A dark blue vertical bar runs down the left side of the page. A blue arrow points to the right, overlapping the bar, with the date '7/25/2018' written inside it in white text.

7/25/2018

# Business Proposal

Transformation of Network System

Several thin, curved lines in dark blue and light grey originate from the bottom left corner and sweep upwards and to the right, creating a sense of movement and design.

Shivank Saxena

WIRED AND WIRELESS TECHNOLOGY PRIVATE LIMITED

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# **CONTENT**

## **OVERVIEW AND BUSINESS CONTEXT OF INITIATIVE**

The prime objective of this proposal is to describe about the network upgradation by Rockwell's corporation private limited to bring work upon the latest technology and increase our business by catering a larger number of customers. This upgradation also ensures flexibility and stress free environment for the employees and better customer service for our esteemed customers.

## **CONTEXT OF INITIATIVE**

This document of business proposal is the core component describing about the detailed view of technological changes within the company's network.

## **SUMMARY**

The company suffered a lot due to lacking modern technology which also affected our customer services. Due to this a major decision was taken by the board member of the company to finally upgrade the network communication within the company which can help in boosting back company's lost business and be a stepping stone for company's new success milestone. The decision was based on the efforts to improve data security, time management, cost management and user friendly.

## **PROBLEM**

A company with approximately 160 employees suffered with very slow internet and network issues. Everyday a new issues used to come up within the network which used to hamper smooth functioning of the entire company the workstations were connected in a token ring fashion where sending and receiving of data used to be very tedious task. Each and every workstation was connected to two other workstations. Whenever any workstation wanted to transmit data to the other workstation, the data was leaked and shared to every individual workstation in between which hampered the security and also used to take a lot time for delivering the information to the desired workstation.

# PROPOSAL

A decision was taken to upgrade the network to the latest industry standards for smooth functioning, reliability and better throughput. Therefore, a local area network was developed within which virtual LAN's were set up. As the cost of computers were too high, computers were kept same and were just introduced with the duplex NIC module for the LANs. These NIC modules have specific address incorporated within each of them which help in distinguishing the workstation on a switch. The duplex module has been used in order to attain two-way communication without collision among data packets. The Network also demanded wiring and additional switches to connect the workstations among themselves and with the internet. The Multifunctional printers being at the extreme ends of the floor were connected using the wireless Ethernet. For this, wireless NIC USB receiver were brought which can process commands wirelessly.

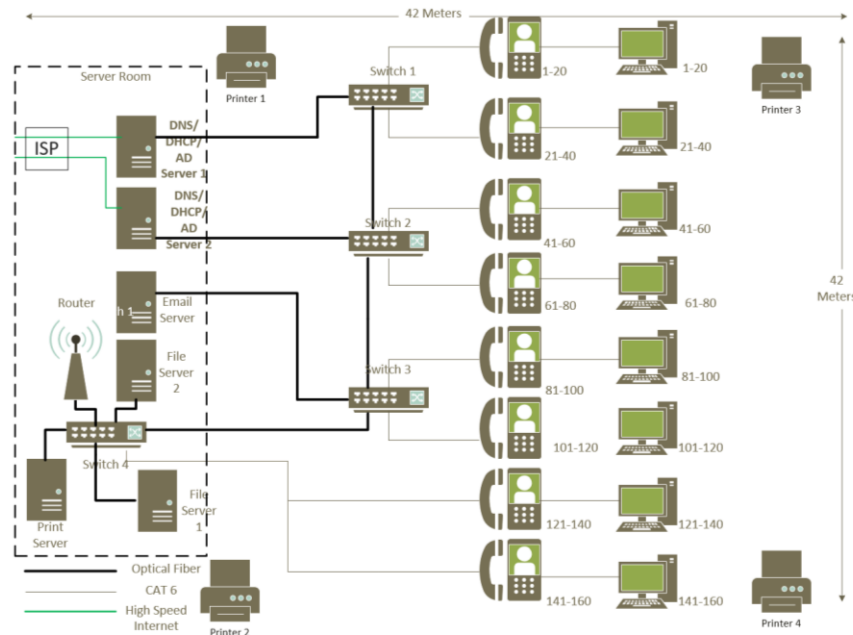


Fig – 1 Proposed Network Architecture

For smooth functioning of the system, all the servers were kept in the separate server rooms which was connected individually within different VLANs. This server room is at the

extreme left of the floor which is well ventilated so that the machines do not heat up. The ceiling of the floor is false, so the wiring can run within them for connecting workstations and switches.

2 of the rows with 20 computers each are connected to a single switch of 48 ports, a server and special software which distinguishes multiple VLANs. The all computers are connected to the switch using CAT 6 wire of 100 mbps as the transmission range is only 42 meters. The switches are interconnected and connected to the servers using Optical fiber cable for high transmission rates as the volume of data would be large enough. Therefore, for successful collision proof transmission, optical fiber has been used.

The employees with maximum usage of internet has been placed over VLAN 1 and VLAN2 where a dedicated DNS server has been allocated to the first 80 workstations through switches 1 and 2. The employees with maximum use of email server are restricted to workstations 81-120 while file system server and multifunctional printers can be accessed with any of the workstation using a router. This router also helps in connecting to the internet to the laptops and mobile phones of the employees.

Additionally, for accessing the internet, 160 internet (IP) address have been taken through the internet provider with a speed of 100Mbps each. The DNS dynamically allocates the IP address to the workstation willing to get connected to the internet.

## **METHODOLOGY**

With a total expense lying within \$20,000 the network was successfully upgraded to a new local area network which can perform operations and data transfer at higher rates. Also this network is smooth, fast and easy to manage with dedicated internet and email support to the workstations diverting traffic only to the concerned workstations and making the network fast and reliable. Also antivirus can be installed to the workstations with permission to access the internet as they have threat of getting virus and malicious infections.

Items	Cost per Item	Total Cost	Links
160 VOIP with POE	\$35.75 Per piece	\$5,720	<a href="https://www.amazon.com/Grandstream-GXP1625-Medium-Business-Device/dp/B00VNMWRFK/ref=sr_1_1?s=pc&amp;ie=UTF8&amp;qid=1532474449&amp;sr=8-1&amp;keywords=grandstream+gxp">https://www.amazon.com/Grandstream-GXP1625-Medium-Business-Device/dp/B00VNMWRFK/ref=sr_1_1?s=pc&amp;ie=UTF8&amp;qid=1532474449&amp;sr=8-1&amp;keywords=grandstream+gxp</a>
160 IP Adresses	\$20 each address	\$3,200	<a href="https://www.broadbandsearch.net/service/illinois/chicago">https://www.broadbandsearch.net/service/illinois/chicago</a>
100 Meter optical fiber	\$8.44 per 100 meters	\$8.44	<a href="https://www.amazon.com/CHINLY-0-03in-0-75mm-plastic-ceiling/dp/B01NQCAHF/ref=sr_1_3?ie=UTF8&amp;qid=1532474717&amp;sr=8-3&amp;keywords=fiber+optics">https://www.amazon.com/CHINLY-0-03in-0-75mm-plastic-ceiling/dp/B01NQCAHF/ref=sr_1_3?ie=UTF8&amp;qid=1532474717&amp;sr=8-3&amp;keywords=fiber+optics</a>
4 - 48 port switches	\$112.28 per switch	\$449.12	<a href="https://www.amazon.com/TP-Link-Ethernet-Unmanaged-Rackmount-TL-SF1048/dp/B003CFATU6/ref=sr_1_4?s=electronics&amp;ie=UTF8&amp;qid=1532474759&amp;sr=1-4&amp;keywords=48+port+switch">https://www.amazon.com/TP-Link-Ethernet-Unmanaged-Rackmount-TL-SF1048/dp/B003CFATU6/ref=sr_1_4?s=electronics&amp;ie=UTF8&amp;qid=1532474759&amp;sr=1-4&amp;keywords=48+port+switch</a>
600 meter CAT 6	\$56.35 per 304.8 meter	\$112.70	<a href="https://www.amazon.com/1000ft-Solid-550MHz-Ethernet-Network/dp/B073V4Y81H/ref=sr_1_fkmr3_2?s=electronics&amp;ie=UTF8&amp;qid=1532475372&amp;sr=1-2_fkmr3&amp;keywords=cat6+duplex+1000">https://www.amazon.com/1000ft-Solid-550MHz-Ethernet-Network/dp/B073V4Y81H/ref=sr_1_fkmr3_2?s=electronics&amp;ie=UTF8&amp;qid=1532475372&amp;sr=1-2_fkmr3&amp;keywords=cat6+duplex+1000</a>
160 NIC duplex module	\$60.29 per module	\$9,646.40	<a href="https://www.amazon.com/NETGEAR-ProSAFE-1000BASE-SX-Module-AGM731F/dp/B0000BVTW/ref=sr_1_4?s=electronics&amp;ie=UTF8&amp;qid=1532475417&amp;sr=1-4&amp;keywords=nic+module">https://www.amazon.com/NETGEAR-ProSAFE-1000BASE-SX-Module-AGM731F/dp/B0000BVTW/ref=sr_1_4?s=electronics&amp;ie=UTF8&amp;qid=1532475417&amp;sr=1-4&amp;keywords=nic+module</a>
5 wireless USB NIC devi	\$12.75 per NIC module	\$63.75	<a href="https://www.amazon.com/StarTech-com-150Mbps-Wireless-Network-Adapter/dp/B005HYDM2M/ref=sr_1_4?s=electronics&amp;ie=UTF8&amp;qid=1532475071&amp;sr=1-4&amp;keywords=wireless+usb+nic+r">https://www.amazon.com/StarTech-com-150Mbps-Wireless-Network-Adapter/dp/B005HYDM2M/ref=sr_1_4?s=electronics&amp;ie=UTF8&amp;qid=1532475071&amp;sr=1-4&amp;keywords=wireless+usb+nic+r</a>
500 RJ 45 Connector	\$8.59 Per 100 Piece	\$42.95	<a href="https://www.amazon.com/CableCreation-100-PACK-Connector-Connectors-Transparent/dp/B01K9Z4FT2/ref=sr_1_fkmr0_1?s=electronics&amp;ie=UTF8&amp;qid=1532475448&amp;sr=1-1_fkmr0&amp;keywo">https://www.amazon.com/CableCreation-100-PACK-Connector-Connectors-Transparent/dp/B01K9Z4FT2/ref=sr_1_fkmr0_1?s=electronics&amp;ie=UTF8&amp;qid=1532475448&amp;sr=1-1_fkmr0&amp;keywo</a>
Router	\$19.98 per router	\$19.98	<a href="https://www.amazon.com/Belkin-Wireless-Router-Latest-Generation/dp/B004N6Z59G/ref=br_lf_m_w8agjxn6rf89z6_ttl?_encoding=UTF8&amp;s=electronics">https://www.amazon.com/Belkin-Wireless-Router-Latest-Generation/dp/B004N6Z59G/ref=br_lf_m_w8agjxn6rf89z6_ttl?_encoding=UTF8&amp;s=electronics</a>
<b>Grand Total</b>		<b>\$19,263.43</b>	

Fig – 2 Snapshot of the components with expenses



## Answers to the questions

- A legacy token ring network was replaced by modern star wired bus LAN network topology.
- As the computers are quite old, they might not support the latest technology with 1000Mbps and equipment related to it. Therefore, a nominal speed of internet was chosen which can support the latest as well as the existing hardware.
- An NIC module was added to the workstations for connecting LANs as these NIC modules have unique addresses which helps in bifurcating each workstation from the other and helps in directing the data to the desired workstation only. This makes the work of switch more easy and resulting in faster data transmission rate.
- The VoIP phones were replaced by modern VoIP phones with Power over Ethernet which does not require additional power source to power the phone. It contains 2 ports. 1 input and the other one if for output which is connected to the workstation.
- We require a wired network for better and faster transmission rate including switches, NIC modules for LANs, Optical fiber and Cat 6 Cable. Yes, even wireless network has been used for addressing the printers as they do not require high data transmission rate and are within the wireless range. Therefore, the printer machines have been fitted with USB NIC modules.
- Yeah, the upgradation required the router for connecting printers, switches for connecting multiple workstations, wireless AP's for connecting printer through router, optical fiber cable for interconnecting the switches and servers to the switches, CAT 6 cable for connecting all the workstations to the switches, optical fiber connector whose expenses has been attached with the document.