Title:
Using Dynamips for CCIE Lab Preparation

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Summary:
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Article Body:
<p>Since the beginning of networking related certification one of the recurring problems that have faced candidates is getting access to hardware to familiarize themselves with how network operating systems work. Traditionally candidates have been limited to hunting for great deals on old or refurbished equipment to buy, renting equipment time from rack rental vendors, using severely limited router simulator programs, or testing configurations on live customer networks and praying that the help desk's phone doesn't ring. Today candidates now have an additional option for creating a Cisco IOS testbed, an emulation program known as Dynamips".</p>
<p>Started in August of 2005 by Christophe Fillot, Dynamips is a Linux and Windows based application that is used to emulate the hardware of the Cisco 7200 and 3600 series routing platforms. Unlike traditional router simulators" Dynamips allows you to boot real Cisco IOS software images and build complex network topologies to test the functionality of IOS on your desktop PC. As of November 2006 Dynamips currently supports Ethernet, Serial, ATM, and POS interfaces for the 7200 series routers and Ethernet, Serial, and Etherswitch modules for the 3600 series routers. Best of all Dynamips is open-source and free to download!</p>
<p>To run Dynamips first you must install
libpcap or
winpcap depending on your platform. Windows users will need to install winpcap 4.0 or later which is currently in beta.</p>
<p>Next download the appropriate Linux or Windows executables for Dynamips. To do this I would recommended to download the
Dynagen installer package, a front end written by Greg Anuzelli which uses an INI-like configuration file to provision the Dynamips emulator.</p>
<p>Next you'll need a Cisco IOS software image for a 7206, 3620, 3640, or 3660 router depending on which platform you will be emulating. IOS can be downloaded from http://www.cisco.com for users with a valid service contract. Once you have downloaded the appropriate IOS image it is recommended that you extract the image to save time in the Dynamips booting process. This can be accomplished with programs such as gunzip for Linux or WinRAR for Windows.</p>
<p>Next you need to build a Dynagen .net file to provision the Dynamips emulator, or you can download prebuilt ones to emulate the Internetwork Expert Routing & Switching and Service Provider topologies from here:</p>
<p>

Click here to download the Internetwork Expert Topologies for Dynagen</p>
<p>Note that these files may need minor modification to specify your working directories and the names and locations of your Cisco IOS images. Also included in the Internetwork Expert topologies for Dynagen is a router instance that is designated as a Terminal Server (Access Server). This instance can be used like a Cisco 2511 series router to reverse telnet to the console ports of the virtual

Dynamips router instances, similar to how the Terminal Server is used in the
CCIE Lab Exam.</p>
<p>To use the Terminal Server instance first create a Loopback interface on your
PC with the IP address 169.254.0.1/16. For Windows clients see

http://support.microsoft.com/kb/839013 for instructions how to add a
Loopback interface in Windows. Once the Loopback is created reboot your PC and
then run the Dynamips shortcut Network Device List" located on the desktop.
This output will show you the hardware address for the Loopback which will look
something like {4065B11C-2A6C-4FD2-8204-A12A9A8328A4}. Next edit the .net file
for the appropriate Internetwork Expert topology, and under the [[Router
TermServ]] entry edit the line E0/0 = NIO_gen_eth:\Device\NPF_{4065B11C-2A6C-4FD2-8204-A12A9A8
to insert the hardware address of your Loopback. If successful you should be
able to ping the IP address of the Terminal Server (169.254.0.2) from your local
PC when the Dynamips instance for it is booted.</p>
<p>Next boot the Dynamips hypervisor. For Windows users this will be the Dynamips
Server" shortcut on your desktop that was created by the Dynagen installer
package. Next run the appropriate .net file for Dynagen, and start" your
devices from the Dynagen command line. Once booted the Dynamips router processes
can be telneted to with any terminal emulation software such as SecureCRT, PuTTY,
HyperTerminal, or command line telnet.</p>
<p>Note that as the number of device you boot in Dynamips increases as do the
processor, memory, and disk space requirements of your desktop. Currently I am
able to boot all the devices in the Internetwork Expert Topology .net files in
Windows with an AMD 64 X2 Dual Core 4400+ processor with 2Gb of RAM and about
2Gb of disk space in the devices' working directory.</p>
<p>As the project matures more functionality is sure to be added. For more
information on the project visit the following sites:</p>
<p>Dynamips:
http://www.ipflow.utc.fr/index.php/Cisco_7200_Simulator
Dynagen:
http://dyna-gen.sourceforge.net/
Hacki's Forum: http://7200emu.hacki.at/</p>