

DATA FLOW IN CDR USING GNS3

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Abstract: This paper explains the transfer of data from exchanges (BSNL) to the main data center through networking. This involves transfer of data through different routers using different protocols. Here data transfer is the main objective and not data extraction. GNS3 a graphical network simulator is used which allows simulation of complex networks. To provide complete and accurate simulations, it is strongly linked with Dynamips which is a Cisco IOS emulator, Quemu one of the generic and open source machine emulator and virtualiser and Virtual Box which is a free and powerful virtualisation software .

Keywords: GNS3, CDR, router

I. INTRODUCTION

In this we have how data transfer is done. PC1 is the exchange. Switch is layer 2 (data link layer) switch. Core Switch is network layer switch and PC 2 is the data center.

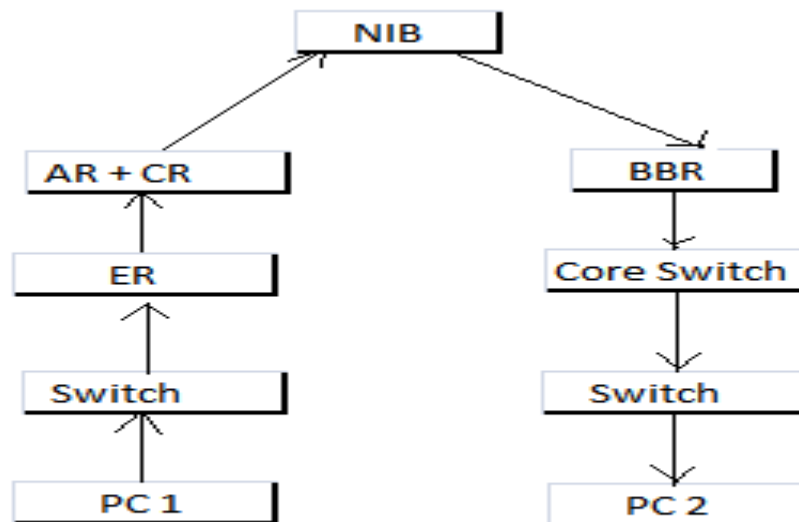


Figure 1. Basic Flow Diagram of Data Transfer

Different routers used have different IOS for their working and data transfer from one router to another is done using different routing/switching protocols.

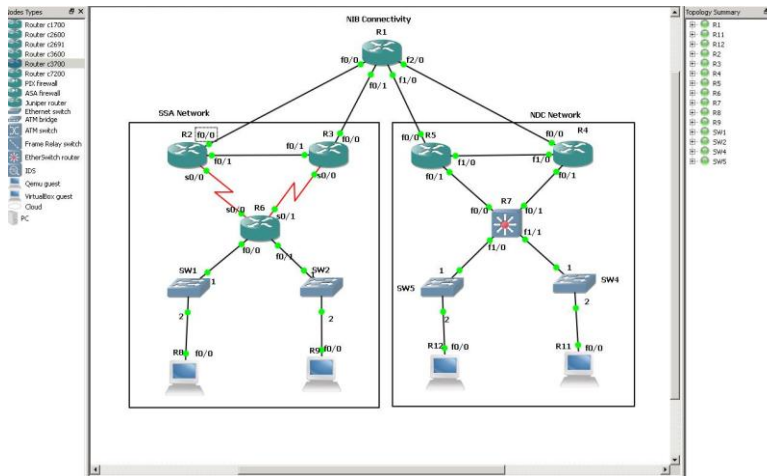


Figure 2. Data Flow of CDR In GNS3

II. DATA CENTER NETWORK

Data is transferred from one end to another for this purpose function of each element has been explained. Now, Exchange router is used for two connections to exchange for CDR collection and service provisioning two WAN connections and routers are aggregated in case of star topology[1]. LAN extender/Remote router is used for extending LAN from LE to CSR and RLUs. Aggregation of routers takes place which are connected to Edge routers of MPLS VPN. There are central routers (optional) between Aggregation routers/LE routers and Edge routers[2]. The function of Backbone Routers (two in each DC) is to connect DC to MPLS VPN. Data Centre routers are used for termination of all data traffic in the billing network. X.25 serial connectivity to CDR collectors; connected to the Backbone routers. Managed Ethernet switch, CSR Ethernet switch, Data centre Ethernet switches (Type I and Type II), Work station Ethernet switch at DC. Internet Router present at DC is used for internet connectivity to the DC[3].

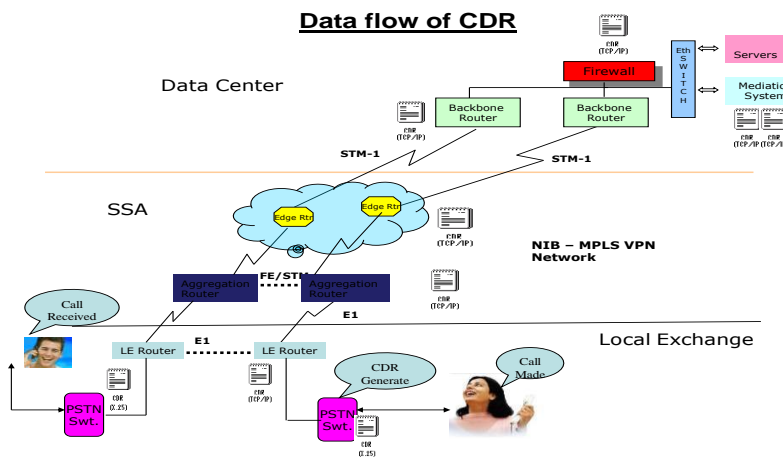


Figure 3. Data Flow of CDR

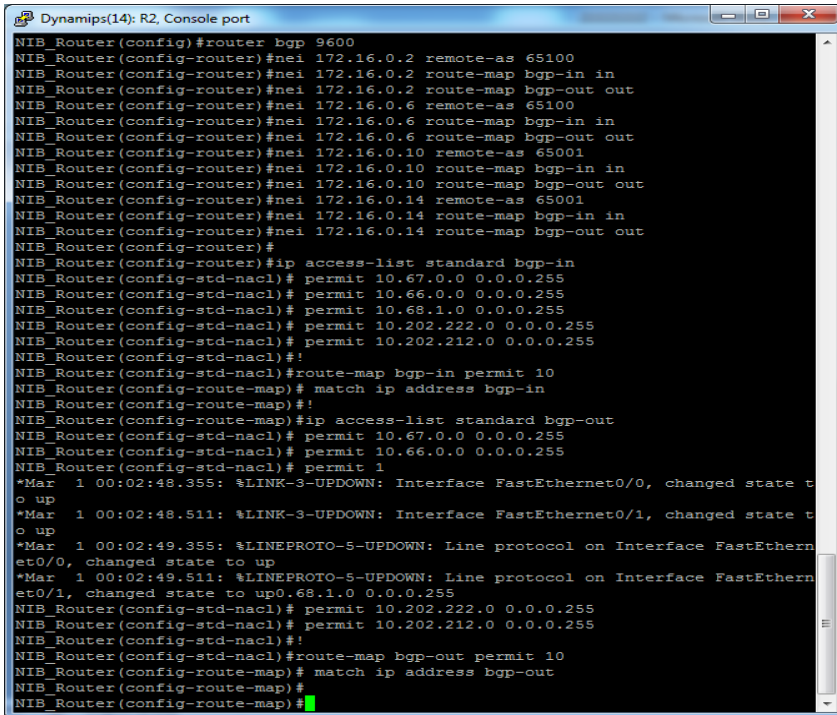
III. NEED FOR NETWORK SIMULATOR

If we are the manager of a growing network, with ever greater demands being placed upon our network, then network simulators are an area we should seriously consider investigating. Making changes to our network are expensive. Mistakes can cost us a lot of money to rectify. If we had a tool that allowed us to model our current network, then we

make changes to it to see what happened. The network simulator would remove some of the uncertainty surrounding the changes we were making[4]. Of course, it won't remove all of the uncertainty, but at least it will remove some of it. Network simulators are most useful when used to model large networks. Here, GNS3 is a graphical network simulator that allows simulation of complex networks.

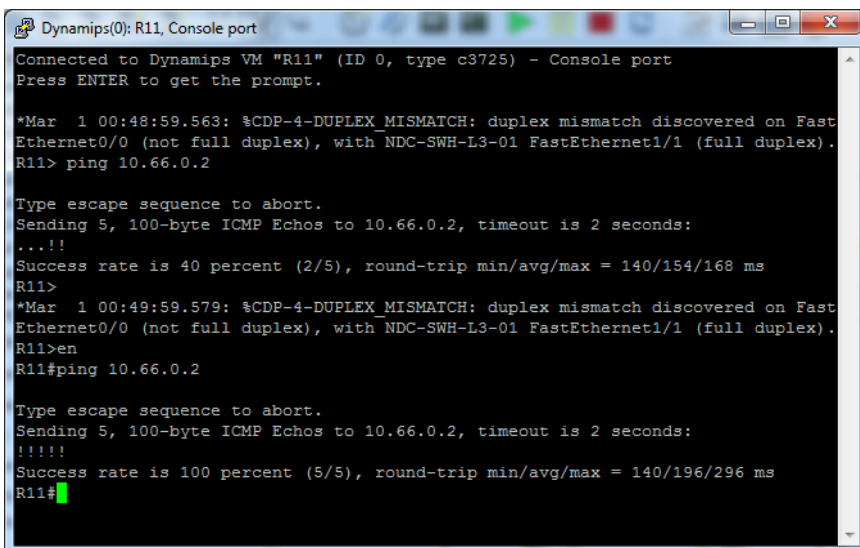
IV. NIB Router

It works as a main router for data transfer and incorporate BGP for this purpose.

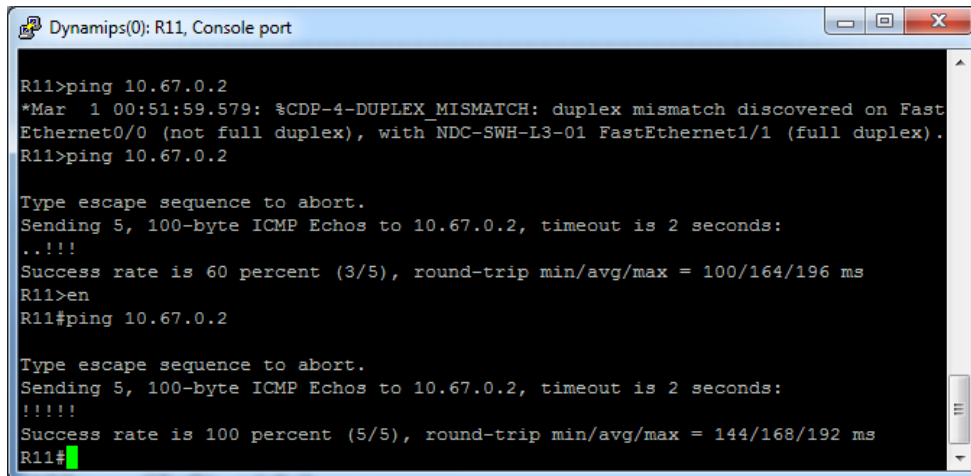


```
Dynamips(14): R2, Console port
NIB_Router (config)#router bgp 9600
NIB_Router (config-router)#nei 172.16.0.2 remote-as 65100
NIB_Router (config-router)#nei 172.16.0.2 route-map bgp-in in
NIB_Router (config-router)#nei 172.16.0.2 route-map bgp-out out
NIB_Router (config-router)#nei 172.16.0.6 remote-as 65100
NIB_Router (config-router)#nei 172.16.0.6 route-map bgp-in in
NIB_Router (config-router)#nei 172.16.0.6 route-map bgp-out out
NIB_Router (config-router)#nei 172.16.0.10 remote-as 65001
NIB_Router (config-router)#nei 172.16.0.10 route-map bgp-in in
NIB_Router (config-router)#nei 172.16.0.10 route-map bgp-out out
NIB_Router (config-router)#nei 172.16.0.14 remote-as 65001
NIB_Router (config-router)#nei 172.16.0.14 route-map bgp-in in
NIB_Router (config-router)#nei 172.16.0.14 route-map bgp-out out
NIB_Router (config-router)#
NIB_Router (config-router)#ip access-list standard bgp-in
NIB_Router (config-std-nacl)# permit 10.67.0.0 0.0.0.255
NIB_Router (config-std-nacl)# permit 10.66.0.0 0.0.0.255
NIB_Router (config-std-nacl)# permit 10.68.1.0 0.0.0.255
NIB_Router (config-std-nacl)# permit 10.202.222.0 0.0.0.255
NIB_Router (config-std-nacl)# permit 10.202.212.0 0.0.0.255
NIB_Router (config-std-nacl)#!
NIB_Router (config-std-nacl)#route-map bgp-in permit 10
NIB_Router (config-route-map)# match ip address bgp-in
NIB_Router (config-route-map)#!
NIB_Router (config-route-map)#ip access-list standard bgp-out
NIB_Router (config-std-nacl)# permit 10.67.0.0 0.0.0.255
NIB_Router (config-std-nacl)# permit 10.66.0.0 0.0.0.255
NIB_Router (config-std-nacl)# permit 1
*Mar 1 00:02:48.355: %LINK-3-UPDOWN: Interface FastEthernet0/0, changed state t
o up
*Mar 1 00:02:48.511: %LINK-3-UPDOWN: Interface FastEthernet0/1, changed state t
o up
*Mar 1 00:02:49.355: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthern
et0/0, changed state to up
*Mar 1 00:02:49.511: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthern
et0/1, changed state to up
NIB_Router (config-std-nacl)# permit 10.202.222.0 0.0.0.255
NIB_Router (config-std-nacl)# permit 10.202.212.0 0.0.0.255
NIB_Router (config-std-nacl)#!
NIB_Router (config-std-nacl)#route-map bgp-out permit 10
NIB_Router (config-route-map)# match ip address bgp-out
NIB_Router (config-route-map)#
NIB_Router (config-route-map)#
```

RESULT: Data from SSA to NDC is received successfully.



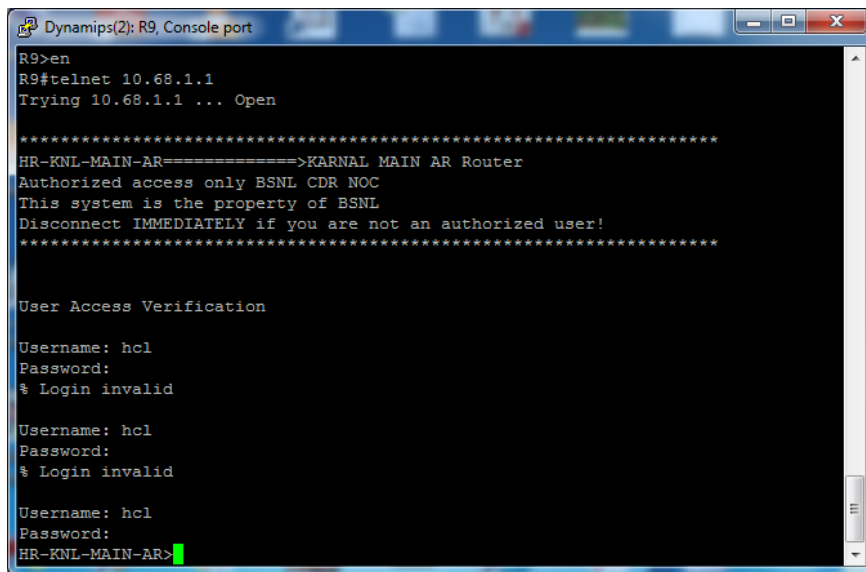
```
Dynamips(0): R11, Console port
Connected to Dynamips VM "R11" (ID 0, type c3725) - Console port
Press ENTER to get the prompt.
*Mar 1 00:48:59.563: %CDP-4-DUPLEX_MISMATCH: duplex mismatch discovered on Fast
Ethernet0/0 (not full duplex), with NDC-SWH-L3-01 FastEthernet1/1 (full duplex).
R11> ping 10.66.0.2
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 10.66.0.2, timeout is 2 seconds:
...!!
Success rate is 40 percent (2/5), round-trip min/avg/max = 140/154/168 ms
R11>
*Mar 1 00:49:59.579: %CDP-4-DUPLEX_MISMATCH: duplex mismatch discovered on Fast
Ethernet0/0 (not full duplex), with NDC-SWH-L3-01 FastEthernet1/1 (full duplex).
R11>en
R11#ping 10.66.0.2
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 10.66.0.2, timeout is 2 seconds:
!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 140/196/296 ms
R11#
```



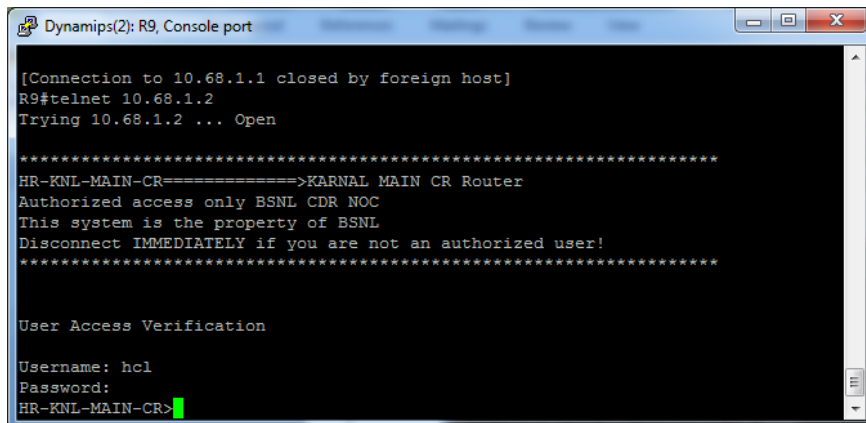
```
Dynamips(0): R11, Console port
R11>ping 10.67.0.2
*Mar 1 00:51:59.579: %CDP-4-DUPLEX_MISMATCH: duplex mismatch discovered on FastEthernet0/0 (not full duplex), with NDC-SWH-L3-01 FastEthernet1/1 (full duplex).
R11>ping 10.67.0.2
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 10.67.0.2, timeout is 2 seconds:
..!!!
Success rate is 60 percent (3/5), round-trip min/avg/max = 100/164/196 ms
R11>en
R11#ping 10.67.0.2
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 10.67.0.2, timeout is 2 seconds:
!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 144/168/192 ms
R11#
```

Success rate comes out initially to be 40% due to timeout and later it achieved 100%. This is for 5 packets.

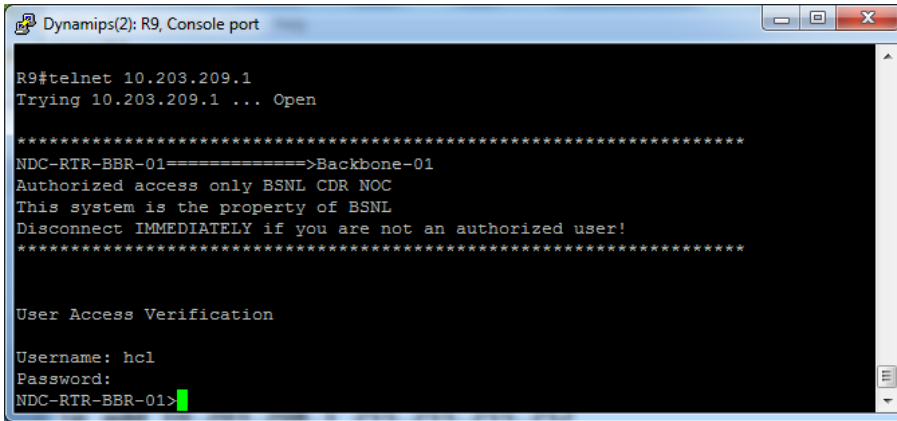
TELNET configuration with security using access list is implemented successfully.



```
Dynamips(2): R9, Console port
R9>en
R9#telnet 10.68.1.1
Trying 10.68.1.1 ... Open
*****
HR-KNL-MAIN-AR=====>KARNAL MAIN AR Router
Authorized access only BSNL CDR NOC
This system is the property of BSNL
Disconnect IMMEDIATELY if you are not an authorized user!
*****
User Access Verification
Username: hcl
Password:
% Login invalid
Username: hcl
Password:
% Login invalid
Username: hcl
Password:
HR-KNL-MAIN-AR>
```



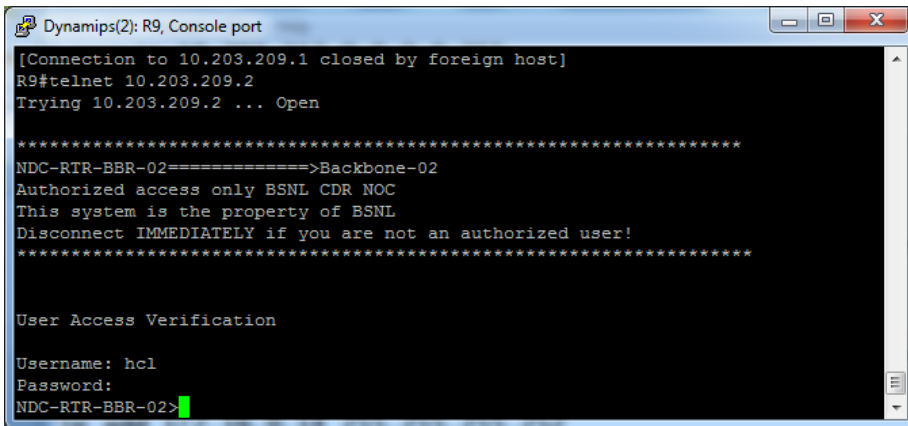
```
Dynamips(2): R9, Console port
[Connection to 10.68.1.1 closed by foreign host]
R9#telnet 10.68.1.2
Trying 10.68.1.2 ... Open
*****
HR-KNL-MAIN-CR=====>KARNAL MAIN CR Router
Authorized access only BSNL CDR NOC
This system is the property of BSNL
Disconnect IMMEDIATELY if you are not an authorized user!
*****
User Access Verification
Username: hcl
Password:
HR-KNL-MAIN-CR>
```



```
Dynamips(2): R9, Console port
R9#telnet 10.203.209.1
Trying 10.203.209.1 ... Open
*****
NDC-RTR-BBR-01=====>Backbone-01
Authorized access only BSNL CDR NOC
This system is the property of BSNL
Disconnect IMMEDIATELY if you are not an authorized user!
*****

User Access Verification

Username: hcl
Password:
NDC-RTR-BBR-01>
```



```
Dynamips(2): R9, Console port
[Connection to 10.203.209.1 closed by foreign host]
R9#telnet 10.203.209.2
Trying 10.203.209.2 ... Open
*****
NDC-RTR-BBR-02=====>Backbone-02
Authorized access only BSNL CDR NOC
This system is the property of BSNL
Disconnect IMMEDIATELY if you are not an authorized user!
*****

User Access Verification

Username: hcl
Password:
NDC-RTR-BBR-02>
```

This configuration leads to the access of AR,CR,ER,BBR1 and BBR2 from NDC PC.

The access list provides security to access router through telnet command.

Username- hcl

Password – ***

References

- [1] Cisco Certified Network Associate, Study Guide, seventh edition by Todd Lammle.
- [2] GNS3 documentation by Greg Anuzelli.
- [3] Cisco Router Configuration tutorial by CISCO.
- [4] Cisco Service Control Engine (SCE) , CLI Command Reference , Version 2.5.7, OL-7825-02.