**КИЇВСЬКИЙ КОЛЕДЖ ЗВ´ЯЗКУ**

Циклова комісія "Комп’ютерної інженерії"

**ЗВІТ** **ВИКОНАННЯ**

**ПРАКТИЧНОГО ЗАВДАННЯ №2**

з дисципліни: «Введення до Інтернету речей»

Виконали студенти

групи РПЗ-94

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Перевірив викладач

Повхліб В.С. \_\_\_\_\_\_\_

Київ  2022

***Aims and objectives***

***Part 1: Testing Network Connectivity Using Ping***

***Part 2: Tracing a route to a remote server using Windows Tracert***

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***Part 4: Compare Traceroute results***

**Part 1. Check network connectivity with Ping**

**Звєрєв В.В.**

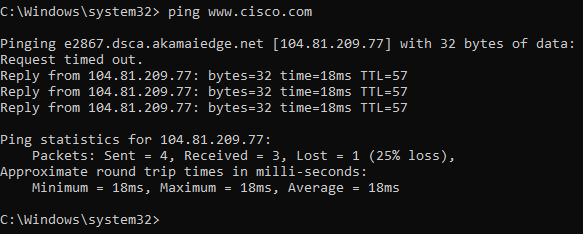
**Step 1:** Визначте, чи доступний віддалений сервер.

**a.** Ping is a tool used to check the availability of a host. Packets of information are sent to the remote host with instructions to respond. Your PC determines whether a response to each packet will be accepted and how long it takes for those packets to cross the network. The name ping comes from active sonar technology, in which a pulse of sound is sent underwater to bounce off terrain or other vessels.

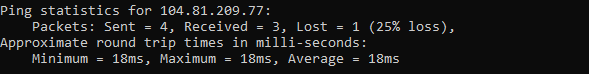
**b.** On your computer, type “cmd” in the search bar.



**c.** At the command prompt, type ping www.cisco.com.



**d.** The first line of output shows the Fully Qualified Domain Name (FQDN) e144.dscb.akamaiedge.net. Next comes the IP address 104.81.209.77. Cisco has the same web content on different servers around the world (known as mirrors). Therefore, depending on where you are geographically, the FQDN and IP address will be different.e. З цієї частини виходу:

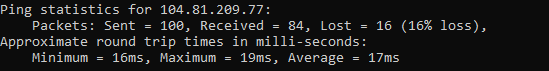


Four pings were sent and only three pings were answered. Since not every ping was answered, packet loss was 25%. On average, packets took 18 msec (18 milliseconds) to travel through the network. A millisecond is 1/1,000th of a second.

Streaming videos and online games are two applications that experience packet loss or slow network connections. A more accurate determination of the speed of the Internet connection can be determined by sending 100 pings instead of the default 4. Here's how to do it:



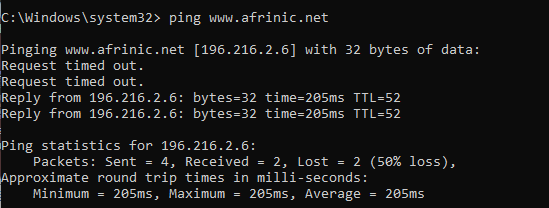
And this is what comes out of it:



**f.** Now the websites of Regional Internet Registries (RIRs) located in different parts of the world:

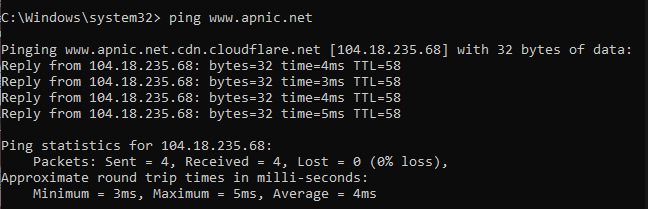
For Africa:

C:\> ping www.afrinic.net



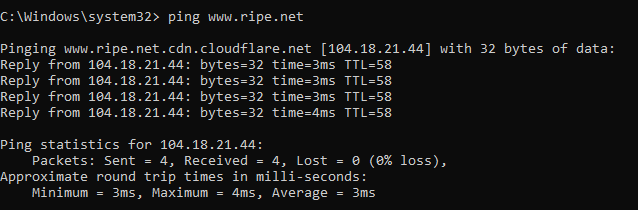
For Australia:

C:\ > ping www.apnic.net



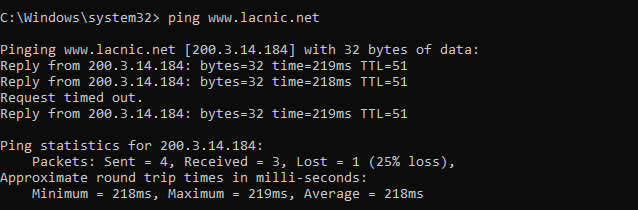
For Europe:

C:\ > ping www.ripe.net



For South America:

C:\ > ping www.lacnic.net



*All of these pings were initiated from a computer located in the US. What happens to the average ping time in milliseconds when data travels within one continent (North America) compared to data from North America traveling across continents?*

Every time the ping takes a little longer to be received.

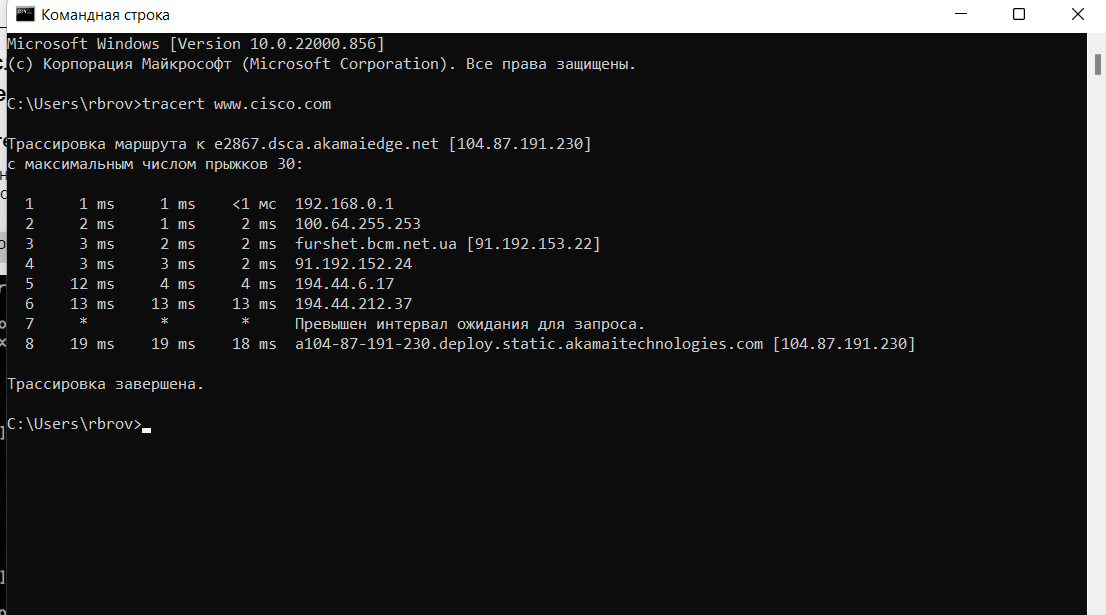
*What's interesting about the pings that were sent to the European website?*

Request latency for Europe is quite fast with an average response time of 3 msec. We got interesting results from the African site. Some requests timed out, suggesting it takes a bit longer to ping from Africa, causing it to wait.

**Part 2. Trace a route on a remote server using Tracert**

**Бровченко Р.А.**

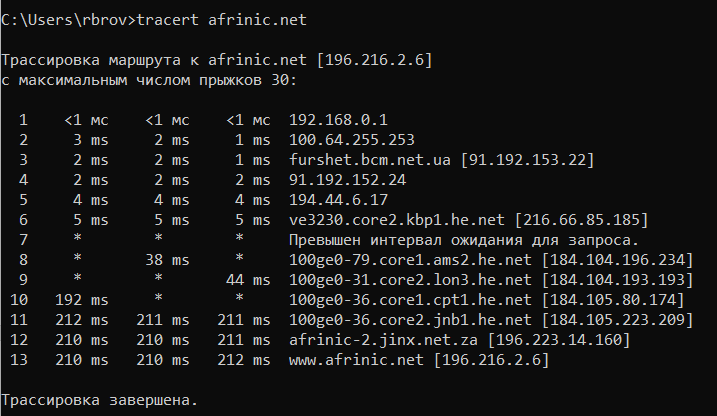
a) At the command line, type tracert [www.cisco.com](http://www.cisco.com).



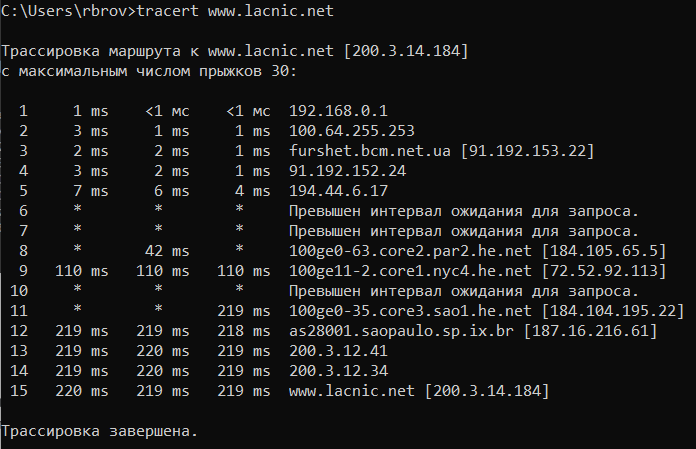
b) Save the tracert output to a text file

c) Run tracert for each destination website and save the output in sequentially numbered files.

C:\> tracert [www.afrinic.net](http://www.afrinic.net)



C:\> tracert [www.lacnic.net](http://www.lacnic.net)

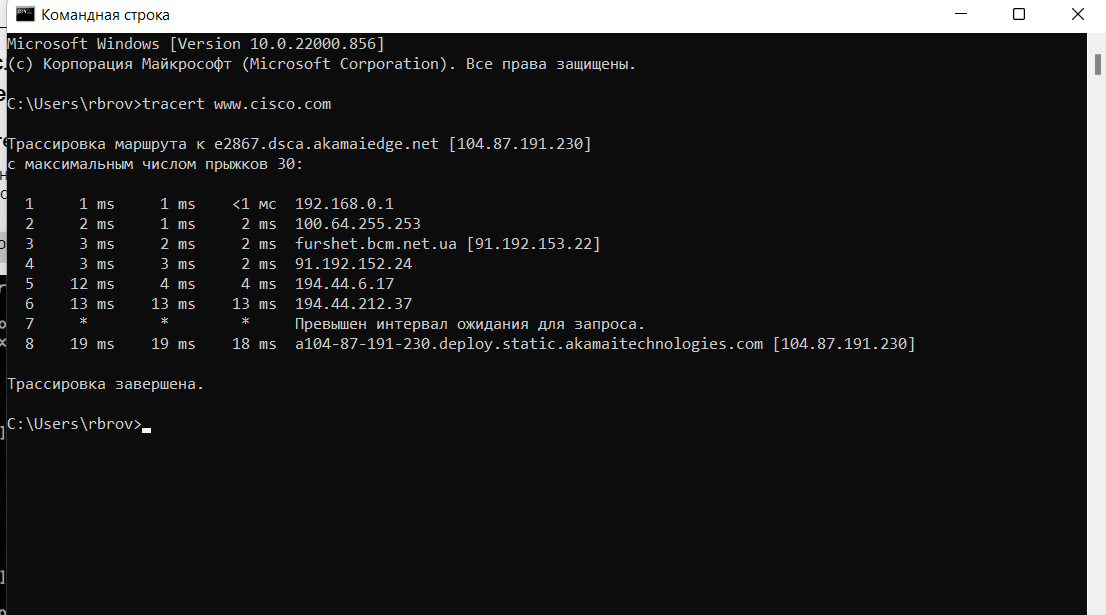


d) Interpretation of tracert results.

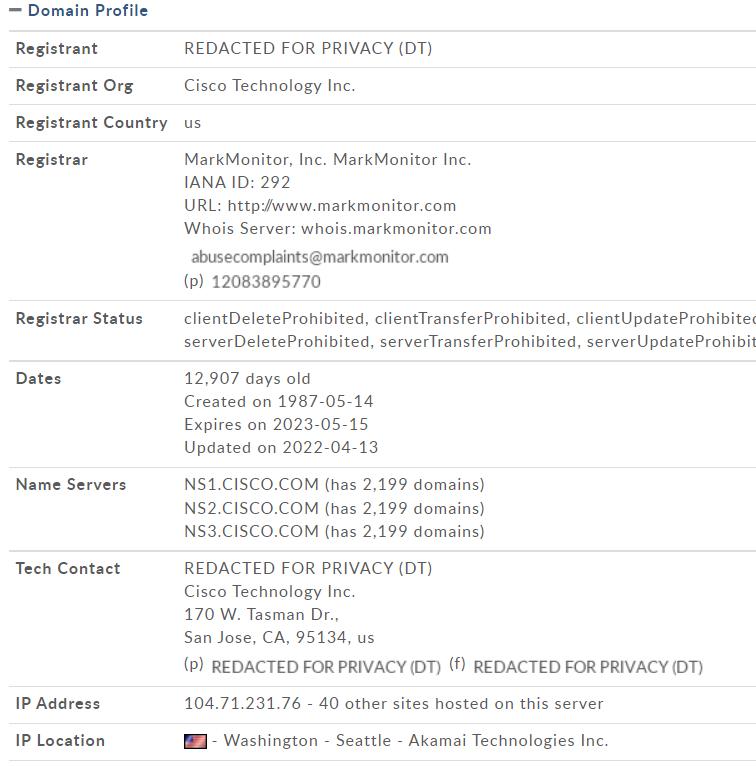
Streaming routes can go through multiple gateways and multiple other Internet Service Providers (ISPs) depending on the size of your ISP and the location of the source and destination hosts. Each "hop" is a router.

Because computers speak in numbers, not words, routers are uniquely identified by IP addresses (numbers with the format x.x.x.x for IPv4 addresses). The tracert tool shows the path through the network that a data packet takes to reach its final destination.

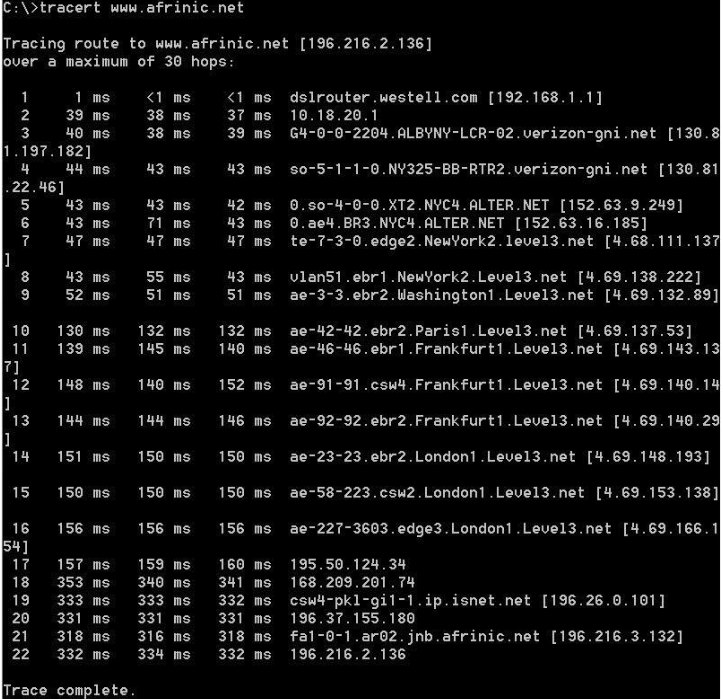
The tracert tool also provides insight into how traffic is occurring on each network segment. Three packets are sent to each router along the way, and the round trip time is measured in milliseconds. Now use this information to analyze www.cisco.com tracert results.



There is an internet tool known as Whois. The Whois tool allows you to determine who owns a domain name. The Whois web tool is located here http://whois.domaintools.com/ . This domain is also owned by Verizon according to the web Whois tool.



e) Now consider an example that involves Internet traffic crossing multiple ISPs Below is the tracer for www.afrinic.net :



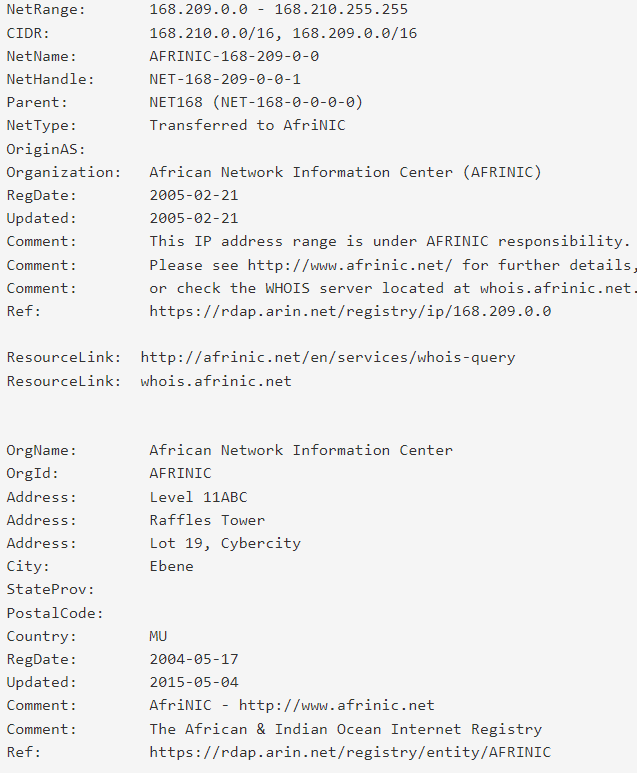
***What's happening at 7 hop? Is level3.net the same ISP as hops 2-6 or is it a different ISP? Use the Whois tool to answer this question.***

In hop 7, the IP address changes from 152.63.9.249 to 4.68.111.137 because it found a new ISP. Level 3.net is different than hops 2-6 because hops 2-6 are Verizon while hop’s 7 ISP is Level 3 Communications.

***What happens at hop 10 in the time it takes to travel a packet between Washington and Paris compared to hops 1-8?***

The time of sending packets is gradually increasing as paris is at a great distance from Washington

***What's happening at hop18? Do a Whois lookup for 168.209.201.74 using a Whois tool. Who owns this network?***

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African Network Information Center owns this 168.209.201.74 network

**Part 3. Track the route on a remote server using web and software tools**

**Звєрєв В.В.**

**Step 1:** Use the traceroute web tool.

**a.** Use http://www.subnetonline.com/pages/network-tools/online-tracepath.php to trace the route to the following websites:

*www.cisco.com*

TracePath Output:

1?: [LOCALHOST] pmtu 1500

1: nova.subnetonline.com 0.100ms reached

1: nova.subnetonline.com 0.044ms reached

Resume: pmtu 1500 hops 1 back 1

---- Finished ------

*www.afrinic.net*

TracePath Output:

1?: [LOCALHOST] pmtu 1500

1: nova.subnetonline.com 0.151ms reached

1: nova.subnetonline.com 0.050ms reached

Resume: pmtu 1500 hops 1 back 1

---- Finished ------

*How does traceroute differ when going to www.cisco.com from the command line (see Part 2) and not from the website? (Your results may vary depending on where you are geographically and which Internet service provider connects you.)*

The tracert command line is different from the online website because it used pings from my service provider to get to cisco.com, while the online website took a different path to the cisco website.

*Compare the tracert from part 1 that goes to Africa with the tracer that goes to Africa from the web interface. What is the difference?*

It took the team a few more pings to get to the website in Africa, some of which were unanswered, than the website on the Internet. I think that the request from the site will come faster than in the console, since the site's host may be under favorable conditions for connection.

*Some of them contain the abbreviation asymm. Any guesses as to what that means? What is its meaning?*

I do not come across such an abbreviation, I do not know what it means.

**Step 2:** Use VisualRoute Lite Edition.

VisualRoute is a native traceroute utility that can graphically display trace results.

Track routes on www.cisco.com using VisualRoute

The IP addresses:

192.168.0.105

192.168.0.1

100.64.255.253

91.192.153.22

91.192.152.24

194.44.6.17

194.44.212.37

195.182.218.115

104.81.209.77

**Part 4. Compare Traceroute results**

**Бровченко Р.А.**

Compare the traceroute results to www.cisco.com from parts 2 and 3.

Calculate the path to www.cisco.com using tracert.

Трассировка маршрута к e2867.dsca.akamaiedge.net [104.87.191.230]

с максимальным числом прыжков 30:

1 1 ms 1 ms <1 мс 192.168.0.1

2 2 ms 1 ms 2 ms 100.64.255.253

3 3 ms 2 ms 2 ms furshet.bcm.net.ua [91.192.153.22]

4 3 ms 3 ms 2 ms 91.192.152.24

5 12 ms 4 ms 4 ms 194.44.6.17

6 13 ms 13 ms 13 ms 194.44.212.37

7 \* \* \* Превышен интервал ожидания для запроса.

8 19 ms 19 ms 18 ms a104-87-191-230.deploy.static.akamaitechnologies.com [104.87.191.230]

Трассировка завершена.

**Calculate the path to www.cisco.com using the web tool at subnetonline.com.**

TracePath Output:

1?: [LOCALHOST] pmtu 1500

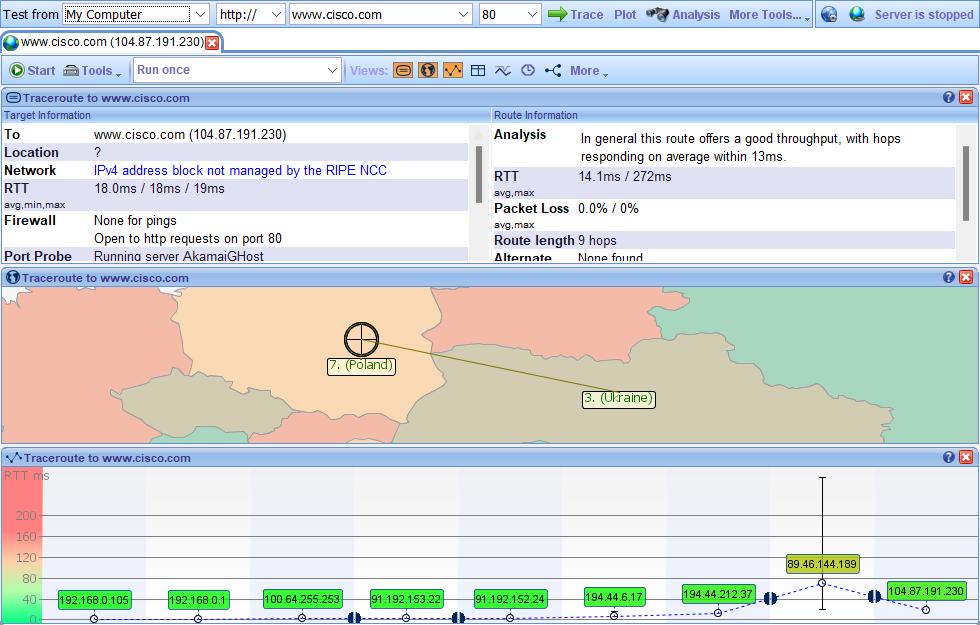
1: nova.subnetonline.com 0.094ms reached

1: nova.subnetonline.com 0.042ms reached

Resume: pmtu 1500 hops 1 back 1

---- Finished ------

**List the route to www.cisco.com with VisualRoute Lite edition.**

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**Do all traceroutes use the same paths to www.cisco.com? Explain.**

No, because a different path will be used every time.

**Consideration**

**Having looked at traceroute with three different tools (tracert, web interface, and VisualRoute), are there any ideas that use VisualRoute provided the other two tools don't?**

Using VisualRoute is quite convenient, with this tool we can visually see how the connection to a certain network takes place, and we can also see the details of each individual hop.