

# VOLUME 1, SECTION 3.5: ETHERNET SERVICES



### 3.5 ETHERNET SERVICES (ETHS) [C.2.7.1, M.6.1]

This section of our proposal addresses the Level 3 Team’s offering to provide Ethernet Services (EthS) to Government agency customers through the Networx program. Our service meets or exceeds the requirements for EthS as defined in RFP Section C.2.7.1.

#### 3.5.1 Stipulated Responses to Table J.9.1.1.2 (b)

In accordance with Networx Enterprise RFP Amendment 0005, Level 3’s responses to the requirements in Table J.9.1.1.2 (b) Technical Stipulated Requirements for Optional IP-Based Services have been submitted to GSA via the Networx Hosting Center.

#### 3.5.2 Narrative Responses to Table J.9.1.1.3 (b)

In accordance with Networx Enterprise RFP Amendment 0005, Level 3’s responses to the requirements in Table J.9.1.1.3 (b) Technical Narrative Requirements for Optional IP-Based Services have been submitted to GSA via the Networx Hosting Center.

A description of our EthS offering is provided below, followed by responses to the requirements in RFP Section L.34.1.4.6 as they apply to this service.

The Level 3 Ethernet Service (EthS) offering is a data services solution that enables Ethernet Private Line (E-Line) and Ethernet Local Area Network (E-LAN) services. An overview of each service offering follows.

**E-Line (Ethernet over SONET) Service:** This service provides agencies with dedicated bandwidth, similar to standard SONETS TDM-type services.

Our E-Line services are built on [REDACTED] product to ensure the KPI/AQLs for EthS are met. [REDACTED]

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[Redacted]	[Redacted]
[Redacted]	[Redacted]

[Redacted]

[Redacted]

[Redacted]

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[Redacted]

- [Redacted]
- [Redacted]
- [Redacted]
- [Redacted]
- [Redacted]
- [Redacted]

[REDACTED]

Level 3 Ethernet Service also provides core network scalability compared to traditional data networking solutions. For example, ATM and Frame Relay customer interfaces often top out at 622 Mbps (OC-12) for ATM and DS-3 for Frame Relay. ATM backbone speeds only scale to OC-48, and the overhead of ATM consumes upwards of 20% of the available circuit capacity. Level 3 Ethernet Service's backbone runs at [REDACTED], which provides one of the industry's most robust and scalable network architectures for the reliable transmission of Ethernet services. Evaluation of [REDACTED] interfaces for use in the backbone is underway. New designs employing [REDACTED]

### 3.5.3 Technical Description of Ethernet Services

The Level 3 Ethernet Service offering fulfills the Mandatory Service Requirements for EthS contained in RFP Section C.2.7.1.1. This section demonstrates our capabilities in the following areas:

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

**3.5.3.1 STANDARDS [C.2.7.1.1.2]**

The members of our team are active in a variety of industry forums and working groups, such as Internet Engineering Task Force (IETF), the North American Network Operators Group (NANOG) and the American Institute of Electrical Engineers (IEEE) and committed to implementing future standards as technologies are developed and standards are defined and become commercially available. [REDACTED]

[REDACTED]

**3.5.3.2 CONNECTIVITY [C.2.7.1.1.3]**

Level 3 is a Tier 1 Internet Service Provider. Our EthS offering meets the connectivity requirements listed RFP Section C.2.7.1.1.3. As such, our service will connect to and interoperate with:

[REDACTED]

[REDACTED]

[REDACTED]

**3.5.3.3 TECHNICAL CAPABILITIES [C.2.7.1.1.4]**

Our EthS solution complies with the 25 mandatory requirements listed in RFP Section C.2.7.1.1.4. The technical capabilities and features of the Level 3 E-Line and E-LAN offerings follow.



### 3.5.3.3.1 E-LINE Services

E-LINE service will support [REDACTED]

[REDACTED]

[REDACTED]

### 3.5.3.3.2 E-LAN Services

[REDACTED]



[Redacted text block containing multiple paragraphs of blacked-out content]





[Redacted text block]

[Redacted text block]

[Redacted text block]

[Redacted text block]

[Redacted text block]

[REDACTED]

The flexibility of Level 3 Ethernet Service allows Government agencies to customize networks as [REDACTED] demand dictates. Government agencies can decrease their network, operations, and capital expenses. In addition, the Level 3 Ethernet solution enables the following:

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]



[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]

[REDACTED]

### 3.5.5 Proposed Service Enhancements

Level 3 does not intend to exceed the AQLs in the KPIs at this time but would like to reserve the ability to do so with performance improvements that may be attained through the introduction of new technology. Level 3 believes in continuous improvement and will always strive to provide the highest quality, available services.

### 3.5.6 Experience Delivering Ethernet Services

Level 3 Ethernet Service’s backbone runs [REDACTED] which provides one of the industry’s most robust and scalable network architectures for the reliable transmission of Ethernet services. Our EthS enables the Government to scale its network in a manner unmatched by other data transport services.





[Redacted text block]

Level 3 Ethernet design and solution:

[Redacted text block]

Moving to a single vendor required that [Redacted] choose the right one carefully. The thought and attention Level 3 paid to satisfying every [Redacted] requirement for a new network convinced [Redacted] that Level 3 was the correct partner.

[Redacted text block]

[REDACTED]

### 3.5.7 Access Arrangements

#### 3.5.7.1 PHYSICAL ACCESS

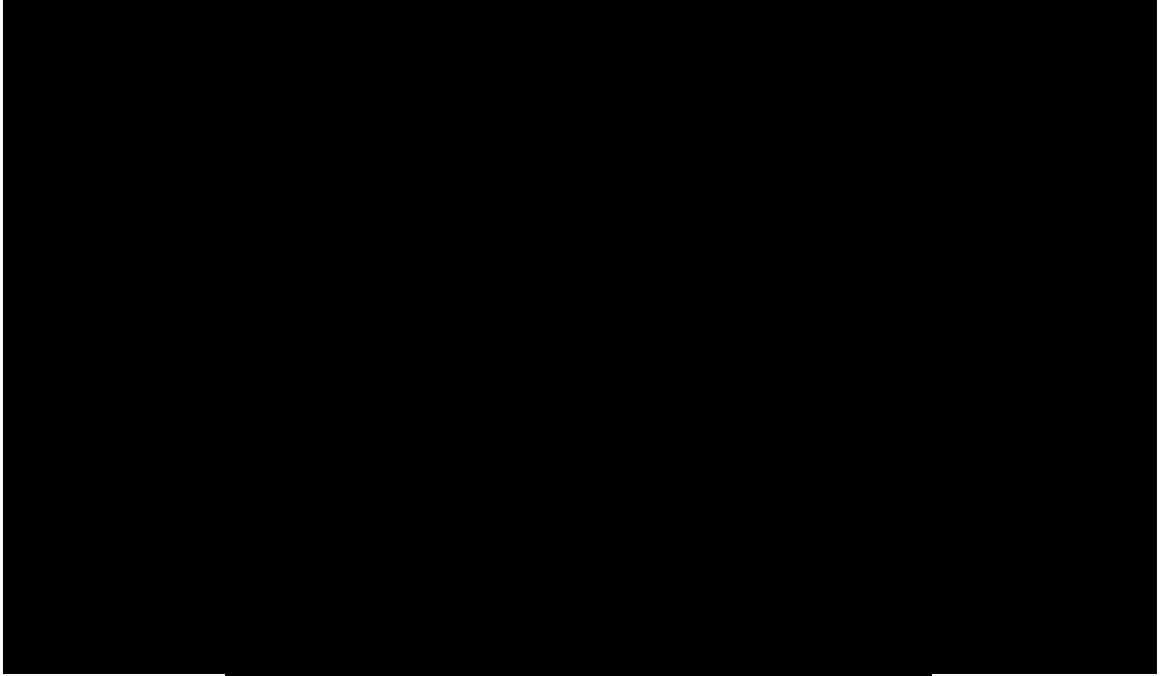
[REDACTED] a combination of access methods are available to Networkx customers based on the location of each point on the network. For those Networkx locations that are not already served by Level 3, physical connection to Level 3 will be supported through one of the following approaches:

- [REDACTED]
- [REDACTED]
- [REDACTED]
- [REDACTED]

The specific access design selected enables delivery for the Networkx services with the required KPI and AQL. In all cases, [REDACTED] are followed, including [REDACTED] [REDACTED]

[REDACTED]

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[Redacted text block]

[Redacted text block]



**3.5.7.2 SONETS INTERFACES FOR ETHERNET ACCESS, CUSTOMER PREMISES EQUIPMENT, CUSTOMER-PROVIDED ACCESS, OR LEVEL 3-PROVIDED ACCESS**

This capability provides the customer networking equipment that employs SONETS interfaces for the transmission of Ethernet (EoS) to access the Level 3 Ethernet Service core.

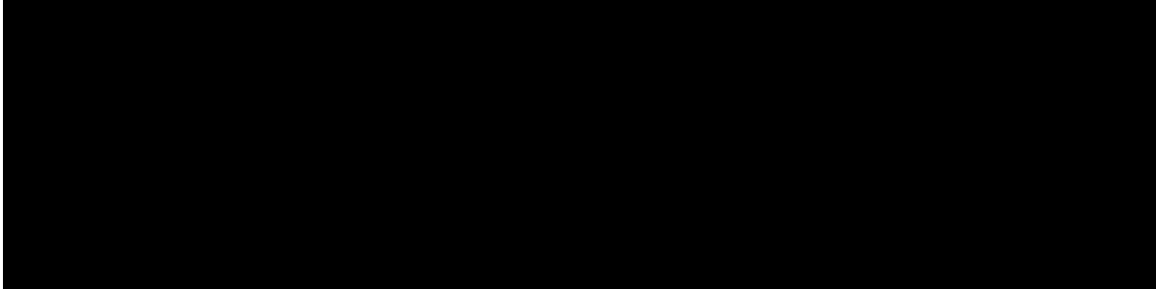
Level 3 has tested several equipment Ethernet access services for high performance interoperability. [REDACTED]

[REDACTED]

On-net means a customer location is in a building physically connected to our Metropolitan Fiber network. Off-net means the customer's location is not connected to the Level3 Network and SONETS facilities must be provided by an alternate provider, such as a PTT, ILEC or CLEC, or through new construction of fiber facilities to the Government location. Level 3 has relationships in place with [REDACTED] local carriers to provide off-net metro access [REDACTED]

[REDACTED]

Figure 3.5-2 is a high-level diagram for the EoS architecture.

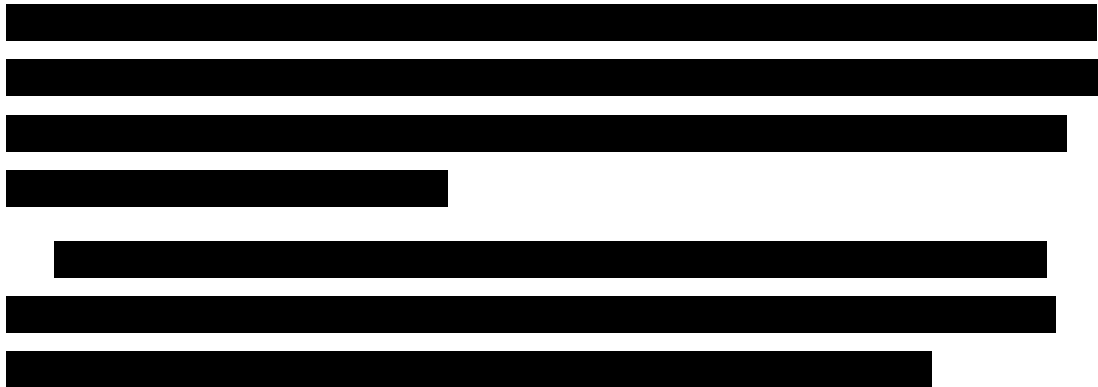


**3.5.7.2.1 Level 3 Co-Location Facilities**

For Government customers that are or will be co-located in Level 3 gateway facilities, or in buildings where Level 3 has gateways, Level 3 EthS are [redacted] away. Co-location provides a mission critical data center facility for access as our facilities are directly on the Level3 Network. In most cases this is the fastest way for a customer to access the service.

**3.5.7.2.2 Level 3 Points of Presence (POPs)**

Level 3 Ethernet POPs (EPOPs) are located in [redacted] collocation facilities and select customer locations. [redacted]



### 3.5.7.2.3 Metro Ethernet Provider (MEP)

Government customers may also elect to utilize a third party Metro Ethernet Provider. These companies provide metro Ethernet services over metropolitan networks. The Government may contract directly with the MEP to use them for Ethernet services access. This type of access is very limited in today's market place with approximately 10% or less of commercial office buildings available. However, the offerings are growing [REDACTED]. Also, Level 3 will employ this option in support of Government requirements when appropriate to reach the Network location.

### 3.5.7.2.4 Fiber Extensions

Fiber extensions are another method by which agencies can access Level 3's EthS. Level 3 Ethernet Service is accessible via Level 3 fiber or by using Customer-Provided Fiber if the Government has an existing fiber plant that they wish to use. [REDACTED]

[REDACTED] The Government may elect to directly purchase fiber, or have Level 3 purchase the fiber and arrange for the connectivity required to support the service.

### 3.5.7.2.5 Metro Fiber Extensions

Level 3's facilities-based metro networks can be utilized for [REDACTED] as an alternative access method for customers that are not located in either our collocation facilities or EPOPs. [REDACTED]

[REDACTED]

### 3.5.8 Monitoring and Measuring KPIs and AQLs

This section describes Level 3's approach to ensuring compliance with the Government-specified KPIs and AQLs for EthS as defined in [REDACTED]. In addition to collecting performance data, Level 3 must demonstrate to the Government that we are, in fact, performing within the specified KPIs/AQLs.

[REDACTED]

Section 2.2.3 of this proposal volume describes Level 3's Transport and IP Management Infrastructure and operations teams, [REDACTED]. Below is a

summary of the specific tools used by our NOC for comprehensive visibility of numerous network elements associated with EthS and the ability to accurately measure AQLs for the applicable KPIs.

[REDACTED]

- [REDACTED]



[Redacted text block]

[Redacted text block]

[Redacted text block]

[Redacted text block]

[Redacted text block]



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[Redacted text block]

- [Redacted list item]

### 3.5.9 Handling Time-Sensitive Traffic

This section describes our approach to ensure delivery of time-sensitive traffic (e.g., voice quality, video quality, video lip-synch) under different traffic patterns and load conditions for both our E-Line service offering and E-LAN service offering.

- E-Line services delivered using Ethernet over SONETS smoothly handle time-sensitive traffic. [Redacted]



[REDACTED]

Government E-Line service based on traffic loading of the network.

[REDACTED]

### 3.5.10 Integrated Access for Different Performance Requirements

This section describes the approach for providing integrated access to locations that support customer applications with different performance requirements.

[REDACTED]

### 3.5.11 Infrastructure Enhancements and Emerging Services

A detailed response to this requirement is provided in Section 3.4.11 of this volume.

### 3.5.12 Network Convergence

Level 3 E-LAN Service is the first commercially available Ethernet WAN service to offer [REDACTED]. The service's Service Level Agreements

(SLAs) are industry-leading and cover a series of important metrics for determining a network's performance.

[Redacted text block]

[Redacted text block]

[Redacted text block]

[Redacted text block]





[REDACTED]

[REDACTED]

[REDACTED] Level 3 is taking a phased approach to the deployment of IPv6 and has been keen to focus on needs of the customers both for deployment today and deployment in the future. Later sections of this proposal volume addresses this topic in detail.

### **3.5.15 Protection of SS7 Signaling**

[REDACTED]

### **3.5.16 National Capital Region Service**

Section 2.5.4 of this proposal volume discusses this topic in detail for all of Level 3's proposed services.

### **3.5.17 Meeting Section 508 Provisions**

Section 508 provisions are not applicable to Ethernet services.

### **3.5.18 Optional Service Impact on Network Architecture**

Level 3 currently offers Ethernet service to commercial customers. Therefore, offering Ethernet Service to Networx customers is not expected to have any negative impacts on our network. In addition, because of the scalability characteristics designed into our network architectures, we do not foresee any unplanned changes to the network to assure ease of use.

### **3.5.19 Optimizing Engineering**

Section 3.1.5.1 of this proposal volume discusses in detail Level 3's approach for optimizing the engineering of IP-based and optical services.

### **3.5.20 Service Internetworking**

Level 3's vision for implementing service internetworking over a common infrastructure is discussed in section 3.1.5.4 of this proposal volume.

### 3.5.21 Traffic Model

All Level 3 services use a common network. Therefore, traffic on Level 3's network considers all our proposed services. Traffic related to the Government traffic model and Level 3 is discussed in detail in Section 3.1.4.1 of this proposal volume.