CCNA is probably the most popular Cisco certification.
This course covers everything in CCNA 200-301.
You will learn the basics of networking, how to configure a small network with Cisco routers and switches and more.
Cisco company name derived from SANFRANCISCO

Course Highlights:

In this course you will learn:

Learn the basics of networking.

- The difference between protocols like IP, TCP, and UDP.
- The difference between IPv4 and IPv6.
- The difference between routers and switches.
- How to configure Cisco Catalyst switches.
- How to configure Cisco IOS routers.
- How to configure the OSPF routing protocol.
- How to protect your routers with access-lists and VPNs.
- How network automation impacts traditional network management
- And many other topics…

Requirements:

- Basic computer skills
- A basic understanding of networking (this will make it easier but is not required, we start from the beginning.)

CCNA Exam v1.1 (200-301):

Exam Description: CCNA Exam v1.0 (CCNA 200-301) is **a 120-minute** exam associated with the CCNA certification**. This exam tests a candidate's knowledge and skills related to network fundamentals, network access, IP connectivity, IP services, security fundamentals, and automation and programmability**. The course, Implementing and Administering Cisco Solutions (CCNA), helps candidates prepare for this exam.

The following topics are general guidelines for the content likely to be included on the exam. However, other related topics may also appear on any specific delivery of the exam. To better reflect the contents of the exam and for clarity purposes, the guidelines below may change at any time without notice.

20% 1.0 Network Fundamentals:

1.1 Explain the role and function of network components

1.1.a Routers

1.1.b L2 and L3 switches

1.1.c Next-generation firewalls and IPS

1.1.d Access points

1.1.e Controllers (Cisco DNA Center and WLC)

1.1.f Endpoints

1.1.g Servers

1.2 Describe characteristics of network topology architectures

1.2.a 2 tier

1.2.b 3 tier

1.2.c Spine-leaf

1.2.d WAN

1.2.e Small office/home office (SOHO)

1.2.f On-premises and cloud

1.3 Compare physical interface and cabling types

1.3.a Single-mode fiber, multimode fiber, copper

1.3.b Connections (Ethernet shared media and point-to-point)

1.3.c Concepts of PoE

1.4 Identify interface and cable issues (collisions, errors, mismatch duplex, and/or speed)

1.5 Compare TCP to UDP

1.6 Configure and verify IPv4 addressing and subnetting

1.7 Describe the need for private IPv4 addressing

1.8 Configure and verify IPv6 addressing and prefix

1.9 Compare IPv6 address types

1.9.a Global unicast

1.9.b Unique local

1.9.c Link local

1.9.d Anycast

1.9.e Multicast

1.9.f Modified EUI 64

1.10 Verify IP parameters for Client OS (Windows, Mac OS, Linux)

1.11 Describe wireless principles 1.11.a Nonoverlapping Wi-Fi channels 1.11.b SSID 1.11.c RF 1.11.d Encryption

1.12 Explain virtualization fundamentals (virtual machines)

1.13 Describe switching concepts

1.13.a MAC learning and aging

1.13.b Frame switching

1.13.c Frame flooding

1.13.d MAC address table

20% 2.0 Network Access:

2.1 Configure and verify VLANs (normal range) spanning multiple switches

2.1.a Access ports (data and voice)

2.1.b Default VLAN

2.1.c Connectivity

2.2 Configure and verify interswitch connectivity

2.2.a Trunk ports

2.2.b 802.1Q

2.2.c Native VLAN

2.3 Configure and verify Layer 2 discovery protocols (Cisco Discovery Protocol and LLDP)

2.4 Configure and verify (Layer 2/Layer 3) EtherChannel (LACP)

2.5 Describe the need for and basic operations of Rapid PVST+ Spanning Tree Protocol and identify basic operations

2.5.a Root port, root bridge (primary/secondary), and other port names

2.5.b Port states (forwarding/blocking)

2.5.c PortFast benefits

2.6 Compare Cisco Wireless Architectures and AP modes

2.7 Describe physical infrastructure connections of WLAN components (AP, WLC, access/trunk ports, and LAG)

2.8 Describe AP and WLC management access connections (Telnet, SSH, HTTP, HTTPS, console, and TACACS+/RADIUS)

2.9 Configure the components of a wireless LAN access for client connectivity using GUI only such as WLAN creation, security settings, QoS profiles, and advanced WLAN settings

25% 3.0 IP Connectivity:

3.1 Interpret the components of routing table

3.1.a Routing protocol code

3.1.b Prefix

3.1.c Network mask

3.1.d Next hop

3.1.e Administrative distance

3.1.f Metric

3.1.g Gateway of last resort

3.2 Determine how a router makes a forwarding decision by default

3.2.a Longest match

3.2.b Administrative distance

3.2.c Routing protocol metric

3.3 Configure and verify IPv4 and IPv6 static routing

3.3.a Default route

3.3.b Network route

3.3.c Host route

3.3.d Floating static

3.4 Configure and verify single area OSPFv2

3.4.a Neighbor adjacencies

3.4.b Point-to-point

3.4.c Broadcast (DR/BDR selection)

3.4.d Router ID

3.5 Describe the purpose of first hop redundancy protocol

10% 4.0 IP Services:

4.1 Configure and verify inside source NAT using static and pools

4.2 Configure and verify NTP operating in a client and server mode

4.3 Explain the role of DHCP and DNS within the network

4.4 Explain the function of SNMP in network operations

4.5 Describe the use of syslog features including facilities and levels

4.6 Configure and verify DHCP client and relay

4.7 Explain the forwarding per-hop behavior (PHB) for QoS such as classification, marking, queuing, congestion, policing, shaping

4.8 Configure network devices for remote access using SSH

4.9 Describe the capabilities and function of TFTP/FTP in the network

15% 5.0 Security Fundamentals:

5.1 Define key security concepts (threats, vulnerabilities, exploits, and mitigation techniques)

5.2 Describe security program elements (user awareness, training, and physical access control)

5.3 Configure device access control using local passwords

5.4 Describe security password policies elements, such as management, complexity, and password alternatives (multifactor authentication, certificates, and biometrics)

5.5 Describe remote access and site-to-site VPNs

5.6 Configure and verify access control lists

5.7 Configure Layer 2 security features (DHCP snooping, dynamic ARP inspection, and port security)

5.8 Differentiate authentication, authorization, and accounting concepts

5.9 Describe wireless security protocols (WPA, WPA2, and WPA3)

5.10 Configure WLAN using WPA2 PSK using the GUI

10% 6.0 Automation and Programmability:

6.1 Explain how automation impacts network management

6.2 Compare traditional networks with controller-based networking

6.3 Describe controller-based and software defined architectures (overlay, underlay, and fabric)

6.3.a Separation of control plane and data plane

6.3.b North-bound and south-bound APIs

6.4 Compare traditional campus device management with Cisco DNA Center enabled device management

6.5 Describe characteristics of REST-based APIs (CRUD, HTTP verbs, and data encoding)

6.6 Recognize the capabilities of configuration management mechanisms Puppet, Chef, and Ansible

6.7 Interpret JSON encoded data

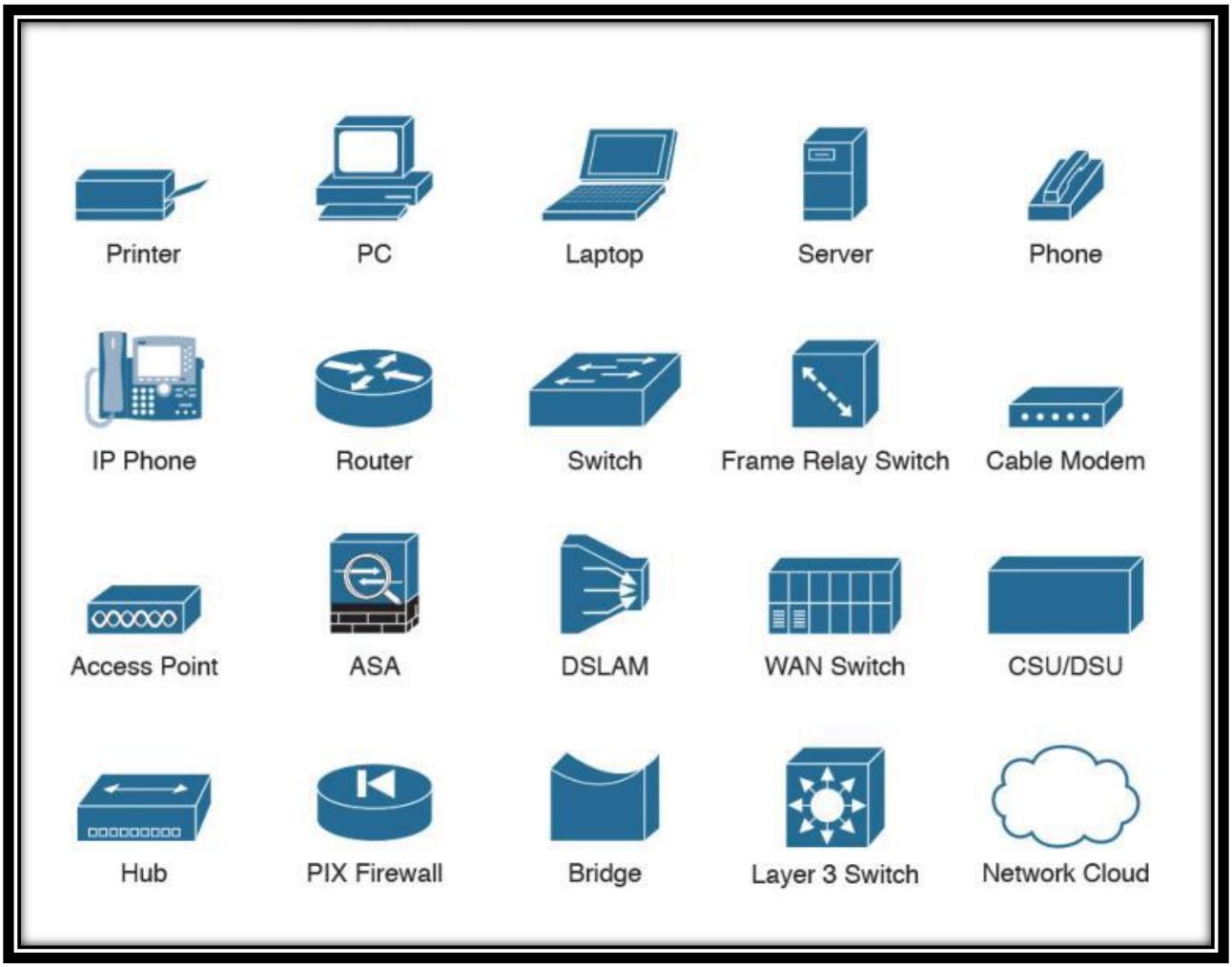
In Cisco exams, they test you on two things:

- **Theoretical knowledge:** you need to understand how certain networking protocols work.
- **Practical knowledge:** they ask questions about configurations, commands, and the output of commands.

This means you have to do two things:

- **Study theory:** we need to learn about different networking protocols that we use on routers and switches.
- **Labs:** we need to configure routers and switches. Learn the different commands and outputs.

Icons Used for this Course



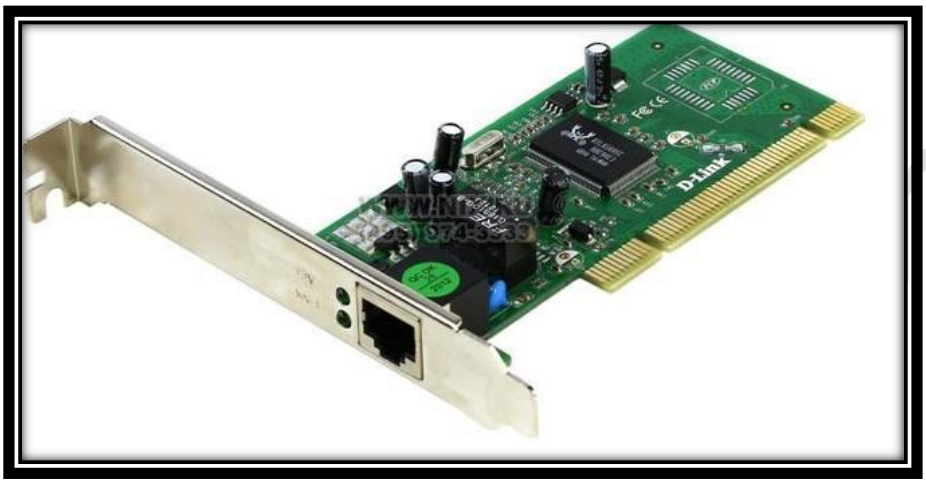
Basics of Networking:

What is a network?

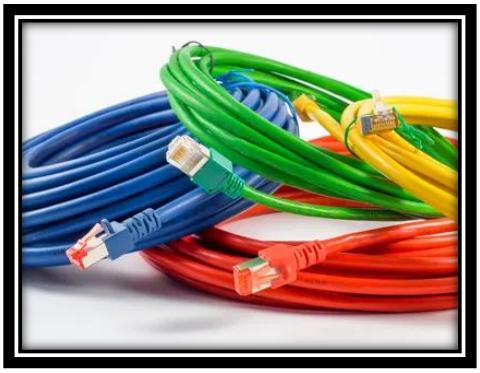
- A network is a collection of devices and end systems connected to each other and able to communicate with each other. These could be computers, servers, smartphones, routers etc.
- A network could be as large as the internet or as small as your two computers at home like sharing files and a printer.
- When the devices which are connected together share data and resources is known as network.

Some of the components that make up a network:

- Personal Computers (PC): These are the endpoint of your network, sending and receiving data.
- Network Cards: they translate data from your computer in a readable format for the network.it is also known as NIC (Network interface card).



- Media Cables and connectors: network cables, perhaps wireless, Connectors: the plug you plug in your network card, RJ 45 is common for Ethernet cable.



- Routers: Routers interconnect networks and choose the best path to each network Destination.

Some Command Prompt for CCNA :

- ping :- packet internet gopher it uses icmp (internet control message protocol) protocol
- For verification the other device is reachable to me or not ??
- ipconfig :- to check the IP address of a computer
- ipconfig /all :- to check the IP address + mac address
- getmac :- to check the mac address of a computer
- arp -a :- to check arp table
- arp –d :- to delete arp table (run as administrator)
- To check public IP

Visit: - www.whatismyipaddress.com to check your public IP or type in google what is my IP we will get.

How To assign address to your PC ?

- windows button + R
- type ncpa.cpl to go to your network connections
- choose your lan adapter and go to properties and click on IPV4
- Assign Ip address

Hub:

- Known as Dummy Device.
- Always do broadcast.
- Layer 1 device.
- Shared bandwidth.
- Less no of ports.
- Doesn't learn mac address.

SWITCH

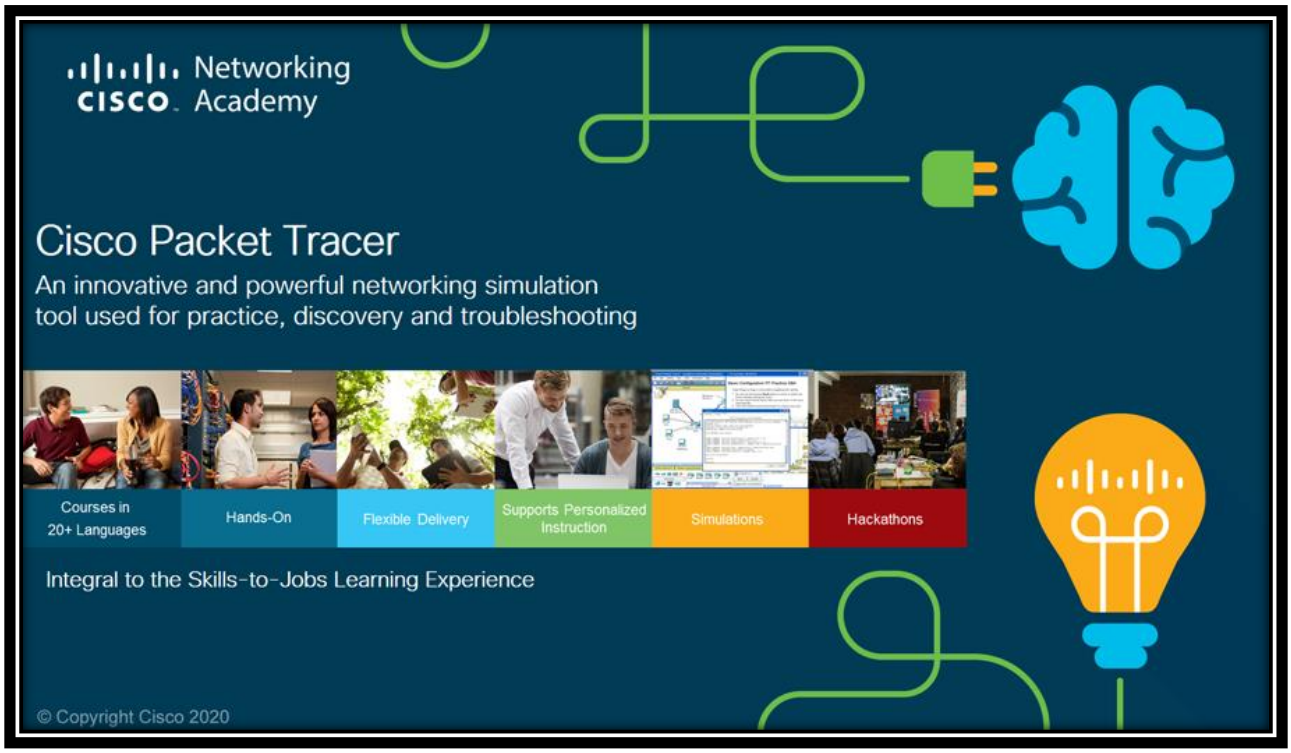
- Which connects two or more computers together?
- Many no of ports.
- Learn mac address.
- Two types of switch Manageable switch and unmanageable switch.
- It is a Layer 2 Device.

In this course we are going to use the following software as given below:

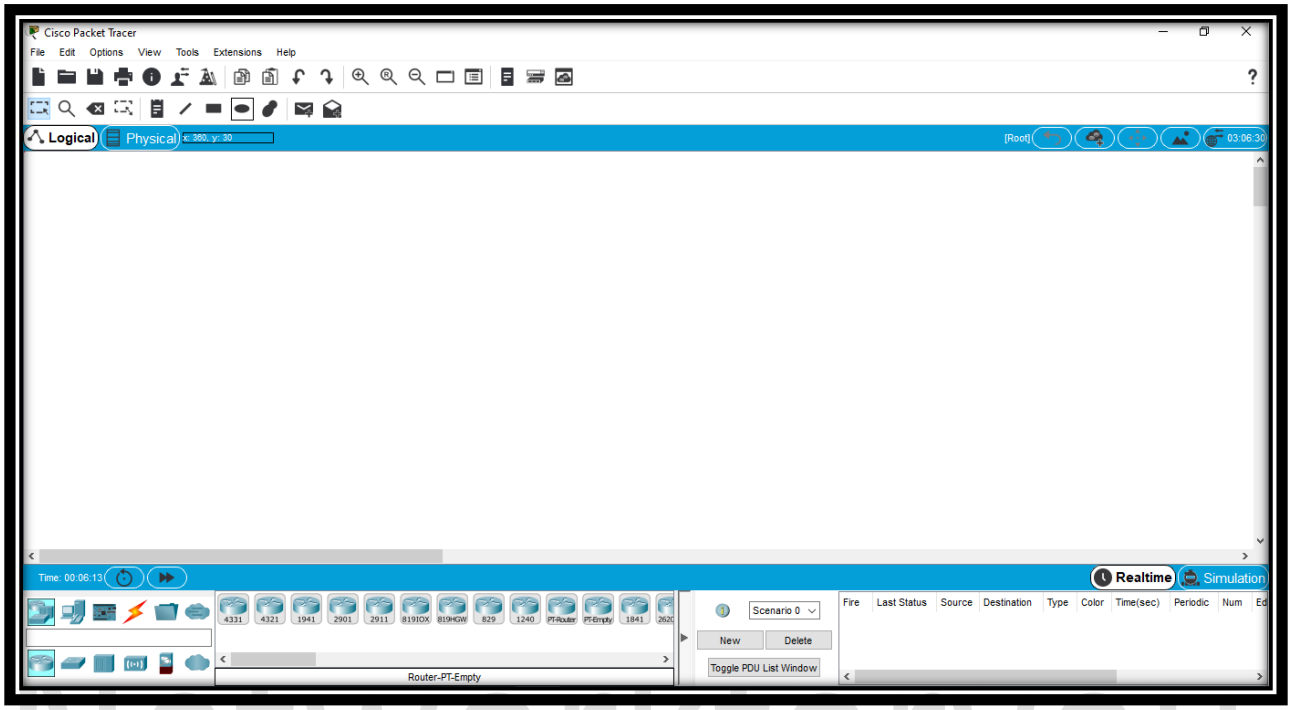
1. Packet Tracer.
2. GNS3.
3. EVE ng.

Packet Tracer:

- Packet Tracer is a cross-platform visual simulation tool designed by Cisco Systems that allows users to create network topologies and imitate modern computer networks.
- The software allows users to simulate the configuration of Cisco routers and switches using a simulated command line interface.

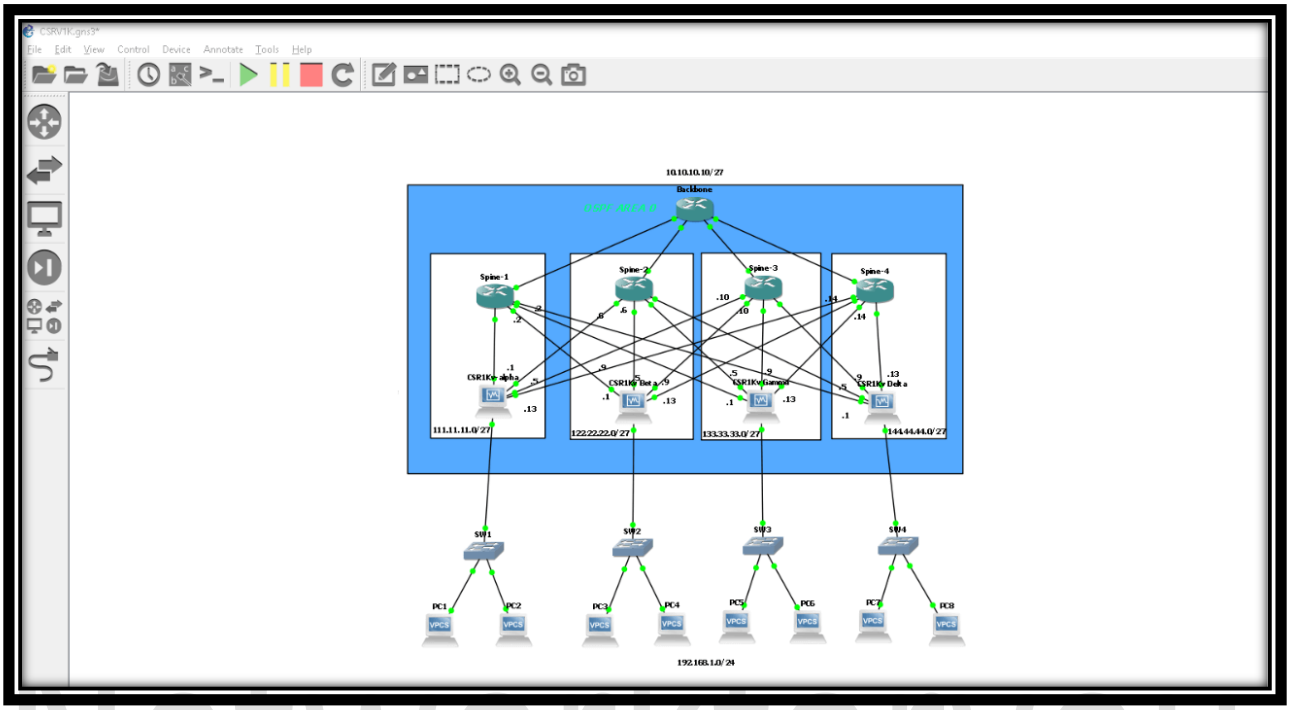


- The software allows users to simulate the configuration of Cisco routers and switches using a simulated command line interface.
- Packet Tracer makes use of a drag and drop user interface, allowing users to add and remove simulated network devices as they see fit.
- The software is mainly focused towards Certified Cisco Network Associate Academy students as an educational tool for helping them learn fundamental CCNA concepts.
- It is free we need to create account to his account and use same login when we open packet tracer.
- By using this link you can create account https://legacy.netacad.com/portal/learning



GNS3:-

- Graphical Network Simulator-3 is a network software emulator first released in 2008.
- It allows the combination of virtual and real devices, used to simulate complex networks.
- It uses Dynamips emulation software to simulate Cisco IOS.
- GNS3 is used by many large companies including Exxon, Walmart, AT&T and NASA, and is also popular for preparation of network professional certification exams



- We need to register gns3 site and download this as link is given below.
- https://www.gns3.com

EVE-NG (Emulated Virtual Environment Next Generation):

- EVE-NG (Emulated Virtual Environment Next Generation) is a multi-vendor virtual network simulator that, similar to VIRL Personal Edition,
- Was developed for individuals and smaller businesses.
- They offer a free Community Edition as well as a Professional Edition for $110.75 per year.

How we can install what we need where we get we will see that later. I will provide you have thing what you need to run this software no problem.