TABLE OF CONTENTS

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Crossmark Auto Group

6 January 2020

<center>Crossmark Auto Group Network Design Proposal</center>

<u>Overview</u>

Crossmark Auto Group is a growing auto dealership established in Santa Fe, New

Mexico that specializes in new and used cars. They are looking to reconstruct the network in

order to keep up with the latest technologies and advancements and create a managed network as

they expand into other regions of New Mexico, Texas, and the Oklahoma. They have acquired

properties in Las Cruces, NM, Plainview, TX, and Guymon, OK; these properties are still under

construction. The current network system needs to be updated to help with the unification of the

dealerships with expansion and they have requested a VoIP phone solution and cloud-based

office productivity solutions. They would like to plan a roadmap for IT support over the next

5-years in order to create a well-organized, well-managed network for the other locations. In the

existing building, the billing/finance office, auto-service deck, and customer lounge need to be

equipped for network as they have not been equipped before. They need a space to store

electronic documents and a backup strategy for the system and their computers need a plan for an

upgrade with enterprise-class desktop computers. They have also requested cloud-based office

productivity solutions with a unique domain name for the company. They want the other

dealerships to have similar network specifications as the existing dealership but also account for

new VoIP solutions. The new dealerships have not been wired and will need to be prepared for

the new network. The dealership in Las Cruces, NM would like to be established as a

customer-relations department as well to handle telephone calls related to the issues about the

cars, trucks, and vans they sell. This will include about 20 agents to provide telephone support and an additional sales department of 5 office staff members and 2 managers. Crossmark Auto Group has a goal to be totally paperless by 2025, which will require adding shared-network multi-function devices for efficient printing, scanning, and faxing.

Current Position

The existing building was built with Cat 5 cabling retrofitted to be used as network cabling for a small network in the dealership. The current network solution is a small 6U wall-mounted open-frame rack inside of a small hallway closet which also contains the janitorial supplies for the dealership. The current equipment includes a retail branded router, one unmanaged sixteen-port switch, and one eight-port switch. Their information is stored in the cloud through a file-sharing cloud service attached to the sales manager's personal email. The computers are logged in with local users and use a flat network. They currently use a small-bandwidth DSL connection with 4.0 Mbps down and 1.0 Mbps.

Figure 1. CURRENT LAYOUT OF SANTA FE, NM BRANCH
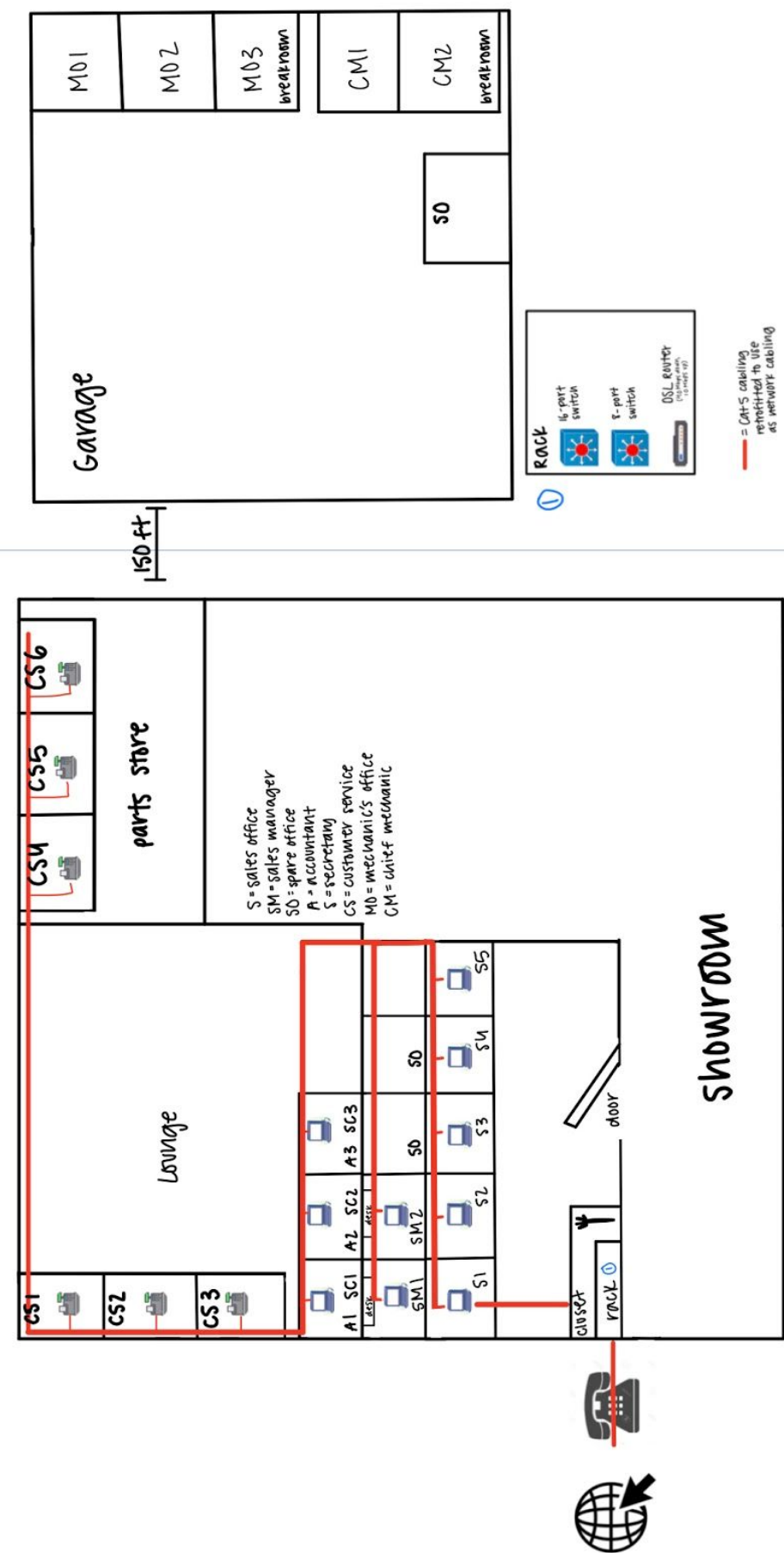
Customer Profile

Crossmark Auto Group targets people from ages 18 to 65 years, with an emphasis on those between 50 to 55 as the average age of new car buyers has been going up and is now around 53 years old. Most car shoppers are between the ages of 18 and 54, while most new truck buyers are ages 25 to 54. Based on the locations of the dealerships, the main target group will be customers with families as the dealerships are situated in more suburban locations and not near very large colleges or urban cities, which would attract graduating college students. Most young adults in Santa Fe tend to leave the city for elsewhere in the country, with very few returning or coming to settle down, which results in a much older population. Since the auto dealership is still relatively new, especially at the locations still under construction, the Crossmark Auto Group will rely more on attracting new customers than existing clientele. Automobile companies tend to target males and females relatively equally for the sale of cars, but they will mostly target males for the sale of trucks as they are much more likely to buy trucks. Their intended customers are also those with a household income of about 50,000 to 60,000 as that is the median household income in the locations of the dealerships and the target consumers must be able to reasonably afford the vehicles sold.

Objectives

1. The main objective is to improve the overall network of the main dealership as well as create a well-organized, well-managed network for other locations with an initiative business network solution that is suitable for a growing company.

2. Integration and Upgrade: Presently, Crossmark Auto Group uses a flat network without centrally managed computers that are logged in with local users. Much of the equipment

is out of date and not connected in a system-wide network. Their aging computers need to be upgraded with enterprise-class desktop computers designed for daily business use.

3. Computer and VoIP Network: The Crossmark Auto Group plans to move from standard telephone solutions in favor of a VoIP phone solution and cloud-based office productivity solutions for the entire auto group.

4. Effective Internet Bandwidth: Currently the Crossmark Auto Group uses a small-bandwidth DSL connection with 4.0 Mbps down and 1.0 Mbps up to supply internet to the dealership. In order to keep up with the changes to the network, the dealership needs an effective bandwidth that can carry network information to each location.

5. Centrally Managed Network: The Crossmark Auto Group does not use a centrally managed network and instead uses a file-sharing cloud service that is shared via personal email addresses. The use of a flat network hinders the productivity of the company as it causes poor security because traffic travels through one switch, so it is not possible to segment the network into sections, which makes it easier for hackers to intercept data on the network. The Crossmark Auto Group needs a centrally managed network with an efficient way to streamline the maintainability and security of all devices of the network.

6. Collaboration: They want to combine the power and capabilities of diverse equipment across the dealerships to provide a collaborative medium that helps users combine their skills regardless of their physical location and enable people to share information and ideas easily so they can work more efficiently and productively.

7. Carbon Footprint: The Crossmark Auto Group has set a goal to be paperless by 2025. They require shared-network multi-function devices that can be used to reduce the carbon

footprint of paper used in the dealership by making printing, scanning, and faxing more effective.

8. High-Speed Network: They would like to reduce congestion and traffic flow between each department in order to provide high-speed networks to the mechanic's offices.

9. Storage Space: The Crossmark Auto Group requires more space to store electronic documents and backup strategies for the system.

10. Scalability: The design must be scalable so that more district offices can be added as funding becomes available without having to redo the installed network.

Short and Long-Range Goals

The long-range goal of Crossmark Auto Group is to, over the next five years, become a more efficient and environmentally conscious dealership by improving the overall network of the main dealership and creating a well-organized, well-managed, reliable, and scalable network for the other locations. They have also set a long-term goal to be totally paperless by 2025, reduce the carbon footprint of the dealership, and move to the cloud. In the short term, they want to improve their productivity with a fast and reliable solution to account for VoIP networks, a centrally managed network with a more efficient way to streamline the maintainability and security of all of the devices on the network, high-speed network to all parts of the dealership, and a cloud-based office productivity solution. Additionally, setting up a well-maintained server room in each branch is an ideal short term goal.

Abstract of Implementation

The long term goal for Crossmark Auto is to establish and network the newer branches and move to the cloud to reduce paper waste. Using Office 365 to encourage employees to use less paper and reduce the paper use of the company by storing documents in the cloud and implementing stricter policies regarding the use of the multi-function devices over time will accomplish this. The network architecture will require two routers at each branch in order to create redundancy for a backup strategy. Cisco AnyConnect VPN will be used, which will be set up through virtual Cisco ASA on Microsoft Azure to use with AnyConnect. Each branch will have 1 48-port managed switch with a VLAN for each department and an 8-port managed switch with uplink ports. The branch in Las Cruces will also need a 24-port managed switch with uplink ports as well for the call center. Two Cisco Firepower firewalls will be used in each branch for redundancy and for security. By creating VLANs, congestion and traffic flow can be reduced between each department. The Santa Fe department currently has spare offices. These spaces can be utilized in order to create a network room for each department to store all the hardware. The network room should be kept cool and air-conditioned. The new offices being built should also include rooms to store the network equipment. The current placement of the equipment in the janitorial closet is risky and not a safe practice.

Guest WiFi will be available for customers to utilize while waiting in the room. Some security policies that will need to be implemented is that each employee should change their password every sixty days, and the WiFi password will be changed every thirty days. To centralize and manage the network, Microsoft Active Directory Services will be used. It authenticates and authorizes all users and computers in a Windows domain type network and enforces security policies for all computers and installing or updating software. Also, it provides

authentication and authorization mechanisms and establishes a framework to deploy other related services such as Microsoft Teams which will be used to account for the VoIP network internally in the company. In order to establish a customer-relations department to handle telephone calls in the Las Cruces branch, a solution called NICE inContact will be used. The bandwidth to each site will need to be increased to handle the extra traffic. All desktops will be connected using Cat 7 Ethernet cabling in order to provide exceptionally fast network performance and gigabit speeds. Fiber Optic cabling will be used to connect the main office to the mechanic's garage in each branch to provide high-speed network over long distances. In the Las Cruces branch, Fiber Optic cabling will be used to connect the call center to the main building as well because the call center requires greater bandwidth and higher speeds. Security measures will need to be taken for the call center to keep customer information protected, such as no WiFi access. Crossmark Auto will need to purchase an Office 365 E5 Enterprise License in order to gain full access to all Office applications, utilize Microsoft Teams, utilize cloud storage services such as Sharepoint and OneDrive, integrate Active Directory, and use the Phone System. This network design is scalable, fast, secure, and efficient.

Network Design

The network topology that will allow for a cheap and centrally managed network is a hub and spoke network topology. The Microsoft Azure Data Center will be the "hub", and all the other branches will be the "spokes". A hub and spoke network is a traditional, proven and widely used topology for all types of networks. All network traffic must go through the hub to reach other spokes in the network or to connect to an outside network. It offers a high degree of security because each device on the network is isolated from the others through a single

connection to the wireless router. Other benefits include high performance, centralization, and simplicity. The most important con to this network topology is the single point of failure at the hub. If the router dies, the entire network goes down. In this case, redundancy will need to be implemented by creating an additional data center. This topology is also scalable; new computers can be added without having to take the network offline like you have to do with ring topology.

For the existing dealership in Santa Fe, all devices on each LAN network will be connected by upgrading the current Cat 5 cabling to Cat 7 cables. The Internet bandwidth necessary to carry network information to each location will be around 100 Mbps download and 20 Mbps upload for Sante Fe, Plainview, and Guymon. For Las Cruces, additional bandwidth of around 800 Mbps will be needed as there is a call center. Cat 7 Ethernet cable will be used in the main building, and fiber optic cable will connect from the main building to the mechanic's garage. This gives about 10 GB bandwidth per second and bandwidth speed of 600 MHz for the main building, which will be more than enough for the main dealership, and about 40 Gbps for the call center and garage. The uplink port will be used to connect the garage's smaller local network to the main office's larger network. Additionally, there will be one wireless access point in the garage and two in the main office in each branch. The wireless access point will provide a connection to the laptops and for customer devices. Additionally, in Las Cruces, fiber optic will be used to connect the call center 24-port managed switch with an uplink port to the 48-port managed switch in the main office. Cat 7 cable can support multiple applications with fewer errors and less crosstalk. Cat 7 cables have an estimated lifespan of around fifteen years.

Each branch will have 2 Cisco ISR 4331 routers for redundancy. These routers have GE/SFP integrated WAN ports, 2 Gbps performance, and 500 Mbps encrypted throughput. The router will be connected to a firewall that will be connected to a managed 48-port switch, which

will be divided into 5 VLANs for each department. Each department will also have a printer. There will be a print server based in the Azure cloud integrated into AD in order to manage print requests and make printer queue status information available to end-users and network administrators. By basing the print server in the cloud, the cost of multiple servers to each branch is reduced. Ezeep for Azure is scalable, a single solution for all scenarios such as mobile printing, and integrated into Azure Active Directory. All hardware will be stored in a spare office that will be secured as only the administrators will have access to the room. There will need to be a network room in the main dealership as well as the mechanic's garage. Two internet services providers, AT&T and CenturyLink will be used in case one provider has issues. The branch offices will be connected to the Microsoft Azure Data Center, and AT&T Switched Ethernet on Demand using MPLS (Multi-Protocol Label Switching) will be used protocol to route traffic to avoid complex lookups in a routing table and speeding traffic flows by making point to point connections between the branches. This solution is also scalable to fit the size of the growing business. An AD/DNS/DHCP server will also be used. The DHCP assigns reusable IP addresses to clients, the DNS maintains a directory of domain names and translates them to IP addresses, and Active Directory is incorporated into the server. A Windows Server 2019 Standard will be required at each location to install AD/DNS/DHCP.

A Guest WiFi will also be created on the wireless access point in the main building for customers to use in the lobby or while they are waiting while they are one secondary network keeping the data safe. It will have a different password than the main network. This means devices connected to the Guest WiFi will not be able to share printers or files to the main network. Additional security measures will be added, such as the following: every user will change their password every 60 days; the WiFi password will be changed every 30 days.

Figure 2. ARCHITECTURE FOR LAS CRUCES, NM BRANCH*
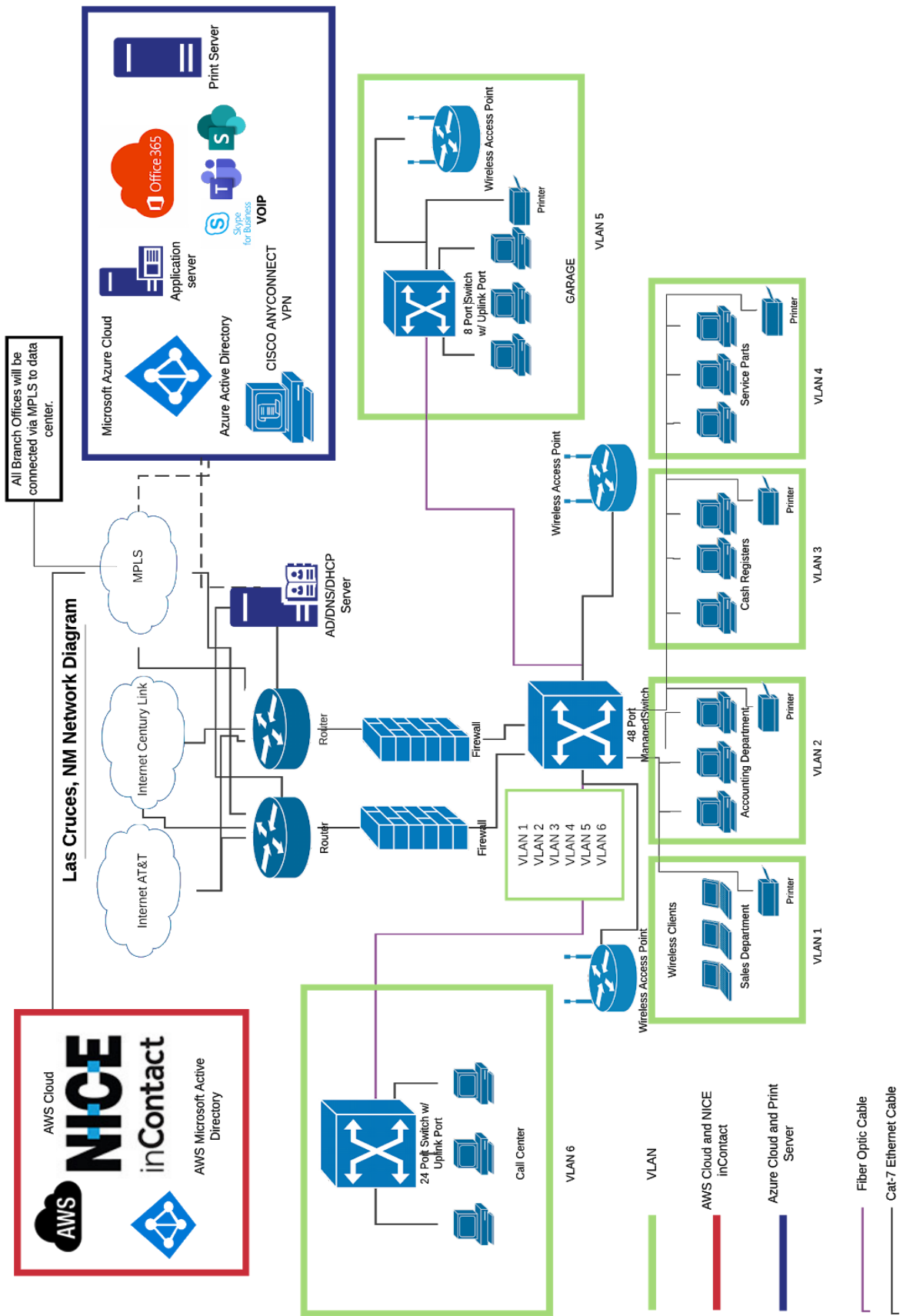
*All the other branches will have a similar layout but without the Call Center or NICE inContact.

Computers and VoIP Networks

A scalable and fresh solution for VoIP networks and cloud storage is Office 365 Enterprise E5. This service plan provides the most advanced innovations in security, compliance, analytics, and collaboration. It includes full desktop versions of Office apps such as Word, Excel, PowerPoint, Outlook, and OneNote. Office 365 Enterprise E5 also includes new features, such as Skype for Business Dial-in Conferencing and Meeting Broadcast, Power BI Pro, Delve Analytics, and advanced security and compliance features, such as Advanced eDiscovery, Advanced Security Management, Advanced Threat Protection, and Customer Lockbox. The Advanced Threat Protection defends users against threats hidden in emails and links.

For the VoIP aspect of the solution, Office 365 will be used as it includes Microsoft Teams and Yammer. Microsoft Teams provides a modern conversation experience for employees. It includes persistent chat, threaded chat, and messaging capabilities. Teams offers a comprehensive meeting and calling experience, with a built-in, fully integrated voice and video. Teams is fully integrated with Office 365, which makes it convenient for employees. Teams also provides direct access to email, Skype, OneDrive, and SharePoint. Microsoft Teams allows you to collaborate live in real-time. Using Teams, employees are also able to invite chat users from outside Crossmark Auto using their direct email, which is great for communicating with vendors or clients. Team conversations are visible to the entire team, but there is an option for private chats as well. Teams are able to customize their workspace, with extensibility and open APIs available at general availability. Furthermore, Microsoft Teams provides advanced security and compliance capabilities. A calling plan is also needed in conjunction with Teams. Yammer is

used to connect people across Crossmark Auto. Using these two facilities, communicating and interacting across the company and to third parties becomes simple and fast. Specifically, with Office 365 Enterprise E5, audio conferencing, toll-free numbers for dial-in access to meetings, a phone system, and voicemail are included with Microsoft Teams in addition to the other features.

Microsoft Teams supports the ability for users to make voice over IP calls from employee to employee. With Microsoft Teams, anyone in Crossmark Auto Group can make VoIP calls to any other team members across branches using Teams and even make calls to third party clients if needed. These VoIP calls are essentially an intercom system for employees inside a company because Teams does not connect to the public switched telephone network (PTSN).

Office 365 Enterprise E5 comes with the Phone System which gives Crossmark Auto Group PBX capabilities without expensive equipment. It allows Skype for Business to make and receive calls, transfer calls, and more. It also allows users to set call forwarding options in Skype for Business that allows calls to be forwarded to colleagues or go to voicemail and allows calls to be made or answered on behalf of a manager. Calls from inside the company display a detailed caller ID that pulls information from the corporate directory, showing a picture and job title instead of just a phone number.

The Office 365 Enterprise E5 includes Sharepoint and OneDrive to store and back up electronic documents. SharePoint Online is a cloud-based service used to create websites and as a secure place to store, organize, share, and access information. SharePoint provides a platform for shared access, interaction, and collaboration. It allows files, data, news, and resources to be shared with team members inside and outside the organization, across multiple devices. It also drives organizational efficiency by sharing common resources and applications on home sites and portals. It also works well with other Office 365 applications, including OneDrive. OneDrive

is a cloud-based service that serves as personal online storage for employees. It also comes with an app that can capture documents quickly for safe storage. Files saved in OneDrive folders can be accessed from any PC, tablet, or phone and can be opened and edited at any time, even without an internet connection. With Office 365 E5, OneDrive has 5 TB of storage per user. These solutions along with Delve for users to view information on who they are working with encourage employees to began to move to the cloud and use less paper, which is conducive to reducing the carbon footprint of the company. Moving documents to Sharepoint and OneDrive will also back up documents and keep them safe in case the original data is lost or corrupted.

Office 365 Enterprise E5 service plan also includes the Azure Active Directory, which will be used to streamline the maintainability and security of all devices and users. The main service in Active Directory is Domain Services, which stores directory information and handles the interaction of the user with the domain. All devices will be connected to one domain meaning all information will be stored at a central location and not on each individual device, as is the case currently. AD DS verifies access when a user signs into a device or tries to connect to a server over a network and controls which users are allowed to have access to which resources using Group Policy Objects. This keeps network access rights management centralized by organizing objects into organizational units. AD DS also provides built-in redundancy so that if one domain controller fails, another domain controller is still there. The biggest benefit of Active Directory is that it authenticates users on the network by verifying their credentials, group membership, and security policies.

A custom GoDaddy domain name will be bought within Office 365 which enables you to have work emails set up for each employee with a unique domain name specific to Crossmark

Auto Group to encourage efficient collaboration between employees. The purchase is integrated with Office 365, so the integration of the domain is fast and convenient.

In Sante Fe, NM, Plainview, TX, Guymon, OK, and Las Cruces, NM, the current computers in everything but the sales floor will need to be replaced with Dell OptiPlex 3060 desktops. The Dell OptiPlex 3060 is an affordable and easily upgradable enterprise-class desktop computer. The base model comes with an Intel Core i3-8100T processor, 8GB RAM, and Windows 10. Each desktop can easily run multiple applications simultaneously and they support automatic deployment and updates with included in-band management capabilities. While the OptiPlex 3060 has wireless capabilities, it will be connected to the Cat 7 cables to reduce traffic on the network. The OptiPlex desktops feature TPM 2.0 and a chassis intrusion switch for increased security. The Dell Client Command Suite automates and streamlines system deployment, configuration, monitoring and updates and is free on all Dell commercial PCs. The design also allows for quick access to the system, so you can easily upgrade and replace components like storage and memory, making the desktops viable for use over many years. With a desktop tower, even after the unit is out of warranty, there are many things that can be easily replaced to keep the desktop working smoothly. The OptiPlex desktops also come with a 3-year warranty and have easy lifecycle management from configuration and deployment through resale and recycling with Dell Services. Each desktop will also have a Dell 24 Monitor (P2419H), Dell KM636 Wireless Keyboard and Mouse, and Dell Pro Stereo Headset UC350.

In the sales floor of every dealership, the current computers will be replaced with Dell Latitude 7290 Business laptops. Using laptops allows sales employees to carry around their devices so they can work remotely and go directly to the customer. This laptop supports Windows 10 which is necessary for the Enterprise package. The Latitude laptops are 2-in-1s that

enable all-day productivity with secure and manageable features. Every computer, desktop, and laptop will have Office 365 Enterprise E5. Every employee will undergo Office 365 training from the free online service provided with the package.

Environmental Solution

The Lexmark MB2236adw and HP Color LaserJet Enterprise M681f Flow MFP printers are multifunction devices that can be used for effective printing, scanning, and faxing. The LaserJet printers will be on the same Cat 7 cables as the desktops, while the Lexmark will be connected to the wifi to ensure that multiple employees can access the same printer at the same time, from different computers. Its wireless connection allows it to meet the needs of multiple employees with a single printer. The scanner function of the printers can not only reduce future paper usage but also upload existing paper documents which will create more space in the office buildings. Each dealership will have one HP ColorJet Enterprise M681f Flow MFP printers for the sales floors to account for the increased need for paper and scanning, while the Las Cruces dealership will have two. Each of the offices in use and shops will have a Lexmark printer. The call center will not have a printer. A print server called Ezeep integrated with the Azure cloud will manage all the printers and queue prints.

The Crossmark Auto Group has set a goal to be paperless by 2025 and reduce the carbon footprint of paper used in the dealership. In addition to helping the environment, saving paper will also reduce search time with PDF and online storage/access, reduce workload stress as paper can be cluttering and with unified storage office stress will be greatly reduced, and result in tidier offices. The biggest wastes of paper in the company are choosing fax over email, printing emails, printing presentations, using paper as note-pads, envelopes, and poor use of recycling bins.

Having strict guidelines on printer use, sending things digitally, and introducing alternatives to physical notepads will promote a lack of wastage and can increase transparency and cooperation within teams. Reducing the paper usage of the company will also free storage space in the offices. Storing files in the cloud through Office 365 will help the goal of becoming paperless and make file sharing and access more efficient. Paperless document storage will allow the company to securely store and back up important files and documents. It will also allow files to be shared with employees and customers without the cost of faxing or mail services. Other benefits to using the cloud include reducing hardware costs as the storage of large files can be shifted from the local system to the cloud, saving local space, and allowing access to documents that employees don't have in their personal possession. Using the cloud is flexible and the way it is used can grow and change as the needs of the business grow and change. Having paperless meetings by taking advantage of information-sharing technology will not only reduce paper use by reducing printed handouts for meetings but also allow meeting presentations to be shared with participants through the cloud so that they can be referenced later. Using electronic communication by email will offer faster communication and keep a copy of all communication on the computer in favor of wasting paper.

Customer Relations Department - Las Cruces, NM

The branch office in Las Cruces, NM, wants to establish a customer-relations department to handle telephone calls and provide customer support. A solution for this is a software called NICE inContact. NICE inContact uses CXone which is a cloud platform. CXone runs on AWS, utilizing microservices, and is based on an open, cloud foundation, which provides full elasticity, rapid turn up and reliability by being able to grow the business as needed by paying as you go,

based on what is used. CXone includes hundreds of APIs and enables integrations with dozens of partner solutions. The benefits of NICE inContact include real-time interaction routing based on customer intent and employee persona, personalized customer experiences, real-time capabilities including real-time insight, employee guidance, and Real-Time Authentication, and full scalability. Furthermore, NICE inContact has fast turn-ups, taking an average of sixty days to be up and running. It includes built-in redundancy, integrated voice infrastructure, and monitoring, and is open and extensible with over 250 APIs. The package comes with ACD/IVR, ports, integrated softphones, audio recording pro, and live chat and email capabilities. An easy and smooth interaction is vital and drives customer loyalty and advocacy. NICE inContact is able to provide the call center agents with the tools to have more personalized experiences with customers.

Security

Security measures that will be taken include using Cisco AnyConnect. A Virtual Private Network (VPN) connection allows users to access, send, and receive data to and from a private network by going through a public or shared network such as the Internet but still ensuring secure connections to an underlying network infrastructure to protect the private network and its resources. A VPN tunnel establishes a private network that can send data securely. The VPN provides a remote access solution that allows employees to work securely from outside the establishment. AnyConnect simplifies secure endpoint access and provides the security necessary to help keep the organization safe and protected. AnyConnect is also scalable with the ability to add more users. AnyConnect will need to be set up with a virtual Cisco ASA Firewall on Microsoft Azure Cloud to use with AnyConnect VPN connection and set up external user

authentication with Active Directory. AnyConnect provides full network connectivity to the

remote user. The ASA firewall, working as AnyConnect VPN server, assigns an IP address to the

remote user and attaches the user to the network. Thus, all IP protocols and applications function

across the VPN tunnel without any problems. This will allow a remote access solution which will

enable employees to work securely from any location. By setting up AnyConnect in the Azure

Cloud, the cost of having a local VPN for each branch is reduced.

Financial Analysis

This is an estimate of the cost of all of the products that will be needed for this plan for

the first month (Figure 3) and the first year (Figure 5). An estimate of the monthly cost (Figure

4) and annual cost (Figure 6) are also included. While it seems expensive, in reality, it is only a

small fraction of the entire profit of the Crossmark Auto Group and it is important to keep in

mind that this is the cost for all 4 dealerships. The first month and first-year costs are much

higher than the regular monthly and yearly costs because they include the costs of items that are

only purchased once but will be used for many years. The benefit analysis is also included

(Figure 7) with a cost-benefit analysis for each year (Figure 8) and for after five years (Figure 9)

which shows that the network solution will begin to pay itself off in a few years, as the annual

profit is greater than the annual cost.

Figure 3. FIRST MONTH COSTS

Item	Cost	Quantity	Total Cost	Location
Dell 24 Monitor (P2419H)	$159.00	105	$16,695.00	All
Dell OptiPlex 3060 Desktop	587.99	105	61,738.95	All
Dell KM636 Wireless Keyboard and Mouse	32.44	105	3,406.20	All
Dell Latitude 7290 Business Laptop	719.00	25	17,975.00	All
Lexmark MB2236adw Printer	292.00	28	8,176.00	All
HP Color LaserJet Enterprise M681f Flow MFP printer	4,149.99	5	20,749.95	All
Dell Pro Stereo Headset UC350	53.12	105	5,577.60	All
Cisco 4331 Router	790.00	8	6,320.00	All
Office 365 Enterprise E5	35.00	130	4,550.00	All
NICE inContact	100.00	20	2,000.00	Las Cruces, NM
Cisco AnyConnect Plus VPN 5-Year Subscription 100-249 users	432.00	1	432.00	All
Linksys AC1900 Dual Band Wireless Router	100.00	12	1,200.00	All
AD/DNS/DHCP PowerEdge T30	609.00	4	2,436.00	All

Mini Tower Server				
Calling Plan for Teams	10.00	130	1,300.00	All
AT&T MPLS	1,000.00	4	4,000.00	All
Cisco SG250X Gigabit	664.00	4	2,656.00	All
Windows Server 2019 Standard	972.00	4	3,888.00	All
Cisco Firepower FPR2110-NGFW-K9	7,240.00	8	57,920.00	All
1000 ft Fiber Optic Cable	177.00	2	354.00	All
Cat 7 Cable 1000 ft	305.00	6	1,830.00	All
Cisco ASAv10	4,125.00	1	4,125.00	All
Cisco Catalyst 3750-X Fiber Switch	2,354.00	1	2,354.00	Las Cruces
Cisco Catalyst 2960L-8PS-LL - Switch - 8 Ports	447.00	4	1,788.00	All
42U Standing Server Rack Cabinet Enclosure. Bonus Temperature Control System, Casters, LED-Screen, PDU	799.00	4	3,196.00	All
Total	**$26,132.54**		**$234,667.70**	

Figure 4. MONTHLY COSTS

Item	Cost	Quantity	Total Cost	Location
NICE inContact	$100.00	20	$2,000.00	Las Cruces, NM
Office 365 Enterprise E5	35.00	130	4,550.00	All
Total	**$135.00**		**$6,550.00**	

Figure 5. FIRST YEAR COSTS

Item	Cost	Quantity	Total Cost	Location
Dell 24 Monitor (P2419H)	$159.00	105	$16,695.00	All
Dell OptiPlex 3060 Desktop	587.99	105	61,738.95	All
Dell KM636 Wireless Keyboard and Mouse	32.44	105	3,406.20	All
Dell Latitude 7290 Business Laptop	719.00	25	17,975.00	All
Lexmark MB2236adw Printer	292.00	28	8,176.00	All
Dell Pro Stereo Headset UC350	53.12	105	5,577.60	All
HP Color LaserJet Enterprise M681f Flow MFP printer	4,149.99	5	20,749.95	All
GoDaddy Domain	14.99	1	14.99	All

NICE inContact	100.00	240	24,000.00	Las Cruces, NM
Office 365 Enterprise E5	35.00	1,560	54,600.00	All
Ezeep Print Server for Azure	1.99	120	238.80	All
Cisco 4331 Router	790.00	8	6,320.00	All
Cisco AnyConnect Plus VPN 5-Year Subscription (100-249 users)	432.00	1	432.00	All
Linksys AC1900 Dual Band Wireless Router	100.00	12	1,200.00	All
AD/DNS/DHCP PowerEdge T30 Mini Tower Server	609.00	4	2,436.00	All
Calling Plan for Teams	10.00	130	1,300.00	All
AT&T MPLS	1,000.00	4	4,000.00	All
Cisco SG250X Gigabit	664.00	4	2,656.00	All
Windows Server 2019 Standard	972.00	4	3,888.00	All
Cisco Firepower FPR2110-NGF W-K9	7,240.00	8	57,920.00	All
1000 ft Fiber Optic Cable	177.00	2	354.00	All

Cat 7 Cable 1000 ft	305.00	6	1,830.00	All
Cisco ASAv10	4,125.00	1	4,125.00	All
Cisco Catalyst 3750-X Fiber Switch	2,354.00	1	2,354.00	Las Cruces, NM
Cisco Catalyst 2960L-8PS-LL - Switch - 8 Ports	447.00	4	1,788.00	All
42U Standing Server Rack Cabinet Enclosure. Bonus Temperature Control System, Casters, LED-Screen, PDU	799.00	4	3,196.00	All
Total	**$26,169.52**		**$306,971.49**	

Figure 6. ANNUAL COSTS

Item	Cost	Quantity	Total Cost	Location
NICE inContact	100.00	240	24,000.00	Las Cruces, NM
Office 365 Enterprise E5	35.00	1,560	54,600.00	All
GoDaddy Domain	14.99	1	14.99	All
Ezeep Print Server for Azure	1.99	120	238.80	All
Total	**$151.98**		**$78,853.79**	

Figure 7. BENEFIT ANALYSIS

Product	Price
Increased Productivity	25,000.00 yr
Decreased Anxiety (from increased reliability)	4,000.00 yr
Less Training Time	6,000.00 yr
Increased Connectivity between Offices	10,000.00 yr
Ease of Record Keeping (fewer lost files and faster availability)	25,000.00 yr
Increased Security	30,000.00 yr
Decreased Paper Costs	25,000.00 yr
Better Customer Relations	26,000.00 yr
Intangible Benefits	**Price**
Increased Community Support	30,000.00 yr
Increased Staff Morale	15,000.00 yr
Better Informed Public	20,000.00 yr
Total	**$226,000.00 yr**

Figure 8. COST-BENEFIT RATIO

Annual Cost	Annual Benefit	Ratio
$78,853.79	$226,000.00	0.35

Figure 9. FIVE-YEAR COST-BENEFIT ANALYSIS

Five Year Cost	Five Year Benefit	Profit
$622,386.65	$1,130,000.00	$507,613.35

Organizational Chart and Company Information

Figure 10. TABLE OF USERS

	Santa Fe, NM	Las Cruces, NM	Plainview, TX	Guymon, OK	Total
Sales Department	7	14	7	7	**35**
Billing/Finance Department	7	7	7	7	**28**
Service Desks	4	4	4	4	**16**
Parts Store	4	4	4	4	**16**
Service Mechanics Garage	3	3	3	3	**12**
Call Center		20			**20**
Total	**25**	**52**	**25**	**25**	**127**

INDEX

ACD	Automatic Call Distributor
AD DS	Active Directory Domain Services
API	Application Programming Interface
AWS	Amazon Web Services
CAT7	Category 7 Cable
DHCP	Dynamic Host Configuration Protocol
DNS	Domain Name System
DSL	Digital Subscriber Line
IVR	Interactive Voice Response
LAN	Local Area Network
MPLS	Multi-Protocol Label Switching
PBX	Private Branch Exchange
PTSN	Public Switched Telephone Network
SSL	Secure Sockets Layer
TPM	Trusted Platform Module
VLAN	Virtual Local Area Network
VoIP	Voice over Internet Protocol
VPN	Virtual Private Network
WAN	Wide Area Network