Telecommunications Review and Assessment

January 27, 2014

Table of Contents

Executive Overview

Current Network Environment

Nearly all of the data transported in state government, including city, county, and tribal network traffic, is carried over the Wide Area Network (WAN) infrastructure managed by CTS. Gathering this much demand in one place provides Consolidated Technology Services (CTS) with the capability to competitively acquire large amounts of bandwidth, driving down costs while boosting speed and capacity. CTS can act as the single point of contact for designing, ordering, implementing, and operating wide area networks; dispatching staff around the clock to resolve problems and work with vendors.

In support of this responsibility, ***ESSB 5891 Section 6*** requires CTS to "review and assess the current state telecommunications and information services network model of the executive branch with the objective of agency network consolidation into consolidated technology services. The assessment must include a review of cost management, state and federal regulatory issues, development and feasibility of each option, and a migration strategy and implementation plan for each option." This report provides the required review.

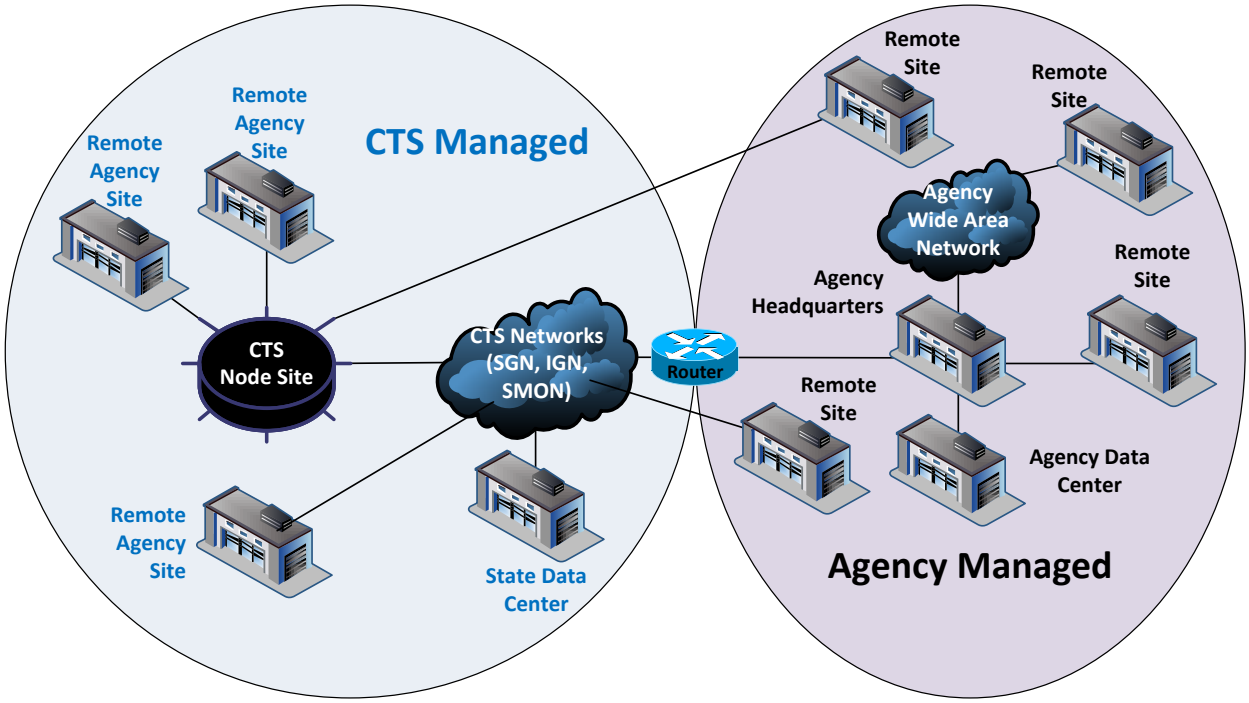
The macro trends in enterprise-level information technologies continue to place more demands on the networks. Examples of these trends are Software as a Service (SaaS), variability in end-points, mobility services, and vendor hosted applications that require a fast, well-managed, and secure network to support mission critical application transactions and the delivery of critical data. Increasing demand on networks that traditionally supported either voice or data, and now support both, also need to meet ever increasing demands for substantial bandwidth to support such technologies as video and advanced graphics. Managing the networks reliably and seamlessly from end-to-end becomes more important virtually every day. Networks managed by CTS include:

Network	Description
State Government Network (SGN)	The common network used by state agencies
Intergovernmental Network (IGN)	The network used by customers to securely connect to managed gateways, applications, and other online end points owned by state agencies, cities, and counties
Public Government Network (PGN)	The network that makes online services available to the public
State Metropolitan Optical Network (SMON)	This high-speed fiber optic backbone service transports voice, video, and data communications for customers located in over 30 buildings on the state Capitol Campus in Olympia and throughout Thurston County.
Internet Services	The facility provided to connect government customers with high-speed internet access. This service includes Domain Name Services (DNS) and IP Addressing.

Today, CTS manages the statewide telecommunications networks that transport voice, video, and data used by state of Washington agencies, governmental entities, and the public. Despite this, in many cases, CTS does not provide circuits nor completely manage the end-to-end wide area network infrastructure. For example:

- Individual agencies often make separate design and buying decisions and administer their own WAN circuits and equipment
- Often the CTS management of the network stops short of the physical premise of the agency or organization
- Even where CTS manages the circuits, many times the end network device is managed by the agency

The result is a *critical infrastructure* that is not currently managed as a critical asset.



The diagram above shows the typical case where CTS manages the majority of the state of Washington's wide area network and the routers at the agency remote sites. There are also agencies that, while they have connectivity to state resources, fully manage and maintain their own wide area networks and routers at their remotes sites. In addition, there are instances where CTS manages the network to an agency location; the agency manages the router at that location.

With each agency potentially engineering and contracting for WAN services, the mix of technologies and vendors makes effective planning, contracting, engineering, and management of the State networks

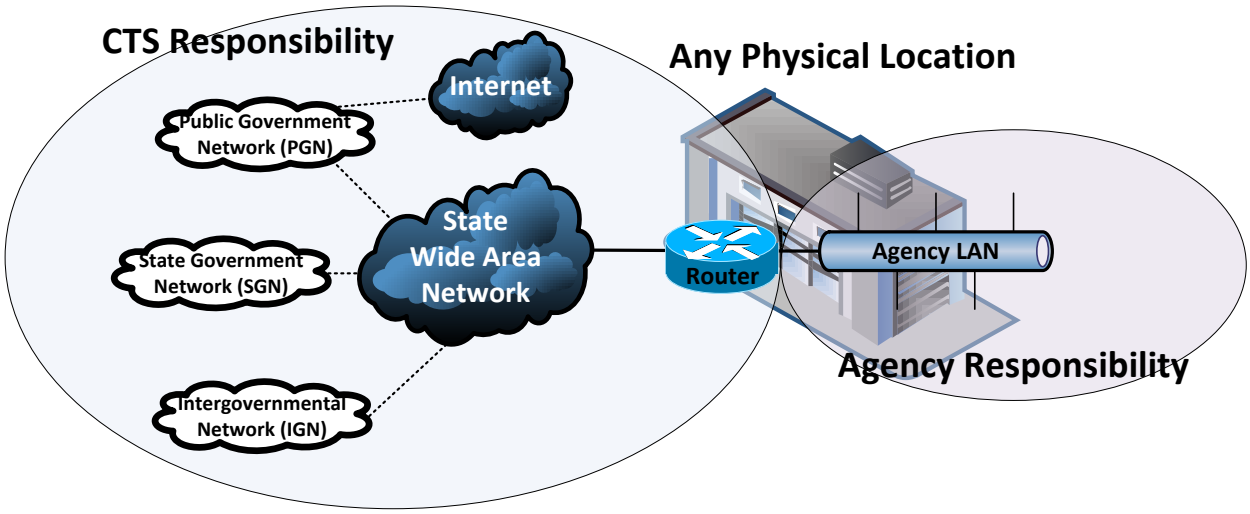
difficult, if not impossible, to perform on a manageable, reliable, and cost-effective basis. It is also a hindrance to solid security, business continuity, and disaster recovery planning due to the multiple handoffs, vendors, and technologies involved as well as the lack of standard demarcation points. The result is predictably unpredictable.

Individual agencies have a solid understanding of their business requirements. This is not necessarily expected to extend to detailed WAN engineering, provisioning, and management decisions. This is the expertise of CTS, the agency created by the legislature to manage the State's information technology infrastructure. In creating the agency, the legislature directed that all state agencies move to using CTS for all utility-based infrastructure, which they defined as including network administration and telephony, among other services.

When individual agencies implement their own WAN network technologies, additional expense, and complexity is inserted into the overall manageability and stability of the State infrastructure. For example:

- Duplicate WANs add unnecessary complexity, unpredictable total operating costs, disproportionately allocated capacity, inconsistent administration and security between network end points.
- CTS is limited in its ability to reliably deliver consistent and cost-effective service levels, allocate capacity, or plan for growth in high bandwidth services, such as VoIP, video, and cloud computing.
- Business Continuity and Disaster Recovery is complicated by dissimilar and often isolated agency WANs. Recovery is restricted by the weakest links, which are generally agency managed and operated WAN services and equipment.

Recommended Future State



The overall recommendation is for the consolidation of the State's WANs, end-to-end, within CTS. This approach supports:

- Standardized WAN technologies
- Centralized procurement
- Integrated end-to-end WAN management and monitoring
- Consolidated network services
- Improved network security

Cost effectiveness and management objectives for WAN service delivery require a centralized approach while the sizing, planning, provisioning, and management of WAN technologies and services need continued close collaboration with the agencies. CTS currently negotiates infrastructure and network contracts, delivers network services, and centrally manages the network for a majority of customers, although not all and not in a standardized way. The suggested approach extends these services through the physical location router and serves to achieve standardization in procuring and managing WAN links to agency facilities. CTS, through its Customer Advisory Council, currently collaborates with agency representatives to govern the infrastructure and networks of the state of Washington. It is expected that the management of the WANs will become part of the agenda of the Customer Advisory Council.

Analysis

Goals and Expectations

The mission of CTS is to provide innovative technologies and support to customers through competitive services that deliver measurable value in order to be the information technology provider of choice for agencies in the state of Washington. The fulfillment of this mission, which enables network simplification, easier planning, and improved cost predictability, requires completion of the consolidation of the telecommunications and information services network into CTS.

With the completion of the WAN consolidation, the desired end-state provides:

- A simplified financial approach that moves from fee-for-service to an allocated model
- Simplification and improvements in procurement of telecommunications products and services
- A consolidated statewide IP-based network with last mile connectivity
- A more efficient level of network sharing and cost optimization
- A sustainable model for monitoring, maintaining, operating, and upgrading the WAN
- A sustainable approach for covering on-going operational expenditures that:
  - Fairly treats each agency's use of the WAN
  - Creates incentives to maintain a modern WAN infrastructure
  - Provides incentives for agencies to fully use the state WAN
- A governance model that enables:
  - Ongoing evaluation and evolution of the state WAN's requirements and capabilities
  - Traffic from government users at the state and local level to ride the same shared infrastructure
- Cost-effective use of the consolidated state WAN
- A secure and reliable WAN that provides the foundation for continuing voice and video network consolidation

Required Activities

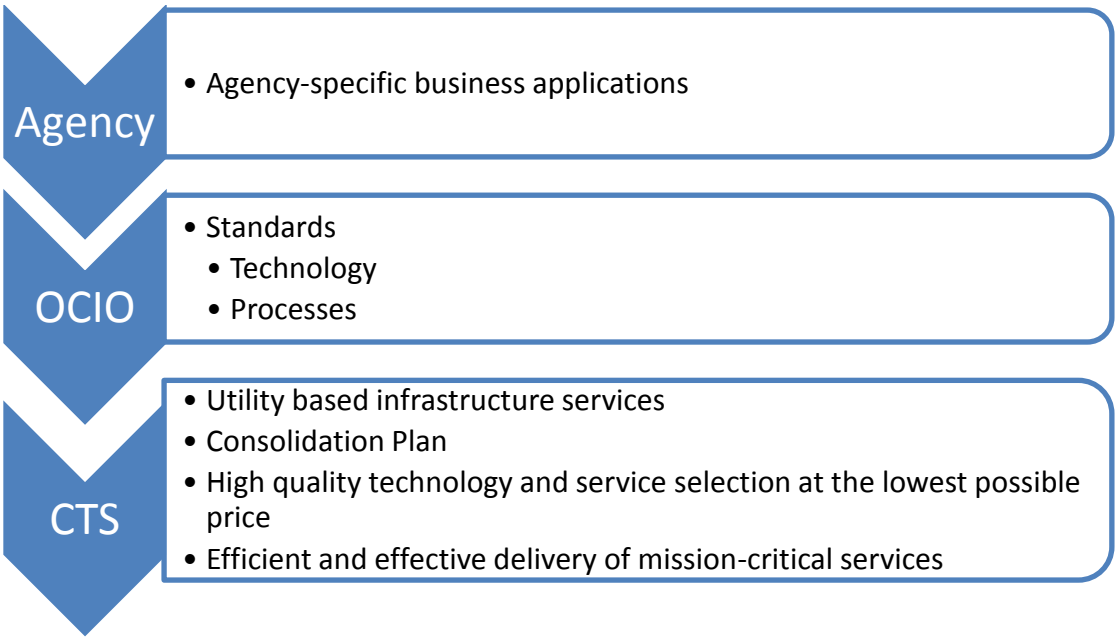
There are a number of activities that need to be performed in order to meet the goal. Detailed activities that are necessary to provide the desired end-state and that will appear on a Consolidation Planning Roadmap that is recommended as a next step and would include:

1. Demand and Financial Management
   a. Provide business related, transparent WAN service descriptions and costs to support earlier and more accurate cost predictability
   b. Document the CTS WAN service delivery methods and capabilities

c. Document an accurate financial cost baseline with defined elements

2. Simplified WAN Architecture
   a. Document and work toward a standardized network architecture across the agencies and CTS
   b. Support earlier and improved planning and more effective and proactive WAN management
3. Mobility and Access
   a. Provide enhanced mobility and access capabilities
   b. Create standardized citizen, employee, and partner access
   c. Ensure integrated security functions across services
4. Efficiency of Services
   a. Implement automated service processes
   b. Leverage competitive network service sourcing
   c. Align Telecommunications Incident Management
5. Unified Communications
   a. Expand converged service capabilities
      i. Continue to migrate older digital voice services to VoIP
      ii. Video
6. Contracts
   a. Review and standardize contractual agreements with vendors
   b. Review Vendor Service Level Agreements and pass-throughs
   c. Create detailed Internal Service Level Agreements (Terms of Use) and agency review process

Each organization within the State needs to focus on those activities that are within their organization's primary responsibilities:



Strategies for Managing State-wide Networks

There are many reasons for managing a standardized, state WAN from end-to-end. The most obvious and impactful of these reasons are improved and earlier capacity planning and management, the resulting cost-effectiveness, and improved security.

Network Management

Network Management, at a high level, consists of determining on a real-time and an ongoing basis the degree to which the WAN is performing as anticipated and managing any incidents or potential problems determined through monitoring tools or through reports from users. Network Management is typically seen as encompassing:

- Capacity and Performance
  - Eliminating bottlenecks through effective routing of traffic
  - Load balancing to optimize use of all components
- Reliability
  - Responding to outages and ensuring the WAN is available to users
  - Monitoring performance real-time
  - Reviewing logs and incident reports to proactively address potential issues

- Managing Quality of Service (QoS)
- Security
  - Ensuring that the network is protected from unauthorized users

There are a variety of approaches and tools used to enable effective Network Management. Some are in use within CTS today and at various agencies to some degree. By standardizing and extending the centralized management of the WAN through to the point of demarcation at the agency's physical location, the ability to monitor information and to obtain the detailed data that is required for proactive fault avoidance is made easier. Monitoring tools are more easily implemented and leveraged when the devices that they manage are standardized. Better use can be made of all of the state WAN assets when all of the assets are available to improve traffic routing and load balancing. Security is also enhanced when standard firewalls are provisioned and security is centrally monitored "door-to-door." Use of a standard architecture, with standard hardware and centralized network management, also enables effective disaster recovery and business continuity planning.

Capacity Planning and Management

Determining the requirements for future capacity needs of the state WAN requires a great deal of perpetual analysis and planning as performance and needs are continually evolving. In addition to the ongoing network assessment and planning work performed by CTS, individual agencies engage in planning efforts as well. The work to consolidate the future capacity needs among the agencies and CTS includes consolidation of these planning efforts and further analysis of:

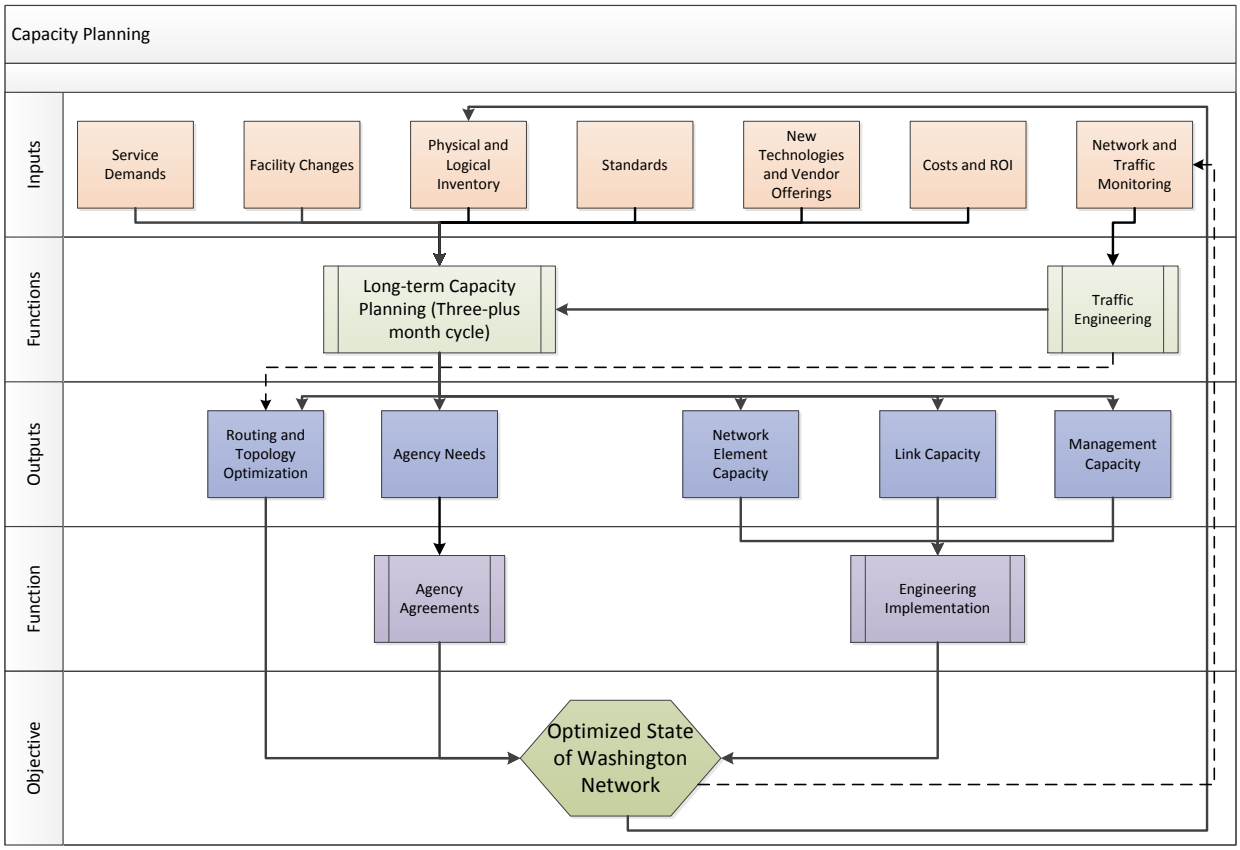
- Additional enterprise and agency business applications currently in plan or under active discussion
- The OFM Strategic Facilities Plans for awareness of additional governmental and non-governmental agencies, moves, and locations under consideration to support earlier planning
- Existing and newly required interconnections with peer and federal networks
- Security, disaster recovery, and business continuity needs
- Documentation of time sensitivity of delivery of information; response time
- Timing of consolidation of information technologies into the State Data Center
- Migration to wireless devices to access information and applications
- Increasing use of e-mail, large data, and video in addition to voice communications
- Schedule for moving from older digital-based voice services to VoIP-based delivery
- Quality of Service (QoS) needs

Centralizing this activity supports longer term planning, both technical and financial, as CTS is able to see and plan for upcoming events well ahead of the actual timing for the provisioning of the capacity. Awareness of these factors also supports performance management efforts as capacity issues can be a

cause of degraded service. When there is adequate time to anticipate and plan for increased capacity, cost can often be managed as well as improved management of the risk to the project that requires the additional capacity.

Bandwidth and capacity management strategies based on monitoring and managing voice, data, and multimedia networks cannot be effectively separated as capacity management and performance management are intertwined. Capacity management (planning) is the process of determining the network resource required to prevent a performance or availability impact on business-critical applications. Performance management is the practice of managing network service response time, consistency, and quality for individual and overall services. Information provided by performance monitoring and management is frequently an early indicator of increasing capacity needs.

The following chart represents the process to incorporate service demands, facility changes, new technologies, and network monitoring to produce the Long-term Capability Plan. From this plan, CTS makes changes to the state WAN that result in reliable, manageable, and cost predictable state of Washington WAN services.



Capacity and performance management best practices include:

1. Service level management
2. Network and Application “what-if” analysis
3. Base lining and trend analysis
4. Exception management
5. QoS (Quality of Service) management

Bandwidth and capacity management also includes:

1. Consulting with agencies to forecast their needs for capacity on the WAN
2. Analyzing the forecasts and conclusions of capacity planning along with other relevant industry documents
3. Leveraging relevant strategy documents published by the OCIO, agencies, peers, and network service providers
4. Taking account of the services where the capacity of the WAN has been enhanced for a specific purpose
5. Reviewing relevant guidance issued by TSB

Centralization of this activity provides end-to-end visibility of current capabilities and the need for future enhancements to capacity and capability. It also supports the management of the entire WAN and precludes confusion and potential finger pointing regarding issues where management of the state WAN is handed off to management of the individual agency WAN for the last mile or other current agency end-point. Consistent hand off points for each agency across the enterprise supports accountability and effective management practices.

CTS has implemented a 24 X 7 centralized network monitoring capability, often referred to as a Network Control Center or “NCC.” Leveraging and expanding this capability to provide more proactive monitoring and management of the State WAN will assist in the timely identification and correction of network issues and effective problem avoidance.

There is often a perception that a centrally managed organization does not have the same level of urgency regarding the uptime and time to resolution that an individual organization or agency may have. A mechanism to manage this perception is through the use of Service Level Agreements (Terms of Use) that are detailed, business focused, reviewed for compliance regularly, and that delineate escalation processes for failures to comply.

Security Management

As with Capacity Planning, determining the needs for effective security management of the state-wide network requires a great deal of ongoing observation, analysis, and planning as security risks are continually developing. In addition to the ongoing network security assessment and planning work performed by CTS, individual agencies engage in planning efforts as well. The work to consolidate the future security management needs among the agencies and CTS includes standardizing network technology components such as firewalls.

Vendor Management

Improvements in the vendor management processes that are possible with a standardized centrally procured and managed WAN also supports cost-effectiveness and predictability. In today's environment where individual agencies are able to procure any technology from any vendor that they choose, the cost of managing the vendors and holding them uniformly accountable to standard commitments is difficult at best.

Troubleshooting a network problem is a complex exercise in the best of circumstances. There are multiple potential failure points in the hardware and services provided by telecommunications carriers, hardware vendors, and software components. When disparate technologies, multiple vendors of each of the components, and additional hand offs of responsibility enter the already complex environment, time to resolution and the resulting cost to the organization can increase substantially.

In addition to the complexity that is added with multiple technologies and vendors is the associated increase in the number of vendor agreements. This also introduces an increased opportunity for vendor finger pointing and leaves it potentially unclear as to specific vendor contacts and resolution and escalation processes, once more potentially increasing the time to resolution. Although many contracts are similar, CTS may or may not have visibility to the detail of the underlying contracts making it more difficult to act as the central resolution point for network problems.

Standardizing the contracts for procurement of WAN components and bandwidth and centralizing the procurement within CTS will go a long ways toward streamlining the troubleshooting process as well as potentially providing not only better price points with vendors, but also better terms and conditions, delineated responsibilities and escalation processes, and unified contact numbers and procedures.

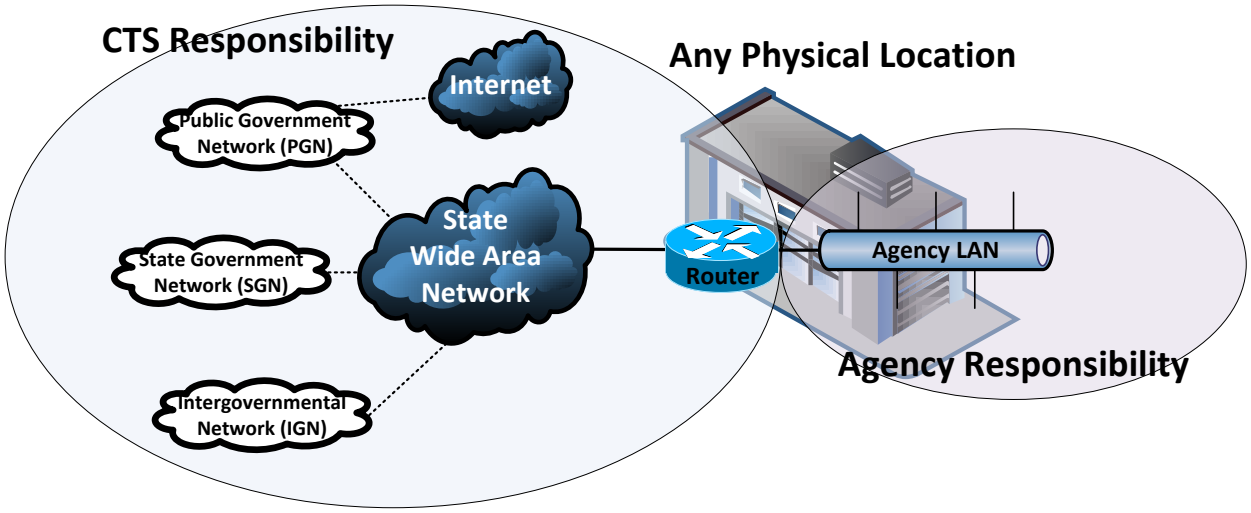
Consolidation Options

Consolidation of the WANs is necessary to continue to improve planning and management, security, and cost-effectiveness. The options regarding consolidation exist largely in terms of the cost mechanism, timing, and the demarcation point where the agencies assume management responsibilities and which needs to be the same point at each physical location.

The cost mechanism, discussed in the Funding Alternatives section, will ideally be in place for the 2015-2017 biennium budget. This requires the decision around the alternative and the estimated pricing to be complete by late spring 2014. This work will be part of the *Consolidation Planning Roadmap* recommended as the next step.

The logical demarcation point is the router interface at the physical premise. Any connectivity outside the agency's local area network environment is the responsibility of CTS. CTS then plans, engineers, and manages anything on the state WAN as it arrives at or leaves the premise. This enables the agency focus on their business needs and for CTS focus on the delivery of the telecommunications utility.

The following diagram represents the recommended demarcation between CTS and Agency IT responsibilities:



Risk Management

A major risk to the consolidation plan is that, while the state of Washington legislated centralized network responsibility within CTS with strategic input from agencies, it does not currently require agencies to comply with those objectives. Moving forward, the completion of the consolidation required the agencies to participate in the project according to the plan that is developed. It is essential

to solicit and leverage agency input during the creation of the plan that is essential to buy-in from the agencies. The OCIO needs to administer the needed cooperation from the agencies if it is found to be lacking.

Risk of Doing Nothing

By not pursuing consolidation of telecommunication technologies, the state of Washington executive agencies will continue to use less reliable, less manageable, and less cost-effective network services that will not support cost predictability and not be managed as a mission-critical asset.

Other Defined Risks

Function	Objective	Potential Impact	Risk
Governance	Implement the roles as defined in ***ESSB 5931 and 5861.*** • **OCIO** establishes enterprise-wide policy, standards, and processes • **CTS** defines standards, procures, implements, and manages technology infrastructure and network services • **DES** procures, implements, and manages enterprise applications • **Agencies** procure, implement, and manage business applications CTS will continue to use their Customer Advisory Council for guidance.	Lack of clear delineation of responsibility and accountability amongst various IT organizations. Lack of ability to achieve cost efficiencies with vendors and in planning network capacity requirements	Lack of appropriate governance may result in the continuation of disparate points of planning, engineering, and procurement continuing the risk to the critical network. *Mitigation*: Create a governance model for the consolidation project. Work closely with the Customer Advisory Council on governance decision making as the details are defined. Obtain concurrence from the OCIO and OFM to enforce the approach and agreements with the agencies.
Procurement	Implement the roles as defined in ***ESSB 5931*** that standardizes and centralizes	Inability to leverage scale to provide cost and contractual advantage.	Agencies may not agree that CTS should procure the network

Function	Objective	Potential Impact	Risk
	procurement and network provisioning to enable CTS to provide reliable network services, manage the State's networks, and plan capacity and growth. Align contracts and procurement with current regulatory requirements	Standard terms and conditions to define vendor responsibility and accountability. Inability to engineer and implement a network that is standard across all agencies.	facilities for the last mile. There may be a perceived loss of control or sense of urgency, or perception of additional cost. *Mitigation*: Work closely with agencies that have facilities and contracts in place to understand the current state and near-term planning including contracts and agreements with vendors. Provide formal network planning with the agencies ahead of substantial procurements.
Network Management	Centralize WAN network monitoring at CTS Align telecommunications help desk processes	Lack of clear lines of responsibility for incidents. Leverage incident data in ongoing capacity planning and network management. Increased time to resolution and cost per incident.	Agencies may believe that CTS will not keep them adequately in the loop regarding proactive dissemination of network problems or provide adequate information and time to resolution. *Mitigation*: Leverage the Customer Advisory Council as Service Level Agreements are defined. Include communication and escalation processes and adhere to the processes.

Function	Objective	Potential Impact	Risk
Service Catalog	Standardize services available to the agencies to reduce customization of network infrastructure and Service Level Agreements. Provide catalog information in terms of business requirements rather than technical components.	Agencies will not need the same degree of technical detail to order the telecommunications services that support their business.	Since many agencies have telecommunications expertise today, it will likely be difficult for some agencies to have reduced visibility to the technical detail of services provided. Confidence in the result may be low. *Mitigation*: Include existing agency telecommunications staff in the review of the translation of their technical requirements into business language.
Funding Considerations	Move to a cost allocation model for the telecommunications utility services.	Lack of support for longer term planning, standardization of technology, and cost efficiencies as well as increased transparency. Partial funding will not support longer term planning, standardization of technology, and cost efficiencies as well as increased transparency.	Changing from a fee for service to an allocation model is a large cultural change. There may likely be initial distrust in the financial model. *Mitigation:* Provide periodic scheduled reviews of the financials related to the network.
People	Centralizing WAN monitoring within CTS.	WAN monitoring tasks may move from Agency IT teams to CTS	Agency IT teams may object to a perceived reduction in duties. *Mitigation:* Refocus the team members to completing tasks associated with pent-up demand and to participate in required planning.

Function	Objective	Potential Impact	Risk
Security	Through standardized WAN technologies and centralized monitoring, improve the ability to avoid security breaches.	Increased potential security disruptions, loss of data, privacy breaches of state of Washington services and data.	If the changes take too long to accomplish, there is an increasing potential for loss of data. *Mitigation:* Make security monitoring an evaluation criterion when purchasing telecommunication technologies.
Disaster Recovery	Through standardized WAN technologies, improve the ability to avoid or recover from an outage.	Increased potential service disruptions of state of Washington services	If the changes take too long to accomplish, there is an increasing potential to be unable to recover from disasters in a timely manner. *Mitigation:* Standardization of WAN technologies will enable better disaster recovery and business continuity planning

Funding Alternatives

CTS is currently a fee for service agency. In general, CTS invests in technology infrastructure and charges agencies for its use. In many cases, CTS recoups its initial investment as an overhead component of the rates that are charged. In other cases, the service is never completely paid for by the agencies that make use of the service. In the case of telecommunications services, the inconsistency in the endpoints between CTS and the agencies makes the total cost of providing this utility unclear. The lack of consistency in the mechanisms for recovering cost and the lack of consistency in boundaries skews the picture of the cost of providing the technology infrastructure to the state.

Because agencies can choose to acquire infrastructure services from the private sector, CTS is motivated to provide the best value and actual cost for the service provided, and has compiled a good record of accomplishment for this measure.

The project to consolidate the remaining telecommunications network infrastructure is a large project. It is currently estimated to take approximately three years to accomplish from the funding date along with the other initiatives that are currently underway within both CTS and the agencies. The consolidation requires funding for the project that may be considered outside of the ongoing operational financial model. This onetime cost, if borne directly by the agencies, may pose an insurmountable financial hurdle to the long-term benefit provided by the consolidation. As such, specific funding for the consolidation project should be obtained.

Some accommodation may be required to offset the sunk cost of items such as circuits, software licenses, or hardware that have been purchased by the agencies and are now either no longer needed or subsumed into the consolidated infrastructure. Until an inventory of the agency-owned assets that participate in the network is complete, it is difficult to recommend in detail an approach for dealing with these assets.

Consolidation Options

The actual consolidation of the networks is necessary to continue to improve planning and management, security, and cost-effectiveness. The options regarding consolidation exist largely in terms of the cost mechanism, timing, and the demarcation point where the agencies assume management responsibilities, which needs to be the same point at each agency.

The cost mechanism will ideally be in place for the 2015-2017 biennium budget. This requires the decision regarding the alternative and the resulting pricing to be complete by late spring 2014. This work will be part of the Consolidation Planning Roadmap recommended as the next step.

The logical demarcation point is the router at the physical premise. CTS then plans, engineers, and manages anything on the network until it arrives at or leaves the premise. This maintains the agency focus on their internal business needs and the CTS focus on the delivery of the telecommunications utility.

Operating Funding

Allocation

One of the most straight-forward approaches to funding a centralized service is to allocate the costs across the users of the service. In the allocation approach, each entity pays a proportional share of the ongoing cost for operations and new services. The share can be defined in a number of ways; a cost per FTE is the most common approach across organizations. This approach is fairly simple and straightforward and provides a typically lower tracking and billing complexity and cost than other approached. The biggest downside to this approach is that organizations, in this case agencies, that

have smaller demand for the service per FTE pay the same allocated cost per FTE as those agencies with high demand.

Metered

A metered approach to recovering the ongoing cost of a centralized service is through a metered approach. In this approach, tools are implemented to measure the use of the service by individual users, departments, or agencies and the actual costs are billed back to the agency. This approach likely bills for the costs in a more equitable manner, but carries the overhead of the metering and billing that is more detailed, and therefor likely more costly, than an allocation approach. CTS currently does not have the tools to collect the usage data required to define metered billing nor integration with state financial systems.

Tiered

A third approach to recovering the cost is a hybrid approach that makes use of allocation and tiered pricing. This approach differentiates between the heavy users of a service and the more casual users. It is best implemented in situations where there is a large disparity between the amounts of service consumed per user between organizations. To leverage the best features of both the pure allocation approach and the detailed metered approach, the tiered pricing approach is best kept to a small number of tiers. For telecommunications services, there may be three pricing "tiers" for instance. Examples might be:

- Heavy data users
- Light data users
- Remote data users

Modeling will need to be performed to determine if there is, in fact, a somewhat clear line of differentiation between the heavy and light users that could be determined. The charges might be provided to the agencies on an FTE basis for heavy and light data users and on a per office basis for remote users.

Federal Cost Recovery Considerations

The federal government has rules for what are considered allowable costs to be charged to federal programs. Shared service rates need to have a reasonable nexus to the benefit received by the federal program. Also, the federal government will pay for the usage of capital assets but will not participate in the cost of building an asset. Thus, it is preferable if rates include only the depreciation related to a capital asset and not the initial cost of the asset.

Ongoing Performance Analysis

Since Service Level Agreements are key to the successful implementation and ongoing management of the consolidated network, performance analysis against the Service Level Agreements is critical. Much of the performance analysis that is required to substantiate the Service Level Agreement attainment is performed as an integral part of the day-to-day network monitoring and management that is required for a reliable network. Therefore, what is additionally required is the formal review of performance to the agreements on a scheduled periodic basis. This formality of reporting also supports the needed conversations regarding future project and hiring plans of each agency and the associated infrastructure improvements that might be necessary based on those plans. In addition, these reviews are the obvious conversations with individual agencies for CTS to share their planning and scheduling for maintenance or improvements to the network and validate any potential impacts to the agencies.

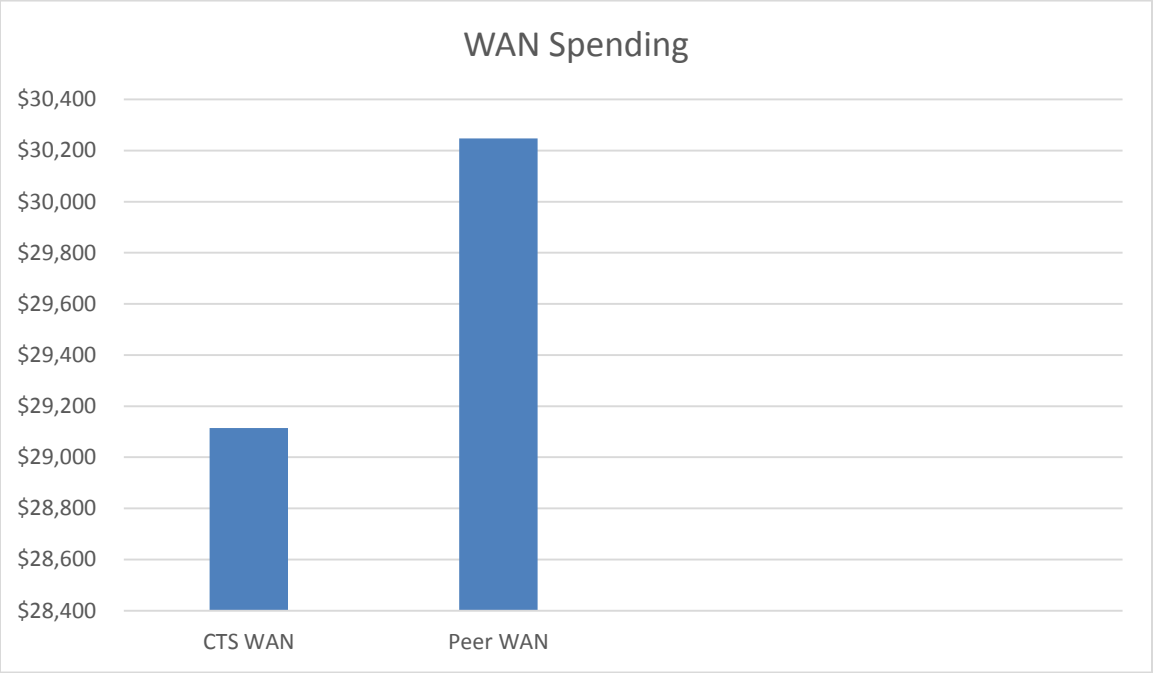
Staff Impact

Today many agencies have at least a partial FTE responsible for their components of the state networks. Every agency has fewer staff than they believe are needed to fulfill their mandated responsibilities. Transferring the planning, engineering, procurement, and management of the agency-managed WAN to CTS frees up some number of hours within the agency that the person currently providing agency WAN support can use for other, more agency focused activities.

There is likely a need for at least some increase to the staff at CTS that currently plans and manages the network to absorb the completed consolidation. By standardizing the network and implementing the increased use of automation, tools, and training, any staff increase is expected to be held to a minimum. A better view as to required tools and staffing will be provided once planning is complete.

Feasibility and Cost/Benefit

According the Agency Total Cost of IT Ownership Assessment completed by Gartner Consulting for OFM, CTS WAN costs are currently lower than the peer group:



It is feasible, and in fact advantageous, that the state WAN be consolidated from end-to-end. While there is a substantial work effort required to complete the consolidation, both technically and contractually, the benefits outweigh the effort.

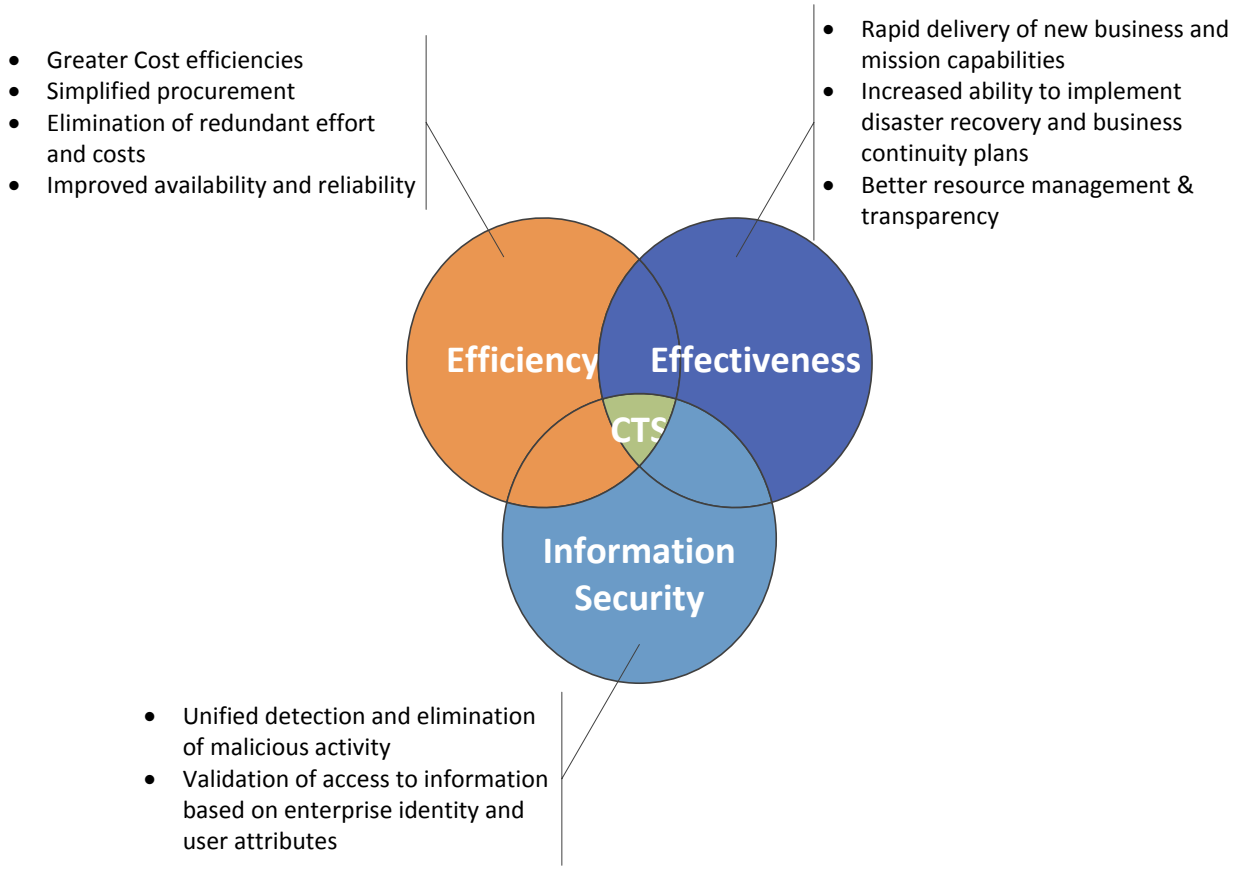
The detailed information required to provide a solid cost/benefit analysis will take some weeks to obtain and analyze, although there are a number of inherent benefits to completing the consolidation that clearly provide benefit:

- Improve the cost-effectiveness of the network assets by leveraging them across the agencies
- Provide additional pricing and terms and conditions leverage for vendor contracts by consolidating multi-agency volume in single procurements for like equipment and services
- Reduce the time, and therefore cost, to determine and correct network outages by simplifying the network architecture and reducing the number of involved parties and vendors
- Improve network management cost-effectiveness by leveraging automated tools and processes end-to-end

The cost to complete the consolidation lies primarily in the work effort of the consolidation, some of which should be accomplished regardless of whether the project proceeds. The inventories of the WAN equipment, circuits, and contracts in a standard format will help with managing the existing network and contracts whether or not the project to consolidate takes place. The information today is in numerous agencies with multiple vendors and a variety of contractual forms. Visibility to this information is imperative for business continuity planning and disaster recovery efforts.

As part of the planning effort, inventories of equipment, agreements, and contracts will more accurately document the current cost of the WANs. The inventory will provide the baseline against which an actual cost/benefit analysis can be performed.

The benefits of the consolidated state WAN are summarized below:



Migration Alternatives and Timeline

There are a variety of valid approaches that CTS can use to determine the schedule to migrate from the current WAN model to the proposed model. Each of these alternatives provides a different timeline and risks although the resource requirements for each is similar. The primary alternatives are:

- Migrate WAN services based on expiration of key contracts
- Migrate WAN services as part of substantial projects within an agency
- Migrate WAN services based on duplicative services

These approaches are all based on creating a manageable schedule that stages work and provides a completed migration in a time frame that is acceptable for completion.

Migrate Based on Contract Expiration

One potentially low impact scheduling approach to migrating to the centralized network model is to migrate agency WAN network services and equipment as their primary contracts expire. With this approach, some smaller contracts may need to be terminated early, but major contracts may be intact through their expiration.

In order to implement this approach, a key first step is to inventory the contracts that support the agency's WAN network and equipment and perform an analysis of expiration dates as well as any terms and conditions that may be relevant to the migration, particularly those of smaller supporting contracts. A timeline needs to be created from this analysis that will determine the overall feasibility of the approach. Contracts that may run many years need to be examined for early termination penalties and clauses if the results show the migration taking more time than is considered acceptable.

Migrate Based on Major Projects

Another potentially low impact scheduling approach to the migration is to migrate WAN services as major projects or upgrades are undertaken. With new projects frequently comes new bandwidth requirements and often include underlying technology changes and additional security layers, making this potentially an ideal time to migrate an agency's portion of the WAN. This approach may, however, place additional risk on large technology programs that frequently have challenges without such a dependency.

As with a migration plan based on contract expiration, a key first step in determining the viability of a migration plan based on major projects is to inventory the planned major project efforts and to create a timeline based on those projects. In addition, contracts need to be examined to determine early termination costs, terms, and conditions to determine the overall feasibility of the approach.

Migrate Based on Duplicative Services

There are a number of agencies that share physical locations across the state of Washington. It is likely that these shared facilities each have network facilities that are owned and managed by the individual

agencies creating what is essentially duplicate services. Any duplicate services should be considered a high priority for migration, thus eliminating the duplicate expense.

The detailed planning to determine the most effective approach to consolidation will likely indicate a mix of all three migration options.

Recommendations

CTS will be the end-to-end state WAN provider. The overall recommendation is to complete the consolidation of the state WAN though the router at each agency physical location.

Consolidation Approach

The suggested approach is to create the state WAN consolidation plan based on the expiration of major contracts. Removing duplicate services and supporting major projects that require substantial bandwidth increases or WAN technology upgrades or changes should be laid into the plan as needed. The practical goal is to have all of the WANs consolidated within a three-year time frame. As a first step towards this goal, the inventory must be completed and laid out in the timeline to determine whether this approach supports the desired timeframe for migration.

Funding

To meet the goal of better and longer-term financial planning for both the participating agencies and CTS, the recommendation is to implement an approach that makes use of allocation. This approach differentiates between the heavy users of a service and the more casual users to more fairly represent the uses of the assets where there is a large disparity between the amounts of service consumed per user between organizations. To leverage the best features of both the pure allocation approach and the detailed metered approach, the tiered pricing approach is best kept to a small number of tiers.

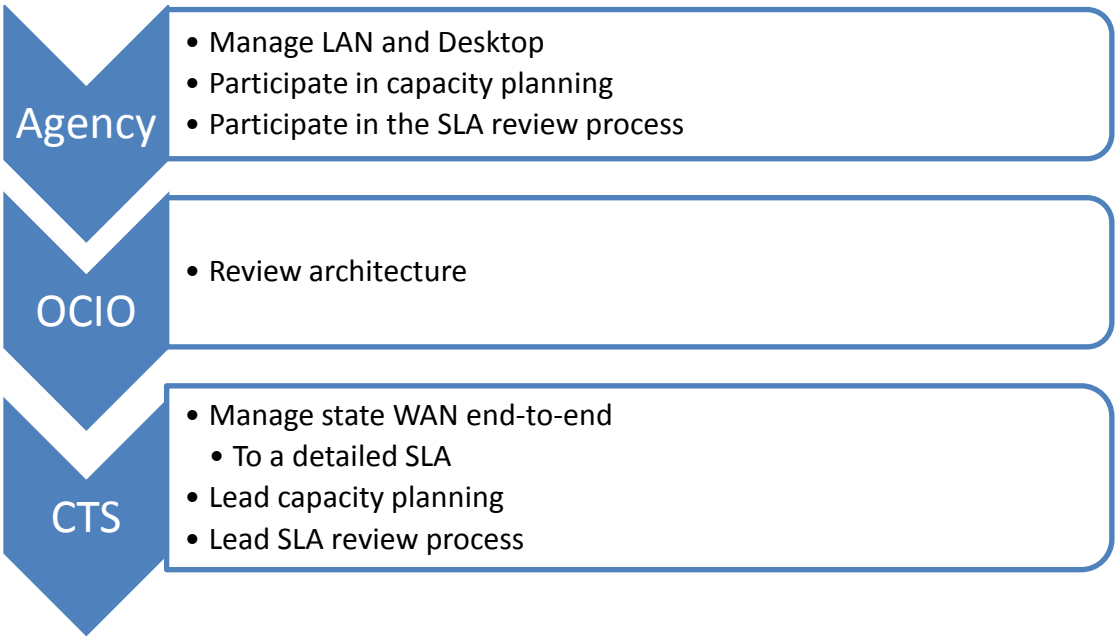
Organizational Roles

Each organization needs to participate according to their defined current responsibilities and mission:

- **Office of the Chief Information Officer (OCIO):** Responsible for establishing and enforcing the technology strategy for the state and providing the policy, standards, and decision framework for implementing this strategy
- **The Consolidated Technology Services Agency (CTS):** Provides technology infrastructure and network services to state agencies, local and tribal governments, and non-profits. Defines the technology infrastructure and network service standards and works through the Customer Advisory Council for agreement.

- **The Department of Enterprise Services (DES):** Responsible for developing and operating enterprise applications and master contracts and grants master contract authority to CTS for technology infrastructure and network services
- **Technology Services Board (TSB):** Provide a forum for discussing the state's technology vision and planning; reviewing and approving policies and standards adopted by the OCIO; and to provide strategic oversight of the state's major technology projects
- **Agency CIOs and IT teams:** Many agencies have their own IT teams and IT leaders who are responsible for defining and implementing information technology to support the business needs of their individual agency

At a high-level, the recommended roles for the primary organizations are noted below:



Next Steps

Create Consolidation Planning Roadmap

The first step to consolidating the remaining WAN facilities into CTS is to create the roadmap that lays out the plan in detail. There are a variety of activities that are required before a detailed timeline, resource requirements, and budget can be reliably created. These activities include:

Project Planning Activity	Detail	Responsible	Deliverable
Inventories	• Physical Assets • Software Assets • Contracts	• CTS • Agency Staff	• Complete WAN Inventory • Contract Dates and Terms and Conditions
Demand and Financial Management	• Document the CTS WAN service delivery methods and capabilities • Define business related, transparent WAN services catalog • Define business-oriented Service Level Agreements • Document an accurate Financial cost baseline with defined elements • Analyze and document proposed cost structure	• CTS • OFM • Customer Advisory Council	• Updated Service Catalog • Service Level Agreements • Cost Documentation
Simplified Network Architecture	• Document a standardized WAN architecture across the agencies and CTS • Design the core backbone between the multiple agency physical locations and the State Data Center	• CTS • Customer Advisory Council	• Proposed WAN architecture
Mobility and Access Planning	• Define enhanced mobility and access options • Determine standardized citizen, employee, and partner access • Define integrated security functions across services	• CTS • Customer Advisory Council	• Detailed WAN architecture
Efficiency of Services	• Design automated service processes • Review competitive network sourcing approach • Design Consolidated WAN	• CTS • Customer Advisory Council	• Service Process Design

Project Planning Activity	Detail	Responsible	Deliverable
	Management		
Unified Communications	• Define expanded service capabilities ○ Transition older digital voice to VoIP ○ Session Initiation Protocol (SIP) ○ Video	• CTS • Customer Advisory Council	• Updated architecture
Project Activity	• Detail	• Responsible	• Deliverable
Project Initiation	• Create Project Charter ○ Vision and Objectives ○ Description and Scope ○ Project Governance and Communications ○ Assumptions • Determine Staffing Requirements and Options • Determine Funding Requirements • Create detailed Project Plan ○ Timeline ○ Resources ○ Budget ○ Dependencies	• CTS • Customer Advisory Council • OCIO review	• Project Charter • Consolidation Project Plan

Perform Consolidation

Once the detailed Project Plan is complete, the work of implementing the design can begin. The goal is to complete the consolidation within a three-year window to begin capturing the efficiencies as quickly as possible while causing the least disruption possible. This goal may likely require a temporary increase in staff to focus on completing the Consolidation Project while current staff focuses on day-to-day operations.

This project supports:

- Standardized WAN technologies
- Centralized procurement
- Integrated end-to-end WAN management and monitoring
- Consolidated network services
- Improved network security

Cost effectiveness and management objectives for WAN service delivery are delivered through a centralized approach while the sizing, planning, provisioning, and management of WAN technologies

and services are provided through continued close collaboration with the agencies. CTS will negotiate infrastructure and network contracts, deliver network services, and centrally manage the state WAN. This approach extends these services through the physical location router and serves to achieve standardization in procuring and managing WAN links to agency facilities. CTS, through its Customer Advisory Council, will continue to collaborate with agency representatives to govern the infrastructure and state WAN to achieve their agency goals.