

# IBM zAware

## Using Analytics to Improve System z Availability

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# Agenda

- What is IBM zAware, and what can it detect?
  - How can it help identify problems on z/OS systems?
  - How can it help diagnose problems on z/OS systems?
- Operating requirements
- Use of the IBM zAware GUI
- Enhancements available Sept 2013
- Integration with other management products

# Background

## Systems are more complex and more integrated than ever

- *Errors can occur anywhere in a complex system*
  
- *Some problems are particularly...*
  - **Difficult to detect**
    - Several allowable anomalies can build up over time
    - Symptoms / problems can manifest for hours or days
    - Problem can grow, cascade, snowball
  - **Difficult to diagnose**
    - Sometimes finding the *system* in error is a challenge
    - Many times finding the *component* in error is a challenge
    - Volume of data is not humanly consumable, *especially* when seconds count
  
- *Need information and insight*



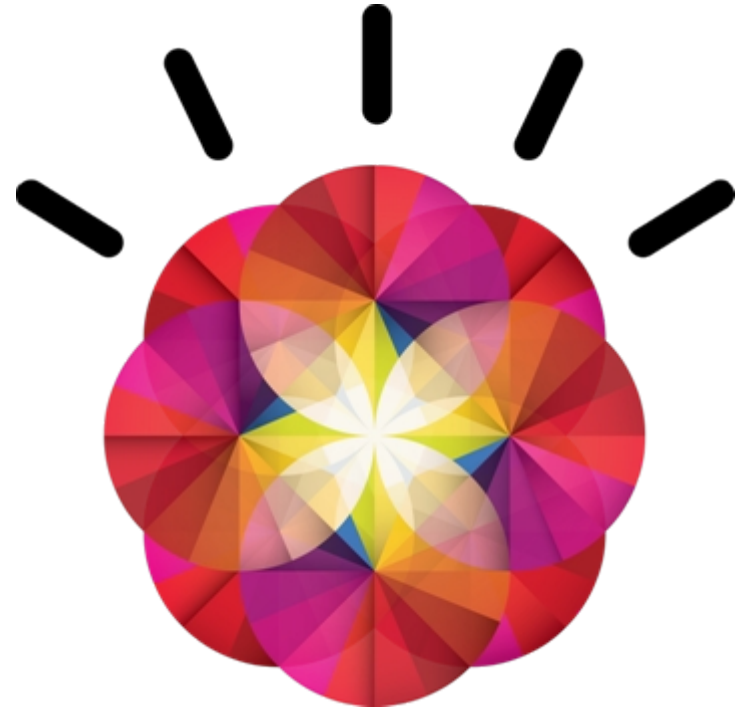
# IBM zAware – IBM System z Advanced Workload Analysis Reporter

- 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 too common)  
Useful for long-term health issues
  - Uniqueness (message not common enough)  
Useful for real-time event diagnostics
- Color coded easy to use GUI via web browsers
- Output can be queued up to existing monitoring systems.
- Early detection and focused diagnosis can help improve time to recovery



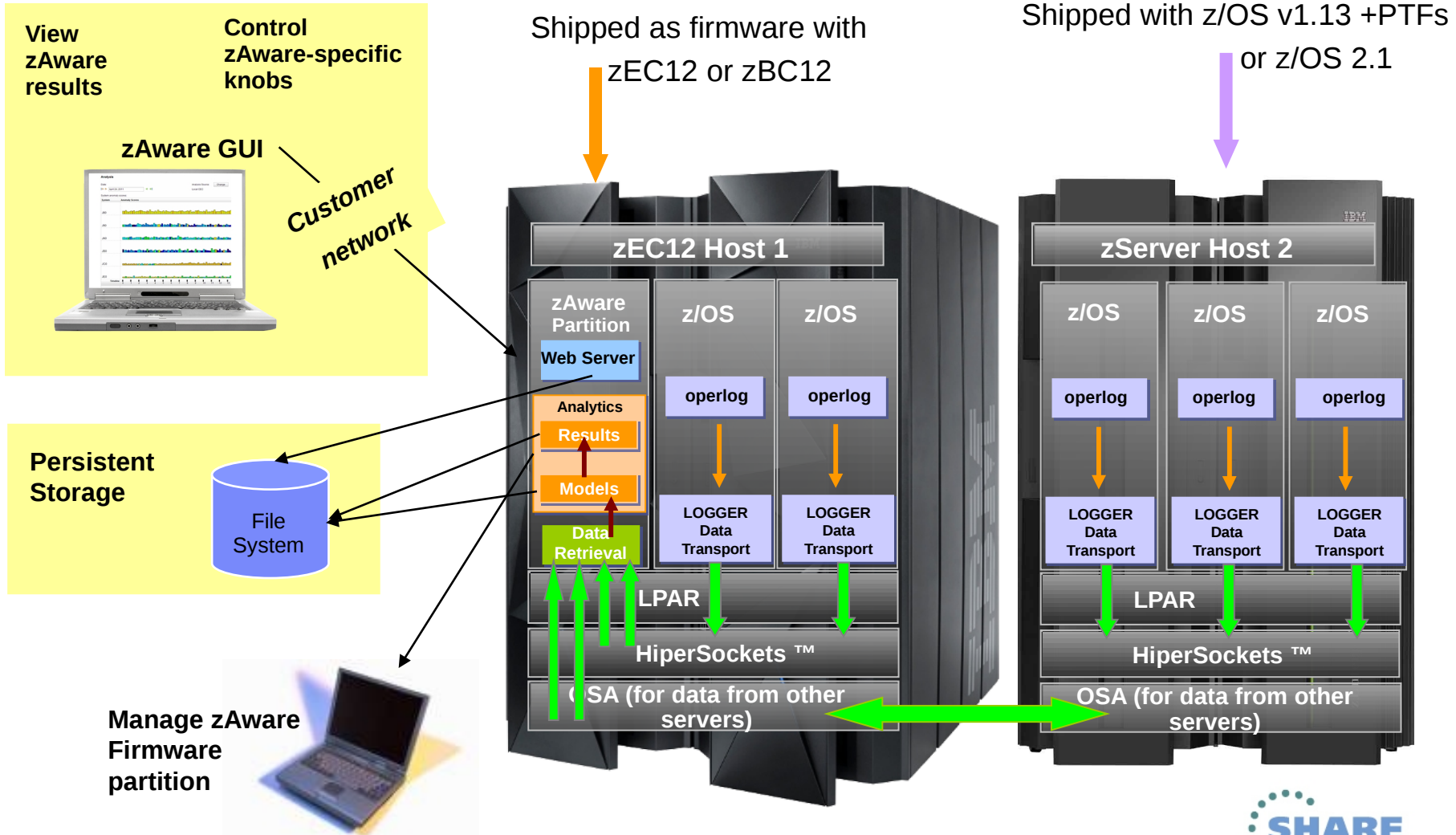
# IBM zAware – Smarter Computing Needs Smarter Monitoring

- New technology based on machine learning developed by IBM Research
- Cutting edge pattern recognition techniques look at the health of a system to pinpoint deviations from the 'norm'
- High speed analytics facilitates the ability to consume large quantities of message logs
- Improves problem diagnosis across a set of System z servers
- Speeds up the time to decide on appropriate corrective actions on problems before they get bigger
- Allow establishment of procedures to prevent reoccurrence



*zAware's capacity as a 'watch dog'  
can help to detect unusual  
behavior in near real time*

# Inside IBM zAware





# Inside IBM zAware Analytics

- OPERLOG is processed per-system
- zAware recognizes any well-formed message Ids
  - including IBM and non-IBM products and customer applications
- zAware summarizes the common message text and records the occurrences
- zAware builds a **model** of normal behavior based on the last 90 days
  - Called “Training”
  - Automatically trains every 30 days
  - Can be forced manually
  - Customizable
  - Unusual days can be excluded from future models
- z/OS utility is used to load historical logs into zAware

# Inside IBM zAware Analytics

- Real-time OPERLOG data is compared to the model
- Assigns a **message anomaly** score to indicate deviation from the model
  - Rare messages
  - Out of context from normal patterns
  - High counts
- Uses z/OS-specific knowledge to influence the scores
- Generates an **interval anomaly** score per 10 minute interval
  - Current interval is updated every 2 minutes
  - GUI shows number of unique message IDs (bar height)
  - GUI shows interval anomaly score (bar color)
- Drill down on interval shows the message scores
- XML output available via HTTP APIs

# Analysis View



IBM zAware

- Analysis
- Notifications
- System Status
- Administration

## Analysis

The System Anomaly Scores graph shows message analysis data for each system in ten minute intervals. For each interval, the bar height indicates the number of unique message IDs. Click on an interval bar to access detailed message information. To view messaging analyses from other dates, use the date selector. To customize which systems

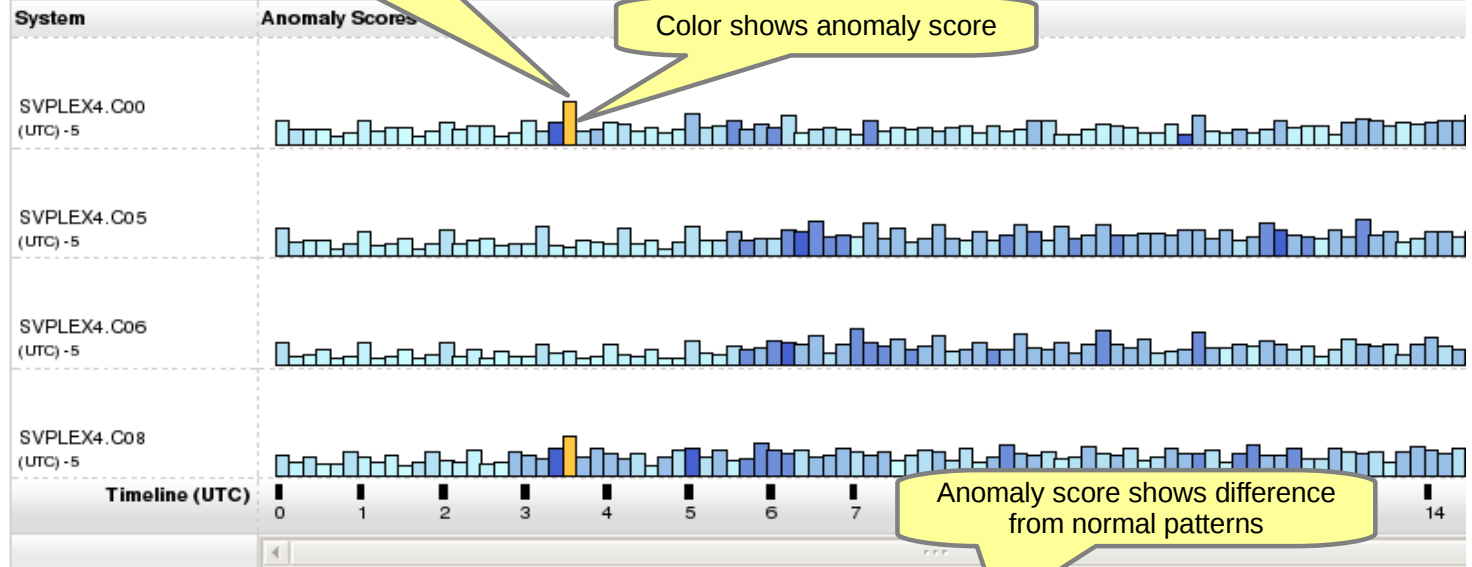
Date:

Jan 10 2014

Analysis Source:

SVPLEX4.C00, SVPLEX4.C05, SVPLEX4.C06, SVPLEX4.C08

Interval Anomaly



Zoom level:



Interval anomaly score key:



# Analysis View

Hovering over a bar displays the values

Clicking on a bar drills down to Interval

IBM zAware
Welcome admin

- Analysis
- Notifications
- System Status
- ▾ Administration

## Analysis

The System Anomaly Scores graph shows message analysis data for each system in ten minute intervals. For each interval, the bar height indicates the number of unique messages in that interval. Click on an interval bar to access detailed message information. To view messaging analyses from other days, use the date selector. To customize which systems are shown, use the Analysis Source selector.

Date: January 6, 2013 Change Source

Analysis Source: SVPLEX4.C00, SVPLEX4.C05, SVPLEX4.C06, SVPLEX4.C08

Interval Anomaly Scores by System

System	Anomaly Scores
SVPLEX4.C00 (UTC) -5	
SVPLEX4.C05 (UTC) -5	
SVPLEX4.C06 (UTC) -5	
SVPLEX4.C08 (UTC) -5	

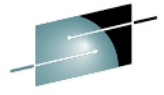
Timeline (UTC) 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

Zoom level: 1 hr 4 hrs 8 hrs 12 hrs 16 hrs 20 hrs 24 hrs

Interval anomaly score key:

■	■	■	■	■	■
0	99.5	99.6 - 100	101		
No Difference			Significantly Different		

# Interval View



- Analysis
- Notifications
- System Status
- Administration

Current Analysis ▶ Interval View

## Interval View for System C00

The Messages table provides detailed information for each message that occurred during the indicated time interval. To view message details for other intervals use the date and time interval selectors. Click the **Return to Analysis** button to go back to the Analysis page.

Date:

Time interval (UTC):

System: SVPLEX4.C00  
Interval anomaly score: 00.0

Messages

▼1 Anomaly Score	Interval Contribution Score	▼2 Message Content	Rules Status	Appearance Count	Time Line	Message ID	Message Example	Rarity Score	Component	Cluster ID
1	41.348	new	None	238		<a href="#">IGW702I</a>	PDSE Directory Validation Unsuccessful DESC:<ND> Structure is corrupted LTK:	101	IGW	-1
1	41.3	new	None	237		<a href="#">IGW699I</a>	PDSE Directory Validation Unsuccessful DESC:PDSE structure is corrupted	101	IGW	-1
1	18.184	new	None	16		<a href="#">IEC909I</a>	212-00,MSR13M7 , TESTM7 ,SAM00001,00000024,06105AF8	101	IEC	-1
1	10.684	new	None	2		<a href="#">IEC036I</a>	002-6C,IGC0005E,MSR13M7,TE:IST.DFSMS.MAS1IR13.DS00000:	101	IEC	-1
1	7.818	unclustered	IMPORTANT	1		<a href="#">CNZZ002E</a>	MESSAGE THRESHOLD REACHED FOR JOB Z850A010 ASID 021B	74	CNZZ	-1
1	0	in_context	IMPORTANT	1		<a href="#">CNZZ007E</a>	MESSAGE RATE EXCEEDED 600 MESSAGES IN <1 SECONDS.	64	CNZZ	22
1	0	in_context	IMPORTANT	1		<a href="#">IEA611I</a>	COMPLETE DUMP ON D83DUMP.DYNZOS21.C00.D130: DUMPRD=002 REQUESTED BY	47	IEA	109

Several messages never seen in the model

Time Line shows occurrences within interval

Message ID is a link to LookAt

z/OS specific rules affect anomaly score



## ***Identify unusual behavior quickly***

### ***Which z/OS image is having unusual message patterns?***

- High score generated by unusual messages or message patterns
- GUI shows all systems or selected subsets

### ***Which subsystem or component is abnormal?***

- Examine high-scoring messages

### ***When did the behavior start?***

- Current 10 minute interval or earlier?
- Which messages are unusual?
- How often did the message occur?
- When did the messages start to occur?

### ***Were similar messages issued previously***

- Easily examine prior intervals or dates

# Identify unusual behavior quickly – example 1

Which z/OS image is having unusual message patterns?

- Yellow and dark blue on CB88

When did the behavior start?

- Around 2:30

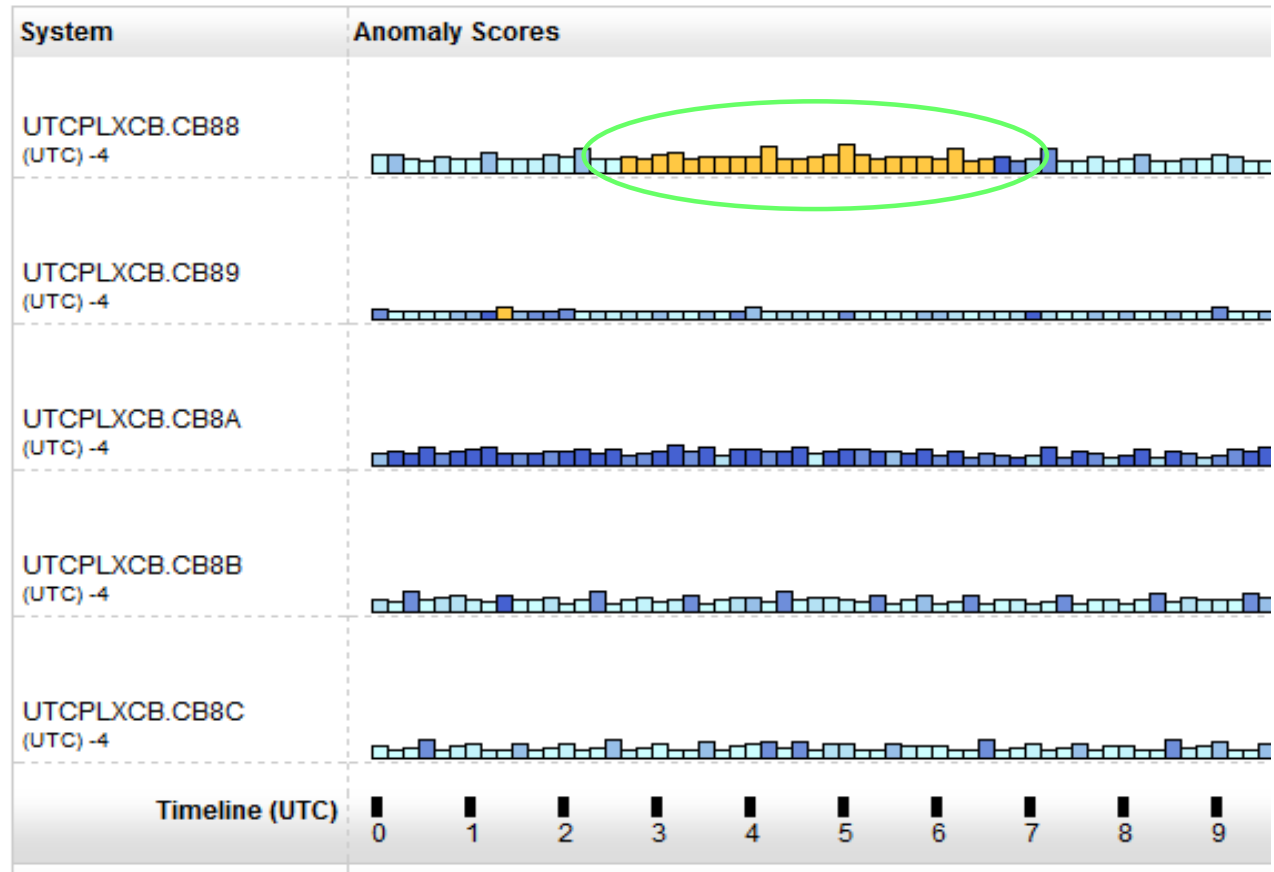
Date:

March 22, 2013

Analysis Source:

UTCPLXCB

Interval Anomaly Scores by System



# Identify unusual behavior quickly – Configuration Error



## Interval View for System CB88

The Messages table provides detailed analysis information for each message that occurred during the indicated time interval. To view message details for other intervals use the date and time interval selectors. Click the Re

Date:

March 22, 2013

Analysis Source:

UTCPLXCB.CB88

Time interval (UTC):

02:40 – 02:50

Interval anomaly score:

99.8

Messages

Anomaly Score	Interval Contribution Score	Message Context	Rules Status	Appearance Count	Time Line	Message ID	Message Example	Rarity Score	Component	Cluster ID
0.999	196.275	unclustered	None	898		<a href="#">IRRC131I</a>	(<) RACF ENCOUNTERED AN R_PROXYSERV ERROR WHILE ATTEMPTING TO CREATE AN	73	IRRC	-1
0.999	48.115	unclustered	None	932		<a href="#">IRRC144I</a>	(<) RACF ENCOUNTERED AN R_PROXYSERV ERROR: SAF RETURN CODE=X'00000008',	85	IRRC	-1

## What component is having the problem?

- **Drill down indicates 900 IRRC131I and IRRC144I messages per interval. A review of SYSLOG showed that this was the result of work being performed in the LDAP address spaces. Further analysis showed that the LDAP PC Callable Interface was not enabled. At 6:40, the function was enabled, and the 131I and 144I messages are no longer generated.**

## Impact

- **Unnecessary messages blocking ability to see anything else. Impacts ability to look at the console.**

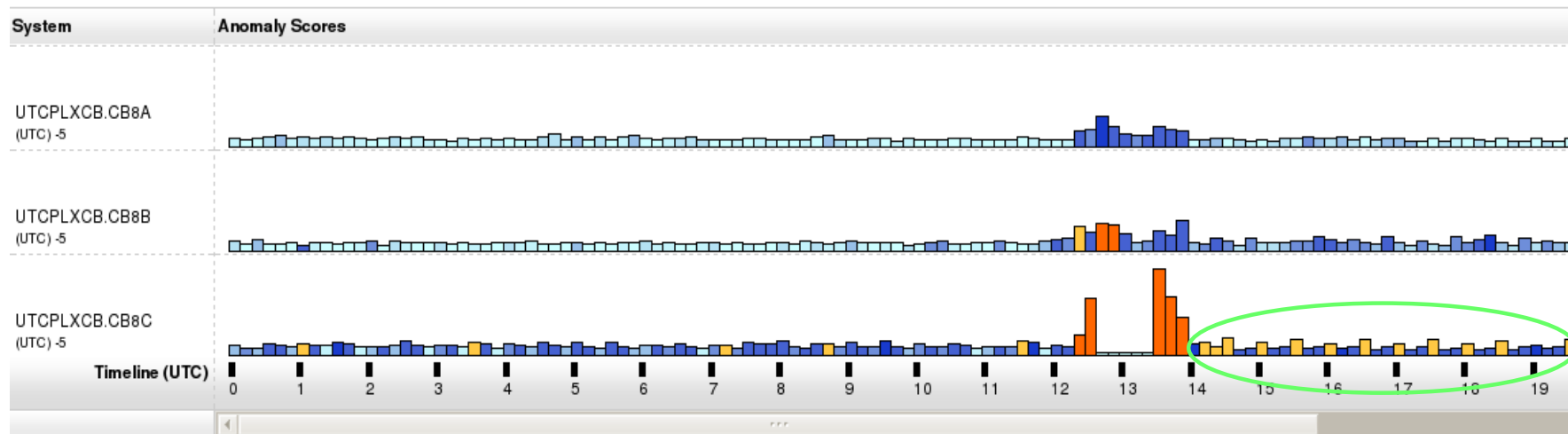




# Identify unusual behavior quickly – example 2

Date:  Analysis Source:   
UTCPLXCB

Interval Anomaly Scores by System



**Which z/OS image is having unusual message patterns?**

- **Recurring yellow and dark blue on CB8C**

**When did the behavior start?**

- **After an IPL at 13:30**

# Identify unusual behavior quickly – Configuration Error



## Interval View for System CB8C

The Messages table provides detailed analysis information for each message that occurred during the indicated time interval. To view message details for other intervals use the date and time interval **Return to Analysis** button to go back to the Analysis view.

Date:

August 28, 2012

Analysis Source:

UTCPLXCB.CB8C

Time interval (UTC):

14:20 -- 14:30

Interval anomaly score:

99.6

### Messages

▼1 Anomaly Score	Interval ▼2 Contribution Score	Message Context	Rules Status	Appearance Count	Time Line	Message ID	Message Example	Rarity Score	Component
0.999	14.369	unclustered	None	2		<a href="#">IEE838I</a>	TNPROC NON-CANCELABLE - ISSUE FORCE ARM	93	IEE
0.999	12.943	unclustered	None	2		<a href="#">EZZ0621I</a>	AUTOLOG FORCING TNPROC, REASON: TCP/IP HAS BEEN RESTARTED	100	EZZ
0.999	9.41	unclustered	None	1		<a href="#">IXG601I</a>	10.27.18 LOGGER DISPLAY 081 CONNECTION INFORMATION BY	62	IXG
0.997	6.078	unclustered	None	3		<a href="#">IEA631I</a>	OPERATOR GTHOMPS NOW INACTIVE, SYSTEM=CB8C, LU=TCP8C003	31	IEA

### Which subsystem or component is abnormal?

- Examine high-scoring messages

### When did the behavior start?

- When did the messages start to occur?

### Were similar messages issued previously?

- Easily examine prior intervals or dates

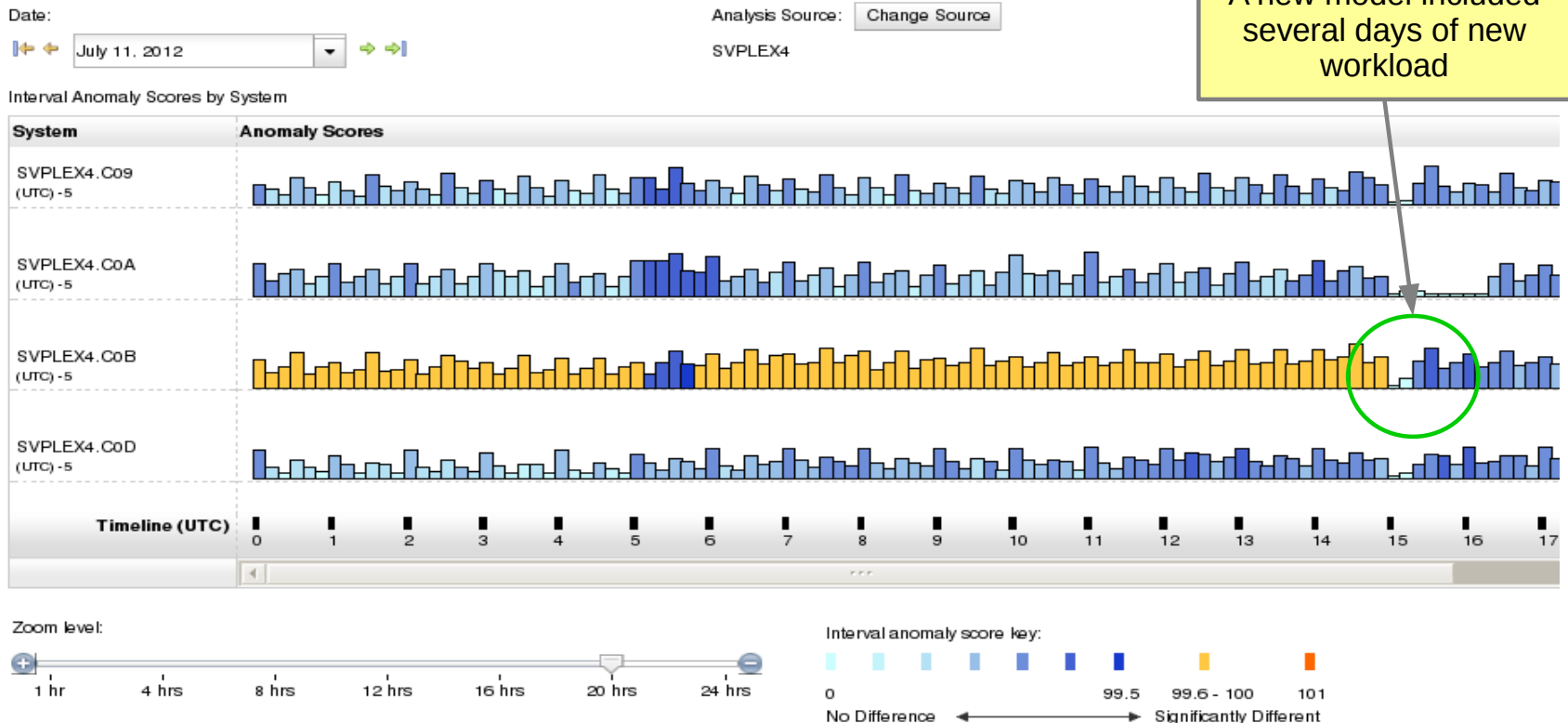
Moving left and right by interval shows messages due to TNPROC being cancelled by TCP/IP



# Identify behavior after a change

## Are unusual messages being issued after a change?

- New software levels (operating system, middleware, applications)
- Updated system settings or system configurations
- Differentiate expected message traffic from side effects



# Diagnose Intermittent Problems

*Are new unusual messages being issued when an intermittent problem occurs?*

- Compare previous time periods
- Are more messages issued then expected?
- Are messages issued differently from the normal pattern?

## Analysis

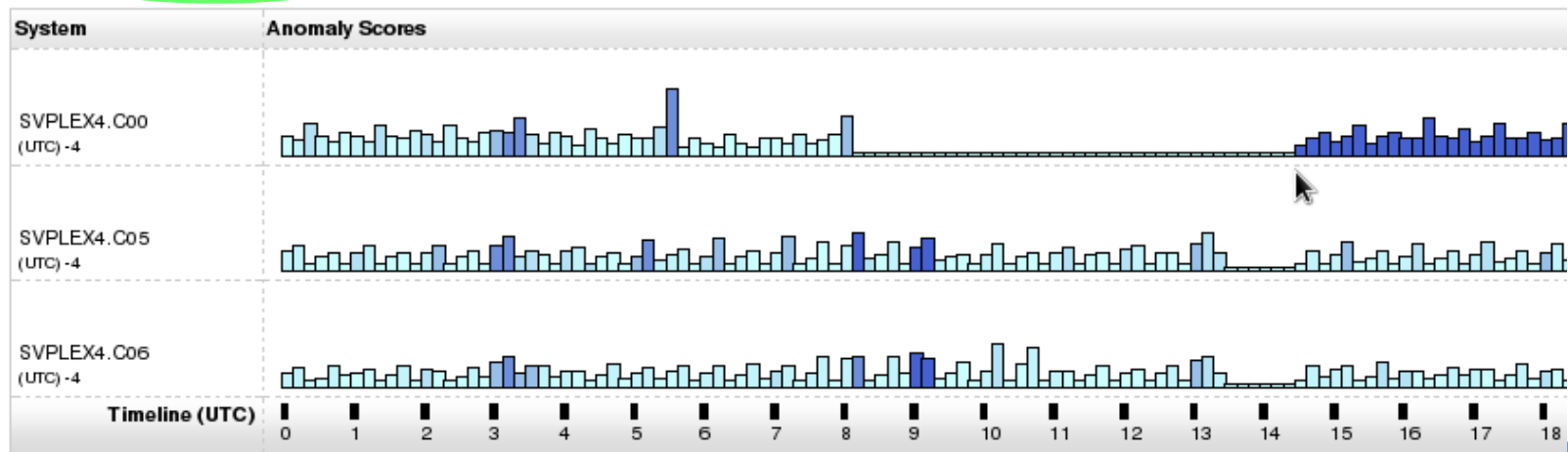
The System Anomaly Scores graph shows message analysis data for each system in ten minute intervals. For each interval, the bar height indicates the number of unique messages of the messages occurring during that interval. Click on an interval bar to access detailed message information. To view messaging analyses from other days, use the date select the graph, click the **Change Source** button.

Date:

Analysis Source:

SVPLEX4

Interval Anomaly Scores by System



# Connection Status

- Which z/OS Monitored clients are connected?



IBM zAware Welcome admin

- Analysis
- Notifications
- System Status**
- Administration







### System Status

System Status displays the IBM zAware analytics engine status, as well as monitored systems information for z/OS systems connected to IBM zAware. Click the


Analytics engine status: Running

IBM zAware Monitored System Data Suppliers:

System	Sysplex	Status	Instrumentation Data Type	Connect Start Time
CB8C	UTCPLXCB	 Active	OPERLOG	January 18, 2013 11:38:53 AM EST
CB8D	UTCPLXCB	 Active	OPERLOG	January 18, 2013 11:40:05 AM EST
CB8E	UTCPLXCB	 Inactive	OPERLOG	July 23, 2012 6:19:39 PM EDT
TA0	SVPLEXA	 Inactive	OPERLOG	January 15, 2013 4:06:19 PM EST
TA1	SVPLEXA	 Active	OPERLOG	January 15, 2013 4:08:40 PM EST
TA2	SVPLEXA	 Active	OPERLOG	January 18, 2013 10:51:12 AM EST

# Notifications





- zAware messages for asynchronous events
  - Storage, Training, Bulk load, ...
- Viewable by all users
- Persistent, until removed by an admin
- New ones indicated by  in header

- Analysis
- **Notifications**
- System Status
- ⊕ Administration

### Notifications

Notification messages

Actions ▾

<input type="checkbox"/>	Message ID	Message Text	Message Date/Time
<input type="checkbox"/>	 AIFT0001I	Training request for SVPLEXA-TA3 started Tue Jan 15 21:06:58 UTC 2013.	Tue Jan 15 2013 16:06:59 GMT-0500 (EST)
<input type="checkbox"/>	 AIFT0103I	Modeling for SVPLEXA-TA3 did not complete successfully. Insufficient number of intervals with acceptable number of unique message ids.	Tue Jan 15 2013 16:07:21 GMT-0500 (EST)
<input type="checkbox"/>	 AIFT0004E	Training request for SVPLEXA-TA3 failed Tue Jan 15 21:07:21 UTC 2013.	Tue Jan 15 2013 16:07:21 GMT-0500 (EST)
<input type="checkbox"/>	 AIFT0001I	Training request for SVPLEXA-TA4 started Tue Jan 15 21:10:07 UTC 2013.	Tue Jan 15 2013 16:10:07 GMT-0500 (EST)

# Training Sets

- Admins can view
  - Model training status
  - Dates included in the current model and next model
- Admins can take action
  - Request training
  - Exclude days from the next model

- Analysis
- Notifications
- System Status
- Administration
  - Training Sets
  - Configuration

## Training Sets

The Monitored Systems table provides training statuses and results for IBM zAware monitored systems. The Actions menu provides functions for managing model dates, requesting or canceling training, and ignoring messages. Training details for a given system can be accessed by clicking on links in the Training Progress and Last Training Result columns.

Monitored Systems

Actions ▾						
System	Sysplex	Training Progress	Last Training Result	Last Training Result Time	Current Model Built	
<input checked="" type="radio"/> D6	SVPLEX3	—	<input checked="" type="checkbox"/> <a href="#">Complete</a>	January 5, 2013 9:17:11 PM EST	January 5, 2013 9:17:11 PM EST	
<input type="radio"/> C00	SVPLEX4	—	<input checked="" type="checkbox"/> <a href="#">Complete</a>	January 3, 2013 7:02:30 PM EST	January 3, 2013 7:02:30 PM EST	
<input type="radio"/> C01	SVPLEX4	—	<input type="checkbox"/> <a href="#">Not Trained</a>	—	—	
<input type="radio"/> C02	SVPLEX4	—	<input type="checkbox"/> <a href="#">Not Trained</a>	—	—	

# Operating Requirements – IBM zAware Server



- Logical partition on a **zEC12** or **zBC12** server
  - Runs on **IFLs** or general purpose **CPs** – may be dedicated or shared
  - Runs its own self-contained firmware stack
  - Recommended 2 partial engines
    - *Initial priming and training:* 25-80% of 1 **zEC12** IFL (30-95% of 1 **zBC12** IFL)
    - *Analysis:* 20-40% of 1 IFL (zEC12 or zBC12)
- Memory and DASD resources are dependent on the number of monitored clients, amount of message traffic, length of time data retained
  - Minimum Memory is **4 GB** for 6 clients with light message traffic (500 msgs/sec)  
For > 6 clients + **256 MB per client** required
  - Estimated DASD storage is ~ **500 GB** (ECKD)
- Network resources
  - HiperSockets or shareable OSA ports or IEDN
  - IP address for partition
- Browsers
  - Internet Explorer 9
  - Firefox ESR 10



# Operating Requirements - z/OS Monitored Clients

- System z servers supported as IBM zAware monitored clients
  - zEC12
  - zBC12
  - IBM zEnterprise™ 196 (z196) or z114,
  - IBM System z10™ EC or BC
  - *Prior generations that meet the OS and configuration requirements*
  
- Running **z/OS 1.13 + PTFs**    **or z/OS 2.1**
  - *APAR OA38747*
  - *APAR OA38613*
  - *APAR OA39256*
  - *APAR OA42095*
  
- System needs to be configured as a monoplex, system in a multisystem sysplex, or a member of a parallel sysplex
- Using operations log (**OPERLOG**) as the hardcopy medium
- Sysplex name + system name must uniquely identify system
- Requires an OSA or IEDN or HiperSocket for IP network connection
  
- z/OS zAware monitored client MIPs usage ~ 1%

# New function available Sept 20 2013



## Customer added domain knowledge – Ignore messages

- When a new workload is added to a system monitored by zAware
  - Generates messages that are not in the zAware model
  - Flagged as anomalous
    - *Orange bars on zAware Analysis*
    - *High anomaly scores on the Interval View*

*Review of these messages is needed to improve the scoring*

**A)** If a **real** problem is indicated, **fix the problem** on the monitored system

- Check subsequent zAware Analysis to confirm resolution
- Do not mark these messages as ignored

**B)** If the messages are **normal messages** from the new workload,

-- Mark these as **Ignore until next training**

- *In subsequent analysis, the ignored messages will **not** contribute to the anomaly scores*
- *At the next training for this system, these messages will be built into the model, and removed from the system's ignored list*



# Ignore messages continued



- c) If you examine high scoring messages, and determine they are always **ok**
  - Mark these as **Ignore until manually restored**
    - In subsequent analysis, the ignored messages will not contribute to the anomaly scores
    - This setting will **persist** after trainings
    - This **reduces false positives**, based on user input, so real problems are not masked
  - This feature is the first phase in giving the user input into the IBM zAware rules.

# Ignore messages continued GUI selection



- From the Interval View
- When logged in as Admin
- When no IBM Rule (Rules Status is None)

Date:  → →

Time interval (UTC):  → →

Analysis Source:  
SVPLEX4.C05

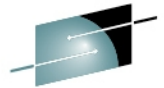
Interval anomaly score:  
85.8

Messages

▼1 Anomaly Score	Interval ▼2 Contribution Score	Message Context	Rules Status	Appearance Count	Time Line	Message ID	Message Example	Rarity Score
1	13.248	new	None	5		AOF310I	22:10:26 : JES2 RECOVERY IS SET ON - RECOVERY NOT FOUND	101
0.999	19.894	unclustered	None	7		GFS A1033E	(MVS NFSP4) There are many delays detected. There is more information	49
0.999	8.033	unclustered	None	2		AOF917E	The high-level qualifier has not been defined.	71

Click for options to ignore this message in future interval analyses.





# Ignore messages continued GUI selection

- Choose duration specific to this message, on this monitored system
- Takes effect on next analysis interval. Shows in Rules Status
- Lists available from Training Sets > Actions > Manage Ignored Messages

Date: August 5, 2013  
 Analysis Source: SVPLEX4.C05  
 Time interval (UTC): 02:10 -- 02:00  
 Interval anomaly score: 05.0

▼ 1 Anomaly Score	▼ 2 Interval Contribution Score	M	C
1	13.248	n	
0.999	19.894	u	
0.999	8.033	u	
0.995	5.514	u	

**Ignore Message Status**

The current ignore status for the selected message ID is shown in the following information. To change this status for future intervals on the current system, select a different ignore message option in the list and click OK.

Selected message ID: AOF310I      Current system: SVPLEX4.C05

Current ignore status: Not Ignored      Current ignore status applied (UTC): N/A

Ignore message option for future intervals:

- Do not ignore message. (current status)
- Ignore message until next training occurs for the current system.
- Ignore message until manually restored. Messages can be restored using the Manage Ignored Messages action in the Training Sets task.

OK    Cancel     Go to Manage Ignored Messages view on OK.

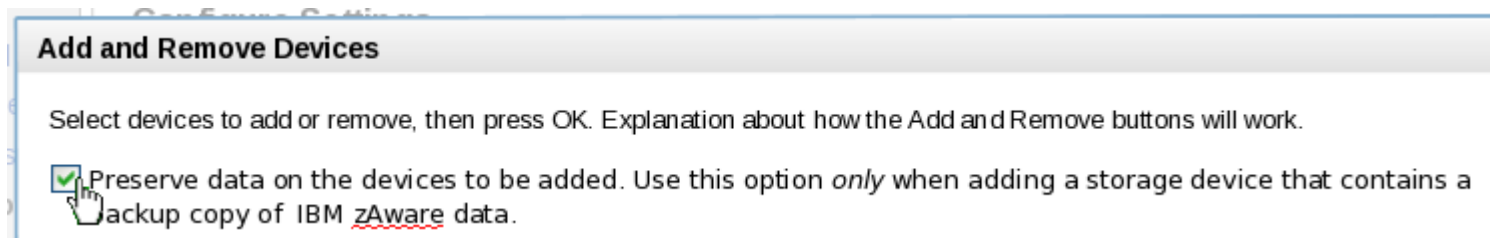
Message Example	Ra
22:10:26 : JES2 RECOVERY IS SET ON - RECOVERY COMMAND NOT FOUND	
(MVSNFSP4) There are many delays detected. There is more information	
The high-level qualifier has not been defined.	
Analysis of command response (CMR) time detected one or more	

# New function available Sept 20 2013

## Alternate Data Storage Set



- Addition of DASD volumes without formatting
- Allow a backup copy of zAware data to be added after a failure.
  - DASD CU failure – Restore backup to zAware
  - Partition failure – Switchover to an alternate zAware with backed up copy of data
- Replication is not handled by zAware (Use IBM FlashCopy, DFSMS XRC, PPRC, ...)
- Manage the primary devices and the backup devices as separate, but equivalent sets
  - Same number of devices, same sizes



# Integration with other System Management products

- **z/OSMF**
  - Configure a new external **link**
    - to access IBM zAware from z/OSMF
  - Administration > Links > Actions > New
    - Provide link name, SAF suffix, zAware GUI URL
    - Category – recommend Problem Determination
    - Define authority required to use the link

# Integration with other System Management products

- **APIs**
  - Provides **XML** equivalent to GUI
    - Analysis page
    - Interval View page
  - Requires HTTPS
    - From z/OS, use AT-TLS
  - HTTP GET/POST requests
    - **Connect and authenticate** to IBM zAware server
      - *UserID known as a zAware user (e.g. LDAP)*
    - **Retrieve analysis** for a monitored client
      - *LPAR*                      *Interval scores for date*
      - *INTERVAL*                *Message scores for a 10-minute interval*

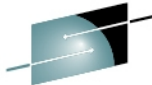


## Integration with other System Management products

- IBM Tivoli **NetView** for z/OS
    - Can use the APIs to get IBM zAware results
    - Sample programs are available from <https://www.ibm.com/developerworks/mydeveloperworks/wikis/home/wiki/Tivoli%20System%20z%20Monitoring%20and%20Application%20Management/page/Integration%20Scenarios%20for%20Tivoli%20NetView%20for%20zOS?lang=en>
    - Described in detail in the Redbook:
      - **Extending z/OS System Management Functions with IBM zAware**
    - The samples can be tailored to drive NetView message **automation** and raise **alerts** on anomaly score.
  - **Announced July 2013**, Tivoli Integrated Service Management products use of IBM zAware results.
    - Omegamon XE on z/OS (including predefined situations)
- Session 14077: Improve Service Levels with Enhanced Data Analysis**
- Paul Smith                      Thurs, Aug 15 1:30                      Room 200**
- Other products can exploit the XML format results



# Omegamon XE on z/OS – July 2013



**Chart of last hour anomaly scores most recent at left**

**Client and server status**

**Last hour in 10 minute increments. Anomaly and unique messages**

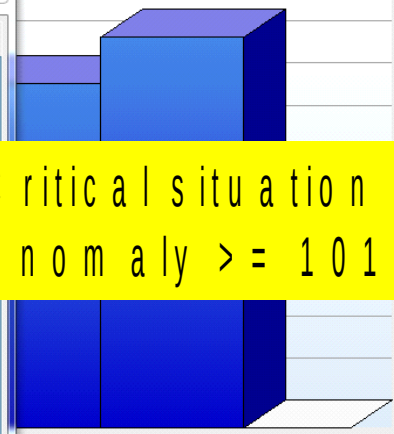
Current Interval Time	Current Anomaly Score	Current Unique Messages	Interval Time 02	Anomaly Score 02	Unique Messages 02	Interval Time 03	Anomaly Score 03	Unique Messages 03	Interval Time 04	Anomaly Score 04	Unique Messages 04	Interval Time 05	Anomaly Score 05	Unique Messages 05	Interval Time 06	Anomaly Score 06	Unique Messages 06
06/13/13 20:20:00	78.3	4	06/13/13 20:10:00	57.9	2	06/13/13 20:00:00	91.8	29	06/13/13 19:50:00	78.3	4	06/13/13 19:40:00	81.7	3	06/13/13 19:30:00	92.9	12

# Omegamon XE on z/OS – July 2013



The screenshot shows the zAware Analysis application window. A yellow box at the top center contains the text "Product provided situations". On the left, a yellow box contains the text "Two for status" and "Two for MOSWOS", with arrows pointing to the "Situations for - zAware Analysis" tree view. In the tree view, three items are listed: "KM5\_zAware\_Analysis\_Crit", "KM5\_zAware\_Analysis\_Warn", and "KM5\_zAware\_Client\_Status". A yellow box at the bottom center contains the text "Every 5 min", with an arrow pointing to the "Sampling interval" field in the "Formula editor" dialog, which is set to "0:5:0". To the right, a yellow box contains the text "Critical situation" and "Anomaly >= 101", with arrows pointing to the "Name" field (containing "KM5\_zAware\_Analysis\_Crit") and the "Formula" field (containing "Anomaly Score (02) >= 101.0") in the "Formula editor" dialog. The "Formula editor" dialog also shows "Situation Formula Capacity" at 5%, "Sound" settings, and "State" set to "Critical". At the bottom right, a "Situation Event Console" table is visible.

Severity	Status	Owner	Name	Display Item	Source	Impact
Unique Messages 05	Interval Time 06	Anomaly Score 06	Unique Messages 06			
06/13/13 20:20:00	78.3	4	06/13/13 20:10:00			
					06/13/13 19:30:00	92.9 12



# Summary

## You should now understand

- What IBM zAware is, and what can it detect
- How can it help identify problems on z/OS systems
- How can it help diagnose problems on z/OS systems
- Operating requirements
- Use of the IBM zAware GUI
- Integration with other management products

## Questions?



# References

- IBM System z Advanced Workload Analysis Reporter (IBM zAware) Guide SC27-2623-00

<http://www.ibm.com/systems/z/os/zos/bkserv/r13pdf/#E0Z>

- Redbook: Extending z/OS System Management Functions with IBM zAware SF24-8070-00

<http://www.redbooks.ibm.com/abstracts/sg248070.html?Open>

- **IBM Mainframe Insights blog**      **[www.ibm.com.systemz](http://www.ibm.com.systemz)**

- The Journey to IBM zAware

[http://www.ibm.com/connections/blogs/systemz/entry/zaware?lang=en\\_us](http://www.ibm.com/connections/blogs/systemz/entry/zaware?lang=en_us)

- zAware Installation and Startup

[http://www.ibm.com/connections/blogs/systemz/entry/zaware\\_installation?lang=en\\_us](http://www.ibm.com/connections/blogs/systemz/entry/zaware_installation?lang=en_us)

- Top 10 Most Frequently Asked Questions About IBM zAware

[http://www.ibm.com/connections/blogs/systemz/entry/zawarefaq?lang=en\\_us](http://www.ibm.com/connections/blogs/systemz/entry/zawarefaq?lang=en_us)

- IBM zAware Demo

[http://www.ibm.com/connections/blogs/systemz/entry/zawaredemo?lang=en\\_us](http://www.ibm.com/connections/blogs/systemz/entry/zawaredemo?lang=en_us)