Cisco VSM Operations Manager High Availability Troubleshooting Guide

Revised: December 3, 2014

Review the following information for workarounds and solutions to Cisco Video Surveillance Operations Manager high availability (HA) issues:

Note For more information including configuration and management instructions, see the “Operations Manager High Availability” section of the Cisco Video Surveillance Operations Manager User Guide.

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Requirements

Before you configure Operations Manager HA, verify that the following requirements are met.

Note The **VSOM High Availability** configuration page appears only if the server is a stand-alone Operations Manager and is running a supported OS (such as RHEL 6.4).

Table 1-1 Requirements

Requirements	Requirement Complete? (✓)
To configure Operations Manager HA, admins must belong to a User Group with permissions for *Servers & Encoders*. See the Cisco Video Surveillance Operations Manager User Guide for more information.	❑
Two standalone physical or virtual servers must be installed on the network. – Supported physical servers: CPS-UCS-1RU-K9 or CPS-UCS-2RU-K9 – Supported virtual machines: VMs deployed using the Cisco VSM release 7.5 or 7.6 OVA templates. **Note** Any data on the server used as the Peer server will be deleted and replaced with the data from the Master server.	❑
We recommend two CPS-UCS-2RU-K9 servers for best performance. • Performance issues can occur using the CPS-UCS-1RU-K9 servers for Operations Manager HA since performance issues (such as slowness) may occur. • Do not mix a CPS-UCS-2RU-K9 server with a CPS-UCS-1RU-K9 server.	❑
Additional server requirements and recommendations: • Stand-alone servers—Only stand-alone physical or virtual servers are supported in an HA configuration. The Operations Manager servers can not be co-located with other server services, such as a Media Server. • Operating system—Red Hat 6.4 64 bit OS only (SUSE and Red Hat 5.8 are NOT supported). • We recommend that both servers have the same hardware specifications such as processor, hard disk storage, and other attributes. For example, two CPS-UCS-2RU-K9 servers. • We do not recommend using Cisco UCS E-series platform servers for Operations Manager HA. • Both servers used for HA must be fully up and running prior to configuring HA or replacing the Peer server. Verify that there are no pending jobs (of any kind) in the Peer server.	❑
Split Brain recovery support: • At least one Media Server must be added to the Split Brain Configuration to support recovery if communication between the Master and Peer server is lost. • See Unmanaged Split Brain Scenario, page 12 for more information.	❑

Table 1-1 Requirements

Requirements	Requirement Complete? (✓)
Network requirements: • Subnet—Both servers must be in the same network subnet. This ensures connectivity and data synchronization between the servers. • NIC port—Both servers must be connected to the network using the same NIC port: for example, Eth0. Only a single Ethernet port can be active (either Eth0 or Eth1). • Three IP addresses/hostnames are required: – An IP address/hostname for the Master server Ethernet (NIC) port. – An IP address/hostname for the Peer server Ethernet (NIC) port. – A virtual IP address that is shared by both servers. **Note** End-users should always use the virtual IP address to access the Operations Manager since it will still work even in a failover occurs. Users should never use the server Ethernet port (NIC) address since connectivity can be lost if the server is unreachable.	❑
Security certificate requirements: By default, all Cisco VSM server include a self-signed certificate. Using the self-signed certificate on the Operations Manager server causes a security warning to appear when users log in the Operation Manager. To avoid this, you can create and install a web server certificate for the Operations Manager servers. The certificate must point to the HA virtual IP address and be installed on both Operations Manager servers (Master and Peer) used in the HA configuration. For more information: • See the "Operations Manager High Availability" section of the Cisco Video Surveillance Operations Manager User Guide. • Cisco Video Surveillance Management Console Administration Guide for instructions to install the certificate. • Resolving a "Server Unreachable" Error During Force Failover, page 10	❑
Network Time Protocol (NTP) server: All servers must be configured with the same NTP configuration to ensure the time settings are accurate and identical. See the "NTP Information" section of the Cisco Video Surveillance Operations Manager User Guide for more information.	❑
Passwords: • The Management Console password for Operations Manager each server. This is the *localadmin* password used to access the Cisco VSM Management Console, and is set during the initial server setup. • The admin password used to access the browser-based Operations Manager interface.	❑

The HA Configuration Job Does Not Complete

Issue

While configuring Operations Manager HA or replacing the HA Peer server, the sub job that updates the Peer server may not complete, and cause the job to remain in Pending/Running state.

Root Cause

This can happen if the Peer server is in any of the following states:

- The Peer server is being rebooted.
- The Peer server was recently rebooted but is not fully up.
- The Peer server has a Pending or In-progress job. This can be any job but examples include synchronization, device configuration, or template configuration.

Recovery

To clear the job and complete the HA configuration, do one or more of the following:

Step 1 Verify that there are no configuration or other tasks being performed on the Peer server, and that the Peer server does not have any Pending jobs.

a. Login to the Peer server Operations Manager interface.

b. Click **System Settings** > **Jobs**.

c. Verify that there are no Pending jobs in the Peer server.

Step 2 Restart the services on the Master server:

a. Log in the Master server Management Console interface.

b. Click **Restart Services** at the top right corner of the page.

c. Follow the on-screen prompts and wait for the operation to complete (the login screen will reappear when services are fully restarted).

See the Cisco Video Surveillance Management Console Administration Guide for more information.

Step 3 Verify that the HA job is cleared on the Master server.

a. Login to the Master server Operations Manager interface.

b. Click **System Settings** > **Jobs**.

c. Verify that the previously stuck Operations Manager HA job is marked *Failed*.

Step 4 Replace the HA configuration:

a. Select **System Settings** > **Servers**.

b. Select the **Master** server from the list.

c. Select the **VSOM High Availability** tab.

d. Click the pencil icon in the top right to turn maintenance mode ON.

- The icon is grey  when maintenance mode is ON.

e. Select **Device Settings** > **Replace HA Configuration**.

f. Click **OK** and wait for the job to complete.

See the Cisco Video Surveillance Operations Manager User Guide for more information.

Step 5 Log in to the Operations Manager using the virtual IP address or hostname to verify that the HA setup was successful.

Database Replication Failures

Some events on either server in an HA configuration can cause database replication failures, where the data on the Master server is different than the data on the Peer server.

Events that can cause this include server reboots, power failures, database crashes, or a database going down on either of the participating servers.

Refer to the following topics for information to determine the cause of the failure and recover the database.

- Determining the if a Database Replication Error Occurred, page 5
- Detecting if the Database Crashed, page 7
- Recovering the Database, page 7

Determining the if a Database Replication Error Occurred

To detect if a database replication issue occurred, run the following command. If the fields LAST_SQL_ERRNO or LAST_SQL_ERROR fields have a value in the response, the database replication is stuck (the query is in the response).

Example Output

For example, the replication errors in the following output are shown in red:

```
mysql> show slave status\G
*************************** 1. row ***************************
               Slave_IO_State: Waiting for master to send event
                  Master_Host: 172.28.0.64
                  Master_User: vsomrepl
                  Master_Port: 6611
                Connect_Retry: 60
              Master_Log_File: vsom-mysql-bin.000001
          Read_Master_Log_Pos: 29020815
               Relay_Log_File: mysql-relay-bin.000004
                Relay_Log_Pos: 2462282
        Relay_Master_Log_File: vsom-mysql-bin.000001
             Slave_IO_Running: Yes
            Slave_SQL_Running: No
              Replicate_Do_DB:
          Replicate_Ignore_DB:
           Replicate_Do_Table:
       Replicate_Ignore_Table:
vsom.qrtz_trigger_listeners,vsom.qrtz_calendars,vsom.qrtz_fired_triggers,vsom.qrtz_job
_details,vsom.qrtz_scheduler_state,vsom.qrtz_job_listeners,vsom.qrtz_triggers,vsom.qrt
z_locks,vsom.qrtz_paused_trigger_grps
      Replicate_Wild_Do_Table:
  Replicate_Wild_Ignore_Table:
                   Last_Errno: 1032
                   Last_Error: Could not execute Delete_rows event on table
vsom.issue; Can't find record in 'issue', Error_code: 1032; handler error
HA_ERR_KEY_NOT_FOUND; the event's master log vsom-mysql-bin.000001, end_log_pos
23237993
                 Skip_Counter: 0
```

```
           Exec_Master_Log_Pos: 23237346
               Relay_Log_Space: 8246408
               Until_Condition: None
                Until_Log_File:
                 Until_Log_Pos: 0
            Master_SSL_Allowed: No
            Master_SSL_CA_File:
            Master_SSL_CA_Path:
               Master_SSL_Cert:
             Master_SSL_Cipher:
                Master_SSL_Key:
      Seconds_Behind_Master: NULL
Master_SSL_Verify_Server_Cert: No
              Last_IO_Errno: 0
              Last_IO_Error:
             Last_SQL_Errno: 1032
             Last_SQL_Error: Could not execute Delete_rows event on table
vsom.issue; Can't find record in 'issue', Error_code: 1032; handler error
HA_ERR_KEY_NOT_FOUND; the event's master log vsom-mysql-bin.000001, end_log_pos
23237993
  Replicate_Ignore_Server_Ids:
            Master_Server_Id: 2
                 Master_UUID: f55e65d2-5261-11e4-a165-005056ae786a
            Master_Info_File: /mysql/data/vsom/mysql/data/master.info
                   SQL_Delay: 0
         SQL_Remaining_Delay: NULL
     Slave_SQL_Running_State:
          Master_Retry_Count: 86400
                 Master_Bind:
     Last_IO_Error_Timestamp:
    Last_SQL_Error_Timestamp: 141012 17:47:50
              Master_SSL_Crl:
          Master_SSL_Crlpath:
          Retrieved_Gtid_Set:
           Executed_Gtid_Set:
               Auto_Position: 0
1 row in set (0.00 sec)
```

Procedure

For example, complete this procedure to detect which database replication query is stuck in the following error:

> Could not execute Delete_rows event on table vsom.issue; Can't find record in 'issue', Error_code: 1032; handler error HA_ERR_KEY_NOT_FOUND; the event's master log **vsom-mysql-bin.000001**, end_log_pos **23237993**'

Step 1 Decrypt the binary error log file.

Step 2 Look in the master log file for the *end_log_pos* entry in the Example Output, page 5.

Step 3 Enter the following command on the master log file on the Peer server.

For example, if an HA deployment includes server 50 and server 51, and the issue was seen on server 51, go to the Peer server 50 and enter the following command on the master log file. In the example error message above it is *vsom-mysql-bin.000001*:

```
/usr/BWhttpd/vsom_be/db/mysql/bin/mysqlbinlog -r /tmp/error_log.sql
--base64-output=DECODE-ROWS --verbose
/mysql/data/vsom/mysql/data/vsom-mysql-bin.000001
```

- Notice that the command was storing the parsed output in the `/tmp/error_log.sql` file.

- Open the parsed log file `error_log.sql` and search for log position seen in above error 23237993.
- Check the query seen at the log position which gives the ASCII format of the original query that is being executed and is stuck.

Detecting if the Database Crashed

To determine if the database crashed, verify the `/usr/BWhttpd/vsom_be/mysql.log` and look for errors such as the following (in **red**):

```
2014-11-06 13:46:40 2859 [Note] Error reading relay log event: slave SQL thread was
killed
2014-11-06 13:46:40 2859 [ERROR] Error reading packet from server: Lost connection to
MySQL server during query ( server_errno=2013)
2014-11-06 13:46:40 2859 [Note] Slave I/O thread killed while reading event
2014-11-06 13:46:40 2859 [Note] Slave I/O thread exiting, read up to log
'vsom-mysql-bin.000023', position 580246
2014-10-24 15:34:39 13859 [Note] InnoDB: Not using CPU crc32 instructions
2014-10-24 15:34:39 13859 [Note] InnoDB: Initializing buffer pool, size = 64.0M
2014-10-24 15:34:39 13859 [Note] InnoDB: Completed initialization of buffer pool
2014-10-24 15:34:39 13859 [Note] InnoDB: Highest supported file format is Barracuda.
2014-10-24 15:34:39 13859 [Note] InnoDB: The log sequence numbers 46653980 and
46653980 in ibdata files do not match the log sequence number 197868345 in the
ib_logfiles!
2014-10-24 15:34:39 13859 [Note] InnoDB: Database was not shutdown normally!
```

Recovering the Database

If a Database Replication Error Occurred

If the SQL that was stuck is of no significance, log in to the Operations Manager using the virtual IP address, and then select **Replace HA Configuration**. This process clears the replication error by replacing the Peer data with the Master data.

If the Database Crashed

Step 1 Restart Cisco services using the following commands:

service cisco stop

service cisco start

Step 2 Ensure the database is fully up, by checking Cisco service status:

service cisco status

Step 3 If the VSOM database service is still not coming up, check the `/usr/BWhttpd/vsom_be/mysql.log`:

- If the log states that the slave thread was killed, fix the issue by logging into the Operations Manager using the virtual IP address, and then select **Replace HA Configuration**.
- if the *ibdata files* do not match the log sequence number, force recover the database as recommended by Oracle Support team in this link and restart Cisco services: http://dev.mysql.com/doc/refman/5.6/en/forcing-innodb-recovery.html

Step 4 If all services are up and running, a database replication issue occurred. Recover the database by logging into the Operations Manager using the virtual IP address, and then select **Replace HA Configuration**.

File Replication Failures

If a database or file replication issue is displayed in the server Status page, double-click the alert to view the events that describe why file replication is failing. The following can cause these errors:

Password Change

The *localadmin* password for the Peer server is not valid. For example, the password was changed on the Peer server but was not updated on the **VSOM HA Configuration** page.

To resolve this problem:

Step 1 Log in to the Operations Manager using the virtual IP address / hostname.

Step 2 Click the pencil icon in the top right to turn maintenance mode ON.

- The icon is grey when maintenance mode is ON.

Step 3 Select **System Settings** > **Servers**.

Step 4 Select the **Master** server from the list.

Step 5 Select the **VSOM High Availability** tab.

Step 6 Enter the new Peer server password.

Step 7 Click **Save**.

The Remote Host Identification (Hostkeys) for the Peer Server Changed

The Hostkeys for the Peer server can change if the server IP address is changed when the server is reinstalled or replaced. If this occurs:

Step 1 Log in to the Master server using an SSH client.

Step 2 SSH to the Peer server to verify that the following error is displayed. For example:

```
[root@psbu-server-qaha]# ssh localadmin@psbu-server-qa2
@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@
@    WARNING: REMOTE HOST IDENTIFICATION HAS CHANGED!     @
@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@
IT IS POSSIBLE THAT SOMEONE IS DOING SOMETHING NASTY!
Someone could be eavesdropping on you right now (man-in-the-middle attack)!
It is also possible that the RSA host key has just been changed.
The fingerprint for the RSA key sent by the remote host is
d3:b5:e3:0d:fc:0b:ab:6a:c6:c4:b2:3e:17:21:7b:c9.
Please contact your system administrator.
Add correct host key in /root/.ssh/known_hosts to get rid of this message.
Offending key in /root/.ssh/known_hosts:8
RSA host key for psbu-server-qa2 has changed and you have requested strict checking.
```

```
Host key verification failed.
```

Step 3 If this message appears, edit the known hosts using the following command:

- **vi /root/.ssh/known_hosts**

Step 4 Delete the host key entry of the Peer server and save the changes.

Step 5 Verify that the database or file replication error is resolved. Wait at least one minute since health monitoring jobs are updated each minute.

a. Log in to the Operations Manager using the virtual IP address / hostname.

b. Select **System Settings > Servers**.

c. Select the **Master** server from the list.

d. Select the Status tab.

e. Verify that the issue is clear.

Network Connectivity Loss Results in a Split Brain Scenario

If communication between the Master and Peer servers is lost, both servers will try to independently assume the Master role. This is called a "Split Brain" scenario.

Cisco VSM will automatically detect a Split Brain scenario and direct all traffic to the server that was Master at the time of communication loss. The Peer server is put in standby and a Health alert is sent.

Note This recovery process requires that at least one Media Server be added to the HA "Split Brain Configuration. See the "Operations Manager High Availability" section of the Cisco Video Surveillance Operations Manager User Guide.

Since there can be a delay up to 90 seconds for the issue to be detected, users may still be able to log in to the wrong server. During this time, it is possible that user traffic will go to both servers.

If this occurs, refer to the "Operations Manager High Availability" section of the Cisco Video Surveillance Operations Manager User Guide for more information.

Troubleshooting Errors During a Force Failover

If a force failover does not complete or encounters errors, review the following information and workarounds.

- Summary of Force Failover Errors and Workarounds, page 10
- Resolving a "Server Unreachable" Error During Force Failover, page 10
- Force Failover During a Software Upgrade on the Peer Server, page 11

Summary of Force Failover Errors and Workarounds

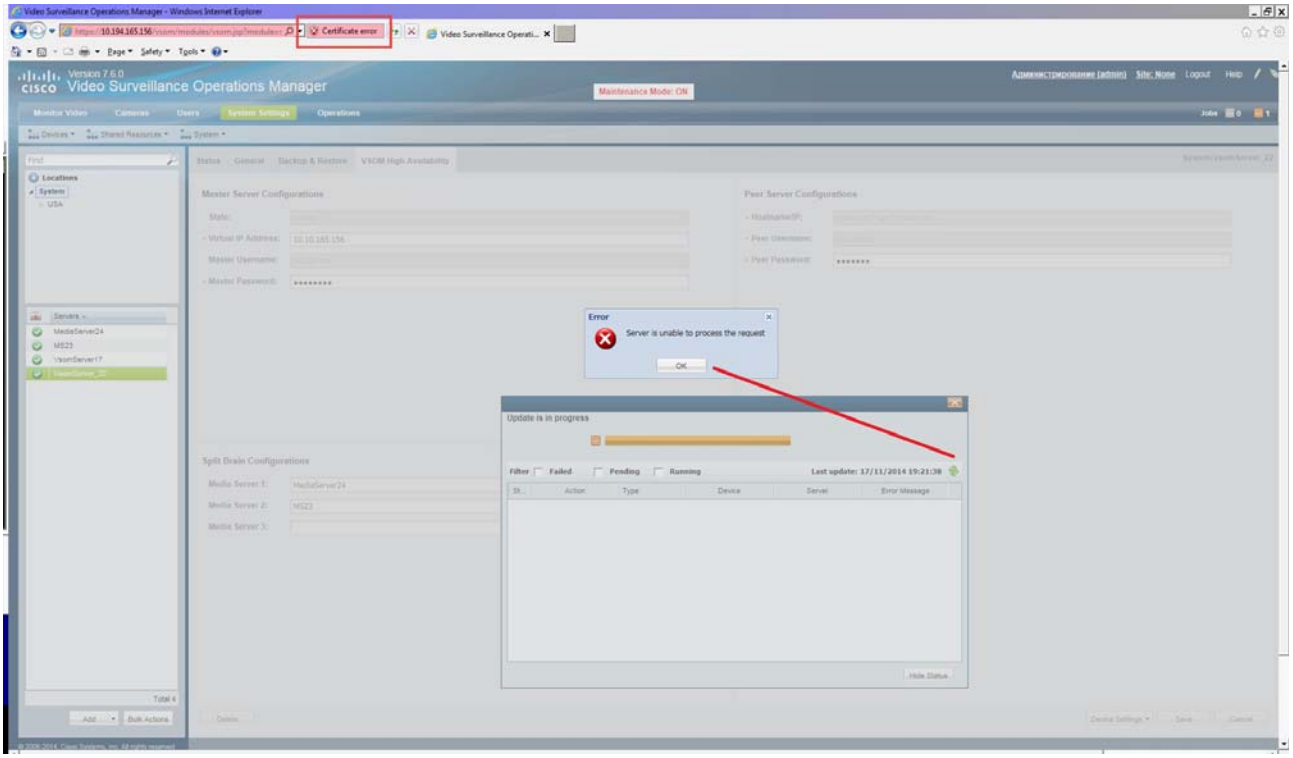
Table 1-2 Troubleshooting Force Failover

Issue	Workaround
A “Server Unreachable” error appears	Resolving a “Server Unreachable” Error During Force Failover, page 10
Errors during a software upgrade	Force Failover During a Software Upgrade on the Peer Server, page 11
The Peer server is not reachable	Check the Peer server’s Status tab to see if the server is reachable.
The *pacemaker* service is not running	Go to the Peer server **Status > Status History** tab to see if there is a issue “HA Functionality is not available at this time.Pacemaker service is not running”. To resolve the issue select **Device Settings > Replace HA Configuration** to bring up the pacemaker service on the Peer server.
The system is in a Split Brain state	To resolve this, go to **Server > VSOM High Availability** and select **Device Settings > Clear Split Brain Issues**. For more information See .

Resolving a “Server Unreachable” Error During Force Failover

If the default self-signed certificates are used on the master and peer servers, a “Server unreachable” error may occur when performing a force failover (Figure 1-1).

Figure 1-1 Certificate Error



To temporarily address this issue, refresh the browser page to remove the error and continue.

To resolve the issue, obtain and install a signed certificate issued by a Certification Authority.

1. Obtain a signed certificate by a Certification Authority. This certificate should contain the host name mapped to the virtual IP. For example: *vsom-server3*.
2. Install the certificate on both the Master and Peer servers using the Cisco Video Surveillance Management Console. For example *vsom-server1 and vsom-server2*.
3. Wait for the services to be restarted.
4. Log in again to the Operation Manager using the virtual IP address. The certificate error should not appear.

For more information, see the following:

- Requirements, page 2
- Cisco Video Surveillance Operations Manager User Guide
- Cisco Video Surveillance Management Console Administration Guide—for instructions to install the certificate.

Force Failover During a Software Upgrade on the Peer Server

If you perform a force failover while a software upgrade is in process on the Peer server (for example, the Peer server has not fully initialized after the upgrade), the virtual IP address/hostname can be lost.

If this happens, error messages may appear when a user attempts to log in using the Operations Manager virtual IP address. Messages include: “Invalid access, server is in standby mode” or “”Must login with Virtual IP [*IP address*] to access system”. This is because both the Master and Peer servers are in standby state.

Recovery

To resolve this issue, you must manually release *standby* mode on the original Master server.

Step 1 To determine the Master server, query the following database with the following SQL from either server:

select peerserverip from haconfig where state = 2

Step 2 Log in to the Master server from the command prompt.

crm_node -n

Step 3 This provides the node name of the server.

Step 4 Release standby mode using the following command:

crm_standby -D -N *server-name* [node name collected from above command]

For example: **crm_standby -D -N vsm-server**

Step 5 After releasing the Standby mode, the server should automatically acquire the virtual IP address.

Step 6 Log back in to the Operations Manager using the virtual IP address or hostname.

Step 7 Go to the Master server and select **Force Fail Over** to proceed with rest of the software upgrade process.

Virtual IP Login Failure

If users are not able to login using the virtual IP address or hostname, do the following:

Determine the following

- The pacemaker service may be down or crashed.
  - Check the status by entering **service pacemaker status** on both the servers.
  - Run the command **crm_mon -1** to list node status information on both the servers.
- The virtual IP address is not assigned to either of the participating Operations Manager servers:
  - Enter the command **ifconfig** on both servers. If either server returns **NO eth0:0** or **eth1:0**, then neither server acquired the virtual IP address.

If a software upgrade was not being performed, log in to the Master server using the server's actual IP/Hostname and select **Replace HA Configuration**. Otherwise, try one of the following:

Software Upgrade Issue

If a force fail over was issued before a software upgrade was complete, see Force Failover During a Software Upgrade on the Peer Server, page 11.

Recovery for Pacemanker Down

Step 1 If the pacemaker is down, restart the pacemaker service using the command:

service pacemaker start

Step 2 If the pacemaker does not come up clean, run the script:

/usr/BWhttpd/vsom_be/ha/recoverPacemaker.sh

Step 3 Restart the pacemaker service:

service pacemaker start

Unmanaged Split Brain Scenario

If network connectivity is lost between the Master and Peer server, both servers can assume the Master role and acquire the virtual IP address.

If connectivity is restored between the servers, user traffic can be sent to both servers.

Root Causes

This scenario can be caused by the following:

- The Master server is disconnected from the rest of the world, but the Peer server can see all other servers (including the Media Servers used for HA storage).
- The Master server has communication with all servers except the Peer server, and the Peer server loses network communication with the rest of the world.
- No Media Servers are configured for HA storage, so the system cannot resolve the split brain.
- Media Servers are configured for HA storage but the connectivity issue was shorter than a minute.

Validate

If an unmanaged split brain scenario occurs, the virtual IP address is configured on both servers. Enter the **ifconfig** command on both servers to view the IP address on each server and verify that both servers are using the virtual IP address.

For example, if the Eth0 interface was used, the virtual IP address is displayed under the eth0:0 entry. If the eth1 interface was used for HA configuration, the virtual IP address is displayed under eth1:0.

Recovery: Method 1

After network connectivity between the Operation Manager HA servers is restored, log in to the Operation Manager browser-based interface to replace the HA configuration.

Step 1 Log in to the Operation Manager for either server using the physical IP address.

Step 2 Select **Device Settings > Replace HA Configuration**.

Step 3 If the issue is still not resolved, delete the HA Configuration and reconfigure Operation Manager HA:

a. Delete the HA Configuration.

b. Re-configure Operations Manager HA.

See the Cisco Video Surveillance Operations Manager User Guide for more information.

Recovery: Method 2

The following alternative method can also be performed to manually resolve the issues.

Step 1 Enter the command **ifconfig** on both servers to determine if both servers are configured with the virtual IP address.

- For example, if the Eth0 interface was used, the virtual IP address will appear under the eth0:0 entry.

Step 2 Verify that the Cisco service is up on both servers.

Step 3 Bring the Cisco service back up on both servers, if necessary.

Step 4 Stop the pacemaker service on both servers.

Step 5 Start the pacemaker service on the original master server.

Step 6 When the pacemaker service starts, enter the command **ifconfig** to verify it has the virtual IP address.

Step 7 Log in to the Operation Manager using the virtual IP address or hostname.

Step 8 View the server status.

Step 9 If the database replication issue is not automatically released, go to the **VSOM High Availability** tab and select **Device Settings > Replace HA Configuration**.

Useful Command Line Tools for HA Troubleshooting

Table 1-3 CLI Monitoring Tools

CLI	Description
service pacemaker status	Displays if pacemaker service is running or not. For example: *pacemakerd (pid 2583) is running...*

crm_mon -1	Lists the participating servers along with where the resources are running.
	For example:
	`Last updated: Mon Nov 17 10:47:23 2014`
	`Last change: Thu Nov 13 16:11:23 2014 via crm_attribute on vsm7-55`
	`Stack: cman`
	`Current DC: vsm7-54 - partition with quorum`
	`Version: 1.1.10-14.el6-368c726`
	`2 Nodes configured`
	`2 Resources configured`
	
	`Online: [ vsm7-54 vsm7-55 ]`
	
	`Resource Group: group1`
	`ClusterIP (ocf::heartbeat:IPaddr2): Started auto-vsm7-54`
	`vsom (lsb:vsomha): Started vsm7-54`

crm_node -n	Get node name as seen by the pacemaker on local server
crm_mon --failcounts	Resource current failure status and limits
crm_standby –v true [*nodename*]	To force the server to pacemaker standby state (useful for upgrades and backup restores). For example: **`crm_standby -v true vsm7-server`**
crm_standby –D –N [*nodename*]	Release the server from standby mode. For example: **`crm_standby -D -N vsm7-server`**

Related Documentation

See the following locations for the most current information and documentation:

HA Configuration, Management and Monitoring

See the "Operations Manager High Availability" section of the Cisco Video Surveillance Operations Manager User Guide for more information.

Cisco Video Surveillance 7 Documentation Roadmap

Descriptions and links to Cisco Video Surveillance documentation, server and storage platform documentation, and other related documentation.

http://www.cisco.com/go/physicalsecurity/vsm/roadmap

Cisco Physical Security Product Information:

www.cisco.com/go/physicalsecurity/

Cisco Video Surveillance Manager Documentation Website

www.cisco.com/go/physicalsecurity/vsm/docs

Troubleshooting Operations Manager High Availability, Release 7.6