



# NETWORK DESIGN TEAM (325)

REGIONAL – 2015

**Judges/Graders: Please double check and verify  
all scores and answer keys!**

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## **Description**

Analyze existing and planned business environments and develop a strategy for the implementation of a network infrastructure that addresses the business needs of the scenario provided. At state and national level, teams will be presented with an additional element to the scenario that requires revision of their final presentation.

## **Topic**

A new government contract has been awarded to Reynolds, Washburn, Cobb & Tam Systems, LLC. RWC&T is a highly rated systems engineering procurement firm catering to state and federal governments. The majority of its customers are local and state agencies who are upgrading or increasing aging infrastructure. Due to the nature of the work that RWC&T performs, there are many challenges that the private sector is not as concerned with. Such items include reliance on state and federal funding, public transparency, security threats from outside sources and auditing for internal compliance. The awarded contract is for a state agency who is facing various technology challenges regarding aging systems, aging network infrastructure, and a large unmanaged fiber ring around the state that handles connectivity to various agencies.

RWC&T is seeking proposals from qualified firms for the following project. This contract is concerning the state's traffic management systems and operations. This contract's immediate need is to replace the 26 aging servers, upgrade core network technologies, replace all workstations, and build out a local Wi-Fi network in the operations center that will allow private Active Directory access for employees and guest internet access for guests to the center. Due to the antiquated nature of the existing infrastructure, the agency would like the contractor to present an entirely new design that would fit their needs.

The agency's physical infrastructure consists of three state offices: the primary Highway Operations Center, a Secondary Operations Center, and a Fiber-ring Switching Facility.

## **Main Highway Operations Center**

The agency's primary operations center consists of a main operations center which includes 50 users, each user has 3 workstations with a minimum of 2 monitors connected to each one. These workstations are generally running internally developed specialized software applications that cover functions such as traffic operations management, road sensory data monitoring, highway signage control, public information dissemination, and Computer-Assisted Dispatch of DOT and emergency services. These operators also need the ability to view up to 30 multi-cast video streams at any given time on their workstations.



This facility houses 10 highly technical engineers which require high-bandwidth access to all servers and centers. These engineers are primarily responsible for the maintenance of all specialized operations systems. The engineering team will also need their workstations replaced with workstation “grade” machines since they are often dealing with large CAD drawings and multiple monitors. This engineering staff is highly overloaded and that is why they have enlisted RWC&T to help procure a sub-contractor to assist with the upgrade of the environment.

This facility also has the main datacenter for all operations. This includes all servers, core networking equipment, external connectivity to the Internet and a main fiber trunk to the Fiber-ring Switching facility. All systems in this center must be available 24/7 365-days; little to no downtime is acceptable in this environment.

All connectivity at this site is currently 100 Mbs with switch uplinks at 1 Gbs with a T1 for all Internet connectivity.

### **Secondary/Backup Highway Operations Center**

The secondary operations center is similar to the Main in the sense that it has 20 full-time operations staff that have the same workstation requirements as the operators at the main operations center. However, these workstations connect to all servers at the main operations center. Connectivity to this center is via a SONET OC-48 fiber-ring. Users at this site are complaining that access to main systems at the Main operations center is slow.

### **Main Fiber-Ring Switching Facility**

The state maintains a large multi-strand private fiber-optic cable infrastructure around the state. This is primarily used to backhaul all Real Time Traffic information from in-road sensors and live camera feeds from 350 cameras on the roads around the state. This network consists of over 1000 miles of 100-strand Corning fiber installed, owned, and managed by the state. This facility is connected back to the Main Operations Center via a 1 Gbs dedicated fiber.

**Existing network subnets are not provided, as you are tasked with creating a complete network redesign proposal.**

### **What the customer wants:**

Reynolds, Washburn, Cobb & Tam, LLC is seeking a contractor who can provide services to the State agencies which include the upgrade to core systems and many ancillary systems. This would include servers, WAN links, Network, etc.



**Immediate needs:**

1. Prepare a network redesign proposal to adequately address state's immediate needs including security.
2. Review all network equipment. Recommend upgrades where needed.
3. Review all WAN connections for proper performance, bandwidth and security, taking into account the growing client base and holdings of the firm (and the explosive growth in datasets that implies.)
4. Provide an off-site hosting solution for still images captured from all 350 camera and connectivity for this hosting.
5. Address network latency. Users in the operations center complain that access during peak times is very slow. This would include access to cameras, email, and the main operations application.
6. Address the possibility of utility or hardware failure.
7. Replace 26 aging servers with new virtualized environment.

**Judges Notes:**

1. Connections should be appropriate for "heavy" custom application use.
2. Address proper workstation sizing
3. Multiple subnets for the amount of computers. Never allow a subnet larger than a /24 due to creating large broadcast domains.
4. Sub-netting by location is a plus.
5. Should address power backup (UPS and Generator due to 24/7 requirement).
6. Address server redundancy.

**JUDGING PROCEDURE**

- Teams will be introduced by team number.
- As a team of judges, formulate two to three questions to ask at the conclusion of the presentation. Be sure to ask the same questions of each team.
- No more than five (5) minutes for setup.
- No more than ten (10) minutes for the presentation.
- No more than five (10) minutes for judges' questions.
- Excuse teams upon completion of judges' questions.
- **There can be no ties in the top ten (10) teams.** It is the responsibility of the judges to break any ties.
- Administrator will fill out ranking sheet prior to dismissing the judges.
- If more than one (1) section is necessary, finalists will be determined by selecting an equal number from each section.
- Give administrator all Judges' Rating Sheets, Judge Evaluation Sheets and contest materials.
- No audience is allowed in the contest room.

**Please double-check and verify all scores!**