

Network Management and High Availability

Continuous Assessment 1

Module Title:	Network Management and High Availability
Assignment Type:	Part 1: Research Report (Individual assignment) Part 2: Report (Individual contribution/reflection) Part 3: Implementation in Packet Tracer (Group – max size 4) Part 4: Justification (Group – max size 4)
Project Title:	Utilizing data centres to improve performance and provide high availability for business data
Project Date:	15 th October 2019
Assignment Compiler:	Greg South, gsouth@cct.ie
Weighting:	30% of CA
Due Date:	10 th November 2019 @ 11:55 p.m.
Method of Submission:	Submission through Moodle ONLY
Late submissions:	Will be accepted up to 5 days after the deadline. All late submissions are subject to a penalty of 10% per day. Submissions received more than 5 days after the deadline above will not be accepted.

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Summary

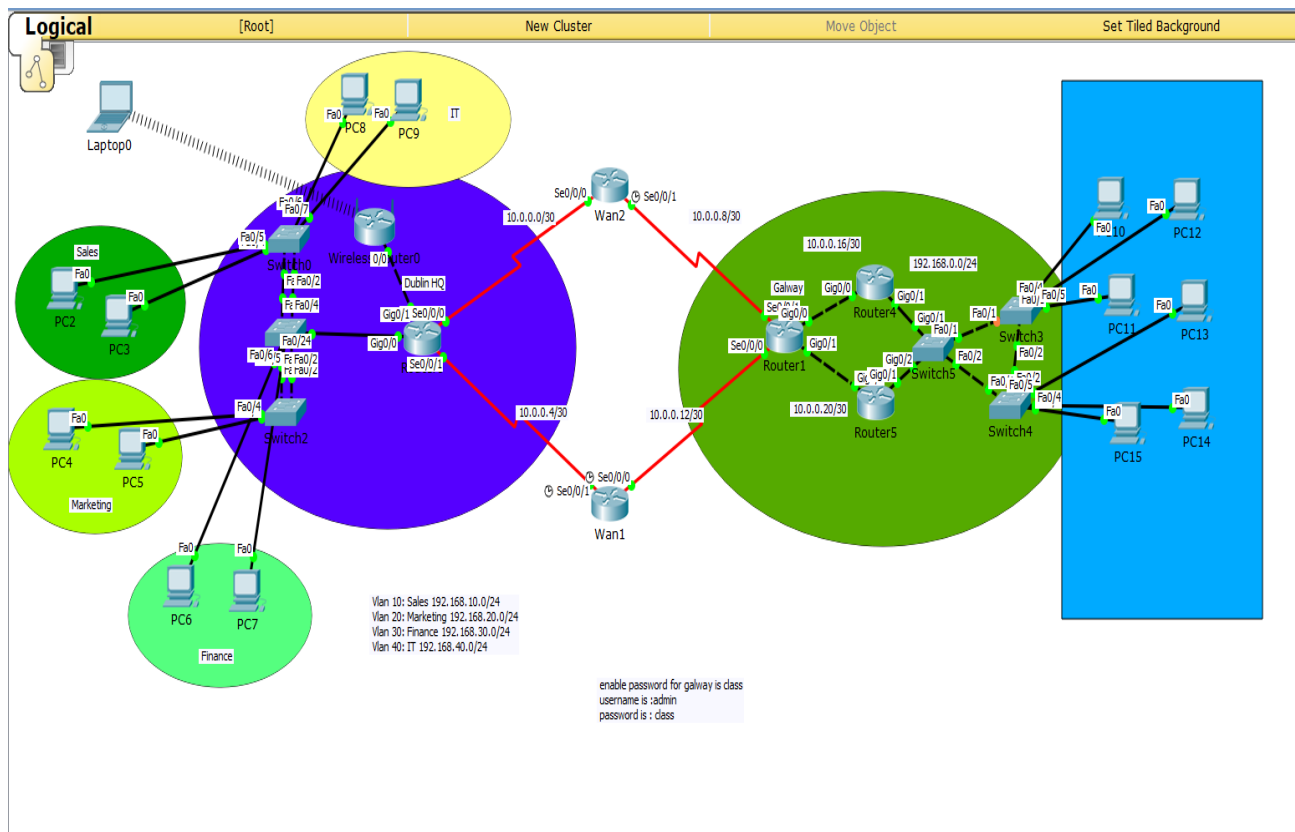
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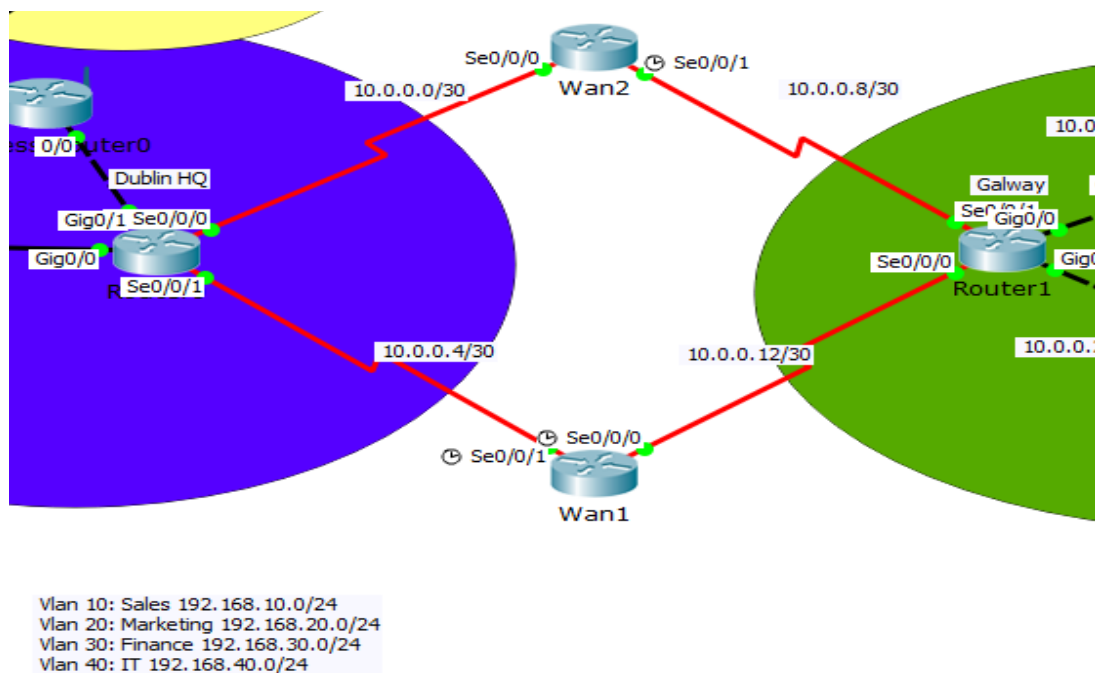
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Design and planning

This is the design for this communication network.



We have implemented 2 Sites, one is the Dublin HQ and the other is Galway, both these sites are connected with different WAN connections. We can see the WAN connections in closer below.



In Dublin HQ we have installed 3 switches which create between them the etherchannel.

That etherchannel is on the trunk mode and are allowed different vlan's for different departments.

Each department is designated as the following:

Sales department: number 10 Vlan

Marketing: number 20 Vlan

Finance: number 30 Vlan

IT: number 40 Vlan

There is also one trunk link that is connected to the main router of Dublin HQ and there are allowed all these vlan's, there is implemented intervlan Routing on that trunk link.

We have also implemented some security features on these switches. We have blocked all the unused ports and make them access on a "black hole" VLAN 80. As well as this we have implemented switchport security on all interfaces.

For each vlan we created a network, which are:

Vlan 10: 192.168.10.0/24

Vlan 20: 192.168.20.0/24

Vlan 30: 192.168.30.0/24

Vlan 40: 192.168.40.0/24

For all these subnet's we created DHCP on Dublin HQ as a Gateway and DHCP server.

For the WiFi Router we created another subnet with 192.168.8.0/24 and implemented DHCP, and created a guest network with a key for security purposes.

On Dublin HQ router we have connected 2 Wan connections with 2 different routing protocols to reach the Galway Network.

One path is with EIGRP routing protocol that means it will have lower Administrative Distance than the other path that is with OSPF routing protocol and as the primary and best path will be from path 1 with EIGRP routing protocol.

On the Galway site we have implemented on the primary router a DHCP server for the hosts that are located on this site, and behind this router there are two routers that are for HSRP purpose.

That means that all these hosts located on this site have the abilities to have a back-up line and when a router or link goes down other link will be ready to act as a the primary link or active link. There are 3 Switches that give access for the hosts and we have implemented STP protocol, which is needed for redundant links whenever a path goes down.

Also some unused ports are put in black hole vlan and shutdown like switches on Dublin HQ.

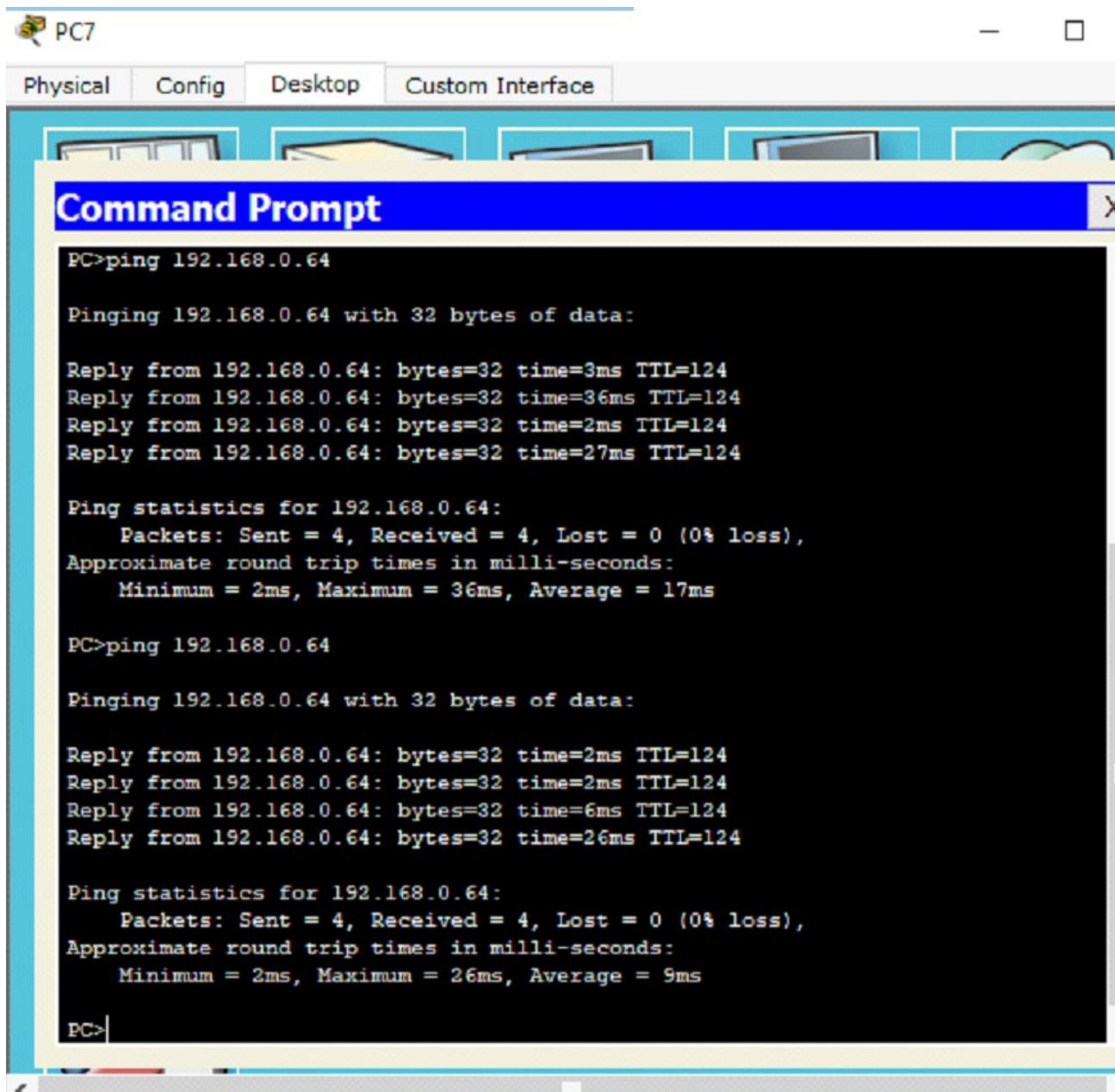
We have also implemented portsecurity.

On the Galway router we have setup SSH for remote access only from Dublin HQ site IT network, this is a security feature, instead of using another protocol like Telnet that doesn't provide encryption when transmitting username and password.

Also including Access lists is a good asset of being secure or filtering what we want to filter.

Connectivity Testing

Below we can find some ping test that are issued to test the connectivity:



The screenshot shows a Packet Tracer environment with a PC7 icon in the top left. The desktop has four tabs: Physical, Config, Desktop, and Custom Interface. A Command Prompt window is open, displaying two ping tests to the IP address 192.168.0.64.

```
PC>ping 192.168.0.64

Pinging 192.168.0.64 with 32 bytes of data:

Reply from 192.168.0.64: bytes=32 time=3ms TTL=124
Reply from 192.168.0.64: bytes=32 time=36ms TTL=124
Reply from 192.168.0.64: bytes=32 time=2ms TTL=124
Reply from 192.168.0.64: bytes=32 time=27ms TTL=124

Ping statistics for 192.168.0.64:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 2ms, Maximum = 36ms, Average = 17ms

PC>ping 192.168.0.64

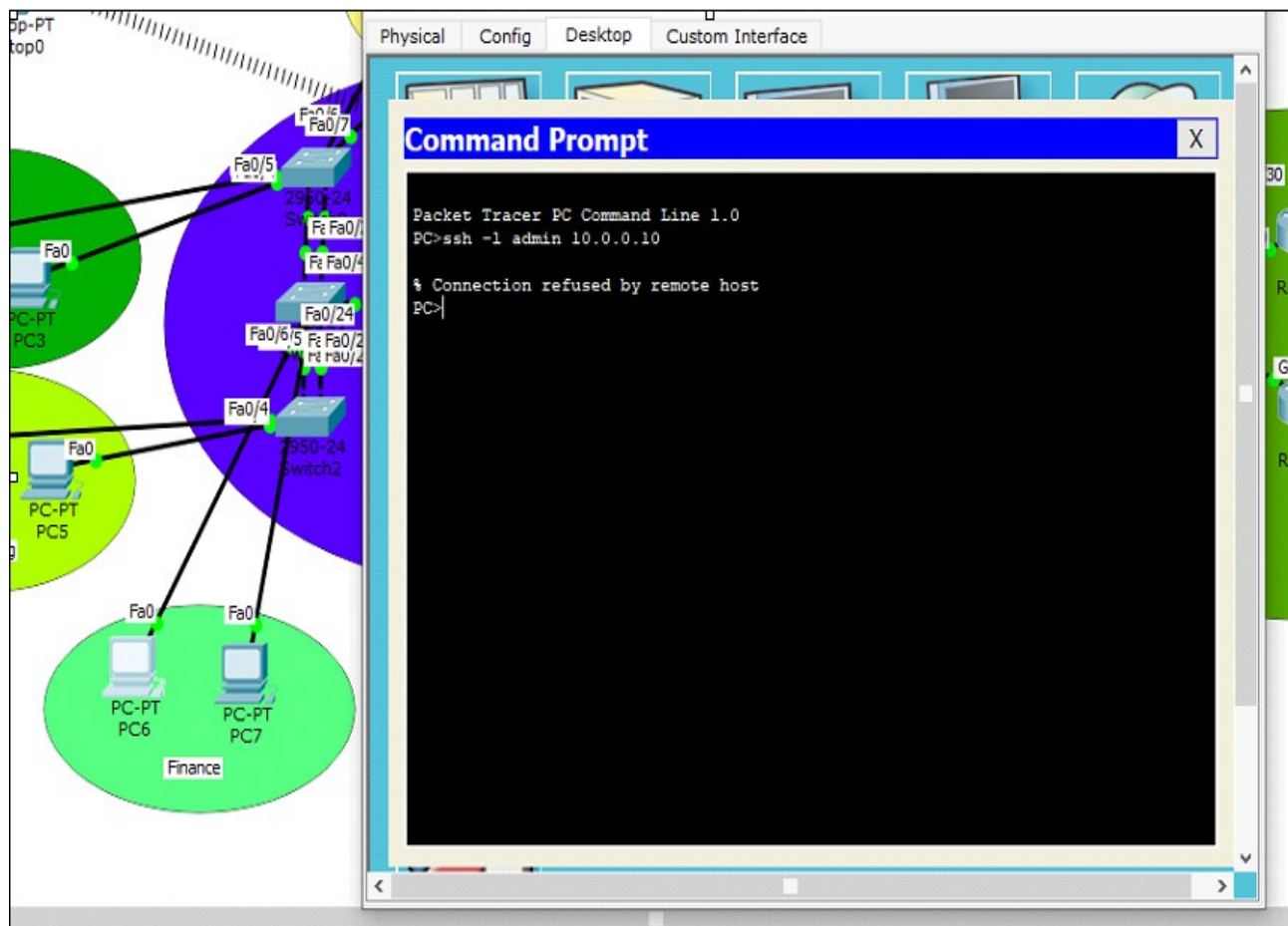
Pinging 192.168.0.64 with 32 bytes of data:

Reply from 192.168.0.64: bytes=32 time=2ms TTL=124
Reply from 192.168.0.64: bytes=32 time=2ms TTL=124
Reply from 192.168.0.64: bytes=32 time=6ms TTL=124
Reply from 192.168.0.64: bytes=32 time=26ms TTL=124

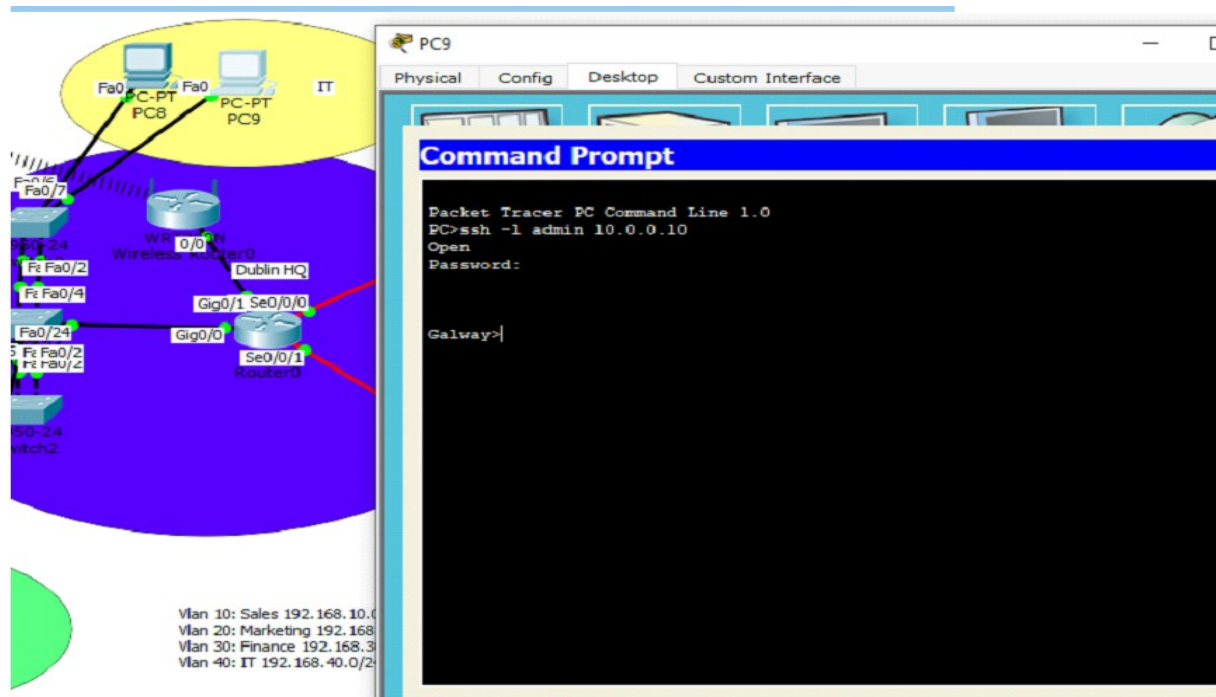
Ping statistics for 192.168.0.64:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 2ms, Maximum = 26ms, Average = 9ms

PC>
```

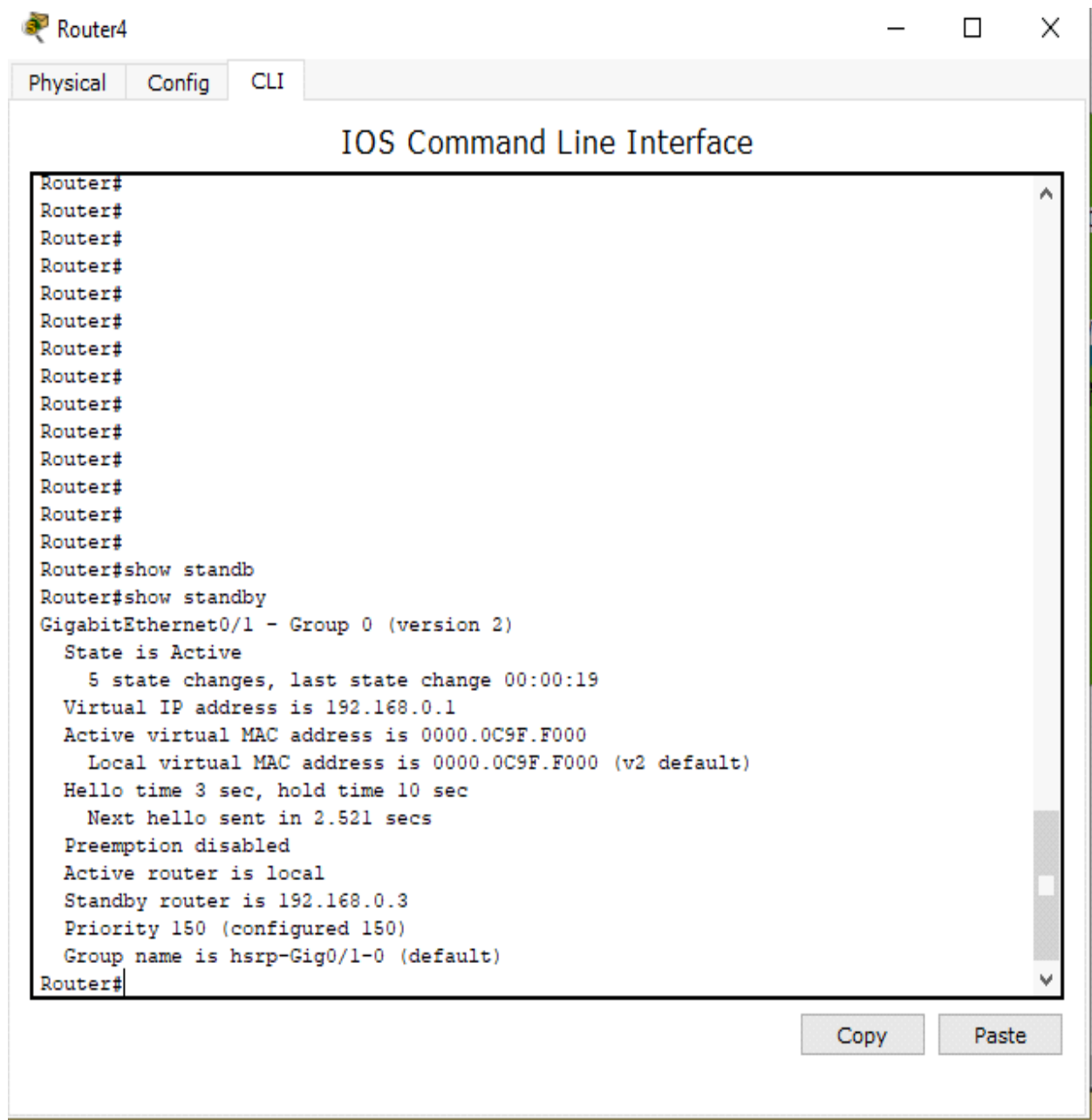
This is a ping from HQ host to Galway host :



In this test we tested to remote through SSH from another department and says that connections refused because we used a standard ACL to deny other traffic that isn't from the IT network.



In this case that we checked from IT network we can connect remotely through SSH with Galway site.

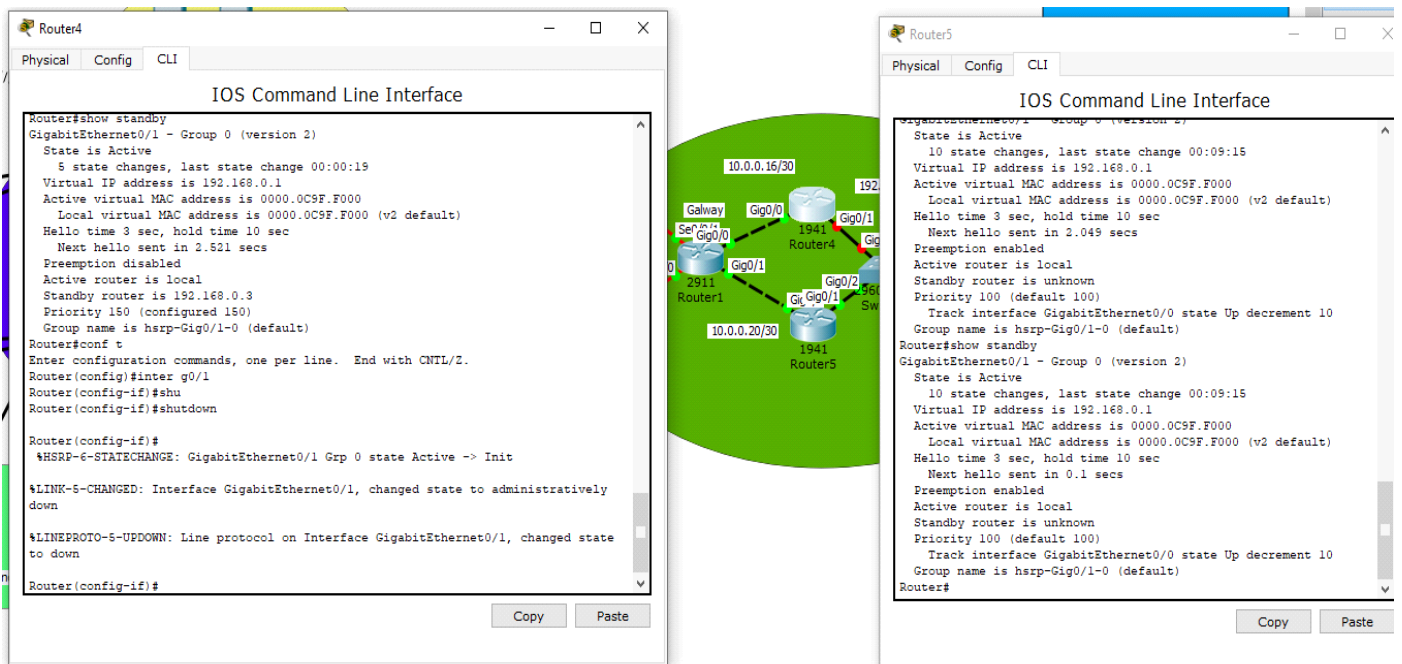


The screenshot shows a window titled "Router4" with three tabs: "Physical", "Config", and "CLI". The "CLI" tab is active, displaying the "IOS Command Line Interface". The command prompt is "Router#". The user has entered the command "show standby", and the output is displayed as follows:

```
Router#
Router#
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Router#
Router#
Router#
Router#
Router#
Router#show standby
Router#show standby
GigabitEthernet0/1 - Group 0 (version 2)
  State is Active
    5 state changes, last state change 00:00:19
  Virtual IP address is 192.168.0.1
  Active virtual MAC address is 0000.0C9F.F000
    Local virtual MAC address is 0000.0C9F.F000 (v2 default)
  Hello time 3 sec, hold time 10 sec
    Next hello sent in 2.521 secs
  Preemption disabled
  Active router is local
  Standby router is 192.168.0.3
  Priority 150 (configured 150)
  Group name is hsrp-Gig0/1-0 (default)
Router#
```

At the bottom right of the CLI window, there are two buttons: "Copy" and "Paste".

This time we checked if HSRP is working. As shown it works as expected. This is the active router in this case, we tried to shutdown the link and checked again.



As we see when the link goes down the other router will be in active state and will route the traffic.

References

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