

RADEON PRO

SOFTWARE

Radeon Pro Settings for VMware vSphere Client

User Guide v1.0

Radeon Pro Settings for VMware vSphere Client allows system administrators to manage and deploy VMware ESXi Hosts with the AMD FirePro™ S7150 and S7150 x2

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1 Overview

This user guide provides an overview of the Radeon Pro Settings user interface plug-in developed for VMware vSphere® Client. This user interface plug-in was designed to allow system administrators to manage and deploy VMware ESXi™ Hosts with AMD FirePro™ S7150 and S7150 x2 family of products in MxGPU mode.

Using Radeon Pro Settings, you can virtualize your AMD FirePro™ GPUs and create up to 16 virtual mxGPUs per physical MxGPU. These mxGPUs can then be assigned – manually or automatically – to Virtual Machines (VMs) on the ESXi Host.

1.1 Advantages of Using Radeon Pro Settings

- Manage your VMs and MxGPUs on multiple Hosts and Datacenters.
- Change the partitioning of MxGPUs on the fly. No need to reboot the ESXi host system.
- Assign virtual mxGPUs to your VMs with a simple mouse click.
- Easily visualize your deployment with partition usage for MxGPUs and VMs.

2 Hardware and Software Requirements

The sections below detail the hardware and software that are required for setting up the VMware environment. Consult the [VMware Basic Setup Guide](#) or VMware's website for details on setting up the VMware environment.

2.1 Hardware Requirements

2.1.1 Host/Server

Graphics Adapter: AMD FirePro™ S7100X, S7150, S7150 x2.

Sample Certified Server Platforms:

- Dell PowerEdge R730 Server.
- HPE ProLiant DL380 Gen9 Server.
- SuperMicro 1028GQ-TR Server.

Additional Hardware Requirements:

- CPU: 2x4 and up.
- System memory: 32 GB and up to 1 TB; more guest VMs require more system memory.
- Hard disk: 500 GB and up; more guest VMs require more HDD space.
- Network adapter: Gigabit Ethernet (GbE) and up.

2.1.2 Client

Any of the following client devices can be used to access the virtual machine once these VMs are started on the host server:

- Zero client (up to 4 connectors) with standard mouse/keyboard and monitor.
- Thin client with standard mouse/keyboard and monitor running Microsoft® Windows® Embedded OS.
- Laptop/desktop with standard mouse/keyboard and monitor running with Microsoft Windows 7 and up.

2.2 Software Requirements

2.2.1 Host/Server

- VMware ESXi 6.0 U2 and up.
- VMware ESXi 6.5 build 4564106 and up.

2.2.2 vCenter system

- Microsoft Windows Server 2012 R2.
- VMware vCenter 4602587.
- vSphere Client (HTML).

2.2.3 Administrator system

Any OS with one of these internet browsers: Microsoft Internet Explorer® 11+, Microsoft Edge™, Google Chrome™, or Firefox®.

2.2.4 Guest VM

- Microsoft Windows 7 Service Pack 1 (SP1) 64-bit.
- Microsoft Windows 10 Version 1511 64-bit.
- Latest Radeon Pro Software Enterprise Unified Driver.
- VMware Horizon® View™ Agent (7.x.x).

2.3 System Configuration

2.3.1 Host/Server Configuration

- Enable IOMMU, SR-IOV, and ARI in CMOS.
- Enable above 4G space memory mapping IO.
- Enable UEFI Boot.
- AMD FirePro™ S7150 or S7150 x2.

2.3.2 Guest VM Configuration

Configuration	vCPU	System memory (GB)	Framebuffer size (MB)	Enabled mxGPU	User
High Performance	4	8	3840	2	Workstation User
Professional	2	4	1920	4	Power User
Enhanced	2	3	960	8	Knowledge User
Standard	1	2	480	16	Task worker

(Note: Make sure all guest memory is locked/reserved.)

3 Install Driver on VMware ESXi Host

On each VMware ESXi host that will be managed by the UI, install amdgpuv and amdgpuv-cim.

- For VMware ESXi 6.5, download the [AMD FirePro - VMware vSphere ESXi 6.5 Driver](#) and install:

```
amdgpuv-1.02-1OEM.650.0.0.4598673.x86_64-CL1356850.vib  
amdgpuv-cim-1.00-6.5.0-4598673.vib
```

- For VMware ESXi 6.0, download the [AMD FirePro - VMware vSphere ESXi 6.0 Driver](#) and install:

```
amdgpuv-1.02-1OEM.600.0.0.2494585.x86_64-CL1356850.vib  
amdgpuv-cim-1.00-6.0.0-2768847.vib
```

After rebooting the server, no matter how many virtual mxGPUs are configured for each GPU, you should see:

- 1) 15 mxGPUs on the bus for each GPU on VMware ESXi 6.0.
- 2) 16 mxGPUs on the bus for each GPU on VMware ESXi 6.5.

To install the drivers, copy the amdgpuv driver and CIM to a data store using SSH and use the following commands to install:

```
esxcli software vib install --no-sig-check -v /vmfs/volumes/datastore1/amdgpuv-1.02-1OEM.650.0.0.4598673.x86_64.vib
```

```
esxcli software vib install --no-sig-check -v /vmfs/volumes/datastore1/amdgpuv-cim-1.00-6.5.0-4598673.vib
```

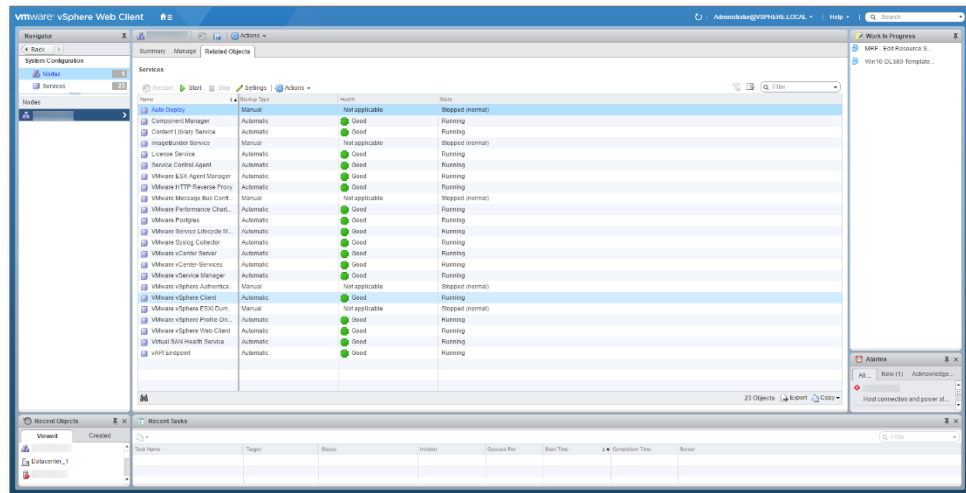
4 Install the Plug-in on VMware vCenter Server

On the VMware vCenter Server the MxGPU control center plug-in needs to be installed first.

4.1 Install the Plug-in

4.1.1 Stop the VMware vSphere client service

1. Log in to the VMware vSphere Web Client (Flash).
2. Click the **Home** icon then select **Administration -> Deployment -> System Configuration**.
3. Click on **Nodes** in the left navigation bar and choose your **VMware vCenter Server**.
4. Stop the **VMware vSphere Client** service under the **Related Objects** tab.



4.1.2 Register and Install the Plug-in

1. Open a browser and type in the following URL:

<https://<NAME OF VCENTER>/mob/?moid=ExtensionManager>

2. A window will appear similar to the following:

[Home](#)
[Logout](#)

Managed Object Type: ManagedObjectReference:ExtensionManager
Managed Object ID: ExtensionManager

Properties

NAME	TYPE	VALUE
extensionList	Extension[]	extensionList["com.vmware.vim.js"] Extension extensionList["com.vmware.vim.sms"] Extension extensionList["com.vmware.vim.sps"] Extension extensionList["com.vmware.vim.stats.report"] Extension extensionList["com.vmware.vim.vcha"] Extension (more...)

Methods

RETURN TYPE	NAME
Extension	FindExtension
string	GetPublicKey
ExtensionManagerIpAllocationUsage[]	QueryExtensionIpAllocationUsage
ManagedObjectReference:ManagedEntity[]	QueryManagedBy
void	RegisterExtension
void	SetExtensionCertificate
void	SetPublicKey
void	UnregisterExtension
void	UpdateExtension

3. Click on the **RegisterExtension** link. The window shown below will pop up:

Managed Object Type: ManagedObjectReference:ExtensionManager
Managed Object ID: ExtensionManager
Method: RegisterExtension

void RegisterExtension

Parameters

NAME	TYPE	VALUE
extension (required)	Extension	<pre><extension> <description> <label>AMD Radeon Pro Settings</label> <summary>MxGPU Control Panel for vSphere Client</summary> </description> <key>com.amd.mxgpui</key> <company>AMD</company> <type></type> <version>1.0.0</version> <subjectName></subjectName> <server> <url>https://download.amd.com/software/mxgpui-plugin.zip</url> <description> <label>AMD Radeon Pro Settings</label> <summary>MxGPU Control Panel for vSphere Client</summary> </description> <company>AMD</company> <type>HTTPS</type> <adminEmail>string</adminEmail> </server> </extension></pre>

[Invoke Method](#)

4. In the pop-up window, copy and paste the XML below into the **VALUE** text box. This will register the plugin and install the necessary files to your VMware vCenter Server.

```
<extension>
  <description>
    <label>AMD Radeon Pro Settings</label>
    <summary>MxGPU Control Panel for vSphere Client</summary>
  </description>
  <key>com.amd.mxgpui</key>
  <company>AMD</company>
  <type></type>
  <version>1.0.0</version>
  <subjectName></subjectName>
  <server>
    <url>https://download.amd.com/software/mxgpui-plugin.zip</url>
    <description>
      <label>AMD Radeon Pro Settings</label>
      <summary>MxGPU Control Panel for vSphere Client</summary>
    </description>
    <company>AMD</company>
    <type>HTTPS</type>
    <adminEmail>string</adminEmail>

    <serverThumbprint>A3:50:BF:3E:48:05:6E:26:B5:49:B9:83:E7:BA:0B:4E:1E:94:DC:35</
serverThumbprint>
  </server>
  <client>
    <version>1.0.0</version>
    <description>
      <label>AMD Radeon Pro Settings</label>
      <summary>MxGPU Control Panel for vSphere Client</summary>
    </description>
    <company>AMD</company>
    <type>vsphere-client-serenity</type>
    <url>https://download.amd.com/software/mxgpui-plugin.zip</url>
  </client>
  <lastHeartbeatTime>2017-03-15T09:00:00Z</lastHeartbeatTime>
  <healthInfo>
    <url></url>
  </healthInfo>
  <shownInSolutionManager>true</shownInSolutionManager>
</extension>
```

- Click **Invoke Method**. It should show **Method Invocation Result: void** if it was successfully registered and installed.

Managed Object Type: **ManagedObjectReference:ExtensionManager**
Managed Object ID: **ExtensionManager**
Method: **RegisterExtension**

void RegisterExtension

Parameters

NAME	TYPE	VALUE
extension (required)	Extension	<pre> </server> <client> <version>1.0.0</version> <description> <label>AMD Radeon Pro Settings</label> <summary>MxGPU Control Panel for vSphere Client</summary> </description> <company>AMD</company> <type>vsphere-client-serenity</type> <url>https://download.amd.com/software/mxgpui-plugin.zip</url> </client> <lastHeartbeatTime>2017-03-15T09:00:00Z</lastHeartbeatTime> <healthInfo> <url></url> </healthInfo> <shownInSolutionManager>true</shownInSolutionManager> </extension> </pre>

Method Invocation Result: void

4.1.3 Restart VMware vSphere Client Service

- Log in to the VMware vSphere Web Client (Flash).
- Click the **Home** icon the select **Administration -> Deployment -> System Configuration**.
- Click on **Nodes** in the left navigation bar and choose your **VMware vCenter Server**.
- Start the **VMware vSphere Client** service under the **Related Objects** tab.

4.2 Update the Plug-in

If there is a new plug-in to update, follow the steps below:

4.2.1 Stop the VMware vSphere Client Service

The same step as [section 4.1.1](#)

4.2.2 Update the Plug-in

1. Open a browser and type in the URL:

https://<NAME_OF_VCENTER>/mob/?moid=ExtensionManager

2. A window will appear similar to the following:

The screenshot shows the vCenter Extension Manager interface. At the top, there are links for 'Home' and 'Logout'. Below them, the title is 'Managed Object Type: ManagedObjectReference:ExtensionManager' and the 'Managed Object ID' is 'ExtensionManager'.

Properties

NAME	TYPE	VALUE
extensionList	Extension[]	extensionList["com.vmware.vim.ls"] Extension extensionList["com.vmware.vim.sms"] Extension extensionList["com.vmware.vim.sps"] Extension extensionList["com.vmware.vim.stats.report"] Extension extensionList["com.vmware.vim.vcha"] Extension (more...)

Methods

RETURN TYPE	NAME
Extension	FindExtension
string	GetPublicKey
ExtensionManagerIpAllocationUsage[]	QueryExtensionIpAllocationUsage
ManagedObjectReference:ManagedEntity[]	QueryManagedBy
void	RegisterExtension
void	SetExtensionCertificate
void	SetPublicKey
void	UnregisterExtension
void	UpdateExtension

3. Click on the **UpdateExtension** link. In the pop-up window field **VALUE**, enter the following. Change the version and URL as necessary.

```
<extension>
  <description>
    <label>AMD Radeon Pro Settings</label>
    <summary>MxGPU Control Panel for vSphere Client</summary>
  </description>
  <key>com.amd.mxgpui</key>
  <company>AMD</company>
  <type></type>
  <version>1.0.0</version>
  <subjectName></subjectName>
  <server>
    <url>https://download.amd.com/software/mxgpui-plugin.zip</url>
    <description>
      <label>AMD Radeon Pro Settings</label>
    </description>
  </server>
</extension>
```

```
<summary>MxGPU Control Panel for vSphere Client</summary>
</description>
<company>AMD</company>
<type>HTTPS</type>
<adminEmail>string</adminEmail>

<serverThumbprint>A3:50:BF:3E:48:05:6E:26:B5:49:B9:83:E7:BA:0B:4E:1E:94:DC:35</
serverThumbprint>
</server>
<client>
  <version>1.0.0</version>
  <description>
    <label>AMD Radeon Pro Settings</label>
    <summary>MxGPU Control Panel for vSphere Client</summary>
  </description>
  <company>AMD</company>
  <type>vsphere-client-serenity</type>
  <url>https://download.amd.com/software/mxgpui-plugin.zip</url>
</client>
<lastHeartbeatTime>2017-03-15T09:00:00Z</lastHeartbeatTime>
<healthInfo>
  <url></url>
</healthInfo>
<shownInSolutionManager>true</shownInSolutionManager>
</extension>
```

4. Click **Invoke Method**. It should show **Method Invocation Result: void** if it was successfully registered and installed.

Managed Object Type: **ManagedObjectReference:ExtensionManager**
Managed Object ID: **ExtensionManager**
Method: **UpdateExtension**

void UpdateExtension

Parameters

NAME	TYPE	VALUE
extension (required)	Extension	<extension> <description> <label>AMD Radeon Pro Settings</label> <summary>MxGPU Control Panel for vSphere Client</summary> </description> <key>com.amd.mxgpui</key> <company>AMD</company> <type></type> <version>1.0.0</version> <subjectName></subjectName> <server> <url>https://download.amd.com/software/mxgpui-plugin.zip</url> <description> <label>AMD Radeon Pro Settings</label> <summary>MxGPU Control Panel for vSphere Client</summary> </description> <company>AMD</company> <type>HTTPS</type> <adminEmail>string</adminEmail>

Invoke Method

Method Invocation Result: void

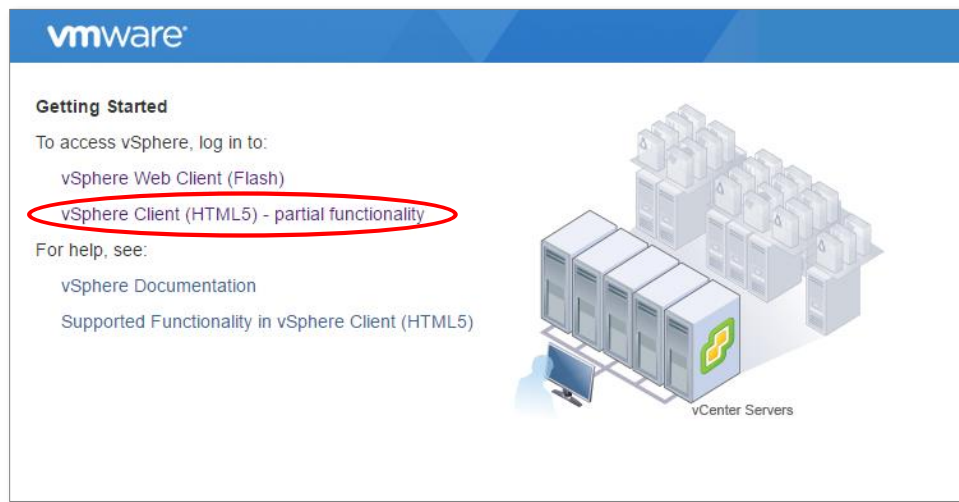
4.2.3 Restart VMware vSphere Client Service

The same step as [section 4.1.4](#)

5 Using the Plug-in

5.1 VMware vSphere HTML5 Client

1. After installing/updating the plug-in on the VMware vCenter Server. Open a browser and type in the URL <https://<NAME OF VCENTER>>, where the name of the server can be either the IP or FQDN of the server. This will lead to a page with two entries as shown in the image below.



2. Click on **VSphere Client (HTML5)**. If the option is not available, please ensure you are using vSphere 6.5. If you are using a fling HTML5 client, you can use:

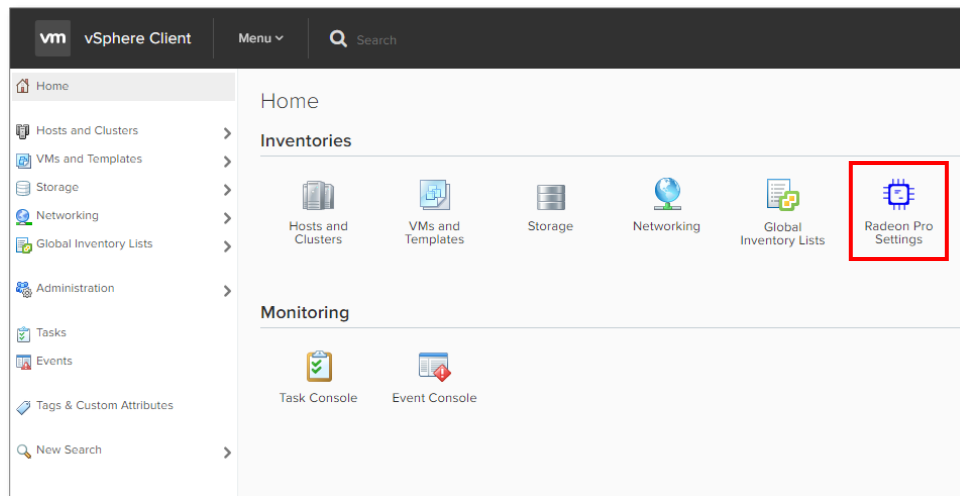
<https://<NAME OF HTML5 CLIENT>/ui>

3. Log in with an account with administrator privileges.

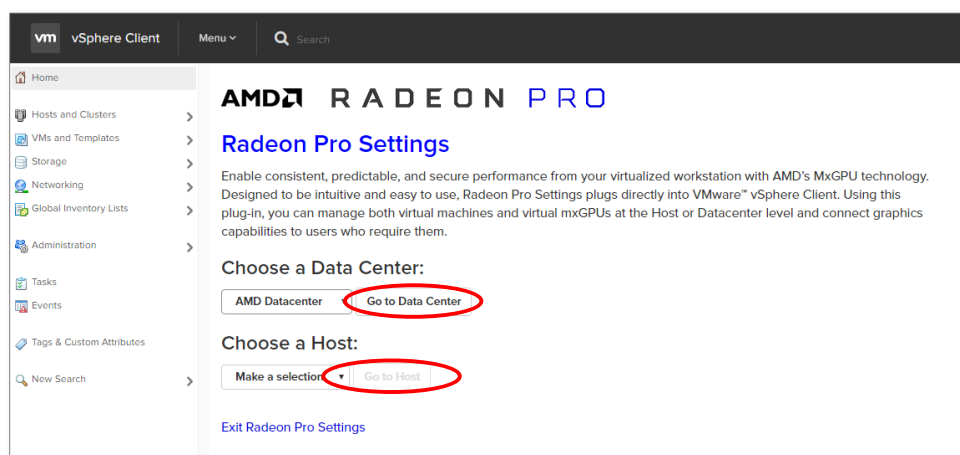
5.2 Starting the Plug-in

5.2.1 From the VMware vSphere Client Home Page

1. Click the **Radeon Pro Settings** icon on the home page.

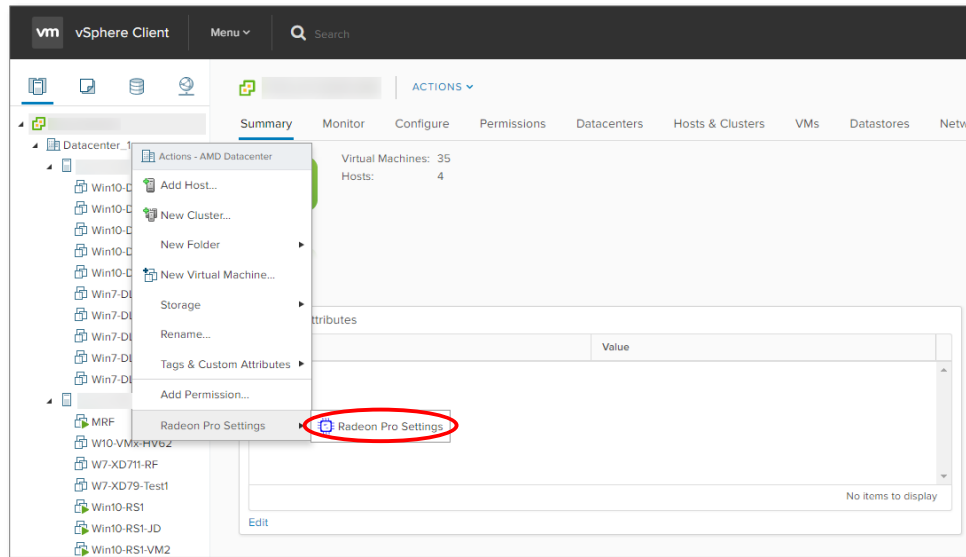


2. Select the Datacenter you wish to manage. There are two options:
 - a. You can view and manage VMs and MxGPUs on all hosts on the selected Datacenter by clicking **Go to Data Center**.
 - b. You can view and manage VMs and MxGPUs on a specific host in the Datacenter by selecting a host from the second drop-down and then clicking on **Go to Host**.



5.2.2 From the VMware vSphere Client Navigation Bar

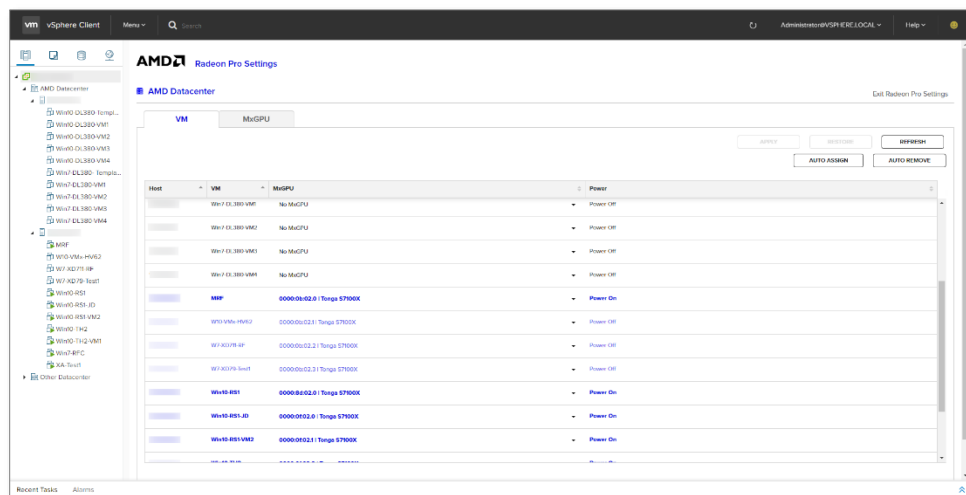
Right-click a Datacenter or Host from the left navigation bar and select **Radeon Pro Settings**.



5.3 The Virtual Machine Tab

The first tab that you will see is the VM tab and it displays all the VMs in your Datacenter or Host. It also contains the following information for each VM:

- Host name.
- VM name.
- The PCI-E bus number and name of the mxGPU that has been assigned to it.
- Power state.



5.3.1 Virtual Machine States

There are 3 possible states for a VM in the Radeon Pro Settings Plug-in:

- Under **Power:**
 1. **Power Off:** No mxGPU is assigned.
 2. **Power On:** mxGPU is assigned.
 3. **Power On:** VM is turned on.

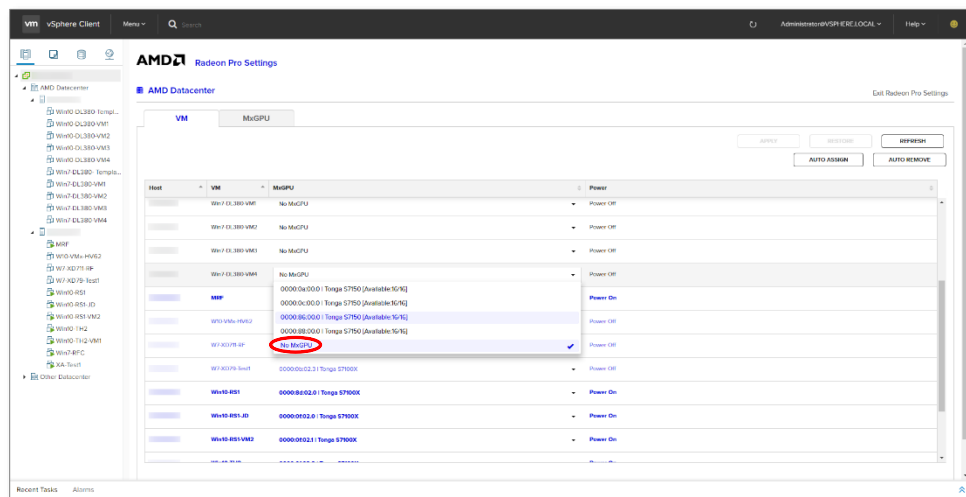
Note: mxGPUs cannot be assigned to or removed from a VM that is powered on.

5.3.2 Assigning mxGPUs to VMs

1. Manually

Note: Configure the partitioning of MxGPUs before assigning. See Section 5.4.2

- Click on the **MxGPU** drop-down menu of a VM and select an MxGPU.
 - The drop-down menu displays all MxGPUs available to the VM
 - It also displays the available number of virtual mxGPUs out of the total configured number for each physical MxGPU.
 - Select **No MxGPU** to remove an mxGPU from a VM.



Click the **APPLY** button to assign a virtual mxGPU to the respective VMs from the selected MxGPU if the MxGPU has any available.

2. Automatically

Note: Configure the partitioning of MxGPUs before assigning. See Section 5.4.2.

When Auto Assigning, it is recommended that all MxGPUs on a host are partitioned the same so that VMs have identical performance.

- Click the **AUTO ASSIGN** button to automatically assign mxGPUs to all VMs.
- Virtual mxGPUs will be assigned from the first MxGPU in a host that has available mxGPUs until the MxGPU has no more available mxGPUs. This continues until either all VMs have been assigned an mxGPU or there are no more available mxGPUs.
- Click the **AUTO REMOVE** button to automatically remove mxGPUs from all VMs.

Auto Assign and Auto Remove act on all VMs in a Datacenter while in the Datacenter view, but only act on VMs of a specific host when in a Host view.

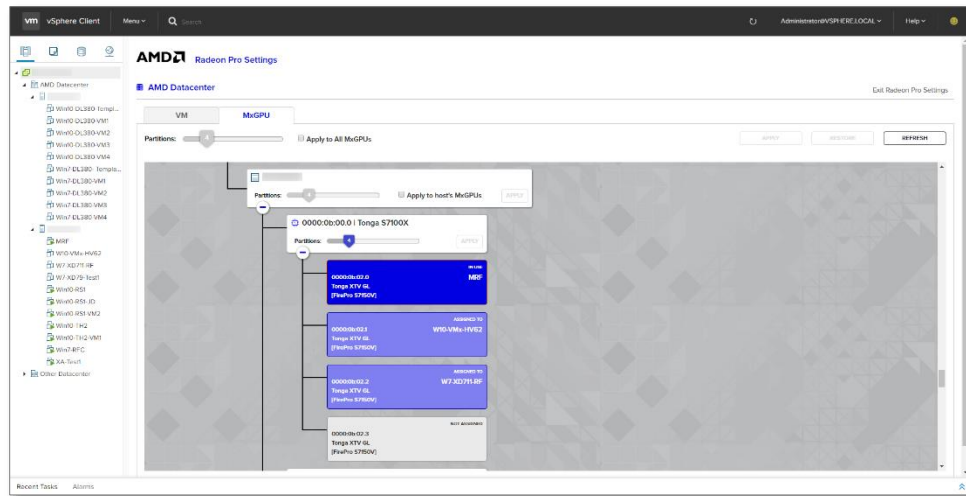
Additional Notes

- VMs need to be powered off in order to be able to assign or remove an mxGPU.
- Only one mxGPU can be assigned to a VM at once. Consider reducing the number of partitions of the MxGPU for better graphics performance on the guest VM.

5.4 The MxGPU Tab

The MxGPU tab displays all physical MxGPUs and the virtual mxGPUs partitioned from each MxGPU. It also contains the following information for each MxGPU:

- PCIE Bus No.
- MxGPU name.
- Power state.
- Name of VM assigned if the mxGPU is assigned to VM.



5.4.1 mxGPU States

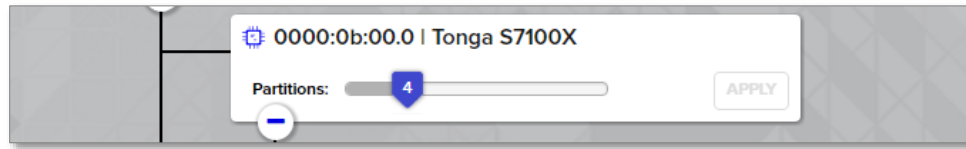
There are 3 possible states for a virtual mxGPU in the Radeon Pro Settings Plug-in

1. Not Assigned.
2. Assigned – Assigned but VM is powered off.
3. In Use – Assigned and VM is powered on.

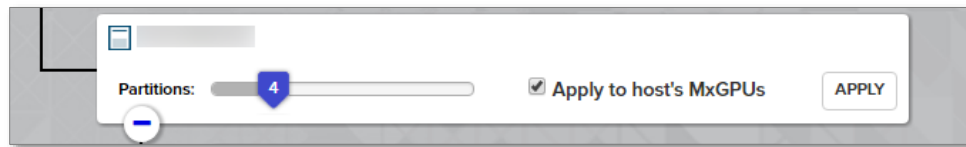
5.4.2 Configuring MxGPUs

There are 3 different levels of sliders to configure the partitioning of MxGPUs.

- **MxGPU slider:** change the configuration of a single MxGPU:

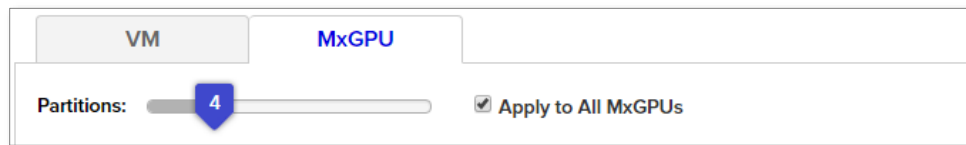


- **Host slider:** click the checkbox to enable this slider and change the configuration of all MxGPUs on the host:



(Note: this slider is only available in the Datacenter view)

- **Master slider:** click the checkbox to enable this slider and change the configuration of all MxGPUs:



This slider will apply the configuration to all MxGPUs in the Host or Datacenter.

Additional Notes

- MxGPUs with mxGPUs in use cannot be reconfigured.
- If you plan to use Auto Assign, it is recommended to use the Host or Master slider to configure MxGPUs to ensure that all assigned VMs have identical performance.
- In the case where an MxGPU with mxGPUs assigned is reconfigured to a lower number of mxGPUs such that some of the assigned mxGPUs are no longer valid, the invalid mxGPUs are automatically removed from the VMs. For this reason, it is recommended to configure all MxGPUs first before assigning mxGPUs to VMs.

6 Known Issues

- The plugin is currently not compatible with the vSphere Web Client (Flash)
- The current VMware vSphere Client (Build 4598948) doesn't have the functionality to detect PCI pass-through devices in VM settings. To confirm that your mxGPU assignment was successful, power on the VM and check device manager or log in to the VMware vSphere Web Client (Flash) and check the VM setting there.
- The new AMDGPUV host driver for ESXi host has the functionality to repartition MxGPUs without the requirement of a reboot of the host to enable a smoother user experience, but this requires that all 16 virtual mxGPUs are visible to the VMware ESXi host system at all times. This means that only the first N partitions are usable and the rest are not usable, where N is the number of partitions configured on the MxGPU. It is advised to use the Radeon Pro Settings interface to make all changes since it will only detect usable mxGPUs.