VOYAGE2007

Implementation and Management of a Global Distributed PI Infrastructure

Jim Cummins
Manager: Systems Integration
Specialty Minerals

Mike Purcell
Director of Process industries
Omicron (USA)

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Minerals Technologies Inc.

Minerals Technologies
(Sales US $1billion)

Is a Global Resource- and Technology-Based Growth Company that Develops, Produces and Markets The Highest Quality Performance-Enhancing Minerals and Related Products, Systems and Services

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Minerals Technologies Inc.

2006 Sales

Minerals Technologies
(US $1billion)

Refractory products and technology for steelmaking (~ 33%)

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Minerals Technologies Inc.

2006 Sales

Minerals Technologies
(US $1billion)

Precipitated Calcium Carbonate products (~ 52%)

Paper Industry

Refractory products and technology for steelmaking (~ 33%)

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Minerals Technologies Inc.

2006 Sales

Minerals Technologies
(US $1billion)

Precipitated Calcium Carbonate products (~ 52%) → **Paper Industry**

+

Processed Minerals (~ 15%) → **Construction, Plastic, Food & Glass Industries**

Refractory products and technology for steelmaking (~ 33%)

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Minerals Technologies Inc.

2006 Sales

Minerals Technologies
(US $1billion)

PI Implementation

Precipitated Calcium Carbonate products (~ 52%) → **Paper Industry**

\+

Processed Minerals (~ 15%) → **Construction, Plastic, Food & Glass Industries**

Refractory products and technology for steelmaking (~ 33%)

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SMI Overview

- SMI is the leading supplier of PCC (Precipitated Calcium Carbonate) worldwide.

- Our ability to customize filler and coating PCC products has made us the pigment supplier of choice for paper mills throughout the world.

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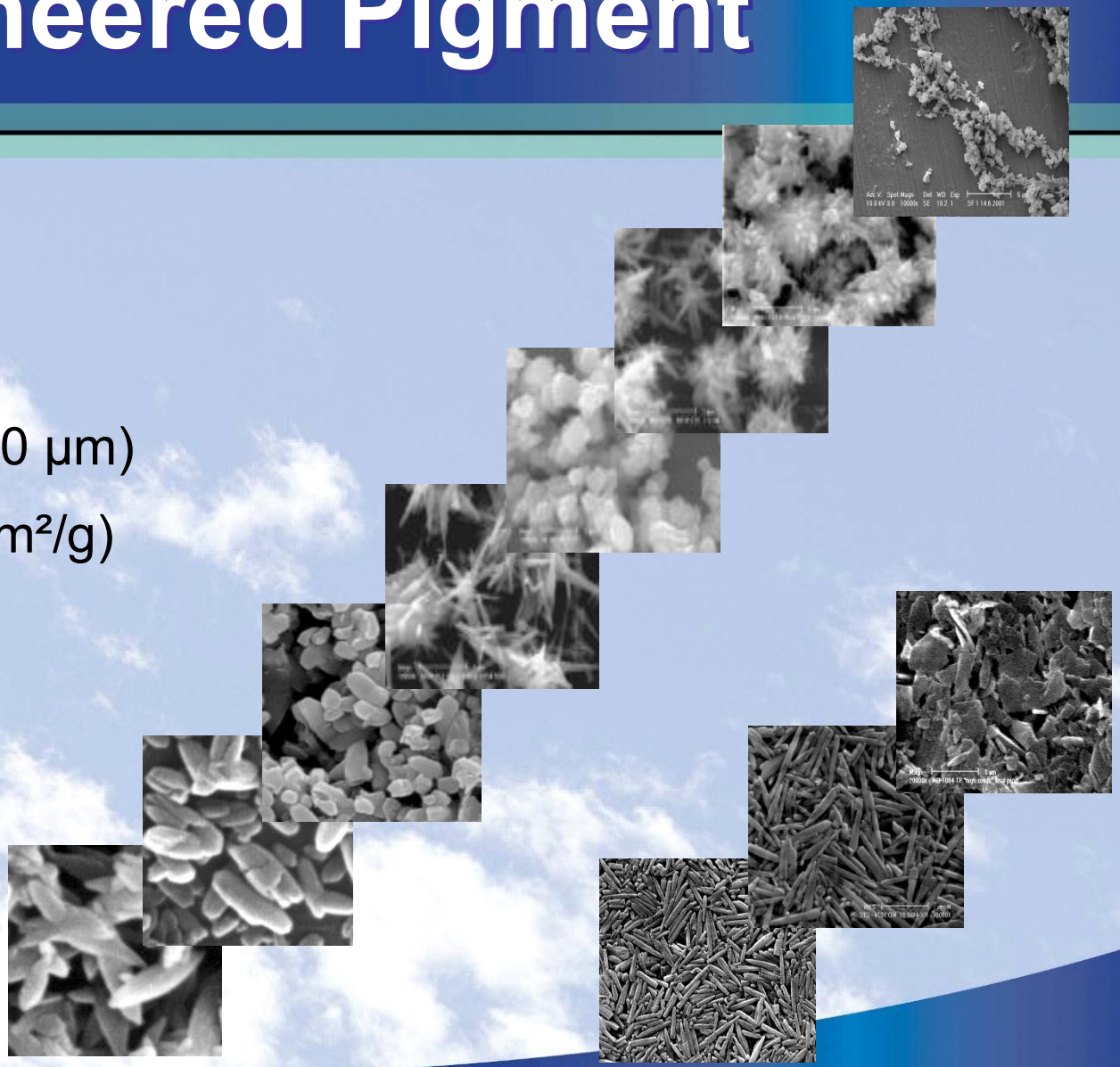
PCC Engineered Pigment

5 Degrees of Freedom

- Particle structure (morphology)
- Particle size (0.3 – 4.0 µm)
- Surface area (2 - 80 m²/g)
- Distribution
- Surface chemistry

strength, bulk, light scattering, sizing, retention, porosity, gloss, ink absorption, etc. …



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PCC Facility: Ashdown Arkansas

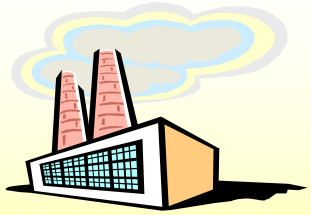
PCC manufacturing process

Commercial Quicklime

+

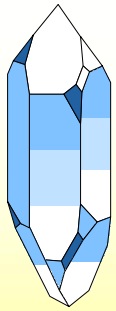
Mill Water

+



Mill Flue Gas

=



Custom PCCs

$CaO + H_20 + CO_2 = CaCO_3$

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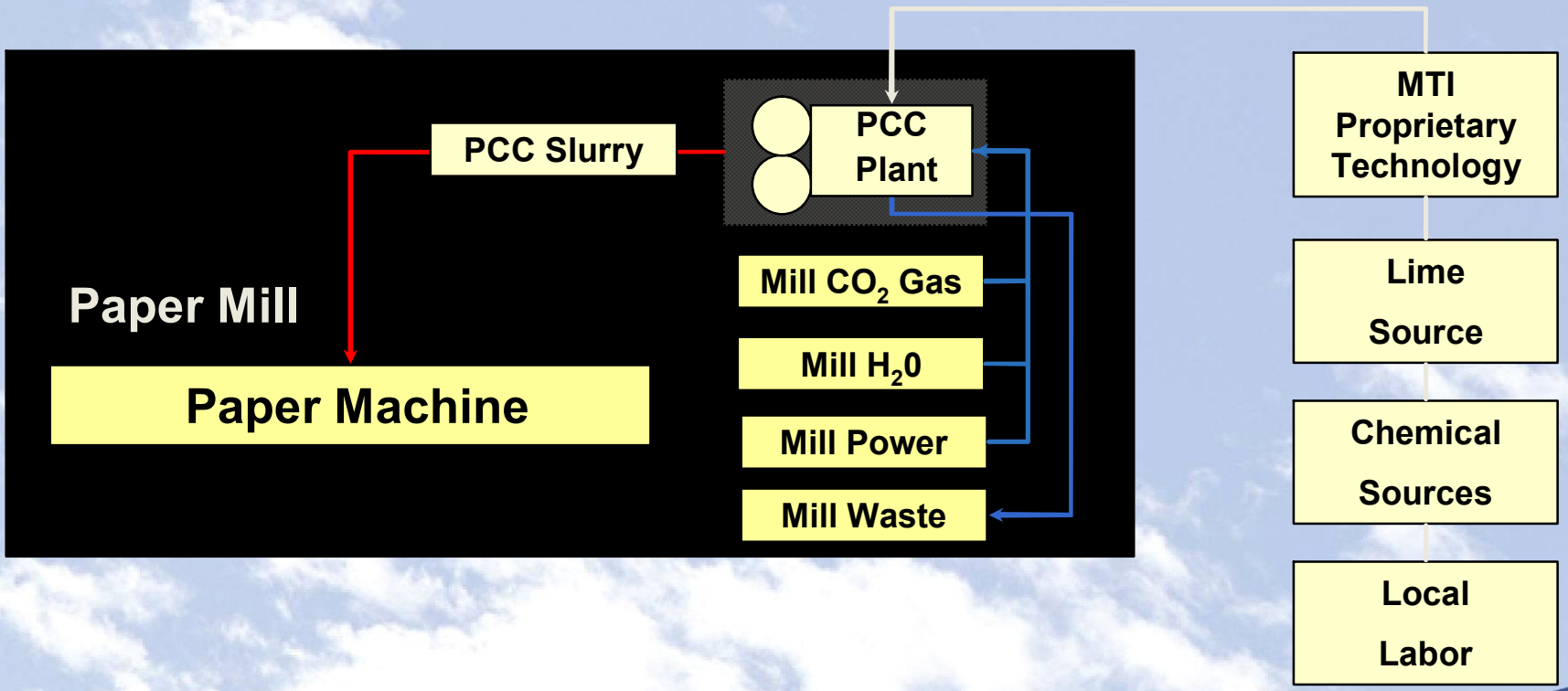
Satellite Concept

Symbiotic Relationship with Customer



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MTI – a global manufacturing presence

North America	43
Europe	17
Asia	8
Latin America	5
Africa	1
Total	74

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MTI Vision

- Organizing and managing the information workspace
- Standardize work practice
- Increase speed and accuracy of work execution
- Operational Excellence
  - Improve Return on Capital
  - Improve Profitability

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Implementation Challenge

- Cost effective collection of Process Data for many small facilities (< 3000 tags)
- Minimal requirements for plant level support
- One central data repository for all information
- Consolidation of plant information into management reporting and dashboards
- Integration of non-PI data
- Web based information and reports

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Implementation plan

- Phase I
  - Install OSI PI and MS SharePoint 2003 web server
  - Interface 25 PCC manufacturing facilities using OPC Interface to Siemens PCS 7 control systems
  - Expand to Include 7 Process Minerals facilities using various PC based control systems
  - Using web parts, excel, and Process book create basic plant graphical overview, dashboards, and production reports
  - Timing: POC 2005
  - Implementation April 2006 – Dec 2006: User count 50

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Implementation plan

- Phase II
  - Increase Interface count to 50 PCC manufacturing facilities using OPC Interface to Siemens PCS 7 control systems
  - Using web parts, excel, and Process book create basic plant graphical overview, dashboards, and production reports using SharePoint Services and RtPortal.
  - Timing: Through 2007: User count 150

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Implementation plan

- Phase III
  - Migrate to MS SharePoint 2007 web server
  - Add additional interfaces to include Minteq
  - Improve user interface to reports and expand scope to include document control features of SP 2007 and associated team sites
  - Integrate financial and maintenance information with production data collected from PI
  - Timing: July 2007 – Dec 2008: User count 300

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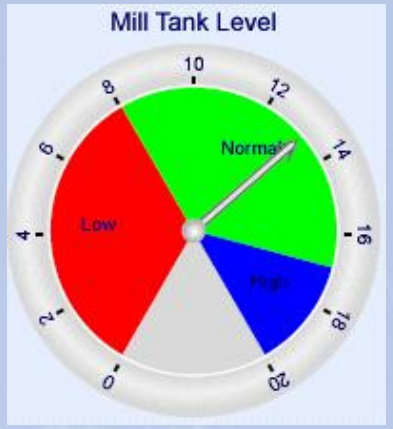
Operational Tools

- KPI Dash Boards

  Status at a glance

  - Production
  - Quality
  - Maintenance
  - Product and operating costs
  - Determine how the business is performing against plan.



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Operational Tools

- Operations Alerts

  Report by exception

  - Production
  - Quality
  - Maintenance
  - Product and operating costs

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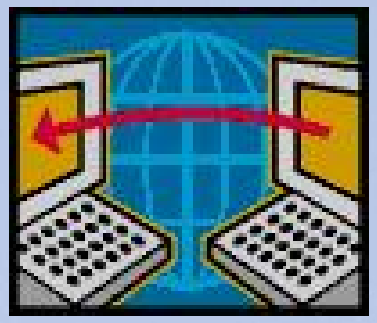
Operational Tools

- Conditional based maintenance

  PI production data feeds maintenance system

  - Drives work requests
  - Reduces operational costs



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Operational Tools

- Quality reporting

  Implementation of SPC

  - Establish tight control
  - Quality metrics
  - Reduce product variability

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Systems and Products used

- 150K PI Enterprise server
  - 50 OPC interface to Siemens PCS 7 control system
    - Batchview
    - SQC Add-in
- RtPortal
- PI-to-PI
- MS SharePoint
- Oracle ERP

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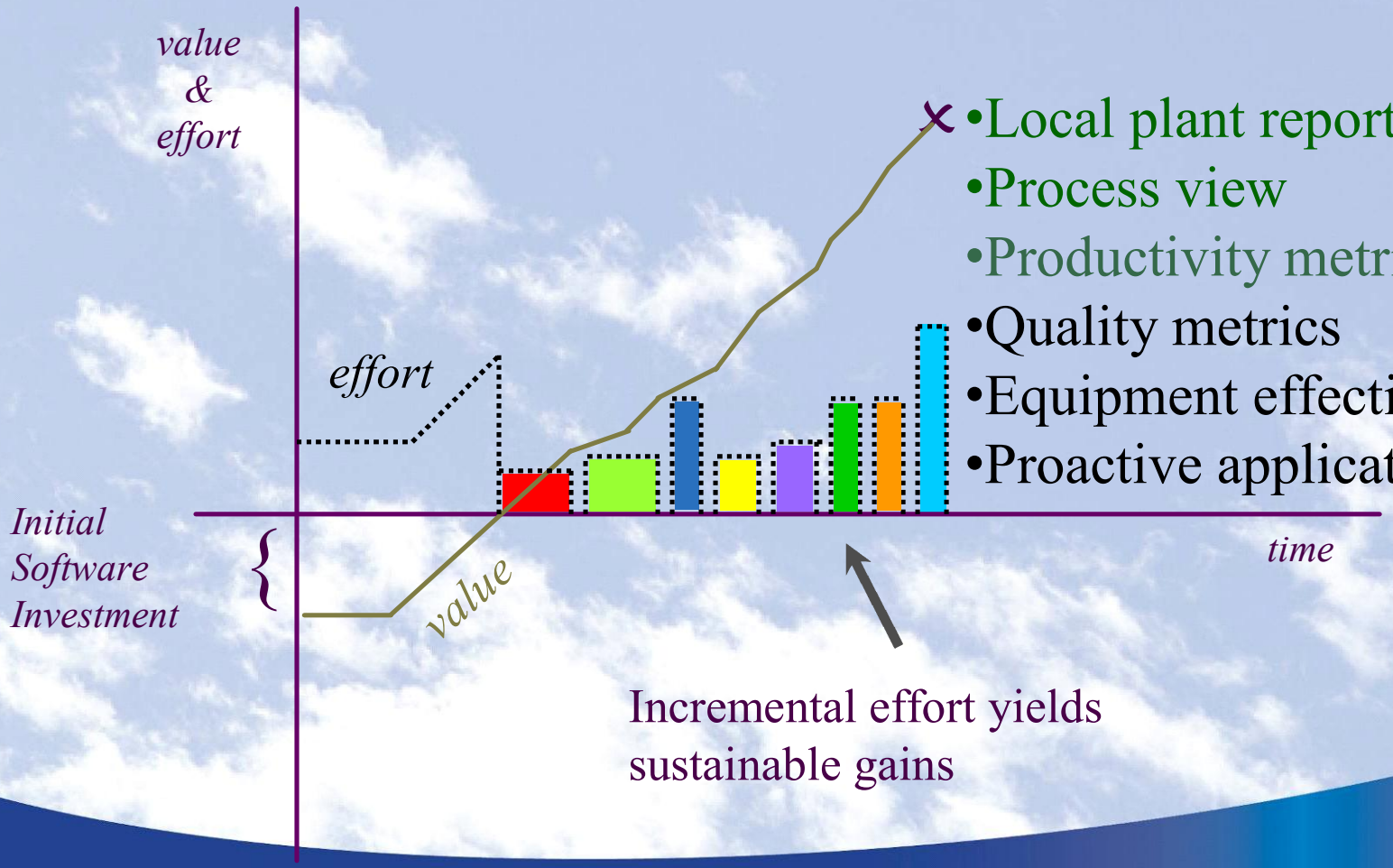

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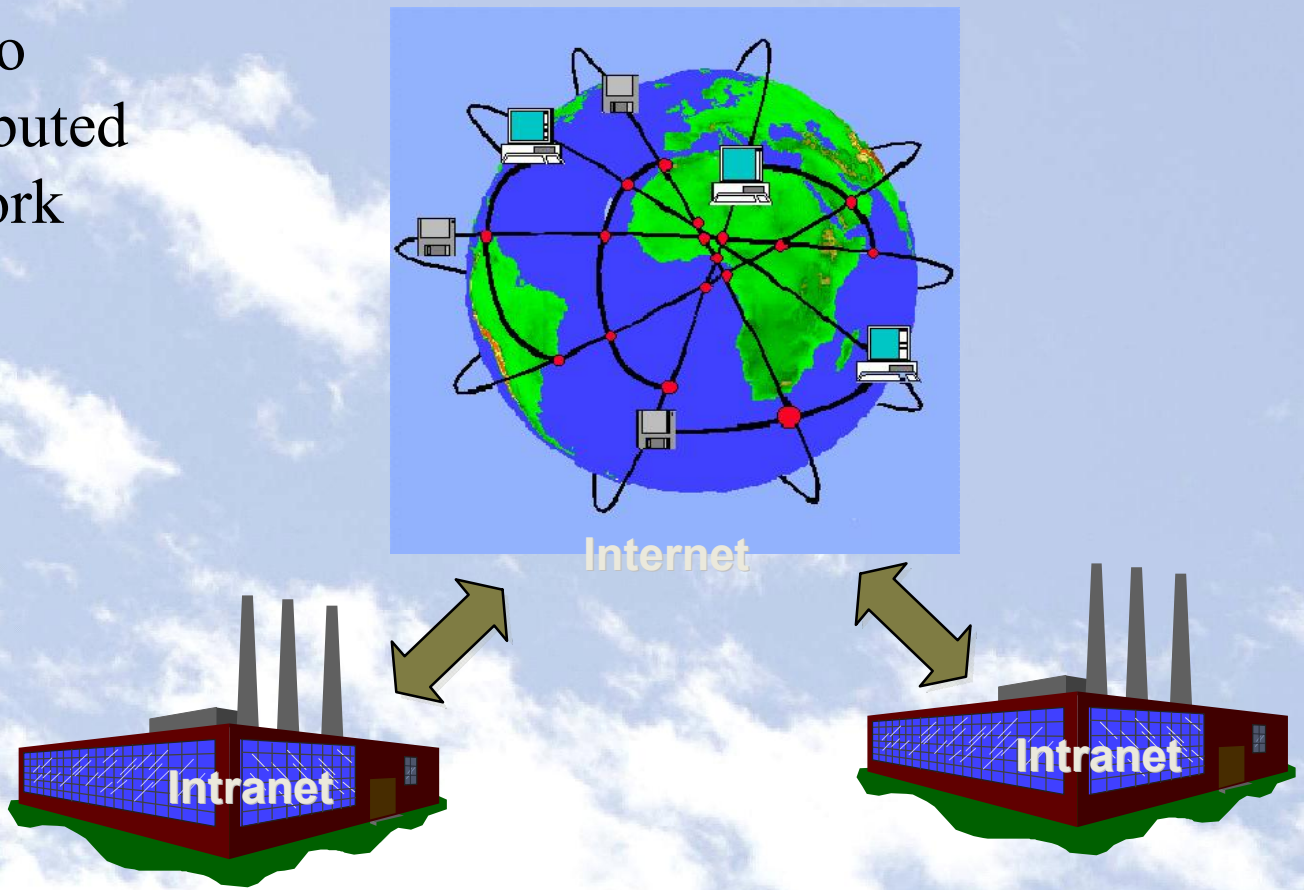
Secure Internet connections

Key to distributed network



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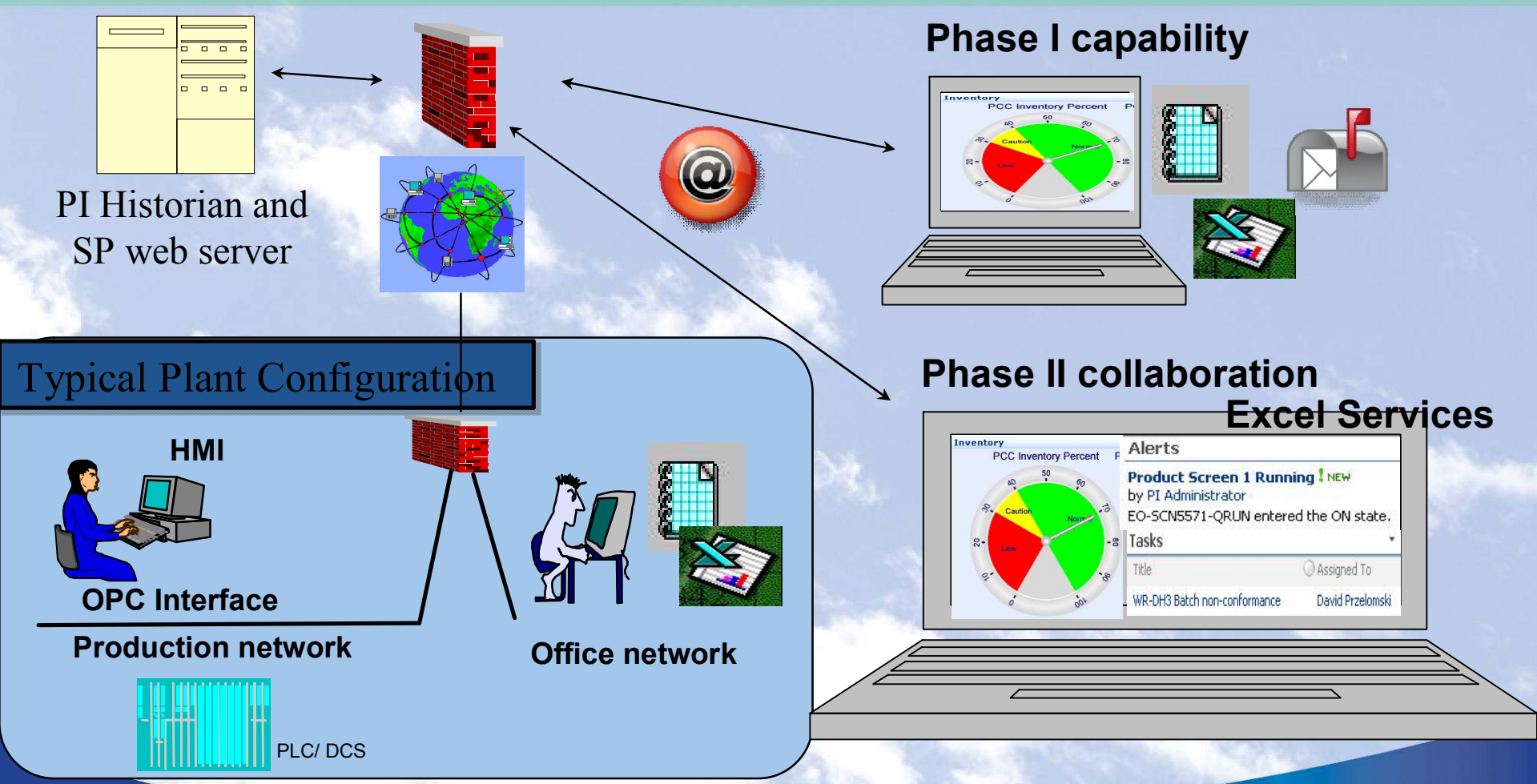
Capability

Remote access to Operational Tools, Dashboards, Alerts, and Tasks



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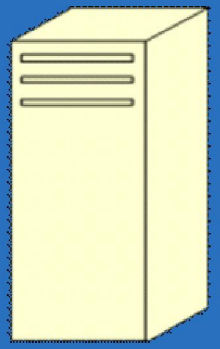
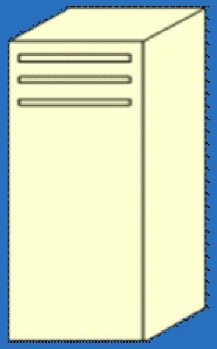
“Extensible Server design”

Initial Setup



Front-End Web Server

- Web Server
- Forms Server
- Excel Server
- Search Server
- Index Server



SQL Server

- Content Database
- Configuration Database
- Search/Index Database

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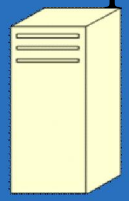
“Extensible Server design”

Initial Setup



Front-End Web Server
- Web Server
- Forms Server
- Excel Server
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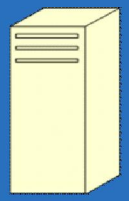
- Index Server



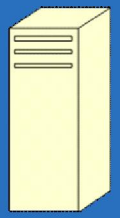
SQL Server
- Content Database
- Configuration Database
- Search/Index Database

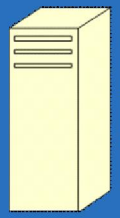
100 users

Expansion & Growth

Controlling cost
Expansion capability over time
without losing past investment

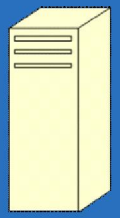
Growth





Front-End Web Servers
- Web Server
- Excel Server
- Search Server

- Web Server
- Forms Server
- Search Server
- Index Server



SQL Server
- Content Database
- Configuration Database
- Search/Index Database

300 users

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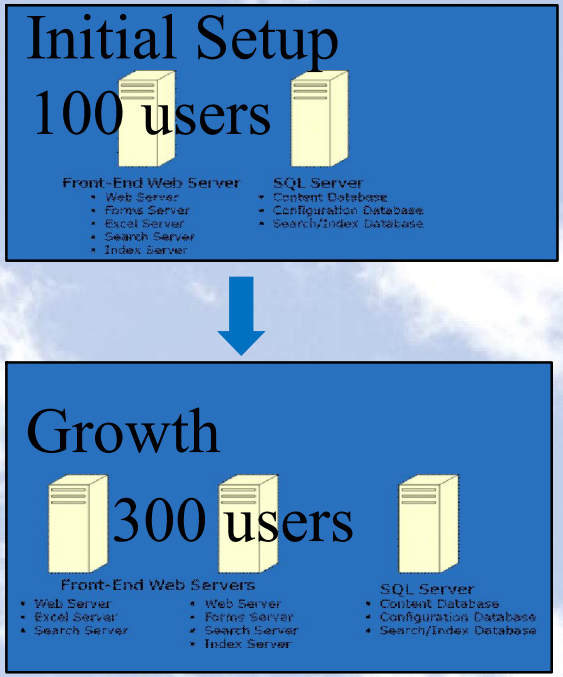
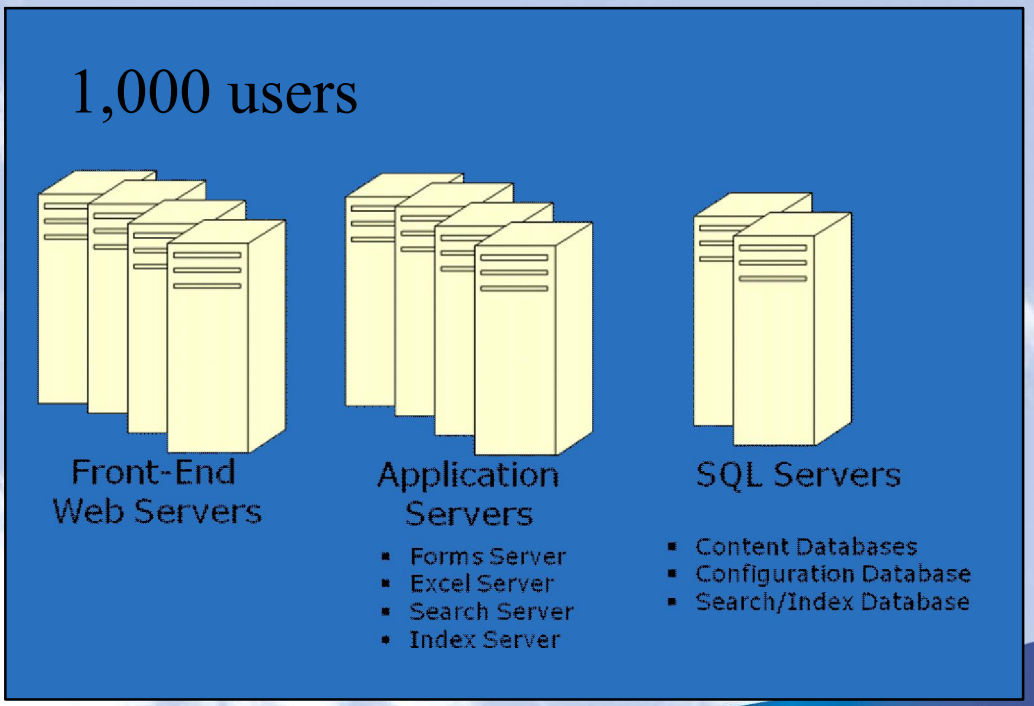
“Extensible Server design”



Controlling cost
Expansion capability over time
without losing past investment



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Phase I Implementation

- Real-Time Data Updates in a Browser
- Daily and weekly production reports
- Web based process graphics
- Process modeling and system analysis

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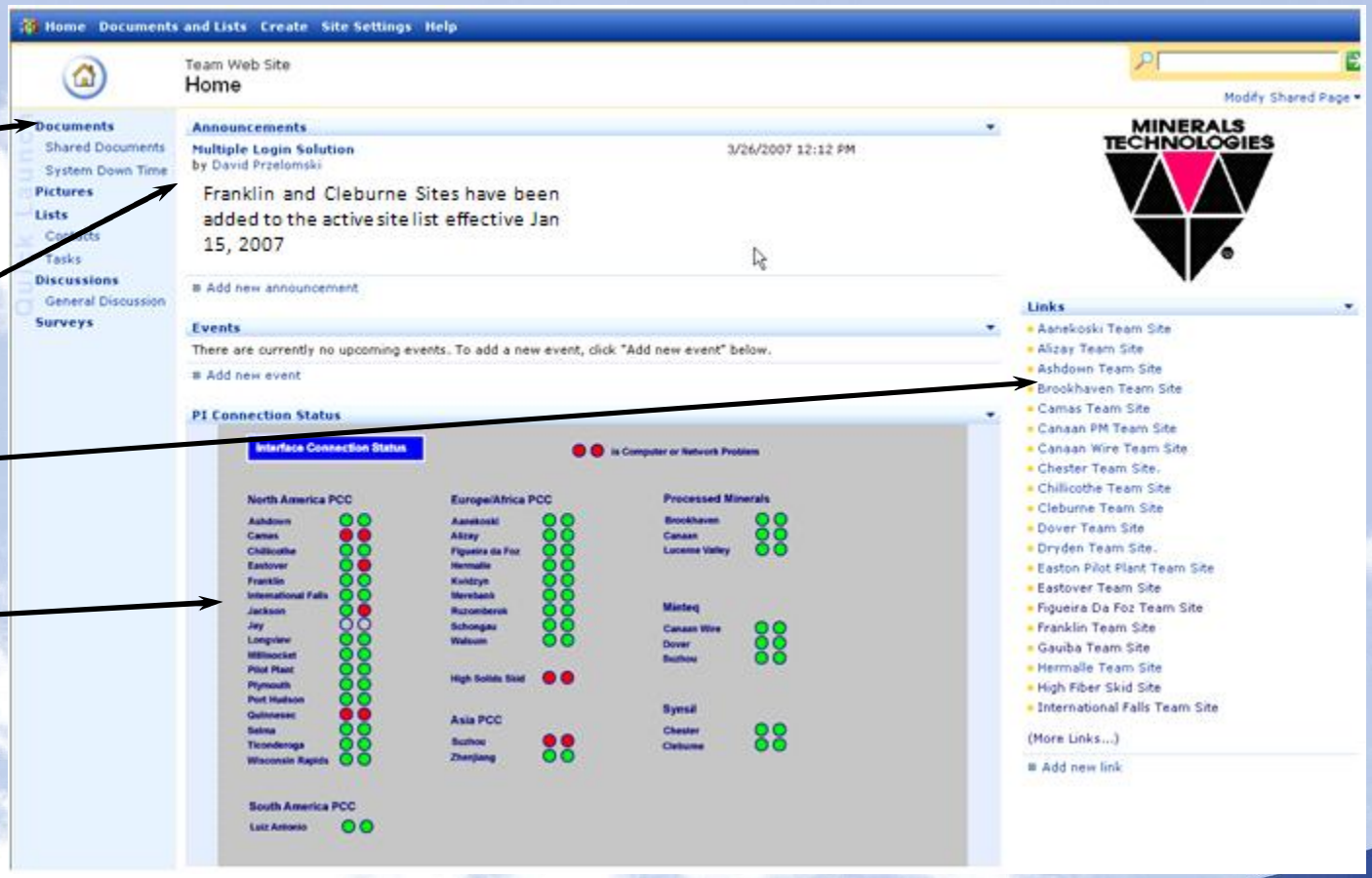
Home site

Document Link

General Announcements

Team site Link

Status Display



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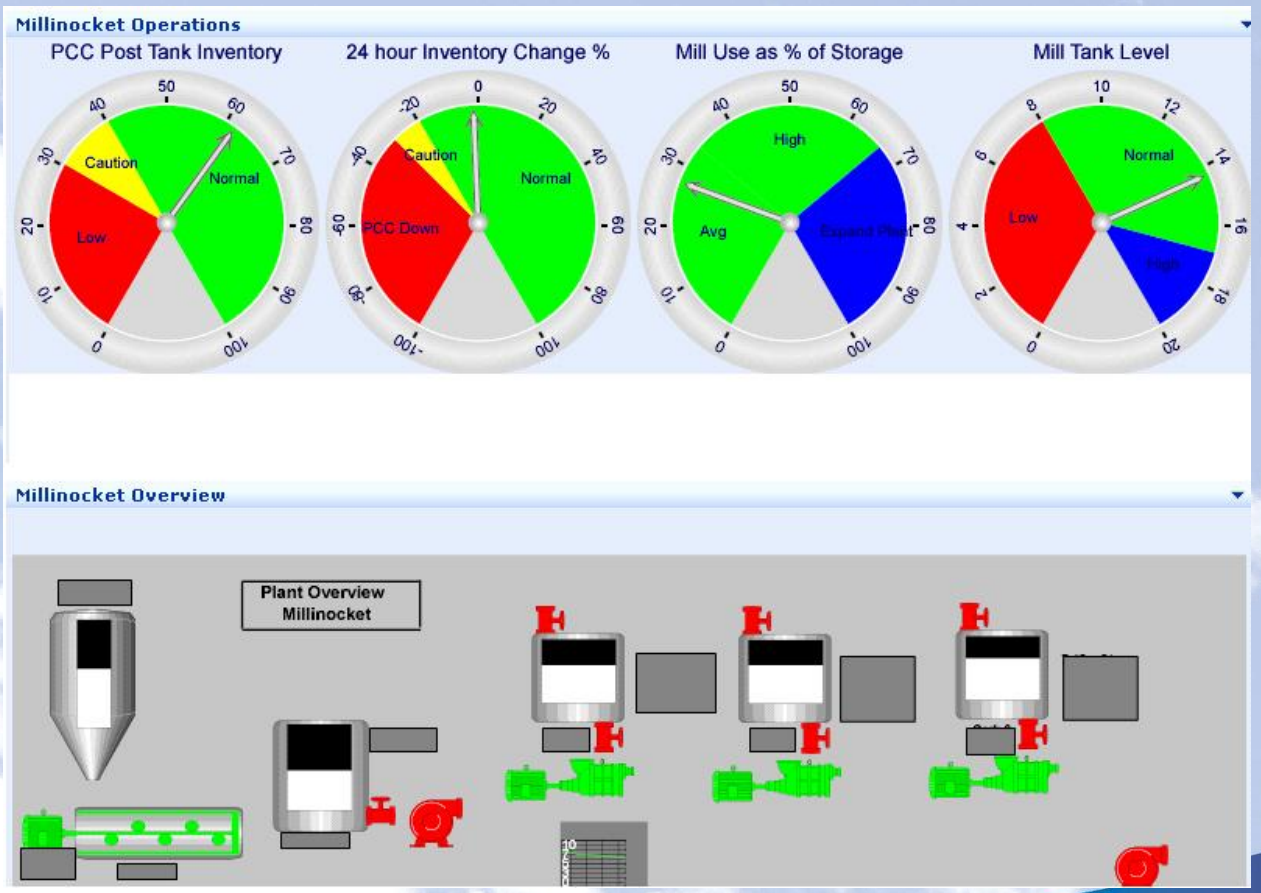
Team site Overview

KPI Display →

Trends →

Status Display



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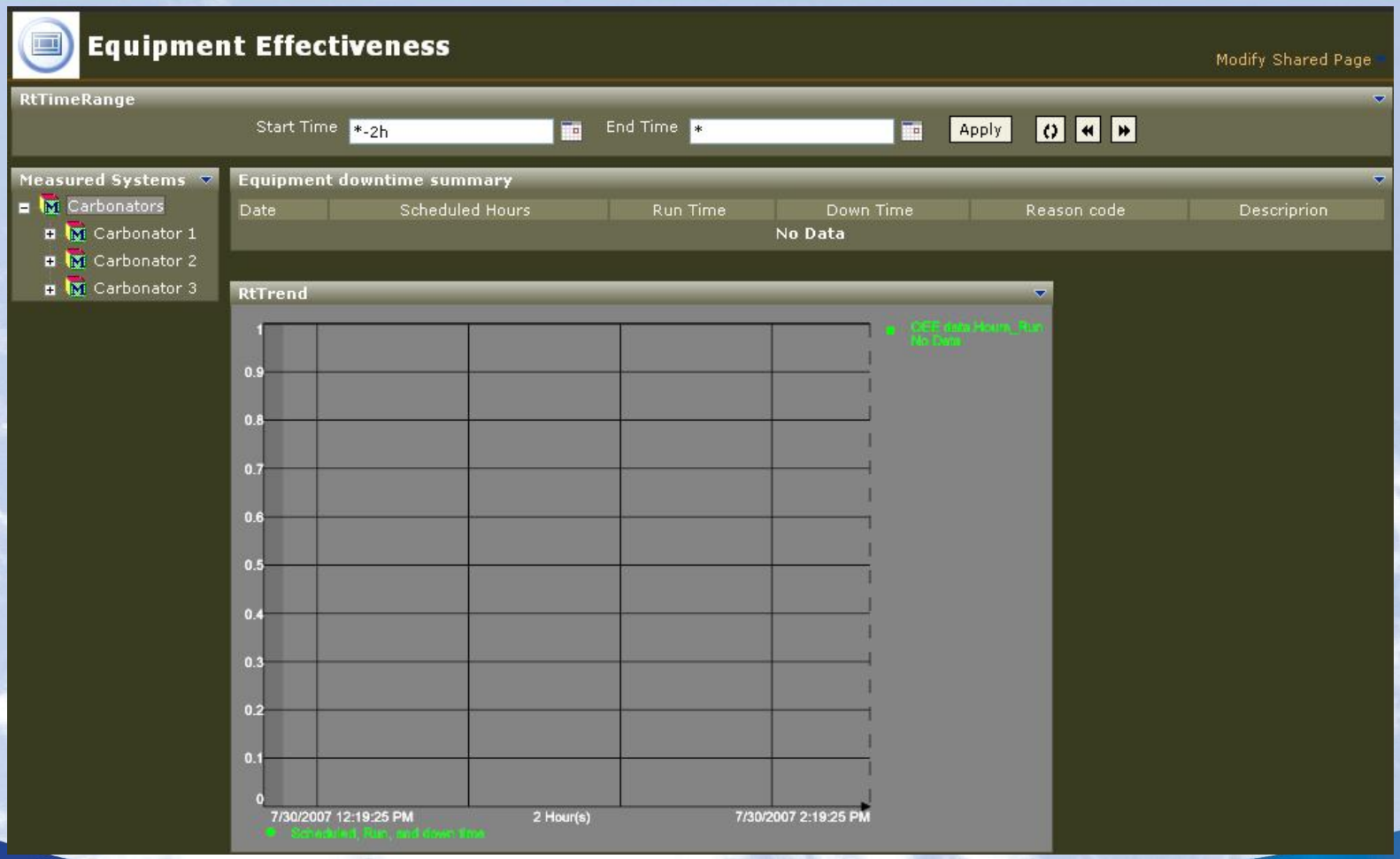
RtWeb Parts example



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Batch Reports example

Plant Y

Batch Report Summary 7/3/2006

Environmental reporting

	Total # Batches	Batch Cycle	Gassing Time
Carb 1	10	100	100
Carb 2	10	100	100
Carb 3	10	100	100
Carb 4	0	0	0
Carb 5	0	0	0
Carb 6	0	0	0
Carb 7	0	0	0
Total	30	300	300

Step 1: Enter date in fields below

Day	Month	Year
3	7	2006

Step 2: Click the button to get the daily summary

GetSummaryData

Step 3: Verify the accuracy of the data in the table below and to the left

Step 4: Click the button below to update the yearly summary tab

UpdateYearlySummary

Batch	Start Time	End Time	Duration	Product	Carb	Batch Cycle	Gassing Time
605331	7/2/2006	7/3/2006	72:00:00	2	1	xx	xx
605332	7/2/2006	7/3/2006	73:00:00	2	1	xx	xx
605333	7/2/2006	7/3/2006	74:00:00	2	1	xx	xx
605334	7/2/2006	7/3/2006	75:00:00	2	1	xx	xx

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Phase I: System Users

- Customers / Suppliers
- Upper Management
- Business Teams and Work Groups
- Operations and Operations Management
- Technical and Operations Support Groups

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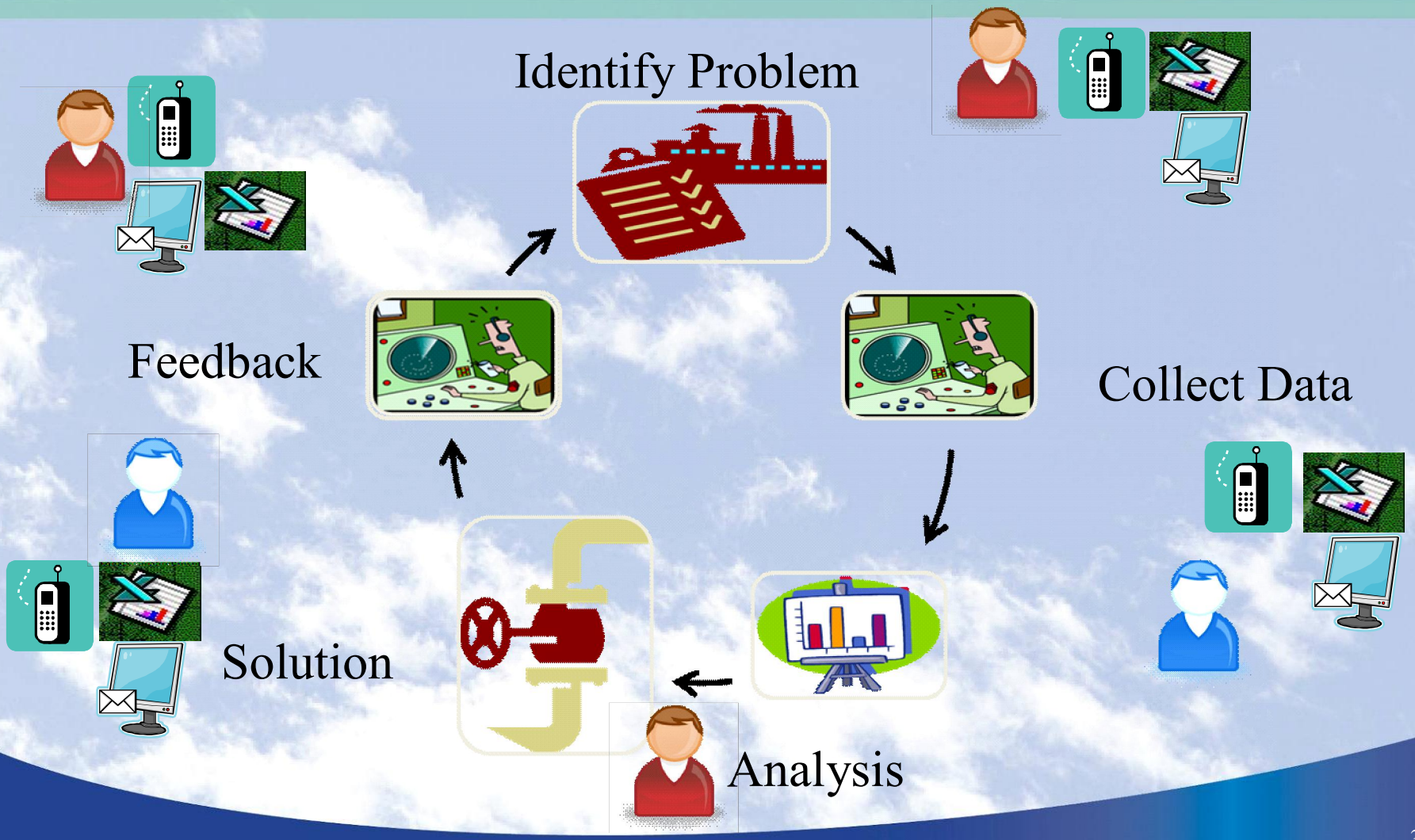
Previous Information Flow



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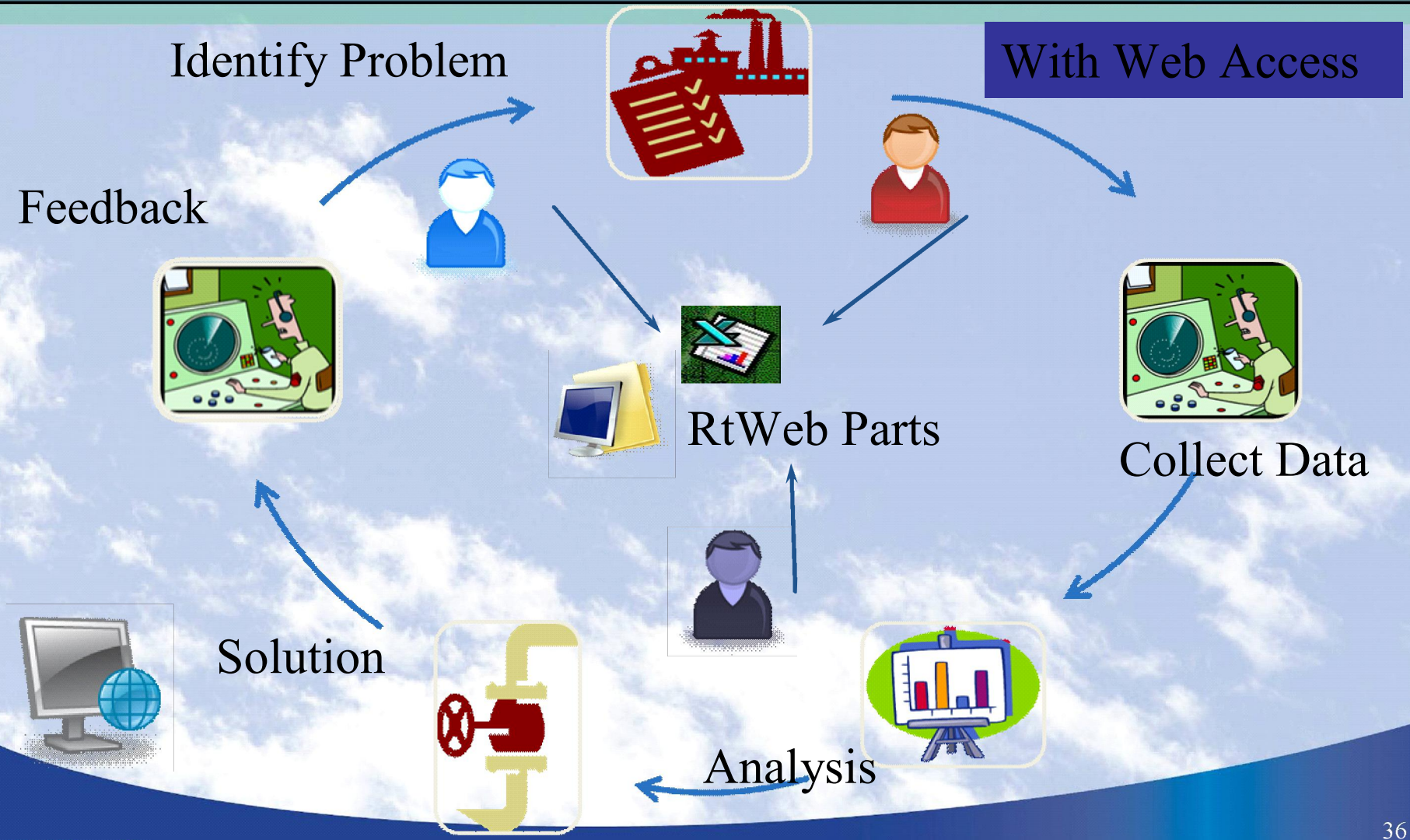
Collaborative Process Improvements



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Benefits of collaboration

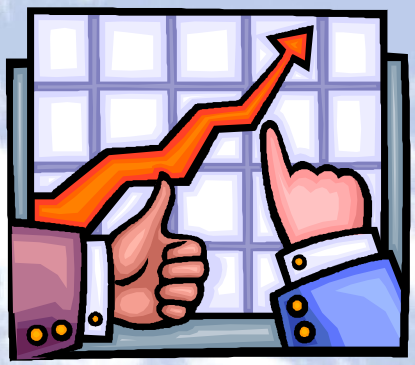
Web Data Access

Effects:

- Opportunity identification
- Data Collection
- Analysis
- Verification

Results in:

- Reduced time cycle
- Less effort
- Defined metrics
- Improved ROC



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Phasing

Phase	Components	Status	Timeframe
I	PI Infrastructure for PCC Sites	Complete	2006
II	Expand Capacity and Interface Additional Sites	In-Progress	2007/2008
III	Advanced Applications using RtWebParts and MOSS 2007	Planning	Mid 2007 -

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Phase III Goals

- Integrated and contextual views of process operations and financial impact
- Document control and collaboration
- Standardize Process
- Eliminate Antiquated Processes/Systems
- Alerting and Advanced Applications

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The Approach

- RtPortal Workshop
  - Vision
  - Architectural Design & Proof of Concept
  - Implementation Planning

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Process

- Training
- Visioning/Requirements/Scoping
- Architecture
- Proof of Concept
- Implementation Plan

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Timeframe

Task	Week 1	Week 2	Week 3	Week 4	Week 5	Week 7	Week 8
Kickoff							
Training Preparation							
Training Setup							
Training							
Overall Strategy Sessions							
POC Requirements Session							
POC Preparation							
POC Workshop							
High Level Architecture Document							
Implementation Plan							
Final Presentation							

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Vision

- Enhance Management Control
- Improve Global Communication
- Increase Efficiency of the Business Process
- Cost/Incident Avoidance
- Leverage Current Technology Direction (OSIsoft)

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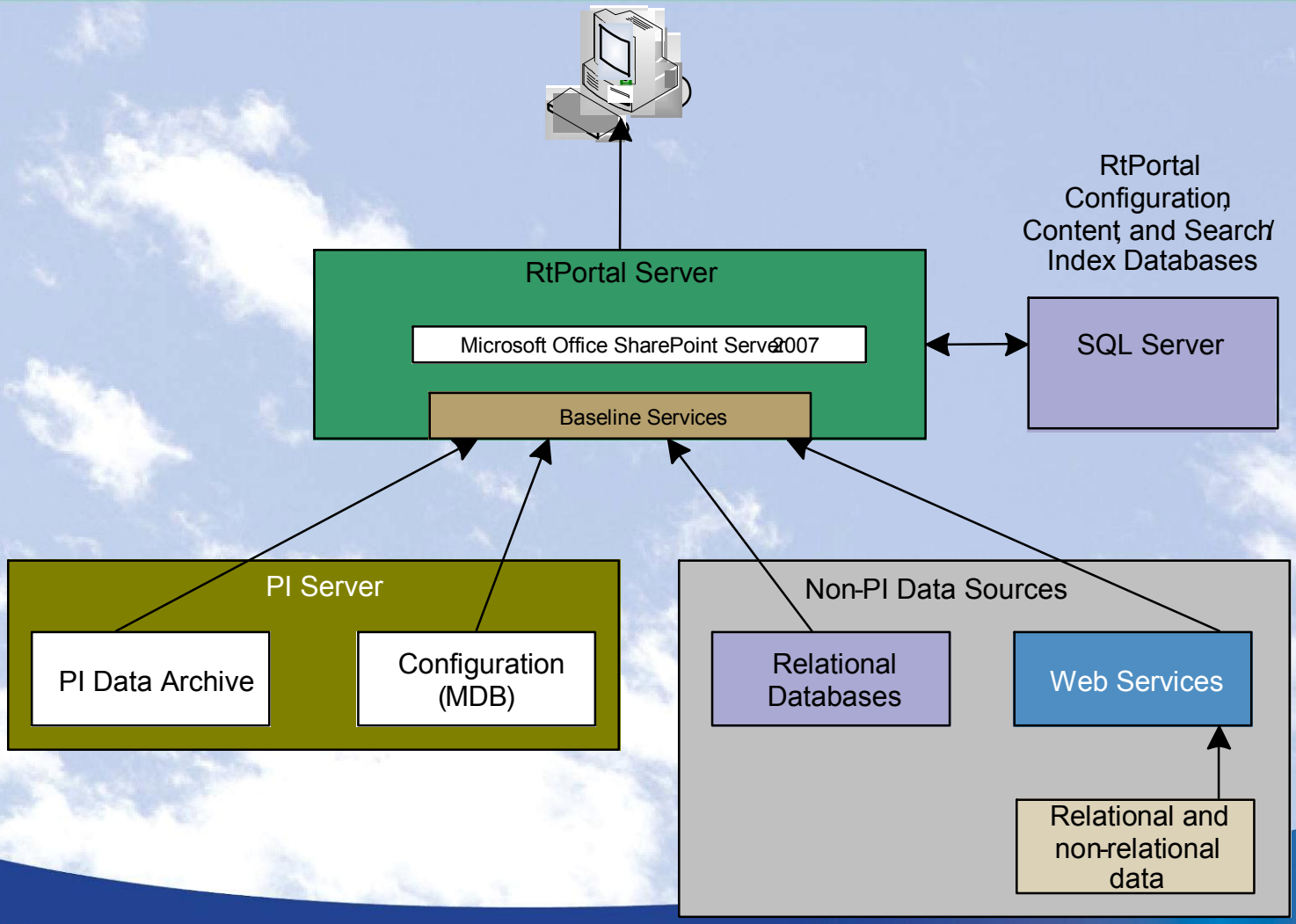
Architecture



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Advanced Functionality

- Document Management/Workflow
- Process Modeling/Optimization
- Lab Data Collection/Analysis/Reporting
- Statistical Process Control
- Batch/Recipe Workflow
- KPI's Dashboards
- System Health Monitoring
- Environmental Reporting

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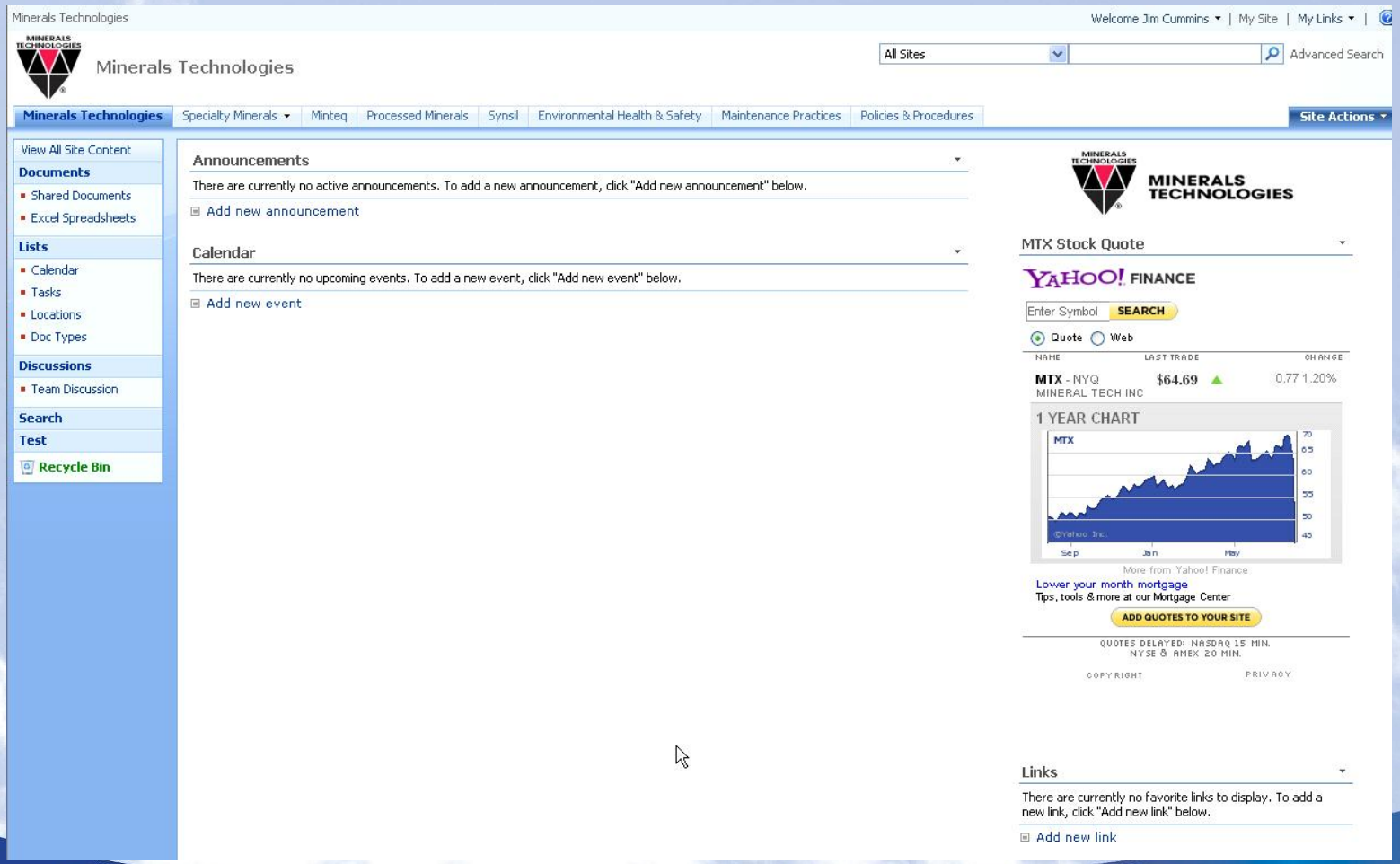
RtWebparts/MOSS POC



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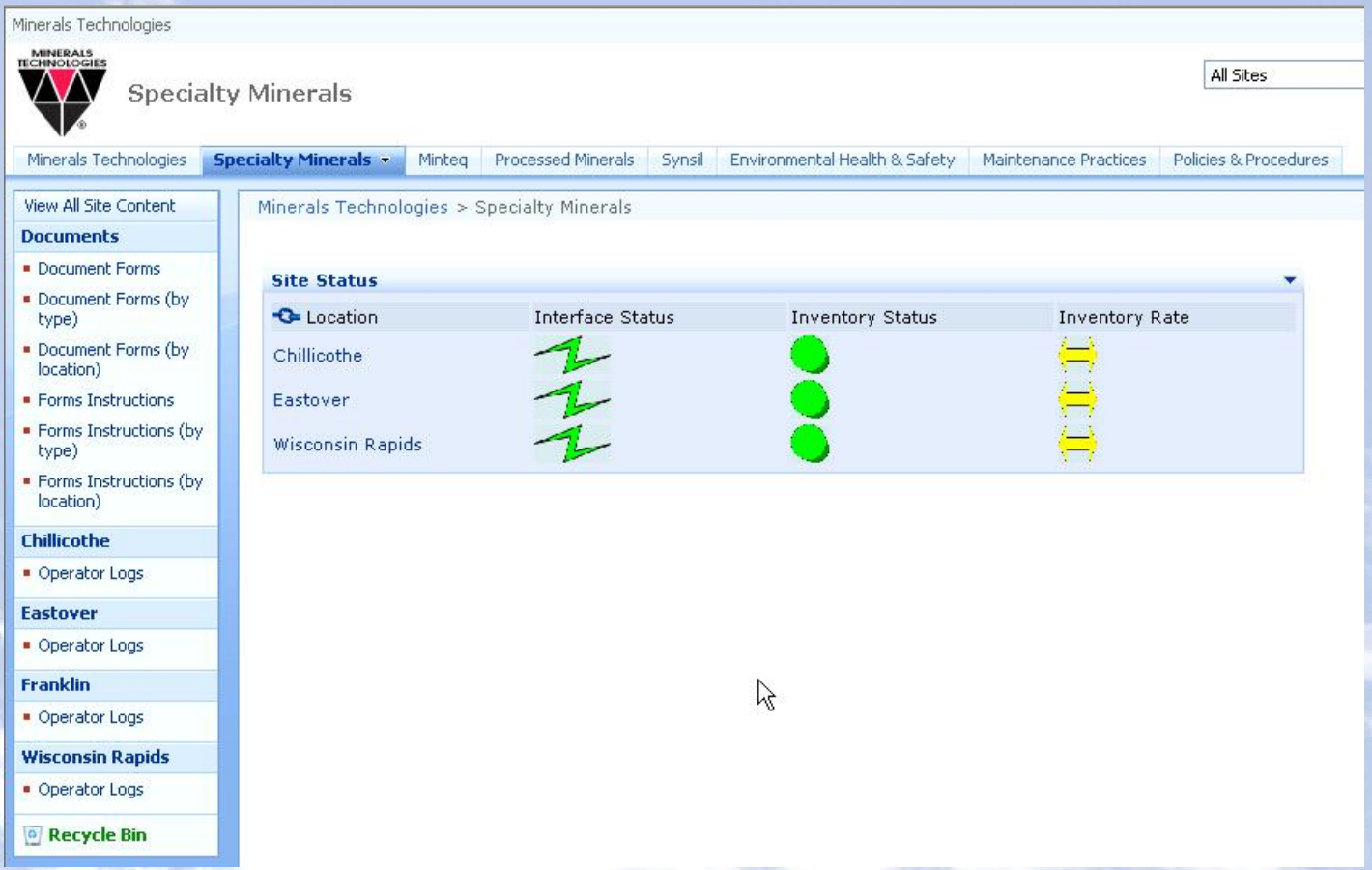
Specialty Minerals Site: KPI



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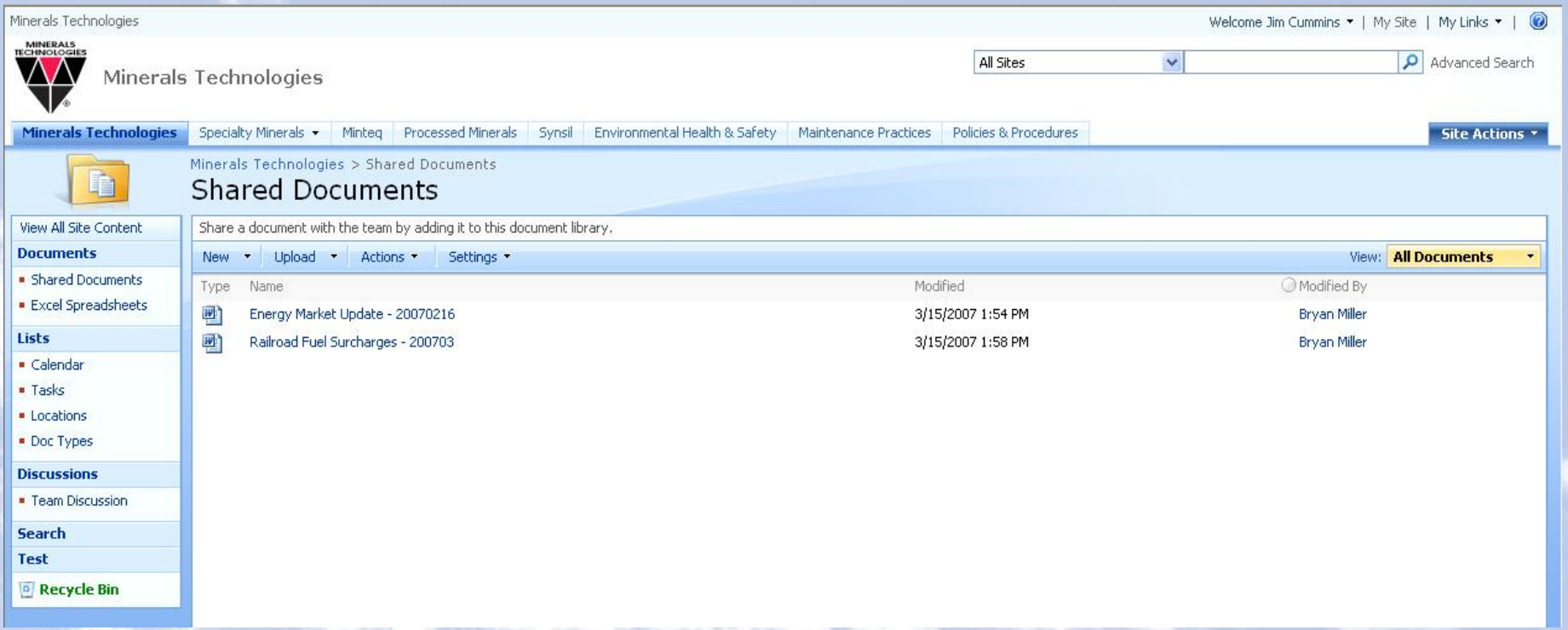
Document List



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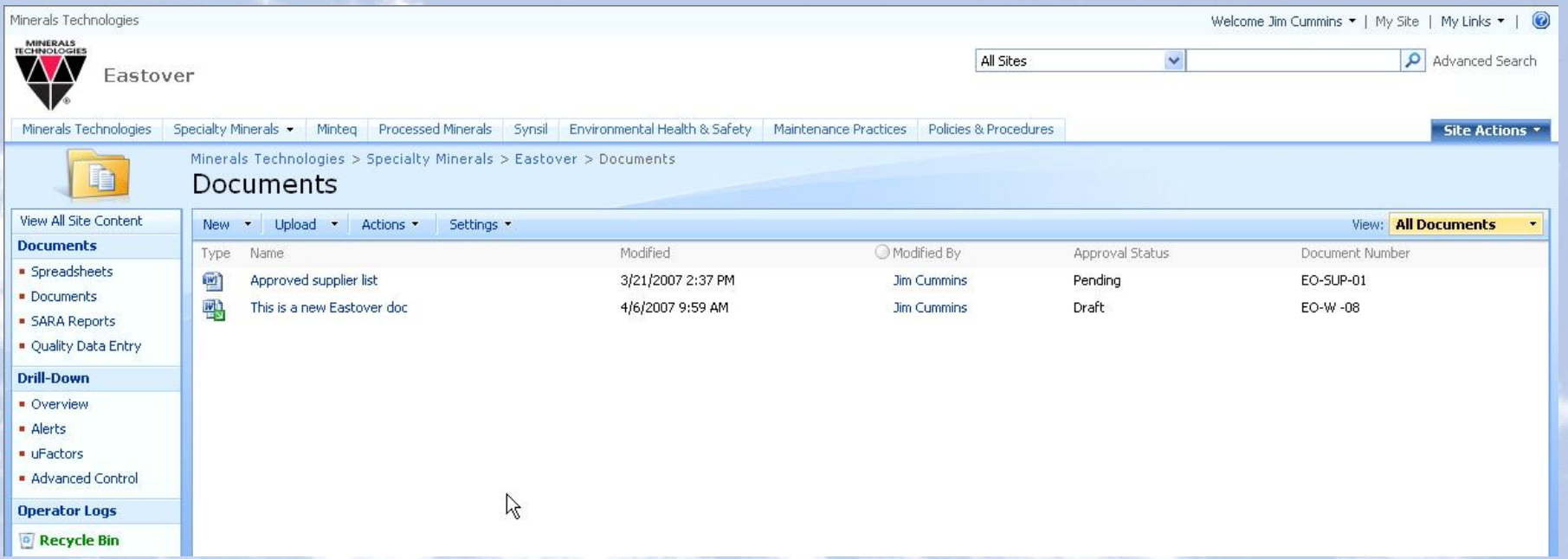
Document Control



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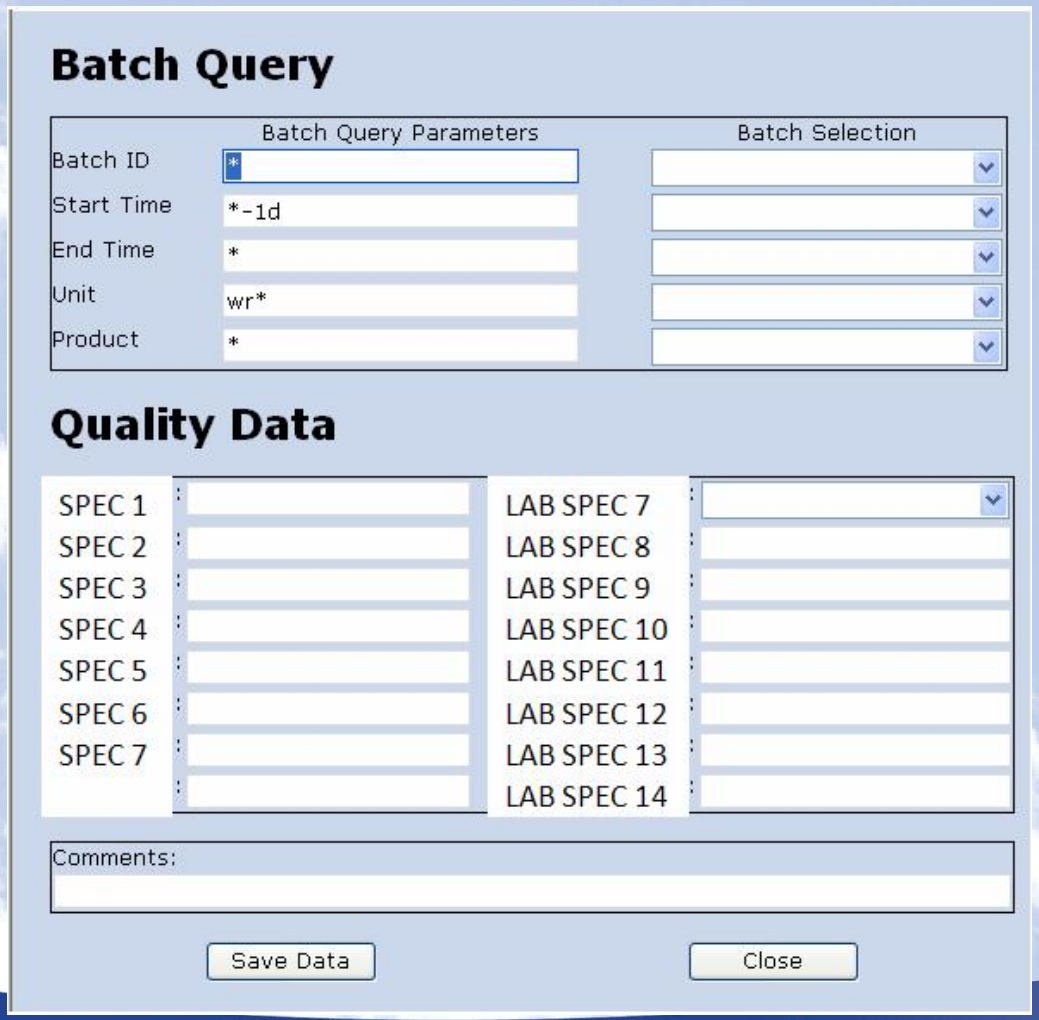
Lab Data Using InfoPath Entry



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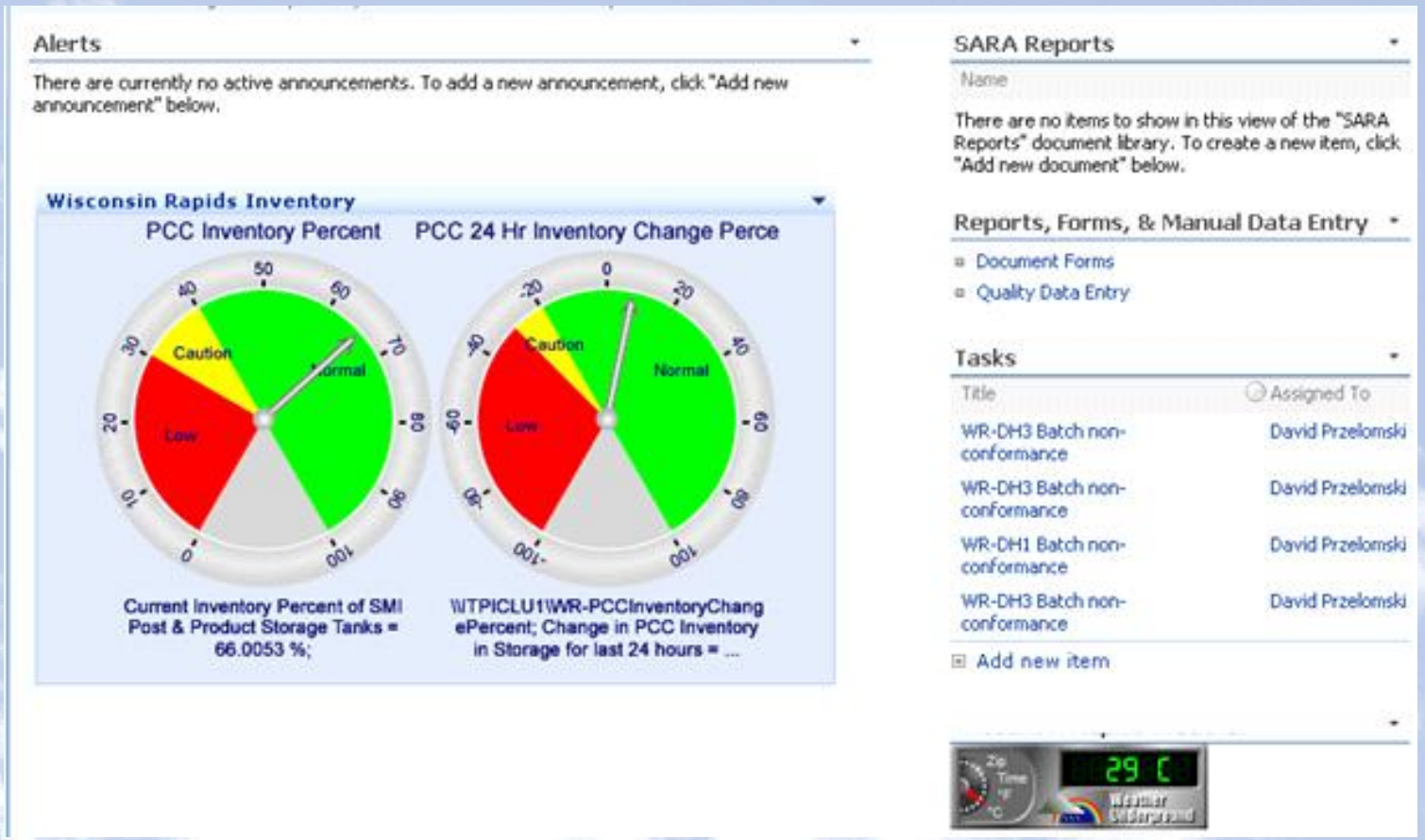
Alerts and Task Assignments



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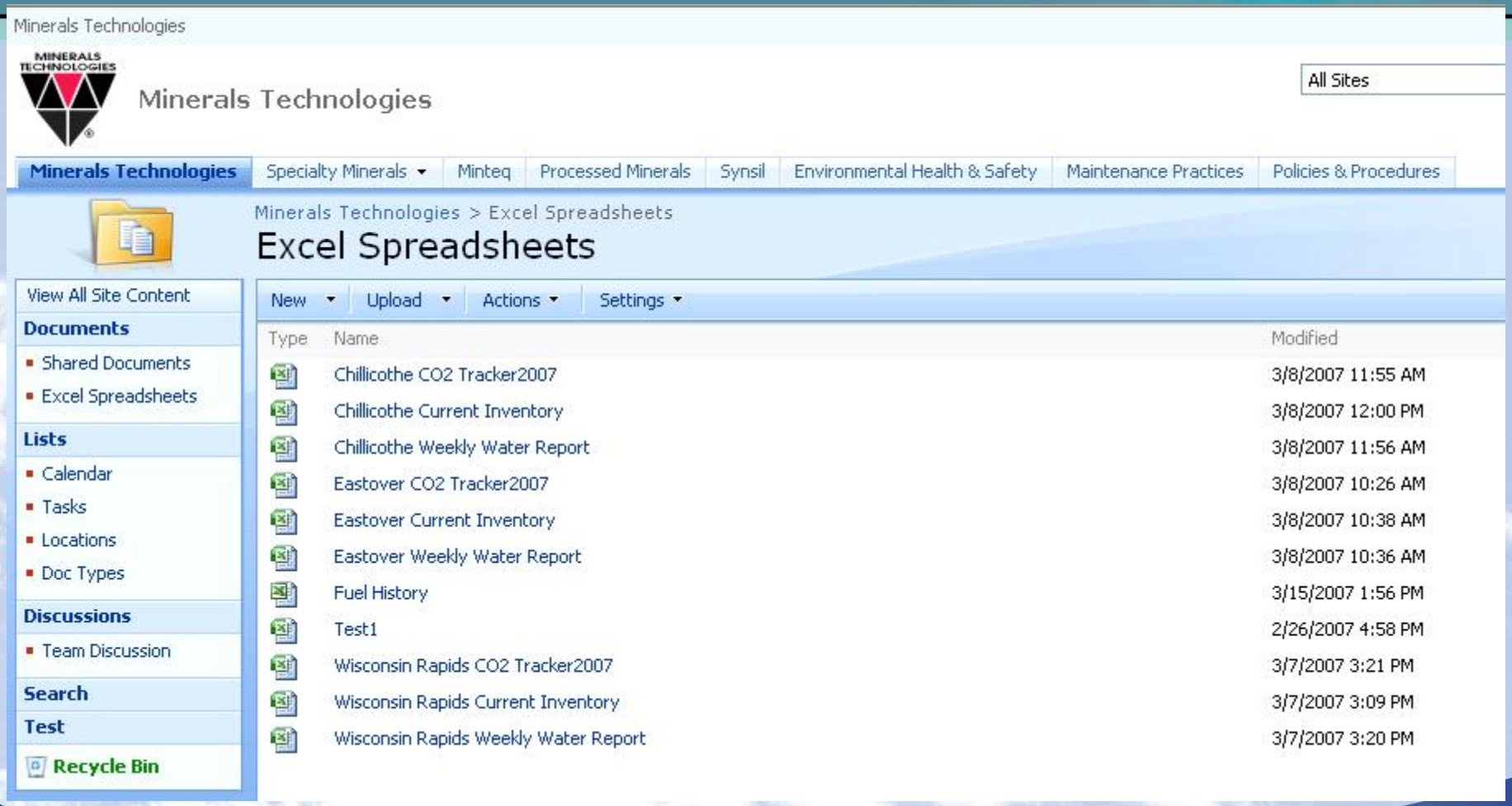
Excel Services



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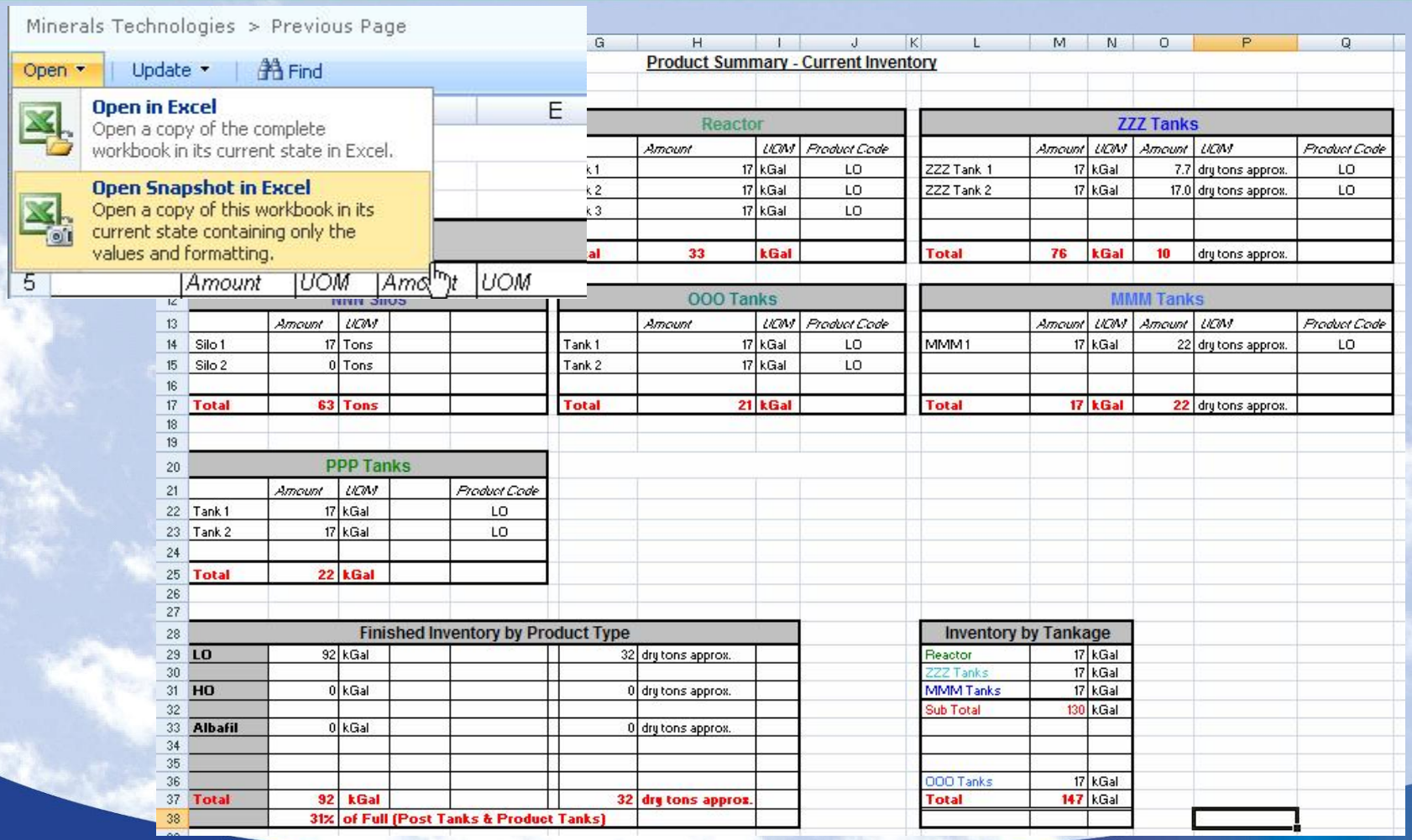
Web Page to Excel



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