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Cisco lab simulator

Get practical experiences without having to invest big in hardware, software, or other equipment. With Cisco CCNA-focused laboratories authored by industry experts such as Wendell Odom, these simulations help you learn the skills you need to master the exam and workplace and prepare for certification exams that are inclusive for simulation 1. CCNA Routing and Switching 200-125 Network Simulator Sean Wilkins, Wendell Odom \$119.99 (Save 20%) 2. CCNA Routing and Switching 200-125 Network Simulator, Download Version by Sean Wilkins, Wendell Odom \$119.99 (Save 20%) 3. CCNA Routing and Switching 200-125 Network Simulator, Pearson uCertify Academic Edition Student Access Card by Sean Wilkins, Wendell Odom \$90.00 (Save 10%) 5. CCENT ICND1 100-105 Network Simulator, Pearson uCertify Academic Edition Sean Wilkins Student Access Card, Wendell Odom \$90.00 (Save 10%) 6. CCNA R&S 200-120 Network Simulator Academic Edition Pearson uCertify Labs Student Access Card SHARE * Displayed sales prices reflect our daily 20% savings from the stated price. Offer subject to change. *Sorry to interruptCSS Error Editor note: April 8, 2020, Cisco announced that VIRL is being renamed Cisco Modeling Labs – Personal (CML-Personal) - and that the latest version will be released on 12 May 2020. When studying for CCNA, CCNP or CCIE, choosing the right network simulator or emulator can be a difficult decision. (Yes, despite the title, we will cover both.) And there is no best way to go about making your choice. Realistically, it is not feasible to test each program individually. At the end of the day, you're in for an exam. So you will probably rely on recommendations - and everyone has their own opinions. Whether advised by a coworker, supervisor or thread on Reddit, everyone has their favorite simulator or emulator. Someone who primarily uses GNS3 will always claim to be superior to VIRL, and vice versa. Similarly, there are campsites on the side of the simulator. That doesn't make the decision any easier. Objectively, each piece of software has its own set of pros and cons. That's exactly what we're going to look at. Let's take a step back and look at the software itself and give up the horse race. Our analysis focuses on two simulators and three emulators: Cisco Packet Tracer Boson NetSim GNS3 VIRL EVE-NG These are the most popular software for gaining practical experience of Cisco laboratories for routing and switching track certification. Many of these tools can also be used to test networking technologies for real-world deployment. However, we will focus as much as possible on the case of using the certification exam. Disclaimer: We won't necessarily pick a winner. It is worth noting this here. We will not make a general recommendation on this certain software is the best. Our intention is that, I do, about the pros and cons of each particular software, leaving you to decide. Let's start diving into the first category of software - simulators. What are network simulators? The simulator is part of software that, as the name implies, simulates network topology composed of one or more network devices. Network devices that are simulated are not real network devices and are not capable of passing live network traffic in the same way that a real network device could. Instead, every network device is part of the software that pretends to be the right network device for the test of its power. As a result, network devices within the simulator are limited to commands and features that you program into the simulation. For this reason, many advanced features (such as DMVPN, Policy-Based Routing, and so on) that real network devices are capable of are not present in simulated colleagues. The key advantage of simulators is that they tend to be extremely lightweight. Simulator software can work on almost any modern computer without worrying about the processor, memory or storage requirements. What is Packet Tracer? Packet Tracer is Cisco's visual simulation tool that simulates network topologies composed of Cisco routers, switches, firewalls and more. Packet Tracer was originally designed as an educational aid for Cisco's network academy (better known as NetAcad), but it's an excellent simulator for anyone following entry-level Cisco certification, such as CCENT or CCNA R&S. Version: This article evaluates the 64-bit Tracer option version 7.2.1.0218 on the Windows 10 operating system. Pros of Packet Tracer Network Simulator Packet Tracer has a number of advantages as a free Cisco network simulator, including: Cost Cross-Platform Compatibility Device Variety Connection Variety Making the Lab Realistic Simulation Mode Realistic Terminal Custom Exercise Creation Packet Tracer is free. There are absolutely no costs associated with using Cisco's Packet Tracer. It is completely free to download and use. The only requirement is to create and log in to Packet Tracer with a Cisco Networking Academy account, which is free to create. Multi-platform compatibility. At the time of writing, Packet Tracer works on most operating systems, including all active Windows operating systems (Windows 7, 8.1 and 10), macOS High Sierra and Mojave and Ubuntu 14.04 LTS. This is great news for anyone using macOS or Linux, but still needs a simulator to practice test topics for entry-level Cisco certificates. Variety of devices. While most people will use the standard package of routers, switches and access points, Packet Tracer has a healthy variety of devices to use. It's a big list. Here are some of the most common devices to use: Routers – ISR 4321, 1941, 2901, and 2911 Switches – 2960, 3560, and 3650 ASA Firewalls – 5505 and 5506 Meraki MX65W Security Device Meraki Server Trace Tracer also has a variety of wireless controllers, access and house house These network components are invaluable when studying for CCNA. You can even experiment with devices outside of exam preparation. What does it look like when a laptop accesses a network over a wireless connection? How is asa firewall configuration different from an ISR router? Packet Tracer makes it easy to add devices to existing topology. Connection variety. Whether flat or crossover copper cables, fiber optic cables, DCE or DTE serial cables or crossover console cables, Packet Tracer provides plenty of options for connecting entry-level network devices. While most manufacturing environments use either fiber optic or flat copper cables to connect devices, production environments continue to use serial connections for WAN connectivity due to a lack of alternative options. As a result, you should be aware of the differences between ethernet and serial physical media. Packet Tracer provides the necessary convenient experience with configuring and troubleshooting both types of connections. Making a realistic laboratory. Most of the time, you'll probably click on each device in the simulator to the left and configure it via the CLI tab. However, you can also simulate how network engineers supply devices in the real world. You can do this by connecting your computer to each device via a console cable and then configuring the network device through the computer terminal. You can even use this to configure remote control of a network device through Telnet or SSH, and then connect your computer to a control network and configure each device remotely. In this way, Packet Tracer provides a robust web sandbox simulator. You can make rules about how realistic you want your labbing session to be. Simulation mode. Packet Tracer is your best friend when solving connectivity issues – especially with Simulation Mode, which shows you the package's path through the network. By default, Packet Tracer works in real-time mode. In real-time mode, connected network devices generate real-time control plane traffic (such as Spanning Tree Protocol BPDUs, Hello messages routing) and forward data plane traffic (such as ICMP messages and TCP/UDP packages between the end host) in real time, just as actual network devices would. This network activity is visible in real time through the flashing lights of the connection between devices, indicating that the data has been sent or received on the connection. However, let's say you're having trouble solving connection issues between the two end hosts. It can be difficult to visualize how the package flows through a large network. Simulation mode allows you to walk through a step-by-step package. You can observe the attributes of the package change and see the forwarding decision that each intermediary network device makes on the package. With simulation mode, you can quickly compare what's happening on CLI device with what actually happens to the package as it crosses their simulated network. A realistic terminal. As already mentioned, you are more than likely to configure, check and troubleshooting tools on network devices via the CLI tab - which is very similar to the traditional PuTTY terminal. In fact, the CLI terminal provided by Packet Tracer uses many of the same traditional terminal keyboard shortcuts. Here are the shortcuts I tested: Ctrl+W - Delete the previous word to the left of the cursor. Ctrl+U - Delete the entire user input line to the left of the cursor. Ctrl+K - Delete the entire user input line to the right of the cursor. Ctrl+C - Cancel the current user entry and return the new line. If the user is in global configuration mode, return the user to global EXEC mode. Functionally identical Ctrl+Z. Ctrl+Z - Cancel the current user entry and return the new line. If the user is in global configuration mode, return the user to global EXEC mode. Functionally identical Ctrl+H. Ctrl+H - Move the pointer forward one character. Functionally identical to the keys of the right keyboard arrow, but more convenient because it requires less hand movement. Ctrl+B - Move the pointer back one character. Functionally identical to the left keyboard arrow keys, but more convenient because it requires less hand movement. Ctrl+P - Scroll up (less recently) through previously performed commands in the context of the current configuration. Functionally identical to the up arrow key, but more convenient because it requires less hand gesture. Ctrl+N - Scroll down (newer) through previously executed commands within the current configuration context. Functionally identical to the down arrow keys of the keyboard, but more convenient because it requires less hand movement. This may seem like a minor feature, but it is extremely important. When you master the keystroke inside packet tracer, you simultaneously master the key handle for the right Cisco IOS command line. Furthermore, many of these keystrokes are applicable to other CLI-based applications, including Linux devices. Because keyboard shortcuts work in both environments, your transition from Packet Tracer to real network devices will be seamless. The only exception to this rule is the highlighting of text in the terminal window. With most terminal applications, highlighting text with your mouse automatically copies that text to the System Clipboard. After it is copied, you can attach the contents of the system buffer to the terminal with a right click. Unfortunately, Packet Tracer does not support this functionally. Instead, you must right-click the highlighted text and select Copy from drop-down menus to copy it, and then right-click and select Paste from the drop-down menus to pour it into the terminal. Alternatively, the Copy and Paste button in the lower-right corner of the terminal window. Custom creation of exercises. Students who have attended NetAcad courses may be familiar with the Packet Tracer laboratory exercises provided during the course. These exercises include formal instructions that appear when the lab is executed, as well as a built-in evaluation system that lets you know if all tasks within the lab are complete. Packet Tracer also allows you to create these types of labs through the Activity Wizard feature, along with formal instructions and a rating system. These labs can be as simple or complex as you like. Laboratories may include HTML instructions with images similar to the laboratory instructions provided by NetAcad, variables that randomize the nature of the lab a little, and custom JavaScript. In addition, the Activities Wizard provides a definition of the Response Network that is used to evaluate your work. The response network consists of a number of different tests, including the necessary configuration parameters on network devices and successful connectivity between the end host. Cons of Packet Tracer Network Simulator Cisco Packet Tracer has a number of things that could be improved, including: Custom Exercise Distribution Bugs No Built-In Labs Custom Exercise Distribution. When you create a custom exercise, you must save the activity as a file and distribute this file to all interested parties. The lack of a centralized method of distribution results in some challenges. For example, if you (or someone) need to update the exercise to fix the error, correct lab instructions, or add additional content, you will need to reassemble the updated version of the training file. The version is also a challenge. The Packet Tracer file created with version 7.2.1 is incompatible with previous versions of the Package Tracker (although the latest version of Packet Tracer is fully compatible with back). Why not have a market? Ideally, these challenges would be addressed by the market for laboratory exercises in applications similar to that offered by Boson's NetSim. With this solution, authors could publish exercises directly to neacadu that others could then download within Packet Tracer instead of downloading and opening a separate file. This also opens up the possibility of friendly competition among the authors of laboratory exercises through the simple implementation of the evaluation system, allowing high-quality laboratory exercises to rise to the top. Bugs. All software has errors, and Packet Tracer is no exception. Packet Tracer bugs tend to be more prominent than other simulators or emulators, perhaps due to their popularity and widespread use through Cisco's NetAcad courses. A quick Google search shows that users repeatedly report odd bugs where the device configuration is correct, but the behavior of the device is unexpected. These errors are usually repaired by saving the simulation file and then reloading packet tracer, after which he's acting according to expectations. This is a problem because you can valuable time troubleshooting, not labbing. Because Packet Tracer is so similar to the production environment, there is another risk here, too. You may inadvertently develop a habit of saving and reloading as a valid problem-solving methodology, which can be transferred to production environments and be influential on business networks. There are no labs installed. When you first download and install Packet Tracer as a new user, you are presented with an empty network topology as a sandbox. For some, the sandbox is considered an invitation to experiment and learn independently. For others, an empty sandbox can be irresistible. The lack of built-in laboratories can be daunting for students who need more structure to start labbing. Cisco offers a number of excellent laboratory exercises at Packet Tracer, but they are locked behind Cisco's NetAcad courses, offered by educational institutes such as community colleges and IT training schools. These courses are usually offered both online and on-premises to accommodate a variety of learning styles, but the cost of these courses can be prohibited for anyone with a tight budget. Packet Tracer: Gold Standard Cisco Simulator Cisco's Packet Tracer remains the gold standard in virtual network simulators. For free software, it offers a sandbox environment rich in features to experiment with a large number of types of network devices, platforms, and connections. Furthermore, Packet Tracer's simulation of Cisco's IOS software shows the closest behavior to real network devices, and its built-in terminal client is very similar to the actual thing. For budget-conscious students who find the sandbox environment frightening, the lack of built-in laboratories covering common CCENT and CCNA exam topics could be considered negative. To mitigate this, the software allows you to create custom laboratories, but the distribution of these file-based laboratories presents its own challenges. Despite the maturity of the software, Packet Tracer has problems with lab-busting errors and cause simulated network devices to behave in unexpected ways. Finally, the limited implementation of simulated Cisco IOS software makes Packet Tracer most desirable for CCENT and CCNA R&S, but not necessarily CCIE. Although it is possible to use Packet Tracer for laboratory test topics for other Cisco certification exams, Packet Tracer should not be considered the primary tool for this. What is Boson NetSim? Boson is an IT training organization known for its high-quality Cisco certification exam course and challenging practice exams. Another key product of Boson's is NetSim, an app that simulates Cisco network routers and switches. Version. This article evaluates Boson NetSim 12.2.0.24632 running windows 10. Professionals Boson NetSim Boson NetSim has a number of benefits as a paid network simulator, including: Licensing Test Maps Quality Lab Accessibility Lab Custom Laboratory Distribution Device Terminal Fewer clicks than licensing cards to follow packages to exams. Boson's licensing model is cumulative just like Cisco certification levels. Each Boson license maps specifically to the Cisco certification exam, and includes laboratories for previous exams, too. Here are some examples of Boson NetSim lab costs: CCENT: 98 labs for \$99 CCNA: 171 labs for \$179 (all ICND1 laboratories plus ICND2 laboratories) CCNP: 316 laboratories for \$349 (all ICND1/ICND2 laboratories plus CCNP lab) This licensing model is easy to understand, relatively affordable, and provides a large number of built-in laboratories for each exam. If structure is important to you, it's really appropriate. Laboratory quality. While the number of labs you receive depends on the price, each Boson lab is of high quality and adapted to the Cisco certification exam. Each lab comes with detailed instructions on what to configure and verify within connected network topology. Furthermore, most laboratories ask insightful questions about the output of commands observed in the CLI networking device, which helps to strengthen understanding of what is configured and why it needs to be configured. Just like Packet Tracer, each lab is evaluated for completion and accuracy within the app. However, where Boson NetSim differs from Packet Tracer is the ability to track lab completion within the app. This feature allows you to view completed laboratories, laboratory attempts and unsolved laboratories at a glance. It is worth noting here that Cisco's NetAcad courseware also offers laboratories through Packet Tracer exercises, as well as practical laboratories with physical equipment. However, the focus of this article is an overview of packet tracer software itself, not a netacad course. Boson's software revolves around purchased laboratory activities along the sandbox. This is a feature and advantage that NetSim has over Packet Tracer, which requires you to get creative or original laboratories from NetAcad. Lab accessibility. All purchased Boson laboratories are easily accessible within the app, unlike Packet Tracer. There is no need to download the lab through individual files and import into NetSim - all laboratories are downloaded, completed and evaluated within the application itself. This allows you to focus your time on labbing exam topics rather than downloading files and setting up labs. Custom laboratory distribution. If you create the network topology you want to share with the world, you can easily transfer topology to the NetSim community. On the other hand, you can browse other people's uploaded topologies and learn from the app. As mentioned earlier, there is no need to download a separate topological file and import it as done with Packet Tracer. Realistic features of the terminal. Copying and pasting very realistic in NetSim. In the actual terminal, the highlighted text is automatically copied to the system buffer. Paste with gums NetSim's terminal mimics this function. This one feature extracts NetSim from Packet Tracer, where this is not supported. By default, terminals are marked, so that the terminal of each device appears inside its own card, unlike Packet Tracer where each terminal gets its own window. If you don't want to, you can place the tab in your own window by right-clicking the tab and selecting Float. Here's what it looks like: Alternatively, you can drag the card outside the terminal window to perform the same task. In fact, the entire NetSim interface boasts this user interface – almost any window can be anchored and easily undone so that the interface is tailored to your preferences. Customizing devices. Boson NetSim borrows GNS3's intuitive device customization system. At NetSim, if a network device can be customized by adding modules (called Addons), the software explicitly asks which modules you would like to insert into your device when the device is added to network topology. In addition, NetSim calls out the type of interface that each module adds. For example, if you want to add an HWIC-2T network module to your device, NetSim explicitly tells you that the plugin provides two additional serial interfaces that the device can use. Finally, after the device has been customized and added to network topology, a device with the same physical configuration is saved in the Recent Devices window. This modified device can be easily added to topology by dragging from the Recent Devices window into network topology. Less clicking than Packet Tracer. NetSim's recent devices feature is much more intuitive and easy to use than packet tracer equivalent. In Packet Tracer, you need to place the device in network topology, manually turn off the device by clicking on the power switch, drag the desired network module to the desired slot, and then manually turn on the device by clicking on the power switch. Furthermore, this process should be repeated for each device that needs to modify its physical configuration. If you need to test the topology in Packet Tracer with eight routers using serial interfaces, modifying each device results in a lot of clicking. Cons Boson NetSim Boson NetSim also has several things that could be improved, including: Lack of topology information Lack of topology adaptation cannot alter active topology Without simulation of modes without compatibility on multiple platforms Lack of topology information. The network topology window displays a limited amount of information, especially while simulating topology. For example, you cannot see the connection status of each connection between network devices, nor do you have any indication that the device is actively transmitting data. The primary source of feedback for this type of information is the device itself. While this might help you prepare for a remote network administrator role where physical access to devices is not possible, additional feedback in the simulation would be useful for visual learners. Lack of topology adjustment. Unlike most other network simulators and emulators, NetSim has no way to add colored shapes to network topology. In addition to network devices and connections, you can only add text-based notes and tags to topology. This is a fairly small point, but it is important when rehearsing some test topics, such as the OSPF multiarea, where coloured shapes that illustrate different areas come very usefully. I can't modify active topology. After network topology is running, you cannot change it until you stop topology, which turns off simulated network devices. If you need to add a new network device or new connection to network topology, you need to stop the entire topology, modify it as needed, and then run topology once more. This behavior is very similar to current versions of Cisco's VIRL. This is a smaller point, because the topology itself begins and stops very quickly, but the less time you spend managing the simulator, the better! There's no way to simulate it. There is no way to place NetSim network topologies in simulation mode as it can with Packet Tracer. There is no way to see the contents of individual packages as they cross the network at NetSim. At a network devices are simulated in real time. As a result, you cannot visualize the package path throughout your simulated network in the same way you can in Packet Tracer. There is no multi-platform compatibility. NetSim is available only for Windows operating systems – specifically, Windows 10, 8, 7, Vista, and XP. It is not supported on macOS or any Linux distribution. As a result, macOS and Linux users cannot use NetSim without a Windows virtual machine. Cisco Simulators: Boson NetSim vs Packet Tracer Boson NetSim the strongest feature is built-in laboratories that directly map the test topics of specific Cisco certification exams. For existing partners of Boson courses and practical exams, these laboratories are an excellent practical aid for strengthening network concepts. The fact that laboratories (whether built by Boson or built by a community) can be accessed directly through the NetSim app simplifies the labbing experience and allows you to focus on learning instead of on demanding tasks. The weakness of the software is in the creation, manipulation and interaction of network topologies in the sandbox environment. It is more difficult to create aesthetically pleasing network topologies in NetSim compared to other network simulators and emulators. Active network topology does not provide much visual feedback on device status, connections, and data transfer. NetSim's simulated Cisco IOS software has small punts that are not shown by actual Cisco IOS software, especially when using context-sensitive assistance or executing nonexistent commands, a common error that many online beginners make. Finally, while NetSim's terminal emulator has some features that I can't find in Tracer's terminal emulator, packet tracer's broader keystroke support represents a more tactile CLI experience. Now that we have reviewed two pieces of network simulator software offered on the market, let's dive into the emulators! An emulator is part of the software that runs and connects virtual network devices together. Emulators virtualize real network devices, and virtual network devices typically offer a more advanced set of features compared to network devices present in simulators. The behavior exhibited by virtual network devices is more representative of how real physical network devices behave in the real world. Network Simulators vs Network Emulators However, there are compromises between simulators and emulators. Emulators tend to be limited in the types of virtual devices they support, as well as how these virtual devices can connect to each other. Furthermore, depending on the specific software used, you will need to find the virtual network device binary image file that you want to emulate, as well as the appropriate licensing. These resources are usually gained through support agreements with networking vendors. Finally, because emulators virtualize real network devices, their system requirements require much more processing power, memory and storage compared to network simulators. In fact, some network emulators require a separate server (virtualized or otherwise) to be deployed to make it work! What is GNS3? Graphical Network Simulator 3 (often shortened to GNS3) is a free, open-source client/server interface for network emulation and virtualization. It is a Python-based platform that primarily uses software called Dynamips to mimic Cisco software and hardware. Since Dynamips supports Cisco 1700, 2600, 2691, 3600, 3725, 3745 and 7200 routers, GNS3 also supports these same platforms. In recent years, GNS3 has evolved to support a greater range of virtual network devices than various suppliers through the use of devices, which are easily titable templates of common virtual network devices. Supported vendors for these devices include Cumulus, Aruba, Palo Alto, F5, Juniper and more. Since GNS3 is a client/server application, it is recommended that you install GNS3 VM (Virtual Machine) to act as a server. You can deploy this virtual machine to your local computer using the free VMware Player, a free VMware workstation, or a dedicated server through VMware ESXi. You can then install the GNS3 client application on your local computer and connect to the GNS3 VM server. After installation, you can create network topologies through the client, which are executed on the server. Version: GNS3 is estimated using GNS3 v2.1.16 in a virtual machine with 16GB of memory and 4 vCPUs. The apparatuses used for evaluation included Layer 3 and Layer 2 Cisco IOU 15.1g images. Pros GNS3 Networks GNS3 has a number of advantages such as Free open source network emulator, including: GNS3 is a free network emulator Simple, easy-to-read documentation variable active topology of multiple types of connections Community Labs GNS3 is a free network emulator. Open Source software means that the source code of the software can be viewed and modified by the general public. Since GNS3 is open-source, you can view the source code of the software on GitHub for free. If a user finds a bug with the software, they can report it, and a member of the community (or even the user himself) can try to reproduce the bug, fix it and send the changed source code to improve the software. The fact that the GNS3 open source has a number of advantages. First of all, if the software exhibits unexpected behavior and you think it's a bug, you can review open issues to see if other users are experiencing similar behavior. Those with software development backgrounds (or those who want to start learning software development) can copy the source code of GNS3 (known as code plowing) and customize it to their liking. This means that you can develop new features that can be dragged back into the NetSim community. In short, participating in an open source project improves software, helps others, and can build your reputation among fellow network engineers. For those who are not interested in software development, contributions to open source projects can often be done by writing or improving project documentation. There is always a need for useful individuals to help other users solve problems - and document them. The greatest advantage of the nature of open source GNS3 is the community. You will benefit from a positive feedback loop created by a group of like-minded people who want to help others learn, work and play. Simple, easy-to-read documentation. GNS3 documentation is one of the best among open source projects. Whether you're just getting started or need guidance on advanced configuration, GNS3 most likely has excellent, well-written documentation for its task - complete with images. Variable active topology. In GNS3, any virtual network device can be started and stopped independently of other virtual network devices. As a result, there is no need to stop all network devices in order to add one new network device, nor is there a need to stop any network devices from adding new connections between devices. This feature is similar in behavior with Cisco's Packet Tracer, making it a popular choice for Packet Tracer users who switch to a network emulator. Multiple types of connections. GNS3 not only supports Ethernet connections between network devices, but also enables serial connections between devices that support serial network modules. This is a mandatory feature for those studying for the CCNP ROUTE exam, which has test topics that require knowledge of serial technologies (such as Frame Relay, which can only be configured over interface.) Community labs. GNS3 Marketplace, which is often used to distribute and install network devices, has a section that allows you to exchange network topologies for the purpose of labbing specific technologies. Importing and exporting network topologies from this market can sometimes be difficult due to other users using different software images of network devices. However, the market can still be used as a source of inspiration for network topologies relevant to specific technologies. Counter GNS3 Network Emulator Software Image Access. GNS3 does not come prepackaged with any virtual network devices. Therefore, to mimic Cisco routers or switches, you must first have an existing CISCO IOS software image that is compatible with GNS3. In other words, the only legitimate way to obtain these Cisco IOS software images is to have a valid support agreement with Cisco that allows access to these images - or be a student. Network emulators: GNS3 vs EVE-NG If Cisco's Packet Tracer is the gold standard in virtual network simulators, then GNS3 is the gold standard in virtual network emulators. GNS3's mature open source community has created well-documented feature-rich software that is completely free. Despite following the traditional server/client application model, the server component is easy to implement, configure, and maintain. Similar to EVE-NG (see below), the main drawback of GNS3 is the fact that you have to source your own network of device software images to mimic. It's not the fault of GNS3. After all, unifying Cisco IOS software images with GNS3 would be illegal. But these images are a factor you must bear in mind before implementing GNS3 for personal or commercial use. What is VIRL? VIRL (Virtual Internet Routing Lab) is Cisco's proprietary virtual network emulator positioned towards educational institutions and individuals. It is very similar to Cisco Modeling Labs (better known as CML), which is a very scalable variant of VIRL designed for medium and large companies for modeling and impersonation of business networks. VIRL operates in a client/server model similar to GNS3. You install a VIRL server either on a bare-metal server or as a virtual machine under VMware ESXi, and then build network topologies and communicate with the server using a client application called VM Maestro. Version: VIRL was evaluated using version 1.6.64 in a virtual machine with 32 GB of memory. Nodes used for evaluation included IOSv 15.7(3)M3 and IOSv-L2 15.2, both of which were included in VIRL. VIRL Network Professionals Emulator VIRL has several advantages as a paid network emulator, including: Software Image Access Network Topology Portability Advanced Automation Capabilities Software Image Access. Installing VIRL servers provides legitimate, licensed access to various Cisco software images, including IOSv (I Layer 3 and Layer 2), IOS-XRv, NX-OSv, CSR1000v, and ASAv. These software images are installed in other network emulators, such as GNS3 and EVE-NG. For this reason, many VIRL users do not actually use the VIRL server to test network topologies, as they prefer to use other network emulators. Instead, they consider virl subscription to be a legitimate method for updating software images. Network topology Portability. If you want to share the network topology of a friend, colleague, or execute it on another VIRL server, exporting network topology is easy. This is especially true if your topology uses basic, non-custom images that always come with VIRL (such as IOSv or CSR1000v). Advanced automation capabilities. VIRL includes a feature called AutoNetKit, which allows you to automatically settle the basic configuration of features on nodes throughout the topology of the network. This feature is useful if you need to quickly test the behavior of a particular technology or virtually recreate an existing network. However, this is not very useful when studying for Cisco certificates as it can prevent you from building muscle memory when configuring, checking and solving problems. Cons of VIRL Network Emulator VIRL has several things that could be improved, including: Cost resource requirements No serial interface can change the cost of active topology. Access to VIRL Personal Edition costs \$ 199 per year. However, the Personal Edition license only allows a total of 20 nodes (meaning that, 20 network devices) works at the same time in all active simulations. That's more than enough if you're studying for CCNA or CCNP certificates, but probably not enough for CCIE. Resource requirements. VIRL requires more processing power and memory compared to other solutions. The minimum system requirements are 8 GB of memory and four CPU cores assigned to a virtual machine. VIRL recommends 12 GB of memory to use the full 20 IOSv nodes. VIRL's resource calculator states that each IOSv node requires 512 MB of memory and a third of the CPU core. You may notice that ASAv, NX-OSv, CSR1000v and IOS-XRv require 3 GB of memory. Furthermore, the newer NX-OS 9000v requires a minimum of 5GB of memory and the IOS-XR 9000v requires a whopping 16GB of memory per node. Needless to say, if you plan to use any nodes outside of an IOSv device, memory must be allocated accordingly. There are no serial interfaces. Only Ethernet interfaces are supported in VIRL. Therefore, if you need access to serial testing areas for technologies such as Frame Relay in preparation for the CCNP ROUTE exam, you will need to use another labbing solution, such as Packet Tracer or NetSim. I can't modify active topology. In VIRL there are two different views on network topology – design and simulation views. The aptly named Design view is intended to place and connect nodes, as well as define automation and manual configurations for each node. Simulation display enables you to manage and connect to Active devices Once topology is done, you can't modify topology. You cannot add or remove nodes or add or remove links between nodes. This can result in a full wasted startup time. Some nodes, such as NX-OSv or IOS-XRv, can take a long time to run. Future releases are expected to change this issue. In VIRL-NG – or VIRL – Next Generation – you will be able to add and remove caravays and links to active topologies. This improvement comes alongside other excellent changes, such as the elimination of the VM Maestro fat client in favor of the HTML5 web client, improved licensing scheme and lower basic resource requirements. Network emulators: VIRL vs EVE-NG The annual VIRL subscription gives you access to software images of network devices. That's probably the biggest benefit for money. Finally, these software images are usually available only with a service contract or through a college program. If you are not a student or otherwise have access to these images, VIRL is the only (semi)affordable method for the average test taker to get them. This does not mean that the VIRL software itself

is objectively worse than GNS3 or EVE-NG. In fact, VIRL offers a number of features that cannot be found in any of its competitors, especially in relation to configuration automation! At the time of writing, VIRL has a number of drawbacks, such as the use of basic resources of the VIRL server device and the lack of support for serial interfaces. The good news is that many of these weaknesses are planned to be addressed in the future release of the software. However, until this update is released to the public, you should weigh these shortcomings when considering implementing VIRL. What is EVE-NG? 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 companies. They offer free Community Edition, as well as a professional edition for \$110.75 per year. Version: EVE-NG was evaluated using version 2.0.3-95 in a virtual machine with 16GB of memory and 4 vCPUs. Network devices used for evaluation included Layer 3 and Layer 2 Cisco IOU 15.5(2)T. Eve-NG Network Professionals Emulator Eve-NG Community Edition has several main advantages, including: Costless Client Modifiable Active Topology Multiple Connection Types Cost. Eve-NG's Community Edition is completely free, and more than enough to prepare for CCNA. There are two big differences between Community Edition and Professional Edition EVE-NG: Community Edition has a limit of 63 nodes per laboratory (which is even enough for CCIE). The professional edition has a number of missing administrative features in the Community release, including multi-user support, user roles, and support for connection quality/demotion settings. No clients. The EVE-NG HTML5 client is a key feature that distinguishes it from VIRL and At EVE-EG, you design, connect, and manage network topologies through an HTML5 client. In other words, in addition to servers, you do not need to download and install a separate application for virtualization, connectivity and configuration of network devices. You easily deploy the server through a bare-metal installation or virtual machine, and everything else can be done through the HTML5 client. The HTML5 client also reacts quite a bit, even when working with larger topologies. Variable active topology. Similar to GNS3, EVE-NG allows you to modify network topologies while actively working. As previously noted, this is an excellent time-saving, especially when working with nodes that would otherwise take a long time to boot, such as the NX-OS 9000v or IOS-XRv. Multiple types of connections. Similar to GNS3, EVE-NG supports both serial and Ethernet interfaces. This is useful if you are working with technologies that include serial interfaces such as Frame Relay, which are still in ccnp route certification exam test. Cons of EVE-NG Network Emulator The EVE-NG Community Edition also has two drawbacks as a free network emulator, including: Software Image Access Documentation Software Image Access. Just like GNS3, EVE-NG does not provide any software images. This means that you will need to (legally) obtain compatible Cisco IOS software images for use with EVE-NG. Documentation. Eve-NG Community Edition documentation is initially difficult to navigate and consume at first. The documentation itself is quite good, but it contains the occasional grammatical Kill and is sometimes written in a conversational way. Some documentation is not available in written format, such as instructions for installing a virtual machine, which are documented in the video. The video itself is informative, but the lack of written instructions can be unattractive to some users. On the other hand, EVE-NG Professional Cookbook is very useful. It serves as a centralized user manual for paying customers. Pro tip: Although this document was written for the professional edition of EVE-NG, many of the instructions are also applicable to Community Edition. Network emulators: EVE-NG vs VIRL vs GNS3 EVE-NG stands out among its competitors as the only emulator of a virtual network without clients. Although GNS3 and VIRL require downloading and installing a separate application to manipulate network devices on the server, EVE-NG only requires a lightweight terminal application (such as PuTTY). The creation and modification of network topology is done entirely through the HTML5 web client. It is very useful on the desktop, but also opens the possibility to lab it up on mobile, too! Similar to GNS3, the biggest drawback that EVE-NG owns is that you already need to have licensed access to software images of network devices to mimic them through EVE-NG. An additional drawback is eve-NG's process of installing a virtual network device software image, while requires SSH access to the EVE-NG server and some small skill with a Linux shell to import software devices for use in network topologies. Furthermore, depending on the topic, EVE-NG documentation may be more difficult to consume. Choose One Best for you The existing ecosystem of online simulation and emulation software can be difficult to navigate, especially for newcomers to the networking industry. Any software discussed in this article may appeal to a particular type of student. For this reason, our intention is not to recommend any particular software, but to educate you about the pros and cons of each option offered by the market. We hope that this knowledge will help you make an educated decision and achieve your Cisco certification goals and learn about modern beauty that is computer networking! Networking!

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