

# Virtual Routing Modules

SKU ZOS-VR-OSPF  
SKU ZOS-VR-BGP  
SKU ZOS-VR-BGP6

SKU ZOS-VR-RIP  
SKU ZOS-VR-NSM

## Overview

The term “virtual router” is widely used, but depending on hardware support, topology, network protocol support and overall solution goal, it has a number of different definitions. This document defines a virtual router to be an emulation of a physical router from a software point of view. It has exactly the same mechanisms as a physical router, and therefore inherits all existing mechanisms and tools for configuration, deployment, operation, troubleshooting, monitoring, and accounting. In short, there may be many instances of router and protocol code running on a single box, each operating independently from one another and for a different purpose. Virtual Router is a perfect solution for OEM access providers. It allows consolidation of multiple physical routers into a single route; therefore, reduces capital cost, power, management and floor space.

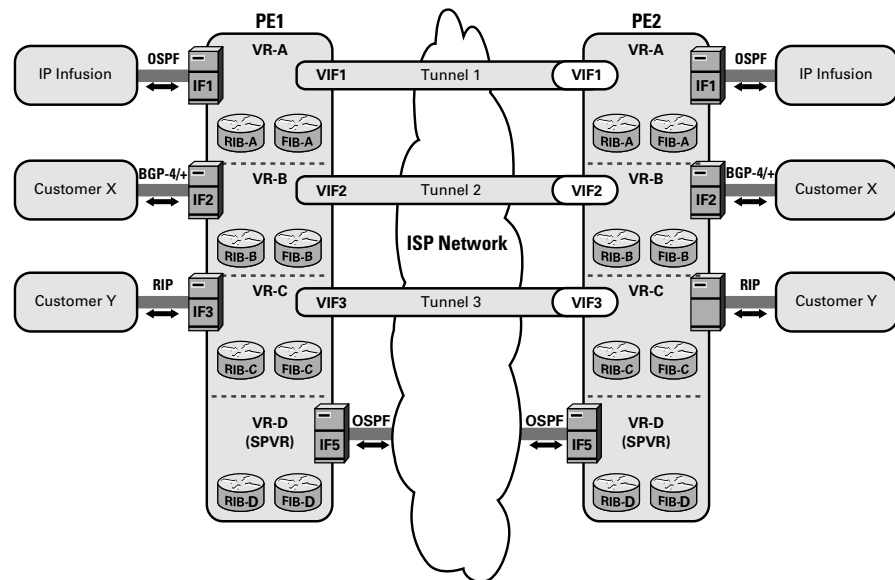


Figure 1 Example of Virtual Routing

## Applications

### Virtual Private Networks (VPNs)

Many sources refer to virtual routers in terms of their application within virtual private networks. This design interprets the VPN implementation to be a specific application of the overall virtual routing design. As a result, the VPN approach is considered to be an add-on feature of virtual routing.

In Figure 1, PE1 or PE2 is one physical router that has been divided into multiple virtual routers. Each of the virtual router can run a different routing protocol with its own independent RIB and FIB. In this example, Customer X on VR-B/PE1 communicates via Tunnel 2 to its corresponding VR-B on PE2. Therefore, the physical link between PE1 and the ISP Network can carry multiple tunnels. Virtual routers help reduce the equipment footprint and cost as well as make the network management easier.

## OSPF, BGP and RIP Virtual Routing Support

Within a Virtual Router, the BGP, RIP & OSPF VR clients communicate with the NSM server to pass VR information. The NSM passes virtual router ID and other additional information to OSPF and BGP, so that they can associate them with correct protocol instances per context. OSPF, RIP and BGP also learn about other virtual routers via communication to NSM.

The ZebOS® Virtual Routing Modules are written in ANSI C programming language and are modular and portable.

## Management of Virtual Routing

The ZebOS Virtual Router Modules include an industry-standard command line interface (CLI). Using this CLI, an administrator may connect directly to the Virtual Router Modules and apply configuration changes.

In addition, the ZebOS Virtual Router Modules combine seamlessly with the ZebOS Integrated Management Interface (IMI) to create an end-to-end virtual routing and management solution.

The ZebOS IMI is a complete management plane that unifies the configuration of the ZebOS routing daemons through a centralized interface. The ZebOS IMI and the IMI Shell together support advanced I/O functions and provide extensive logging and monitoring capabilities.

The ZebOS IMI enables the virtual routing device to be managed at a system level or on individual virtual router basis.

## Ordering Requirements

SKU	PRODUCT NAME
ZOS-NSM	ZebOS Network Services Module
ZOS-OSPF	ZebOS OSPFv2 Module (required when ordering ZOS-VR-OSPF)
ZOS-BGP	ZebOS BGP Module (required when ordering ZOS-VR-BGP)
ZOS-BGP6	ZebOS BGP-4+ Module (required when ordering ZOS-VR-BGP6)
ZOS-RIP	ZebOS RIP Module (required when ordering ZOS-VR-RIP)

## Supported Operating Systems

- Linux
  - Monta Vista Professional Edition
  - VxWorks® \*
- \* Requires IP Infusion TCP/IP Module.

## Standard Deliverables

- Source Code (written in ANSI compliant C)
- Virtual Routing Command References
- Developer Guides
- Installation and Configuration Guide



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