

Cisco IOS Software Release 11.1CT

New Features

Release 11.1CT Overview

This product bulletin describes new features introduced in Cisco IOS™ software Release 11.1CT.

Cisco IOS Software Release 11.1CT is an early deployment release for Tag Switching on the Cisco's 7200, Cisco 7500, Cisco 7000 with RSP7000 series routers, as well as, Cisco's BPX 8620 wide area switch and BPX 8650 IP+ATM switch.

Included in this release are the following:

- Tag Switching platform support for Cisco 7000 with RSP 7000, 7200, and 7500 series routers.
- Tag Switching platform support for Cisco BPX 8620 wide area switch and BPX 8650 IP+ATM switch. Note support for Tag Switching on the BPX 8620 and 8650 requires the uses of a Cisco 7200 or 7500 as a Tag Switch Controller.

Cisco IOS Software Release 11.1CT will receive regular maintenance like all other Major Releases. Interim releases may be made available on a weekly basis. For further information please reference product bulletin #758 - Cisco IOS Software Release Process for Release 11.1CT. Note that 11.1CT will be a limited life release, with regular maintenance and support only available until the introduction of a future mainline IOS release (targeted for CQ4 1998). At which time all customers running 11.1CT will be required to upgrade to that release for regular maintenance and support.

Cisco IOS Software Release 11.1CT should only be used for those customers who wish to run Tag Switching in their network. Moreover, since 11.1CT will be a limited life release, it should be only used in environments in which it is acceptable to move to a newer Major Release for maintenance updates.

The first release date for Cisco IOS Software Release 11.1(19)CT is:

- Electronic Transfer availability from CCO - 7/1/98
- No media based shipments are planned at this time for 11.1CT.
- Future maintenance releases will be available from CCO.
- Note 11.1CT is only available thorough CCO with no new orders or RMAs supported.

New Features

Tag Switching is an innovative new technique for high-performance packet forwarding that assigns "tags" to multiprotocol frames for transport across packet or cell-based networks. It is based on the concept of "label swapping," in which units of data (e.g., a packet or a cell) carry a short, fixed length label that tells switching nodes how to process the data.

Specifically Cisco's Tag Switching delivers the following features, functions, and benefits:

Feature	Function	Benefit
Tag Switch Path Tunnels (TSP Tunnel)	Create alternative path(s) or connection(s) between source and destination.	Lower cost - through higher network utilization

Feature	Function	Benefit
Traffic Engineering	Define traffic that will traverse a TSP Tunnel.	Lower cost through higher network utilization
Ships in the Night	Support ATM and Tag Switching services simultaneously on the same ATM backbone	Lower cost through higher network utilization
Tag Distribution Protocol (TDP)	Assign tags to routes and communicate assignments to peers. Runs in conjunction with Layer 3 routing protocols.	Supports the creation of a Tag Switching network.
Dynamic Tag Switching	Allocate and distribute tags based on routing topology discovered by Layer 3 protocols. Runs in conjunction with Layer 3 routing protocols.	Supports the creation of a Tag Switching network.
Static Tag Switching	Allocate and distribute tags based on RSVP signaling.	Supports the creation of TSP tunnels.
Support for OSPF, IS-IS, RIP, and EIGRP	Build routing topology used by the Tag Distribution Protocol	Flexibility to support multiple Layer 3 routing protocols
Tag Switch Controller	Enables BPX 8620 and 8650 to participate in a Tag Switching network.	Supports scalable integration of IP and ATM.

Tag Distribution Protocol (TDP)

Tag Distribution Protocol (TDP) is the protocol responsible for binding tags to routes and distributing tags between neighboring routers. TDP runs in parallel with native Layer 3 protocols using them to discover the routing topology of the network. TDP is an incremental protocol thereby limiting TDP traffic between Tag Switch Routers (TSRs) to changes in the routing topology.

Dynamic Tag Switching

When a Tag Switching network is in the dynamic mode, tags are allocated and distributed based on the routing topology. This is in contrast to the static mode where tags are allocated based on a configured path using RSVP signaling (see Tag Switched Path Tunnels). The TDP protocol, running in parallel with native Layer 3 routing protocols, is used to distribute tags. As new routes are discovered, tags are assigned and TDP is used to distribute them with no modification of the routing protocols required. So Tag Switching can be run in conjunction with any routing protocol. In Tag Switching phase 1 OSPF, IS-IS, RIP, and EIGRP are all supported on Cisco's 7xxx family of routers and Cisco's BPX 8620 and 8650 with OSPF support on the Cisco LightStream 1010.

Tag Switched Path (TSP) Tunnels

In conventional layer 3 routing, network topologies frequently include multiple paths between two points, but the normal routing procedures typically select a single path as the Layer 3 route between two points regardless of the load on the links that implement the path. As a consequence, some links are congested while some are underused. TSP Tunnels provide a way to override routing protocols across multiple routers. It gives you the ability to direct selected traffic over specific paths in the network in order to efficiently use network resources and provide different levels of service.

RSVP, with some extensions, is the signaling protocol used to set up TSP tunnels. Within a Tag Switching network the RSVP tunnel set-up is initiated at the source Tag Switch Router (TSR) or ATM-TSR at the head of the tunnel. The forward message carries a complete source routed path with all intermediate hops identified. The reply message carries the tags that build the tunnel. A rapid tear down mechanism has been added, via an extension, in the event of link failure. Thus we can immediately stop using a tunnel rather than relying on the standard RSVP time-out.

Traffic Engineering

Traffic Engineering is the set of mechanisms by which an administrator can specify what traffic should enter a TSP tunnel. This is accomplished by defining a filter that specifies the traffic you are interested in engineering and then mapping that filter to the appropriate TSP tunnel. Several options exist when mapping a filter onto a TSP tunnel, such as, mapping a filter to a specific tunnel,



mapping a filter to multiple tunnels, or load balancing between multiple tunnels. When mapping to multiple tunnels it is possible to rank the various tunnels by attractiveness (e.g. number of hops) with the default option of normal IP routing if no tunnel is available.

Ships in the Night

ATM Tag Switched Routers (ATM-TSR), such as Cisco's LightStream 1010 or BPX 8620 or BPX 8650, can simultaneously support ATM and Tag Switching Virtual Paths (VPs) on the same switch allowing Service Providers to deliver ATM and IP services on the same ATM network.

Tag Switch Controller (TSC)

The Tag Switch Controller (TSC) is a tag switch router (TSR) that controls the operation of a separate ATM switch. Together, the router and ATM switch function as a single ATM Tag Switching router (ATM-TSR). A Cisco 7200 or 7500 series router acts as the TSC, and a Cisco BPX 8600 Service Node (8620 wide area switch or 8650 IP+ATM switch) or a partner's switch acts as the VSI-controlled ATM switch. The TSC controls the ATM switch using the Cisco Virtual Switch Interface (VSI), which runs over an ATM link connecting the two.



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