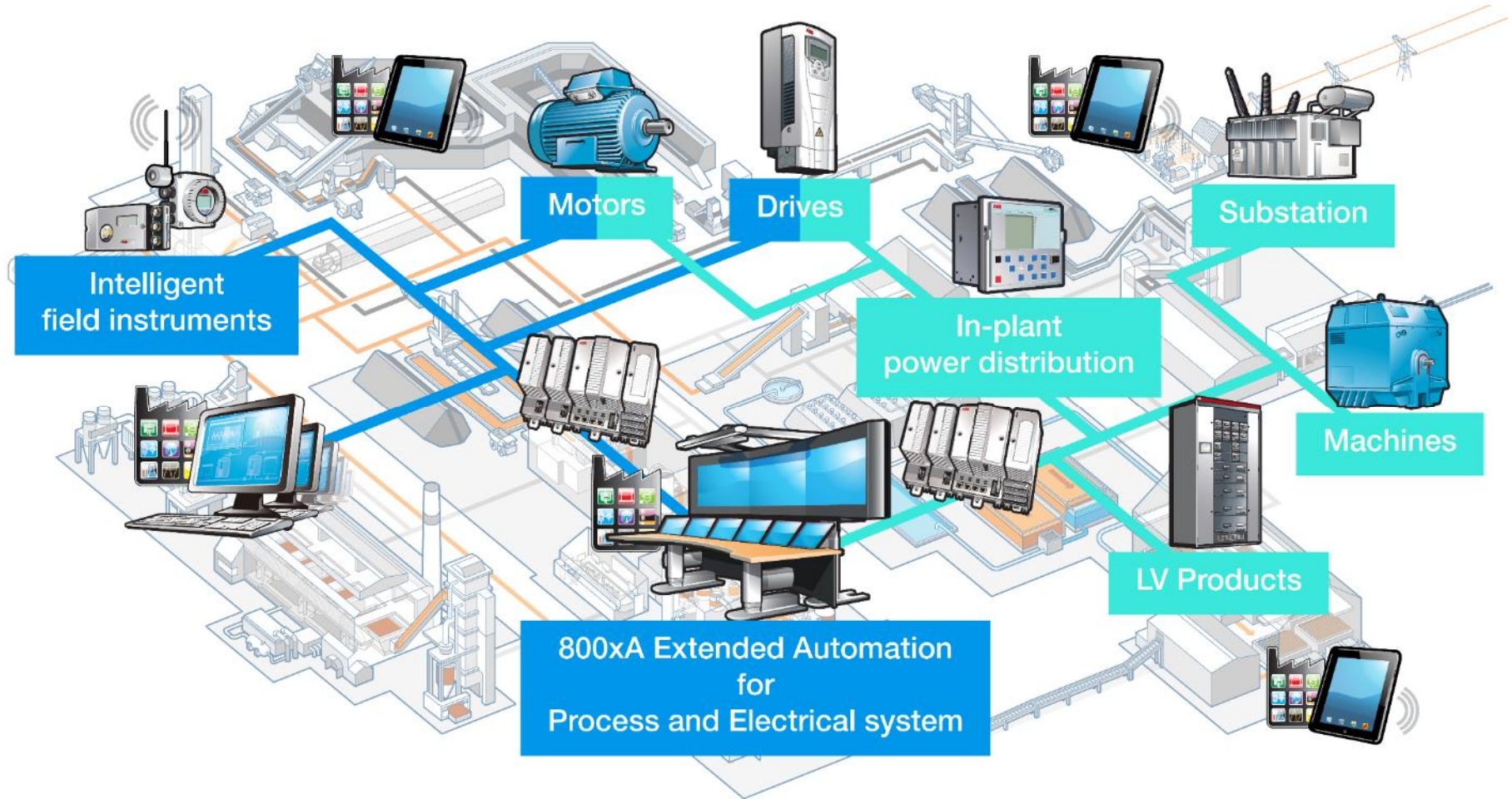
Challenges

Operational and maintenance cost increases



800xA Electrical Control System

Complete system for electrical, and process control



Integrated process and power automation

Our value proposition: Total ABB portfolio advantage

Project Benefits

Reduced CAPEX (15-20%)

- Faster project startups
- Reduced engineering
- Less equipment required

Operational Benefits

Reduced OPEX (15-20%)

- Energy management
- Operator efficiency/productivity
- Increased safety
- Reduced lifecycle costs (training, spare parts, personnel, maintenance)

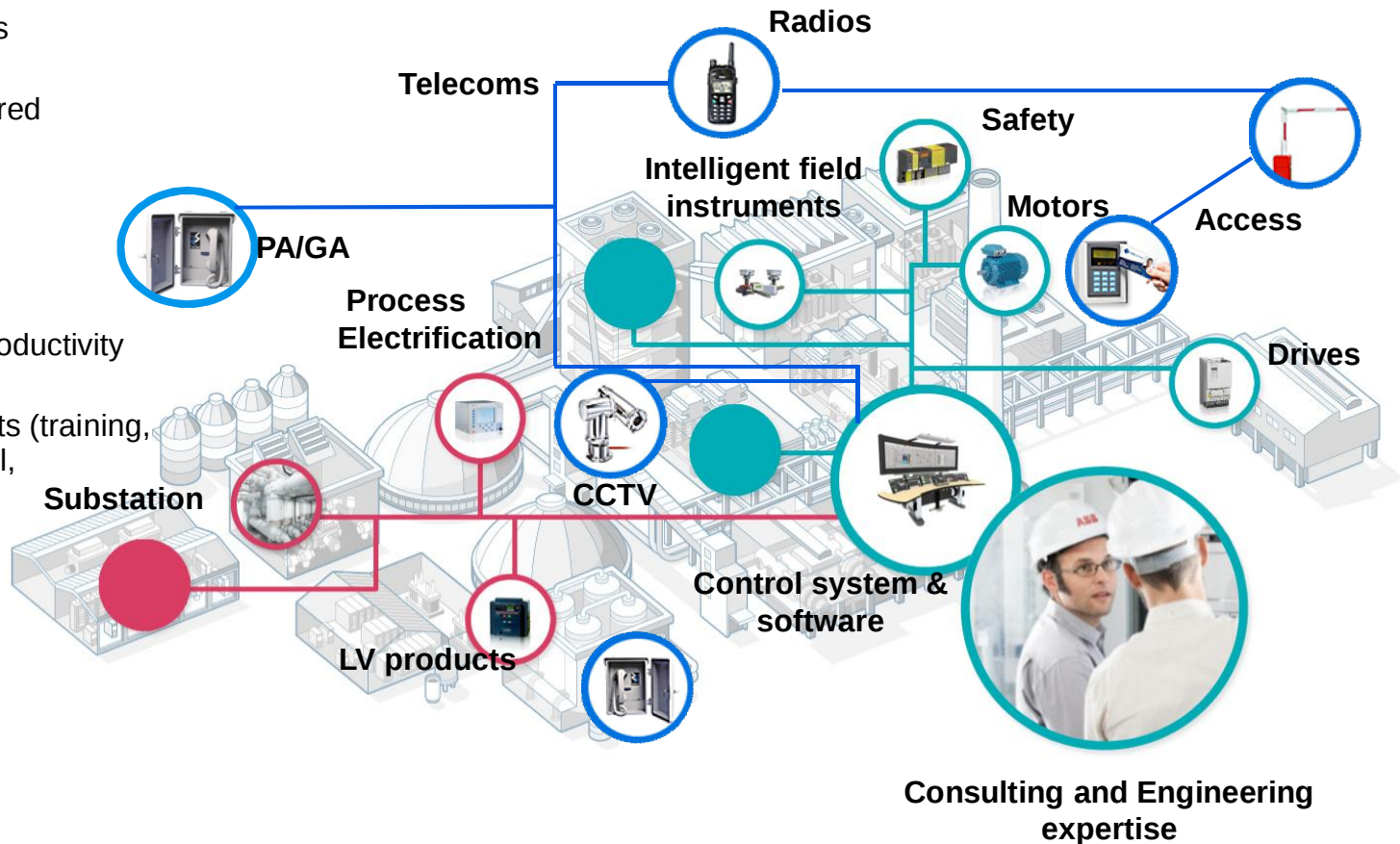


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800xA Integrated Asset Management

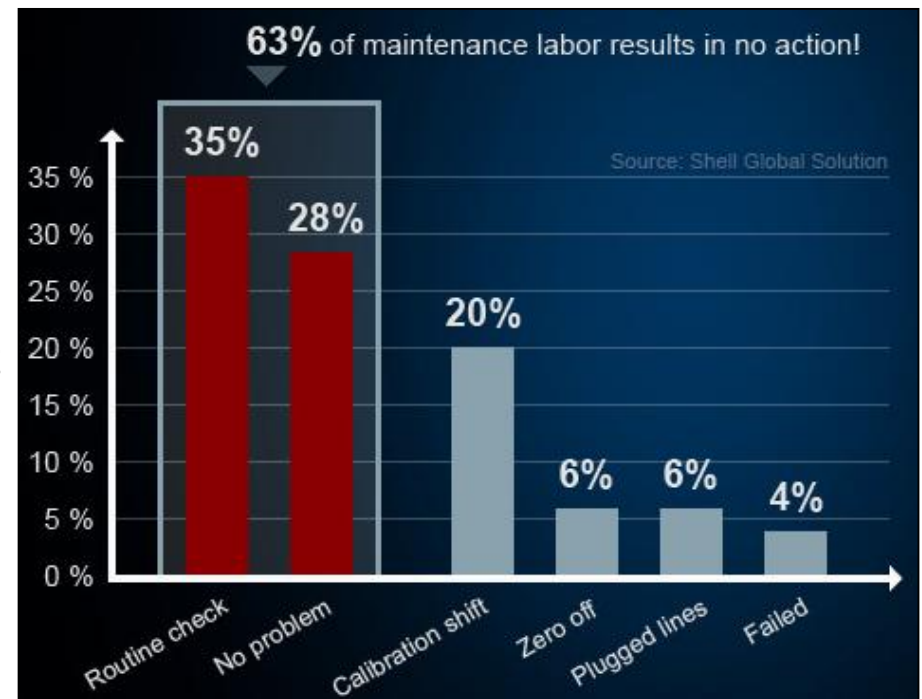
Efficient working methods

Current methods at hand

1. **Corrective:** On failure (55%)
2. **Preventive:** On schedule (35%)
3. **Predictive:** On condition (10%)
4. **Reliability centered:** Mix the above based upon the role of the individual asset and its safety and criticality status

The ABB recommendation

- Choose a reliability centered approach
- Encourage the organization to be proactive and use collaboration
- Start up cross functional teams comprised of Operations, Process, Electrical and Maintenance personnel
- Use 800xA Asset Management as facilitator



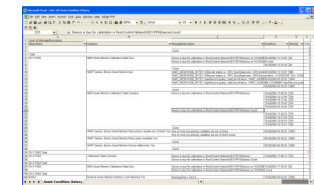
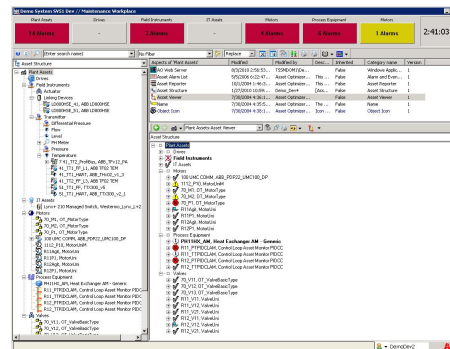
800xA Integrated Asset Management

Asset Condition Monitoring for Process Equipment

- Detect early warnings to maintain high plant availability
- Apply predictive maintenance strategies
- 800xA Asset Optimization enables
 - Automatic condition monitoring
 - Maintenance workplace for all maintenance actions
 - Share and access of maintenance data
 - One common workflow with CMMS



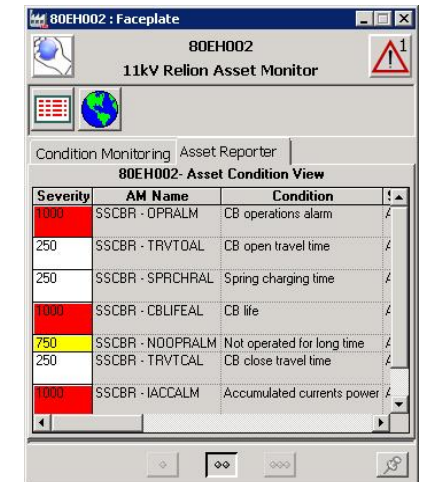
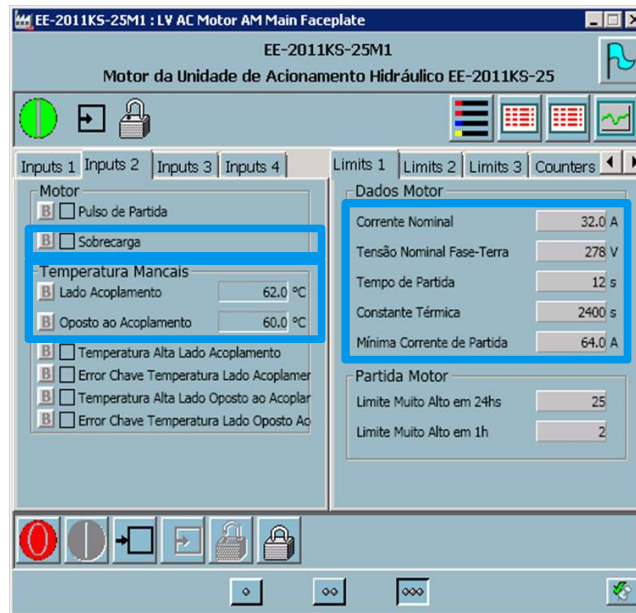
Severity	AM Name	Condition	Sub Condition	Description	Timestamp	Quality Status	Fault Report
Warning	Device Asset Monitor	Configuration Status	Normal		7/26/2011 10:36:31 AM	good	
Warning	Device Asset Monitor	Hardware Status	Failure	Sensor 1 wire break was detected	9/12/2011 12:39:04 PM	good	
Normal	Device Asset Monitor	Operating Conditions	Normal		7/26/2011 10:36:31 AM	good	



800xA Asset Management

Asset Condition Monitoring for electrical equipment

Increase
plant
availability
and safety



80-EN-8001:SSCBR - SPRCHRAL 'Spring charging time' Condition Details

Condition Details Asset Monitor Status

Condition: **Spring charging time**

Condition: SubCondition: [good] **Spring charging time: Alarm**

TimeStamp: Friday, September 02, 2011 9:50:06 AM

Severity: **250**

Description: Spring charging time has crossed the set value

Possible Cause: The spring charging motor or CB springs are not working properly.

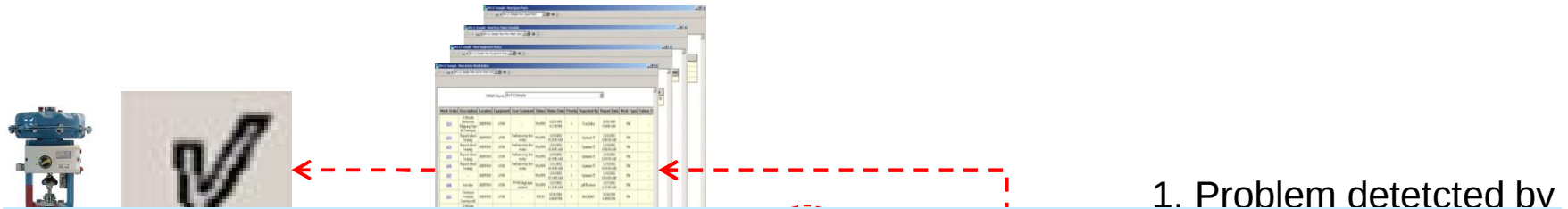
Suggested Action:

1. Check that spring charge motor supply is on and that voltage level is within the given limits. (With low voltage the motor torque will not be sufficient)
2. Check that the spring charge motor is operating.
3. If motor is operating check that aux contacts is working correct.
4. If motor is not operating change motor.
5. If spring charge function still gives alarm contact an ABB service centre. Then the CB open/close spring may be damaged.

Corrective Action Taken:

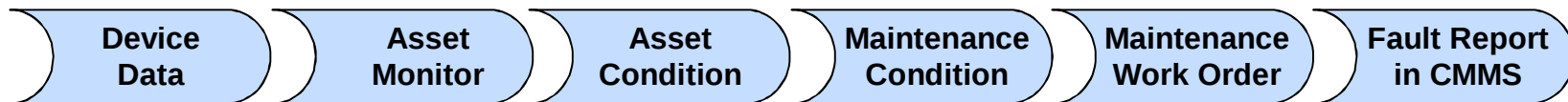
800xA Asset Management

One maintenance workflow throughout the entire plant



Reduces downtime and
enables collaboration =>
Increased plant efficiency

n.



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800xA Integrated Alarm Management Streamlining the Operator's Working Situation



- EEMUA 191/ISA 18.2
- Alarm Hiding
 - Process state based alarm hiding
- Alarm Shelving
 - Operator temporarily removes alarms from alarm list
- Alarm Response Navigation
- Alarm Analysis
 - Alarm Key Performance Indicators for alarm system performance

What does an integration platform deliver?

Savings – Integrated Alarm Analysis

Adding alarm analysis to an existing 800xA system is significantly less than adding a 3rd party tool....

- Hardware and Software
- Software Maintenance
- Application Engineering
- Interface HW and SW
- Additional mapping (rules, post-scripting,...)
- Training
- Long term costs/expansions

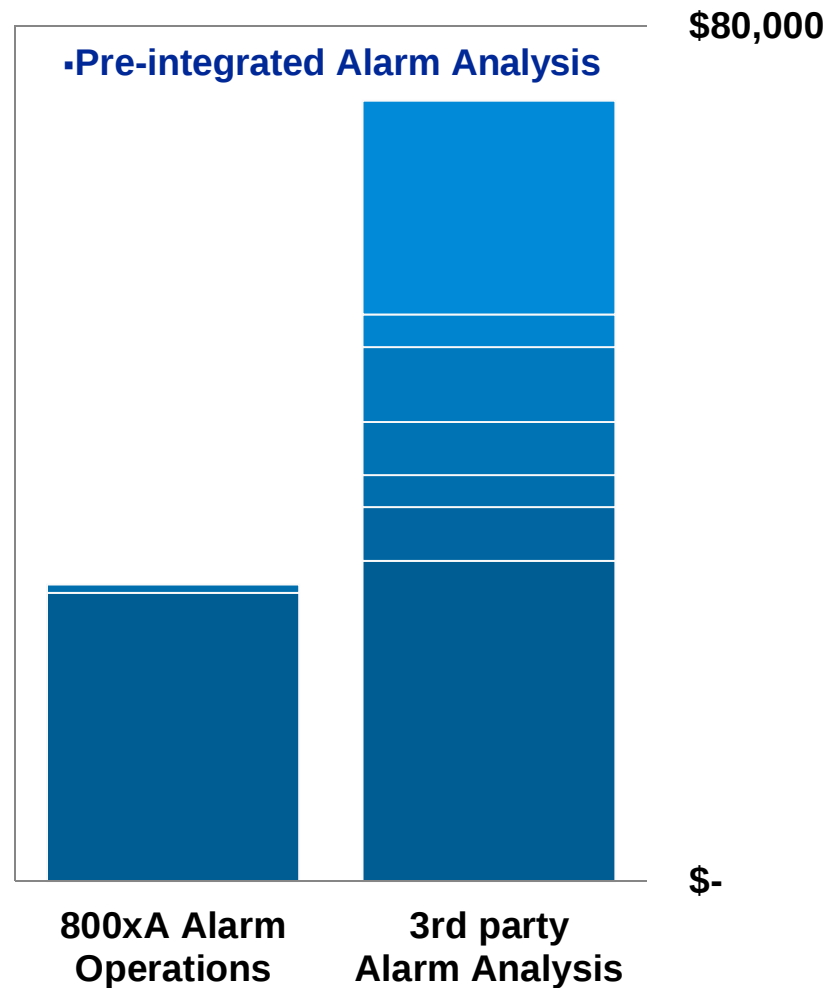


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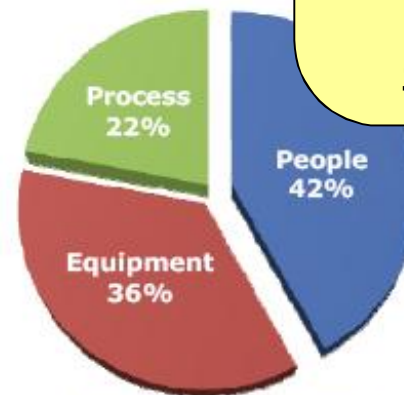
Operator Effectiveness is essential

- Minimizes the risks of accidents
- Eliminates unscheduled downtime
- Maximizes the production and quality
- Minimizes OPEX (95% of total life cycle)



The global process industry loses \$20 billion, or five percent of annual production, due to unscheduled downtime and poor quality.

ARC estimates that almost 80 percent of these losses are preventable and 42 percent are primarily the result of operator error.

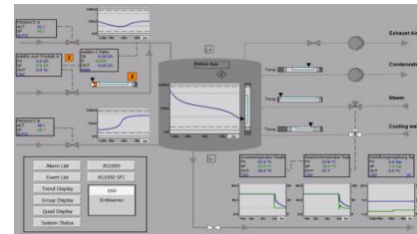
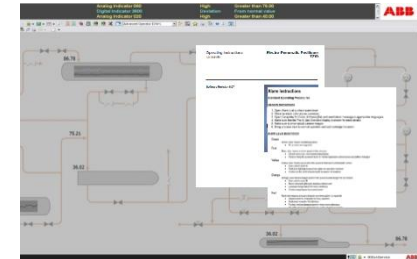


Distribution of Unscheduled Shutdowns and Slowdowns



800xA Integrated Operator Effectiveness The Four Pillars.....

- Integrated information and systems
 - Various plant and control systems seamlessly presented and controlled from one single interface to promote better decision support.
- High Performance HMI
 - Providing operators with a more effective environment using principles such as situation awareness, efficient navigation, and best practices for alarm management.
- Attention to human factors
 - Focused attention on maximizing operators performance through control room design and providing an integrated ergonomic workplace.
- Operator competency
 - Operator training simulation to improve competency and instill confidence when handling abnormal situations.



System 800xA Overview

Old style of User Interface



Extended Operator Workplace

A Complete Operator Environment



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800xA Integration to 3rd party systems

Why ABB as Evolution Partner - The ABB History

- ABB, it's many years of Evolution Projects and Systems in various Industries and Environments



- The called ABB Install Based has obliged ABB to Develop the right DCS System to Evolve in one direction
- Control System technology and market leading – The best system on the Market

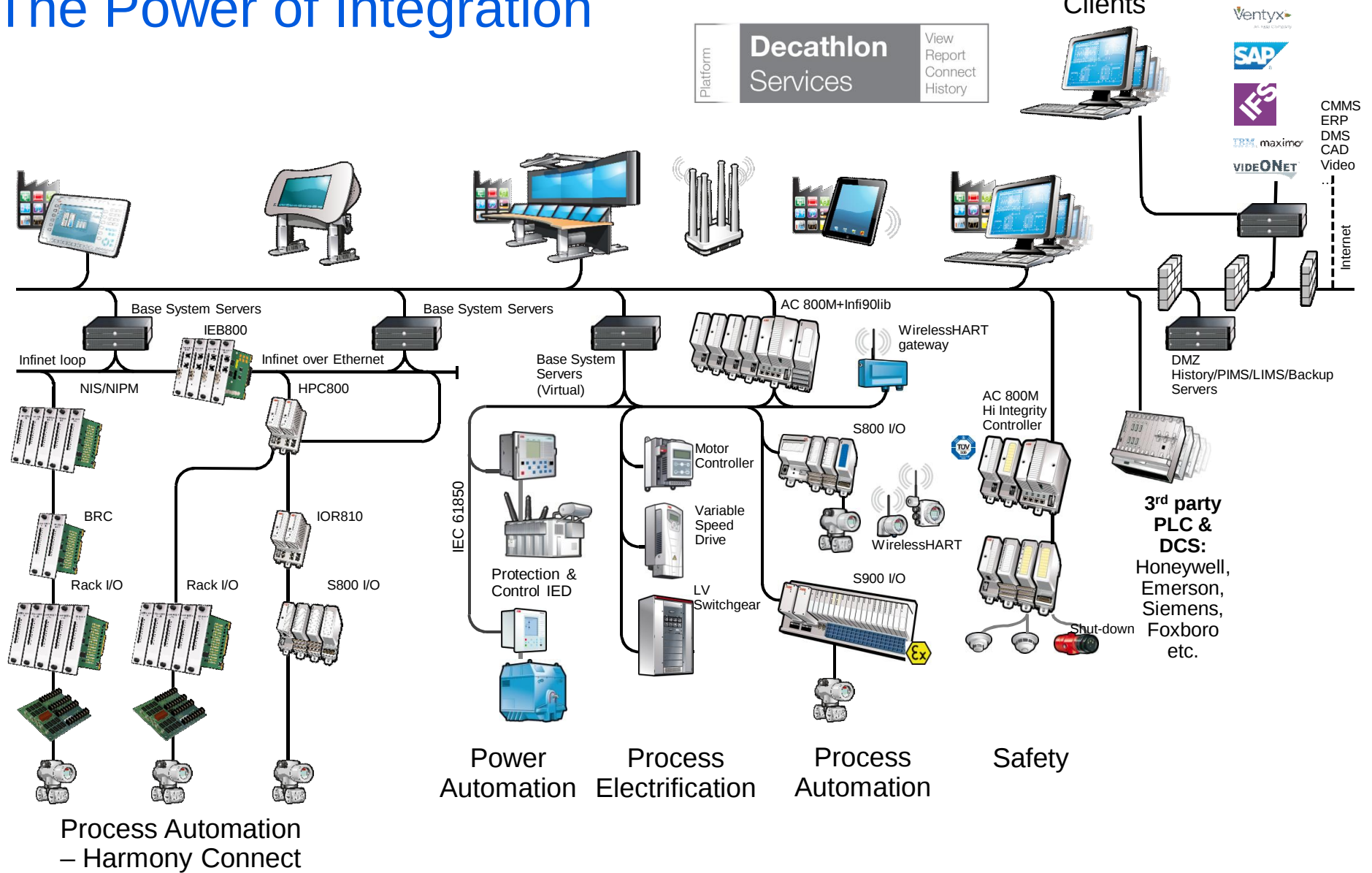
800xA

The Power of Integration

Platform
Decathlon Services
View
Report
Connect
History

Smart
Clients

Business
Systems

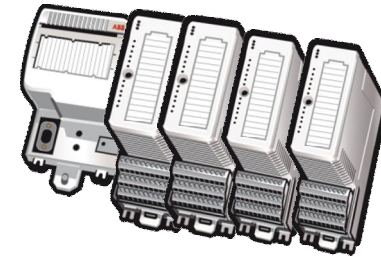


800xA Hardware

S800 High Density I/O modules

- DI818 / DO818 - 32 channel 24V
 - TU818 (Screw Terminations)
 - TU819 (2-25 pin D-sub)
- DI828 - 16 channel 120V / DO828 - 16 channel Relay
 - TU851 (Screw Terminations)
 - TU852 and TU854 redundant MTUs w/25 pin D-sub

Approximately 20% space savings in typical project (approx. 70% digital signals)



Flexible and scalable in size and performance

Performance

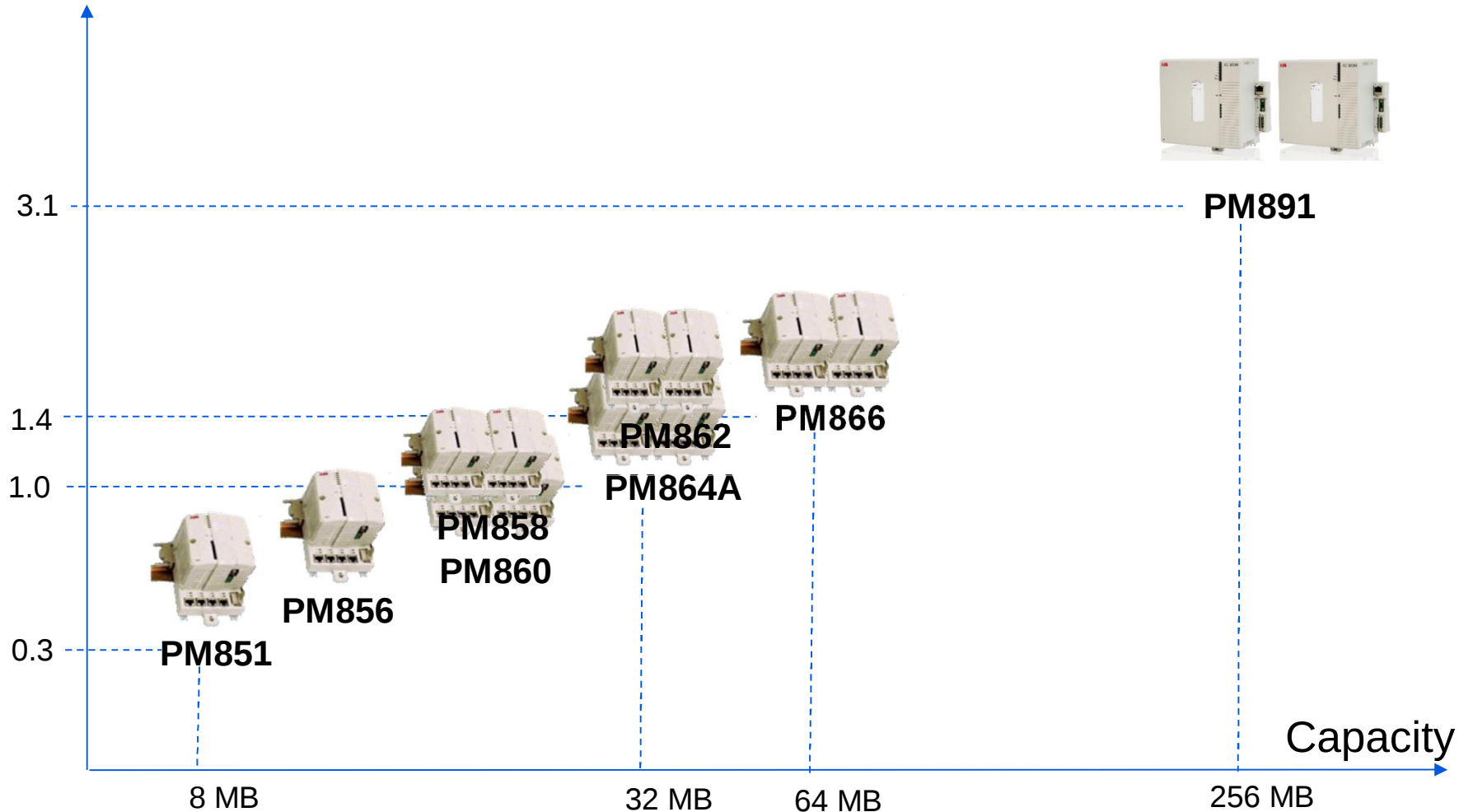
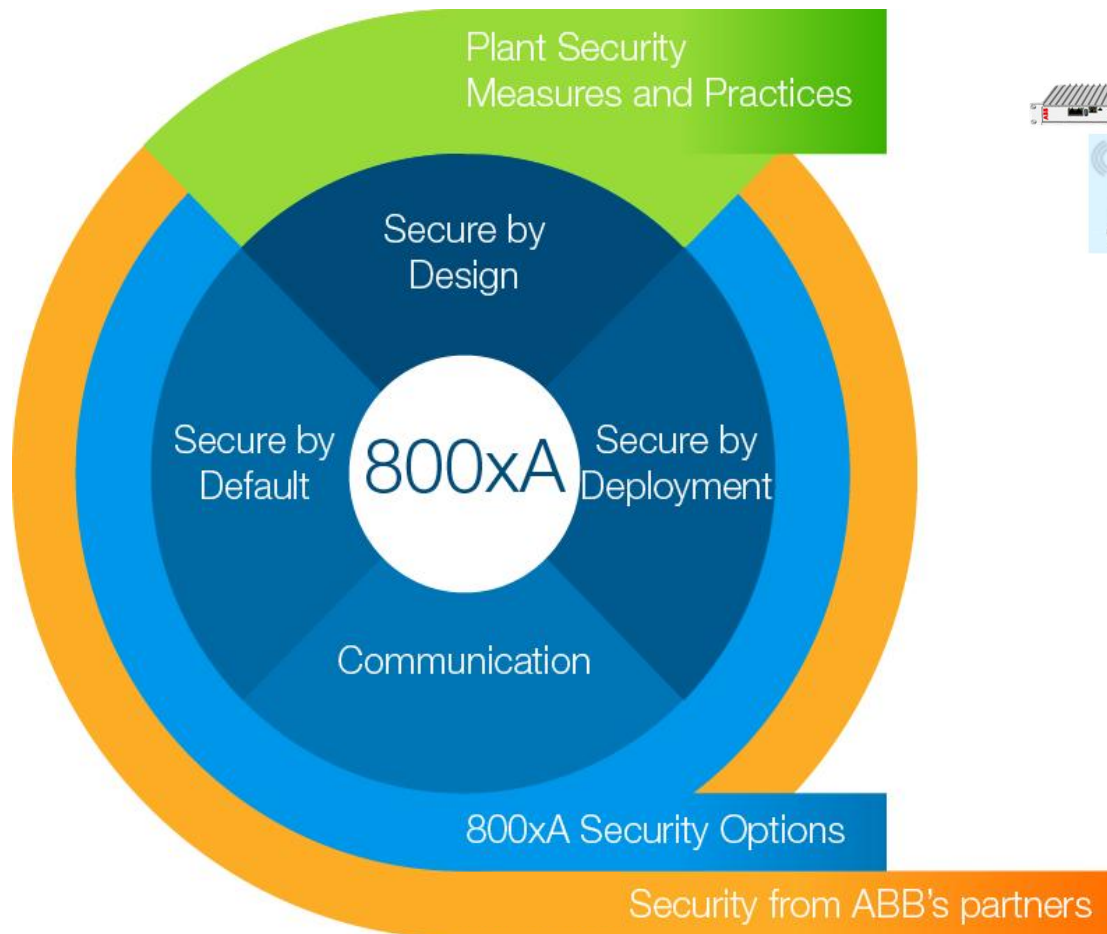


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800xA - The power of integration

Cyber Security, SD³+C



nexus

INDUSTRIAL DEFENDER®



symantec.

McAfee®
An Intel Company

wurldtech

cchilles™



Windows Server
Update Services

SPIRENT

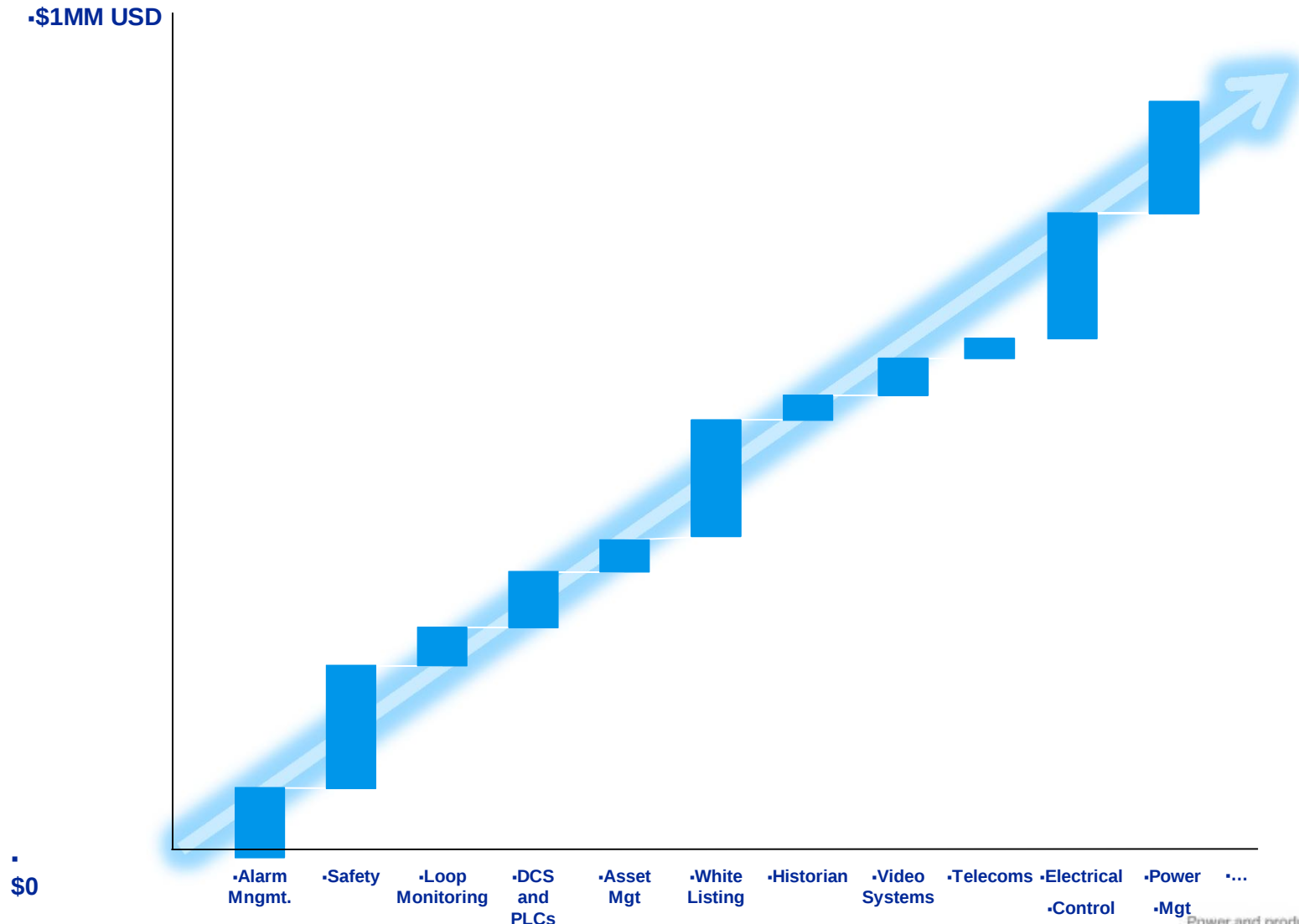
tenable
network security

Nessus®

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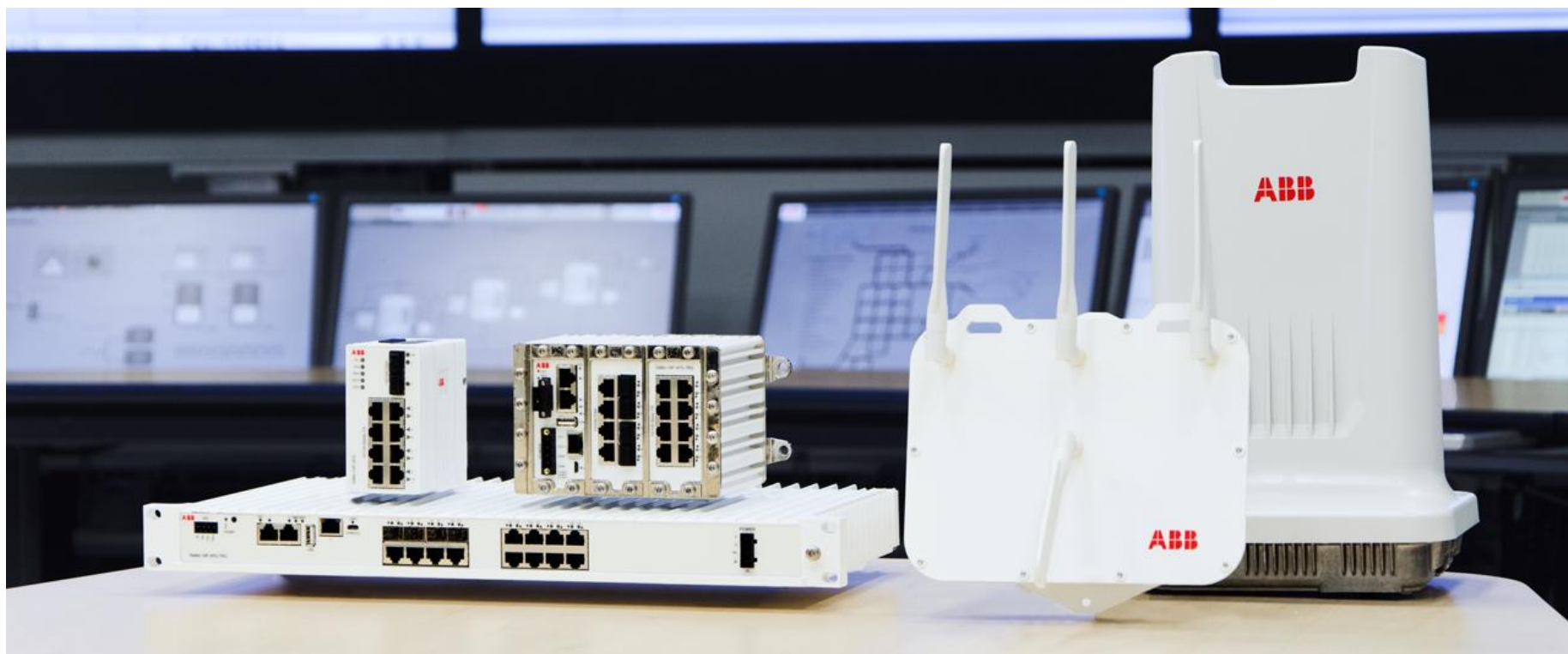
ABB

Without Integration...it adds up to hundreds of thousands of cost



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800xA Networks

Ethernet in industrial applications

Trends & drivers



Trends & drivers:

- Increasing use of PROFINET, IEC 61850, EtherNet/IP, etc.
- Ethernet reach the field to a greater extent.
- Cyber security focus
- Remained focus on reliability & availability
- Mobility

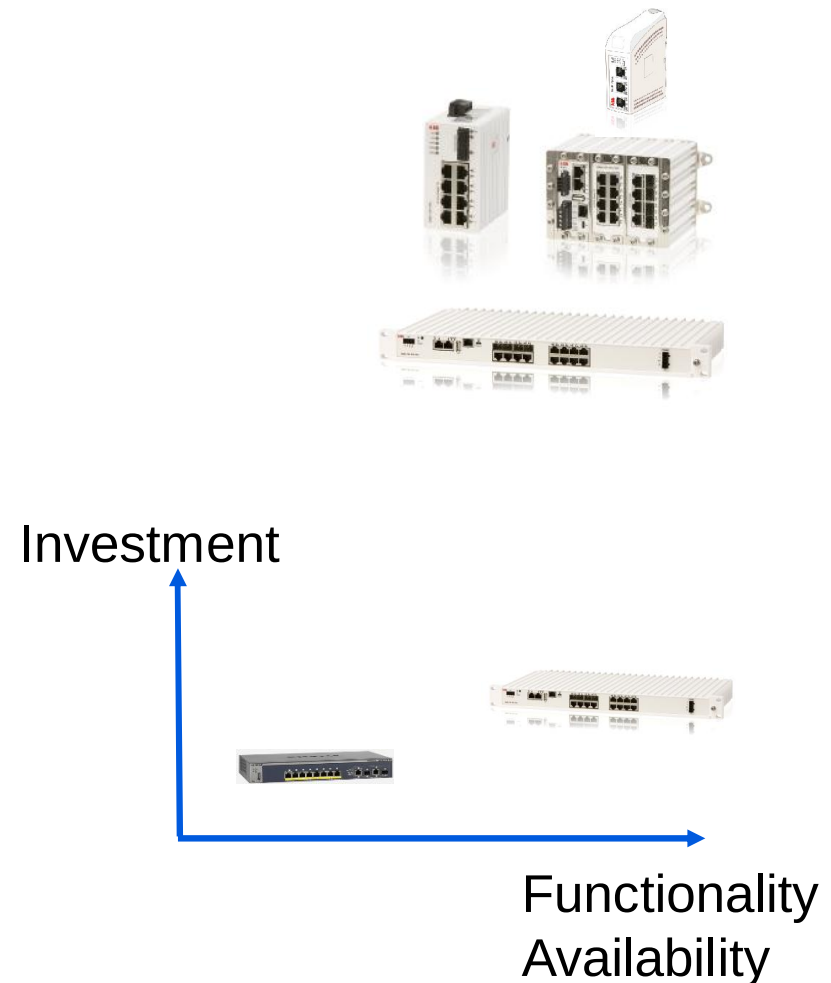
Leads to:

- More & more functionality in network equipment, but harder to configure.
- Increased focus on monitoring of IT assets to ensure stable systems.
- Wireless deployment of automation networks

800xA Network Switches

Key benefits

- ABB can now take full responsibility also for the networks in our Control System deliveries
- Detailed supervision makes it possible to detect and solve network related problems early
- Designed for industrial use gives high availability, also in tough environments



800xA Networks

Fully supported by ABB

Type of equipment	Configuration support	Architecture support	Software support Firmware, preconfigured	Hardware support	Enhanced Monitoring
<u>Non</u> Industrial IT certified					
Industrial IT certified	✓	✓			
800xA Networks	✓	✓	✓	✓	✓

800xA Networks

Enhanced network monitoring

Attribute monitored	IIT certified	800xA Networks
Device general health (summary alarm)	✓	✓
Power supply status	✓	✓
Port connected		✓
Port lockdown		✓
Device temperature		✓
Traffic (Packets per second & per port)		✓
Input Error Rate (% of bad/dropped packages)		✓



Early identification of network issues, before problems arise.
=
Increased uptime.

Device general Health, PS Status, Port Connected and Device temp use Trap for fast update

800xA Networks Portfolio



	RaMa 19P-4FG-7RG (NE840)	DiMa 19P-4FG-7RG (NE820)	DiMa 10P-2FG (NE810)	DiLi 5P-1FG(LC2) (NE801)
Ports	19	19	10	5
- Gbps	4 (SFP) 7 (RJ45)	4 (SFP) 7 (RJ45)	2 (SFP)	
- 10/100 Mbps	8 (RJ45)	8 (RJ45)	8 (RJ45)	1 (LC2) 4 (RJ45)
Managed	✓	✓	✓	Lightly**
RSTP	✓	✓	✓	
Ring redundancy	FRNT (20ms recovery time)	FRNT (20ms recovery time)	FRNT (20ms recovery time)	
VLAN	IEEE 802.1Q	IEEE 802.1Q	IEEE 802.1Q	
Quality of Service	4 queues	4 queues	4 queues	
G3 compliant	✓	✓	✓	✓
Temperature range	-40 to +55°C	-40 to +70°C	-40 to +70°C	-25 to +70°C
Fanless	✓	✓	✓	✓
Marine certification	DNV	DNV	DNV	DNV
Power supply	110/230V AC	Redundant 24V DC	Redundant 24V DC	Redundant 24V DC

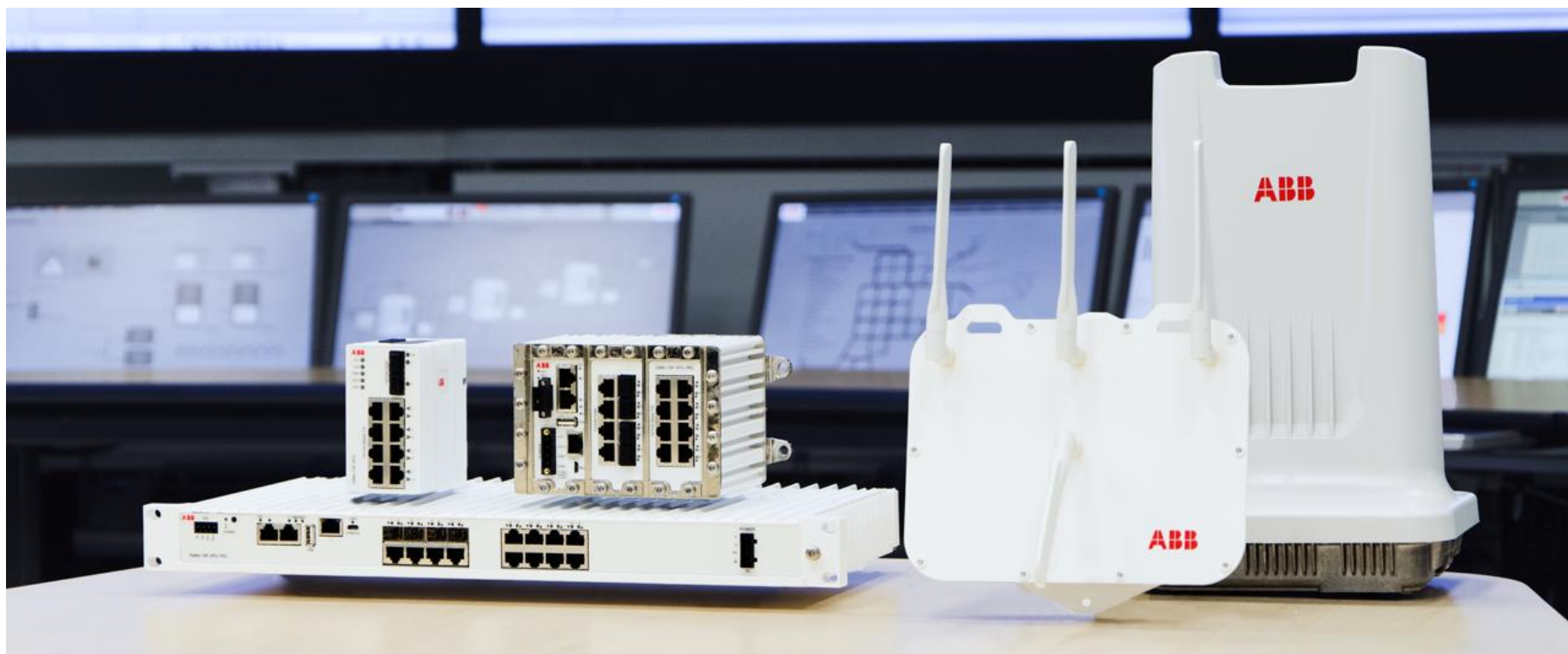


ABB Wireless

800xA Networks goes Wireless

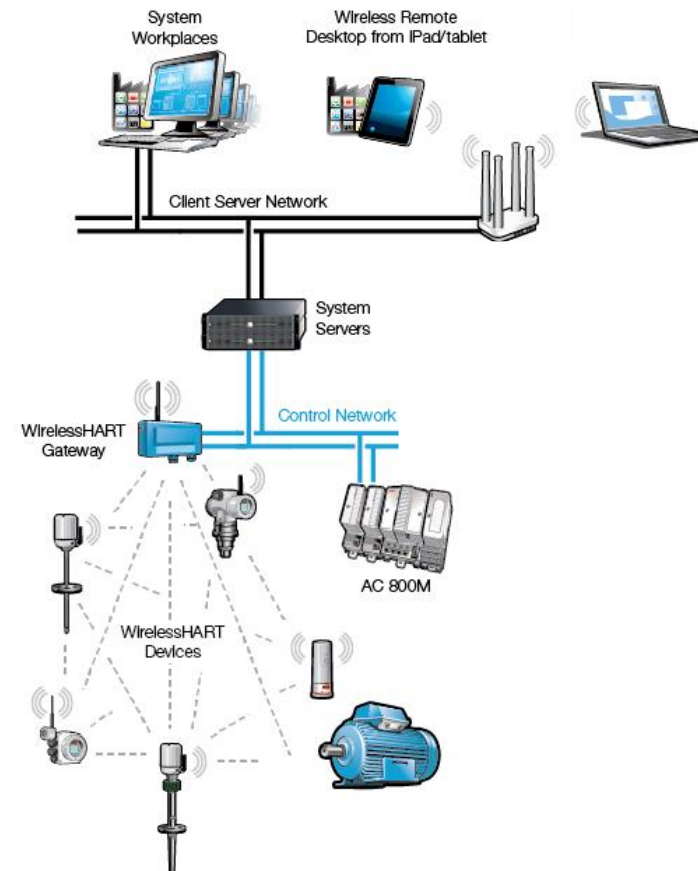
Wireless use cases

- **Wireless solutions**

- Wireless networks enable laptop and tablets to connect to the system and get complete and secure access via remote desktop.

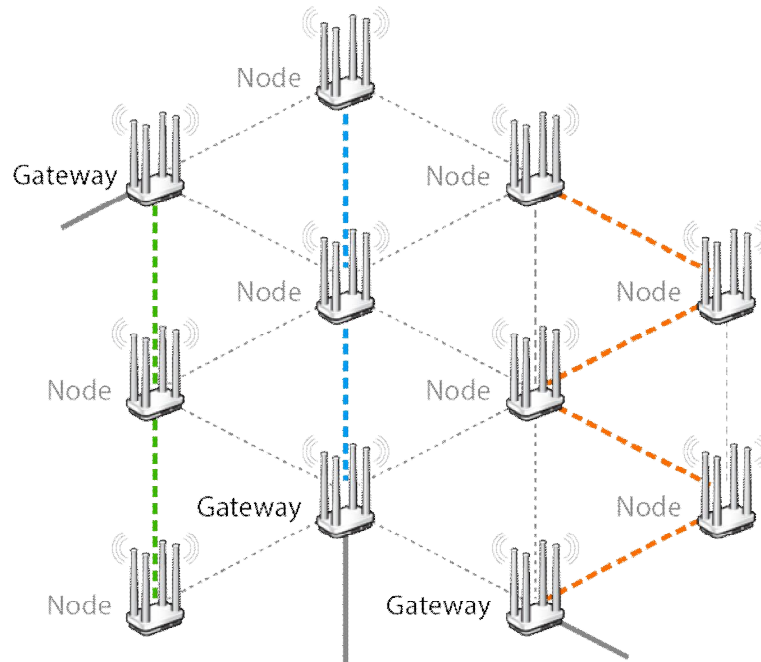
- **Enables**

- Mobile workforce support which easily can get access to the full system.



800xA Networks goes Wireless

Wireless IP networks for mission-critical applications



- Deliver reliability to meet or exceed factory automation requirements
 - Tropos Mesh OS leverages multiple RF paths, channels and bands
 - Controller-free architecture, no single points of failure
 - Rugged hardware for industrial use (indoor and outdoor)
- Many applications over one network
 - High capacity, low latency
 - Interoperability/open standards-based
- Secure – multi-layer, defense-in-depth security architecture
- Easy to deploy – wired backhaul required for only 10-20% of routers

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