CISCO SYSTEMS

DATA SHEET

CISCO IOS IPv4 MULTICAST TECHNOLOGIES

Companies now require the ability to maximize Network investment. IP Multicast applications enable efficient use of existing network infrastructure.

Cisco IOS® Software is the foundation networking software that allows customers to deliver Cisco IP Network Services on a flexible infrastructure that is scalable, reliable, and secure. It provides industry-leading, standards-based technologies proven in use across the broadest and largest networks in operation today.

IP Multicast technologies enable scalable distribution of data, voice, and video streams efficiently to hundreds, thousands, even millions of users. Cisco IOS Multicast enables corporate communications, financial trading, Hoot & Holler, video conferencing, E-learning, commercial Television and Radio over IP, streaming media applications, and Multicast enabled VPN services.

MULTICAST ARCHITECTURES

Multicast deployments require three elements: the application, the network infrastructure, and client devices. Cisco IOS Multicast technologies reside in the network infrastructure within Cisco routers and switches. IP Multicast utilizes a single data stream, which is replicated by routers at branch points throughout the network. This mechanism uses bandwidth much more efficiently and greatly decreases load on content servers, reaching more users at a lower cost per user.

BENEFITS OF IP MULTICAST

Cisco IOS Multicast technologies make it easier for enterprises and service providers to leverage their network resources for massively scalable content distribution applications. Cisco IOS Multicast enables customers to:

- Efficiently deploy and scale distributed group applications across the network
- Create a ubiquitous, enterprise-wide content distribution model
- Solve traffic congestion problems
- Allow service providers to deploy value-added services that leverage their existing infrastructure
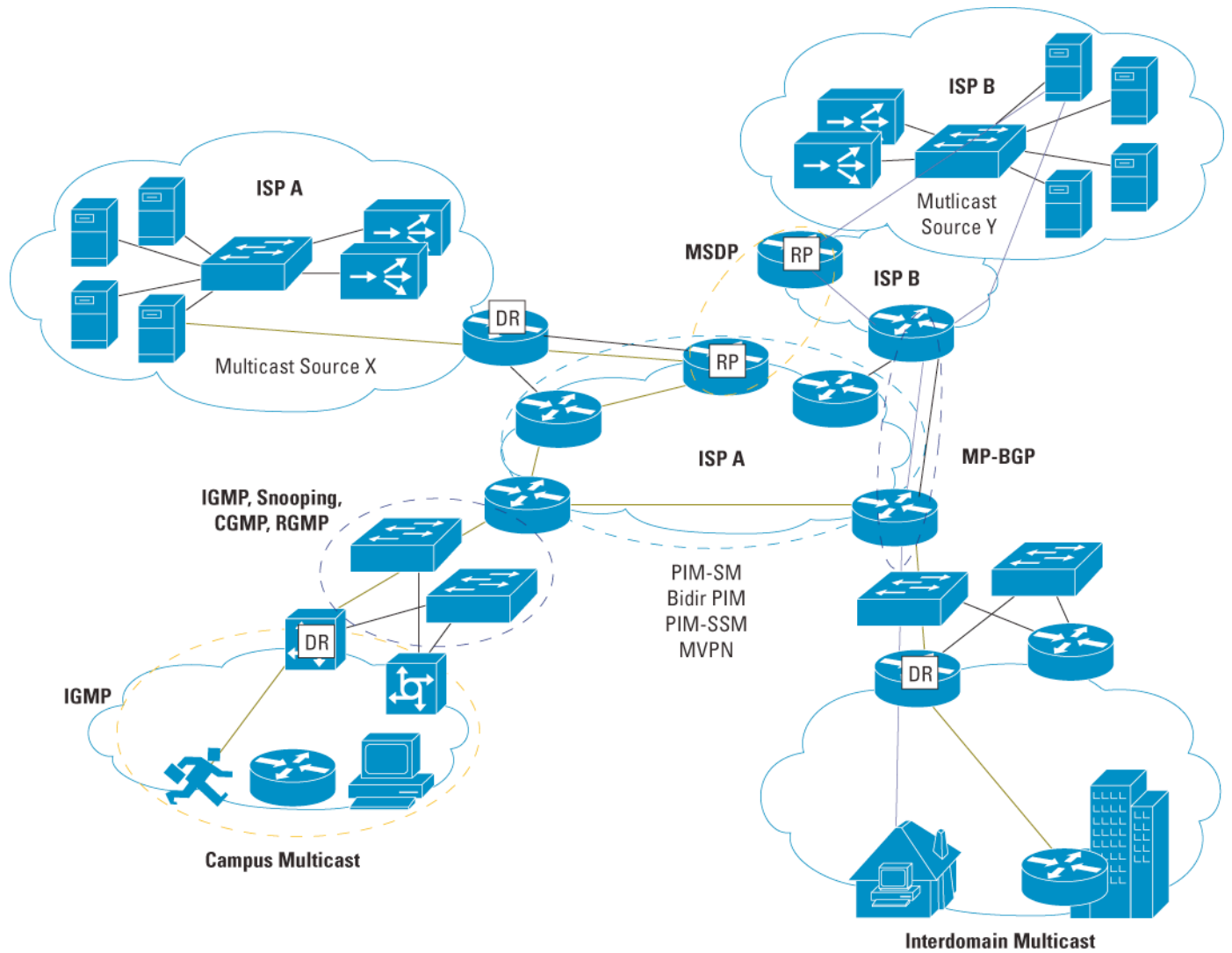
Figure 1
Multicast Components

Table 1.   Cisco IOS Multicast Features

Feature	Description
Protocol Independent Multicast v2 (PIMv2)	Provides intradomain multicast forwarding for all underlying unicast routing protocols
	Independent from any underlying unicast protocol such as Open Shortest Path First (OSPF) or Border Gateway Protocol (BGP)
	Supports explicit join (sparse mode), flood-and-prune (dense mode), or hybrid sparse-dense modes
	Sparse Mode: relies upon an explicit joining method before attempting to send multicast data to receivers of a multicast group
	Dense Mode: actively attempts to send multicast data to all potential receivers (flooding) and relies upon their self-pruning (removal from group) to achieve desired distribution
Internet Group Management Protocol (IGMP) Versions 1, 2, and 3	Protocol used by IPv4 hosts to communicate multicast group membership states to local multicast routers
	Version 3 of IGMP adds source awareness to the protocol. This allows the inclusion or exclusion of Sources. IGMPv3 is the basis for Source Specific Multicast (SSM)
PIM Source Specific Multicast	SSM forwarding uses only source-based forwarding trees. SSM range is defined for inter domain use, and Cisco IOS Software allows other groups to be configured using the SSM forwarding model
Multiprotocol Border Gateway Protocol (MP-BGP)	Multiprotocol extensions to the BGP unicast inter-domain protocol that carry multicast specific routing information
	Adds capabilities to BGP to enable multicast routing policy throughout the Internet and connect multicast topologies within and between BGP autonomous systems
	Carries IP Multicast routes. MP-BGP carries multiple instances of routes for unicast routing, multicast routing, and VPNv4
	PIM uses routes associated with multicast routing to join Reverse Path Forwarding (RPF) decisions at the inter domain borders
Multicast Source Discovery Protocol (MSDP)	Allows multiple PIM sparse-mode domains to share information about active sources
	Announces active sources to MSDP peers
	Interacts with MP-BGP for inter domain operation
	Used for Anycast Rendezvous Point redundancy solution
Pragmatic General Multicast (PGM)	Reliable multicast transport protocol for applications that require ordered, duplicate-free multicast data delivery
	Guarantees that a receiver in a multicast group either receives all data packets from transmissions and retransmissions or can detect unrecoverable data packet loss
	Manages retransmission of lost packets in a scalable fashion.
Multicast-VPN (MVPN)	Multicast-VPN feature in Cisco IOS Software provides the ability to support the multicast feature over a Layer 3 VPN
	MVPN uses a static default Multicast Distribution Tree (MDT) for each multicast domain. This default MDT can be used to transmit both data and control messages to other members of the VPN
	Cisco MVPN also supports the dynamic creation of MDTs for high-bandwidth transmission. These are only transmitted to those members of the VPN who explicitly request the data
PIM Bi-dir	A variant of the PIM, whereby data flows both up and down the same distribution tree
	Bi-directional PIM uses only shared tree forwarding, thereby reducing state creation
Boot Strap Router(BSR)	BSR is a mechanism where a PIM router learns the set of group-to-RP mappings required for PIM SM
Auto-RP	Auto-RP is a mechanism where a PIM router learns the set of group-to-RP mappings required for PIM SM

Feature	Description
Heartbeat	IP Multicast stream monitoring and notification, if delivery fails to meet configured parameters, via a SNMP trap
Mtrace	Mtrace is the same as Unix command used to discover the path between a receiver back and a source
Multicast Routing Monitor (MRM)	MRM is a management diagnostic tool that provides network fault detection and isolation
Load splitting across equal paths	Per source, group load splitting enables efficient utilization of multiple equal cost paths
STUB multicast routing	Stub multicast routing allows IGMP messages to be forwarded through a non PIM enabled router towards a PIM enabled router
SSM mapping	SSM mapping allows SSM routing to occur without IGMPv3 being present. SSM mapping uses statically configured tables or dynamic Domain Name System (DNS) discovery of the source address for a SSM channel
Cisco Multicast MIB	Adds additional functionality to Internet Engineering Task Force (IETF) Multicast MIB
Cisco PIM MIB	Adds additional functionality to IETF PIM MIB
MSDP MIB	Allows the monitoring of MSDP activity using SNMP
IGMP MIB	Allows the monitoring of IGMP activity
PIM MIB	IETF Standard PIM MIB
Multicast Network Address Translation (NAT)	Allows the Unicast Source address to be translated
Router-Port Group Management Protocol (RGMP)	RGMP constrains IP multicast on switches that have only routers attached
Cisco Group Management Protocol (CGMP)	Cisco developed protocol between routers and switches that allows Layer 2 switches to forward multicast traffic to only those ports that have host joined to the group Used in low-end or older versions of Cisco Catalyst® Series Switches that do not support IGMP snooping
Internet Group Management Protocol (IGMP) Snooping	A method by which a switch can constrain Multicast to only those ports that have requested the stream. Used in higher-end, hardware-enabled hardware

ADDITIONAL INFORMATION

For more information about Cisco IOS Multicast, contact your Cisco account manager or global service manager, or visit:

http://www.cisco.com/go/ipmulticast

http://www.cisco.com/go/ios

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Printed in the USA