

# **TAC SKILL SET**

## **Tr. Network Support Engineer**

1. Energetic, self-driven, motivated and responsible.
2. Should have good analytical and problem-solving skills.
3. Good knowledge of degree subjects.
4. OSI/TCP IP layers functionality.
  - Physical Layer.
  - Data Link.
  - Network.
  - Transport.
  - Session.
  - Presentation.
  - Application.
5. What is LAN/WAN?
6. What is switching?
7. What is Routing? Concept and use of below mentioned types of routing and algorithms of routing.
  - Static routing.
  - Dynamic routing.
  - Link state routing.
  - Distance vector routing.
8. What are hub/bridge/switch/router/AP, differences and their working?
9. Basics of IP addressing.
10. Basic knowledge of TAC L1 SOPs
11. Basic understanding of NOC team functions
12. Understanding and knowledge of TAC L1 CRM modules and their functions.
13. Proper FAULT TYPE selection in CTI module/TT generation.
14. Basic troubleshooting skills, for NTL services.

Good knowledge of all of the above is required for all posts.

Common requirements and brief description of tasks for all designations mentioned below;

1. Good communication (Verbal & Written) and call handling skills.
  - Greetings.
  - Courtesy.
  - Anger diffusion techniques.
2. Should be able to report problems/user related issues to Supervisor/Manager.
3. Should be able to log each complaint on CRM and update trouble tickets accordingly.
4. Should be able to troubleshoot on BRAS and Core Routers respectively.
5. Should be familiar with NTL services (Data, Voice and Video) including value added services.

## **Network Support Engineer**

In addition to Tr. Network Support Engineer skill set, Network Support Engineer should have knowledge of following:

1. Good communication skills.
2. Good knowledge of all Nayatel services.
  - Data.
  - Voice.
  - Video.
3. Basic knowledge of all the VAS services of Nayatel.
4. Basic knowledge of NTL infrastructure and all network elements (Data/Voice/Video).
5. Good knowledge of FTTH/PON.
6. PPPoE troubleshooting, departments involved and their responsibilities.
7. CPE configurations - Should be able to lookup CPE configurations of common routers/APs and guide customers on call. Basic knowledge of CPE configurations for provisioning, troubleshooting and customer requirements.
8. Troubleshooting as per latest TAC workflow.
9. Good understanding of CRM Alarm modules
10. Awareness of the latest TAC guidelines updated on [knowledge.dsl.net.pk](http://knowledge.dsl.net.pk)

## **Operations Engineer**

In addition to Network Support Engineer skill set, Operations Engineer should have knowledge of following:

1. Detailed knowledge of NTL infrastructure, traffic flows and service provisioning of the following services:

- PPPoE/PREMIUM/ L2 & L3 VPNs/CVAS
- IPTV/VOD/ Nayatel Live
- NWatch
- POTS/SIP POTS/HOSTEX

2. Detailed knowledge of NAYatel VAS services, their provisioning/troubleshooting and responsibilities of departments involved.

3. Latest Nayatel Core/Access Network Diagram

4. Latest Bandwidth of Core Ring and Uplink Bandwidth

5. Basic PON/FTTH related knowledge and understanding of V-OLT, P-OLT, NT/SHUB/LANX, WDM & Splitters

6. Troubleshooting All issues as per latest TAC workflow

### **7. Technological Concepts**

#### **a) Access**

##### **I. GPON**

Ranging Process  
Logical and differential distance  
DBA concept & types  
TCONTs concept & types  
GEM Header  
Rogue ONT and its identification  
Service ports

##### **II. IGMP**

Multicast  
Versions & Differences  
Snooping vs Proxy  
Working in NAYatel network

##### **III. VLANs**

Understanding of VLANs and dot1q Header  
RB & CC VLANs  
Smart & MUX VLANs

##### **IV. PON Infrastructure**

Fiber Single & Multimode  
POLT  
VOLT  
ONT  
SPLITTER  
WDM  
ODF  
NAP

BPR

**b) Networks**

Basic knowledge of network protocols - their significance in our network  
(Core/Access/NGN/Systems/Video protocols for communication and service delivery)

**I. CGNAT**

What is CGNAT  
Pros and Cons  
Implementation in our network

**II. CDNs**

What is CDN  
Advantages of CDNs  
CDNs deployed in our network  
Traffic flow

**c) Systems**

DNS Resolution Flow  
Understanding & Traffic Flow of POP & SMTP  
Understanding of FTP protocol  
Knowledge of Web hosting and working  
Knowledge of Email hosting and working

**d) NGN**

Service provisioning and Troubleshooting of POTS/SIP-POTS and HOSTEX

**e) NOC**

Understanding of NMS Server  
MRTG  
SNMP/ICMP/Syslog

**8. Configurations**

Triple play Service Provisioning and Configuration of ONT  
NWatch/NWall and NMonitor  
ATA Configurations  
IP Routed / PPPoE Configuration knowledge of GUI & CLI CPEs

**9. Troubleshooting**

All issues as per latest TAC Level 1 and Level 2 Toolkit  
Advance level use of Huawei NCE, Alcatel AMS and Huawei LMT

**10. Soft Skills**

Should be able to take ownership and responsibility for customer issues  
Should be actively participating in achieving TAC departmental KPIs  
Good decision-making skills under pressure  
Should be able to immediately escalate reported issues  
Should be able to implement the task/procedures given by Supervisor/Manager.  
Should be able to maintain the floor decorum.  
Should know the working, targets and goals of TAC  
Should know the SOPs of company  
Should have submitted 1 lesson learned after promotion as OE and have clear understanding of previously approved lessons learnt

Read at least 1 book on soft skills like:

- a. Winning
- b. The 7 Habits of Highly Effective People
- c. The One Minute Manager
- d. High Output Management
- e. Think and grow rich

by Jack Welch  
by Stephen R Covey  
by Ken Blanchard  
by Andrew Groove  
by Napoleon Hill

# **Network Engineer**

In addition to Operations Engineer skill set, Network Engineer should have knowledge of following:

## **1. Technological Concepts**

In addition to technological concepts mentioned in OE's skill set, NE must have in depth knowledge of below mentioned protocols.

### **a) Core**

#### **I. BGP**

- Autonomous System
- Messages, States & Attributes
- eBGP vs iBGP
- Split Horizon/Synchronization Rule
- MP-BGP
- Path Selection Criteria
- Route Reflectors
- Implementation in our network
- Basic Configurations in virtual environment (GNS3)

#### **II. ISIS**

- Advantages of ISIS as an IGP
- Message Types
- Areas and the Routing Domain
- Router Types (L1, L2, L1/L2)
- Packet Types
- NSAP Addresses
- Designated Intermediate System (DIS) and Pseudonodes
- Implementation in our network
- Basic Configurations in virtual environment (GNS3)

#### **III. MPLS**

- Traditional IP Routing vs MPLS
- Basic architecture and components
- Label distribution protocol (LDP) and Label retention modes
- MPLS Tables (RIB, LIB, FIB, LFIB) and the sequence in which they are populated
- Terms (LDP, FEC, LSP, P, PE, CE, Push, POP, PHP)
- Basic knowledge of MPLS Applications
- Troubleshooting and working of MPLS based L2VPN and L3VPN
- Bridge domains and BVI
- Basic Configurations in virtual environment (GNS3)

#### **IV. CDNs**

- What is CDN
- Advantages of CDNs
- CDNs deployed in our network

Traffic flow

## **V. Switches**

Basic knowledge of REP

### **b) Systems**

DNS Resolution Flow

Resource Records (Types/significance)

Understanding & Traffic Flow of POP, IMAP & SMTP

SSL certificates

Understanding of FTP protocol

Domain registration and Domain Hosting

Knowledge of Web hosting and working

Knowledge of Email hosting and working

Email flow and troubleshooting

Webhosting and Email hosting servers in NAYatel and their differences

VPS

### **c) NGN**

Megaco

SIP

RTP & RTCP

Bicom & Softx

SIP traces

NGN Network elements and infrastructure

Troubleshooting POTS/SIP-POTS, HOSTEX, PHONEAPP and Cloud PBX

### **d) NOC**

Network Architecture of Core and Access at Layer 1/Layer 2 and Layer 3

Understanding of NMS Server

MRTG

SNMP vs ICMP vs Syslog

LACP

## **2. Configurations**

Triple play Service Provisioning and Configuration of ONT

IP Routed/IP Pool/HOSTEX configurations on Core Router

ATA Configurations

IP Routed / PPPoE Configuration knowledge of GUI & CLI CPEs

Nwall, Nwatch and Nmonitor

All NTL CPEs

## **3. Troubleshooting**

All issues as per latest TAC Level 1 and Level 2 Toolkit

Advance level use of Huawei U2000 and Alcatel AMS

## **4. Soft Skills**

1. Should be able to take ownership and responsibility for customer issues
2. Should be actively participating in achieving TAC departmental KPIs

3. Good decision-making skills under pressure
4. Should be able to immediately escalate reported issues
5. Should be able to implement the task/procedures given by Supervisor/Manager.
6. Should be able to get the tasks/SOPs implemented with the help of team
7. Should be able to maintain the decorum of floor.
8. Should know the working, targets and goals of TAC
9. Should know the SOPs of company
10. Should be able to present weekly and monthly reports of team working
11. Should have submitted 1 lesson learned after promotion as OE and have clear understanding of previously approved lessons learned

12. Read at least 1 book on soft skills like:

- |  |                    |
|--|--------------------|
| a. Winning                                 | by Jack Welch      |
| b. The 7 Habits of Highly Effective People | by Stephen R Covey |
| c. The One Minute Manager                  | by Ken Blanchard   |
| d. High Output Management                  | by Andrew Grove    |
| e. Think and grow rich                     | by Napoleon Hill   |



## **Senior Network Engineer**

In addition to Network Engineer skill set; Sr. Network Engineer should have knowledge of following:

### **Technical Skills:**

1. In-depth knowledge of packet flow of PPPoE, PREMIUM, L2 VPNs, L3 VPNs, SMTP, HD Box, VOD, NAYAtel Live, SIP-POTS, HOSTEX, DNS
2. In depth knowledge of all services NAYAtel offers
3. Good Knowledge of role of network elements involved in NAYAtel's any service
4. In depth understanding and configurations` of following protocols/technologies and those associated with them:
  - BGP
  - MPLS
  - ISIS
  - SIP
  - GPON

### **Soft Skills:**

1. Should be able to
  - a. Manage, coach, mentor team and conduct regular 121 meetings
  - b. Give feedback to team members and perform evaluation based on their performance and the targets achieved
  - c. Specify at least 3 resources that were groomed along with their positives and negatives
2. Should share at least 3 to 4 ideas that were implemented that ensured efficient utilization of resources
3. Should have customer service orientation by having will and ability to give priority to customer and their issue along with delivering high quality services to meet their needs along with sharing of at least 5 tough customers handled personally
4. Should develop environment that breeds continuous improvement and planning process along with ensuring of this through personal participation along with understanding of departmental budget
5. Should be able share steps taken for resource allocation to ensure optimal running of any shift along with ensuring the same in future
6. Should be able to deliver trainings and presentations to team. Should have already given at least 2 soft skills training as well as 5 trainings on technical topics.
7. Should be able to get the tasks/SOPs implemented.
8. Should be able to evaluate supervisors based on their performance and the targets achieved by their teams.
9. Should be able to deliver effective presentation on a given topic.
10. Should be able to manage employees working under you, groom and develop them.
11. Should have effective written and verbal communication skills: resolve problems, make decisions, build team and motivate.
12. Should be able to allocate tasks efficiently and then have a strong follow up to ensure things get done.
13. Should be able to build excellent inter/intra department coordination & friendly relationships.

14. Should be able to groom juniors by giving trainings/presentations (10 hours in total), regular

15. Read at least 2 books on soft skills like:

Good to Great	by Jim Collings
Straight from the gut	by Jack Welch
Winning	by Jack Welch
The 7 Habits of Highly Effective People	by Stephen R Covey
The One Minute Manager	by Ken Blanchard
High Output Management	by Andrew Groove
Think and grow rich	by Napoleon Hill

## **Associate Engineer**

Associate Engineer should have knowledge of following:

- **Concepts**
  - Basic Internet Services/Main NTL internet services
  - DHCP
  - NAT
  - PAT
  - CRM
  - FAULT TYPE selection in CTI module
  - FAULT TYPE selection in TT generation.
  - Customer Portal
  - TAC Level 1 SOPs
  - TAC guidelines updated on knowledge.dsl.net.pk
  - WLAN
  - LAN
  - WAN
- **Video**
  - Troubleshooting of following services:
    - Basic cable
    - Digital box
    - Joy Box/HD Box
    - Joy App
    - VOD
    - Nayatel Live
- **NGN**
  - Troubleshooting of POTS
- **Core**
  - Troubleshooting of following services on customer end routers:
    - PPPoE
    - IPoE
- **Systems**
  - Troubleshooting of following services:
    - eView
- **Troubleshooting**
  - Slow Browsing – LAN/Wireless/WAN
  - No Browsing – LAN/WAN/Wireless
  - Frequent Disconnections – LAN/WAN/Wireless
  - WiFi Signal Strength issues
  - UPS
- **Computer Usage and related tools:**

- Advance level Knowledge of Computer on Windows OS 7/8/8.1/10 for following topics:

- Ping
- Traceroute

- **Soft Skills:**

- Good communication (Verbal & Written) and call handling skills.
  - Greetings.
  - Courtesy.
  - Anger diffusion techniques.
- Should be able to report problems/user related issues to Supervisor/Manager.
- Should be able to log each complaint on CRM and update trouble tickets accordingly.
- Should be able to troubleshoot on BRAS and Core Routers respectively.
- Should be familiar with NTL services (Data, Voice and Video) including value added services.

## **Assistant Engineering Supervisor**

In addition to Associate Engineer skill set, Assistant Engineering Supervisor should have knowledge of following:

- **Concepts**
  - NTL VAS services
  - DMZ
  - UPnP
  - Multi-NAT
  - NMS
  - Non-Manageable Switches
  - Access Points
- **Video**
  - Configuration/Troubleshooting of following services:
    - Basic cable
    - Digital box
    - Joy Box/HD Box
    - Joy App
    - VOD
    - Nayatel Live
  - Basic Troubleshooting of NWatch
- **NGN**
  - Basic Troubleshooting of following services:
    - SIPOTS
    - HOSTEX
- **Core**
  - Configuration/Troubleshooting of following services on customer end routers:
    - IP Pool
    - Port forwarding
    - Optimus
- **Systems**
  - Configuration/Troubleshooting of following services:
    - eView
- **Computer Usage and related tools:**
  - Advance level Knowledge of Computer on Windows OS 7/8/8.1/10 for following topics:
    - Telnet
- **Soft Skills:**
  - Good communication and call handling skills.
  - Greetings.
  - Courtesy.

- Anger diffusion techniques
- Should have good written communication. The emails written for escalations and updates on TTs should be clear, precise and easily understandable
- Should be able to take ownership and responsibility for customer issues
- Should be actively participating in achieving TAC departmental KPIs
- Good decision-making skills under pressure
- Should be able to immediately escalate reported issues
- Should be able to implement the task/procedures given by Supervisor/Manager.
- Should be able to maintain the decorum of the floor.
- Should know the working, targets and goals of TAC
- Should know all the SOPs related to TAC
- Should be able to log each complaint on CRM and update trouble tickets accordingly.
- Should be able to use BRAS (Juniper/CISCO)
- Should be familiar with NTL services (Data, Voice and Video) including value added services

## **Engineering Supervisor**

In addition to Assistant Engineering Supervisor skill set, Engineering Supervisor should have knowledge of following:

- **Concepts**

- NAT Types
- OSI/TCP IP layers functionality.
- Basics of IP Addressing Schemes
- Subnetting
- BOD
- Parental Locking
- What is Routing? Concept and use of below mentioned types of routing and algorithms of routing.
  - Static routing.
  - Dynamic routing.
- Basic NTL infrastructure
- NOC team functionality
- Detailed knowledge of NAYatel VAS services, their provisioning troubleshooting and responsibilities of departments involved.

- **Video**

- Configuration/Troubleshooting of following services:
  - Basic cable
  - Digital box
  - Joy Box/HD Box
  - Joy App
  - VOD
  - Nayatel Live
- Basic knowledge of NTL infrastructure, traffic flows and service provisioning of the following services:
  - IPTV/VOD/Nayatel Live/NWatch

- **NGN**

- Basic knowledge of NTL infrastructure, traffic flows and service provisioning of the following services:
  - POTS/SIP POTS/HOSTEX

- **Core**

- Configuration/Troubleshooting of following services on customer end routers:
  - IP Pool
  - Port forwarding
- Basic knowledge of NTL infrastructure, traffic flows and service provisioning of the following services:
  - PPPoE/PREMIUM/L2 & L3 VPNs/CVAS

- **Systems**

- Troubleshooting of following services:
  - eView

- **Troubleshooting**

- Slow Browsing – LAN/Wireless/WAN
- No Browsing – LAN/WAN/Wireless
- Frequent Disconnections – LAN/WAN/Wireless
- WiFi Signal Strength issues
- Basic cable/DSTB
- HDBox/Joy Box
- UPS
- POTS
- VOD/Live

- **Computer Usage and related tools:**

- Advance level Knowledge of Computer on Windows OS 7/8/8.1/10 for following topics:

- Ping
- Traceroute
- Telnet

- **Soft Skills:**

- Good communication and call handling skills.
- Greetings.
- Courtesy.
- Anger diffusion techniques
- Should have good written communication. The emails written for escalations and updates on TTs should be clear, precise and easily understandable
- Should be able to take ownership and responsibility for customer issues
- Should be actively participating in achieving TAC departmental KPIs
- Good decision-making skills under pressure
- Should be able to immediately escalate reported issues
- Should be able to implement the task/procedures given by Supervisor/Manager.
- Should be able to maintain the decorum of floor.
- Should know the working, targets and goals of TAC
- Should know all the SOPs related to TAC
- Should be able to log each complaint on CRM and update trouble tickets accordingly.
- Should be able to use BRAS (Juniper/CISCO)
- Should be familiar with NTL services (Data, Voice and Video) including value added services



## **Assistant Transmission Engineer**

In addition to Engineering Supervisor skill set, Assistant Transmission Engineer should have knowledge of following:

- **Concepts**
  - o DNS
  - o Multicast vs Unicast vs Broadcast
  - o MAC Filtering
  - o VLAN
  - o Duplex
  - o Console NAT types
  - o Safeweb
  - o CPE Firewall settings
  - o Difference between routed and bridge ports
- **Traffic Flows**
  - o PPPoE (Home/Connect) traffic flow
  - o Premium traffic flow
  - o VOD traffic flow
  - o HDBox/JoyBox/JoyApp traffic flow
  - o POTS traffic flow
  - o Bandwidth of core ring and uplinks
- **CPE Configurations**
  - o PPPoE
  - o IPoE
  - o Eview/Port forwarding
  - o Routed and/or Bridge configurations through CPE
- **Access**
  - o Complete understanding of Alarm modules and the outputs
  - o Service ports and their details
- **NGN**
  - o Hostex Basic troubleshooting
  - o SIP/POTS Basic troubleshooting
- **Soft Skills:**
  - o Good communication and call handling skills.
  - o Greetings.
  - o Courtesy.
  - o Anger diffusion techniques
  - o Should have good written communication. The emails written for escalations and updates on TTs should be clear, precise and easily understandable
  - o Should be able to take ownership and responsibility for customer issues
  - o Should be actively participating in achieving TAC departmental KPIs
  - o Good decision-making skills under pressure
  - o Should be able to immediately escalate reported issues
  - o Should be able to implement the task/procedures given by Supervisor/Manager.

- o Should be able to maintain the decorum of floor.
- o Should know the working, targets and goals of TAC
- o Should know all the SOPs related to TAC
- o Should be able to log each complaint on CRM and update trouble tickets accordingly.
- o Should be able to use BRAS (Juniper/CISCO)
- Should be familiar with NTL services (Data, Voice and Video) including value added services

# **Transmission Engineer**

In addition to Assistant Transmission Engineer skill set, Transmission Engineer should have knowledge of following:

## **1. Soft Skills:**

Good communication skills (Written & Verbal)

- o Verbal : Excellent Customer Handling & Troubleshooting
- o Written: Email Writing

## **2. Technological Concepts**

Knowledge of ALL NTL VAS services (working, flow, escalation) is a must.

Latest Nayatel Core/Access Network Diagram

Latest Bandwidth of Core Ring and Uplink Bandwidth

Basic PON/FTTH related knowledge and understanding of V-OLT, P-OLT, NT/SHUB/LANX, WDM & Splitters

### **A) Access**

#### **• GPON**

- o Ranging Process
- o Logical and differential distance
- o Service ports
- o Service profile, Line profile, VAS profile, Bandwidth Profile

#### **• IGMP**

- o Multicast
- o Versions & Differences
- o Snooping vs Proxy
- o Working in NAYAtel network

#### **• VLANs**

- o Understanding of VLANs and dot1q Header
- o RB & CC VLANs
- o Smart & MUX VLANs

#### **• PON Infrastructure**

- o Fiber Single & Multimode
- o POLT
- o VOLT
- o ONT
- o SPLITTER
- o WDM
- o ODF
- o NAP
- o BPR

### **B) Networks**

#### **• CGNAT**

- What is CGNAT
- Pros and Cons
- Implementation in our network .

- **CDNs**

- What is CDN
- Advantages of CDNs
- CDNs deployed in our network
- Traffic flow IX

- **Routing**

- Static routing.
- Dynamic routing.
- Link state routing.
- Distance vector routing.

### **C) Systems**

- DNS Resolution Flow
- DNS Resource Record
- Basic understanding of POP, IMAP & SMTP
- Basic understanding Email flow and troubleshooting
- Webhosting and Email hosting servers in NAYAtel and their differences

### **D) NGN**

- Troubleshooting POTS/SIP-POTS, HOSTEX and Cloud PBX

### **3. Configurations**

- Triple play Service Provisioning and Configuration in ONT
- IP Routed / PPPoE Configuration knowledge of GUI & CLI CPEs
- All NTL CPEs

### **4. Troubleshooting**

All issues as per latest TAC Level 1 and Level 2 Toolkit

### **5. Soft Skills**

1. Should be able to take ownership and responsibility for customer issues
2. Should be actively participating in achieving TAC departmental KPIs
3. Good decision-making skills under pressure
4. Should be able to immediately escalate reported issues
5. Should be able to implement the task/procedures given by Supervisor/Manager.
6. Should be able to get the tasks/SOPs implemented with the help of team
7. Should be able to maintain the decorum of the floor.
8. Should know the working, targets and goals of TAC
9. Should know the SOPs of company
10. Should be able to present weekly and monthly reports of team working
11. Should have submitted 1 lesson learned after promotion as OE and have clear understanding of previously approved lessons learned
12. Read at least 1 book on soft skills like:
  - Winning by Jack Welch

- The 7 habits of highly effective people by Stephen R Covey
- The One Minute Manager by Ken Blanchard
- High Output Management by Andrew Grove
- Think and grow rich by Napoleon Hill