

# Practical Home Networking Using a Linux Router

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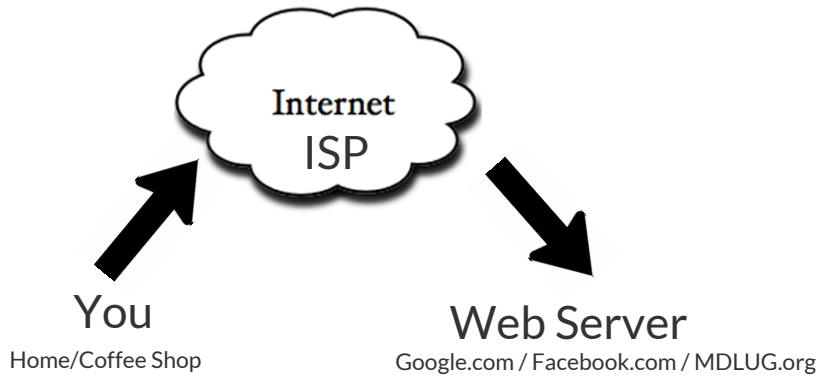
Tony Bemus  
<http://bemushosting.com>

## What I'm going to talk about

- Internet Interactions
- Inside the Home Network
- Replace the Commercial Router
- Physical Design of the Network
- Logical Design of the Network
- Configure the new Router
- Addressing Devices
- Port Forwarding
- Public IP address
- Dynamic DNS (DDNS)

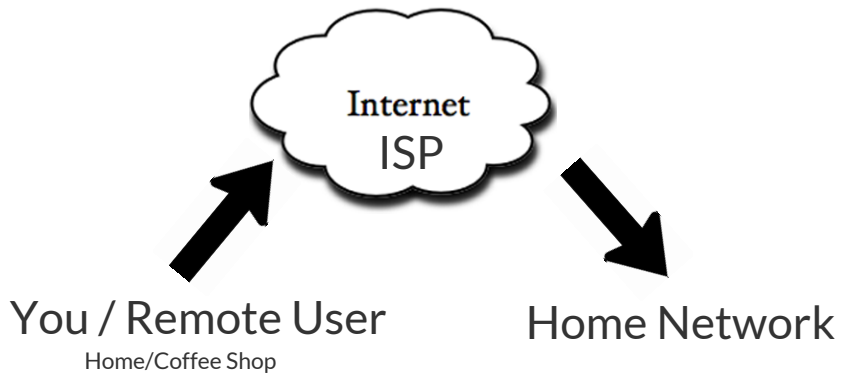
Notes:

# Typical Internet interactions



Notes:

# Home Server



# Inside the Home Network

- Modem / ISP Router



- WIFI Router



- Switch



- Server / PC



# Replace the Commercial Router

What you need:

- PC / laptop
- Download software
  - IPFire.org / IPcop.org
  - Smoothwall.org
  - PF Sense



# Computer Requirements

## Minimum

- 1000 Mhz
- 128 MB Ram
- 2 GB HD

## Recommended

- 2.4 Ghz Pentium 4
- 1 GB + Ram
- 20 GB + Hard drive

## Required - 2 Network Cards (NIC)

Choices:

- wired and wired
- wired and wireless
- wireless and wireless

# Physical Design



ISP Modem

Linux Router



Wireless AP



PC / Home Server



# Logical Design

Common ISP Modem networks to avoid

- 192.168.0.x
- 192.168.1.x
- 10.0.0.x

I suggest to stay close to your ISP modem  
and just change the third number:

ISP - 192.168.1.x    Yours - 192.168.2.x

## Safe Networks To Use

RFC1918 name	IP address range	number of addresses
24-bit block	10.0.0.0 - 10.255.255.255	16,777,216
20-bit block	172.16.0.0 - 172.31.255.255	1,048,576
16-bit block	192.168.0.0 - 192.168.255.255	65,536

[http://en.wikipedia.org/wiki/Private\\_network#Private\\_IPv4\\_address\\_spaces](http://en.wikipedia.org/wiki/Private_network#Private_IPv4_address_spaces)

# Initial Router Config

Red NIC goes to Modem = DHCP

Gets address from the ISP Modem

Green NIC goes to Switch = Static IP

first or last in your range: 192.168.2.1

Blue NIC goes for Wireless = Static IP

(optional static - 192.168.3.1)

Orange NIC is for DMZ = Static IP

(optional static - 192.168.4.1)

# Initial Router Config cont...

Enable DHCP server

Set DNS as the router green IP

DHCP Pool range about 100 addresses:

192.168.2.100 - 192.168.2.200

This will leave room for static address devices

If you are reusing your wireless router:

- Turn off DHCP server
- Set IP address on the inside of your green

## Addressing Devices

### Static Assignment

Manually assign and configure device

\*\*\* Static address are ALWAYS

outside of the DHCP pool

192.168.2.1 - 192.168.2.99

### DHCP reservation

Configure DHCP to give the same address to a single device.

No device configuration needed (leave as DHCP)

Usually inside DHCP pool

# ABC Network

Use both static and DHCP reservations!

192.168.2.1 - Router (Static)

192.168.2.2 - Wireless AP (Static)

192.168.2.101 - Home Server (DHCP)

192.168.2.102 - Printer (DHCP)

Client PC are handled by DHCP

# Port Forwarding

Only forward ports needed!!!  
Shut off port not currently being used

Common TCP ports to forward:

- 22 - SSH / SSHFS / FTPS
- 80 - HTTP
- 443 - HTTPS
- 3389 - RDP

# Port Forwarding cont...

Source Port is from the internet  
Destination port is on your server

Open SSH to server  
Source port 22 to destination port 22  
on IP address 192.168.2.101

This model allows for changing the source  
port without having to configure the server  
Thus Security through Obscurity

\*\*\* Not Really Secure

# Public IP address

## ISP supplied Static IP

Static IP is better for hosting servers

\*\* Monthly charges apply

## ISP supplied DHCP \*The Most Common

Not conducive to hosting servers

Dynamic DNS Needed

Client software needed to report current Public IP address  
two options - do not use both

- Linux Routers have it built in
- ddclient on one of the servers



# Dynamic DNS (DDNS)

## Services

- \*Namecheap.com Domain Registrar  
\*\*\* Free Dynamic DNS
- DNSExit.com
- DYNU.com
- FreeDNS.afraid.org
- System-NS.com (Beta)

## Best Free Dynamic DNS Services

<http://www.gnutomorrow.com/best-free-dynamic-dns-services-in-2013/>

\* - This is what I use

# References

## Private IP ranges

[http://en.wikipedia.org/wiki/Private\\_network#Private\\_IPv4\\_address\\_spaces](http://en.wikipedia.org/wiki/Private_network#Private_IPv4_address_spaces)

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Based on a work at <http://bemushosting.com/practical-networking-using-linux-router>.

