IOS Server Load Balancing

Feature History

Release	Modification
12.0(7)XE	This feature was introduced with support for the following platforms: • Multilayer Switch Feature Card 2 (MSFC2) and Supervisor Engine 1 for Cisco Catalyst 6500 family switches (including the Catalyst 6506, Catalyst 6509, and Catalyst 6513) • Cisco 7200 Series Routers The following functions were provided: • Algorithms for Server Load Balancing, page 5 • Automatic Server Failure Detection, page 6 • Automatic Unfail, page 6 • Bind ID Support, page 7 • Client-Assigned Load Balancing, page 7 • Delayed Removal of TCP Connection Context, page 8 • Dynamic Feedback Protocol for IOS SLB, page 8 • Maximum Connections, page 11 • Port-Bound Servers, page 12 • Slow Start, page 15 • Sticky Connections, page 15 • SynGuard, page 16 • TCP Session Reassignment, page 16
12.1(1)E	The following functions were added: • Alternate IP Addresses, page 6 • Content Flow Monitor Support, page 8 • Network Address Translation (NAT) and Session Redirection, page 11—Server NAT • Redundancy Enhancements, page 14—Stateless Backup • Transparent Webcache Load Balancing, page 16

12.1(2)E	The following functions were added:
	• Probes, page 12—HTTP Probes
	• Network Address Translation (NAT) and Session Redirection, page 11—Server and Client NAT
	• Redundancy Enhancements, page 14—Stateless and Stateful Backup
12.1(3a)E	The following functions were added:
	• Firewall Load Balancing, page 9
	• Probes, page 12—HTTP and Ping Probes
	• Protocol Support, page 13
	• Redundancy Enhancements, page 14—Stateless and Stateful Backup, and Active Standby
	• WAP Load Balancing, page 17
12.1(5a)E	The following functions were added:
	• Avoiding Attacks on Server Farms and Firewall Farms, page 7
	• Probes, page 12—HTTP, Ping, and WSP Probes
12.1(5)T	The Cisco IOS Release 12.1(1)E feature was integrated into Cisco IOS Release 12.1(5)T, supporting Cisco 7200 Series Routers only.
12.2	The Cisco IOS Release 12.1(5)T feature was integrated into Cisco IOS Release 12.2.
12.1(7)E	Support for the following platform was added:
	• Cisco 7100 Series Routers
	The following functions were added:
	• Multiple Firewall Farm Support, page 11
	• Route Health Injection, page 15
12.1(8a)E	Support for the following platform was added:
	• MSFC2 and Supervisor Engine 2 for Cisco Catalyst 6500 family switches (including the Catalyst 6506, Catalyst 6509, and Catalyst 6513)
	The following functions were added:
	• Backup Server Farms, page 7
	• DFP Agent Subsystem Support, page 8
12.1(9)E	The following functions were added:
	• GPRS Load Balancing, page 10
12.2 S	The Cisco IOS Release 12.1(8a)E feature and the GPRS Load Balancing function were integrated into Cisco IOS Release 12.2 S.

This document describes the Cisco IOS Server Load Balancing (SLB) feature in Cisco IOS Release 12.2 S. It includes the following sections:

- Overview of the IOS SLB Feature, page 3
- Functions and Capabilities, page 4
- Benefits, page 17

Overview of the IOS SLB Feature

The IOS SLB feature is an IOS-based solution that provides IP server load balancing. Using the IOS SLB feature, you can define a *virtual server* that represents a group of *real servers* in a cluster of network servers known as a *server farm*. In this environment, the clients connect to the IP address of the virtual server. When a client initiates a connection to the virtual server, the IOS SLB function chooses a real server for the connection based on a configured *load-balancing algorithm*.

Note IOS SLB does not support load balancing of flows between clients and real servers that are on the same local area network (LAN) or virtual LAN (VLAN). The packets being load balanced cannot enter and leave the load-balancing device on the same interface.

IOS SLB also provides firewall load balancing, which balances flows across a group of *firewalls* called a *firewall farm*.

Figure 1 illustrates a logical view of a simple IOS SLB network.

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Figure 1   *Logical View of IOS SLB*
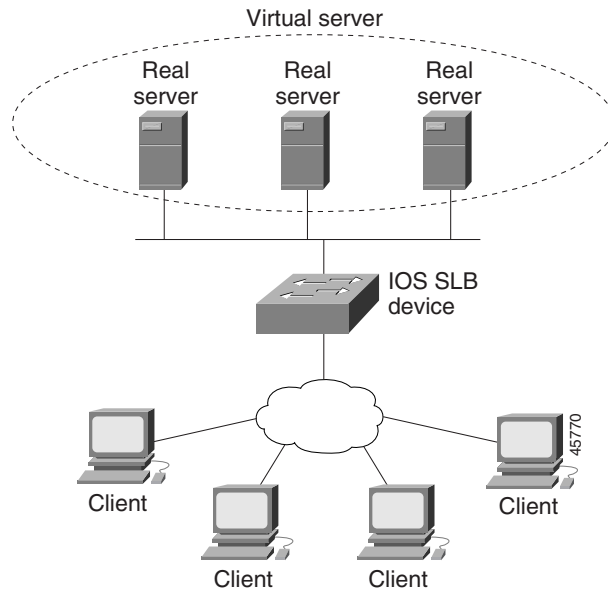
Functions and Capabilities

This section describes the following functions and capabilities provided by IOS SLB.

> **Note**   Some IOS SLB functions are specific to one platform and are not described in this feature module. For information about those functions, refer to the appropriate platform-specific documentation.

- Algorithms for Server Load Balancing, page 5
- Alternate IP Addresses, page 6
- Automatic Server Failure Detection, page 6
- Automatic Unfail, page 6
- Avoiding Attacks on Server Farms and Firewall Farms, page 7
- Backup Server Farms, page 7
- Bind ID Support, page 7
- Client-Assigned Load Balancing, page 7
- Content Flow Monitor Support, page 8
- Delayed Removal of TCP Connection Context, page 8
- DFP Agent Subsystem Support, page 8
- Dynamic Feedback Protocol for IOS SLB, page 8
- Firewall Load Balancing, page 9
- GPRS Load Balancing, page 10
- Maximum Connections, page 11

Algorithms for Server Load Balancing

IOS SLB provides the following load-balancing algorithms:

You can specify one of these algorithms as the basis for choosing a real server for each new connection request that arrives at the virtual server.

Weighted Round Robin

The weighted round robin algorithm specifies that the real server used for a new connection to the virtual server is chosen from the server farm in a circular fashion. Each real server is assigned a weight, n, that represents its capacity to handle connections, as compared to the other real servers associated with the virtual server. That is, new connections are assigned to a given real server n times before the next real server in the server farm is chosen.

For example, assume a server farm comprised of real server ServerA with $n = 3$, ServerB with $n = 1$, and ServerC with $n = 2$. The first three connections to the virtual server are assigned to ServerA, the fourth connection to ServerB, and the fifth and sixth connections to ServerC.

Note Assigning a weight of n=1 to all of the servers in the server farm configures the IOS SLB device to use a simple round robin algorithm.

GPRS load balancing requires the weighted round robin algorithm. A server farm that uses weighted least connections can be bound to a virtual server providing GPRS load balancing, but you cannot place the virtual server **INSERVICE**. If you try to do so, IOS SLB issues an error message.

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