

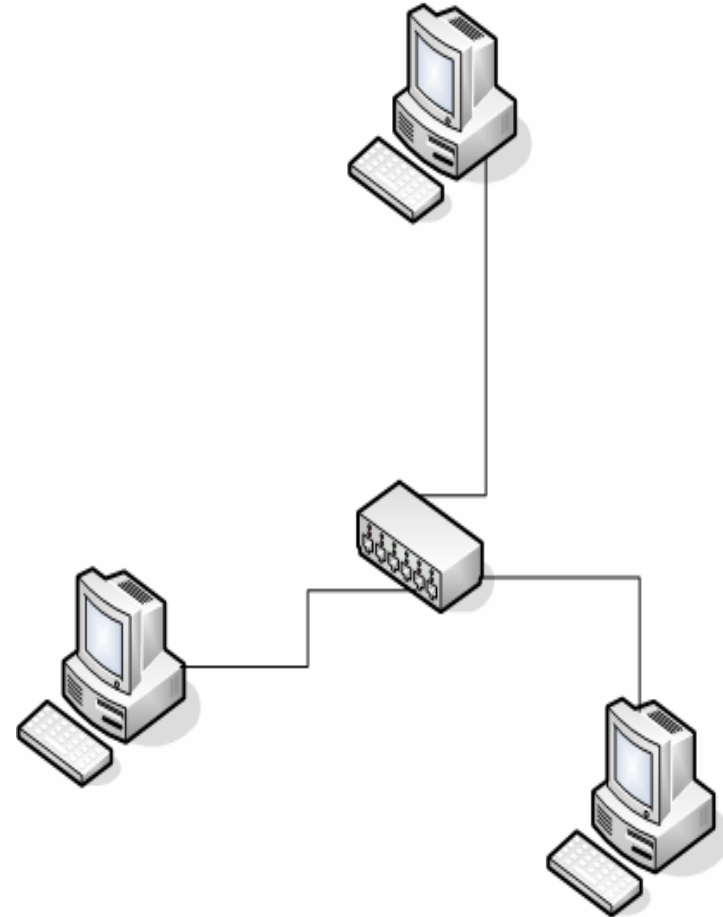
CrossBow: Network Virtualization

Tutorial

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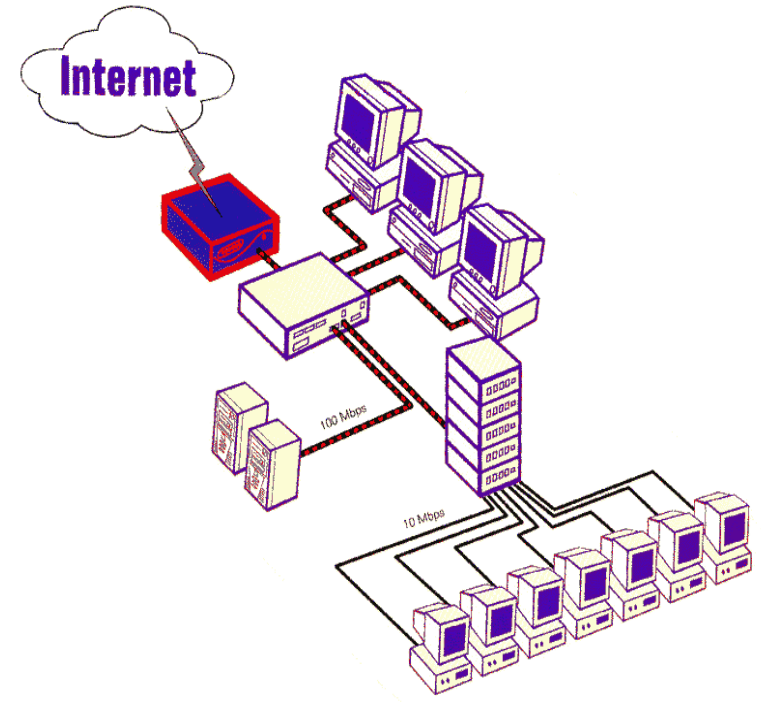
Aim

- To Understand and appreciate the features of Project Crossbow
- Create a Virtual Network on a Physical machine
- Enable flow control on the Virtual Network
- Identify further uses of Network Virtualization



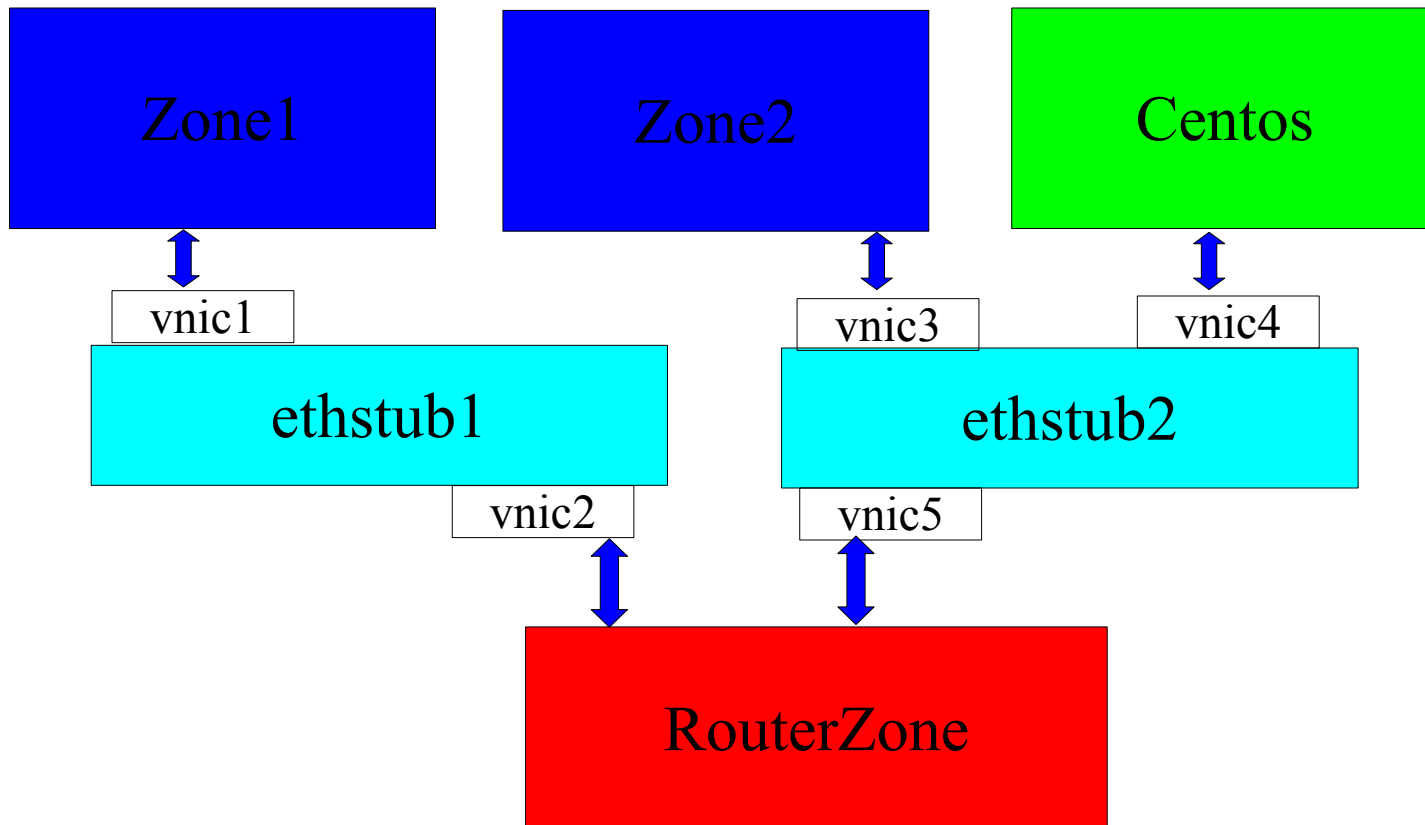
Various Possible Use Cases

- Public Virtual Network
 - Network services on a network are virtualized and consolidated into a single host
- Private Virtual Network
 - Virtual network restricted inside a single server. Used for testing purposes
- Virtual network combining the above two.



Exercise 1

- Create a Virtual Private Network



Creating etherstubs

```
gz# dladm create-etherstub etherstub1
gz# dladm create-etherstub etherstub2
gz# dladm show-etherstub
LINK
ethstub1
ethstub2
```

ethstub1

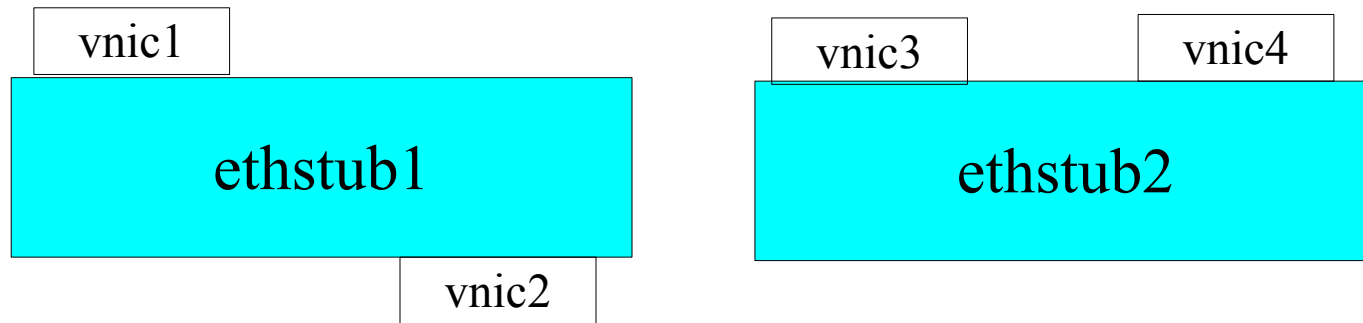
ethstub2

Create VNICs

```
gz# dladm create-vnic -d etherstub1 1
gz# dladm create-vnic -d etherstub1 2
gz# dladm create-vnic -d etherstub1 3
gz# dladm create-vnic -d etherstub3 6
gz# dladm create-vnic -d etherstub3 9
gz# dladm show-vnic
```

LINK	OVER	SPEED	MACADDRESS	MACADDRTYPE
vnic1	etherstub1	- Mbps	2:8:20:8d:de:b1	random
vnic2	etherstub1	- Mbps	2:8:20:4a:b0:f1	random
vnic3	etherstub1	- Mbps	2:8:20:46:14:52	random
vnic6	etherstub3	- Mbps	2:8:20:bf:13:2f	random
vnic9	etherstub3	- Mbps	2:8:20:ed:1:45	random

Current Configuration



Create the BaseZone

```
# zonecfg -z basezone
zonecfg:basezone> create
zonecfg:basezone>set zonepath=/zones/basezone
zonecfg:basezone>add inherit-pkg-dir
zonecfg:basezone:inherit-pkg-dir>set dir=/opt
zonecfg:basezone:inherit-pkg-dir>set dir=/etc/crypto
zonecfg:basezone> add net
zonecfg:basezone:net> set physical=vnic1
zonecfg:basezone:net> end
zonecfg:basezone> verify
zonecfg:basezone>commit
zonecfg:basezone> exit
```


Create and configure the zones

```
#zoneadm -z zone1 install  
#zoneadm -z zone1 boot  
#zlogin -C zone1
```

Perform sysconfig on the zone1

```
zone1 192.168.1.10/24 gateway 192.168.1.1
```

```
zone2 192.168.2.10/24 gateway 192.168.1.1
```

```
zone3 192.168.2.20/24 gateway 192.168.1.1
```

```
router
```

```
    vnic2 192.168.1.1 gateway none
```

```
    vnic5 192.168.2.1 gateway none
```

Enable ipv4-forwarding on router zone.

Zone configuration

Zone1

vnic1 192.168.1.10
gateway 192.168.1.1
nameservice none

Zone2

vnic3 192.168.2.10
gateway 192.168.2.1
nameservice none

Centos

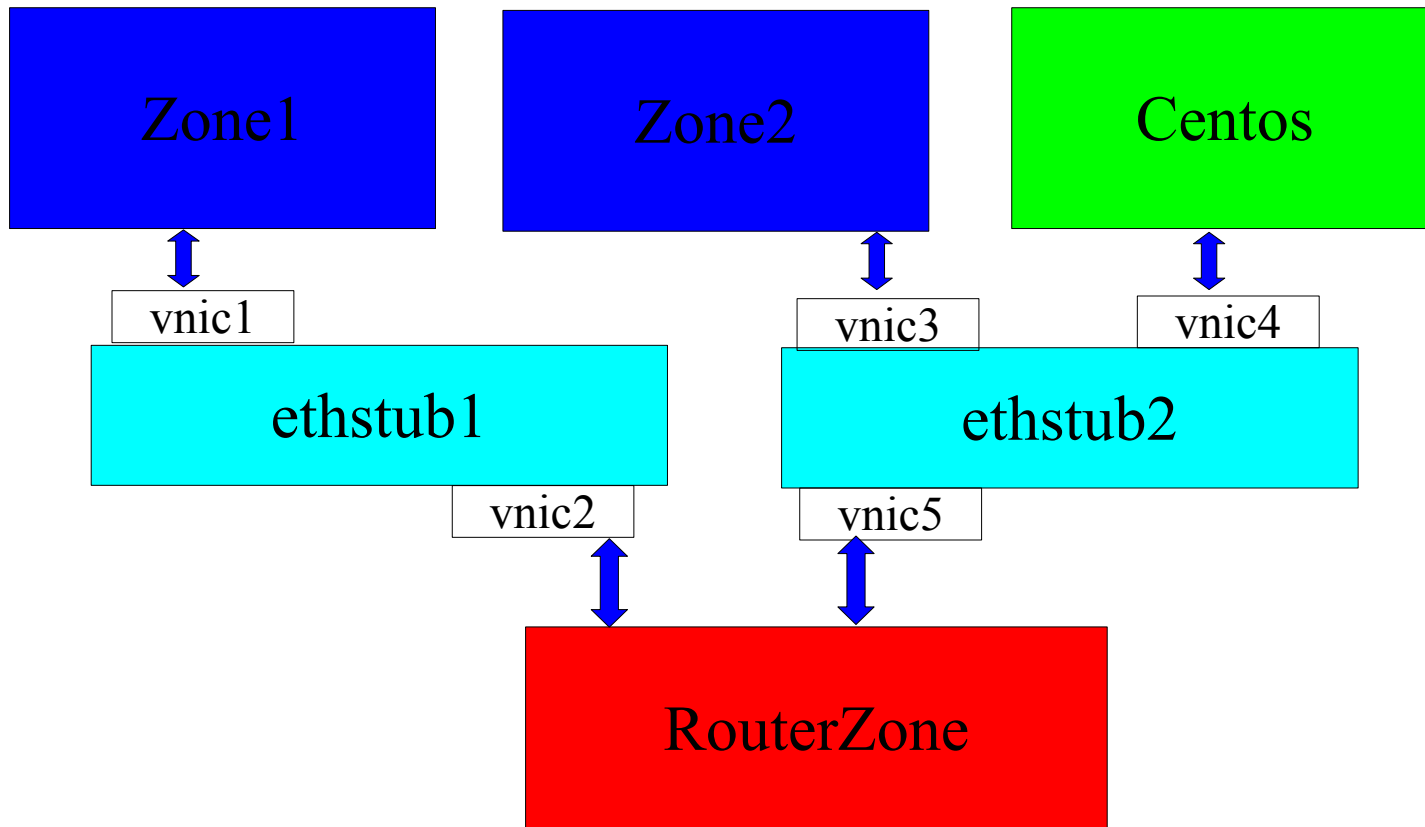
vnic4 192.168.2.20
gateway 192.168.2.1
nameservice none

Router

vnic2 192.168.1.1
vnic5 192.168.2.1
vnic6 192.168.3.1
gateway none
nameservice none

ipv4-forwarding enabled

Current Configuration



Some Testing

- Try pinging various zones
- Start apache and do some bandwidth testing
 - wget in the same zone
 - wget between different zones

BandWidth Control

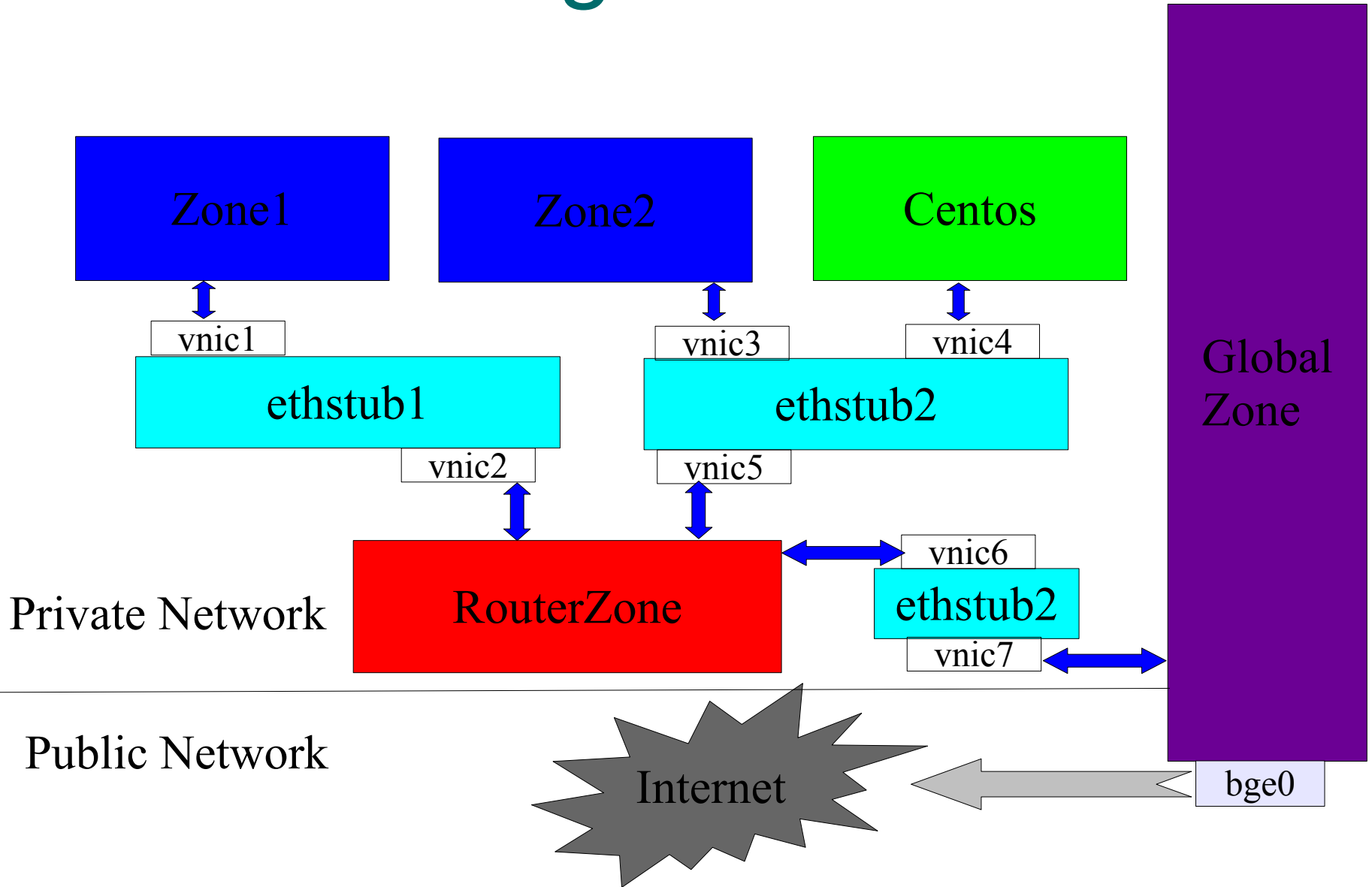
```
#dladm set-linkprop -p maxbw=10mb vnic2  
#dladm show-linkprop vnic2
```

Exercise 2

- Connect the Virtual Private Network with Global Zone
 - Create two more ethstub3 vnic6 and vnic7
 - Make it another subnet 192.168.3.0

A complete Private Virtual Network connected to global zone ready on your Box!

Current Configuration



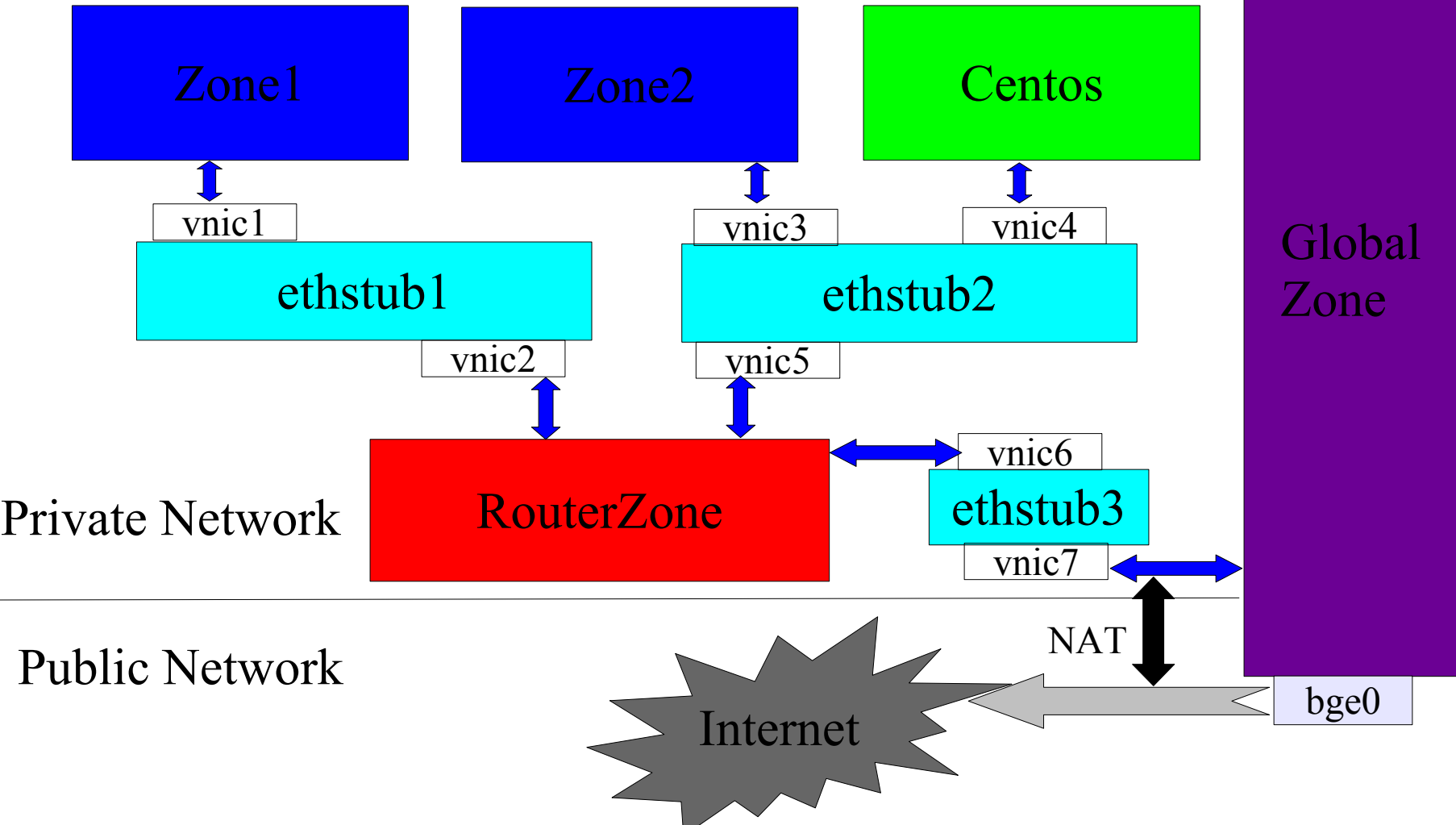
Exercise 3

•Combining Private and Public Networks : NAT

- We use ipfilter to enable NAT
- Ipfilter ships by default with solaris 10.
- Create the configuration file /etc/ipf/ipnat.conf
- Enable ipfilter smf service
- Add a default route entry in router zone pointing to vnic in the global zone

```
#cat /etc/ipf/ipnat.conf
map bge0 192.168.1.0/24 -> 0/32 tcp/udp auto
map bge0 192.168.1.0/24 -> 0/32
map bge0 192.168.2.0/24 -> 0/32 tcp/udp auto
map bge0 192.168.2.0/24 -> 0/32
map bge0 192.168.3.0/24 -> 0/32 tcp/udp auto
map bge0 192.168.3.0/24 -> 0/32
#svcadm enable ipv4-forwarding
#svcadm enable network/ipfilter
#ipnat -l
```

Current Configuration



Crossbow Webinterface

- Webmin in Solaris `http://<hostname>:10000`
- How to:
 - `pkgrm SUNWwebmin`
 - Get crossbow webmin package from <http://opensolaris.org/os/project/crossbow/snap>
 - `pkgadd SUNWwebmin`
 - `cd /usr/sfw/lib/webmin; ./setup.sh`

Bibliography

- <http://www.opensolaris.org/os/project/crossbow>
- <http://blogs.sun.com/sunay/>
- <http://blogs.sun.com/iyer/>
- <http://blogs.sun.com/droux/>
- <http://www.opensolaris.org/os/project/crossbow/handson/>

Thank You!

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