



CHAPTER 9

Managing Resource Pools

Resource pools help you organize your resources to make it easier to make appropriate allocations to your virtual contexts. Each resource type in each virtual context has a default resource pool, but administrators in the Admin context, or in virtual contexts that have more than one service network, will probably benefit from creating additional pools to create subsets of resources.

This chapter describes resource pools, how to create them, and what you can do with them, and includes the following sections:

- [Understanding Resource Pools, page 9-1](#)
- [Working with Resource Pools, page 9-4](#)
- [Troubleshooting Resource Pools, page 9-12](#)
- [Resource Pool Reference, page 9-13](#)

Understanding Resource Pools

This section explains what resource pools are and how you should use them, and includes the following topics:

- [Resource Pool Overview, page 9-1](#)
- [Static and Dynamic Resource Pools, page 9-2](#)
- [Dynamic Pool Rules and Expressions, page 9-2](#)
- [How VFrame Uses Resource Pools, page 9-4](#)

Resource Pool Overview

A resource pool is a named collection of assets of a particular type of resource. For example, you can create a pool of servers, or a pool of Catalyst 6500 switches, but you cannot create a pool that contains a mix of servers and switches.

Each virtual context, including the Admin context, has a set of default resource pools, one for each type of resource, that start with the word “All.” Pool names include the name of the context plus the name of the pool. For example, **AdminContext: All Server** is the name of the default server pool in the Admin context.

Default pools contain all resources (of the given type) that appear within the context. Admin context default pools contain all assets.

With three exceptions, all pools, whether default or user-created, contain resources added only through discovery (performed in the Admin context). However, in the Admin context, you can also add undiscovered resources to the following pools (and to user-created pools for these types of resources):

- **AdminContext: All IP Address Range**—The IP address range pool contains the ranges of IP addresses that can be assigned to resources acquired for use by service networks. The administrator must add IP address ranges and assign at least one IP address pool to each virtual context.
- **AdminContext: All VLAN (VFrame Created)**—You can add VLANs that have not been discovered. If you assign one of these VLANs to a service network, VFrame creates it on the managed Ethernet switches.
- **AdminContext: All WWNs for Spoofing**—The World Wide Name (WWN) range pool contains the ranges of WWNs that VFrame can use to spoof HBA WWNs.

After creating resource pools, you can assign them to virtual contexts if you are using virtual contexts. Assigned non-default pools appear in the virtual context and the contents of the all assigned pools appear in the virtual context default pools.

Keep in mind that a resource can belong to more than one pool. All resources show up in the default pools, and each resource can show up in one or more additional pools based on your needs.

Static and Dynamic Resource Pools

There are two functional types of resource pools:

- **Static**—A static resource pool contains only those resource you specifically assign to the pool. Resources are removed from the pool only if you manually remove them or if they are marked as unmanaged in the Admin context.
- **Dynamic**—A dynamic pool is defined by a set of rules that specify what types of resources belong to the pool. For example, you could create a dynamic pool of servers whose processor speed is greater than 2000 MHz. The software evaluates your rules, compares them to the managed resources defined in the system, and adds only those resources that satisfy your rule set. As you manage or unmanage resources, the contents of a dynamic pool change accordingly without requiring manual intervention.

Dynamic pools are especially valuable if your applications require specific types of hardware or performance characteristics. You can create a pool whose rules define these characteristics and assign only that pool to the service network that runs the application.

VFrame reassesses membership of dynamic pools whenever you modify the pool, change the managed state of an asset within the pool, assign a pool to a virtual context (the default pools in the virtual context are reassessed), or remove an asset from a static pool in the Admin context (virtual context default pools are reassessed).

Dynamic Pool Rules and Expressions

Membership in dynamic resource pools is controlled by an expression made up of rules. These rules define the attributes that a resource must have to be included in a group.

The types of attributes on which you can define rules depend on the type of resource. For example, server attributes differ from logical unit number (LUN) attributes. Explore the attributes available for your type of resource before deciding how you want to define pool membership. For information on viewing these attributes, see [Creating Dynamic Resource Pools, page 9-5](#).

When you create dynamic resource pools, try to keep your rule set simple by keeping the following points in mind:

- If you select **Match all of the following**, every rule must be satisfied by a resource for it to be placed in the pool.
- If you select **Match any of the following**, if a resource satisfies any single rule in the expression, it is placed in the pool.

When defining a rule, you select the attribute, then the operator that defines the relationship to the value you are testing for, and then the value. For example, the following rule is based on CPU speed, selecting only those servers with greater than 1 GHz CPU speed.

```
PhysicalServer.cpuSpeedInMHz > 1000
```

In this example, `PhysicalServer` is the resource Pool Type class, `cpuSpeedInMHz` is the attribute, `>` is the operator, and `1000` is the value (for this attribute, in megahertz).

The next example adds an additional constraint. The server must also have more than 1 GB of memory.

```
PhysicalServer.cpuSpeedInMHz > 1000 AND
PhysicalServer.memorySizeInMB > 1000
```

You can also do exact-value and partial-value matching by using the following operators:

- `=` (the equals sign)—The attribute must contain the exact value. For example, the following rule matches only those servers that have Qlogic HBAs.

```
PhysicalServer.fcInterfaces.vendor = Qlogic
```

- `!=` (an exclamation point followed by an equals sign)—The attribute must not contain the exact value. Use this operator to apply a negative exact-match test. For example, the following rule excludes all servers that have unsupported HBAs (those defined as “other vendor”).

```
PhysicalServer.fcInterfaces.vendor != other
```

- `contains`—The attribute must contain the value anywhere within the attribute. For example, the following rule matches any IP address that includes 100 in any octet.

```
PhysicalServer.lom.ipAddress contains 100
```

- `does-not-contain`—The opposite of `contains`, the attribute cannot include the value anywhere within it. For example, the following rule excludes all IP addresses that include 100 in any octet.

```
PhysicalServer.lom.ipAddress does-not-contain 100
```

- `begins-with`—The attribute must start with the value. For example, the following rule selects all IP addresses on 10.100.0.0 network.

```
PhysicalServer.lom.ipAddress begins-with 10.100
```

- `ends-with`—The attribute must end with the value. For example, the following rule selects all IP addresses that end in 13, including 13, 113, and 213, on all subnets.

```
PhysicalServer.lom.ipAddress ends-with 13
```

How VFrame Uses Resource Pools

VFrame uses resource pools to acquire resources when you deploy a service network. In the service network definition, you select a pool or resources from within a pool. When you deploy the service network, if you selected a pool, VFrame finds an available resource in the pool and acquires it. If you selected a specific resource within a pool, that resource must be available or you cannot deploy the network.

If you later remove the resource from the pool, nothing happens to the service network. The resource is not suddenly removed from operation. Only if you undeploy and redeploy the service network does VFrame acquire a new resource from the pool. Thus, changes to dynamic pools, or changes you make to static pools, do not affect your running applications; they are protected.

Working with Resource Pools

This section describes how to create and manage resource pools, and includes the following topics:

- [Creating Static Resource Pools, page 9-4](#)
- [Creating Dynamic Resource Pools, page 9-5](#)
- [Changing the Contents of a Static Resource Pool, page 9-7](#)
- [Adding IP Address Resources, page 9-8](#)
- [Adding New VLAN Resources, page 9-9](#)
- [Editing or Modifying Resource Pools, page 9-10](#)
- [Deleting IP Address Ranges, VFrame-Created VLANs, or WWN Ranges, page 9-11](#)
- [Deleting Resource Pools, page 9-12](#)

Creating Static Resource Pools

Static resource pools contain only those resources you assign to them manually. These pools are useful if you are dealing with only a small number of devices, or if your selection criteria are too complex to develop a rule-based dynamic pool. For example, if you know that your finance group owns specific servers, you can create a static pool and add just those specific servers.

Before You Begin

Obtain a list of the resources that should be placed in the pool. Most resources must already be discovered and placed in the managed state before you can put them into pools. If you are creating a pool for IP address ranges, VFrame-created VLANs, or WWN ranges, you must add these resources to the default pools before you can copy them to your new static pools. See the following sections for information on adding the following types of resources:

- [Adding IP Address Resources, page 9-8](#)
- [Adding New VLAN Resources, page 9-9](#)
- [Adding New WWN Range, page 9-10](#)

If you are creating a pool within a virtual context, you can pick only from resources that the Admin context administrator assigned to your virtual context. However, for IP address and WWN ranges, you can create subranges in virtual contexts from the Admin context-assigned ranges.

Procedure

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- Step 1** Choose **Tools > Resource Pools** to open the Resource Pools dialog box (see [Resource Pools Dialog Box, page 9-13](#)).
- Step 2** Choose **New > Resource Pool**. The New Resource Pool dialog box opens (see [New and Edit Resource Pool Dialog Boxes, page 9-16](#)).
- Step 3** In the New Resource Pool dialog box:
- Enter a name and optionally a description for the pool.
The name of the virtual context in which you are creating the pool is prefixed to this name (for example, if you enter Finance Servers in the Admin context, the full name is AdminContext: Finance Servers).
 - From the Pool Type drop-down list, choose **Static** to create a static pool.
 - From the Resource Type pull-down list, choose the type of resources the pool contains.
- Step 4** Click **OK** when finished and the pool is created and added to the list of pools.
- Step 5** Add resources to the pool:
- a. Find the pool that contains the resource that you want to add to the pool. It is typically the default pool for the resource type, but you can use user-created pools.
 - b. Choose the desired resource and click **Copy to Pool**. The Copy Resources dialog box is opened, where you can choose the resource pool to which you want to add the resource.
 - c. Choose the pool and click **OK**. Repeat this process until you have copied all desired assets into the pool.
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Related Topics

- [Understanding Resource Pools, page 9-1](#)
- [Troubleshooting Resource Pools, page 9-12](#)

Creating Dynamic Resource Pools

Dynamic resource pools contain only those resources that satisfy the rules you define for the pool. You define the criteria that a resource must meet to be included in the pool.

Dynamic pools are useful if you are dealing with a large number of assets, or if you frequently add resources to or remove them from the system. They are also useful if you must ensure that resources meet certain minimum criteria to be used in the service networks to which you assign the pool. For example, if you know that a service network can use only servers that run above a certain processor speed, you can use that attribute to define the membership of the pool.

Before You Begin

You can use many different attributes to build rules, and the available attributes differ depending on the type of resource. To explore the types of attributes you can use, follow this procedure to get to the New Resource Pool dialog box. In this dialog box, you can explore the attributes available for the selected resource type and plan how to create meaningful rules to fit your specific requirements.

You can also select the default pool for the type of resource your pool will contain, and click **Properties**. This displays the values for some of the attributes you can use to create dynamic rules. This will help you identify strings or other values to use in dynamic rules.

Procedure

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- Step 1** Choose **Tools > Resource Pools** to open the Resource Pools dialog box (see [Resource Pools Dialog Box, page 9-13](#)).
- Step 2** Choose **New > Resource Pool**. The New Resource Pool dialog box opens (see [New and Edit Resource Pool Dialog Boxes, page 9-16](#)).
- Step 3** In the New Resource Pool dialog box:
- Enter a name and optionally a description for the pool.
The name of the virtual context in which you are creating the pool is prefixed to this name (for example, if you enter Finance Servers in the Admin context, the full name is AdminContext: Finance Servers).
 - From the Pool Type drop-down list, choose **Dynamic** to create a dynamic pool. The Rules and Expression groups are enabled.
 - From the Resource Type pull-down list, choose the type of resources the pool contains.
- Step 4** In the Rules and Expression sections of the dialog box, add the rules that define the resource to be included in the pool. Before creating an expression, read the conceptual information and examples in [Dynamic Pool Rules and Expressions, page 9-2](#).
- To create the expression, add as many rules as you require:
- From the Match All/Any Rules drop-down list, choose **All** if all rules must be satisfied for pool membership (rules are linked by AND), or choose **Any** if only one of the rules must be satisfied for pool membership (rules are linked by OR).
 - To create a rule, click the attribute you want from the Attributes list, choose the desired operator from the Operator drop-down list, and then enter the value for which you want to test. Click **Create Rule** to add it to the expression.
 - To delete a rule, select the rule in the Expression Pane and click the **Delete** button. The logical operand preceding the rule is also deleted.
 - To test your rule, click **Preview Resources**. VFrame evaluates your rule and opens the Resources List dialog box to show you the resources that would be part of the pool based on the rule.
- Step 5** When your expression is correct, click **OK** to create the resource pool.
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Related Topics

- [Understanding Resource Pools, page 9-1](#)
- [Static and Dynamic Resource Pools, page 9-2](#)
- [Editing or Modifying Resource Pools, page 9-10](#)
- [Troubleshooting Resource Pools, page 9-12](#)

Changing the Contents of a Static Resource Pool

You can add resources to or remove them from a static resource pool.

If a resource is being used by an operating service network, removing the resource from a pool does not affect the service network. The resource remains part of the network until the network needs to reacquire resources.

You cannot manually change the contents of a dynamic resource pool. Instead, you must modify the pool rules that define its contents. For more information, see the following sections:

- [Creating Dynamic Resource Pools, page 9-5](#)
- [Editing or Modifying Resource Pools, page 9-10](#)

Before You Begin

Most resources must already be discovered and placed in the managed state before you can put them into pools. You must add IP address ranges, VFrame-created VLANs, or WWN ranges to the default pools before you can copy them to a user-created pool. For more information about adding these resource types, see the following sections:

- [Adding IP Address Resources, page 9-8](#)
- [Adding New VLAN Resources, page 9-9](#)
- [Adding New WWN Range, page 9-10](#)

If you are in a user-created virtual context, you are able to choose only from resources assigned to your context. However, for IP address and WWN ranges, you can create subranges in virtual contexts from the Admin context-assigned ranges.

Procedure

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- Step 1** Choose **Tools > Resource Pools** to open the Resource Pools dialog box (see [Resource Pools Dialog Box, page 9-13](#)).
- Step 2** To add a resource to a static resource pool:
- Find the pool that contains the resource that you want to add to the pool. This is typically the default pool for the resource type, but you can use user-created pools.
 - Choose the desired resource and click **Copy to Pool**. The Copy Resources dialog box opens, where you can choose the resource pool to which you want to add the resource.
 - Choose the pool and click **OK**.
- Step 3** To remove a resource from a static resource pool:
- Choose the resource pool from which you want to delete the resource.
 - Either choose the resource in the right pane or click the + icon for the resource pool and choose the desired resource in the left pane.
 - Click **Remove From Pool**. The resource is removed from the pool, but it is not removed from the system, and its managed state does not change.
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Related Topics

- [Creating Static Resource Pools, page 9-4](#)
- [Editing or Modifying Resource Pools, page 9-10](#)

Adding IP Address Resources

Resources pools for IP address ranges do not contain discovered assets; you manually enter the address ranges included in the pool. VFrame uses the IP addresses identified by these ranges when assigning IP addresses to acquired resources during service network operations. You cannot operate a service network without defining at least one IP address range.

If you are logged in to the Admin context, you can add any routable IP address range. If you are logged in to a user-defined virtual context, you can define ranges only within the range already assigned to the virtual context from the Admin context.

The range cannot overlap the IP addresses ranges defined for DHCP address ranges. The DHCP addresses are exclusively used for server discovery and golden image creation. For more information about DHCP IP address ranges, see [Understanding How VFrame Uses DHCP, page 5-1](#).

Procedure

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- Step 1** Choose **Tools > Resource Pools** to open the Resource Pools dialog box (see [Resource Pools Dialog Box, page 9-13](#)).
- Step 2** Choose **New > IP Address Range Resource**. The Create New IP Address Resource dialog box opens (see [Create New IP Address Resource Dialog Box, page 9-18](#)).
- Step 3** Enter the IP address range using one of the following methods:
- Click **Network Address** and enter the IP address of a network VFrame can use. For example, 10.100.50.0. Then from the Subnet Mask drop-down list, choose the subnet mask.
All addresses except the network address and the broadcast address are added to the pool. For example, 10.100.50.0/24 defines the address range 10.100.50.1 to 10.100.50.254.
 - Click **Begin IP** and enter the first and last IP addresses in the desired address range. Then from the Subnet Mask drop-down list, choose the subnet mask.
Specifying an address range is useful if some addresses in the network are statically assigned to certain devices (for example, a router interface), or addresses that VFrame should not manage.
- To enter a single IP address, enter the same IP address as the first and last IP address in the desired address range.
- Step 4** Click **Save**. Before saving the changes, VFrame does the following:
- If in Admin context, verifies that the IP address ranges do not overlap with any address ranges defined in the DHCP IP address range table, whose ranges are used for server discovery and golden image creation. VFrame cannot use these addresses for service network operations.
 - If in a virtual context, verifies that the IP address ranges do not overlap with any other subranges.
 - Verifies that the IP address ranges do not include any IP addresses assigned to the VFrame interfaces.

If the address range passes the tests, it is created in the All IP Address Range pool.

Tips

- If you want the new resources to reside in a user-created static pool, choose them in the default pool, click **Copy to Pool**, and then choose the desired pool.
- You cannot modify the properties for an IP address range after you create it. To change properties, delete the resource and recreate it.

- VFrame must have a route to these address ranges. If the VFrame default gateway does not include a route, configure a static route as described in [Configuring Static Routes, page 18-10](#).

Related Topics

- [Understanding Resource Pools, page 9-1](#)
- [Creating Static Resource Pools, page 9-4](#)
- [Changing the Contents of a Static Resource Pool, page 9-7](#)
- [Deleting IP Address Ranges, VFrame-Created VLANs, or WWN Ranges, page 9-11](#)
- [Troubleshooting Resource Pools, page 9-12](#)

Adding New VLAN Resources

When VFrame discovers your Ethernet switches, it also discovers the VLANs defined on them. If you want to allow VFrame to create additional VLANs, you can identify them in a VLAN (VFrame-created) pool. When you assign a VFrame-created VLAN to a service network, VFrame configures the necessary switched virtual interface (SVI) and DHCP helper addresses for the VLAN.

VFrame cannot use VLANs numbered higher than VLAN 1001.

You can add VFrame-created VLANs only when you are logged in to the Admin context.

Procedure

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- Step 1** Choose **Tools > Resource Pools** to open the Resource Pools dialog box (see [Resource Pools Dialog Box, page 9-13](#)).
- Step 2** Choose **New > VLAN Resource**. The Create New VLAN Resource dialog box opens (see [Create New VLAN Resource Dialog Box, page 9-18](#)).
- Step 3** Enter the first and last VLAN identifiers in the range you want to add.
- For example, to add all VLANs in the 200 range, enter 200 as the beginning ID, and 299 as the ending ID. To add a single VLAN, enter the VLAN ID in both the BeginVLAN ID and End VLAN ID fields.
- When finished, click **OK** in the dialog box to add the resource to the All VLAN (VFrame Created) pool.
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Tips

- If you want the new resources to reside in a user-created static pool, choose them in the default pool, click **Copy to Pool**, and then choose the desired pool.

Related Topics

- [Understanding Resource Pools, page 9-1](#)
- [Creating Static Resource Pools, page 9-4](#)
- [Creating Dynamic Resource Pools, page 9-5](#)
- [Changing the Contents of a Static Resource Pool, page 9-7](#)
- [Deleting IP Address Ranges, VFrame-Created VLANs, or WWN Ranges, page 9-11](#)
- [Troubleshooting Resource Pools, page 9-12](#)

Adding New WWN Range

Resources pools for World Wide Name (WWN) ranges do not contain discovered assets; you manually enter the WWN ranges included in the pool. VFrame uses the WWNs identified by these ranges when spoofing HBA WWNs.

A WWN is a 64-bit address used in Fibre Channel networks to uniquely identify each device in a Fibre Channel network, such as an HBA. Spoofing HBA WWNs provides implicit support for any SAN fabric.

You can define a WWN range in the Admin context and in virtual contexts. WWN pools defined in virtual contexts must be a subset of the WWN pool defined in the Admin context. VFrame reserves over 64,000 WWNs from which to define the WWN pool.

Procedure

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- Step 1** Choose **Tools > Resource Pools** to open the Resource Pools dialog box (see [Resource Pools Dialog Box, page 9-13](#)).
- Step 2** Choose **New > WWN Resource for Spoofing**. The New WWN Range dialog box opens (see [New WWN Range Dialog Box, page 9-19](#)).
- Step 3** Enter the first and last WWNs in the range you want to add.
For example, to define a range of 512 WWNs, you can specify 23:00:00:05:AD:1E:00:00 as the beginning WWN, and 23:00:00:05:AD:1E:01:00 as the ending WWN. To add a single WWN, enter the same WWN in both the From and To fields.
- Step 4** When finished, click **OK** in the dialog box to add the resource to the All WWNs for Spoofing pool.
-

Tips

- If you want the new resources to reside in a user-created static pool, choose them in the default pool, click **Copy to Pool**, and then choose the desired pool.

Related Topics

- [Understanding Resource Pools, page 9-1](#)
- [Creating Static Resource Pools, page 9-4](#)
- [Creating Dynamic Resource Pools, page 9-5](#)
- [Changing the Contents of a Static Resource Pool, page 9-7](#)
- [Troubleshooting Resource Pools, page 9-12](#)

Editing or Modifying Resource Pools

After creating a resource pool, you can modify its properties as your needs change.

If you make a change to the expression that defines the content of a dynamic pool, and the change affects which resources are contained in the pool, these changes do not affect any service networks that have acquired a resource from the pool. Even if you remove that resource from the pool, service networks do not release these resources just because they are no longer in the assigned pool.

If you want to change the resources assigned to a static resource pool, see [Changing the Contents of a Static Resource Pool, page 9-7](#).

Procedure

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- Step 1** Choose **Tools > Resource Pools** to open the Resource Pools dialog box (see [Resource Pools Dialog Box, page 9-13](#)).
- Step 2** To change the characteristics of the pool, choose it and click **Edit** to open the Edit Resource Pool dialog box ([New and Edit Resource Pool Dialog Boxes, page 9-16](#)).

You can change the following characteristics:

- The description.
 - For dynamic pools, the expression that defines the contents of the pool. For information on building expressions, see the following sections:
 - [Dynamic Pool Rules and Expressions, page 9-2](#)
 - [Creating Dynamic Resource Pools, page 9-5](#)
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Related Topics

- [Creating Static Resource Pools, page 9-4](#)
- [Creating Dynamic Resource Pools, page 9-5](#)
- [Deleting Resource Pools, page 9-12](#)

Deleting IP Address Ranges, VFrame-Created VLANs, or WWN Ranges

You can delete IP address ranges, VFrame-created VLANs, or WWN ranges from their default resource pools. These are resources you define in VFrame, rather than those that are discovered in your network.

Before You Begin

Ensure that the resource you are deleting is not being used by a service network.

Procedure

-
- Step 1** Choose the resource you want to delete from the All IP Address Range, All VLAN (VFrame Created), or All WWNS for Spoofing resource pool.
- Step 2** Click **Delete**. The resource is removed from the pool and deleted from the system.
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Related Topics

- [Adding IP Address Resources, page 9-8](#)
- [Adding New VLAN Resources, page 9-9](#)
- [Adding New WWN Range, page 9-10](#)

Deleting Resource Pools

You can delete resource pools if you no longer need them. You cannot delete a default resource pool.

You can also remove resources from static resource pools. For information, see [Changing the Contents of a Static Resource Pool, page 9-7](#).

Before You Begin

Ensure that the resource pool is not currently assigned to a service network. You are warned if it is still assigned and told which networks use the pool.

Procedure

-
- Step 1** Choose **Tools > Resource Pools** to open the Resource Pools dialog box (see [Resource Pools Dialog Box, page 9-13](#)).
- Step 2** Choose the resource pool and click **Delete**.
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Related Topics

- [Understanding Resource Pools, page 9-1](#)
- [Troubleshooting Resource Pools, page 9-12](#)

Troubleshooting Resource Pools

This section describes some problems you might encounter when working with resource pools and their solutions, and includes the following topics:

- **Problem** You cannot see a pool that you expect to see within a particular virtual context.
- **Problem** You cannot see any pools within a virtual context.
- **Problem** A resource is not included in a dynamic pool when you think it should be.
- **Problem** A resource is not included in a static pool when you think it should be.
- **Problem** VFrame cannot communicate with an IP address in an IP Address Range pool.

Problem You cannot see a pool that you expect to see within a particular virtual context.

Solution Within a virtual context, you can see only pools that were created from within the context. Pools assigned from the Admin context define only the resources assigned to the context and these resources appear in the default resource pools. In addition, your user account might restrict you from seeing specific pools if your account specifies that you are allowed to view specific service networks (this applies only in a virtual context). If you are not an administrator, ask your administrator to check on your user restrictions. If you are an administrator, log in to the Admin context and check pool and user assignments for the virtual context, and whether the user is restricted by service network assignments.

Problem You cannot see any pools within a virtual context.

Solution When your user account is created for a virtual context, the account also includes a resource domain scope based on service networks. The person who creates your account must either select **All**, to give you access to all service network resources, or select specific service networks. A selection must be made or you will not see any resource pools, because you are not authorized to see any.

Problem A resource is not included in a dynamic pool when you think it should be.

Solution A dynamic resource pool contains only managed resources, so if a resource is marked as unmanaged, it is removed from the pool. If you do not have permission to view the resource on the Resources tab, ask the administrator to check on the managed state of the device. If this is not the problem, recheck the rules for the pool and compare them to the attributes of the resource (gather these from the device itself).

Problem A resource is not included in a static pool when you think it should be.

Solution Static pools contain just those resources that were specifically added to the pool. However, if a resource is unmanaged (in the Admin context), it is removed from all pools. If it is put into managed state again, the resource must again be manually added to the static pool: it is not added automatically. If the resource has been managed again, you can find it the default pool and add it back to the resource pool. If you cannot find it in the default pool, and you do not have permission to view the resource on the Resources tab, ask the administrator to check on the managed state of the resource and to remanage it or troubleshoot the problem as necessary.

Problem VFrame cannot communicate with an IP address in an IP Address Range pool.

Solution VFrame must have a route to a network address space to manage the network. If the VFrame default gateway does not have a route to the network, you must configure a static route on the VFrame Data Center Director to the network. For information on configuring static routes, see [Configuring Static Routes, page 18-10](#).

Resource Pool Reference

This section describes the tab and dialog boxes you use when managing resource pools, and includes the following topics:

- [Resource Pools Dialog Box, page 9-13](#)
- [New and Edit Resource Pool Dialog Boxes, page 9-16](#)
- [Create New IP Address Resource Dialog Box, page 9-18](#)
- [Create New VLAN Resource Dialog Box, page 9-18](#)
- [New WWN Range Dialog Box, page 9-19](#)

Resource Pools Dialog Box

Use the Resource Pools dialog box to create and manage resource pools. Resource pools are collections of assets of a particular type, for example, a pool of servers or a pool of switches. Resource pools let you group resources that belong together so that you can assign them to virtual contexts or to individual service networks.

How to Get to This Tab

Choose **Tools > Resource Pools** to open the Resource Pools dialog box.

Related Topics

- [Understanding Resource Pools, page 9-1](#)
- [Working with Resource Pools, page 9-4](#)
- [Troubleshooting Resource Pools, page 9-12](#)

Field Reference**Table 9-1 Resource Pools Dialog Box**

Element	Description
New > Resource Pool button	Click this button to create a new resource pool. The New Resource Pool dialog box opens so that you can define the pool (see New and Edit Resource Pool Dialog Boxes, page 9-16).
New > IP Address Range Resource button	Click this button to add IP address ranges to the All IP Address Range resource pool. The Create New IP Address Resource dialog box opens so that you can define the address range (see Create New IP Address Resource Dialog Box, page 9-18).
New > VLAN Resource button (Admin context only)	Click this button to add an undiscovered VLAN to the All VLAN (VFrame Created) resource pool. The Create New VLAN Resource dialog box opens so that you can identify the VLANs you will allow VFrame to create. Enter the first and last VLAN identifiers in the range you want to add. For more information, see Adding New VLAN Resources, page 9-9 .
New > WWN Resource for Spoofing button	Click this button to add a new WWN range to the All WWNs for Spoofing resource pool. The New WWN Range dialog box opens so that you can define the range of WWNs you will allow VFrame to use for WWN spoofing. Enter the first and last WWNs in the range you want to add. For more information, see Adding New WWN Range, page 9-10 .
Edit button	Click this button to modify the selected resource pool. The Edit Resource Pool dialog box opens so that you can change the pool definition (see New and Edit Resource Pool Dialog Boxes, page 9-16). You cannot modify default resource pools.
Delete button	Click this button to delete the selected resource pool, IP address range resource, VFrame-created VLAN resource, or WWN resource for spoofing. You cannot delete default pools or discovered resources. For more information on the implications of deleting a resource or resource pool, see the following sections: <ul style="list-style-type: none"> • Changing the Contents of a Static Resource Pool, page 9-7 • Deleting Resource Pools, page 9-12 • Deleting IP Address Ranges, VFrame-Created VLANs, or WWN Ranges, page 9-11
Copy to Pool button	Click this button to copy the selected resource to another resource pool. You are prompted to select the desired pool from a list of pools for that type of resource. You can copy resources only to static resource pools.

Table 9-1 *Resource Pools Dialog Box (continued)*

Element	Description
Remove from Pool button	<p>Click this button to remove the selected resource from a static resource pool. You cannot use this command to remove resources from dynamic or default pools.</p> <p>Removing a resource from a static pool does not delete it from the system. The resource remains in the default pool and in any other pools to which you added it.</p>
Show Service Networks button	<p>Click this button to see the service networks to which the selected pool or resource is assigned. This information can help you identify who is using a pool or resource before you make changes.</p>
Properties button	<p>Click this button to see the properties of the selected item. If you select a resource pool, you see the properties for each resource within the pool. If you select an individual resource, you see only the properties for that resource.</p> <p>The properties displayed depend on the type of resource. Viewing the properties can help you identify property values that you can use when developing dynamic pool rules. However, not all properties you can use in dynamic rules are displayed.</p> <p>If you select an individual resource, the Resource Attributes dialog box also includes a Device Manager tab. The Device Manager tab displays the device managers available for connecting to the device, and the parameters available for use with the device managers. For some attributes, such as the alternate management address, you can configure the value by choosing the attribute and clicking Edit. However, your changes are used only if the configured device managers use the selected attribute. For information on the attributes available, see Device Managers Parameter Variables, page 18-18</p>
Device Manager button	<p>Starts an external application to connect to the selected device for device management. You are presented with a list of applications that the VFrame administrator defined for the type of device selected. Choose the appropriate application, and VFrame starts it. For example, the Device Manager command might allow you to start an SSH session with a Catalyst switch.</p> <p>The command does not function unless you or an administrator with the appropriate privileges sets up a device manager as described in Configuring Device Managers, page 18-7.</p>
Resource Pools list (left pane)	<p>Displays all resource pools available for the virtual context. The pools are organized in folders based on resource type.</p> <p>You cannot modify the default pools (such as AdminContext: All Server). Pool names are prefixed by the context name.</p>
Pool Contents (right pane)	<p>Displays the contents of the pool selected in the resource pools list, including the pool description.</p>

New and Edit Resource Pool Dialog Boxes

Use the Create or Edit Resource Pool dialog box to define the attributes of a resource pool.

How to Get to This Dialog Box

- Choose **New > Resource Pool** on the [Resource Pools Dialog Box](#).
- Choose a user-created resource pool on the [Resource Pools Dialog Box](#) and click **Edit**.

Related Topics

- [Resource Pools Dialog Box](#), page 9-13
- [Understanding Resource Pools](#), page 9-1
- [Creating Static Resource Pools](#), page 9-4
- [Creating Dynamic Resource Pools](#), page 9-5
- [Editing or Modifying Resource Pools](#), page 9-10
- [Troubleshooting Resource Pools](#), page 9-12

Field Reference

Table 9-2 *New and Edit Resource Pool Dialog Box*

Element	Description
Name	The name of the group. In the resource pool list, this name is prefixed with the name of the context in which it was created. For example, if you name the pool “HP Servers” and create it in the Admin context, the pool is called “AdminContext: HP Servers.” You cannot modify the name after you create the pool.
Pool Type	The type of pool you want to create. You cannot modify this setting after you create the pool. <ul style="list-style-type: none"> • Static Pool—The group contains only those resources you specifically assign to the group. • Dynamic Pool—The group membership is based on rules; for example, the server CPU must meet a minimum speed requirement. If you choose this type, the Rules and Expression groups are enabled so that you can define the membership rules for the group.
Resource Type	The type of resource that this resource pool will contain. You cannot modify this setting for existing pools.
Description	A description of the purpose for the pool.
Preview Resources button	Click this button to see the resources that will be selected by the expression currently in the Expression pane. Use this to test your rule so that you can make the necessary changes before you save the pool.
OK button	Click this button to create (or modify) the resource pool. For dynamic pools, the system accesses your rules and places the appropriate resources into it. If you are modifying an existing dynamic pool, membership is reassessed even if you did not make changes on the page.

Table 9-2 *New and Edit Resource Pool Dialog Box (continued)*

Element	Description
Rules Group	
<p>If you are creating or modifying a dynamic pool, use the controls in the Rules and Expression groups to create the rules that control pool membership. Only resources that meet these rules are included in the group.</p> <p>Before creating a rule, read Dynamic Pool Rules and Expressions, page 9-2.</p>	
Attributes	<p>The attributes you can use for creating a rule. The available attributes depend on the type of resource pool you are creating.</p> <p>Note When rules for a dynamic resource pool are being created, the attribute names shown in the Attributes window are derived from values in the data model and may not be very descriptive or meaningful. However, when you choose an attribute, a full description for the attribute is shown in the pane below the Attributes pane.</p>
Operator	<p>The relationship to the value.</p> <ul style="list-style-type: none"> For numbers, the operators are greater than (>), greater than or equal to (>=), less than (<), less than or equal to (<=), equal to (=), and not equal to (!=). For strings, the operators are equal to (=), not equal to (!=), contains, does-not-contain, begins-with, and ends-with.
Value	<p>The value for which you are testing. Either enter the desired value or select it from the list (depending on the type of attribute you are testing). You can use the % wildcard character to represent zero or more characters within the value.</p>
Create Rule button	<p>Click this button to add the attribute rule to the end of the expression in the Expression pane.</p>
Expression Group	
<p>Before building an expression, read Dynamic Pool Rules and Expressions, page 9-2.</p>	
Expression	<p>The expression defined for the dynamic resource pool. As you create rules, they are added here.</p> <p>You can only delete rules from the expression, you cannot modify them. To change a rule (for example, to change a value), delete the rule and recreate it with the correct value.</p>
Match all/any Rules	<p>If there is more than one rule in the expression, how those rules are evaluated:</p> <ul style="list-style-type: none"> all—A resource must satisfy all of the rules for it to become a member of the pool. The rules are conjoined by AND. any—A resource must satisfy only one of the rules for it to become a member of the pool. The rules are disjoined by OR.
Delete button	<p>Click this button to delete the selected rule in the Expression pane.</p> <p>This button does not delete the resource pool. For information on deleting a resource pool, see Deleting Resource Pools, page 9-12.</p>

Create New IP Address Resource Dialog Box

Use the Create New IP Address Resource dialog box to define IP addresses that VFrame can use when assigning addresses to acquired resources such as servers. These addresses are used during service network operations.

VFrame must have a route to any network or IP address range you specify. If the VFrame default gateway does not have a route, you must configure a static route as described in [Configuring Static Routes, page 18-10](#).

If you are logged in to a user-defined virtual context (that is, not the Admin context), you can define ranges only within the range already assigned to the virtual context from the Admin context.

The range cannot overlap the IP addresses ranges defined for DHCP address ranges. The DHCP addresses are exclusively used for server discovery and golden image creation. For more information about DHCP IP address ranges, see [Understanding How VFrame Uses DHCP, page 5-1](#).

How to Get to This Dialog Box

Choose **New > IP Address Range Resource** in the [Resource Pools Dialog Box](#) (choose **Tools > Resource Pools**).

Related Topics

- [Adding IP Address Resources, page 9-8](#)
- [Deleting IP Address Ranges, VFrame-Created VLANs, or WWN Ranges, page 9-11](#)

Field Reference

Table 9-3 Create New IP Address Resource Dialog Box

Element	Description
Network Address	Choose to add an entire network to the resource pool. Enter the address of the network you want to add to the resource pool. VFrame adds all addresses in the network to the pool except the network address and the broadcast address. For example, network 10.100.50.0/24 defines addresses 10.100.50.1 to 10.100.50.254.
Begin IP	Choose to add a specific address range to the resource pool. Enter the first IP address in the range of addresses that VFrame can assign to acquired resources.
End IP	The last IP address in the range.
Subnet Mask	The subnet mask for the network address or the IP addresses in the identified range.

Create New VLAN Resource Dialog Box

Use the Create New VLAN Resource dialog box to create a VLAN pool. When you assign a VLAN from the pool to a service network, VFrame configures the necessary switched virtual interface (SVI) and DHCP helper addresses for the VLAN. VFrame cannot use VLANs numbered higher than VLAN 1001.

You can create a VLAN pool only when you are logged in to the Admin context.

How to Get to This Dialog Box

Choose **New > VLAN Resource** in the [Resource Pools Dialog Box](#) (choose **Tools > Resource Pools**).

Related Topics

- [Adding New VLAN Resources, page 9-9](#)
- [Deleting IP Address Ranges, VFrame-Created VLANs, or WWN Ranges, page 9-11](#)

Field Reference

Table 9-4 Create New VLAN Resource Dialog Box

Element	Description
Begin VLAN ID	Enter the first VLAN identifier in the range you want to add. For example, to add all VLANs in the 200 range, enter 200 as the Begin VLAN ID, and 299 as the End VLAN ID. To add a single VLAN, enter the same VLAN ID in both the Begin VLAN ID and End VLAN ID fields.
End VLAN ID	The last VLAN identifier in the range.

New WWN Range Dialog Box

Use the New WWN Range dialog box to define a pool of World Wide Names (WWNs) that VFrame can use when spoofing the WWNs of the HBAs in the data center. A WWN is a 64-bit address used in Fibre Channel networks to uniquely identify each device in a Fibre Channel network, such as an HBA. Spoofing HBA WWNs provides implicit support for any SAN fabric.

You can define a WWN pool (a range of WWN addresses) in the Admin context and in virtual contexts. WWN pools defined in virtual contexts must be a subset of the WWN pool defined in the Admin context. VFrame reserves over 64,000 WWNs from which to define the WWN pool.

How to Get to This Dialog Box

Choose **New > WWN Resource for Spoofing** in the [Resource Pools Dialog Box](#) (choose **Tools > Resource Pools**).

Related Topics

- [Adding New WWN Range, page 9-10](#)
- [Deleting IP Address Ranges, VFrame-Created VLANs, or WWN Ranges, page 9-11](#)

Field Reference

Table 9-5 New WWN Range Dialog Box

Element	Description
From	<p>Enter the first WWN in the range you want to add.</p> <p>Defining a WWN is divided into the three following parts:</p> <ul style="list-style-type: none"> • Beginning six hexadecimal pairs (48 bits)—Defines a block of 1024 possible. The drop-down menu offers 64 possible blocks from which to choose. • Middle hexadecimal pair (8 bits)—Defines a block of 256 possible WWNs within the larger block of 1024 WWNs specified by the beginning six hexadecimal pairs. The pull-down menu offers the following four values: <ul style="list-style-type: none"> – 00—First block of 256 WWNs (1 to 256). – 01—Second block of 256 WWNs (257 to 512). – 02—Third block of 256 WWNs (513 to 768). – 03—Fourth block of 256 WWNs (769 to 1024). • Last hexadecimal pair(8 bits)—Defines a single WWN within the block of 256 WWNs specified by the middle hexadecimal pair. <p>For example, to define a range of 512 WWNs, you can specify 23:00:00:05:AD:1E:00:00 as the beginning WWN, and 23:00:00:05:AD:1E:01:00 as the ending WWN. To add a single WWN, enter the same WWN in both the From and To fields.</p>
To	The last WWN in the range.
Number of WWNs	Total number of WWNs included within the WWN range.