FUTURE

Disruption and Next-Gen Plant Automation

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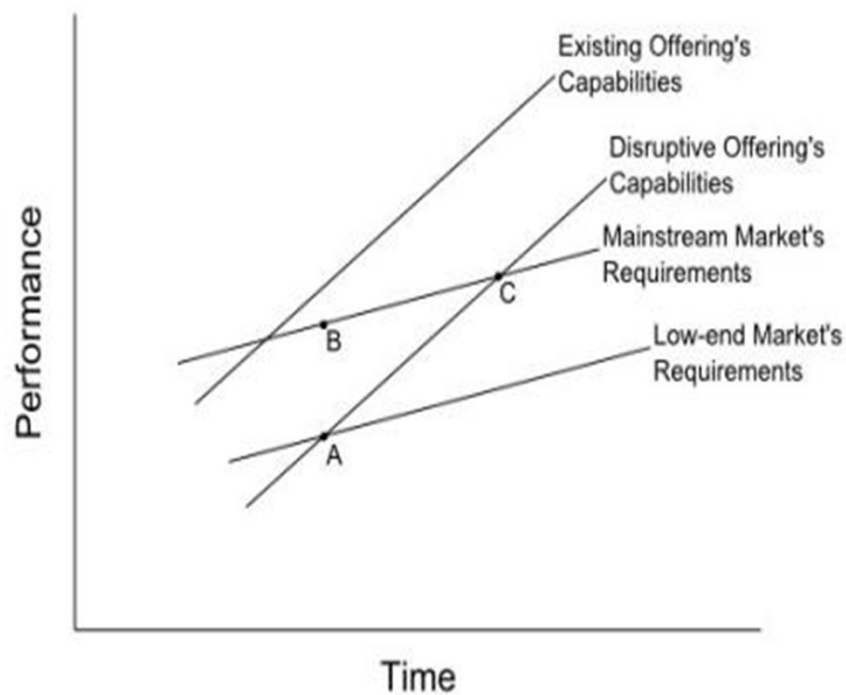
Disruption
[dis-ruhp-shuh n]

3. *Business*: A radical change in an industry, business strategy, etc., especially involving the introduction of a new product or service that creates a new market:

e.g., Gobalization and the rapid advance of technology are major causes of business disruption.

Performance of Disruptive Innovations over Time

Existing Offering's Capabilities

Disruptive Offering's Capabilities

Mainstream Market's Requirements

Low-end Market's Requirements

Performance

Time

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IIoT and Other Disruptions Drive Industry Change

- Speed of Business
  - Transactional operations beginning to occur in real time
  - Require real-time control

- The Open Process Automation Forum (OPAF) and XOM
  - A secure, open, interoperable, modular, **vendor-independent** control system that is upgradeable without production loss

- NAMUR
  - A secure, open, interoperable, inexpensive, **vendor-independent** data acquisition system bypassing the process control system (PCS)
  - PCS used for control only.

- Industry 4.0
  - A new generation of industrial manufacturing
    - Open, flexible, equipment/asset centered cyber-physical system (CPS)

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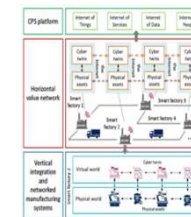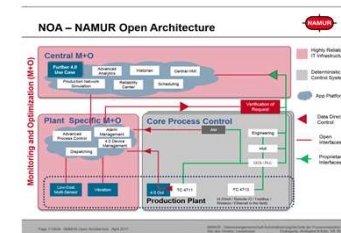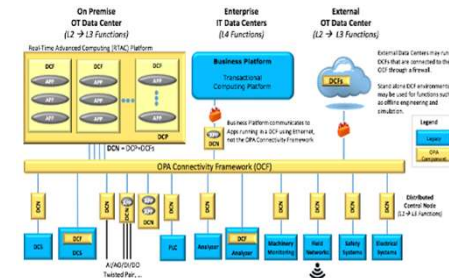
Disruption: The Increasing Speed of Business

- **Our Insight**
  - Market changes faster than business systems can respond
- **Our Takeaway**
  - Requires new products & services
- **Our View**
  - Requires applications by segment
  - RT/Transactional not OT vs. IT

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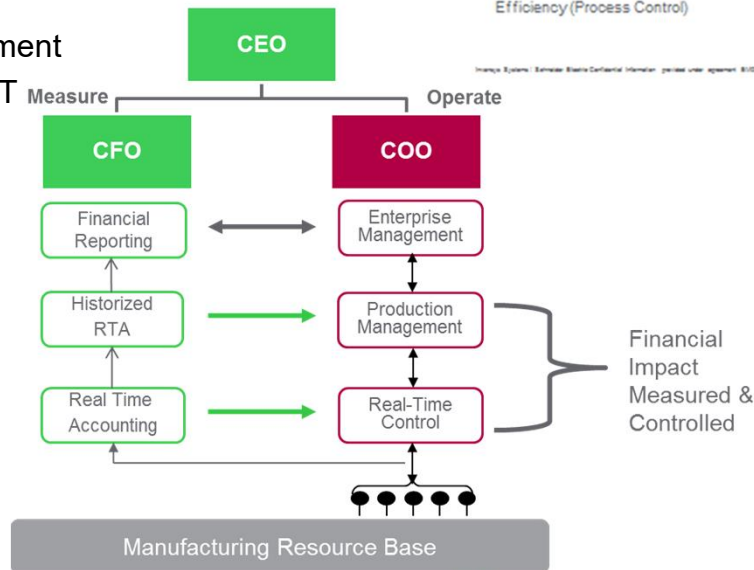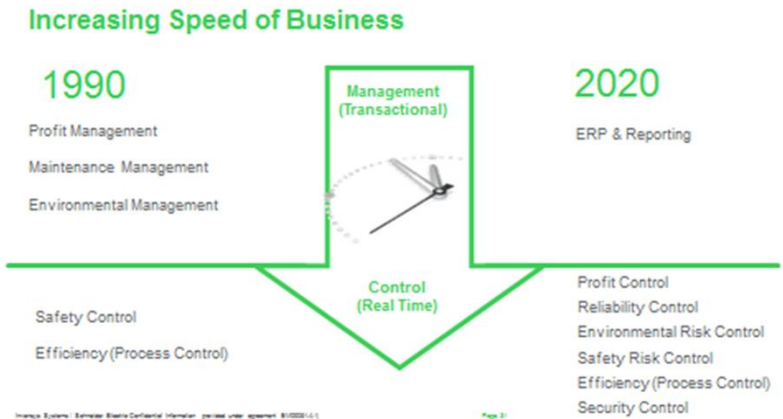
Disruption: Open Process Automation Forum

- **Vision**
  - Secure, Open, Modular, & Vendor Independent
- **Mission**
  - Create the market
- **Key Takeaway**
  - Lower cost through competition
  - More value through increased innovation
- **PCS Vendor's View**
  - Major disruption
  - New opportunities
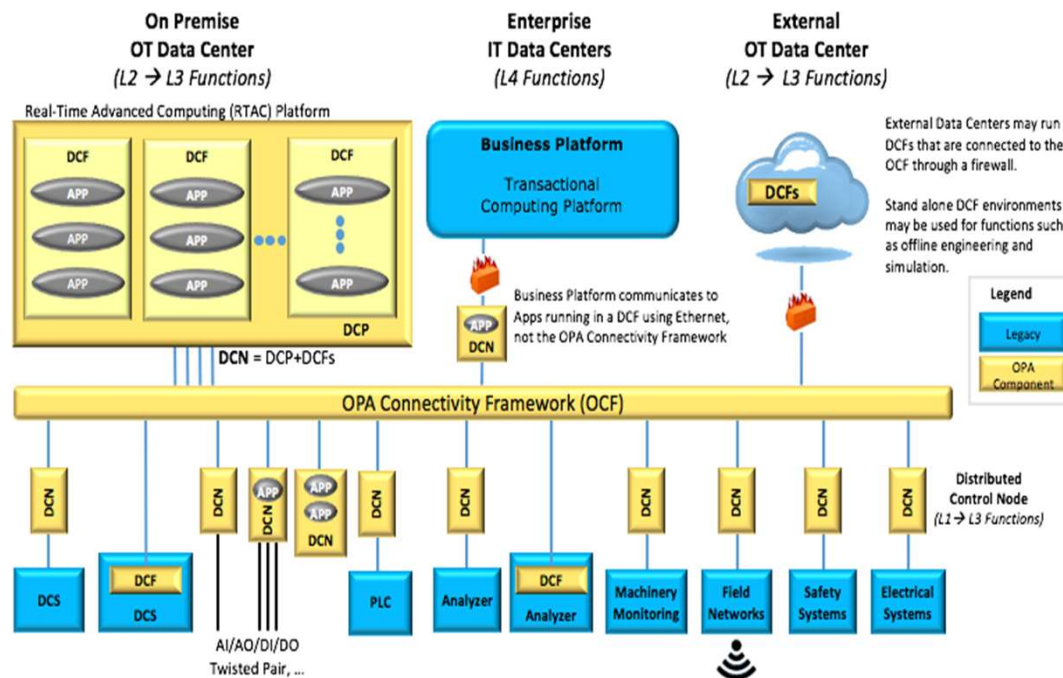
Disruption: NAMUR

- Vision
  - Data driven analytics
  - Bypass the PCS
- Mission
  - Create a viable parallel channel for information
- Key Takeaway
  - Less data in PCS
  - Increase in smart sensors and applications
- PCS Vendor's View
  - Opportunity in new sensors
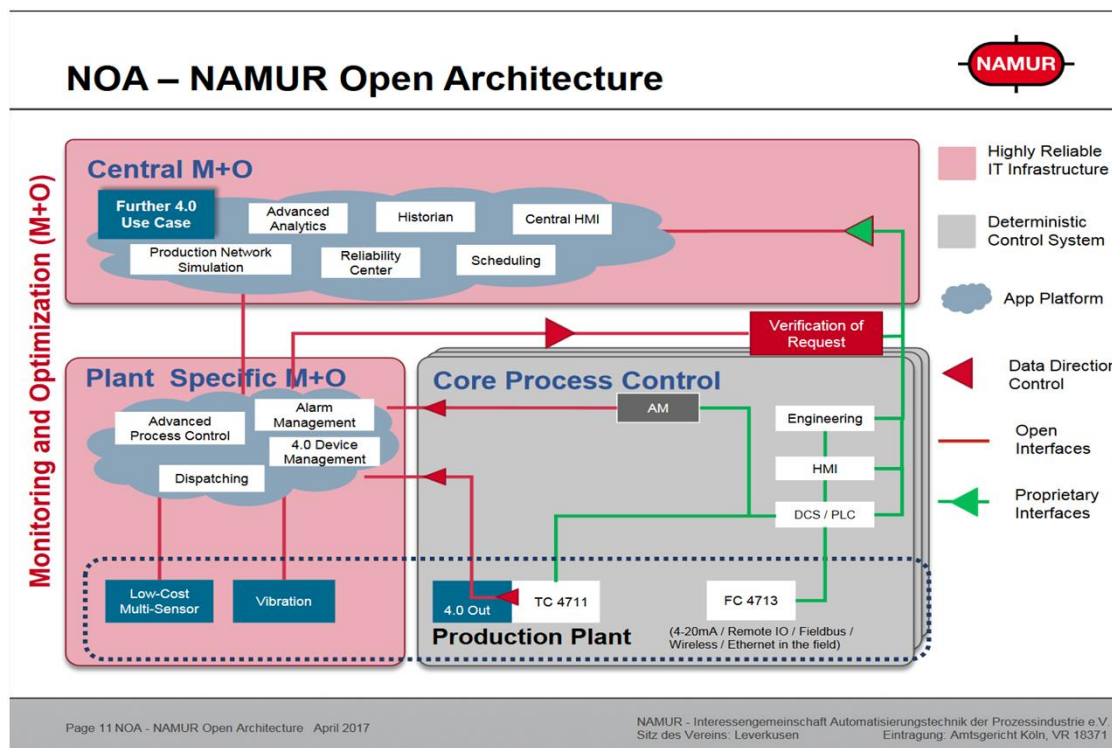
NAMUR Presentation at Open Group Meeting in Berlin

Disruption: Industry 4.0

- **Vision**
  - Cyber-Physical Systems
  - Snap together plants

- **Mission**
  - Drive OEMs to create the quipment
  - Drive PCS vendors to create the platform

- **Key Takeaway**
  - PCS migrates to intelligent equipment

- **PCS Vendor's View**
  - OEMs become the target market
  - Matches our view of the future
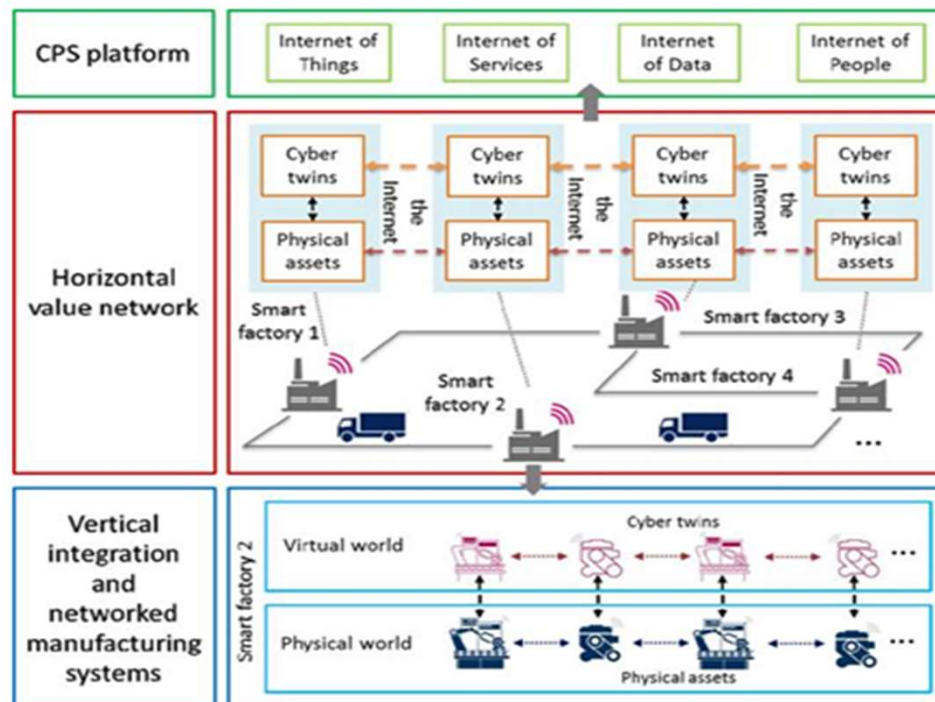
Cyber-Physical Systems as key enabler for Industry 4.0

Disruptions and Threats: OPAF

- Lower-margin hardware
- Lower-margin base software
- Lower-margin base control
- Elimination of long project tail
- Lower-cost
  - Delivery
  - Engineering
  - Maintenance competitors

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Disruptions and Threats: NAMUR

- Fewer PCS I/O points
- Smaller PCS scope
- Increase in simple sensors
- Budget shifts
  - From hardware to applications
  - From PCS suppliers to application suppliers

Disruptions and Threats: Industry 4.0

- Commoditization of automation assets
- Move from control-centric to equipment-centric
  - Emergence of CPS
- Reduced engineering effort

Disruptions and Threats: New Competition

- Market opens to **new** competitors
  - **New** ideas
  - **Lower** price points
- Look who's already in the game
  - Microsoft
  - Intel
  - Cisco
  - GE
  - TI
  - IBM
  - Accenture
  - ?????

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But Disruptions Provide New Opportunities Too

- New revenue via:
  - Software applications
  - Hardware manufacturing
  - Services
  - Entry to new markets
- Reduced costs via:
  - Reduced product maintenance costs
  - Including more third-party content for infrastructure

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New Revenue: Software Applications

- Provide open offers
  - Real-time profitability control
  - Specialty applications
  - Lifecycle suites
    - Project execution support
    - Process lifecycle support
    - Product lifecycle support
      - Planning, scheduling, purchasing, etc.
    - Safety lifecycle support
      - From cause & effect design to operation

- Reduce product maintenance costs
  - Standard interfaces

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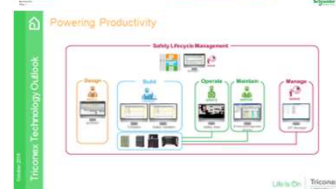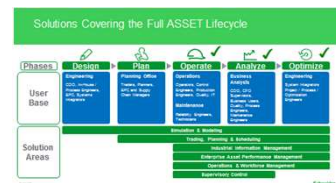
New Revenue: Equipment

- Become a leading, large-scale provider of:
  - Sensors
    - Inexpensive
    - Trivial to configure, install and maintain
  - Inexpensive data delivery infrastructure
  - New applications that link new data to product quality
  - Product property measurement vs. state measurement
- Provide CPS and develop new OEM-focused business model
  - OEMs embed their IP in PCS vendor equipment
  - Automate and capture their IP/expertise
  - Maximize volume (through packages)
    - CPS with zero integration
    - System and equipment modelling
- High-volume/low-mix manufacturing
  - Sensors and control equipment

HELLO my name is Opportunity

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Impact on PCS Clients

- End-users
    - Procurement changes
    - Project execution changes
    - Post-project support
- EPCs
    - DCS implementation
    - Procurement process
- OEMs

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Guidance is Available

- OPAF Business Guide
  - Published March 2018

- OPAF Procurement Guide
  - In progress

- All OPAF documents are publicly available

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A System with O-PAS™ Components

**On Premise
OT Data Center**
(Executing ISA 95 Level 2 & 3 Functions)

**Enterprise
IT Data Centers**
*(Executing ISA 95
Level 4 Functions)*

**External
OT Data Center**
*(Executing ISA 95
Level 2 & 3
Functions)*

Advanced Computing Platform

DCF
- Application
- Application
- Application

DCF
- Application
- Application
- Application

DCF
- Application
- Application

DCP

DCN = DCP+DCFs

**Business
Platform**
Transactional
Computing Platform

**Non OPAF
Environments**

DCFs

External Data Centers may run DCFs that are connected to the OCF through a firewall.

Stand alone DCF environments may be used for functions such as offline engineering and simulation.

APP
DCN

Business Platform communicates through Apps running in a DCF, not directly to the OPAF Connectivity Framework

DCN

O-PAS Connectivity Framework (OCF)

DCN | APP DCN | APP APP DCN | DCN | DCN | DCN | DCN | DCN | DCN | DCN

DCS | DCF DCS | PLC | DCF PLC | Analyzer | DCF Analyzer | Machinery Monitoring | Field Networks | Safety Systems | Electrical Systems

AI/AO/DI/DO
Twisted Pair,
…

Legend

Non-OPAS Conformant Platform

O-PAS Component

**Distributed
Control Nodes**
*(Executing ISA 95
Level 2 & 3 Functions)*

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