Automation Scenarios for a z/VM Cluster and Linux on System z Guests

SHARE Session 12459

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Agenda

- Recommended practices
- Requirements for these scenarios
- Overview of product being used
  - IBM Operations Manager for z/VM
  - Considerations for z/VM V6.2 SSI
    - Apply to many automation solutions
- Automation scenarios
  - Can be product agnostic
  - Live demos
  - Configuration options and sample code
- Summary and reference information
Managing z/VM and Linux on System z

- **Security**
  - RACF and zSecure Manager for z/VM

- **Performance monitoring**
  - OMEGAMON XE on z/VM and Linux

- **Automation and operational monitoring**
  - Operations Manager for z/VM
  - Including integration with existing monitoring and alert systems

- **Backup and recovery**
  - Backup and Restore Manager for z/VM
  - Tape Manager for z/VM
  - Tivoli Storage Manager
Recommended Practices – Operational Management

**Generate alerts and/or automatically recover from**
- Service machine disks approaching full
- Termination messages
- Abend messages
- Critical user IDs being logged off or entering error state
- Spool and page space approaching full

**Schedule automated system maintenance procedures**
- Spool cleanup based on policies
- Minidisk cleanup (from logs) – may include archiving
- Orderly startup and shutdown
  - Relocation of critical guests to another SSI member
Requirements

Implementing these Scenarios
Automation requirements for z/VM system

- Take an action based on a message on a console
  - Provide data from the message to the action
- Send commands to Linux guests
- Trigger an action if spool usage reaches a specified percent full
  - Provide data about spool usage to the action
- Trigger an action if page space usage reaches a specified percent full
  - Provide data about page space usage to the action
- Chain any actions (triggered by messages, schedules, etc.)
- Suspend and resume message rules, schedules, spool/page monitors, etc.
- Issue commands real-time on a service machine console
- Add messages to a console view from local or remote sources
- Detect a user ID logging off
- Suppress lines when viewing a console
Automating Operations

*Operations Manager for z/VM*
Operations Manager for z/VM

Increase productivity
- Authorized users to view and interact with monitored virtual machines without logging onto them
- Multiple users view/interact with a virtual machine simultaneously

Improve system availability
- Monitor virtual machines and processes
- Take automated actions based on console messages
- Reduce problems due to operator error

Automation
- Routine activities done more effectively with minimal operations staff
- Schedule tasks to occur on a regular basis

Integration
- Fulfill take action requests from performance monitoring products (e.g. OMEGAMON XE on z/VM and Linux)
- Send alerts to email, central event management systems (e.g. Netcool/OMNibus), etc.
Features and Functions

- Monitor service machine consoles
- Monitor page space and spool usage
- Monitor system events
- Schedule events/actions
- Take actions automatically based on monitoring results
- View and interact with monitored consoles from authorized user IDs
- Find and view spool files
- Dynamic configuration
- Separation of access control
Monitor Service Machine Consoles

Data space 1

TEST Message 1
TEST Message 2

OPER Message 1
OPER Message 2

LNX Message 1
LNX Message 3

TCP Message 1
TCP Message 2

slog Message 1
slog Message 2
slog Message 3

Data space 2

OPER Message 1
OPER Message 2

TEST Message 1
TEST Message 2

Data space 3

LNX Message 1
LNX Message 3

TCP Message 1
TCP Message 2

Data space 4

TCP Message 1
TCP Message 2

Data space 5

slog Message 1
slog Message 2
slog Message 3

Data space 6

OPER Message 1
OPER Message 2

LNX Message 1
LNX Message 2

TCP Message 1
TCP Message 2
slog Message 1
slog Message 3

TEST Message 1
OPER Message 2

Test Data

syslog data

OPERATOR

LINUX

TCPIP

Daily log

Unfiltered
Monitor Service Machines

- **Define rules to**
  - Scan console messages for text matching
    - Includes column, wildcard, and exclusion support
    - Optionally restrict to specific user ID(s)
  - Take actions based on matches
    - Change color, highlight, hold, or suppress a console message
    - CP or CMS commands
    - REXX EXECs

- **Multiple rules can apply to one message**
  - Rules processed in order of definition in the configuration file
  - FINAL option available to indicate no additional rules should be evaluated

- **Take multiple actions based on one message**
  - Chain actions together

- **Rules apply to consoles received by local Operations Manager server**
View and Interact with Consoles

- **Authorized users can view live consoles of monitored service machines and guests**
  - Multiple users can view the same console simultaneously
  - No need to logon to the service machine to see its console
  - Test data and Linux syslog data treated as a “console”
  - Views can be defined to look at a group of consoles in one view

- **Full screen mode**
  - Scroll up and down to view and search historical data
  - Auto scroll (on or off) as new output is displayed on the console
  - From command line, issue commands back to the monitored console

- **Amount of data that is visible depends on specified or default data space size**

- **Rules/actions may modify the view**
  - Suppress messages from the console
  - Hold or highlight messages with color, blinking, etc.

- **Authorized users can view the log file**
  - Can also request a copy of the log file from today or a previous day
Operations Manager - non-SSI Environment

- **Main Server (OPMGRM1)**
  - Captures consoles
  - Evaluates rules
  - Triggers schedules
  - Monitors events, page space, and spool usage
  - Executes actions or sends them to action processing servers

- **Action Processing Server (OPMGRS\(n\))**
  - 0 to \(n\) server instances
  - Processes actions as a result of:
    - Console rule matching
    - Spool monitors
    - Event monitors
    - Schedules

- **Remote system** (\(z/VM, email, Netcool\OMNIbus, etc.\))

- **Existing z/VM User**
- **Existing Linux Guest**
- **Existing Linux Guest**

- **Authorized Users**
  - View and interact with monitored consoles
  - Find and view spool files
  - Update configuration information

- **Other z/VM or Linux user**
SSI Considerations for Console Monitoring

Option 1

Option 2
Recommended
Managing Configuration Files

**COMMON CONFIG E**

- Configuration specific to all members of the cluster.

```
CONFIG FN(&SYSNAME),FT(CONFIG),FM(E)
```

**MEMBERA CONFIG E**

- Configuration specific to MEMBERA system.

```
... 
```

**MEMBERB CONFIG E**

- Configuration specific to MEMBERB system.

```
... 
```
Operations Manager in SSI Cluster - Example

- Multiconfiguration users: OPMGRM1, OPMGRSn, OPERATOR, MAINT
- Single configuration users: RHEL5G, SLES11C, OPERSSI, DEMOADMN
- May relocate OPERSSI and DEMOADMN manually or via VMRELOCATE
Relocating OPERSSI and DEMOADMN (CMS Users) …

- VMRELOCATE for CMS user IDs not officially supported
- Can be done for some CMS users
  - Create single configuration user ID for z/VM system disks
  - Copy MAINT 190, 19D, 19E to minidisks owned by this new user ID
  - Relocateable CMS user must IPL from identical NSS (CMS) or minidisk (190)
    - Use SPXTAPE to copy CMS NSS
      - VMRELOCATE uses checksum of NSS to determine if identical
      - CMS NSS includes date/time it was loaded
    - Or, have relocateable CMS users IPL 190 instead of IPL CMS

**OPERSSI DIRECT**

```
USER OPERSSI …
  …
  OPTION CHPIDVIRTUALIZATION ONE
  …
  IPL 190
  …
  LINK CMAINT 0190 0190 RR
  LINK CMAINT 019D 019D RR
  LINK CMAINT 019E 019E RR
  …
```

**PROFILE EXEC**

```
/* PROFILE EXEC for OPERSSI */
…
‘SET RELPAGE OFF’
…
```
… Relocating OPERSSI and DEMOADMN (CMS Users)

- **Beware**
  - It’s worth repeating … VMRELOCATE for CMS user IDs not officially supported
  - All members of the cluster must be kept at same z/VM (or at least CMS) code level
  - If IPL 190, will use more memory as each user ID will have private copy of CMS
  - SET RELPAGE OFF can have a negative impact on overall system performance
  - Only works for “basic” CMS users
    - All relocation rules still apply
    - E.g. user IDs connecting to VMCF or IUCV can’t relocate
Monitor Service Machines - Considerations

- **Consoles received by Operations Manager via SECUSER or OBSERVER**
  - Prefer SECUSER
    - OBSERVER won’t detect CP and VM READ messages
    - Output of actions on OBSERVED console may not be viewable in console
  - OBSERVER allows Operations Manager to receive console output even when user is logged on

- **Single System Image allows SECUSER and OBSERVER across members of cluster**
  - Content does not contain member name information
  - Rules, actions, and users wouldn’t be able to distinguish between IDENTITY users on multiple members
  - Creates single point of failure on one member

- **Recommendation for z/VM V6.2 Single System Image environments**
  - Have all consoles monitored by an Operations Manager server on the same member as the monitored guest (i.e. all Operations Manager servers are IDENTITY users)
    - Requires action processing servers (OPMGRSn) to be on same member as main server
  - Share configuration data on minidisk owned by single configuration user
    - For example: VMTOOLS 198
    - Master configuration file unique to each member
    - Imbed common file(s) used by all members
  - **Request a copy of the current console of a remote user**
    - SMSG OPMGRM1 at membername VIEWCON USER(userid),MODE(RDR)
Monitor Page and Spool Usage, View Spool Files

- **Create page and spool space monitors to trigger actions when**
  - Percent of spool usage falls within a specified range
  - Percent of spool usage increases at a specified rate
  - Percent of page space usage falls within a specified range
  - Percent of page space usage increases at a specified rate

- **Actions triggered can be the same actions used by console monitoring**

- **For spool files, authorized users can**
  - Display a list of spool files based on one or more attributes
    - Owner
    - Size
    - Date created
  - From the list, the user can
    - Sort the list on any of the available columns
    - View the contents of an individual spool file
    - Purge, transfer, or change a spool file
SSI Considerations for Spool and Page Space Monitoring
Spool and Page Space Monitoring - Considerations

- **Page space is local**
  - Separate space for each member and only visible to the local member

- **Spool data – visibility to authorized users**
  - Spool data for multiconfiguration users
    - Only files owned by the local instance of that user are visible on the local member
    - No visibility to spool files owned by other instances of that user on other members
  - Spool data for single users
    - Files created while logged onto that member are always visible on that member
    - Files owned by the user but created while logged onto another member are only visible to the local member when the user is logged on (or running disconnected) on the local member

- **Another way of putting it**
  - Spool data created on a member is always visible on that member
    - Whether the owning user is currently logged on or not
    - This includes
      - Files created by single configuration users while logged onto that member
      - Files created by multiconfiguration users with subconfig info for that member
  - Spool data owned by single configuration users is seen by the local member when the user is logged on (or running disconnected) on the local member
    - Even if data was originally created while logged onto another member of the cluster

- **Recommendation**
  - Have an Operations Manager server on each member to monitor spool and page space
Schedule Events and Actions

- **Define schedules**
  - Hourly, daily, weekly, monthly, or yearly, nth weekday of the month
  - Once on specified month, day, year, and time
  - At regular intervals
    - Every x hours and y minutes
  - Within a specified window of time
    - Specify start time
    - Specify conflicting schedules
    - Specify maximum time to defer this schedule
  - Within limits
    - Restrict to specific days of the week: Monday through Sunday plus holidays
    - Restrict to certain hours of the day

- **Specify the action associated with the schedule**
  - Actions specified are the same as those for console and spool monitoring

- **No impact from SSI**
Idle Monitors

- **Define idle monitors**
  - Watch for idle rules, schedules, and monitors
  - Rule, schedule, or monitor *not* triggered n number of times within specified period of time

- **Specify the action associated with the idle monitor**
  - Actions specified are the same as those for schedules, console and spool monitoring

- **No impact from SSI**
Respond to System Events

- Create monitors for z/VM system events (*VMEVENT) related to user IDs
  - Class 0
    0 - Logon
    1 - Logoff
    2 - Failure condition (typically CP READ)
    3 - Logoff timeout started
    4 - Forced sleep started
    5 - Runnable state entered (VM READ)
    6 - Free storage limit exceeded
    9 - Outbound relocation started
    10 - Inbound relocation started
    11 - Outbound relocation complete
    12 - Inbound relocation complete
    13 - Outbound relocation terminated
    14 - Inbound relocation terminated

- Additional classes also supported
- Optionally restrict to specific user ID(s)
- Specify the action associated with the event
  - Actions specified are the same as those for schedules and console and spool monitors
Dynamic Configuration

- **Initial configuration file loaded at startup**
  - May imbed other configuration files

- **Most configuration options can be updated while Operations Manager is running**
  - Add, delete, or change:
    - Rules, actions, monitors, schedules, holidays, groups, user authorization
    - Suspend or resume rules, monitors, schedules

- **Multiple methods**
  - CMS command interface
  - (Re)load a new or updated configuration file
  - Commands in action routines
  - Request reload from user IDs on other members of a cluster
    - Use SMSG OPMGR1 at <member> CONFIG …
Recommended Practices – Operational Management

Generate alerts and/or automatically recover from:
- Abend, termination, or error messages
- Service machine disks approaching full
- Critical user IDs or guests being logged off or entering error state
- Spool and/or page space approaching full

Schedule automated system maintenance procedures:
- Spool cleanup based on policies
- Minidisk cleanup (from logs), including archiving
- Orderly startup and shutdown
  - Relocation of critical guests to another SSI member
- Backups of z/VM system
Summary

- **Use Operations Manager to**
  - Automate daily operations
  - Integrate your z/VM and Linux on System z environment with existing enterprise monitoring and alerting
  - Prevent problems rather than react to them
  - Automate reactions to problems when they can’t be prevented
  - Improve problem determination procedures
  - Increase programmer and operator productivity
  - Continue to monitor locally with improved management of clusters
Reference Information

- **Product Web site**
  - Product pages include
    - Publications
    - Pre-requisites
    - Announcements
    - Presentations
    - White papers
    - Support

- **e-mail**
  - Mike Sine, sine@us.ibm.com, Technical Marketing
  - Tracy Dean, tld1@us.ibm.com, Product Manager

- **White papers on Operations Manager website (Library page)**
  - Routing Linux syslog data
  - Sending alerts from Operations Manager to Netcool/OMNIbus
  - Using Shared File System to store Operations Manager configuration files and automation EXECs
  - Automatically logging on a user at Linux system boot time for easier console management
Demonstration Scenarios
Automation Demos Available

1. Send an e-mail based on a console message
2. Send an alert to Netcool/OMNIbus based on a console message
   a. Using POSTZMSG interface to Netcool/OMNIbus
   b. Using SNMP interface to Netcool/OMNIbus
3. Send a message or email if spool approaches full
   a. Send a message if spool usage is too high on any member of an SSI Cluster
   b. Send an email if spool usage is too high on a single system
4. View and clean up spool files
5. Automated spool cleanup
6. Archiving DIRMAINT’s log files when disk gets full
7. Process a file of test messages as a console
8. Process Linux syslog data as a console
9. Create a central operations console on one z/VM system
10. Create a central operations console across multiple z/VM systems
   a. When the systems are in an SSI cluster
   b. When the systems are not in an SSI cluster
11. Integration with OMEGAMON XE on z/VM and Linux - take action based on CPU usage of a Linux guest
12. Monitor service machines for logoff – and autolog them
13. Send an email if page space approaches full
14. Monitor SSI connectivity between 2 cluster members
15. Suppress passwords on Linux consoles
16. Autolog a Linux Guest and Send Message if Doesn’t Start Successfully
Automation Scenarios
Scenario 1: Send an Email if Abend or Fatal Message Occurs

- Watch all monitored consoles for an error message that includes the word “fatal” or “abend”
  - Message must also contain the word “mail” (for demo purposes only)

- Send an email if one of the words appears on a console

- Dynamically include in the email
  - Host name of z/VM system where the error occurred
  - User ID that received the error message
  - Indicator of whether the word was fatal or abend
  - Full text of the error message
Scenario 1: Detailed Steps

- From any VM user ID:
  
  \texttt{tell opmgrc1 this is an abend message from SHARE. Send an e-mail, please.}
  
- From an authorized VM user ID, view the console of OPMGRC1:
  
  \texttt{gomcmd opmgrm1 viewcon user(opmgrc1)}
  
- Check the inbox of the appropriate person to see the e-mail
tell opmgrcl this is an abend message from SHARE. Send an e-mail, please.
Ready; T=0.01/0.01 19:36:19
The following message was received on OPMGR1 running on MSINE.WASHINGTON.IBM.COM:

* MSG FROM SINE : this is an abend message from SHARE. Send an e-mail, please.

DO NOT REPLY - This e-mail was generated by an automated service machine
Scenario 1: How Do You Do That?

Rules in Operations Manager:

* Send an e-mail to someone if I see a message containing the word "fatal" on any monitored console

DEFRULE NAME(FATLMAIL),+
   MATCH(*FATAL*mail*),+
   EXUSER(ESMTS112),+
   ACTION(EMAIL),+
   PARM(FATAL)

* Send an e-mail to someone if I see a message containing the word "abend" on any monitored console

DEFRULE NAME(ABNDMAIL),+
   MATCH(*ABEND*mail*),+
   EXUSER(ESMTS112),+
   ACTION(EMAIL),+
   PARM(ABEND)
Scenario 1: How Do You Do That?

**Action in Operations Manager:**

* Replace "tld1 at us.ibm.com" with the e-mail address of the user that should receive the e-mail
* Leave &u, &p, and &t as-is. These represent the user ID that had the "fatal" message, the parameter passed (fatal or abend), and the text of the message. These will be included in the text of the e-mail.

```
DEFACTN NAME(EMAIL),+
COMMAND(EXEC SMTPNOTE tld1 at us.ibm.com &u &p &t),+
OUTPUT(LOG),+
ENV(LVM)
```
Scenario 1: How Do You Do That?

SMTPNOTE EXEC (excerpts)

/* */
Parse arg mail_user AT mail_node baduser errtype msgtext
if errtype = 'FATAL' then
    errtext = 'Fatal error on user ID' baduser 'on z/VM system'
else
    if errtype = 'ABEND' then
        errtext = 'Abend on user ID' baduser 'on z/VM system'
    else errtext = msgtext
/* Construct the e-mail */
line.1 = 'OPTIONS: NOACK LOG SHORT NONOTEBOOK ALL CLASS A'
line.2 = 'Date: ' Date() ',' Time()
line.3 = 'From: Operations Manager for z/VM'
line.4 = 'To: ' mail_user 'at' mail_node
line.5 = 'Subject: ' errtext
line.6 = 'The following message was received on' baduser 'running on'
line.7 = msgtext
line.8 = '
line.9 = 'DO NOT REPLY - This e-mail was generated by an automated service machine
line.0 = 9
'PIPE stem line. | > TEMP NOTE A'
'EXEC SENDFILE TEMP NOTE A (NOTE SMTP'
Scenario 2a: Send an Alert to OMNIbus – Using POSTZMSG

- Watch all monitored consoles for an error message that includes the word “fatal” or “abend”
  - Message must also contain the word “omni” (for demo purposes only)

- Send an alert to OMNIbus if one of the words appears on a console
  - Use POSTZMSG, running on Linux guest
    - Do not trigger the action if the message is on this guest

- Dynamically include in the alert
  - User ID that received the error message
  - Indicator of whether the word was fatal or abend
Scenario 2a: Detailed Steps

- View “All Events” in OMNIbus

- From any VM user ID:
  
tell opmgrc1 this user is abending at SHARE. Tell OMNIBUS.

- From an authorized VM user ID, view the console of OPMGRC1:
  
gomcmd opmgrm1 viewcon user(opmgrc1)

- From an authorized VM user ID, view the console of the Linux guest that runs POSTZMSG:
  
gomcmd opmgrm1 viewcon user(esmts112)

- View the OMNIbus console to see the alert
Ready; T=0.01/0.01 26:10:47
tell opmrgc1 this user is abending at SHARE. Tell OMNIBUS.
Ready; T=0.01/0.01 26:10:52
### Automation Scenarios for a z/VM Cluster and Linux on System z Guests

#### Event Log

<table>
<thead>
<tr>
<th>Event Group</th>
<th>Event Type</th>
<th>Summary</th>
<th>Date/Time</th>
<th>Severity</th>
</tr>
</thead>
<tbody>
<tr>
<td>OPMGRB1</td>
<td>SCARY EVENT</td>
<td>guest is abending</td>
<td>22/09/2009 08:10:52 P</td>
<td>1</td>
</tr>
<tr>
<td>mwb161</td>
<td>Administrator</td>
<td>Attempt to login as root from mwb161 failed</td>
<td>06/09/2009 06:19:51 P</td>
<td>1</td>
</tr>
<tr>
<td>hasil12</td>
<td>TEST EVENT</td>
<td>Test message from hasil12</td>
<td>12/09/2009 02:15:45 P</td>
<td>3</td>
</tr>
<tr>
<td>mwb161</td>
<td>MWTEST</td>
<td>Test Message</td>
<td>05/09/2009 05:36:50 P</td>
<td>2</td>
</tr>
<tr>
<td>hasil12</td>
<td>TEST EVENT</td>
<td>Test message from hasil12</td>
<td>12/09/2009 02:15:45 P</td>
<td>3</td>
</tr>
<tr>
<td>hasil332</td>
<td>Unix Event</td>
<td>A @09522621:09522621:1.0 process running on hasil332</td>
<td>24/09/2009 08:06:35 P</td>
<td>1</td>
</tr>
<tr>
<td>East</td>
<td>Unix Event</td>
<td>A @OmnibusEventConnector process running on hasil332 connected as username</td>
<td>09/09/2009 08:13:16 P</td>
<td>1</td>
</tr>
<tr>
<td>hasil12</td>
<td>TEST EVENT</td>
<td>Test message from hasil12</td>
<td>12/09/2009 02:15:45 P</td>
<td>3</td>
</tr>
<tr>
<td>hasil332</td>
<td>Unix Event</td>
<td>A @OmnibusEventConnector process running on hasil332 connected as username</td>
<td>09/09/2009 08:13:16 P</td>
<td>1</td>
</tr>
<tr>
<td>hasil12</td>
<td>TEST EVENT</td>
<td>Test message from hasil12</td>
<td>12/09/2009 02:15:45 P</td>
<td>3</td>
</tr>
<tr>
<td>USIBMZVHSLV12</td>
<td>TBSMOV3_SOURCE350</td>
<td>Test message from USIBMZVHSLV12 to TBSMOV3_SOURCE350</td>
<td>25/09/2009 05:23:22 P</td>
<td>5</td>
</tr>
<tr>
<td>USIBMZVHSLV12</td>
<td>TBSMOV3_SOURCE350</td>
<td>Test message from USIBMZVHSLV12 to TBSMOV3_SOURCE350</td>
<td>25/09/2009 05:23:21 P</td>
<td>5</td>
</tr>
<tr>
<td>USIBMZVHSLV12</td>
<td>TBSMOV3_SOURCE350</td>
<td>Test message from USIBMZVHSLV12 to TBSMOV3_SOURCE350</td>
<td>05/09/2009 09:38:25 A</td>
<td>1</td>
</tr>
</tbody>
</table>

**Diagram:**

- No rows selected.
Scenario 2a: How Do You Do That?

Rules in Operations Manager:

* Send an alert to OMNIBUS for fatal errors on consoles

DEFRULE NAME(FATLOMNI),+
    MATCH(*fatal*omni*),+
    EXUSER(ESMTS112),+
    ACTION(ALRTOMNI),+
    PARM(FATAL)

* Send an alert to OMNIBUS for abends on consoles

DEFRULE NAME(ABNDOMNI),+
    MATCH(*abend*omni*),+
    EXUSER(ESMTS112),+
    ACTION(ALRTOMNI),+
    PARM(ABEND)
Scenario 2a: How Did You Do That?

**Action in Operations Manager:**

```
*  
* Call POSTZMSG on a Linux guest to send alert to OMNIBUS
DEFACTN NAME(ALRTOMNI),+
  COMMAND(EXEC POSTZMSG &u &p),+
  OUTPUT(LOG),+
  ENV(LVM)
```
Scenario 2a: How Did You Do That?

POSTZMSG EXEC (excerpts)
/* */
Parse arg baduser errtype
if errtype = 'ABEND' then
   do
      zerrtype = 'CRITICAL'
      cmdpart2 = '-m guest_is_abending hostname='baduser'
      cmdpart4 = 'sub_origin=tcp SCARY_EVENT OpsMgr'
   end
else
   do
      zerrtype = 'WARNING'
      cmdpart2 = '-m fatal_error_on_guest hostname='baduser'
      cmdpart4 = 'sub_origin=tcp WARN_EVENT OpsMgr'
   end

   cmdpart1 = './postzmsg -f e2o.conf -r' zerrtype
   cmdpart3 = 'sub_source=postzmsg origin='baduser
   'CP SEND ESMTS112 cd /workloads'
   'CP SEND ESMTS112' cmdpart1 cmdpart2 cmdpart3 cmdpart4
Scenario 2b: Send an Alert to OMNIbus – Using SNMP

- Watch all monitored consoles for an error message that includes the word “abend”
  - Message must also contain the word “snmp” (for demo purposes only)
- Send an alert to OMNIbus if this word appears on a console
  - Use SNMPTRAP command on z/VM
- Dynamically include in the alert
  - IP address of the z/VM system where the error occurred
  - User ID that received the error message
  - Text of the abend message
Scenario 2b: Detailed Steps

- View “All Events” in OMNIbus
- From any VM user ID:
  
  ```
  tell opmgrcl this user is abending during demo. Send SNMP alert to Netcool
  ```
- From an authorized VM user ID, view the console of OPMGRC1:
  
  ```
  gomcmd opmgrml viewcon user(opmgrcl)
  ```
- View the OMNIbus console to see the alert
tell opmgrcl this user is abending during demo. Send SNMP alert to Netcool
Ready; T=0.01/0.01 12:47:08

gomcmd opmgrml viewcon user(opmgrcl)
### Automation Scenarios for a z/VM Cluster and Linux on System z Guests

<table>
<thead>
<tr>
<th>Node</th>
<th>Alert Group</th>
<th>Summary</th>
<th>Last Occurrence</th>
<th>Count</th>
<th>Type</th>
<th>Expiration</th>
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<td>mrh0p</td>
<td>TEST</td>
<td>Test_Message</td>
<td>07/19/2008 02:45:57 PM</td>
<td>4</td>
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<td>has125</td>
<td>TEST01</td>
<td>test_message_from_zif</td>
<td>06/19/2008 03:30:51 PM</td>
<td>2</td>
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<td>USBMWZVHSVL12</td>
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<td>03/05/2008 03:38:25 PM</td>
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<td>OPMGRSCI</td>
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<td>fatal_error_on_guest</td>
<td>04/24/2008 11:26:56 AM</td>
<td>2</td>
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<td>hasle313LZ</td>
<td>OTM/Linux_CPU</td>
<td>Linux_High_CPU_Overload(idle_CPU&lt;10.)</td>
<td>02/10/2010 07:39:46 PM</td>
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<td>hasle332</td>
<td>JIELD</td>
<td>A JIELD process running on hasle32.ha</td>
<td>02/14/2010 11:05:10 PM</td>
<td>1</td>
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<td>9.5.5.20.193</td>
<td>Generic</td>
<td>Repl Neighbor Loss</td>
<td>02/15/2010 03:00:56 PM</td>
<td>3</td>
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<td>Not Set</td>
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<td>Primary:HASLE337:</td>
<td>OTM_HT_Monitored_Log</td>
<td>NT_Log_Space_Low((%_Usage&lt;95) ON</td>
<td>02/16/2010 12:12:47 PM</td>
<td>1</td>
<td>ITM Problem</td>
<td>Not Set</td>
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<td>02/16/2010 12:12:47 PM</td>
<td>1</td>
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<td>Generic</td>
<td>Cold Start</td>
<td>03/03/2010 02:25:12 PM</td>
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<td>Disconnecting O@9522621@95226211</td>
<td>03/03/2010 04:55:00 PM</td>
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<tr>
<td>hasle332</td>
<td>Linux Event List</td>
<td>A at @9522621@95226211:0 process e</td>
<td>03/04/2010 00:08:34 AM</td>
<td>1</td>
<td>Problem</td>
<td>Not Set</td>
</tr>
<tr>
<td>OPMGRSCI</td>
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<td>guest is abending</td>
<td>03/05/2010 12:25:42 PM</td>
<td>28</td>
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<td>WSCZPL:EXMSVSY</td>
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<td>KM5_No_Sysplex_DASD_Filter_Warning(V)</td>
<td>03/05/2010 03:42:32 PM</td>
<td>2</td>
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<tr>
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<td>NT_Logical_Disk_Space_Warning((%_Fre</td>
<td>03/05/2010 04:20:37 PM</td>
<td>3</td>
<td>ITM Problem</td>
<td>Not Set</td>
</tr>
<tr>
<td>Primary:HASLE337:</td>
<td>OTM_HT_Monitored_Log</td>
<td>NT_Logical_Disk_Space_Warning((%_Fre</td>
<td>03/11/2010 03:27:47 PM</td>
<td>1</td>
<td>ITM Problem</td>
<td>Not Set</td>
</tr>
<tr>
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<td>KM5_No_Sysplex_DASD_Filter_Warning(V)</td>
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<td>Warning threshold for disk utilization on 0</td>
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<td>1</td>
<td>ITM Problem</td>
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<td>hasle332</td>
<td>mtrrapd probe on hasle32:Heartbeat Me</td>
<td></td>
<td>03/12/2010 12:37:53 PM</td>
<td>2312</td>
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<td>Not Set</td>
</tr>
<tr>
<td>9.5.2.4.123</td>
<td>Generic</td>
<td>mtrrapd probe on hasle32:Heartbeat Me</td>
<td>03/12/2010 12:37:53 PM</td>
<td>2312</td>
<td>Type Not Set</td>
<td>Not Set</td>
</tr>
<tr>
<td>9.5.2.4.123</td>
<td>Z/VM_SHMP</td>
<td>this user is abending during demo: Sund</td>
<td>03/12/2010 12:37:53 PM</td>
<td>9</td>
<td>Problem</td>
<td>Not Set</td>
</tr>
</tbody>
</table>
Scenario 2b: How Do You Do That?

Rule and action in Operations Manager:

* Send an alert to OMNIbus using SNMP for abend msgs on consoles

DEFRULE NAME(ABNDSNMP),+
  MATCH(*abend*snmp*),+
  ACTION(SNMPALRT),+
  PARM(ABEND)

DEFACTN NAME(SNMPALRT),+
  COMMAND(EXEC SNMP2OMN &T),+
  ENV(SVM)
Scenario 2b: How Did You Do That?

**SNMP2OMN EXEC**

/* SNMP2OMN action routine for Operations Mgr */
address command
parse arg ":" msgtext
msgtext2 = '"'msgtext '"'
/* Send message */
snmptrap trape 1.1 number 30 1.2 text "UXZVM001" 1.3 text msgtext2 ent 1.3.6.1.4.1.9545.6
exit
Scenario 2b: Additional Steps Required on z/VM

- SNMPD user ID configured and running
- Update files on TCPMAINT 198 disk
  - Add OMNIbus IP address to SNMPTRAP DEST file
  - Open SNMPD and SNMPQE ports in PROFILE TCPIP
  - Update SNMPMIBX TEXT section of MIB_EXIT DATA
- Give OPMGRM1 and OPMGRSn access to SNMPTRAP command
  - On TCPMAINT 592 disk
Scenario 2b: Additional Steps Required on OMNIbus

- Install the IBM Tivoli Netcool/OMNIbus SNMP Probe
  - Install it on same platform as target OMNIbus server
- Customize operational information in the probe properties (mttrapd.props)
  - Listening port, heartbeat interval, mibs and mibs locations, etc.
- Customize the probe rules (mttrapd.rules)
  - Map variables created by the probe (from data extracted from the SNMP trap) into the desired OMNIbus event fields
    - Default mappings for the SNMP generic traps (trap types 0-5)
    - Enterprise-specific traps (trap type 6) require customization
- Documentation for installation and customization
  - IBM Tivoli Netcool/OMNIbus SNMP Probe Reference Guide (SC23-6003-04)
Scenarios 2a and 2b – POSTZMSG vs SNMP

- **Using POSTZMSG**
  - Can direct the alert to only the IP address(es) you specify
  - Need a Linux guest running and logged on that can run POSTZMSG and must be on the same z/VM system
    - Can be overcome by using a socket interface to send POSTZMSG command to the guest
  - Limit of 160 characters on POSTZMSG command sent to Linux guest (using CP SEND)
    - Can’t always send full text of message
    - Can be overcome by using a socket interface to send POSTZMSG command to the guest

- **Using SNMP**
  - No requirement for a Linux guest. SNMP runs on z/VM.
  - No limit on message size
  - All SNMP alerts on z/VM go the same set of IP addresses
Scenario 3a:
Send a Message if Spool Usage is Too High on Any Member in an SSI Cluster

- **Operations Manager** monitors the spool usage (percent full) on each member of a cluster

- **Usage exceeds the specified limit**
  - For demo purposes, we’ll dynamically resume (re-activate) an existing spool monitor that requires the spool to only be 5% full
    - Must reactivate on each member of a cluster

- **Automatically send a message to a central console for the entire cluster**

- **Message includes the member name and % full**

- For demo purposes, suspend (de-activate) the spool monitors when complete

- Demonstrate which spool files are visible on each member
Scenario 3a: Detailed Steps

- From an authorized VM user ID, see the spool usage on local member TEST7SSI:
  
gomcmd opmgrm1 viewspl

- From a user ID with Operations Manager privileges:
  
gomcmd opmgrm1 resume spool(splfull)
  
smsg opmgrm1 at testcssi resume spool(splfull)

- Check the Operations Manager log to see the spool monitor triggered on local member:
  
gomcmd opmgrm1 viewlog

- View the central console for the cluster to see warning messages from each member:
  
gomcmd opmgrm1 viewcon user(operssi)

- From a user ID with Operations Manager privileges:
  
gomcmd opmgrm1 suspend spool(splfull)
  
smsg opmgrm1 at testcssi suspend spool(splfull)
Scenario 3a: Detailed Steps

- From member TEST7SSI, send a spool file to a single configuration and a multiconfiguration user:
  
  sendfile test7 file a demoadmn op1

- From member TEST7SSI, send a spool file to a multiconfiguration user on another member:
  
  sendfile testc file a op1 at testcssi

- From a user ID with Operations Manager privileges on TEST7SSI, view spool files on TEST7SSI:
  
  gomcmd opmgrml viewspl

- From a user ID with Operations Manager privileges on TESTCSSI, view spool files on TESTCSSI:
  
  gomcmd opmgrml viewspl
Scenario 3b: Send an Email if Spool Usage is Too High

- Operations Manager monitors the spool usage (percent full)
- Usage exceeds the specified limit
  - For demo purposes, we’ll dynamically resume (re-activate) an existing spool monitor that requires the spool to only be 25% full
- Automatically send an e-mail to someone who can evaluate and take action
- For demo purposes, suspend (de-activate) the spool monitor when complete
Scenario 3b: Detailed Steps

- From an authorized VM user ID, see the spool usage:
  
gomcmd opmgrml viewspl

- From a user ID with Operations Manager privileges:
  
gomcmd opmgrml resume spool(splfull2)

- Check the Operations Manager log to see the spool monitor triggered:
  
gomcmd opmgrml viewlog

- Check the inbox of the appropriate person to see the e-mail

- From a user ID with Operations Manager privileges:
  
gomcmd opmgrml suspend spool(splfull2)
Automation Scenarios for a z/VM Cluster and Linux on System z Guests
Spool is 48% full on z/VM system

OPMGRM1 to Tracy Dean

Default custom expiration date 03/14/2011

03/14/2010 05:04 PM

The following message was received on GDP4.GPSPLEX.USCLAS.WASHINGTON.IBM.COM:

Spool is 48% full on z/VM system

DO NOT REPLY - This e-mail was generated by an automated service machine
Scenario 3b: How Do You Do That?

**Spool monitor and action in Operations Manager:**

* *

DEFSMON NAME(SPLFULL2),+
    USAGE(025-099),+
    ACTION(SPLEMAIL),+
    PARM(SPOOL)
* 

DEFACTN NAME(SPLEMAIL),+
    COMMAND(EXEC SMTPNOTE tld1 at us.ibm.com &4 &p),+
    ENV(LVM)
Scenario 3b: How Do You Do That?

SMTPNOTE EXEC (excerpts)

/* */
Parse arg mail_user dummyat mail_node baduser errtype msgtext
if errtype = 'ABEND' then
   errtext = 'Abend on user ID' baduser 'on z/VM system'
else
   if errtype = 'SPOOL' then do
      errtext = 'Spool is' baduser'%' full on z/VM system'
      msgtext = errtext
   end
   else errtext = msgtext /* Construct the e-mail */
line.1 = 'OPTIONS: NOACK LOG SHORT NONOTEBOOK ALL CLASS A'
line.2 = 'Date: ' Date() ',', ' Time()'
line.3 = 'From: Operations Manager for z/VM'
line.4 = 'To: ' mail_user 'at' mail_node
line.5 = 'Subject: ' errtext
...
line.7 = msgtext
line.8 = '
line.9 = 'DO NOT REPLY - This e-mail was generated by an automated service machine
line.10 = 9
'PIPE stem line. | > TEMP NOTE A'
'EXEC SENDFILE TEMP NOTE A (NOTE SMTP')
Scenario 4: Find and View Spool Files – Clean up the Spool

- **Authorized user specifies spool search criteria**
  - By user ID
  - By date
  - By file size

- **Result list presented**
  - Sort
  - Open/view a specific spool file
  - Purge, modify metadata, or transfer a file
Scenario 4: Detailed Steps

- From an authorized VM user ID, view the spool files:
  
gomcmd opmgrm1 viewspl

- Sort by date
  - Put cursor on date column header and hit F6

- Find the spool files just sent and type PURGE next to them

- From an authorized VM user ID, view the log to see that the spool monitor is no longer triggered:
  
gomcmd opmgrm1 viewlog
<table>
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<tr>
<th>Owner</th>
<th>File</th>
<th>CLS</th>
<th>QUE</th>
<th>TYP</th>
<th>Size</th>
<th>Hole</th>
<th>Date/Time</th>
<th>Name</th>
<th>Type</th>
</tr>
</thead>
<tbody>
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<td>0011</td>
<td>A</td>
<td>RDR</td>
<td>PUN</td>
<td>17M</td>
<td>NONE</td>
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<td>INITRD</td>
<td>IMG</td>
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<tr>
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<td>A</td>
<td>RDR</td>
<td>PUN</td>
<td>17M</td>
<td>NONE</td>
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<td>INITRD</td>
<td>IMG</td>
</tr>
<tr>
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<td>CON</td>
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**Automation Scenarios for a z/VM Cluster and Linux on System z Guests**

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**Automation Scenarios for a z/VM Cluster and Linux on System z Guests**

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Scenario 5: Automated Spool Clean Up

- **Use z/VM SFPURGER utility to manage spool files based on criteria, e.g.**
  - User ID
  - Days in spool
  - Class
  - Number of records

- **Automate SFPURGER execution**
  - Regularly scheduled using Operations Manager
  - Triggered by Operations Manager spool monitor
Scenario 5: Detailed Steps

- From an authorized VM user ID, view the spool files for a specific user:
  
gomcmd opmgrm1 viewspl user(tstadmn2)

- Send a file to this user as class Z
  
sendfile profile exec a tstadmn2 (class z)

- View spool files for this user again to see the new file
  
gomcmd opmgrm1 viewspl user(tstadmn2)

- Delete any existing schedules called DEMO
  
gomcmd opmgrm1 delschd name(demo)

- Schedule SFPURGER for execution
  
  - It will purge any files of class Z
    
gomcmd opmgrm1 defschd name(demo),action(sfpurger),WHEN(now)

- View spool files for this user again to see the new file is gone
  
gomcmd opmgrm1 viewspl user(tstadmn2)
GOMCMD OPMGRM1 VIEWsp1 user(tstadmin2)_
sendfile profile exec a tstamp (class z)

File PROFILE EXEC A1 went to TSTADMN2 at DEM1ZVM on 09/27/09 15:23:11

Ready; T=0.01/0.01 15:23:11
<table>
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<th>QUE</th>
<th>TYP</th>
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<td>576K</td>
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<td>04:55:56</td>
<td>AMV1004</td>
<td>BADARC</td>
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<td>Z</td>
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Automation Scenarios for a z/VM Cluster and Linux on System z Guests

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Automation Scenarios for a z/VM Cluster and Linux on System z Guests

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<td>11:07:21</td>
<td>TSTADMIN1</td>
<td>NETLOG</td>
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</tbody>
</table>
Scenario 5: How Do You Do That?

Action in Operations Manager to call z/VM’s SFPURGER EXEC

* DEFACTN NAME(SFPURGER),+
  COMMAND(EXEC SFPURGER FORCE),+
  OUTPUT(LOG),+
  ENV(LVM)

SFPURGER OPTIONS file

* Send console log to user ID TSTADMN1 at demo node
CONSOLE   TSTADMN1 DEM1ZVM
* Erase LOG and RUN files that are more than 3 days old
KEEPDAY   21
* Set prime shift start and end times
PRIMSHFT  07:30:00 16:30:00
* Use defaults for the following:
  * MSGTYPE SORTMOD SFPCNTL SOSCNTL SFPMOD APPEND
  SFPCNTL SFPTRACY
Scenario 5: How Do You Do That?

**SFPTRACY CONTROL**

* Ignore any spool files found in the NSS queue (privilege class E)
  QUEUE NSS ACTION IGNORE

* Purge any spool files found in class Z
  CLASS Z ACTION PURGE

**Make sure OPMGRM1 links and accesses MAINT 193 disk for access to SFPURGER functions**
Scenario 6: Detecting Disk Full Conditions of Logging IDs

- **Operations Manager monitors the console of a user ID that does logging**
  - DIRMAINT, for example

- **Disk full or early warning message triggers a rule/action in Operations Manager**
  - Quiesce or shut down DIRMAINT
  - Send the log files to a separate service machine
  - Erase the log files from DIRMAINT’s logging disk
  - Restart DIRMAINT
  - Separately, other service machine automatically archives all files it receives (in Archive Manager for z/VM)
  - Log files are safely archived in Archive Manager and DIRMAINT is running with a clean log disk

- **Get a copy of the console for further review/debugging**
Scenario 6: Detailed Steps

- From an authorized VM user ID, view the DIRMAINT console:
  gomcmd opmgrm1 viewcon user(dirmaint)

- In the console view
  - Issue CMS commands to copy old (large) log files to DIRMAINT’s log disk
    cms copyfile dirmaint tlog0914 t = tlog0912 h
  - Verify the logging disk is more than 75% full
    cms q disk
  - Run DIRMAINT’s hourly processing now
    exec dvhourly
  - Verify the logging disk is less than 75% full
    cms q disk

- Exit the console view and find the files in the archive
  amvlist
  - Type “archlogs” in the owner field and press ENTER

- Request a copy of the console for further review/debugging
  gomcmd opmgrm1 viewcon user(dirmaint),mode(rdr)
DIRMAINT DEM1ZVM - 2009/02/24; T=0.01/0.01 22:56:04
DVHWA12140I Waiting for work on 09/02/24 at 22:56:04.
DVHWA12143I Wakeup caused by timer file entry on 09/02/24 at 23:01:02.
DVHWA12143I Processing event number 00005 scheduled for ==/==/== at
DVHWA12143I +01:00:0.
DIRMAINT DEM1ZVM - 2009/02/24; T=0.02/0.02 23:01:02
DVHREQ2290I Request is: CMS EXEC DVHOURLY
DVHREQ2288I Your CMS request for DIRMAINT at * has been accepted.
DVHRLY3886I Hourly processing started; with 0 log
DVHRLY3886I files.
DVHREQ2289I Your CMS request for DIRMAINT at * has completed; with RC
DVHREQ2289I = 0.
DIRMAINT DEM1ZVM - 2009/02/24; T=0.03/0.03 23:01:03
DVHWA12140I Waiting for work on 09/02/24 at 23:01:03.
DVHWA12142I Wakeup caused by elapsed time on 09/02/24 at 23:06:03.
DIRMAINT DEM1ZVM - 2009/02/24; T=0.01/0.01 23:06:03
DVHWA12140I Waiting for work on 09/02/24 at 23:06:03.
DVHWA12142I Wakeup caused by elapsed time on 09/02/24 at 23:11:03.
DIRMAINT DEM1ZVM - 2009/02/24; T=0.01/0.01 23:11:03
DVHWA12140I Waiting for work on 09/02/24 at 23:11:03.
* -- Operations Manager VIEWCON session from TSTADMINI entered the following --
cms acc 333 t
DVHWA12146I Wakeup caused by console attention on 09/02/24 at 23:12:15.
DIRMAINT DEM1ZVM - 2009/02/24; T=0.01/0.01 23:12:16
DVHREQ2290I Request is: CMS acc 333 t
DVHREQ2288I Your CMS request for DIRMAINT at * has been accepted.
DVHREQ2289I Your CMS request for DIRMAINT at * has completed; with RC
DVHREQ2289I = 0.
DIRMAINT DEM1ZVM - 2009/02/24; T=0.02/0.03 23:12:17
DVHWA12140I Waiting for work on 09/02/24 at 23:12:17.
cms copyfile dirmaint tlog0914 t = tlog0912 h_
Automation Scenarios for a z/VM Cluster and Linux on System z Guests
Session B - TSTADMM1 - [32 x 80]

```
cms copyfile dirmaint tlog0914 t = tlog0910 h
DVHWAI2146I Wakeup caused by console attention on 09/02/24 at 23:24:42.
DIRMAINT DEM1ZVM. - 2009/02/24; T=0.01/0.01 23:24:42
DVHREQ2290I Request is: CMS copyfile dirmaint tlog0914 t = tlog0910 h
DVHREQ2288I Your CMS request for DIRMAINT at * has been accepted.
DVHREQ2289I Your CMS request for DIRMAINT at * has completed; with RC
DVHREQ2289I = 0.
DIRMAINT DEM1ZVM. - 2009/02/24; T=0.03/0.03 23:24:43
DVHWAI2146I Waiting for work on 09/02/24 at 23:24:43
```

--- Operations Manager VIEWCON session from TSTADMM1 entered the following --
cms q disk

```
DVHWAI2146I Wakeup caused by console attention on 09/02/24 at 23:25:08.
DIRMAINT DEM1ZVM. - 2009/02/24; T=0.01/0.01 23:25:08
DVHREQ2290I Request is: CMS q disk
DVHREQ2288I Your CMS request for DIRMAINT at * has been accepted.
```

```
LABEL VDEV M STAT CYL TYPE BLKSIZE FILES BLKS USED-(%) BLKS LEFT BLKS TOTA
DIR155 155 A R/W 9 3390 4096 12 80-05 1540 162
DRM491 191 C R/W 15 3390 4096 250 1311-49 1389 270
DRM11F 11F D R/W 8 3390 4096 47 568-39 872 144
DIR1DF 1DF E R/W 9 3390 4096 124 265-16 1355 162
DIR1DA 18A C R/W 9 3390 4096 16 111-00 1476 162
DIR1AA 18A H R/W 9 3390 4096 16 1385-85 235 162
MNT190 190 S R/O 100 3390 4096 687 14513-81 3487 1800
DIR303 933 I R/W 5 3390 4096 2 505-56 395 90
MNT19E 19E Y/S R/O 250 3390 4096 1162 28088-62 16912 4500
DIR1FA 1FA Z R/W 9 3390 4096 0 7-00 1613 162
DVHREQ2289I Your CMS request for DIRMAINT at * has completed; with RC
DVHREQ2289I = 0.
DIRMAINT DEM1ZVM. - 2009/02/24; T=0.02/0.03 23:25:09
DVHWAI2140I Waiting for work on 09/02/24 at 23:25:09.
```

DIRMAINT (Scroll)
Automation Scenarios for a z/VM Cluster and Linux on System z Guests

23:29:24 * -- Operations Manager VIEWCON session from TSIADMINI entered the foll

23:29:24 * cmd exec dvhourly

23:29:24 DWHM12146I Wakeup caused by Console attention on 09/02/24 at 23:29:24

23:29:24 DIRMAINT DEMP1ZVM. - 2009/02/24; T=0.01/0.01 23:29:24

23:29:25 DWHREQQ2290I Request is: CMS exec dvhourly

23:29:25 DWHREQQ2290I Your CMS request for DIRMAINT at * has been accepted

23:29:25 DWHRLY3895W Disk 01AA is 75% full, exceeding its

23:29:25 * -- Operations Manager Action DIRMLOGB scheduled for execution -- *

23:29:33 DWHRLY3895W WARNING threshold of 75%.

23:29:33 DWHRLY3886I Notify processing started, with 8 log

23:29:33 DWHRLY3886I files.

23:29:33 DWHREQQ2289I Your CMS request for DIRMAINT at * has completed; with RC

23:29:33 DWHREQQ2289I 0.

23:29:33 DIRMAINT DEMP1ZVM. - 2009/02/24; T=0.04/0.04 23:29:25


23:29:33 DWHWAI12141I Wakeup caused by *SMSG on 09/02/24 at 23:29:25 from OPMGRM

23:29:33 DIRMAINT DEMP1ZVM. - 2009/02/24; T=0.01/0.01 23:29:25

23:29:33 DWHREQQ2290I Request is: REQUEST 74 SHUTDOWN

23:29:33 DWHREQQ2288I Your SHUTDOWN request for OPMGRM1 at * has been accepted.

23:29:33 DWHREQQ2288I Your SHUTDOWN request for OPMGRM1 at * has been accepted

23:29:33 DWHSHU2190I A shutdown command has been issued by

23:29:33 DWHSHU2190I OPMGRM1 from DEMP1ZVM.

23:29:33 DWHSHU2198A The DIRMAINT service machine is logging

23:29:33 DWHSHU2198A off

23:29:33 CONNECT- 09:01:29 VRTCPU- 000:00 48 TOTCPU- 000:00 17

23:29:33 LOGOFF AT 23:29:27 CST TUESDAY 02/24/09

23:29:33 PRT FILE 0791 SENT FROM DIRMAINT CON HOS 0791 RECS 00005 CPY 001 0 HOL

23:29:33 DASD 0191 LINKED R/W; R/O BY DATAMOVE

23:29:33 DASD 011F LINKED R/W; R/O BY DATAMOVE

23:29:33 DIRMAINT

31/001
gomcmd opmgrm1 viewcon user(dirmaint),mode(rdr)
RDR FILE 0112 SENT FROM OPMGRM1 PRT WAS 0043 RECS 4039 CPY 001 A NOHOLD NOKEEP
Ready, T 01/01/01 11:48:24
DIRMAINT DEMIZVM. - 2010/09/24; T=0.01/0.01 07:01:02
DVHREQ22891 Your CMS request for DIRMAINT at * has been accepted.
DVHRLY38861 Hourly processing started; with 0 log
DVHRLY38861 files.
DVHREQ22891 Your CMS request for DIRMAINT at * has completed; with RC
DVHREQ22891 = 0.
DIRMAINT DEMIZVM. - 2010/09/24; T=0.02/0.02 07:01:02
DVHREQ22901 Request is: CMS EXEC DVHOURLY
DVHREQ28881 Your CMS request for DIRMAINT at * has been accepted.
DVHRLY38861 Hourly processing started; with 0 log
DVHRLY38861 files.
DVHREQ22891 Your CMS request for DIRMAINT at * has completed; with RC
DVHREQ22891 = 0.

Automation Scenarios for a z/VM Cluster and Linux on System z Guests

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Scenario 6: How Do You Do That?

Console rule and action in Operations Manager:

DEFRULE NAME(DIRMLOG),+
  MATCH (*DVHRLY3895*01AA*),+
  USER(DIRMAINT),+
  ACTION(DIRMLOG)
*
DEFACTN NAME(DIRMLOG),+
  INPUT(AHI),+
  NEXTACTN(DIRMLOGB)
*
DEFACTN NAME(DIRMLOGB),+
  COMMAND(EXEC DIRM1AA &U),+
  ENV(LVM)

Authorize Operations Manager to issue DIRM SHUTDOWN – from MAINT issue

DIRM AUTHFOR OPMGRM1 CMDLEVEL 150A CMDSET O
Scenario 6: How Do You Do That?

**DIRM1AA EXEC (excerpts):**

```
Parse Upper Arg Tuser . ;
/* Try to shut DIRMAINT down. */
Say 'DIRM1AA - Issuing DIRM SHUTDOWN ....';
Address CMS 'DIRM SHUTDOWN';

Address Command 'CP LINK' Tuser '1AA' Dev 'MR';
Address CMS 'ACCESS' Dev Fm;

Address Command 'PIPE CMS LISTFILE DIRMAINT *LOG*' Fm '{ NOHEADER,' |
STEM FILES.>'; Do I = 1 to Files.0;
    Parse Upper Var Files.I Fn Ft . ;
    Address CMS 'SENDFILE' Fn Ft Fm 'TO ARCHLOGS';
    If Rc = 0 then Do;
        Sent = Sent+1;
        Address CMS 'ERASE' Fn Ft Fm;
    End

Address Command 'CP XAUTOLOG' Tuser;
```
Scenario 7:  
Process a File of Test Messages as a Console

- Create a file containing lines of test messages  
  - Test rules and actions without creating critical conditions

- Use Operations Manager to send the file for processing  
  - Treat it as the console of one user  
  - Send it again treating it as the console of another user  
  - Notice triggered rules and actions are different

- View the “consoles” of these two users
Scenario 7: Detailed Steps

- Create or view a file of test messages
  
xedit test consdata a
  
  - Notice the “hello” message in the file

- From a z/VM user ID, send the test file to Operations Manager
  
  - Send it twice, specifying two different “owning” user IDs. One generates a message and one doesn’t:

    gomrsif test consdata a 9.39.64.72 63000 tstadmnn8
    gomrsif test consdata a 9.39.64.72 63000 tstuser8

- From an authorized z/VM user ID, view the consoles of the owning user IDs:

  gomcmd opmgrml viewcon user(tstadmnn8)
  gomcmd opmgrml viewcon user(tstuser8)
TEST CONSDATA A1 F 80 Trunc=80 Size=5 Line=0 Col=1 Alt=0

Hello there from remote system input
Here is another critical system message
Warning message to test
Junk
Noise
End of File
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Session B - TSTADM8 - [32 x 60]

Ready; T=0.01/0.01 13:39:12
gomrsif test consdata a 9.39.68.141 63000 tstadmin8
Connecting to 9.39.68.141
Sending TEST CONSDATA A to 9.39.68.141

Ready; T=0.01/0.01 13:39:18
gomrsif test consdata a 9.39.68.141 63000 tstuser8
Connecting to 9.39.68.141
Sending TEST CONSDATA A to 9.39.68.141
Ready; T=0.01/0.01 13:39:18
hello there from remote system input
* -- Operations Manager Action TESTEX scheduled for execution -- *
here is another critical system message
warning message to test
junk
noise
hello there from remote system input
here is another critical system message
warning message to test
junk
noise
Scenario 7: How Do You Do That?

Console rule and action in Operations Manager:

*  
DEFRULE NAME (TESTEX),+  
  MATCH (*HELLO*),+  
  MCOL (001:030),+  
  ACTION (TESTEX),+  
  EXGROUP (TSTUSERS)  
*  
DEFACTN NAME (TESTEX),+  
  COMMAND (CP MSG TSTADMIN1 HELLO BACK FROM &U.),+  
  OUTPUT (LOG),+  
  ENV (LVM)
Scenario 7: How Do You Do That?

Set up TCP/IP listener for test data and define group of consoles:

*  
  DEFTCPA  NAME(TESTDATA),+  
       TCPUSER(TCPIP),+  
       TCPAPPL(GOMRSIF),+  
       TCPADDR(000.000.000.000),+  
       TCPPORT(63000)  
  *  
  DEFGROUP  NAME(TSTUSERS),+  
       USER(TSTUSER*)

Update TCP/IP configuration to allow Operations Manager to listen on the specified port
Scenario 8:
Process Linux Syslog Data as a Console

- Route syslog data from a Linux guest to Operations Manager for z/VM
  - Supports syslogd, syslog-ng, rsyslog
  - syslog-ng and rsyslog include hostname or IP address in message

- Treat it as the console of a “fake” user ID

- Trigger rules and actions based on syslog data

- View the “console” containing syslog data

- Option to create one console per syslog or combine multiple syslogs into one console
Scenario 8: Detailed Steps

- From an authorized z/VM user ID, view any syslog data already received
  
gomcmd opmgrpml viewcon user(lxs syslog)

- Use PUTTY to connect to a Linux guest

- Login as root and issue the command
  
  `logger here is a critical test message from SHARE`

- Return to the VIEWCON session
  
  – See the message in the syslog “console”
  
  – Using syslog, so no hostname or IP address

- Repeat from a different Linux guest that uses syslog-ng
root@hasl106:~

login as: root
root@9.82.56.106's password:
Last login: Thu Feb 12 17:12:21 2009

[root@hasl106 ~]# logger here is a critical test message from share
[root@hasl106 ~]#
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LXSYSLOG (Scroll)
14:14:58  * MSG FROM OPMGRM1 : GOT A CRITICAL MESSAGE '

            ROOT: HERE IS A CRITICAL TEST MESSAGE FROM SHARE.' FROM LXSYSLOG.

            Ready; T=0.01/0.01 14:18:41
login as: root
Using keyboard-interactive authentication.
password:
hasl114:~ # logger demo message from linux guest with syslog-ng
hasl114:~ #
Scenario 8: How Do You Do That?

Console rule and action in Operations Manager:

* 
DEFRULE NAME(LXLOG),+
    MATCH(*critical test message*),+
    ACTION(LXLOG),+
    USER(LXSYSLOG)
* 
DEFACTN NAME(LXLOG),+
    COMMAND(CP MSG TSTADMIN1 Got a critical message '&T' from &U.),+
    OUTPUT(LOG),+
    ENV(LVM)
Scenario 8: How Do You Do That?

- **Set up TCP/IP listener for syslog data**
  
  ```plaintext
  DEFTCPA NAME(LNXSYSLOG),+  
  TCPUSER(TCPIP),+  
  TCPAPPL(GOMRSYL),+  
  TCPADDR(000.000.000.000),+  
  TCPPORT(00514),+  
  PARM(LXSYSLOG03330417UTF8)
  *
  
  DEFTCPA NAME(LNXSYSLOG2),+  
  TCPUSER(TCPIP),+  
  TCPAPPL(GOMRSYL),+  
  TCPADDR(000.000.000.000),+  
  TCPPORT(00515),+  
  PARM(LXSYSLOG203330417UTF8)
  *
  ```

- **Update TCP/IP configuration to allow Operations Manager to listen for UDP traffic on the specified port(s)**
  - Ports 514 and 515 used here

- **Update the Linux guest to send its syslog data to the IP address and port of your z/VM system**
Scenario 9:
Create a Central Operations Console on One z/VM System

- Use Operations Manager to watch for error, warning, fatal messages on service machine consoles
  - DIRMAINT, TCP/IP, RACF, etc.
  - Linux guests
  - Linux syslog
- Route these messages to a central operations console
- Operations staff watches operations console for signs of trouble
  - View individual service machine consoles for more details when needed
Creating a Central Console on One z/VM System
Scenario 9: Detailed Steps

- From an authorized z/VM user ID, put “abend”, “fatal”, and error messages on DIRMAINT console
  
  `msgnoh dirmaint this is a test abend message`

  `msgnoh dirmaint this is a fake fatal message`

  `msgnoh dirmaint DMSxxxxxxxE here is a made-up CMS error msg`

- View the “Operations Console” to see the messages
  
  `gomcmd opmgrml viewcon user(oper8)`

- Note the fatal message is red and abend message is highlighted and will be held when other messages come in
Scenario 9: Detailed Steps

- From another user ID, run an EXEC to send multiple messages to the Operations Console
  lotsmsgs

- View the “Operations Console” to see the messages
  gomcmd opmgrml viewcon user(oper8)

- Watch the scrolling, held messages, etc.
msgnch dirmaint this is a test abend message
Ready; T=0.01/0.01 10:36:23
msgnch dirmaint this is a fake fatal message
Ready; T=0.01/0.01 10:36:29
msgnch dirmaint DMSxxxxxxxxxE here is a made-up CMS error msg
Ready; T=0.01/0.01 10:36:39

gomcmd opmgrml viewcon user(operm8)
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Session A - TSTADMNT [32 x 80]

11:54:03 A FAKE ABEND HAS OCCURRED
14:13:50 A fake abend has occurred
14:14:32 This is standard non scary message 17
14:14:33 This is standard non scary message 18
14:14:34 This is standard non scary message 19
14:14:35 This is standard non scary message 20
14:14:36 This is standard non scary message 21
14:14:37 This is standard non scary message 22
14:14:38 This is standard non scary message 23
14:14:39 This is standard non scary message 24
14:14:39 This is standard non scary message 25
14:14:41 This is standard non scary message 26
14:14:42 This is standard non scary message 27
14:14:42 This is standard non scary message 28
14:14:43 This is standard non scary message 29
14:14:44 This is standard non scary message 30
14:14:46 This is standard non scary message 31
14:14:47 This is standard non scary message 32
14:14:48 This is standard non scary message 33
14:14:49 This is standard non scary message 34
14:14:50 This is standard non scary message 35
17:39:47 DIRMAINT : TEST MESSAGE WITH FATAL TEXT
17:40:26 DIRMAINT : TEST MESSAGE WITH ABEND TEXT
00:00:00 HCPMID6001I TIME IS 00:00:00 CDT FRIDAY 10/02/09
00:00:00
23:59:59 HCPMID6001I TIME IS 00:00:00 CDT SATURDAY 10/03/09
23:59:59
10:36:23 DIRMAINT : THIS IS A TEST ABEND MESSAGE
10:36:28 DIRMAINT : THIS IS A FAKE FATAL MESSAGE
10:36:39 DIRMAINT : DMSXXXXXXHERE IS A MADE-UP CMS ERROR MSG

- OPER8 (Scroll)
11:54:03 A FAKE ABEND HAS OCCURRED
14:13:50 A fake abend has occurred
17:40:26 DIRMAINT : TEST MESSAGE WITH ABEND TEXT
10:36:23 DIRMAINT : THIS IS A TEST ABEND MESSAGE
10:46:16 A fake abend has occurred
10:46:23 This is standard non scary message 8
10:46:25 This is standard non scary message 9
10:46:26 This is standard non scary message 10
10:46:26 This is standard non scary message 11
10:46:27 This is standard non scary message 12
10:46:28 This is standard non scary message 13
10:46:29 This is standard non scary message 14
10:46:30 This is standard non scary message 15
10:46:31 This is standard non scary message 16
10:46:32 This is standard non scary message 17
10:46:33 This is standard non scary message 18
10:46:34 This is standard non scary message 19
10:46:35 This is standard non scary message 20
10:46:36 This is standard non scary message 21
10:46:37 This is standard non scary message 22
10:46:38 This is standard non scary message 23
10:46:39 This is standard non scary message 24
10:46:40 This is standard non scary message 25
10:46:41 A fake fatal message
10:46:42 This is standard non scary message 1
10:46:43 This is standard non scary message 2
10:46:44 This is standard non scary message 3
10:46:45 This is standard non scary message 4
10:46:47 This is standard non scary message 5
10:46:48 This is standard non scary message 6

OPER8 (Scroll)
<table>
<thead>
<tr>
<th>Time</th>
<th>Message</th>
</tr>
</thead>
<tbody>
<tr>
<td>11:54:03</td>
<td>A FAKE ABEND HAS OCCURRED</td>
</tr>
<tr>
<td>14:13:50</td>
<td>A fake abend has occurred</td>
</tr>
<tr>
<td>17:40:26</td>
<td>DIRMANT : TEST MESSAGE WITH ABEND TEXT</td>
</tr>
<tr>
<td>10:36:23</td>
<td>DIRMANT : THIS IS A TEST ABEND MESSAGE</td>
</tr>
<tr>
<td>10:46:16</td>
<td>A fake abend has occurred</td>
</tr>
<tr>
<td>10:46:52</td>
<td>This is standard non scary message</td>
</tr>
<tr>
<td>10:46:53</td>
<td>This is standard non scary message</td>
</tr>
<tr>
<td>10:46:54</td>
<td>This is standard non scary message</td>
</tr>
<tr>
<td>10:46:55</td>
<td>This is standard non scary message</td>
</tr>
<tr>
<td>10:46:56</td>
<td>This is standard non scary message</td>
</tr>
<tr>
<td>10:46:57</td>
<td>This is standard non scary message</td>
</tr>
<tr>
<td>10:46:58</td>
<td>This is standard non scary message</td>
</tr>
<tr>
<td>10:46:59</td>
<td>This is standard non scary message</td>
</tr>
<tr>
<td>10:47:00</td>
<td>This is standard non scary message</td>
</tr>
<tr>
<td>10:47:01</td>
<td>This is standard non scary message</td>
</tr>
<tr>
<td>10:47:02</td>
<td>This is standard non scary message</td>
</tr>
<tr>
<td>10:47:03</td>
<td>This is standard non scary message</td>
</tr>
<tr>
<td>10:47:04</td>
<td>This is standard non scary message</td>
</tr>
<tr>
<td>10:47:05</td>
<td>This is standard non scary message</td>
</tr>
<tr>
<td>10:47:06</td>
<td>This is standard non scary message</td>
</tr>
<tr>
<td>10:47:07</td>
<td>This is standard non scary message</td>
</tr>
<tr>
<td>10:47:08</td>
<td>This is standard non scary message</td>
</tr>
<tr>
<td>10:47:09</td>
<td>This is standard non scary message</td>
</tr>
<tr>
<td>10:47:10</td>
<td>This is standard non scary message</td>
</tr>
<tr>
<td>10:47:10</td>
<td>This is standard non scary message</td>
</tr>
<tr>
<td>10:47:11</td>
<td>This is standard non scary message</td>
</tr>
<tr>
<td>10:47:12</td>
<td>This is standard non scary message</td>
</tr>
<tr>
<td>10:47:13</td>
<td>This is standard non scary message</td>
</tr>
<tr>
<td>10:47:14</td>
<td>This is standard non scary message</td>
</tr>
<tr>
<td>10:47:15</td>
<td>This is standard non scary message</td>
</tr>
<tr>
<td>10:47:16</td>
<td>This is standard non scary message</td>
</tr>
</tbody>
</table>
Scenario 9: How Do You Do That?

Console rules in Operations Manager:

*  
DEFRULE NAME (ABEND), +  
    MATCH (*abend*), +  
    EXUSER (OPER8), +  
    ACTION (MSGOPER8)

*  
DEFRULE NAME (FATAL), +  
    MATCH (*fatal*), +  
    EXUSER (OPER8), +  
    ACTION (MSGOPER8)

*  
DEFRULE NAME (EMSGS), +  
    MATCH (DMS*E), +  
    MCOL (001:011), +  
    EXUSER (OPER8), +  
    ACTION (MSGOPER8)

Action in Operations Manager:

*  
DEFACTN NAME (MSGOPER8), +  
    COMMAND (CP MSGNOH OPER8 &U : &T), +  
    OUTPUT (LOG), +  
    ENV (LVM)
Scenario 9: How Do You Do That?

**Console rules in Operations Manager:**

*  
DEFRULE NAME(ABENDHLT),+  
  MATCH(*abend*),+  
  USER(OPER8),+  
  ACTION(HLTHOLD)  
*  
DEFRULE NAME(FATALRED),+  
  MATCH(*fatal*),+  
  USER(OPER8),+  
  ACTION(RED)  

**Actions in Operations Manager:**

*  
DEFACTN NAME(HLTHOLD),+  
  INPUT(AHI,HLD)  
*  
DEFACTN NAME(HILITE),+  
  INPUT(AHI)  
*  
DEFACTN NAME(RED),+  
  INPUT(CRE)
Scenario 10a: Create a Central Operations Console across multiple z/VM systems in an SSI cluster – Includes relocation of Linux and CMS guests

- Use Operations Manager to watch for error, warning, fatal messages on service machine consoles on one or more systems in an SSI cluster
  - OPERATOR, DIRMAINT, TCPIP, RACF, etc.
  - Linux guests
  - Linux syslog

- Route these messages to a central operations console on one of the z/VM systems

- Operations staff watches one operations console for signs of trouble across multiple z/VM systems
  - View individual service machine consoles for more details when needed
Creating a Central Console Across Multiple Members of SSI Cluster

Single Configuration Users: LINUX01, LINUX02, OPERSSI, DEMOADMN
Multiconfiguration (IDENTITY) Users: OPERATOR, DIRMAINT, OPMGRM1
Scenario 10a: Detailed Steps

- On System B (TEST7SSI), view the “Operations Console” (user ID OPERSSI)
  
  `gomcmd opmgrml viewcon user(operssi)`

- On System A (TEST7SSI), find a Linux guest running disconnected locally and relocate it

  `q names`

  `VMRELOCATE MOVE USER RHEL5G TO TESTCSSI`

- On System B (TEST7SSI), prepare for planned shutdown by relocating the central operations console (OPERSSI)

  `VMRELOCATE MOVE USER OPERSSI TO TESTCSSI`

- Note the messages received on OPERSSI on TEST7SSI from OPERATOR on both TESTCSSI and TEST7SSI indicating RHEL5G was relocated

- Note the message received on OPERSSI on TESTCSSI indicating OPERSSI has been relocated
id
DEMODMN AT TEST7SSI VIA RSCS 08/07/12 15:20:24 EDT TUESDAY
Ready; T=0.01/0.01 15:20:24

GOMCMD OPMGRM1 VIEWCON USER(OPERSSI)
05:50:32 User OPERSSI has been relocated from TESTCSSI to TEST7SSI
05:50:32 From OPERATOR on TESTCSSI : User OPERSSI has been relocated from TESTC
05:50:32 From OPERATOR on TEST7SSI : User OPERSSI has been relocated from TESTC
05:51:08 From TEST7SSI : Inbound relocation for RHEL5G on TESTCSSI started
05:51:08 From TESTCSSI : Outbound relocation for RHEL5G on TEST7SSI started
05:51:09 From OPERATOR on TEST7SSI : User RHEL5G has been relocated from TESTCS
05:51:09 From OPERATOR on TESTCSSI : User RHEL5G has been relocated from TESTCS
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Relocation of RHEL5G from TEST7SSI to TESTCSSI started
User RHEL5G has been relocated from TEST7SSI to TESTCSSI
Ready; T=0.01/0.01 05:57:32
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User OPERSSI has been relocated from TEST7SSI to TESTCSSI
Scenario 10a: How Do You Do That?

**Event monitor in Operations Manager:**

* 

```plaintext
*** Notify OPERSSI console when relocations started
DEFEMON NAME(RELOC),+
   TYPE(9,10),+
   ACTION(RELOC)
```

**Action in Operations Manager:**

* 

```plaintext
DEFACTN NAME(RELOC),+
   COMMAND(EXEC MSG2OPER &u &3 &4 &5 junk),+
   ENV(LVM)
```
Scenario 10a: How Do You Do That?

MSG2OPER EXEC (excerpts):

/*  Send a message to a central console OPERSSI for SSI cluster */
/*
trace r
Address Command
Parse arg userid euser event sourcesys msgtext

/* Get local TCP/IP hostname */
parse value Search_TCP/IP_Data("hostname") with getrc tcphostname .
if getrc > 4 then tcphostname = "unknown_host_name"

if userid = '_GOMEMON' then
do
  if event = 9 then
    msgtext = 'Outbound relocation for' euser 'on' sourcesys 'started'
  else
    msgtext = 'Inbound relocation for' euser 'on' sourcesys 'started'
    'CP MSGNOH OPERSSI AT TEST7SSI From' tcphostname ':' msgtext
end
Scenario 10b:
Create a Central Operations Console across multiple z/VM systems that are not in an SSI cluster

- Use Operations Manager to watch for error, warning, fatal messages on service machine consoles on one or more systems
  - OPERATOR, DIRMAINT, TCP/IP, RACF, etc.
  - Linux guests
  - Linux syslog
- Route these messages to a central operations console on one of the z/VM systems
- Operations staff watches one operations console for signs of trouble across multiple z/VM systems
  - View individual service machine consoles for more details when needed
Creating a Central Console Across Multiple LPARS

OPERATOR
- OP Message 1b
- OP Message 2b
- OP Message 3b

z/VM A

CP SECUSER

Operations Mgr (OPMGRM1)

DIRMAINT
- DIR Message 1b
- DIR Abend Msg 2b
- DIR Message 3b

DIRMAINT
- DIR Message 1b
- DIR Abend Msg 2b
- DIR Message 3b

LINUX02
- LX2 Urgent Msg 1b
- LX2 Message 2b
- LX2 Message 3b

LINUX02
- LX2 Urgent Msg 1b
- LX2 Message 2b
- LX2 Message 3b

DEMOADMN

OPERATOR
- OP Message 1b
- OP Message 2b
- OP Mount Message 3b

z/VM B

OPMGRC1
- Urgent Message 1a
- Abend Message 2b
- Mount Message 3a
- Urgent Message 1b
- Abend Message 2a
- Mount Message 3b

CP MSGNOH
msgnoh operator here is a test remote error message
Ready; T=0.01/0.01 21:58:52

gomcmd opmgrm1 viewcon user(operator)
Running TESTCSSI
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Scenario 10b: Detailed Steps

- On System A (DEM1ZVM) put an “error” message on the OPERATOR console
  - Must contain the text “remote error”

  ```
  msgnoh operator here is a remote error message
  ```

- View the “Operations Console” (user ID OPMGRC1) on System B (ZVMV5R40) to see the message

  ```
  gomcmd opmgrcl viewcon user(opmgrc1)
  ```

- Note the message received on OPMGRC1 on ZVMV5R40 from OPERATOR on DEM1ZVM
msghc: operator here is a remote error message
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Scenario 10b: How Do You Do That?

Console rule in Operations Manager on System A:

*  
DEFRULE NAME(OPERMSGS),+  
  MATCH(*remote error*),+  
  USER(OPERATOR),+  
  ACTION(MSG2GBRG)

Action in Operations Manager on System A:

*  
DEFACTN NAME(MSG2GBRG),+  
  COMMAND(EXEC MSG2OPS OPMGRC1 From &u on DEM1ZVM: &t),+  
  OUTPUT(LOG),+  
  ENV(LVM)
Scenario 10b: How Do You Do That?

MSG2OPS EXEC on System A:

/* Send a message to a console in Ops Mgr on another system */
/*
   */
trace r
Address Command
Parse arg cons_user msgtext
'PIPE var msgtext | > TEMP NOTE A'
'EXEC GOMRSIF TEMP NOTE A 9.82.24.129 63000' cons_user
Exit
Scenario 10b: How Do You Do That?

TCP/IP listener definition in Operations Manager on System B:

*                           DEFTCPA NAME(TESTDATA),+    TCPUSER(TCPIP),+          TCPAPPL(GOMRSIF),+        TCPADDR(000.000.000.000),+ TCPPORT(63000)

- May also need to update TCP/IP on System B to allow Operations Manager to listen on port 63000
- Can alternatively use TELL (instead of GOMRSIF) to send messages from System A to System B, but requires RSCS
Scenario 11
Integration with OMEGAMON XE on z/VM and Linux

- Use Operations Manager to take action based on a triggered situation in OMEGAMON XE on z/VM and Linux
- Virtual CPU consumption is high for a Linux guest
- OMEGAMON detects the situation, creates an event, and sends message to Operations Manager
- Action is triggered by a rule in Operations Manager
- Operations Manager checks SHARE status of guest and issues CP commands to tune the guest
  - SET QUICKDSP
  - SET SHARE
- Event is resolved in OMEGAMON when virtual CPU consumption of guest is back down
OMEGAMON XE and Operations Manager for z/VM

Process Flow

System z

Operations Manager
Perf Toolkit

Web browser (TEP)

z/VM

1. *MONITOR
2. TMS
3. VM Agent
4. VM Cmd Proc
5. Linux Guest

Web Server
Linux Agent
Database Server
Scenario 11: Detailed Steps

- Create and start an application on a Linux guest that uses more than 20% of virtual CPU
  - HOG command on our demo system

- Updates to Tivoli Enterprise Portal
  - z/VM CPU graph shows guest CPU % as it runs the application
  - Event pops up on situation event console to say higher than 20%

- Use Operations Manager to watch z/VM user console used by OMEGAMON
  - Message receive from OMEGAMON to address high CPU on the guest
  - Message from Operations Manager indicating action is triggered

- Updates on Tivoli Enterprise Portal
  - CPU used by that guest decreases below 20%
  - Event closed (removed from the event console)
Automation Scenarios for a z/VM Cluster and Linux on System z Guests
Automation Scenarios for a z/VM Cluster and Linux on System z Guests
Scenario 11: How Do You Do That?

Rules in Operations Manager:

* Adjust SHARE of Linux guest if CPU usage is too high
* Watch for message from OMEGAMON

DEFRULE NAME(GUSTCPU),+
  MATCH(*NEEDS CPU PRIORITY*),+
  ACTION(GUESTCPU)

* Highlight message from OMEGAMON and call EXEC to check and adjust
* SHARE of Linux guest

DEFACTN NAME(GUESTCPU),+
  INPUT(AHI),+
  NEXTACTN(GUSTCPUB)

* 

DEFACTN NAME(GUSTCPUB),+
  COMMAND(EXEC VCPU &4),+
  ENV(LVM),+
  OUTPUT(LOG)
Scenario 11: Detailed Steps
OMEGAMON Configuration
Scenario 11: Detailed Steps
OMEGAMON Configuration

![Situation Builder Diagram]

- **Action Selection**
  - System Command
  - Universal Message

- **System Command**
  - `VL:msg oprmgr1 & (VL_User_Workload_User_D) needs CPU priority`

- **If the condition is true for more than one monitored item:**
  - Only take action on first item
  - Take action on each item

- **Where should the action be executed (performed):**
  - Execute the action at the Managed System (Agent)
  - Execute the action at the Managing System (TEMS)

- **If the condition stays true over multiple intervals:**
  - Don't take action twice in a row (wait until situation goes false then true again)
  - Take action in each interval
Scenario 12:
Monitor Service Machines for LOGOFF Status – and AUTOLOG them

- Monitor specific service machines to make sure they stay logged on
  - Demo will monitor TSTADMIN2 user ID
  - If it changes from logged on to logged off status, then restart it

- Dynamically pass the user ID to the action
  - Re-use action for multiple user IDs
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Scenario 12: How Do You Do That?

Console rule and action in Operations Manager:

* DEFEMON NAME(ADMIN2),+
  TYPE(1),+
  USER(TSTADMIN2),+
  ACTION(AUTOLOG1)
* DEFACTN NAME(AUTOLOG1),+
  COMMAND(CP SLEEP 3 SEC),+
  NEXTACTN(AUTOLOG2),+
  OUTPUT(LOG),+
  ENV(OPMGRS1)
* DEFACTN NAME(AUTOLOG2),+
  COMMAND(CP XAUTOLOG &3),+
  OUTPUT(LOG),+
  ENV(OPMGRS1)
Scenario 13: Monitor Page Space – Send Email if Full

- Operations Manager monitors the page space usage (percent full)

- Usage exceeds the specified limit
  - For demo purposes, we’ll dynamically resume (re-activate) an existing page space monitor that requires the spool to only be 10% full

- Automatically send an e-mail to someone who can evaluate and take action

- For demo purposes, suspend (de-activate) the page space monitor when complete
Scenario 13: Detailed Steps

- From an authorized VM user ID, see the page space usage:
  `q alloc page`

- From a user ID with Operations Manager privileges:
  `gomcmd opmgrml resume page(pgfull)`

- Check the Operations Manager log to see the spool monitor triggered:
  `gomcmd opmgrml viewlog`

- Check the inbox of the appropriate person to see the email

- From a user ID with Operations Manager privileges:
  `gomcmd opmgrml suspend page(pgfull)`
### q alloc page

<table>
<thead>
<tr>
<th>VOLID</th>
<th>RDEV</th>
<th>LUNIT</th>
<th>EXTENT</th>
<th>START</th>
<th>END</th>
<th>TOTAL</th>
<th>PAGES IN USE</th>
<th>PAGE USED</th>
<th>HIGH %</th>
</tr>
</thead>
<tbody>
<tr>
<td>540PA4</td>
<td>6B04</td>
<td>1</td>
<td>1</td>
<td>3338</td>
<td>600840</td>
<td>106231</td>
<td>141895</td>
<td>17%</td>
<td></td>
</tr>
<tr>
<td>ZVMP04</td>
<td>6B05</td>
<td>1</td>
<td>1</td>
<td>3338</td>
<td>600840</td>
<td>107778</td>
<td>149533</td>
<td>17%</td>
<td></td>
</tr>
<tr>
<td>ZVMP03</td>
<td>6B06</td>
<td>1</td>
<td>1</td>
<td>3338</td>
<td>600840</td>
<td>107866</td>
<td>142859</td>
<td>17%</td>
<td></td>
</tr>
<tr>
<td>ZVMP03</td>
<td>6B07</td>
<td>1</td>
<td>1</td>
<td>3338</td>
<td>600840</td>
<td>105872</td>
<td>143574</td>
<td>17%</td>
<td></td>
</tr>
<tr>
<td>ZVMP02</td>
<td>6B08</td>
<td>0</td>
<td></td>
<td>3338</td>
<td>601020</td>
<td>109931</td>
<td>146486</td>
<td>18%</td>
<td></td>
</tr>
<tr>
<td>ZVMP04</td>
<td>6B09</td>
<td>0</td>
<td></td>
<td>3338</td>
<td>601020</td>
<td>109115</td>
<td>139962</td>
<td>16%</td>
<td></td>
</tr>
<tr>
<td>ZVMP05</td>
<td>6B0C</td>
<td>0</td>
<td></td>
<td>10016</td>
<td>1761K</td>
<td>111151</td>
<td>149402</td>
<td>6%</td>
<td></td>
</tr>
</tbody>
</table>

**SUMMARY**

- **5869K 856141** 14%

**USABLE**

- **5869K 856141** 14%
gomcmd opmgrml resume page(pgfull)
Ready: T=0.01/0.01 15:14:21

gomcmd opmgrml viewlog
Automation Scenarios for a z/VM Cluster and Linux on System z Guests

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Scenario 13: How Do You Do That?

- Console rule and action in Operations Manager:

```plaintext
*  
DEFPMON NAME(PGFULL),+  
   USAGE(010-100),+  
   INTERVAL(1),+  
   LIMIT(3,3600),+  
   ACTION(PAGEMAIL),+  
   PARM(SPOOL)  
*  
SUSPEND PAGE(PGFULL)  
*  
DEFACTN NAME(PAGEMAIL),+  
   COMMAND(EXEC SMTPPG tld1 at us.ibm.com &4),+  
   OUTPUT (LOG),+  
   ENV(LVM)
```
Scenario 13: How Do You Do That?

SMTPPG EXEC (excerpts)

/* */
Parse arg mail_user dummyat mail_node pgpct

errtext = 'Page space is' pgpct'%' full on z/VM system'

/* Get local TCP/IP hostname */
parse value Search_TCPIP_Data("hostname") with getrc tcphostname .
if getrc > 4 then tcphostname = "unknown_host_name"
parse value Search_TCPIP_Data("domainorigin") with getrc tcpdomain .
if getrc > 4 then tcpdomain = "unknown_domain_name"

fqdomain_name = tcphostname.'tcpdomain'

/* Construct the e-mail */
line.1 = 'OPTIONS: NOACK LOG SHORT NONOTEBOOK ALL CLASS A'
line.2 = 'Date: ' Date() ',' 'Time()'
line.3 = 'From: Operations Manager for z/VM'
line.4 = 'To: ' mail_user 'at' mail_node
line.5 = 'Subject: ' errtext 'on' fqdomain_name
line.6 = 'DO NOT REPLY - This e-mail was generated by an automated service machine'
line.7 = ' '
line.8 = msgtext
line.0 = 8

'PIPE stem line. | > TEMP NOTE A'

'EXEC SENDFILE TEMP NOTE A (NOTE SMTP')
Scenario 14:
Monitor SSI Connectivity between Two Members of a Cluster

- Create a schedule to query ISLINKs between two members of a cluster
- If less than 4 links up, send message to consolidated SSI console (OPERSSI)
  - For demo purposes, we’ll dynamically deactivate a link then reactivate it when done
Scenario 14: Detailed Steps

- From an authorized VM user ID, see the currently available ISLINKs:
  
  ```
  q islink node testcssi
  ```

- Deactivate one of the links:
  
  ```
  deactivate islink 0d01
  ```

- Using Operations Manager, view the central operations console to see the alert:
  
  ```
  gomcmd opmgrm1 viewcon user(operssi)
  ```

- Schedule is triggered every 2 minutes, so wait 2 minutes and see the messages again

- Reactivate the link:
  
  ```
  activate islink 0d01
  ```
Scenario 14: How Do You Do That?

- **Schedule and action in Operations Manager:**

  *** Check every 10 minutes for any IS links being down

  DEFSCHD NAME(ISLINK1),+
    EVERY(00:02),+
    ACTION(QISLINK),+
    PARM(TESTCSSI)
  *

  DFACTN NAME(QISLINK),+
    COMMAND(EXEC QISLINK TEST7SSI &p),+
    ENV(SVM)
Scenario 14: How Do You Do That?

- **QISLINK EXEC:**

  /* Find the number of IS Links available to another node */
  /* If less than 4, then send message to OPERSSI */
  trace o
  Address command
  Parse Arg thisnode othernode
  'PIPE CP QUERY ISLINK NODE' othernode '|' find _____State:____Up| COUNT LINES | VAR numlinks'
  If numlinks < 4
  Then 'CP MSGNOH OPERSSI AT TEST7SSI From' thisnode': Number of ISLINKs to' othernode 'is' numlinks
  Exit 0
Scenario 15:
Suppress Passwords on Linux Consoles

- TN3270 login to Linux guest displays password
  - Password on separate line from password prompt
  - Password captured in console and viewable in Operations Manager VIEWCON

- Use a rule in Operations Manager to suppress the password
  - I.e. the line following the “password:” prompt

- Can be expanded to suppress multiple lines following matching text
Scenario 15: Detailed Steps

- Use Operations Manager to view the console of a Linux guest:
  
gomcmd opmgrml viewcon user(omeglnx1)

- Enter the login command:
  
login root

- Enter the password
  
  – Note that it’s not displayed
Scenario 15: How Do You Do That?

- **Rule and action in Operations Manager:**

  *
  *
  * Change password prompt to red.
  * Suppress the password when logging onto OMEGLNX1.
  * Have to suppress next 2 lines to include the line Ops Mgr adds indicating the user entered a "command"
  *

  **DEFRULE NAME(OMEGPW),+**
  MATCH(Password:*),+
  USER(OMEGLNX1),+
  ACTION(SUPPW),+
  SUPNEXT(2)
  *

  **DEFACTN NAME(SUPPW),+**
  INPUT(CRE)
Scenario 16:
Autolog a Linux Guest and Send Message if Doesn’t Start Successfully

- Define a schedule and action to start a Linux guest
- Define a rule looking for the application specific message indicating up and ready for work
- Define an idle monitor for the above rule
  - If “up and ready” message is not found within nn minutes, then send message to central console
- Rule and idle monitor are suspended until schedule is triggered
  - Before autologging the Linux guest, resule rule and idle monitor
- Rule and idle monitor are suspended again once they are triggered
Scenario 16: Detailed Steps

- View the configuration file to see the action that will be “scheduled”, plus the rules and monitors
  
  `tracy config`

- Run the action that starts the guest (and monitors)
  
  `gocommand opmgrm1 run action(strtlnx1)`

- View the console of TSTLNX1 to see that it gets autologged
  
  `gocommand opmgrm1 viewcon user(tstlnx1)`

- View the central console of OPER8 to see the message that the guest did not start successfully
  
  `gocommand opmgrm1 viewcon user(tstlnx1)`
Scenario 16: How Do You Do That?

- **Rule and monitor in Operations Manager:**

```plaintext
* 
* Watch for “up” message on DB2 guest
DEFRULE NAME(DB2UP),+
  MATCH(*DB2*UP*),+
  USER(TSTLNX1),+
  ACTION(MSGDB2),+
  PARM(DB2 on TSTLNX1 is up and running)
* 
DEFIMON NAME(DB2NOTUP),+
  RULE(DB2UP),+
  OCCUR(1,1),+
  ACTION(MSGDB2),+
  PARM(DB2 on TSTLNX1 did NOT start successfully)
```
Scenario 16: How Do You Do That?

- **Actions in Operations Manager:**
  
  * Send message to central console and suspend rule and monitor

  DEFACN NAME(MSGDB2),+
  COMMAND(CP MSGNOH OPER8 From DEM1ZVM: &p),+
  ENV(SVM),+
  NEXTACTN(DB2SUSP1)

  DEFACN NAME(DB2SUSP1),+
  COMMAND('SUSPEND RULE(DB2UP)'),+
  ENV(GOM),+
  NEXTACTN(DB2SUSP2)

  DEFACN NAME(DB2SUSP2),+
  COMMAND('SUSPEND IDLE(DB2NOTUP)'),+
  ENV(GOM)

  SUSPEND RULE(DB2UP)
  SUSPEND IDLE(DB2NOTUP)
Scenario 16: How Do You Do That?

- **Actions in Operations Manager:**

  *DEFACTN NAME (STRTLNX1), +
    COMMAND (‘RESUME RULE (DB2UP)’), +
    ENV (GOM), +
    NEXTACTN (STRTLNX2)
  *

  DEFACTN NAME (STRTLNX2), +
  COMMAND (‘RESUME IDLE (DB2NOTUP)’), +
  ENV (GOM), +
  NEXTACTN (STRTLNX3)
  *

  DEFACTN NAME (STRTLNX3), +
  COMMAND (XAUTOLOG TSTLNX1), +
  ENV (SVM)
Thank You

Hindi

Traditional Chinese

Korean

Russian

Spanish

Arabic

Brazilian Portuguese

English

Italian

Danke

German

Grazie

Simplified Chinese

Grazias

Obrigado

Danke

Merci

Danke

French

Tamil

Japanese

Thai