Design of a Structured Network Cabling Applying International Standards

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Abstract — *This article is designed to present and illustrate the need for the requirement of the technical specifications around the development of applicable international standards for structured cabling. One of the main objectives is encouraging the market to promote professionalism in the area of telecommunications framed within the real trends of the structured cabling from a technical point of view. This design uses the structured cabling methodology, not only because it is an organized and appropriate method to interconnect multiple and different data processing equipment, but also to comply with standards and regulations. Among its benefits are the ability to integrate both voice, data and video services, at the same time that gives the advantage of accepting new technologies, support multiple computing environments at a lower cost, something that most enterprises are looking for nowadays. The Standards of structured cabling topologies specified generic installation and design that are characterized by a "category" or "class" of performance transmission as a function of the bandwidth. When you specify a structured cabling in accordance with the standards you gain many advantages, these include the guarantee of application operations, more flexibility of cabling choices, and connectivity that may otherwise be incompatible, now will be compatible with previous categories, and a design and structured wiring topology universally recognized by professionals and entities responsible for management of these standards.*

Key Terms — *Contingency Planning, Information Assurance, International Standards, Structured Cabling.*

INTRODUCTION

The Structured Cabling takes real importance in the present, given the fast development that communications had in the past few years. Each day, it becomes more imperative that commercial buildings and even residential, have an adequate connectivity infrastructure included in their designs to support internal and external communications, and provide to each workstation or other devices the availability for connecting equipment for information handling. We all are aware of how critical is to be more efficient and productive in today's work environment. Technology is on our side, because it provides means to operate while saving time, space, money, and strategically allocate resources to the advantage of the enterprise. However, these technologies are changing at a fast pace, and increasingly demanding to the corporate network, so you should consider very well the optimum utilization of resources. Before the design and implementation of this alternative, it is necessary to research on the purposes and expected outcomes of implementing the security of computer networks to ensure functionality and minimize the risks of vulnerability in the networks, serving with the international norms and standards established for the good operation, development and operation of the network. These systems must be flexible, adapt to constant changes and needs of companies; they must also be safe to safeguard the information.

JUSTIFICATION

The objective of the project is to design and define a LAN network of telecommunications that interconnect the computers located in each workstation with the data and application servers, as well as with external providers of telecommunications services. This network will enable the establishment of a secure communication and flexible, and endure all data services, voice and Internet. This structured cabling

system is an open architecture design because it is independent of the information that is transmitted through the network. It is designed with a bus topology, resources are spent in a single structure of cabling, and not in several (such as in buildings with conventional cabling). It is a network that can last without replacement of 10 to 20 years, a structured cabling system allows you to move staff from one place to another, or add services to be transported by the network without the need to incur high costs of recabling. Prevents breaking walls to change circuits or cabling, which also causes temporary closures or inconvenience in the workplace. In the economic sphere, the initial cost of a complete installation of cabling will avoid futures changes or additional investment. Often there is a need for the amendment of the electric lines, a new projection of works in the building, etc., while the software components (network operating systems, software installations in customers, etc.) are easily upgrade, the physical components require quite a few changes. The facilities are regulated by standards, which ensures the customer their certification for demanding applications, the type of cable installed is of such high quality that enables the transmission of high speeds for local area networks, the system of wiring is secure both at the data level and at the level of personal security, allows easy management and systematic of the shifts and changes in location of people and equipment.

NETWORK CLASSIFICATION

The network implemented in this design is the local area network (LAN-Local Area Networks): LAN is a group of computers that belong to the same organization and are connected within a small geographic area through a network, usually with the same technology. A local area network is a network in its simplest form. The speed of data transfer in a local area network can reach up to 10 Mbps up to 100 Gbps. It is characterized by be restricted in size, transmission technology, generally broadcast), high speed and topology. It has a low error rate.

INTERNATIONAL STANDARDS APPLIED

Different associations which were developed many standards applied in this project. The Telecommunications Industry Association (TIA) is accredited by the American National Standards Institute (ANSI), International Standards Organization (ISO), Institute of Electrical and Electronics Engineers (IEEE), Electronic Industries Alliance (EIA), Technical Standards Board (TSB).

TIA/EIA 568B-2: cabling components through balanced twisted pair. The cable type and quality of the transmission medium to implement. Organization (Telecommunications Industry Association) (TIA) Standard: 568-C.2 (replaces 568-B.2-10) Defines: Performance requirements for CAT 6A channels, permanent links, and component. TIA-568-C (telecommunications cabling standards, used by nearly all voice, video and data networks) ISO (International Standards Organization) Standard: 11801; Class EA Specification Defines: Class EA cabling and component performance requirements for customer premises. ISO equivalent of CAT 6A; commonly specified outside of North America. This standards is for Telecommunications Infrastructure for Data Centers ANSI/TIA-942-A [1].

Institute of Electrical and Electronics Engineers (IEEE) Standard: 802.3ab Defines: Channel performance for 10 GBASE-T Ethernet over balanced twisted pair cables. The IEEE Wi-Fi standards 802.11b and 802.11g. The IEEE 802.1Q protocol, is a mechanism that would allow multiple networks transparently share the same physical environment, without interference problems between them (trunking). IEEE 802.3af, Is Power over Ethernet (PoE). The IEEE 802.11 standard defines the use of the two lower levels of the architecture (OSI physical layer and data link), by specifying its rules of operation in a WLAN [1].

ANSI/EIA/TIA-569: Commercial Building Standards for Telecommunication Pathways and space (October 1990). Specifies the infrastructure of the telecommunications wiring, dare records,

channels and lines between other for its efficiency and development. ANSI/EIA/TIA-569-A: Rules of travel and telecommunications spaces in commercial buildings [1].

This is the functions of this standards.

- Design Criteria and installation
- Routes and spaces
- Calculate duct diameters.

ANSI/EIA/TIA-570: Residential and Light Commercial Telecommunication cabling Standard (June 1991). Specifies Rules for the installation of telecommunications systems for residential and commercial areas of low density. ANSI/EIA/TIA-606-B: The Administration standard for the telecommunication infrastructure of Commercial Building (February 1993). Regulates and suggests methods for the administration of telecommunications systems. Refers to drawings, reports, worksheets, and documentation. Fourth equipment: The fourth of computers is a space assigned for exclusive use of telecommunications equipment. This is based on the ANSI/TIA/EIA 568A, and the ANSI/TIA/EIA 569. Space had been allocated exactly in a corner, thinking as well for the ventilation of equipment. ANSI/EIA/TIA-607: Commercial Building Grounding and Bonding Requirements for Telecommunications (August 1994). The second standard 607 regulates the power systems under which shall operate and protect the elements of the formal system. It is necessary in the design of the laboratory which specifies how to protect the equipment and the Room of telecommunications against electrical shock by proposing that all of these are grounded or connected to a land of physical systems and to allow the protection against electrical shock, if this is not implemented will cause large costs of arrangement to the network. TIA/EIA TSB-67: Transmission Performance Specification Unshielded Twisted-Pair Cabling System - Draft (September 1995). Regulates the specifications of the equipment for the measurement, certification and testing of structured cabling system. TIA/EIA TSB-75- Additional Horizontal Cabling Practices

for open offices-Draft (June 1996). Regulates the relating to office spaces or open offices with high turnover of staff. ANSI/EIA/TIA-568B: Is a set of standards that is structured cabling in commercial buildings and telecommunications services. TSB 36 (cabling with twisted pair 100W UTP -and ftp) and TSB 40 (RJ- 45), How to install structured cabling. TIA/EIA 568B-1: General Requirements. TIA-942 Telecommunications Infrastructure Standard for Data Centers. ANSI/EIA/TIA 568: In this standard are based the minimum requirements for the structured cabling, taking recommendations for the topology maximum distance between the wires [1].

NETWORK EQUIPMENT

Server dual Windows – Linux

This server will be able to withstand video, data, voice and security, as a means of a special configuration in a single manageable package. This implementation is made with the intention of establishing an installation for the operation of laboratory practices of configuring servers and other devices of the network. For this equipment will have the opportunity to conduct tests of manual setup with the implementation of protocols and network concepts. The same will work with dual operating system platforms such as Windows Server and Linux to carry out the functionality of your configuration.

Server Radius - Linux

Radius is a protocol used to provide authentication and authorization services and administration of an account. The Radius server will be in Linux platform with the purpose of including it in the policies of the network of the handling of free software, in addition to this the server can authenticate and authorize the requests of the Radius client and return a Radius response message.

Server Characteristic

These servers will be validated through an access point that will be the access point included

in the wireless module, which also send messages of account management to the RADIUS server.

- Intel Core Duo Processor M 3.40Ghz CPU horizontal.
- Standard Memory of 8GB/ 32GB DDR3-SDRAM UDIMM PC3-12800 1600MHz through 4 DIMM slots.
- Hard maximum of 12 TB SATA 6Gb/s 7200 RPM.
- 16 GB RAM DDR2, Optical Drive DVD Burner.
- LCD TFT active matrix 17¨ high-resolution optical mouse
- Lan Network Card integrated video card.
- Modem of 56 Kbps V. 92 Output and audio input. Multimedia Keyboard integrated serial port.
- USB 2.0 ports, VGA port, parallel port, serial port, Drive 3 1/2.

CABLE UTP CAT.6A

Category 6A cabling is designed to support next-generation applications, including the transfer of large amounts of data at high speeds, up to 10 Gbps. CAT 6A extends electrical specifications to 500 MHz from 250 MHz for CAT6 cabling. CAT 6A cables are fully backward compatible with previous categories, including CAT6 and 5e. Category 6A is also designed to support bundled cable installations up to 100 meters and PoE+ low-power implementations. The standard includes the performance parameter, Alien Crosstalk (ANEXT). Because of its higher performance transmission speeds and higher MHz rating, CAT 6A cable needs to be tested for external noise outside the cable, which wasn't a concern with previous cabling categories. CAT 6A UTP also has a much larger diameter than previous cables. Category 6A (augmented category 6 or CAT 6A) is a standard for balanced twisted pair cable and CAT 6A is designed to support 10GBASE-T or 10 Gigabit Ethernet up to distances of 100 m (328) Feet. Velocity 10,000 Mbps. The third Generation 6A Shielded Cable Shielded cable provides higher

immunity to EMI/RFI and has a smaller OD, typically .29" - .32". However, the cable has a drain wire and foil shield that will increase installation time. In addition, every component in the system must be shielded and properly bonded to ground in order to be effective. To maintain CAT 6A performance, minimum bend radius should exceed 4x OD for UTP and shielded cable. This radius is significantly larger than CAT 6 and 5e. TIA recommends storing 10 feet of extra cable in the telecom room and 12-18 inches above work area installations for re-terminations and to accommodate moves, ads, and changes. The final result will be a high-performance system that supports today's requirements and provides a smooth migration path toward 10G network performance. Organization Standard Applied-(TIA) Standard-568-C.2 (replaces 568-B.2-10), ISO Standard- 11801 and IEEE Standard-802.3an [2].

EQUIPMENT ROOM

The equipment room is a space assigned for exclusive use of telecommunications equipment and counting offering service to users. This based on the ANSI/TIA/EIA 568A and the ANSI/TIA/EIA 569. Telecommunications Infrastructure Standard for Data Centers ANSI/TIA-942-A [1].

PATCH CORD

Connection Cables - Category 6A UTP Cables for connecting the network features and specifications to avoid crosstalk (or crosstalk) and the noise is used to connect the patch panel with the computer on the network (switch or hub) RJ45 plug has its design is under the rules ANSI/TIA/EIA 568A and must comply with ANSI/TIA/EIA 568B. The standard cable is used for 10BASE-T, 100BASE-TX, and 1000 BASE TX (Gigabit Ethernet). Reaches frequencies up to 250MHz in each pair and a speed of 1 Gbps.

PATCH-PANEL

Two Patch panel of 24 RJ-45 ports that allow for the proper management and structure of the cables that interconnect the computers on the network, with bandwidth of 250 MHz. located in the cabinet or rack of communications. Mask should be black in color and in steel. Each port on this must have identification system for front and back labels also each port must be labeled on your back so you can work with the cabling system ANSI/TIA/EIA 568A and ANSI/TIA/EIA 568B, in turn, each front port must be connected as shown with the plug in the RJ-45 Patch Cord [1].

Different characteristic of patch panel.

* Verified according standard ETL, Adopted under standard • UL, CSA, Cat 6 24 ports.
* Complies with the EIA/TIA standards 568a, 568b and ISO/IEC 11801, Compatibility with network technologies.
* Offers extension capabilities network easy.
* Ideal for Ethernet networks/Fast/Gigabit Ethernet (1000Base-T),Compatible with CAT 3 cabling, 4, 5 and 5E.

CONNECTOR RJ-45

Thirteen connectors were installed, these elements have been designed under the guidelines that complies with the final rules of the ANSI/TIA/EIA 568A and 568B according to the label color coding. Well same must exceed all the requirements of performance standards of the ANSI/EIA/TIA 568B category 5e and Category 6A for the patch cord. In the design of the lab network will be used for connecting the wires from the RJ-45 plug up to the patch panels [1].

CABLE DUCT

The Cable duct is used for the distribution and support of the cabling, as well allows you to connect the same hardware between the outputs of the work station toward the room of computers. The channel to use in the laboratory is in metal foil sixteen gauge cold rolled electrostatic paint, twelve-

centimeter with by five centimeters meters high. Will be installed with all its accessories and couplers that correspond to the UTP cable Cat. 6A of the cabling, it will be fixed to the wall with bolts and screws all the way inside and will have self-adhesive fasteners with plastic ties to hold the drivers each metro. Due to the fact that it's already installed a cable duct with the electrical cabling is not recommended to share the same cable duct for the structured cabling since it generates noise and interference in the transmission of information in there the decision to install a new duct in the bottom bordering the area from work stations, with a recommended distance of fifty centimeters at least between the two, so that the network is not affected in the speed of transmission and the supply of power to the equipment. This channel must have fixing points and assurance every one meters to the wall. Additional installed the Will plates these are the structures or plastic covers that are normally found on the walls, and allow the connection of PCs on the network. These devices are modular and come without the connector so you must add them to connect. It depends on where you need to install Will plates are available that allow one to four different connections at the same time [1].

DESKTOP PC

The HP Desktop PC, 110-243wb sticks to the basics, providing the competitive performance and students. Was installed thirty one computers, essential features you need for routine tasks like email and social networking, homework and personal finances or casual Web browsing and online shopping. The clean modern styling makes the HP 110 Desktop with 8GB Memory, 21.5" Monitor and 1TB Hard Drive reliable, easy to use and extremely affordable.

* HP 110-243wb Desktop PC,
* HP Desktop PC, 110-243wb Key Features and Benefits.
* AMD A4-5000 Quad-Core processor, 1.50GHz, 2MB L2 Cache, 8GB DDR3

SDRAM system memory (expandable to 16GB).

- Gives you the power to handle most power-hungry applications and tons of multimedia work, 1TB SATA hard drive.
- Store 666,000 photos, 285,000 songs or 526 hours of HD video and more.
- Super Multi DVD Burner, Watch movies and read and write CDs and DVDs in multiple formats,10/100Base-T Ethernet, 802.11b/g/n Wireless LAN.

NET INTERFACE CARD

Is a peripheral that allows communication with devices connected together and sharing resources between two or more computers (hard drives, CD-ROM, printers.

- Supports under standard IEEE 802.11b/g 2.4 GHz, Supports WMM (Wi-fi Multi- Media)
- Supports 64/128 Bit WEP encryption and WPA/ WPA 2
- Supports operating systems Windows 8 SE/ ME/ 2000/ 7 / Server 2012

SWITCH

The network will have two Switch this is an active element of the network considered an intelligent Hub. Its operation is classified within the two layers of data network of the OSI Model; in this way allows you to identify and recognize "MAC" addresses that are usually sent by each port as well same when the information reaches the switch this already knows which is the most appropriate port of exit. The 24-port Gigabit Switch Cisco SGE2010P allows you to expand your network securely. The configuration of the switch on the Internet is safe with the use of SSL. Cisco equipment SGE 2010P is optimized to provide maximum system availability, with fully redundant stacking. Redundant power options and dual images for flexible upgrade firmware. The switch protects the network with IEEE 802.1Q VLANS, IEEE 802.1X port authentication, access control lists (ACLS), prevention through denial of service

(DoS) and MAC-based filtering. The functions of quality of service (QoS) and traffic management contribute to ensure improved voice and video communications and reliable crisp. Implementations For wireless or voice over IP, Cisco equipment SGE2010P is an IEEE 802.3af relative to Power over Ethernet (PoE). The function of automatic detection of load allows the circuitry detects the existence of PoE in the terminals before providing power. For added security, each port has independent protection against overload and short circuit, along with LED indicators that show the power state. Provides PoE power available 15W in a maximum of 24 Gigabit Ethernet ports for the wireless access points or micro VoIP phones with PoE capability [1].

ROUTER

The award-winning Cisco 2800 Series routers, ideal for small to medium-sized businesses and enterprise branch offices, are designed for wire-speed delivery of highly secure concurrent services and can accommodate multiple T1/E1 connections for services including: Data, Voice, Video and Wireless. The integrated services routing architecture of the Cisco 2800 Series provides the performance, availability, and reliability needed to scale mission-critical business applications in the most demanding environments. Features of the routers include:

- Cisco Configuration Professional (CCP) for simplified management.
- A modular platform with a broad range of interface options.
- Up to 2 10/100/1000 Mbps built-in routed ports.
- Up to 64 10/100 Mbps switch ports with optional Power over Ethernet (PoE), for providing DC power to network devices such as IP phones, Up to 1500 VPN tunnels.
- Cisco Call Manager Express (CME) call-processing support for up to 96 Cisco IP phone users.

- Cisco Survivable Remote Site Telephony (SRST) support for up to 96 Cisco IP phone users, allowing the router to provide call-processing functionality to keep voice service in operation should the connection to Cisco CME be lost.
- Support for wireless LAN standards 802.11a/b/g, Built-in- security.
- Support for a Small Form-Factor Pluggable (SFP) port for Gigabit Ethernet (except 2801)
- Built-in redundant power supply connector (except 2801).

TESTING OF CABLING CAT 6A PERFORMANCE TESTS

To verify that the installation and cabling installation is in perfect operation for laboratory conditions and requirements. There of must have the limit values for certification testing in category 6A [2].

- Wire map, Length, Attenuation.
- Propagation delay, Delay skew.
- NEXT – near-end crosstalk.
- PSNEXT – power sum near-end crosstalk.
- FEXT – far-end crosstalk.
- ELFEXT (ACRF) – equal level far-end crosstalk (attenuation-to-crosstalk ratio, far-end).
- PSELFEXT (PSACRF) – power sum equal level far-end crosstalk (power sum attenuation-to-crosstalk ratio, far-end).
- Return loss (RL)
- PSFEXT – power sum far-end crosstalk
- PSACRF – power sum attenuation-to-crosstalk ratio, far-end.
- AACRF – alien attenuation-to-crosstalk ratio, far-end.
- AFEXT – alien far-end crosstalk
- ANEXT – alien near-end crosstalk
  PSAACRF – power sum alien attenuation-to crosstalk ratio, far-end.
- PSAFEXT – power sum alien far-end crosstalk

- PSANEXT – power sum alien near-end crosstalk.

ELECTRIC NETWORK

To meet the final design of the lab network is necessary to have an electrical structure that meets the requirements for equipment connections assigned area. AWG wire for power N12, N10 AWG be used for ground line and N6 AWG wire to run lines to electrical panels and to the electrical ground wells. Was installed a totalizer, Transitional element located between the regulator and the regulated power board to distribute the sum of the transmitted power to the board. This element was located within the structure of the network after the regulator to make way for its distribution on the electrical panel. Was installed regulator because Voltage Regulators provide stable voltage which require computers and other commercial and industrial electronic equipment, automatically correcting variations in Air conditioning power line while limiting voltage spikes, using a sophisticated system he or suppressor compromisers . It will have a controller to support and prevention of computer equipment laboratory in case of faults in the electrical system, a type of two-phase regulator incorporating voltage regulator range of one is used to 40 KVA, this element was located on the first floor next to the main electrical panel that manages the computer center energy, network functionality specified in the electrical part of the document. Was installing a pole ground system for the Laboratory, is due to constant fluctuations in electricity flow are exposed to computer equipment and which should be offered the protection needed for its proper functioning. Since this system is the responsible for preventing and withstand heavy shock channeling through its grounding system transmitted through its copper cable. Regulated output electrical outlet are installed with grounding port installation on the floor in places where it does not interfere with the data network at a distance of more than fifty inches. In the laboratory they will have sixty outlet

regulated outputs that are distributed throughout the study center, including equipment room.

ELECTRIC PANEL

It will have three Electric panel capacity for three phases one for eight circuit capacity and two boards with six circuits capacity, which are allocated for use by the laboratory as follows:

Electric panel number 1 will be near the main entrance accessible only to employees consist of eight circuits.

- Circuit one to Circuit six will be connected five workstation per circuit in this way will be connected thirty computers.
- From seven and eight circuit to be connected computer center manager and ten regulated power outlets.

Electric panel number two on the back of the center will be near the exit door accessible only to employees consist of six circuits.

- Circuit one will be full used for air conditioning.
- The circuit two to six will be used to distribute the remaining energy required by the center.

Number Three electrical panel located in the equipment room of the center will be near the door accessible only to employees consist of six circuits. It will manage power equipment room which comprises Dual and Radius servers and other equipment.

ACCESS POINT

Composed of two Wireless Access Point fifty four Mbps LAN Brand PLANET: To transmit wireless internet signal for electronic equipment such as laptop and Smart Phone, the features that you have are the following:

- Access point PLANET Ref.-WAP -4033.
- Supports sixty three clients for network connection. (For best performance, the suggested maximum number of clients of a WAP-4030 is 25).

- Support Standards Wi-Fi: IEEE 802.11b and IEEE 802.11g.
- High data rate up to 54Mbps, Auto delay rate.
- Integrate Ethernet networks and wireless LAN.
- Provides WPA-PSK, 64/128-bit WEP encryption and MAC filtering to protect wireless data transmissions.
- Supports DHCP client for automatic IP address assignment.
- Interface LAN, one port RJ-45 UTP.
- Frequency Band 2.400 ~ 2.4835GHz.

CONTINGENCY PLANNING

The purpose of this plan is to maintain the continued implementation of mission-critical processes and information technology systems of the computer center in the rare event that an event could cause the systems to fail at the minimum of its production. Will get backup copies of all the elements of software necessary to ensure the successful implementation of systems or applications of the institution [3].

- Back up the operating system.
- Back up of the Base Software.
- Back up of data.

By agreement with another institution that has similar or larger equipment and to provide the confidence to continue activities to be put at our disposal, to place a contingency and as a final solution to the incident occurred is searched. Such agreements must have both considerations equipment like environment and work facilities. For backups will be taken into consideration the use of encryption tools. Main service that must be restored and recovered in alternative computer center [3].

- Windows 8, Email,
- Internet, Antivirus, Microsoft Office Tools.
- Software Base, Executable application
- Database Servers, Information Back up.
- Data base Back up
- Platform for Applications (Systems) Back up
- Website Back up, File server.
- Server Domain Controller Backup

## REQUIREMENTS OF LOGICAL AND PHYSICAL SECURITY

The supporting information will be saved in a safe place. Administrator must do an inventory of physical computers as well as the software of each machine. The system administrator is responsible for restoring the information. Administrator must make backups of your critical information, as long as you have the physical means to accomplish it and must take control of the records database for the management of access control. Creating relevant measures to be installed the network cabling to fifty centimeters or more, away from the electrical cabling and five centimeters of any water or gas or similar in addition to channel them by different ducts. Will you keep the wires away from devices that can introduce noise in the same were prevented, kinks in the cabling. It channeled the cabling without staple to prevent fractures in the cabling. The cable management includes the label of the cabling in terminals at the same [3].

- UPS (power supply is not interruptible).
- Air Conditioning, Extinguishers, Power Plant.
- Prevent access to the network equipment from the outside, limiting the possibility of denials of services or unwanted intrusion.
- Filter potential IP spoofing attempts that may appear from suppliers.
- The temperature required for this design is 18-24 degrees Celsius using air conditioning.
- For the protection of networking equipment such as computers, Router and Switch is to use voltage regulators (UPS).
- Connect management centers to the network in a transparent manner, in an environment of high availability and contemplating the requirements of different applications.
- Build a firewall that protects the network from external attacks from intruders or hackers.
- Establish safety requirements AAA for access to all computers, centralized authentication on the server being.

- Security lock, will be adjusted to provide security at entry and exit from the laboratory. These keys will be handled only by the administrator of the laboratories as well as access to the equipment room.
- Signs, Additional to have more control and better equipment identification labels with numbers are placed at the ends of each UTP cable or patch cord, this in order to identify them on the rack and the output patch panel and the arrival of the Switches.

For more safety Adopted additional access control policies.
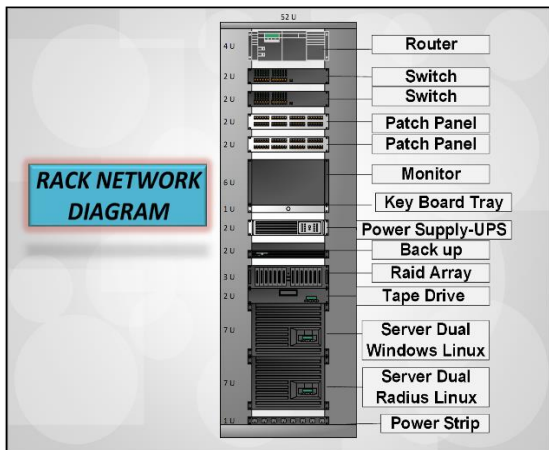
- All users must authenticate with an account.
- The Computer Center administrator shall administer the Database and System logs.
- It is prohibited to access the system different from the name registered in the official user identification.
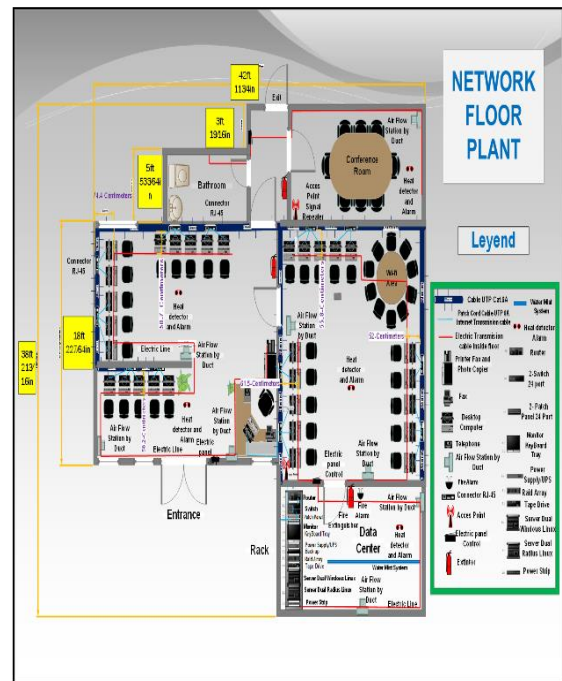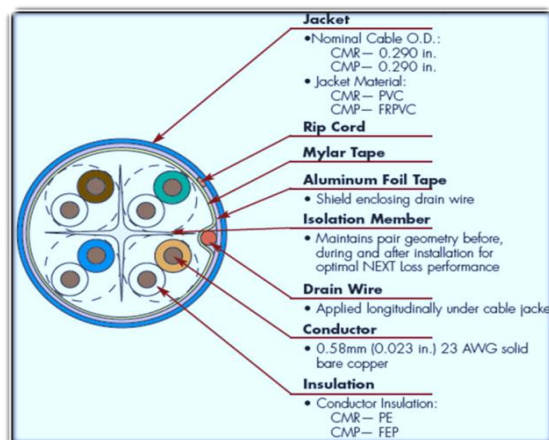

Figure 1
Network Floor Plant
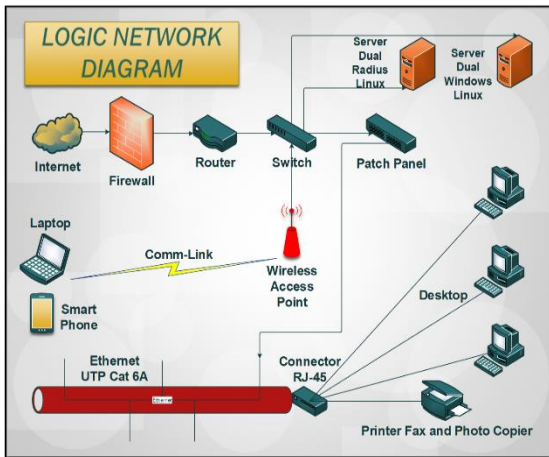
Figure 2
Logic Network Diagram

Figure 3
Rack Network Diagram

Figure 4
Cable UTP Cat.6A Specifications

CONCLUSION

Standards are the platform of all telecommunications networks. They establish guidelines and recommend best practices for every aspect of telecommunications cabling systems from network design and installation to cable performance and verification. Standards establish technical criteria and ensure uniformity and compatibility in and between networks, even multivendor networks. They simplify moves, ads, and changes. They maximize system availability, and they extend the usable lifetime of a cabling system. Standards enable you to build structured cabling systems that can easily accommodate existing technologies, equipment, and users, as well as future ones. Companies that pay close attention to future structured cabling needs will be ahead of their competitors and will not have to play catch-up in their data centers the same way others will. Many major companies, including retailers, health care facilities, and educational institutions, are investing in new data center cabling infrastructures. Many data center specialists will state that a rock-solid cabling system is the foundation of a network infrastructure which in turn serves the larger IT infrastructure. In communications cabling, standards define cabling types, distances, connections, cabling architectures, performance parameters, testing requirements, and more.

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