



Monitoring for Predictive Maintenance

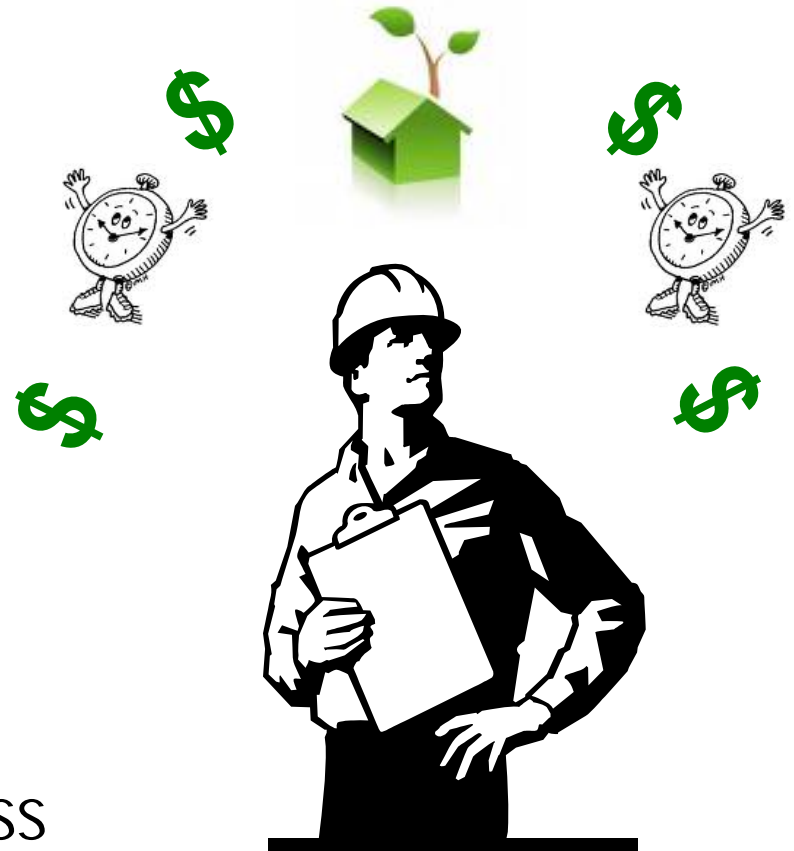
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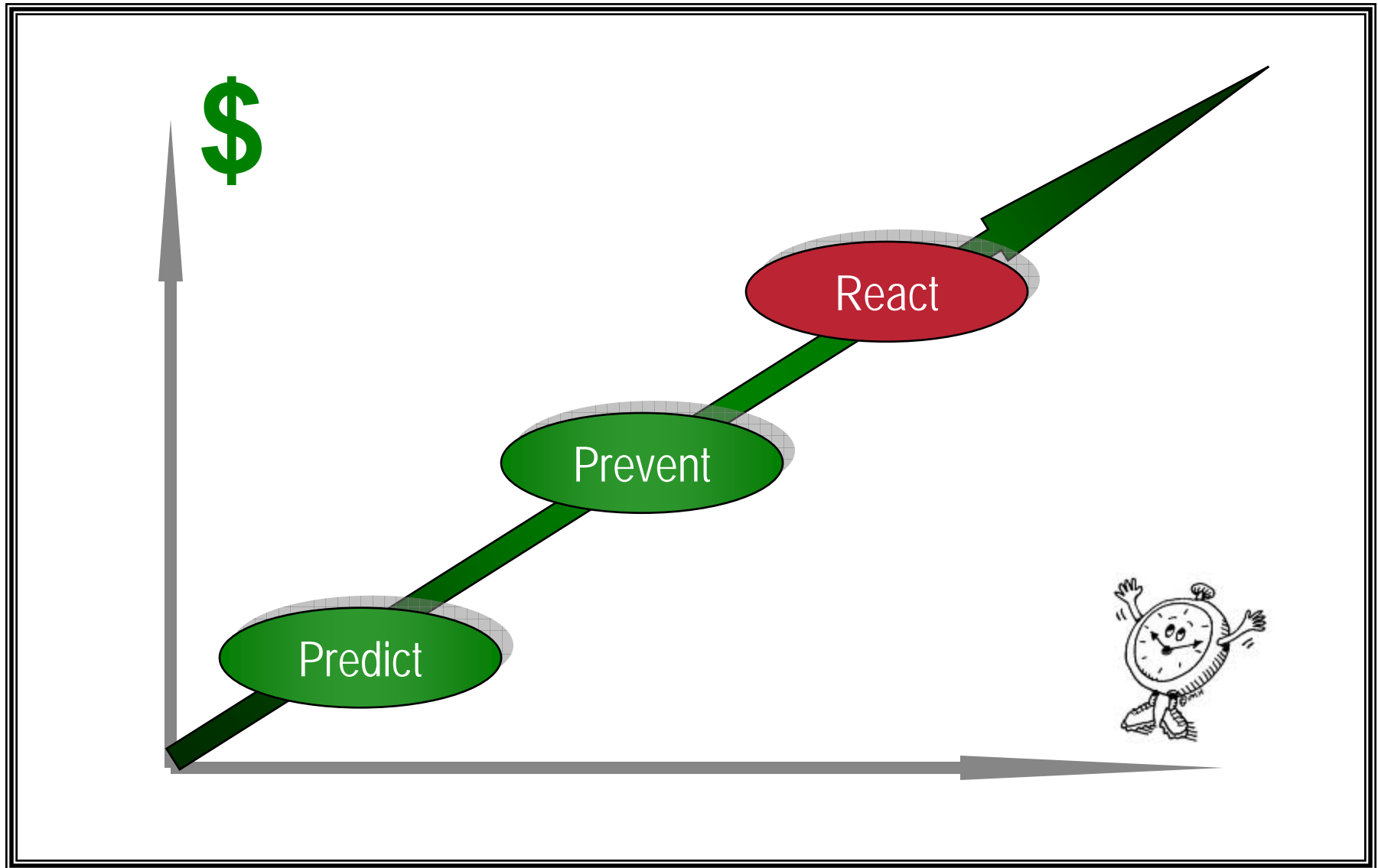
Today's Challenges

- Reduced Maintenance budgets
- Reduced Tax Revenue Streams
- Limited Workforce
- Workforce turnover
- Increasing Complexity of Systems
- Need to decrease MTTR
- Need to reduce repair costs
- Increased Environmental Awareness



*"We are having to operate far more complex systems with less experienced people
In an ever intensifying environment"*

Strategic Maintenance TCO



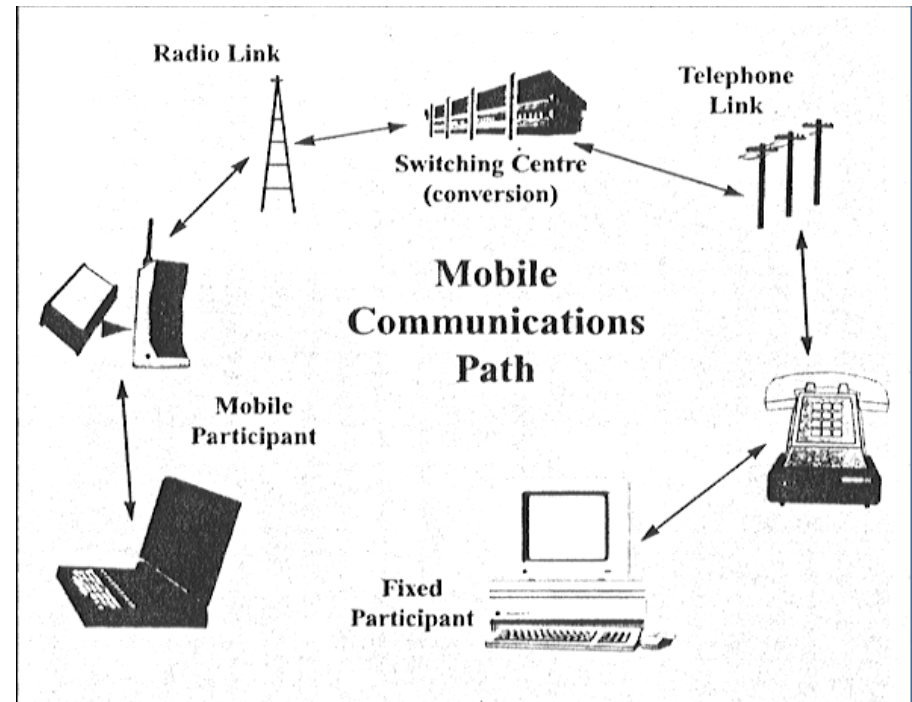
Sounds good- But How?

- Unmanned sites or stations
- Various configurations
- Mix of Technology or lack there of.
- Some basic alarming
- No Confirmation of operation – Until Alarm
- Lack of Informed Dispatch



Remote Monitoring

- Not a new concept
 - Telephone Lines
 - Line of site dedicated Wireless
 - Alarming

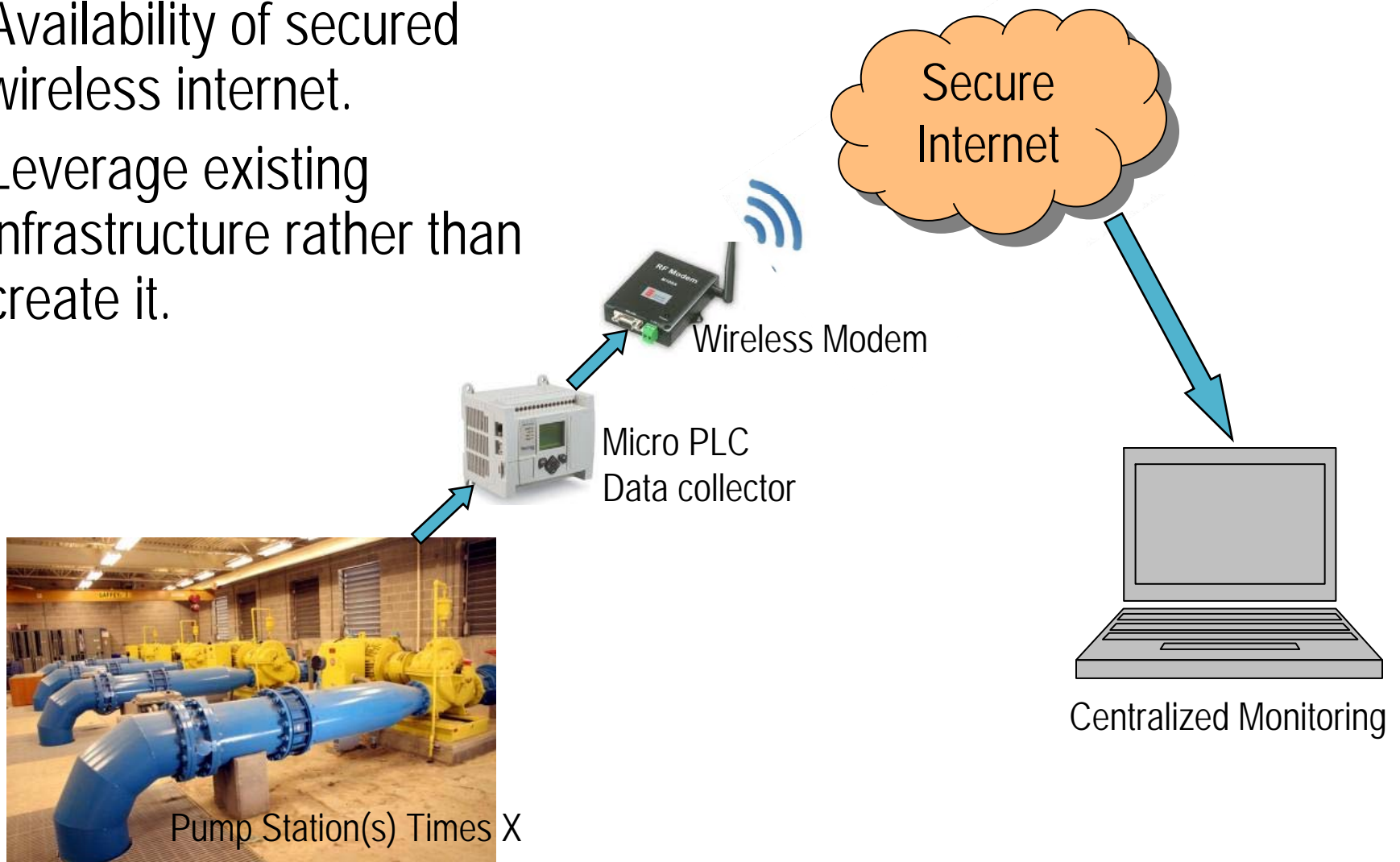


So what has changed?

Remote Monitoring

So what has changed?

- Availability of secured wireless internet.
- Leverage existing infrastructure rather than create it.



What is the impact?

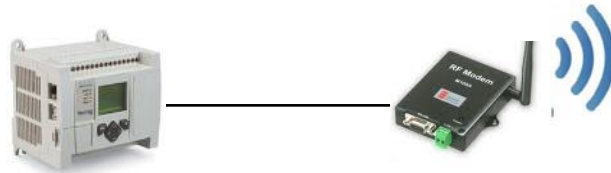
- Ease of monitoring multiple remote stations
- Ability to capture more information
- Improved timing of information
- Early detection of deviation to mitigate catastrophic failure
- Reduced cost to repair due to early detection
- Informed Dispatch reduces MTTR



Case Study - Summit County

- 80+ remote sanitary pump stations
- Some with PLC technology most without
- Current state
 - Basic alarming
 - High Wet Well
 - Power Fail
 - Low Wet Well
 - Flooded Dry Well
 - 24VDC Power Loss
- Desired State
 - Improved pump station status
 - Predict issues before they hit high level to prevent flooding
 - To reduce MTTR when issues occur

Case Study - Summit County



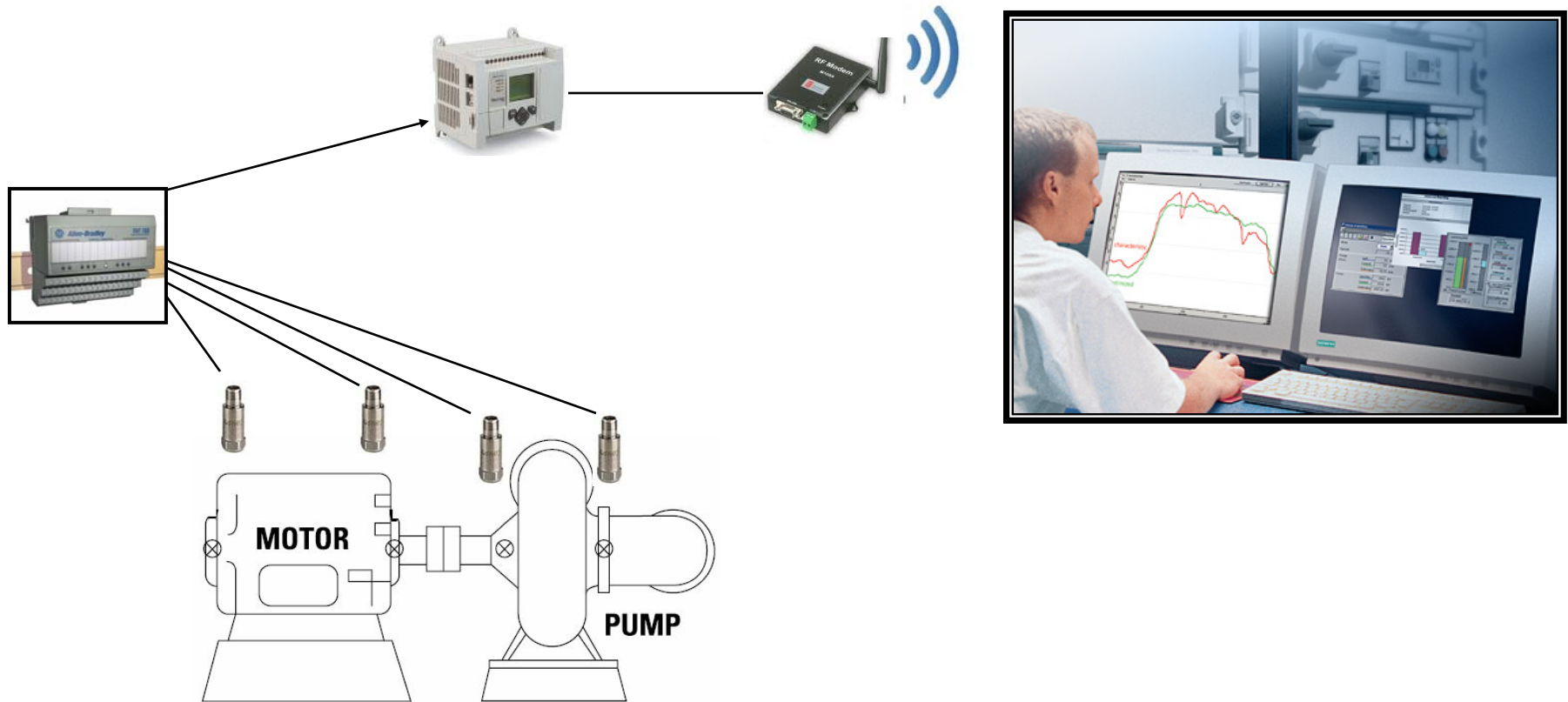
Digitals Status Indicators

Pump 1 Status	Pump 2 Status	Pump 3 Status	Overload 1	Overload 2	Overload 3	Pump 1 Fail	Pump 2 Fail	Pump 3 Fail	Seal Fail 1	Seal Fail 2	Seal Fail 3
X	X	X	X	X	X	X	X	X	X	X	X

Analog Inputs

Wet Well Level	Flow	Today's Total Flow	Yesterday's Total Flow	Amps 1	Amps 2	Amps 3	Pump 1 % Speed	Pump 2 % Speed	Pump 3 % Speed
X	X	X	X	X	X	X	X	X	X

Next level of Predictive support



Vibration

Motor 1	Pump 1	Motor 2	Pump 2	Motor 3	Pump 3
X	X	X	X	X	X

What about the Infrastructure?

- What if we do not have enough resources for monitoring?
- What if we do not have qualified Technical resources?
- Turnover is killing us.
- We can't afford all that infrastructure

Leverage a resource with existing infrastructure to do it for you.



Remote Monitoring - Many Shapes, Sizes.....

And options:

Surveillance

Diagnostics

Knowledge

Administration

Visualization

Optimization



*The right mix can predict problems and
prevent extended unplanned outages*

Remote Monitoring options



Surveillance

Continuous monitoring of systems & infrastructure



Diagnostics

System/Application support and troubleshooting, via phone & on-demand remote connection



Knowledge

Ongoing knowledge, case management & document management



Visualization

Online delivery of information (plant/production/enterprise) via subscription



Optimization

Focused process/system improvement projects for supported systems



Administration

Ongoing system & application management, engineering & disaster recovery services

First define where monitoring would help



Surveillance

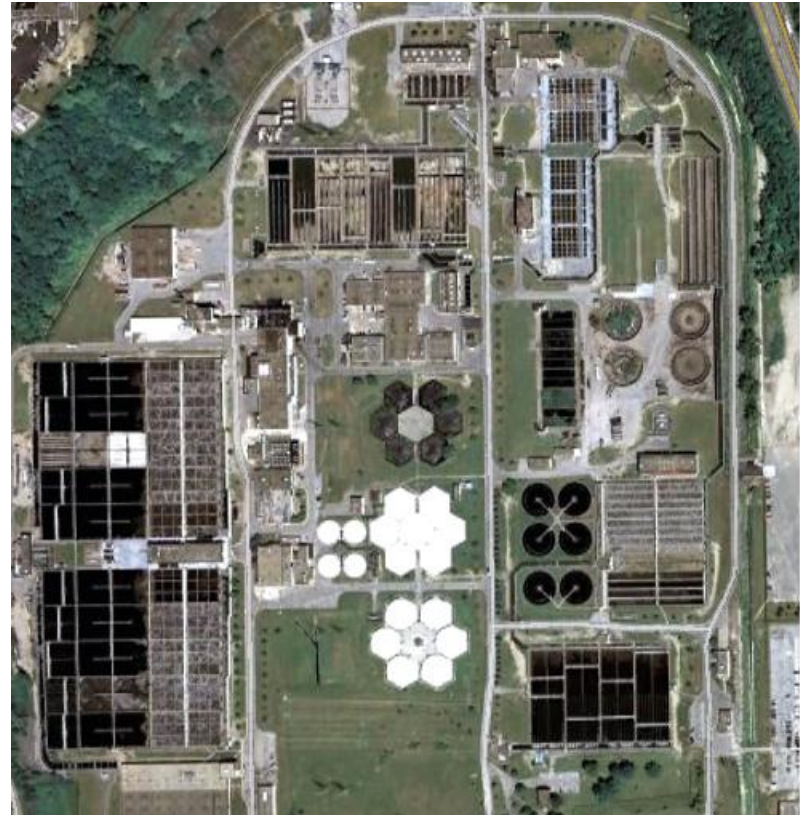
- 24/7?
 - Network IT Systems
 - Surveillance of Mfg. IT Applications & Infrastructure
 - Servers, Networks, MES, Historians, Plant Intelligence, Middleware
 - Process Systems
 - Surveillance of Process Systems
 - Process Controls, HMI, Process Parameters, Equipment Parameters, Alarms, Events, Quality
 - Automation Systems
 - Surveillance of Discrete Control Systems
 - Controls, HMI, Process Parameters, Equipment Parameters, Alarms, Events, Quality
 - Drive Systems
 - Surveillance of Drive Systems
 - Controls, Drives, Process Parameters, Equipment Parameters, Alarms, Events, Quality



Vibration

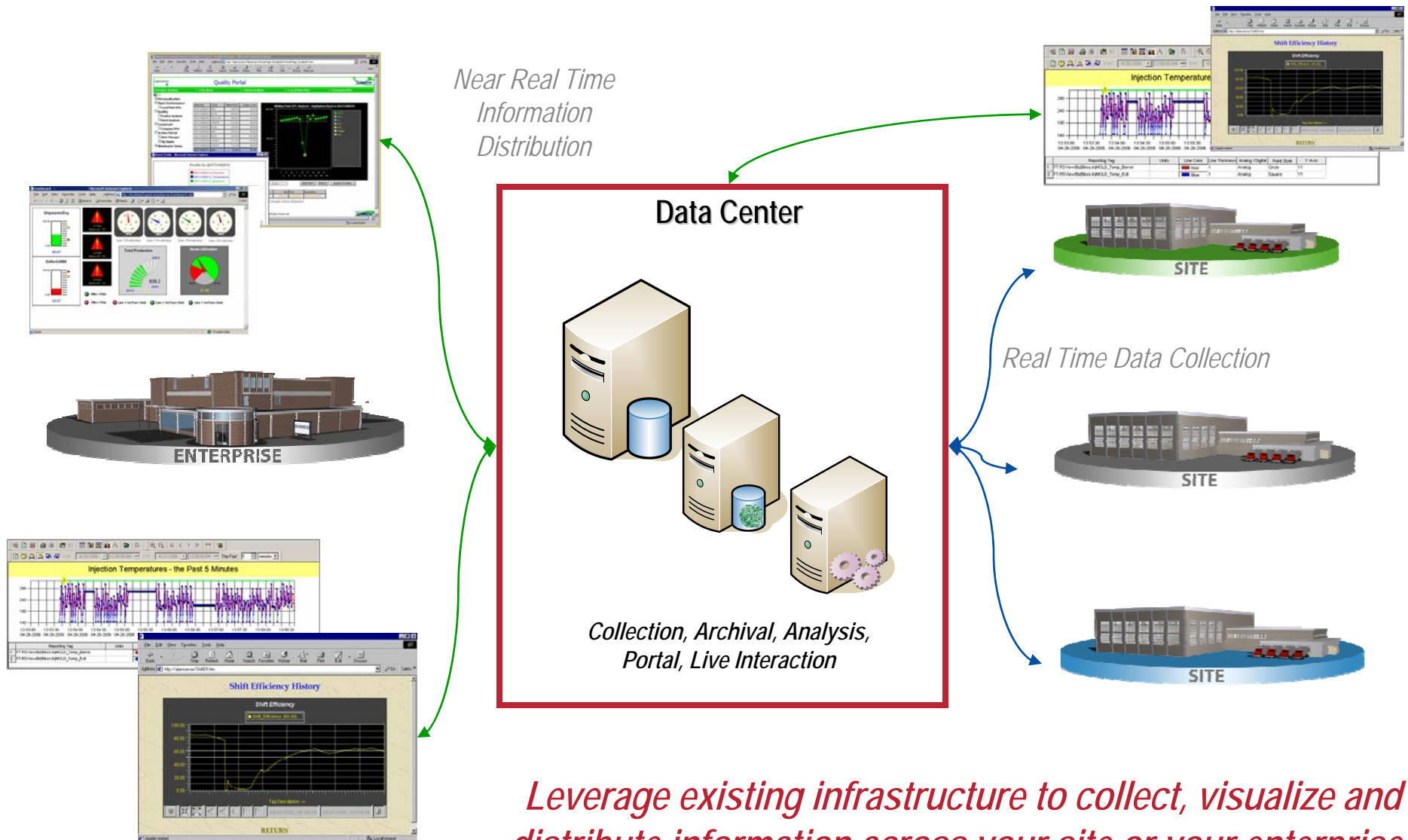
Diagnostics

- Diagnose and Troubleshoot Systems & Applications
- Site & System Audit
 - Documentation and System Review
 - FMEA
 - Support & Escalation Strategy
- Instant, on demand
 - Direct Connection to Support Team
 - Online system & application diagnostics
 - Online system & application troubleshooting & fixes
 - Hot Hand Offs to Onsite Engineers
- Support Program Management
 - Monthly Reviews of Activity
 - FMEA Progress Reporting
 - Root Cause Reviews
 - Issue Reduction Strategies



Most issues occur where systems interact – NOT with a standalone product

Visualization



Leverage existing infrastructure to collect, visualize and distribute information across your site or your enterprise

Administration

- Sustain Your Systems
 - Systems Administration
 - Application Management
 - Version & Patch Management
 - Upgrades & Migrations
 - Disaster Recovery
 - User Management
 - System Performance Tuning



Optimization

- Extending and Enhancing Usage, Functionality, & Performance
 - System & Application Enhancements
 - Adding new functions & modules
 - Creating new reports and interfaces
 - Adding new data, metrics, products
 - Integrating with additional systems
 - Ongoing training for users

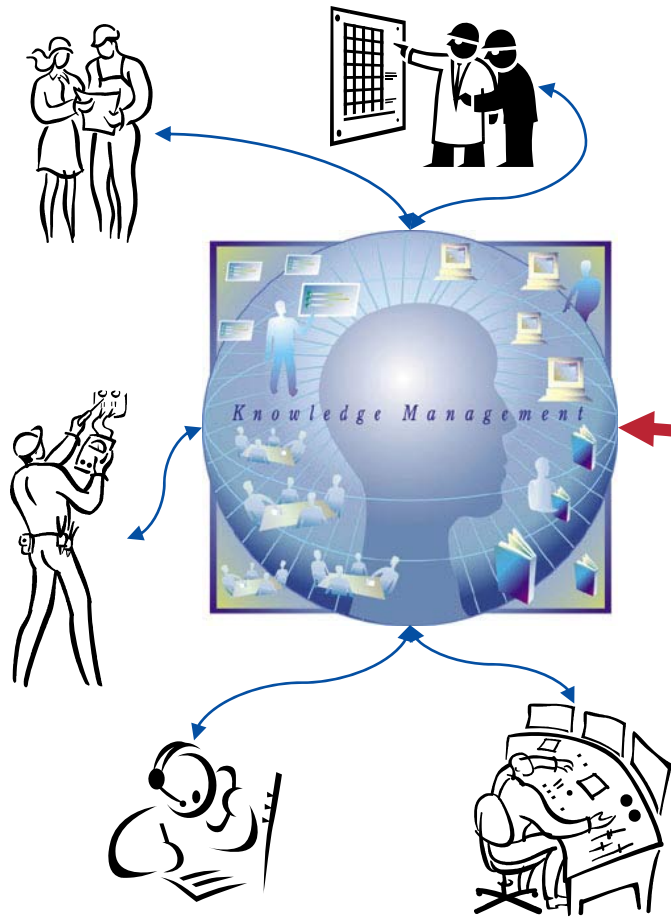


Knowledge



- Capture, Manage, Maintain and Use Knowledge Instantly
 - Customer specific knowledge base creation and support
 - Access application & support knowledge any time, any where
 - Continuously updated with every support engagement
 - Capture, manage and use customer, Rockwell, and partner know how
 - Leverage the combined know-how of domain, application, and technology experts

Knowledge



Input, Update and Capture Knowledge from Engineering, Maintenance, Production, Vendors, Support Calls and all other sources

Category	# of Incidents
Account and Billing	15
DGL and Internet Services	3
General	22
How Do I...?	16
Long Distance	1
No Value	43
Product Guides	2

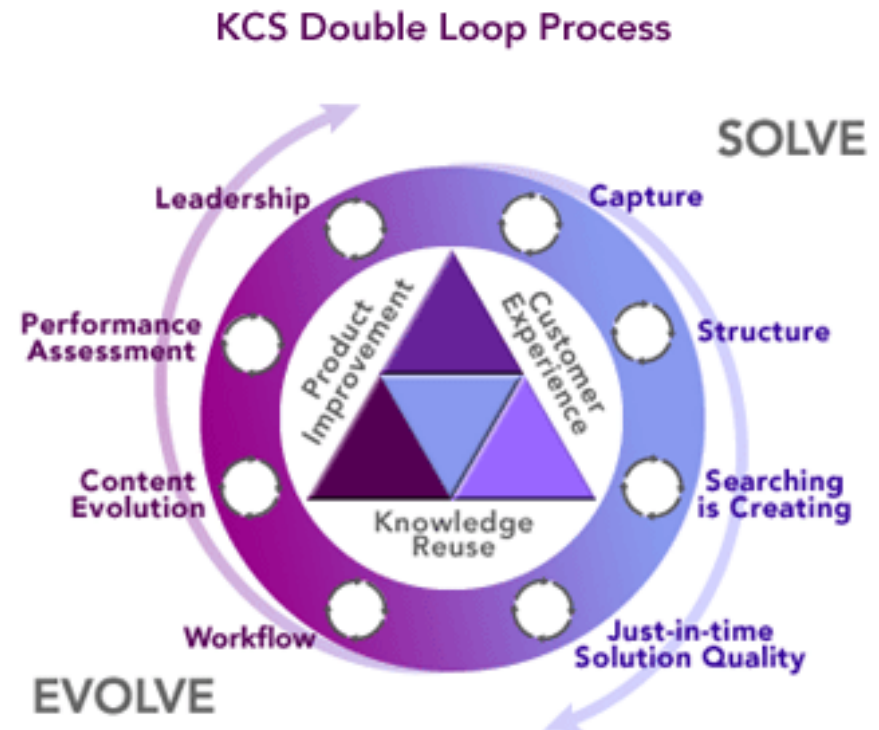
Use, Manage, Measure, Report from anywhere in the organization

Knowledge Centered Support

KCS is a methodology and a set of practices and processes that focuses on knowledge as a key asset of the support organization.

KCS seeks to:

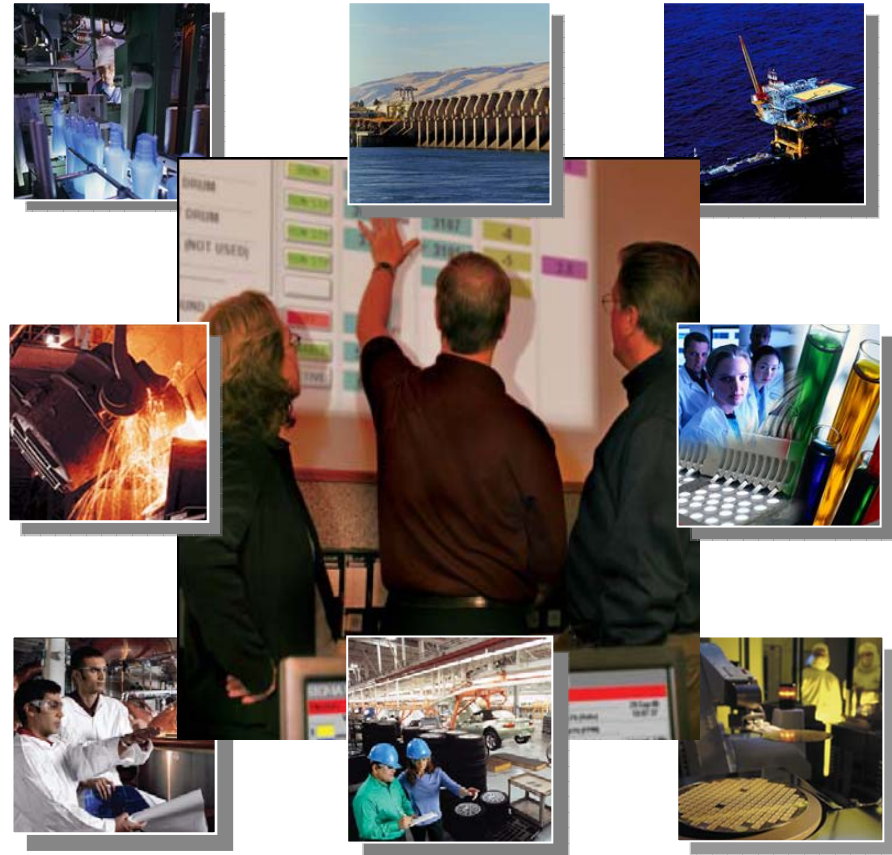
- Create content as a by-product of solving problems
- Evolve content based on demand and usage
- Develop a KB of our collective experience to-date



KCS becomes the process to solve problems

Infrastructure - Not just technology

- Engineering support professionals
- Experience
 - Domain Knowledge
 - Teams of Product Experts
- Infrastructure
 - Data Center & Telecom systems in place
 - Case and Knowledge Management tools & processes
- Support Program Management
 - Focused on measuring and driving value in your terms
 - Primary point of contact for escalations
 - Applies Lean/Six Sigma tools to drive process discipline and performance



Ability to connect to experts, with detailed knowledge of your system, instantly



Thank you

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