Intelligent Network

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Abstract: *Networks are Developing Continuously. The number of subscribers are increasing & new services required more network capacity. Higher capacity demands are tackled with network re-segmentation and node splitting, which leads to more effort & costly on-site re-adjustment of network devices. It will not only result in increased risk for human errors and network unreliability, but also require higher operating costs. To reduce this we require network devices which can control all errors & automatically fix these errors & monitor the whole network. For this we require Intelligent Network.*

Keywords: Intelligent Network (IN), Nodes, Service Switching Point (SSP), Signal transfer Point (STP), Service Control Point (SCP), Off-hook, On-hook, Service Creation Environment (SCE), Service Data point (SDP)

1. Introduction

In today world we see that in a network number of subscribers are increasing & new network services require more network capacity. For fulfilling this we require a network which is capable in handling this. So here we need intelligent network. By intelligence, we mean intelligent network devices that can automatically aligned & management software to control and monitor the whole network. Adding intelligence to network can help in decreasing operating cost and also reduce error which occur in network. We typically save 50% in operating costs & payback times 1-3 years for the additional investments require to enable the intelligence. [1]

2. Current Situation of Network

Network devices are getting more complex. Although the devices are robust & designed to stand in rough conditions. But after this also technical problems can occur like configuration faults, hardware defects etc. and solving this we need re-adjustment of the devices. With increasing capacity demands, network operators need to invest heavily both in new network hardware & the maintence & renewal of their network. It means with the size of the network expanding, different types of challenges are coming. Network operations are never entirely risk free & they are full of human mistakes, which leads to service interruptions and many errors. Network downtime is often happened & it's very costly & can have a serious impact

On customer and therefore it is very necessary that network problems are solve fastly.
Network maintenance is very hard task & require extreme care & manual maintenance is often a prime reason for high operating costs. Operators need highly skilled peoples for guarantee quality of service and to perform adjustments and maintenance to network components such as nodes and amplifiers. [4]

3. Problem with Network

The main problem in network management and maintenance is that network problem can be difficult to locate where there is a problem in the network, operators cannot see where this problem actually occurs, so they have to go through complex network diagrams to show where network elements are located. This slow down the process and results in longer repair times & higher costs.
Information on the status of network elements is a basic feature in many network systems but they often fail to deliver accurate information on where these elements are physically located & what their impact area. If documentation is not available lots of time can be lost & a frustration generated both among the customers & the maintenance crew. [1]

Figure 1: Testing data- load current (amperes)

4. SOLUTION OF THE PROBLEM: BRING INTELLIGENCE

Maintaining & upgrading a network cannot be costly & time consuming. An innovative way to speed up network, save costs, & improve network is available. The answer is intelligence i.e. bringing intelligence in network.

The problem can be best solve by populating the network with intelligent devices which are capable of monitoring & adjusting themselves automatically. By using these devices any errors & maintenance work which need to be done can be solve & it also reduce downtime & unnecessary costs. In this way, intelligence is built with the combination of automatically configuring intelligent fiber optics nodes & amplifiers & a management system that allows automatically address problem.

Additionally, I found out that it is important to make network management easier. Today network management systems include wide range of essential features, so it can help every individual user. [3]

5. Impact on Business: More Savings

The business benefits of intelligent networks are wonderful. According to my research, moving to an intelligent network architecture in a medium size network of 120000 users can amount to saving of 10 million euros over 15 years, reducing the total cost to less than 50%. For a large network of 1.2 million users, this means saving of almost 100 million euros over 15 years. With this type of reductions in costs, payback times for intelligent network equipment investment are very short. We see the investments to intelligence in the figure given below (Figure 1). In this fig. it shows lifespan costs of a traditional network of 120000 subscribers compared to a similar sized network equipped with intelligent devices. [1]
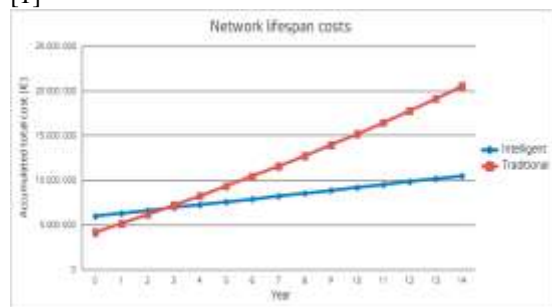

Figure 1

Lifespan costs of a traditional network of 120000 subscribers compared to similar sized network equipped with intelligent device [1]

6. Need of Intelligent Networks

According to a study conducted by Stanford University, USA, it is reported that many scientists have predicted that a global network of affordable multimedia computers, online libraries, & enhanced human communications in general will improve access to high-quality education. But for this we require a network which can be capable in handling all these without any error and any other maintenance costs & that network can also be cost-effective and reliable. So, here we an intelligent network which is capable in handling all errors and manage the network automatically with low cost & with low maintenance. The three main elements of intelligent networking strategy are system-level approach to network design, how the network communicate with the rest of the information technology.

Infrastructure & performance of network in delivering of applications & services. Also adaptation of intelligent network can also decreased higher maintenance costs and also increase network speed. [4]

7. Architecture of Intelligent network

The intelligent network architecture consists of the following main components which are presented below:

- **Service Switching Point (SSP)**

Service switching point is the additional functionality built in a voice switch to provide trigger for a call to IN. The triggers are dialling, answering, Off-hook, On-hook etc.

- Service Control Point (SCP)

SCP is the heart of IN. It receives queries from SSP and provides direction based on criteria define in SCP application.

- Signal Transfer Point (STP)

STP's are basically routers which route the signal to the SCP based on the best route. These are useful in bigger Networks.

- Service Creation Environment (SCE)

This is the development environment used to create services on IN. The actual services can be created in low level languages as "C". The services created may be prepaid service, Advance routing services etc.

- Service Data Point (SDP)

This is the database that consists the data of the subscribers & corresponding services offered. E.g. the balance which is remaining in the particular prepaid customer account.

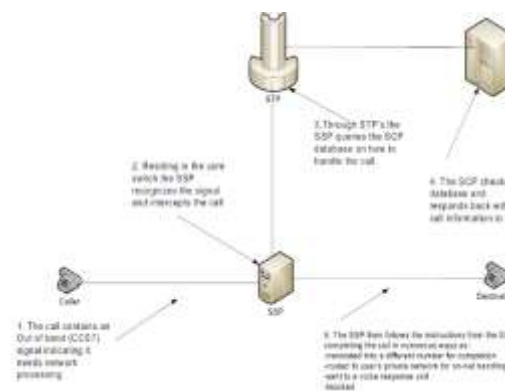Take look at the Figure 2 which shows the IN Architecture [5]

Figure 2

The upper diagram (Figure 2) shows the IN architecture and after this (Figure 3) shows the working of each component in an Intelligent Network. [2]

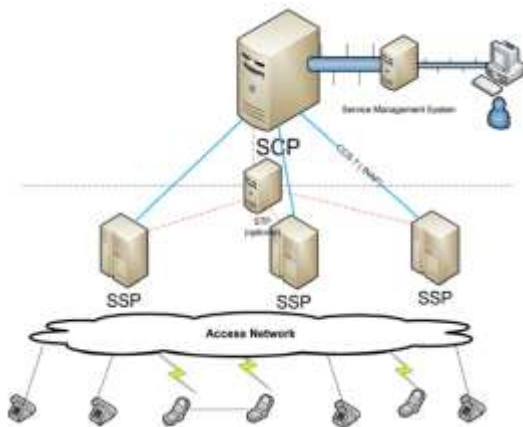Figure 3

8. Future of Intelligent network in developing Countries

Telecommunications networks have become important not only for developed but also for developing countries. Unfortunately for many developing Networks (PSTN), which are not able to support rising demand for services through network systems. The demand for network based services have risen in developing countries. Intelligent networks (IN) is a promise that countries which are implementing telecommunication networks can use to deliver network based services. [2]

CONCLUSION

Increasing competition & changes in value chain are forcing broadband operators to seek new ways to improve efficiency and reduce costs. This issue can be solve by adding Intelligence to the network. Adding intelligence to the network can reduce the need of on-site maintenance & improve network reliability. Countries, the telecommunications are still powered by the public switched telephone.

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