Implementation of an All in One NGN

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Abstract— **A next generation network intergrates the services of otherwise vast domains of applications into a single fully functional network .This network would provide a single platform complex in nature due to increased heteroginity. The voice ,data and video services would be provided on wireless and optical means of transmission with considerable measures to ensure security both during transmission and to the end point. The network is designed to satisfy both QoS(quality of Service) and to the (Quality of Experience) measuring performance of network in terms of users perception.A network design takes into account many other important factors like scalability, cost ,load management,congestion control .This paper discusses the procedures for design and implementation of NGN along with the possible devices used in the same and the challenges during the network design & establishment**

Index Terms— **Next Generation Networks, NGN, Design,Network Implementation.**

I. INTRODUCTION

The internet today has provided a huge contribution for data connectivity in between millions of users.Increased need to confine the requirements to one platform gave rise to the next generation networks.These Networks included a variety of network types from wireless to wired,,from voice to video and from data to telecommunication. Adding voice and video to this otherwise fully functional network would optimize the usability that a user mobile or stationary would desire. NGN's use the technologies of internet that is IP addressing and multiprotocol label switching (MPLS). Although these concepts are theoretically known practical implementations seem to be difficult.There is an increased need for energy efficient and high security networking.

The Network convergence provides a possible solution to the problem of reducing the operational costs by reducing unnecessary expenditure on multiple parallel and overlapping networks.

II. REQUIREMENT ANALYSIS

There has been a significant shift from the traditional network to an all IP based network The proposed network provides the services of any data ,voice network with additional features of video conferencing .the whole network is secured with features for log maintenance and management of every device.The data network consists of basic setup of routers and switches with a core switch acting as a server and various

distribution switches for interconnectivity and scalability of networks. The network is made mobile with the use of access points which can be placed both indoor or outdoor with maximum practical connectivity of 50 mtrs.This increases the scalability of networks,which is constantly monitored by a controller

III. IMPLEMENTATION

The proposed network would converge the services of voice,data, and video,by providing services to both the wired or wireless users.There would be controlled monitoring and administration of each device.

In practical applications there are usually 3 main types of switches based on cisco's hierarchical model

Core switches: These switches work as the backbone of the entire functioning network which includes the usage high-end switches and cables such as optical fiber cables. The traffic at the Local Area Network is not routed and no manipulation of the packets is carried out by this layer.Rather, this layer is ensures timely and reliable delivery of packets. These switches have high data transfer rate and high reliability as these switches work as the backbone controlling the entire network.The core swiches used in this design are cisco 4506 –e series.

Distribution switches: These type of switches are LAN-based and layer 3 switches which ensures that packets are routed between VLANS.The switches in this layer provides packet filtering and caters to the Qos requirements of the users.

Access Switches: These devices used are hubs and switches.These switches are concerned with client connectivity. Ensuring delivery to end point.and includes MAC address filtering and separating collision domains.

The core switch is usually connected to all the important devices, which includes:

➢ FAZ 200d – Forti analyser is used to provides security analysis and management functions .It combines several functions like log management,security analysis and shows reports on single web interface. It is also used as a central administrating unit which performs event analysis,data mining,quarantines malicious files and performs overall accessment.

➢ Cisco PRIME NCS- The Cisco Prime Network Control System (NCS) broadens the network visibility and provides integrated services of wired, wireless, and security management in a unified platform for easier and efficient troubleshooting and network operations. It provides complete visibility of all the devices functionalities .

➢ AIR CT-2504-k9-This is a wireless controller which provides and monitors all the wireless functions.

➢ Cisco BUSINESS Edition 6k-This is a server which is used for the installation on CUCM(cisco unified

communication manager) which is used to maintaining and enabling calls.

➢ Fortigate 600c- Unified Threat Management (UTM) is a device from Fortinet provides overall security to the network infrastructure and increases the efficiency of performance.

The ISP link is terminated on the UTM along with a separate backup ISP link.There is a separate voice router used for Voice over IP functions and a PRI(primary Rate interface) link is terminated on that.

The important VLANS are configured on the core switch.There are separate VLANS for Voice,Video and data and management.These separate VLANS provide the first basic level of security.The next levels are provided by subsequent devices like UTM etc.

The access layer switches are connected to the distribution layer switches via access links.These switches can thereby be connected to serve the purpose of configuration by either connecting to desktops or VOIP phones or video conferencing kits.The wireless services are provided by access points that are connected to the distribution layer switches and can control wireless unite.
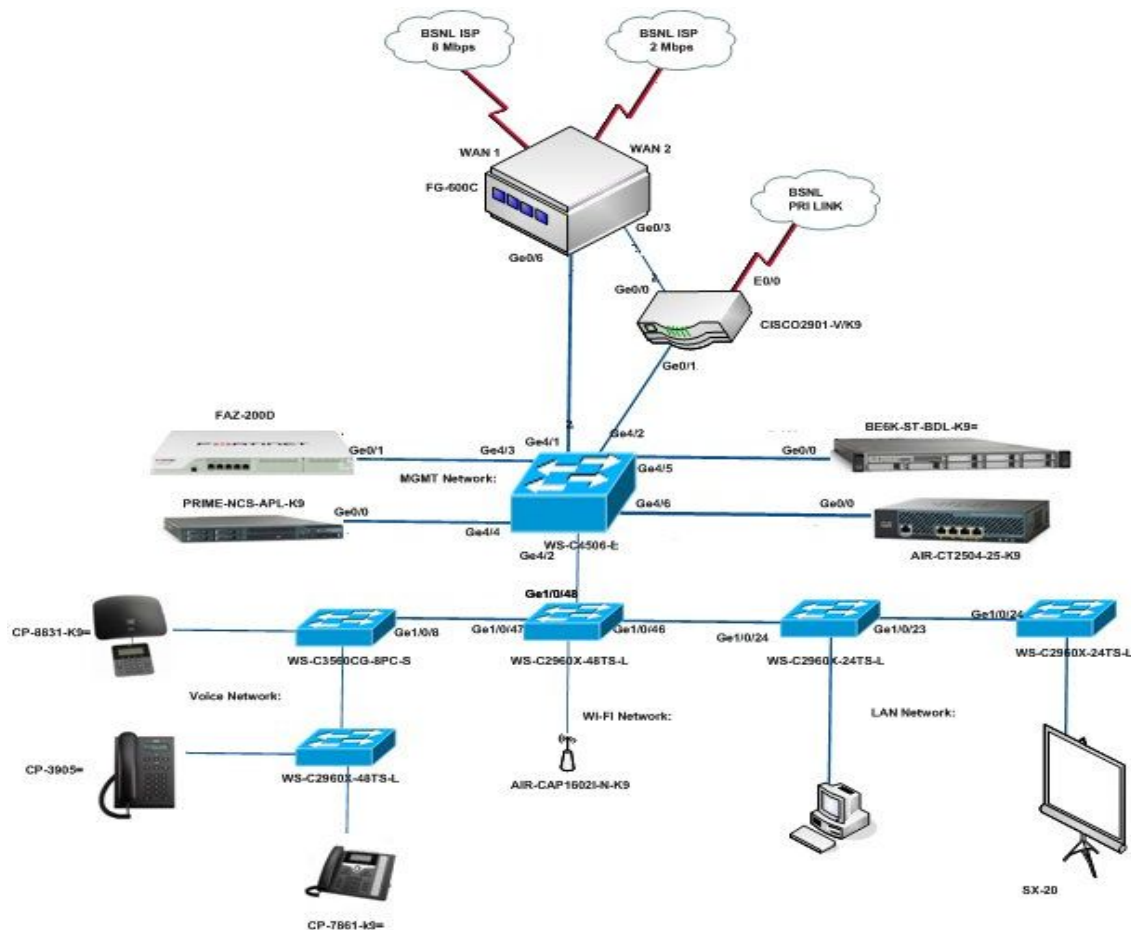

Figure 1:Design Of The Converged Network

CONCLUSION

The traditional network usually consists of separate networks for every domain.The convergence towards next generation networks would drastically change the future of the telecommunication industry by providing a single network with all the functionalities of different domains .This would give rise to a highly efficient,energy conserving network with improved security.This can further be improved by giving yet another dimension by designing the software to perform the

necessary functions aka Software Defined Networks for enhanced performance of Next Generation Networks.

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