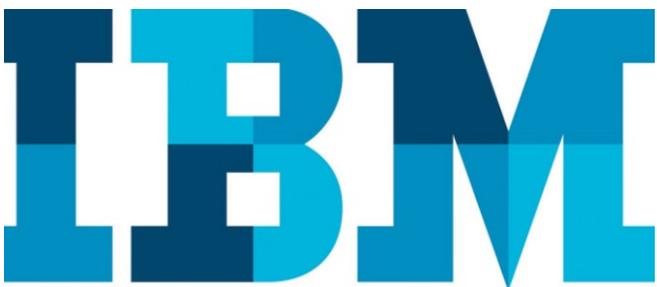


Events and notifications in IBM VM Recovery Manager

*An overview of the event notification types,
usage, and implementation*

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Overview

Challenge

If any error occurs in VM Recovery Manager, users need to go through very huge logs to identify the exact error. This is a complex task, and it consumes a lot of time for users.

Solution

This paper provides detailed explanation about event notification types, usage in IBM VM Recovery Manager HA/DR for Power Systems. Using the information about various events provided in this paper, users can quickly identify the problem.

Introduction

The main purpose of this paper is to provide an overview of the event notification types, usage, implementation and the scenarios supporting by KSYS in IBM® VM Recovery Manager.

Prerequisites

To send notifications or events to a user, you should configure a cluster on the respective KSYS node and set the notification level of the system.

Run the following command to set the notification level to low, medium, high or disable:

```
# ksysmgr modify system notification  
level=<low/medium/high/disable>
```

Types of events

This section describes of the various event types in all clusters.

Critical error event

Critical events will be generated when the notification level is high. Users should take immediate action for critical events.

Refer to the following example of a critical error event:

```
-----EVENT START-----  
DAILY_VERIFY_FAILED event has occurred. Details are as follows:  
Event: DAILY_VERIFY_FAILED  
Type: Critical Error Event  
Time: Sun Nov 4 00:00:50 CDT 2018  
Entity Affected: HG  
Resource Affected: HG: HG180 HG id: 1  
Description: 0000-152 Error - Verification seems to have failed HG180 ID 1  
-----EVENT END-----
```

Warning event

The operations that do not have much impact on the KSYS cluster and have chances to disturb the environment are notified through a warning error event.

Refer to the following example of a warning error event:

```
-----EVENT START-----  
FILESYSTEM_SPACE_WARNING event has occurred. Details are as follows:  
Event: FILESYSTEM_SPACE_WARNING  
Type: warning Event  
Time: Wed Oct 16 16:12:33 CDT 2018  
Entity Affected: HG  
Resource Affected: HG: HG180  
Description: 0000-142 Warning - File system /var is 92% full. Please review  
and administer maintenance as necessary  
-----EVENT END-----
```

Informational event

Informational events are triggered for starting and successful completion of tasks such as discovery, verification, recovery, and so on.

Refer to the following example of an informational event:

```
-----EVENT START-----  
DISCOVERY_SUCCESS event has occurred. Details are as follows:  
Event: DISCOVERY_SUCCESS  
Type: Informational Event  
Time: Wed Sep 29 07:30:56 CDT 2021  
Entity Affected: HG  
Resource Affected: HG: HGTest1  
Description: 0000-477 Auto discovery is successful for (HG: HGTest1)  
-----EVENT END-----
```

Information operational event

Information operational events are designed for GUI and these events are triggered for all notification levels.

Refer to the following example of an informational operational event:

```
-----EVENT START-----  
HG_LEVEL_REFRESH event has occurred. Details are as follows:  
Event: HG_LEVEL_REFRESH  
Type: Informational Operational Event  
Time: Tue Oct 13 01:32:44 CDT 2020  
Entity Affected: HG  
Resource Affected: HG: MIG_HG  
Description: 0000-424 HostGroup MIG_HG level refresh has completed  
-----EVENT END-----
```

Notifying users about events

This section describes how to notify users about various events.

Register contact information

This option allows registering one entry (one username and one contact information) at a time. One user can register with multiple contact information.

Contact information could be an email address or a valid phone number (to send an SMS).

Run the following command to configure the user contact to notify events:

```
# ksysmgr add notify user=john contact=*****@ibm.com  
# ksysmgr add notify user=john contact=5126661888@ibm.net
```

Register notification scripts using the ksysmgr command

Scripts are user-defined options to notify the readable messages for a specific event.

Following example shows how to register a script for a particular event.

```
# ksysmgr add notify script=/tmp/script.sh event=HMC_UNREACHABLE  
# ksysmgr add notify script=/tmp/script.sh event=STG_UNREACHABLE
```

After this, the registered scripts get run whenever the HMC_UNREACHABLE and STG_UNREACHABLE events are triggered.

Manage notifications

VM Recovery Manager allows you to add, delete, and manage the notification system from the user's end. All operations are at the KSYS system level and can impact the whole cluster of the environment.

Query notification

The following table describes the query notification commands.

Command	Description
# ksysmgr query system	View notification attributes.
# ksysmgr query script	View registered scripts.
# ksysmgr query contact	View registered user contact information.

Modify notification

The following table describes the modify notification commands.

Command	Description
<code># ksysmgr modify notify oldContact=user1 newContact=user2</code>	Update a user contact with a new user contact.
<code># ksysmgr modify notify oldscript=/tmp/script1 newScript=/tmp/script2</code>	Update a user registered script with a new script.

Delete notification

The following table describes the delete notification commands.

Command	Description
<code># ksysmgr delete notify user=user1</code>	Delete the registered user.
<code># ksysmgr delete notify script=/tmp/script1</code>	Delete the user-registered script.

Events log

An event log describes where events are stored and what happens if an events file reached its maximum size. Events are stored in the `/var/ksys/events.log` file and operation events are stored in `/var/ksys/opevents.log` file.

Note:

In case the `events.log/opevents.log` file reaches the size of 5 MB, the existing `events.log` file will be renamed as `events.log.1` with the old events and a new file will be created with the name `events.log` for new events. When `events.log/opevents.log` file reaches the size of 5MB, `events.log.1` is renamed as `events.log.2`, and the existing `events.log` will be renamed as `events.log.1` with the old events and a new file named `events.log` will be created for new events. As and when the file reaches the maximum size, this process continues until `events.log.9`. Refer to the following screen capture for an example.

```

root@ksyshm3gui [/var/ksys]$ ls -lrt
total 92244
drwxr-xr-x 2 root system    256 2021-11-01 09:53 config
drwx----- 2 root system    256 2021-11-02 00:00 log
drwx----- 2 root system    256 2021-11-02 01:05 tmp
drwx----- 3 root system   4096 2021-11-16 10:02 snapshots
-rw-r--r-- 1 root system 5242943 2021-11-16 09:56 events.log.9
-rw-r--r-- 1 root system 5242943 2021-11-16 10:12 opevents.log.9
-rw-r--r-- 1 root system 5242943 2021-11-16 10:13 opevents.log.8
-rw-r--r-- 1 root system 5242943 2021-11-16 10:15 opevents.log.7
-rw-r--r-- 1 root system 5242943 2021-11-16 10:17 opevents.log.6
-rw-r--r-- 1 root system 5242943 2021-11-16 10:18 events.log.8
-rw-r--r-- 1 root system 5242943 2021-11-16 10:59 events.log.7
-rw-r--r-- 1 root system 5242943 2021-11-16 11:06 events.log.6
-rw-r--r-- 1 root system 5242943 2021-11-16 11:07 opevents.log.5
-rw-r--r-- 1 root system 5242943 2021-11-16 11:10 opevents.log.4
-rw-r--r-- 1 root system 5242943 2021-11-16 11:10 events.log.5
-rw-r--r-- 1 root system 5242943 2021-11-16 11:11 opevents.log.3
-rw-r--r-- 1 root system 5242943 2021-11-16 11:11 events.log.4
-rw-r--r-- 1 root system 5242943 2021-11-16 11:25 events.log.3
-rw-r--r-- 1 root system 5242943 2021-11-16 11:26 opevents.log.2
-rw-r--r-- 1 root system 5242943 2021-11-16 11:26 events.log.2
-rw-r--r-- 1 root system 5242943 2021-11-16 11:38 opevents.log.1
-rw-r--r-- 1 root system 5242943 2021-11-16 11:38 events.log.1
-rw-r--r-- 1 root system   1671 2021-11-16 11:40 opevents.log
-rw-r--r-- 1 root system   1667 2021-11-16 11:40 events.log
root@ksyshm3gui [/var/ksys]$
    
```

A maximum of 10 events.log and opevents.log files can be created. After the maximum file count is reached, the oldest file (events.log.9/opevents.log.9) in the node gets deleted.

Various events in VM Recovery Manager

This section provides a description of the various event types such as error events, informational events, and warning event.

Refer to the following table for the expansion of the abbreviations used in the various error type tables.

Abbreviation	Expansion
LPM	Live partition management
VIOS	Virtual I/O Server
SSP	Shared storage pool
HMC	Hardware Management Console
HM	Host monitor
HB	Heartbeat
LPAR	Logical partition

Error events

The following table lists the error events and the output it displays as description when the specific event is triggered in VM Recovery Manager.

Event name	Description
HMC_UNREACHABLE	HMC is down or not reachable
VIOS_FAILURE	VIOS seems to have failed
VIOS_RMC_STATE_DOWN	HMC to VIOS RMC connectivity/network seems to be having problems
VM_CONFIG_COLLECTION_FAILURE	Configuration data collection failed for the VM
DAILY_VERIFY_FAILED	Daily verification checks have failed
HOST_FAILURE	Host failure has occurred
VM_STORAGE_COLLECTION_FAILURE	VM disk information retrieval from VIOS has failed
HMC_LOGIN_FAILURE	HMC login failed. Check username and password
VM_AUTO_START_ENABLED	VM auto start is enabled for LPAR.
HA_SWITCH_CREATE_FAILED	HA related switch creation failed for host
HA_SWITCH_DELETE_FAILED	HA related switch deletion failed for host
HA_TRUNK_ADAPTER_CREATE_FAILED	Trunk adapter creation failed for VIOS
HA_TRUNK_ADAPTER_DELETE_FAILED	Trunk adapter deletion failed for VIOS
HA_NW_ADAPTER_CREATE_FAILED_FOR_VM	Client Ethernet adapter creation failed
CREATE_SSP_CLUSTER_FAIL	SSP cluster creation failed
HA_INIT_OF_VIOS_IN_HOST_FAILED	HA initialization of VIOS in a Host has failed
HA_INIT_OF_VM_IN_VIOS_FAILED	Initialization of VM HA management inside VIOS failed
VM_START_HB_FAILED	Start HB failed
VM_STOP_HB_FAILED	Stop of VM for HB management failed
UNSUPPORTED_VERSION	Version is not supported
NO_TARGET_HOST_IDENTIFIED_FOR_LPM_OF_VM	No Target host could be identified that can host the VM (capacity is insufficient, etc)
LPM_VALIDATION_FAILED_FOR_VM	LPM validation failed in verify phase
LPM_FAILED	LPM operation failed
VM_CONFIG_REDISCOVERY_AFTER_LPM_FAILED	VM configuration rediscovery failed after LPM
HOST_CONFIG_REDISCOVERY_AFTER_LPM_FAILED	Host rediscovery failed after LPM
VM_RESTART_FAILED	Restart of VM failed on target host
VM_CONFIG_REDISCOVERY_AFTER_RESTART_FAILED	VM Rediscover failed
HOST_CONFIG_REDISCOVERY_AFTER_RESTART_FAILED	Host rediscovery failed after VM restart
NO_TARGET_HOST_IDENTIFIED_FOR_RESTART_OF_VM	No Target host could be identified that can host the VM (capacity is insufficient, etc)

VM_CLEANUP_ON_HMC_FAILED	VM cleanup operation on HMC failed
VM_VERIFY_FAILED	VM verification failed
HG_VERIFY_FAILED	Host group verification failed
APP_FAILURE	APP is failure
ALL_VIOS_UNREACHABLE	Could not reach all VIOS in the Hostgroup
VM_FAILURE_DETECTED	VM failure detected
HOST_FAILURE_DETECTED	HOST failure detected
HMC_DOWN	HMC(s) is down
REPLICATION_LINK_FAILURE	Storage is reporting replication failure
HOST_FAILURE	Host failure occurred
VM_ON_MULTIPLE_HOST	VM is seen on more than one host
VM_MON_SETUP_ISSUES	VM agent within VM could not establish connection with VIOS host monitoring subsystem
VM_MON_MISSEDHB_SETUP_ISSUES	Cannot issue relocation for VM as it is not being monitored by VIOS
REPOSITORY_DISK_FAILURE	Reading from SSP repository disk failed
HA_DISK_FAILURE	Reading from SSP HA disk failed
VIOS_NODE_FAILURE	Cluster is down on VIOS
NETWORK_INTERFACE_FAILURE	Network interface failure detected
SCRIPT_FAILURE_EVENT	Script failed to execute for an event
VIOS_SLOW_IO_DETECTED	Slow I/O for VIOS detected
VIOS_SLOW_IO_RECOVERED	Recovered from slow I/O for VIOS
APP_FAILURE_DETECTED	Application failure is detected
VIOS_HM_NONRESP_DETECTED	VIOS: Host Monitor non-responsive
SITE_STG_UNREACHABLE	Storage is unreachable
SITE_MOVE_FAILED	Site move has failed
HOSTGROUP_MOVE_FAILED	Hostgroup move has failed
WORKGROUP_MOVE_FAILED	Workgroup move has failed
DRTEST_DISCOVERY_FAILED	Drtest discovery has failed
REPOSITORY_DISK_DOWN	Repository disk is down
SFW_ADAP_DOWN	Event for VIOS belonging to Hostgroup
SFW_PORT_DOWN	Event for VIOS belonging to Hostgroup
SITE_DISCOVERY_FAILED	Site discovery has failed
SITE_VERIFY_FAILED	Site verify has failed
DRTEST_VERIFY_FAILED	Daily auto verify failed
DISK_GROUP_CREATION_FAILED	Disk Group creation failed for storage agent
VM_APPLICATION_PERMANENT_FAILURE	App permanent failed on vm
DRTEST_SITE_DISCOVERY_FAILED	Site level drtest discovery has failed
DRTEST_SITE_VERIFY_FAILED	Site level drtest verify has failed
HG_DRREHEARSAL_FAILED	Hostgroup DR Rehearsal has failed
WG_DRREHEARSAL_FAILED	Workgroup DR Rehearsal has failed
DRTEST_VM_CLEANUP_FAILED	Drtest cleanup operation has failed
DISKPAIR_FAILED	Disk pair error
INCONSISTENT_VIEW_OF_VIOS	Vioses in Hostgroup have an inconsistent view

VM_HB_LOSS_DETECTED	VM is missing heartbeats
VM_HB_LOSS_EXCEEDED	VM missed heartbeats exceeded the failure detection time
VM_REBOOT_SKIPPED_FOR_APPLICATION_FAILURE	Skipping VM reboot as DRTest operation is in progress
VM_RESTART_SKIPPED_FOR_APPLICATION_FAILURE	Skipping VM relocation as DRTest operation is in progress
VIOS_HOST_MON_NONRESP_DETECTED	HM is not responsive

Informational events

The following table lists the informational events and the output it displays as description when the specific event is triggered in VM Recovery Manager.

Event name	Description
ALL_VIOS_REACHABLE	Able to reach VIOS
VIOS_CAA_STATE_UP_DETECTED	CAA state UP
VIOS_MONITOR_MODE	Monitor mode changed
VIOS_NODE_ACTIVE	Cluster is active on VIOS
REPOSITORY_DISK_ACCESSIBLE	SSP repository disk is now accessible
HA_DISK_ACCESSIBLE	SSP HA disk is now accessible
NETWORK_INTERFACE_ADDED	Network interface has been configured
NETWORK_INTERFACE_ACTIVE	Network interface is now active
NETWORK_INTERFACE_DELETED	Network interface has been deleted
SITE_MOVE_START	Site move started
HOSTGROUP_MOVE_START	Host group move started
SITE_STG_REACHABLE	Storage is reachable
FILESYSTEM_SPACE_SUFFICIENT	Filesystem space is sufficient
DISCOVERY_SUCCESS	Discovery completed successfully
SITE_MOVE_COMPLETE	Site move is successful
HOSTGROUP_MOVE_SUCCESS	Host group move is successful
VM_CLEANUP_PENDING	VM cleanup is pending
SCRIPT_SUCCESS_EVENT	Script successfully ran
VM_NOT_ACTIVE	VM does not seem to be active
VM_DISCOVERED_ON_HOST	VM has been detected on host
HMC_REACHABLE	HMC has recovered and is now reachable
VM_MOVE	VM has moved from one host to another
WORKGROUP_MOVE_START	Workgroup move operation has started
DRTEST_DISCOVERY_STARTED	Drtest discovery has started
DRTEST_DISCOVERY_SUCCESS	Drtest discovery has success
REPOSITORY_DISK_UP	Repository disk is up for vios
SFW_ADAP_UP	Event for VIOS belonging to Hostgroup
SFW_PORT_UP	Event for VIOS belonging to Hostgroup
SITE_DISCOVERY_STARTED	Site discovery has started
SITE_DISCOVERY_SUCCESS	Site discovery has success

SITE_VERIFY_STARTED	Site verify has started
SITE_VERIFY_SUCCESS	Site verify has success
DRTEST_SITE_DISCOVERY_STARTED	Site level drtest discovery has started
DRTEST_SITE_DISCOVERY_SUCCESS	Site level drtest discovery has success
WORKGROUP_MOVE_SUCCESS	Workgroup move has started
HOSTGROUP_MOVE_SUCCESS	Hostgroup move has success
HG_DRREHEARSAL_START	Hostgroup DR Rehearsal has started
HG_DRREHEARSAL_SUCCESS	Hostgroup DR Rehearsal has success
WG_DRREHEARSAL_START	Workgroup DR Rehearsal has started
WG_DRREHEARSAL_SUCCESS	Workgroup DR Rehearsal has success
SITE_MOVE_SUCCESS	Site move has success
SITE_DRREHEARSAL_SUCCESS	Site DR Rehearsal has success
DRTEST_VM_CLEANUP_STARTED	Drtest cleanup operation has started
DRTEST_VM_CLEANUP_SUCCESS	Drtest cleanup operation has success
VM_CONFIG_REDISCOVERY_AFTER_DRREHEARSAL_SUCCESS	VM configuration rediscovery successful after drrehearsal
RECOVERY_STARTED	Recovery operation has started
RECOVERY_SUCCESS	Recovery operation has success
DAILY_VERIFY_STARTED	Daily auto verifies started
DAILY_VERIFY_BLOCKED	Auto discovery is blocked as HA operations in progress for HG
DISCOVERY_BLOCKED	Discovery is blocked as HA operations in progress for HG
VM_HB_LOSS_RECOVERED	VM no longer missing heartbeats

Warning events

The following table list the warning events and the output it displays as description when the specific event is triggered in VM Recovery Manager.

Event name	Description
FILESYSTEM_SPACE_WARNING	File system is reaching full condition
UNMANAGED_VM_LPM_DETECTED	Unmanaged VM performing LPM
VIOS_DELETED	VIOS deletion has been detected
VM_DELETED_FROM_HOST	VM has been deleted from host
TARGETHOSTS_CAPACITY_CHECK	Host group migration to backup partner hosts will be affected due to the scarcity of resources on backup partner hosts. Require additional resources
STG_IP_UNREACHABLE	IP address of storage agent is not reachable

Summary

Events has a vital role in debugging and analyzing the issues, and it helps users to quickly analyze a failure or to know about the integration of the components and their roles in the product.

Related links

- [Installing VM Recovery Manager HA](#)
- [Error notifications and usage](#)

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