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STAPLES VALUE CHAIN NAFAKA ACTIVITY

TASK ORDER NO. AID-623-I-10-00001

SERVER INFRASTRUCTURE INSTALLATION

DATE

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List of Acronyms

LAN	Local Area Network
WAN	Wide Area Network
MPLS	Multiprotocal Label Switching
UPS	Uninterrupted Power Supply
APC	American Power Conversion
SATA	Serial Advanced Technology Attachment
HD	Hard Disk
RAID	Redundant Array of Independent Disks
GB	Gigabytes
NOS	Network Operating System
DFS	Distributed File System
DHCP	Dynamic Host Configuration Protocol
DNS	Domain Name Service
Mbps	Megabits per second
MS	Microsoft
DSM	Dar Es Salaam
NSA	Network Security Appliance (firewall)

List of Exhibits

Executive Summary

Working under the supervision of the Chief of Party and together with network administrator, the consultant will verify the installation of two Local Area Networks (LAN) computer system in the Dar es Salaam (DSM) and Morogoro project offices. They will be linked together using a direct fiber optic connection creating a Wide Area Network (WAN).

Each LAN will include:

- Laptops, servers, switches, routers, firewalls, wireless access points and cabling.
- Tape backup hardware and software.
- Microsoft Windows Server 2012.
- Microsoft Windows 7.
- Fiber optic cable direct connection (exhibit 4) with Distributed File System (DFS) data replication between the offices.
- Internet connection to Microsoft Office 365 for Outlook and SharePoint.

1. Background

1.1 NAFAKA Overview

The NAFAKA Staples Value Chain Activity is a $30 million project funded by USAID under the Tanzania Feed the Future (FtF) Initiative. It integrates agricultural, gender, environment and nutritional development efforts to improve smallholder farmer productivity and profitability within the maize and rice value chains in Morogoro (Kilombero and Mvomero Districts), Dodoma (Kongwa district) and Manyara (Kiteto District). NAFAKA's goal is to sustainably reduce poverty and food insecurity by increasing incomes for smallholder farmers, including men, women and youth.

The NAFAKA project is part of USAID's Feed the Future initiative in Tanzania. The project aligns with the Feed the Future (FtF) goal to harmonize regional hunger- and poverty-fighting efforts in countries with chronic food insecurity and insufficient production of staple crops.

The NAFAKA program works with rural communities and the Tanzanian Ministry of Agriculture to analyze the local maize and rice value chains and develop a strategy to strengthen them. Increases in food availability, access and consumption are expected to ameliorate food insecurity and malnutrition in rural areas.

NAFAKA has project offices in Dar es Salaam (DSM, representational and administrative office), Morogoro (technical office), and satellite offices in Ifakara (covering southern project areas) and Kibaigwa (covering northern project areas).

1.2 Computer System

The DSM and Morogoro offices have been using non-networked laptops with MS Windows 7 peer to peer printer sharing. Important files including the M&E database in MS Access are shared using external hard drives. File sharing between DSM and Morogoro is done via email attachments. There is no backup system for the files. System insecurity has resulted in the loss of information. The project will greatly benefit moving to the WAN as it will ensure the data integrity and safety and information sharing.

The project recently changed their email system from Gmail to MS Office 365 Outlook using their domain, nafaka-tz.org. The overall user email experience has been positive since moving users to the laptop based Outlook email client from Gmail's web email interface.

1.3 Assignment Tasks

- Verify and test network hardware setup.
- Working with local IT manager, prepare graphic of proposed network in each of the two offices and between the two of them.
- Evaluation of procedures to add new users and delete old ones.

- Verify and test laptop backup and DFS replication setup.
- Review and test tape backup schedules, test restore.
- Verify off site tape storage.
- Check and test Internet connections and access speeds.
- Examine physical security: power supplies, air conditioning, locked rooms, power down capability and procedures.
- Check Active Directory procedures for addition and termination of users, user profile backup, authentication and granting access rights to files and folders.
- Discussion of disaster recovery/business continuity plans with IT manager.
- Discussion of network security/authentication etc with IT manager.
- Office 365 rollout
    - User email experience
    - Work to date downloading Office 2013
    - Review of NAFAKA SharePoint site
- Assess staff impressions of Office 365.
- Train and assist with IT manager/others in the configuration of a project team site in Office 365.
- Train and assist in creating custom applications in Office 365 using SharePoint Designer and InfoPath.
- Open discussion of opportunities for better IT support from HQ
- Review of findings and concerns with VP of IT
- Review of findings and concerns with COP
- Trip report

2. Activities

2.1 Initial Setup

October 20. Arrived Dar Es Salaam (DSM).
October 21. Arrived at Nafaka office. Reviewed my activities regarding the network installation with COP . Met IT network administrator, (based in Morogoro), IT network technician (based in DSM), and the vendor representative, from TechnoBrain, Ltd. will be working closely with the team until the installation is completed. There had been numerous delays in the delivery of the equipment, the last being difficulty in extracting it from customs.

The equipment had as yet not been unpacked from the shipping boxes. The team began the process of unpacking and assembling the rack cabinet. There are two almost identical network systems for Local Area Networks (LANs) in the DSM and Morogoro project offices. Although the project has been in operation for more than two years it has not been networked. The team is currently sharing information via email and portable hard drives. The new network will provide a safe and secure platform to store project information.

Summary of network hardware and software for both offices (exhibit 1):
2 Metal rack cabinets (exhibit 5) with power accessories & castors
2 Dell Poweredge Servers, 6 SATA HD's (300 GB each), 1.5 TB Total, RAID 5
2 server monitors & keyboards
2 HP External Tape Drives, 4 tapes, 160 GB each, total storage 640 GB:
2 SonicWall NSA 220 Firewalls
1 Cisco 2960 Switch 24 ports
1 Cisco 2920 Switch 48 ports
Cat 6 ethernet cables and patch panels
3 Cisco wireless access points (1 DSM, 2 Morogoro)
2 APC UPS power backups
2 Windows 2012 server standard software
2 Kapersky server anti virus software
2 Backup Exec tape backup software

The Morogoro office will service 35+ users, DSM 10+. Each office has a dedicated, dust free secure server room with 24/7 air conditioning. System equipment will be connected to a UPS which provides battery power in case of a power outage. The UPS will automatically shut down the equipment before the battery is drained. will manage the larger Morogoro office operation. Microsoft's Distributed File System (DFS) will allow transparent file sharing between the two offices, including the M&E Access database. The bandwidth between the offices, 2-4 mbps, will be on a dedicated fiber optic link.

Most of the users will use wireless access points to connect to the network. The three Cisco wireless access point devices were added after the original equipment order when it was

decided to go with a wireless network. As a result the Cisco switch 24 and 48 wired ports will be used for peripherals such as printers, fiber optic links, wireless access points and tape drives. There will be five wired user locations in the DSM office, one for finance, one for the conference room (where the tape drive will be located), one for the wireless access point and two others as a backup .

The MS Access database used for the large M&E operation is currently set up as a single user data entry system. Spreadsheet data entered by field staff is downloaded to the database. It would be possible to create a multiuser database system on the WAN but the current setup works well and as the data is reviewed before downloading. The database will be accessible as read/write for the data administrator and read/only for other WAN users.

2.2 DSM Server Setup

October 22. Begin LAN unit 1 (DSM) implementation tasks:

- Server hardware configuration
- Hard disk array format
- Installation and configuration of Windows server 2012 Network Operating System (NOS)
- Cisco 24 port router configuration
- Sonicwall firewall configuration
- Link to wireless internet
- Connect to workstations via wireless
- Set up the domain controller and active directory
- Test

After the Windows server operating system installation an Ethernet line connected to the internet router allowed to log in wirelessly. We reviewed the details of the network setup including:

- Partitioning server storage
- User shares and folders
- Diagramming the network
- Network security – only the wireless Internet router will be outside the firewall
- DFS for file sharing between the offices
- Multiprotocol Label Switching (MPLS) for interoffice system communication

2.3 Morogoro Server Setup/WAN Implementation

October 23-25. The second file server destined for the Morogoro office was installed temporarily in the DSM rack cabinet for configuration and testing. The hard disks were initialized and Windows Server installed. Further configuration was done on the DSM and Morogoro file servers, setting up DNS (Internet domain access), DHCP (automatic workstation address assignment), DFS, active directory, etc. The main domain controller was established on

the Morogoro server with DSM as a child domain so Reuben can control both servers from Morogoro.

I recommended to Reuben that he use a file folder system similar to what we have at HQ using Windows server active directory for file access security to the file shares residing on the large hard disk partition. A small partition (200 GB) contains server software such as Windows Server, Backup Exec and Anti-Virus.

The rack cabinet houses the server/hard disk array, switch, firewall, UPS and ethernet patch panel. Staff will use the wireless access point(s) (one in DSM, two in Morogoro) to log on to the network. The wireless router will continue to be used for Internet access. The tape unit will be located in the conference room for disaster recovery purposes and tapes will be rotated off site.

The two offices will be connected by a dedicated fiber optic connection with speeds of 2-4 Mbps. MPLS, a faster means of sending data packets will be used to speed up data transfer. It will be inside the firewall (see exhibit 2) creating a reliable, fast and secure means of communication between the two LANs.

I met with Deputy Chief of Party to update her on the WAN.

Ethernet cable installation (five runs) was begun in the DSM office by TechnoBrain.

2.4 Morogoro Office Activities

October 28-30. Travel to Morogoro office. Met the staff and toured the new building under construction (exhibit 6) including the future server room. The room will be partitioned with 's office in front of the LAN cabinet. Construction appears to be progressing on schedule as three weeks ago there was only a foundation. DCOP and I agreed that we make a presentation to staff to acquaint them with the new computer system.

The office is overcrowded as it has increased staff to meet the demands of expanded activities. The new construction, due to be finished in approximately two weeks, should alleviate the overcrowding and provide a secure, dust free, air conditioned location for the LAN cabinet. A wireless access point will be installed in each building with an Ethernet line to connect the current office access point to the server in the new building.

I presented a slide show to the office staff to familiarize them with the forthcoming network. The slides contained an overview of local area networks, file sharing and the fiber optic link between the two offices. Included was the network diagram (exhibit 2).

dedicated the rest of the day to reviewing Office 365 and Sharepoint. The main areas covered were document sharing, task and calendar lists, configuration of the project management site and creating custom applications for specific data needs. For example, it will be possible to export information from the M&E MS Access database to Sharepoint custom

lists. As the current NAFAKA Office 365 site was barely started, we began by updating and adding to the home page.

2.5 Continuation of network configuration at the DSM office

October 31-November 1. Upon returning to DSM, began setting up top level file shares. The proposed file sharing system I recommended would look approximately like this:

Nafaka\Shared	The S drive for all users where departmental folders would go. Each folder would have public and private folder.
Nafaka\Users\Name	The P drive for all users for personal files. The individual name folder is automatically mapped upon log in.
Nafaka\Finance	An additional drive for certain departments with sensitive information such as finance. Other departments can store their department only data in the private folder section in Shared.
Nafaka\M&E	MS Access database. Read/only for all except data entry staff.

The Cisco wireless access points were missing their power supplies. retrieved spares from their office and installation began for the DSM access point. also configured the DSM Sonicwall firewall.

I logged into the network using a wired connection and tested DFS by saving files on to the Morogoro server and viewing them on the DSM server after they had automatically replicated.

2.6 Conclusions

Many of this assignment's tasks were based on there being a functioning network before I arrived. As this was not the case my observations are focused on the initial network setup and *proposed* running of that network once it is fully implemented. The network plan is sound and should work as anticipated. The fiber optic link between the two offices will significantly improve inter-office information sharing by providing DFS file replication, dedicated connection speed and security. The project should see an increase in productivity through seamless information sharing. The equipment is high quality from major manufactures Dell, Cisco, Sonicwall and APC. NAFAKA's network team has the requisite skills to make it all work.

There remains much to be done before the WAN is fully functional. The new building in Morogoro should be ready for the server cabinet installation around Nov 11. The fiber optic connection is anticipated at the end of November. I will be receiving WAN progress reports from R over the next few weeks.

WAN tasks to be done:

- Finish active directory users, shares and permissions
- Move LAN cabinet to the server room in the DSM office
- Set up and install a wireless access point in the DSM office
- Create login scripts for all users

- Configure DSM laptops for network login
- Move all personal and shared files to server storage
- Configure and implement tape backup software for daily backups
- Implement tape rotation system with offsite tape storage
- Set up terminal services for remote log in
- Set up LAN cabinet in Morogoro
- Setup network infrastructure for Morogoro
- Connect both offices to the fiber optic link
- Implement the WAN between the two offices including DFS
- Installation of anti-virus software on the server and workstations
- Implement Office 365 Sharepoint services

Annex: Exhibits

Exhibit 1: Vendor supplied equipment list

1	PowerEdge R510 Rack Chassis, Up to 8x 3.5" Hot Plug HDDs, Supports 750W Hot Swap PSUs, LCD Diags
2	HP StoreEver DAT 160 SAS External Tape Drive (Q1588B)
3	APC UPS 1.5 KVA
4	HP 19" TFT Monitor
5	SonicWALL NSA 220 Security Appliance
6	Catalyst 2960 24 10/100 + 2 T/SFP LAN Lite Image
7	Catalyst 2960 48 10/100 + 2 T/SFP LAN Lite Image
8	Cisco 2901 Security Bundle w/SEC license PAK
9	Cat 6 4 Pair UTP Cable 305M
10	Cat 6 RJ45 Patch Lead Booted 1M GREY
11	Cat 6 RJ45 Patch Lead Booted 3M GREY
12	Cat 6 24 Port 1U Patch Panel, Black
13	Cat 6 Single UTP Module c/w Faceplate
14	6U 500MM Deep Wall Box c/w 2 Way Fans and 5 Way PDU Horizontal, GREY
15	1U Cable Management Bar, BLACK Plastic Rings
16	Cisco 1602I Wireless Access point
17	Cabling Accessories
18	SYMC BACKUP EXEC 2012 SERVER WIN PER SERVER BNDL STD LIC EXPRESS BAND S BASIC 12 MONTHS with media kit
19	Kaspersky Enterprise Space Security
20	Windows Server Standard 2012 SNGL OLP NL Acdmc 2Proc
21	Windows Server Client Access License 2012 SNGL OLP NL Acdmc
22	Windows Server Standard Media Kit

Exhibit 2 Network Diagram

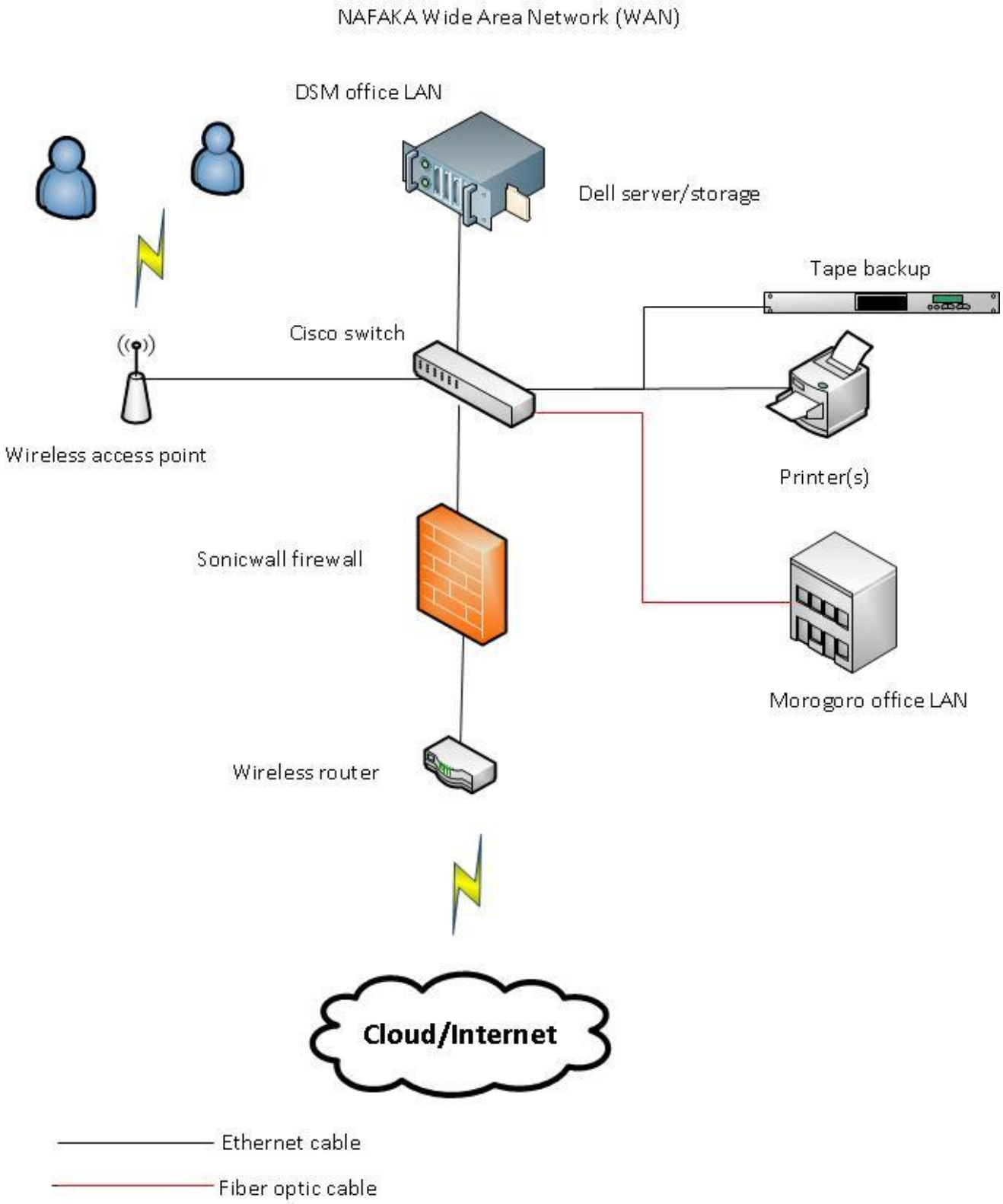

Exhibit 3 LAN Rack System

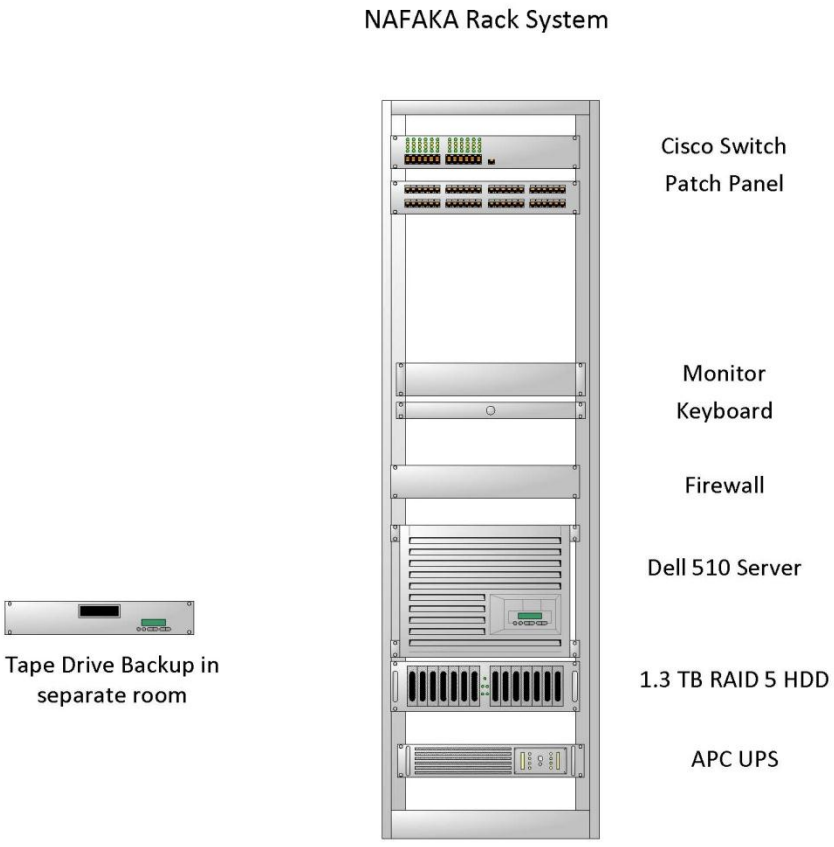

Exhibit 4. Fiber optic inter-office link with MPLS

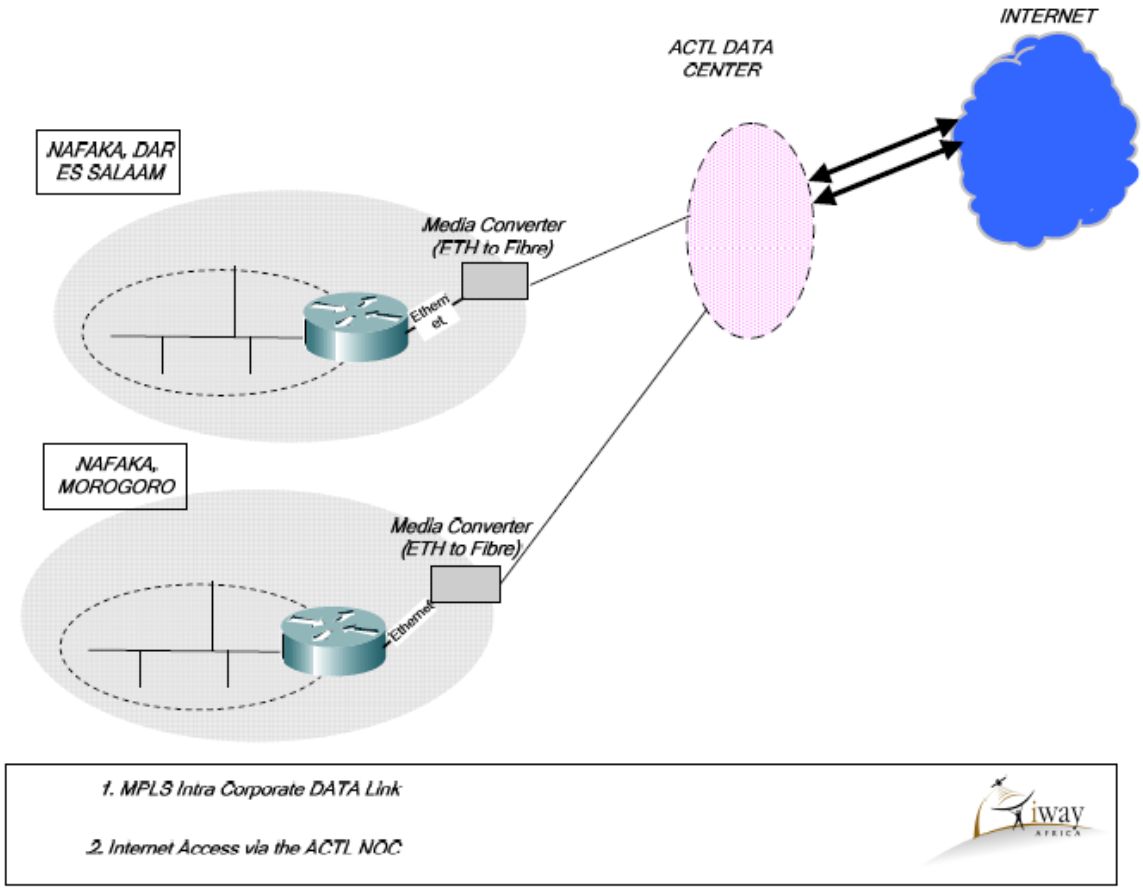

Figure 1: Intra corporate MPLS and Internet access link for NAFAKA

Exhibit 5. LAN cabinet with rack mounted file server, switch, patch panel, and firewall.

Exhibit 6. New building in Morogoro to house the file server cabinet