

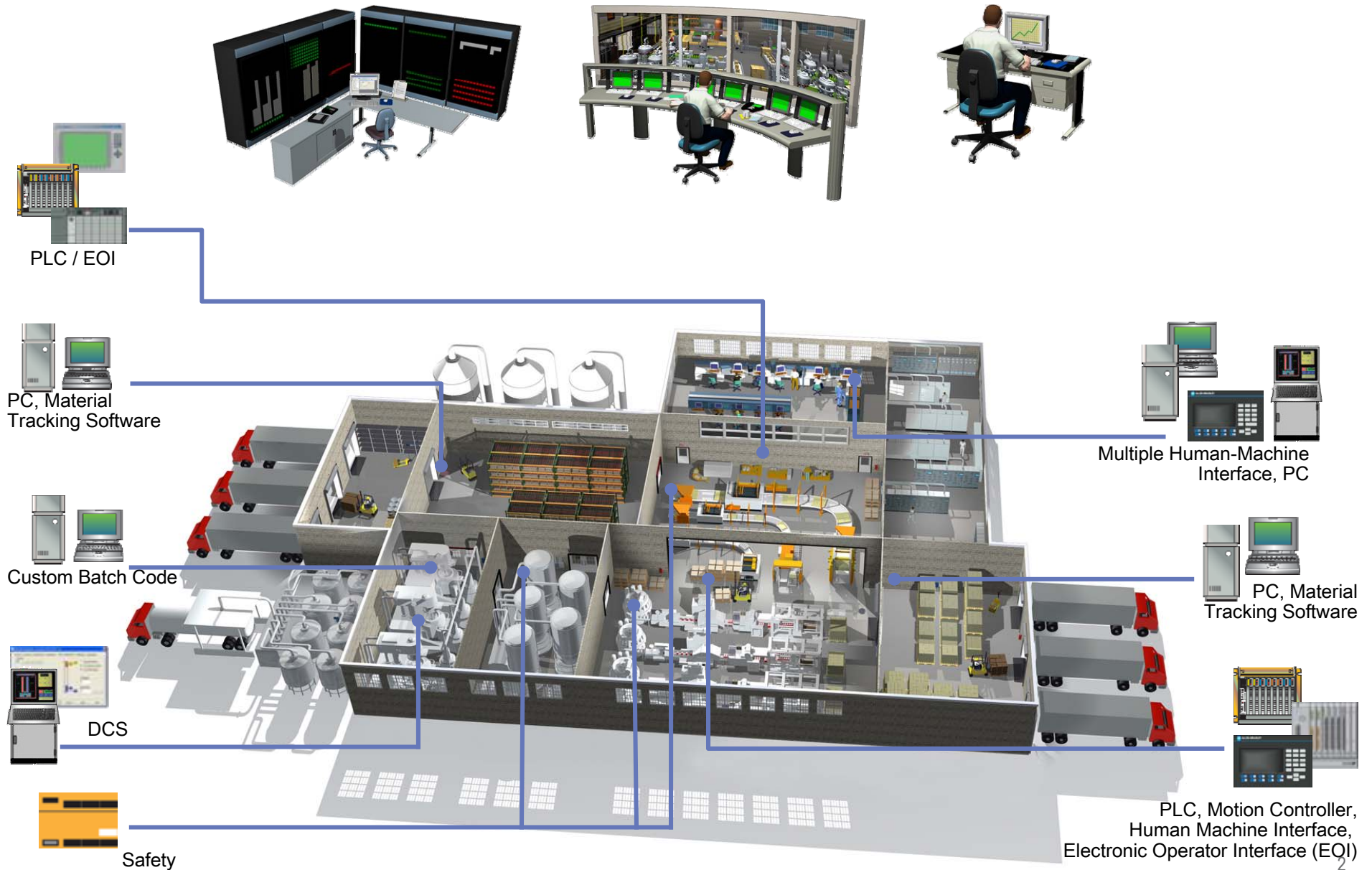
---

LISTEN.  
THINK.  
SOLVE.®

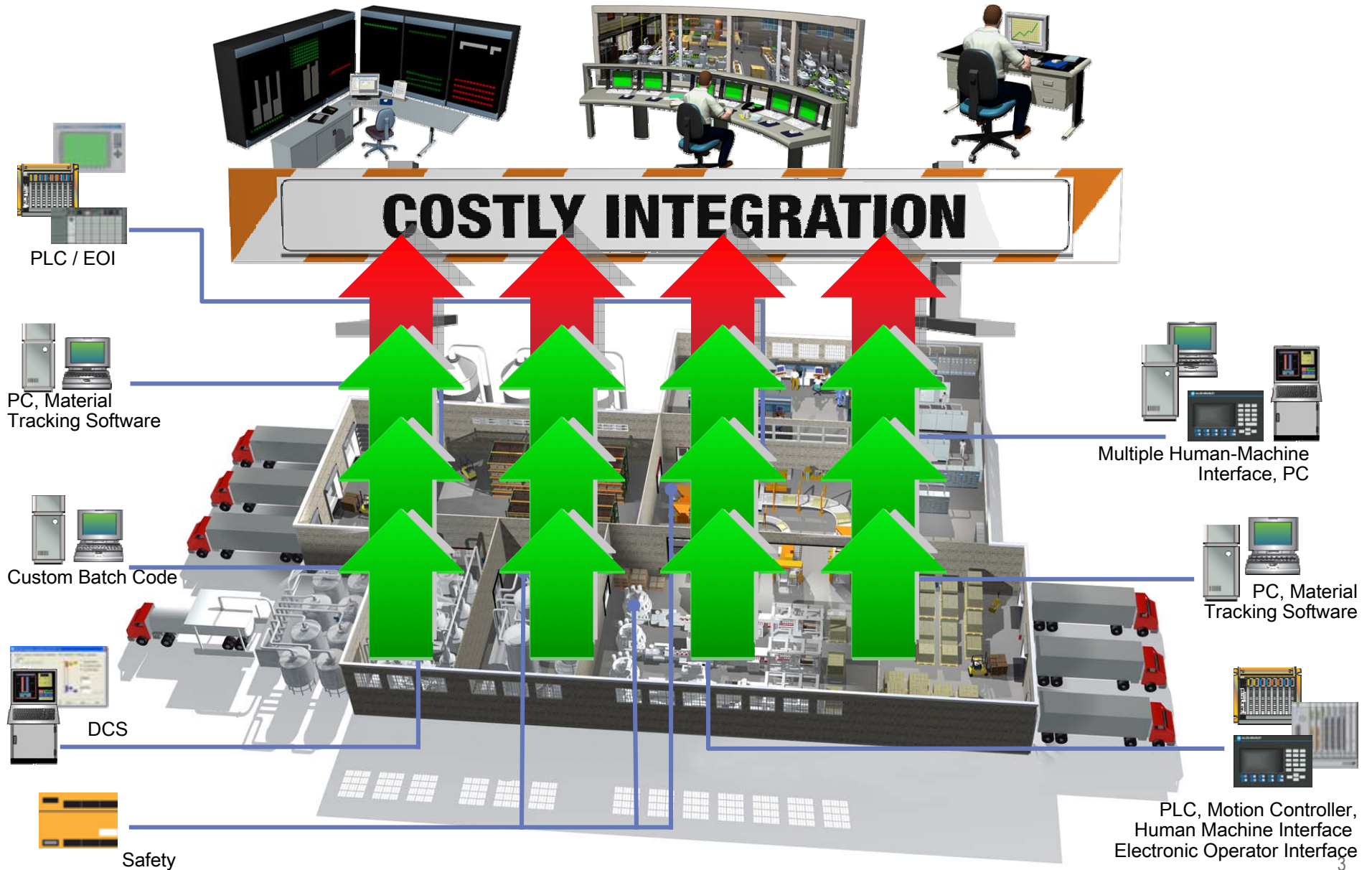
## Convergence-Ready Integrated Architecture

Introduction to the Integrated  
Architecture and the Influence of  
Manufacturing Convergence

# Typical Plant Situation



# Typical Plant Situation

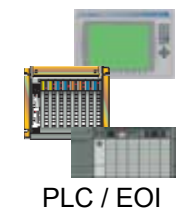


# Typical Plant Situation

## Disparate Control Systems

- High Operational Costs
- High Total Cost of Ownership
- Challenging to Maintain
- Disconnected and Proprietary Networks
- Inaccessible Real Time Information
- Inflexible System Deployment

**= ROADBLOCKS to Business Success**



PLC / EOI



PC, Material Tracking Software



Custom Batch Code



DCS



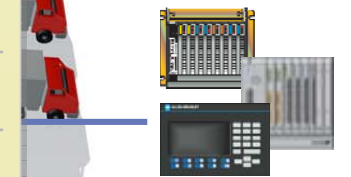
Safety



Multiple Human-Machine Interface, PC

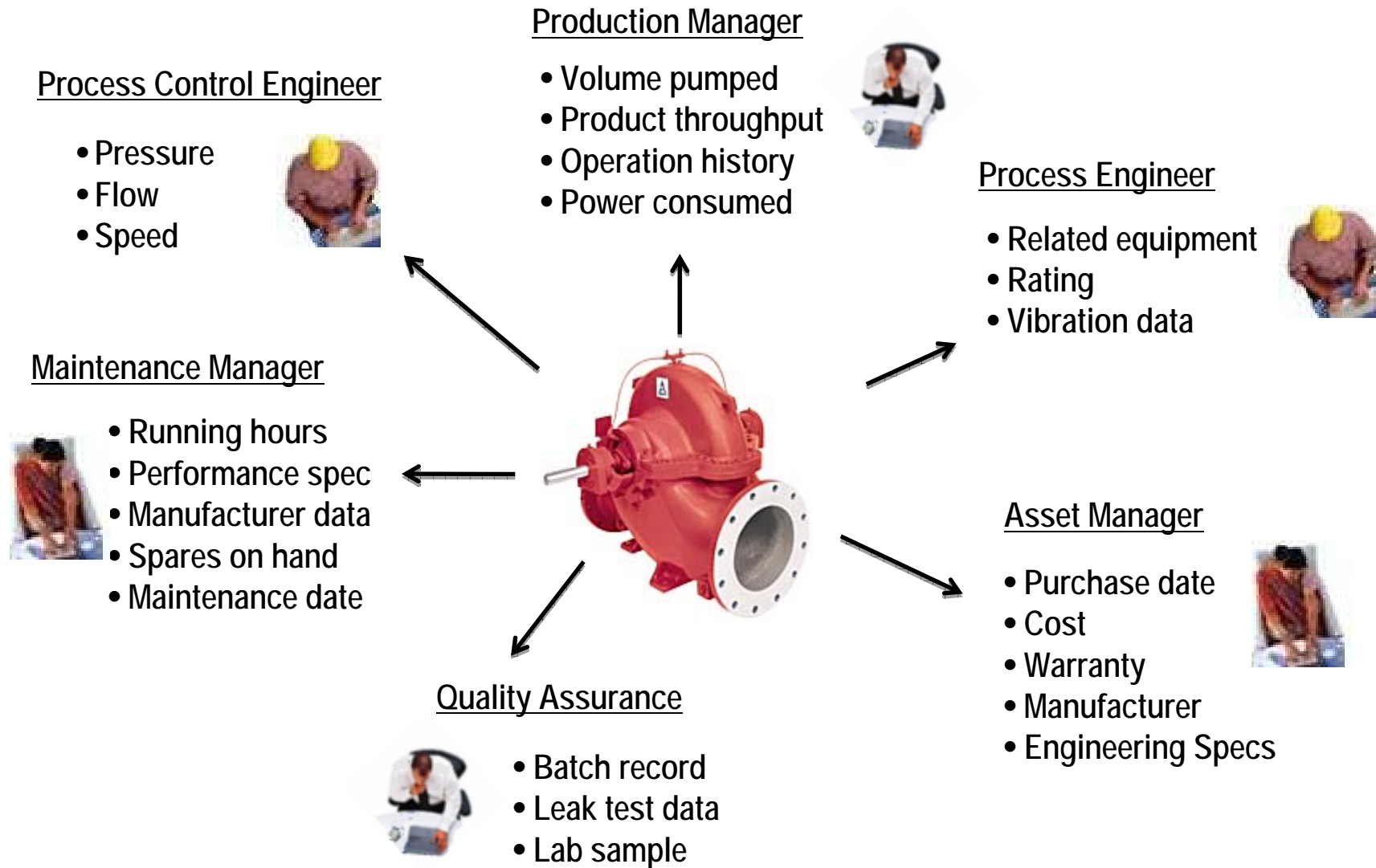


PC, Material Tracking Software



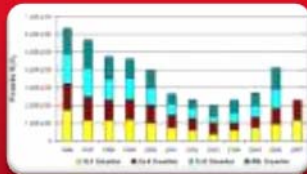
PLC, Motion Controller, Human Machine Interface, Electric Operator Interface (EOI)

# A Pump is a Pump - or is it?



# Manufacturing Goals

Maintenance  
&  
Operations



## Analyze Production

- Find bottlenecks ... troubleshoot problems
- Integrates plant floor information and provides KPIs, trends & graphs, analytics and reports to isolate root cause.

Engineering &  
Maintenance  
Managers



## Improve Equipment Performance

- Integrate asset (EAM, CBM) data with schedules and production data
- Monitor key equipment metrics (OEE/Downtime) then drill-down, analyze and resolve equipment problems.

Production &  
Quality Managers



## Improve Product Quality

- Integrates quality data (LIMS, SPC and PLM) with production data to identify and isolate production quality issues as they occur.
- Monitor key quality metrics (defect or rework rates) and drill down/solve

Plant &  
Production  
Managers



## Optimize Production

- Integrates production information (schedules, cost, MES) with asset quality and plant floor data to provide overall production KPIs.
- Monitor KPIs, drill-down and optimize production performance.

Plant & Supply  
Chain Managers



## Optimize Supply Chain

- Integrates production data with vendor and customer information to energize the supply chain.
- Users monitor KPIs (e.g. % perfect deliveries) and drill down to optimize.

# Issues Driving Manufacturing Convergence

## Market Drivers



Sustainability



Innovation



Globalization



Productivity

Emerging

Current

## Manufacturing Convergence



**Convergence-Ready Solutions = Enabling Business**  
(technology + people + process)

## RA Disciplines



Information



Communication



Control



Power

# Issues Driving Manufacturing Convergence

To handle current and future demands, you need an **Integrated Architecture** that is



**Convergence-Ready**

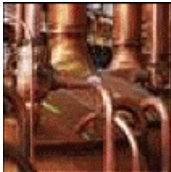
# Multiple Control Disciplines

## Historically Fragmented

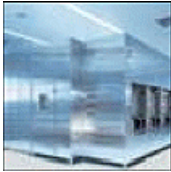
Process



Batch



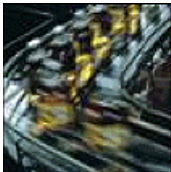
Discrete



Motion



Drives



Safety



Today Converged  
Faster Integration  
Less Training  
Simplified Maintenance  
Reduced Complexity  
Design Productivity  
Faster Time to Market  
Faster Changeover

Multi-discipline Control

# Logix



# Integrated Architecture Bypasses Roadblocks to Business Success



# Standard Unmodified Ethernet

## COTS Products and Technologies

Use commercial off the shelf (COTS) products like Ethernet switches, cameras, devices, instruments, and technologies like wireless, web pages, email, remote access, and video/voice

## Simplified Integration

Easier integration into existing Ethernet installations and corporate networks, no special requirements or conditions to meet

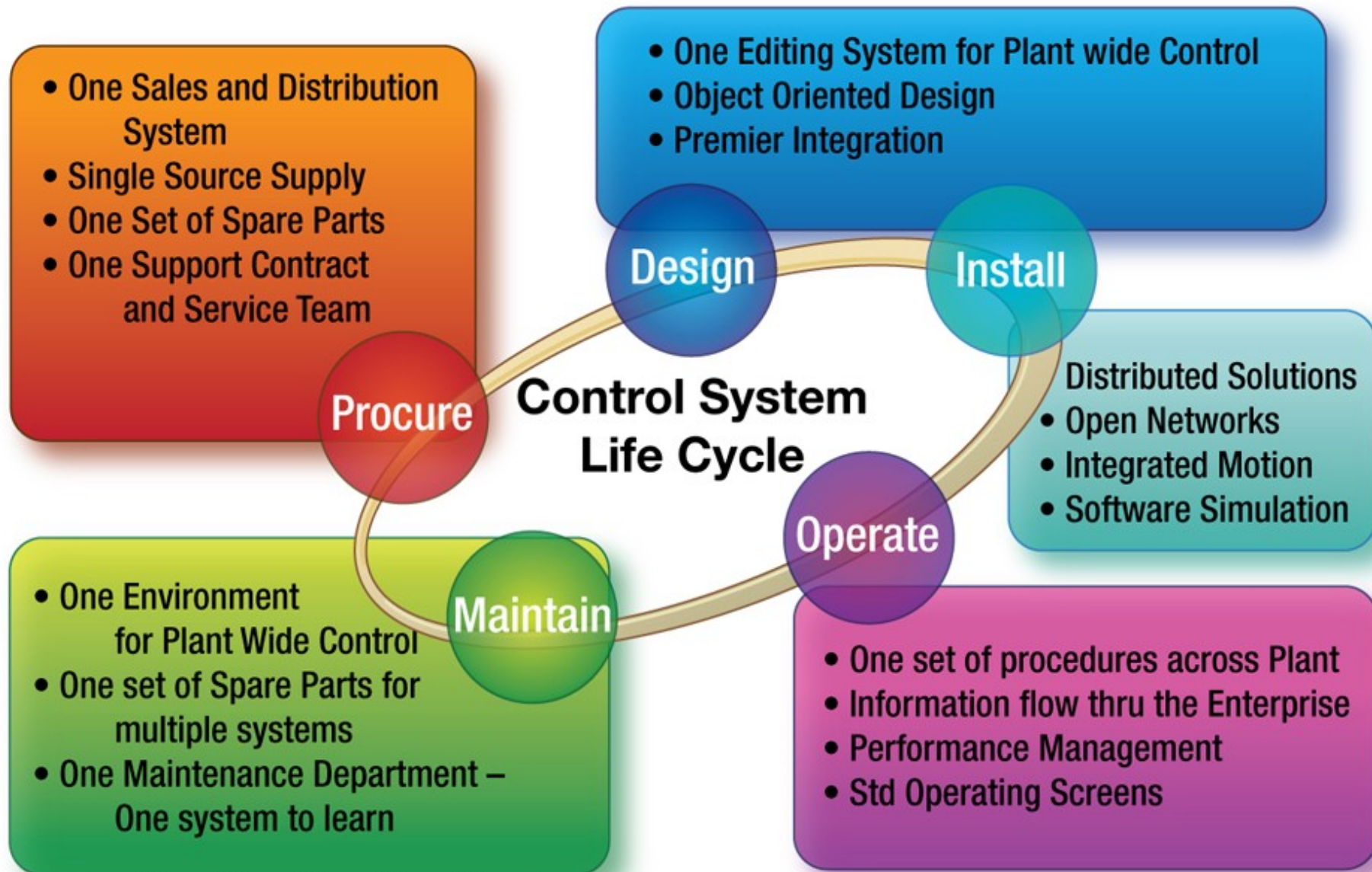
## Reduce Training

No special training or knowledge needed from the IT workforce, works the same as their existing networks

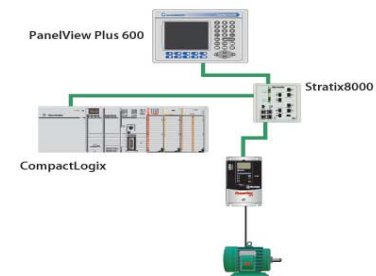
## Leverage Technology

Future proof your application and networks by leveraging the advancements of Ethernet

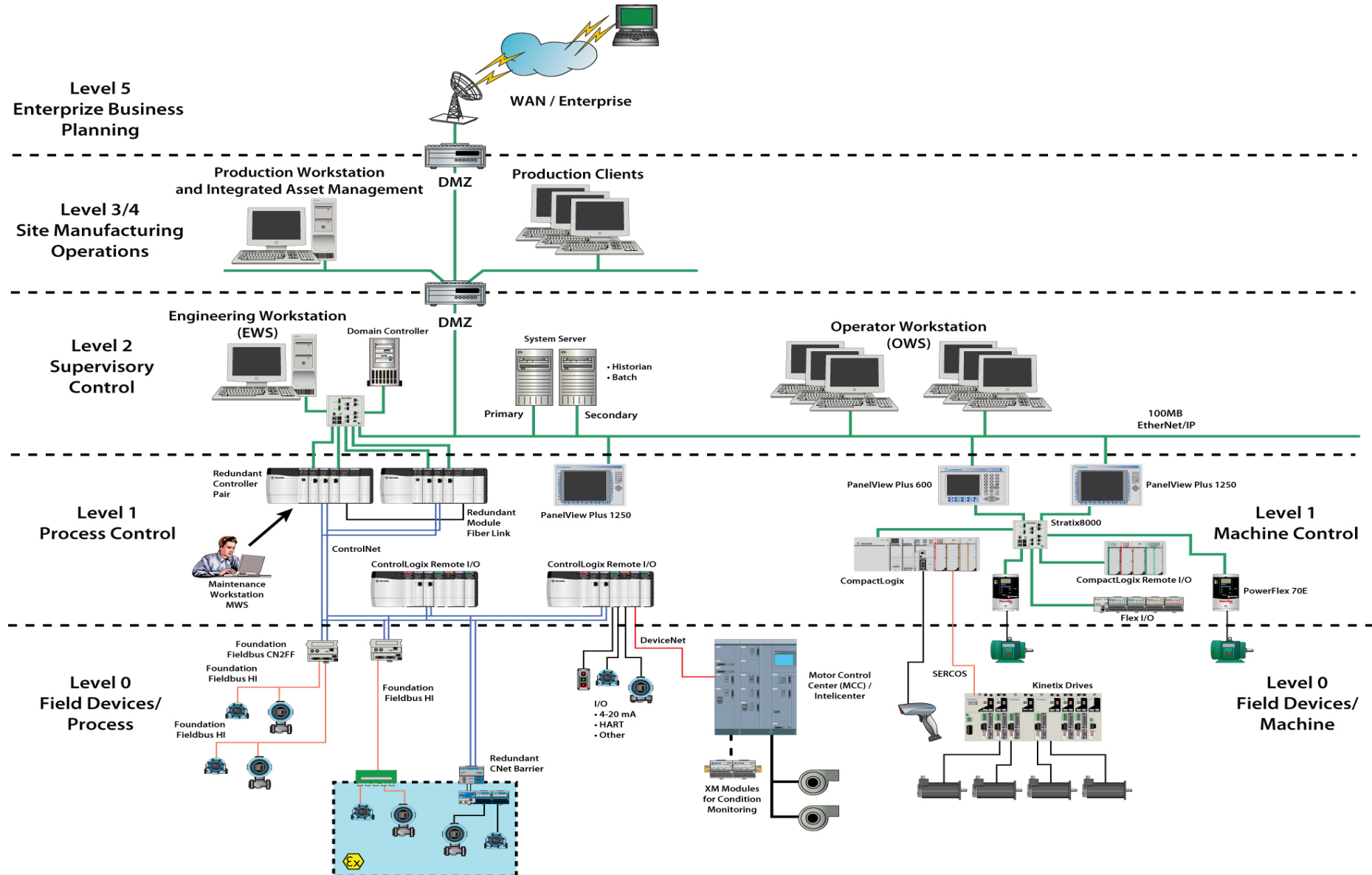
# Increasing Profitability by Reducing Total Cost of Ownership



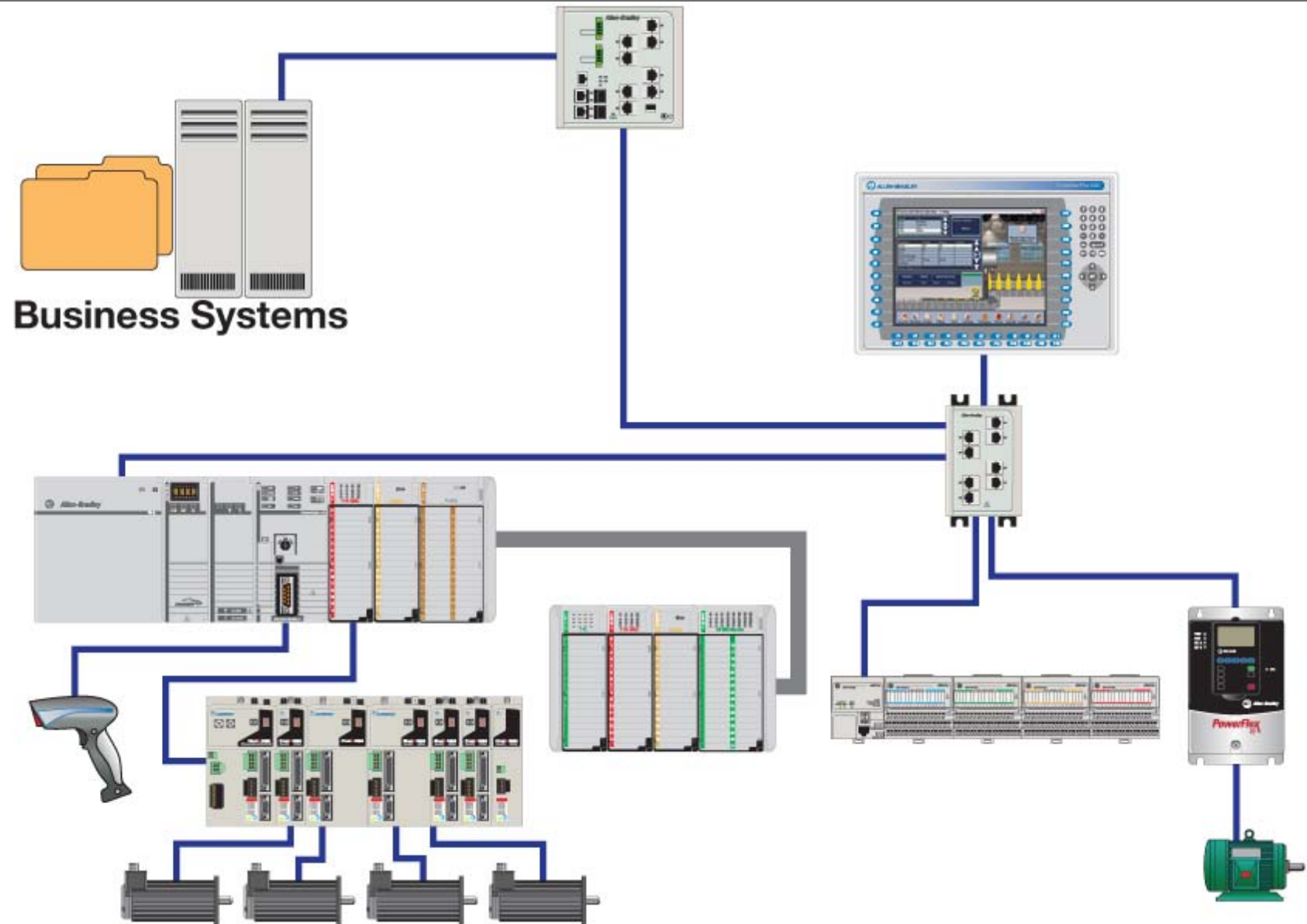
# Scalable - can start from small



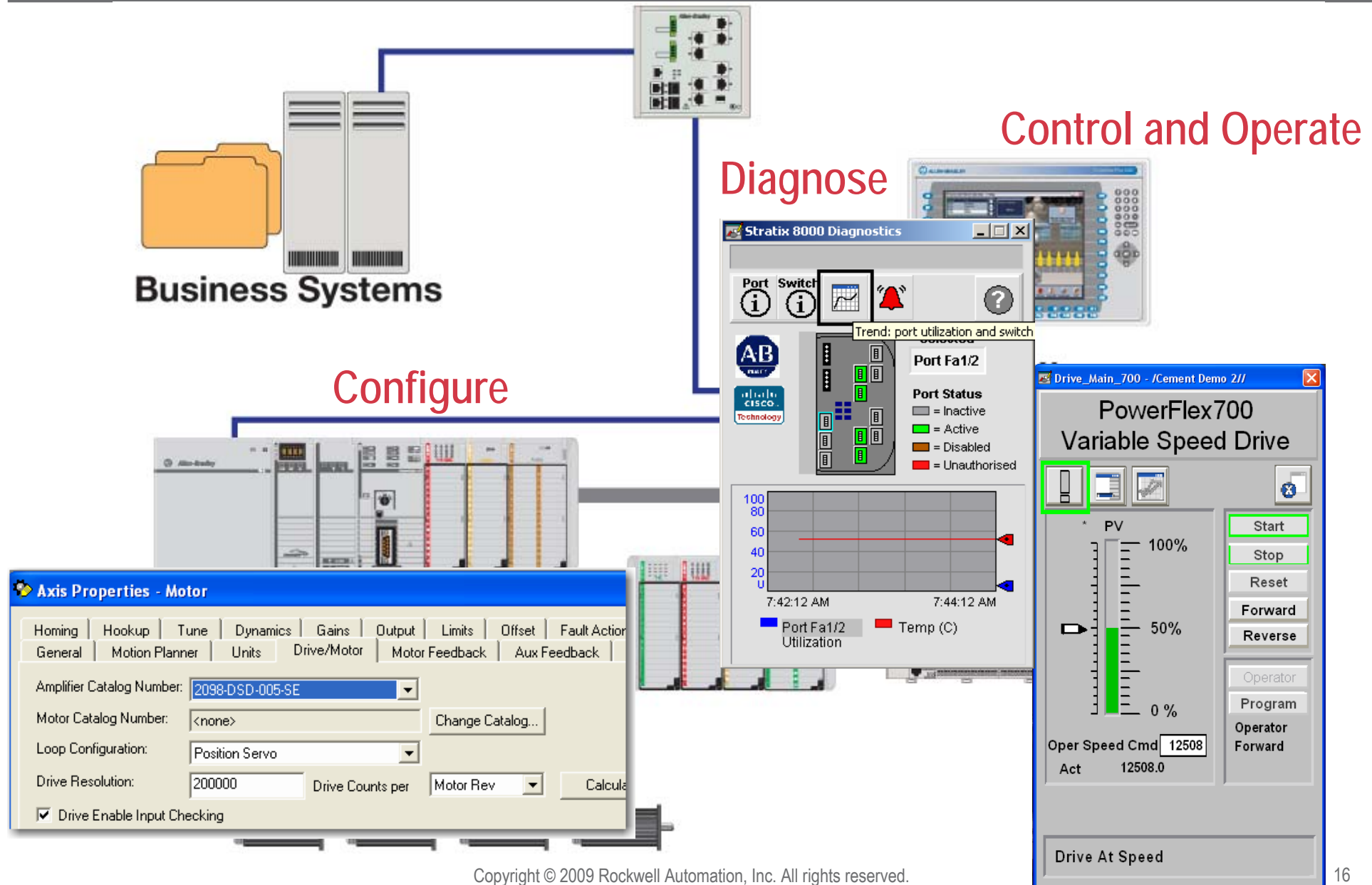
# Scalable - and then, extend to enterprise



# Premier Integration



# Premier Integration



# Information-Enabled - *Logix & FactoryTalk*

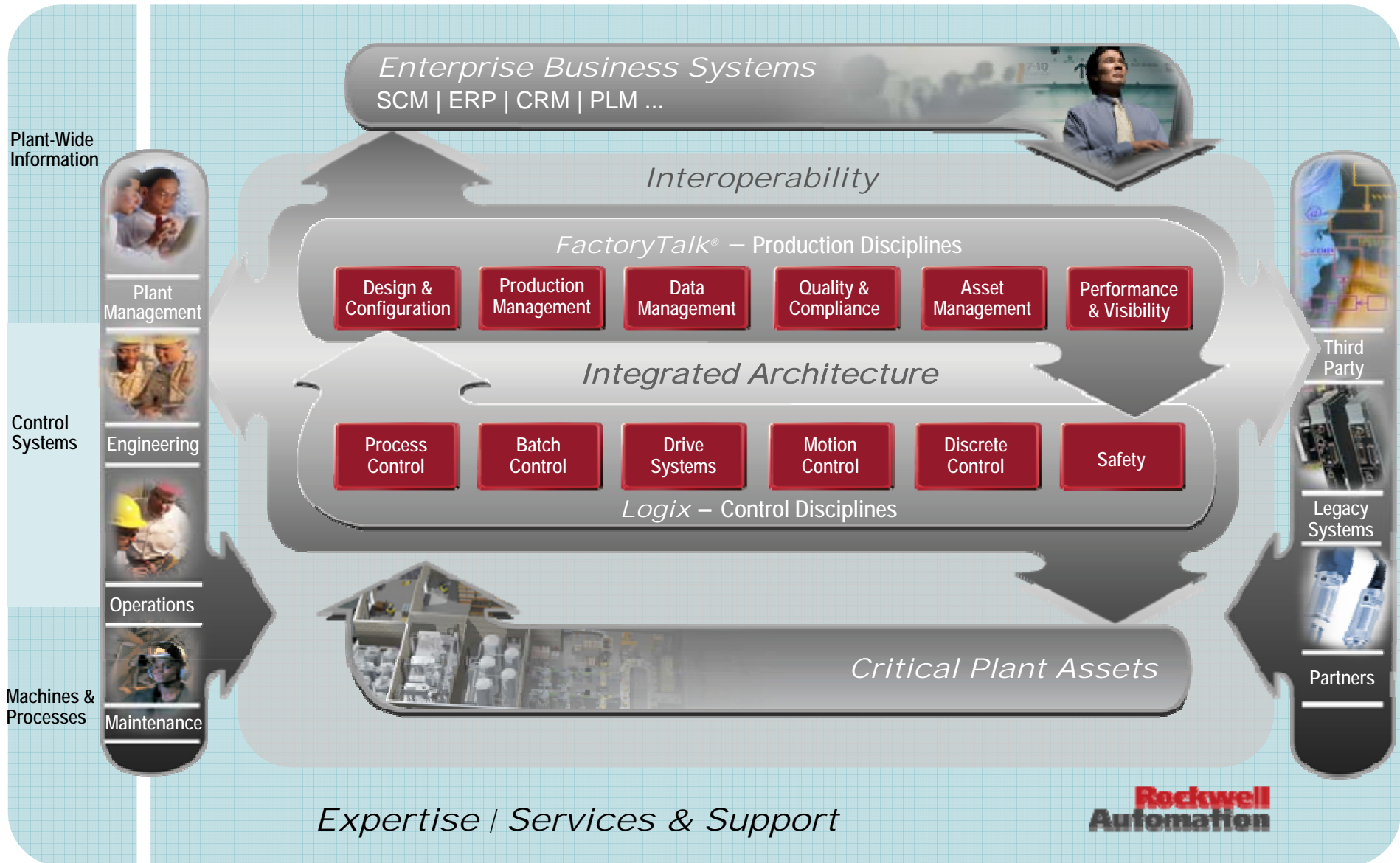


# FactoryTalk Message

*“FactoryTalk applications deliver production visibility, tracking and control for improved performance, and the flexibility to quickly, efficiently, and accurately respond to change”...*

- Information in context across disparate systems, accurate views into any step in production
- Improve delivery performance, product quality, and production efficiency
- React quickly to changes in market demand (products, volume, mix) or available resources (machines, material, manpower)
- Platform consolidation simplifies Manufacturing-IT application deployment and maintenance
- Integration across automation and enterprise business systems
- Cost reductions via standardization, Centralized Management
- Global Rollout and Deployment Capability, Reference Architectures

# Integrated Architecture : Control & Information



# What is FactoryTalk® ?

- Integrated Production and Performance Management

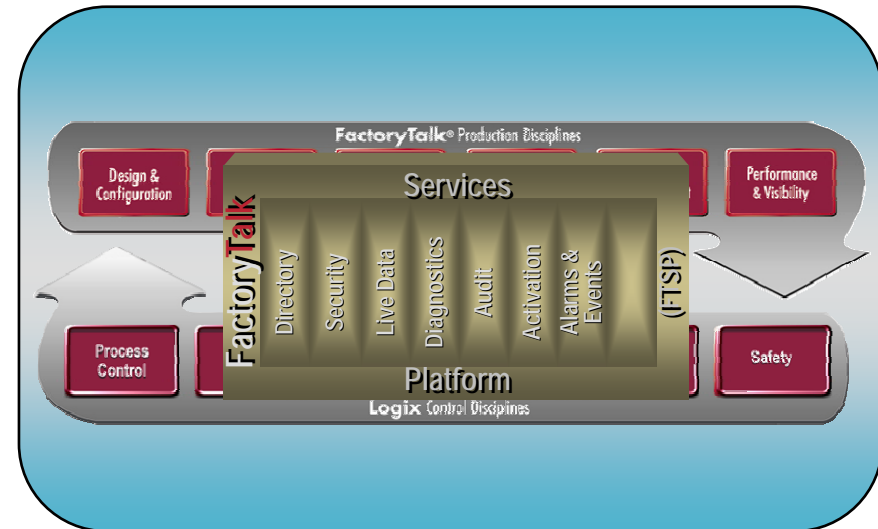
- Extends Integrated Architecture from Control into Information layer
- Modular, scalable and comprehensive
- 3rd party connectivity/integration

- Comprehensive Set of Manufacturing Apps.

- Discrete/Process Control & Visualization
- Historian & Data Management
- Asset Management
- Business Intelligence – EMI
- MES & Production Management

- FactoryTalk Services Platform

- SOA delivers shared services to FactoryTalk-enabled applications
- Reduces customer learning curve and project engineering time through commonality and reuse



# Production Disciplines

# FactoryTalk®



## Design and Configuration

Integrated environments for creating, modeling programming your production processes



## Quality & Compliance

Ensure operational processes and procedures meet standards or specifications



## Production Management

Real-time coordination across your plant-wide production processes



## Asset Management

Optimizes maintenance and plant operations to improve your resource availability



## Data Management

Tools & methods to use for collecting, transforming & integrating production information



## Performance & Visibility

Presents a window into the process so you can make better decisions

# Highlight on Modular Information Software Products



Design and Configuration



Quality & Compliance



Production Management



Asset Management

FactoryTalk AssetCentre



Data Management

FactoryTalk Historian



Performance & Visibility

FactoryTalk ViewPoint

FactoryTalk VantagePoint

FactoryTalk Metrics

# FactoryTalk AssetCentre

## Core Features & Capabilities

### Archive

- Complete change management system with check-in / check-out functionality for version control
- Secure electronic document repository

### Audit

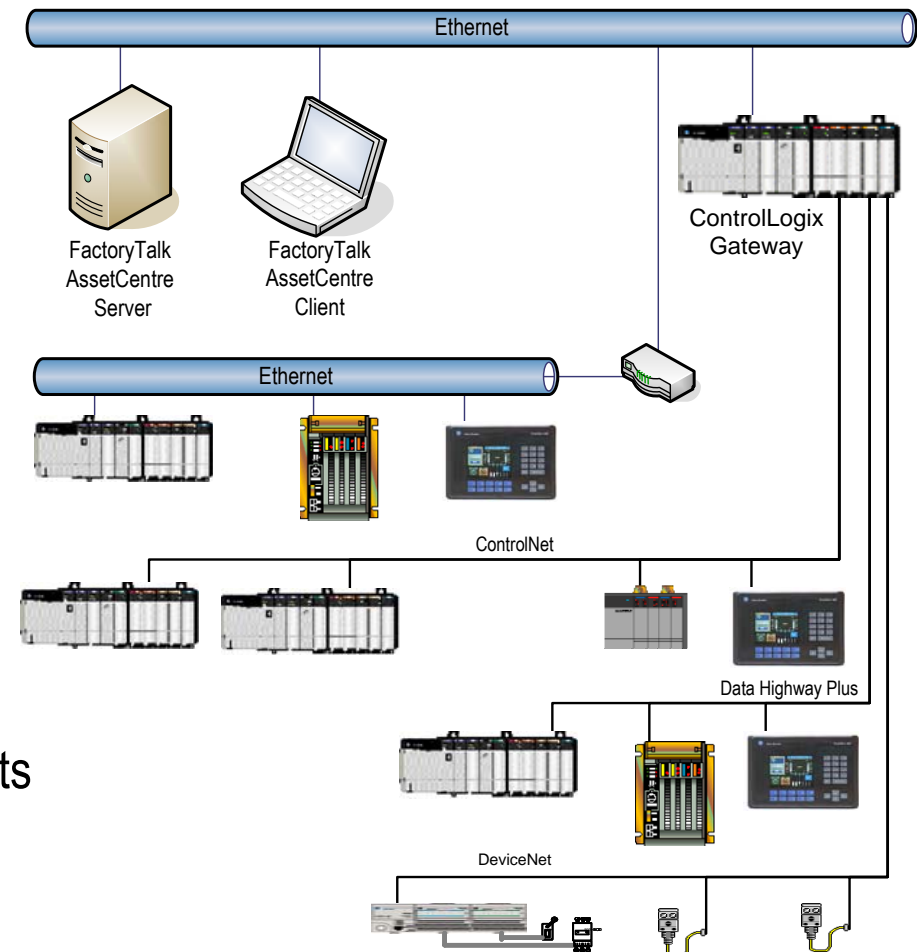
- Records individual user activity and logs information to a secure database

### Security

- User security and access privileges prevents unwanted or unauthorized changes

### Notification

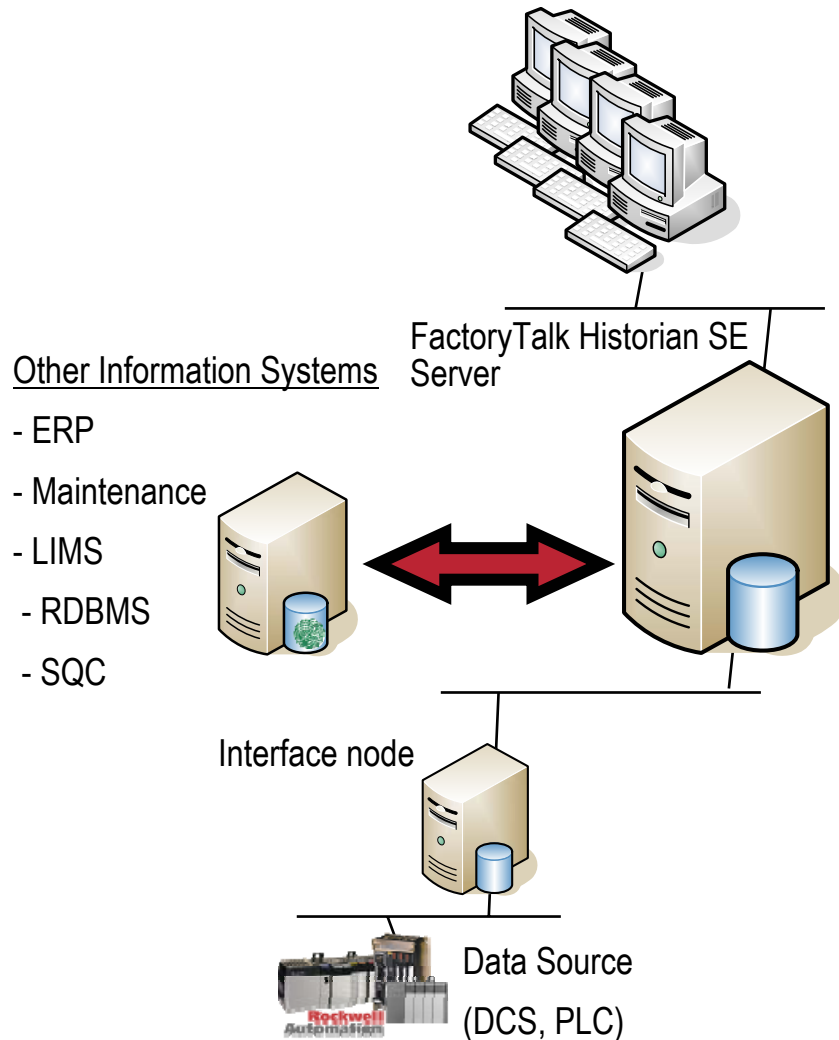
- Capability to send e-mail notification when system changes are made



# FactoryTalk Historian SE

## Architectural Overview

### FactoryTalk Historian SE Clients



### FactoryTalk Historian Client Tools

- Various tools for specific purposes

### FactoryTalk Historian SE Server

- Utilizes OSI PI Enterprise Pro Technology
- Compresses and stores data in a time-series archive based on point definition

### Interface Node

- “Touch point” to the control system – communicates with underlying devices
- Performs data capture (“snapshot”) based on individual point configuration

# FactoryTalk ViewPoint Overview

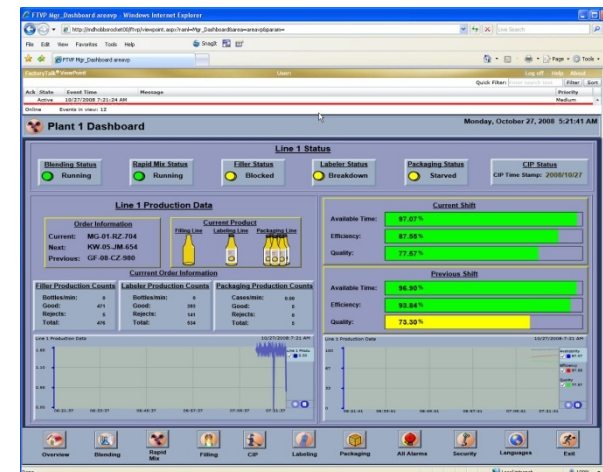
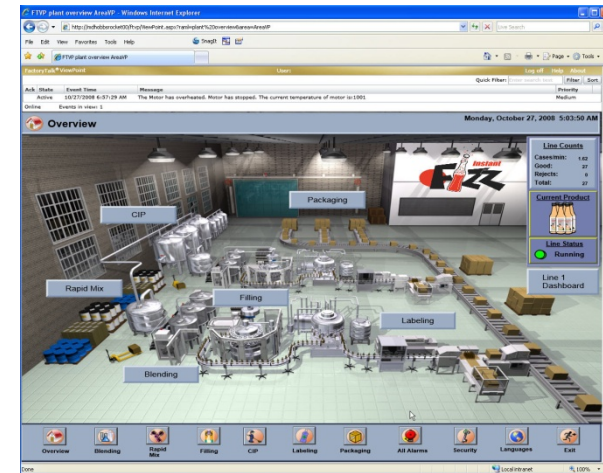
- New, web-based solution for FactoryTalk View (Human Machine Interface/ Operator Station & Electronic Operator Interface)
- Extends FactoryTalk View to include web based client
  - Rich, interactive browser user experience
  - Full animation of graphics
  - HMI navigation is preserved
  - Fully scalable graphic displays
- Web Client is Internet Browser with small Plug-In
  - No client software to install and maintain
  - Plug-In loads and updates automatically
  - Supports multiple browsers / devices
  - Browser navigation is fully functional



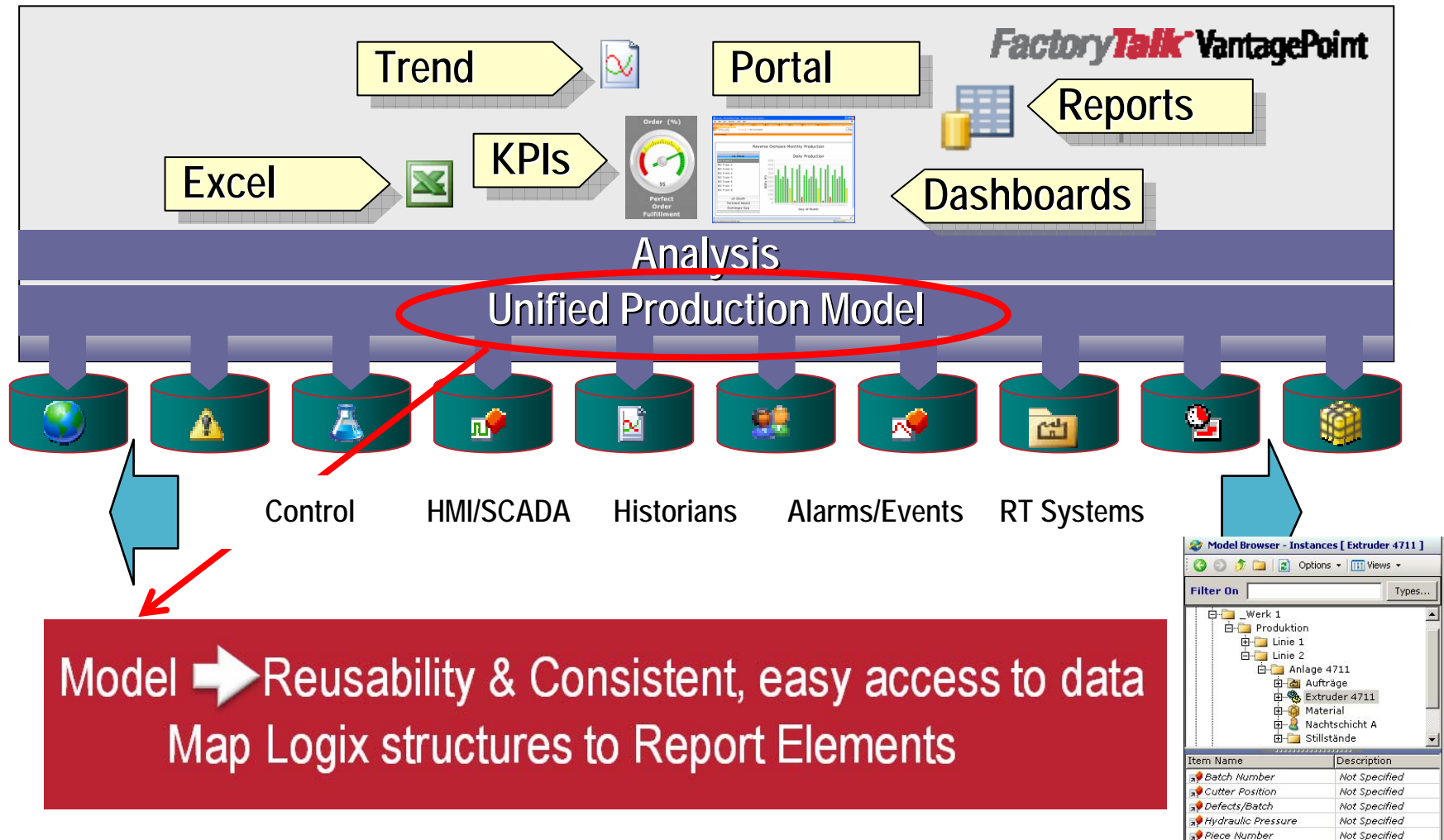
Browsing the factory has never been easier

# FactoryTalk ViewPoint Benefits

- Lowers Total Cost of Ownership
  - Client is an Internet Browser with small plug-in
  - No client software to install & maintain
- Extends visualization & real-time decision capabilities to browser-based remote users
  - Plant managers & supervisors
  - Mobile personnel
  - OEM's & System Integrators
- Provides convenient access from anywhere
  - In the office
  - At Home
  - On the road
- Supports multiple browsers / devices
  - Internet Explorer, FireFox, Safari



# What is FactoryTalk VantagePoint?



# FactoryTalk VantagePoint Key Benefits

- “Zero touch” deployment of clients – just a browser
- No replication of data – we get it when we need it
- Can store data if needed, e.g. data aggregation
- Premier integration with Rockwell’s Integrated Architecture
- Works with existing systems – no need to rip and replace
- Provides IT a single platform that can support any application for business intelligence

# When to Visualize, When to Report

## Visualization/HMI

HMI/SCADA: *FactoryTalk View*

- Operators monitoring ops
- Typically 1:1 View:Control
- Graphic in nature, single or multiple screens
- Little/no contextual reference
- Real-time
- Pre-determined content
- Minimal screens – high eng. cost for specific screens

## Reporting/EMI

*FactoryTalk VantagePoint LE*

- Distributing information to users
- Combined from multiple ops/lines
- Formatted reports, trends, objects, via content viewer/portal
- Data from multiple systems, context for synthesizing information
- Multiple time-frame
- Ad hoc content
- Lots of screens – different aspects & users

# When to Visualize, When to Report

## Visualization/HMI

HMI/SCADA: *FactoryTalk View*

## Reporting/EMI

*FactoryTalk VantagePoint LE*

### DATA SOURCES

Specific tags, targeted systems

Disparate data sources  
(technical & relational disparity)

### BARRIERS TO CURIOSITY

HIGH

LOW

Curiosity ►►► Innovation & Improvement

# The most widely used mfg. analysis tool is ?



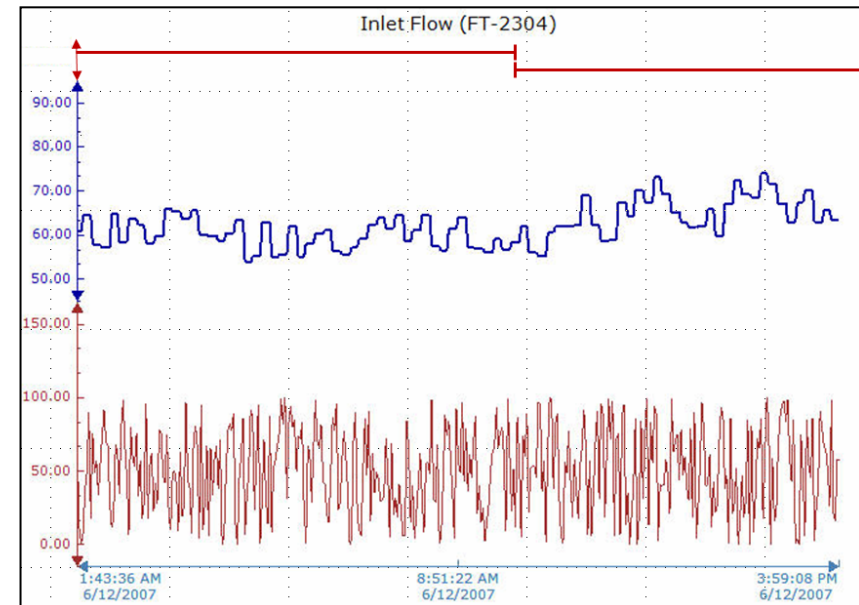
The screenshot shows the Microsoft Excel interface with a spreadsheet. Two text boxes are overlaid on the spreadsheet:

- Strengths**
  - Everyone knows Excel
  - Relatively easy to produce a report
  - Data can be imported as .csv file
  - Most manufacturing systems can produce .csv
- Concerns**
  - Security
  - Islands of Data
  - Portability
  - Collaboration
  - Cost of Labor to produce

With FactoryTalk VantagePoint , Excel runs on the server providing secure, collaborative client connections via a web browser

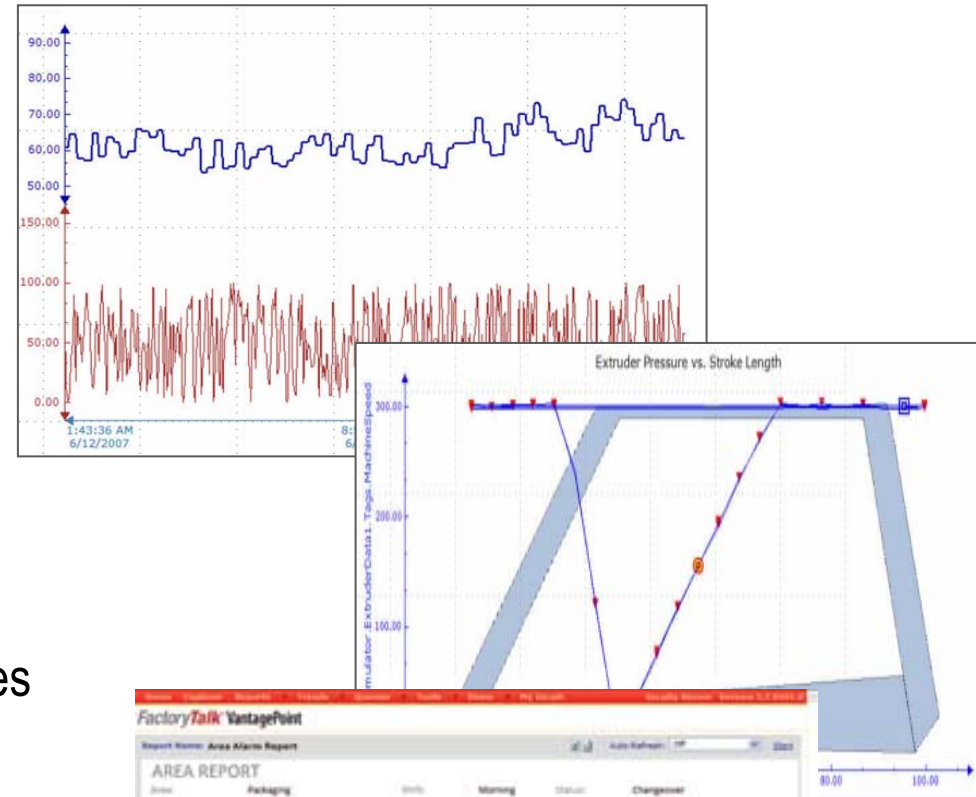
# Historian Connectivity

- Historical data is often the cornerstone for data analysis
  - Time Series data
  - Time periods
    - Batch data, Production Runs, Startups, Shutdowns
  - Time Tags
    - Shifts, Reporting Periods
- Connectors for all major historians
  - FactoryTalk Historian (premier integration)
  - Wonderware Industrial SQLServer
  - GE Proficy Historian
  - OSI PI
  - OPC Historical Data Access (HDA)
    - Emerson DeltaV Process Historian
    - Yokogawa Exaquantum
    - Others



# Historical Data Analysis Tools

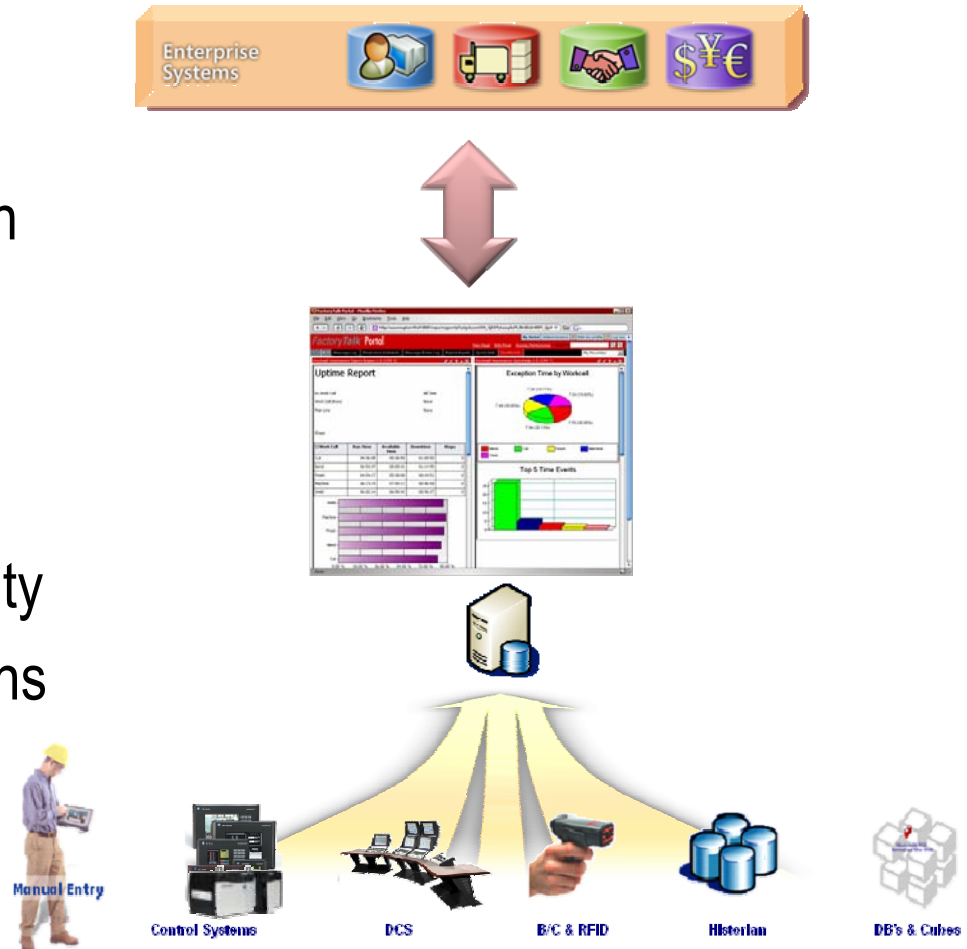
- Trend
  - Unlimited traces
  - Multiple Time Periods
  - Real-time and historical
  - Golden Batch
  - Statistical analysis
- XY Plot
  - Analyze correlation between variables
  - Similar to Trend capabilities
- Excel Add-In
  - Report creation tool for the Portal
  - Powerful post-processing engine





# FactoryTalk VantagePoint Summary

- Decision support
- Analytics and reporting
- Aggregation and contextualization
- Data mining
- Dash boarding
- Predictive & advisory capabilities
- Performance management visibility
- Integration with IT web applications
- Role based access



Operational or Business Intelligence, Plant Data Sources Are Essential

# FactoryTalk Metrics Overview

- A management tool to help you optimize production efficiency
  - Analyzes **Overall Equipment Efficiency (OEE)**
  - **OEE = Availability \* Performance \* Quality**
- Identify equipment problems and get to a root cause
  - Efficiency problems
  - Downtime causes
  - Production events
- Customizable and scalable
  - Make it unique to your plant
  - Continuum from simple to complex; small to large
  - Measure what is important to you
- Access to all reports via Web Browser
  - Built in standard reports
  - Sample report templates (extended reports)
  - Data Access Interface for customized reports

# How Does FactoryTalk Metrics Help You ?

- Reliable production data collection (no more clipboards!) Accurate & Timely
- Records data to calculate OEE :
  - Uptime: are machines running when they are supposed to?
  - Throughput: are machines (or people) working as fast as they should?
  - Quality: how much waste are you producing?
  - Production counts, cycle times, schedules, etc.
- Visualize data in meaningful ways
  - By date, shift, part, operator, etc.

<input type="checkbox"/> Line	Work Cell	Uptime %	Throughput %	Quality %	OEE %
<input type="checkbox"/> Dispenser	D1 Filler	51.69 %	66.39 %	94.96 %	32.59 %
	D2 Capper	47.15 %	67.07 %	95.09 %	30.07 %
	D3 Labeler	80.98 %	50.79 %	95.02 %	39.08 %
	D4 Pack	48.27 %	100.50 %	94.97 %	46.07 %

# Visualization / Analysis Tools

## FactoryTalk Metrics - Provides Different Views of Performance Information

### Operations

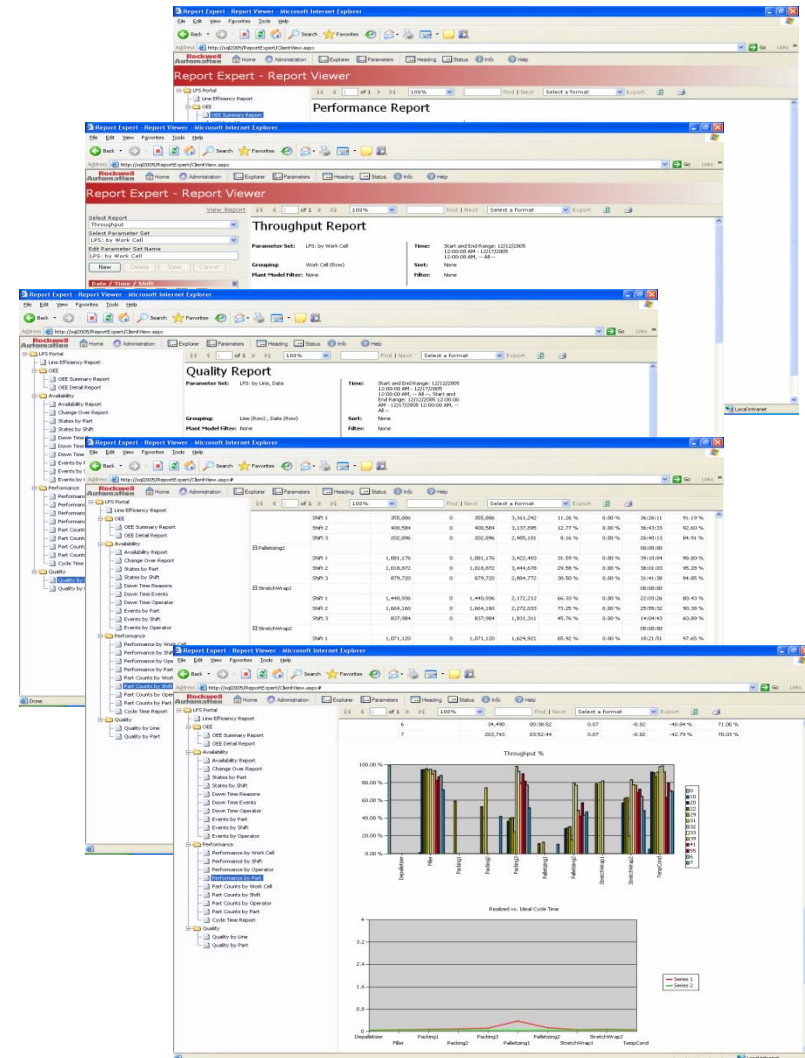
- Dashboard
- Summary Pages
- Drill Down to actionable problems

### Maintenance

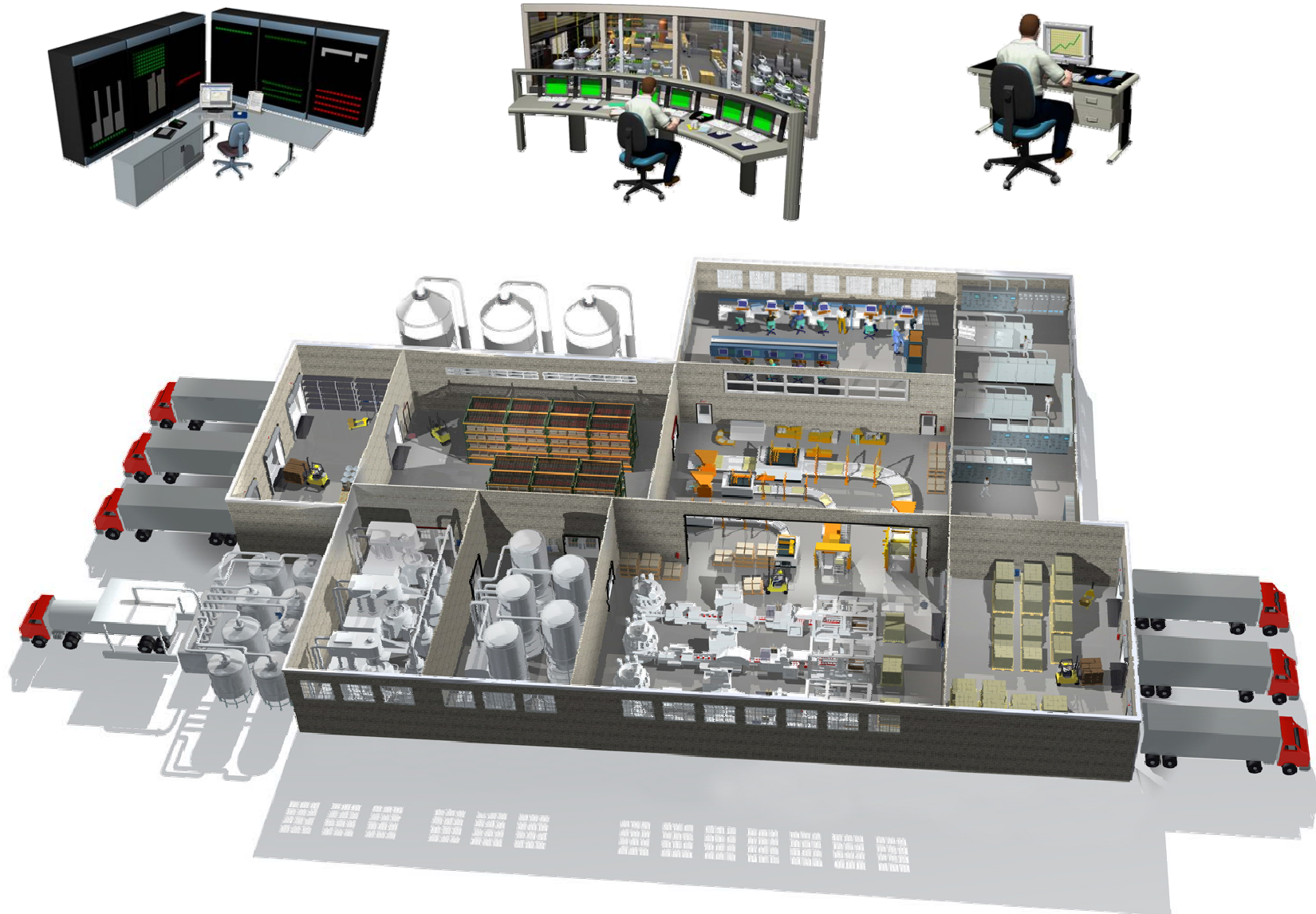
- Fault Summary / Detail Reports
- Machine Modes / Changeovers

### Engineering / QR

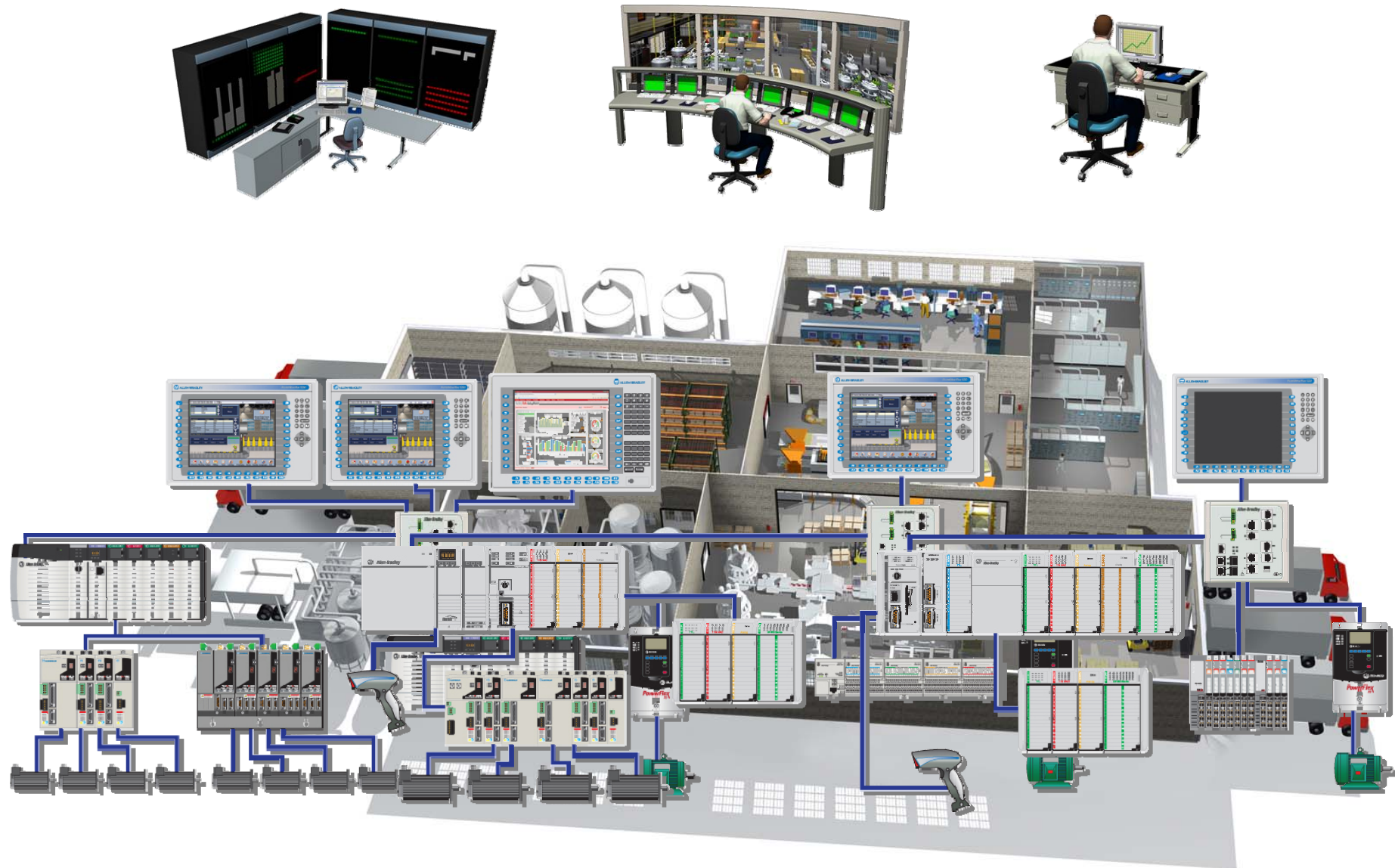
- Performance Indicators
- Quality KPI's
  - Scrap by workcell
- Performance KPI's
  - Cycle Times / Machine Modes
  - Production Reports



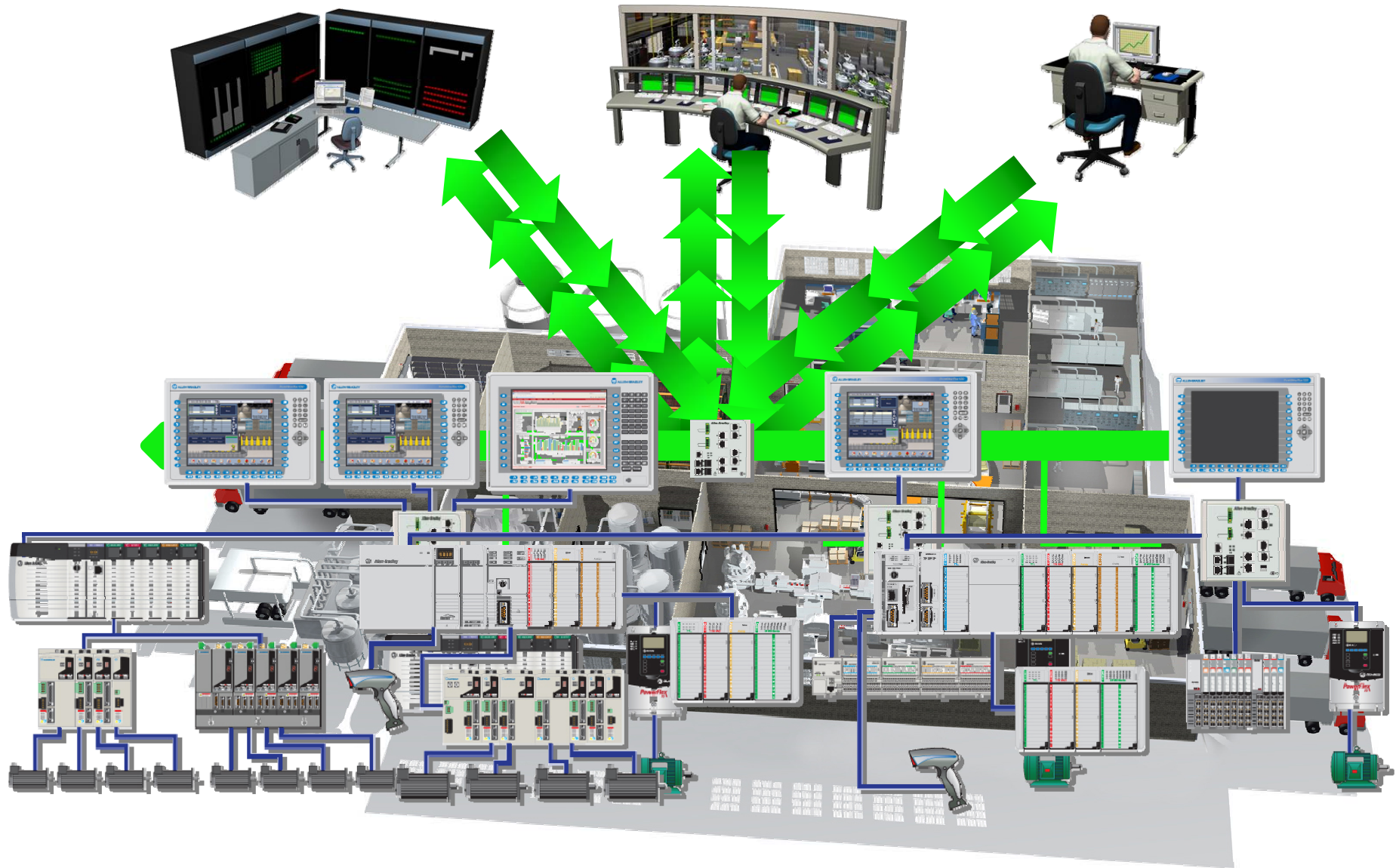
# Integrated Architecture



# Integrated Architecture



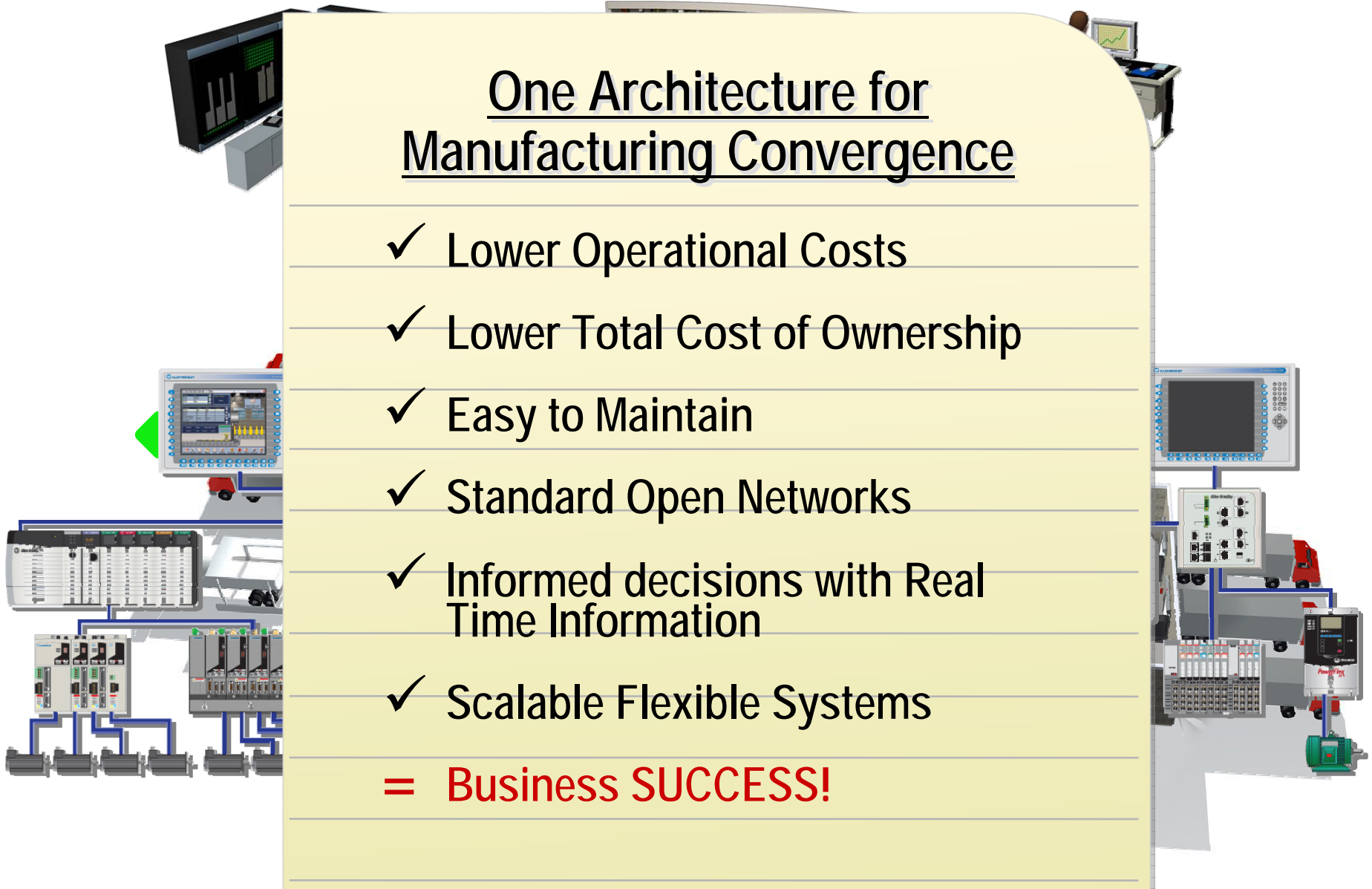
# Integrated Architecture



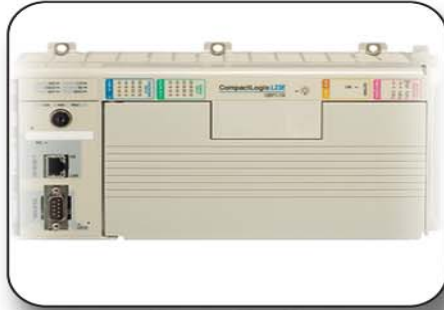
# Integrated Architecture

## One Architecture for Manufacturing Convergence

- ✓ Lower Operational Costs
  - ✓ Lower Total Cost of Ownership
  - ✓ Easy to Maintain
  - ✓ Standard Open Networks
  - ✓ Informed decisions with Real Time Information
  - ✓ Scalable Flexible Systems
- = Business SUCCESS!**



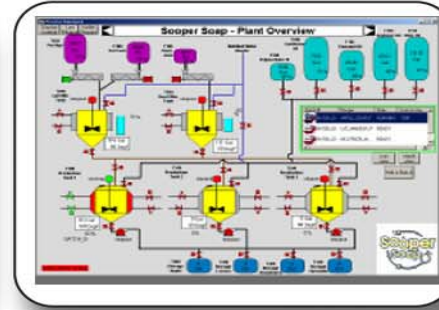
# Integrated Architecture Portfolio



Control ■ ■



Configure ■



Visualize ■



Information ■



I/O ■



EOI ■ ■



Networks ■



Motor Control ■



Services ■



Industrial Control



Solutions ■ ■ ■



Partners / Emcompass



*Thank you !*

To learn more visit <http://www.rockwellautomation.com>