

## ITS Strategic Roadmap – FY20 Planning

### **Network Infrastructure**

Author: *Jesse Turner*

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### **Background**

Metro's network infrastructure is the communications components that make up and support the reliable transmission of voice (telephone), video and data between Metro Government facilities throughout Davidson County. Metro's network infrastructure also supports Internet connectivity for outside entities such as business partners, citizens and third parties, which includes components such as routers, firewalls, switches, wireless devices and other types of gear. As Metro continues to implement smart city projects, an effective and resilient network infrastructure will facilitate the transit of data that makes smart city systems function.

As a matter of policy, the ownership and management of the network and its components underwent consolidation during the Bill Purcell mayoral administration for all Metro General Government agencies, the Davidson County Sheriff's Office, and the judicial community. This was due to the criticality of network infrastructure, the potential for security compromise via the network, and the advantages of economies of scale. Exceptions to consolidation are authorities including Nashville Electric Service, the Airport Authority, Metro Development and Housing Authority, and Metro Nashville Public Schools.

Technologies are standardized on Cisco Systems. In October of 2015, Metro ITS implemented a high-speed high capacity 40Gbps MPLS backbone to provide wire speed encryption technology and a capacity planning path to 100Gbps.

Metro continues to work on the 11 strategic initiatives around its Broadband Infrastructure Plan. Many of those initiatives are central to processes in other Metro departments, and in these cases ITS has taken on a coordination and support role between our consultant and the affected departments. Over the past year, Metro has received a steady volume of small cell applications from multiple telecommunications carriers. This influx, coupled with new state legislation regarding small cells, has created challenges for multiple Metro departments. ITS is working with these departments to address these challenges.

Primary stakeholders include the Metro departments and agencies and their citizen customers, the department of General Services through their management of construction and maintenance of Metro General Government facilities; and major vendor partners including AT&T, XO and Comcast.



## Current Strategic Drivers

1. **Internet of Things (IoT)**  (Game-changing) – A major component of smart city strategies, the Internet of things relates to the inter-networking of physical devices, vehicles, buildings and other items embedded with electronics, software, sensors, actuators and network connectivity that enable these objects to collect and exchange data.
2. **Internet Access** (High) – The dependency on Internet access across Metro departments and agencies has grown beyond standard Internet browsing into the de facto standard transportation mechanism for system and personal communications.
3. **Cloud Services** (High) – The widespread public acceptance of cloud for services that employees and citizens use every day, along with the potential for positive financial impact and the increasingly effective cloud vendor security stance make a hybrid model a potential direction.
4. **Connected Nashville Smarter Cities**  (High) – Various Connected Nashville strategies using data and technology to improve the lives of our citizens, require reliable and robust connectivity.
5. **Customer Demand: Ongoing Smart City Technology Projects**  (High) – The Public Works department is implementing an updated intelligent traffic system in place for synchronizing traffic signal throughout Davison County. The new system requires the use of TCP/IP and Ethernet protocols, for which ITS provides service. Another smart city project in the works between Public Works and Metro Transit Authority is the Traffic Signal Prioritization project, which will facilitate a more consistent public transportation schedule across multiple corridors.
6. **Demand for Secure Government Systems** (High) – With massive data breaches in the news on a seemingly daily basis, we must strive at all times to protect the security, availability and integrity of all facilities and systems entrusted to our management.
7. **End of Life Hardware/Technology** (High) – Typically, per defined schedule, hardware vendors discontinue support on selected models of equipment. Replacing EOL equipment ensures Metro’s ability to obtain, support and deliver new services.
8. **Recommendations of Metro Broadband Study**  (High) – Metro engaged CNX to study and make recommendations regarding the future of broadband within Metro Government. These recommendations include increasing Metro’s owned fiber-network plant.
9. **Challenges in a Complex and Growing Environment** (High) – As the amount of network infrastructure increases, the complexity of the network and its management challenges increases as well. The need for highly skilled staff becomes ever more critical for Metro. However, compared the national average for skilled technical occupations salaries, Middle Tennessee falls below the national average, making it difficult to attract the necessary workforce.
10. **Demand for Video** (High) – We have seen growth in usage of video among the general population, thus the Metro employee population. Additionally, large-scale public safety projects have increased demand for video services.
11. **Remote Worker/Disaster Recovery** (High) – Considering that connectivity is the basis of both disaster remediation and business recovery activities, as seen in the 2010 Nashville flood, a



focus on disaster recovery readiness is critical. Additionally, the increased interest in establishing a remote worker solution in the immediate term to help elevate growing traffic challenges can be addressed with the same solutions for BC/DR.

12. **Service Provider and Industry Standards Changes** (High) – Many of the traditional Telco products used for delivering communications services are reaching EOL as newer technology is deployed in the providers’ networks. This enables Metro to take advantage of the competitive market for these services.

### On the Horizon Strategic Drivers

1. **Change of Administration** (High) – A major election for Metro Government in the fall of 2019 has the potential to replace our current mayor, vice mayor and members of the Metro Council. With this election comes the potential to disrupt the planned direction of systems, funding and personnel related to prior administrations.
2. **New Networking Technologies** (Medium) – The marketplace will bring new technologies, including 5G, which will present additional bandwidth and connectivity options for ITS customers.

### Short Term Goals (0-6 months) 7/1/19 – 12/31/19

#	Goal/Objective	Est. Start	Est. Duration
1	Replace End of Life network hardware – Although ITS has moved to a depot maintenance posture, it will be necessary to replace older hardware, on a much smaller scale, to meet security, port density and capacity planning requirements. Capital funding required.	7/2019	Ongoing
2	Continued implementation of private Metro fiber throughout Nashville per Broadband plan. Capital funding required.	7/2019	Ongoing
3	Buildout of secure data center infrastructure for the Metro public safety data center. Buildout to include internal data center-to-data center redundancy, as well as diverse Internet redundancy. Capital funding required.	7/2019	6 months
4	Continue to review security configuration and processes to align with CIS best practices. Capital funding may be required.	7/2019	Ongoing
5	Upgrade and expand the current monitoring and management systems due to technology changes and cloud services.	7/2019	12 months
6	Investigate potential benefits and costs related to establishing an Enterprise Agreement (EA) for Cisco network and telephony products and services. Capital funding may be required.	7/2019	6 months
7	Continue working with General Services to identify the needs of facility renovations and new construction. Capital funding required for resultant projects.	7/2019	Ongoing



8	Evaluate and upgrade facility and backbone network as required to support the storage and retrieval of video related to MNPB body-worn and in vehicle video cameras.	7/2019	6 months
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### Medium Term Goals (6-18 months) 1/1/20 – 12/31/20

#	Goal/Objective	Est. Start	Est. Duration
1	Replace End of Life Technology – Based on Enterprise Architect recommendations begin upgrade of primary data center Cisco Catalyst switching infrastructure. Capital funding required.	1/2020	Ongoing
2	Expansion of IoT usage for Public Works, Storm Water and Parks Capital funding required.	1/2020	12 Months
3	Expansion of TSP project for MTA. Capital funding required.	1/2020	Ongoing

### Long Term Goals (18-36 months) 1/1/21 – 6/30/22

#	Goal/Objective	Est. Start	Est. Duration
1	Expansion of traffic management system in cooperation with TDOT. Capital funding required.	1/2021	Ongoing

### Related Roadmaps:

- Data Center and Environmental Support
- Network Security
- Unified Communications
- Wireless Networking
- Structured Cabling

### Related Resources

- Metro Government Broadband Study, CNX, 2016
- [Connected Nashville: A Vision for a Smarter City](#)
- <https://www.mtsu.edu/isa/documents/MT-Tech-Workforce-2018.pdf>

