Kraken OVA Deployment Guide

Kraken OVA

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.

A 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 	vmware [°]

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).

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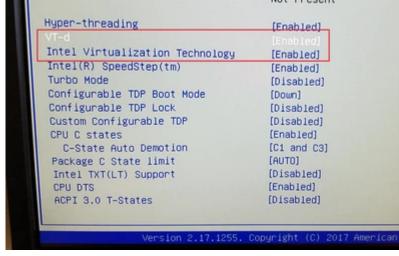
- Confirming the BIOS Settings
- Enabling Hardware Pass-through on the Host
- Importing the Kraken OVA
- Learning the Virtual Machine's IP Address
- Configuring the Kraken Virtual Machine
 - VM Client Configuration for NVIDIA GPUs
- Booting the Virtual Appliance
- Licensing the Virtual Appliance
- Testing the Installation

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 passthrough 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 $Host \rightarrow Manage \rightarrow Hardware \rightarrow PCI Devices$.
- 3. On an example host, locate the graphics card and the video capture devices to be enabled for passthrough.

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

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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]

Manage Monitor	System Hardware Lic	consing	Packages	Services	Security & users		
Monitor	PCI Devices	1.1.1.1					
	PCI Devices		0000:17:1e.2	Intel Concernity	on Sky Lake-E PCU Registers	Not capable	Not capable
-	D. H.		0000:17:1e.2		in Sky Lake-E PCU Registers	Not capable	Not capable
Virtual Machines	Power Management		0000:17:1e.4		in Sky Lake-E PCU Registers	Not capable	Not capable
+ 🍈 k-187			0000:17:16.4		in Sky Lake-E PCU Registers	Not capable	Not capable
Monitor			0000:17:1e.6		in Sky Lake-E PCU Registers	Not capable	Not capable
More VMs			0000:3a:00.0		in Sky Lake-E PCI Express Root Port A	Not capable	Not capable
Storage			0000:3b:		ation GP107GL High Definition Audio Controller	Not capable	Active
Q Networking			0000:3b:		ation GP107GL [Quadro P400]	Not capable	Active
			0000;3a:05.0	Intel Corporati	on Sky Lake-E VT-d	Not capable	Not capable
			0000:3a:05.2	Intel Corporate	on Sky Lake-E RAS Configuration Registers	Not capable	Not capable
			0000:3a:05.4	Intel Corporation	in Sky Lake-E IOxAPIC Configuration Registers	Not capable	Not capable
			0000:3a:08.0	Intel Corporate	on Sky Lake-E Integrated Memory Controller	Not capable	Not capable
		Qui	ick filters		v		284 items 🦼
1	Recent tasks						
Ta	sk v	- Target		~ Initiator	~ Queued ~ Started ~ Resu	it 🔺	~ Completed •

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

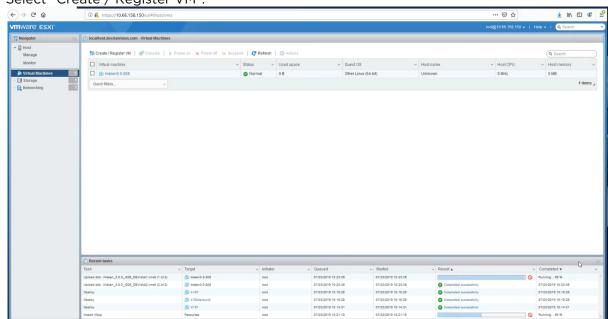
"vmkapi_v2_1_0_0_vmkernel_shim loaded successfully." There will be no further visual indication from the host console that VMWare is booting up, but it is. After a couple of minutes, you will be able to navigate to the hypervisor with a Web browser and log in.



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.)

 1 Select creation type 2 Select OVF and VMDK files 3 Select storage 	Deployment options Select deployment options	
4 Deployment options 5 Ready to complete	Network mappings	bridged VM Network ~
	Disk provisioning	Thin O Thick
	Power on automatically	
vm ware [®]		
		Back Next Finish Cancel

- 5. Click **Next** to choose the default datastore.
- 6. Click Finish to begin importing.

7.	It will take a	a few	minutes	for	the	OVA	file	to	upload	to	the a	pplia	nce.
										-			

 1 Select creation type 2 Select OVF and VMDK files 	Select storage Select the storage type and datastore
✓ 3 Select storage	celer ne stolege the and gerestole
4 License agreements	
5 Deployment options	3
6 Additional settings	
7 Ready to complete	
	Extracting OVA, this could take some time
vm ware [®]	
	Back Next Finish Cancel

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).

Copyright 2817 To Administer the systems too http://10.66.131.135	
Please Log In Userwaw: _ Password: _	

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 \rightarrow Edit Settings \rightarrow VM Options.

Irtual Hardware VM Options	
General Options	VM Name: Kraken3.6r184
VMware Remote Console Options	Lock the guest operating system when the last remote user disconnects
VMware Tools	Expand for VMware Tools settings
Power management	Expand for power management settings
Boot Options	Expand for boot options
Advanced	
Settings	Disable acceleration Enable logging
Debugging and statistics	Run normally ~
Swap file location	 Default Use the settings of the cluster or host containing the virtual machine. Virtual machine directory Store the swap file in the same directory as the virtual machine. Datastore specified by host Store the swap files in the datastore specified by the host to be used for swap files. If not possible, store the swap files in the same directory as the virtual machine. Using a datastore that is not visible to both hosts during vMotion might affect the vMotion performance for the affected virtual machines.
Configuration Parameters	Edit Configuration
Latency Sensitivity	Normal
Fiber Channel NPIV	Expand for fiber channel NPIV

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

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

Add parameter 🗙 Delete parameter	Q Search :
Key	Value ~
ypervisor.cpuid.v0	FALSE
ched.mem.pin	TRUE
mware.tools.internalversion	2147483647
mware.tools.requiredversion	10341
nigrate.hostLogState	none
nigrate.migrationId	0
nigrate.hostLog	./Kraken3.6r184-7794bf4e.hlog
vga.vgaonly	TRUE
	53 items

🔒 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.

Virtual Hardware VM Options						
Add hard disk 🗰 Add netw	ork adapter 🛛 🚊 Add other de	vice				^
CPU	8 🔻 🚯					
- Memory						
RAM	4096 MB					
Reservation	4096	•	MB			
	Reserve all guest m	emory (All	locked)			1
Limit	Unlimited	•	MB	•		
Shares	Normal					
Memory Hot Plug	Enabled					
Hard disk 1	73.242187: GB				0	~

Intual Hardware VM Options	J				
Hard disk 2	9.765625 GB •			0	,
SCSI Controller 0	LSI Logic Parallel	•		0	
New USB controller	U\$8.2.0			0	
WE Network Adapter 1	VM Network	▼ 🗹 Con	nect	0	
G CD/DVD Drive 1	Host device	•		0	
Wideo Card	Specify custom settings	•			
New PCI device	Iris Pro Graphics P580 - 0000:00:02	2.0	•	0	1
New PCI device	DeckLink Micro Recorder - 0000:02	00.0		0	I
III New PCI device	CX23885 PCI Video and Audio Dec	oder - 0000:03:00.0		0	I
EE New USB device	Blackmagic design DeckLink Micro	Recorder •		0	I

VM Client Configuration for NVIDIA GPUs

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

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

🗗 Edit settings - K198OVA (ESXi 5.1 vi	rtual ma	achine)				
Virtual Hardware VM Options						
🔜 Add hard disk 🛛 🎫 Add network a	dapter	🚍 Add other device				
► 🔲 CPU	8	CD/DVD drive				
n 🚍 Managa		Floppy drive	-			
Memory	819	oo Serial port				
▶ 🛄 Hard disk 1	73.2	2 🖪 Parallel port				\otimes
▶ 🛄 Hard disk 2		USB controller	-			-
	9.76	USB device				\otimes
SCSI Controller 0	LS	Sound controller	~			8
Network Adapter 1	VM	1 III PCI device	~	Connect		\otimes
Video Card	Spe	SCSI controller	~			
Im PCI device 1					~	8
					Save	Cancel

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

CPU	2 ~ ()		
Memory	4096 MB	~	
Hard disk 1	73.242187 GB	~	0
Hard disk 2	9.765625 GB	~	0
SCSI Controller 0	LSI Logic Parallel	~	0
Network Adapter 1	VM Network VM Connect		0
CD/DVD Drive 1	Host device Connect		0
Video Card	Specify custom settings ~		
New PCI device	GP107GL [Quadro P400] - 0000:3b:00.0		
New PCI device	GP107GL [Quadro P400] - (v v v v v v v v v v v v v v v v v v v	٢

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

	sork adapter 🛛 🚊 Add other dev	ce			_	1
CPU	8 🔻 🚯					
- Memory						
RAM	4096 MB	•				
Reservation	4096		MB	•		
	Reserve all guest me	mory (All	locked)			
Limit	Unlimited		MB	•		
Shares	Normal			Ψ.		
Memory Hot Plug	Enabled	Enabled				
+ And disk 1	73.2421871 08				0	``

- 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.)

💠 Add parameter 🔀 Delete parameter		Q Sear	rch
Key	- Value		~
sched.cpu.latencySensitivity	normal		1
pciPassthru0.id	00000:000:02	.0	
pciPassthru0.deviceId	0x1912		
pciPassthru0.vendorld	0x8086		
pciPassthru0.systemId	5abd29b1-1a	5f-23d4-c30e-847bebcf61	b4
tools.guest.desktop.autolock	FALSE		
pciBridge0.present	TRUE		
svga.present	TRUE		
			53 items

hypervisor.cpuid.v0 = "FALSE"

Configuration Parameters	
+ Add parameter 🗙 Delete parameter	Q Search
Key ~	Value ~
guestinfo.vmtools.buildNumber	15389592
guestinfo.appInfo	{ "version":"1", "updateCounter":"570", "publishTime":
vmware.tools.internalversion	11269
vmware.tools.requiredversion	10341
migrate.hostLogState	none
migrate.migrationId	0
migrate.hostLog	./Kraken3.6r191-7794bf6c.hlog
hypervisor.cpuid.v0	FALSE
	53 items
	OK Cancel

svga.vgaonly = "TRUE"

💠 Add parameter 🛛 🗙 Delete parameter	Q Search
Key ~	Value ~
hpet0.present	TRUE
ethernet0.pciSlotNumber	33
nvram	Kraken3.6r191.nvram
virtualhw.productcompatibility	hosted
svga.vgaonly	TRUE
numa.autosize.cookie	40001
numa.autosize.vcpu.maxPerVirtualNode	4
sched.swap.derivedName	/vmfs/volumes/5abd3449-da641d8c-3b52-847bebcf6
	53 items

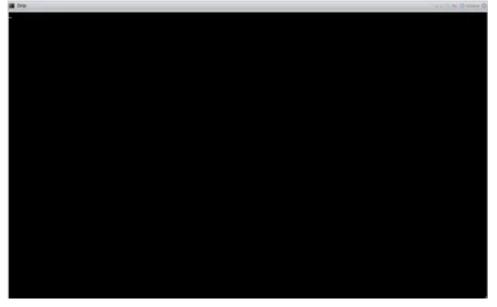
\rm A Note

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.

krak				
Usernam				
Password				
	Sign In			

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.

Kraken		Welcome haladmin (Sign out)	0 🔅 0
Licensing			Save Settings
Accounts	Haivision Kraken		
Certificates	License expires on 12/0	6/2020, 20:00	B
Events		Kraken 3.2.0	
Licensing	MAC Address	00:30:64:18:D5:7A	
Network	Instance UUID	564D7AB8-9323-D6B3-67B5-A04797080391	
Presets	CPU ID	E3 06 05 00 FF FB AB 0F	
REST API			
Status	License Features		
Update			
	Upgrade Version Limit	3.2	
	MPEG-2 video encoder		
	HEVC video encoder		
	ST2110 Input		
	KLV option		
	HD H.264 streams allowed		
	Active stream load	0%	
	Load calculated based on	1x HD H.264 = 2x SD H.264 1x HD HEVC = 4x HD H.264 = 2x SD HEVC 1x HD MPEG-2 = 1x HD H.264	•

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.

Inputs	New Input		
GENERAL SETTINGS Streams	Parameters		
Inputs			
Transcoders	Name		
Outputs	Source	TS over UDP	
Metadata		TS over UDP	
	URL -	TS over SRT	e.g. udp://239.100.100.100:5000
	Source Specific Multicast	RTSP RAW Motion JPEG	e.g. 192.168.1.220
	Network Interface	DeckLink Micro Recorder 1 Analog Capture 1	

- 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.

Parameters		
Transcoder Name =		
Encoder	Software	
	Software	
Format	Hardware (QSV)	
Video Bitrate		
Resolution	Auto (Detect Continuously)	
KLV Metadata		
Frame Rate	Auto (Detect Continuously)	
Framing	Auto	
GOP Size		
Intra Refresh		
	Transcoder Name - Encoder Format Video Bitrate Resolution KLV Metadata Frame Rate Framing GOP Size	Transcoder Name Encoder Software Software Format Handware (QSV) Video Bitrate Resolution Auto (Detect: Continuounly) KLV Metadata Frame Rate Auto (Detect: Continuounly) Framing Auto GOP Size

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

Obtaining Documentation

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	International 1 (514) 334-5445		
	and choose from the following: Sales - 1, Cloud Services - 3, Support - 4		
Managed Services	U.S. and International 1 (512) 220-3463		
Fax	1 (514) 334-0088		
Support Portal	https://support.haivision.com		
Product Information	info@haivision.com		