SONET/SDH Transport

Carrier Ethernet E-Line services can be delivered over SONET and SDH networks. SONET and SDH are typically based on ring topologies. Each ring can operate at several rates, up to a maximum of 10 Gbps.

An example of the network architecture is illustrated in figure 1 at right.

Ethernet over SONET/SDH is used to deliver Carrier Ethernet E-Lines over SONET and SDH. Ethernet over SONET/SDH refers to encapsulation of Ethernet frames in a specific container which has pre-determined rate. There are several means for encapsulating asynchronous Ethernet traffic in a synchronous transport like SONET or SDH. With SONET/SDH, the end-to-end (UNI to UNI) connection is known as the path, and the Subscriber data that flows from end-to-end is known as the path data.

Encapsulation of an Ethernet frame inside GFP-F frame is shown in figure 2.

All of the encapsulation techniques (e.g. GFP, POS) are not aware of the Ethernet frame structure. This means that any L2CP frame can be tunneled through a SONET/SDH-based E-Line service. Also, no MAC learning or filtering is performed by these network elements.

Each incoming service is transported transparently over the CEN (Carrier Ethernet Network). Each service is carried in its own container with no bandwidth sharing or contention amongst containers. Likewise, each service requires a dedicated port on the ADM. For example, if a single CE sends traffic for two different EVCs across a service multiplexed UNI, two different ports on the ADM will be needed in order for the traffic to be mapped to distinct containers. This can be done by the ADM (Add/Drop Multiplexing) function of SONET/SDH network element.

Each SONET/SDH link can support several EVCs. However, the number of services that can be supported is limited due to the static bandwidth allocation mechanism of SONET/SDH. Each such SONET/SDH path has no CoS awareness or VLAN tag awareness.

Note: Throughout this text, the term “awareness” is used to describe a network’s ability to identify, interpret and act upon specific information contained within datagrams. For example, VLAN-aware means that a network may read, manipulate or make forwarding decisions based on VLAN tags. Conversely, the term “unaware” means that a network does not have the capability to identify, interpret or act upon specific information contained within datagrams.

SONET/SDH technology is suitable only for E-Line services. It can provide some sort of service multiplexing using external ADM device for delivering EVPLs. Resiliency is inherently supported by this transport network, which provides sub-50 msec service restoration that is transparent to the Ethernet layer.

Support for the various Ethernet services is summarized in the table at right.

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