
Replacing a CDS Generation 3 Appliance with a CDS Generation 5 Appliance

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Preface

The [Replacing a CDS Generation 3 Appliance with a CDS Generation 5 Appliance](#) document provides instructions on how to replace Actifio CDS Generation 3 nodes in a cluster with newer Actifio CDS Generation 5 nodes without suffering any storage downtime and with only minimal Actifio services downtime. It assumes that you have an understanding of the basic concepts associated with an Actifio appliance.

Note: Migration is not possible if the Actifio CDS Generation 3 node to be replaced has a 10g/1g flip. Contact the Actifio Services representative for more information.

This guide does not cover the following scenarios:

- Single node clusters: This document does not cover the steps involved in replacing single node clusters. If you need to replace a single node cluster, escalate the issue to Engineering.
- Malfunctioning node: This document does not cover the steps involved in replacing a failed node. If you need to replace a malfunctioning node, escalate the issue to Engineering.

Audience

This document is intended for use by Actifio employees and designated third party installers who possess the Actifio installation certification. It contains proprietary and confidential information that may not be communicated outside of Actifio.

Assumptions

- Both the Actifio CDS Generation 3 nodes are functioning and are present in the cluster
- Both the Actifio CDS Generation 3 nodes are running CDS v8.0.9 or later
- Both the Actifio CDS Generation 3 nodes have Actifio Firmware v7.5.0.9 or higher

Terminology

Familiarize yourself with the following terms and concepts:

- Actifio CDS node: The smallest hardware building block in the environment is a single node with its stand alone or built-in battery pack.
- BBSID: The base board system identifier is a unique arbitrary number that becomes part of a unique suffix to the node's World Wide Node Number and World Wide Port Number.
- CDS System or Appliance: A paired primary and secondary node form a CDS *system* or *appliance*. The CDS system is paired either with Actifio provided dedicated Fibre Channel switches (two switches are part of the standard setup) and storage to form an *Actifio Turnkey Solution*, or with customer provided Fibre Channel switches and storage to form an *Actifio Gateway Solution*.
- Copy Data Storage Platform: Describes the whole Actifio environment, either physical, virtual, or both.
- HBA: Host bus adapter.
- WWNN: World Wide Node Number is a unique chassis identification number within a fabric.

Note: The WWNNs differ between Generation 3 and Generation 5. The Generation 5 WWNNs are required for rezoning, and must be identified after replacing the Generation 3 nodes.

- WWPN: World Wide Port Number is a unique port identification number within a fabric.
- Why not call a CDS system a cluster? Within Actifio, it is common to use “system” and “cluster” interchangeably to mean a configured primary and secondary node that perform different tasks. This may be confusing to some customers, because a more common definition of “cluster” is two or more servers that perform the same task — SQL Clusters, Oracle Clusters, Red Hat Clusters, and so on.

Note: When rezoning the Generation 5, the user must rename the WWNNs used previously for the Generation 3 to reflect Generation 5. These WWNNs can then be used to get the previously mapped Generation 3 ports, as well as the unmapped Generation 5 ports.

The ActifioNOW Customer Portal

Your Actifio representative provided you with a user name and password for the ActifioNOW customer portal.

From the ActifioNOW customer portal you can obtain detailed reports about your Actifio appliance, access the Actifio product documentation, including release notes, and search the knowledge base for answers to specific questions.

To log into the ActifioNOW customer portal:

1. Go to: <https://now.actifio.com>
2. When prompted, enter the user name and password provided by your Actifio representative.

Actifio Support Centers

To contact an Actifio support representative, you can:

- Send email to: support@actifio.com
- Call:
 - From anywhere:** +1.315.261.7501
 - US Toll-Free:** +1.855.392.6810
 - Australia:** 0011 800-16165656
 - Germany:** 00 800-16165656
 - New Zealand:** 00 800-16165656
 - UK:** 0 800-0155019

1 Preparation

This chapter helps you prepare for the replacement of two Actifio CDS Generation 3 nodes with two Actifio CDS Generation 5 nodes. It has the following topics:

- [Tools](#) on page 1
- [Customer Site Assessment](#) on page 1
- [Checklist for the Actifio CDS Generation 3 Nodes](#) on page 2
- [Assessment of Actifio CDS Generation 3 Nodes](#) on page 5
- [Sample Actifio CDS Generation 3 Assessment Worksheet](#) on page 5
- [Ethernet Cabling Map](#) on page 7
- [Software Download](#) on page 8

Replacement of both nodes usually takes about four hours. Site preparations and configuration changes, if required, can add additional time. After node replacement, the SAN storage must be rezoned for the Actifio CDS Generation 5 Node.

Tools

The tools required are:

- #0, #1, and #2 Phillips screwdrivers
- 3/16" (5mm) and 1/4" (6.35 mm) flat blade screwdriver
- 5/16" (8mm) hex nut-driver

Note: An extra-long flat blade screwdriver is helpful when reaching across a rack to a bolt in a rail on the far side of the rack. A flashlight or headlamp can also be useful.

Customer Site Assessment

At the customer site:

- Inspect for unsafe conditions according to existing Field Services procedures.
- Verify the CDS Generation 3 node details: [Assessment of Actifio CDS Generation 3 Nodes](#) on page 5.
- Verify there is rack space to mount the new 2U servers.
- Verify there are two power outlets each for the two new servers.
- Verify there are labeled Ethernet cables in the same number as connected to the old nodes.
- Verify there are labeled Fibre Channel cables as specified during planning. If cables are not labeled, then the customer must provide a chart of which top-of-rack ports have been reserved and configured for use by the new appliance hardware.

Checklist for the Actifio CDS Generation 3 Nodes

Before you begin, go through this checklist (in order) and record the information in the [Sample Actifio CDS Generation 3 Assessment Worksheet](#) on page 5. Then go through the [Assessment of Actifio CDS Generation 3 Nodes](#) on page 5 and evaluate if the CDS Generation 3 nodes can be replaced.

1. Obtain the BBSID
2. Obtain the Panel Name
3. Check for the Actifio Firmware Version
4. Check the Actifio CDS Version
5. Obtain the WWPNs
6. Obtain Port Counts
7. Ensure That eth0 Has Not Been Configured on a 10G Port
8. Identify the Config Node
9. Identify Which Node is the VDP Node

Obtain the BBSID

To obtain the BBSID, run this command:

```
/opt/act/bin/act_sysid
```

Example:

```
[14:53:41] dotgov1:~ # /opt/act/bin/act_sysid
1476
[14:54:12] dotgov1:~ #
```

Note: The Generation 3 BBSID is required for producing the WWNN's on an Generation 5 node for rezoning.

Obtain the Panel Name

To obtain the panel name, run:

```
sainfo lsservicestatus | grep panel_name
```

Example:

```
[14:43:37] dotgov1:~ # sainfo lsservicestatus | grep panel_name
panel_name KQ9M9Y
[14:43:38] dotgov1:~ #
```

Check for the Actifio Firmware Version

To obtain Actifio Firmware version information, run this command:

```
cat /compass/vrmf
```

Example:

```
[14:39:25] dotgov1:~ # cat /compass/vrmf
7.0.3.138 (7.5.0.9)
[14:39:29] dotgov1:~ #
```

Note: The Actifio Firmware version is in bold type.

Check the Actifio CDS Version

To obtain Actifio CDS version number, run:

```
grep UDS /act/etc/key.txt
```

Example:

```
KEY: UDS-jenkins-1101
UDS: 7.1.11.1101
GUI: 7.1.11.1101
BRANCH_UDS_NAME: sp-7.1.11
BRANCH_UDS_HASH: 4a673ff7fa52ec99492d5775f36e121b7d9c5fe7
BRANCH_SYSTEM_NAME: sp-7.1.11
BRANCH_SYSTEM_HASH: 97a17ef32f933464a3944de1efdae078036cecaf
BRANCH_GUI_NAME: sp-7.1.11
BRANCH_GUI_HASH: 4eeb25ad09200ad9c10753d4df3ad5dae34a07de
On 2018-11-13 13:20:11 applied hotfix hf-CDS7.1.11.1522 udpengine
On 2018-11-13 13:23:40 applied hotfix hf-CDS7.1.11.1592 adhd
```

Obtain the WWPNS

To obtain WWPNS, run: `sainfo lsservicestatus | grep -i ^port_wwpn`

Example:

```
[14:38:04] dotgov1:~ # sainfo lsservicestatus | grep -i ^port_wwpn
port_wwpn 538a95f2254005c4
port_wwpn 538a95f2253005c4
port_wwpn 538a95f2251005c4
port_wwpn 538a95f2252005c4
```

Obtain Port Counts

To obtain port counts, look at the back of the server. The 1G ports are on the motherboard. The 10G ports are on a riser card.



Ensure That eth0 Has Not Been Configured on a 10G Port

To obtain Ethernet speed, run:

```
ethtool eth0 | grep Speed
```

Note: Remember to use the uppercase "S" in the command.

Example:

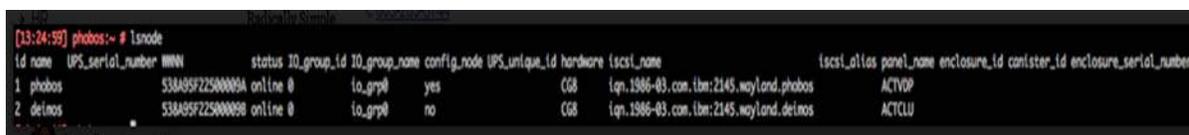
```
[14:34:12] dotgov1:~ # ethtool eth0 | grep Speed
Speed: 1000Mb/s
[14:35:03] dotgov1:~ #
```

Identify the Config Node

To identify the config node, run:

```
lsnode
```

If you do not get back any data, it means that the node is not the config node. If it is a config node, you will see data similar to this:



```
[13:24:39] phobos:~ # lsnode
id name UPS_serial_number MNN status IO_group_id IO_group_name config_node UPS_unique_id hardware iscsi_name iscsi_alias panel_name enclosure_id conister_id enclosure_serial_number
1 phobos 538A89F225000094 online 0 io_grp1 yes CG8 lqn.1986-03.com.lbn:2145.wayland.phobos ACTVDP
2 deimos 538A89F225000098 online 0 io_grp0 no CG8 lqn.1986-03.com.lbn:2145.wayland.deimos ACTCLU
```

Identify Which Node is the VDP Node

The VDP node has a file /act/etc/key.txt, and the CLU node does not.

```
[11:35:01] node01:~ # ls /act/etc/key.txt
/act/etc/key.txt
[11:35:07] node01:~ # logout
Shared connection to node01.sqa.actifio.com closed.

[11:35:15] node02:~ # ls /act/etc/key.txt
ls: cannot access /act/etc/key.txt: No such file or directory
```

Sample Actifio CDS Generation 3 Assessment Worksheet

The following table provides you with a space to note down information that you gather as you run through the [Checklist for the Actifio CDS Generation 3 Nodes](#) on page 2.

Actifio CDS Generation 3 Assessment Worksheet

	VDP	CLU
BBSID		
Panel Name (Serial Number)		
SVC Version		
Actifio CDS Version		
WWPN Port 1		
WWPN Port 2		
WWPN Port 3		
WWPN Port 4		
Number of used 1G Ports (excluding IMM)		
Number of used 10 G Ports		
Speed of eth0 (1G or 10G)		

Assessment of Actifio CDS Generation 3 Nodes

The Actifio CDS Generation 3 nodes are ready for replacement if:

- The CDS Generation 3 cluster must be healthy, consisting of two nodes and running at least 8.0.9.
- Actifio Firmware version is at least 7.5.
- The CLU node actsys must be at the same version as VDP
- Speed of eth0 shows as 1000 Gmb/s
- `/act/etc/vfy` shows no errors on the VDP node
- `/act/servicetools/upgrade-preflight` shows no errors on the VDP node
- The new CDS Generation 5 nodes should be freshly factory installed

If any of the assessment fails, contact the Actifio Services team for guidance.

Checklist for the Actifio CDS Generation 5 Nodes

Unpack the Actifio CDS Generation 5 Nodes

As you unpack the nodes, set the cables and mounting rails aside for use. Set up the new nodes on a bench, not in the rack. Each node comes with two batteries. Insert the batteries into the chassis now.

Identify the VDP and CLU Nodes

Identify the VDP (primary) node. There is a product ID sticker on the top of each node. A product ID that ends with the letters "YUS" is the VDP node. A product ID that ends with "RUS" is the CLU node.

Preparing the Generation 5 Cluster for Replacement and Rezoning

The following steps are required prior to complete cluster replacement, and cluster rezoning to SAN storage.

1. Upon setting up the bench, run this command on the Generation 5 VDP node:
`satask leavecluster -force`
2. Then, leave service mode on the primary (VDP) node:
`satask stopservice`
3. Review and note the WWNN from each node after running:

```
$ sainfo lsservicestatus|grep node_wwnn
node_wwnn 538a95f225000048
```
4. This will return two items labeled `node_wwnn`. These are required for rezoning after the Generation 3 / Generation 5 replacement procedure. Rezoning requires changing the WWPNs from the previous Generation 3 cluster to the new WWPNs for the Generation 5 cluster.
5. Record the WWNNs on both nodes and compare them to the Generation 3 WWNNs recorded in the [Sample Actifio CDS Generation 3 Assessment Worksheet](#).

Note: Fibre Channel WWNN ports are numbered in the fourth octet (xx:xx:xx:**01**.xx.xx).

6. Zone the Generation 5 cluster as detailed in [Zoning and Storage](#).

Ethernet Cabling Map

Note: The Actifio CDS Generation 3 nodes must not have the 1G/10G flip in effect.

The Actifio CDS Generation 3 node has up to five physical Ethernet ports:

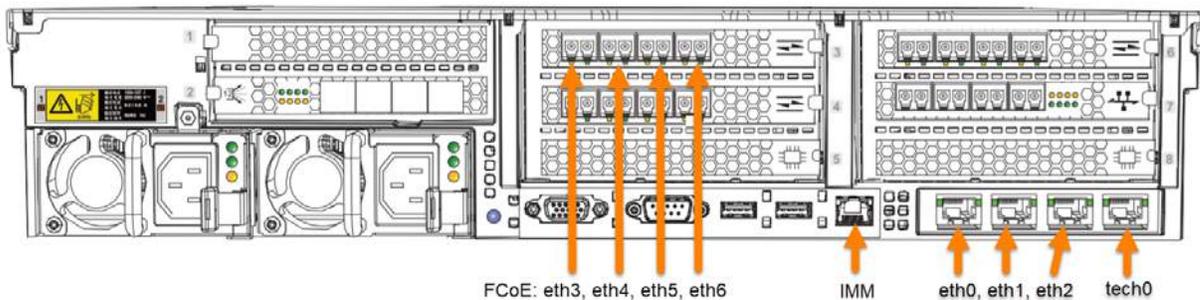
- One 1G port built into the motherboard for IMM, not seen by the OS.
- Two 1G ports built into the motherboard, designated eth0 and eth1.
- Two 10G ports on an optional daughtercard, designated eth2 and eth3.



Actifio CDS Generation 3 Ethernet Ports

The Actifio CDS Generation 5 node has nine physical Ethernet ports:

- One 1G port built into the motherboard for IMM, inactive and not seen by the OS.
- Three 1G ports built into the motherboard, designated eth0-eth2.
- One 1G port built into the motherboard, designated tech0.
- Four 10G Ethernet/FCoE ports on a daughtercard in slot 3, designated eth3-eth6.



Actifio CDS Generation 5 Ethernet Ports

Mapping the Actifio CDS Generation 3 Ports to the Actifio CDS Generation 5 Ports

CDS Generation 3 Port	CDS Generation 5 Port
Port 1 / eth0	Port 1 / eth0
Port 2 / eth1	Port 2 / eth1
Port 3 / eth2	Port 3 / eth2
Port 4 / eth3	Port 4 / eth3
Port 5 / eth4	Port 5 / eth4

Caution: Do not plug anything into the tech0 port. This can disrupt the LAN by offering DHCP that's meant for an isolated technician laptop. The tech0 port is the rightmost port (viewed from the rear of the node), and it is present only on the Actifio CDS Generation 5.

The two leftmost ports on the Actifio CDS Generation 3 motherboard go to the two leftmost ports on the Actifio CDS Generation 5 motherboard. The two 10G ports on the Actifio CDS Generation 3 go to the leftmost two 10G ports on the Actifio CDS Generation 5. Use a device such as a Lantronix Spider Duo to provide remote access services; see [Installing the Lantronix SpiderDuo KVM](#) on page 31.

Software Download

The migration kit is available for download from **chuckwagon**. Download and save the migration kit as a ".tgz" file on your laptop. During node replacement, use the `scp` command to copy the migration kit from your laptop to the node you are replacing.

Note: This has been tested using FireFox and Chrome.

Zoning and Storage

The new appliance will have different WWPNs to the old one. This is because both the BBSID and the general WWPN formatting of the CDS Generation 5 nodes are different from the old ones.

A CDS appliance consists of two nodes, each with two connections to a storage fabric. This makes four unique WWPNs. These WWPNs are all zoned together into a Failsafe Zone for cluster communications.

These four WWPNs are also zoned into a Storage Zone including the WWPNs of the storage controllers that the customer is using. The storage is then configured to present a number of LUNs to a single host made up of these four LUNs.

Since the WWPNs of the Actifio nodes are changing, the Zoning and the Storage configuration must be updated.

Before starting work, understand and note down the old and new BBSIDs of each node, and use the WWPN calculator spreadsheet (BBSID2WWPN Converter.xlsx) to know in advance the WWPNs of the new hardware. Use this information to pre-configure the SAN switches and storage infrastructure in use. This will be a collaborative effort with the customer who may own and manage this infrastructure.

When you perform the CDS Generation 3 to CDS Generation 5 migration, you must add the WWPNs of the new nodes to the zones and the storage ahead of time, and then remove the old WWPNs afterwards.

1. Identify the WWPNs of the new cluster using the BBSIDs.
2. Add the new WWPNs to the Failsafe Zone on the SAN switches.
3. Add the new WWPNs to the Storage Zone on the SAN switches.
4. Add the new WWPNs to any Host Zones on the SAN switches.
5. Add the new WWPNs to the existing appliance host record on the storage array.
6. Perform the migration.
7. Remove the old WWPNs from the storage and each zone.

Instructions for each step are not provided here, because customers use different systems and topologies will differ.

2 CDS Generation 3 to CDS Generation 5 Migration

High level outline of procedure

1. [Upgrade the CDS Generation 3 Appliance to SVC 7.8](#) on page 11
2. [Backup the Configuration of Both Nodes](#) on page 11
3. [Remove the CDS Generation 3 CLU Node from the Cluster](#) on page 12
4. [Install the CDS Generation 5 CLU Node and Restore the Configuration](#) on page 13
5. [Remove the CDS Generation 3 VDP Node from the Cluster](#) on page 15
6. [Install the CDS Generation 5 VDP Node and Restore the Configuration](#) on page 16
7. [Perform Fixes and Check the Health of the Cluster](#) on page 18

Before starting any of this, the scheduler must be stopped, and no jobs should be running.

Upgrade the CDS Generation 3 Appliance to SVC 7.8

Refer to [Appendix A, Updating Actifio Firmware 7.5 to 7.8](#). Note that running SVC 7.8 on CDS Generation 3 is ONLY approved for this migration process and must NOT be used otherwise!

Backup the Configuration of Both Nodes

1. Obtain the new upgrade-preflight script from chuckwagon and copy it to /dumps/ on both nodes.
2. Perform a backup of the configuration of both nodes. On the VDP node:

```
cd /dumps/  
chmod 0755 upgrade-preflight  
./upgrade-preflight --backup-full
```

Running this on the VDP node creates two .tgz files, one in /dumps/ on each node. Check that the script ends with PASS. If it ends with FAIL, correct the errors before proceeding.

If the CLU file does not get copied to the VDP node automatically, or vice-versa, copy it manually.

3. Copy these .tgz files to your laptop or other media for safe keeping.

Remove the CDS Generation 3 CLU Node from the Cluster

1. From the VDP node, identify and remove the CLU node from the cluster. Identify the CLU node ID using the output of `lsnode: config_node` is `no`. In this example, the CLU node has ID of 3:

```
[16:15:47] r-cds1n1:~ # lsnode
```

```
id name      UPS_serial_number WWNN status IO_group_id IO_group_name config_node
UPS_unique_id hardware iscsi_name          iscsi_alias panel_name
enclosure_id canister_id enclosure_serial_number site_id site_name
1 r-cds1n1 GF451A0022      538A95F225000C10 online 0          io_grp0      yes
25D6105051000082 iqn.1986-03.com.ibm:2145.r-cds1.r-cds1n1 KQ0MPW
3 r-cds1n2 GF472A0196      538A95F225000C0F online 0          io_grp0      no
25D6107091001246 iqn.1986-03.com.ibm:2145.r-cds1.r-cds1n2 KQ5PD8
```

2. Remove the CLU node:

```
[14:11:56] r-cds1n1:~ # rmnode 3
```

```
[14:11:56] r-cds1n1:~ #
```

3. Verify that the CLU node has disappeared:

```
[14:02:10] r-cds1n1:~ # lsnode
```

```
id name      UPS_serial_number WWNN status IO_group_id IO_group_name
config_node UPS_unique_id hardware iscsi_name
iscsi_alias panel_name enclosure_id canister_id enclosure_serial_number site_id
site_name
```

```
1 r-cds1n1 GF451A0022      538A95F225000C10 online 0          io_grp0      yes
25D6105051000082 iqn.1986-03.com.ibm:2145.r-cds1.r-cds1n1 KQ0MPW
```

If it is in 'pending' state try again after a minute or so.

4. Shut down and remove the CLU node from the rack. Log on to the CLU node and run:

```
[16:19:33] r-cds1n2:~ # satask stopnode -poweroff
```

If the command fails, it's possible that SVC is restarting. Wait a moment and try again.

5. Once the CLU is stopped, remove it from the rack, making sure to carefully remove and label each cable.

Install the CDS Generation 5 CLU Node and Restore the Configuration

1. Rack the new CDS Generation 5 CLU node and connect the power and Fibre Channel connections. Do not connect the node to the customer IP network at this time.
2. Using a crash cart or KVM, power up and configure the new node with the correct IP address for the CLU node, as per the recorded CDS Generation 3 information.
3. Connect the network cables to the new CLU node.
4. Verify that the new node is in 'Candidate' state using the crash cart or KVM.

```
[00:28:49] newinstall:~ # sainfo lsservicestatus | grep node_status
node_status Candidate
```

If it is in service mode, then as root, run:

```
[14:12:44] r-cds1n1:~ # satask stopservice
```

After a few minutes, verify that the node status is Candidate:

```
[14:20:01] r-cds1n1:~ # sainfo lsservicestatus | grep node_status
node_status Candidate
```

5. Add the CDS Generation 5 CLU node's WWPNs to the required zones on Actifio or customer SAN switches and storage.

At this stage, the CDS Generation 5 CLU node and the CDS Generation 3 VDP node must be zoned together and the CDS Generation 5 CLU node must also be able to see the same storage as the CDS Generation 3 VDP node. See [Zoning and Storage](#) on page 9.

6. From the CDS Generation 3 VDP node, check that the new CDS Generation 5 CLU node is visible:

```
[16:29:22] r-cds1n1:~ # lsnodecandidate
id                panel_name UPS_serial_number UPS_unique_id   hardware serial_number
product_mtm machine_signature
538A95F225002B69 78HBMP0                538A95F225002B69 SV1      78HBMP0
2145-SV1    5BB2-3734-B534-78FA
```

If it is not, check FC connectivity and zoning. Check again the node_status of the CLU node.

7. From the CDS Generation 3 VDP node, add the CDS Generation 5 CLU node to the existing cluster:

```
[14:25:45] r-cds1n1:~ # addnode -iogrp 0 -panelname XXXXXX
Node, id [4], successfully added
```

8. Verify that the node has been added. This might take a few minutes:

```
[16:30:39] r-cds1n1:~ # lsnode
id name      UPS_serial_number WWNN                status IO_group_id IO_group_name
config_node UPS_unique_id   hardware iscsi_name
iscsi_alias panel_name enclosure_id canister_id enclosure_serial_number site_id
site_name
1 r-cds1n1 GF451A0022      538A95F225000C10 online 0          io_grp0      yes
25D6105051000082 iqn.1986-03.com.ibm:2145.r-cds1.r-cds1n1 KQ0MPW
4 r-cds1n2      538A95F225002B69 online 0          io_grp0      no
SV1 iqn.1986-03.com.ibm:2145.r-cds1.r-cds1n2 78HBMP0
```

9. Copy the backup files created to the new node. From the new CLU node, run the following command, using the panelname of the CDS Generation 3 VDP node from lsnode above:

```
[16:31:31] newinstall:~ # satask cpfiles -prefix "/dumps/upgrade.backup.*" -source
<panelname>
```

Check the status of this copy job with

```
[16:31:42] newinstall:~ # sainfo lscmdstatus
last_command satask cpfiles -prefix /dumps/upgrade.backup.* -source KQ0MPW
last_command_status CMMVC8044E Command completed successfully.
T3_status
T3_status_data
cpfiles_status Complete
cpfiles_status_data Copied 3 of 3
snap_status
snap_filename
installcanistersoftware_status
```

10. Once the files are copied, identify the backup file from the old CDS Generation 3 CLU node:

```
[16:32:27] newinstall:~ # ls -l /dumps/upgrade.backup*
-rw-rw-rw- 1 root root 2789656 Nov 16 16:31 /dumps/upgrade.backup.r-
cds1.KQ0MPW.1811161350.tgz
-rw-rw-rw- 1 root root 660344198 Nov 16 16:31 /dumps/upgrade.backup.r-
cds1.KQ0MPW.1811161614.tgz
-rw-rw-rw- 1 root root 3473643 Nov 16 16:31 /dumps/upgrade.backup.r-
cds1.KQ5PD8.1811161617.tgz
```

11. Restore the configuration of the CLU node.
Make SURE that the file you specify is the latest backup of the CLU node!

```
[16:36:19] newinstall:/dumps # /dumps/upgrade-preflight --backup-restore /dumps/
upgrade.backup.r-cds1.KQ5PD8.1811161617.tgz
```

Upgrade preflight check on Fri Nov 16 16:36:34 GMT 2018. Logging to /dumps/upgrade-preflight-24355.log

```
Restore source specified OK
```

12. Reboot the CLU node:

```
[16:36:34] newinstall:/dumps # satask stopnode -reboot
```

The node will reboot and automatically restore the configuration, and automatically reboot again. The progress of the reboots can be monitored from your crash cart or KVM.

13. After the second reboot, log in and verify that the hostname and IP address are correct. Give the node some time to re-join the cluster, and from the CDS Generation 3 VDP node, run `lsnode` to make sure both nodes are online and healthy:

```
[16:47:37] r-cds1n1:/data/act/etc/actconfig.d # lsnode
id name      UPS_serial_number WWNN          status IO_group_id IO_group_name
config_node UPS_unique_id  hardware iscsi_name
iscsi_alias panel_name enclosure_id canister_id enclosure_serial_number site_id
site_name

1 r-cds1n1 GF451A0022 538A95F225000C10 online 0 io_grp0 yes
25D6105051000082 iqn.1986-03.com.ibm:2145.r-cds1.r-cds1n1 KQ0MPW

4 r-cds1n2 538A95F225002B69 online 0 io_grp0 no
SV1 iqn.1986-03.com.ibm:2145.r-cds1.r-cds1n2 78HBMP0
```

You should have one Generation 3 node and one Generation 5 node. If there is any doubt as to the health of the cluster, stop now and escalate before removing the CDS Generation 3 VDP node.

Remove the CDS Generation 3 VDP Node from the Cluster

1. From the VDP node, identify and remove the VDP node from the cluster. Identify the VDP node ID using the output of `lsnode: config_node = yes`. In this example, the VDP node ID is 1:

```
id name      UPS_serial_number WWNN                status IO_group_id IO_group_name
config_node UPS_unique_id   hardware iscsi_name
iscsi_alias panel_name enclosure_id canister_id enclosure_serial_number site_id
site_name

1 r-cds1n1 GF451A0022      538A95F225000C10 online 0          io_grp0      yes
25D6105051000082 iqn.1986-03.com.ibm:2145.r-cds1.r-cds1n1 KQ0MPW

2 r-cds1n2 GF472A0196      538A95F225000C0F offline 0          io_grp0      no
25D6107091001246 iqn.1986-03.com.ibm:2145.r-cds1.r-cds1n2 KQ5PD8
```

2. Remove the VDP node:

```
[14:11:56] r-cds1n1:~ # rmnode 1
```

This will cause the cluster to fail over to the CLU node. Log in now to the CLU node and wait for it to become the config node.

3. Verify that the VDP node has disappeared:

```
[16:49:50] r-cds1n2:~ # lsnode
```

```
id name      UPS_serial_number WWNN                status IO_group_id IO_group_name
config_node UPS_unique_id   hardware iscsi_name
iscsi_alias panel_name enclosure_id canister_id enclosure_serial_number site_id site_name

4 r-cds1n2      538A95F225002B69 online 0          io_grp0      yes
SV1 iqn.1986-03.com.ibm:2145.r-cds1.r-cds1n2 78HBMP0
```

4. Shut down and remove the VDP node from the rack. On the VDP node, run:

```
[16:50:32] r-cds1n1:~ # satask stopnode -poweroff
```

If the command fails, it's possible that SVC is restarting. Wait a moment and try again.

Once the VDP is stopped, remove it from the rack, making sure to carefully remove and label each cable.

Install the CDS Generation 5 VDP Node and Restore the Configuration

1. Rack the new CDS Generation 5 VDP node and connect the power and Fibre Channel connections. Do not connect the node to the customer IP network at this time.
2. Using a crash cart or KVM, configure the new node with the correct IP address for the VDP node, as per the recorded CDS Generation 3 information.
3. Connect the network cables to the new VDP node
4. Verify that the new node is in 'Candidate' state using the crash cart or KVM. A VDP node from the factory will likely have been formed with single node cluster. If this is the case, the node_status will be Active.
 - If node_status is Active, then forcefully remove the node from its own cluster:

```
[12:00:02] newinstall:~ # satask leavecluster -force
```

After a few moments, check the node_status again.

```
[14:20:01] r-cds1n1:~ # sainfo lsservicestatus | grep node_status
```

- If node_status is Service, then as root, run:

```
[14:12:44] r-cds1n1:~ # satask stopservice
```

And verify that after a few minutes, the node status is Candidate:

```
[14:20:01] r-cds1n1:~ # sainfo lsservicestatus | grep node_status  
node_status Candidate
```

5. Remove any existing software from /act:

```
[12:02:35] newinstall:~ # cd /act
```

```
[12:02:37] newinstall:/act # rm -rf *
```

6. Add the CDS Generation 5 VDP node's WWPNs to the required zones on Actifio or customer SAN switches and storage.

At this stage, the CDS Generation 5 VDP node and the CDS Generation 5 CLU node must be zoned together and the CDS Generation 5 CLU node must also be able to see the same storage as the CDS Generation 3 VDP node. See the Zoning pre-requisites.

7. From the CDS Generation 5 CLU node, check that the new CDS Generation 5 VDP node is visible:

```
[17:03:19] r-cds1n2:~ # lsnodecandidate
```

id	panel_name	UPS_serial_number	UPS_unique_id	hardware	serial_number
538A95F225002B5B	78HAPD0		538A95F225002B5B	SV1	78HAPD0
2145-SV1	C5E9-758E-9EFF-1E0F				

If it is not, check FC connectivity and zoning. Check again the node_status of the CLU node.

8. From the CDS Generation 3 CLU node, add the CDS Generation 5 VDP node to the existing cluster:

```
[17:03:22] r-cds1n2:~ # addnode -iogrp 0 -panelname <panel name>
```

```
Node, id [5], successfully added
```

9. Verify that the node has been added. This might take a few minutes:

```
[17:04:45] r-cds1n2:~ # lsnode
```

id	name	UPS_serial_number	WWNN	status	IO_group_id	IO_group_name
5	r-cds1n1	538A95F225002B5B	online	0	io_grp0	no
SV1	iqn.1986-03.com.ibm:2145.r-cds1.r-cds1n1				78HAPD0	

```
4 r-cds1n2          538A95F225002B69 online 0      io_grp0      yes
SV1 iqn.1986-03.com.ibm:2145.r-cds1.r-cds1n2 78HBMP0
```

10. Copy the backup files created to the new node. From the new VDP node, run the following command, using the panelname of the CDS Generation 5 CLU node from lsnode above:

```
[17:05:06] newinstall:~ # satask cpfiles -prefix "/dumps/upgrade.backup.*" -source <panelname>
```

Check the status of this copy job with

```
[17:05:20] newinstall:~ # sainfo lscmdstatus
last_command satask cpfiles -prefix /dumps/upgrade.backup.* -source 78HBMP0
last_command_status CMMVC8044E Command completed successfully.
T3_status
T3_status_data
cpfiles_status Complete
cpfiles_status_data Copied 3 of 3
snap_status
snap_filename
installcanistersoftware_status
```

11. Once the files are copied, identify the backup file from the old CDS Generation 3 VDP node:

```
[17:06:42] newinstall:/dumps # ls -l /dumps/upgrade.backup.r-cds1.KQ*
-rw-rw-rw- 1 root root 2789656 Nov 16 17:05 /dumps/upgrade.backup.r-cds1.KQ0MPW.1811161350.tgz
-rw-rw-rw- 1 root root 660344198 Nov 16 17:05 /dumps/upgrade.backup.r-cds1.KQ0MPW.1811161614.tgz
-rw-rw-rw- 1 root root 3473643 Nov 16 17:05 /dumps/upgrade.backup.r-cds1.KQ5PD8.1811161617.tgz
```

12. Restore the configuration of the VDP node:

```
[17:06:53] newinstall:/dumps # /dumps/upgrade-preflight --backup-restore /dumps/upgrade.backup.r-cds1.KQ0MPW.1811161614.tgz
Upgrade preflight check on Fri Nov 16 17:07:14 GMT 2018. Logging to /dumps/upgrade-preflight-13027.log
Restore source specified OK
```

13. Reboot the VDP node

```
[17:07:14] newinstall:/dumps # satask stopnode -reboot
```

The node will reboot and automatically restore the configuration, and reboot again. The progress of the reboots can be monitored from your crash cart or KVM.

14. After the second reboot, log in and verify that the hostname and IP address are correct. Give the node some time to re-join the cluster, and from the CDS Generation 3 CLU node, run lsnode to make sure both nodes are online and healthy:

```
[17:17:55] r-cds1n2:~ # lsnode
id name      UPS_serial_number WWNN          status IO_group_id IO_group_name
config_node UPS_unique_id hardware iscsi_name    iscsi_alias
panel_name enclosure_id canister_id enclosure_serial_number site_id site_name
```

```

5 r-cds1n1          538A95F225002B5B online 0      io_grp0      no
SV1 iqn.1986-03.com.ibm:2145.r-cds1.r-cds1n1 78HAPD0

4 r-cds1n2          538A95F225002B69 online 0      io_grp0      yes
SV1 iqn.1986-03.com.ibm:2145.r-cds1.r-cds1n2 78HBMP0

```

Both nodes are now CDS Generation 5 and the migration is almost complete.

15. Update actsys on new VDP node

```
[17:17:00] r-cds1n1:/dumps # /act/actsys/actsys-svc_el7/install.sh
```

16. Once the new VDP node has rebooted it will rejoin the cluster but the CLU node is still the config node. From the VDP node, force a failback:

```
[17:19:36] r-cds1n1:~ # /act/bin/failback -y
```

Within about 5 minutes, SVC will fail back to the VDP node, and Actifio services will start.

Perform Fixes and Check the Health of the Cluster

1. Run IP address config fix-up script:

```
[19:28:14] r-cds1n1:~ # ./fix_ipaddr_record.sh
```

2. Upgrade actsys on CLU node:

```
/act/servicetools/cluster_actsys_check
```

3. Check that dedup is up. If it is not, it may be being inhibited by the following file

```
/data/act/etc/actconfig.d/svc-upgrade-nodedup.conf
```

The file can be removed and adhd restarted.

The process is now complete.

You will need to check the health and functionality of the cluster, and make any networking changes which may be required, due to changes in interface names.

The WWPNs of the old Generation 3 nodes can now be removed from all zones and storage arrays.

3 Troubleshooting

This chapter describes two common scenarios you may come across during node replacement and their solutions.

- Scenario 1: The new node is not showing up in the candidates list
- Scenario 2: The new node is defective and will not work correctly

Scenario 1: The new node is not showing up in the candidates list

This means that the node was not answering when the SAN fabric was probed for candidates. This could mean that:

- The new node has not finished booting.
- The new node has an error condition that prevents it from being a candidate.
- The new node does not have an uninitialized SVC on it (may be an used un-refurbished node).
- The new node is not cabled to the Fibre Channel switch correctly.
- The new node does not have the correct Fibre Channel zoning.
 - o Must be able to see all ports on the same storage controller.
 - o Must be able to see all ports on the other node(s).
 - o Must be able to see any other "client" hosts as well.
- The new node does not have the correct LUNS presented to it by back-end storage.
 - o Must exactly match what has been presented to the existing nodes.
- The new node might not appear due to a duplicate ports issue. If you get the message **Duplicate port WWPN detected**, then:
 - a. Get a list of the ports:

```
switchshow
```
 - b. Find the duplicate port:

```
26 26 291a00 id N8No_Sync FC Disabled (Persistent) (Duplicate Port WWN detected)
27 27 291b00 id N8No_Sync FC Disabled (Persistent) (Duplicate Port WWN detected)
```
 - c. Reset the port:

```
portdisable #
portcfgdefault #
portenable #
```

Solution

Check for each of the conditions listed above. If they are found, correct them, and then rescan for candidates. If none of those conditions turn out to be true, escalate to Engineering.

Scenario 2: The new node is defective and will not work correctly

Solution

Escalate to Engineering immediately.

A Updating Actifio Firmware 7.5 to 7.8

If you are upgrading a CDS system's platform software from SVC 7.5.0.9 to SVC 7.8, several pre-upgrade checks and tasks are required.

The platform software must be on 7.5.0.9 before upgrading to 7.8.

Note: Several Actifio 7.0+ features require SVC 7.5.0.9 or higher on the CDS.

Note: Actifio maintains a separate numbering system to track SVC versions. For this release, Actifio 7.0.1.134 contains the SVC 7.5.0.9 version documented in this article.

Perform the steps listed below at least 48 hours prior to upgrade. These steps include:

1. [Copy Required Files to the Appliance](#)
2. [Check for SVC Conflicts](#)
3. [Run the -preflight.sh Script and Other Checks](#)

After completing these steps, the system can be updated:

4. [Update to SVC 7.8.](#)

The system will be offline for several hour during the upgrade.

The downtime can be minimized by upgrading SVC immediately after patch update.

Copy Required Files to the Appliance

The files required by the SVC upgrade are stored on the Chuckwagon server at:

<https://chuckwagon.corp.actifio.com/releases/SVC-8.0.5/>

Retrieve these files and copy them to `\dump` (CDS nodes are delivered with a copy of the pre-flight in `\act\servicetools` — that copy may also be used).

- The SVC upgrade file, **UPDATE_8.0.5**
- The SVC upgrade preflight file, **upgrade-preflight**

Note: Use `upgrade-preflight -r` to return the CDS to the state it was before the upgrade. For when the upgrade needs to be halted before being started.

Use `upgrade-preflight -r` only when the `upgrade-preflight -p` was run, haven't run the `-u`, the `-u` failed, or the upgrade was aborted cleanly by the system.

Check for SVC Conflicts

Review IBM's [V7.5.x Supported Hardware List, Device Driver, Firmware and Recommended Software Levels for SAN Volume Controller](#) matrix to ensure that customer equipment and software will be compatible with the upgraded SVC code.

Run the `-preflight.sh` Script and Other Checks

1. Copy the SVC upgrade file to the `/upgrade` directory.

Execute: `cp UPDATE_7.0.1.134 /upgrade`

2. Run the upgrade preflight to check for issues on the system and with the upgrade.

Execute: `sh upgrade-preflight.sh`

The system's log output should all read `ok`.

3. Check the preflight output for:

- Free Space Check in `/tmp`.
- If preflight fails because of insufficient free space in the `/tmp` directory, *do not* delete all the files in the `/tmp` directory. The three files that must be maintained are:

```
initrd.tgz
ldflash.tgz
flashbase.tgz
```

- If preflight displays a `Panel Names Failure`, the panel names must be changed. Panel names must be unique and exactly six characters long.
 - Refer to https://docs.google.com/a/actifio.com/document/d/1d8xUAeTUAWlt0n1aiFtKEZkGtTw2A_nyLLco_rl6oLA/ for the panel name-change procedure.
4. Check that both clusters have identical CPUs.

- a. Execute: `lsnode` to get the node IDs. For example

```
> nodeID1:/dumps # lsnode
```

You should see a response similar to this on the console:

```
id name      UPS_serial_number WWNN                status IO_group_id IO_group_name
config_node UPS_unique_id   hardware iscsi_name          iscsi_alias
panel_name enclosure_id canister_id enclosure_serial_number
1 nodeID1 GG395A0008      538A95F2250005C4 online 0             io_grp0      yes
25D70C9151000008 CG8 iqn.1986-03.com.ibm:2145.dotgov.dotgov1 KQ9M9Y
2 nodeID2 GF472A0195      538A95F2250008CC online 0             io_grp0      no
25D6107091001245 CG8 iqn.1986-03.com.ibm:2145.dotgov.dotgov2 KQ6L0P
```

- b. Search the ID information on Node 1.

```
Execute: > nodeID1:/dumps # lsnodevpd 1 | grep Intel
```

You should see a response similar to this on the console:

```
manufacturer Intel(R) Corporation
version Intel(R) Xeon(R) CPU E5645 @ 2.40GHZ
manufacturer Intel(R) Corporation
version Intel(R) Xeon(R) CPU E5645 @ 2.40GHZ
```

- c. Then continue with Node 2.

Execute: > nodeID1:/dumps # lsnodevpd 2 | grep Intel

- d. Compare the response on the console to node 1. The CPU type and clock speed must match; the output should resemble this example:

```
manufacturer Intel(R) Corporation
version Intel(R) Xeon(R) CPU E5645 @ 2.40GHz
```

Update to SVC 7.8

This step can take several hours, and the system will be offline during that time.

The system must be upgraded to SVC 7.5.0.8 before it can be upgraded to 7.8.

The HealthCheck script log generated earlier contains the current SVC version.

Use only the latest build of SVC 7.8 that comes with the migration package.

Save the Configuration to a Backup File

To save the current configuration to a file, run the preflight script with the backup switch.

As root on the primary node:

1. Run the preflight script with the `-p` switch. Execute:

```
sh upgrade-preflight -p
```

Note: This step brings dedup processes down (if running), and can take up to 20 minutes.

2. Save the backup configuration to a location off the appliance.

The configuration backup can be found in the `/dumps` directory; the location is included at the bottom of the preflight output.

SCP the `.tgz` to your local machine. Execute:

```
scp -p 26 -A root@[VPN]:/dumps/upgrade.backup.#####.#####.tgz ./
```

3. Copy the contents of `/var/log/command` to the `dumps` directory so it will not be deleted. Execute:

```
cp /var/log/command /dumps/command
```

In event of an upgrade failure, restore normal service on the primary node by executing:

```
upgrade-preflight -r
```

Start the SVC Upgrade

Run the preflight script with the `-u` switch. You will be prompted to enter a number to run the upgrade. At the prompt, type **1** and press **Enter**.

1. Execute:
`/act/servicetools/upgrade-preflight -u`

```
UPDATE_7.0.1.134
```

When the “number>” prompt is displayed, enter **1**.

```
number> 1
```

A long delay occurs after inputting **1** before the system prompt is displayed again because the system is unpacking and installing the update files.

- To monitor the process of the upgrade, on the config node, execute: `svcinfolsoftwareupgradestatus`.

The config node's role changes as the other node is upgraded. Execute `lsnode` to figure out which node is the config node.

On the config node, execute: `svcinfolsoftwareupgradestatus`

While the upgrade is in process, the system will respond with a message similar to this example:

```
[13:54:35] mercury:~ # svcinfolsoftwareupgradestatus
status
upgrading
```

If `lsoftwareupgradestatus` does not return `upgrading` then the status will be:

Status	What's Happening	What To Do
inactive	No upgrade is running. It could have failed pre-checks or backed itself out.	It should have thrown an error from upgrade-preflight - u. If not, check <code>node.trc</code> for a reason the preflight failed
stalled	Tried to run and got stuck.	Escalate to engineering
failed	Stalled and never recovered.	Escalate to engineering

Note: SVC upgrade requires ten minutes of preparation, then each node takes 15 minutes, with a wait of 45 minutes between nodes.

- As you monitor the upgrade process, at some point the ssh session will terminate when the files controlling your login session are overwritten or communication is interrupted.
- While you are waiting for the upgrade to finish, you can check the status with the `svcinfolupdate` command. The system returns detailed information about the process:


```
[16:08:09] venus:/dumps # svcinfolupdate
status system_completing_pausing
event_sequence_number
progress 50
estimated_completion_time 160223161213
suggested_action wait
system_new_code_level
system_forced no
system_next_node_status waiting
system_next_node_time 160223161013
system_next_node_id 2
system_next_node_name venus
```
- At the end of the upgrade, ensure that dedup is running by looking for line `now open for business` in the dedup logs.

Execute: `grep business /dumps/adhd.log`

The system responds with a display similar to this example:

```
/dumps/adhd.log:2016-08-26 14:25:51.430 INFO [0x7f1964635700] adhd.c:699:main() adhd
version 6.1.1.46095 pid 26903, now open for business. dedup_disabled=0
scoreboard_enabled=1
```

B Installing the Lantronix SpiderDuo KVM

This section provides instructions on how to install the Lantronix SpiderDuo KVM. The SpiderDuo device is a KVM-over-IP used to provide remote access to the CDS Generation 5.

The CDS Generation 5 does not have IMM functionality. KVM installation must occur directly after initial deployment for remote connectivity to the appliance.

Before You Begin

Installation of the SpiderDuo KVM requires setting a static IP address for the device. The static IP address is used to access the KVM/CDS Generation 5 through the Lantronix console, and gets used like any other pre-configured Actifio hardware or software appliance.

Pre-Installation

The SpiderDuo automatically requests a DHCP address upon connecting to the customer's network.

Prior to CDS Generation 5 installation, find the KVM's DHCP address.

For pre-installation, prepare:

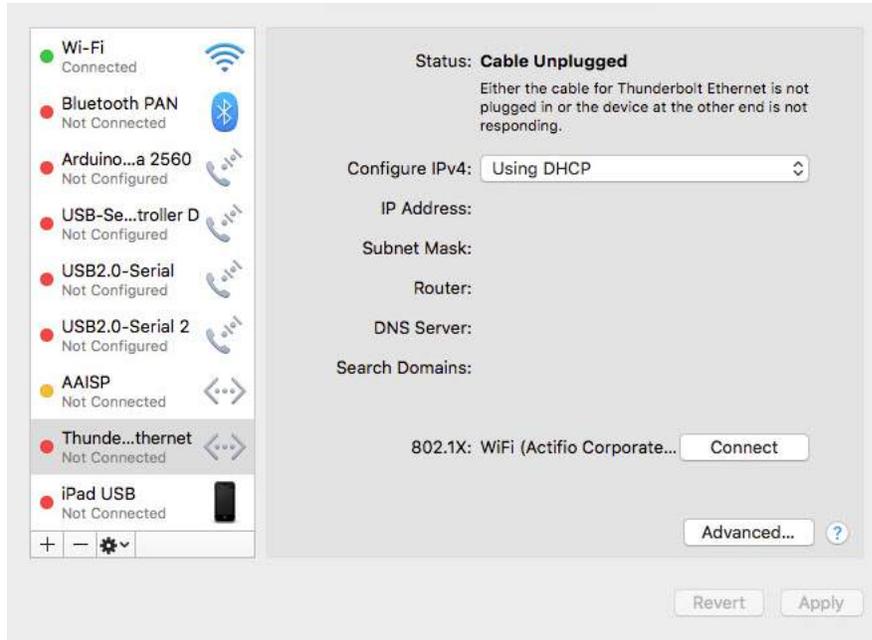
- The SpiderDuo KVM
- 1G copper ethernet cable

Setting a Static IP for the SpiderDuo KVM

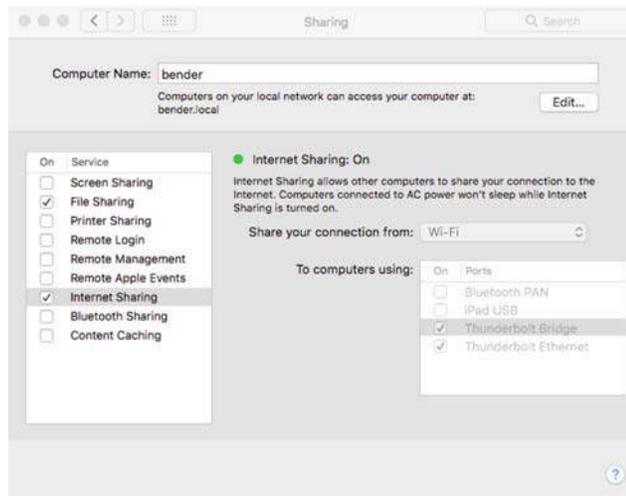
The DHCP address can be found through MacOS by enabling enabling Wi-Fi Internet sharing to the Ethernet port.

MacOS issues a DHCP address to any connected device and acts as a router.

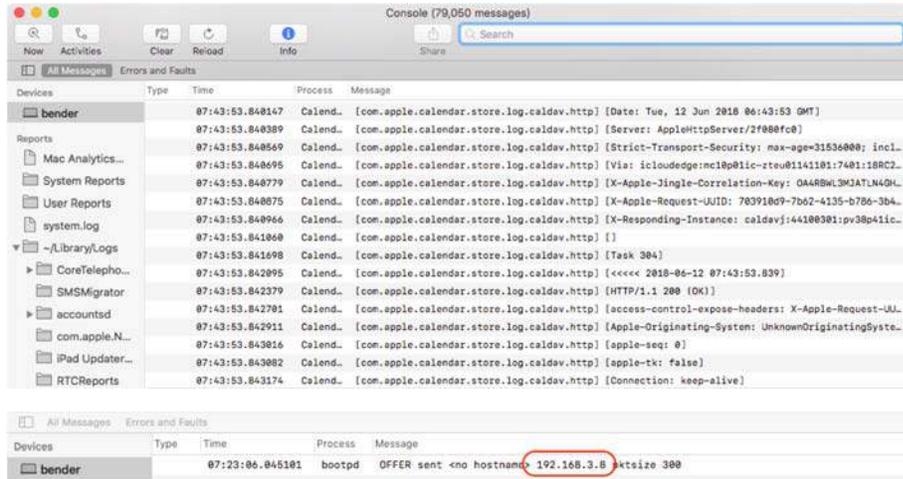
1. Select the **Apple menu**, **System Preferences**, then **Network**.
2. Select the Mac's Ethernet port from the left-hand list. From the **Configure IPv4** drop-down, select **Using DHCP**.



- From **System Preferences**, select **Sharing**.



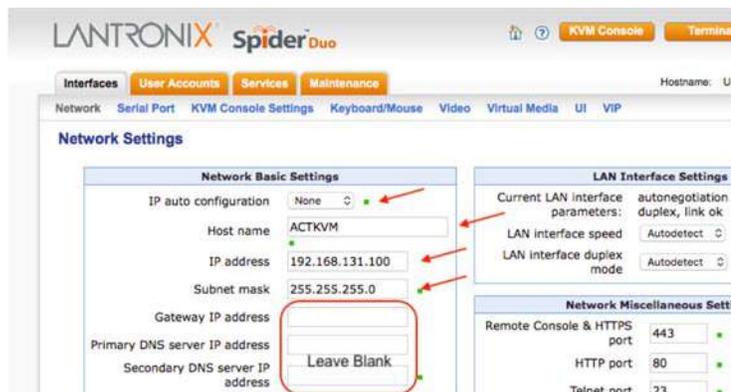
- From the list on the lefthand side, select **Internet Sharing** and select the checkbox **On**.
- Plug in the SpiderDuo KVM to a power source.
- Attach the 1G copper ethernet cable to the ethernet port on the KVM and the ethernet port on the Mac.
- From **Finder**, Select **Applications** and go to the **Utilities** folder.
- Search for the word **offer** in the console. After a few seconds, a message from process **bootp** daemon displays an IP address offered to the KVM. This is the IP address used to connect to the SpiderDuo KVM.



9. Using a web browser, connect to this IP address. Log in with credentials:
 - o Login: sysadmin
 - o Password: PASS



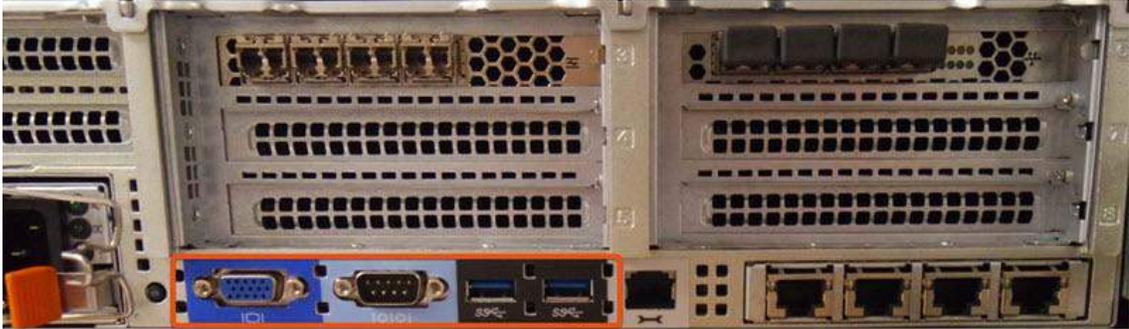
10. Click on the Interfaces tab, and set a static IP address.



11. Click **Save** on the bottom of the screen.
12. Turn off Internet Sharing on the Mac.

Note: It's a good idea to set this in the same range as the CDS Generation 3 and 4 IMM range: 192.168.131.xxx.

KVM Installation



VGA and USB port locations on the CDS Generation 5

Install the SpiderDuo KVM *after* the procedures outlined in the CDS Generation 5 installation guide.



SpiderDuo KVM used with the CDS Generation 5 requires these components

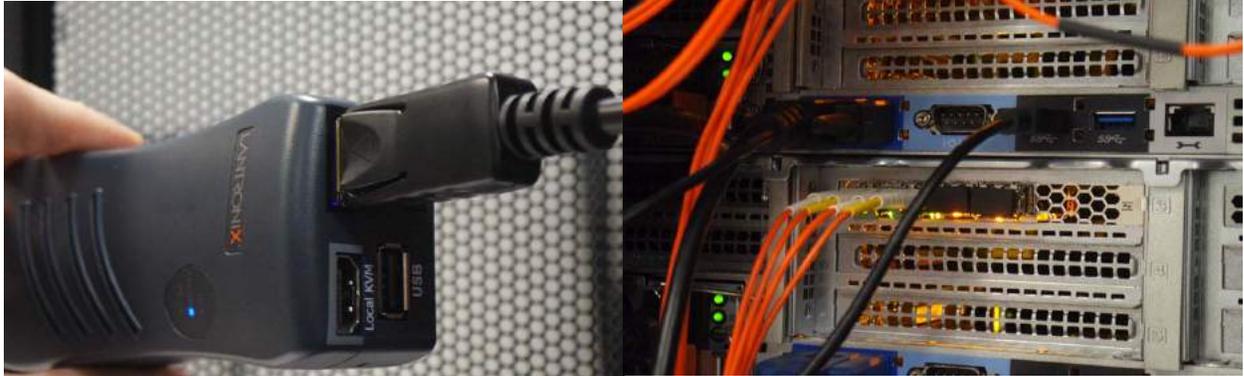
To install the SpiderDuo KVM:

1. Plug the included power cable into a source and into the power input to the left of the ethernet port.



Power input

2. Attach the included VGA/USB component to the To Computer input.
3. Attach the VGA/USB cables to their inputs on the CDS Generation 5.



KVM and CDS Generation 5 input for VGA/USB

4. Attach the Ethernet cable to the Ethernet input of the KVM and the local network.



Ethernet KVM input

Accessing the KVM Console (Accessing the CDS Generation 5 remotely)

When using a web browser:

1. Access the Spider or SpiderDuo device over the network by using a web browser by entering:

`https://<KVM ip address>`

Browser must accept cookies for login.

Note: Safari is not recommended to access the KVM console. Use Chrome or Internet Explorer.

2. Enter user `sysadmin` and password `PASS` at the prompt. The home page displays.
3. From the home page, click KVM Console to launch the Remote Console window. If the window launches in the background, click on the icon to bring the window to the front.



Accessing the CDS Generation 5 via SSH

SpiderDuo KVM enables access to the Spider device serial port, allowing SSH clients to connect directly.

To access via serial port: the serial port must be in passthrough mode with the appropriate connection parameter.

1. Use a SSH utility to connect to the IP address of the SpiderDuo device.
2. The spider device presents LOGIN and PASSWORD prompts. Enter a valid user name and password.
3. The SpiderDuo device will reply with a Welcome and status message, followed by a command line prompt.
4. Enter `connect serial` to connect to the serial port.
5. When complete, enter `ESC-Exit` to return to the command line.