Emerson Modeling Overview

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EMERSON™
Process Management

Contents

- Emerson Process Management – Introduction
- Enter it Once – Introduction
- Project Execution by Emerson Divisions
- Modeling Process and Progress
- Points to Address

Topic

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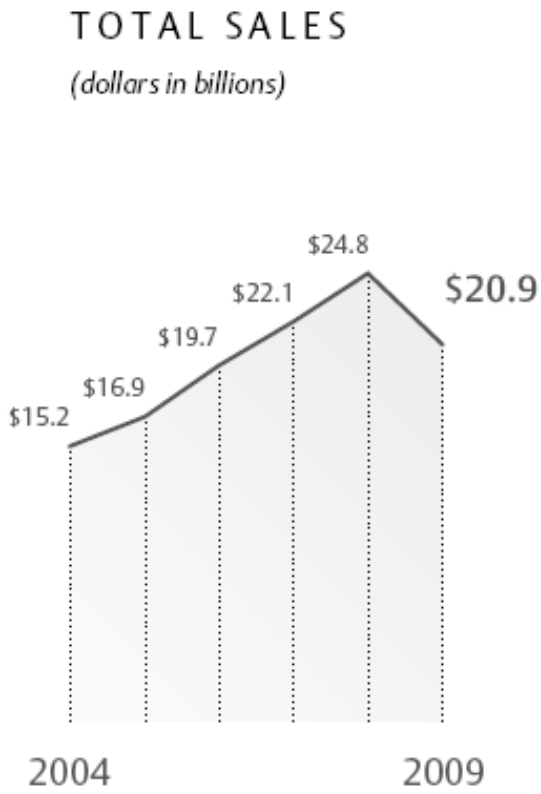
Emerson: Company Profile

Emerson is a diversified global manufacturing and technology company serving industrial, commercial, and consumer markets around the world



- **Publicly traded (NYSE: EMR)**
- **Headquarters in St. Louis, MO (USA)**
- **Recognized for outstanding management process and record of consistent long-term performance**
- **Manufacturing and/or sales presence in more than 150 countries**
- **Founded in 1890 – in business for 120 years`**

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FORTUNE World's Most Admired Companies

2010 Industry Rankings

Electronics Industry

1	General Electric	7.07
2	Samsung Electronics	6.74
3	**Emerson**	**6.31**
4	Sony	6.29
5	Siemens	6.12
6	Panasonic	5.94
7	LG	5.79
8	Schneider Electric	5.75
9	Toshiba	5.67
10	Royal Phillips Electronics	5.62

Ranked 11-15: Sharp, Mitsubishi Electric, Hitachi, Sumitomo Electric Industries and Tyco International

Emerson is #3 in electronics industry… ahead of larger, well-known consumer brands

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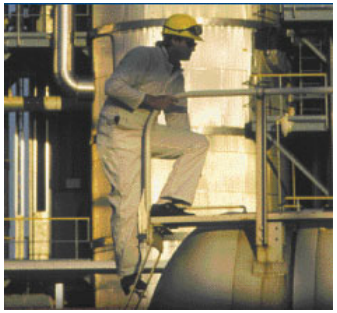
Emerson. Creating Technology and Solutions for a World in Action



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EMERSON
Climate Technologies

EMERSON
Industrial Automation

EMERSON
Network Power

EMERSON
Appliance Solutions

EMERSON
Motor Technologies

EMERSON
Storage Solutions

EMERSON
Professional Tools

Global Market and Technology Leadership

EMERSON Process Management

#1 Control Valves
#1 Measurement Devices
#2 Systems & Solutions

EMERSON Climate Technologies

#1 Compressors
#1 Controls
#2 Thermostats
#2 Valves
#2 Motors

EMERSON Industrial Automation

#1 Alternators
#1 Industrial Motors

EMERSON Network Power

#1 AC & DC Power Syst.
#1 OEM Embedded Power
#1 Precision Climate Syst.

EMERSON Appliance Solutions

#1 Garbage Disposers
#1 Appliance Components

EMERSON Motor Technologies

#1 Fractional Motors

EMERSON Storage Solutions

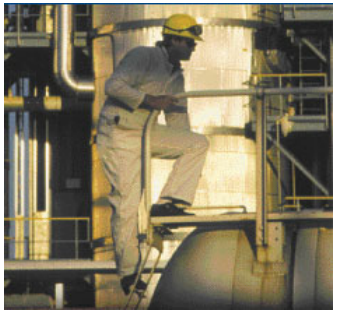
#1 Storage Solutions

EMERSON Professional Tools

#1 Plumbing Tools
#1 Wet/Dry Vacuums
#1 Pressing Tools/ Jaws
#1 CCTV Inspection Systems

Appliance & Tools

Emerson. Creating Technology and Solutions for a World in Action



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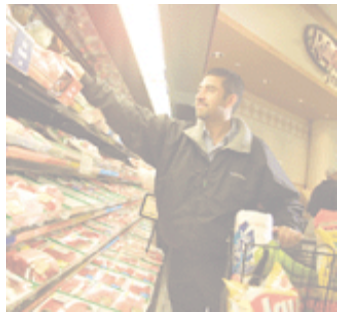

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Systems & Solutions

- DeltaV
- Ovation
- Industry Solutions
  - Chemical
  - Oil & Gas
  - Refining
  - Power & Water
  - Life Sciences
  - Metals & Mining
  - Pulp & Paper
  - Food & Beverage
  - Remote Automation
  - Marine

Asset Optimization

- AMS Suite
- Services and Technologies
  - Mechanical Equipment
  - Electrical Systems
  - Process Equipment
  - Instruments & Valves

Measurement

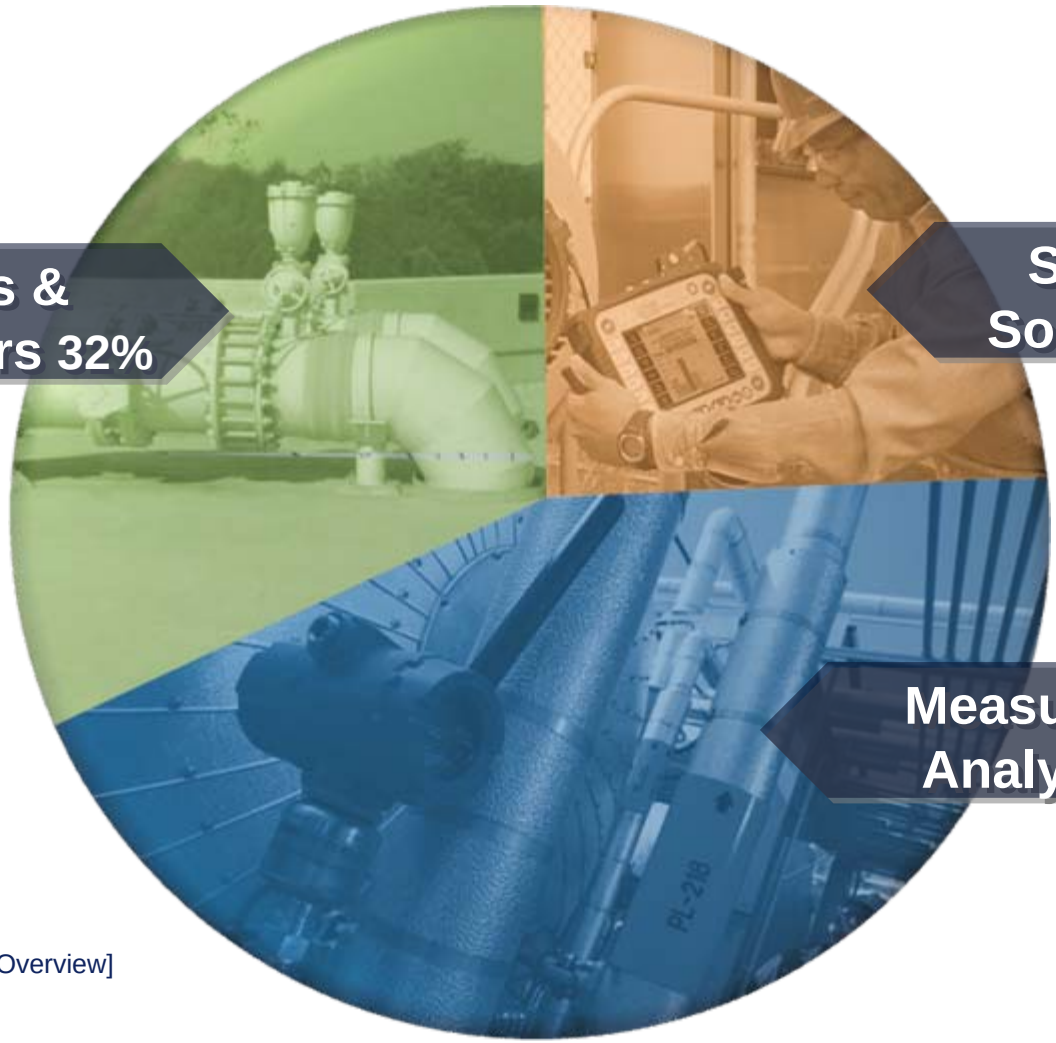
- Rosemount
- Micro Motion
- Rosemount Analytical
- Daniel
- Roxar

Valves & Regulators

- Fisher
- Baumann
- Bettis
- El-O-Matic
- Shafer
- TopWorx
- Hytork
- Dantorque
- FieldQ

Emerson Process Management

Total 2009 Sales $6.2B



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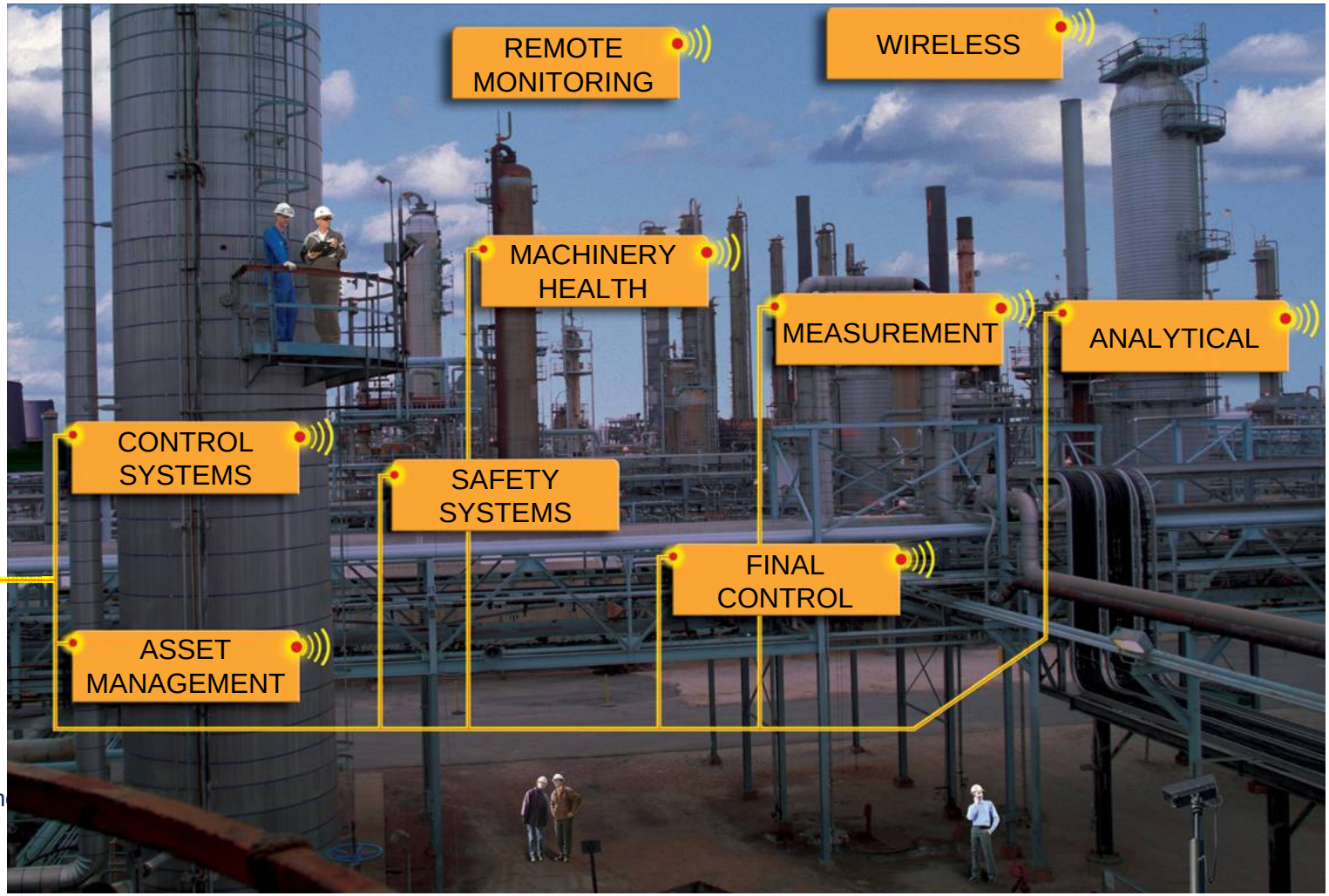
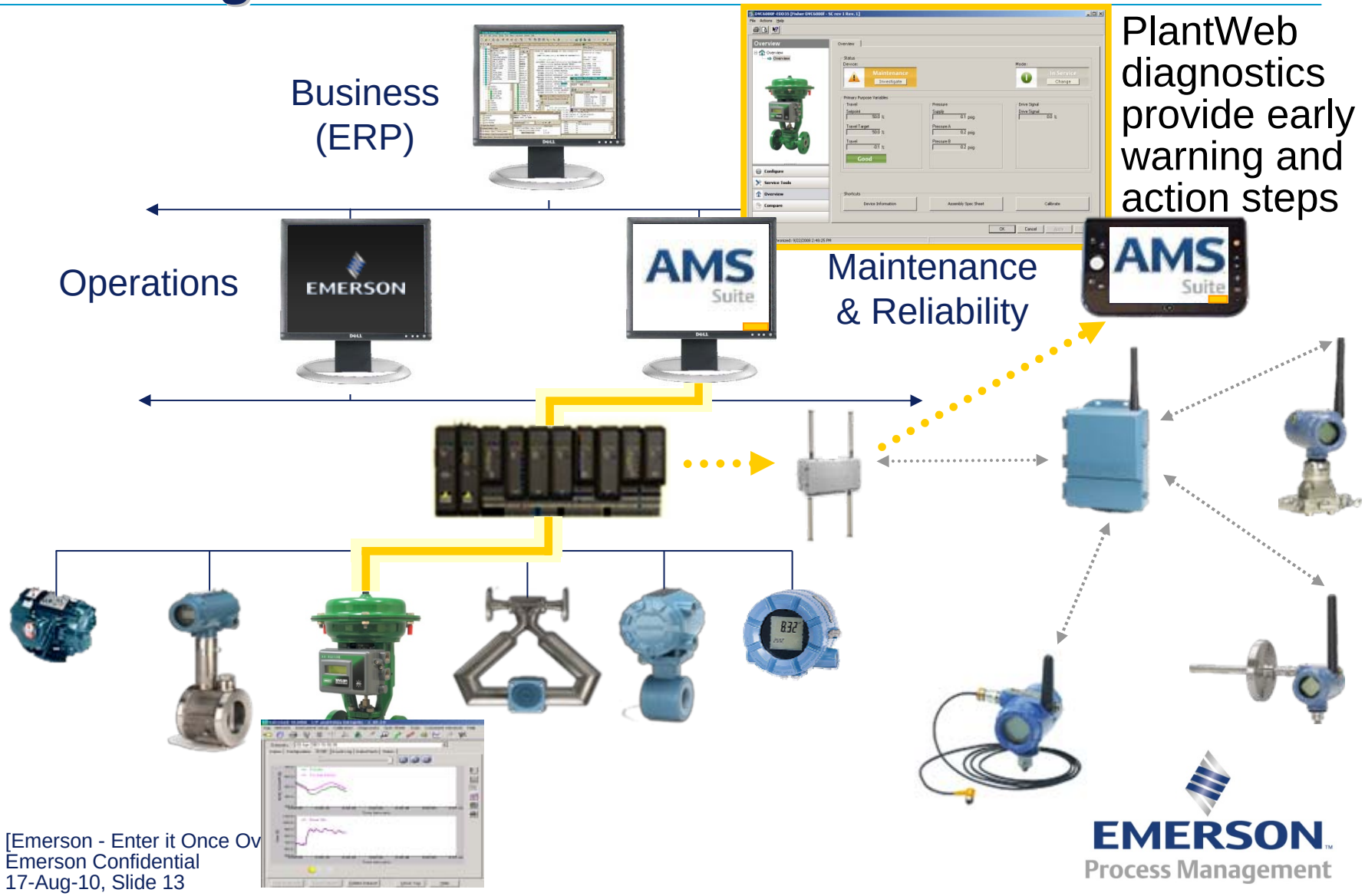
The 'Age of Wireless' Provides the Eyes and Ears to Move Facilities to the Next Level

PlantWeb Improves Business Performance through Process Insight

Smart Wireless extends that insight to locations previously out of geographic or economic reach



PlantWeb Notifies the Right Person with Meaningful and Actionable Information



PlantWeb diagnostics provide early warning and action steps

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Customers Need Help Applying the Right Technology to Achieve Results

Project Planning & Management | **Project Engineering** | **Plant Start-up & Commissioning** | **Process & Asset Optimization**

Over the last 12 years, Emerson has invested in building a strong global solutions capability

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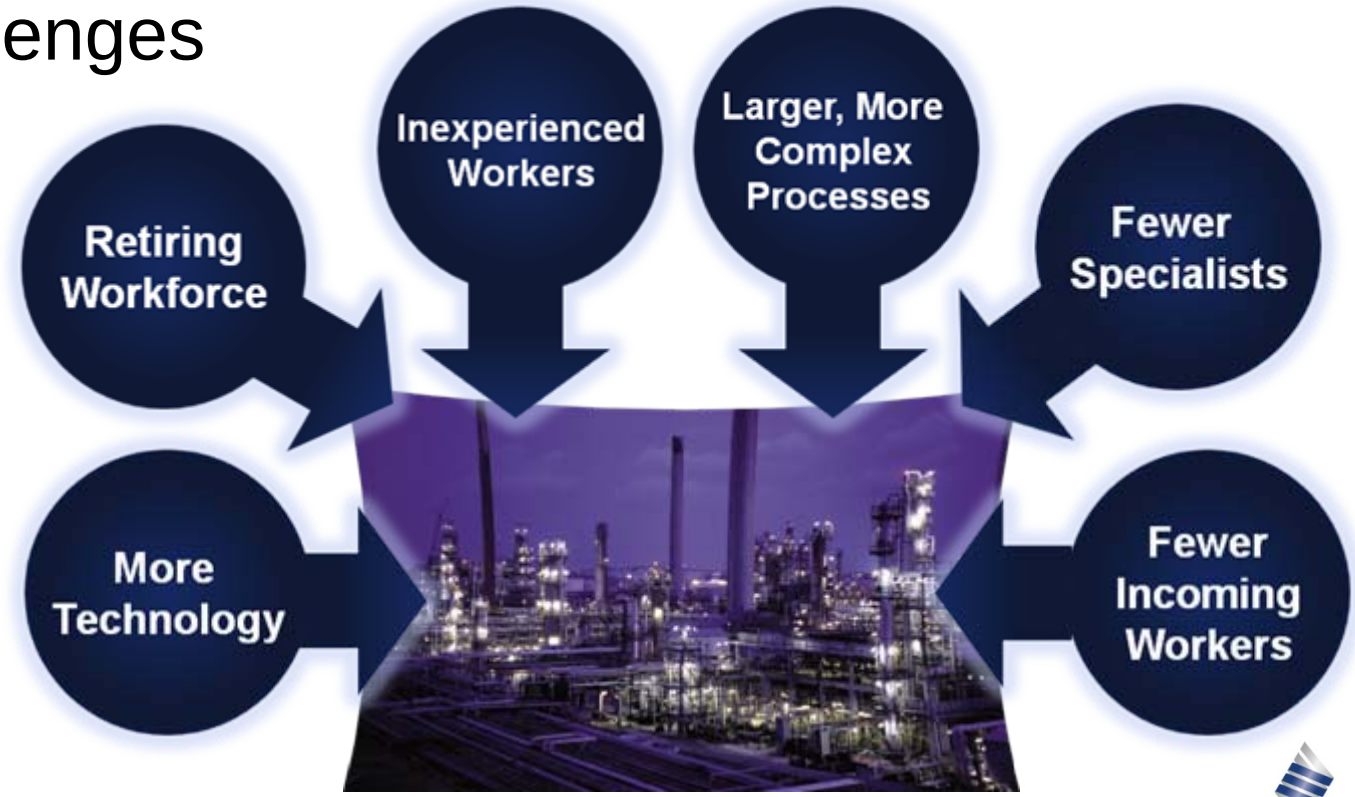
Enter it Once

- Introduction
  - Initiative of Human Centered Design Institute, Austin
- Challenges



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Enter it Once

- Purpose
  - Emerson Process Management is Multi Divisional Entity in the areas of Field Instrumentation and Process Control Systems
  - Catering to EPCs / Process Industries' Small > Medium > Large > MAC projects
  - Seamless Data Exchange is need for all divisions
  - Inter divisional data exchange is equally important

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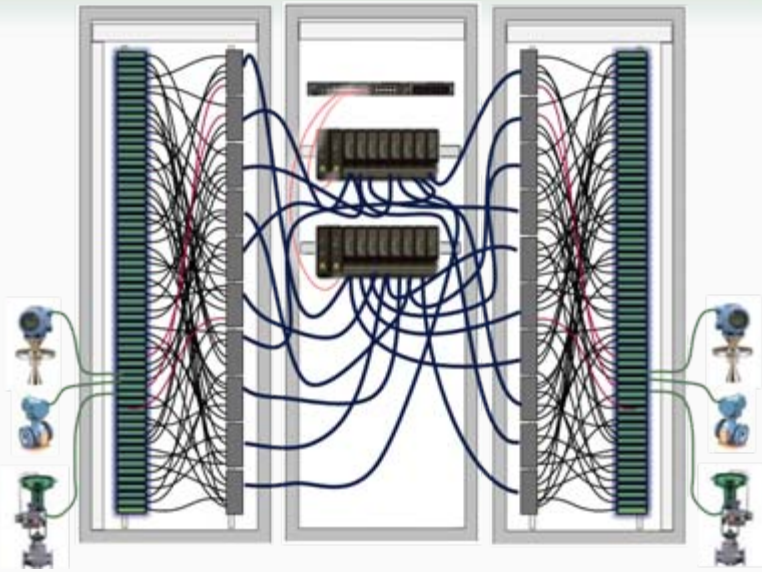
Human Centered Design Will Address These Challenges

- ***Eliminates*** unnecessary ***work*** processes
- ***Removes*** the ***complexity*** of using technology
- ***Embeds*** specialized ***knowledge***
  - We will tell you there is a problem
  - We will tell you what is causing the problem
  - We will tell you how to fix the problem

The result is that safety, reliability and productivity are advanced for customers…industry

Consider It Solved – The Next Generation DeltaV S-series Redefines Project Execution

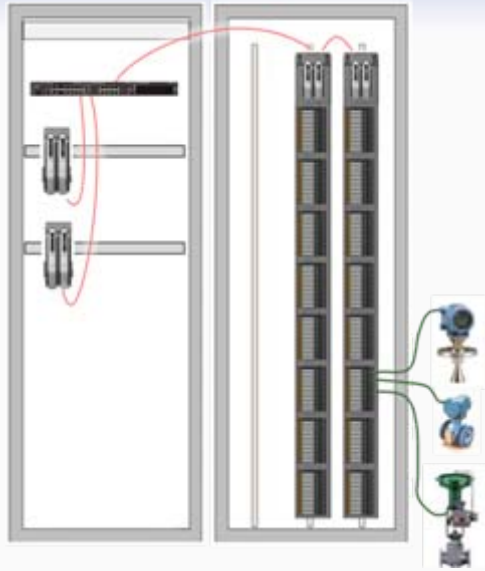
Current DCS Systems



Work processes based on outdated DCS architecture model and technology

- Engineering, labor, and equipment intensive
- Interdependent and unforgiving

New DeltaV S-series

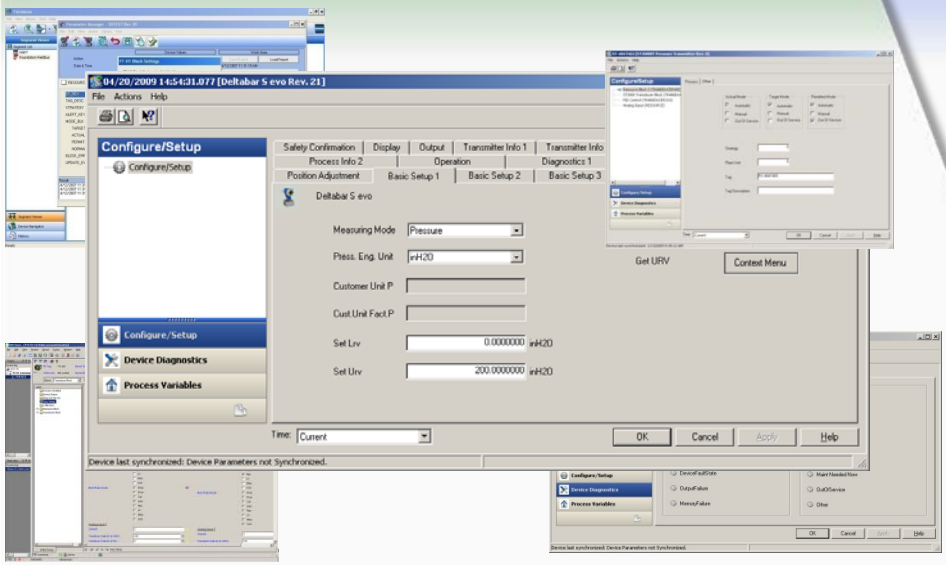


Unnecessary equipment and engineering replaced by "Electronic Marshalling"

- Entire subsystems and their engineering eliminated
- Ultimate flexibility

Emerson Enhances PlantWeb Architecture with First Products Based on HCD

Technology-centric



- Up to 20 tabs per DEVICE
- Over 1000 fields presented to ALL users
- Extensive training required
- Safety impact due to low user confidence

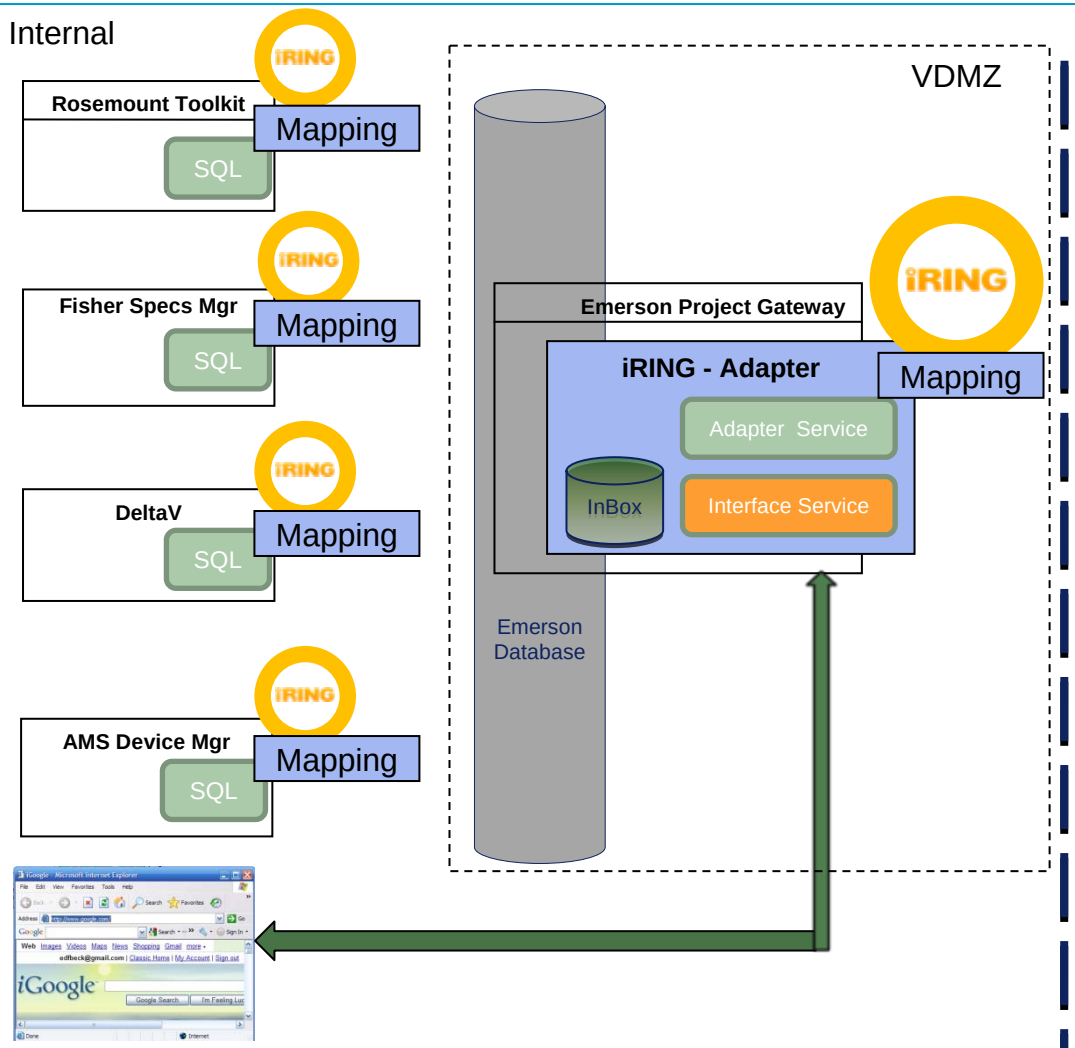
Human-centric

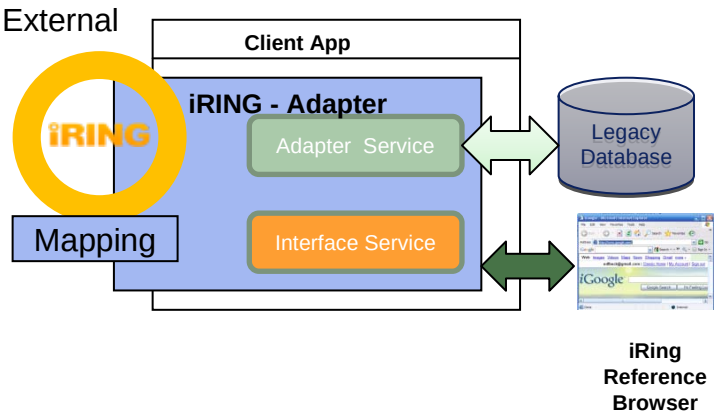
- Easy to use and understand
- 63% of tasks on first click and ‘at a glance’
- Intuitive, lowers training costs
- Improved confidence and safety
- 82% faster task times

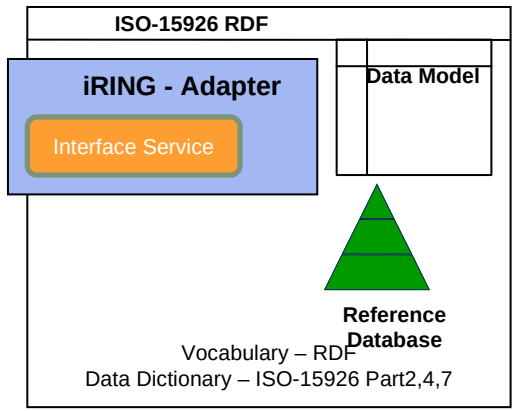
Enter it Once - Objective

- Objective…….in cohesion with iRING User's Group's Objective
  - Implementation of ISO 15926
  - Seamless Interoperability ……..by means of
    - Development of ISO 15926 Reference Data
    - Development of Software products
- Objective extends beyond iRING
  - Development of Emerson architecture for external and internal data exchange
  - Restructuring of internal Tools / Utilities for compatibility with iRING

Architecture







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Enter it Once - Team

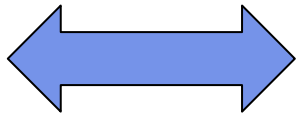
DUANE TOAVS

ED BECK

RAVI GRAMPUROHIT

PRASAD DIXIT

PUNE TEAM



KIM SEWARD
CHRIS SPOORS
JOHN STORY

ROSEMOUNT

SCOTT HOKENESS

AMS Suite

TONYA WYATT

Micro Motion

RANDY BALENTINE

DeltaV

MEREDITH MILLER

FISHER

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Scope – PlantWeb Architecture

…to improve plant performance by delivering accurate, actionable information to the right person in time to make a difference

SMART ASSET OPTIMIZATION

SMART DIGITAL CONTROL

SMART REMOTE AUTOMATION

SMART MEASUREMENT

SMART FINAL CONTROL

SMART SAFETY

SMART ANALYTICAL

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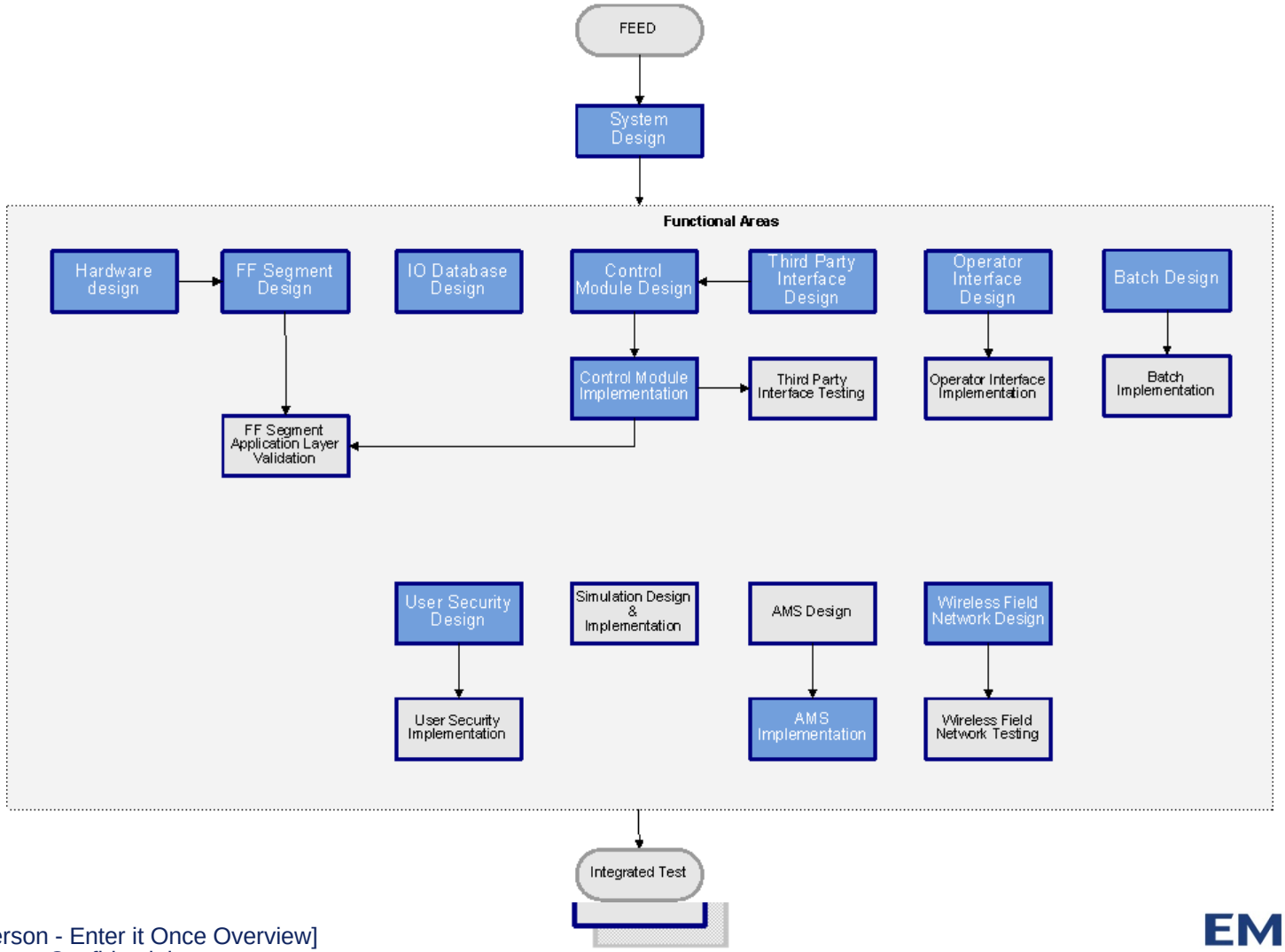
DeltaV Execution Flow – PMO Processes



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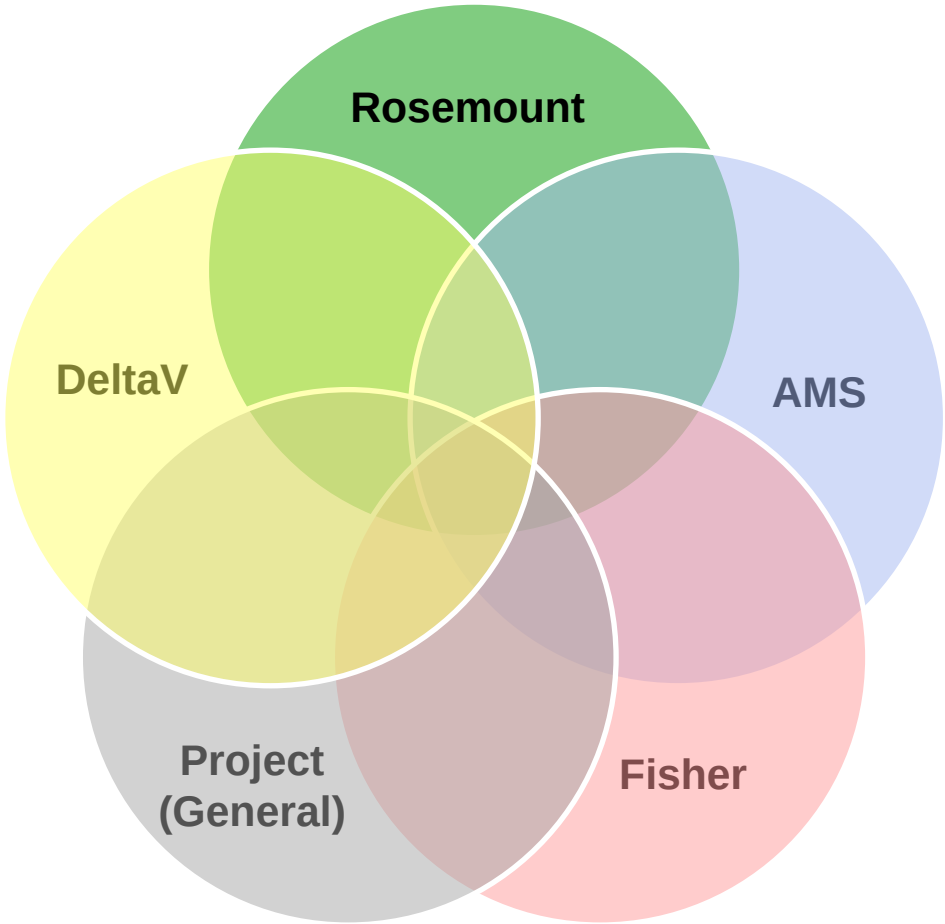
Enter it Once

- Process
    1. Construct Specifications
    2. Data Model
    3. ISO Interpretation

Constructing Specifications



- Identification of Properties
  - ISA Data Sheets
  - SPI Data Sheets
  - Rosemount Toolkit
  - Fisher Specifications Manager
  - AMS Device Definition Files
- Identifying overlapping parameters

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Measuring Instruments *(1/2)*

- Pressure Measurement
  - Pressure Transmitters
  - Differential Pressure Transmitters
- Temperature Measurement
  - Temperature Transmitters
  - Thermocouples
  - RTDs
  - Thermowells
- Level Measurement
  - Radar Level Transmitters
  - Ultrasonic Level Transmitters

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Measuring Instruments(2/2)

- Flow Measurement
  - Coriolis Mass Flow Meter
  - Electro Magnetic Flow Meter
  - Vortex Flow Meter
  - Orifice Plate
- In Progress
  - Annubar
  - Venturi Meters

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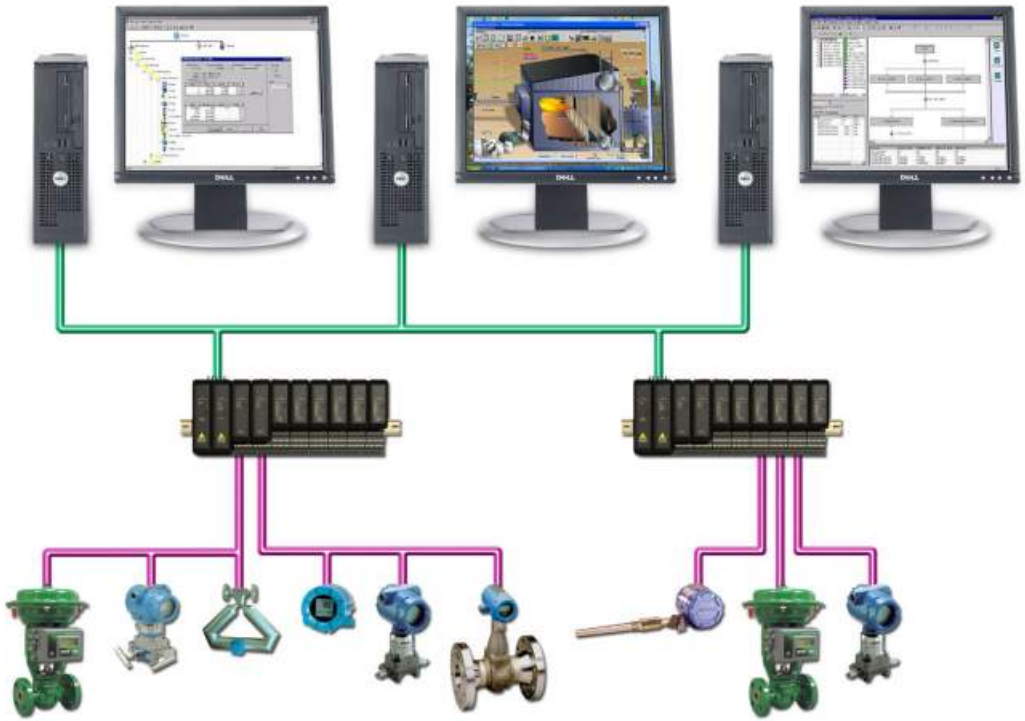
Control Valves

- Control Valves
  - Typical Control Valves
  - Accessories

Process Control Systems

- Distributed Control Systems
  - Hardware
  - Typical Configuration Parameters



Asset Optimization

- Asset Management Solutions
  - Identification of Properties….. In Progress

Asset Management Solution

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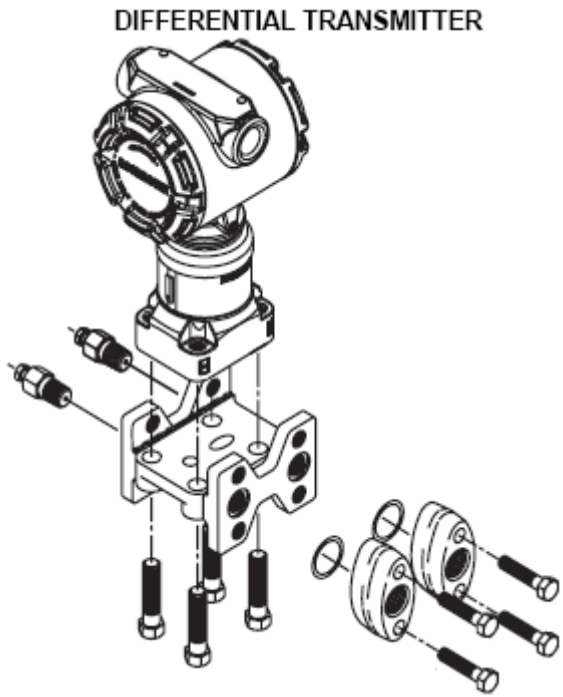
Data Model

- Bubble Diagram
  - Transmitters
  - Control Valves
  - Distributed Control Systems
- Identify the relationships between all those components
- Relate the components to RDL Classes
  - RDL Search…..Search…..Search

ISO 15926 Interpretation

- Modeling exercise being carried out with the help of Bechtel
- Modeling carried out for the smallest bit of device components
- Accessories
- Process Equipment
- Process Data
- Ambient Conditions



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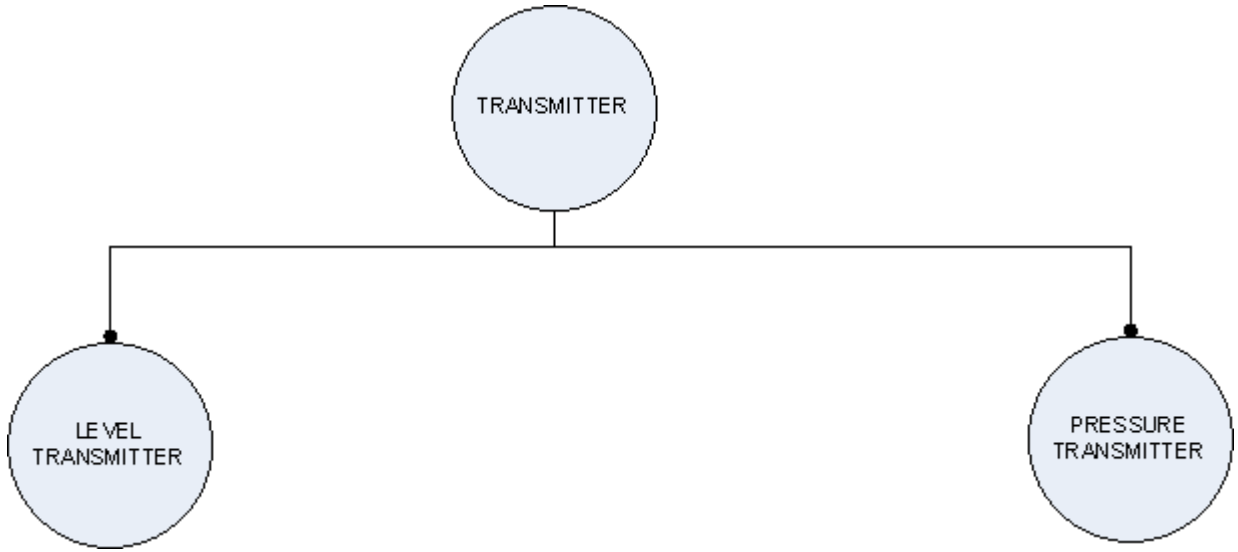
Questions being asked to us

- Does ISO 15926 and iRING take care of Change Management?
- Does it have a built-in Revision Control?

Points to Address 1

- Too many RDL classes make it difficult to determine correct Super Class – Sub Class
- Example from RDL



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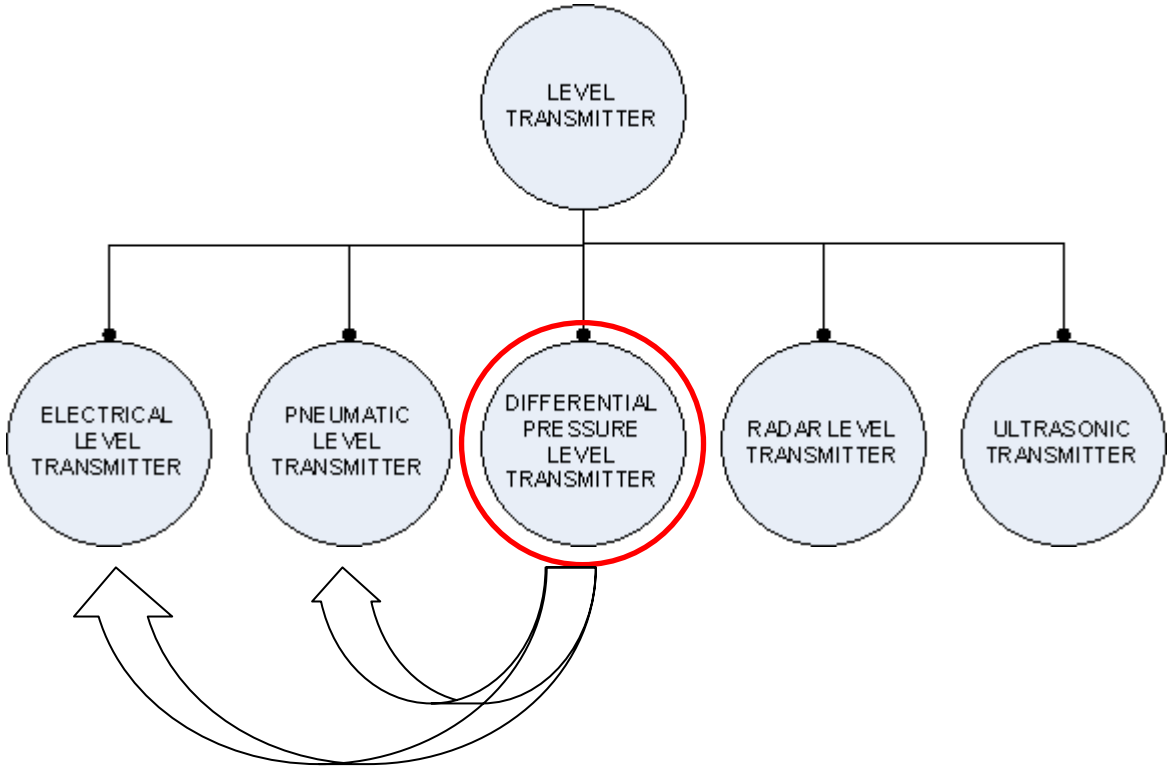
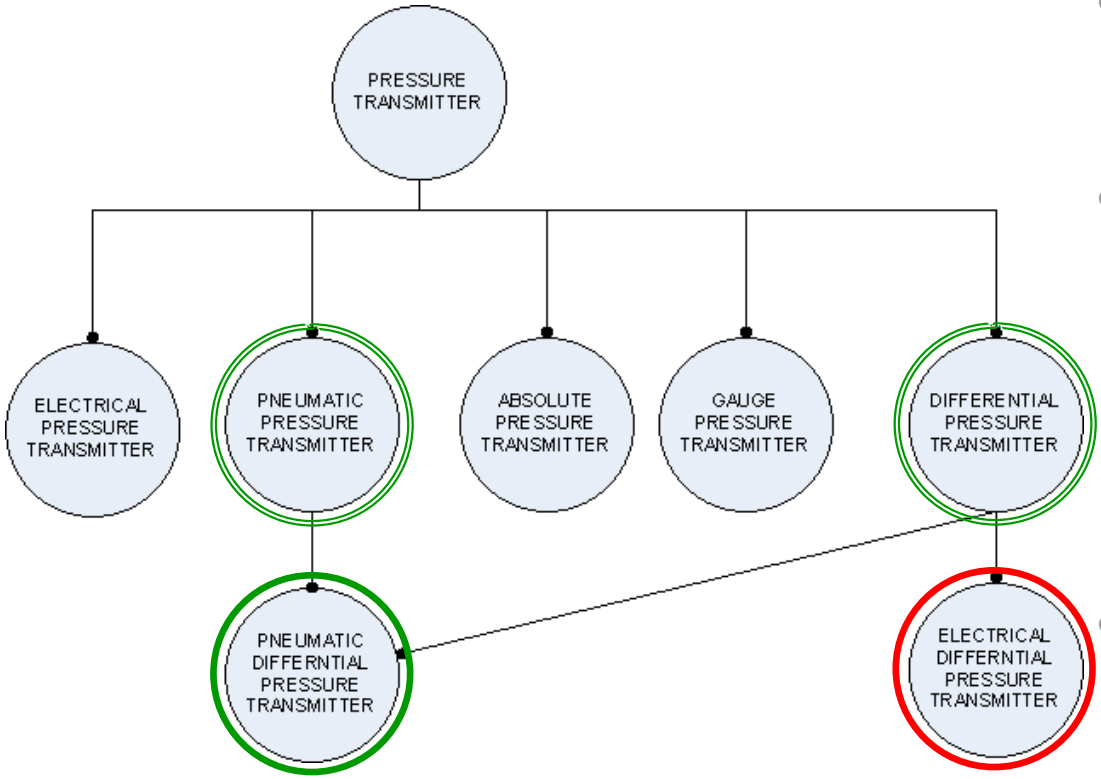
RDL Example …contd

DP level Transmitter could be Electrical Transmitter or Pneumatic Transmitter



It is difficult to decide the class to be used for modeling of DP Transmitters

RDL Example …contd



- Differential Pressure Transmitter could be Pneumatic or Electrical
- Pneumatic Differential Pressure Transmitter is a Sub Class of Pneumatic Pressure Transmitter as well as Differential Pressure Transmitter
- But Electrical Differential Pressure Transmitter is NOT a Sub Class of Electrical Pressure Transmitter

- This is completely inconsistent with Level Transmitter

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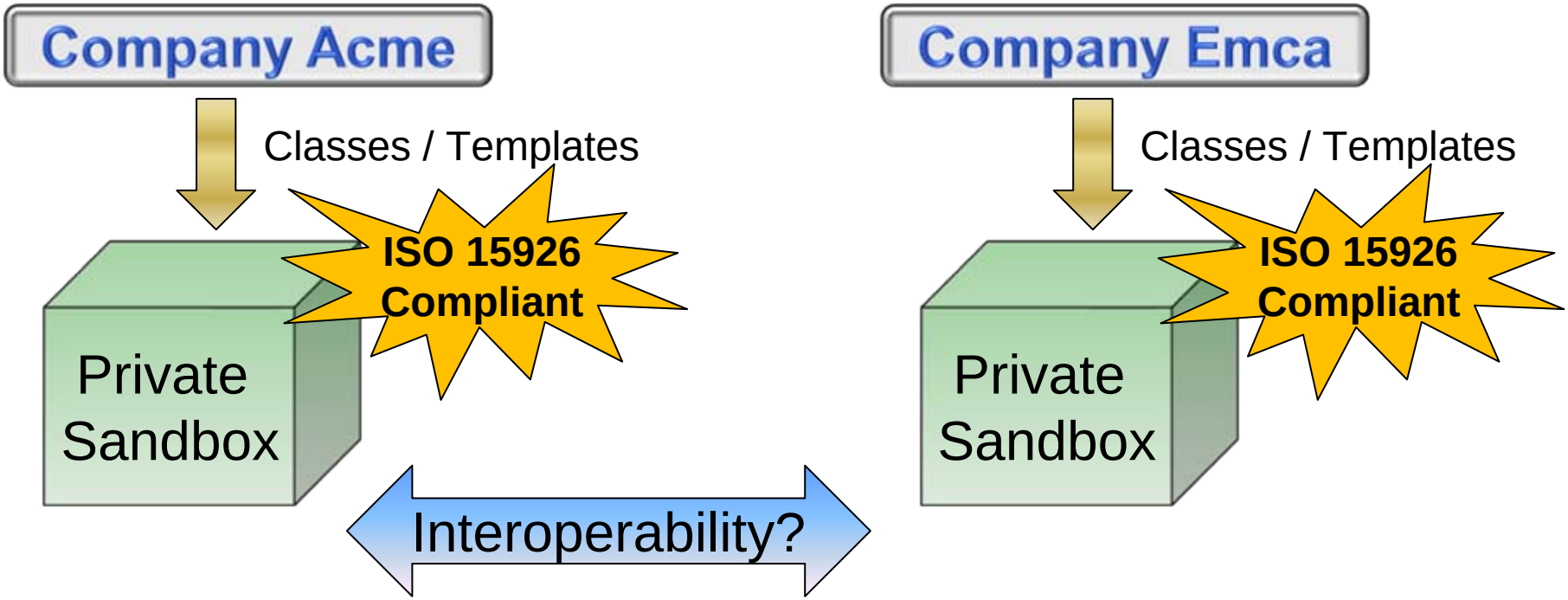
Interoperability?



- They have been operating independently
- Attempting Data Exchange for the first time
- Are they inter-operable?

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Interoperability?

- Possible solution is to become part of the community - iRING User's Group member
- However, both Acme and Emca may be using
  - Different Base / Specialized Templates
  - Different Classes in their Roles
- Template Negotiation required
  - Defeats the purpose of 'One Time Mapping'
- Their sandboxes need to be merged with iRING Sandbox.
  - Possible Duplication
  - Waste of efforts on some modeling activities

Qualification Criteria

- Qualification
  - When is an organization ISO 15926 qualified?
    - Will there be a certificate?
    - Who issues the certificate?
    - To an organization Or a Division?
    - Whether it needs to be renewed?
  - Whenever an organization claims ISO 15926 compliance, will it be ready to exchange data? Who decides the level of compliance?
    - Is data exchange possible if the level of compliance is different?

Difficulties Encountered

- Complex for understanding – Took us an year (and still ongoing)
  - Suggestions
    - Education / Online Training Programs
    - Documentation
    - Better Communication
- Skill Sets are indeed required
  - EPISTLE
  - Manchester Syntax
  - OWL
- Can not estimate correctness as validation is not yet in place

Difficulties Encountered

- Instrumentation Modeling needs Information Model of other domain for completion. For Example,
  - Electrical: Cables
  - Equipment Data: Tanks, Columns, Piping
  - Process Data: Ambient Conditions
- Beyond Emerson competencies

Questions

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Network Power

Climate Technologies

Appliance Solutions

When the stakes are high

Industrial Automation

Motor Technologies

Professional Tools

Storage Solutions

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