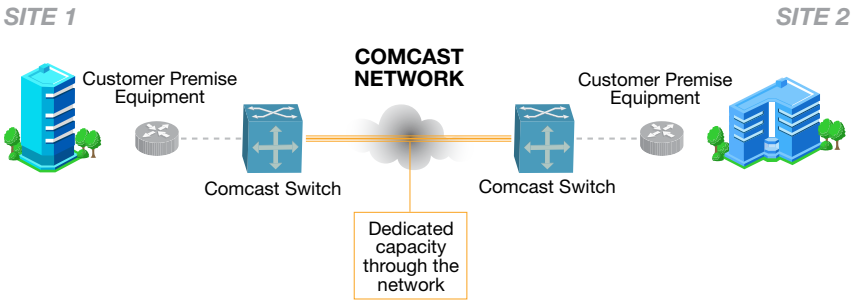
# ETHERNET PRIVATE LINE SERVICE

## COMCAST BUSINESS CLASS

Comcast Business Class Ethernet Private Line (EPL) Service (point-to-point) is a reliable, flexible, high bandwidth alternative to traditional TDM Private Lines, enabling customers to connect their Customer Premises Equipment (CPE) using a lower cost Ethernet interface.

Ethernet Private Line Service allows customers to use any VLANs or Ethernet control protocol across the service.

Your organization can meet the demand of bandwidth-intensive applications without disrupting your internal customers' needs with flexible, scalable point-to-point configurations delivering high-capacity fiber connections between two sites.




Ethernet Private Line offers three Classes of Service (CoS) including: Basic, Priority, and Premium, enabling customers to select the solution that best meets their applications' performance requirements.

Ethernet Private Line Service is offered in 10Mbps/100Mbps, 1Gbps and 10Gbps Ethernet User Network Interfaces (UNI), and is available in speed increments from 1Mbps to 10Gbps.

Comcast Business Class
**ETHERNET PRIVATE LINE SERVICE**

### DEDICATED CONNECTIVITY

Dedicated capacity between locations

### REDUNDANT SITE PROTECTION

Optional path and equipment redundancy can be provided for added reliability

### FLEXIBLE CONFIGURATIONS

Bandwidth scalable up to 10Gbps with multiple CoS options

### BUSINESS CLASS SUPPORT

24/7/365 network monitoring and support through our Business Class Network Operations Center (BNOC)

**Certified MEF* Compliant**

*Metro Ethernet Forum
metroethernetforum.org

For more information or a free consultation, contact your local Enterprise Account Executive.

**business.comcast.com**

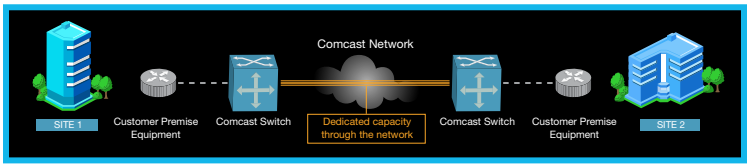
Comcast Business Class

## Service Description

Comcast Ethernet Private Line (EPL) Service is a reliable, more flexible, higher bandwidth alternative to traditional TDM Private Lines. EPL service enables customers to connect their Customer Premises Equipment (CPE) using a lower cost Ethernet interface. EPL service enables customers to use any VLANs or Ethernet control protocol across the service without coordination with Comcast.

EPL service provides one Ethernet Virtual Connection (EVC) between two customer locations. EPL offers three Classes of Service (CoS) including: Basic, Priority, and Premium. CoS options enable customers to select the CoS that best meets their applications' performance requirements. EPL service is offered with 10Mbps, 100Mbps, 1Gbps or 10Gbps Ethernet User-to-Network Interfaces (UNI) and is available in speed increments from 1Mbps to 10Gbps.

Comcast's Ethernet Private Line Service is Certified MEF Compliant.




## Section 1. Technical Specifications

**1.1 Ethernet User-to-Network Interface.** The service provides bidirectional, full duplex transmission of Ethernet frames using a standard IEEE 802.3 Ethernet interface (UNI). Figure 1 lists the available UNI physical interfaces, their associated Committed Information Rate (CIR) bandwidth increments and the Committed Burst Sizes (CBS).

| UNI Speed | UNI Physical Interface |
|---|---|
| 10Mbps | 10BaseT |
| 100Mbps | 100BaseT |
| 1Gbps | 1000BaseT or 1000BaseSX |
| 10Gbps | 10GBASE-SR or 10GBASE-LR |

| CIR Increments | CBS (bytes) |
|---|---|
| 1Mbps | 25,000 |
| 10Mbps | 250,000 |
| 100Mbps | 2,500,000 |
| 1000Mbps | 25,000,000 |

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

**1.2 Class of Service Option.** The service offers three different classes of service. The CoS options allow for differentiated service performance levels for different types of network traffic. It is used to prioritize customer mission-critical traffic from lesser priority traffic in the network. The customer must specify a CIR for each CoS to indicate how much bandwidth should be assigned to each CoS. Figure 2 lists the service performance objectives for each CoS for distances within 250 network miles.

| | Class of Service (CoS) | | |
|---|---|---|---|
| **Performance Objective (≤ 250 miles)** | **Premium** | **Priority** | **Basic** |
| Latency (one way) | < 12ms | < 23ms | < 45ms |
| Jitter (one way) | < 2ms | < 23ms | < 45ms |
| Packet Loss (one way) | < 0.001% | < 0.01% | < 1% |
| Availability | > 99.99% | > 99.99% | > 99.99% |

**Figure 2: CoS Performance Objectives**

**1.3 CoS Identification and Marking.** Customer must mark all packets using 802.1p CoS values as specified in Figure 3 to ensure the service will provide the intended CoS performance objectives specified in Figure 2.

| CoS | 802.1p |
|---|---|
| Premium | 5 |
| Priority | 2-3 |
| Basic | 0-1 |

**Figure 3: CoS Marking**

**1.4 Traffic Management.** Comcast's network traffic-policing policies restrict traffic flows to the subscribed CIR for each service class. If the customer-transmitted bandwidth rate for any CoS exceeds the subscription rate (CIR) and burst size (CBS), Comcast will discard the non-conformant packets. For packets marked with a non-conformant CoS marking, the service will transmit them using the Basic service class without altering the customer's CoS markings.

**1.5 Maximum Frame Size.** The service supports a Maximum Transmission Unit (MTU) packet size of 1600 bytes to support untagged or 802.1Q tagged packet sizes. Jumbo Frame sizes can be supported on an Individual Case Basis (ICB).

**1.6 VLAN Tag Preservation.** The service supports IEEE 802.1Q VLAN-tagged customer packets. All customer VLAN IDs and priority code points (IEEE 802.1p) for CoS are transmitted and received unaltered by the service. Untagged packets are mapped to the native VLAN specified by customer. Customers may configure their own VLANs on their customer owned CPE without coordination with Comcast. Comcast may reserve one VLAN for network management purposes.

**1.7 Ethernet Service Frame Disposition.** The service delivers all service frames associated with the EVC unconditionally across the network as specified in Figure 4.

| Service Frame Type | Service Frame Delivery |
|---|---|
| Unicast | All Frames delivered unconditionally |
| Mulitcast | All Frames delivered unconditionally |
| Broadcast | All Frames delivered unconditionally |

**Figure 4: Service Frame Delivery Disposition**

**1.8 Layer 2 Control Protocol (L2CP) Processing.** Certain L2CP frames are discarded at the UNI, tunneled across the Comcast network or peered at (processed by) the UNI. Refer to Figure 5 for Comcast's L2CP disposition. For L2CPs with multiple disposition possibilities, the customer must specify to Comcast which disposition should be taken. The default disposition is to discard these L2CP service frames.

| Destination MAC Address | Layer 2 Control Protocol | L2CP Frame Disposition |
|---|---|---|
| 01-80-C2-00-00-00 | STP, RSTP, MSTP | Tunnel (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 | 802.1X | Tunnel (All UNIs) |
| 01-80-C2-00-00-07 | E-LMI | Tunnel (All UNIs) |
| 01-80-C2-00-00-0E | LLDP | Tunnel (All UNIs) |
| 01-80-C2-00-00-20 through 01-80-C2-00-00-2F | GARP, MRP | Tunnel (All UNIs) |

**Figure 5: L2CP Frame Disposition**

## Section 2. Monitoring, Technical Support and Maintenance

**2.1 Network Monitoring.** Comcast monitors all Comcast Services purchased by a customer on a 24x7x365 basis.

**2.2 Technical Support.** Comcast provides customers a toll-free trouble reporting telephone number to the customer Business Services Network Operations Center (BNOC) that operates on a 24x7x365 basis. Comcast provides technical support for service-related inquiries. Technical support will not offer consulting or advice on issues relating CPE not provided by Comcast.

**2.3 Escalation.** Reported troubles are escalated within the Comcast BNOC to meet the standard restoration interval described in the Service Level Objectives. Troubles are escalated within the Comcast BNOC as follows: Supervisor at the end of the standard interval plus one hour; to the Manager at the end of the standard interval plus two hours, and to the Director at the end of the standard interval plus four hours.

**2.4 Maintenance.** Comcast's standard maintenance window is Sunday to Saturday from 12:00am to 6:00am local time. Scheduled maintenance is performed during the maintenance window and will be coordinated between Comcast and the customer. Comcast provides a minimum of forty-eight (48) hour notice for non-service impacting scheduled maintenance. Comcast provides a minimum of seven (7) days notice for service impacting planned maintenance. Emergency maintenance is performed as needed.

## Section 3. Service Level Objectives

Comcast provides Service Level Objectives for the service, including network availability, mean time to respond, and mean time to restore. The service objectives are measured monthly from the Comcast point of demarcation.

**3.1 Availability.** Availability is a measurement of the percentage of total time that the service is operational when measured over a 30 day period. Service is considered "inoperative" when either of the following occurs: (i) there is a total loss of signal for the service, (ii) output signal presented to the customer by Comcast does not conform to the technical specifications in Section 1.

**3.2 Mean Time to Respond.** Mean Time to Respond is the average time required for the BNOC to begin troubleshooting a reported fault. The Mean Time to Respond objective is fifteen (15) minutes upon receipt of a fault notification or from the time a trouble ticket is opened with the BNOC.

**3.3 Mean Time to Restore.** Mean Time to Restore is the average time required to restore service to an operational condition as defined by the technical specifications in Section 1 of this document. The Mean Time to Restore objective is four (4) hours for electronic equipment failure or six (6) hours for fiber optic facilities failure from the time a trouble ticket is opened with the BNOC.

## Section 4. Customer Responsibilities

Comcast provides CPE for provisioning its services and the delivery of the UNI. Comcast will retain ownership and management responsibility for this CPE. As a result, the CPE must only be used for delivering Comcast services. Customers are required to shape their egress traffic to the contracted CIR.

**Customers have the following responsibilities related to the installation, support, and maintenance of the Service.**

**4.1** Provide an operating environment with temperatures not below fifty-five (55) or above eighty-five (85) degrees Fahrenheit. Humidity shall not exceed ninety (90) percent at eighty-five (85) degrees Fahrenheit.

**4.2** Provide secure space sufficient for access to one (1) standard, freestanding, equipment cabinet at each of the customer facilities, no further than fifty feet from the customer router or switch interface.

**4.3** Provide outside cable entry conduit(s), entry cable ground point, and internal building conduit to allow Comcast the ability to rod/rope a fiber optic cable to the point of demarcation.

**4.4** Locate and mark all private underground utilities (Water, Electric, etc.) along path of new underground placement not covered by utility companies.

**4.5** Provide a pull rope in any existing duct that Comcast is to use and ensure existing duct is serviceable for Comcast use.

**4.6** Obtain 'right-of-way' entry easement for Comcast facilities and equipment from property owners at each customer location.

**4.7** The customer is responsible for coring of the building's outside wall and internal walls. Upon request, Comcast can perform this activity on an 'as needed' basis for an additional one-time fee.

**4.8** Provide UPS AC power equipment, circuit sizing to be determined, if applicable.

**4.9** Emergency local generator backup service, if applicable.

**4.10** Provide access to the buildings and point of demarcation at each customer location to allow Comcast and its approved Contractors to install fiber for service installation. Provide access to each location for regular (8am - 5pm) and emergency (24 hour) service and maintenance of Comcast's equipment and facilities.

**4.11** Provide, install and maintain a device that is capable of routing network traffic between the Service and the customer's Local Area Network (LAN).

**4.12** Customer must provide a point of contact (POC) for installation, service activation and any maintenance activities.

## Section 5. Definitions

**5.1 Latency.** Latency, also known as Frame Delay, is defined as the maximum delay measured for a portion of successfully delivered service frames over a time interval.

**5.2 Jitter.** Jitter, also known as Frame Delay Variation, is defined as the short-term variations measured for a portion of successfully delivered service frames over a time interval.

**5.3 Packet Loss.** Packet Loss, also known as Frame Loss, is the difference between the number of service frames transmitted at the ingress UNI and the total number of service frames received at the egress UNI.