CAREER EPISODE 1

H1 IP Core Expansion 1_IPCI-GRC Low-Level Design – LLD

A) Introduction

[CE 1.1]

Dates - Sep 2018 - Sep 2020

Duration - 2 years

Location - Islamabad, Federal Capital Pakistan

Name of the organization - Huawei Technologies Pakistan (Pvt) Ltd

Position title - IP-Datacom Engineer

B) Background

[CE 1.2]

The primary aim of this project is the IPCore 1_IPCI-GRC by the integration and deployment of new routers that will act as GboIP as per the RFP of CMPAK 2019, which is known as **IPCI-GRC-Rep under BoQ 0000001748022015051300l2.** The aim of this project is to meet the requirements of the customers of CMPak for gaining a better performance network after the IP core has expanded. This study focuses on covering the different aspects which are related to the planning and design of this specific project. It includes information about IP addressing schemes, service implementation, routing, and security. There are different configuration templates and examples that provide the reader with a deep understanding of the implementations of real networking systems.

[CE 1.3]

CMPAK have planned to add the existing NE40E-X3 GboIP router in the sites of Karachi that include 8 different service slots for their future expansion. A higher-density card LPUI120 has been

proposed for the 10G ports. This project intends to cover different aspects of the planning and design of IP addressing scheme and their service implementation on a real network. The main objectives of this project include:

- Producing new LLD, HLD, MOP, and Scripts.
- Network configuration and deployment, and network documentation.
- Managing the project and planning the deployment of E2M.
- Supporting the organization to achieve monthly and yearly objectives.
- Ensuring the safety of the networks and customer satisfaction.

[CE 1.4]

HUAWEI NetEngine40E is considered as a high-end router that has been positioned as a convergence router on the backbone network of the IP address. Depending on the VRP or the Versatile Routing Platform, the features of NE40E are defined as follows:

- Rich services
- Larger capacity
- High performance
- High availability

I was an IP-Datacom Engineer at Huawei Technologies Pakistan, where I was responsible for producing HLD and LLD. I had coordinated meetings with the groups of customers and supervised cable laying and testing of the router. Apart from that, I have ensured that the project was delivered within the stipulated timeline given by the customer.

[CE 1.5]

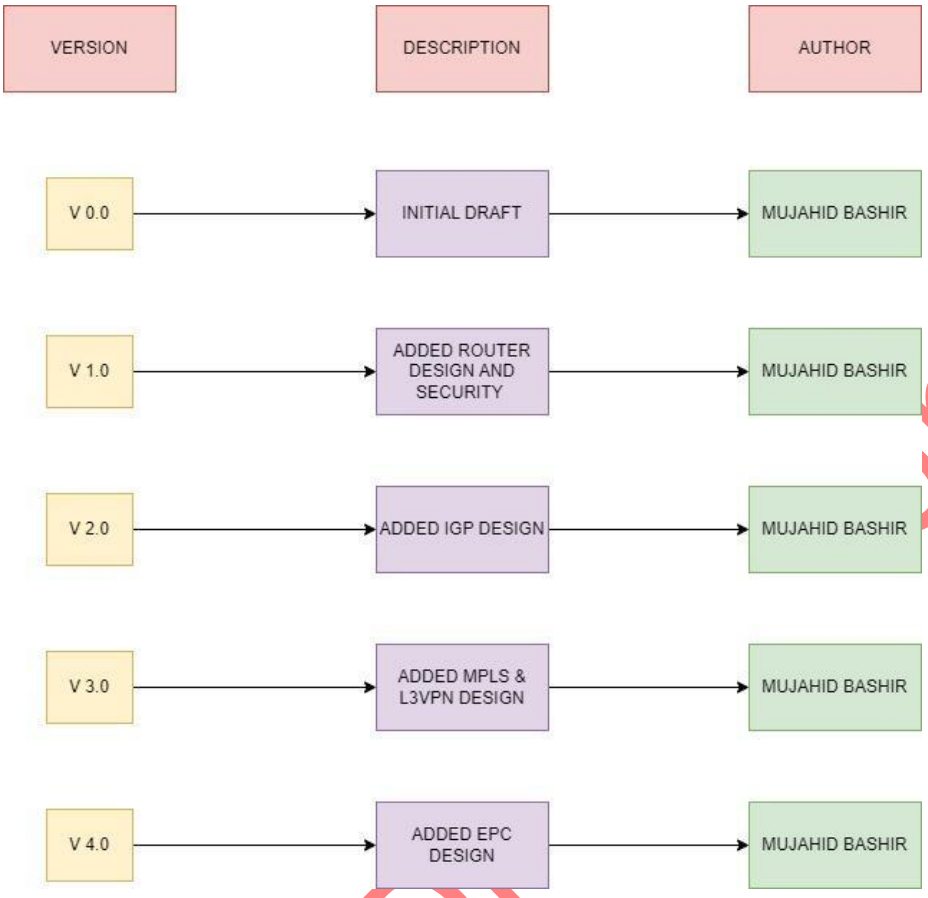


Figure 1: Organizational Chart

[CE 1.6] Duties

I have successfully integrated the IUB routers in CMPAK and replaced the Cisco drivers with Huawei AR2200 Devices. I was responsible for the onsite survey and allocation of power according to the guidelines of SOP. In this project, I was responsible for the onsite installation and power-up of the Huawei Switches, such as the S5300 series, and the S9300 series. Finally, I have conducted Hardware ATP and have ensured network safety and satisfaction of the customer.

C) Personal Workplace Activity

[CE 1.7]

The router NE40-x8 has been proposed in this project for enhancing the capacity and connectivity of the IT network with the IP cores. I have been hired as an IP-Datacom Engineer in this CMPak project and was responsible for managing the project from planning to deployment. In this project, the new PEs helps to connect the IP Core P-routers with the trunk link. The protection mechanism which I have used is OSPF and BFD. The new PEs helps in connecting the remote sites with the help of the IP Transmission network as a point-to-point link. These BSCs are connected to the NE40-CE routers with the help of VRRP standby modes.

[CE 1.8]

Since I was working as an IP-Datacom Engineer, I have deployed and configured the routers, and Huawei switches, thereby upgrading the SRU/SFU as the swaps and migrations. I have performed the acceptance of hardware and software test plans for the newer deployment of firewalls and switches. I have planned and executed successful management of subcontractors and customers in achieving the goals of the project, such as hardware installation, planning, and commissioning of the software, and PAT. I was also responsible for escalating network issues that were critical to the Huawei Icare systems, thereby upgrading the PE&P. I have also replaced the Cisco devices with Huawei AR2200 devices and integrated successfully the IUB routers in CMPAK.

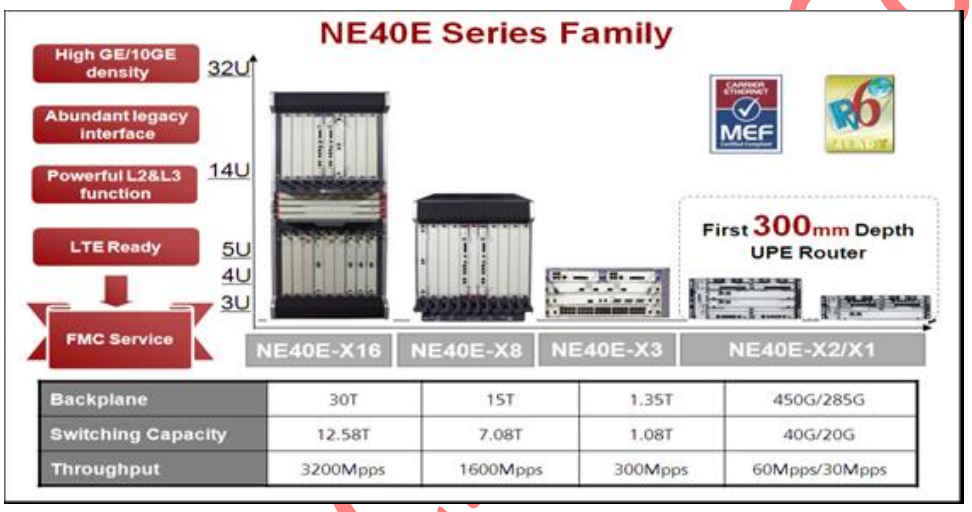


Figure 2: NE40E Family Series

[CE 1.9]

In the IP planning overview, we have several rules for the IP addressing interconnection and the loopback address. Interconnection IPs that have been used were the subnet mask 30 and the loopback address that was used as the ID of the router alongside IP subnet mask 32. I have swapped Huawei EPC with the vendor EPC that carries all the 4G traffic of the CMPAK networks. The connectivity of Huawei equipment has been done in the following ways:

- UGW has been connected with the 10G links that are physical and PTN-Secondary.
- The PS Core Sw01 and Sw02 have been connected to the GboIP for the gn and gb interfaces.
- The connectivity of RNC with the CE had existed as the Trunk.
- Individual HW-CE was established as a physical connectivity for the purpose of redundancy.
- U-2000 had been connected with the instances of O and M.

I have replaced the NE40E router with the **NE40E-x8.NE40E-x8** that has more capacity than the backplane in terms of efficiency and speed.

[CE 1.10]

I have ensured the connectivity of MP-IBGP connections for the purpose of establishing BGP VPNV4 into two different IP core RRs. The reflection of the route helps solve the problems of MP-IBGP peers. In AS, a single router serves as the Route-Reflector for serving different clients. It helps to establish these connections with the RR. It transmits the clients that do not need to establish the connections of BGP alongside each other.

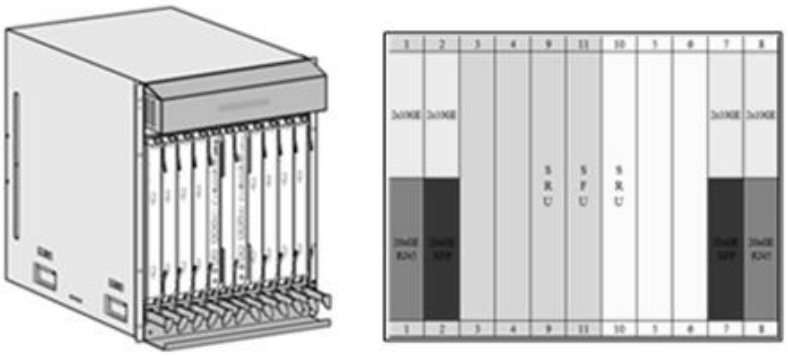


Figure 3: Bayface of NE40Ex8 GboIP router

[CE 1.11]

I and my team have developed the 4 core PE routers that have been swapped from NE80E to the NE40-X8. My team has developed the LLD and HLD for the project of IGW SWAP. The expansion of the link is considered to be 100G, which helps to prepare the scripts for the switches and routers during cutovers and integration. We have escalated issues regarding critical network systems of the Huawei GTAC on their Icare systems. Finally, we have conducted the Hardware ATP and have ensured safety within the networks and maintained customer satisfaction.

[CE 1.12]

I have maintained clear transparency with my team members regarding the work of this project. This has helped them to understand the working of this project and thereby solve any technical difficulties that may have arisen. Apart from that, my entire team has ensured that proper customer satisfaction is met. This has been done by collecting feedback from the customers regarding our work and our project.

D) Summary

[CE 1.13]

Our primary task is to integrate and deploy a new router that is named as NE40E that will work as the GboIP for providing better network performance in the IP core.

[CE 1.14]

Customers were facing problems due to the lack of having a better network performance in the IP core. In this project, we have designed about the IP addressing scheme for improving service implementation and security. Several configuration templates have also been developed for proving readers' implementation of a real network.

[CE 1.15]

My personal role as an IP-Datacom Engineer has helped manage and plan the project till deployment.

CAREER EPISODE 2

IRAQ ASIACELL TELECOM Project

A) Introduction

[CE 2.1]

Dates - Mar 2020 - Sep 2021

Duration - 1 year 6 months

Location - Islamabad, Federal Capital Pakistan

Name of the organization - Huawei Telecom Services

Position Title - IP-Datacom Engineer

B) Background

[CE 2.2]

This project was done for implementing and planning EVPN solutions for the SRV6 and VPN routes as transportation underlays. We have developed a solution for the LLD and HLD of an existing and targeted network. We have commissioned the IP metro devices with the technologies of SRV6. New CSG integration in the enhancement of the metro ring increases the reach ability for the wireless site migration. I was responsible for supplying power replacements from the RSGs NE40 routers.

[CE 2.3]

The objective of the project is to commission the IP metro devices with the technologies of SRV6.

- Wireless mitigation from the switches of S9306 to the RSGs has been transferred with the help of NE40 routers.

- Wireless migration from the switches of Cisco to the CSG routers has been done.
- Microwave establishment has been done for planning the C route.
- Version and patch upgrade of the NE40/NE8000 & ATN950C Routers and the S9300 switches is used in the routing protocols.
- Microwave transmission connectivity with the IP core network and PTN had been implemented.

[CE 2.4]

In this project, I was responsible for designing the EVPN solution in the VPN routes as the underlay of transport. I was responsible for conducting ATP hardware testing and developing a solution for the existing target technologies. I have wirelessly mitigated the Cisco switches to the CSGs and have linked the establishment of the microwave for the PLAN C route. I have upgraded the S9300 switches and have configured the passwords of local routers for the authentication of SSH. Finally, I connected the microwave transmission to the IP core network and PTN.

[CE 2.5]

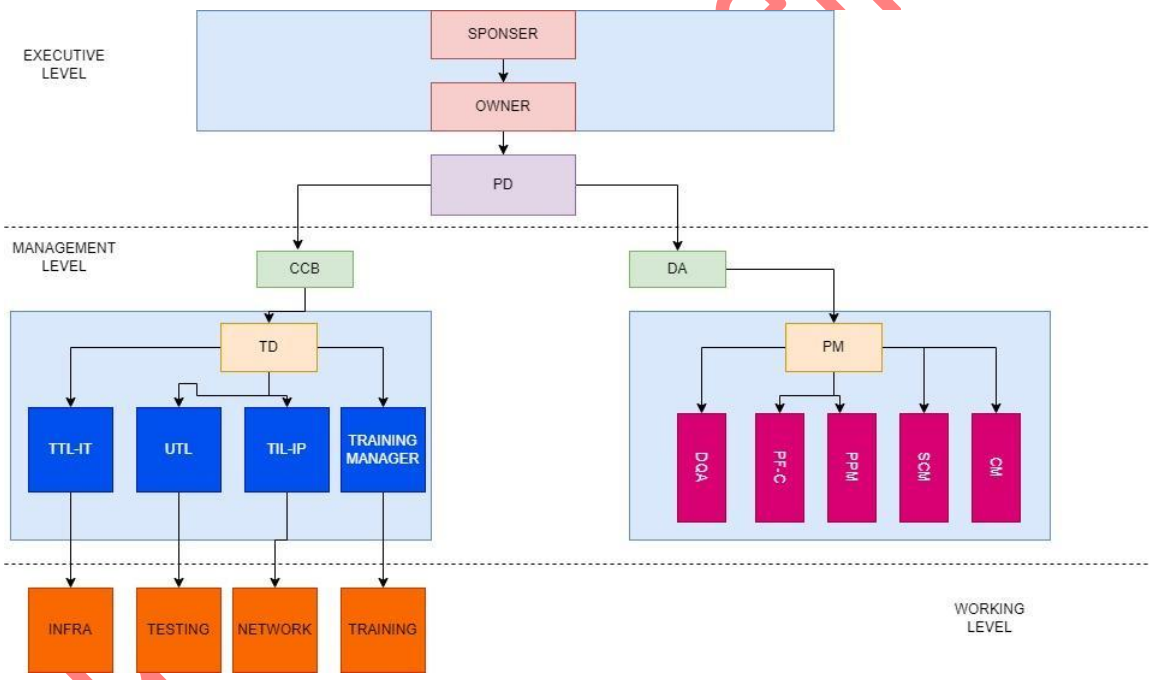


Figure 1: Organizational Chart

[CE2.6]

The duties which I have performed as an IP-Datacom Engineer are:

- The new deployment of IPRAN in 18 different cities of the ASIACELL IRAQ.
- RSG to PE integration in the metro cities for enhancing the reachability with the PE core.
- Newer integration of the CSG for enhancing the network and the migration of the wireless sites.
- Replacement of power supply from the RSG to the NE40 routers.

- Establishment of microwave links for the routing of PLAN C.
- A broader expansion of the IP metro ATN950C and NE40/NE8000 routers.
- Deployment of EVPN VPWS over SRV6 BE.

C) Personal Workspace Activity

[CE 2.7]

In this project BRAS pool has been used that consists of 30K to 100K subscribers in a single BRAS, and any kind of failure will create a significant impact on the BRAS. The internet video that has been committed is the BBC iPlayer and is sensitive towards QOS. There are several benefits of the BRAS pool that can be categorized as IPOE and PPPOE in N:1 and N+1 modes.

[CE 2.8]

Since I was an IP-Datacom Engineer during this project, I have applied my technical knowledge in designing and implementing a VPN solution for the VPN routes as the transport underlay. I have conducted the hardware ATP and deployed new IPRAN in 18 major cities in Iraq. Furthermore, I have integrated the metro ring reachability for the migration of wireless sites and enhancement of the network for the NE40 routers. I have established a microwave link for the planning of the C route and expanded the IP metro in the ATN950C routers. I have also configured the local passwords and the username for authentication of the SSH. Microwave transmission connectivity with the IP core and PTN network has been established.

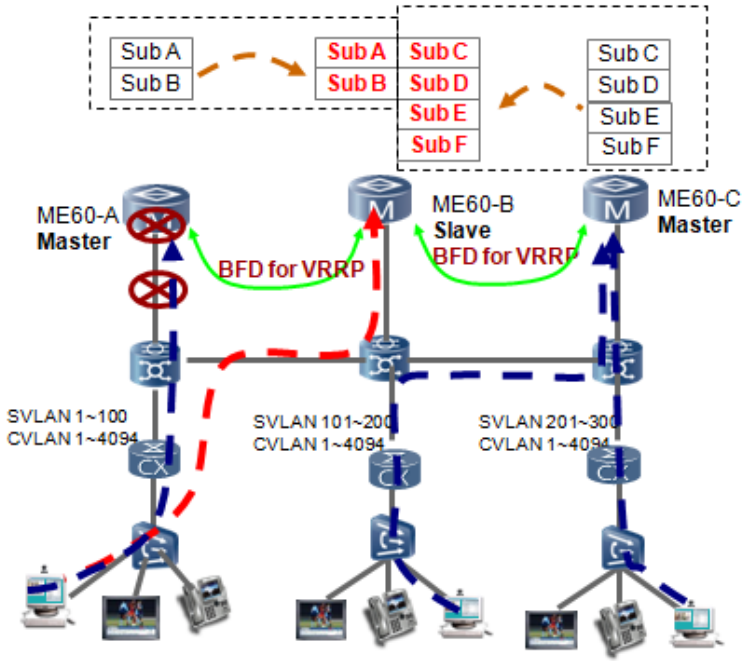


Figure 2: Brass backup of N:1 mode

[CE 2.9]

For completing our project, the master BRAS is loaded fully for challenging the QoS and slaves all the information of BRAS subscribers. OAM and BFD have been used to monitor the master BRAS node links. When a master BRAS fails, the slave BRAS picks up the traffic instantly. Individual master BRAS had been loaded partially for the complex planning of QOS. This helps to balance the load among sub and traffic on the SVLAN link. For reserving a single BRAS resource, it is essential to distribute the BRAS into several smaller categories. An enhanced VRRP helps in the slave management of BRAS, thereby reducing detection failure time at the ms level. It has helped in configuring different VRRP groups, which include BRAS-1 and BRAS-2, where VRRP initially decides the slave or the master. A BFD is mandatory for the failure detection based on the ordinary VRRP that helps in detecting failure at a significant level.

[CE 2.10]

The challenges of the BRAS pool have been identified as follows:

- Management of master and slave helps in the member management of N+1 and N:1 models.
- Real-time information of all sub-SYN helps in the backing up of service protocol for the system and backups of the batch.
- Accessing core traffic switchovers helps in addressing the IP pool that was related to the route entry withdrawal and bypassing a tunnel.

[CE 2.11]

I have avoided re-dail and the backing up of BRAS at the level of sub-information with an active BRAS. The QoS and AAA are needed for the backup of RBSP or **Remote Backup Service Protocol** that helps in supporting batch backup and real backup. There are 20 items in the information backup of the subscriber that includes basic info of the user, accounting info, info of the QoS, and location info. In the essential info, the MAC address, IP Address, and the Session ID have been discussed. In the accounting info, traffic count, and accounting ID has been established, and in the QoS info, QoS template and traffic priority have been discussed, and in the info of locations, VLAN has been used. The communication channel of the BRAS pool has been used in the over RBSP protocol and in the direct link of the core network. In the backup mode, real-time backups have been used where each user is online, and their information changes on time with the backup of SYN.

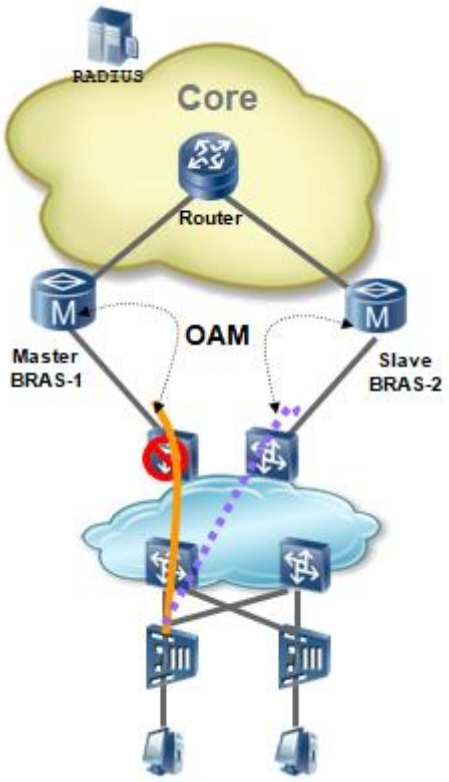


Figure 3: Switching over upstream traffic

[CE 2.12]

I have coordinated with my team members throughout the entire project and have maintained transparency for a clear understanding of the project ideas. In this project, team coordination plays a vital role in meeting the challenges that arise during the course of this project. We have handled all the technical difficulties with proper team coordination and understanding.

D) Summary

[CE 2.13]

In this project, I have worked as an IP-Datacom Engineer, where I have designed and implemented the EVPN solution for the VPN routes and SRV6. I was responsible for conducting ATP hardware and deployment of the IPRAN technologies in Iraq. I, along with my teammates, have configured the username and passwords for the authentication of the SSH, thereby filtering the routing protocols and connecting the microwave transmission with the IP core network and PTN.

[CE 2.14]

The primary aim of this project is to develop and implement a VPN solution that will be responsible for conducting ATP hardware. We have worked as a team in meeting the requirements of our customers and minimizing the chances of any kind of errors.

[CE 2.15]

As a Datacom Engineer, I was responsible for monitoring the entire project and instructing my team about any obstacles that have arrived during our project. Finally, I have upgraded the version of **NE40/NE8000** & **ATN950C** Routers.

CAREER EPISODE 3

Datacom STC MS Project

a) Introduction:

CE3.1: Datacom STC MS Project

Dates: February 2022

Duration: 2022

Location: Manama, Capital Government Bahrain

Name of the organization: PCCW Global Limited-Stc

Position Title: Senior IP-Datacom Engineer

b) Background:

CE3.2

The primary nature of this project is STC Network Mobile Broadband (MBB) and the Fixed Broadband service access the public network from the CGNAT. ASBR PE is mainly connected with the CGN device within the different private AS. Inter-AS VPN, option A has been configured within both devices. Thus, STC would receive a default route through the CGN A10 alongside aggregate private routes. In this project, the default router would be controlled through local preferences within the Tubly and Hoora core. Besides, the route aggregation would be performed by utilizing various kinds of MED values.

CE3.3

The project has been completed within specific operation steps and it has a few vital objectives. Those objectives are to undo the VPN from the interface VPN. Changing the VPN regarding the static alongside binding them with an upgraded routed and undoing the shutdown process in

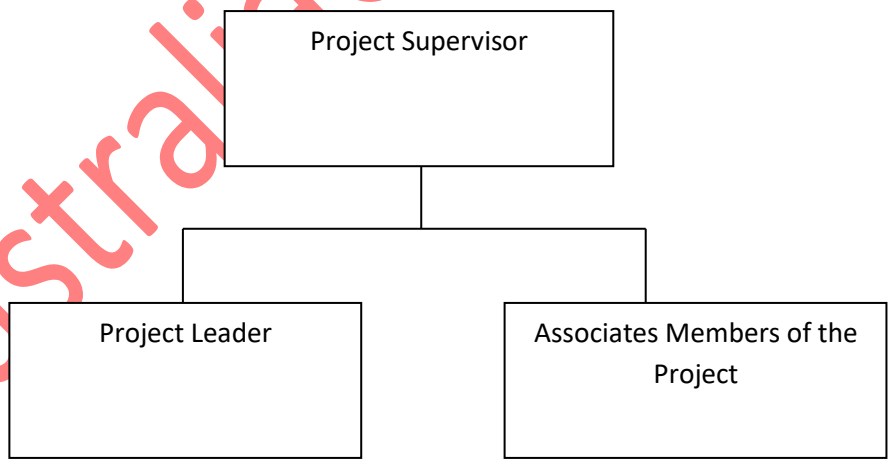
the interface, besides, importing the direct OSPF and the static route towards BGP. However, in this project the rollback steps were migration of VPN-MOBILE-BROADBAND, undoing the new OSPF besides binding with an old VPN and lastly Changing the VPN regarding static routes and unbinding the interface's shutdown. Hence, the primary objective of this project was delivering network operations within the IP Datacom domain, properly maintaining the network enhancement and stability besides fault management and network recovery in the SLAs.

CE3.4

During the period of implementing this project, I was responsible for some vital duties. Those duties were properly managed and I had to take numerous numbers of actions to complete my responsibilities. However, my vital duties in this project were properly explained below

- Faulting the diagnostics within the network and putting the restoration process on priority.
- Identifying risk among the customer network.
- Managing the enterprise infrastructure operations besides troubleshooting customer queries.
- Monthly, weekly, daily, and quarterly checking besides monitoring the performance.
- Troubleshooting of the MW transmission network that involves Eband380, 620,950,950A, and RTN605 beside free band link installation within the STC network.
- Troubleshooting of the DWDM network that involves OSN 1500, 6800, and 8800 including multiple nodes for ensuring the network stability.

CE3.5



Organizational chart

CE3.6

In the period having a meeting with our project manager, I quickly explained all the vital objectives of this particular object besides all sorts of possible frameworks to effectively develop the project. However, I had further indicated and discussed all kinds of vital factors with my project

manager. After listening to all the crucial factors, my manager appointed me to handle the teams. I have properly guided my team members throughout the whole project and helped them to understand their responsibilities as well.

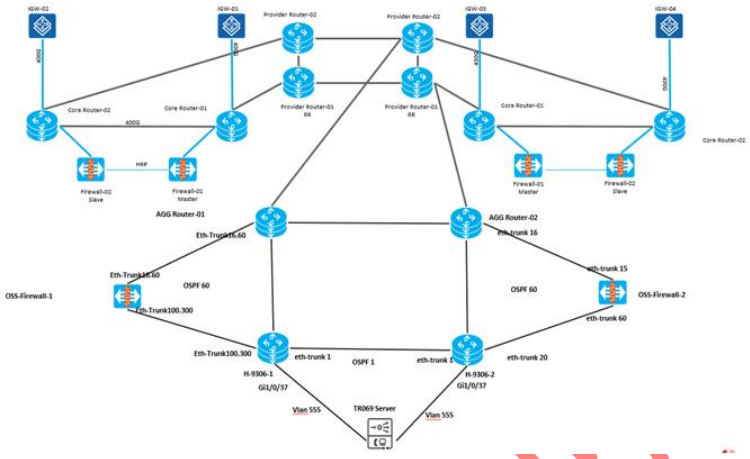


Figure 1: Scenario1P2P+ Static Route Hoora & Tubly AGG-01

Furthermore, as a leader of this project, it was my prime responsibility to complete a few activities such as the preparation of presentations, then giving the presentation and establishing a report. I also divided the whole team among my team members and worked on the development and design of the configuration regarding various kinds of peer-to-peer networks that would obtain integrity.

c) Personal Workplace Activity

CE3.7

I have worked as a senior IP-Datacom Engineer thereby delivering my roles in the IP Domain Datacom and maintaining the reliability of the network and enhancing the fault management and network recovery within the SLA. I have provided incident support during the hours of my duty and prioritizes several incidents based on the urgency and impact to diagnose incidents. An upgrade of the router version and their switches has been done for the scalability within the networks and has resolved several incidents for recovering different services based on the service levels. I have further upgraded the version of different routers for maintaining their scalability within my network.

CE3.8

In the STC networks, Tubli has two firewalls running within the HA to cater to VPN connectivity with the partner. However, in the existing scenario, STC had been deployed within two 1000E-X3 Huawei firewalls. Besides, they are connected with switch-01 & 02 alongside the VAS cloud network.

Figure 2: The two vital firewalls

Currently, the IPSEC service within those firewalls beside existing firewalls is EOS, which needs to be properly replaced with the NG firewall-G3. The primary task of this project was to Swap the existing EOS NG Firewall-X3 with the NG Firewall-G3.

CE3.9

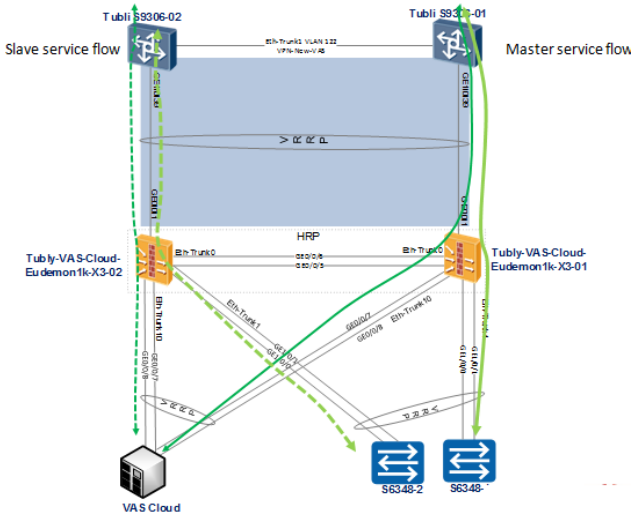


Figure 3: The current topology

The above figure shows the current topology, in the above system, the NG Firewall-X3 and NG Firewall-X3-02 were running within the HA utilizing the HRP to cater IPsev Service, and the current firewall (EOS) need to be replaced. Eth-trunk1 and Eth-trunk10 are the downlinks that are connected to the VAS cloud networks beside the VRRP are running within those links. GEO/0/1 is utilized regarding the uplink that is connected among the Tubli-switch-01 and Switch-02.

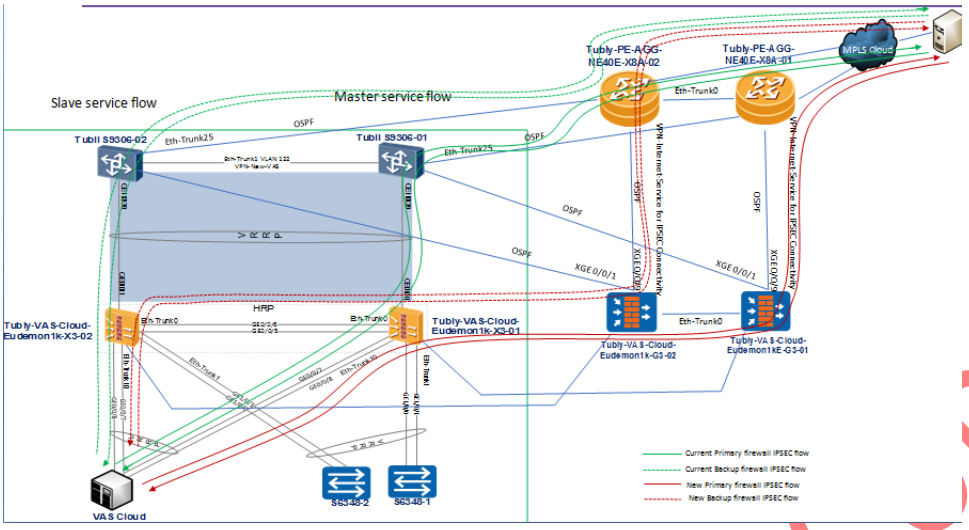


Figure 4: Service flow scenario

In the above flow scenario, I have established the physical connectivity between the new firewall and the old firewalls. Besides, I had configured the point to points IP address within both sides and I had added those interfaces on the entrust zone among both firewalls. However, in the above scenario, I added static routes of service IP among the new firewall with the old next-hop firewall regarding the VAS-cloud reach ability and added a reverse route on the old firewalls.

CE3.10

The migration activity is primarily divided into two major steps which are connectivity among the Tubly-AGG and new-Firewall and connectivity among the Tubly-switch and the new firewalls. The steps among the connectivity among the new firewalls and Tubly-AGG has been done in certain phase which are first undoing the shutdown Eth-Trunk42 from the Tubly-AGG, configuring the E-th-Trunk42.121 among the Tubly-AGG under the new firewall and VPN-internet service. The initial connectivity among the Tubly-switch and new firewall involves configuring the Eth-trunk41.120 within the new firewalls and switch beside I had interfaced the Eth-trunk41.120on the firewall.

CE3.11

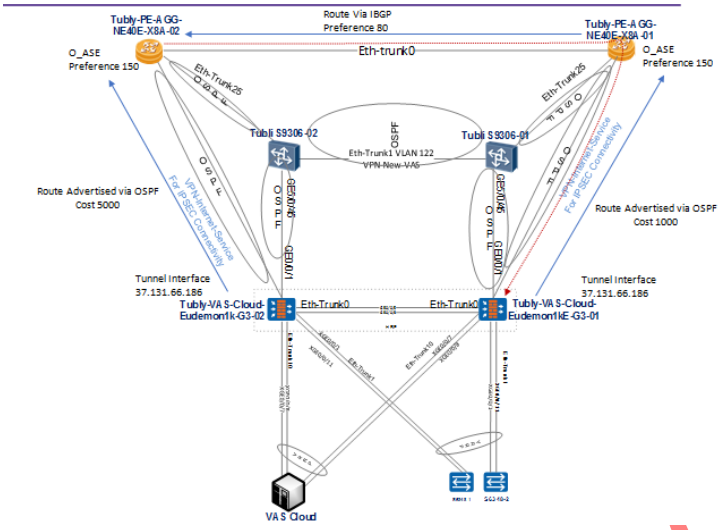


Figure 5: OSPF within the Tubly-PE-AGG and firewall

Both the firewalls had been running within active backup mode besides, they are connected with the Tubly-PE-AGG-01 and the 02. The OSPF was running between the firewalls and uplinks. I utilized the 37.131.66.186 configuration within the tunnel interface. It would be advertised within both AGG as an O_ASE route with a 150 preference. However, the final topology has been given in below.

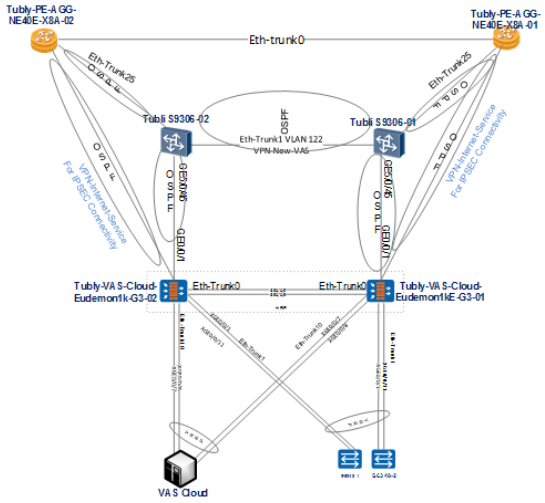


Figure 6: The final topology

CE3.12

In this project, I played as a team leader and I had full permission to implement the next steps and guide my team member. All the tasks had been adequately distributed to my team member and properly communicated with my team members. During the project implementation, I gathered a few research materials which I properly distributed to my team members.

d) Summary

CE3.13

The main objective of this project was delivering network operations among the IP Datacom domain and properly maintaining network enhancement and stability.

CE3.14

The primary objective of this project was faulting the diagnostics within the network and putting the restoration process on priority, besides identifying risks among the customer network. However, after completing the project, it can be said that all the objectives have been properly met and even the whole project was completed successfully.

CE3.15

During this project implementation, I adequately communicated and cooperated with my team members. However working on a complex project, I gained different kinds of leadership and communication techniques. Besides, I have understood that communication and leadership provide a significant impact on a any kind of project.

SUMMARY STATEMENT

• Competency Element	• A brief explanation of element applying process	• Individual number of paragraphs in career episode
• PE1 SKILL AND KNOWLEDGE BASE		
• PE 1.1 Theory basis understanding along with Telecommunication Network Engineer fundamental application	• I implemented three project assignment basis on the Telecommunication Network Engineer field which are • H1 IP Core Expansion 1_IPCI-GRC Low-Level Design – LLD. • IRAQ ASIACELL TELECOM Project. • Datacom STC MS Project.	• CE 1.1, 2.1, 3.1

• PE 1.2 Conceptual Understanding of the both Information and numerical analysis of the Telecommunication Network Engineer Discipline.	• I implemented numerical values and numerical equations within those mentioned projects and as per the project design and with the execution of Telecommunication Network Engineer practices. Additionally, a vital conceptual principle and understandation has been elaborated thoroughly and adequately, especially for analyzing the engineering discipline and Telecommunication Network Engineer practices.	• CE 1.4, 2.4, 3.4

• PE 1.3 Core inside of the knowledge on the Telecommunication Network Engineer discipline and whole practices.	• All the particular research has primarily been made from the engineering fundamental discipline and practices among the Telecommunication Network Engineer field. All kinds of core acknowledgements and theories related to Telecommunication Network Engineer fields have further been properly explained within those mentioned projects.	• CE 1.2, 2.2, 3.2
• PE 1.4 Research knowledge and direction discernment on the engineering practices and discipline.	• The project's main and vital principles are applied and evaluated according to fundamental skills in the Telecommunication Network Engineer domain. Research direction and different kinds of knowledge discernment had been elaborated within the Telecommunication Network Engineer discipline and practices.	• CE 1.3, 2.3, 3.3

• PE 1.5 Understanding of the contextual factors, aspect and fundamental practices.	• I organize definite principle approaches besides implementing Telecommunication Network Engineer aspects for obtaining a proper result. Apart from this, maintaining and handling all the crucial contextual factors and important principles has been fluently represented in those engineering projects.	• CE 1.4, 2.4, 3.4
• PE 1.6 Understanding the principle, practices, norms, and Telecommunication Network Engineer practices.	• I understood primary norms and, vital principles of accountability factors which are mostly analyzed and examined for obtaining the desired result and fulfilling the given assignment. The vital fundamental skills and accountability factor of the Telecommunication Network Engineer has a massive importance to getting the outcome from this subject matter.	• CE 1.7, 2.7, 3.7
• PE2 ABILITY OF ENGINEERING APPLICATION		

• PE 2.1 Utilization of the established engineering procedure alongside resolving a complex engineering problem.	• Different kinds of composite engineering activities and issues have been solved by implementing the primary fundamental skills of Telecommunication Network Engineer. However, the activities and challenges have been adequately sorted through the primary principle of the Telecommunication Network Engineer fields.	• CE 1.8, 2.8, 3.8
• PE 2.2 Proper evaluation of the various kinds of Telecommunication Network Engineer strategies and techniques.	• I have made fluent implementations of the engineering practices with different kinds of fundamental abilities and skills for getting a specific outcome within the explained tenure. Aside from this, executing different kinds of strategies and plans has been a great help in completing this project.	• CE 1.9, 2.9, 3.9

• PE 2.3 Evaluation of the systematic engineering design and Synthesis.	• In the above mentioned projects, there is specific execution has been made for systematic design and fabrications in order to define the outcome.	• CE 1.10, 2.10, 3.10
• PE 2.4 Implementation of the various kinds of Telecommunication Network Engineer approaches and discipline.	• I have implemented a systematic and constant design approach that has been utilized among the different kinds of principles and norms within this project.	• CE 1.11, 2.10, 3.10
• PE 3 PERSONAL AND PROFESSIONAL ATTRIBUTES		
• PE 3.1 Ethical conduct and the Professional Accountability.	• Professional ethics and factor has been properly analyzed and examined along with evaluation for obtaining a desired outcome from the project.	• CE 1.12, 2.12, 3.12

• PE 3.2 Effective and written oral communication among professional domain	• Effective communication ability and soft skills are significantly followed and maintained within the on-site projects. On the other hand, my team member adequately completed the project along with mentioned skills that are implemented properly.	• CE 1.6, 2.6, 3.6
• PE 3.3 Proactive and creative demeanor.	• I fluently conserved a proactive demeanor during the project with the implementation of the innovative plan for securing the desired solution regarding the all above-mentioned on-site projects.	• CE 1.13, 2.13, 3.13
• PE 3.4 Information management and professional utilization of Telecommunication Network Engineer activity.	• I carry through Telecommunication Network Engineer activities that involve the professional utilization of various kinds of technical abilities and acknowledgment in order to accomplish the desired solution.	• CE 1.14, 2.14, 3.14

• PE 3.5 Competent conduct or self-orderly management	• I constantly handled and managed different technical and practical skills within the project regarding my Telecommunication Network Engineer fields.	• CE 1.11, 2.11, 3.11
• PE 3.6 Effective communication, team leadership besides team membership	• I was properly guided by my other coworker for responsibilities in all projects. There were fluent soft skills and effective communication skills have been maintained within the work project. Furthermore, various kinds of research topics and study materials have been properly distributed among my team member for accomplishing the proper result.	• CE 1.15, 2.15, 3.15