

Metro Ethernet—A category of OSI L2 WAN services. The L2 encapsulation is provided (Ethernet); you provide L3, e.g. IPv4. On a Cisco diagram, you can often spot an Ethernet switch within a cloud or MAC addresses on your routers. Physically, you can expect your (the customer's) network to connect through an ordinary fiber optic Ethernet connection. The details of the service provider's network are hidden from you, the customer. You're paying them to deliver Ethernet frames to your other location(s); you don't care about their network or their other customers.

Carrier Ethernet—a newer term used interchangeably with Metro Ethernet to eliminate the connotation that it's only marketed in large cities. "Carrier" refers to the service provider, differentiating it from the Ethernet within your office and has nothing to do with the layer one signal that bits are encoded onto.

Access Link—The Ethernet link between the customer and the Service Provider (SP). Technically, it can be any Ethernet standard, but realistically, you can expect fiber optic for distance. Termination at the customer end would be to a switch or router.

UNI (User Network Interface)—Another term for the access link. The user is the customer (you), the network is that of the SP.

PoP (Point of Presence)—As you follow the signal flow from your network to the SP, this is the first piece of equipment that's owned and administered by the SP. For us, that means a fiber optic Ethernet switch where all the businesses in an area connect. In past technologies, like a leased line, the PoP might have been a CSU physically located in the customer's wiring closet.

EVC (Ethernet Virtual Connection)—To the customer, it just looks like an Ethernet connections, but the service provider is almost certainly using other technologies to achieve the service. EVC types are use by MEF to define which UNIs can talk to which.

T O P O L O G I E S

Topologies (Service Types) are defined by MEF (Metro Ethernet Forum), see http://www.mef.net/Assets/Technical_Specifications/PDF/MEF_6.2.pdf.

SERVICE	EVC TYPE	CHARACTERISTICS
E-Line	Point-to-Point	Mimics an Ethernet crossover cable between two sites.
E-LAN	Multipoint-to-Multipoint	Any-to-Any communication. One big broadcast domain, just like normal access layer Ethernet.
E-Tree	Rooted Multipoint	There are two kind of UNIs: Root and Leaf. Root UNIs can talk to any UNI, including each other; Leaf UNIs can only talk to the Root(s).

A single UNI can multiplex more than one service types, for example E-LAN between branch offices and E-LINE to the internet.

Rooted Multipoint (E-Tree) refers to the fact that the root(s) have only one connection (an 802.1Q trunk), which branches to all the leaf UNIs after it has reached the SP.

L A Y E R 3 D E S I G N

E-Line Service

E-Lines are treated just like the serial links we saw with HDLC:

- Both ends of the link need to be in the same subnet
- Different links should be in different subnets

Multiple e-lines will create a tree structure, with branch offices using the root as the next hop for traffic to other branch offices. Routing protocol neighbor relationships will form between the central site and each branch office.

E-LAN Service

E-LANs are treated just like any other LAN, with every site in the same subnet. For routing protocols, every site will be a neighbor to every other.

E-Tree Service

E-Tree addressing is like the E-LAN, but since branch offices (leafs) can't talk with each other, each will form a neighbor relationship with the root and use it as their next hop for packets to the other.

Note: (out of scope) Split Horizon may need to be disabled on the root so that it can inform leaf A about networks on leaf B even though both sites are connected to the same interface on the root.

U S A G E - B A S E D P R I C I N G

The bitrate will be fixed based on the Ethernet standard chosen by the provider.

CIR (Committed Information Rate)—The rate (\leq the speed of the Ethernet) that you've paid for and the provider has committed to provide.

Policing—The provider discards some frames to keep actual traffic from a customer below the CIR.

Shaping—The customer buffers frame surges and releases them slowly to keep actual traffic below the CIR.