

BusinessConnect and SolutionsConnect

It's time to make bold moves.

IT Operations Analytics

Predict outages before they occur and
increase service levels

Dean Hayes

Tze Ping Yeo









There Is A Need for Agile & Leaner Operations



Operational Visibility



IT Overwhelmed by Data

- Large enterprises **generate TB of data per day**
- **50% growing dissatisfaction** with traditional performance management solutions for production IT
- No way to **proactively detect problems**
- Looking to **gain actionable insights** from raw data

...by **churning through piles of data and translating this to understandable, relevant information, and actionable insights.**

..to **avoid or shorten outages that might cost millions of dollars per hour**

Introducing IBM SmartCloud Analytics



User Scenario

Proactive Outage Avoidance Predict

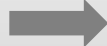
Predict problem before they occur



App Performance



APM data



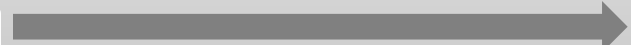
Predictive Insights



PI behavioral learning on APM data



PI sends anomaly alert to Event Mgmt



1. Monitor full service stack
2. Learn normal behaviour
3. Alert on abnormal deviation
4. Diagnose abnormality with log search to find problem

Faster Problem Resolution Search

Quickly search across Massive amounts of data



Log Analysis



OMNIBUS



In-context search from anomaly event to find and resolve problem in logs



**LOB Admin.
Or IT Operations**

Joe, the App Dev/Ops SME

Joe is a Dev/Ops Engineer on the eDaytrader team. He supports the full lifecycle of the eDaytrader application including release automation, monitoring and infrastructure.



The **business prides itself in providing an exceptional online experience and quality of service to their eDaytrader customers.**

These are their **key differentiators separating their boutique online trading application** from the larger incumbents.

This is at the **heart of the company's culture** and each employee places great emphasis in the role they play in this. *(this is dev/ops)*

Blarg gubguzis in rug 1016 rugl bigl in rugl: [ruis is 06\0b2]



AppDevOpsOnCall <devops@edaytrader.com>

eDayTrader Application Anomaly Detected

1 message

Sev	Last Occurrence	Anomalous Metrics	Anomalous Resources	Summary
⚠	5/24/13 4:35 PM	InTotalbytes	GigabitLink-c0372	High Traffic Volume on Telecommunication Link
⚠	2/16/13 4:15 PM	Response Time; CPU Used; Active Users	IBWEBSRV2; CRMWAS2; IBWEBSRV2	Slow Response Time on Internet Banking Front End
⚠	8/16/12 10:30 PM	Timesrun;Usercpupct;Totalwaittime	wasnode06	Anomalous Behaviour on Financial Transaction System
⚠	12/17/11 1:00 AM	AvgDiskMs/read;DiskWriteBytes/sec	AppServer	High Disk Usage on Exchange Servers
⚠	9/3/12 10:30 AM	RespTime	IBWEBSRV2	Poor Response Time on Financial Transaction System

- ServiceDiagnosis...
- Acknowledge Ctrl+A
- De-acknowledge Ctrl+D
- Prioritize
- Suppress/Escalate
- Take ownership
- User Assign
- Group Assign
- Delete
- Ping
- Telnet
- Tracepath from this host
- Proximity log search
- Health Check App



— AVG of ft_odakwas07 ~ Usercpupct — AVG of wasnode06:ft_odakwas07:DDNS ~ Timesrun — AVG of wasnode06:ft_odakwas07:DDNS_cmspl/ev

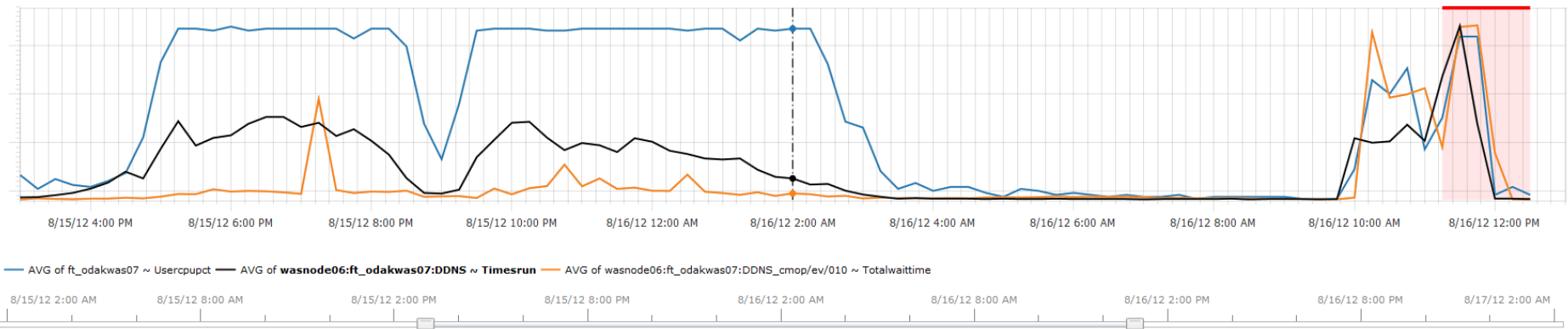
▼ Timesrun on wasnode06:ft_odakwas07:DDNS has been out of sync for 1 hour 15 minutes

Summary Detail

⚠ This anomaly started at 8/16/12 11:15 AM and finished occurring at 8/16/12 12:30 PM



Start: 8/15/12 3:00 PM End: 8/16/12 1:00 PM



▼ Timesrun on wasnode06:ft_odakwas07:DDNS has been out of sync for 1 hour 15 minutes

Summary Detail

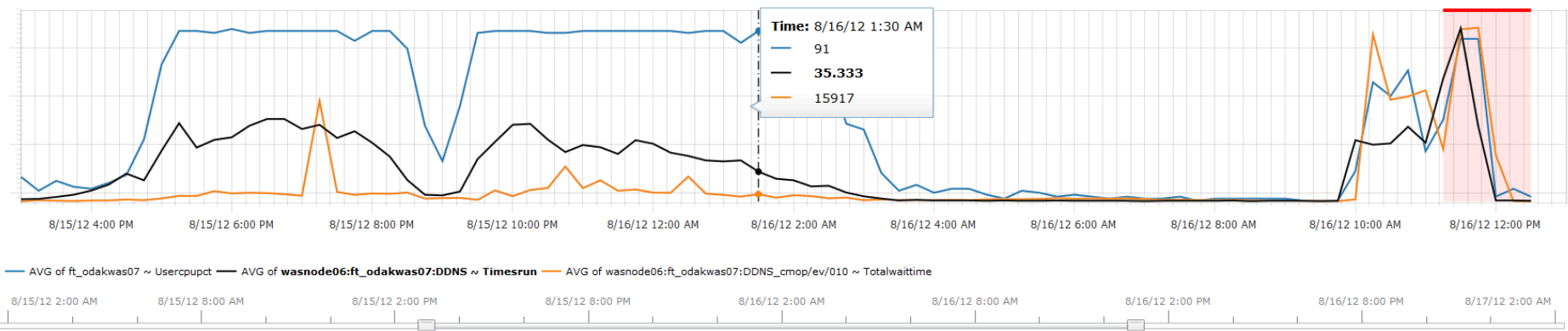


The following metrics are historically related to each other:

- Timesrun on wasnode06:ft_odakwas07:DDNS is 132 (Min:3,Expected:7.056,Max:141)
- Usercpupct on ft_odakwas07 is 46 (Min:2,Expected:7.068,Max:92)
- Totalwaittime on wasnode06:ft_odakwas07:DDNS_cmpop/ev/010 is 108.685 (Min:1 Expected:11.437 Max:918.036)



Start: 8/15/12 3:00 PM End: 8/16/12 1:00 PM



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Summary Detail

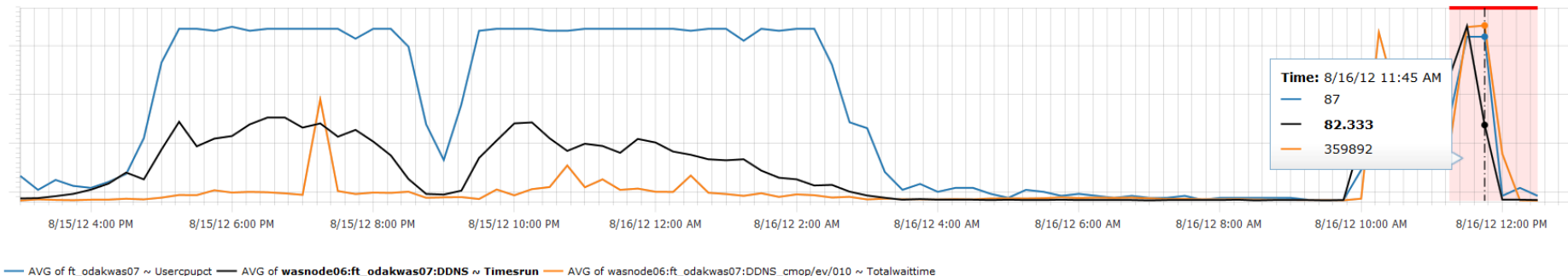


The following metrics are historically related to each other:

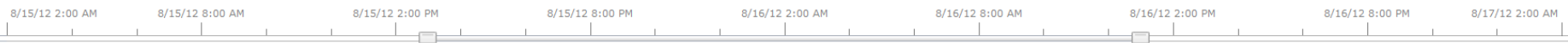
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— AVG of ft_odakwas07 ~ Usercpupct — AVG of wasnode06:ft_odakwas07:DDNS ~ Timesrun — AVG of wasnode06:ft_odakwas07:DDNS_cmon/ev/010 ~ Totalwaittime



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Summary Detail

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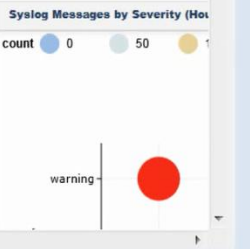
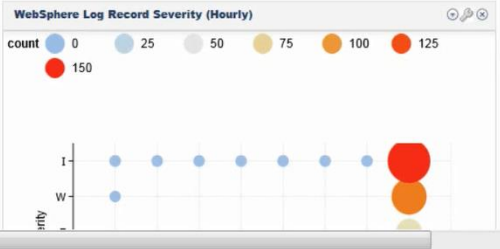
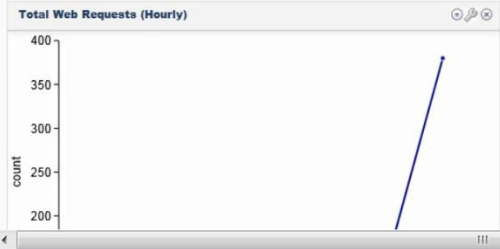
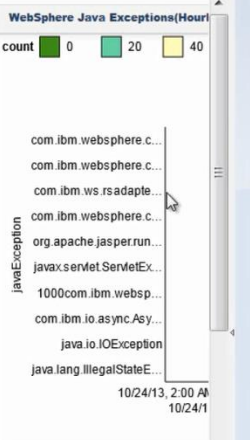
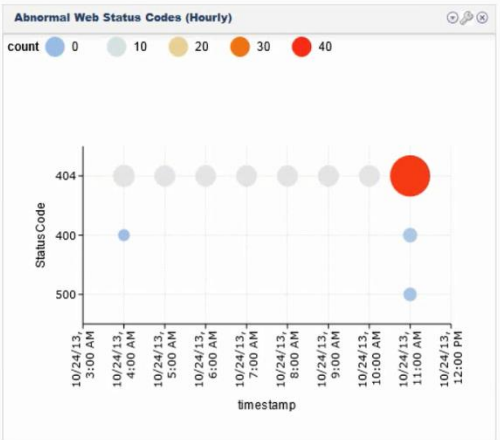
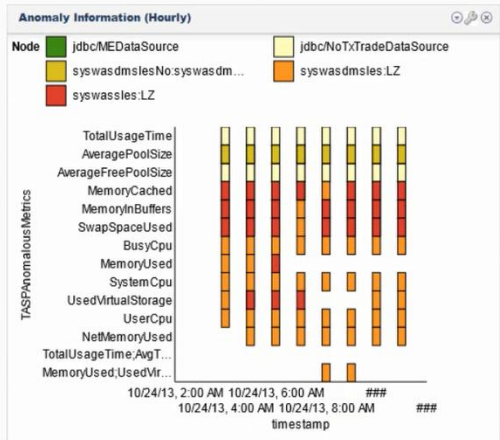
Health check

IBM SmartCloud Analytics Log Analysis

Learn More | unityuser | IBM

- Quick Searches**
- sample WAS SystemOut
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- Configured Patterns**

Getting Started | **eDayTrader Health Check App** | + Add Search



Active Event List (AEL) | Service Diagnosis | **Health check** | -- Select Action --

Health check

IBM SmartCloud Analytics Log Analysis

Getting Started x eDayTrader Health Check App x + Add Search

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Configured Patterns

timestamp

timestamp

Web Response Time (uS) (Hourly)

RespTimeMic... 0 25 50 75 100

125 150

timestamp

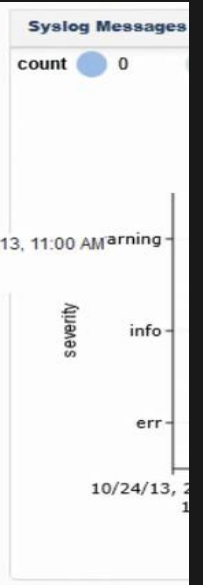
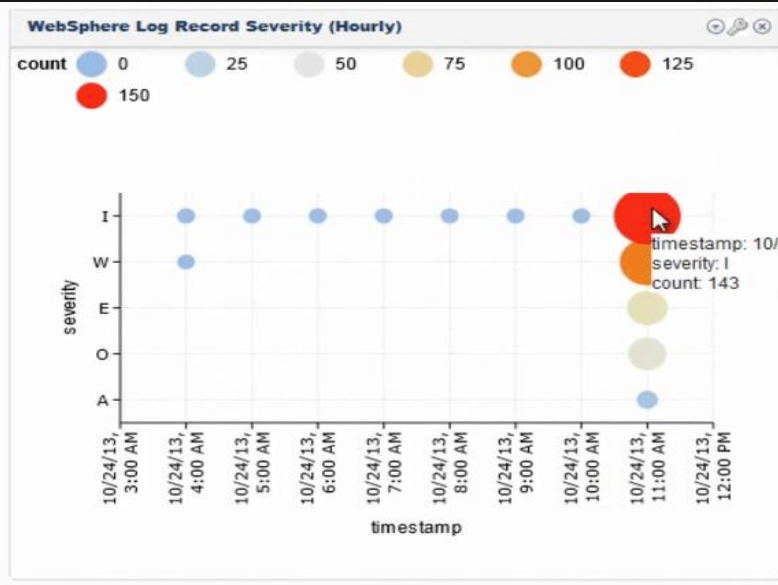
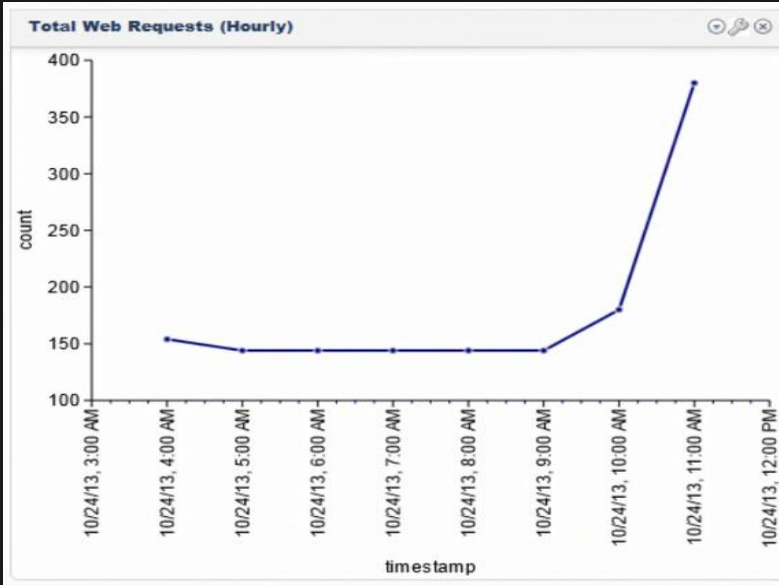
WebSphere Message ID's (Hourly)

count 0 5 10 15 20

timestamp

timestamp

Knowing the anomaly of interest was from one of the application servers, Joe reviews the increase in error messages and decides to investigate the increase by clicking [Learn More](#) and [unityuser](#) for [severity 1 messages](#).



health check

IBM SmartCloud Analytics Log Analysis

Learn More | unityuser | IBM

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- Configured Patterns

Getting Started | eDayTrader Health Check App | severity:"..." | + Add Search

severity:"T" OR CPU | severity:"T" OR CPU | Search | Custom | [Icons]



< 1 to 100 of 159 >

[10/24/13 11:21:13.084 +0000]
_logsource:DayTrader WAS 2 (BSM), msgclassifier:DCSV0004W, threadID:00000007, message:DCS Stack DefaultCoreGroup at Member syswasdmslesCell01\syswasstesNode01\TradeServer2: Did not receive adequate CPU time slice. Last known CPU usage time at 07:20:17.771 EDT. Inactivity duration was 24 seconds., _writetime:10/24/13 11:22:37.586 +0000, application:Trading Application, middleware:WAS, logsourceHostname:syswasstes, hostname:syswasstes, service:Day Trader, severity:W
CPU time slice. Last known CPU usage time at 07:20:17.771 EDT. Inactivity duration was 24 seconds.

[10/24/13 11:45:23.760 +0000]
_logsource:DayTrader WAS-1 (BSM), msgclassifier:DCSV0004W, threadID:00000065, message:DCS Stack DefaultCoreGroup at Member syswasdmslesCell01\syswasdmslesNode01\TradeServer1: Did not receive adequate CPU time slice. Last known CPU usage time at 07:22:36.363 EDT. Inactivity duration was 1337 seconds., _writetime:10/24/13 11:46:13.468 +0000, application:Trading Application, middleware:WAS, logsourceHostname:syswasstes, hostname:syswasstes, service:Day Trader, severity:W
CPU time slice. Last known CPU usage time at 07:22:36.363 EDT. Inactivity duration was 1337 seconds.

[10/24/13 11:20:26.337 +0000]
_logsource:DayTrader WAS 2 (BSM), msgclassifier:DCSV0004W, threadID:00000006, message:DCS Stack DefaultCoreGroup at Member syswasdmslesCell01\syswasstesNode01\TradeServer2: Did not receive adequate CPU time slice. Last known CPU usage time at 07:19:30:859 EDT. Inactivity duration was 16 seconds., _writetime:10/24/13 11:21:13.020 +0000, application:Trading Application, middleware:WAS, logsourceHostname:syswasstes, hostname:syswasstes, service:Day Trader, severity:W
CPU time slice. Last known CPU usage time at 07:19:30:859 EDT. Inactivity duration was 16 seconds.

Health check

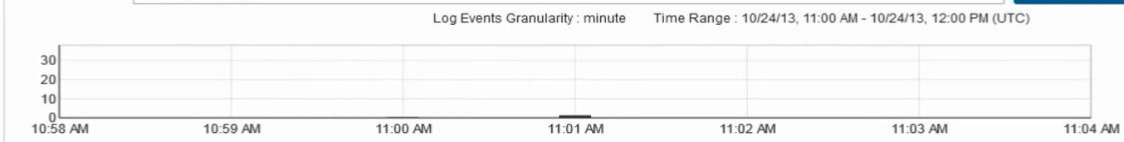
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- ▼ Configured Patterns

Getting Started | eDayTrader Health Check App | severity:"..." | + Add S...

severity:"T" OR CPU

severity:"T" OR CPU



Joe notices an unfamiliar error message related to "CPU Starvation". Joe has never seen this type of error before for his application. He ponders whether opening a PMR is required.

Joe decides to investigate the message classifier and selects the log record cell.

To configure the Grid view to display only the columns that you require, remove the columns that you do not want to display and click OK.

msgclassifier	message	timestamp
DCSV0004W	DCS Stack DefaultCoreGroup at Member syswasdmslesCell01syswasslesNode01TradeServer2: Did not receive adequate CPU time slice. Last known <mark>CPU <...>	10/24/13 11:21:13:084 +0000
DCSV0004W	DCS Stack DefaultCoreGroup at Member syswasdmslesCell01syswasslesNode01TradeServer1: Did not receive adequate CPU time slice. Last known <mark>CPU ...	10/24/13 11:45:23:760 +0000
DCSV0004W	DCS Stack DefaultCoreGroup at Member syswasdmslesCell01syswasslesNode01TradeServer2: Did not receive adequate CPU time slice. Last known <mark>CPU <...>	10/24/13 11:20:26:337 +0000
DCSV0004W	DCS Stack DefaultCoreGroup at Member syswasdmslesCell01syswasslesNode01TradeServer1: Did not receive adequate CPU time slice. Last known <mark>CPU ...	10/24/13 11:13:59:701 +0000
DCSV0004W	DCS Stack DefaultCoreGroup at Member syswasdmslesCell01syswasslesNode01TradeServer2: Did not receive adequate CPU time slice. Last known <mark>CPU <...>	10/24/13 11:21:58:942 +0000
DCSV0004W	DCS Stack DefaultCoreGroup at Member syswasdmslesCell01syswasslesNode01TradeServer1: Did not receive adequate CPU time slice. Last known <mark>CPU ...	10/24/13 11:46:13:486 +0000
DCSV0004W	DCS Stack DefaultCoreGroup at Member syswasdmslesCell01syswasslesNode01TradeServer1: Did not receive adequate CPU time slice. Last known <mark>CPU ...	10/24/13 11:53:46:442 +0000
HMGRO152W	CPU Starvation detected. Current thread scheduling delay is 13 seconds.	10/24/13 11:19:30:608 +0000
HMGRO152W	CPU Starvation detected. Current thread scheduling delay is 9 seconds.	10/24/13 11:17:13:440 +0000
HMGRO152W	CPU Starvation detected. Current thread scheduling delay is 151 seconds.	10/24/13 11:13:52:363 +0000

Active Event List (AEL) | Service Diagnosis | **Health check** | +

Health check

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 - Expert Advice App Demo
 - IBMSupportPortal-ExpertAdvice
 - IBMSupportPortal-ExpertAdv**
 - RSInsightPack_v1.0.0

Getting Started | eDayTrader Health Check App | severity"... | IBMSupp

Search Results

Expert Advice Search Results

[HMGR0152W: CPU Starvation detected messages in SystemOut.log](#)
CoordinatorCo W HMGR0152W: CPU Starvation detected. Current thread scheduling delay is 9 seconds. Cause... to get the CPU, and when the thread actually got CPU cycles. The HMGR0152W message can occur even...scheduling-detect-period until the HMGR0152W ...

[Portal 6.0.1.1 upgrade fails during the action-update-portlets-6011 sub-task with EJPPH0004E and EJPXB0015E errors](#)
. [12/14/07 0:35:18:823 EST] 00000063 CoordinatorCo W HMGR0152W: CPU Starvation detected. Current thread scheduling delay is 18 seconds. [12/14/07 0:35:0:45:10:939 EST] 00000063 CoordinatorCo W HMGR0152W: CPU Starvation detected. Current thread ...

[PK32106: V6.0.2.13 DMGR \(AND NODES AT V6.0.2.11\) CONSUMING HIGH CPU DURING START UP. PROBLEM GOES AWAY IF DMGR IS AT V6.0.2.11](#)
----- 1) [9/14/06 13:43:13:512 EDT] 00000481 CoordinatorCo W HMGR0152W: CPU Starvation detected. Current thread scheduling delay is 8 seconds. [9/14/06 13:55:42:048 EDT] 00000481 CoordinatorCo W ...

[JR33986: SED DURING APPLICATION SERVER START UP DUE TO E MAPPING.XML FILES GENERATED BY THE WS BINDI](#)
due to the multiple mapping.xml files generated by the WS binding HMGR0152W: CPU Starvation detected. Current thread scheduling delay is 7 seconds.... Last known CPU usage time at 19:24:22:103 CDT. Inactivity duration was 26 seconds. HMGR0152W: CPU ...

[Timeout Exceptions occur when executing createSegmentFromXMLCmd](#)
Technote (troubleshooting) Problem(Abstract) The createSegmentFromXMLCmd command may time out while running. Symptom The following exception will show in the logs: [5/29/08 10:32:18:164 BST] 00000960 CoordinatorCo W HMGR0152W: CPU Starvation detected. ...

[PM62615: MESSAGES BUILD UP ON SERVICE INTEGRATION BUS TOPICSPACE](#)
reporting Hung threads and HMGR0152W messages are written to the SystemOut.log: WSVR0605W: Thread "SIBFAPInboundThreadPool : 3" (00000067) has been...) at com.ibm.io.async.ResultHandler\$2.run(ResultHandler.java:905) at com.ibm.ws.util.ThreadPoolS...

[IZ86608: JAVA.LANG.OUTOFMEMOR AND BILL BATCH CHANGE STATUS](#)
*started. [9/16/10 20:06:00:903 CEST] 00001796 CoordinatorCo W HMGR0152W: CPU Starvation detected. Current thread scheduling delay is 5 seconds. [9/16/10...-intjmsbus started. * * * * 9/16/10 20:06:00:903 CEST 00001796 * * CoordinatorCo W * * * * ...*

Joe reviews a number of possible items related to the message classifier associated with CPU Starvation. He sees one nearly identical to what he sees and clicks on the tech note.

Symptom

[10/25/05 16:42:27:635 EDT] 0000047a CoordinatorCo W HI detected. Current thread scheduling delay is 9 seconds.

After reviewing the tech note, Joe confers with his systems SMEs and verifies that there was a runaway process on the system that had been consuming memory and CPU resources over time. This in turn impacted the application server's ability to allocate needed resources for transactions to complete.

Cause

The [HMGR0152W message is an indication that JVM thread scheduling delays are occurring for this process.](#)

The WebSphere® Application Server high availability manager component contains thread scheduling delay detection logic, that periodically schedules a thread to run and tracks whether the thread was dispatched and run as scheduled. By default, a delay detection thread is scheduled to run every 30 seconds, and will log a HMGR0152W message if it is not run within 5 seconds of the expected schedule. The message will indicate the delay time or time differential between when the thread was expected to get the CPU, and when the thread actually got CPU cycles.

The HMGR0152W message can occur even when plenty of CPU resource is available. There are a number of reasons why the scheduled thread might not have been able to get the CPU in a timely fashion. Some common causes include the following:

- The physical memory is overcommitted and paging is occurring.
- The heap size for the process is too small causing garbage collection to run too frequently and/or too long, blocking execution of other threads.
- There might simply be too many threads running in the system, and too much load placed on the machine, which might be indicated by high CPU utilization.

6.0, 6.1, 7.0, 8.0, 8.5, 8.5.4

Operating system(s):

AIX, HP-UX, Linux, Solaris
Windows

Software edition:

Base, Network Deploymer

Reference #:

1236327

Modified date:

2006-04-25

Translate my page

Select Language



"IBM SmartCloud Analytics helped detect 100 percent of the major incidents that occurred, including silent failures, and helped us eliminate manual thresholds, which will result in a cost avoidance of \$300K USD annually"

*Chris Smith, Director, Tools and Automation
Consolidated Communications Holdings, Inc.*

Predict

Consolidated Communications avoids network outages and improves customer service

Need

- Monitoring a customer base of 250k access lines, 125k Internet, and 30k video is a challenge
- Managing manual thresholds within this networking environment is a nightmare

Benefits

- Using SmartCloud Analytics, behavioral learning techniques generate alerts automatically when something is not normal
- Enable earlier detection and insight into issues not detected by existing monitoring systems
- Easily obtain impact analysis into how the network copes with various failure conditions



Optimise

Leading pharmaceutical company optimises VMWare server resources, realising an annual cost savings of \$150K

Need

- Customer was lacking formal analysis of resource capacity
- Unclear if resources were over-allocated with associated increased costs or under-allocated risking SLA commitments

Benefits

- Capacity optimisation solution provided clear visibility and insight into virtualisation usage patterns
- Ability to right-size virtual machine resources to efficiently service workloads while reducing costs

IBM SmartCloud Analytics

Proactive Outage Avoidance

Predict

Predict problems before they occur

Faster Problem Resolution

Search

Search quickly across massive amounts of data

Optimised Performance

Optimise

Optimise across your IT app infrastructure



H
C



x1000RPM



UNLEADED FUEL ONLY
MPH