

NVIDIA Quadro Visual Computing Appliance

Installation Guide

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1 Introduction to Quadro VCA

1.1 Description of the VCA

Accelerate design and VFX workflows with NVIDIA® Quadro® Visual Computing Appliance (VCA), the fastest way to interactive, photorealistic digital 3D models and scenes. This is a powerful network-attached appliance that harnesses the power of the highest-performing NVIDIA GPUs. It's accessible to anyone on the network, easily integrated into design workflows, and effortlessly scales to multiple VCAs to minimize the time to noiseless, physically-based global illumination. This means that you can now deliver photograph-quality images faster than ever before.

1.2 What's in the box

Be sure to inspect each piece of equipment shipped in the packing box. If anything is missing or damaged, contact your supplier.

What's included with your Quadro VCA:

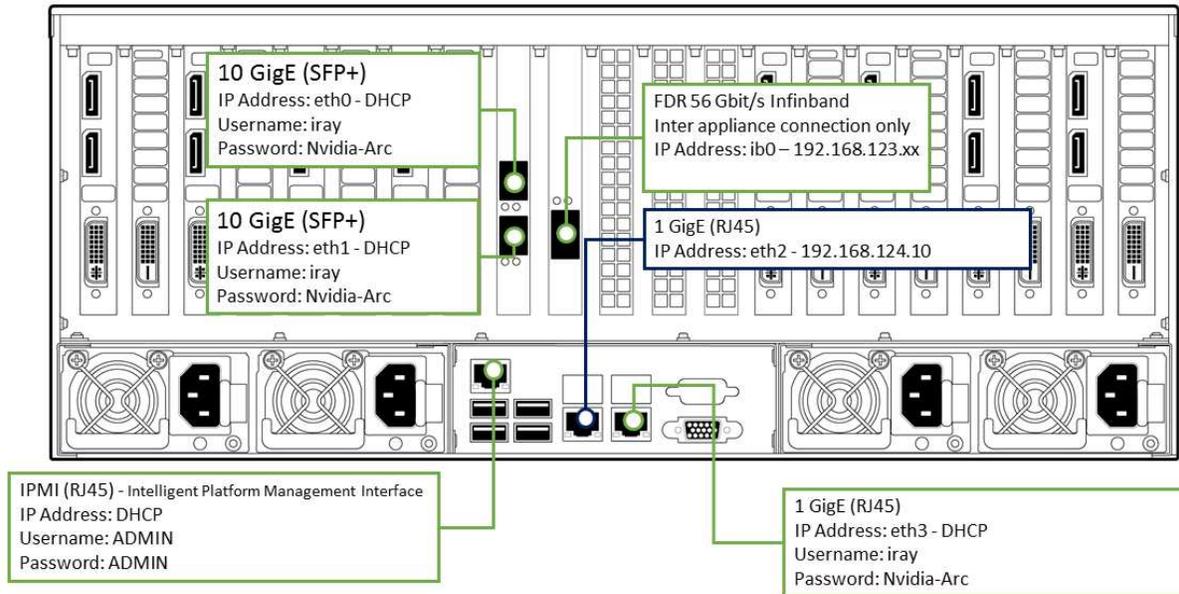
- Welcome card
- Power cables (4)
- Quadro VCA (with rails for rack mounting)

1.3 Community support

The [NVIDIA Advanced Rendering Forum \(https://forum.nvidia-arc.com/\)](https://forum.nvidia-arc.com/) includes a forum for the Quadro VCA user community. Go to this forum to post and to search for answers to your questions. Be sure to check out the useful tips and relevant product information posted by the Quadro VCA engineering and product support teams.

2 Quickstart

This section describes how to configure the hostname and the static IP address of the VCA. Check the mapping of the network ports shown in the following figure before starting this procedure.



Mapping of network ports in the VCA

Note:

- **Installing a required driver:** The first time you connect a machine to a VCA by using a connection port, you are prompted to install a driver. After the driver is successfully installed and the machine is rebooted, you can configure VCA interfaces.
- **Submitting settings:** After you make changes to a section in the VCA Setup page, you must click **Submit**. If you leave fields empty in a section, you must still click **Submit** before continuing to the next section.
- **Configuring network settings:** You can configure all network settings from the VCA Setup page or a Linux shell.

To configure from the VCA Setup page, the hostname, and the static IP address or DHCP address of all network interfaces of the VCA:

- 1 Change the IP address of the external machine to 192.168.124.2.
- 2 Connect to the VCA Setup page:
 - 2.1 Connect the external machine to the eth2 interface (marked in blue in the illustration) by using an Ethernet cable
 - 2.2 Connect the eth3 interface to your local LAN.

2.3 Connect a browser to `http://192.168.124.10:14000`.

Note:

- For more information about changing various parameters, see "[System setup using the VCA Manager](#)" (page 14).
- If your network has a DHCP server running, the `eth3` interface is automatically connected to it.

3 To change the network settings of an interface to a static IP address, use the network parameter section of the Setup page:

3.1 Add a static IP address

3.2 Add a gateway

3.3 Add a network mask

If you are not sure what to enter, ask your system administrator.

Note:

- From this Setup page, you can switch an interface to a static IP address or to DHCP as often as you want.
- If you do not want to change the network settings of an interface to a static IP address, leave this section empty and click `Submit`.

4 To test the performance of the Quadro VCA, perform a render test by clicking `Start Test`.

5 After you have completed and submitted all sections, a `Restart` button is displayed in the upper left corner of the form. Click `Restart` to restart the VCA Manager.

6 Set the IP address of the external machine back to what it was before (DHCP).

7 Reconnect to `https://VCA-IP-address`.

8 Accept the certificate warning.

9 Login to the VCA Manager again:

```
User Name: admin
Password: admin
```

Note: When you change the interface to a static IP address, the IP address of the InfiniBand interface is changed automatically.

3 Quadro VCA specification

3.1 Hardware

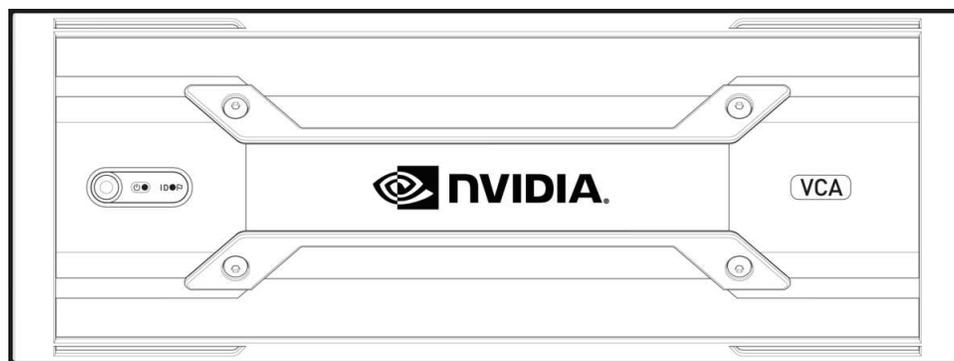
3.1.1 Hardware components

<i>Feature</i>	<i>Description</i>
GPU	8 M6000-VCA
GPU Memory	12 GB per GPU
CUDA cores	23040
CPU cores	40
System memory	256 GB
Storage	4x 500 GB
Network	1x IPMI, 2x 1 GigE, 2x 10 GigE (SFP+), 1x FDR 56 Gbit / s InfiniBand

3.1.2 Physical dimensions

<i>Feature</i>	<i>Description</i>
Form factor	4U Rack mount
Width	18.2" (462mm)

3.1.3 Front panel



Quadro VCA front panel

The front panel of the Quadro VCA contains the power button as well as indicator lights.

Power button

- Press once to turn the system on.
- Press once while running to turn the system off.
- Press and hold while running to force system shutdown.

System Power LED

- LED on when system is running

Alert modes

- A **blue LED** identifies the system using the Intelligent Platform Management Interface (IPMI).
- A **red LED** indicates a hardware error such as a power failure, fan failure, or overheating.

Color	Alert LED Behavior	Status Description
Blue	Off	Normal mode operation
Red	Off	Normal mode operation
Blue	Blink	On when enabled by administrator
Red	Solid	System component overheat
Red	1 blink per second	Power module failure
Red	4 blinks per second	System fan failure

3.1.4 Power requirements and consumption

There are 4x 1600W redundant power supplies. The power supplies can accept either 110V (ac) or 240V (ac) input.

With all system resources under full load, the maximum power consumption is 2800W (at an ambient temperature of 35°C). Idle power consumption is 350W (at an ambient temperature of 25°C).

The following table identifies valid power configurations:

Number of working power supplies	Max input power per power supply	Max current draw per power supply (amps at 2800W and 35C)		Worst case maximum current draw per circuit (amps at 2800W and 35C)		
		120V	240V	Dual 120V/20A circuits; 2 power supplies per circuit	Single 240V/20A circuit; all power supplies on same circuit	Dual 240V/20A circuits; 2 power supplies per circuit
4 (Normal mode)	700W	5.8A	2.9A	11.7A	11.7A	5.8A
3 (1 failed supply)	933W	7.8A	3.9A	15.6A	11.7A	7.8A
2 (2 failed supplies)	1400W	11.7A	5.8A	23.7A (overloaded circuit)	11.7A	11.7A

The minimal requirements for a VCA are two 120V/20A circuits with two power supplies per circuit. If any single power supply fails, the system will continue to operate at full load.

A circuit overload can occur when:

- One whole circuit fails; or
- Two power supplies on the same circuit fail.

With a maximum of two failed power supplies, a single 240V/20A circuit will support the VCA running at full load. However, a fully redundant system requires two separate 240V/20A circuits with two power supplies per circuit; this configuration can tolerate the loss of any two power supplies or one complete 240V/20A circuit.

Caution:

- 1 Do not attempt to operate the VCA on two 120V/15A circuits. Any single failure of either power supply or circuit leads to an overload condition.
- 2 It is recommended that you keep sustained current draw under 80% of the peak rating. For example, the sustained current draw of a 20A circuit should not exceed $0.8 \times 20 = 16A$.

3.1.5 Ports

<i>Type</i>	<i>Description</i>
VGA	Available
USB	2x USB 2.0
Ethernet	One IPMI Ethernet Port. Optionally, the IPMI port can be used to monitor and manage the system, rather than a local keyboard and monitor.
2x 1 Gb Ethernet Ports	Connection to 1 Gbit Ethernet network
2x 10 Gb Ethernet Ports	Connection to 10 Gbit Ethernet network
1x FDR 56 Gbit / s InfiniBand	Connection to a managed InfiniBand switch

3.1.6 Acoustic profile

<i>Fan speed</i>	<i>Sound pressure level</i>	<i>Description</i>
Optimal	72 dBA	The system is at full load
Full	83 dBA	Fans can set to full speed in the BIOS. Full speed can also be triggered by the system.

Sound measurements were made in an independent laboratory. The ambient sound level was 21 dBA, which represents an empty office environment.

3.2 Software

The Quadro VCA comes pre-installed with the operating system, Iray and the VCA Manager. Iray is licensed to run on the Quadro VCA only.

3.2.1 Operating system

3.2.1.1 Operating system setup

<i>Type</i>	<i>Description</i>
Base operating system	CentOS 6.6 (Final)
NVIDIA driver	346.35 with ECC turned off
Mellanox InfiniBand stack	OFED Version 2.4

Note: The system has no X server installed.

3.2.1.2 Linux user accounts

- There is one Linux user account on the system. Access this account either on the console, or with `ssh`, as follows:
 - Login: `iray`
 - Password: `Nvidia-Arc`
- To login to the system to perform Iray or VCA Manager software updates, access the system either from the console login or via `ssh`.
- To perform administrative tasks, use the `sudo` command.

3.2.1.3 Linux security setting

The `iptables` application is enabled and running by default.

All ports are blocked with the following exceptions:

22	Secure Shell access (<code>sshd</code>)
14000	VCA Manager connection port
443	VCA Manager https port
11000	Iray connection port
9090	Iray HTTP administration console

SELinux is turned off.

3.2.2 Iray and the VCA Manager

The installed versions of Iray are:

- NVIDIA Iray 2014.5.3
- NVIDIA Iray 2015

The installed version of the VCA Manager is VCA Manager Version 231000.8180.

3.2.2.1 Directory layout

Iray and the VCA Manager are installed in the directory `/home/iray`. This directory consists of the following subdirectories:

<i>Subdirectory</i>	<i>Description</i>
<code>cluster-server-version-buildnumber</code>	Iray 2014 installation
<code>cluster-server-bunkspeed</code>	Iray 2014 for Bunkspeed Zoom
<code>cluster-manager</code>	VCA Manager installation
<code>cm</code>	VCA Manager startup scripts and VCA Manager database.

Note the following:

- The build number (`buildnumber`) consists of two parts, for example: 221133.2594. For compatibility, the Iray client version has to be identical in the first part and have an equal or higher version number for the second part. For Iray 2015, the client finds the correct server version itself.
- The VCA Manager database contains the user accounts for the VCA Manager. The VCA Manager database is not overwritten when updating the VCA Manager.

4 Hardware installation

4.1 Rack mounting

This section provides instructions on how to rack mount and connect your Quadro VCA. Following the steps in the order given should enable you to have the system operational within a minimal amount of time.

4.1.1 Setup location

Decide on a suitable location for setting up and operating the Quadro VCA. The location should be clean, dust-free, and well ventilated. Avoid areas where heat, electrical noise, and electromagnetic fields are generated. Locate the VCA near a grounded power outlet.

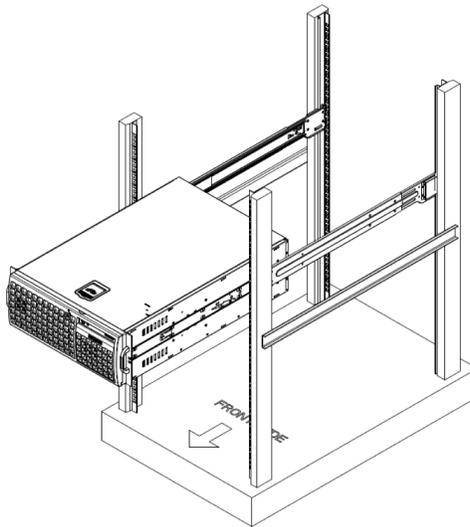
- Leave enough clearance in front of the rack to enable you to open the front door completely (25").
- Leave approximately 30" (76.2cm) of clearance in the back of the rack to allow for sufficient airflow and ease in servicing.
- Always make sure the rack is stable before adding or removing an Quadro VCA or any other component.
- Keep the ambient temperature and humidity within the following ranges:
 - Temperature: 10°C to 35°C (50°F to 95°F)
 - Humidity: 8% to 90% (non-condensing)

4.1.2 Rack installation

4.1.2.1 Precautions

Caution: To prevent bodily injury when mounting or servicing the Quadro VCA in a rack, you must take special precautions to ensure that the system remains stable. The following guidelines are provided to ensure your safety.

- The VCA should be mounted at the bottom of the rack if it is the only unit in the rack.
- When mounting the VCA in a partially filled rack, load the rack from the bottom to the top with the heaviest component at the bottom of the rack.
- If the rack is provided with stabilizing devices, install the stabilizers before mounting or servicing the VCA in the rack.



Installing the VCA in a rack

4.1.2.2 Installing the outer rails

- 1 Adjust the brackets to the proper distance so that the rail fits snugly in the rack.
- 2 Secure the rear of the outer rail with two M5 screws and the rear of the rack.

Note: The outer rail is adjustable from approximately 26" to 38.25" (66cm to 97.16cm).

- 3 Repeat steps 1-2 for the left outer rail.

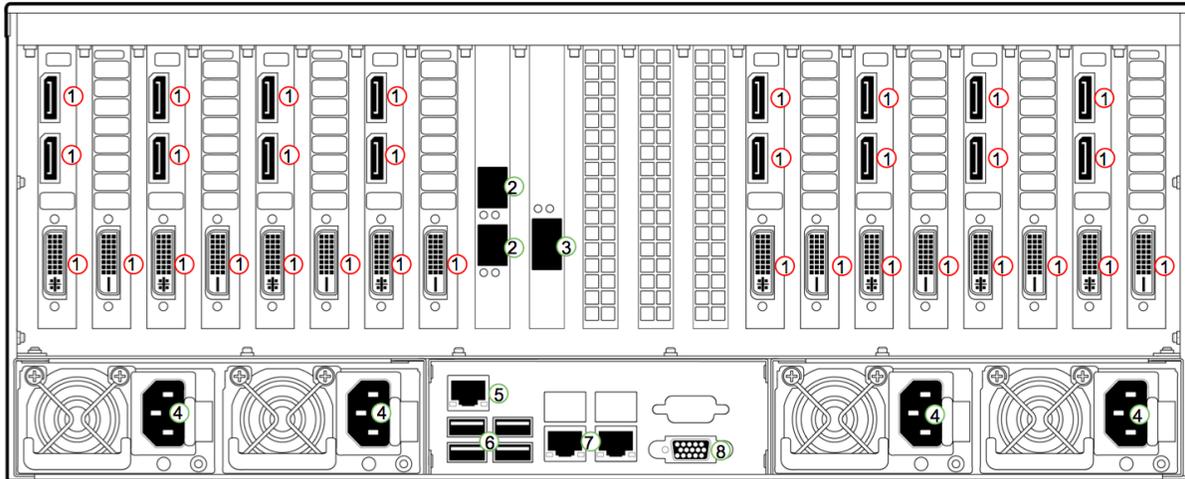
4.1.2.3 Installing the box into the rack

- 1 Confirm that the VCA has the inner rails attached and that you have already mounted the outer rails into the rack.
- 2 Align the inner chassis rails with the front of the outer rack rails.
- 3 Slide the inner rails into the outer rails, keeping the pressure even on both sides (you may have to depress the locking tabs when inserting). When the VCA has been pushed completely into the rack, you should hear the locking tabs "click" into the locked position.

Caution: Stability hazard — The rack stabilizing mechanism must be in place, or the rack must be bolted to the floor before you slide the VCA out for servicing. Failure to stabilize the rack can cause the rack to tip over.

Note: The rail assemblies shipped with the Quadro VCA fit into a standard 19" rack.

4.2 Connecting cables



Quadro VCA connectors

Connector	Description
1	Do not use
2	10 GigE — SFP+
3	FDR 56 Gbit / s InfiniBand
4	Power
5	Intelligent Platform Management Interface (IPMI) — RJ45
6	USB ports for connecting a keyboard during initial setup
7	1 GigE — RJ45
8	VGA display output console

4.2.1 Keyboard and monitor for console access

A VGA monitor can be connected to the VGA connector on the appliance.

A USB keyboard can be connected to any USB port.

Note: The VGA monitor and keyboard are not needed during normal operation.

4.2.2 Connecting power

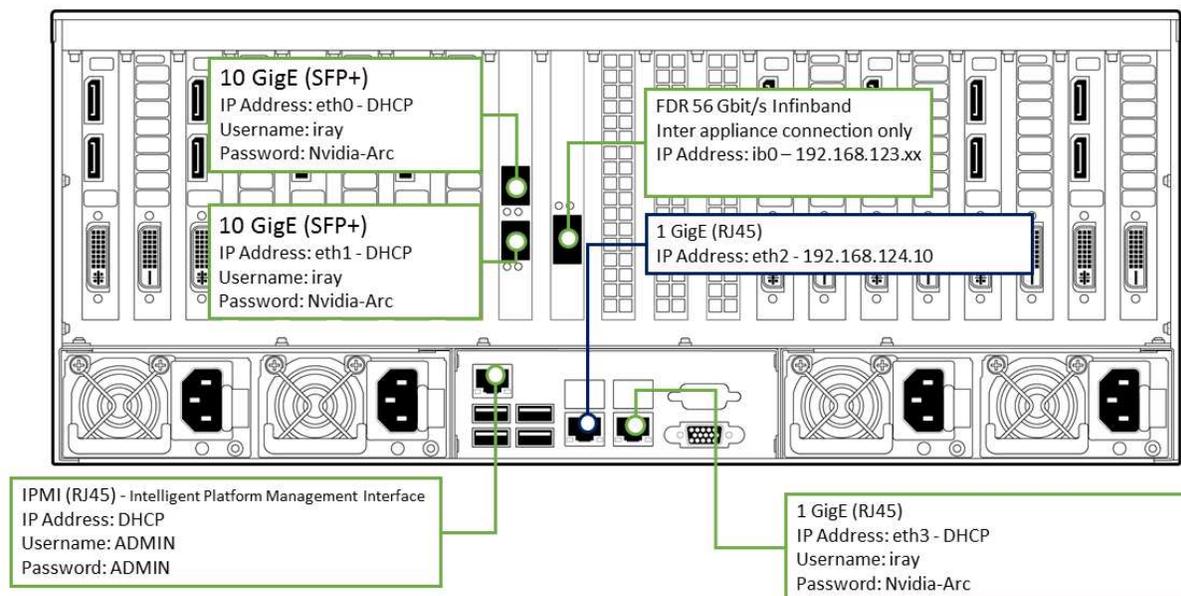
Four power cables are shipped in the VCA kit. Connect these power cables to either a 110V (ac) or 240V (ac) outlet. A voltage of 240 is recommended for better power redundancy in the event of a failure of one of the power supplies.

4.2.3 Ethernet connection

The following network connection ports are available:

Interface	Description
ipmi	IPMI interface
eth0	10 Gbit Ethernet
eth1	10 Gbit Ethernet
eth2	1 Gbit Ethernet
eth3	1 Gbit Ethernet

Connect the network cables from the Quadro VCA to a data center network Ethernet switch, using a Cat5, Cat5e, or Cat6 Ethernet cable.



Mapping of network ports in the VCA

4.2.4 InfiniBand connection

- Connect the Quadro VCA to the InfiniBand switch. The recommended switch is a Mellanox managed 56 Gbit / s FDR switch (tested configuration: Mellanox SX6036). The number of ports may be different depending upon how many Quadro VCA nodes are connected.
- If only two Quadro VCAs have to be connected, no extra switch is needed. Connect them directly with the InfiniBand cable.
- Use 56GB/s Mellanox Passive Copper Cables for connections up to four meters long. 56Gb/s Active Optical Cables from Mellanox should be used for longer distances than four meter between VCAs or the VCAs and the switch. Part numbers are available from the Mellanox website (www.mellanox.de).

4.2.5 Setup Intelligent Platform Management Interface (IPMI)

- 1 Attach a VGA monitor and a keyboard to the VCA.
- 2 During boot of the VCA hit **Delete**.
- 3 The machine will stop booting into BIOS settings.
- 4 Select **IPMI BMC Network Configuration Change** and change it to **yes**.
- 5 Change to a static IP address, gateway and netmask.
- 6 To improve security, change the login and password.
- 7 Reboot the machine.

5 Software installation

5.1 System setup using Linux commands

When booting and the Quadro VCA is connected on interface eth3 to local network DHCP will be used by default.

A unique hostname is preset.

To change the default settings (hostname, IP address, default route), log in either on the console or per ssh as user iray and run:

```
sudo system-config-network
```

This will modify the following system files:

- /etc/sysconfig/network-scripts/ifcfg-eth<N>
- /etc/sysconfig/network
- /etc/hosts

Note: Contact your network system administrator to add the hostname of the Quadro VCA to DNS.

5.2 System setup using the VCA Manager

Network settings can be changed from the VCA Manager interface if you are not familiar with Linux.

- 1 Connect a second machine (for example, your laptop) to the configuration port eth2.
- 2 Set this second machine to any IP address from the 192.168.124.0 network.
- 3 Connect to `http://VCA-IP-address`.

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[← Back to Overview](#)

VCA Manager - Initial Setup

Welcome admin

Retrieve VCA Serial Number: "08154711" ✓ [Please take the time to register your Iray VCA here.](#)

Set the VCA Pool name.

New Name:

For security reasons, please change the administrator password.

New Admin Password:

Confirm new Admin Password:

Please enter new network parameters for the VCA. If you leave fields out, they will be unchanged and the default parameters will be used.

Hostname: (e.g. iray01)

Static IP Address: (e.g. 172.16.1.2)

Default Gateway: (e.g. 172.16.1.1)

Network Mask: (e.g. 255.255.255.0)

Please conduct a basic render performance test. This will take up to 2 minutes.

VCA Setup Page

A field must be submitted to activate a change. Any field may be used and can be left blank.

- 4 The serial number of the Quadro VCA is displayed on the top left corner of the window. Please follow the link to register the system.
- 5 VCA Pool name will change the name that is displayed when connecting with the VCA Manager.

Set the VCA Pool name.

New Name:

VCA Pool name

6 Change administrator password of the VCA Manager (default is admin:admin).

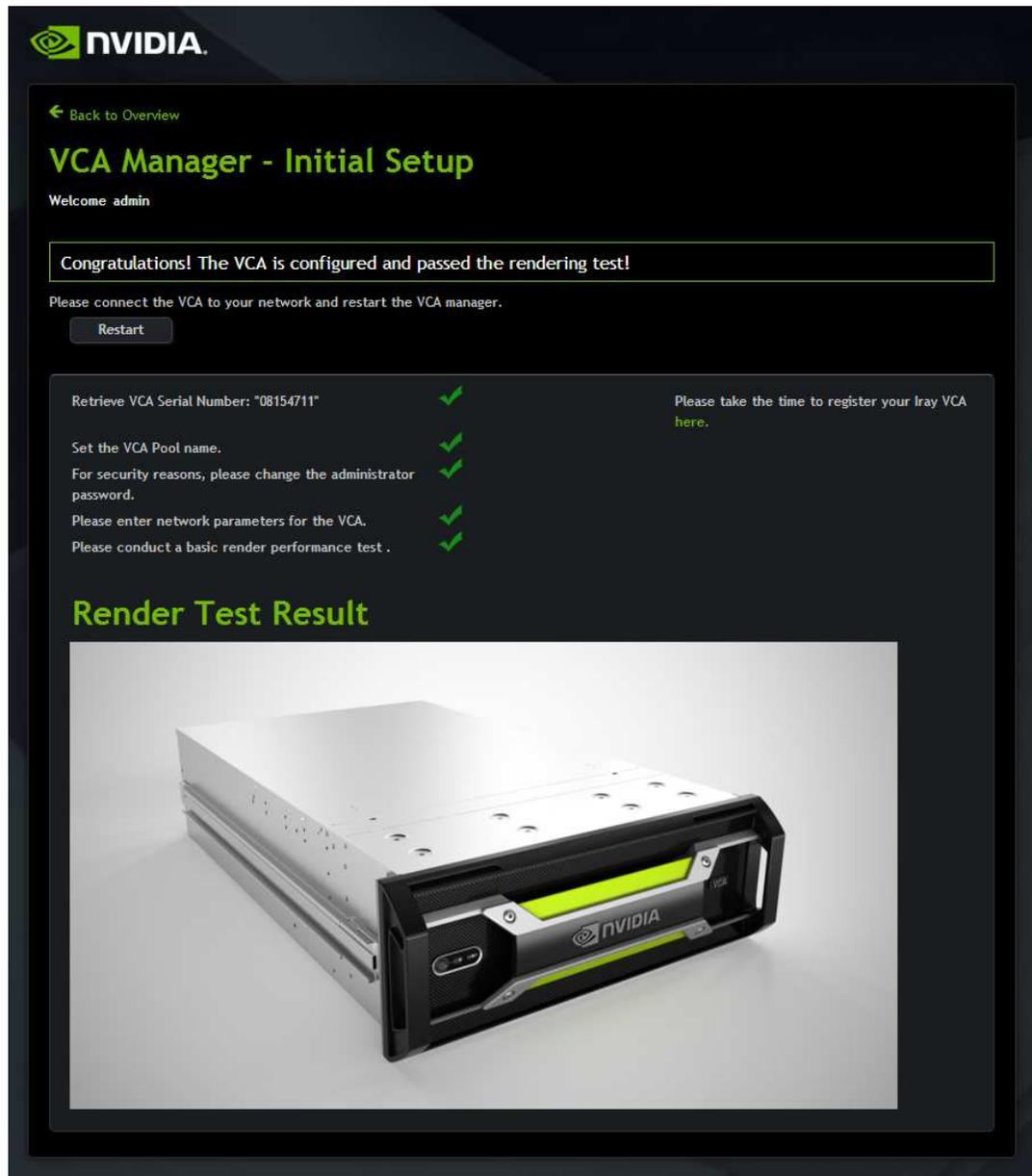
VCA Manager admin password

7 Change network parameters for network interfaces to either a static IP address or a DHCP address.

A VCA Manager restart is necessary when changing IP addresses. The VCA Manager Restart button is displayed when all fields of the form are submitted.

Network setup

8 Start Test will test the rendering performance of the system. If the test runs successfully, an image is displayed within two minutes.



Restart VCA Manager

- 9 If the network settings were altered it is now necessary to press the **Restart** button. This will restart the VCA Manager with the new network parameters.
- 10 Connect a browser to the VCA's new IP address. Using the IP address or the hostname, enter the following in the browser's address input window:


```
https://VCA-IP-address
```
- 11 Accept certificate warning to get to the VCA Manager.

5.3 InfiniBand setup

The configured InfiniBand network is 192.168.123.0. The system comes pre-configured with a random IP address from that network.

Running the VCA Setup procedure will alter that IP address 192.168.123.xxx, where xxx are the last 8 bits of the chosen IP address for eth2. For example, if the static IP address is 172.16.0.214, the InfiniBand address will be set to 192.168.123.214.

InfiniBand is only used for internal communication between the Iray instances on different nodes and does not need to be routed to any other network.

5.4 Software updates

This section describes how to upgrade an existing installation and how to find and install new software.

Note:

- 1 For updates and installations, the Quadro VCA must be connected to the Internet.
- 2 When upgrading the VCA Manager on multiple Quadro VCAs (cluster), the VCA Manager has to be shutdown before upgrading. It can be shutdown from the VCA Manager tools menu.
- 3 If you use multiple VCAs in a rack, each VCA has to be updated individually.

5.4.1 Listing currently installed packages

To display a list of currently installed packages, run:

```
sudo yum --disablerepo="*local*" list installed "nvidia-vca*"
```

5.4.2 Updating an existing installation

Note:

- For Iray, the latest version number is always incremented if a new version is incompatible with older versions due to client-server protocol changes.
- Incompatible versions are not installed as an upgrade, but require a new install operation.

- 1 Login to the system with the **iray** Linux account and run the yum package management utility.

```
sudo yum check-update "nvidia*"
```

- 2 To upgrade your complete installation, run:

```
sudo yum upgrade "nvidia*"
```

- 3 To upgrade a particular package, replace `nvidia*` with the selected package name.

5.4.3 Installing new software packages

- 1 To get a list of all software packages in the repository, see <http://pkg.nvidia-arc.com>.

When a software package is updated:

- The new version is added to the repository.
- The old version is still downloadable from the repository.

- 2 To get a list of new software packages, if any, run:

```
sudo yum --disablerepo="*local*" list "nvidia"
```

When you run the `yum list installed` command, the most recently installed version of a software package is displayed in the list.

Although old versions of the software package are not displayed in the list, they are still downloadable from the repository. For example, if you install the VCA Manager from the repository server, the existing installation is overwritten. However, you can still download older versions of the software packages from the repository.

- 3 To select and install a new package, run:

```
sudo yum --disablerepo="*local*" install name-of-the-selected-nvidia-package
```

5.5 Iray Queue Manager setup

Iray Queue Manager is an Iray-based, multi-user application for remote batch rendering on the VCA. The browser-based user interface enables you to reserve nodes for rendering, manage the render queue, download rendering results, and configure Iray Queue Manager to suit your requirements.

The following sections describe how to install Iray Queue Manager on the VCA, initialize a batch render queue, and use Iray Queue Manager to manage the render queue.

5.5.1 Installing Iray Queue Manager

Note: You need to install or upgrade Iray Queue Manager on one VCA only.

To install Iray Queue Manager:

- 1 Ensure that the latest version of VCA Manager is installed. If you are upgrading Iray Queue Manager, ensure that Iray Queue Manager is not running.
- 2 At the command line, enter:

```
sudo yum -disablerepo="*local*" install "nvidia-vca-iray-server"
```

The latest version of Iray Queue Manager is installed.

- 3 From the VCA Manager home page, click the link **Go to Queue**, which is near the top of the page.

The Queue page for Iray Queue Manager is displayed. On the left side of the Queue page is the navigation panel; the displayed list of page links is determined by your login status: system administrator or VCA user.

5.5.2 Starting the queue

To start the queue in Iray Queue Manager:

- 1 Log in as the Iray Queue Manager administrator.

The user ID and password are `admin`.

- 2 From the navigation panel on the left, click **Settings**.

The Settings page is displayed.

- 3 From the Settings page, go to the Resources section. It is recommended that you log in as Iray Queue Manager administrator. The user ID and password are `admin`.

Note: If you do not want to log in as Iray Queue Manager administrator, create a new account in the VCA Manager and use this new user ID and password to log in.

When a connection to the VCA is established, a confirmation message is displayed in the top right corner of the page. In the following steps, you select VCA nodes and start the queue for Iray Queue Manager.

- 4 From the navigation panel on the left, click **Queue**.

The Queue page is displayed.

- 5 From the Queue page, click **Start Queue**.

The Reserve Cluster dialog is displayed.

- 6 In the Reserve Cluster dialog, check how many VCA nodes are currently available for your use. Specify the number of VCA nodes that you want to reserve and click the **Reserve** button.

The **Reserving Cluster** button is activated. When your reservation is successful, the **Stop Queue** button is displayed; the queue is active and ready to render submitted jobs.

5.5.3 Stopping the queue

To stop the queue in Iray Queue Manager:

- 1 Login as the Iray Queue Manager administrator.

The user ID and password are admin.

- 2 From the navigation panel on the left, click **Queue**.

The Queue page is displayed.

- 3 From the Queue page, click **Stop Queue**.

The **Start Queue** button is displayed. The queue is no longer active.

5.5.4 Using Iray Queue Manager

To use Iray Queue Manager:

- 1 After you have started the queue for Iray Queue Manager, logout as Iray Queue Manager administrator.
- 2 Login using your VCA user ID and password.

After Iray Queue Manager is started, you can submit a job using one of the companion Iray plugins. When a job is successfully submitted it is displayed on the Queue render page under the heading Jobs. With certain limitations, you can change the order of your jobs in the render queue by dragging and dropping the + icon.

Two tabular reports are displayed on the Queue page:

- *Queue report*: Administrators and users get a complete list of jobs in the render queue.
- *Done report*: Administrators get a complete list of rendered jobs. Each user gets a custom report listing their rendered jobs only.

You can view and download rendered images from the Results page.

For more information about the purpose and use of the various pages, see the Iray Server documentation.

5.6 Factory reset

To reset Quadro VCAs to the initial factory settings, perform the following steps:

- 1 Create a bootable thumb drive that contains a factory reset image.
- 2 Reset the hard drives to the initial factory settings by using the bootable thumb drive.

Note:

- When you reset the hard drives, all data is lost and the internal SSD drives are completely overwritten.
- BIOS settings are not reset. If the IPMI network was configured to a static IP address, that value remains unchanged after the factory reset procedure is completed.

5.6.1 Creating a bootable thumb drive

Prerequisites:

- An ISO image file. Contact your reseller for more information.
- A Windows PC (XP/Vista/7/8) connected to the Internet
- A thumb drive with at least 16GB of memory and formatted in FAT32. The thumb drive will be completely overwritten so backup any files you want to keep.

To create a bootable thumb drive that contains a factory reset image, perform the following steps:

- 1 Ensure that you have an ISO image file. If you do not have this file, contact your reseller.
- 2 From a Windows PC (XP/Vista/7/8) connected to the Internet: Download USB Universal Installer (UII), version 1.9.4.8 or later, from <http://www.pendrivelinux.com/universal-usb-installer-easy-as-1-2-3/> (1MB).
- 3 Insert a thumb drive (minimum 16GB) into the Windows PC. Click on **Start > Computer** to verify the drive letter of the thumb drive.

Note:

- 3.1 Ensure that the thumb drive is formatted in FAT32.
- 3.2 Backup any important files on the thumb drive before you continue. The thumb drive will be completely overwritten.

- 4 Launch the Universal-USB-Installer executable (version 1.9.4.8 or later). From the Universal USB Installer Setup dialog, perform the following steps:
 - 4.1 From the **Step 1** pull-down menu, select **Try Unlisted Linux ISO**.
 - 4.2 Under **Step 2**, click **Browse** and locate the `iray_install.YYYYMMDD.iso` image.
 - 4.3 From the **Step 3** pull-down menu, select the target USB device.

Note:

- 4.3.1 Ensure the drive letter matches that of your thumb drive.
- 4.3.2 Check the Format checkbox if your thumb drive needs reformatting.

- 4.4 Click **Create** to write the ISO image to your thumb drive.
- 5 After the message "Installation Done, Process Complete" is displayed in the output window, remove the thumb drive from the Windows PC.

5.6.2 Resetting the hard drives to the factory settings

Prerequisite: A bootable thumb drive that contains a factory reset image.

To reset hard drives to the factory settings, perform the following steps:

- 1 Shut down the Quadro VCA cluster.

From the top-right settings menu of the VCA Manager Web interface, select **Shutdown VCA Managers**. Confirm shutdown.

- 2 For each node in the cluster, repeat the following steps:

- 2.1 Power down the Quadro VCA system using one of the following methods:

- From IPMI web interface (if so configured):

From the System Summary main page, click the **Power Down** option.

- From local console or via ssh terminal:

2.1.1 Login to the VCA where *username/password* is *iray/Nvidia-Arc*

2.1.2 At the command line, enter: `shutdown -P now`

- Press the front power button

- 2.2 On the back of the Quadro VCA, insert the bootable thumb drive, which contains the factory reset image, into an available USB port.

- 2.3 Power up the Quadro VCA.

Note: Ensure you are near the console and keyboard, or IPMI interface, connected to the Quadro VCA node being reset.

- 2.4 As soon as the NVIDIA Logo screen is displayed, press F11 to invoke the Boot menu.

- 2.5 From the Boot menu, select **PMAP**, which is the factory reset thumb drive.

Wait while the system boots from this USB device.

- 2.6 At the NVIDIA Logo screen, press Enter to install the Quadro VCA system software.

- 2.7 After the `IRAY-SERVER login: prompt` is displayed, remove the thumb drive.

- 2.8 For each Quadro VCA node in the cluster, repeat steps 2.1 to 2.7.

5.7 Installing third-party software

5.7.1 Overview

To connect third-party software for use with the VCA Manager, perform the following steps:

- 1 Install the software under the Iray account to avoid permission problems.

- 2 Create a run script and copy it into `/home/iray/cm/satellite`. For more information, refer to "Setting up a third-party run script" (page 24).
- 3 Add the run script to the VCA Manager database, which stores all persistent information. For more information, refer to "Updating the VCA Manager database" (page 24).

5.7.2 Setting up a third-party run script

The following example is a simple run script for third-party software:

```
#!/bin/bash
trap 'killall -9 third-party-process' EXIT
sh -c "third-party-process $1 $2 $3 $4 $5"
```

From the VCA Manager, a run script can get the following arguments:

<i>Argument</i>	<i>Description</i>
\$1	Unique multicast address for an allocated cluster
\$2	Data connection port
\$3	Head node IP address to which the client connects
\$4	Head node (0,1)
\$5	Size of the allocated cluster

Note: The value of *third-party-process* must be the binary that keeps running, not a shell script starting the binary process.

5.7.3 Updating the VCA Manager database

The VCA Manager uses an SQLite database. The following example shows how to add a third-party run script to this database:

```
cd /home/iray/cm
sqlite -line cluster_manager.db \
"insert into scripts values(null,"Description Text", \
"/home/iray/cm/satellite_run_thirdparty",null,null);"
```

For a VCA cluster, the third-party run script has to be added to all nodes since scripts are not automatically synchronized between the nodes.

Note: For third-party software, the VCA Manager icon does not switch from yellow to green.

5.8 Testing the installation

5.8.1 VCA Manager tests

To test the installation:

- 1 Connect a browser to the VCA's IP address.**

In the browser's address input window, enter:

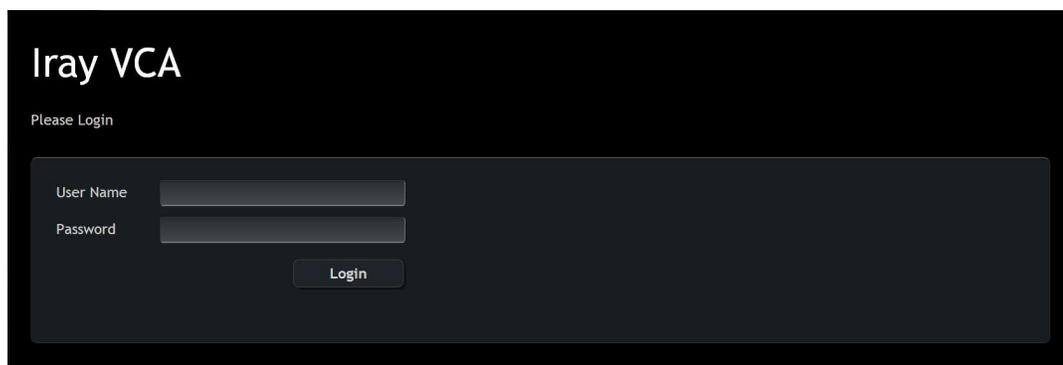
```
https://VCA-IP-address
```

(using the IP address or hostname of your VCA).

- 2 Accept certificate warning.**

- 3 Login to the VCA Manager.**

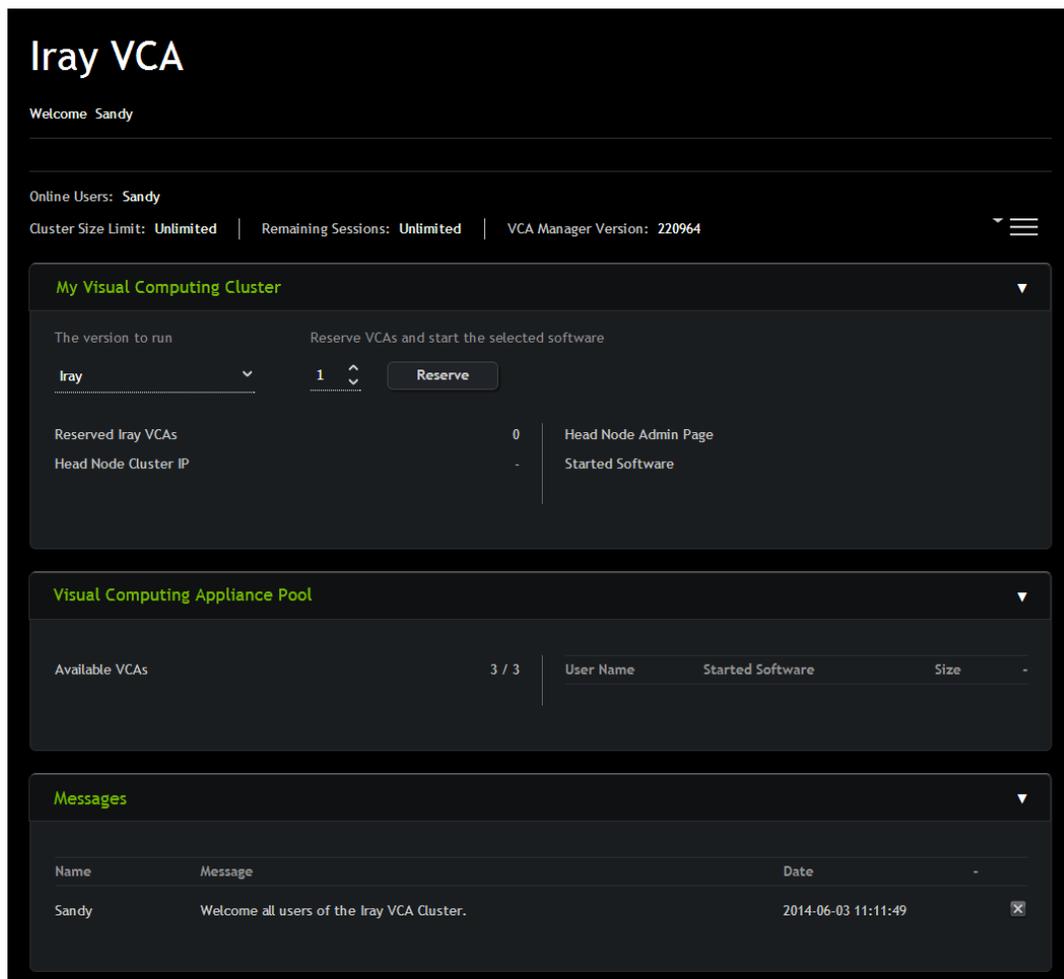
```
User Name: admin  
Password: admin
```



VCA Manager Login window

4 Reserve all available nodes.

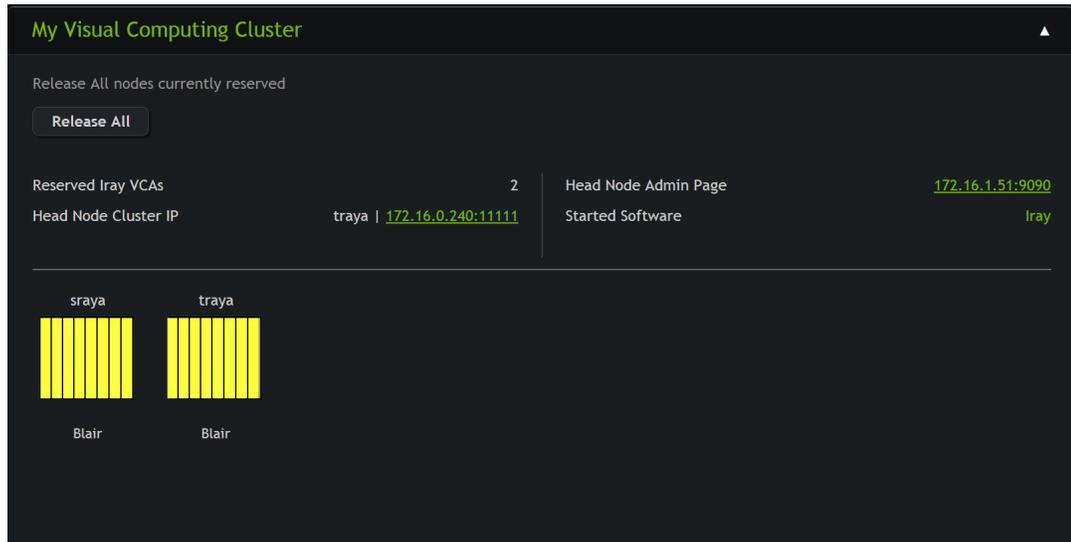
Change the number of nodes to the maximum number available and click **Reserve**.



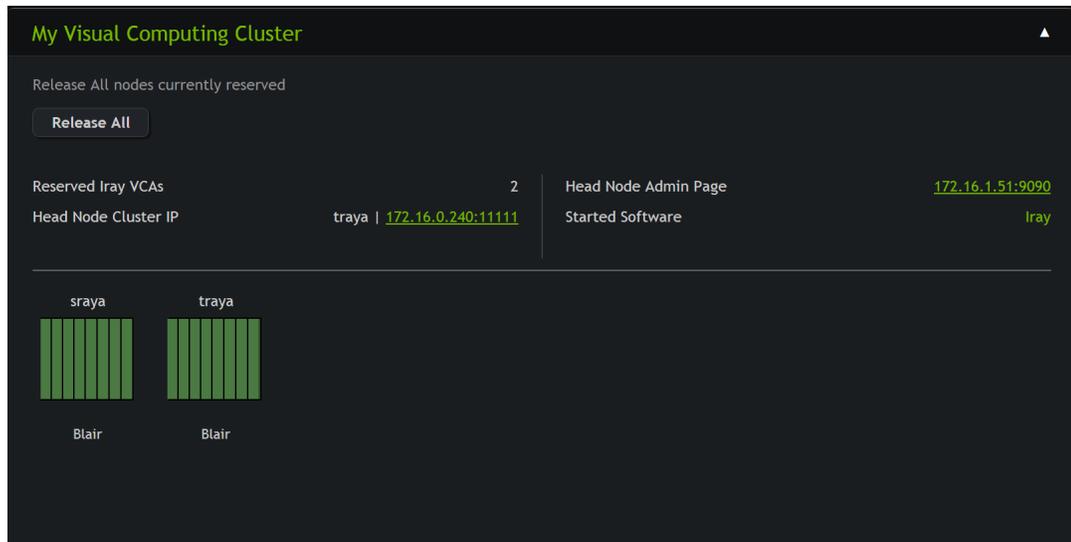
VCA Manager Overview window

5 Check if the cluster startup was successful.

Click on "My Visual Computing Cluster". Cluster reservation is successful if the color of the cluster icons turns from yellow to dark green.



Quadro VCAs reserved



Quadro VCAs ready

6 Test InfiniBand functionality. From the VCA Manager menu, select *Test RDMA Connection*

7 Test Iray Rendering. From the VCA Manager menu, select *Test Rendering*. The test succeeded if an image appears after about 2 minutes.

The Quadro VCA is now ready for connection from any remote Iray client software.

5.8.2 Troubleshooting

If you are not able to connect from the remote client application to the Quadro VCA, perform the following steps:

- 1 Check that the firewall on both the client and server sides have ports 11000, 443 and 9090 unblocked. If necessary, check with your network system administrator on how to unblock these ports.
- 2 If all ports are unblocked and the application can still not connect, follow these steps:
 - 2.1 Login as user `iray` on the Quadro VCA and check if Iray has started by searching for the string `remote_server` in the list of running processes:

```
ps -ef | grep remote_server
```

- 2.2 If that process is not running, check the logfile `/home/iray/cm/cluster-manager.log` on the reserved node.
 - 2.3 If the log entries in `/home/iray/cm/cluster-manager.log` indicate multicast traffic problems, contact the network administrator. It is possible that multicast traffic may have been disabled on the local Ethernet switch. Also check the default route on the system.
- 3 Check if the VCA nodes can ping each other on the Ethernet interfaces. If this does not produce in a live connection, check the default route on your Quadro VCA.
- 4 It must be possible to confirm a network connection using ping to all VCA nodes. If this is not possible, check the connections of the InfiniBand cables.
- 5 To stop, start or restart Iray or the VCA Manager manually, run the following shell commands on all VCA nodes:

```
/home/iray/cm/nvca-cm [-s] start [-k] stop [-r] restart
```

- 6 Check if the processes `cluster_manager` and `nodemgr_listener` are running
- 7 To contact the Quadro VCA support team, send email to: iray-vca-support@nvidia.com

6 Warranty and licensing

Hardware warranty and software licensing:

- NVIDIA limited hardware warranty — VCA:
<http://www.nvidia.com/vca/hw-warranty>
- NVIDIA VCA software end user license agreement:
<http://www.nvidia.com/vca/eula>