Cisco IOS SLB and Exchange Director Server Load Balancing for Cisco Mobile SEF

The Cisco® IOS® SLB and Exchange Director software features provide a rich set of server load balancing (SLB) functions supporting the protocols and component configurations commonly found in application server deployments and mobile wireless environments. The Cisco IOS SLB and Exchange Director features are fully integrated into Cisco IOS Software running on Cisco Catalyst® 6500 Series and Cisco 7600 Series supervisor engine line cards (Figure 1). This provides a low-cost, efficient load balancing solution that requires no additional hardware.

Figure 1.   Catalyst 6500 Series and Cisco 7600 Series with Integrated Cisco IOS SLB and Exchange Director

Solution Overview

The Cisco IOS SLB feature is a Cisco IOS Software-based solution that provides load balancing for a variety of networked devices and services, including:

- Application servers based on protocols such as HTTP, Telnet, FTP, Domain Name Server (DNS), etc.
- Firewalls
- Service nodes, such as authentication, authorization, and accounting (AAA) servers, Web caches, etc.

In addition, Cisco IOS SLB supports the Exchange Director, which enables advanced load-balancing routing capabilities for the following additional service nodes:

- Cisco Service Exchange Framework for Mobile (Mobile SEF) components:
  - Cisco Content Services Gateway (CSG)
  - Cisco Gateway GPRS Support Node (GGSN)
  - Cisco Packet Data Serving Node (PDSN)
  - Cisco Home Agents

- Other components for mobile, public wireless LAN (PWLAN), and service provider networks:
  - Wireless Application Protocol (WAP) gateways
  - Protocol optimization gateways
  - Third-party GGSNs and Home Agents
  - Other RADIUS-aware flow gateways. These gateways are proxies or routing nodes that receive RADIUS authorization and accounting requests for users that route flows through the gateways. The Exchange Director binds the RADIUS and data flows to the same gateway, ensuring that the gateway receives a complete and consistent view of the network activity for the user.

The Exchange Director also adds the following features:

- Enhanced failover capabilities for single-chassis failover within Mobile SEF service nodes on Cisco Catalyst 6500 Series Switches and Cisco 7600 Series Routers. When used with Stateful Switchover (SSO), Cisco IOS SLB stateful backup for redundant route processors provides full Cisco IOS SLB stateful failover for these platforms.
- Flow persistence, which provides intelligent return routing of load-balanced IP flows.

Figure 2.   Cisco IOS SLB Deployment
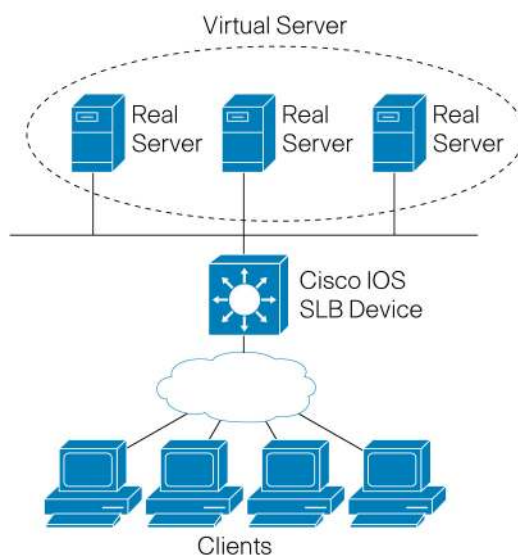
Key Features

This section describes the general features provided by Cisco IOS SLB, as well as the specific features provided by the Exchange Director for Cisco Mobile SEF.

Cisco IOS SLB features:

- Routing
- Security
- Server failure detection and recovery
- Protocol support
- Redundancy

Exchange Director features:

- GPRS load balancing

- GPRS load balancing without GTP Cause Code Inspection

- GPRS load balancing with GTP Cause Code Inspection

- Home Agent Director

- RADIUS load balancing

- WAP load balancing

- Stateful backup of redundant route processors

- Flow persistence

- Support for client traffic arriving on MPLS tunnels

Key Benefits

Cisco IOS SLB and Exchange Director provide the following benefits for Mobile SEF solutions:

- High performance is achieved by distributing client requests across a cluster of servers.

- Administration of server applications is easier. Clients know only about virtual servers; no administration is required for real server changes.

- Security of the real server is provided because its address is never announced to the external network. Users are familiar only with the virtual IP address. Additionally, filtering of unwanted traffic can be based on both IP address and IP port numbers.

- Ease of maintenance with no downtime is achieved by allowing physical (real) servers to be transparently placed in or out of service.

- High availability, scalability, and redundancy of network elements help ensure maximum network uptime, and enable failover solutions in the event of device downtime.

- Management is easy with CISCO-SLB-MIB.

CONFIGURATION LIMITS

- Up to 500 Cisco IOS SLB virtual servers can be configured.

- A maximum of two access VLANs can be configured in a virtual server configuration.

- SLB does not support load balancing of flows between clients and real servers that are on the same LAN or VLAN.

- Cisco IOS SLB VRF-aware is supported with the Supervisor Engine 720 running Cisco IOS Software Release 12.2(18)SXE or later and the Supervisor Engine 32 running Release 12.2(18)SXF5 or later.

Tables 1 and 2 summarize the performance of Cisco IOS SLB and Exchange Director with Cisco Catalyst 6500 Series and Cisco 7600 Series Supervisor Engine 720-3BXL, Supervisor Engine 32-GE-3B or 32-10GE-3B, respectively.

Performance Summary

Table 1.   Performance with Supervisor Engine 720-3BXL

	Max connections per second	Max concurrent connections	Throughput
SLB*	20,000	2,000,000	8G
FWLB**	10,000	1,000,000	8G
RLB***	30,000	8,000,000	Refer to Supervisor Engine 720-3BXL data sheet

Table 2.   Performance with Supervisor Engine 32-GE-3B or 32-10GE-3B

	Max connections per second	Max concurrent connections	Throughput
SLB*	10,000	500,000	4G
FWLB**	5,000	250,000	4G
RLB***	15,000	2,000,000	Refer to the Supervisor Engine 32 data sheet

* SLB – Server load balancing at Layer 4

** FWLB – Firewall load balancing

*** RLB – RADIUS load balancing

RLB subscriber traffic will be switched in hardware once the route flow is created. RLB throughput is only limited by the switch throughput then. Refer to the following data sheet for throughput numbers:

www.cisco.com/en/US/products/hw/switches/ps708/products_data_sheet09186a0080159856.html

Supported Platforms

Table 3.   Supported Hardware and Software Platforms

Hardware	Software Release
Cisco Catalyst 6500 Series/7600 Series Supervisor Engines 720-3B and 720-3BXL (WS-SUP720-3B and WS-SUP720-3BXL)	Cisco IOS Software Release 12.2(18)SXD and later
Cisco Catalyst 6500 Series/7600 Series Supervisor Engines 32-GE-3B and 32-10GE-3B (WS-SUP32-GE-3B and WS-SUP32-10GE-3B)	Cisco IOS Software Release 12.2(18)SXF5 and later

Ordering Information

Table 4.   Cisco IOS SLB and Exchange Director Ordering Information

Product Number	Product Description
FR-IOSSLB FR-IOSSLB=	Cisco IOS Server Load Balancing Feature License • *IP Services* Cisco IOS package required
FR-EXCHDR FR-EXCHDR=	Exchange Director Feature License • *IP Services* Cisco IOS package required

Note: One license covers redundant supervisor engine configurations.

Service and Support

Cisco offers a wide range of services programs to accelerate customer success. These innovative services programs are delivered through a unique combination of people, processes, tools, and partners, resulting in high levels of customer satisfaction. Cisco services help you to protect your network investment, optimize network operations, and prepare your network for new applications to extend network intelligence and the power of your business. For more information about Cisco Services, see Cisco Technical Support Services or Cisco Advanced Services.

Additional Information

For more information about Cisco mobile wireless products and solutions, visit: http://www.cisco.com/go/mobile.

For more information about Cisco Mobile Wireless Center for the Cisco Service Exchange Framework for Mobile, visit: http://www.cisco.com/en/US/partner/products/ps6401/index.html.

For more information about detailed features and configuration for Cisco IOS SLB and Exchange Director, visit:
http://www.cisco.com/univercd/cc/td/doc/product/software/ios122/122newft/122limit/122sx/122sxf18/slbsxf5.htm#wp3600742.

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