5.2.2 Voice Over Internet Protocol Transport Services (VOIPTS) (L.34.1.4; C.2.7.8)

The offeror shall describe the means by which the requirements for Transport/IP/Optical Services specified in Section C.2 Technical Requirements will be satisfied. The mandatory Transport/IP/Optical Services are listed in Table L.34.1-3.

5.2.2.1 Technical Approach (L.34.1.4.1)

5.2.2.1.1 Approach to Service Delivery (L.34.1.4.1 (a))

Analyze the service requirements specified in this solicitation and describe the approaches to service delivery for each service.

Sprint Voice Over Internet Protocol Transport Service (VOIPTS) provides real-time transmission of voice communications as data packets on the global SprintLink network. SprintLink is the Sprint Internet Protocol (IP) backbone connected to the public Internet providing superior flexibility and coverage. Sprint VOIPTS provides the interoperability between IP and the Public Switched Telephone Network (PSTN). Sprint VOIPTS allows voice calls, originating from on-net locations, to be connected to on-net and off-net locations by direct dialing. Sprint VOIPTS XXXXXXXXXXXXXXXXXX solution that reduces initial equipment costs and additional legacy voice circuits associated with many Customer Premises (CPE)-based VOIPTS solutions. Additionally, Sprint VOIPTS offers multiple media gateway

<table>
<thead>
<tr>
<th>Sprint Voice Over IP Transport Service (VOIPTS) Provides Superior Voice Communications Flexibility for IP Voice Traffic</th>
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<tbody>
<tr>
<td>▪ Cost-effective network-based solution</td>
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<tr>
<td>▪ Provides support for Legacy Time Division Multiplex (TDM) PBXs</td>
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<tr>
<td>▪ Multiple gateway options for installation flexibility</td>
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<tr>
<td>▪ Prioritization of time-sensitive voice packets</td>
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<tr>
<td>▪ Security of an IVPN or GMPLS solution</td>
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<tr>
<td>▪ 100% digital fiber optic network</td>
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options to support a variety of existing Agency PBX and voice terminating equipment and provide for a seamless transition to Voice Over IP (VOIP).

Sprint VOIPTS is a combination of America's first 100 percent digital fiber optic network, the best-in-breed IP network, and next generation VOIP gateway technology.
5.2.2.1.2 Expected Benefits of Service Approach (L.34.1.4.1 (b))

Describe the expected benefits of the offeror’s technical approach, to include how the services offered will facilitate Federal Agency Enterprise Architecture objectives (see http://www.whitehouse.gov/omb/egov/a-1-fea.html).

The Sprint technical solution for VOIPTS offers a broad range of benefits to Government users. Based on our industry-leading IP network, XXXXXX, our technical solution not only meets today’s requirements, but will continue to evolve as technology improves over the life of the Networx contract. Table 5.2.2-1 summarizes how our VOIPTS solution facilitates specific Federal Enterprise Architecture (FEA) objectives.
Table 5.2.2-1. VOIPTS Customer Benefits

<table>
<thead>
<tr>
<th>Federal Enterprise Architecture objectives</th>
<th>Benefit of the Sprint VOIPTS Technical Approach</th>
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<tbody>
<tr>
<td>Identifying opportunities to leverage technology and alleviate redundancy, or highlighting where Agency IT overlap reduces the value of investments</td>
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<tr>
<td>Facilitating horizontal (cross-Federal) and vertical (Federal, state and local) integration of IT resources</td>
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<tr>
<td>Applying architecture practices to help drive business management improvements across the Federal Government</td>
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<td>XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX</td>
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<tr>
<td>Supporting a citizen-centered, results-focused Government that maximizes IT to better achieve mission outcomes and fulfill legislative mandates</td>
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5.2.2.1.3 Potential Problems and Solutions (L.34.1.4.1 (c))

Describe the problems that could be encountered in meeting individual service requirements, and propose solutions to any foreseen problems.

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Network Security Concerns

Insufficient Bandwidth/Contention in Network

Because IP voice requires a significant amount of bandwidth and is delay intolerant, its use impacts the overall network, both LAN and WAN. Backbone connections in the overall Wide Area Network (WAN) environment must be reviewed to ensure capacity is available. Multiple voice endpoints on a LAN, as well as multiple data and Internet applications, can vie for the same WAN connectivity, causing potential congestion.
5.2.2.1.4 Synchronization Network Architecture (L.34.1.4.1 (d))

Describe the synchronization network architecture to support the offeror’s access and transport networks.

See Section 5.2.3.1.4 for our response to this requirement.

5.2.2.2 Satisfying Performance Requirements (L.34.1.4.2)

Sprint provides performance metrics for each service listed in RFP Section C.2

5.2.2.2.1 Performance Metrics (L.34.1.4.2 (a))

Describe the quality of the services with respect to the performance metrics specified in Section C.2 Technical Requirements for each service.

Sprint offers the VOIPTS performance metrics detailed in Table 5.2.2-2.

Table 5.2.2-2. VOIPTS Performance Metrics

<table>
<thead>
<tr>
<th>Key Performance Indicator (KPI)</th>
<th>Service Level</th>
<th>Government Requested Acceptable Quality Level (AQL)</th>
<th>Sprint Proposed Acceptable Quality Level (AQL)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Latency (CONUS)</td>
<td>Routine</td>
<td>≤ 200 ms</td>
<td>XXXXXXX</td>
</tr>
<tr>
<td>Grade of Service (Packet Loss) (CONUS)</td>
<td>Routine</td>
<td>≤ 0.4 %</td>
<td>XXXXXXX</td>
</tr>
<tr>
<td>Availability</td>
<td>Routine</td>
<td>99.6 %</td>
<td>XXXXXXX</td>
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<tr>
<td></td>
<td>Critical</td>
<td>99.9 %</td>
<td>XXXXXXX</td>
</tr>
<tr>
<td>Jitter</td>
<td>Routine</td>
<td>≤ 10 ms</td>
<td>XXXXXXX</td>
</tr>
<tr>
<td>Time to Restore</td>
<td>Without Dispatch</td>
<td>≤ 4 hours</td>
<td>XXXXXXX</td>
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<tr>
<td></td>
<td>With Dispatch</td>
<td>≤ 8 hours</td>
<td>XXXXXXX</td>
</tr>
</tbody>
</table>
5.2.2.2 Monitoring and Measuring Key Performance Indicators (L.34.1.4.2 (b))

Describe the approach for monitoring and measuring the Key Performance Indicators (KPIs) and Acceptable Quality Levels (AQLs) that will ensure the services delivered are meeting the performance requirements.

Sprint takes a network-wide approach to monitoring and measuring of our Industry-leading IP Service Level Agreements (SLAs). Below are the details of each measurement.

**Latency, Packet Loss, and Jitter are calculated as follows:**

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Availability is calculated as follows:

Sprint follows the formula described in RFP Section C.2.7.8.4.1 to calculate Availability. We track and total all customer-reported outages monthly.

5.2.2.2.3 Exceeding Acceptable Quality Levels (L.34.1.4.2 (c))

If the offeror proposes to exceed the Acceptable Quality Levels (AQLs) in the Key Performance Indicators (KPIs) required by the RFP, describe the performance improvements.

As shown in Table 5.2.3-2, Sprint exceeds the Government requested

5.2.2.2.4 Additional Performance Metrics (L.34.1.4.2 (d))

Describe the benefits of, rationale for, and measurement approach for any additional performance metrics proposed.
5.2.2.3 Satisfying Service Specifications (L.34.1.4.3)

5.2.2.3.1 Technical Description (L.34.1.4.3 (a))

Provide a technical description of how the service requirements (e.g., capabilities, features, interfaces) are satisfied.

5.2.2.3.1.1 Capabilities (L.34.1.4.3 (a))

The Sprint VOIPTS provides real-time transmission of voice communications as data packets across the Sprint IP network. VOIPTS provides real time transport of Agency voice communications over either of our IP networks and interoperates with the PSTN. VOIPTS allows voice calls originating from on-net locations to be connected to on-net and off-net locations by direct dialing. Our VOIPTS saves Agencies’ money through toll-bypass by transporting on-net traffic across the Sprint IP backbone. XXXX

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Long distance off-net calls are terminated by one of our PSTN gateways located on the Sprint IP network. XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX

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One significant advantage for an agency’s transitioning to our VOIPTS is that Sprint currently carries the traditional voice traffic for many Federal Agencies. Sprint supports a uniform numbering plan for all on-net Government locations, as we do today for traditional voice communications under the FTS2001 contract, whereby each station receiving service is identified by a unique directory number. This enables Sprint to provide a seamless transition experience to our current Federal customers and fully support the needs of new Federal voice customers.
Class of Service

Sprint understands that VOIPTS traffic is very sensitive to fluctuations in IP packet transmissions caused by delay and jitter. Therefore, Sprint provides a routing prioritization scheme or Class of Service (CoS) to distinguish between IP services. Time-sensitive VOIP packets can be assigned by the Agency and treated at a higher priority than non-real-time-sensitive services to mitigate potential call quality issues.
Figure 5.2.2-2. Sprint Class of Service

Media Gateways

Sprint provides gateways for interoperability with VOIPTS and the PSTN, or with Agency User-to-Network Interface (UNI).
Figure 5.2.2-3. XXXXXXXXXXXXXXXXXXXXX

Trunking Gateway

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Fig. 5.2.2-4. XXXXXXXXXXXX

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**PSTN Gateway**

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**Standards**

The Sprint VOIPTS is implemented to support the standards listed in the RFP. XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
Security

Security is an important aspect of any VOIPTS implementation. Sprint has taken many precautions to ensure the security of Government VOIPTS traffic.

Security Practices and Safeguards, Intrusion and Invasion of Privacy

Sprint uses multiple levels of security to protect its assets and information.
Security Practice and Policy Updates

Denial of Service Mitigation

Sprint provides several security measures to prevent intrusion and Distributed Denial of Service/Denial of Service (DDoS/DoS) attacks where feasible as part of its VOIPTS.
5.2.2.3.1.2 Features (L.34.1.4.3 (a))

Sprint supports the following VOIPTS UNI types available through SEDs.

Table 5.2.2-3. VOIPTS User to Networx Interfaces (UNIs)

<table>
<thead>
<tr>
<th>UNI Type</th>
<th>Interface Type and Standard</th>
<th>Line Speed or Bandwidth</th>
<th>Signaling Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>XXXXXXXXXXXXXXXXXXXXXXXXXXX XXXXXXXXX XXXXXXXX</td>
<td>XXXXXXXXX</td>
<td>XXXXXXXXXXX XXXXXXXXX XXXXXXXX</td>
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<tr>
<td>2</td>
<td>XXXXXXXXXXXXXXXXXXXXXXXXXXX XXXXXXXX XXXXXXXX</td>
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<td>3</td>
<td>XXXXXXXXXXXXXXXXXXXXXXXXXXX XXXXXXXX XXXXXXXX</td>
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<td>6</td>
<td>XXXXXXXXXXXXXXXXXXXXXXXXXXX XXXXXXXX</td>
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</table>
**UNI type 1**

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**5.2.2.3.2 Exceeding the Specified Service Requirements (L.34.1.4.3 (b))**

If the offeror proposes to exceed the specified service requirements (e.g., capabilities, features, interfaces), describe the attributes and value of the proposed service enhancements.

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**5.2.2.3.3 Network Modifications for Delivery of Service (L.34.1.4.3 (c))**

Describe any modifications required to the network for delivery of the services. Assess the risk implications of these modifications.

The Sprint network is a robust service delivery platform using state-of-the-art IP and IP voice communications equipment in support of Sprint VOIPTS. Sprint can deliver VOIPTS that satisfies most and exceeds many Agency requirements without modification of the network.

**5.2.2.3.4 Experience Delivering Services (L.34.1.4.3 (d))**

Describe the offeror’s experience (including major subcontractors) with delivering the Transport, IP, and Optical Services listed in Table L.34.1-3 and described in Section C.2 Technical Requirements.

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5.2.2.4 Robust Delivery of Services (L.34.1.4.4)

5.2.2.4.1 Supporting the Government’s Traffic Model (L.34.1.4.4 (a))

Given the offeror’s current network capacity and utilization, explain how the offeror will support the Government requirements specified in the traffic model. Describe the impact on capacity and utilization, as well as any infrastructure build out contemplated.

The Sprint approach to modeling the Networx traffic attempts to use real-world assumptions concerning the interaction of traffic that uses common network resources. Sprint grouped similar types of traffic in its model to show
the maximum impact on these resources. This is detailed in Table 5.2.2-4 in Section 5.1.1.20.

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5.2.2.4.2 Congestion and Flow Strategies (L.34.1.4.4 (b))

(b) Describe the congestion and flow control strategy(ies), including control mechanisms, and redundant switch, router and transmission facilities. Describe the flexibility inherent in the architectural design to handle predicted and unpredicted increased traffic loads. Also discuss the architectural ability to maintain service quality during switch, router and transmission failures.
5.2.2.4.3 Ensuring Robustness of the Access and Backbone Networks (L.34.1.4.4 (c))

Describe the measures and engineering practices designed to provide robustness of the access and backbone networks, ensure resiliency, and plan for growth.

Please refer to Section 5.2.3.4.2 IPS for a description of the Sprint approach for ensuring robustness of the access and backbone networks.

5.2.2.5 Optimization and Interoperability (L.34.1.4.5)

5.2.2.5.1 Optimizing IP-Based Services (L.34.1.4.5 (a))

Describe the offeror's approach for optimizing the engineering of IP-Based Services.

Please refer to Section 5.2.3.5.1 IPS for a description of the Sprint approach for optimizing the engineering of IP-Based services.

5.2.2.5.2 Optimizing Network Architecture (L.34.1.4.5 (b))

Describe how the offeror will utilize methods such as remote concentration, switching/routing capabilities, and high bandwidth transmission facilities to optimize the network architecture.

Please refer to Section 5.2.3.5.2 IPS for a description of the Sprint approach for optimizing network architecture.

5.2.2.5.3 Optimizing Access (L.34.1.4.5 (c))

Describe the engineering techniques for optimizing access for improved performance or increased efficiency in areas where large concentrations of diverse customer applications exist (e.g., the use of multi-service edge platforms).

Please refer to Section 5.2.3.5.3 IPS for a description of the Sprint approach for optimizing access.

5.2.2.5.4 Implementing Service Interworking (L.34.1.4.5 (d))

Describe the offeror's vision for implementing service internetworking over a common infrastructure (e.g., IP-centric architecture). Include a view on network interoperability, control plane integration, and optical infrastructure support for IP-Based Services. Describe the benefits and rationale of the offeror's approach.

Please refer to Section 5.2.3.5.4 IPS for the Sprint vision for implementing service internetworking over a common, IP-packet infrastructure.
5.2.2.6 Summary

Sprint VOIPTS provides the Government with a cost-effective network-based IP voice gateway solution. This solution puts the cost of expensive technology refresh updates on Sprint rather than the Government. With the benefits of being directly connected to the SprintLink network, Agencies will be pleased with the implementation flexibility available with Sprint VOIPTS. Multiple media gateway options provide a smooth transition from TDM-based voice communications to an IP-based voice network. Additionally, with the Sprint commitment to development of IP voice solutions, the Government will benefit from future enhancements to Sprint VOIPTS. Sprint VOIPTS will provide the Government with the flexibility of multiple gateways, cost benefits of a network-based PSTN gateway solution and CoS prioritization support to ensure successful transmission of the Government’s IP voice traffic.