

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



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& increase service levels

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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 behavioural learning on APM data



PI sends anomaly alert to Event Mgmt



Faster Problem Resolution **Search**

Quickly search across Massive amounts of data



Log Analysis



OMNibus



**LOB Admin.
Or IT Operations**



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

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

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)*

Great emphasis in the role they play in this. *(this is dev/ops)*

Gmail - eDayTrader Application Anomaly Detected <https://mail.google.com/mail/u/0/?ui=2&ik=f0f14b694&view=pt&sear...>



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 | IBWEBSR | 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



Timesrun on wasnode06:fl_odakwas07:DDNS has been out of sync for 1 hour 15 minutes

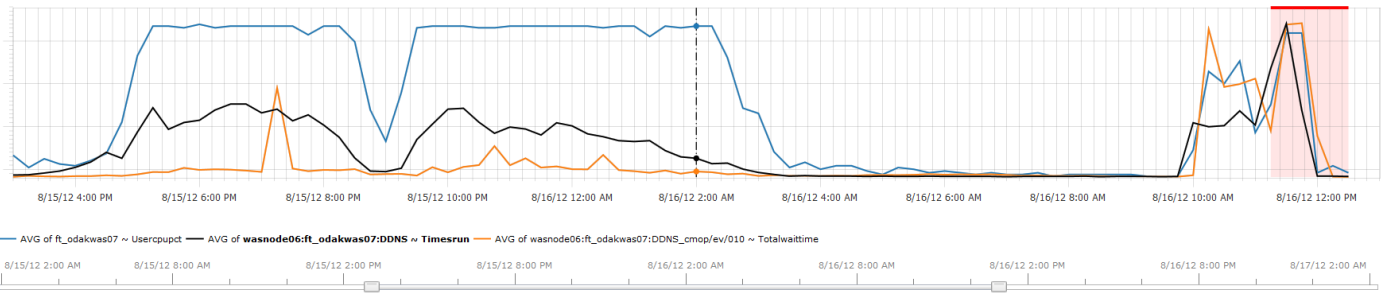
Summary Detail

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

GCD2/



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



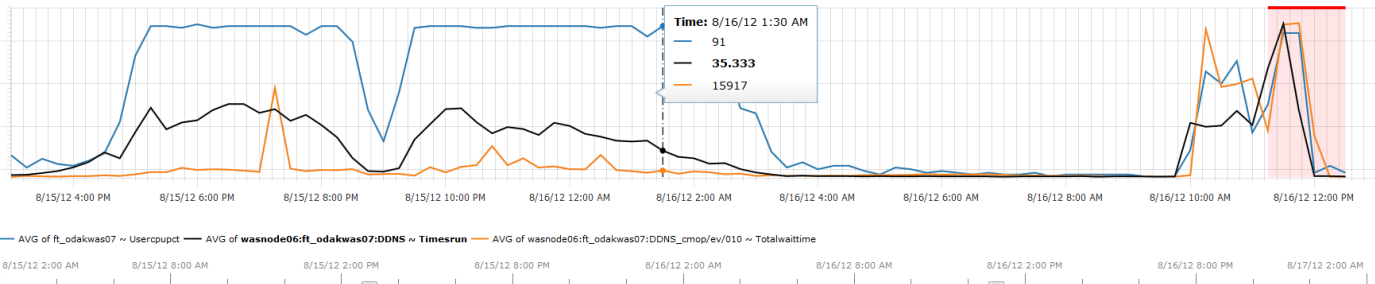
The following metrics are historically related to each other:

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

GCD2/



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



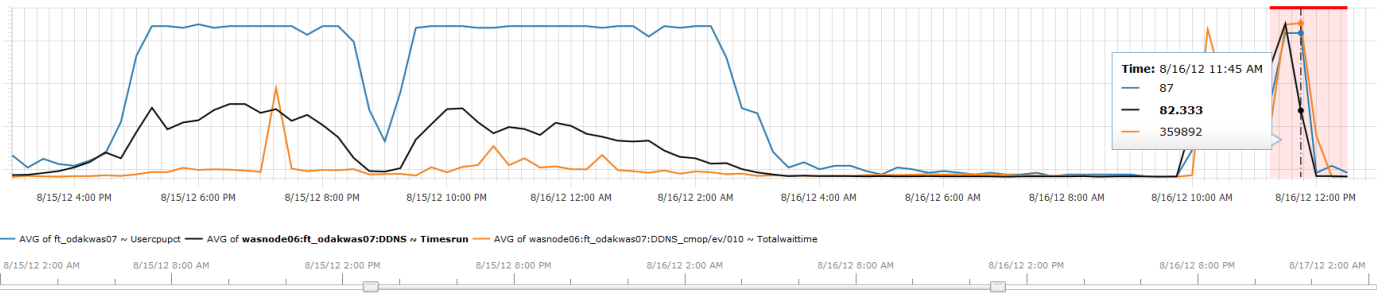
The following metrics are historically related to each other:

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

GCD2/



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



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

Health check

IBM SmartCloud Analytics Log Analysis | Learn More | unityuser | IBM

Getting Started x eDayTrader Health Check App x + Add Search

Quick Searches

- sample WAS SystemOut
- sample DB2 db2diag
- sample MQ amqerr
- sample Oracle alert
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- OOM in Syslog
- OOM in Syslog syswasstles
- 10-24 0545-1130
- 10-24 0545-1130 AppServer
- 10-24 0400-1130

Custom Apps

- Anomaly Detection App
- AnomalyApp
- ApacheWWW
- CDNApp
- DB2AppInsightPack_v1.1.0
- eDayTrader
- EventAnalysisApp
- EventInsightPack_v1.0.0
- ExpertAdvice
- RSInsightPack_v1.0.0
- SyslogCustomAppsDemo
- WASAppInsightPack_v1.1.0
- WebAppInsightPack_v1.0.0

Configured Patterns

- Configured Patterns

Anomaly Information (Hourly)

Node: jdtbcMEDDataSource, jdtbcNoTrTradeDataSource, syswasdmsles.No syswasdm..., syswasdmsles.LZ, syswasstles.LZ

TAPPhonometrics Metrics

TotalUsageTime, AveragePoolSize, AverageFreePoolSize, MemoryCached, MemoryInBuffers, SwapSpaceUsed, BusyCpu, MemoryUsed, SystemCpu, UsedVirtualStorage, UserCpu, NetMemoryUsed, TotalUsageTime AvgT..., MemoryUsed, UsedVr...

10/24/13, 2:00 AM | 10/24/13, 6:00 AM | ###
10/24/13, 4:00 AM | 10/24/13, 8:00 AM | ###

Abnormal Web Status Codes (Hourly)

count: 0, 10, 20, 30, 40

count

404, 400, 500

10/24/13, 3:00 AM | 10/24/13, 4:00 AM | 10/24/13, 5:00 AM | 10/24/13, 6:00 AM | 10/24/13, 7:00 AM | 10/24/13, 8:00 AM | 10/24/13, 9:00 AM | 10/24/13, 10:00 AM | 10/24/13, 11:00 AM | 10/24/13, 12:00 PM

WebSphere Java Exceptions (Hourly)

count: 0, 20, 40

com.ibm.websphere.c..., com.ibm.websphere.c..., com.ibm.ws.rs.adapte..., com.ibm.websphere.c..., org.apache.jasper.run..., javax.servlet.ServeEx..., 1000com.ibm.websp..., com.ibm.io.async.Asy..., java.io.IOException, java.lang.IllegalState...

10/24/13, 2:00 AM | 10/24/13

Total Web Requests (Hourly)

count

400, 350, 300, 250, 200

WebSphere Log Record Severity (Hourly)

count: 0, 25, 50, 75, 100, 125, 150

count

150

I, W

Syslog Messages by Severity (Hourly)

count: 0, 50, 100

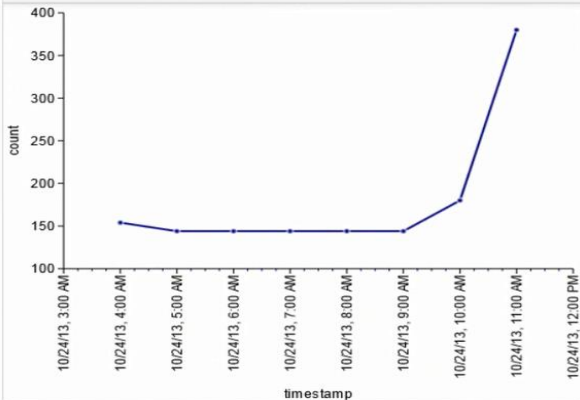
count

warning

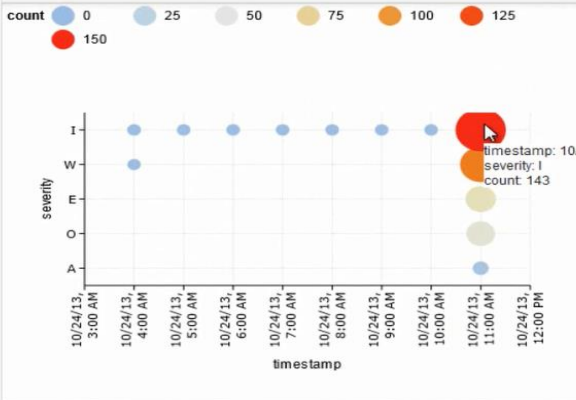
© 2014 IBM Corporation



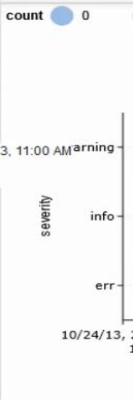
Total Web Requests (Hourly)



WebSphere Log Record Severity (Hourly)



Syslog Messages



health check 1 ?

IBM SmartCloud Analytics Log Analysis

Learn More | unituser | IBM

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- 10-24 0545-1130 AppServer
- 10-24 0400-1130

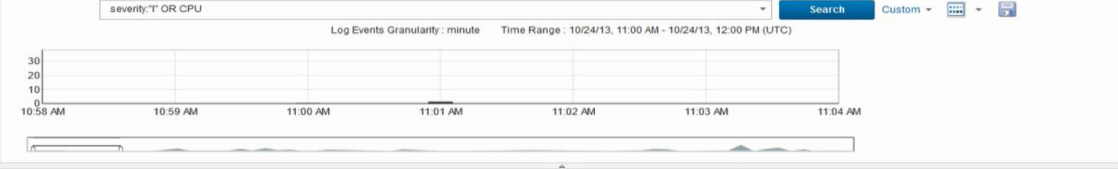
Custom Apps

- Anomaly Detection App
- AnomalyApp
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- SyslogCustomAppDemo
- WASAppInsightPack_v1.1.0
- WebAppInsightPack_v1.0.0

Configured Patterns

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

severity:"T" severity:"T" OR CPU Search Custom



< 1 to 100 of 159 >

[10/24/13 11:21:13.084 +0000]
 _logsource:DayTrader WAS 2 (BSM), msgclassifier:DCSV0004W, threadID:0000007, message:DCS Stack DefaultCoreGroup at Member syswasdmslesCell01/syswaslesNode01/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, logsource:hostname:syswasles, hostname:syswasles, service:Day Trader, severity:W
 [10/24/13 7:21:13.084 EDT] 0000007 ApplicationMo W DCSV0004W: DCS Stack DefaultCoreGroup at Member syswasdmslesCell01/syswaslesNode01/TradeServer2: Did not receive adequate 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, logsource:hostname:syswasdmsles, hostname:syswasdmsles, service:Day Trader, severity:W
 [10/24/13 7:45:23.760 EDT] 00000065 ApplicationMo W DCSV0004W: 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.

[10/24/13 11:20:26.337 +0000]
 _logsource:DayTrader WAS 2 (BSM), msgclassifier:DCSV0004W, threadID:0000006, message:DCS Stack DefaultCoreGroup at Member syswasdmslesCell01/syswaslesNode01/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, logsource:hostname:syswasles, hostname:syswasles, service:Day Trader, severity:W
 [10/24/13 7:20:26.337 EDT] 0000006 ApplicationMo W DCSV0004W: DCS Stack DefaultCoreGroup at Member syswasdmslesCell01/syswaslesNode01/TradeServer2: Did not receive adequate CPU time slice. Last known CPU usage time at 07:19:30.859 EDT. Inactivity duration was 16 seconds.

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

Health check

IBM SmartCloud Analytics Log Analysis

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- SyslogCustomAppDemo
- WASAppinsightPack_v1.1.0
- WebAppinsightPack_v1.0.0

Configured Patterns

Getting Started | eDayTrader Health Check App | severity:"T" OR CPU | Add S...

severity:"T" OR CPU

Log Events Granularity: minute | Time Range: 10/24/13, 11:00 AM - 10/24/13, 12:00 PM (UTC)

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 syswasdmlesCell01syswasdmlesNode011TradeServer2: Did not receive adequate CPU time slice. Last known &mark=CPU &... | 10/24/13 11:21:13.064 +0000 |
| DCSV0004W | DCS Stack DefaultCoreGroup at Member syswasdmlesCell01syswasdmlesNode011TradeServer1: 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 syswasdmlesCell01syswasdmlesNode011TradeServer2: 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 syswasdmlesCell01syswasdmlesNode011TradeServer1: 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 syswasdmlesCell01syswasdmlesNode011TradeServer2: 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 syswasdmlesCell01syswasdmlesNode011TradeServer1: 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 syswasdmlesCell01syswasdmlesNode011TradeServer1: 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 |

< 1 to 100 of 159 >

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.

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

Health check

IBM SmartCloud Analytics Log Analysis

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- Anomaly Events 310-620UTC 1
- OOM in Syslog
- OOM in Syslog syswssles
- 10-24 0545-1130
- 10-24 0545-1130 AppServer
- 10-24 0400-1130

Custom Apps

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- eDayTrader
- EventAnalysisApp
- EventInsightPack_v1.0.0
- ExpertAdvice
- Expert Advice App Demo
- IBMSupportPortal-ExpertAdvice
- IBMSupportPortal-ExpertAdv**
- RSSInsightPack_v1.0

Getting Started | eDayTrader Health Check App | severity... | IBMSupport

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-portslets-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] 00000900 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: WSYTR0605W: Thread "SIBFAPInboundThreadPool : 3" (00000067) has been... at com.ibm.io.async.ResultHandler\$2.run(ResultHandler.java:905) at com.ibm.ws.util.ThreadPool\$...

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, 8.5.1

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



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

Optimise

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





NO!

NO!

x1000RPM

UNLEADED FUEL ONLY MPH

158882

0254