EP-Tree: Secure, Reliable, High-Speed Multi-Site Connectivity

OVERVIEW

Ethernet Private Tree (EP-Tree) service from IFN provides high-speed, point-to-multipoint connectivity across the IFN network. Within EP-Tree service, each connected location is known as either a "Root" or "Leaf." A Root site within the service can communicate to other Root and all Leaf sites. However, a Leaf site can only communicate with the Root site, making EP-Tree service an attractive option for businesses that have a main headquarters and multiple branch offices.

The EP-Tree service provides for multipoint connectivity without requiring all remote sites to scale to total service bandwidth.

Key Highlights of EP-Tree:

- **One-to-Many Connectivity:** Link up to 20 business locations on one network.

- **Private & Secure:** All data travels within the secure domain of a Layer 2 dedicated, high-capacity, point-to-point connection at native Ethernet speeds.

- **Fast & Reliable:** With speeds ranging from 10Mbps to 10Gbps, EP-Tree is a reliable, flexible, and higher bandwidth alternative to TDM private lines like T1, DS3, and SONET.

- **Cost Savings:** Enables customers to connect their locations using a lower cost Ethernet interface.

Service Description

- IFN Ethernet Private Tree (EP-Tree) Service is a reliable, flexible, and higher bandwidth alternative to traditional hub and spoke topologies utilizing Ethernet or TDM private lines (T1, DS3, SONET, etc.).

- The EP-Tree service provides for multipoint connectivity without requiring all remote sites to scale to total service bandwidth.

- The EP-Tree service enables customers to connect their locations using a lower cost Ethernet interface.

- The EP-Tree service allows the customer to use any VLANs or Ethernet control protocol across the service without coordination with IFN.

- The EP-Tree service provides one Ethernet Virtual Connection (EVC) allowing one-to-many connectivity between multiple customer locations.

- The service is offered with 10Mbps, 100Mbps, 1Gbps or10Gbps Ethernet User-to-Network Interfaces (UNI) and is available in speed increments from 10Mbps to 10Gbps.

TECHNICAL SPECIFICATIONS

Ethernet User-to-Network Interface:

The service provides full duplex transmission of Ethernet frames using a standard IEEE 802.3 Ethernet interface. The table below lists the available UNI physical interfaces:

UNI Speed	UNI Physical Interface
10Mbps	10Base-T
100Mbps	100Base-T
1Gbps	1000Base-T 1000Base-SX 1000Base-LX 1000Base-SR 1000Base-LR
10Gbps	10GBase-SX 10GBase-SR 10GBase-LR

Figure 1: Available UNI interface types and CBS values for different CIR increments

Locations:

EP-Tree services interconnect multiple customer sites in one-to-many manner. Each customer site is referred to as either a Root or Leaf within the service. A Root site within the service can communicate to all Root and Leaf sites. A Leaf site within the service can communicate only with Root sites. IFN EP-Tree services support a maximum of 20 locations including a single Root site. Support for additional Root sites will be considered on an individual case basis. Support for additional Leaf sites will be considered on an individual case basis.

MAC Learning Support:

In order to efficiently move traffic, EP-Tree services learn the MAC addresses of any customer devices attached to the service. Each EVC will support learning of 250 MAC addresses. Each UNI will support learning of 250 MAC addresses. Additional MAC learning will be supported on an individual case basis.

Traffic Management:

IFN's network traffic-policing policies restrict traffic flows to the subscribed CIR for each service. If the customer-transmitted bandwidth rate for any service exceeds the subscription rate (CIR) and burst size (CBS), IFN will discard the excess frames. For frames with CoS marking the service will transmit them without altering the customer's CoS markings.

Maximum Frame Size:

The service supports a Maximum Transmission Unit (MTU) frame size of 9000 bytes to support untagged or 802.1Q tagged frame sizes. For On-Net Services delivered via the IFN Last Mile Partner Network, frame sizes may not exceed 1518 MTU size (1522 with single VLAN tag). All frames that exceed specifications shall be dropped.

VLAN Tag Preservation:

The service supports IEEE 802.lQ VLAN-tagged customer frames. All customer VLAN IDs and priority code points (IEEE 802.lp) for CoS are transmitted and received unaltered by the service. Frames received without an IEEE 802. lQ VLAN tag will be delivered without an IEEE 802. IQ VLAN tag. Customers may configure their own VLANs on their customer-owned CPE without coordination with IFN. IFN may reserve one VLAN for network management purposes.

Ethernet Service Frame Disposition:

Unicast frames will be forwarded to the UNI that hosts the destination MAC address only. Multicast and Broadcast frames will be flooded to all UNIs in the service.

Layer 2 Control Protocol (L2CP) Processing:

Certain L2CP frames are discarded at the UNI, tunneled across the IFN network or peered at (processed by) the UNI. Reference the table below for EPL UNI behavior for specific L2CP. For L2CPs with multiple behavior possibilities, the customer must specify to IFN which behavior should be taken. The default behavior is to discard these L2CP service frame.

Destination MAC Address	Layer 2 Control Protocol	L2CP Frame Behavior
01-80-C2-00-00-00	STP, RSTP, MSTP	Peer or Discard (all UNIs)
01-80-C2-00-00-01	PAUSE	Discard (all UNIs)
01-80-C2-00-00-02	LACP, LAMP	Peer or Discard (disposition specified per UNI)
01-80-C2-00-00-02	Link OAM	Peer or Discard (disposition specified per UNI)
01-80-C2-00-00-03	Port Aunthentication	Peer or Discard (disposition specified per UNI)
01-80-C2-00-00-07	E-LMI	Peer or Discard (disposition specified per UNI)
01-80-C2-00-00-0E	LLDP	Discard (all UNIs)
01-80-C2-00-00-20 through 01-80-C2-00-00-2F	GARP, MRP	Tunnel (all UNIs)

Figure 5: L2CP Frame Behaviors

More advanced technical information can be found in the appendix »