


VOLUME 1, SECTION 3.7:
SYNCHRONOUS OPTICAL
NETWORK SERVICES

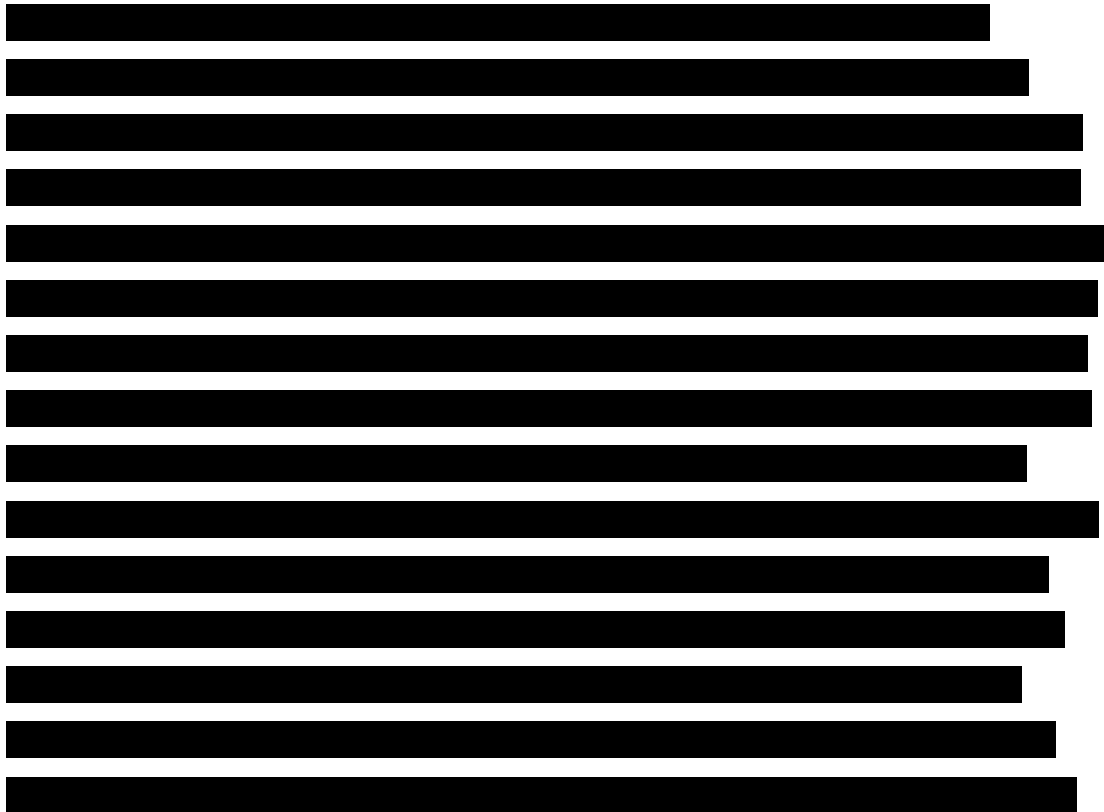


3.7 SYNCHRONOUS OPTICAL NETWORK SERVICES (SONETS) [C.2.5.2, M.6.1]

This section of our proposal addresses the Level 3 Team's offering to provide Synchronous Optical Network Services (SONETS) to Government agency customers through the Networx program. Our service meets or exceeds the requirements for SONETS as contained in Section C.2.5.2 of the RFP.

A description of our SONETS 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 SONETS are provided by using 



[REDACTED]

3.7.1 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.

3.7.2 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.

3.7.3 Service Requirements

The Level 3 SONETS offering fulfills the mandatory service requirements for SONETS as defined in RFP Section C.2.5.2.1. This section demonstrates our capabilities in the following areas:

- Standards
- Connectivity
- Technical capabilities
- Features
- Interfaces

3.7.3.1 STANDARDS [C.2.5.2.1.2]

The Level 3 SONETS infrastructure is comprised of standards-compliant fiber and equipment. Our offering complies with the required standards as delineated in RFP Section C.2.5.2.1.2.

3.7.3.2 CONNECTIVITY [C.2.5.2.1.3]

In compliance with RFP Section C.2.5.2.1.3, Level 3 will [REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]

3.7.3.3 TECHNICAL CAPABILITIES [C.2.5.2.1.4]

Our SONETS solution complies with the mandatory requirements listed in RFP Section C.2.5.2.1.4. The discussion below provides details on the more salient requirements. Additional detail is provided in the Narrative Requirements tables.

3.7.3.3.1 End-to-End SONETS Delivery

Level 3 provides connections between [REDACTED]
[REDACTED] In North America, [REDACTED]
[REDACTED] locations. [REDACTED] The major cities
are currently served in both [REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]



[Redacted]

[Redacted]

[Redacted]

[Redacted]

3.7.3.3.2 Gateway Functionality

Level 3 will support the optional requirement for gateway functionality specified in Section C.2.5.2.1.4 (2) of the Networx Enterprise RFP on a limited basis.

[Redacted]

[Redacted]

[Redacted]

[Redacted]

[Redacted]

[Redacted]

[Redacted]

Level 3 employs various [REDACTED] that can perform this transformation. Also, [REDACTED]

Metro Off-Net Access: *Off-net* means that the Government is not in a building on the network and that access to the Level 3 Network must be provided by an alternate provider, such as a Post Telephone and Telegraph (PTT), Incumbent Local Exchange Carrier (ILEC) or Competitive Local Exchange Carrier (CLEC). Level 3 has relationships in place with many local carriers to provide off-net metro access (resale) providers. In addition, many of the Government sites are located very near the Level 3 Network. In those cases, Level 3 can construct fiber to the building to enable fiber access directly to the Government customer at additional cost.

3.7.3.3.3 Network Topologies

Level 3 will support the required topologies and protection methods using [REDACTED]
[REDACTED]
[REDACTED] These are the standard, commonly used topologies implemented and operated daily by Level 3. [REDACTED]

Metro Point-to-Point: Metropolitan (Metro) SONETS provide a dedicated and fully route-diverse circuit between two or more Government-specified locations within one metropolitan market. [REDACTED]



[Redacted]

Dedicated Metro Ring Service: [Redacted]

Dedicated Metro Ring provides the Government with a dedicated optical metro ring service connecting two or more Government locations within a single metro market. [Redacted]

[Redacted]

Level 3 Intercity SONETS: [Redacted]

[Redacted]

3.7.3.3.4 Protection Methods

[Redacted]

The particular protocol used depends on the customer application. By employing protection [REDACTED]

[REDACTED]

Unprotected Service: Level 3 has offered unprotected SONETS for years. Our unprotected [REDACTED]

[REDACTED]

3.7.3.3.5 Transmux Capability

[REDACTED]

3.7.3.3.6 Concatenation

The Level 3 SONETS support [REDACTED]

- [REDACTED]



[Redacted text block]

3.7.3.3.7 SONETS Performance

The Level 3 capability to meet the requirements for SONETS performance indicators and the performance metrics described in RFP Section C.2.5.2.4 is described below.

Jitter: [Redacted]

[Redacted]

Restoration Time: [Redacted]

[Redacted text block]

[Redacted text block]

3.7.3.3.8 Performance Monitoring

[Redacted text block]

[Redacted text block]

[Redacted text block]

[Redacted text block]

[Redacted text block]

[Redacted text block]

[Redacted text block]

[Redacted text block]

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[Redacted text block]

[Redacted text block]

[Redacted text block]

[Redacted text block]

[Redacted]

3.7.3.3.9 Synchronization and Timing

The Level 3 approach for synchronization and timing is discussed in detail in Section 3.1.1.4 of this proposal volume.

3.7.3.3.10 Interfaces

Level 3 will support all commercially available optical interfaces and shall comply with American National Standards Institute (ANSI), ITU, and Telcordia, standards. These interfaces are manufactured by the equipment vendors to support customers' needs and will be plugged into [Redacted]

[Redacted]

Next Generation SONETS: Level 3 will not support the optional Next Generation SONETS features.

Data Communications Channel (DCC): [Redacted]

Integrated Control Plane (e.g., ASON-based GMPLS): [REDACTED]

[REDACTED]

Management Plane: [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

3.7.3.4 FEATURES [C.2.5.2.2]

The discussion below addresses the requirements for SONETS, as described in RFP Section C.2.5.2.2.

1. Bandwidth on Demand [Optional]

[REDACTED]

2. Channelization

Level 3 will support SONETS interfaces to the Customer Premises Equipment (CPE) to seamlessly interface with the Level 3 SONETS network for data transport. The required channelization features are standard [REDACTED] [REDACTED] by Level 3 and thus they can be provisioned accordingly. [REDACTED]

3. Dedicated Metro Ring

Level 3 will support dedicated metro rings for consolidation of agency traffic within a highly reliable metro infrastructure. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

4. DS-1 Rate Synchronization Service [Optional]

[Redacted]

5. Equipment Protection 1:1 – CPE

[Redacted]

6. Equipment Protection 1+1 – CPE

[Redacted]

7. Equipment protection – Network side

[Redacted]

8. Framing for Electrical Interfaces

[Redacted]

9. Geographic Diverse Protection

[Redacted]



[Redacted text block]

[Redacted text block]

10. Local and Remote Node Multiplexing [Optional]

[Redacted text block]

3.7.3.5 INTERFACES [C.2.5.2.3]

Level 3 will support all commercially available optical interfaces and shall comply with ANSI, Telcordia, and ITU standards. These interfaces are manufactured by the equipment vendors to support customers' needs, and will be plugged into an [Redacted text block]

[Redacted text block]

- [Redacted text block]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

3.7.4 Required Performance Metrics [C.2.5.2.4.1]

[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]

3.7.4.1 AVAILABILITY

Network reliability was a key consideration during the design and construction of the Level 3 Network. It uses mostly [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

Equipment failures that affect service are extremely rare, since all SONETS equipment used in the Level 3 Network is totally redundant, whether for the optical interface cards, the management cards, the cooling fans, or the power supplies.

Thus, for CONUS services, the Level 3 Network will meet the critical availability number cited in RFP Section C.2.5.2.4.1 for routine users of SONETS.

3.7.4.2 TIME TO RESTORE (TTR)

The TTR cited depends on sparing, equipment supplies and field staffing. Level 3 has contracts with all of its suppliers for [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

3.7.4.3 BIT ERROR RATE (BER)

The target BER is well within the specifications of the SONETS equipment employed on the Level 3 Network for each SONETS section. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

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[Redacted text block]

[Redacted text block]

Individual Agencies using Networx will need a partner that understands their challenges and can help solve these issues in creative ways. Level 3 has a strong history of solving such challenges:

[Redacted text block]

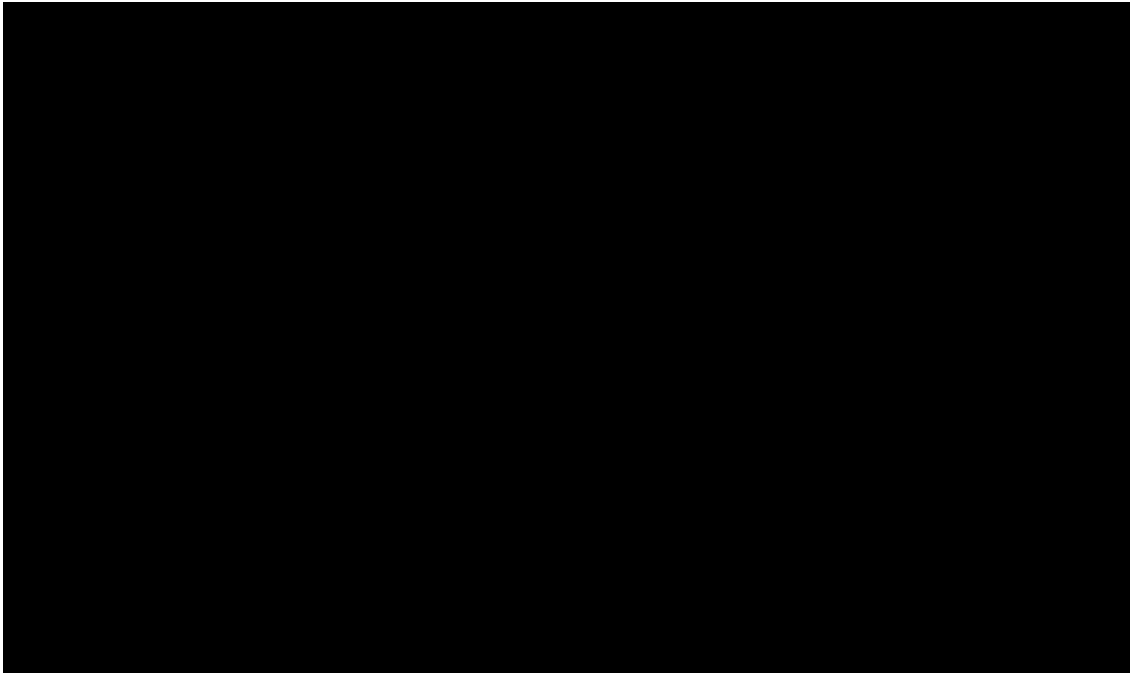
3.7.7 Access Arrangements

The access arrangements required for SONETS will differ by site. We anticipate that many of the sites addressed under the Networx Program will be on-net to Level 3 [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]



3.7.8 Monitoring and Measuring KPIs and AQLs

This section describes Level 3’s approach to ensuring compliance with the Government-specified KPIs and AQLs for SONETS as defined in Table 3.7-1. In addition to collecting performance data, Level 3 must demonstrate to the Government that we are, in fact, performing within the specified KPIs and AQLs.



Section 2.2.3 of this volume describes Level 3’s Transport Management Infrastructure and operations team, which is responsible for monitoring and

managing our SONETS offering. Below is a summary of the specific tools used by our [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]



[Redacted text block]

[Redacted text block]

[Redacted text block]

3.7.9 Handling Time-Sensitive Traffic

[Redacted text block]

3.7.10 Integrated Access for Different Performance Requirements

[Redacted text block]

3.7.11 Infrastructure Enhancements and Emerging Services

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

3.7.12 Network Convergence

Level 3 maintains high traffic flow and quality over our network while handling multiple types of service, including data, voice, and video. This is possible because of the underlying architecture of the Level 3 Network and

[Redacted text block]

Later sections of this proposal volume discuss network convergence in detail from a Level 3 perspective.

[Redacted text block]

[Redacted text block]

Also, converged networks will likely be supported using SONETS as the underlying transport layer; so this requirement is not relevant to SONETS.

3.7.13 IP and PSTN Interoperability

[Redacted text block]

3.7.14 IPv4-to-IPv6 Migration

[Redacted text block]

3.7.15 NS and EP Functional Requirements

The Level 3 approach to satisfying the National Security/Emergency Preparedness (NS/EP) basic functional requirements listed in RFP Section C.5.2.2.1.1 is described in Section 2.5 of this volume.

3.7.16 Protection of SS7 Signaling

Section C.5.2.5 of the RFP with respect to protection of SS7 signaling systems is not relevant to SONETS.

Security of our network and data is significant to both Level 3 and our customers. Section 2.5.3 of this volume discusses protection of SS7 signaling systems in detail. However, RFP Section C.5.2.5, which addresses SS7 signaling, is not applicable to SONETS.

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3.7.17 National Capital Region Service

Section 2.5.4 of this volume discusses in detail how the network architecture will satisfy the requirements in RFP Section C.5.2.7 for all of the Level 3 proposed services.

3.7.18 Meeting Section 508 Provisions

Meeting Section 508 Provisions as specified in Section C.6.4 of the RFP is not applicable to the Level 3 SONETS offering.

3.7.19 Optional Service Impact on Network Architecture

SONETS services are part of the Level 3 standard commercial offerings. Providing this service to the Government under Networkx will have no adverse impacts on network architecture or performance.

3.7.20 Optimizing Engineering

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

3.7.21 Service Internetworking

The Level 3 vision for implementing service internetworking over a common infrastructure is not relevant to SONETS. This topic is discussed in Section 3.1.5.4 of this volume.

3.7.22 Traffic Model

All Level 3 services use a common network. Therefore, traffic on the Level 3 Network considers all of 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 volume.