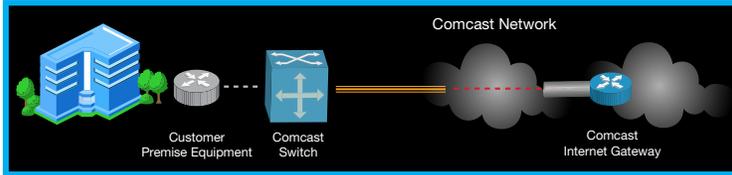


Service Description

Comcast's Ethernet Dedicated Internet (EDI) Service provides a reliable, simpler, more flexible, and higher bandwidth options than T1 or SONET-based dedicated Internet access services. The service is offered with a 10Mbps, 100Mbps, 1Gbps or 10Gbps Ethernet User-to-Network Interface (UNI) in speed increments from 1Mbps to 10Gbps subject to available capacity. The service provides an Ethernet Virtual Connection (EVC) from the customer premises location to a Comcast Internet Point of Presence (POP) router.



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 | CIR Increments | CBS (bytes) |
|-----------|--------------------------|----------------|-------------|
| 10Mbps | 10BaseT | 1Mbps | 25,000 |
| 100Mbps | 100BaseT | 10Mbps | 250,000 |
| 1Gbps | 1000BaseT or 1000BaseSX | 100Mbps | 2,500,000 |
| | | 1000Mbps | 25,000,000 |
| 10Gbps | 10GBASE-SR or 10GBASE-LR | | |

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

1.2 Traffic Management. Comcast's network traffic-policing policies restrict traffic flows to the subscribed, Committed Information Rate (CIR). If the customer-transmitted bandwidth rate exceeds the subscription rate (CIR) and burst size (CBS), Comcast will discard the non-conformant packets. The customer's router must shape their traffic to their contracted CIR.

1.3 Maximum Frame Size. The service supports a maximum transmission unit (MTU) frame size of 1518 bytes including Layer 2 Ethernet header and FCS.

1.4 Layer 2 Control Protocol (L2CP) Processing. All L2CP frames are discarded at the UNI.

1.5 IP Address Allocation. IP address space is a finite resource that is an essential requirement for all Internet access services. Comcast assigns eight (8) routable IP addresses to each customer circuit. Customers can obtain additional IP addresses if required.

1.6 Domain Name Service. Comcast provides primary and secondary Domain Name Service (DNS). DNS is the basic network service that translates host and domain names into corresponding IP addresses, and vice-versa.

1.7 Border Gateway Protocol (BGP) Routing. Comcast supports BGP-4 routing as an optional service feature. BGP-4 allows customers to efficiently multi-home across multiple ISP networks. The service requires an Autonomous System Number (ASN) be assigned to a customer by the American Registry for Internet Numbers (ARIN). Customers should also be proficient in BGP routing protocol to provision and maintain the service on their router. Section 5 "Comcast BGP Policy" provides further details. Comcast supports private peering if the customer is multi-homed to Comcast's network only.

1.8 Online Reporting. Comcast provides the customer with a password-protected web portal to access online reports containing their historical network traffic information. Reports may vary based on the customer's service.

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 Customer Premise Equipment (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 BNOC as follows: Supervisor at the end of the standard interval plus one (1) hour; to the Manager at the end of the standard interval plus two (2) hours, and to the Director at the end of the standard interval plus four (4) 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 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. Comcast BGP Policy

The following provides the routing requirements to interconnect with the Comcast network. Additional details of Comcast's BGP inbound/outbound network policy and traffic engineering is available upon request.

- 5.1 Customers must be multi-homed to run BGP, either:
 - a. multi-homed within Comcast's network
 - b. multi-homed with Comcast and another service provider

5.2 Customers must use an Autonomous System (AS) number assigned by a regional registrar American Registry for Internet Numbers (ARIN), Réseaux IP Européens (RIPE), or Asia Pacific Network Information Centre (APNIC) etc. that is registered to their organization.

- a. All customer route announcements must be registered with a regional registrar. A route object must exist for each route prefix in one of the well known global routing registries such as RADB.
- b. The customer ASN needs to be verifiable in WHOIS database.
- c. Comcast will only accept private peering when the customer is multi-homed to Comcast only.
- d. Comcast will support a 4-byte ASN starting 01/01/2010 in accordance with ARIN policy.
- e. Comcast will assign a private ASN in the range of 64512-65534 for private peering and not accept any customer provided private ASN.
- f. Comcast will strip off the private ASN when advertising to peers.

5.3 Customers must use a router that supports BGPv4.

- a. Comcast will not run BGP4 with customers connected on a link with less than 2Mbps bandwidth.
- b. Customers are responsible to ensure their peering routers have adequate CPE processing power and memory space if a full Internet table is requested.
- c. Comcast will employ all best-known practices to establish, maintain, and troubleshoot BGP4 sessions with all BGP4 compliant router vendors. However, Comcast makes no warranty that it can establish and maintain a BGP4 session with any CPE due to vendor interoperability.

5.4 Customers can specify one of the following received-prefixes options:

- a. Default-route only
- b. Comcast customer routes
- c. Comcast customer routes + default-route
- d. Full routes
- e. Full routes + default-route

5.5 Customer must be capable of configuring their BGP session with Comcast. This includes all setup of neighbor statements and all sanity checks on customer CPE.

5.6 Comcast requests the use of an MD5 authentication key for all EBGP sessions. The customer should specify the MD5 password.

5.7 Customers must prevent redistribution from their Interior Routing Protocol (IGP) into BGP. Customers should also apply restrictive filters on outbound announcements so that only the customer's intended outbound prefixes are announced to Comcast.

5.8 Comcast will assign a /30 IP address for the interfaces that connect to Comcast's network. This will be assigned from a Comcast address block publicly registered with ARIN and already advertised as part of a larger aggregate to the Internet.

5.9 Comcast will announce any portable or non-portable net block so long as this space is larger than /24, and the space is assigned to the customer via WHOIS or RWHOIS databases. If the net block does not belong to the customer and the net block is not already being announced from the customer's AS then Comcast will need to have an LOA (Letter of Agreement) from the true owner of the block stating that they are aware of, and are accepting of the fact that our customer wants to make the announcement through Comcast.

5.10 Comcast does not alter any of its BGP4 configurations, including route-maps, filter-policies, and communities, for any individual customer, but rather will dynamically alter BGP policy dependent on the customers' employment of predefined Comcast BGP communities. This ensures the Comcast network is built and maintained in a strategic, organized, and efficient fashion and reduces mean-time-to-repair for BGP related trouble.