

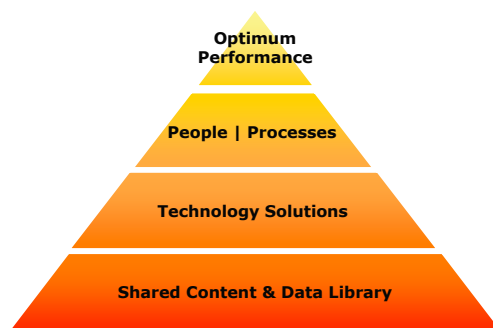


vision
experience

THOUGHT LEADERS FOR MANUFACTURING & SUPPLY CHAIN

answers

Driving Operational Excellence Through Collaboration & Interoperability



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Agenda



- ◆ **Business Drivers**
- ◆ **Design, Operate, Maintain Optimization Concept**
- ◆ **Standards-based Interoperability**
- ◆ **Plant Asset Management (PAM) Solutions**
- ◆ **Case for Wireless Devices**



~~Market Forces Demand Optimum Performance~~ ~~Manufacturers Are Feeling the Squeeze~~

**Increasing Global
Competition**

**Dynamic Customer
Requirements**

**Downward pressure
on costs**

**More Customer-
Imposed Standards**

**More Distributed
Operations**

**Pull-based
Replenishment**

**Shrinking Product
Lifespan**

**Excessive IT
Support Costs**

**Aging Workforce
in Manufacturing**

**Proliferation of
Regulations**

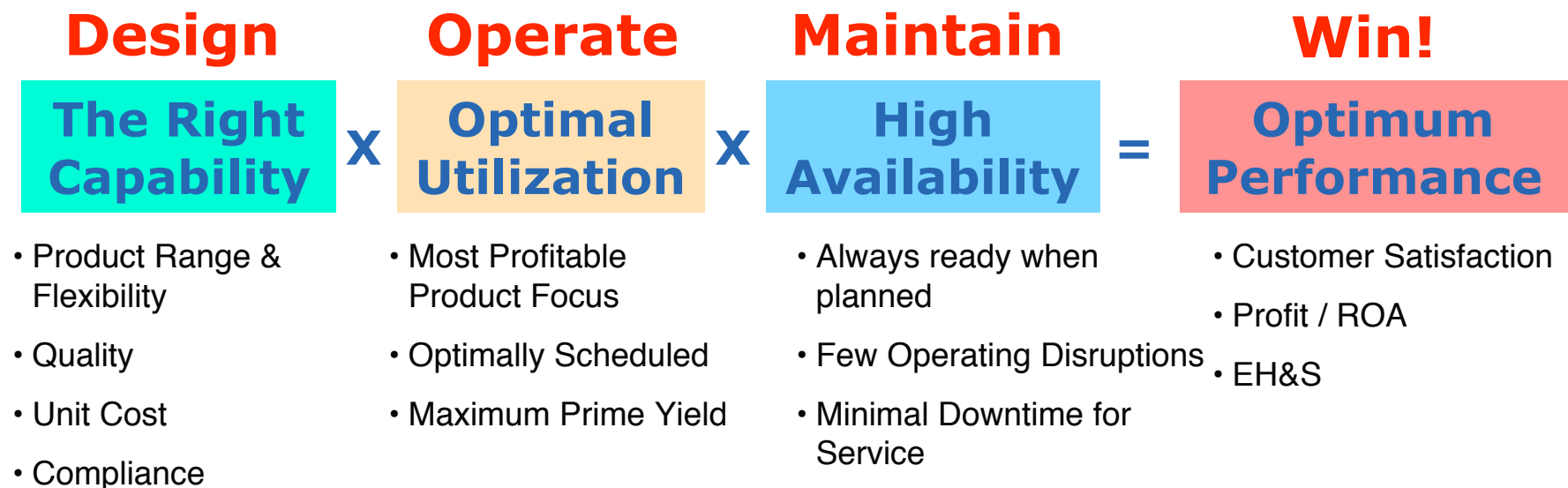


**Collaborative Manufacturing Strategies
Are an Effective Response**



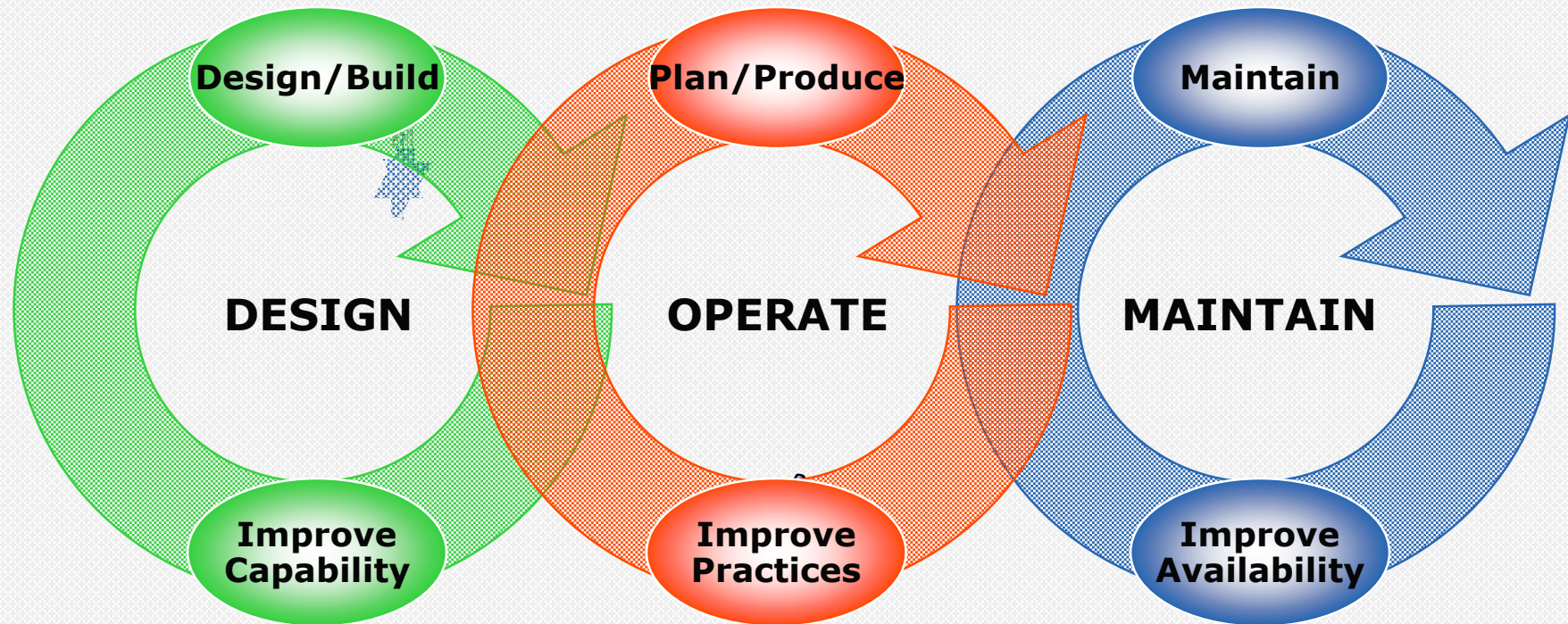
The Plant Performance Equation

Plant Performance is determined by three key factors:



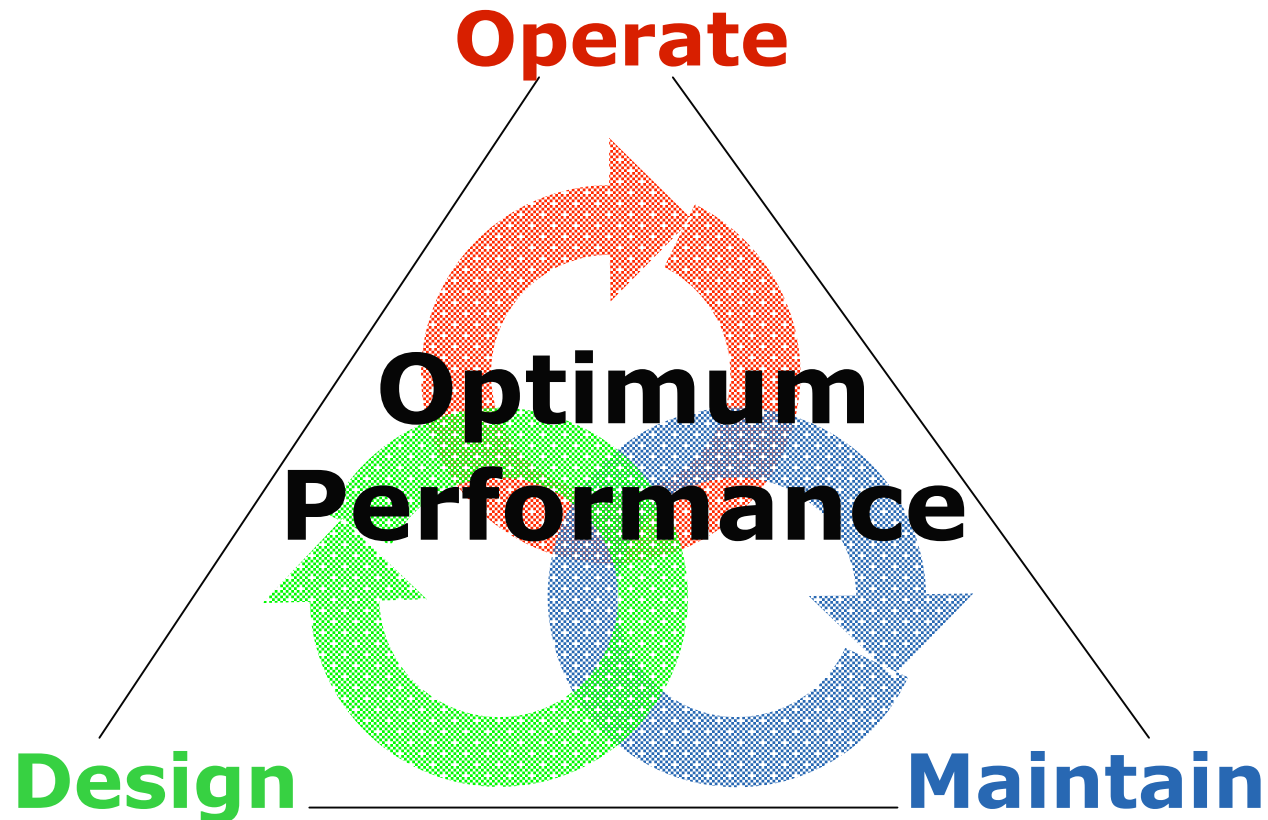
Optimum Performance is Achieved by Maximizing Performance in Each Factor AND Their Aggregate Effect!

~~Design, Operate, Maintain Processes are Highly Interdependent~~



DOM Interdependency and Complexity Demand Interoperability and Collaboration at all Levels

~~ARC's Design, Operate, Maintain Plant Performance Optimization Concept~~



Design and Maintain Provide the Foundation for Optimum Performance!

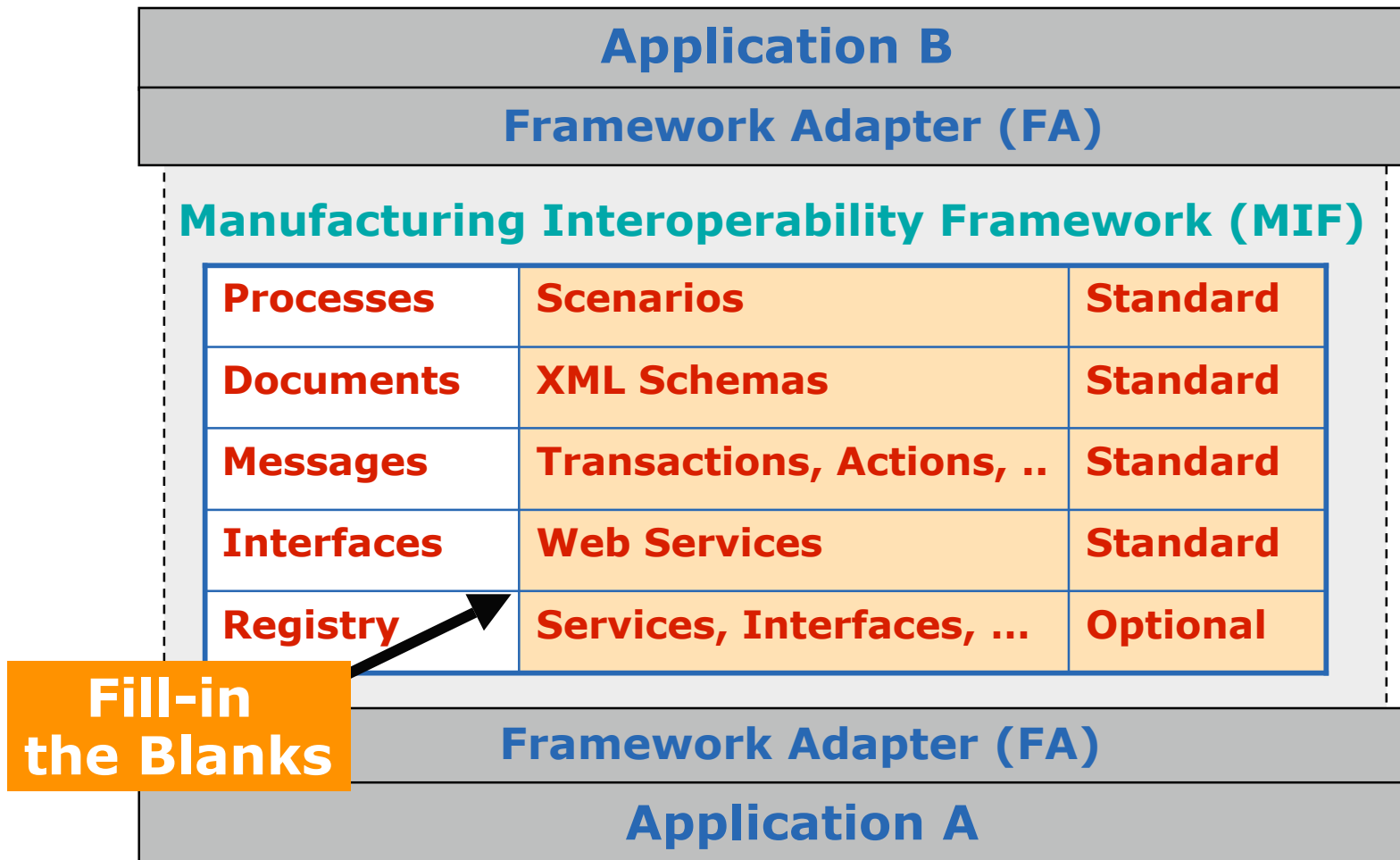


~~The Integration Challenge~~

- ◆ **There are many different approaches**
- ◆ **Mostly through proprietary interfaces and connectors**
- ◆ **Few standards are used**
- ◆ **Initial investment is generally very high**
- ◆ **Can take months or years to implement**
- ◆ **Not easy to change for ongoing improvement**
- ◆ **System complexity is increasing**
- ◆ **Generally not aligned with business needs**
- ◆ **Technology is continuing to rapidly change**

Most Plants Continue to Operate as Islands

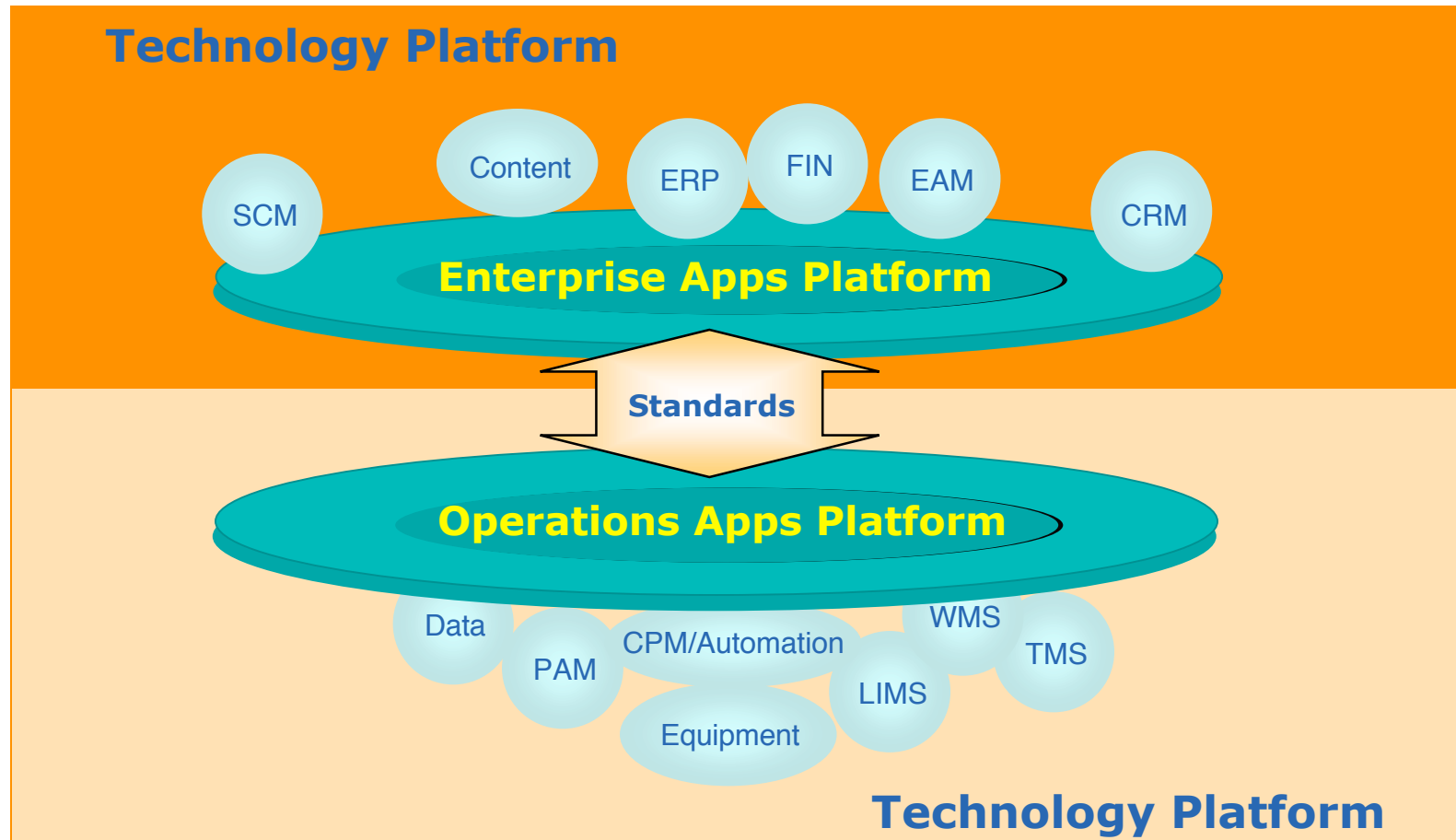
~~A Simplified Manufacturing Top Framework~~



Requires Industry Agreement To Be Effective



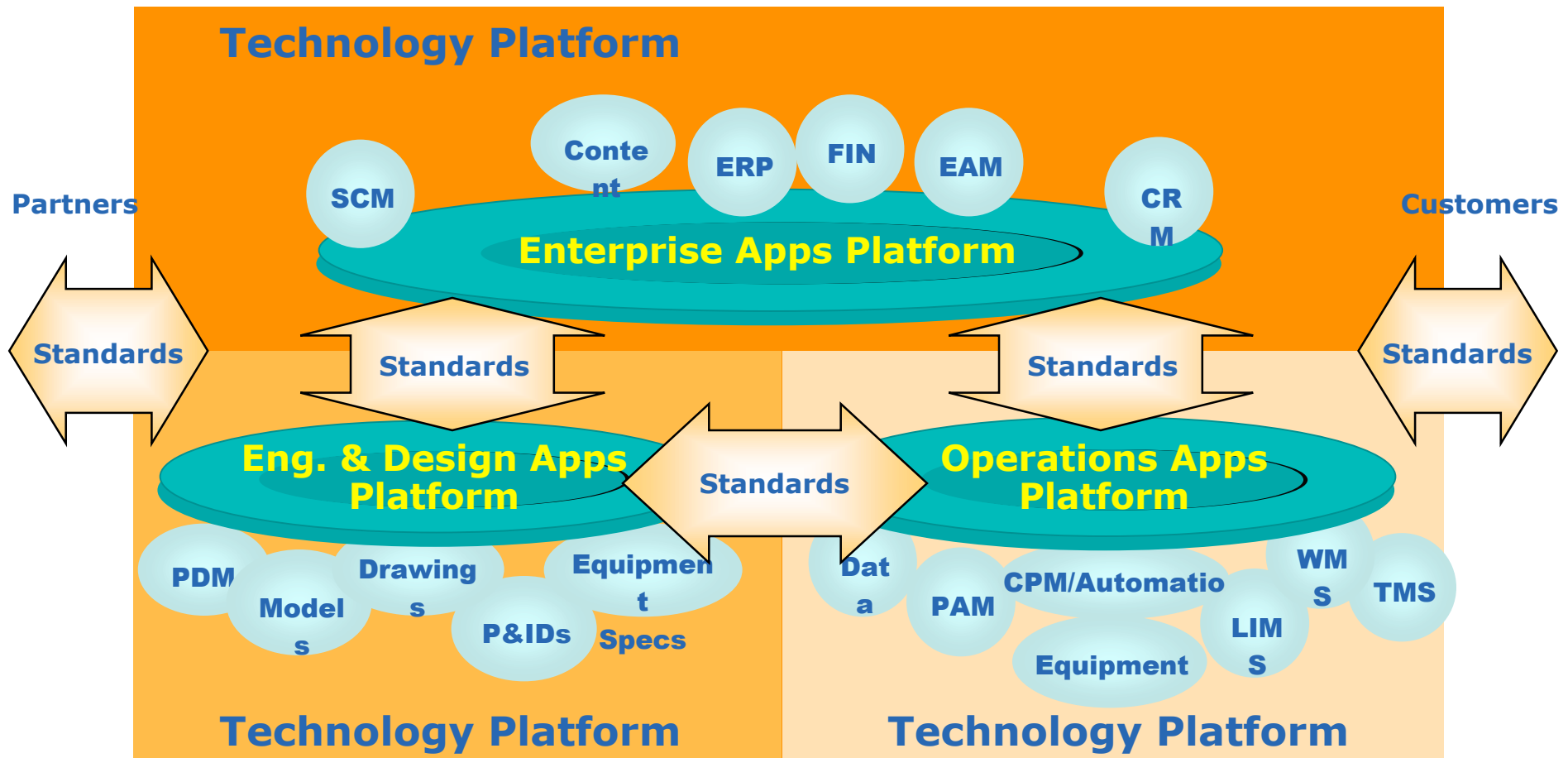
~~Significant Progress Has Been Made with Production to Business (P2B) Interoperability~~



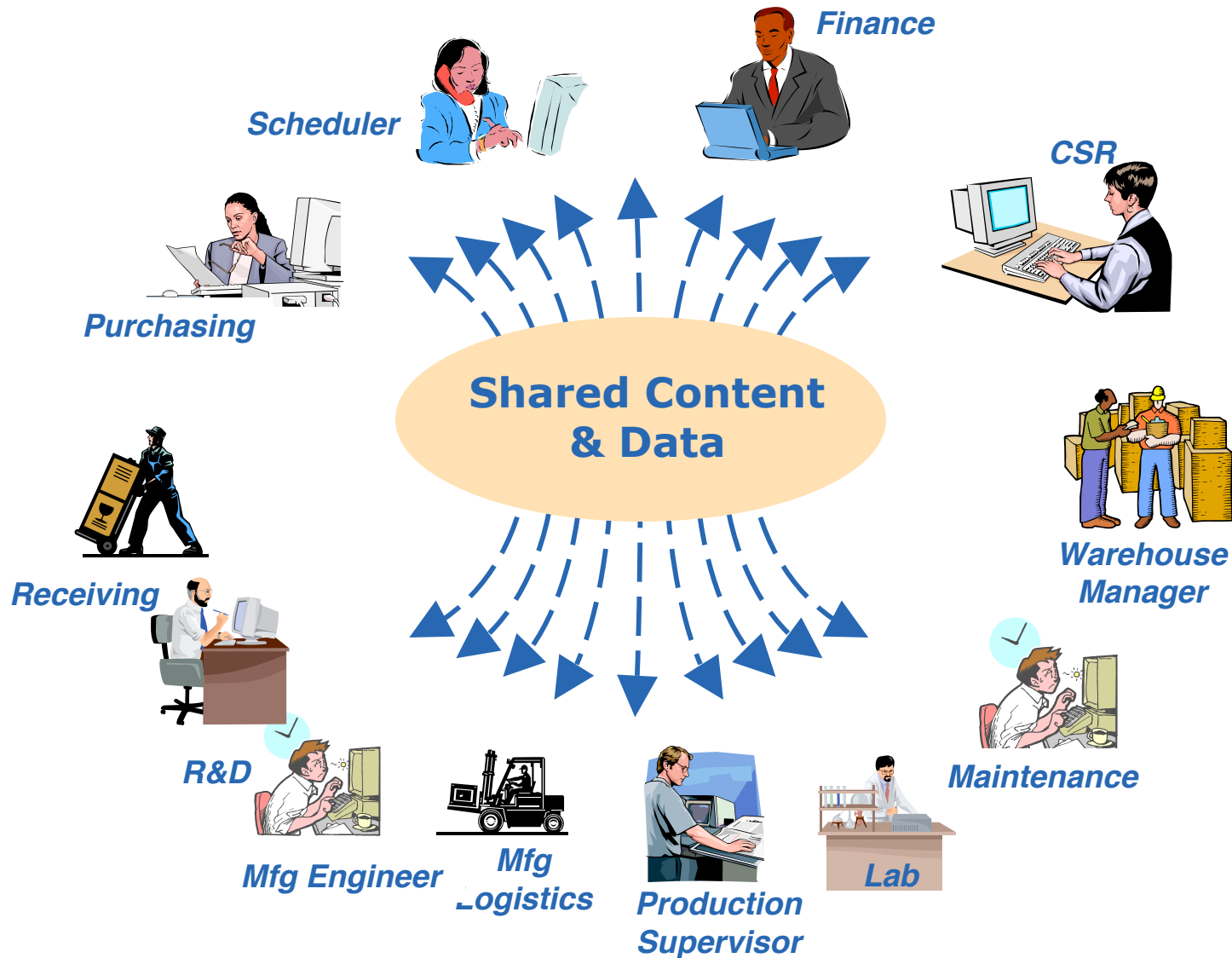
Complete Set of Standards Is Required for IOp



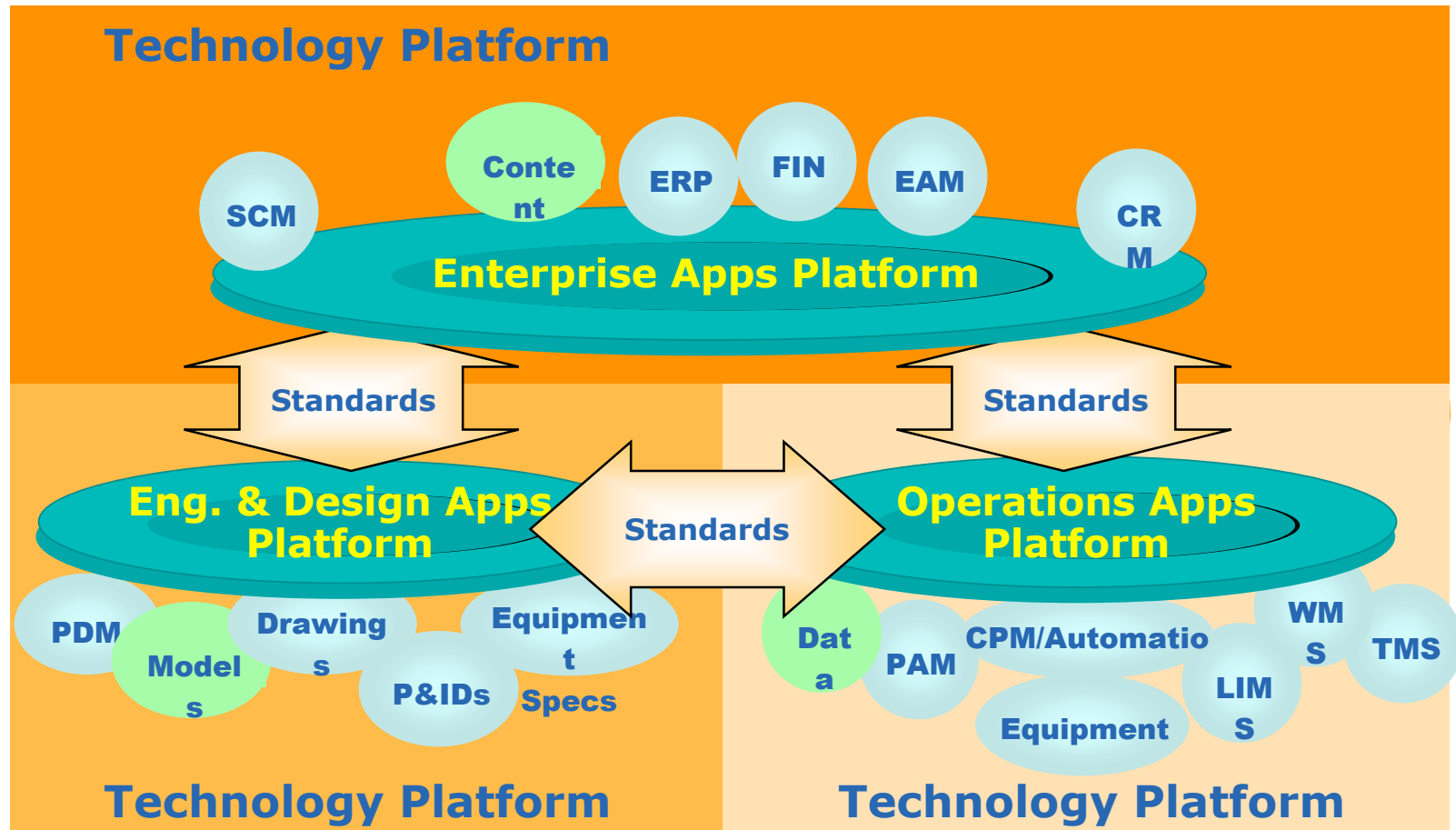
Enterprise Interoperability Across All Applications ~~Is Needed~~



~~Shared Content & Data Library Enable Enterprise Interoperability~~



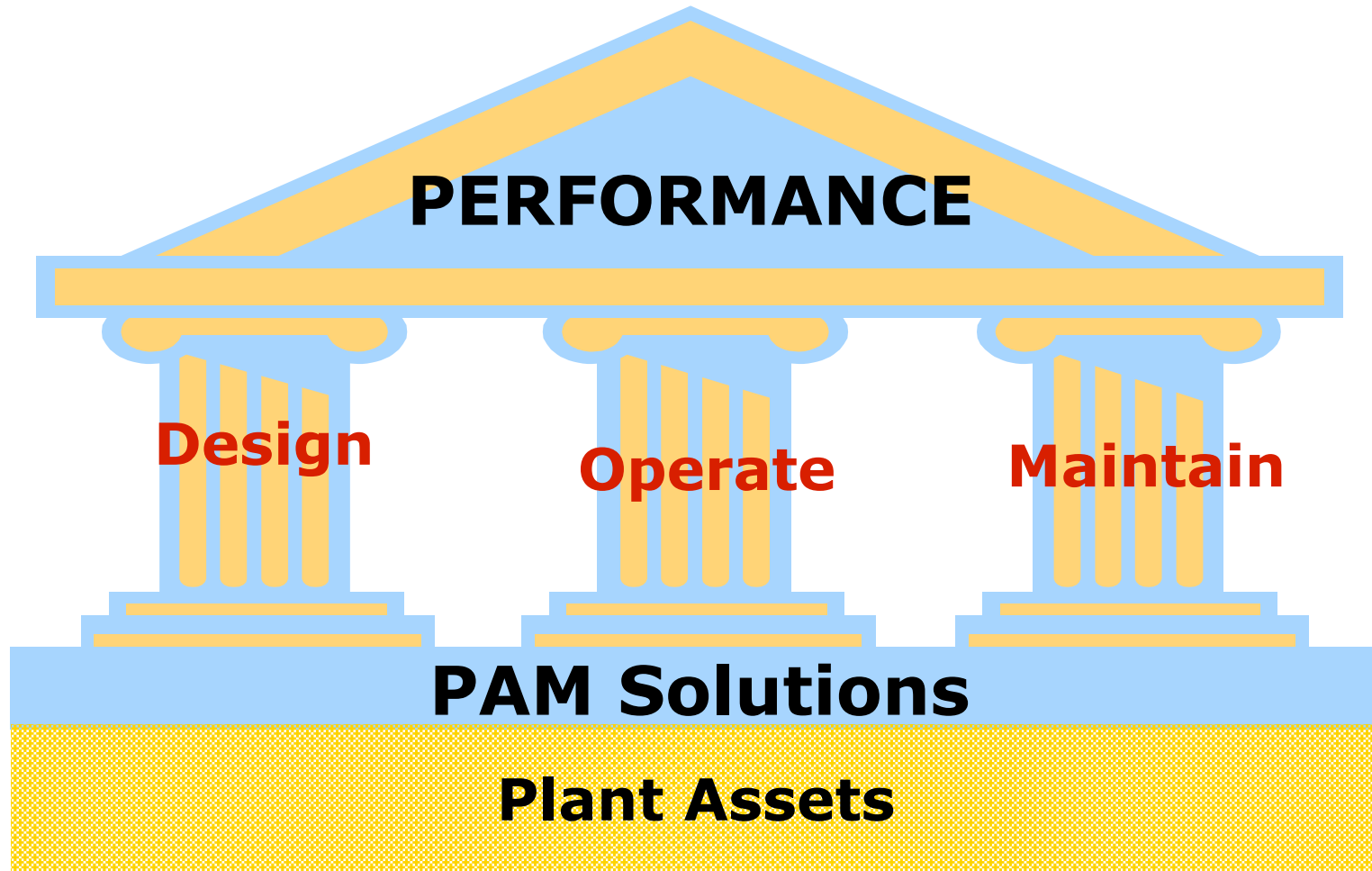
~~Shared Content & Data Will Be Distributed, But Accessible by All~~



Content & Data Will Reside in Numerous Places



Plant Asset Management (PAM) Solutions Support the Three Pillars of Plant Performance



What Is PAMP?

- ◆ ARC's **solution** for managing plant assets
- ◆ Provides real-time **predictive** asset health information
- ◆ Uses an intelligent **analytical engine** to predict potential asset issues
- ◆ Helps maintenance **mitigate risks** and consequences of asset failures
- ◆ Enables use of **optimal** maintenance and operations practices
- ◆ Focuses resources on the most **critical** issues
- ◆ Becoming equally **important** as control in automation

PAM Solutions Enable Workers to Monitor, Analyze, and Optimize Plant Asset Utilization

~~Why PAMP?~~

◆ Installed Base (units)

Process Instrumentation: >40M

Discrete Sensors: >500M

Valves: >30M

Other Plant Assets: >550M

**The Sheer Volume of Plant Assets
Presents a Huge Problem and Opportunity
for Improvement !**

~~Today's Extended Workload~~

**Increasing Asset
Installed Base
+
Manpower
Reduction**

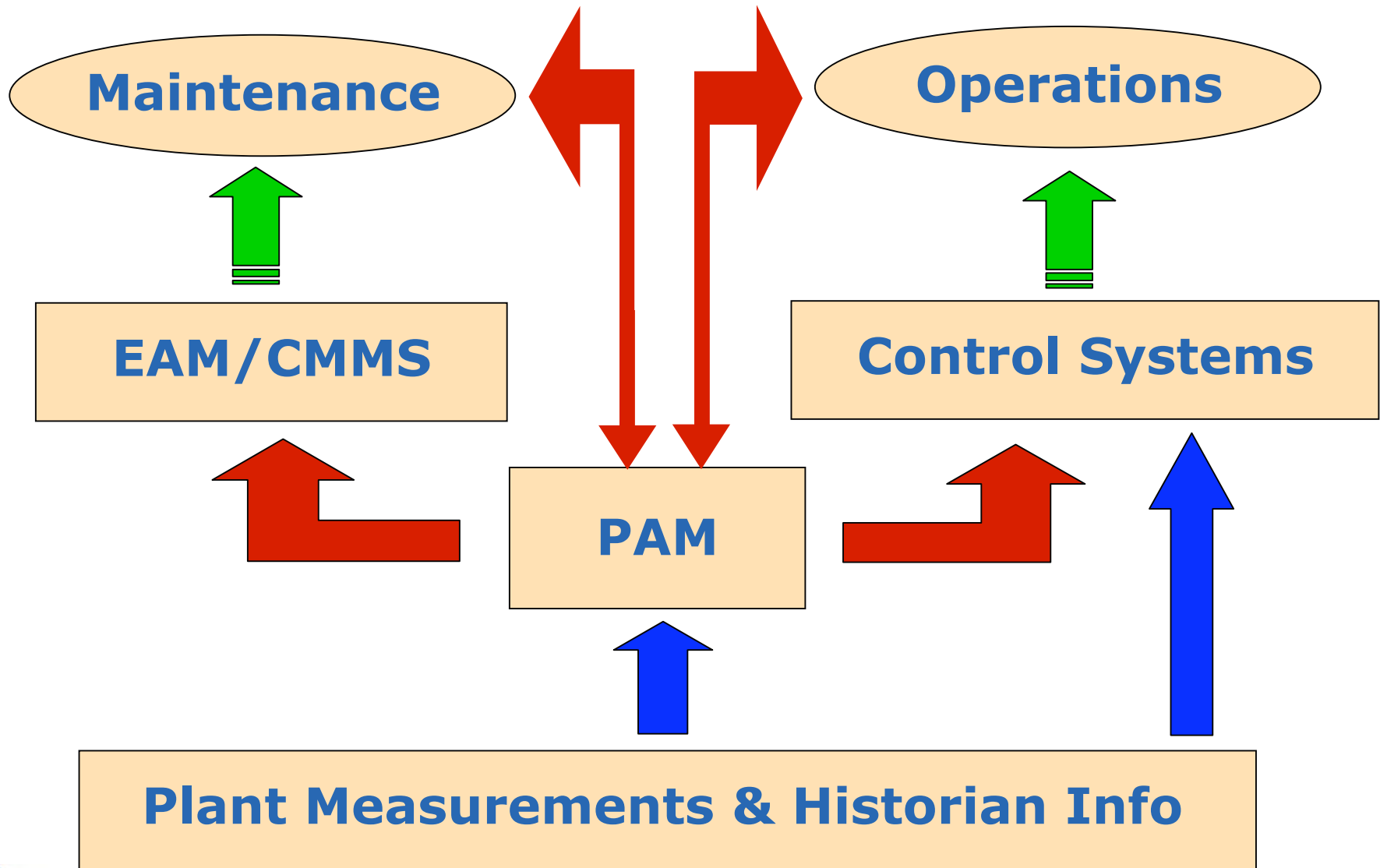
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**500 to 2000 Loops
per Technician**

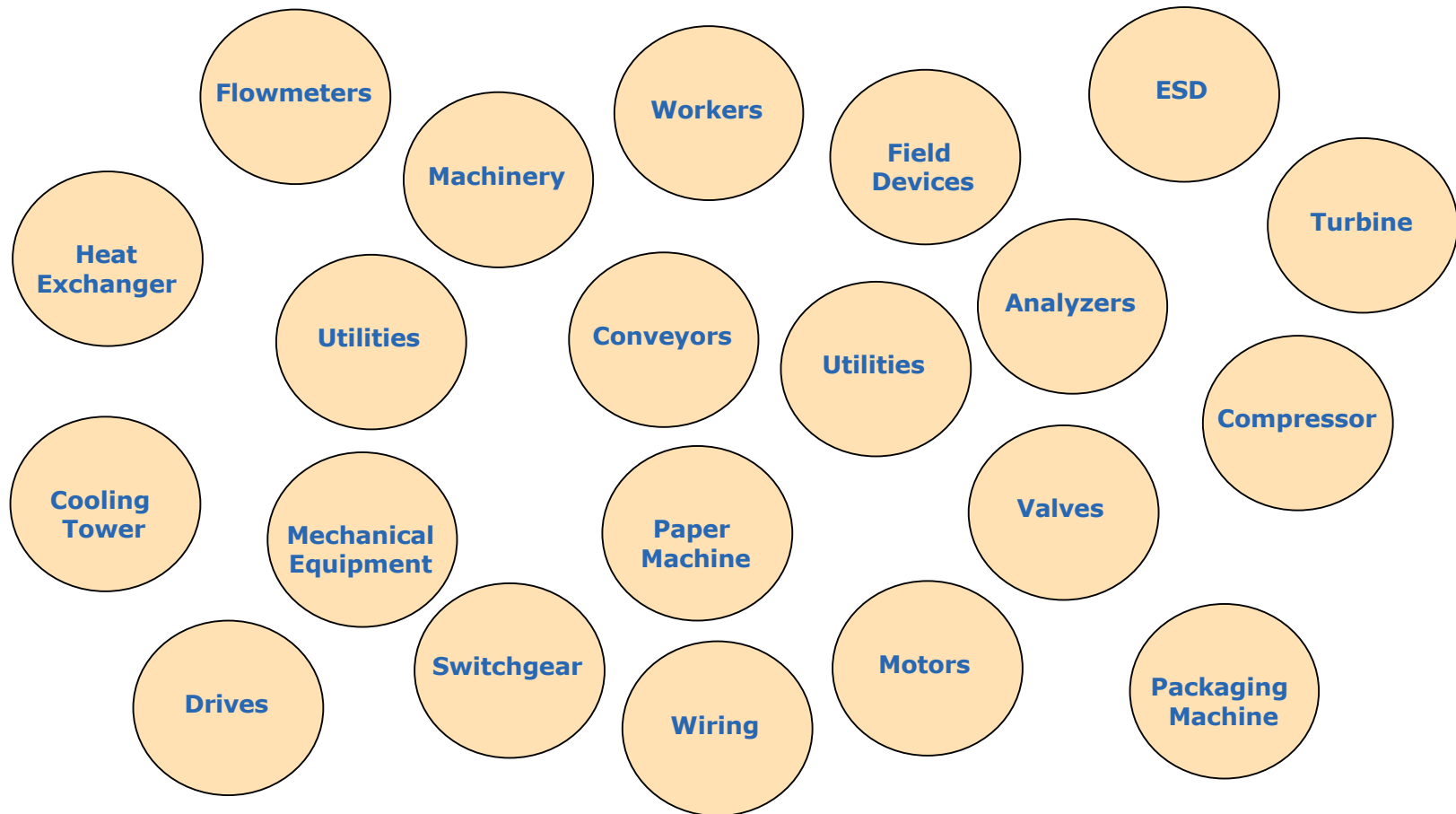
**Plant Assets Can Not Be Managed by the
Workforce Alone**



~~PAM Enhances Maintenance and Operating Decisions~~



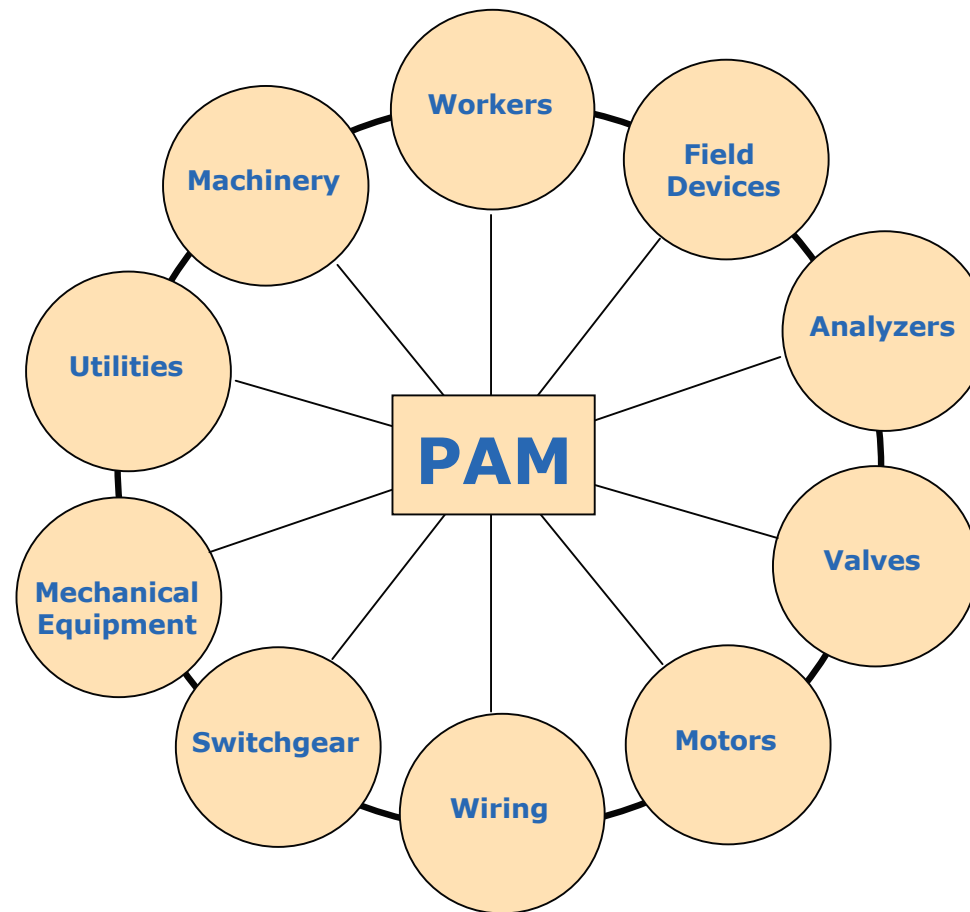
~~ARC MATHS~~



Maintenance and Operations of Assets Require Different Skill Sets and Solutions

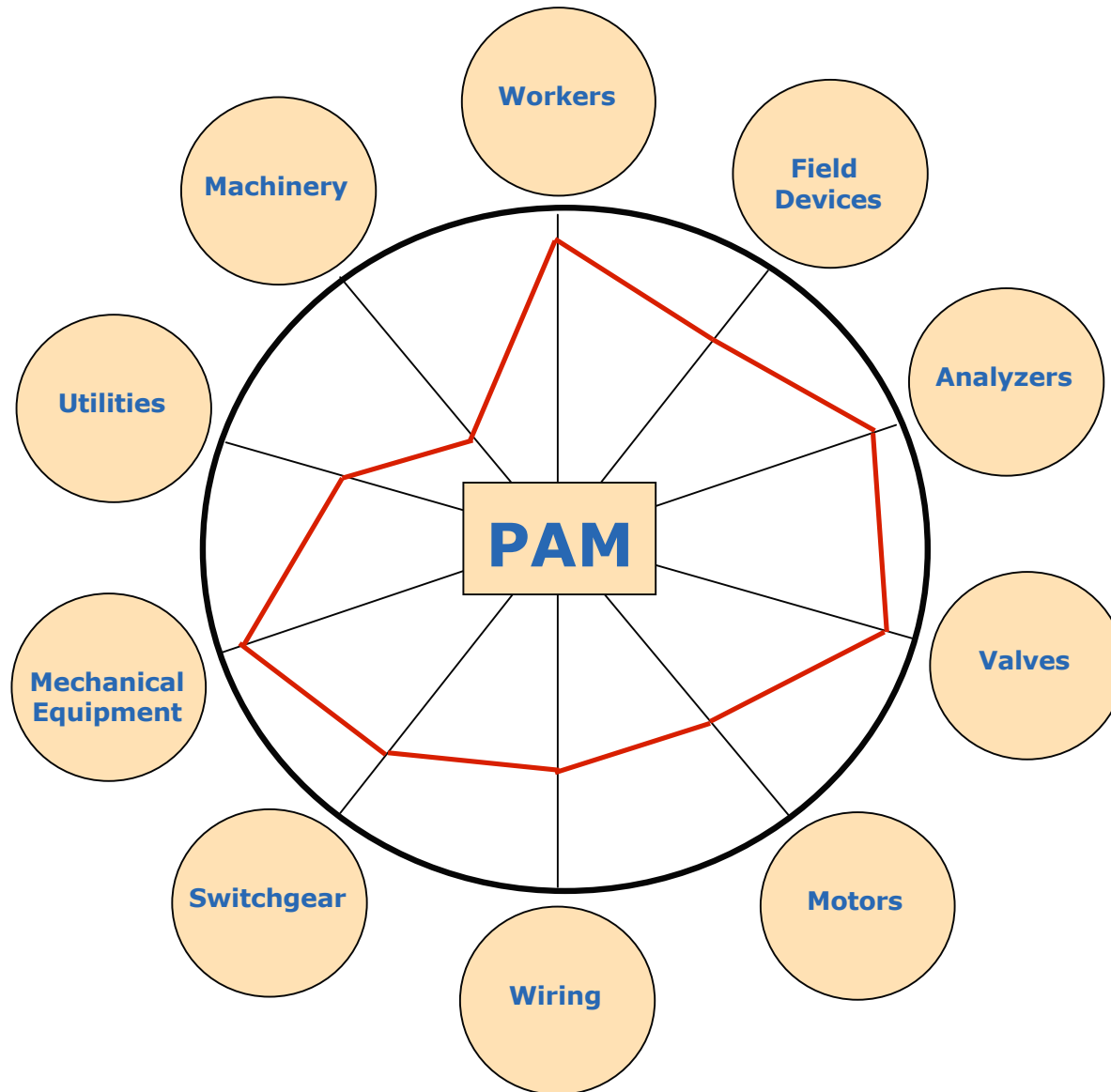


~~ARC Vision of a Collaborative PAM Solution~~



A PAM Solution Must Monitor, Analyze and Optimize all Plant Assets

~~PAM Asset Assessment Audit~~ can Help Improve Plant Performance



~~PAM Deployment Choices~~

◆ **Home-Grown**

- Combination of Vendor Technology-Specific Solutions

◆ **In-House**

- Plant-wide Centric Solution Purchased from a Diversified PAS

◆ **In-House/Outsourced Hybrid**

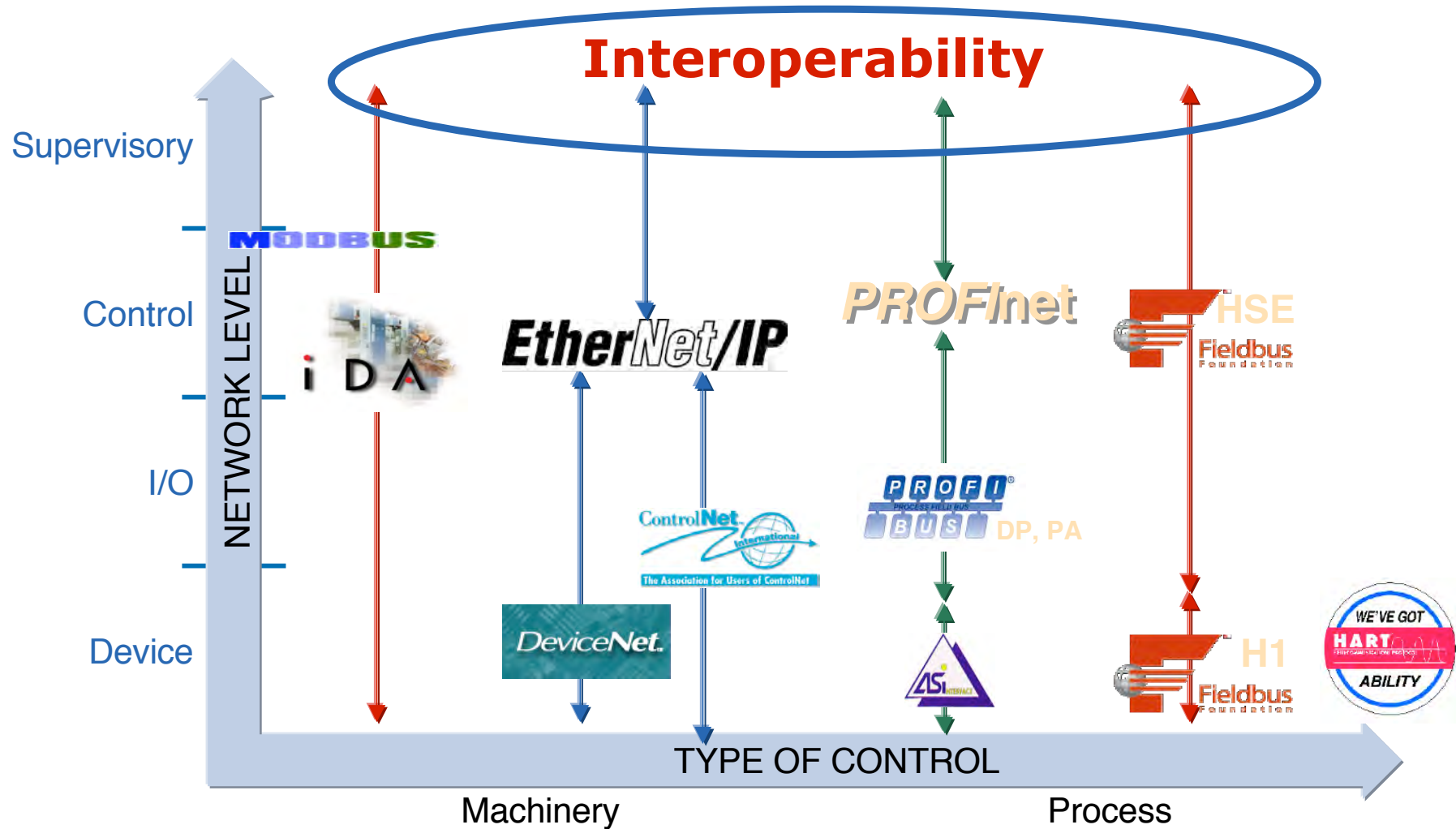
- Internal Workforce, External ASP PAM

◆ **Outsourced**

- Complete External PAM and Workforce

**Deploying a DOM Strategy Identifies
Appropriate PAM Deployment Strategies**

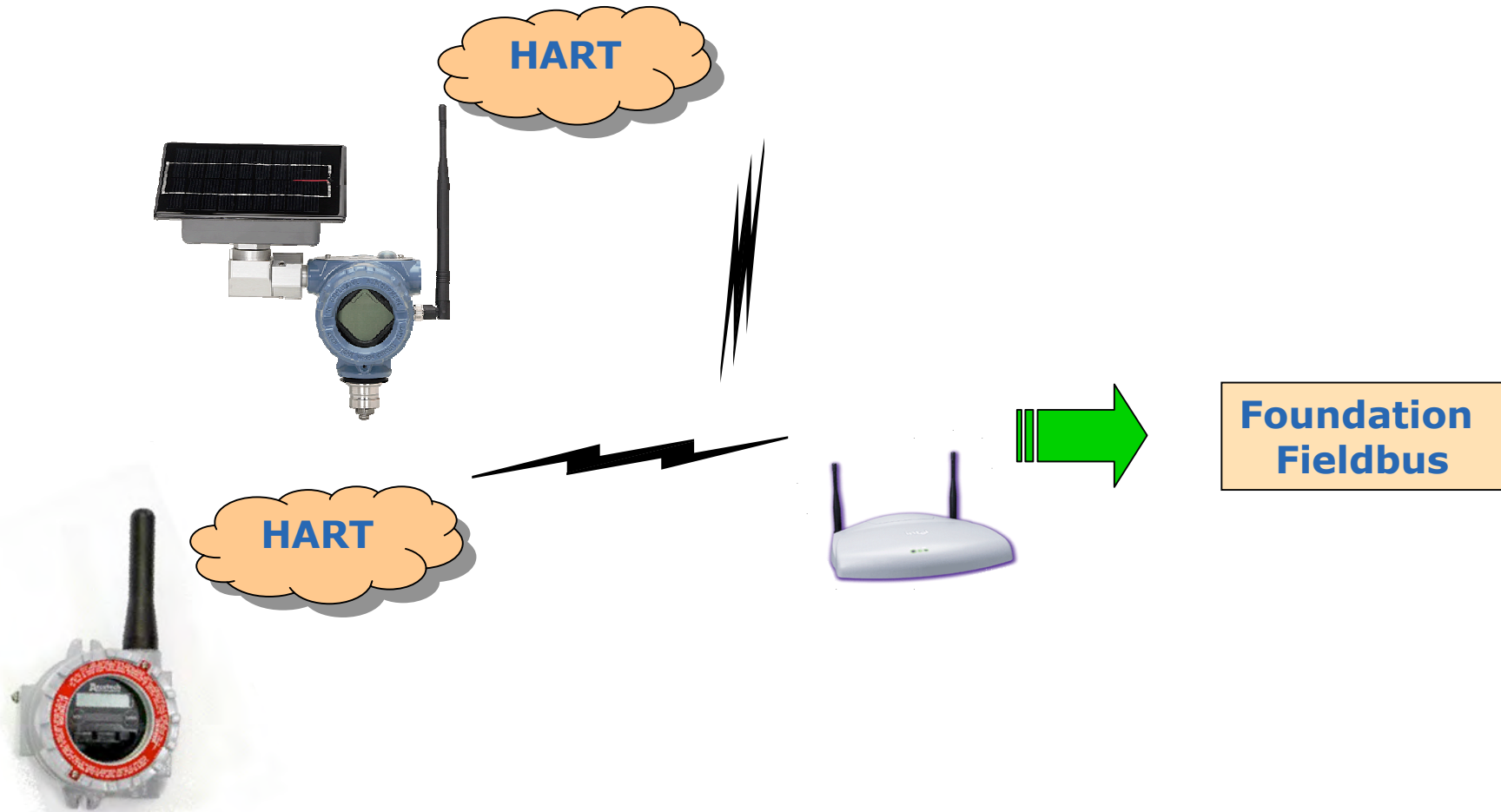
PAM Requires Interoperable Communication Technologies



~~Wireless Implications~~

- ◆ **Wireless can provide a path to interoperability**
- ◆ **Potential benefits of un-tethered assets will provide the catalyst to significantly expand the deployment of PAM solutions**
- ◆ **Monitoring PAM solutions are expected to drive wireless growth in plants**
- ◆ **Current wireless latency and other drawbacks do not significant impact PAM solutions**
- ◆ **Wireless is becoming more important with the increasing growth of 3rd party outsourced ASP solutions**

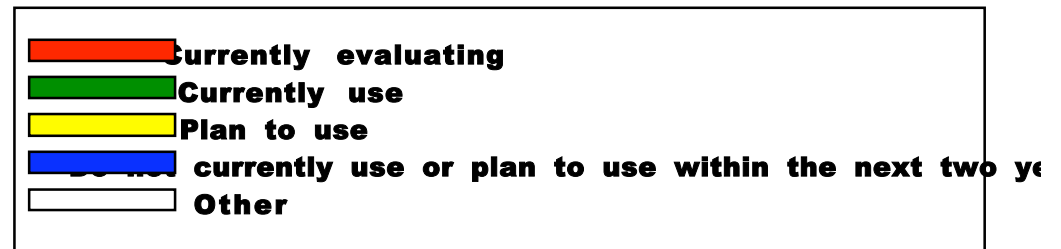
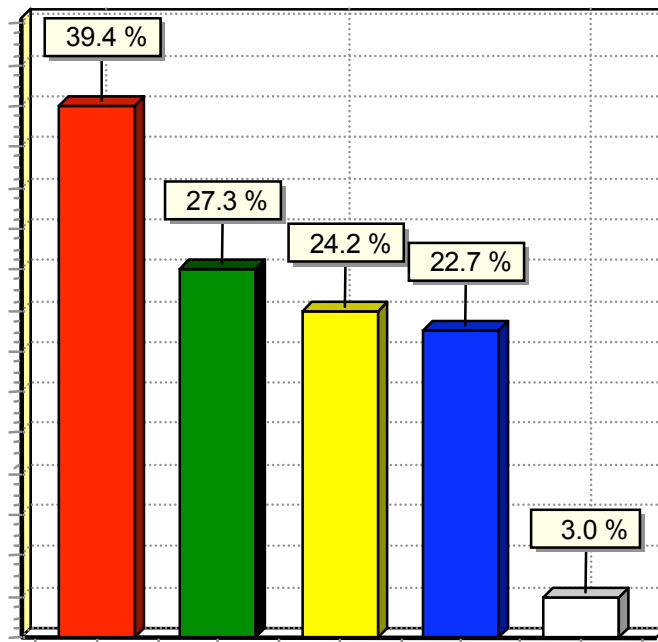
~~Wireless as an Interoperability Enabler~~



Wireless Can Route Information to the Right Place and in the Right Form



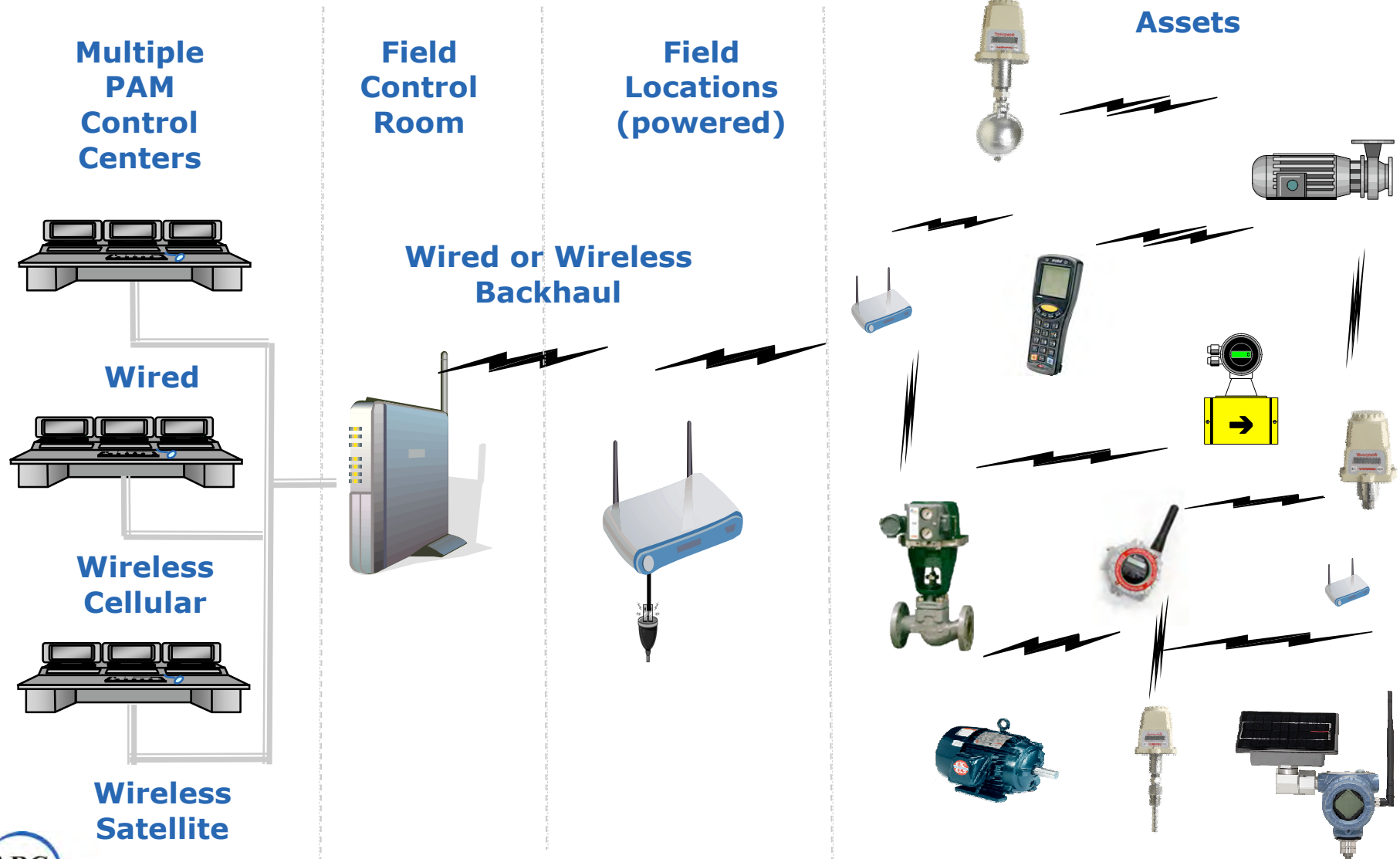
Wireless Use



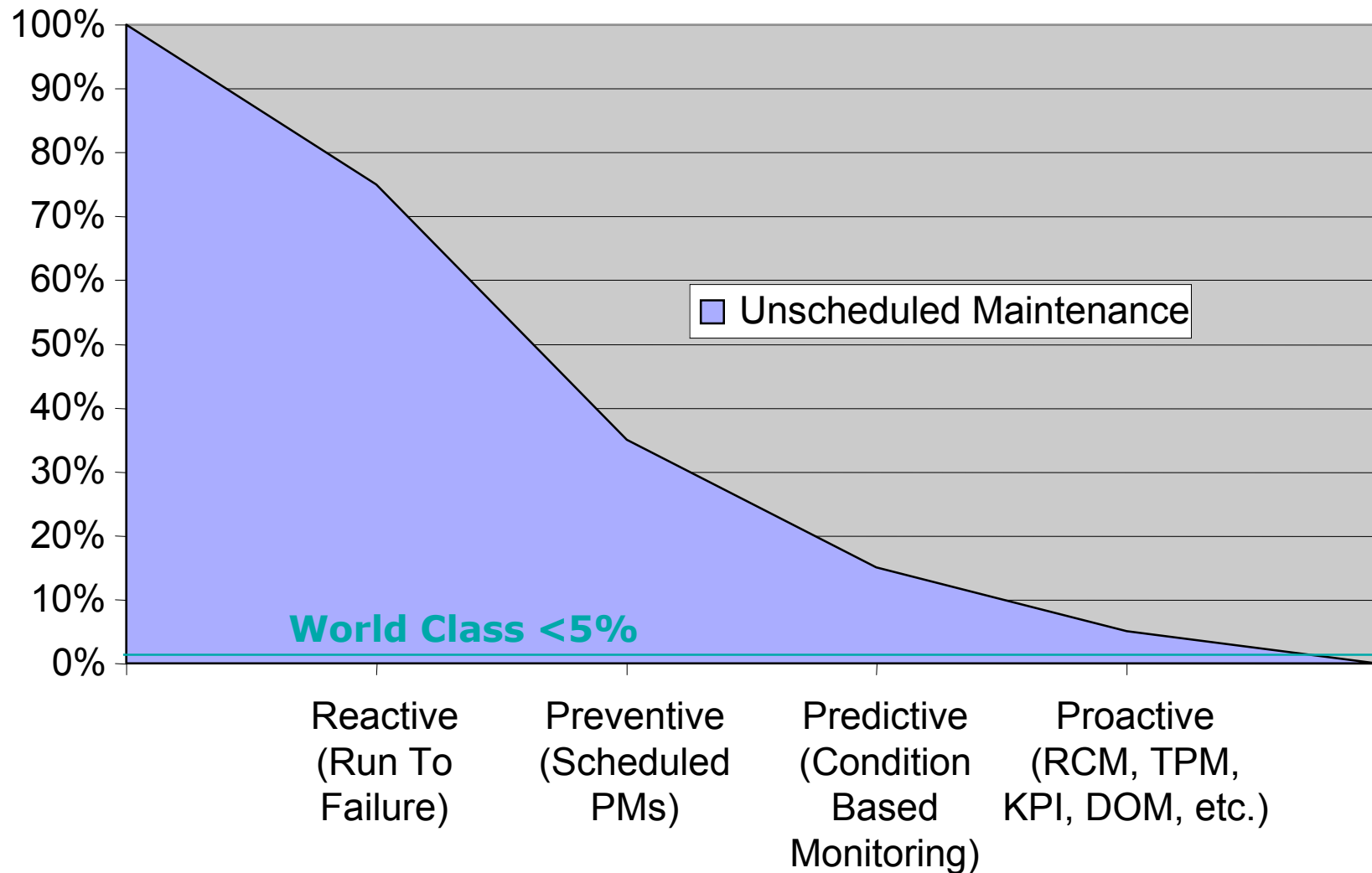
Over 50% of the Responds Currently Use or Plan Use Wireless Devices!



~~Wireless Devices can Lower PAM Solution Deployment Cost~~



Proactive Maintenance Improves Plant Availability, Capacity and Performance



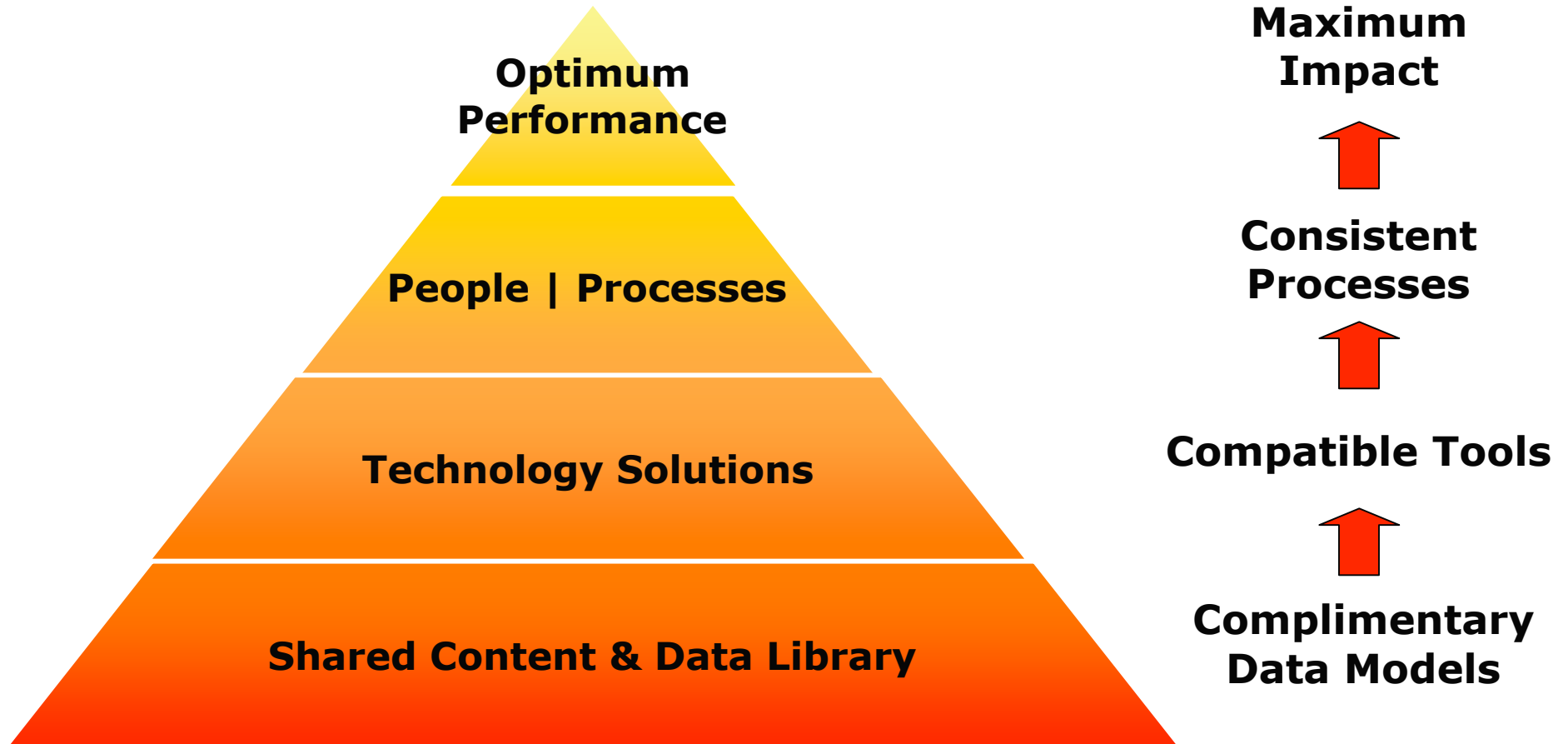
Interoperability Enables Proactive Maintenance !



~~Key PAM Solution Take Aways~~

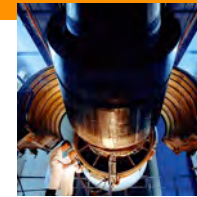
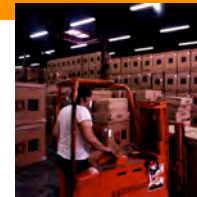
- ◆ Efficient management of assets is **critical** to Performance
- ◆ Consider **PAM** solutions in **strategic** business plans
- ◆ Solutions offer **huge benefits** and merit close evaluation
- ◆ Invest in an **infrastructure** that will enable a PAM solution
- ◆ Recognize the **full breadth** of PAM Solutions
- ◆ **PAM information needs** will **accelerate** wireless adoption
- ◆ New PAM measurement applications **previously deemed un-measurable** will extend **explosive wireless growth**
- ◆ All of the **workers** will be **wirelessly** connected
- ◆ **PAM Asset Assessment Audit** is a necessary first step

~~Collaboration & Interoperability~~ Can Help You Achieve Optimum Performance



Interoperability Amplifies the Impact of All Improvement Efforts !



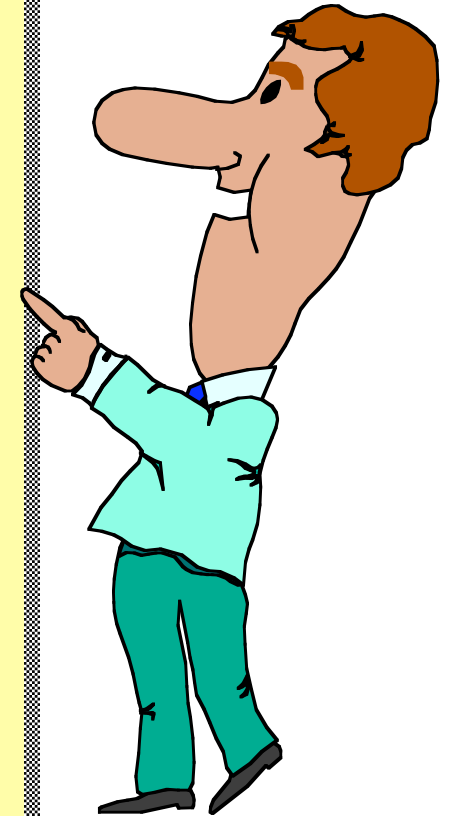


Thank You

For more information, contact the author at
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www.arcweb.com

~~Enterprise Program~~

NGM	Next Generation Manufacturing
DOM	Design, Operate, Maintain
IOp	Interoperability
OpX	Operational Excellence
P2B	Production to Business
SOx	Sarbanes Oxley Regulations
RPM	Real-time Performance Management
KPI	Key Performance Indicators
KPM	Key Performance Measures
CMM	Collaborative Mfg Management
BPM	Business Process Management
ERP	Enterprise Resource Planning
SCM	Supply Chain Management
EAM	Enterprise Asset Management

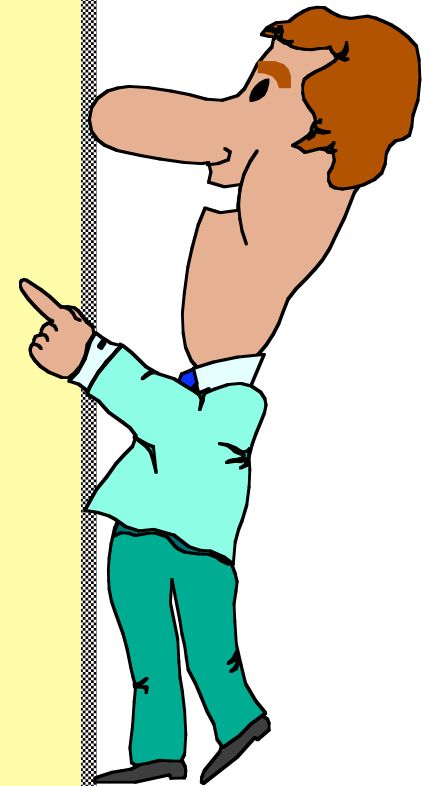


A complete list is available on ARC's Homepage: ARCweb.com





KW	Knowledge Worker
KM	Knowledge Mgmt
CPM	Collaborative Production Management
MES	Manufacturing Execution System
CAS	Collaborative Automation Systems
CPAS	Collaborative Process Automation Systems
CDAS	Collaborative Discrete Automation Systems
HMI	Human Machine Interface
DCS	Distributed Control Systems
PLC	Programmable Controllers
RFID	Radio Frequency Identification
OPC	Ole for Process Control
OMAC	Open Modular Architecture Controller



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