Deep Dive – Monitoring Servers using BI 4.1

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Solid Ground Technologies

SESSION CODE: 0305
AGENDA

- Introduction
- Definitions and Architecture
- Configuration
- Metrics
- Watches and Alerts
- Probes
- Reporting
- Conclusion
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
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 …”
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
Machines, Nodes, and Servers

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

**DEFINITIONS**

- **Webi Processing Server**
- **Central Management Server**
- **Adaptive Job Server**
- **Adaptive Processing Server**

**Machine:** grumpy

**Node:** siagrumpy1
DEFINITIONS

- Cluster
  - Two or more nodes

Machine: grumpy
- Webi Processing Server
- Adaptive Processing Server
- Node: siagrumpy1
- Central Management Server
- Adaptive Job Server

Machine: sleepy
- Webi Processing Server
- Adaptive Processing Server
- Node: siasleepy1
- Central Management Server
- Adaptive Job Server
DEFINITIONS

- Metric
  - Every server has attributes that can be measured

Busy Server Threads
CPU usage_%_
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

Webi Processing Server

Node: siagrumpy1
DEFINITIONS

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

Webi Processing Server

Node: siagrumpy1

| RAM _MB_ | - Total RAM memory of server |
| Virtual memory size _Mb_ | - RAM memory used |

RAM _%_  (Virtual memory size _Mb_ ) / (RAM _MB_)

DEFINITIONS

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

\[
\text{WebIntelligenceServices}\$\text{Health State} = 1 \quad (\textcolor{red}{\bigcirc} + \textcolor{green}{\bigcirc} + \textcolor{yellow}{\bigcirc} = \textcolor{green}{\bigcirc})
\]

- Node: siagrumpy1

- Webi Processing Server
- Adaptive Job Server
- Adaptive Processing Server
**DEFINITIONS**

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

**Watch: Webi Memory**

- **Metric:** Virtual memory size _Mb_
- **Caution:** 3500 Mb
- **Danger:** 4500 Mb

**Node:** siagrumpy1

**Webi Processing Server**
DEFINITIONS

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

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

**Watch: Webi Memory**

- **Metric:** Virtual memory size _Mb_
- **Caution:** 3500 Mb
- **Danger:** 4500 Mb

**Node:** siagrumpy1

**Webi Processing Server**
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
**DEFINITIONS**

- **Dashboard**
  - Visual representation of your BI Landscape
ARCHITECTURE

- Formal diagram from the BI 4.1 Admin Reference:
Architecture from an Administrator’s standpoint:

<table>
<thead>
<tr>
<th>Metrics: sia1.WebIntelligenceProcessingServer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Web Intelligence Processing Service Metrics</td>
</tr>
<tr>
<td>Cache size (Kb)</td>
</tr>
<tr>
<td>Number of out-of-date documents in cache</td>
</tr>
<tr>
<td>Cache high mark count</td>
</tr>
<tr>
<td>CPU usage (%)</td>
</tr>
<tr>
<td>Total CPU time (seconds)</td>
</tr>
<tr>
<td>Memory high threshold count</td>
</tr>
<tr>
<td>Memory max threshold count</td>
</tr>
<tr>
<td>Virtual memory size (Mb)</td>
</tr>
<tr>
<td>Current number of client calls</td>
</tr>
<tr>
<td>Number of remote extension errors</td>
</tr>
<tr>
<td>Current number of tasks</td>
</tr>
<tr>
<td>Total number of client calls</td>
</tr>
<tr>
<td>Total number of tasks</td>
</tr>
<tr>
<td>Idle time (seconds)</td>
</tr>
<tr>
<td>Current number of active sessions</td>
</tr>
<tr>
<td>Number of documents opened from cache</td>
</tr>
<tr>
<td>Number of documents</td>
</tr>
<tr>
<td>Current number of sessions</td>
</tr>
<tr>
<td>Number of document swap</td>
</tr>
<tr>
<td>Number of swapped documents</td>
</tr>
<tr>
<td>Number of sessions timeout</td>
</tr>
<tr>
<td>Total number of sessions</td>
</tr>
<tr>
<td>Number of users</td>
</tr>
<tr>
<td>Number of active threads</td>
</tr>
<tr>
<td>Total number of threads</td>
</tr>
</tbody>
</table>

Which metrics matter?

Which servers should be traced?

Do I have a problem?
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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
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
AGENDA

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- **Metrics**
- Watch lists and Alerts
- Probes
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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
OS-Level metrics require an agent to be installed on your server - SAPOSCAL
The metrics can also be retrieved using QueryBuilder if you knew the proper syntax (not hard).

Derived metrics (formula using existing metrics) stored here.
METRICS – Probes

Probes
- sia1.BINauchpad
  - execution:time
  - passed
- sia1.CMSCache
- sia1.CMSDBConnection
- sia1.EMSLogonLogoff
  - execution:time
  - passed
- sia1.CMSPing
- sia1.CrystalReportsService(ProcessingServer)
- sia1.CrystalReportsService(ReportApplicationServer)
- sia1.InteractiveAnalysis

Probe metrics will only show values when scheduled

- sia1.EMSLogonLogoff$executiontime: 78 milliseconds (Live: Sep 8, 2014 8:43 PM to Sep 8, 2014 8:45 PM)
- sia1.EMSLogonLogoff$passed: 1 (Live: Sep 8, 2014 8:44 PM to Sep 8, 2014 8:45 PM)
METRICS – Servers

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

Health State values

0 - Danger
1 - Warning
2 - OK

Health states represent the general state of the server
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 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
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

Follow @ASUG365 and #ASUG on Twitter
WATCHES – Creating a Watch

Watch results must be written to the database to be reviewed later!
Use this button to group multiple metrics together.
WATCHES – Adding Danger Rule(s)

Edit Watch - Overall CPU - Danger Rule

Available Metrics

Filter: 

Added Metrics:

OS$CPUIdle...

Boolean Expression: Syntax is NodeName.ServerName$Metric Name$ > ThresholdValue

SG-Win2008-01.OS$CPUIdle_Percentage' <= 40

Danger Rule currently evaluates to:

Danger
WATCHES – Throttle and Act

Warn when %CPU Idle < 40% for two hours

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

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

Notification Settings:
- Enable alert notifications
- List of users to be notified:
  - Administrator
  - Add Metric Trend History As Attachment

**Directory**

<table>
<thead>
<tr>
<th>User/Group Name</th>
<th>Type</th>
<th>Email id</th>
<th>Alerts</th>
<th>Email Notification</th>
<th>Email Notification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monitoring Users</td>
<td>User Group</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Administrators</td>
<td>User Group</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Administrator</td>
<td>User</td>
<td><a href="mailto:alan.mayer@solidgrounded.com">alan.mayer@solidgrounded.com</a></td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Email recipient</td>
<td>Email recipient</td>
<td><a href="mailto:alan.mayer@solidgrounded.com">alan.mayer@solidgrounded.com</a></td>
<td></td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>

Enter email ID(s) here: [Add email recipient...]

Delete email recipient: Alert Settings:
ALERTS – Viewing an alert

- 4 Unread Alerts
  - sia1.AdaptiveProcessingServer Watch Caution Event
  - sia1.AdaptiveProcessingServer Watch Caution Event
  - sia1.AdaptiveProcessingServer Watch Caution Event
  - sia1.AdaptiveProcessingServer Watch Caution Event
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
WATCHES – Demonstration
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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
Input parameters must be filled in for some probes to run!
Use a probe by scheduling it (just like a document).

They can also be triggered by a watch.
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**
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
PROBES – Demonstration
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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
REPORTING – Demonstration
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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
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/2012/06/14/sap-businessobjects-monitoring-part-1/)
  - [http://michaelwelter.wordpress.com/2013/01/10/sap-businessobjects-monitoring-part-3/](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](https://support.sap.com/SAP BUSINESSOBJECTS BUSINESS INTELLIGENCE 4.0)
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THANK YOU FOR PARTICIPATING

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