OSIsoft® UC2010

Real Time Information — Currency of the New Decade

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OSIsoft® UC2010

PI Network Health Monitoring in Real-time utilizing IT Monitor, PI AF and PI WebParts

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Eastman Chemical Company

EASTMAN

www.eastman.com

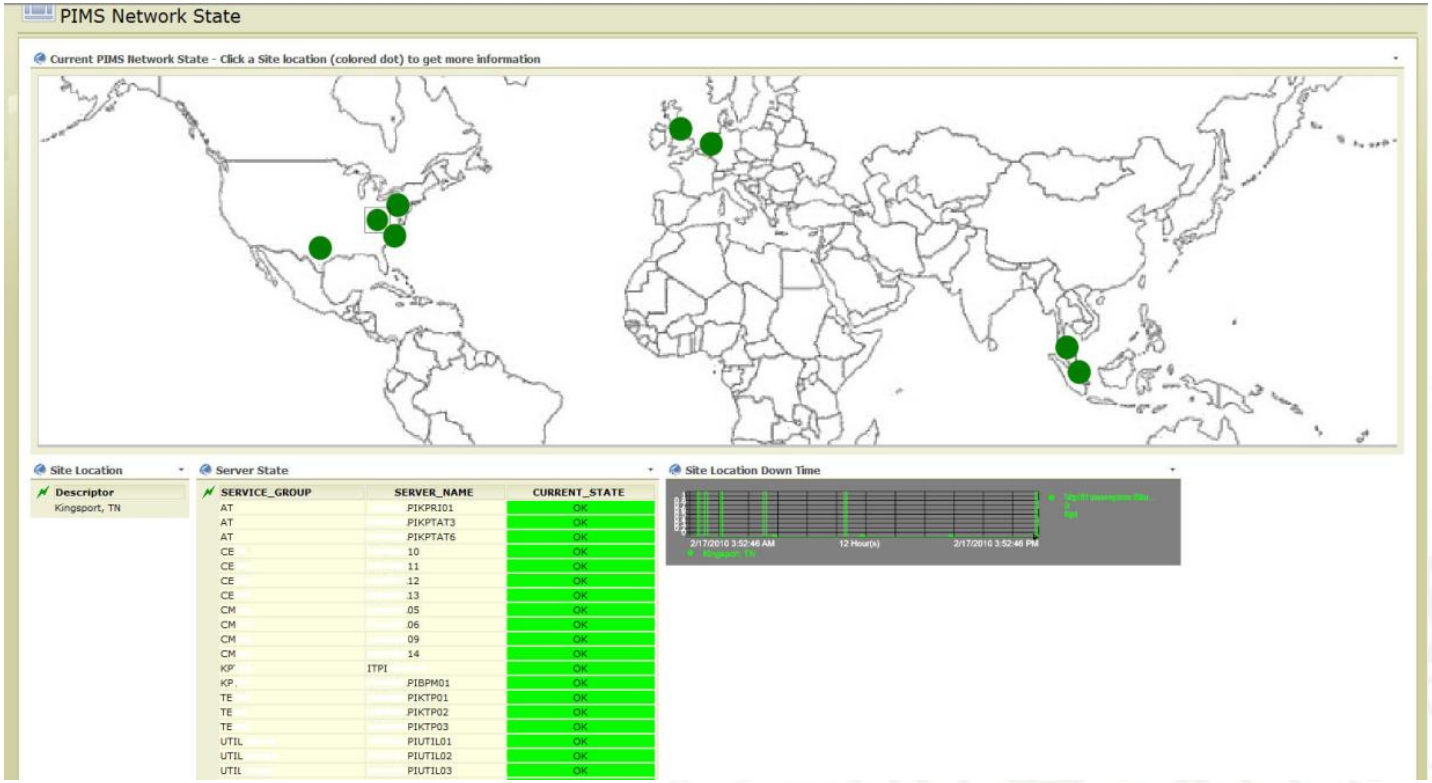
Key Facts

- 2009 Sales Revenue of $5 billion
- Approximately 10,000 employees worldwide
- NYSE Symbol: EMN
- 13 manufacturing locations and several sales offices around the globe
- Responsible Care® company
- Corporate Headquarters in Kingsport, Tennessee

- Eastman is divided into five business segments including:
  - Coatings, Adhesives, Specialty Polymers and Inks
  - Fibers
  - Performance Polymers
  - Performance Chemicals and Intermediates
  - Specialty Plastics

What are we learning about today?

BI/KPI driven n-tiered application



Key Advantage: Single glance assessment and advisement

Initiative

Mission

The IT Incident Response Team (ITIRT) exists to provide effective containment and recovery from detrimental events on information technology capabilities

Responsibilities

Prepare……maintain this plan and assist other units to prepare for a wide variety of incidents.

Respond

- **Detect**……...activate team and alert others
- **Assess**……..determine incident scope and severity
- **Contain**…….prevent further damage / interruption
- **Correct** …….repair compromised resources

Inform……...share timely information

Critique…….improve prevention, education and future responses

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Measure…….Gather metrics

Design Challenges

Criteria Focus

- Easier way to evaluate data
- Simple graphical visualization
- Aggregate into division-wide metrics

Questions

- *What is the value of uptime?*
- *How to measure and report performance?*
- *How to extend the application?*

The Value of Uptime

365 days x 24 hours = 8760 hours per year

Computing Environment *24x7 coverage*	Hour Unavailable
90%	876
95%	438
99%	87.6
99.9%	8.76
99.95%	4.38
99.99%	0.876
99.999%	.0876
99.9999%	.00876

**A Single PI Server (PS) Uptime has limited dollar impact; it is Proportional to the PS contribution divided by the sum of all network production resources (NPR) (E.G., 1 PS/100 NPR = 0.01 = 1%)*

What do we have to work with?

We Have:

- Over forty PI servers
- Globally connected network system
- OSI PI technology

We Provide:

- Global Site Support
- Control
- Mitigation
- Development Resources

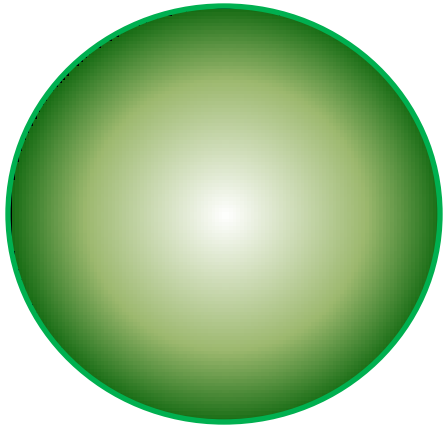
We need to Supply :

- System Availability metrics
- Roll up data into division metrics

	Target	January 2010
Invest		
Value		
Risk		
Operate		
Value		
Declared Incidents (YTD)	2	0
Global Response Time		
Internet Reachability	99.4%	99.89%
IT Support Calls Resolved Without Escalation	90%	90.7%
Patch Saturation	7 days	5 days
System Availability	99.4%	99.96%
EIW	99.4%	100.00%
MESA LIMS	99.4%	100.00%
MESA PIMS	99.4%	99.96%
Oracle Database	99.4%	100.00%
SAP R/3	99.4%	100.00%
Cost		
Risk		
Controls		
Security		
Privacy		
Continuity		

Original Concept – simple KPI

PIMS Status



- Summary of overall status
- Drill-down for more info

Green = OK
Yellow = 1 Down
Red = > 1 Down

The Power of Simple Communication

What does this graphic tell us?

1. Geographical Site locations
2. Two sites have problems
3. The other sites are OK
4. 1 site is completely down

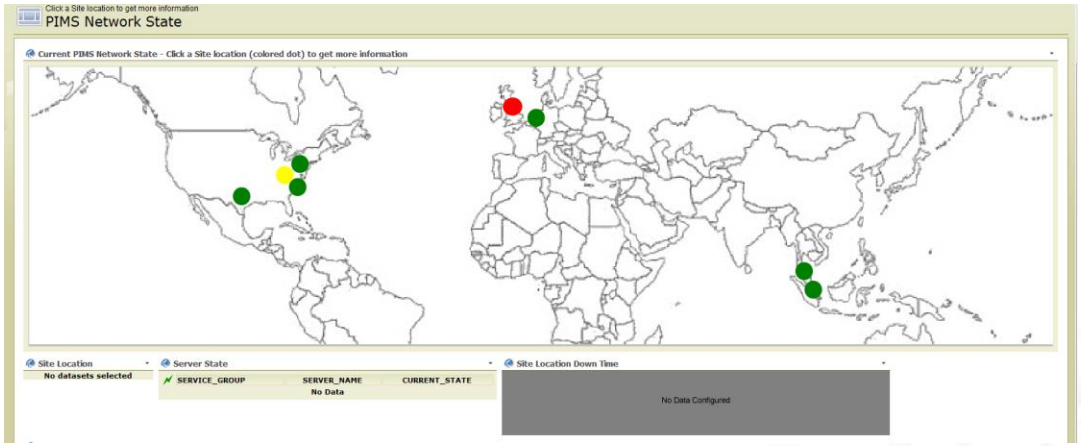
   And…
5. 1 server is down at the other site

   And that means…
6. There is more than 1 server at that site.

   And that means…
7. We have to do more research to find out:
   - ❖ Specific server state(s)
   - ❖ Downtime message(s)

Ideas:

- ❖ Status Report
- ❖ Update meeting
- ❖ Executive summary
- ❖ Etc…



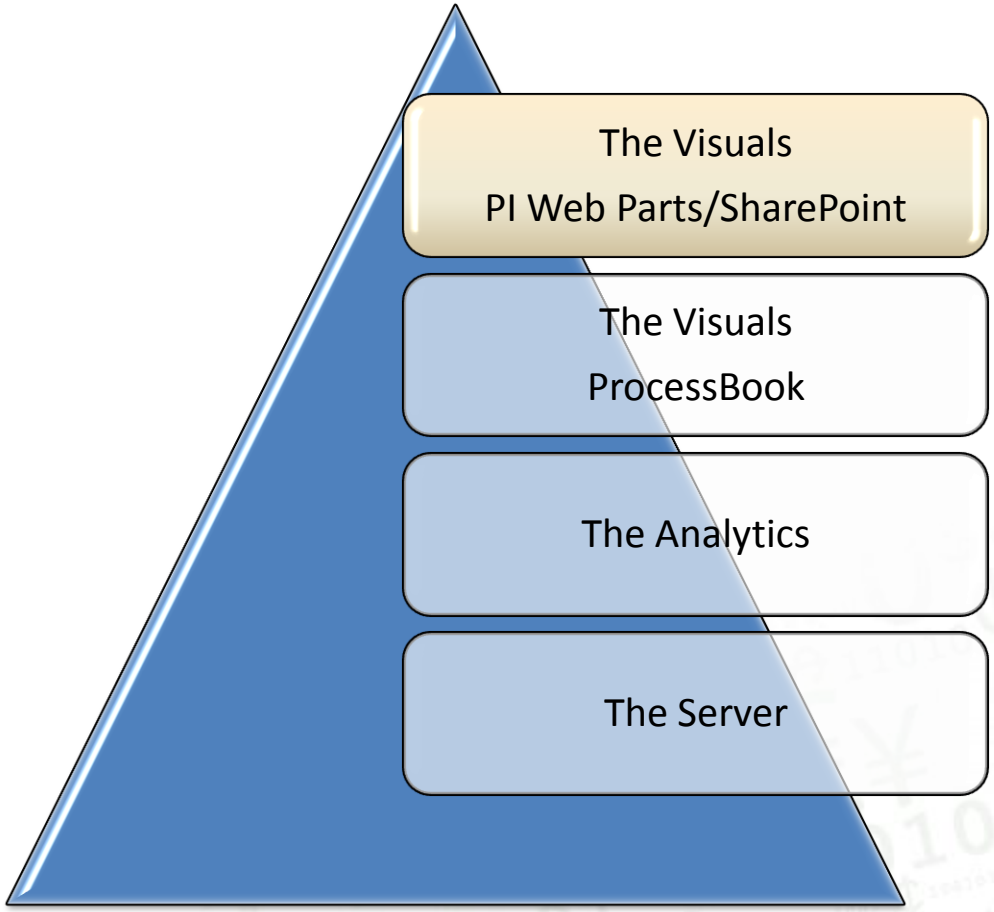
All servers up

1 server down

2 servers down or site down

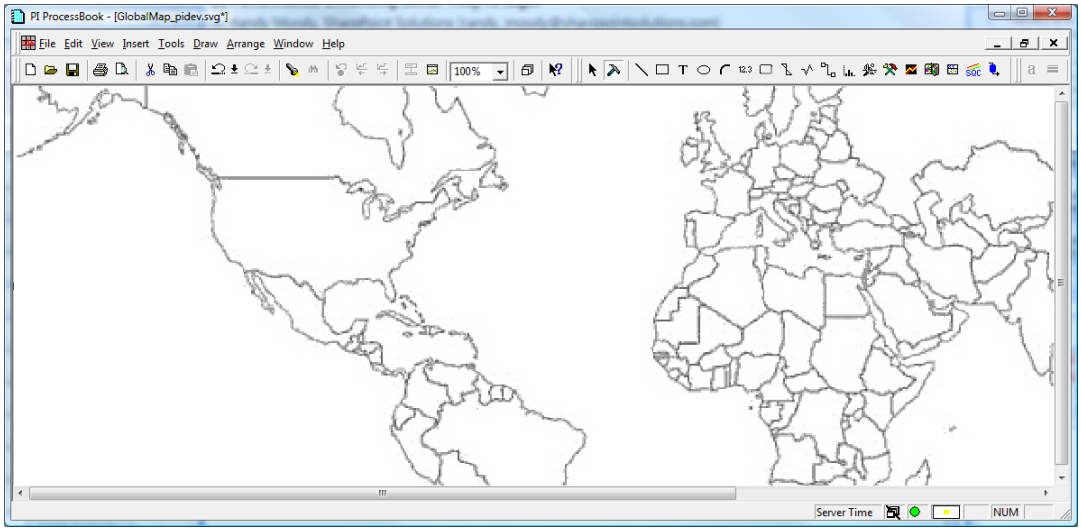
> 2 server down

Application Presentation Layer



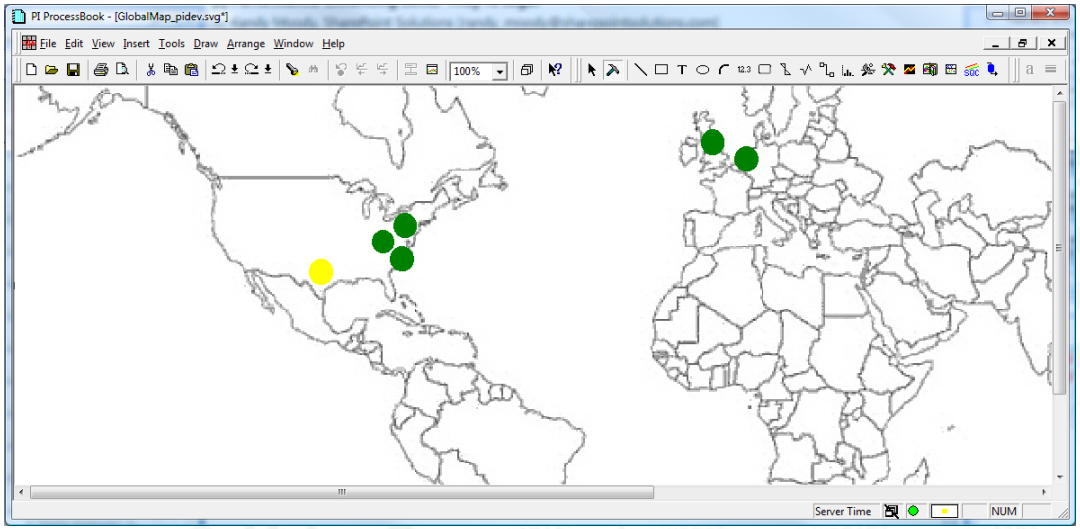
Start with ProcessBook

1. Open a new PDI file



2. Insert JPG as a graphic object

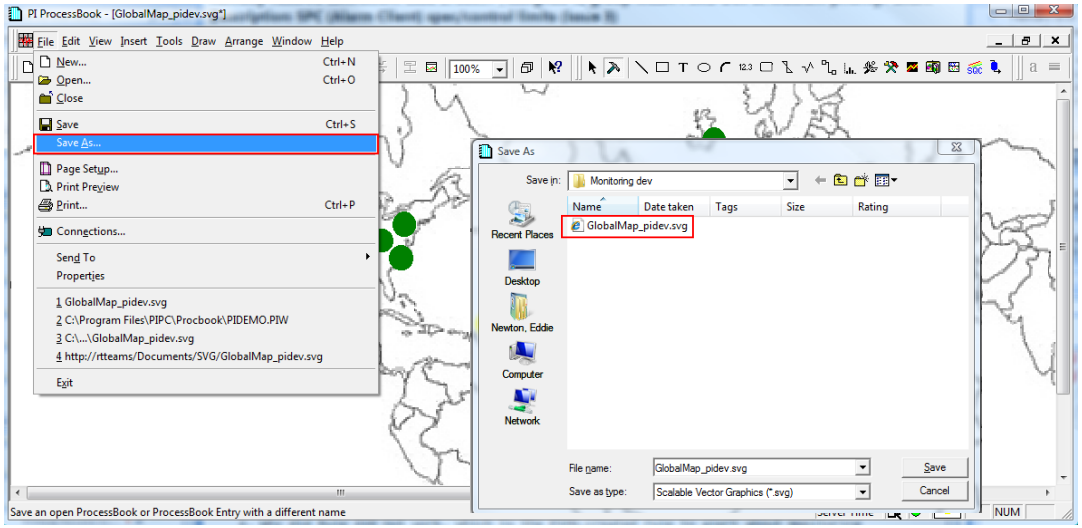
3. Add a symbol object
   1. Select a graphic
   2. Repeat



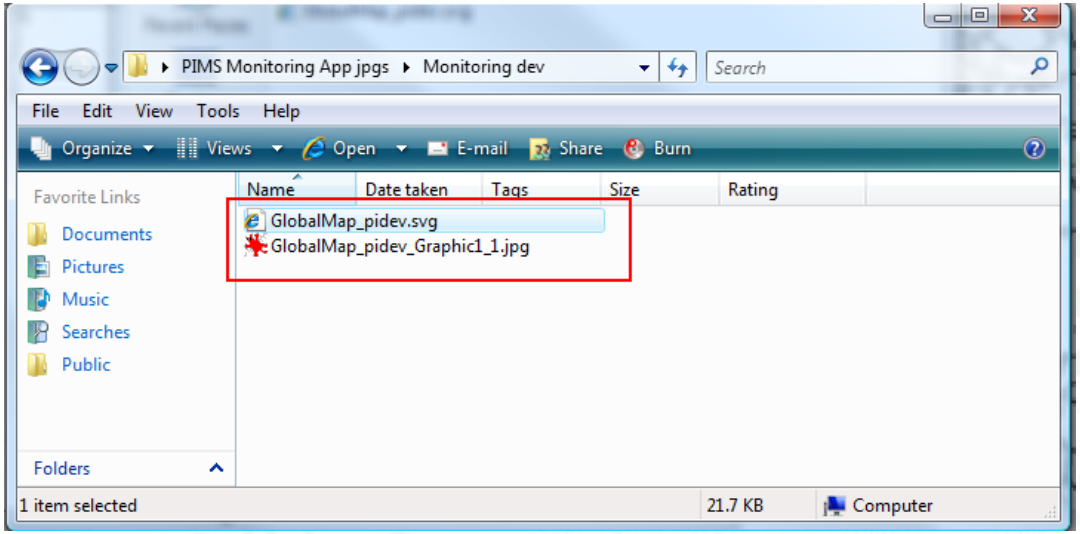
4. Change Symbol to multi-states
   1. Set values and colors

Converting to SVG is as easy as Save As…

1. Click File→Save As…
2. Select SVG as the file type
3. Type in the desired file name
4. Open the folder where the SVG is saved

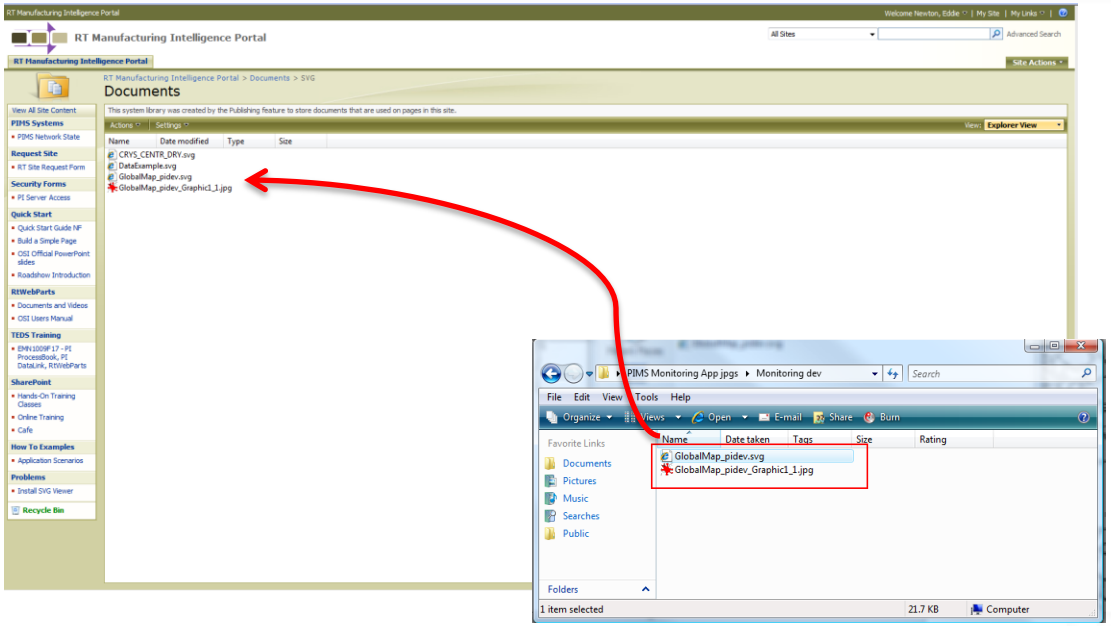


5. Notice that there are now two files.
6. One is the PDI that has been converted to SVG.
7. The matching file(s) is the JPG that is linked to this file



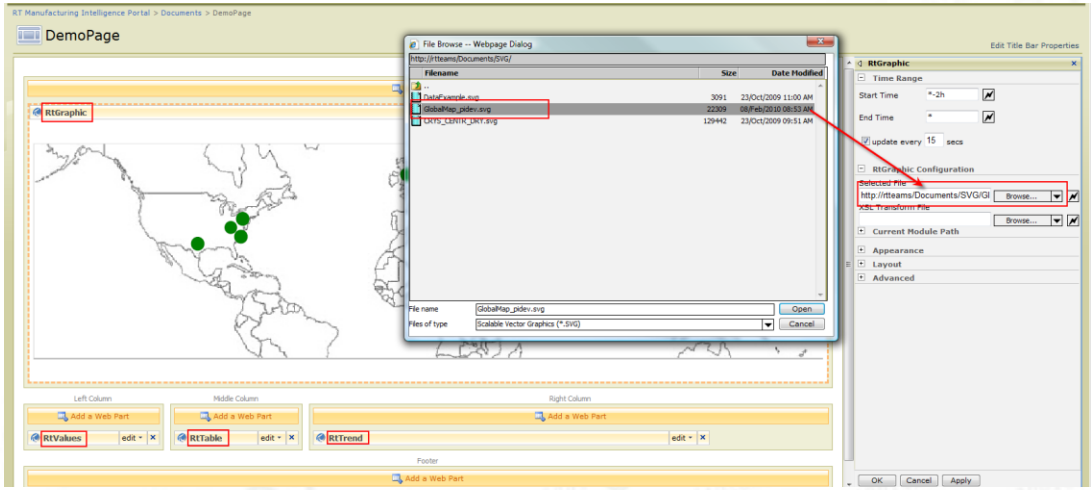
Upload SVG and finish building web page

1. Add all the files to a Document library

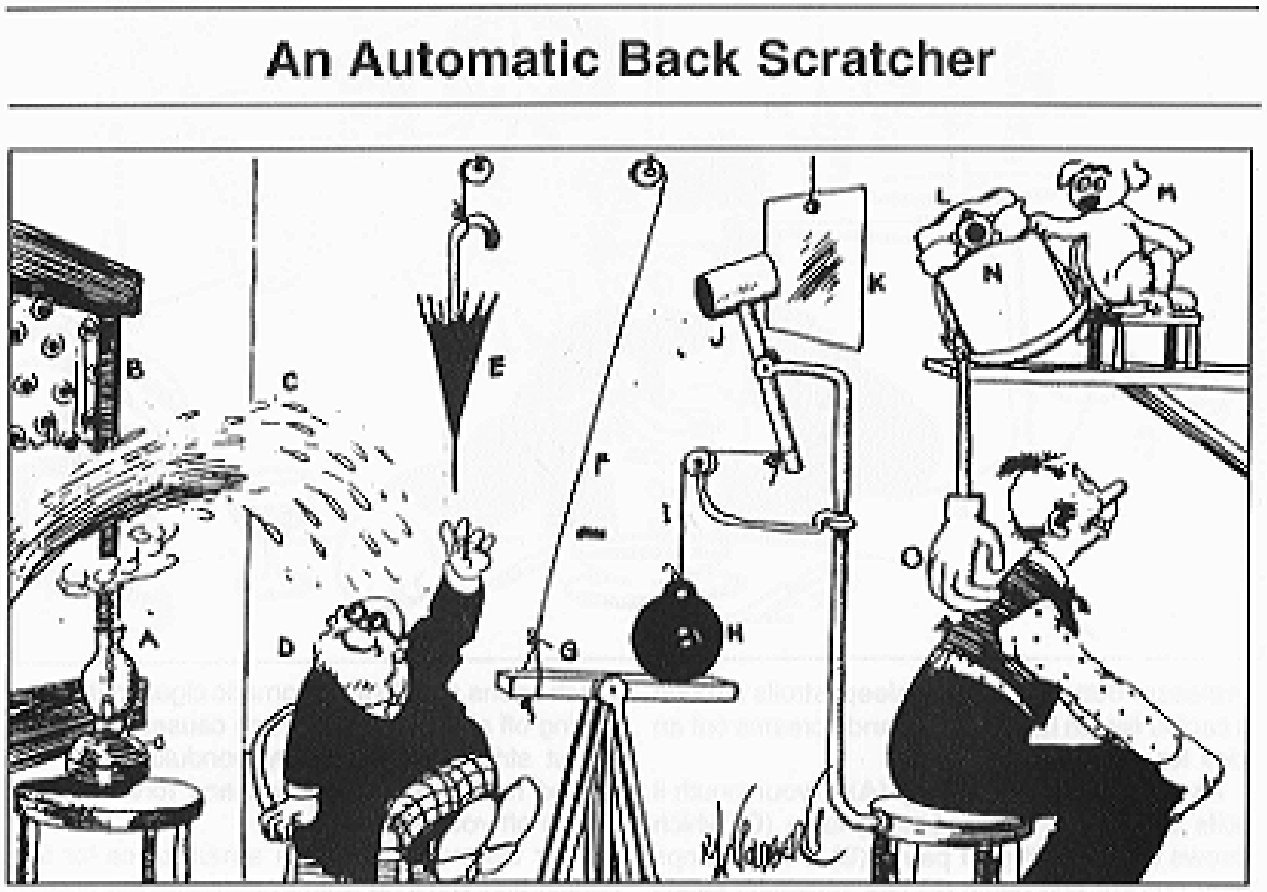


2. Add these PI WebParts to web parts page:
   - PI Graphic
   - PI Values
   - PI Table
   - PI Trend

3. Load the SVG file into the PI WebPart page



RG next

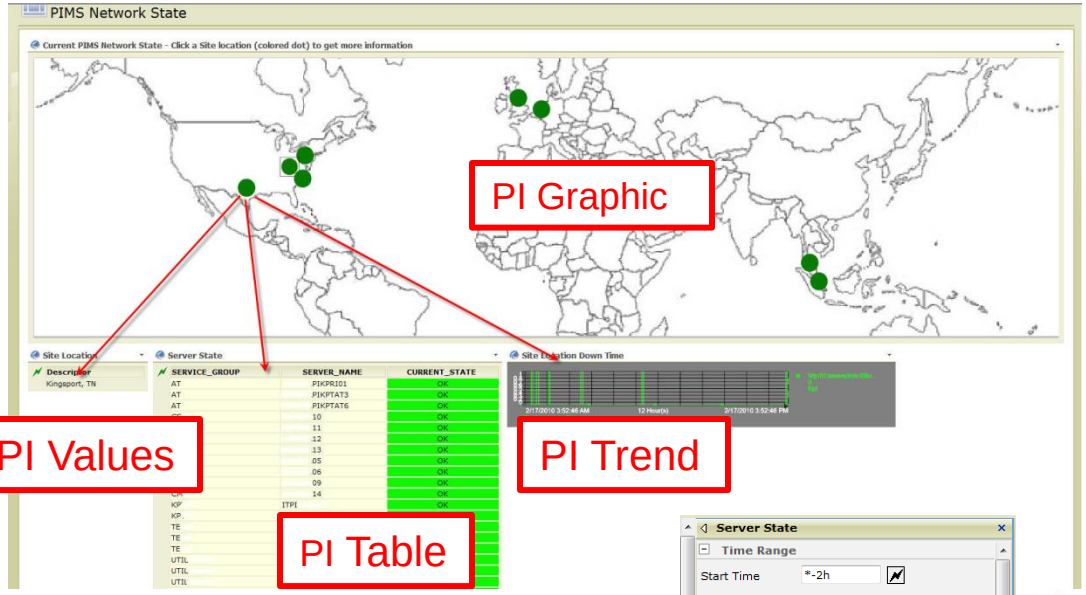


Rube Goldberg would have loved SharePoint

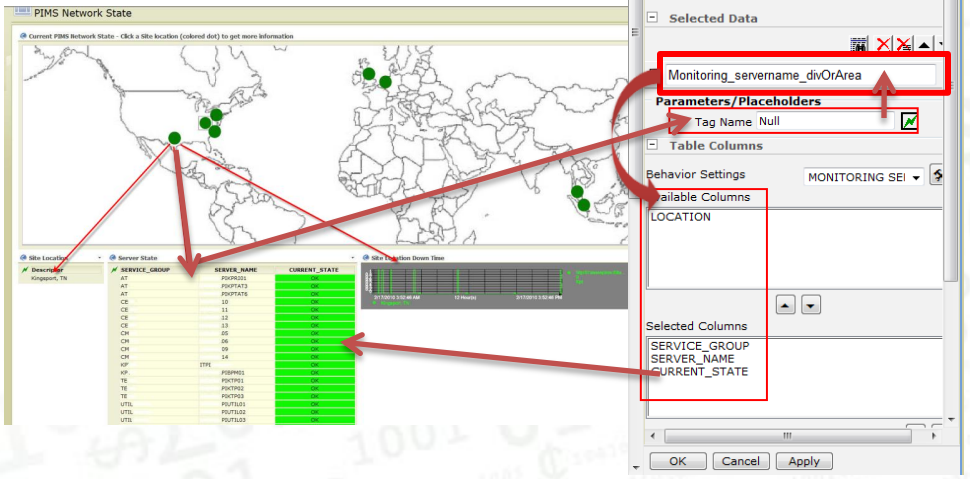
Connect and Configure PI WebParts

1. PI Graphic connects to 3 PIWebParts.

2. PI Values , PI Trend and PI Table
   - ❖ All three connect to connection field (CF) Data Source (DS).
   - ❖ Each part uses DS differently.



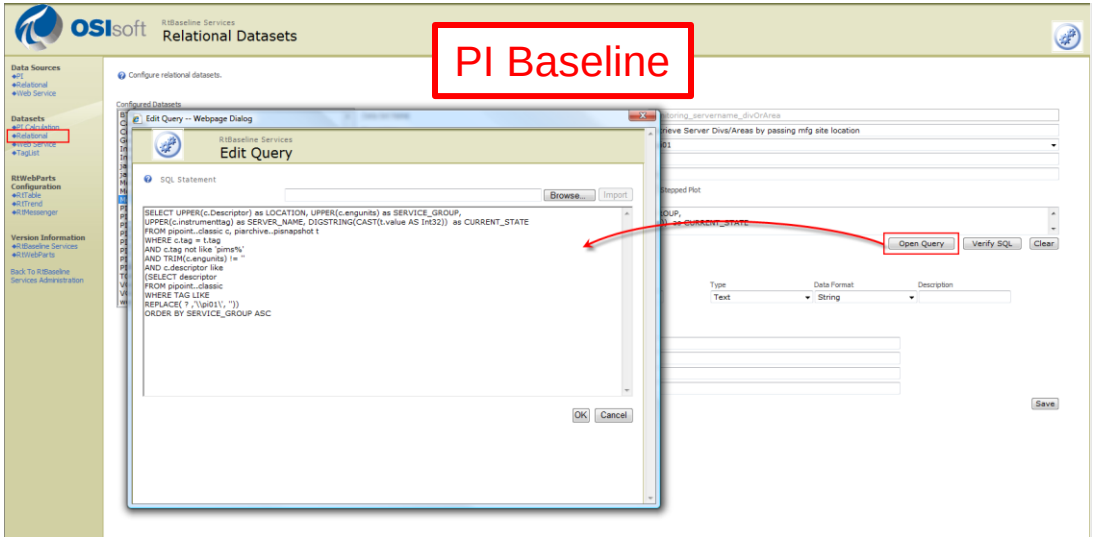
3. PI Table Configuration
   - ❖ PI Table gets Tag Name
   - ❖ Tag Name passed to query as parameter in PI Baseline
   - ❖ Returns dataset to configuration panel
   - ❖ Select columns to display in PI Table



Configure PI Baseline queries

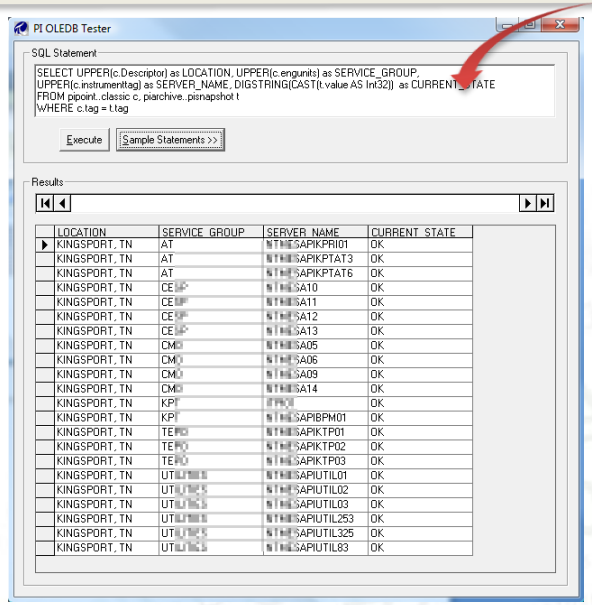
1. PI Table
   - ❖ Links tag name from DS to PI Server that has location, Service_Group, Server_Name and Current_State messages

2. PI Baseline
   - ❖ Complex query to pull specific data



   - ❖ Combine PI OLEDB queries and SQL Database queries

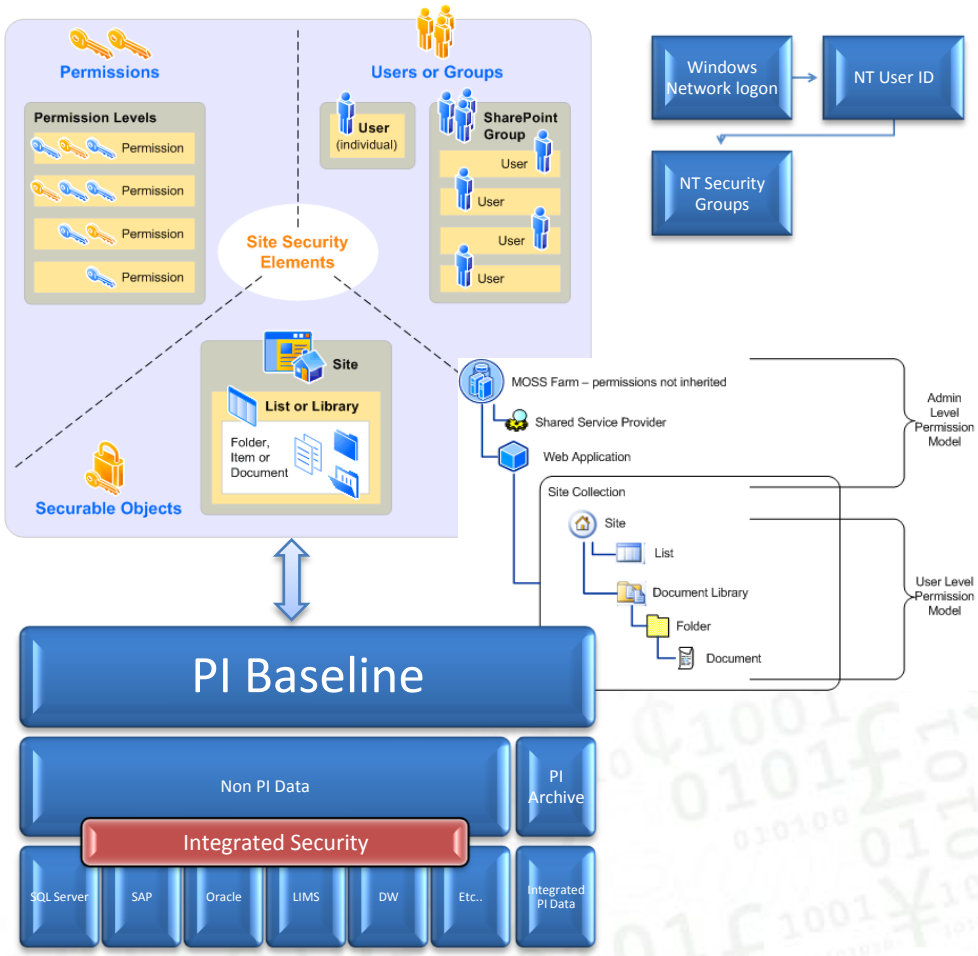
3. Use PI OLE DB Tester to build and test queries against PI
   - ❖ Use this tool to perfect queries
   - ❖ Far right is a sample query from this application



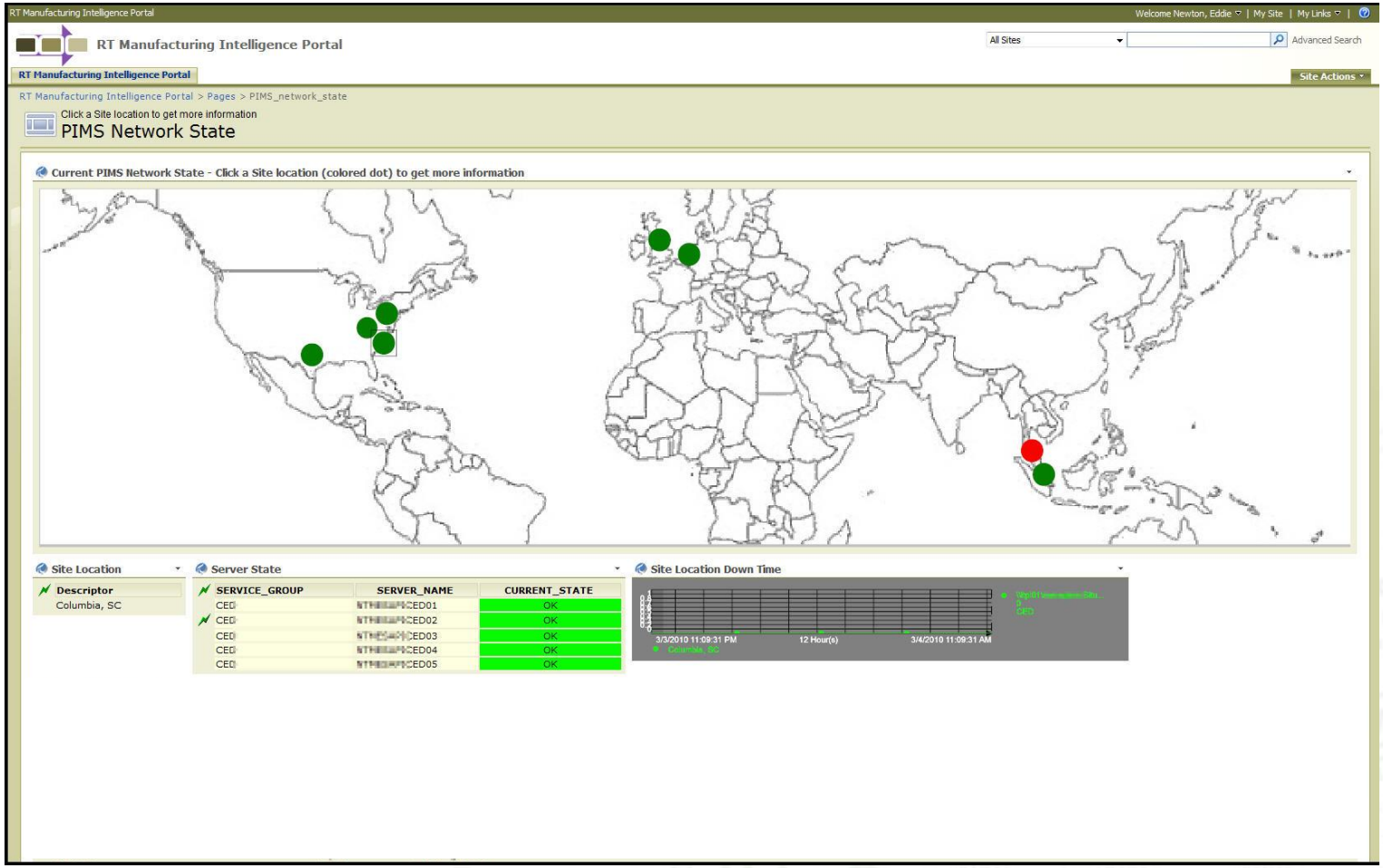

```
SELECT UPPER(c.Descriptor) as
LOCATION, UPPER(c.engunits) as
SERVICE_GROUP,
UPPER(c.instrumenttag) as
SERVER_NAME,
DIGSTRING(CAST(t.value AS Int32))  as
CURRENT_STATE
FROM pipoint..classic c,
piarchive..pisnapshot t
WHERE c.tag = t.tag
AND c.tag not like 'xxxxxxxx%'
AND TRIM(c.engunits) != ''
AND c.descriptor like
(SELECT descriptor
FROM pipoint..classic
WHERE TAG LIKE
'xxxxxxxxx:xxxxxxxxx_KPT.cv')
ORDER BY SERVICE_GROUP ASC
```

Layers of Security

1. Windows Integrated Security (network logon)
2. SharePoint Security Groups
3. SharePoint Audience Security applied to specific web parts
4. PI Baseline Server Page Security
5. PI Baseline leveraging Data Source Integrated Security:
   - PI
   - SQL Server
   - Oracle
   - Etc…

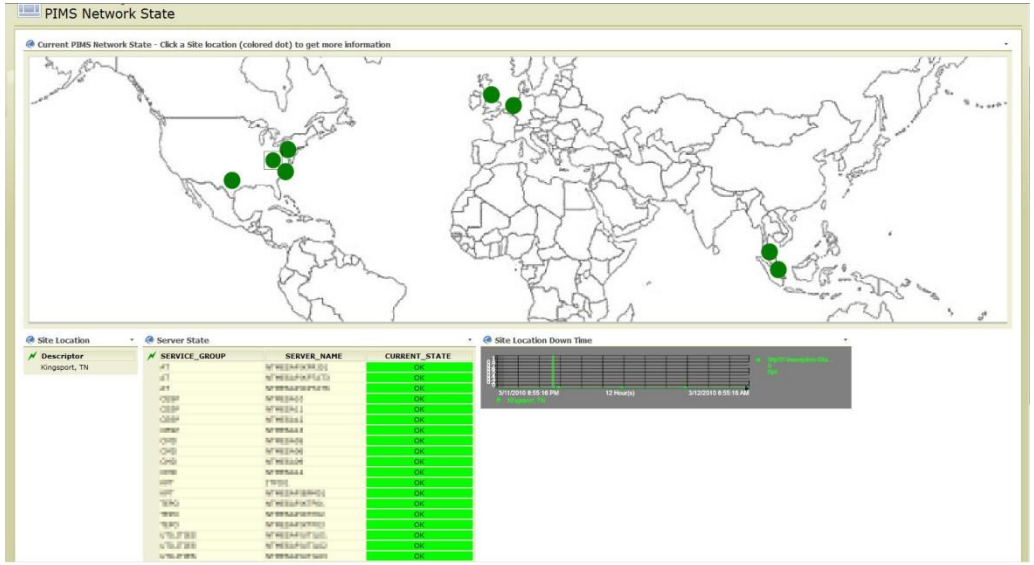


The Incident Response & Monitoring Presentation layer



Real-world Action

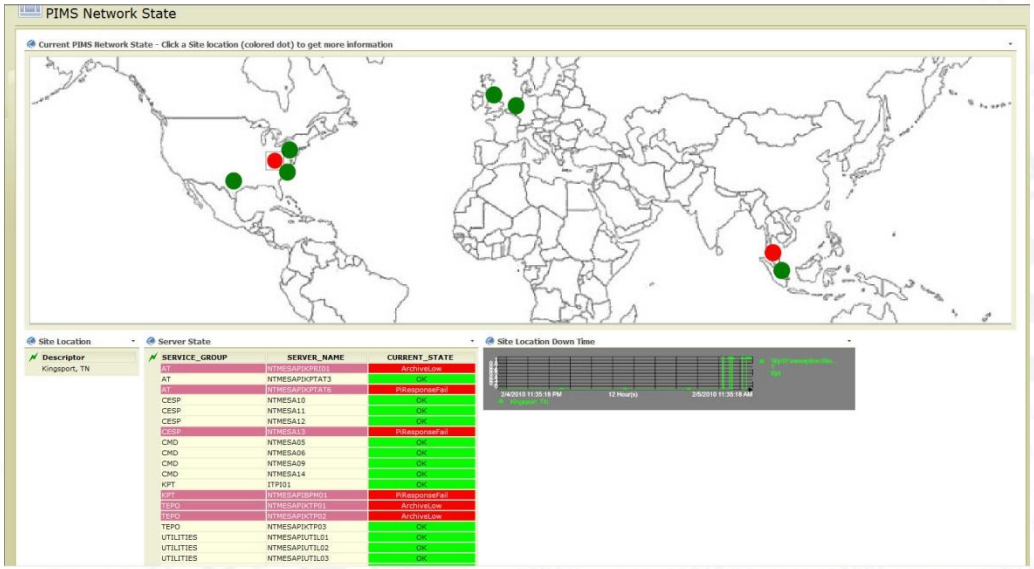
•Everything is OK



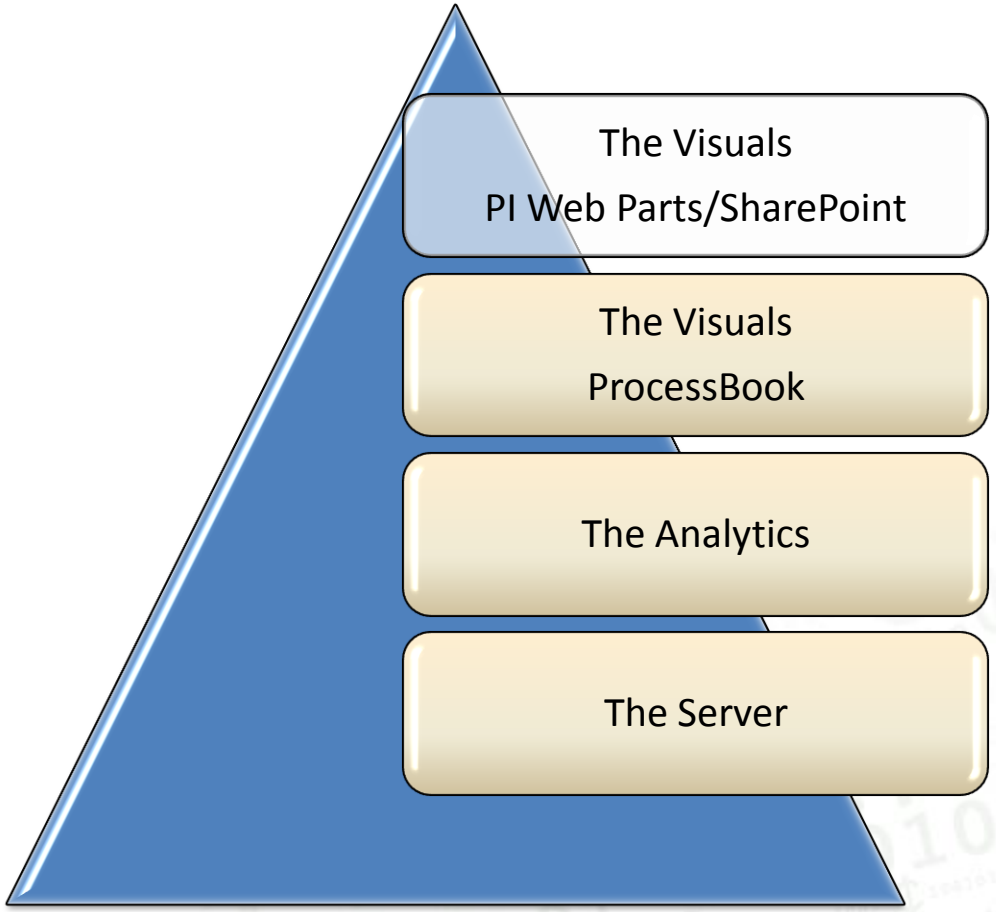
•Site specific servers are down

"It's never been so much fun to watch the system fall apart. The events were going to happen anyway, but now we know exactly what is happening and can ascertain how to repair the disruption as quickly as possible."

-unidentified support personnel



The Server and The Analytics



Visuals, Analytics and Server Components

The Visuals

- ProcessBook

The Analytics

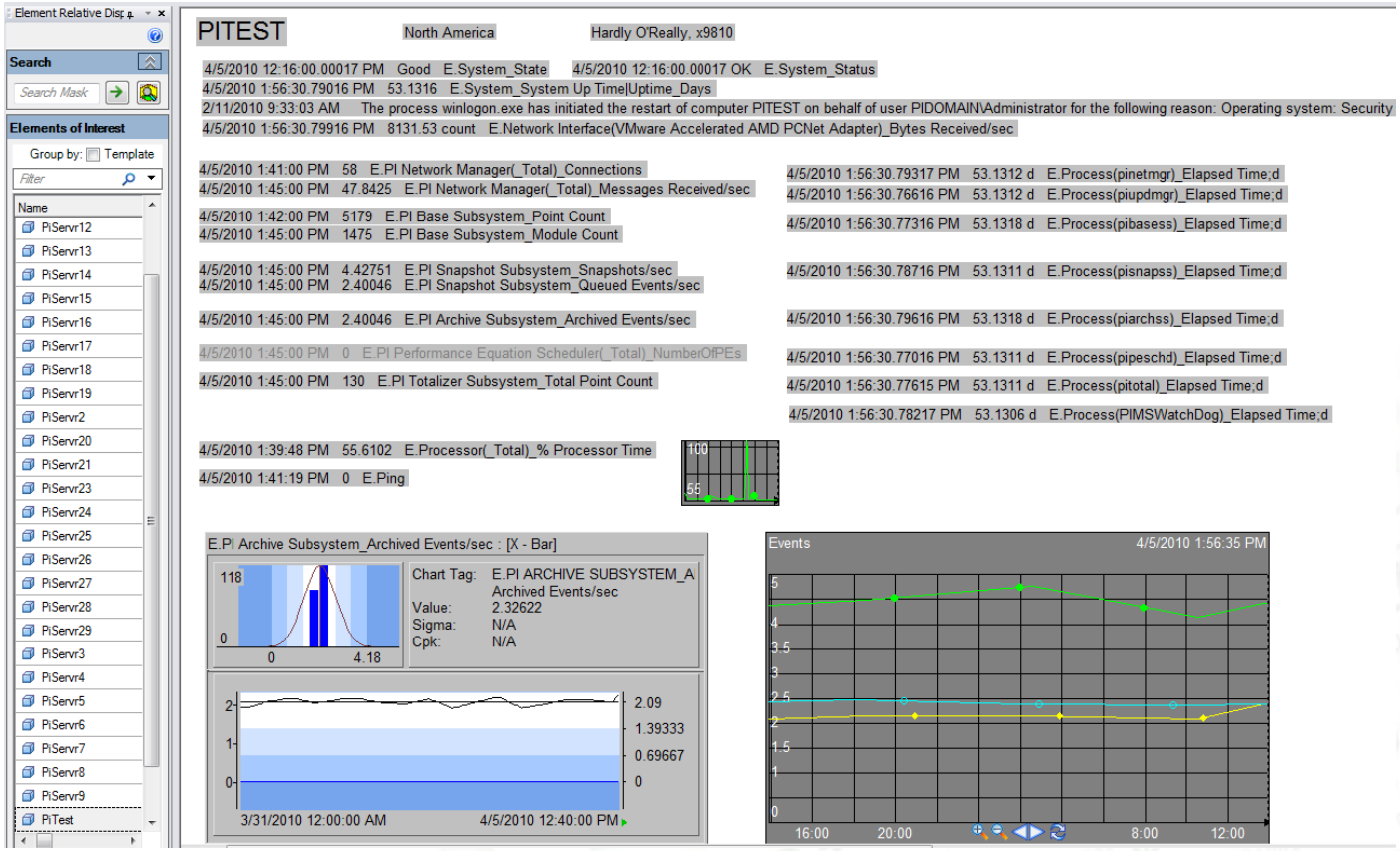
- AF Server Elements
  - Analysis and Reporting
- Performance Equations
  - Server Status and Site Summary

The Server

- PI PerfMon (IT Monitor and MCN)

ProcessBook
Element Relative Display

- Provides details behind the SharePoint Summary



The Analytics

PI-AF Elements

- Template Element Attribute Tags are element name based to streamline tag to attribute mapping:

Name:	PI Base Subsystem_Point Cour
Description:	[24] Pi Base Points
Configuration Item:	Indexed:
Categories	PIMS_Measure_LowerLim
UOM:	count
Value Type:	Double
Default Value:	0 count
Data Reference:	PI Point
Settings...	
\\%Element%\%Element%_%Attribute%	

System_System Up Time	[01] System Up ...	0 s
Network Interface(Net Adapter)_Bytes Received/sec	[02] Network Int...	0 count
Process(pinetmgr)_Elapsed Time	[03] Pi Network ...	0 s
Process(pibasess)_Elapsed Time	[04] Pi Base upti...	0 s
Process(pisnapss)_Elapsed Time	[05] Pi Snapshot...	0 s
Process(piarchss)_Elapsed Time	[06] Pi Archive u...	0 s
Process(piupdmgr)_Elapsed Time	[07] Pi Update ...	0 s
Process(pitotal)_Elapsed Time	[08] Pi Totalizer ...	0 s
Process(pipeschd)_Elapsed Time	[09] Pi Performa...	0 s
Process(pimsgss)_Elapsed Time	[10] Pi Message ...	0 s
PI Network Manager(_Total)_Messages Received/sec	[20] Pi Network ...	0.1 Hz
PI Network Manager(_Total)_Connections	[22] Pi Network ...	0 count
PI Base Subsystem_Point Count	[24] Pi Base Poi...	0 count
PI Base Subsystem_Module Count	[26] Pi Base MD...	0 count
PI Snapshot Subsystem_Snapshots/sec	[28] Pi Snapship...	0 Hz
PI Snapshot Subsystem_Queued Events/sec	[30] Pi Snapshot...	0 Hz
PI Archive Subsystem_Archived Events/sec	[32] Pi Archived ...	0 Hz
PI Totalizer Subsystem_Total Point Count	[34] Pi Totalizer ...	0 count
PI Performance Equation Scheduler(_Total)_NumberOfPEs	[38] Pi Performa...	0 count
Process(PIMSWatchDog)_Elapsed Time	[40] PIMS Watc...	0 s
Processor(_Total)_% Processor Time	CPU Usage	0 %
LocalContact	Local Contact N...	
reboot_description	Reason given fo...	
Process(TCRD)_Elapsed Time	RLink TCRD Up...	0 s
Enabled	Server Uptime M...	True
System_State	System State	
System_Status	System Status D...	

Performance Equations

Calculate

- Real Time System Availability

Tag	PISERVER1:system_status_rt.di
Descriptor	Kingsport, TN
Engunits	Kpt
Exdesc	if badval('PISERVER1:ping') then "PingFail" else if badval('TCP_Response_PI_PISERVER1') then "PiResponseFail" else if badval('PISERVER1_System_System Up Time') or 'PISERVER1_System_System Up Time' < 300 then "Reboot" else if 'PISERVER1_PI Archive Subsystem_Archived Events/sec' < 5 then "ArchiveLow" else "OK"

- Real Time Site Availability

Tag	PIMS:Situation_KPT.cv
Descriptor	Kingsport, TN
Exdesc	(if('PISERVER1:system_status_rt.di'="OK") then 0 else 1) + (if('PISERVER2:system_status_rt.di'="OK") then 0 else 1) + (if('PISERVER3:system_status_rt.di'="OK") then 0 else 1)

The Server

PI PerfMon and IT Monitor

- OSIsoft provides sample Performance Monitoring tags for PI PerfMon Basic self-monitoring

Key Values are used to assert Uptime and Functionality

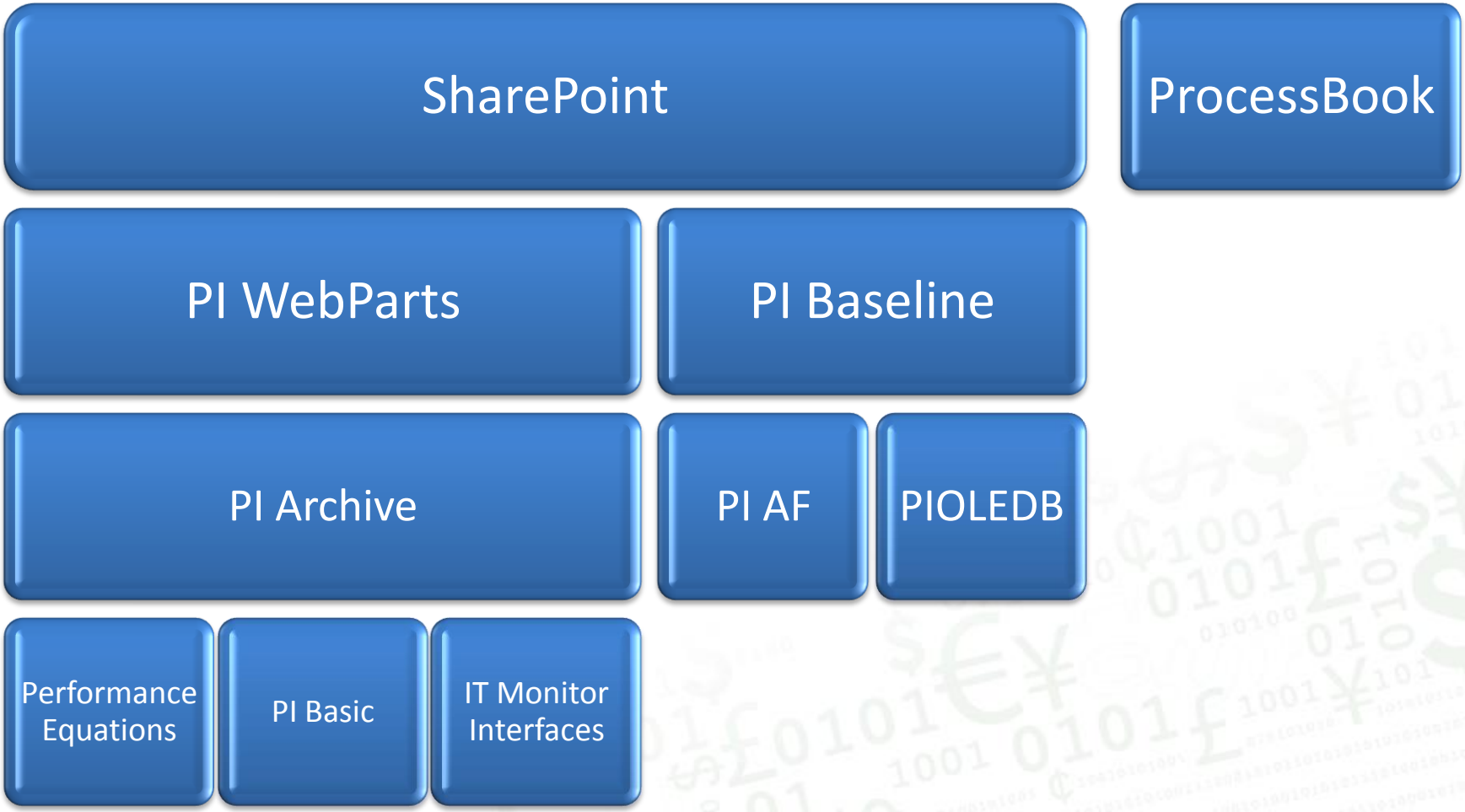
- Uptime: System Up Time, Service Uptime (Archive, Base, Snapshot, Net manager, corporate app, …)
- Functionality: Network Response; Network and PI Connections and traffic; PI Point, Module, Totalizer and PE Counts, PI Snapshot, Queued and Archived Events

Summary of Project Timeline

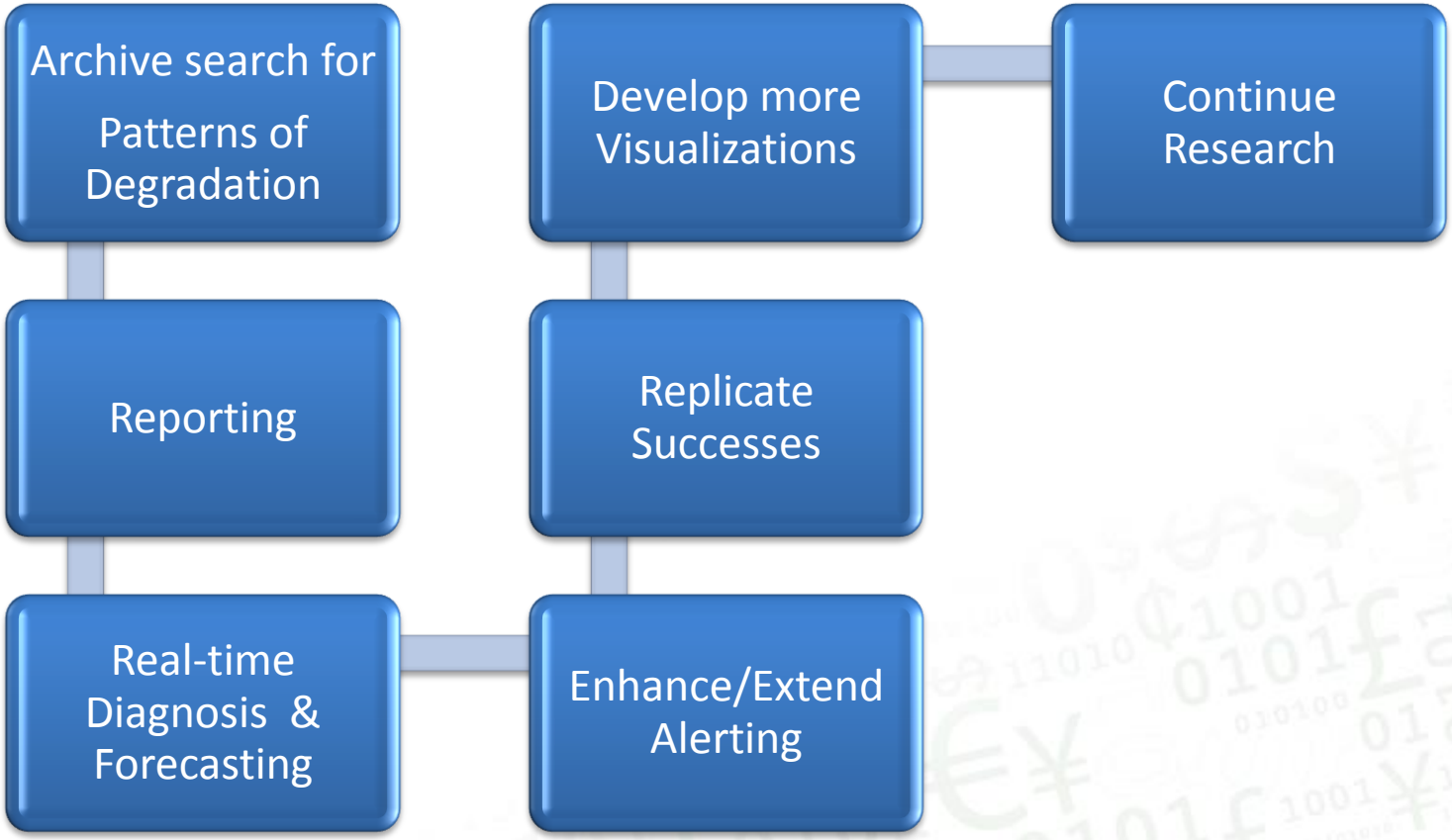
IT Monitoring & Response Application

October/November	December	Total Time	*Research, experimentation, and testing consumed most of time
Initial Meetings Brainstorming Research	Database Configuration PI Web parts Assembly Application Testing/Tweaking Deliver application	20% 1 to 2 days/week 8 weeks 2 people .20x16hrsx10x2= 64 hours	*If everything had been known – could have been assembled in about 4 hours

PI System Architecture and Product Listing



PATH FORWARD



Summary

Project Successes

- Elevating PI system availability information for a broad business and technical support audience
- Delivering a BI/KPI oriented solution to provide instantaneous visual assessment
- Rolling up data into division-wide metrics

Summary

Rationalized Value

- Real-time Visualization
- Minimize Downtime (0.6% or less)
- Quick Response
- Easy to Use
- Easy to Read
- Easy to Communicate
- Easy to Report

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Thank you