Virtual Network Operator (VNO)

Managed Bandwidth

Introduction

The need for Virtual Network Operator (VNO) capabilities is clear. Satellite service providers are offering new service packages for second tier providers who in turn repackage these services to their customers. Users now desire more control over their purchased satellite services. In addition, users want the ability to manage their own resources with minimal support from satellite operators. Comtech EF Data's VNO feature delivers these capabilities

VNO enables operators to partition the satellite network and efficiently allocate resources to specific end customers. With the VNO capability, satellite operators can selectively expose resources and operations in their primary network to external resellers, customers, and sub tier providers.

It utilizes existing web-based technologies and enables flexibility in implementation of key VNO functions.

How It Works

The VNO solution extends the existing Vipersat Management System (VMS) installation with a VMS VNO Web Services (VNO-WS) module. The VNO-WS is a server that mediates requests between VNO client applications and VMS. VNO-WS exposes a limited subset of the total network. It allows the satellite space segment provider to create "virtualized" networks that are accessed by VNO users via web clients or custom applications via the web service interface. The satellite service provider creates a virtual network using VMS's Network Manager function and the VNO-WS extension selectively exposes items from the Network Manager.

Benefits

VNO delivers significant benefits for satellite service providers, including:

- Quick deploymentLowers the barrier to entry for resellers of satellite services
- Provides additional revenue generating value-added services via leveraging centralized network design expertise and first and second level help desk support
- Potential to reduce operating expenses for the primary satellite provider since the VNO user assumes a greater role in managing their own assigned resources
- Supports basic user authentication where access and operation privileges are granted to specific (virtual) networks
- A software development kit is available for custom applications

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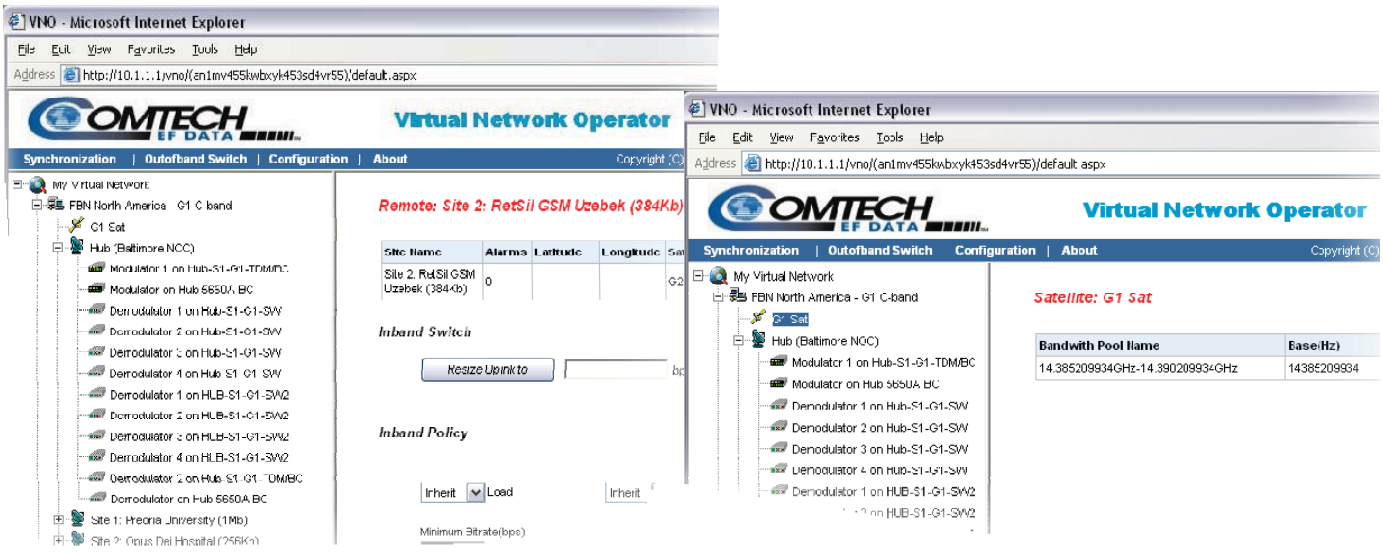

Server Requirements

VNO runs on a Windows 2003 server with SP1 standard edition. In non-redundant VMS applications, VNO can reside on the same server as VMS. In redundant VMS applications, VNO resides on a separate server from VMS, which is on the same local area network as the VMS server. The VNO sample client applications require Microsoft Internet Explorer (IE) Version 6.0 or later, and IIS version 5.1 or later.

VNO Software Development Kit

VNO is provided with a (1) Basic User Authentication enabling a simple user-based security model, and (2) sample VNO client applications. These sample applications demonstrate most of the capabilities of the VNO interface, and, if they meet the needs of the network operator, they can be used with no further modification. However, if the network operator has additional requirements beyond those available in the sample application(s), or Basic User Authentication, the VNO Software Development Kit is available to facilitate the implementation of custom client applications.

VNO Control Functions

The VNO interface exposes the following functions of the VMS:

- Network, satellite, and bandwidth information
- Hub sites & status
- Remote sites & status
- Modulators & status
- Demodulators & status
- Remote site policies
- Circuit switching commands

Hardware Requirements

CPU	Pentium IV, 3.0 GHz or higher
RAM	1 GB
Bus Speed	533 MHz FSB
CD-ROM	24x, internal
Hard Disk Space	80 GB
Video	PCI or AGP, 1280 x 1024, 65,536 Colors
Network Interface	Ethernet 10/100Base-T, RJ-45
Serial Port	One available USB port
Operating System	Windows 2003 Server, SP1, Standard Edition, English only
Windows Server Components	ASP.net IIS Services