



# Deep Dive – Monitoring Servers using BI 4.1

Alan Mayer  
Solid Ground Technologies

**SESSION CODE: 0305**

# AGENDA

- **Introduction**
- Definitions and Architecture
- Configuration
- Metrics
- Watches and Alerts
- Probes
- Reporting
- Conclusion



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# INTRODUCTION

## Alan Mayer

- Co-founded Integra Solutions in 1993
  - Used BusinessObjects since 1992
  - Wrote the first BusinessObjects training manuals
  - Over 75 Fortune 1000 customers before company was sold in 2007
- Presented at every national conference
- Founded Solid Ground Technologies in 2009
  - Different company – same principles
  - Specializing in BusinessObjects consulting and training



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# INTRODUCTION

- We'll look at monitoring from an Administrator's perspective:
  - Configuring the service
  - Understanding the key elements
  - Working through use cases
    - Learning by doing
    - "Day in the life of ..."



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# DEFINITIONS

- What is Monitoring ??
  - Keeps tabs on the health of your BI 4.1 system
  - Provides evidence of what's happened in the past
  - Issues alerts before the system fails
  - Displays real-time statistics for all BI servers
  - Summarizes those statistics in dashboards

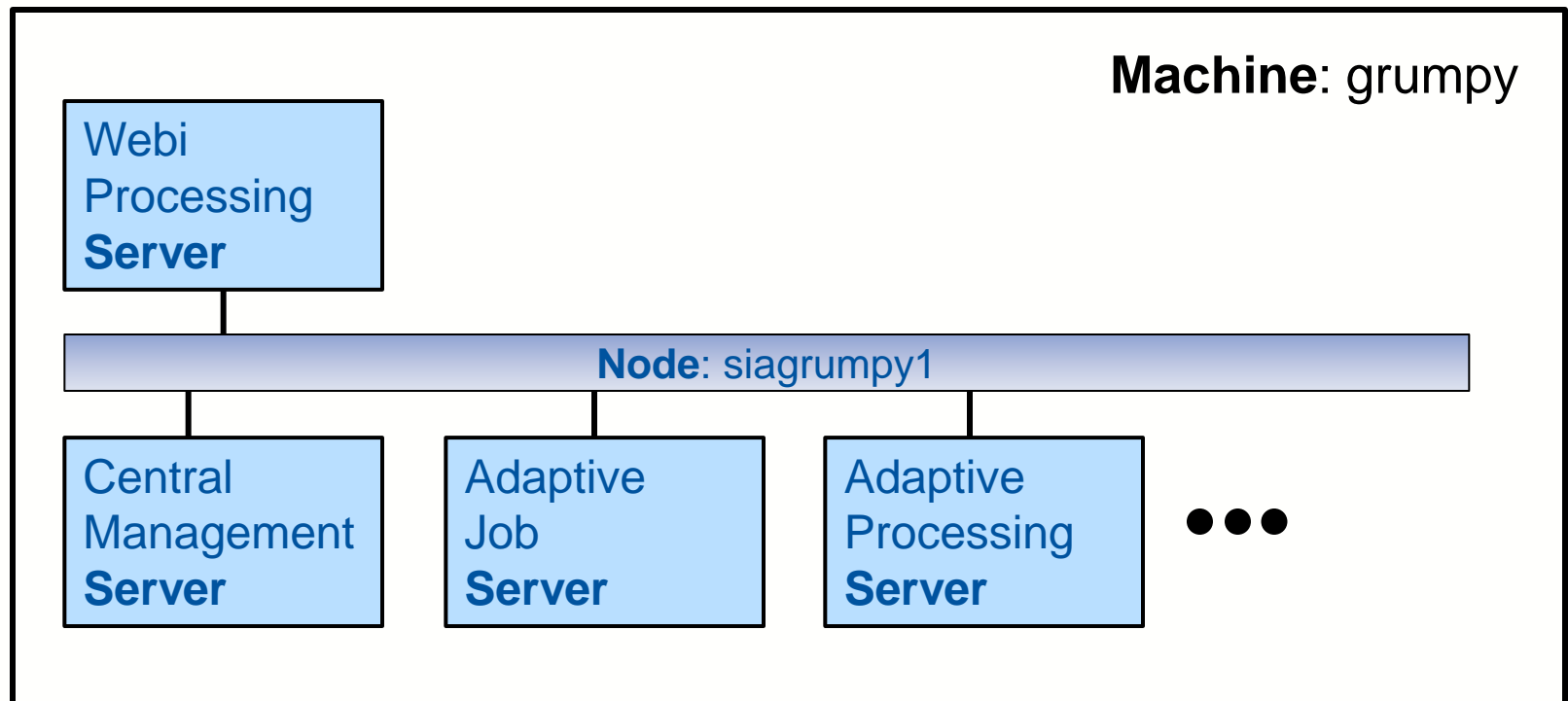


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# DEFINITIONS

- Machines, Nodes, and Servers
  - A physical machine can host one or more BI environments (nodes)
  - Each environment consists of a set of servers

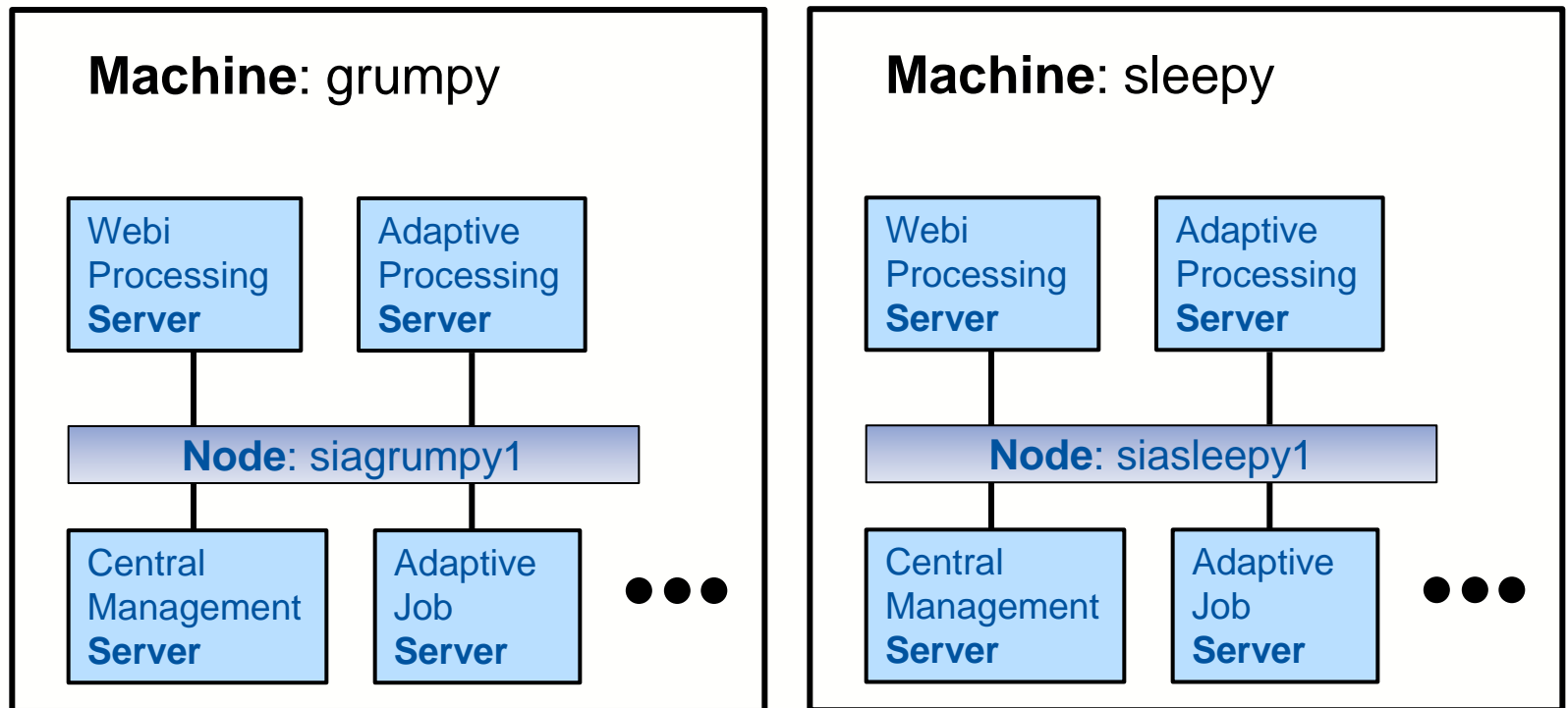


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# DEFINITIONS

- Cluster
  - Two or more nodes



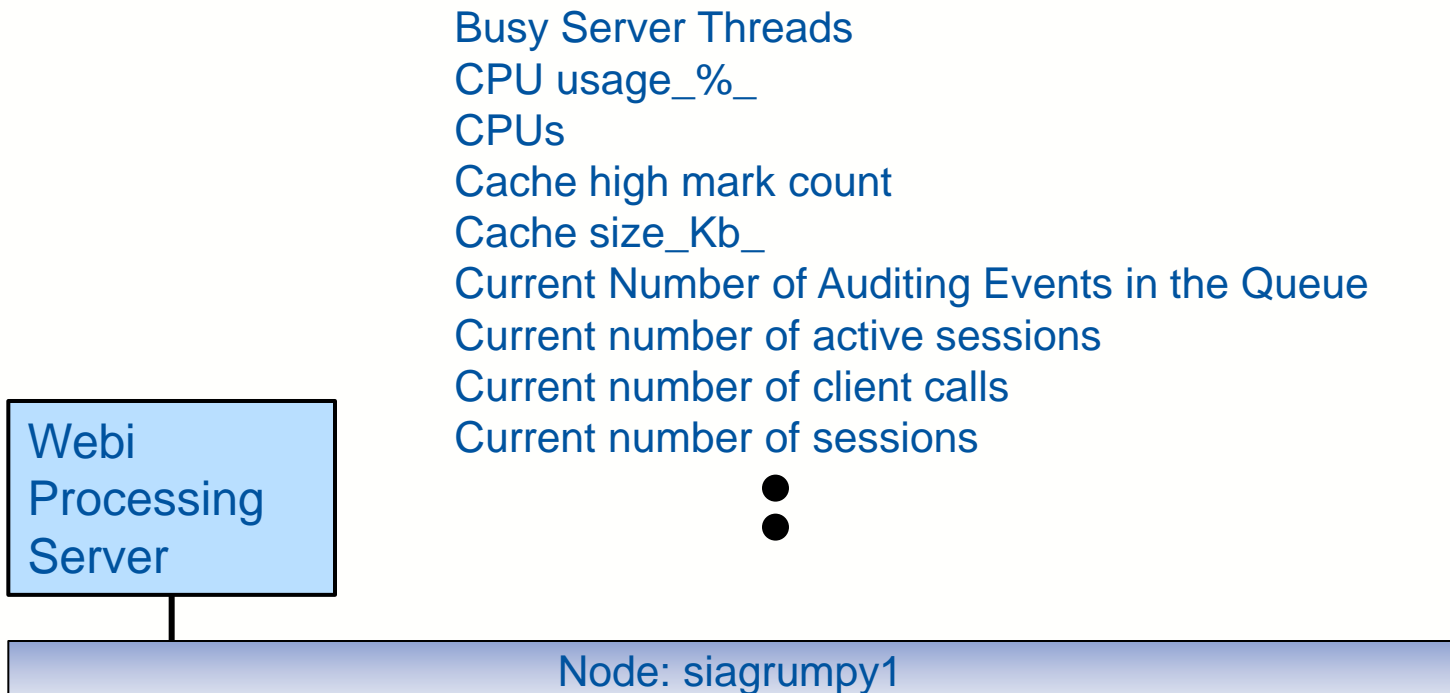
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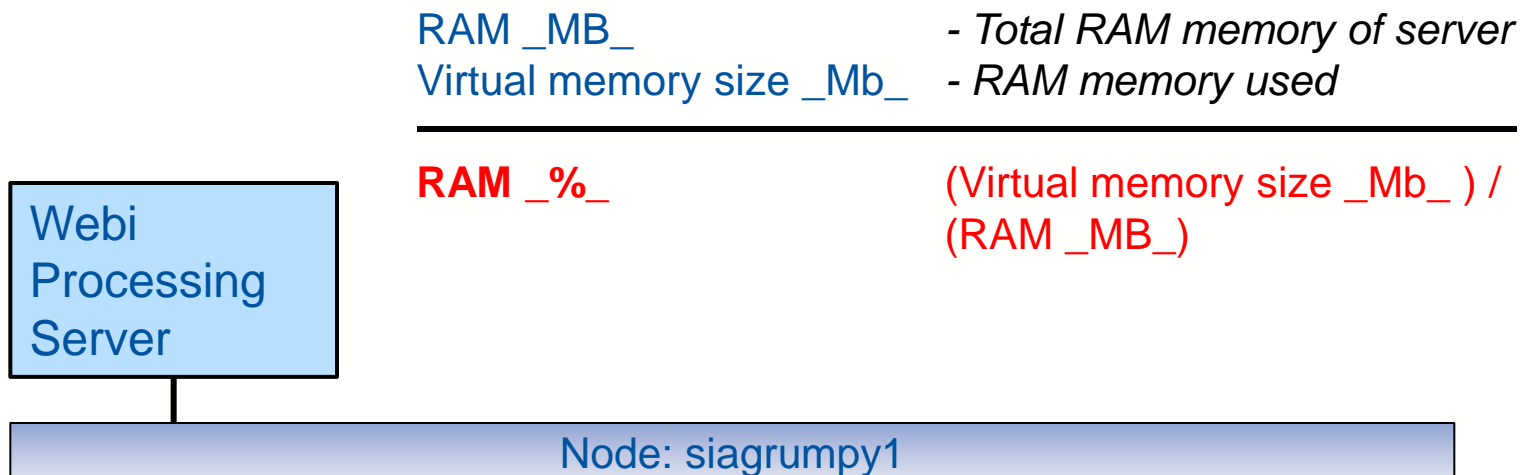
# DEFINITIONS

- Metric
  - Every server has attributes that can be measured



# DEFINITIONS

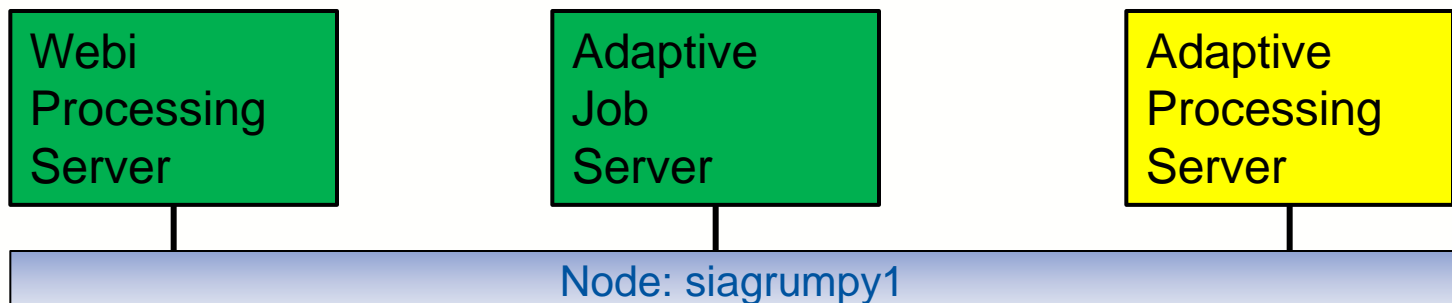
- Derived Metric
  - Calculated attribute made up of other existing attributes



# DEFINITIONS

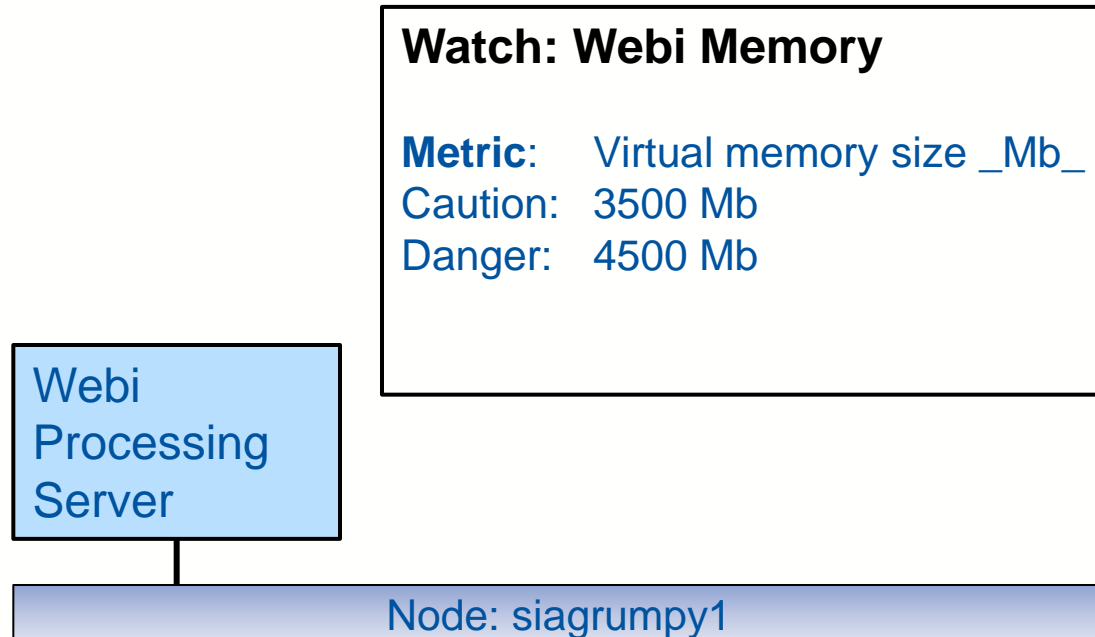
- Topological Metric
  - Attribute that represents the overall health or state of a service
    - 0 – Danger ●
    - 1 – Amber ●
    - 2 – Green ●

**WebIntelligenceServices\$Health State = 1** (● + ● + ● = ●)



# DEFINITIONS

- Watch
  - A set of conditions that indicate the health of a metric or service
  - Provides real time and historical trends



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# DEFINITIONS

- KPI
  - **Key** Performance Indicator
  - Usually reflects good or bad performance
  - Any watch can be chosen as a KPI



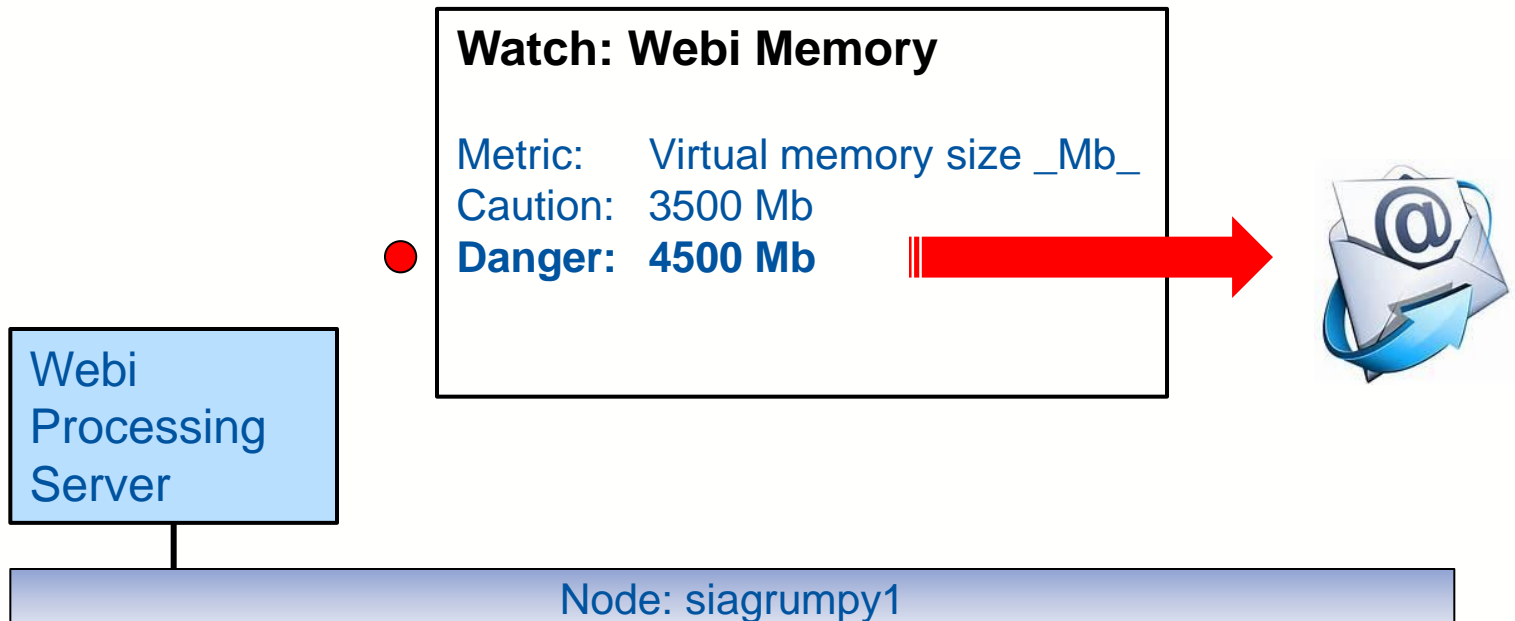
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# DEFINITIONS

- Alert
  - Notification triggered when a threshold has been exceeded
  - Comes as a dashboard notification or email



# DEFINITIONS

- Probe
  - A use case (workflow) scheduled to run at defined intervals
    - CMS Logon Logoff
      - Log onto system, verifies session, then logs off
    - Crystal Reports Service
      - Runs a report using Crystal Reports Page and Cache servers
    - BI launch pad
      - Logs into BI launch pad
    - Interactive Analysis
      - Runs a Webi report and times how long the refresh takes

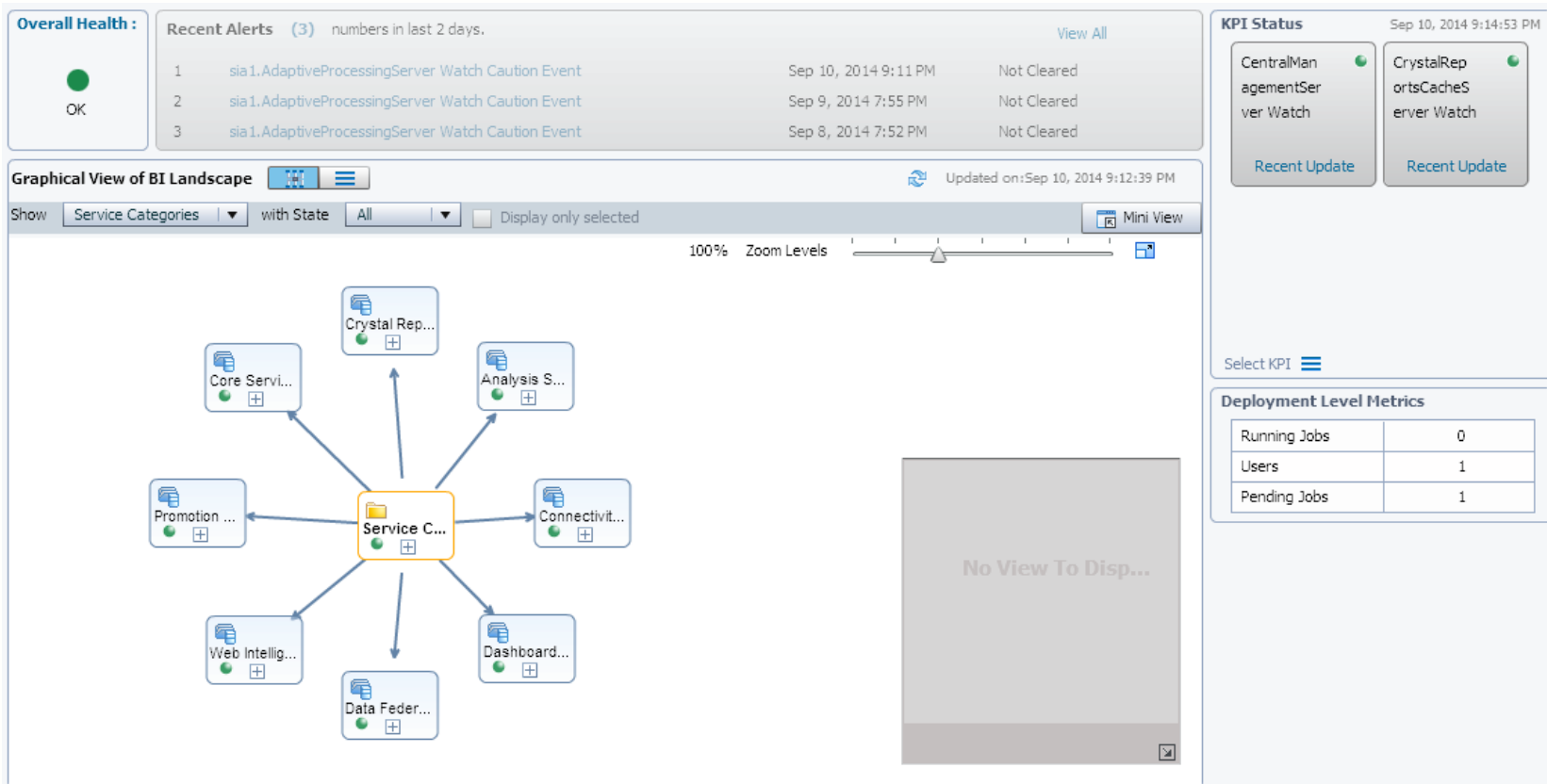


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# DEFINITIONS

- Dashboard
  - Visual representation of your BI Landscape

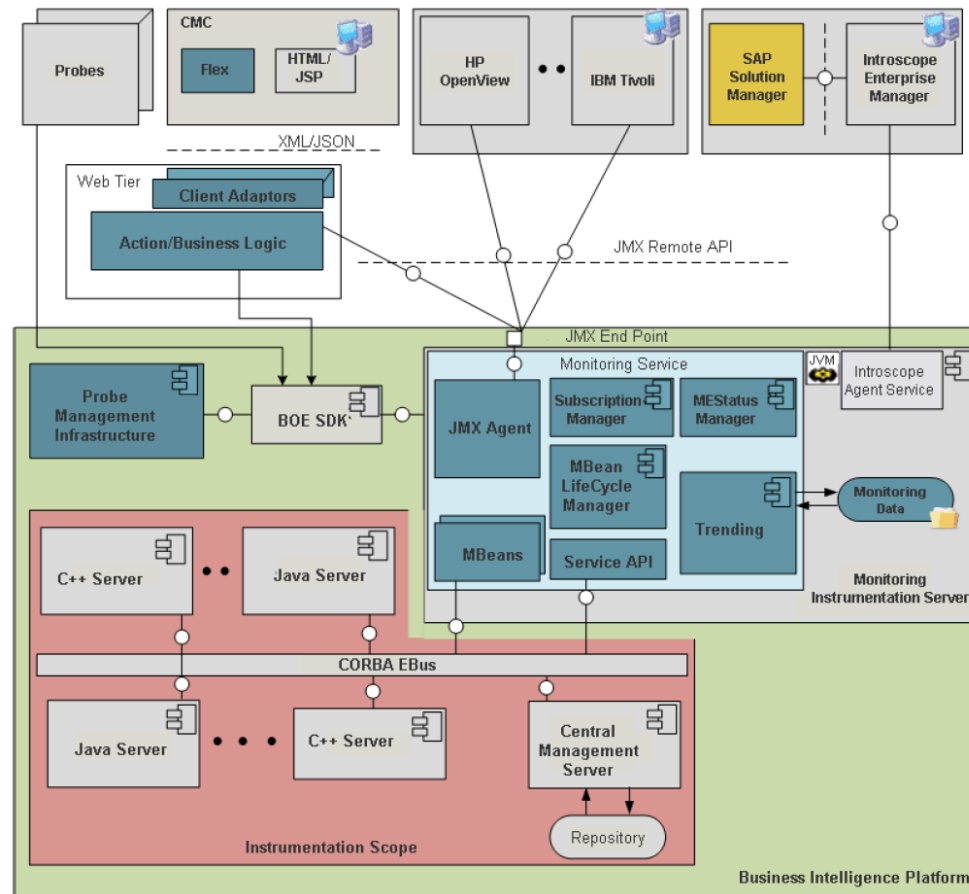


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# ARCHITECTURE

- Formal diagram from the BI 4.1 Admin Reference:



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# ARCHITECTURE

- Architecture from an Administrator's standpoint:

Metrics: sia1.WebIntelligenceProcessingServer		
Hide Navigation		
Properties	Web Intelligence Processing Service Metrics	
Translations	Cache size (Kb)	8128
User Security	Number of out-of-date documents in cache	0
Metrics	Cache high mark count	0
Placeholders	CPU usage (%)	0
Existing Server Groups	Total CPU time (seconds)	7
	Memory high threshold count	0
	Memory max threshold count	0
	Virtual memory size (Mb)	31
	Current number of client calls	0
	Number of remote extension errors	0
	Current number of tasks	0
	Total number of client calls	6
	Total number of tasks	6
	Idle time (seconds)	6027
	Current number of active sessions	0
	Number of documents opened from cache	0
	Number of documents	0
	Current number of sessions	0
	Number of document swap	0
	Number of swapped documents	0
	Number of sessions timeout	0
	Total number of sessions	3
	Number of users	0
	Number of active threads	0
	Total number of threads	5

Which metrics matter?

Which servers should be traced?

Do I have a problem?



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# CONFIGURATION

- Writing monitoring results to a trending database
  - Default database is Apache Derby
    - NOT a great option
      - No failover or backup options provided
      - Must be manually refreshed to return current information
  - Alternative would use the Auditing datastore
    - Could be Oracle, SQL Server, ...
    - Allows users to combine auditing and monitoring info



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# CONFIGURATION

- Using Audit as the trending database
- New installs
  - Create the monitoring tables in the Audit database
  - Configure .SBO files if needed
  - Switch to the Audit database
  - Restart the correct Adaptive Processing Server
    - Find the one dedicated to Monitoring



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# METRICS – Overall

- Metrics display real-time measurements
  - Not recorded
  - Not historical
- Create a watch to record historical values
  - Can contain one or more metrics
  - More on watches in a minute

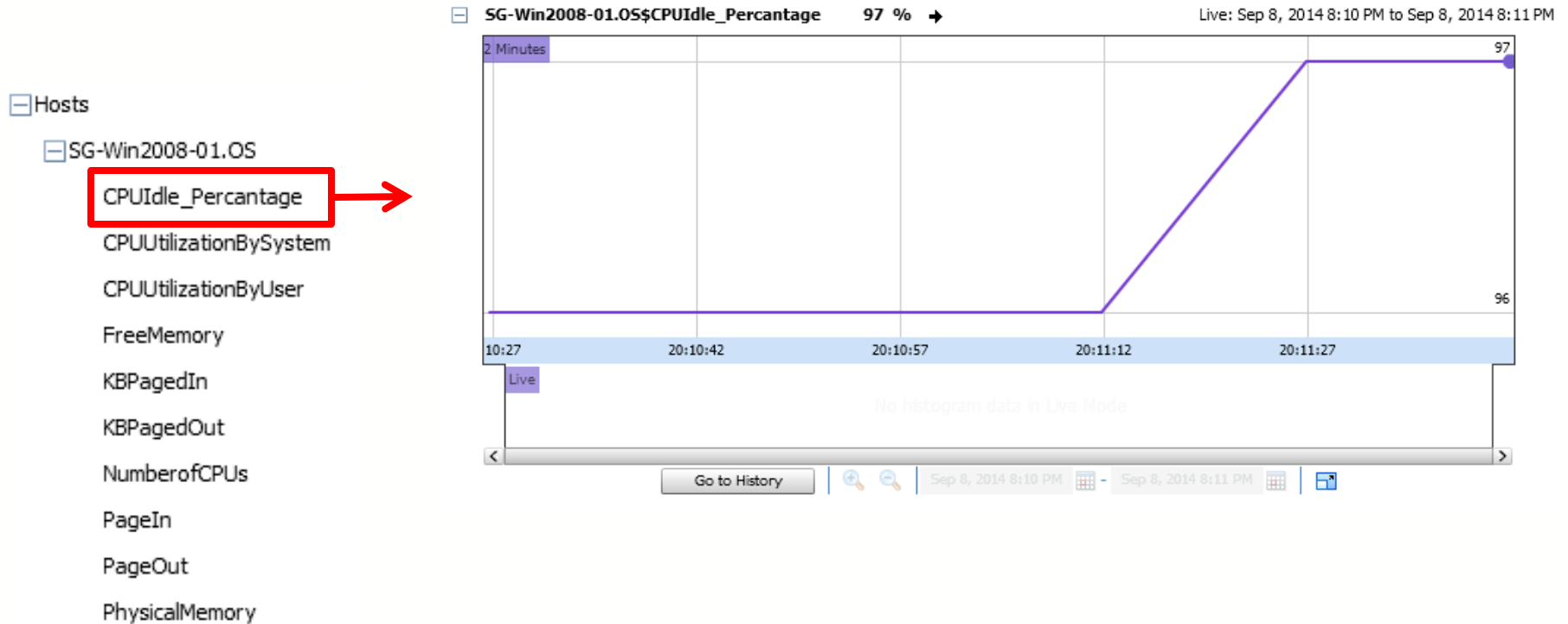


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# METRICS – O/S Level



OS-Level metrics require an agent to be installed on your server - **SAPOSCAL**



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# METRICS – CMS

## [-] Metrics

### [-] Metrics.CMSQueryMetrics

Number Of defined Xcelcius models

Number of Infospaces

Number of Programs

Number of Publications

Number of Universes

Number of defined Crystal Reports

Number of defined Web Intelligence Reports

Number of executed Programs instances

Number of generated Xcelcius Shockwave files

Number of scheduled Crystal Reports

Number of scheduled Web Intelligence Reports

### [+] Metrics.DerivedMetrics

[+] Metrics.CMSQueryMetrics\$Number of Univ...	8	→	Live: Sep 8, 2014 8:29 PM to Sep 8, 2014 8:30 PM
[+] Metrics.CMSQueryMetrics\$Number of defi...	22	→	Live: Sep 8, 2014 8:28 PM to Sep 8, 2014 8:30 PM
[+] Metrics.CMSQueryMetrics\$Number of defi...	52	→	Live: Sep 8, 2014 8:28 PM to Sep 8, 2014 8:30 PM
[+] Metrics.CMSQueryMetrics\$Number of sche...	0	→	Live: Sep 8, 2014 8:28 PM to Sep 8, 2014 8:30 PM
[+] Metrics.CMSQueryMetrics\$Number of sche...	0	→	Live: Sep 8, 2014 8:28 PM to Sep 8, 2014 8:30 PM

The metrics can also be retrieved using QueryBuilder if you knew the proper syntax (not hard)

Derived metrics (formula using existing metrics) stored here



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# METRICS – Probes

## [-] Probes

### + sia1.BIlaunchpad

executiontime

passed

### + sia1.CMSCache

### + sia1.CMSDBConnection

### + sia1.CMSLogonLogoff

executiontime

passed

### + sia1.CMSPing

### + sia1.CrystalReportsService(ProcessingServer)

### + sia1.CrystalReportsService(ReportApplicationServer)

### + sia1.InteractiveAnalysis

+ sia1.CMSLogonLogoff\$executiontime	78 millisecond(s) →	Live: Sep 8, 2014 8:43 PM to Sep 8, 2014 8:45 PM
+ sia1.CMSLogonLogoff\$passed	1 →	Live: Sep 8, 2014 8:44 PM to Sep 8, 2014 8:45 PM

Probe metrics will only show values when scheduled



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# METRICS – Servers

## Servers

- + sia 1.AdaptiveJobServer
- + sia 1.AdaptiveProcessingServer
- + sia 1.CentralManagementServer
- + sia 1.ConnectionServer
- + sia 1.ConnectionServer32
- + sia 1.CrystalReports2013ProcessingServer
- + sia 1.CrystalReports2013ReportApplicationServer
- + sia 1.CrystalReportsCacheServer
- + sia 1.CrystalReportsProcessingServer
- + sia 1.DashboardsCacheServer
- + sia 1.DashboardsProcessingServer
- + sia 1.EventServer
- + sia 1.InputFileRepository
- + sia 1.OutputFileRepository
- + sia 1.WebApplicationContainerServer
- + sia 1.WebIntelligenceProcessingServer

## sia 1.WebIntelligenceProcessingServer

- BasePriority
- Busy Server Threads
- CPU usage \_%\_
- CPUTime
- CPUUtilization
- CPUs
- Cache high mark count
- Cache size \_Kb\_
- Current Number of Auditing Events in the Queue
- Current number of active sessions
- Current number of client calls
- Current number of sessions
- Current number of tasks
- Disk Size \_GB\_
- Health State
- Idle time \_seconds\_
- K
- Memory high threshold count

This represents the bulk of your available metrics (and some of the most valuable).



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# METRICS – Topology

## [-] Topology

### [-] AnalysisServices

Health State

### [+] ConnectivityServices

### [+] CoreServices

### [+] CrystalReportsServices

### [+] DashboardsServices

### [+] DataFederationServices

### [+] EnterpriseNodes

### [+] PromotionManagementServices

### [+] ServerGroups

### [+] ServiceCategories

### [+] WebIntelligenceServices

### [+] sia1

## Health State values

0 - Danger 

1 - Warning 

2 - OK 

Health states represent the general state of the server



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# METRICS – Strategy

- Use the Monitoring Metrics tab to explore
  - Discover which metrics are really important
  - Note those metrics for later uses in watch lists
- ***Be careful!*** Not all metrics are created equal
  - Virtual memory metrics on Linux platforms
    - Linux can allocate 10x the virtual memory needed (or more)
    - Resident memory is much better to track but not available



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# METRICS – Demonstration



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# WATCHES

- Metrics by themselves can't record their values over time
- A Watch can, however
- It contains one or more rules that evaluate to a final state

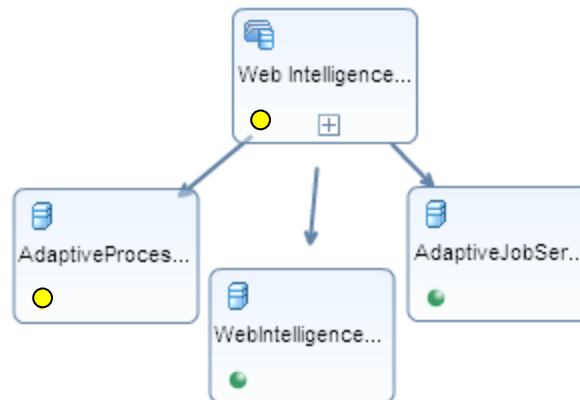


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# WATCHES and Services

- The state of a service = worst state of any watch associated with it
  - Web Intelligence Services =
    - Adaptive Job Server **Watch** ● +
    - Web Intelligence Processing Server **Watch** ● +
    - Adaptive Processing Server **Watch** ●



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# WATCHES – Creating a Watch

**New Watch - General Properties**

1 General Properties  
2 Caution Rule  
3 Danger Rule  
4 Throttle and Noti...

Name: \* Overall CPU

Description: Monitors the overall usage of CPU resources on the machine based on % CPU used. Caution when %CPU Idle < 50%. Warn when %CPU Idle < 40% for an extended time.

Number of States:  
☐ Two (OK, Danger)  
● → ■  
☒ Three (OK, Caution, Danger)  
● → ● → ■

Settings:  
☒ Write to Trending Database  
☒ Add as KPI

Previous Next Save Cancel

Watch results must be written to the database to be reviewed later!



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# WATCHES – Adding Caution Rule(s)

Use this button to group multiple metrics together

1 General Properties

2 Caution Rule

3 Danger Rule

4 Throttle and Not...

Available Metrics

Filter:

Hosts

- SG-Win2008-01.OS
  - CPUIdle\_Percentage
  - CPUUtilizationBySystem
  - CPUUtilizationByUser
  - FreeMemory
  - KBPagedIn
  - KBPagedOut
  - NumberofCPUs
  - PageIn
  - PageOut
  - PhysicalMemory

Add Metrics:

Expand All Desynchronize Time Axes

+ OS\$CPUIdle... History: Sep ... Caution <= 50

Boolean Expression: \* Syntax is NodeName,ServerName\$'Metric Name'>= ThresholdValue

SG-Win2008-01.OS\$CPUIdle\_Percentage'<=50

Caution Rule currently evaluates to:

Previous Next Save Cancel



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# WATCHES – Adding Danger Rule(s)

**Edit Watch - Overall CPU - Danger Rule**

1 General Properties  
2 Caution Rule  
3 **Danger Rule**  
4 Throttle and Noti...

Available Metrics  
Filter:

[-] Hosts  
[-] SG-Win2008-01.OS  
CPUIdle\_Percentage  
CPUUtilizationBySystem  
CPUUtilizationByUser  
FreeMemory  
KBPageIn  
KBPageOut  
NumberOfCPUs  
PageIn  
PageOut  
PhysicalMemory

Added Metrics:  
[-] [X] [Up] [Down] [Expand All] [Desynchronize Time Axes]  
+ OS\$CPUIdle... History: Sep ... | Danger <= 40

Boolean Expression: \* Syntax is NodeName.ServerName\$'Metric Name'> = ThresholdValue  
SG-Win2008-01.OS\$'CPUIdle\_Percentage'<=40

Danger Rule currently evaluates to:

Previous Next Save Cancel



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# WATCHES – Throttle and Act

**New Watch - Throttle and Notification**

1 General Properties  
2 Caution Rule  
3 Danger Rule  
4 Throttle and Notification

☐ Change watch state every time Caution or Danger Rule evaluates to true  
☒ Change watch state according to Throttling criteria below

**Caution Throttling Criteria:**

☐ If Rule evaluates to true for last  days  
☒ Wait for  true evaluation(s) in the last  days

**Danger Throttling Criteria:**

☒ If Rule evaluates to true for last  hours  
☐ Wait for  true evaluation(s) in the last  days

**Configure Action:**

Run Probe:

**Notification Settings:**

☒ Enable alert notifications  
List of users to be notified  
   
☐ Add Metric Trend History As Attachment

**Warn when %CPU Idle < 40% for two hours**

**Caution when %CPU Idle < 50% 4 times in the last day**



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# ALERTS

- Alerts work hand in hand with watches
  - How should a watch caution or warn you?
    - Email
    - Dashboard
    - US Postal Service
    - System meltdown



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# ALERTS – Adding the alert

## Notification Settings:

☒ Enable alert notifications

List of users to be notified

Administrator

Directory

☐ Add Metric Trend History As Attachment



## Directory




Enter email ID(s) here

Add email recipie...

Delete email recipient

Alert Settings



User/Group Name	Type ▼	Email id	Alerts	Email Notific...	Email Notific...
Monitoring Users	 User Group				
Administrators	 User Group				
Administrator	 User		✓		
Email recipient	Email recipient	alan.mayer@solidgrounded.com		✓	✓



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# ALERTS – Viewing an alert

▼ My Recently Viewed Documents







- 002 If formula and variable
- 001 Where clause with measure
- Excel Header Freeze
- 005 Previous
- LOV Test - Prefilled
- LOV Test - Refreshed
- 001 Stacked Bar with Line
- 011 Dimension-Only Contexts
- 010 Where Processed Outside of Aggregate Function
- 009 ForAll Context with Where Condition

▼ 0 unread messages in My Inbox

No unread messages

See more...





▼ My Applications

- 
- 
- 
- 
- 
- 

▼ My Recently Run Documents

- CMS Logon Logoff
- CMS Logon Logoff
- CMS Logon Logoff
- CMS Logon Logoff
- CMS Logon Logoff
- CMS Logon Logoff
- BI launch pad
- CMS Logon Logoff
- BI launch pad

▼ 4 Unread Alerts

-  sia1.AdaptiveProcessingServer Watch Caution Event
-  sia1.AdaptiveProcessingServer Watch Caution Event
-  sia1.AdaptiveProcessingServer Watch Caution Event
-  sia1.AdaptiveProcessingServer Watch Caution Event

See more...



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# WATCHES – Strategy

- Create watches for any metrics you'd like to trend
  - Records the history of these metrics over time
- Include more than one metric per watch
  - Great way to track multiple metrics at one
  - Especially useful if those metrics are related



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# WATCHES – Demonstration



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# PROBES

- Probes are programs that are run by the Monitoring program on a schedule
- Many actions can be performed:
  - Log in / out of BI launch pad
  - Run a report (Webi / Crystal)
  - Shut down / start up servers (careful!!)
- Why?
  - Mimics users as they use your system
  - Benchmarking common tasks
  - Assessing the overall health of a system



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# PROBES – Properties

Register ▼ Run Now Delete Properties Schedule History Enable Auto-Refresh 1 of 1 Help

Probe	Probe Type	Schedule Status	Next Scheduled Run	Previous Run Result and Time
BI launch pad	Hybrid		--	Failure Roundtrip: 352 msec Sep 8, 2014 8:38 PM
CMS Cache	Hybrid		--	No data available
CMS DB Connection	Hybrid		--	No data available
CMS Logon Logoff	Hybrid		Sep 10, 2014 9:44 PM	Success Roundtrip: 188 msec Sep 10, 2014 8:44 PM
CMS Ping				
Crystal Reports Service (Processing Server)				
Crystal Reports Service (Report Application Server)				
Interactive Analysis				
Start Stop Servers				

**BI launch pad Properties**

Title: BI launch pad

ID, CUID: 4075, AefzXCwDfvhJpZITZjWxOig

Description: BI launch pad

Created: 9/24/2013 12:39 AM

Last Modified: 9/8/2014 8:39 PM

Last Run On: 9/8/2014 8:38 PM

Timeout (sec): 100

**Input Parameters:**

URL base: http://localhost:8080/BO

User name: Administrator

Password: ••••••••

CMS name: localhost:6400

Authentication type: Enterprise ▼

SAP Client:

SAP System:

Input parameters must be filled in for some probes to run!



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# PROBES – Using a probe

Register ▾ Run Now Delete Properties Schedule History Enable Auto-Refresh 1 of 1 Help

Probe	Probe Type	Schedule Status	Next Scheduled Run	Previous Run Result and Time
BI launch pad	Hybrid		--	Failure Roundtrip: 352 msec Sep 8, 2014 8:38 PM
CMS Cache	Hybrid		--	No data available
CMS DB Connection	Hybrid		--	No data available
CMS Logon Logoff	Hybrid		Sep 10, 2014 9:44 PM	Success Roundtrip: 188 msec Sep 10, 2014 8:44 PM
CMS Ping				
Crystal Reports Service (Processing Server)				
Crystal Reports Service (Report Application Server)				
Interactive Analysis				
Start Stop Servers				

**Schedule: BI launch pad**

Hide Navigation

- Properties
  - Default Settings
  - Schedule
    - Instance Title
    - Recurrence
    - Schedule For
  - History
  - Limits

**Recurrence**

Run object:

Object will run now.

Number of retries allowed:

Retry interval in seconds:

Use a probe by scheduling it (just like a document).

They can also be triggered by a watch.



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# PROBES - Failures

- Why do certain probes fail?
  - Some take parameters
    - URL
    - Report CUID
    - User/pass
  - Check the properties for these probes
- And others ...
  - Check out the BI launch pad probe
    - Then read SAP Note 2029034
    - BI launch pad Probe is not working in BIP4.1***



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# PROBES – Strategy

- Test simple key workflows
  - Users logging into your system
  - Key reports running
- Be careful how far you extend this concept ...
  - Not an ideal replacement for volume testing
  - Also, there are better ways of benchmarking



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# PROBES – Demonstration



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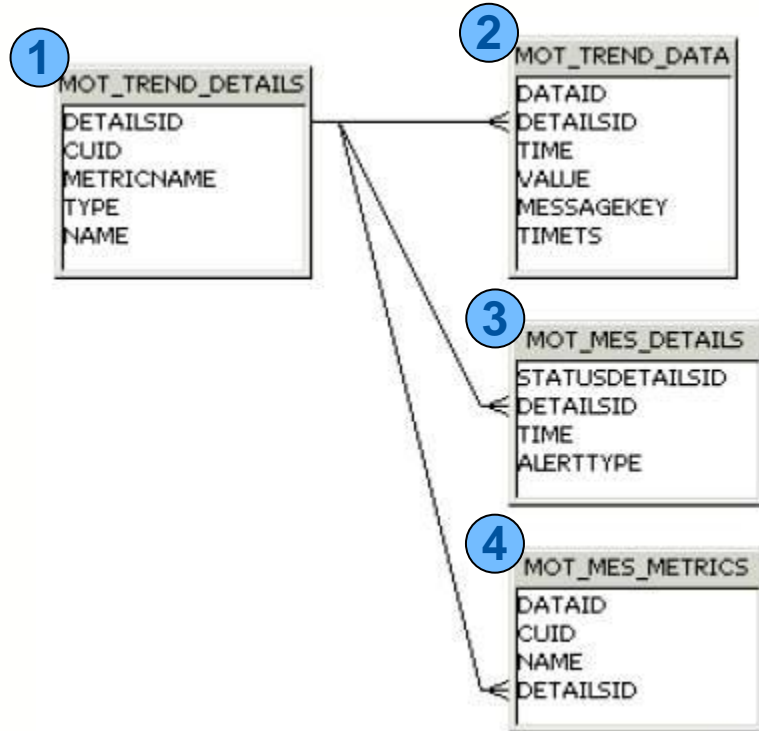
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# REPORTING – Tables Involved



- 1 MOT\_TREND\_DETAILS**  
Metric definitions used by watches and probes
- 2 MOT\_TREND\_DATA**  
Data collected for metrics used by watches and probes
- 3 MOT\_MES\_DETAILS**  
Data collected when watch thresholds are exceeded, alerts issued
- 4 MOT\_MES\_METRICS**  
Watch definitions

SAP KB Note **1805495** describes the columns for each table



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# REPORTING – Demonstration

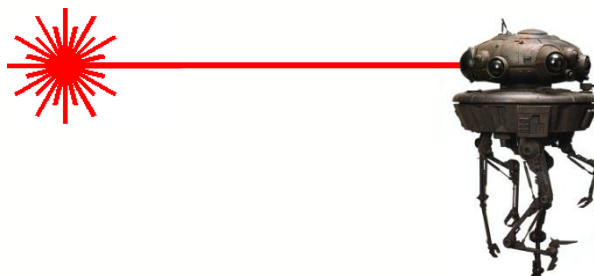


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# KEY LEARNING

- BI 4.x is the first BusinessObjects solution to include built-in monitoring
- This capability greatly enhances your ability to visualize, track and troubleshoot
- It is not perfect
  - Key features still missing (no appserver monitoring/metrics)
- Monitoring results can be stored and read using BusinessObjects universes
- Combine it with other tools like Wiley Interscope for a well-rounded view of your system



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# For More Information

- Read the BI 4.1 Administration Guide for setup and configuration
- Check out Michael Welter's blogs on monitoring:
  - <http://michaelwelter.wordpress.com/2012/06/14/sap-businessobjects-monitoring-part-1/>
  - <http://michaelwelter.wordpress.com/2012/09/27/sap-businessobjects-monitoring-part-2/>
  - <http://michaelwelter.wordpress.com/2013/01/10/sap-businessobjects-monitoring-part-3/>
- Look at this SAP Note for metric explanations:
  - [1772632 - Explanation of Server Monitoring Metrics for SAP BusinessObjects Business Intelligence 4.0](#)



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Session 0305

Deep Dive – Monitoring Servers using BI 4.1

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