CHAPTER 1

What is OverDrive Network Hypervisor?

In conceptual terms, Cisco OverDrive Network Hypervisor combines a network services virtualization engine, as sketched in this chapter, with clients in an architecture that enables creation and management of site-to-site VPNs, network access control within a site, and cloud services to be used by VMs, as described in later chapters.

(Sites in OverDrive Network Hypervisor are logical entities, either single physical locations or multiple physical locations that retain a single, logical edge.)

The OverDrive Network Hypervisor engine reacts to high-level creation and modification of network models by using easily specified business and network policies to configure or reconfigure user access (by people or machines) to resources (services) available on-site, intra-net, or in-cloud.

This chapter briefly describes:

- Network services—shared resources
- Virtualization of network services—automatic and dynamic data center environments
- The OverDrive Network Hypervisor NSV platform— real-time, policy-based, automation and control

Network services

Network services provide capabilities to shared resources and users. Examples of such capabilities are DHCP, DNS, routing and VPNs, switching and VLANs, firewalls (ACLs), security (ACLs and 802.1x), and identity-based network access control.

Virtualization of network services

The term virtualization in an OverDrive Network Hypervisor context applies to a wide range of computer- or server-related hardware, software, memory, storage, data, desktops, and networking.

OverDrive Network Hypervisor virtualizes network services by creating or abstracting a logical network in concordance with the physical network that it also manages. It controls the physical network by virtualizing hardware switches and routers to create subnets of network addressing space, typically VPNs, that also enable and orchestrate clouds and VMs.

The logical network is driven by policies that control network access for individuals to resources. The policies specify high-level resource sharing. They can be created externally or using the OverDrive Network Hypervisor Command Center, as documents that can be imported, exported, and edited within the center. At the XML level, they comprise elements that model all the specifications (and more) that

can be expressed in the command center, using a grammar of variable and parameter substitutions that let admins and network configurators easily specify individual and multiple models that OverDrive Network Hypervisor can express. For this reason, they are called metamodel files.

Thus, OverDrive Network Hypervisor invents and defines network services virtualization as a model-based definition of a network addressing space, the physical and virtual (VM) resources in that space, and the managed services, capabilities, and relationships between those network resources. That is, the deployed network and service infrastructure.

In abstracting a logical from a physical network, the model enables dynamic responses to physical network changes. These responses ensure the on-going operational intent of the logical network services model.

By virtualizing clouds and physical centers, OverDrive Network Hypervisor provides an infrastructure that is entirely dynamic, controlled by the OverDrive Network Hypervisor NSVE (network services virtualization engine).

The NSVE controls the virtualized data center hardware, VM, and cloud environments, so that end users are connected to the network resources they need for their particular business responsibilities, without requiring someone to reconfigure and re-provision as computing resources change.

The result happens quickly, consistently, and predictably.

The OverDrive Network Hypervisor NSV platform

In virtualizing network services, OverDrive Network Hypervisor orchestrates real-time automation and control, based on business policies that define relationships between users, computing resources, and network services (including clouds, VMs, and storage).

This orchestration is based on business semantics. It is a top-down approach to managing a network, instead of a bottom-up approach that concentrates on routers, switches, and other network hardware.

To support this business policy emphasis, OverDrive Network Hypervisor automates device level configurations, thereby automating network service delivery and network management. The NSVE interprets the policy, identifies devices and services that need to be modified to satisfy it, and dynamically pushes configuration updates to the selected devices. In brief, it:

- Creates all configuration updates for appropriate devices
- Negotiates required services among selected devices
- Initiates multiple services in parallel and in concert
- Provides real-time feedback as services are initiated across the network

In other words, OverDrive Network Hypervisor provides the services and configurations that each business policy needs.

A key component of the NSVE is a process called the provisioner or provisioning engine. This determines which sites are affected by the new policy. For each one, it constructs a set of abstract directives to tell the site's DSC (device service controller) which policies it needs to implement. Depending on which services are enabled at the sites, when the service controller receives the directives, it converts them into device-specific instructions and configures the devices accordingly.