



OFFICE OF CIO & DIRECTOR  
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TO: Phyllis Head, Procurement Manager – Purchasing & Contracting  
FROM: Angela Green, IT Business Officer – Innovation & Technology *AG*  
THROUGH: John A. Matelski, CIO & Director – Innovation & Technology *JAM*  
THROUGH: Barry Puckett, Deputy Director – Innovation & Technology *BP*  
RE: Change Order to Layer 3 Contract 15-902994  
DATE: September 14, 2018

The Department of Innovation & Technology is requesting Purchasing & Contracting's Assistance processing a change order to our current Layer 3 contract 15-902994 to add the following three projects:

1. Firewall Upgrade and Re-architecture: Including geographically relocating network elements, modifying the load balancing of the Internet circuits and some routing modifications. Total cost \$281,623.00
2. Redundant WLAN Controller, AirWave Management and upgrade to 8.X Project: Central control for redundant controllers, and better security reporting and setting to help keep the county safe from wireless attacks. Total cost \$128,178.10.
3. Core Upgrade Project: This consists of upgrading the existing Juniper 9208 enterprise core routers to EX series and QFX routers. This upgrade is required to take advantage of additional utilization and management capacity that is not available with the current obsolete equipment. Because of the successful implementation of the lit fiber project, Layer 3 Communications recommended not renewing the costly support on the existing 9208 and use those funds to implement new core routing elements that better fit the current needs of the County. Additionally, the annual support cost for these new network elements will cost less than the support on the 9208's. Because of this equipment upgrade the ongoing maintenance expenses will be reduced significantly as a result of replacing obsolete equipment. Total cost for the new equipment and services is \$138,484.00.

The total cost of all three projects is \$548,285.10 and will be funded by IT General Fund 100, Operating, Maintenance and Repair 542201.

Please feel free to contact Angela Green at 404-371-2374 with any questions or concerns you may have.

Attachments: Layer 3 Quotes  
Layer 3 Statements of Work



Redundant Controller, Airwave and 8.X Code Upgrade Proposal

Prepared for:

DeKalb County Government

Proposal RG-180829-03

Submitted By:

Ryan Greene

Layer 3 Communications

1450 Oakbrook Drive, Suite 900

Atlanta, GA 30093

August 29, 2018



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## • Executive Summary

Layer 3 Communications is a network design and consulting firm specializing in local and wide area networking. Our areas of expertise include network design, infrastructure upgrades, relocation services, and large project implementation. DeKalb County Government has requested Layer 3 Communications to provide a proposal to perform various upgrades to their Aruba / HPE wireless infrastructure to include: 8.X code Upgrade, Redundant wireless controller, and AirWave.

Aruba Wireless OS 8 is the next generation software architecture for Aruba Wireless. It includes innovative features such as controller clustering, AP and client load balancing, and in-service upgrades. The ArubaOS 8 configuration has a hierarchical structure that allows for greater scale and additional functionality. Additionally, ArubaOS 8 will provide the County with support for the Aruba's next generation of access points.

The ArubaOS 8 upgrade will include new virtual Master controllers. As part of the ArubaOS migration, we will rewrite the existing wireless configuration to clean up old entries and optimize it for the ArubaOS 8 hierarchical structure and clustering. Sites will be switched to the ArubaOS 8 system in a phased approach. As part of this proposal, we are including a redundant Aruba 7220 WLAN controller that will be used during the ArubaOS 8 migration and will be installed at a separate location from the existing controller for data center redundancy. This controller will handle the client traffic during the migration for sites switched to the ArubaOS 8 system.

Once the ArubaOS 8 migration is completed, the existing Aruba 7240 WLAN controller will be clustered with the new Aruba 7220 WLAN controller, and both will participate in AP and client load balancing and will provide failover and in-service upgrade capabilities for each other.

As part of this project, we will also implement Aruba's AirWave Management System. The system will provide the County with a central location to monitor and report on the wireless system, allowing for a historical record of access point and client connectivity and location.

Briefly, the services DeKalb County Government requests fall into the following categories:

- Network Planning and Design / Architecture
- Wireless Controller Implementation
  - Staging and Configuration
  - Pre-implementation Planning
  - Integration, Installation and 8.X Migration
  - Testing and Verification
- Airwave Management Implementation
- Customer Responsibilities
- Assumptions

A detailed explanation of these services is included in the "scope of work" section within this proposal. We are prepared to begin immediately upon written authorization to proceed.

Thank you for your continued interest in Layer 3 Communications and the products and services that we provide. We are pleased to have the opportunity to present this proposal for your review.

## • Scope of Work

DeKalb County Government has asked Layer 3 Communications to provide a proposal for network planning and design, equipment procurement and staging, installation, configuration, integration of said equipment, and network support to design and upgrade the County's existing Aruba Networks wireless infrastructure.

**This proposal contains Layer 3 Communications proprietary and confidential information. It is not to be released or disclosed, in whole or in part, other than to those individuals who are directly involved in evaluating this proposal, without the prior express written consent of Layer 3 Communications.**

## • Design / Architecture

Layer 3 Communications will meet and work with DeKalb County Government to determine the best network design and approach to meet the County's goals for their wireless system. Layer 3 Communications will:

- Work with the County to develop a clustered wireless controller design across data centers to provide:
  - Increased resiliency of the wireless network equipment, including (but not limited to) AP and client load balancing, in-service upgrade capability, and seamless controller failover.

*Deliverables:*

- *Network diagram showing new wireless network design and components*

## • Wireless Controllers Implementation / 8.X Migration

### 1.1 Network Staging and Configuration

Layer 3 Communications will receive the new equipment in our staging facility in Norcross, Georgia. We will pre-configure and test the electronics contained within this proposal in our lab. We will:

- Physically configure equipment, add rack mount ears, and interface modules
- Stage and configure the hardware in designated rack space at our staging facility
- Burn-in the new controller for a minimum of 48 hours

- Label the devices
- Test the selected network equipment to ensure it meets the design requirements.
- Manage the return process (RMA) for any product that is faulty or “dead on arrival (DOA)”
- Upgrade the code on the data electronics
- Validate and install software licensing where necessary
- Perform configuration based on the design criteria in working with DeKalb County Government staff

*Deliverables:*

- *Physically configured equipment*
- *Labeled equipment*
- *Upgraded code on the electronics*
- *Registered serial numbers*
- *Validation of software licensing*
- *Pre-configured electronics based on the design*

## **1.2 Pre- Implementation Planning**

Prior to the installation, Layer 3 Communications will work with the DeKalb County Government’s IT team to:

- Develop an implementation plan outlining the necessary steps for the implementation of the new wireless equipment on a per location basis.
- Develop a test plan that Layer 3 Communications and the DeKalb County Government staff will conduct once the installation is completed to validate the state of the network and applications in addition to testing redundancy.

*Deliverables:*

- *Cutover Plan derived by both Layer 3 Communications and DeKalb County Government*

## **1.3 Integration, Installation and 8.X Upgrade**

During integraton and installation phase, we will:

- Install and configure new ArubaOS 8 virtual master infrastructure, including the new wireless system configuration for the County.
- Install the new wireless controller in rack space allocated by DeKalb County Government.
- Modify Juniper switch routing configurations at both data centers as required for new cluster architecture.
- Add the new equipment as a trusted client to the ClearPass RADIUS servers.

- Integrate the new equipment into the facility per the network design, including patching fiber and configuring on-site network switches to connect to the new equipment.

Once the ArubaOS 8 system is operational, we will:

- Migrate locations on a phased approach
- Upgrade the existing Aruba 7240 WLAN controller to ArubaOS 8
- Configure the Aruba 7240 WLAN controller to make it operational in the ArubaOS 8 cluster
- Modify Juniper switch routing configurations as required for the existing controller to work in the cluster.

*Deliverables:*

- *Installed network equipment at the facility per the network design.*
- *ArubaOS 8 wireless cluster at two data centers*

#### **1.4 Testing and Verification**

Upon completion of the Integration and Installation phase we will:

- Test the newly implemented network equipment to ensure it meets the design requirements based on our test plan.
- As locations migrate to the ArubaOS 8 system, we will ensure wireless clients are connected at each site and working as designed by verifying that they are obtaining IP addresses, and that we can ping a sample of the clients (if they respond to pings).

*Deliverables:*

- *Report of findings*
- *As built design documentation*

#### **1.5 Post Implementation Support**

Upon successful implementation of the proposed network solution we will provide remote engineering support to assist DeKalb County Government. In addition, if needed, Layer 3 Communications will be available to troubleshoot network related issues resulting in the implementation of this project.

### **• AirWave Implementation**



Airwave will provide DeKalb County Government with historical information about the Aruba wireless system, in addition to providing reporting and alerting as to the state of the wireless network. We will:

- Install Airwave appliance on-site at DeKalb County Government
- Configure Airwave to monitor and report on the Aruba wireless infrastructure using Aruba's best practices
- Install floorplans with AP locations (if the County can provide them) in the Airwave platform. This will allow for quicker AP location tracking, and client location statistics along with RF signal/noise mapping.
- Assist in configuring reports desired by DeKalb County Government
- Assist in setting up alerts desired by DeKalb County Government

*Deliverable:*

- *Working Airwave server monitoring, reporting, and alerting on Aruba wireless infrastructure*

## • Assumptions

Layer 3 Communications has made the following assumptions for this project:

- The new hardware and virtual master controllers will be installed during normal business hours
- The site migrations will occur afterhours and or over a weekend.
- VLANs will be extended across the two data centers to allow for clustering
- The County will provide existing AP floorplans to be implemented into AirWave. In some instances, the County implemented AP's in some facilities. In these instances, Layer 3 Communications will not have AP floorplans. Under a separate scope of work, using T&M, Layer 3 Communications can develop floorplans, where needed.

## • Customer Responsibilities

In order for Layer 3 Communications to effectively implement this solution, we will require the assistance of the customer. The customer is responsible for providing:

- Name, phone number and email address of the DeKalb County Government's project manager assigned to this project.
- An escort to provide access to controlled areas.
- Any passwords required
- Any community or naming conventions
- The County will provide appropriate virtual server resources that meet Aruba's Virtual Master requirements.
- The County will provide a virtual server infrastructure resource to work with us in installing the Virtual Master servers into the virtual server infrastructure.

- An escort to provide access to controlled areas.
- DeKalb County Government will ensure adequate spacing for new equipment installation prior to the installation date. If items need to be relocated DeKalb County Government will be responsible for such relocation.
- DeKalb County Government will provide all fiber and copper patch cords for the installation.
- DeKalb County Government will be responsible for providing adequate power outlets (as well as overall power capacity) for the new equipment.
- Insure appropriate level of coordination between wiring contractor and Layer 3 Communications (if needed)
- Labeling scheme (Labels usually reflect software name and some restrictions are inherited by software and or label / font size) and esthetics



Internet Edge Network Re-Architecture, Upgrade and Implementation  
Proposal

Prepared for:

DeKalb County Government

**Submitted By:**  
**Ryan Greene**  
**Layer 3 Communications**  
**1450 Oakbrook Drive, Suite 900**  
**Atlanta, GA 30093**

**August 29, 2018**



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## • Executive Summary

DeKalb County Government (DCG) is endeavoring to improve the County's internet connectivity and redundancy by adding additional internet service providers, increasing bandwidth, and adding internet access to the West Exchange facility. To facilitate this effort, DeKalb County Government will need to upgrade and re-architect its internet edge presence to take advantage of the additional internet connectivity and redundancy. This proposal includes internet edge network re-architecture design services, implementation services, and post-implementation support.

Layer 3 Communications is a network systems integrator and professional services organization that specializes in the design, configuration, implementation, security and support of wired and wireless networks for data, voice and video applications. Layer 3 Communications national headquarters is located in Norcross Georgia.

Briefly, this scope of work includes:

- Internet Edge Network Re-Architecture Design and Migration Plan
- Pre-Configuration, Staging and Implementation
- Post Implementation Support
- Assumptions
- Customer Responsibilities

Detail of the scope of work for this project can be found in the "Scope of Work" section of this document.

Thank you for your interest in Layer 3 Communications and the products and services that we provide.

## • Scope of Work

### 1.1 Internet Edge Network Re-Architecture Design and Migration Plan

DeKalb County Government (DCG) is upgrading the County's internet access and improving internet redundancy across multiple internet service providers, as well as physical DeKalb locations. To accomplish this effort and maintain as much system uptime as possible during the migration, Layer 3 Communications will work with DeKalb County staff to create an internet edge network design and migration plan.

DeKalb County Government internet edge currently consists of internet access from both Sprint and ATT, and both of these internet circuits physically reside at the Courthouse. DeKalb County Government is changing one internet provider and adding net new internet circuits from each provider to a secondary core site, West Exchange. DeKalb County Government's internet edge requirements include providing redundant internet access not only across the two internet providers, but also across the two core facilities, such that in the event internal and / or external network access to the Courthouse was lost, the County could continue to operate and provide network services via the West Exchange facility.

The new edge network design may require additional hardware or software to meet the needs and requirements of the County. Layer 3 Communications will provide pricing information in a separate quotation for any additional hardware or software that may be required.

Layer 3 Communications will:

- Review the existing internet edge network connectivity architecture
- Meet with DeKalb County IT Staff to fully understand needs and requirements for the new internet edge connectivity architecture and design
- Develop and review new network edge architecture and design with DeKalb County IT Staff
- Provide quotations for any necessary additional network hardware or software, if needed.
- Develop migration plan from current internet edge network to new design, while maintaining as much network uptime as possible for the County

*Deliverables:*

- *Documentation of new internet edge network architecture and design detailing physical and logical network configurations*
- *Quotations for any additional hardware or software, if required*
- *Migration plan for moving from existing internet edge network architecture and design to new architecture and design while maximizing network uptime for the County*

### 1.2 Lab Testing and Implementation

Layer 3 Communications will simulate the planned topology, per the new design, in a lab environment (at Layer 3 Communications) to confirm necessary changes to existing production environment.

Following the lab testing steps, Layer 3 Communications will lead one controlled maintenance activity to implement the changes necessary to implement the new internet edge network.

Layer 3 Communications will:

- Test network design in a lab environment to confirm network design, using Layer 3 Communications lab equipment.
- Apply software updates, patches, and licenses to any existing network elements, as needed.
- Implement necessary configuration changes to existing network elements at both Courthouse and West Exchange – (Core 9200's, F5 Load Balancers, Palo Alto 5020's, DMZ EX4300's)
- Move necessary existing network elements from Courthouse to West Exchange – (F5 Load Balancer, Palo Alto 5020, DMZ EX4300)
- Rack, power on, and connect network equipment ready for installation to Courthouse and West Exchange sites
- Implement necessary hardware, software, and configuration changes to any existing network elements to facilitate new internet edge design at both core facilities
- Work with DCG IT staff to isolate and remediate any connectivity issues during the maintenance activity

\*Note: Since we will not be implementing new Palo Alto 5250's during this project, we will need a larger maintenance window to allow time for the reconfiguration and move.

*Deliverables:*

- *Relocated, Implemented and Re-Configured network equipment per new architecture*
- *Implemented new internet edge design*

### **1.3 Post Implementation Support**

Layer 3 Communications will provide post implementation remote support for one day following the successful completion of the activity. During this time, any unforeseen issues will be identified and resolved. Furthermore, support will be provided according to the terms of Layer 3 Communications' network support agreement with DeKalb County Government.

### **1.4 Assumptions**

Layer 3 Communications has made the following assumptions:

- Layer 3 Communications will test network functionality for availability and connectivity following the implementation.
- DCG staff will perform end user and application-level testing.
- Migration will occur in a single maintenance window, to occur after normal business hours or over a weekend

- Rack space is available for the network elements being relocated to West Exchange
- Power is available for the network elements being relocated to West Exchange
- Cabling and any additional optics will be provided by DeKalb County Government – (If needed, Layer 3 Communications can provide a quote for these additional items).

### ***1.5 Customer Responsibilities***

In order for Layer 3 Communications to successfully implement this project, we will require the assistance of DCG staff. DCG staff will be responsible for providing:

- An escort to provide access to controlled areas.
- Any passwords required
- Any community or naming conventions
- Detail of the existing network
- Provide access into maintenance accounts for software and documentation
- Remote access account into DCG during the length of the project





Core Network Upgrade and Implementation Proposal

Prepared for:

DeKalb County Government

Submitted By:

Ryan Greene

Layer 3 Communications

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Atlanta, GA 30093

August 29, 2018



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## • Executive Summary

DeKalb County Government (DCG) is planning to upgrade the core network elements located at Courthouse, West Exchange, and the Sheriff's Office to take advantage of new networking technology, reduce costs, and align equipment to the needs of the new WAN architecture. These three sites compose the core networking locations for the entire DCG network and host many critical IT services such as internet presence and data center connectivity. Historically, these locations were also hub sites for private dark fiber WAN connectivity to all DCG locations. DCG has changed their WAN network architecture to leverage ISP-provided WAN circuits, and no longer relies on private dark fiber assets. In addition to the new WAN architecture, the core network devices at these three facilities are greater than five years old and are due for upgrade per the DCG equipment lifecycle management process.

Layer 3 Communications is a network systems integrator and professional services organization that specializes in the design, configuration, implementation, security and support of wired and wireless networks for data, voice and video applications. Layer 3 Communications national headquarters is located in Norcross Georgia.

Briefly, this scope of work includes:

- Core Network Architecture and Design
- Pre-Configuration, Staging and Implementation
- Testing and Verification
- Post Implementation Support
- Assumptions
- Customer Responsibilities

Detail of the scope of work for this project can be found in the "Scope of Work" section of this document.

Thank you for your interest in Layer 3 Communications and the products and services that we provide.

## • Scope of Work

### 1.1 Core Network Architecture and Design

DeKalb County Government (DCG) is planning to upgrade the core network elements located at Courthouse, West Exchange, and the Sheriff's Office to take advantage of new networking technology, reduce costs, and align equipment to the needs of the new WAN architecture. These three sites compose the core networking locations for the entire DCG network and host many critical IT services such as internet presence and data center connectivity. Historically, these locations were also hub sites for private dark fiber WAN connectivity to all DCG locations. DCG has changed their WAN network architecture to leverage ISP-provided WAN circuits, and no longer relies on private dark fiber assets. In addition to the new WAN architecture, the core network devices at these three facilities are greater than five years old and are due for upgrade per the DCG equipment lifecycle management process.

While most WAN connectivity services have been offloaded to ISP-provided circuits, these three core locations still provide key connectivity to critical network services, users, and devices. As a result, these three core sites still require a highly available, scalable, and flexible network design. Layer 3 Communications will work closely with DCG IT staff to understand current and future network requirements, to insure the new network design accommodates all goals and initiatives of the County

The new network design will leverage these products to meet both the current and future networking needs of the County and provide for new capabilities previously unavailable to the county, such as redundant internet edge and data center interconnect. The new core network will consist of Juniper Networks QFX5110 and EX4600 network devices. These devices will provide key network services and connectivity to support multiple needs of the County, including high availability, redundancy, data center interconnect, campus aggregation, and ISP WAN connectivity.

Additionally, Layer 3 Communications will work with DeKalb County IT staff to develop the implementation plan to install and implement the new core network architecture, while maximizing connectivity uptime for County network services.

Layer 3 Communications will:

- Review existing core network connectivity
- Meet with DeKalb County IT Staff to fully understand current and future networking requirements, such as high availability, data center interconnect, internet edge redundancy, and WAN connectivity
- Develop and review new core network architecture and design with DeKalb County IT Staff
- Develop an implementation plan to deploy the new core network infrastructure at Courthouse, West Exchange, and Sheriff's Office

*Deliverables:*

- *Documentation of core network architecture and design, detailing physical network, logical network, and security configurations*

- *Implementation plan for deploying new core network infrastructure at Courthouse, West Exchange, and Sheriff's Office*

## **1.2 Pre-Configuration, Staging and Implementation**

Layer 3 Communications will pre-configure and stage as much of the new core environment as possible in our lab environment in Norcross, GA. During the staging process, equipment will be racked, powered on, pre-configured, and tested per the new network architecture and design.

Following the pre-configuration, staging and testing steps, Layer 3 Communications will lead three controlled maintenance activities (one for each core location – Courthouse, West Exchange, and Sheriff's Office) to implement the changes necessary to implement the new core network.

Layer 3 Communications will:

- Unbox, rack, power on, and burn in any new network elements.
- Apply software updates, patches, and licenses to any new network elements.
- Test network design in a lab environment to confirm network design
- Deliver, rack, power on, and connect network equipment configured and ready for installation to Courthouse, West Exchange, and Sheriff's Office
- Decommission and move necessary existing network elements
- Implement necessary hardware, software, and configuration changes to any existing network elements to facilitate new core network design at all three core facilities
- Work with DCG IT staff to isolate and remediate any connectivity issues during the maintenance activities

*Deliverables:*

- *Configured and tested new network equipment per new architecture*
- *Implemented core network equipment at Courthouse, West Exchange, and Sheriff's Office*

## **1.3 Testing and Verification**

Upon completion of the implementation, Layer 3 Communications will perform tests to verify the network is functioning as designed. We will:

- Test and verify the network connectivity and failover at each core location
- Test and verify high availability of components at each core location

*Deliverables:*

- *Tested and verified network connectivity and failover at each core location*
- *Tested and verified high availability of components at each core location*

### **1.4 Post Implementation Support**

Layer 3 Communications will provide post implementation remote support for one day following the successful completion of each maintenance window activity. During this time, any unforeseen issues will be identified and resolved. Furthermore, support will be provided according to the terms of Layer 3 Communications' network support agreement with DeKalb County Government.

### **1.5 Assumptions**

Layer 3 Communications has made the following assumptions:

- Layer 3 Communications will test network functionality for availability and connectivity following the implementation.
- DCG staff will perform end user and application-level testing.
- Migration of each core site will occur in a single maintenance window, for a total of three maintenance windows, each to occur after normal business hours or over a weekend

### **1.6 Customer Responsibilities**

In order for Layer 3 Communications to successfully implement this project, we will require the assistance of DCG staff. DCG staff will be responsible for providing:

- An escort to provide access to controlled areas.
- Any passwords required
- Any community or naming conventions
- Detail of the existing network
- Provide access into maintenance accounts for software and documentation
- Remote access account into DCG during the length of the project
- DCG will be responsible for testing and verification of applications