CHAPTER 5

OverDrive Network Hypervisor Modeling Tools

This chapter provides an overview of modeling OverDrive Network Hypervisor-managed networks in terms of the user interface, the REST API, and XML metamodels for streamlining their creation:

- Command center—the main OverDrive Network Hypervisor interface to site-to-site VPNs and network access within a site
- Cloud configurator—the cloud-oriented user interface to defining and populating clouds with VMs that can be created and managed
- Cloud orchestration manager—the VM-oriented interface to allow provisioning of VMs to end users
- Metamodels—for creating clouds and VMs programmatically in concert with the orchestration manager
- The REST API—for administering and displaying network status without the OverDrive Network Hypervisor user interface

Command center

The OverDrive Network Hypervisor vCOM Command Center is the administrator's main user interface for working with policies, status, alerts, the domain tree, and so on, including many aspects of cloud configuration and management.

This section provides an overview of the command center's views, and introduces the major components: domains, resources, collections, ports and protocols, policies, and administrative roles:

- Overview of command center views—the policy view, summary view, status views, browse/edit and alert views
- Creating objects in the command center—general introduction to how to name objects and how to select them from the toolbar.

Overview of command center views

The command center contains several views or window panes that you use, along with the toolbar, to control or examine the network components. For example, this is the browse layout view:

Figure 5-1 Views in the command center's browse layout

The layout selection toolbar in the upper right corner lets you choose from three basic arrangements or perspectives for the views.

These options include, from left to right:

- Hide status layout, the default, which suppresses the status views in favor of displaying a docked domain navigator plus selection (summary) and alert/browse views.

The docked navigator layout is good for an environment where you infrequently need to browse through the tree to find things in different domains. With this layout, you can right-click on domains to navigate into them, and you can use the domain bread crumb trail (below the icon toolbar) to navigate up the domain tree.

- Browse layout, as shown in Figure 5-1. In this view you can click either status tab (network or business), and the alerts or browse tab, to see their particular views.

  This layout is appropriate for working in the domain tree, moving through the network, checking network and business status, reacting to alerts, and editing object properties.

- Status layout, in which the business and network status views are both displayed at the same time, and, by default, the alerts view.

  The status layout gives you a very quick overview of the status of the entire network. The domain navigator and summary view are by default practically bookmarks and take up little room on the screen.

Domain navigator view

The command center formats the policy or domain view as a tree of hierarchical container items, which have other objects as members, such as: domains, clouds, collections, sites, network access and business policies, etc.

Non-container items (local resources, administrators, network identities, ports and protocols, as well as network devices) do not appear in this view, but only appear in the selection view.

To see the contents of a particular item, left-click it, and a list of the contents will be displayed in the selection view. To edit an item, right-click it and select Edit. You can also create a new item by right-clicking and then selecting the type of item to create.

Selection view

The selection view displays the contents of an item selected in the domain view. The view's menu bar lets you view only a particular type, such as policy, metamodels, administrators, sites, devices, VLANs, or resources. Or, you can select Summary to see them all.

This view provides a filter to restrict items to display, or to search for a particular one.

Browse/alerts view

The browse view via the browse tab displays information about the currently selected object, or it displays the object creation dialogue for a new item. The displayed information depends on the type of object.

The alerts view via the Alerts tab presents warnings and other alerts. This is not a static display, as the entries appear as the alerts happen and disappear when resolved.

Status views

The status views show the effects of the provisioning process. There are two views: network status and business status. Both views are hierarchic in nature. Each node represents a summary or organizing container for information below it.

The structure of the views includes information that helps to verify that the intent of configured policies matches what is actually being provisioned. Concretely, this includes what is enabled to allow pairs of resources to communicate with each other as a result of provisioning and also which resources are not being connected due to missing or misconfigured policy.

The items in the views have associated context (right-click) menus for showing more information about them, whether logs and the active policy for network devices, or compliance reports, and so on, in addition to tooltips that report on subnets and devices waiting for their first connection.

Network status view

The network status view shows the status of sites and managed network devices. It is organized hierarchically. Sites are marked with a red [x] if the network device is not connected and working. You can mouse over (that is, hover over) a network device to see its status.

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Figure 5-2 Network status view

Color coding shows device status, with real-time performance information appearing in a variety of graphical formats. (Real-time device log files are also available.)

Using the site view, admins can quickly spot malfunctioning devices and respond to outages and potential performance problems.

Business status view

The business policy status view is about the resource pairs being provisioned, where two defined resources are permitted to exchange IP packets.

The business policy status view is particularly useful in debugging configuration problems, because implicit and invalid resource pairs are listed along with well-formed resource pairs.

Implicit pairs are those that cannot be provisioned due to some type of user-configuration error, such as a resource with missing or insufficient information, for example, a resource with an undefined IP address, or a resource not yet assigned to a site.

Invalid pairs are those resource-to-resource connections that are possible due to underlying network connectivity that is beyond the control of OverDrive Network Hypervisor, for example, two resources in the same subnet on the same physical LAN segment.

If configuration is incorrect, pairs that should be provisioned but for some reason are not will appear in the invalid or implicit categories. (You can hover your mouse over the pair to see the reason.)

The business policy view, as shown in Figure 5-3 provides a unique, top-down picture of the deployed infrastructure and the policies that define and control its behavior.

Figure 5-3 Business status view

Using this view, you can quickly identify non-functioning policies. You can drill down into an individual policy and see its individual services and their status. You can continue to drill down deeper into any specific service to see the status of the actual devices that support it.

Creating objects in the command center

You can use right-click context menus as well as toolbars, to create objects, as briefly described below. When you do so, follow the general recommendations here.

General recommendations

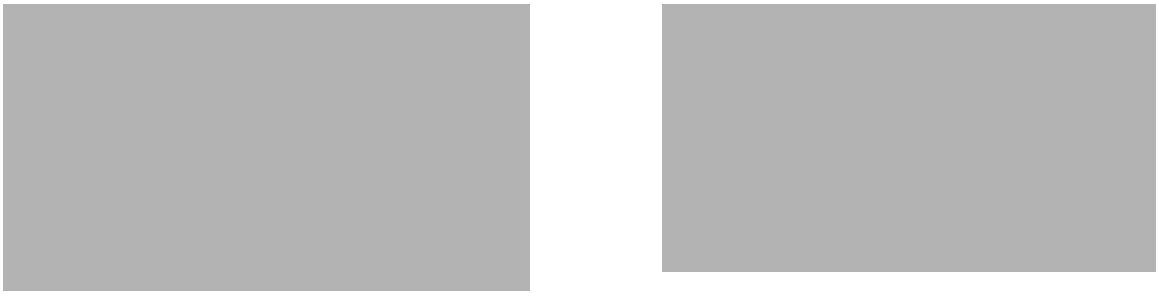
All items you create have two features in common, as shown in Figure 5-4:

- A name, pre-filled with the type of object, such as, for example, Domain: Keep this pre-filled type string until you build up a good understanding of what types of items you see where in the command center.

  Note Routers and switches may not have spaces in their names.

- A comment or description displayed as a tooltip when you hover the mouse over the object. These comments help you capture additional information that can be displayed about the object, for example, contact information for a site, or the purpose of a resource.

Figure 5-4 Object type and mouse-over comments.



- Name routers and switches uniquely and identifiably, generally, by including the model and a unique ID, typically a number.

  We recommend that you use a combination of the name and the comment field to help you properly identify a device.
- When you configure an object, enter as much information as possible on all tabs.
- If you enroll an object like a local resource or VLAN into a policy, the NSVE alerts you if some of the critical information needed to build the services is missing. For example, if you create a local resource, name it, and assign it to a site without filling in the IP address, and then try to use it in a policy, an alert in the business policy status view tells you that the IP address is missing.

Creating objects from the toolbar

The toolbar icons light up or gray out, depending on which item you have highlighted in the policy view. They stay the same if you next highlight an item in the selection view. In the selection view, you can create an object of the same kind that you have highlighted in the domain tree.

If you have selected an object that can contain other objects, they will be included in the container object. For example if you select a site and create a local resource, it will automatically be included in the site.

Table 5-1 Objects you can create from the toolbar

Object	Icon	Object	Icon
Administrator		Network access policy	
Business policy		Network identity	
Collection		Ports & protocols	

Object	Icon	Object	Icon
Domain		Site	
Local resource			

Cloud configurator

The Cloud Configurator user interface allows administrators to define clouds and populate them with VMs. For example, here is a representative view, with the Settings tab in focus:

Figure 5-5 Cloud settings screen example

Clouds are very similar to domains and may have the same components, but they also combine VLAN management with business policies to automate provisioning of network resources and policies in response to requests for creating VMs. They may, like domains, contain sites, business policies, and other domains or clouds.

Creating and configuring clouds

Clouds are created based on customizable models called metamodels that specify parameters such as subnet address ranges, VLAN ranges, whether DNS is enabled and with which credentials and keys, which types of customers can access the cloud, and what kinds of VMs they can use.

The metamodels determine which panels of prompts are presented to collect configuration specifications, how many fields there are within a panel, and what type of data can be collected. For example, the following figure illustrates parameters that have been specified for collection in a VLAN-specific panel:

Figure 5-6 Customizable cloud parameters (VLAN)

Once clouds are created, the configurator provides a Settings tab with appropriate information, as in Figure 5-5 on page 5-7.

Populating clouds with VMs

Adding virtual machines to a cloud is simple: click the cloud's Virtual Machines tab, then the add VM button. Provide a hostname, and a model from a drop-down list, specify a few parameters (which may be optional).

Run, stop, power down, and remove VMs very simply.

Cloud orchestration manager

The Cloud Orchestration Manager provides a subset of the functionality of the Cloud Configurator, namely, the ability to add, run, stop, and remove VMs from a previously created cloud.

This interface is designed for use by near-end users who will create and power on VMs for generally temporary use by real end users.

Metamodels

Metamodels let OverDrive Network Hypervisor administrators support network configurations to automate cloud creation such as for virtual data centers with virtual machines.

These XML documents provide preconfigured settings to:

- Create parts of OverDrive Network Hypervisor-managed networks
- Present certain cloud and VM settings for the Cloud Configurator or Orchestration Manager user to enter or modify
- Specify domains, business policies, network access policies, resources, VLANs, and so on

The REST API

OverDrive Network Hypervisor uses a RESTful web service API to support the OverDrive Network Hypervisor command center and to allow administration and display of the status of a network, without requiring a specific user interface. It allows for the development of in-company-specific interfaces

The API operates on the following primary resource types, which have been described earlier: domains, sites, DSCs, resources, network elements (IDs), policies, groups, and admins.