Study of Managing Traffic Performance in Converged Networks

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Abstract: Universally major network engineers have incorporated network convergence into their strategy to grow service revenues and minimize actual capital and operating costs Convergence occurs in applications, in network control, in the higher transport layer, as well as in the access network. This convergence of networks means that various types of traffic flows, which have been carried by separate specialized networks, now share the resources of a single IP-based network. In the access, the trends are towards wireless convergence as well as convergence of various wireless access technologies. Network convergence will be successful only if the quality of the individual s- vices is maintained in the new network environment without undue increased costs. The quality of service delivery is critically dependent on how network performance and availability, as experienced by the traffic flows, are managed. It is very critical to manage traffic in converged network. It requires network planning, resources planning and so, we are focusing on the managing traffic performance in converge network in converge by interacting convergent and divergent forces.

Keywords: convergent, divergent, converged networks, Sniffer, Tracker, IP Convergence, Post Convergence

I. INTRODUCTION

Network convergence refers to the provision of telephone, video and data communication services within a single network. In other words, one pipe is used to deliver all forms of communication services. The process of Network Convergence is primarily driven by development of technology and demand. [1] One main goal of such integration is to deliver better services and lower prices to consumers. Users are able to access a wider range of services, choose among more service providers. On the other hand, convergence allows service providers to adopt new business models, offer innovative services, and enter new markets.

Today's networks are congested. In addition to carrying traditional business application data (e.g., email and file transfer), internal networks are now also carrying voice traffic and on demand video [2]. Coupled with additional alerting and control traffic like NetBIOS and SNMP, this is creating a perfect storm of monitoring and security problems for information security and network engineering professionals [3]. "The new initiatives of the 21st. century are based on the business process transformation within a service-oriented architecture, "says Frank Dzubeck in a Feb. 2008 Network World article about the growing threat of network latency.

Convergence is one network where all traffic types co-exist. It is the integration of voice, data and video solutions onto a single Internet Protocol (IP) network. Multiple data and traffic types are aggregated to coexist on a ubiquitous network infrastructure [4]. Additionally, a converged network must sufficiently handle multiple traffic types while exhibiting different behaviours to deliver consistent quality and reliability for the user. For example, with a real-time Voice over IP (VoIP) application, a converged network must reliably route voice packets with minimum delay, limited jitter and without dropping or losing packets [5].

II. NEED OF CONVERGED NETWORK

The critical drivers that lead an organization to consider a converged network are the measurable cost savings related to infrastructure, staffing and facilities, as well as improvements in productivity and customer care. There are certain circumstances that can accelerate the evaluation and adoption process [6].

- Building a new office or moving to a new location.
- End of lease for PBX or support contract.
- Necessary upgrades for data network.
- Lack of expansion capacity of current voice network.

In addition to reducing an organization's total cost of ownership for its network, and reducing the on-going costs required to maintain and upgrade the network, moving to a converged network simplifies the administration of the network. This productivity improvement allows a company's business communication staff to focus more on strategic initiatives that can generate demonstrable business benefits.

III. OBJECTIVES OF THE RESEARCH:

a. How can we solve the problems of network access through good and reliable network convergence? Is the network convergence is offered able and suitable for companies and organizations.
b. Designing interactive and feasible procedures for network convergence.

c. Designing and suggesting straight procedures for network convergence for avoiding network traffic collision.
d. Implementing collision detection protocol at every instance, for avoiding collision.
e. VI. Security procedures are to be enhanced, but it should not slow down the network speed, for that suggesting some desirable procedures.

IV. IMPLIMENTATION
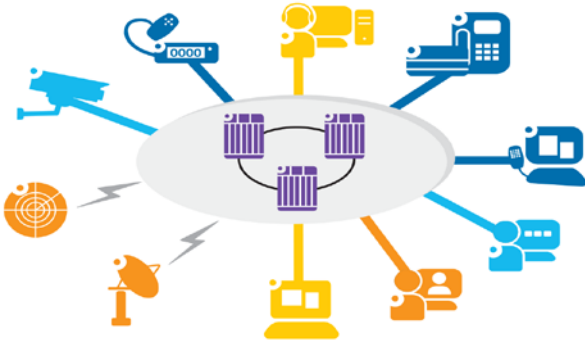
- Assessment
  - ☐ Is your network ready for Voice?
- Planning
  - ☐ Have made decisions to ensure an effective rollout?
- Impact analysis
  - ☐ Is everything running as smoothly as planned?
- Ongoing management
  - ☐ How is your network changing and growing over time?

TOOLS AND TECHNIQUES OF RESEARCH:

a. Wireless Sniffer

Sniffers have been widely used to monitor network traffic at the data-link layer and above, most commercial wireless sniffers are costly and are not a flexible open source solution. However, passive sniffing does not interfere with the hosts under test and does not require access to the hosts themselves. Thus sniffers can be used to measure black-box devices such as hand-held game consoles. The document Wireless Sniffing by Example -- How to Build and Use an IEEE 802.11 Wireless Network Sniffer describes how to build and use a basic IEEE 802.11 wireless sniffer from open source software and off-the-shelf wireless networking hardware [7]

b. Host Access Point:

A wireless Host AP uses a Linux PC and off-the-shelf wireless networking hardware working in master mode to provide access point functionality. An end-host wireless client using a commercial AP should be able to transparently associate and use the Host AP, instead. The control of the internal workings of the Host AP allows

exploration and understanding of the ramifications of internal AP resource allocation decisions on overall WLAN performance [7].

V. APPLICATION LAYER

Media Tracker: Media Tracker is a customized video player that plays Microsoft Media Player from a pre-selected playlist. For each video played, Media Tracker records video performance information including: encoding data rate, payout bitrate, time spent buffering, video frame rate, video frames lost, video frames skipped, packets lost and packets recovered.

Real Tracer: The Real Tracer tools are designed to measure the performance of Real Video. Real Tracer includes Real Tracker, a customized video player that plays Real Video from a pre-selected playlist. For each video played, Real Tracker records user-centric video performance information, including frame rate, jitter and user ratings, and can either send the performance information by email or FTP to a server or save it locally to disk. Real Tracer also includes Real Data, a data analysis tool that helps manage, parse and analyze data captured by Real Tracker.

VI. TECHNOLOGY IMPLICATIONS

Convergent solutions include both fixed-line and mobile technologies. Recent examples of new, convergent services include:

- Using the Internet for voice telephony
- Video on demand
- Fixed-mobile convergence
- Mobile-to-mobile convergence
- Location-based services
- Integrated products and bundles

Convergent technologies can integrate the fixed-line with mobile to deliver convergent solutions. Convergent technologies include:

- IP Multimedia Subsystem
- Session Initiation Protocol
- IPTV
- Voice over IP
- Voice call continuity
- Digital video broadcasting - handheld

A. IP Convergence

Data travels across the Internet courtesy of several sets of rules called protocols. Collectively, these protocols make up the Internet Protocol, or IP. The standardized set of rules is what allows computers to communicate across networks. It's what makes the Internet possible. You may have encountered a term called IP convergence. What does this mean? If IP is a set of rules that defines how data travels across the Internet, what is convergence?

B. How Information Travels on the Internet

Data travels across the internet in packets. Each packet can carry a maximum of 1,500 bytes. Around these packets is a wrapper with a header and footer. The information contained in the wrapper tells computers what kind of data is in the packet, how it fits together with other data, where the data came from and the data's final destination.

C. Post-convergent

Post-convergent literally means "after convergence". Convergence is similar to 'merge'. Different entities, such as two different rivers, may merge at a certain point. Then these are converging. In convergent state they go as one entity in post-convergent, after merge, state. Some authors recognize the merging of media as converging of cultures in contrast to technologies, Henry Jenkins being an example. It is the period during the development of a medium in which, having incorporated its entire "parent" media, is used for purposes beyond those of the parent media.

D. How will 4G networks change business?

Today's cell phones are generally great at what they were originally intended to do -- make calls, send text messages, that sort of thing. But with an ever-growing amount of Internet-related activity taking place on modern mobile phones, the current networks can't keep up. They have a knack for becoming completely swamped whenever too many people try to update their Twitter account, download music, watch videos, check traffic reports or do whatever other online activities they're burning to do while away from their traditional computers.

VII. BENEFITS OF CONVERGED NETWORK

- **Speed:** rapid deployment of productivity applications.
- **Reliability:** network availability is increased.
- **Interoperability:** guarantees that multiple applications work together.
- **Pace of change:** easier integration of new technologies.
- **Cost reduction:** resource and time requirements are minimized, reducing implementation costs.
- **QoS/voice quality**: since voice traffic is real time, delay, jitter, and packet loss can adversely affect the quality of the voice or video transmission. A high-quality converged network must be properly designed, configured and managed with QoS as a critical building block.
- **Cost savings**: there is a tremendous opportunity for cost reductions with converged networks, including merging labor, management and administrative overhead — especially network additions, moves and changes — to minimize costs and create economies of scale.
- **Standards**: interoperability brings compatibility opportunities and investment protection to customers that choose standards-based solutions.
- **Upgrading networks:** eliminating duplicate infrastructures creates cost savings and makes network upgrades easier to manage, allowing enterprises to maximize investment protection and take advantage of new applications, security, and mobility solutions more easily and effectively.
- **Security: customers** should add voice virtual local access network (VLAN) encryption that does not affect voice quality. In addition, customers should deploy security technology that adds protection and prevents denial of service attacks, which could bring down a network.
- **Robustness:** customers should review the reliability of LAN-based solutions versus traditional telephony systems while making the converged network transition and ensure that there is adequate network redundancy.

VIII. CONCLUSIONS

In this paper we have studied converge network, various methods and tools of convergence. We can minimize the traffic and manage it well by the planning and utilizing proper resources.

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