

# **DAYANANDA SAGAR COLLEGE OF ENGINEERING**

(An Autonomous Institute affiliated to VTU, Belagavi, Approved by AICTE & ISO 9001:2008 Certified)

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Malleshwara Hills, Kumaraswamy Layout, Bengaluru-560078.



## **Mini Project Report**

on

## **“Call Centre Data Transmission And Communication”**

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in

## **Computer Network Lab**

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# **Call Centre Data Transmission And Communication**

## **Abstract**

This project briefly explains the concept of OSPF protocol and shows its implementation with an use case scenario. Here the scenario is communication and transmission of data, within the branches of a call centre.

It also illustrates OSPF protocol's benefits and possible (if any) issues.

The OSPF Protocol is a dynamic routing protocol which provides a highly functional open protocol that any vendor can use to communicate using the TCP/IP protocol family. It can converge the networks extremely fast and ensures loop free paths.

It has features that allow for the stricter propagation of routes, for load sharing, and for selective route importing. It can also provide better load sharing on external links rather than other IGPs (Internal Gateway Protocols).

## **Introduction**

OSPF (Open Shortest Path First) Protocol is a famous TCP/IP Internal Gateway Protocol which is used to distribute information within a single system. It is based on link-state technology which is different from algorithms like RIPv4 which are used in Internet Routing protocols.

OSPF Protocol has many new features, including:

- Variable Length Subnet Masks
- Route summarization
- Authentication of Routing Updates, etc.
- It uses IP multicast to send link-state updates. This ensures less processing on routers that are not meant to listen to the packets. This is only done in case of a change instead of doing it periodically. This helps in a better use of bandwidth.

The traditionally used RIP has various limits in a large network setting which have paved the way for OSPF.

Name of call centre branch	Router number	Starting address	Broadcast address	Subnet mask
Dotcom	R0	192.168.10.0	192.168.10.1 5	28
Dot2com	R1	192.168.10.1 6	192.168.10.3 1	28
Dot3com	R2	192.168.10.3 2	192.168.10.4 7	28

From Router	To Router	Network ID
Router 0	Router 1	10.0.0.0
Router 1	Router 2	11.0.0.0
Router 2	Router 0	12.0.0.0
Router 1	Router 3	13.0.0.0
Router 2	Router 4	14.0.0.0
Router 3	Router 5	15.0.0.0
Router 4	Router 6	16.0.0.0
Router 5	Router 7	17.0.0.0
Router 6	Router 8	18.0.0.0
Router 7	Router 9	19.0.0.0
Router 9	Router 8	20.0.0.0
Router 8	Router 5	21.0.0.0
Router 6	Router 3	22.0.0.0
Router 0	Router 3	23.0.0.0
Router 4	Router 7	24.0.0.0

Assignable host address= 14 each

## Web servers:

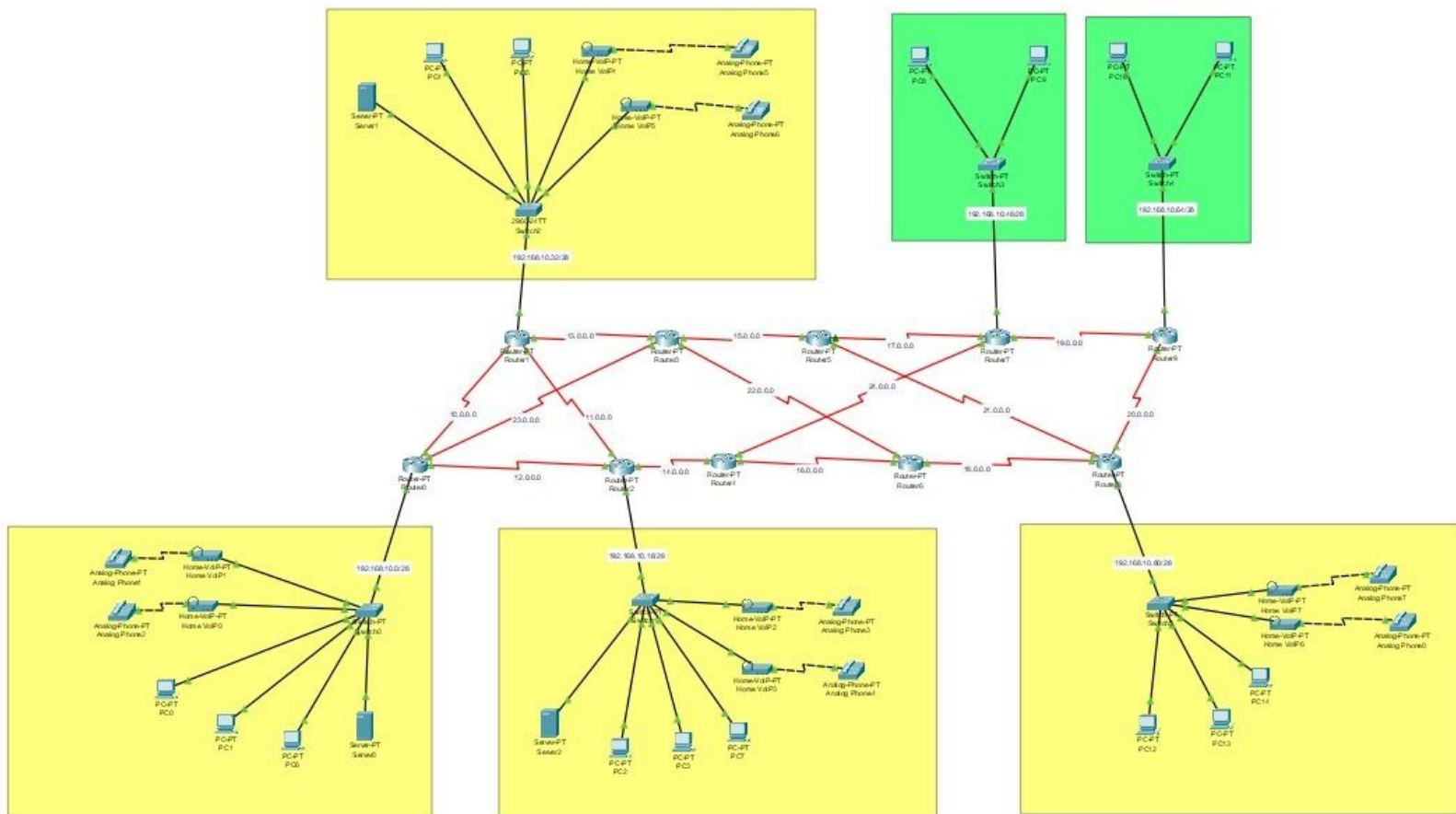
192.168.10.5 : www.callcentre1.com

192.168.10.25 : www.callcentre2.com

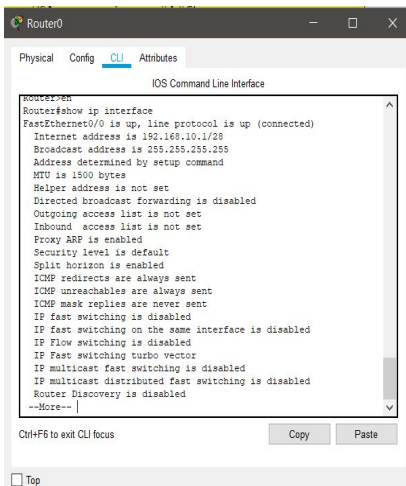
192.168.10.45 : [www.callcentre3.com](http://www.callcentre3.com)

# DESIGN

We have designed a network scenario which resembles different branches of a call centre.



# TESTING AND ANALYSIS



1)The CLI of router 0 shows the internet address with the subnet mask and broadcast address.

Assignment of IP addresses is successful.

```

Router1
Physical Config CLI Attributes
IOS Command Line Interface
Router1#
Router1#show ip ospf
Routing Process "ospf 1" with ID 192.168.10.33
Supports only single TOS(TOS0) routes
Supports opaque LSA
It is an area border router
SPF schedule delay 5 secs, Hold time between two SPFs 10 secs
Minimum LSA interval 5 secs, Minimum LSA arrival 1 secs
Number of external LSA 0, Checksum Sum 0x000000
Number of opaque AS LSA 0, Checksum Sum 0x000000
Number of DCbitless external and opaque AS LSA 0
Number of DoNotAge external and opaque AS LSA 0
Number of areas in this router is 2, 2 normal 0 stub 0 nssa
External flood list length 0
Area BACKBONE(0)
Number of interfaces in this area is 3
Area has no authentication
SPF algorithm executed 24 times
Area ranges are
Number of LSA 38, Checksum Sum 0x11f21c
Number of opaque link LSA 0, Checksum Sum 0x000000
Number of DCbitless LSA 0
Number of indication LSA 0
Number of DoNotAge LSA 0
--More--
Ctrl+F6 to exit CLI focus
Copy Paste

```

2.

The OSPF protocol successfully configured at router 1

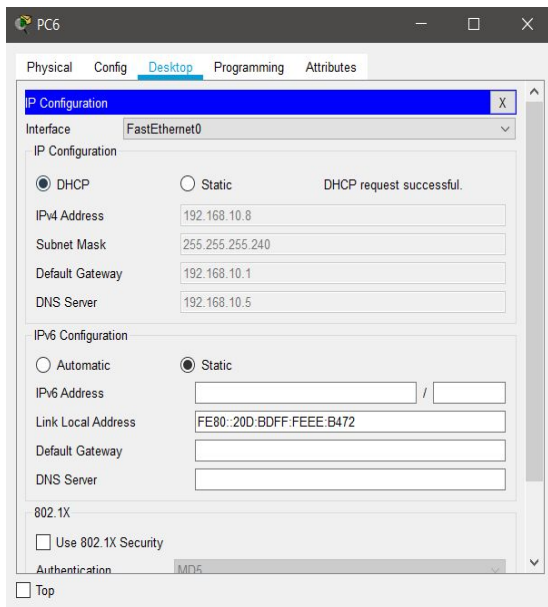
```

Router2
Physical Config CLI Attributes
IOS Command Line Interface
Router2#
Router2#
Router2#
Router2#
Router2#
Router2#
Router2#
Router2#show ip dhcp pool
Pool r2 :
Utilization mark (high/low) : 100 / 0
Subnet size (first/next) : 0 / 0
Total addresses : 14
Leased addresses : 4
Excluded addresses : 0
Pending event : none
1 subnet is currently in the pool
Current index IP address range Leased/Excluded/Total
192.168.10.17 192.168.10.17 - 192.168.10.30 4 / 0 / 14
Router2#show ip dhcp binding
IP address Client-ID/ Hardware address Lease expiration Type
192.168.10.20 0001.42B0.BD78 -- Automatic
192.168.10.19 0000.0CC2.ED9C -- Automatic
192.168.10.21 0090.2BE8.8537 -- Automatic
192.168.10.22 000A.41C0.8101 -- Automatic
Router2#
Ctrl+F6 to exit CLI focus
Copy Paste

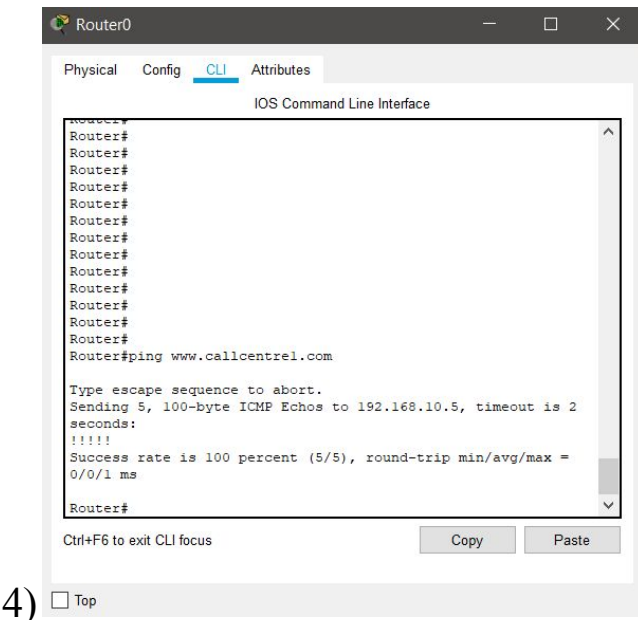
```

3) Total addresses, IP address range, current index are show on CLI of router 0.

Similarly we can check if the DHCP has been setup or not on other routers too.



DHCP request on PC0 is successful.



4)

Shows the DNS server(192.168.10.5) at zone1 resolving host names into IP addresses.

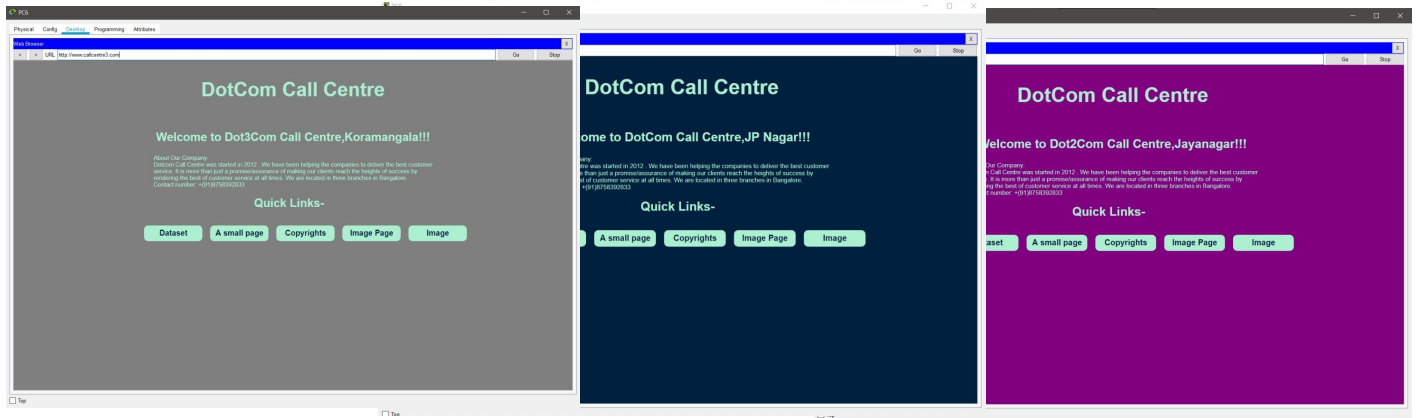
www.callcentre1.com to 192.168.10.5



www.callcentre2.com to 192.168.10.25

www.callcentre3.com to 192.168.10.45

5)



The web search results when the host name/IP address is entered in the URL on the web servers that have been set up.

6)

```
Command Prompt

Packet Tracer PC Command Line 1.0
C:\>ping 192.168.30.146

Pinging 192.168.30.146 with 32 bytes of data:
Reply from 192.168.30.146: bytes=32 time=4ms TTL=124
Reply from 192.168.30.146: bytes=32 time=3ms TTL=124
Reply from 192.168.30.146: bytes=32 time=2ms TTL=124
Reply from 192.168.30.146: bytes=32 time=3ms TTL=124

Ping statistics for 192.168.30.146:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 3ms, Maximum = 2ms, Average = 3ms

C:\>ping 192.168.30.99

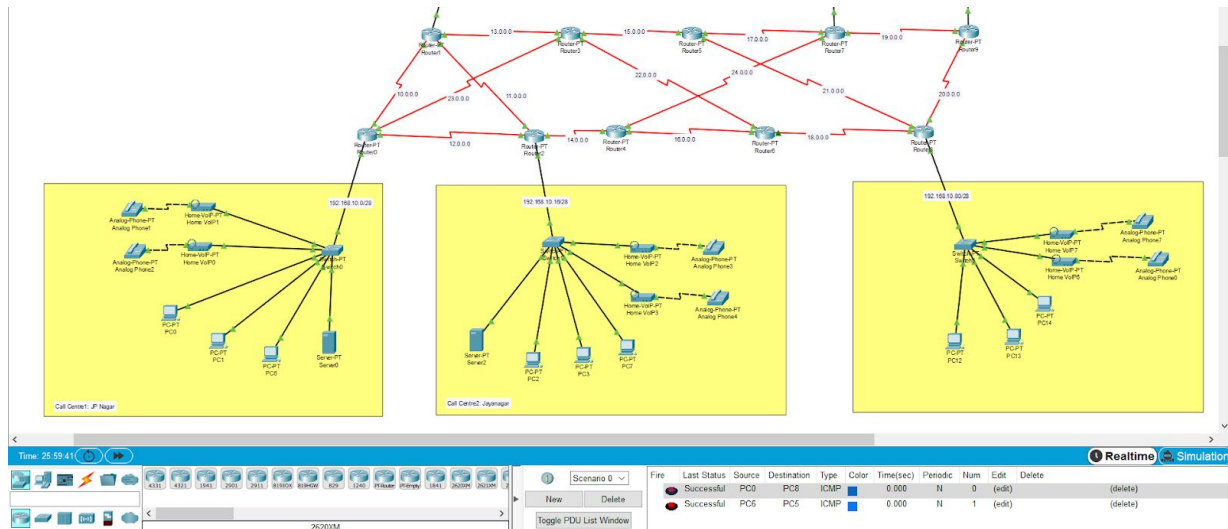
Pinging 192.168.30.99 with 32 bytes of data:
Reply from 192.168.30.99: bytes=32 time=3ms TTL=121
Reply from 192.168.30.99: bytes=32 time=4ms TTL=121
Reply from 192.168.30.99: bytes=32 time=2ms TTL=121
Reply from 192.168.30.99: bytes=32 time=3ms TTL=121

Ping statistics for 192.168.30.99:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 1ms, Maximum = 5ms, Average = 3ms

C:\>
```

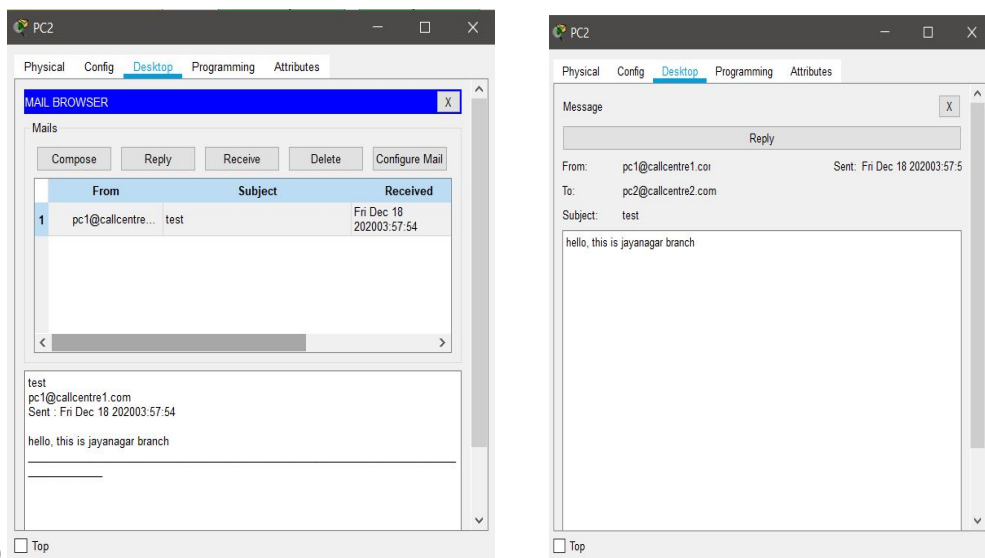
Pinging from PC2(192.168.30.51) to Laptop1(192.168.30.99) and PC8(192.168.30.146)

7)



Shows the successful pinging of message packets from PC0(192.168.10.6) to PC8(192.168.10.50) and from PC6(192.168.10.8) to PC5(192.168.10.35)

8)



Shows e-mail sent successfully from pc1 of first domain to pc2 of second domain.

# CONCLUSIONS AND FUTURE ENHANCEMENTS

Multi LAN Fast Communication Network Topology is useful and can be implemented in call centres where quick retrieval of data is needed in order to ensure quick responses to the customers. As we have implemented OSPF Protocol, communication happens faster finding the shortest path for a message sent from a sender to travel and reach the receiver.

## Future Enhancements:

- ❖ For future enhancement of this network scenario, we can implement VPN (Virtual Private Network) tunnel between routers. Hence, when one call centre transfers data to another, the data being transferred is always secure and in case of a breach the location cannot be traced.
- ❖ 10 routers are available so the number of branches can be increased in order to expand the area covered by the call centre.

# REFERENCES

<https://www.netacad.com/courses/packet-tracer>

<https://www.cisco.com/c/en/us/td/docs/routers/access/800M/software/800MSCG/routconf.htm>

Subnetting:

<https://www.cisco.com/c/en/us/support/docs/ip/routing-information-protocol-rip/13788-3.html>

OSPF Protocol Configuration-

[https://www.cisco.com/c/en/us/td/docs/ios-xml/ios/iproute\\_ospf/configuration/xe-16/iro-xe-16-book/iro-cfg.html](https://www.cisco.com/c/en/us/td/docs/ios-xml/ios/iproute_ospf/configuration/xe-16/iro-xe-16-book/iro-cfg.html)