Kraken OVA Deployment Guide

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This Deployment Guide describes how to deploy Haivision's Kraken H.264/HEVC Video Encoder/ Transcoder within a virtual environment from an Open Virtual Appliance (OVA) file.

Note

- Kraken is available as a virtual machine for VMware ESXi and vSphere environments. For hardware acceleration of video encoding and decoding, VMWare ESXi 6.5 with Update 1 must be installed on the host appliance.
- For Intel GPU accelerator support, processors from the SkyLake (or newer) generation with support for Intel Quick Sync Video (QSV) video are required. Iris Pro Graphics P580 or higher is recommended.
- As of release 3.0, Kraken supports NVIDIA GPUs which utilize NVENC.
- As of release 3.2, Kraken supports capture and encoding of SDI input using SFP SDI->IP gateway devices, specifically Embrionix SDI-SFP devices.
- The minimum disk space requirement for Kraken VMs is 250 GB.

This guide details how to enable GPU passthrough for hardware encoding and supported capture cards (when supported by the hardware, in the current release, either Iris Pro or NVIDIA Quadro). This guide assumes you are familiar with VM servers and hypervisor systems.

After completing the steps in this guide, you will have a Kraken Virtual Machine installed that will include Kraken's support for hardware-accelerated video encoding and access to the capture card.

For detailed Kraken configuration and operation information, please refer to the User's Guide (available at https://doc.haivision.com). For the default credentials, refer to the *Important Notice* (postcard shipped with appliances). You may download the *Important Notice* as well as the latest software and Release Notes through the Download Center on the Haivision Support Portal (http://support.haivision.com).

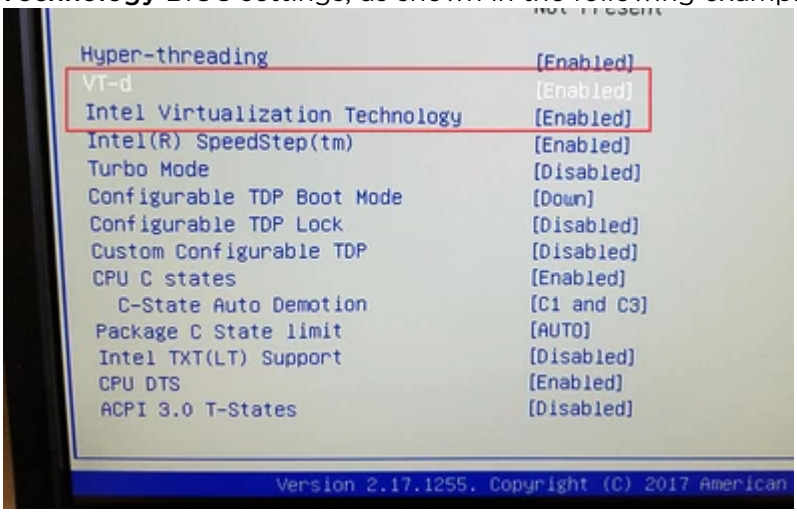
Guide Contents

Confirming the BIOS Settings

To get started, you need to enable the “Virtualization Technology” in the CPU.

To confirm and update the BIOS settings:

1. Reboot the server.
2. When the system is starting up, press F2 to enter the system setup and open the system's BIOS menu.
3. Open the **Processor** submenu (i.e., scroll down to "Processor Settings" and press Enter).
4. Enable both the **Vt-d** (Intel Virtualization Technology for Directed I/O) and **Intel Virtualization Technology** BIOS settings, as shown in the following example.

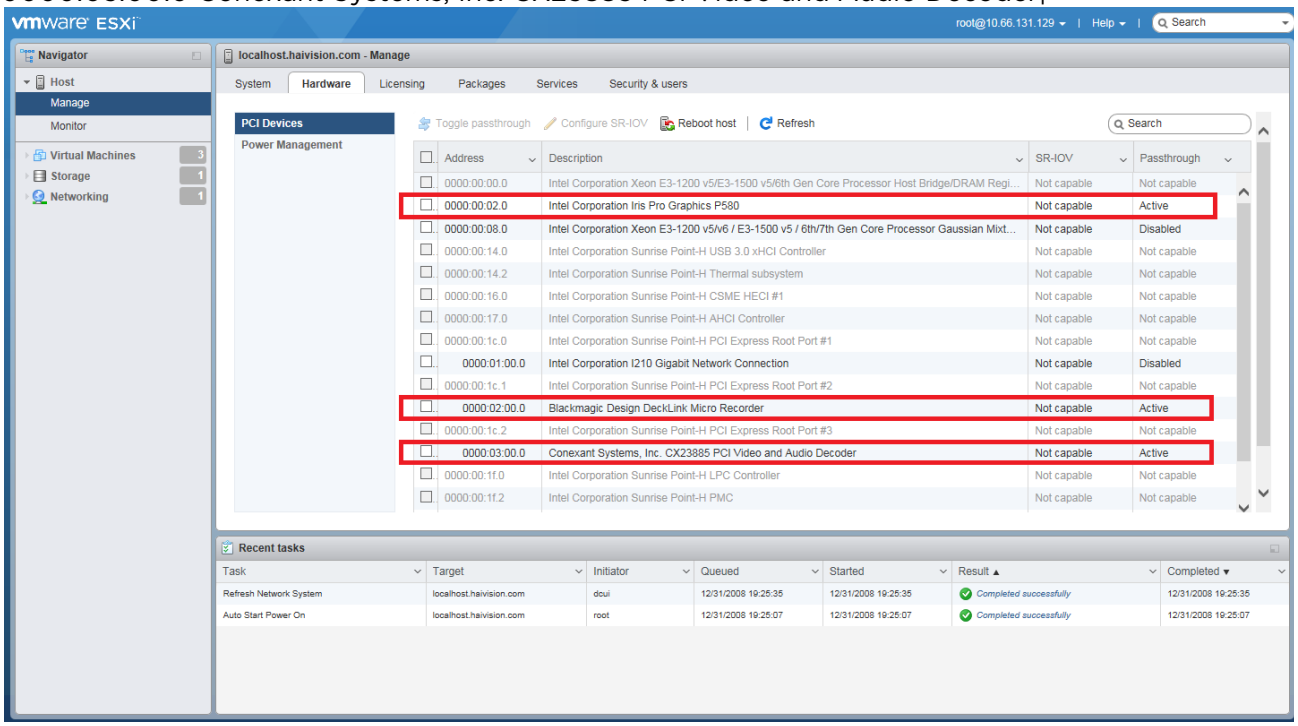


5. Select **Save & Exit**.

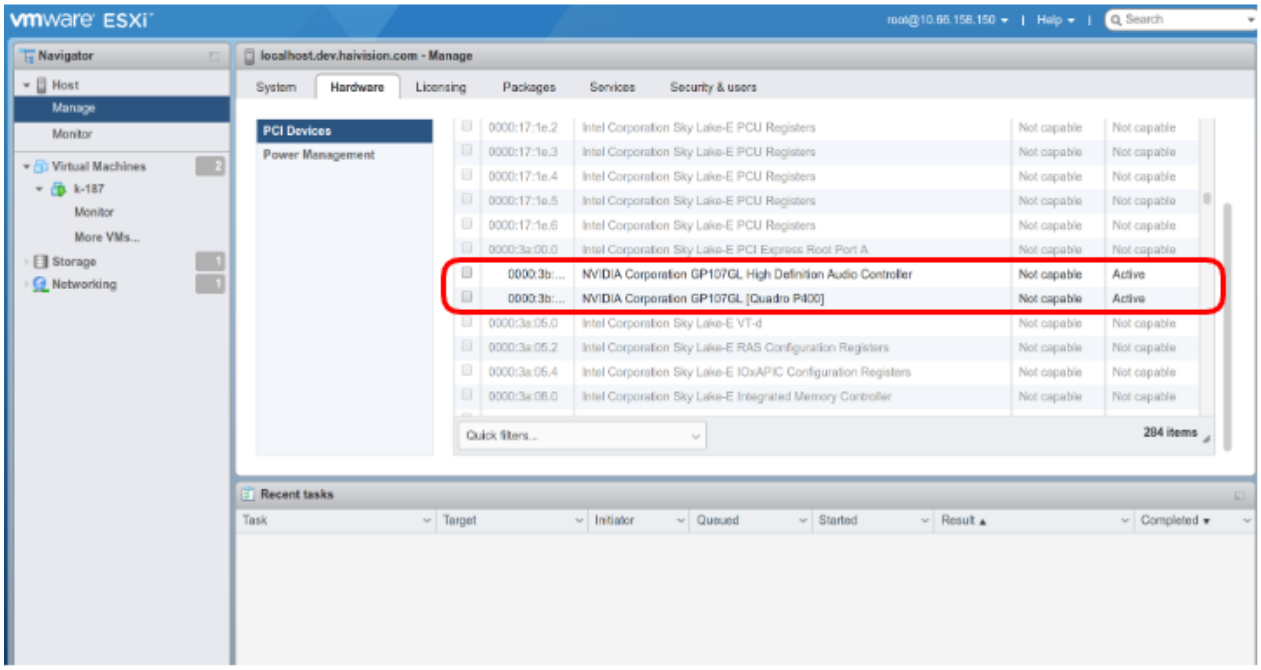
Enabling Hardware Pass-through on the Host

Assuming VMWare ESXi 6.5 is installed with Update 1 on the host system, you must now enable the pass-through of the hardware devices on the system needed by Kraken. This first step is done at the host level.

1. Log into the hypervisor.
2. In the Navigator, select **Host → Manage → Hardware → PCI Devices**.
3. On an example host, locate the graphics card and the video capture devices to be enabled for pass-through.
   Following are examples of the devices available on Kraken CR (Intel Quick Sync Video (QSV)):
   - 0000:00:02.0 Intel Corporation Iris Pro Graphics P580
   - 0000:02:00.0 Blackmagic Design DeckLink Micro Recorder
   - 0000:03:00.0 Conexant Systems, Inc. CX23885 PCI Video and Audio Decoder|



   or devices available on Kraken servers (NVIDIA Quadro)
   - 0000:3b:00.1... NVIDIA Corporation GP107GL High Definition Audio Controller
   - 0000:3b:00.2... NVIDIA Corporation GP107GL [Quadro P400]



4. Referring to the example screenshots above, enable Pass-through on all applicable devices.

> **Note**
>
> The Graphics Controllers are identified differently depending on the CPU model. For example, on Skylake systems, it reports as: **Intel Corporation Iris Pro Graphics ####** (as shown in the above screenshot), while on Kaby Lake systems, it reports as: **Intel(R) Display controller**.

5. Reboot the host to confirm the settings if you changed anything.

> **Tip**
>
> You can toggle all selected devices at once, and then reboot.

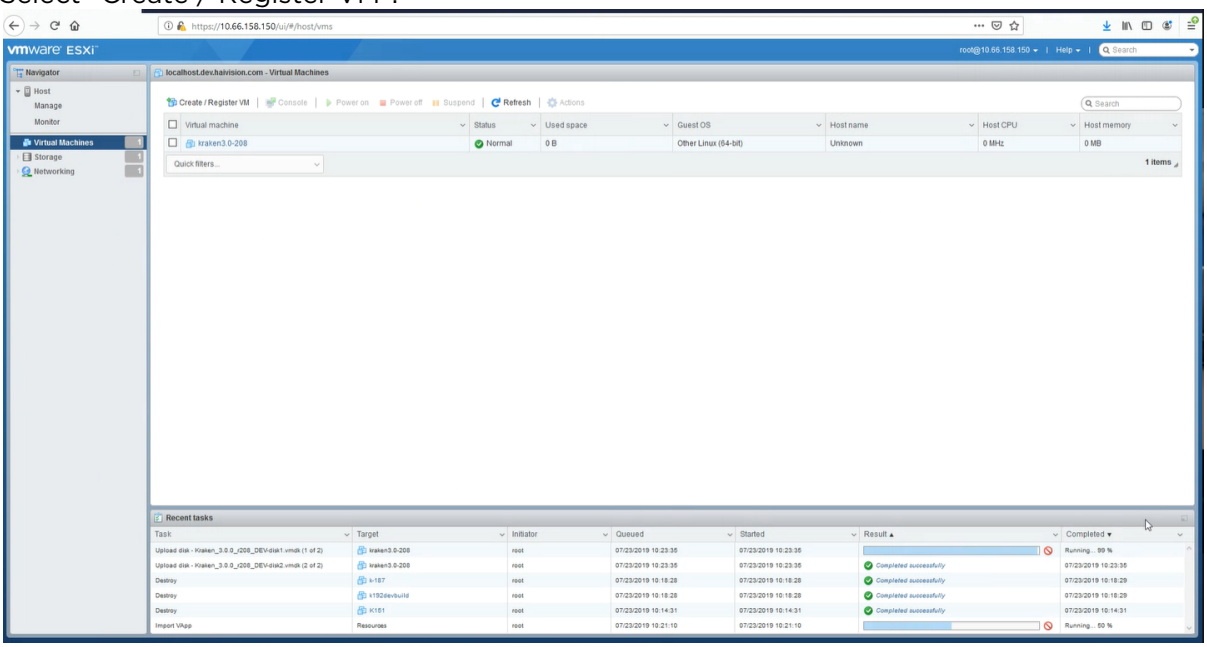
Note

After making this change, you may notice that the VMWare ESXi host console boot screen no longer comes up completely. This is because the GPU pass-through is enabled at the host level and is unfortunately normal. The progress bar will stop at the message "`vmkapi_v2_1_0_0_vmkernel_shim loaded successfully.`" There will be no further visual indication from the host console that VMWare is booting up, but it is. After a couple of minutes, you will be able to navigate to the hypervisor with a Web browser and log in.

Importing the Kraken OVA

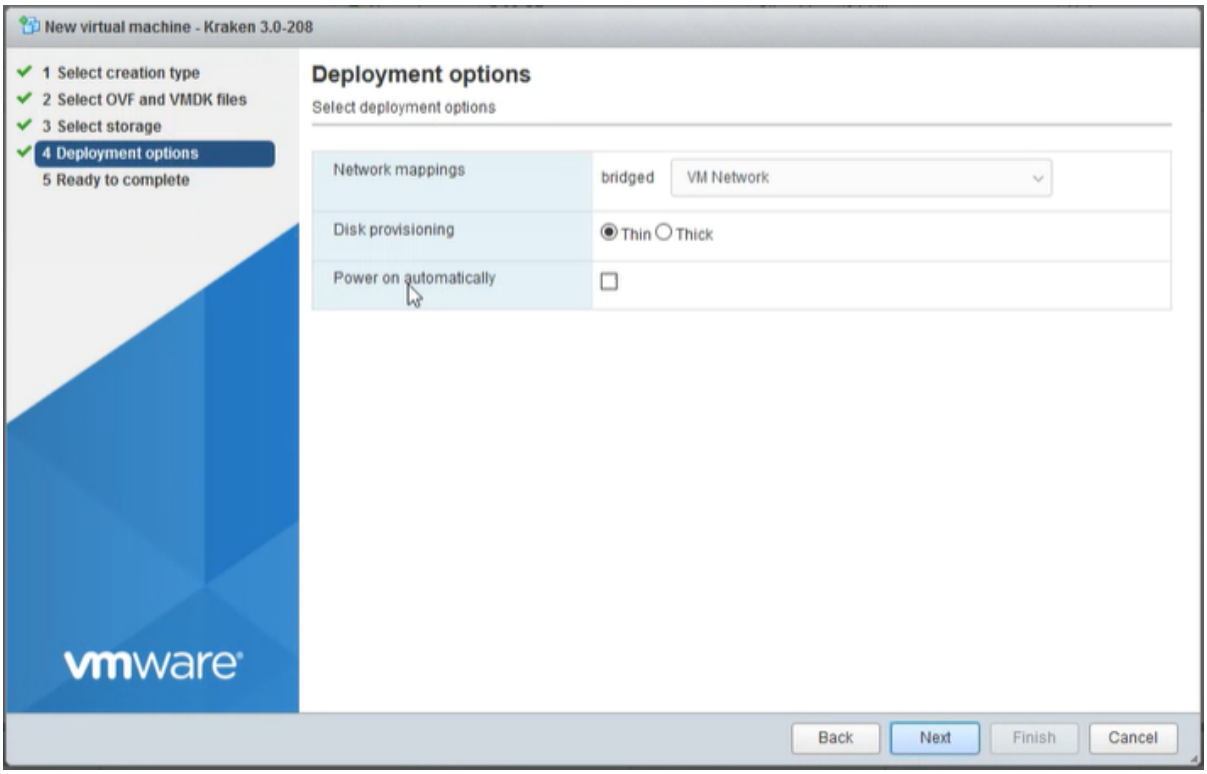
Follow these instructions to import the Kraken OVA onto the hypervisor.

1. Log into the hypervisor and select "Virtual Machines".
2. Select "Create / Register VM".

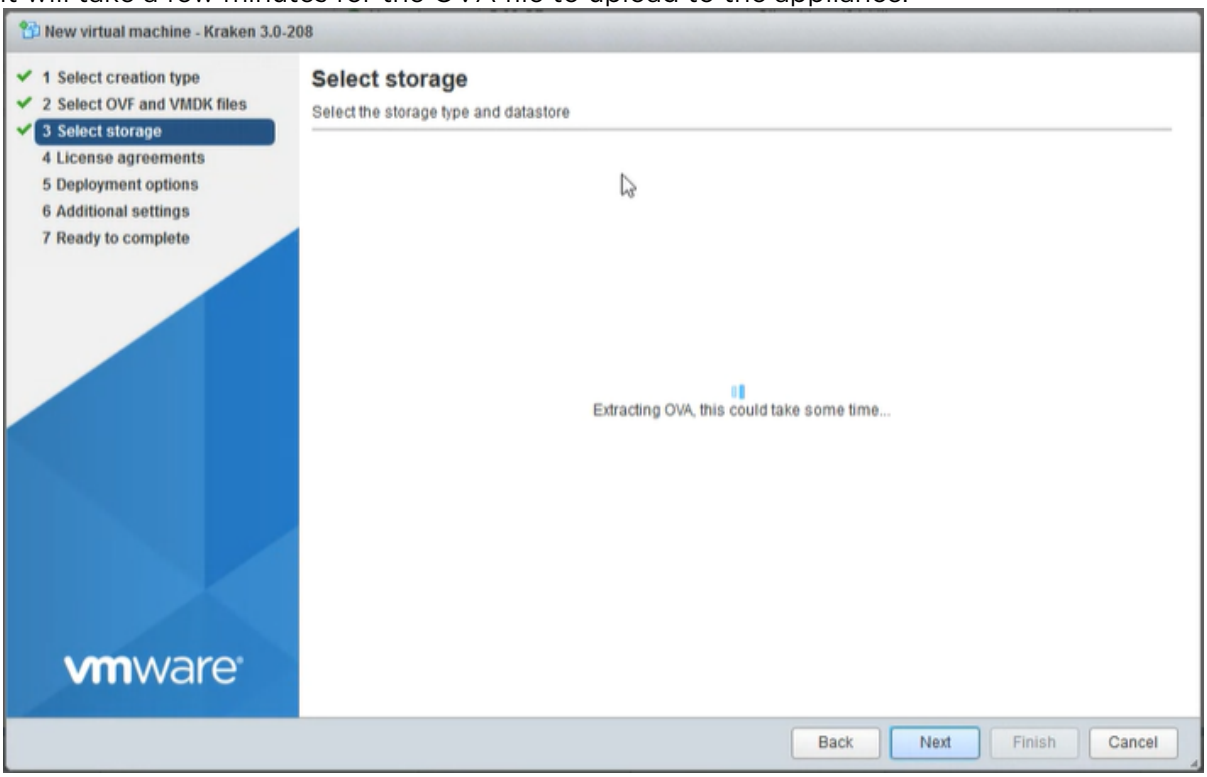


3. Select "Deploy a virtual machine from an OVF or OVA file."
4. Name the VM and drag/drop the Kraken OVA file onto the window.

> **Tip**
>
> Make sure you uncheck "Power on automatically". This will allow you to enable the Intel or NVIDIA cards individually, which will save time and rebooting steps. (You can only change settings in Power Off state.)



5. Click **Next** to choose the default datastore.
6. Click **Finish** to begin importing.
7. It will take a few minutes for the OVA file to upload to the appliance.



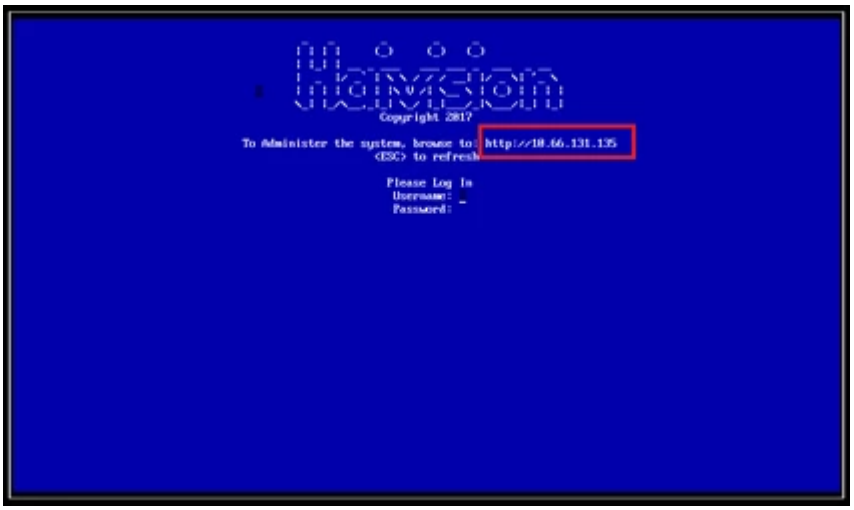
Learning the Virtual Machine's IP Address

When pass-through of the GPU device is enabled to the virtual machine, the VMWare Console will not operate. Similar to what happens on the host, your visibility into the Kraken Device's console will be limited once you enable pass-through. Therefore, it is recommended that you boot the Kraken device now and discover or configure its IP address.

Note

The virtual machine will power on after it is imported. You will see the Kraken "Loading Please Wait" screen in the VMWare console.

1. After the Kraken VM loads, the device's IP address is displayed on the console. Write it down.
2. If static IP addressing on the virtual machine is preferred, use the console to modify it (refer to the Kraken User's Guide for details).



3. When changing to a static IP address, confirm that the settings are valid before moving on to the next step.

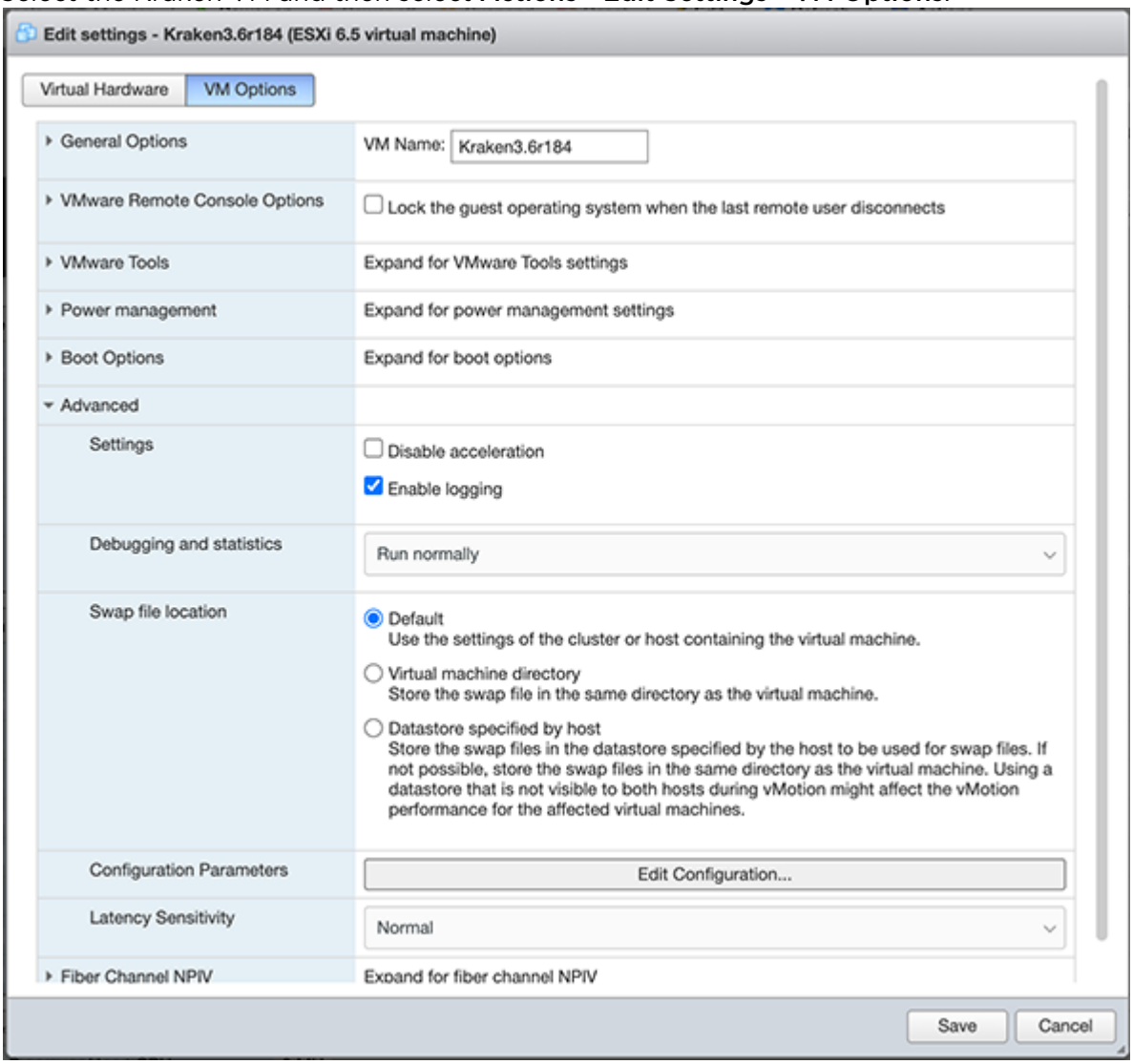
Configuring the Kraken Virtual Machine

Note

For GPU devices that require 16GB or above of memory, the virtual machine must boot in EFI or UEFI mode for correct GPU use. A Kraken OVA that supports EFI boot is required to create an EFI-bootable Kraken VM. (If you import a Kraken OVA that supports EFI boot, the Boot Options->Firmware field is set to EFI automatically.)

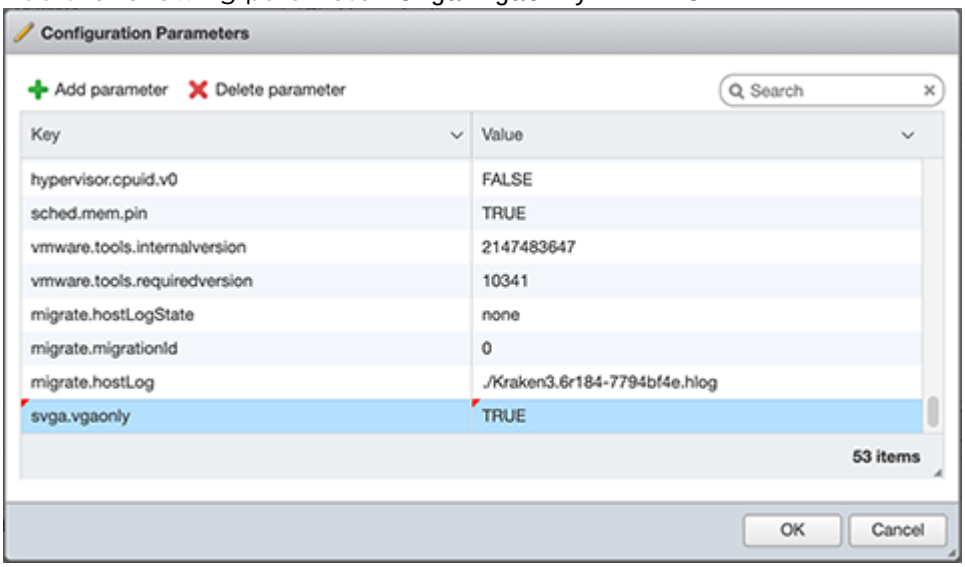
Now that the VM's IP address is known and configured, it is time to enable the hardware pass-through to the Virtual Machine.

1. Close the VM console window and "Shut Down" the Kraken VM using the hypervisor.
2. Select the Kraken VM and then select **Actions**→**Edit Settings**→**VM Options**.



3. Expand **Advanced**, select **Configuration Parameters** and then **+Add Parameter**.

4. Add the following parameter: `svga.vgaonly = "TRUE"`



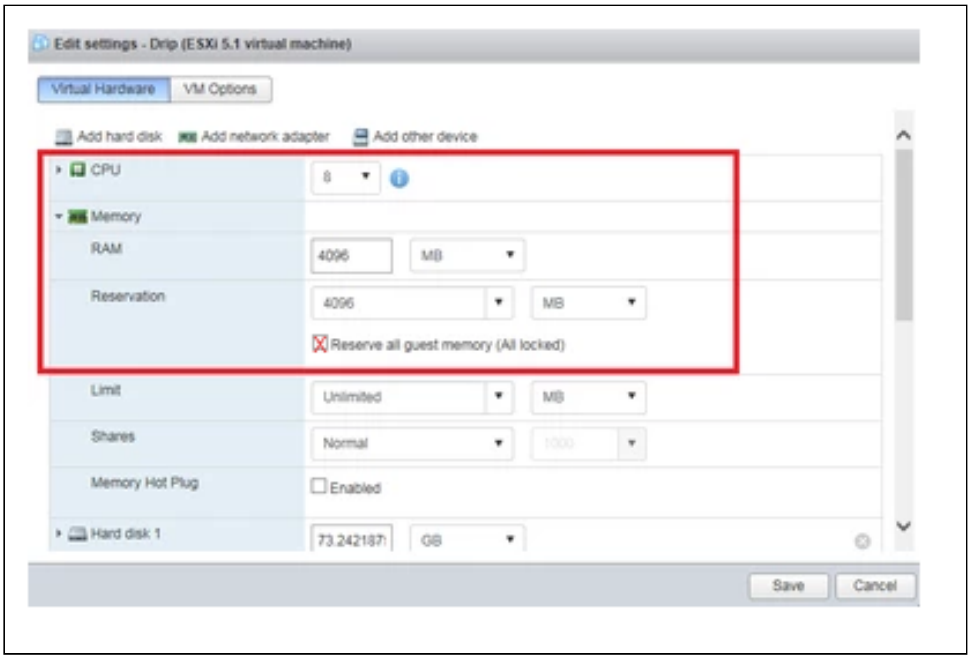
> **Note**
>
> Adding `svga.vgaonly = "TRUE"` as a configuration parameter improves stability for Kraken instances with GPU passthrough enabled.

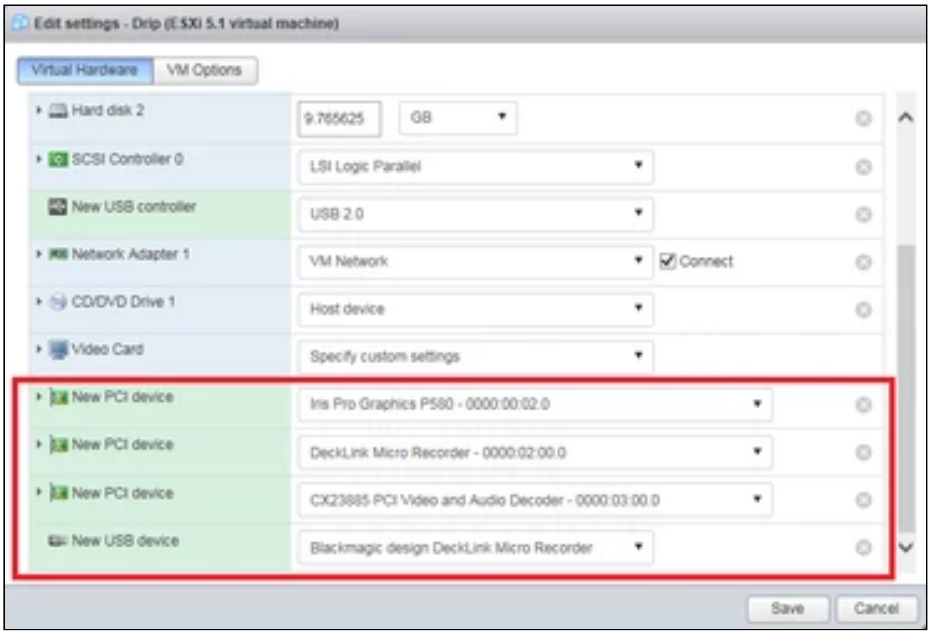
5. Follow the steps below based on the capture card(s) installed.

Intel Quick Sync Video (QSV)

1. Make the following strategic modifications:
   - Increase CPU count from 2 to the desired number.
     More CPU's assigned to the Kraken device increases its ingest and video reformatting capabilities.
   - Under Memory, make the "Reservation" setting equal to the "RAM" setting. 4096 is the default and will work for both.
   - Choose "Add other device"→"USB Device".
     At the bottom you will see a "New USB device" called "Blackmagic design DeckLink Micro Recorder".
   - Choose "Add other device"→"PCI Device" three times.
     All three of them will say "Iris Pro Graphics P580 - 0000:00:02.0".
   - Leave one of them alone, and set the other two PCI Devices to be "DeckLink Micro Recorder - 0000:02:00.0" and "CX23885 PCI Video and Audio Decoder - 0000:03:00.0".
2. Click **Save**.

Following are screen shots of the settings after all of the modifications are done.

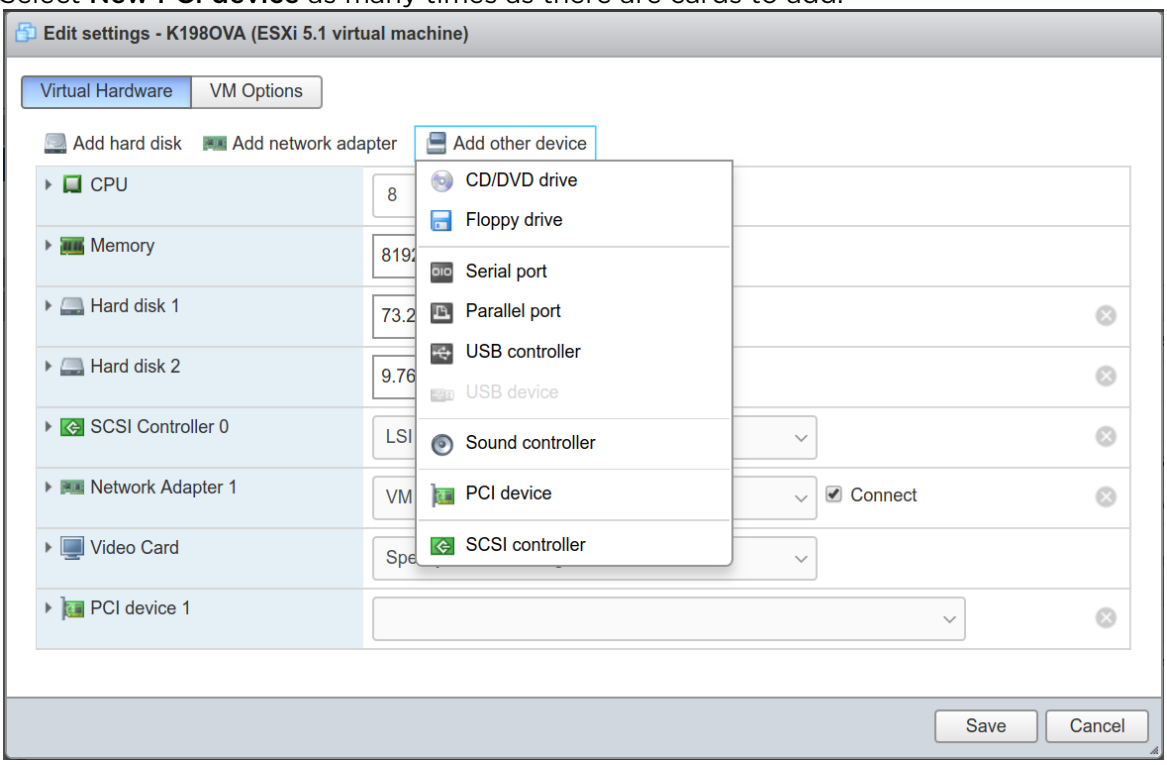

Edit settings - Drip (ESXi 5.1 virtual machine)
Virtual Hardware
VM Options
Add hard disk
Add network adapter
Add other device
CPU
8
Memory
RAM
4096
MB
Reservation
4096
MB
Reserve all guest memory (All locked)
Limit
Unlimited
MB
Shares
Normal
Memory Hot Plug
Enabled
Hard disk 1
73.242187
GB
Save
Cancel


Edit settings - Drip (ESXi 5.1 virtual machine)
Virtual Hardware
VM Options
Hard disk 2
9.765625
GB
SCSI Controller 0
LSI Logic Parallel
New USB controller
USB 2.0
Network Adapter 1
VM Network
Connect
CD/DVD Drive 1
Host device
Video Card
Specify custom settings
New PCI device
Iris Pro Graphics P580 - 0000:00:02.0
New PCI device
DeckLink Micro Recorder - 0000:02:00.0
New PCI device
CX23885 PCI Video and Audio Decoder - 0000:03:00.0
New USB device
Blackmagic design DeckLink Micro Recorder
Save
Cancel

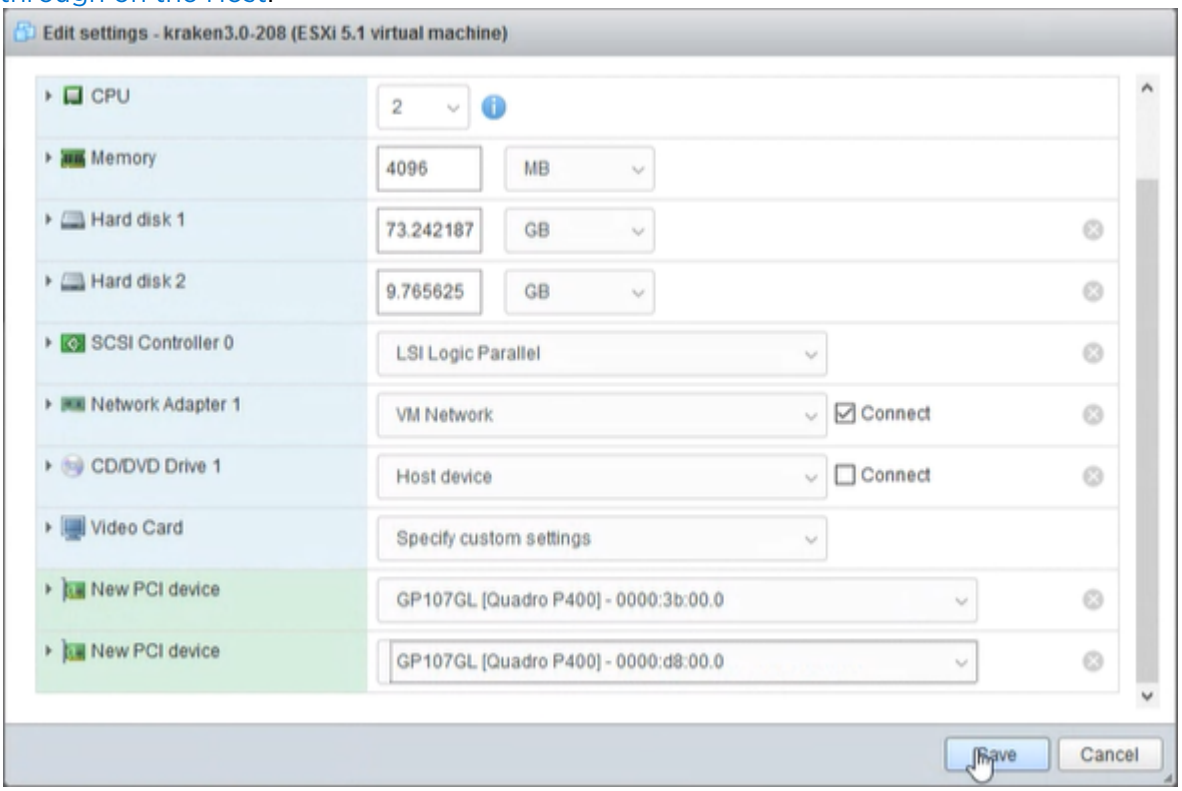
VM Client Configuration for NVIDIA GPUs

Edit the VM settings to add and configure the NVIDIA Quadro P400 cards:

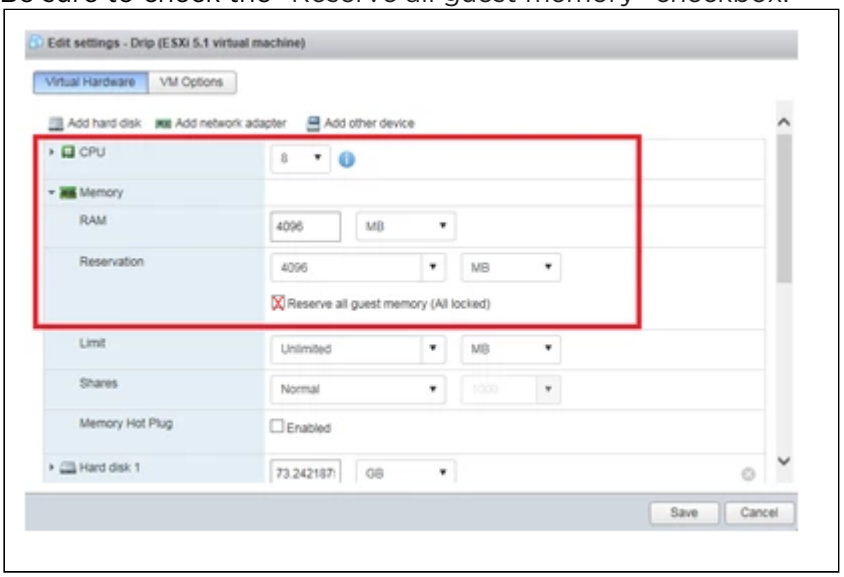
1. Select **Actions → Edit Settings → Virtual Hardware → Add other device**.
2. Select **New PCI device** as many times as there are cards to add.



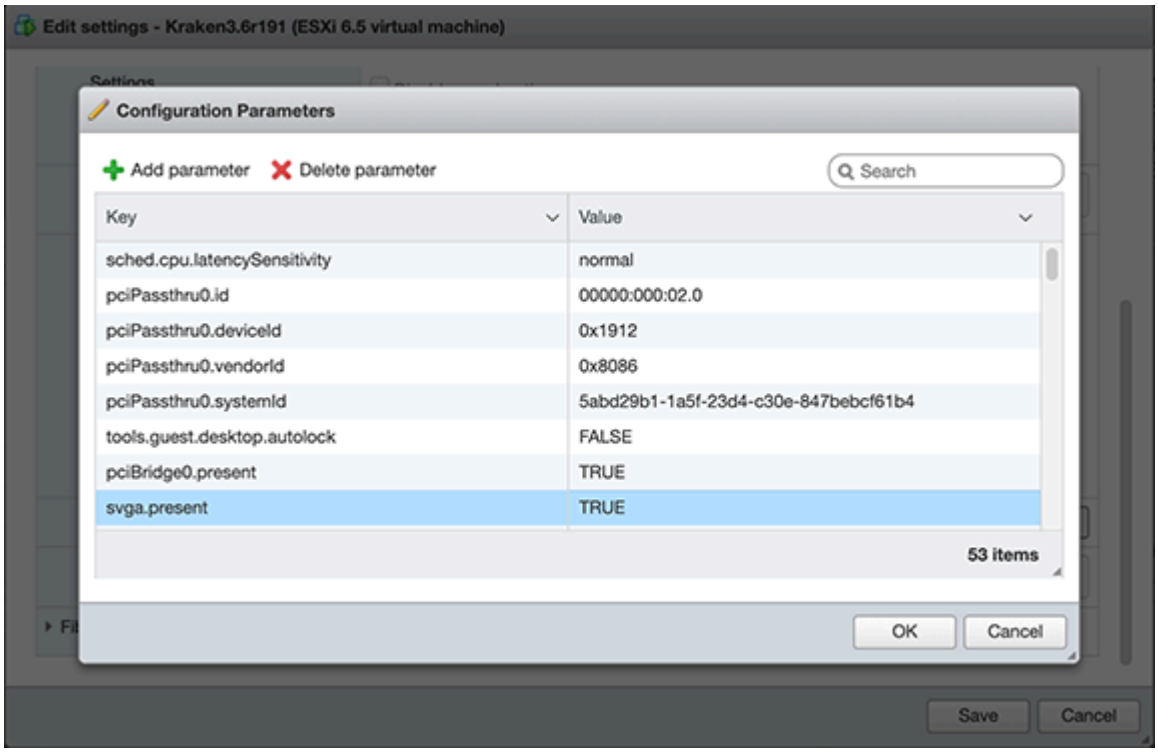
3. Set the new PCI Devices to match the Quadro P400 cards selected under Enabling Hardware Pass-through on the Host.



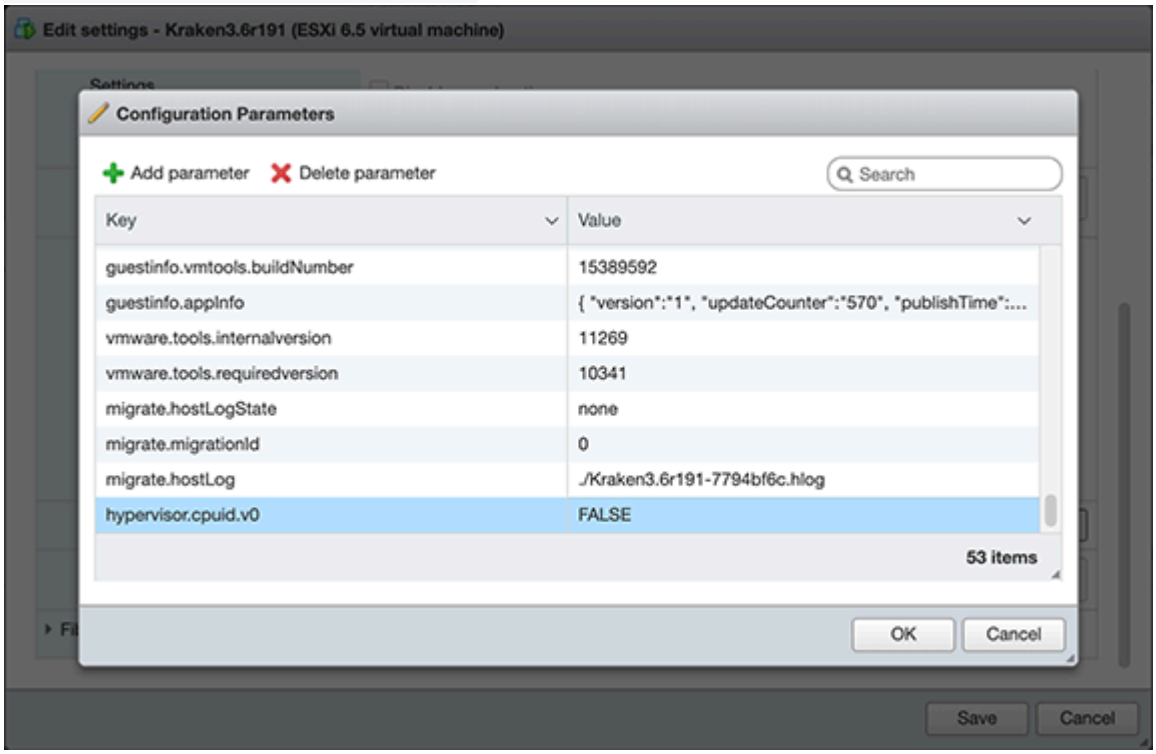
4. Click **Save**.
5. Be sure to check the "Reserve all guest memory" checkbox.



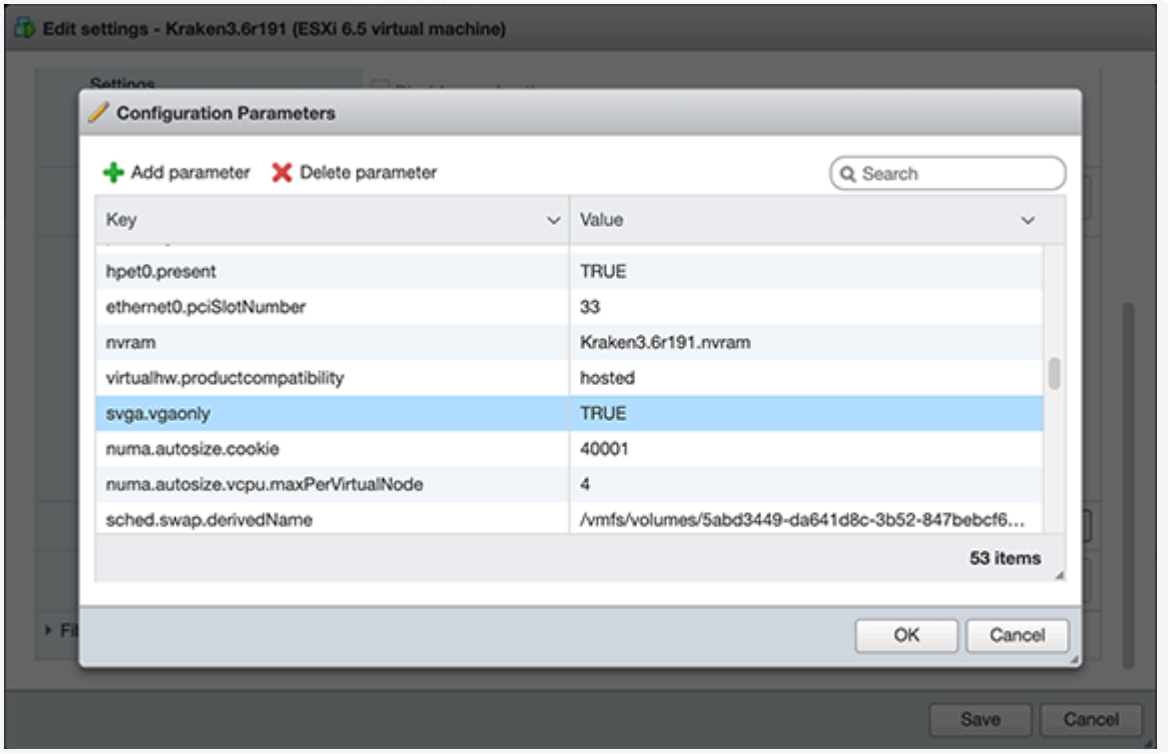
6. Select **Configuration Parameters** and then **+Add Parameter**.
7. Add the following parameters (as shown in the following examples):
   - `pciHole.start = "2048"` (Note: This only applies for VMs that have more than 2GB of configured memory.)



- `hypervisor.cpuid.v0 = "FALSE"`



- `svga.vgaonly = "TRUE"`

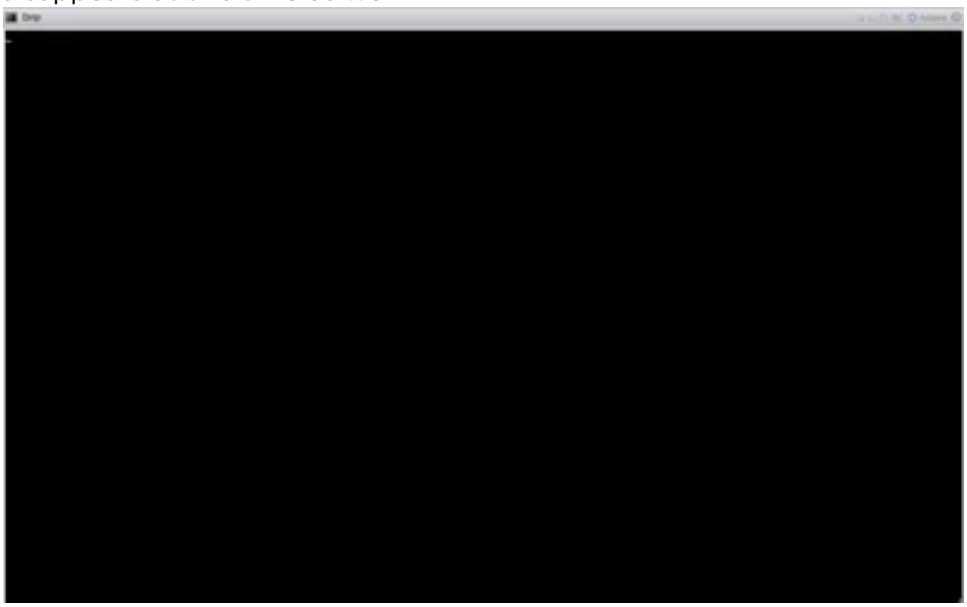


> **Note**
>
> Adding `svga.vgaonly = "TRUE"` as a configuration parameter improves stability for Kraken instances with GPU passthrough enabled.

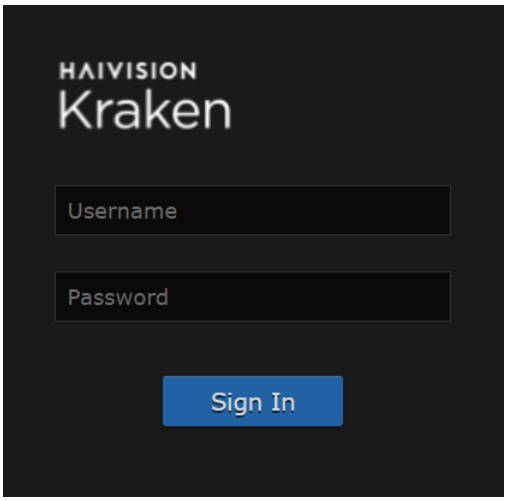
8. Click **OK**, and then **Save**.

Booting the Virtual Appliance

Now that the device passthrough to the VM has been enabled in the settings, power on the VM. The VM console will function briefly and then go black. This is because the GPU device is being passed to the Virtual Machine, making it unavailable for use by the console. You may notice that the host console to the monitor (which was stuck at `"vmkapi_v2_1_0_0_vmkernel_shim loaded successfully"`) disappears at this time as well.



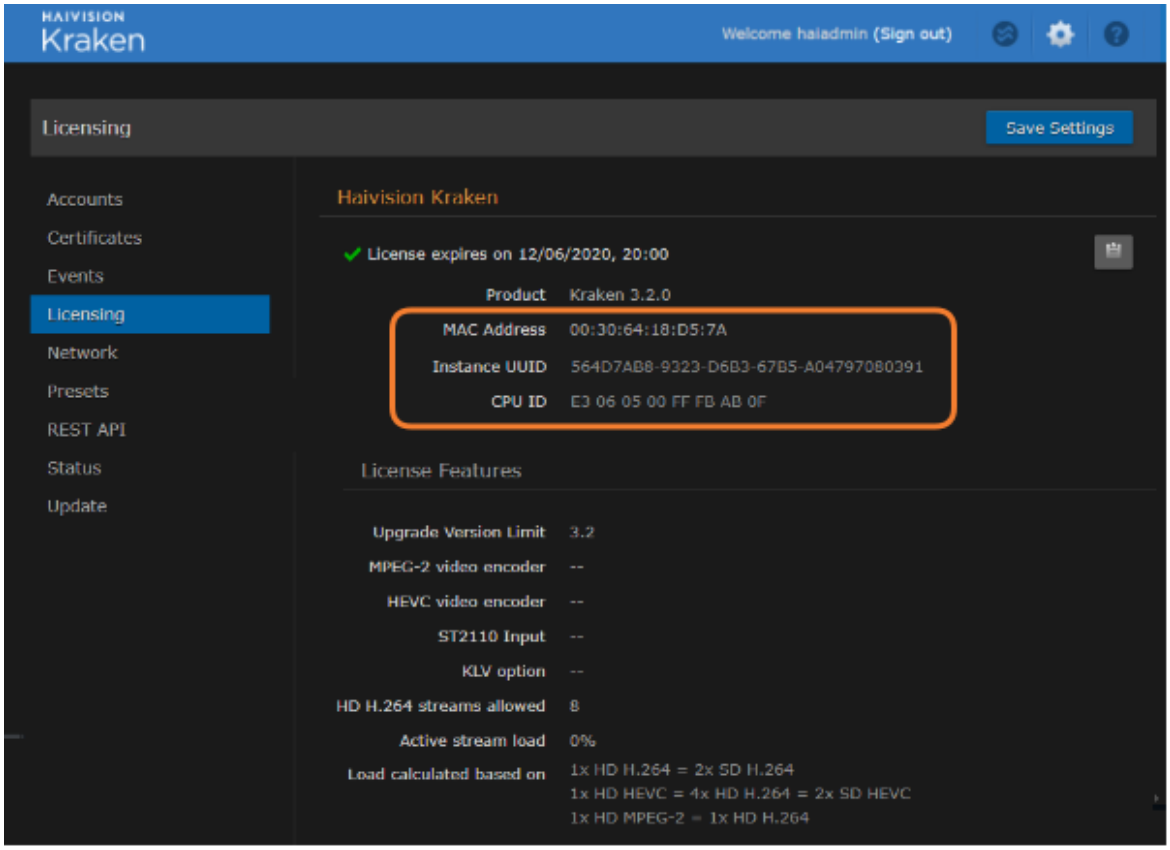
Using your Web browser, you can now navigate to the Web page of the Kraken virtual machine.



Licensing the Virtual Appliance

The next step is to license the Kraken virtual appliance:

1. Sign in to the Web interface using one of the credentials provided in the *Important Notice*.
2. If you see a License Required dialog, click **Add License.**
   -or-
   Click the **Administration** icon on the toolbar (the settings gear) and click **Licensing** from the sidebar.



   The Licensing page provides three pieces of information required to generate the license:
   - MAC Address
   - Instance UUID
   - CPU ID
3. Click the icon to copy the current product details to the clipboard for use in the following step.
4. To request a license for your product:
   a. Log in to the Haivision Support Portal (https://support.haivision.com).
   b. After logging in, click **License Requests**.
   c. Click the **New** button.
   d. Select the appropriate device type and click the **Next** button.
   e. Fill in the form with the appropriate information, and click **Save**.
   Your license request is submitted and you will be contacted by a Haivision representative shortly with a license key for your product.
5. After you receive a license key, paste the license string in the License text box.

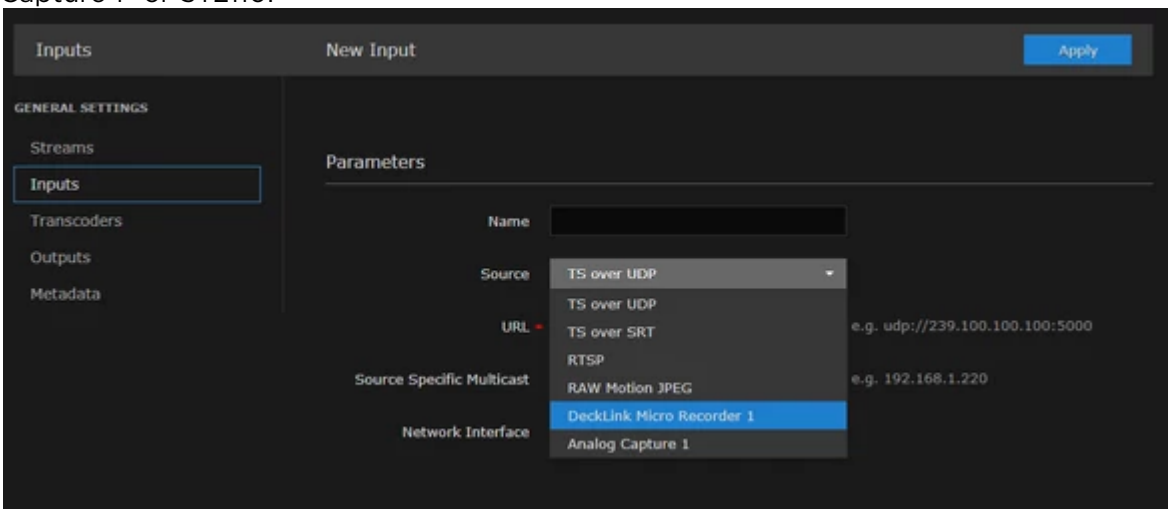
6. Click **Save Settings** to load the license.

The License Status is updated to show the new license information.

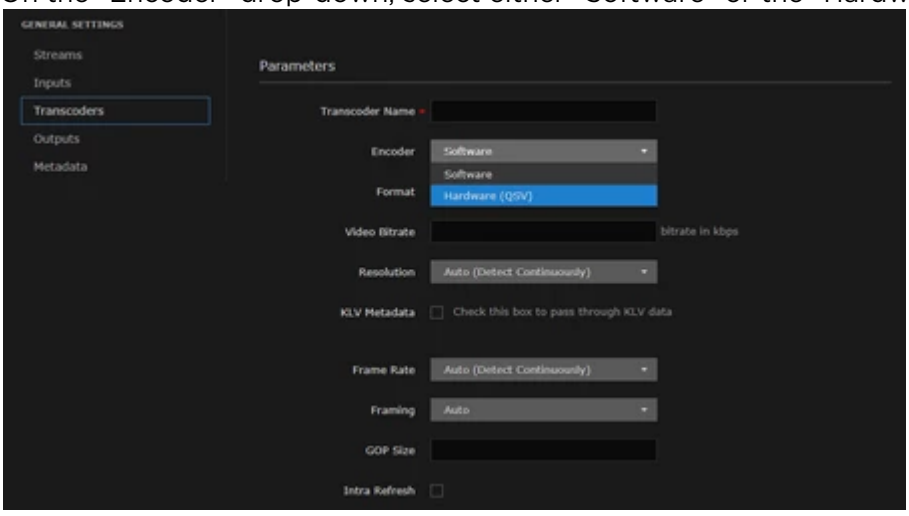
Testing the Installation

At this point, the installation is complete and can be tested.

1. Click the **Streaming** icon on the toolbar, and then click **Inputs** on the sidebar.
2. From the Inputs List view, click the **Add** button to add an input.
3. Select the Source, as applicable for your system, for example, "DeckLink Micro Recorder 1", "Analog Capture 1" or ST2110.



4. Click **Apply**.
5. Click **Transcoders** on the sidebar.
6. From the Transcoders List view, click the **Add** button to add a transcoder.
7. On the "Encoder" drop-down, select either "Software" or the "Hardware (QSV)" encoder.



8. Set up and start a transcoding session with the device of interest to test it.

Obtaining Documentation

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Fax	1 (514) 334-0088
Support Portal	https://support.haivision.com
Product Information	info@haivision.com