dynamips and dynagen

November 12, 2013

Network lab virtualization with dynamips

Dynamips

Dynamips[a] is an emulator (hypervisor) for Cisco hardware (2600, 3600, 3700, 7200)
It emulates all the hardware modules Cisco IOS expects

- ethernet ports
- serial cards
- flash ram

Dynamips can emulate most of the hardware available on these platforms, including switch modules, but it cannot emulate standalone switches (for example, 2960 or 3560 or any other "Catalyst"-type equipment)

[a] http://www.ipflow.utc.fr/index.php/Cisco_7200_Simulator

Dynamips

Running dynamips

- It requires a Cisco IOS software image.
- Dynamips, much like KVM, has many command line options to control which modules will be active, how much RAM will be present, etc. . .

However, unlike KVM which can run emulated OS at nearly the same speed they would run on the physical host (we are using the same x86/x64 instructions), dynamips isn't very fast.

- Cisco equipment in the series mentioned use the MIPS processor family (thus, the Dynamips name), and needs to translate the processor instructions.

Dynagen

Dynagen

Dynagen is a front-end for managing dynamips. It controls dynamips, much in the same way that virsh/libvirtd controls KVM. Dynagen uses a configuration file (`your_project_name.net`) where you can define routers, switches, and connections between the devices.

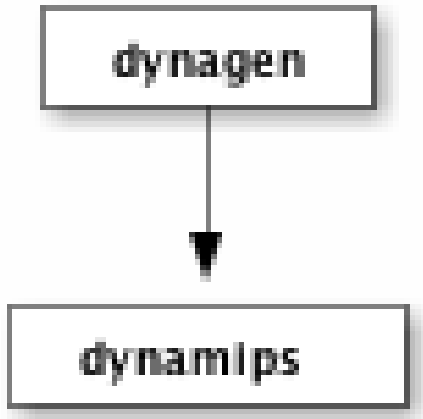


Figure : Dynamips and dynagen

Dynagen - sample config

```
[[router R1]]
    console = 2001
    aux = 3001
    g1/0 = CORE1 1
    model = 7200

[[router R2]]
    console = 2002
    aux = 3002
    g1/0 = CORE1 2
    model = 7200

[[ETHSW CORE1]]
    1 = access 1
    2 = access 1
```

Dynamips and the real world

By default, the routers and switches cannot talk to the rest of the world. They are in a closed environment, talking to each other.

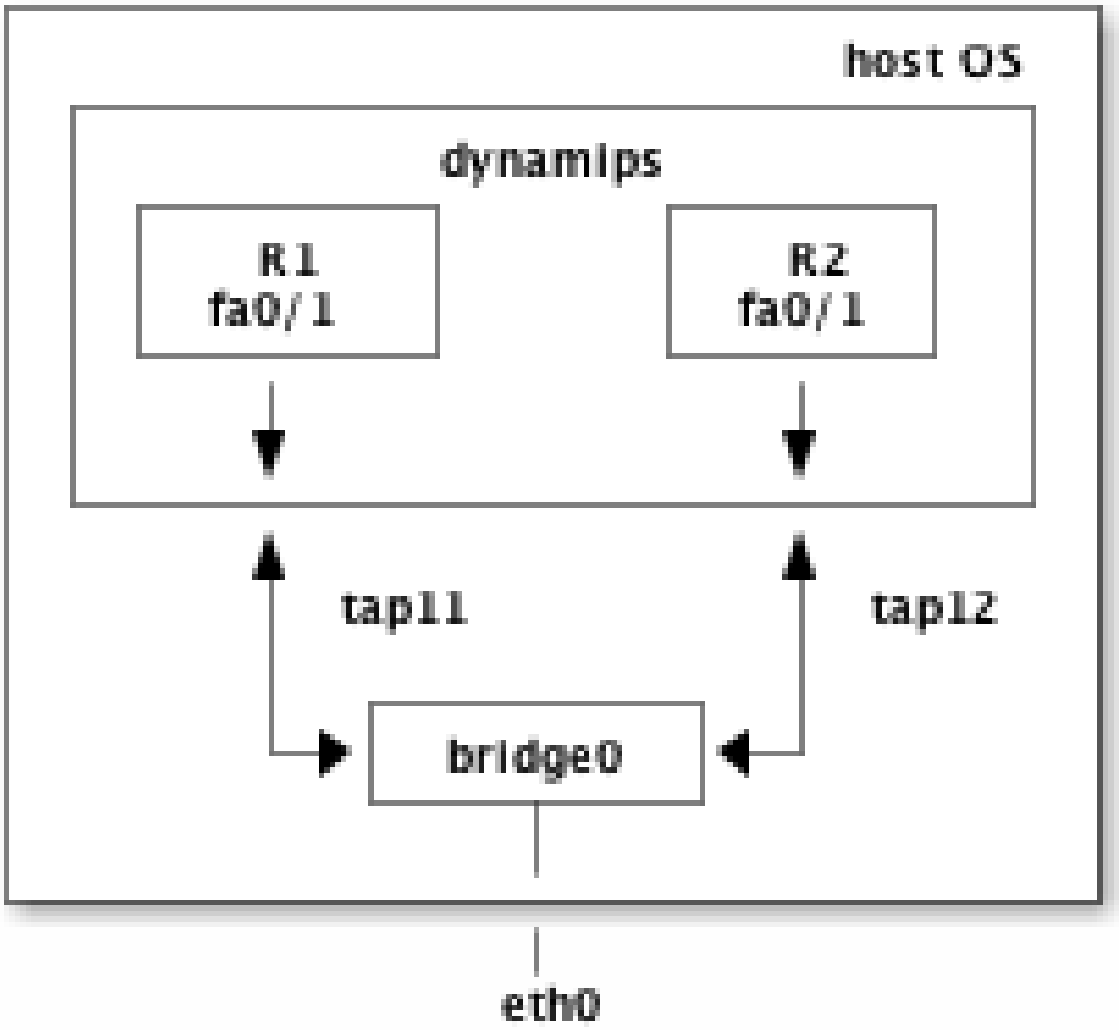
But it is possible to "attach" the ethernet interfaces from the routers, to so-called "tap" interfaces on the HOST.

```
[[ROUTER r3]]
    console = 2103
    aux = 2023
    fa0/1 = NIO_tap:tap3
    fa0/0 = NIO_tap:tap13
    model = 7200
```

Dynamips and the real world

One would then connect these “tap” interfaces coming from the routers, to a virtual switch (called `bridge`) - we’ll see this on the next slide.

Dynamips and the real world



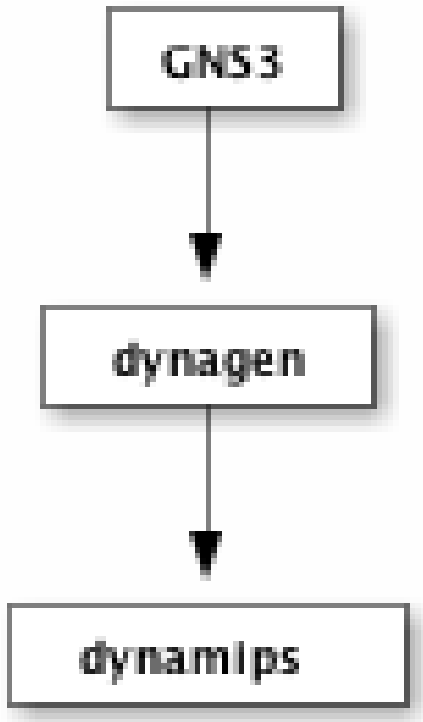
Dynamips and the real world

We can use the `brctl` command to see which ports are attached to which `tap` interfces:

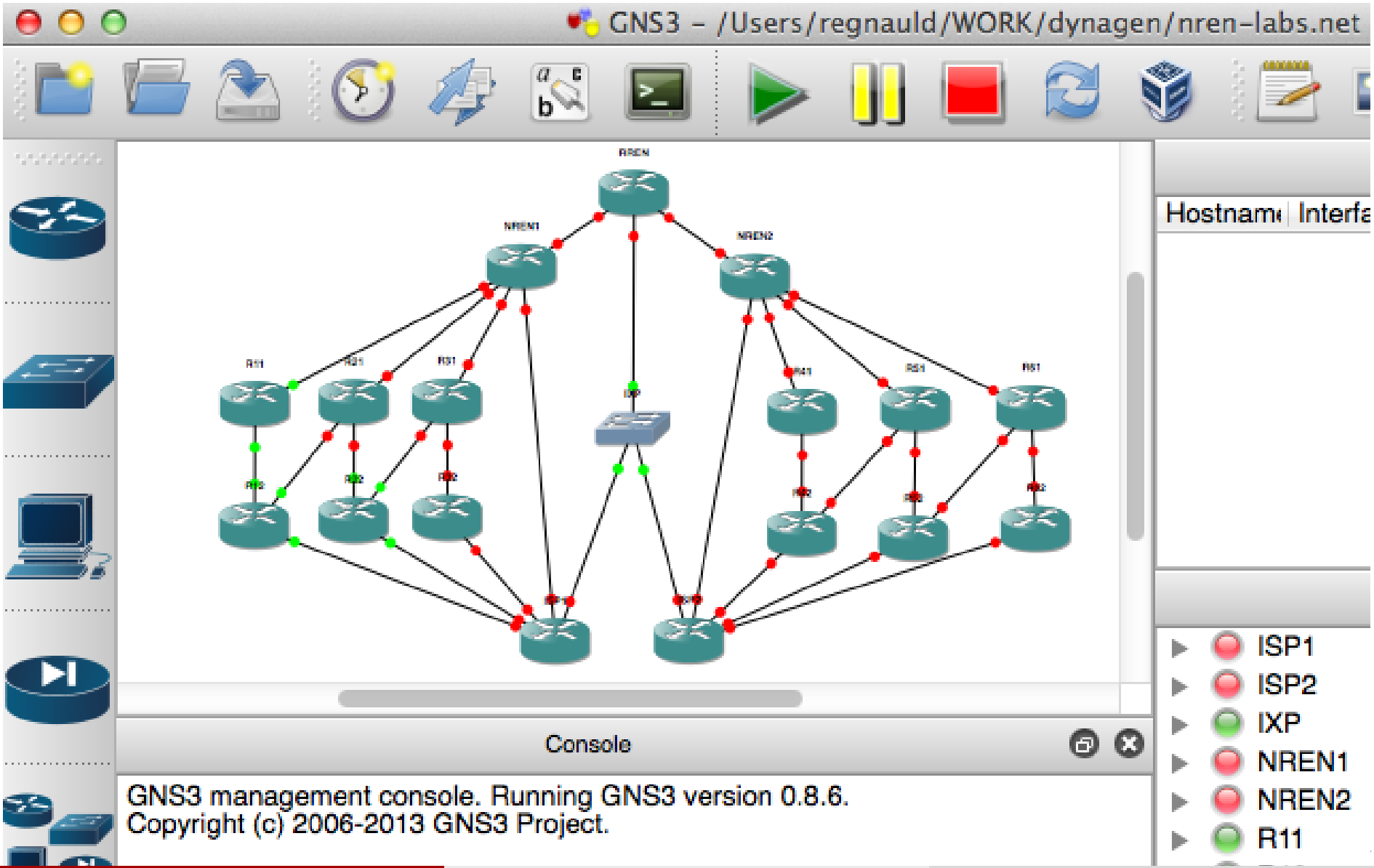
```
$ brctl show br-lan
br-lan          8000.5e56f142f66e       no              tap11
                                                        tap12
                                                        tap13
                                                        eth0
```

A graphical front-end: GNS3

Another tool, which you will see later, is GNS3[1]. It wraps dynagen, and provides a complete Graphical Interface to design, build, run and debug dynagen/dynamips architectures.



GNS3


GNS3 - /Users/regnauld/WORK/dynagen/nren-labs.net
Hostnam
Interfa
ISP1
ISP2
IXP
NREN1
NREN2
R11
Console
GNS3 management console. Running GNS3 version 0.8.6.
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