Improve Service Levels with Enhanced Data Analysis

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Agenda

• Customer Pain Points and Challenges – Problem Determination

• IBM zAware – What is it and why do I need it?

• Integration with existing Service Management tools – Save time, effort and reduce mean time to recovery
Client pain points and challenges

- Takes too long to isolate, diagnose problems in applications and infrastructure.
  - Customer environments have become very complex. Application workloads span multiple platforms and include several different diagnostic capabilities.
  - Datacenters generate a large amount of data. (performance metrics, events, infrastructure logs, application logs, configuration files, traces). Current management systems only use a subset of this information (metrics & events).
  - Systematic ‘soft failures’ are much harder to detect – several anomalies can build up over time

- Existing management tools becoming inappropriate for Systems of Engagement and mobile applications.
  - 100x to 1000x explosion in users and data flooding existing tools. (terabytes)
  - New runtimes, programming languages needing complex instrumentation to use traditional tools.

- Critical missed information leads to outages and/or poor customer experience. Most management of problems reactive.
  - Analyzing all information is a better indicator for predicting problems.
Application and Infrastructure Problem Diagnosis

Operators and subject matter experts are overwhelmed with volumes of data that they manually process to determine the cause, location and scope of a problem.

- Only 3% of the data generated is operations-oriented metric data
- 97% is unstructured/semi-structured data
- An enterprise with 5000 servers generates over 1.3 TB of data per day

Complete your sessions evaluation online at SHARE.org/BostonEval
Analytics Opportunities in IT

Performance and Capacity
Track, Optimize, and Predict Capacity and Performance needs over time

Outage Avoidance
Ensure Availability of Applications and Services

• Use Learning tools to augment custom Best Practices
• Improve Problem detection across IT Silos
• Leverage Statistical methods to maximize predictive warning

Faster Problem Isolation
Find the Critical Data Faster with systems designed for no-touch escalation and highlighting

• Identify problems quicker with insight to large unstructured repositories
• Isolate problems quicker by bringing relevant unstructured data into problem investigations
• Repair problems quicker with the right details quickly to hand.

Customer Insight & Care
Reduce Customer Frustration by spotting their frustrations before they call (or leave)

Knowledge
• Track Capacity and Performance of Applications and Services in Classic and Cloud Environments
• Optimize Resource Deployment with what-if and best fit planning tools
• Escalate Capacity and Performance problems before they cause critical failures

Better Insight
• Use Learning tools to augment custom Best Practices

Find Critical Data
• Identify problems quicker with insight to large unstructured repositories

Pain Points
• Gain insight into what is important to your customer
• Decrease customer churn and acquisition costs
• Increase customer retention and satisfaction

IBM zAware uses Log Analytics to lower mainframe IT Administration Costs and ensure 24/7 uptime:

• Log Analysis surfaces anomalies automatically, removing the need to manually scour through millions of z/OS messages
• Service Management tools enable fast-path to failure, reducing Mean Time to Recovery (MTTR)
**What is IBM zAware?**

**IBM zAware** is a priced feature offered with *IBM zEnterprise EC12 /BC12*. IBM zAware:

- Provides z/OS Log Analytics - Analysis of z/OS operlog
- Surfaces anomalies that indicate abnormal occurrence of messages in z/OS environments
- Packaged as a ‘firmware appliance’ that runs ‘out of band’ (not on z/OS)
How can IBM zAware Improve Problem Determination?

- Identify messages indicating a possible z/OS incident is happening
  - Which image is behaving abnormally?
    - Examines unique messages
    - High score generated by unusual messages or message patterns
  - When did this unusual behavior start?
    - For a selected 10 minute interval either the current 10 minute interval or past intervals
      - Which message ids are unusual?
      - How often did the message occur?
      - When did the message start to occur?
  - Were similar messages issued in the past?
    - Similar characteristics, Same pattern?

- After a change has been made
  - Are unusual messages being issued following changes?
    - New software levels (operating system, middleware, applications)
    - Updated system settings / system configurations
  - When diagnosing the cause of an intermittent problem
    - Are new unusual messages being issued in advance of the problem?
    - Are more messages issued than expected?
    - Are messages issued out of normal pattern or context?

**Finds Anomalies that would be Hard to Detect**

Vertical bar shows the number of unique messages in a 10 minute interval
Scoring of messages color coded from common (blue) to rare (orange)
IBM System z Advanced Workload Analysis Reporter

- Monitors z/OS OPERLOG including all messages written to z/OS console, including ISV and application generated messages
- Detects things typical monitoring systems miss due to:
  - Message suppression (message may be too common)
    - Useful for long-term health issues
  - Uniqueness (message not common enough)
    - Useful for real-time event diagnostics
- Color-coded, easy-to-use web browser GUI
- XML Output can feed other products

Ability to drill down for details on anomalies
Drill down to see JES2 resource shortage

### Interval View for System CB88

**Date:**
- ![July 1, 2012]

**Time interval (local time):**
- 04:00 AM - 04:10 AM

**Analysis Source:**
- All Managed Systems

**Interval anomaly score:**
- 90.7

#### Actions

<table>
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<tr>
<th>Anomaly Score</th>
<th>Interval Contribution Score</th>
<th>Message Context</th>
<th>Rules Status</th>
<th>Appearance Count</th>
<th>Time Line</th>
<th>Message ID</th>
<th>Message Example</th>
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Get the more from the IBM zAware feature by integrating with Tivoli Service Management. Tivoli will utilize the IBM zAware API to integrate log analysis with existing service management capabilities.

- Provide visibility into IBM zAware anomalies via Event Management
- Improve MTTR through integration with existing problem determination and performance monitoring tools
- Identify system errors and eliminate subsequent occurrences thru automation and more sophisticated analysis

IBM zAware is NOT a replacement for traditional performance and availability monitoring tools. It’s just the opposite. When used in conjunction with existing service management tools, it can provide a VERY powerful combination to help achieve 24/7 uptime, improve MTTR when problems occur and help avoid subsequent problems.
IBM zAware Complements Your Existing Environment

zAware provides an API to retrieve XML data to support alternative views generated by higher level managers.

Customer controlled scope
Sysplex views
z/OS Image view
Closed appliance

Programmatic calls
Launch (UI)

Management of z/OS and Sysplex

z/OSMF
IBM zAware – Log Analytics with Anomaly Detection

- Available TODAY as ‘firmware appliance’ with mainframe (EC12)
- Requires z/OS operlog (‘simple’ implementation)
- Focus – Log Analytics – Anomaly detection
- Customer - z/OS Enterprise customers
- Customer Value – Save money by ensuring z/OS availability (decrease time to perform problem determination and lower MTTR)
- Leverage IBM zAware through existing Service Management solutions (NetView and OMEGAMON) to generate events and enable problem isolation.

![IBM zAware](image)

**Surface Anomalies**

Event Management OMNIbus

Problem Determination NetView CANZLOG

Performance Monitoring OMEGAMON
IBM zAware, Automation, Event Management and PD Tools

NetView processing …
- Query IBM zAware (10 minute interval)
- If anomaly detected
  - Generate ‘anomaly’ message
  - Generate Event
- SME - Browse NetView CANZLOG to perform problem determination

- NetView samples provided to generate anomaly message and event(s)
  - Available for download from Service Management Connect
- NetView integration referenced from IBM zAware Redbook
- IBM Services (optional) available to install and configure zAware and NetView

View event in Active Event List
Generate trouble ticket

Browse NetView CANZLOG
Perform PD for anomaly

Operator, SME
NetView CANZLOG – Browse in zAware context

- Browse NetView CANZLOG in context of zAware anomaly
- Set filter and timeframe to view related messages in CANZLOG (consolidated log)
- Perform problem determination in context of timeframe of the anomaly

```
Canzlog MVS & local NetView messages FILTER=LOG 11/06/12 16:50:04 -- 16:50:04
16:50:04 ZAI00001I Interval Results.

System : UTCPLXSB-SP0
Interval: 2012-09-25T09:30:00.000Z
Anomaly : 72.0

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<tr>
<th>Anomaly</th>
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<th>Cluster</th>
<th>Contribution</th>
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16:50:04 ZAI0001I - Starting
TO SEE YOUR KEY SETTINGS, ENTER 'DISPFK' CMD=>
```
IBM zAware, Event Management & Traditional Performance Monitoring

View event in Active Event List
Generate trouble ticket

Perform PD for anomaly using association with traditional monitoring KPIs

z/OS

LOGGER

OMEGAMON
Performance Monitoring

Tivoli

Processing …
- Query IBM zAware (10 minute interval)
- If anomaly detected
  - Trigger situation to Generate Event when anomaly is surfaced
  - Include IBM zAware insights in performance monitoring views
IBM zAware Hot Issue Alerting feature Overview

Benefits IBM zAware (zAware built on analytics) customers by enhancing the power of IBM zAware problem isolation with the alerting and reporting capabilities of OMEGAMON XE on z/OS
Scenario: Situation Detecting IMS Log Failure

- The new OMEGAMON warning situation for zAware, based on anomaly scores, has triggered indicating something highly unusual is happening on my LPAR.
- Launch from TEP to the zAware UI next.
Scenario: Situation Detecting IMS Log Failure …

• Launching to zAware browser I drill down to the message IDs for the interval and see two messages for IMS DFS0739I and DFS0739X contribute heavily to the scoring of this interval
Scenario: Situation Detecting IMS Log Failure …

- Reviewing the SYSLOG for the LPAR I see
  - DFS0739I LOGIC ERROR DDNAME=DFSOLP08 LOG SEQ=0000000000000778 IA1H
  - DFS0739X ERROR READING IMS LOG RC=22 DDNAME=DFSOLP08 LOG SEQ=0000000000000778 IA1H
- IMS Messages and Code manual tells me
  - DFS0739I An error occurred while accessing a log data set during IMS restart. ddddddddd is the ddname of the data set last processed when the error was encountered. ddddddddd can be blank.
  - DFS0739X Restart cannot proceed because of errors encountered. ddddddddd is the ddname of the data set being processed when the error was encountered. ddddddddd can be blank. nnnnnnn can be blank. xx is the hexadecimal error code. Register 14 contains the address of the routine that detected the error. Register 15 contains an error code.
    - RC =22 - A logic error was detected.
- Armed with this information I am able to alert the IMS systems programmer to recover the IMS Log
IBM zAware
in
OMEGAMON e3270ui

Demo
Place slash at LPAR to be investigate
Select zAware workspace
Here is zAware workspace

Top subpanel presents configuration and status for zAware appliance

Second subpanel present current hour zAware observations
Active situations appear here
Active situations appear here
Product provided situations

LPAR alerts
- KM5_zAware_Analysis_Warn when
  - Anomaly Score 02 >= 99.6 AND Anomaly Score 02 < 101.0
- KM5_zAware_Analysis_Crit when
  - Anomaly Score 02 >= 101.0

Agent self monitoring alerts
- KM5_zAware_Client_Status when
  - zAware Client Status != ‘Active Client’
- KM5_zAware_Server_Status when
  - zAware Server Status != Active
Monitoring the zAware Server

The Tivoli zEnterprise Monitoring Agent already monitors the logical partitions in the CEC as shown in the ‘Logical Partitions Summary’ table in the zEnterprise Ensemble Summary workspace.

Monitor the IBM zAware partition Running in the EC12
IBM zAware and Tivoli – more Information

**IBM zAware Publications:**
System z Advanced Workload Analysis Reporter (IBM zAware) Guide - SC27-2623-00
https://www-304.ibm.com/support/docview.wss?uid=isg24f9114255d7d1f3285257a6a0077c2ca&aid=1

**IBM zAware Demo:**

**IBM zAware Redbook:**
Extending z/OS System Management Functions with IBM zAware

**Service Management Connect:**
NetView wiki page to download zAware integration samples and documentation

**IBM zAware and Tivoli – Service Management Myth Buster #199**
https://www.ibm.com/developerworks/mydeveloperworks/blogs/5e65990a-9690-42e2-93b1-c2267be7620c/entry/service_management_myth_busters1?lang=en
Learn more about IBM zAware …

Wednesday

• 13569: IBM zAware - Using Analytics to Improve System z Availability (3:00)
• 13580: Setting up IBM zAware - Step by Step (4:30)
Learn about all recent Tivoli announcement and how to exploit them in sessions this week.

Monday
- 14073 – What’s New in OMEGAMON (11:00)
- 14121 – OMEGAMON for Storage (4:30)

Tuesday
- 13903 – OMEGAMON Lab (9:30)
- 14074 – Automation Control (11:00)
- 14163 – OMEGAMON for Storage (4:30)

Wednesday
- 13295 – OMEGAMON for MfN (8:00)
- 13771 – Advanced Catalog Mgmt (9:30)
- 14076 – System Automation (11:00)
- 14089 – Storage Management (11:00)
- 14080 – Workload Automation (3:00)

Thursday
- 13546 – NetView Canzlog (12:15)
- 14345 – Lunch and Learn – Mike Baskey
- 14077 – OMEGAMON zAware support (1:30)
- 13545 – NetView Management (3:00)

Friday
- 14056 - OMEGAMON power user (8:00)
- 13824 - OMEGAMON for DB2 (9:30)
- 14082 – Capacity Management with TDSz

System z Facebook page: https://www.facebook.com/IBMsystenmz
Twitter hashtag: #systemzsw
IBM System z Service Management critical for moving to Mobile, Big Data and Cloud

IBM continues to improve z/OS environment to support new technologies

• OMEGAMON family enhancements
  • OMEGAMON XE for z/OS V5.1.1
  • OMEGAMON XE for Mainframe Networks V5.1.1
  • OMEGAMON XE for Storage V5.2
  • OMEGAMON for z/VM and Linux V4.3
• IBM Automation Control for z/OS
• Workload Scheduler for z/OS v9.1
• Storage Management for z/OS portfolio enhancements


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Thank You