

Chromecasting in Captive Networks

July 22, 2017

Brad Nelson

A dark blue diagonal gradient bar that starts from the bottom left corner and extends towards the top right corner, covering the lower half of the slide.

A dark blue background on the left side of the slide, separated from the white background on the right by a vertical line. A thin, light-colored diagonal line runs across the bottom of the dark blue area.

“Any word you have to hunt for in a thesaurus is the wrong word. There are no exceptions to this rule.”

— Stephen King

Digital Media Player

- Connect TV / Project to digitally streamed:
 - Audio
 - Video
 - Images

Digital Media Player

- Apple TV
- **Chromecast (Google)**
- Fire TV (Amazon)
- Roku

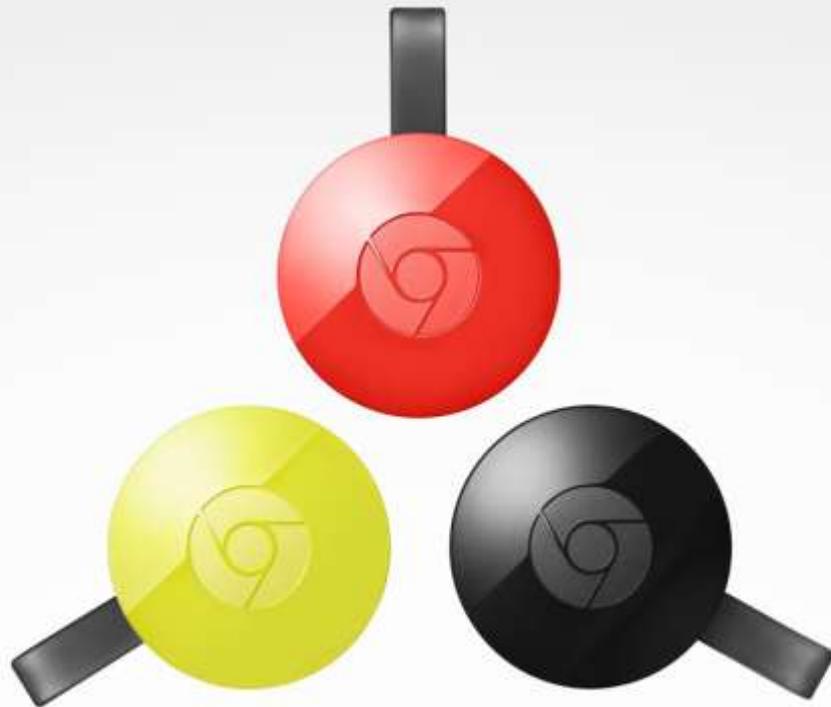
Chromecast

- Google's digital media player
- Stream from:
 - Youtube
 - Web pages
 - Apps or sites supporting the "cast" button





1st Generation (2013)



2nd Generation

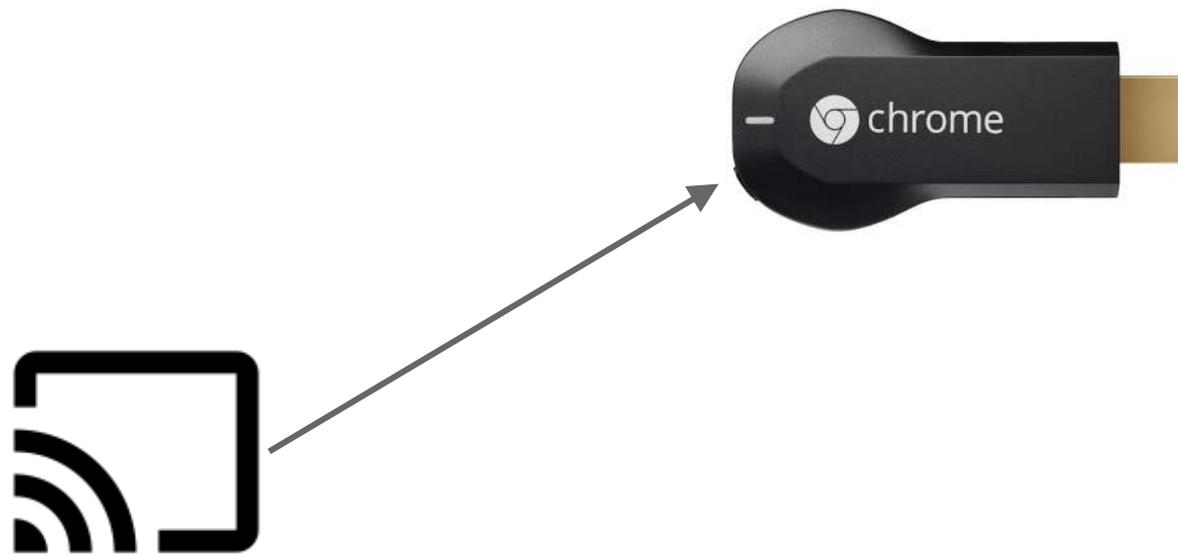


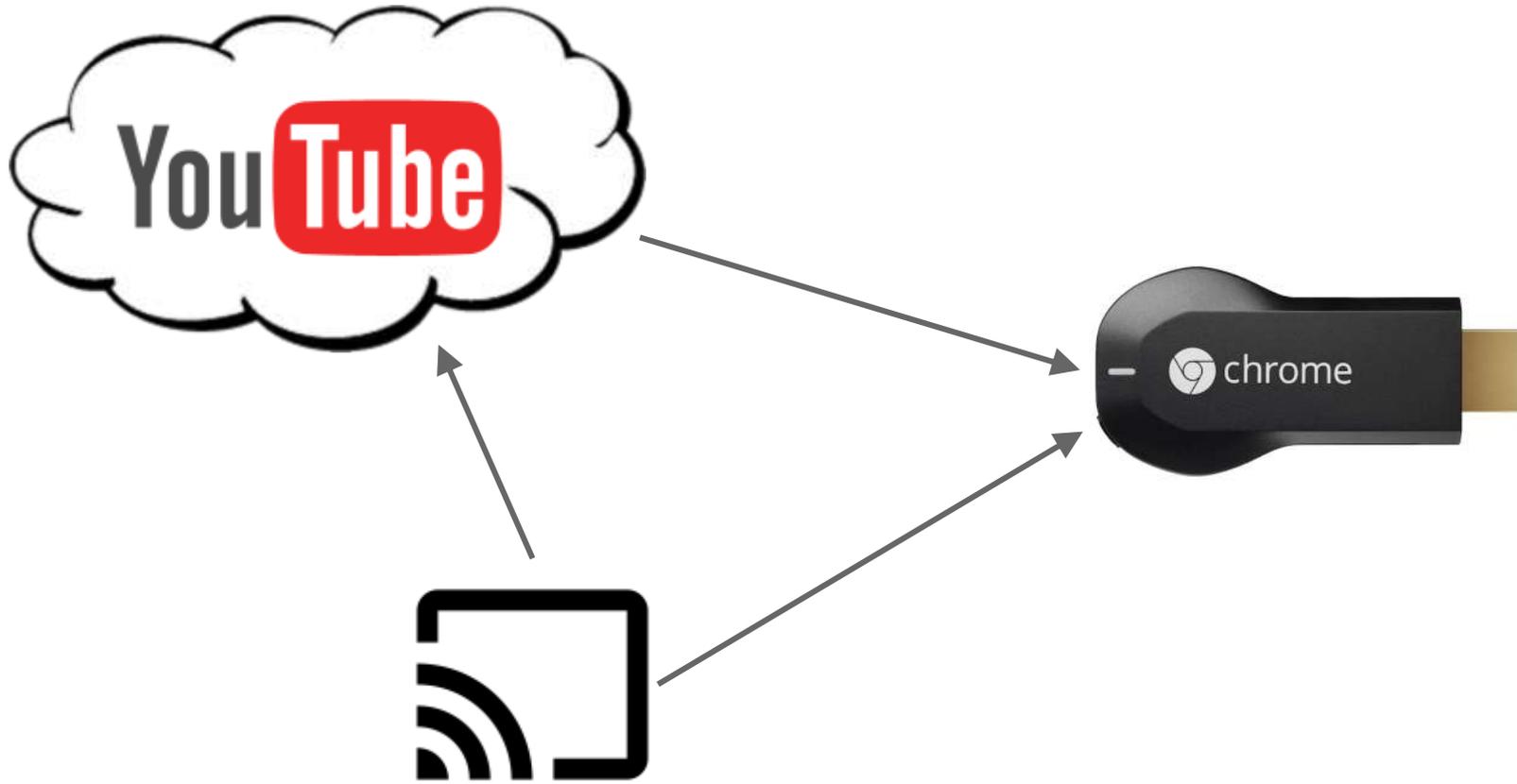
Chromecast Audio



Chromecast Ultra







Direct from the Cloud

Join "Google Starbucks"

I'm Feeling



Free Wi-Fi

From our friends at Google

Accept & Connect

I agree to the Terms of Service and have reviewed the Google Privacy Policy

Need help? 855-446-2374

STARBUCKS

Google

WIFI

WIFI

Google

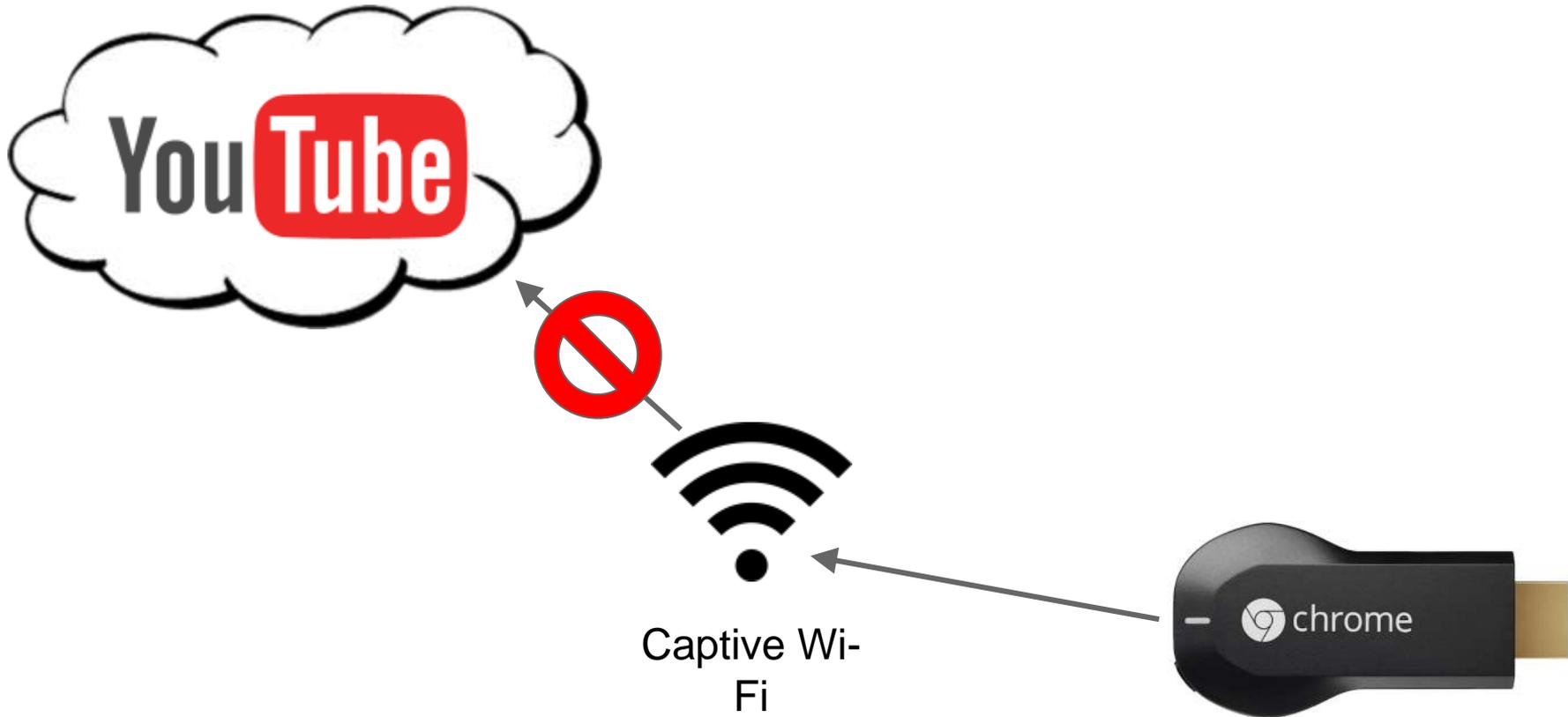
http://sbux-portal.appspot.com/splash?mac=b8:e8:56:45:12:22&apname=18-84:72-ca:59-59

Cancel

Captive Portal

Captive Portals

- Network that requires interaction with Login / Landing page
- Used because...
 - Payment
 - Authentication
 - EULAs
 - Liability
 - Timeout



Blocked by Captive Portal



WRT54-GL

Setup

Wireless

Services

Security

Access Restrictions

NAT / QoS

Administration

Status

Basic Setup

DDNS

MAC Address Clone

Advanced Routing

VLANs

Networking

EoIP Tunnel

Advanced Routing

Operating Mode

Operating Mode

Gateway

Static Routing

Select set number

1 ()

Delete

Route Name

Metric

0

Destination LAN NET

0 . 0 . 0 . 0

Subnet Mask

0 . 0 . 0 . 0

Gateway

0 . 0 . 0 . 0

Interface

LAN & WLAN

Show Routing Table

Save

Apply Settings

Cancel Changes

Help

more...

Operating Mode:

If the router is hosting your Internet connection, select *Gateway* mode. If another router exists on your network, select *Router* mode.

Select set number:

This is the unique route number, you may set up to 50 routes.

Route Name:

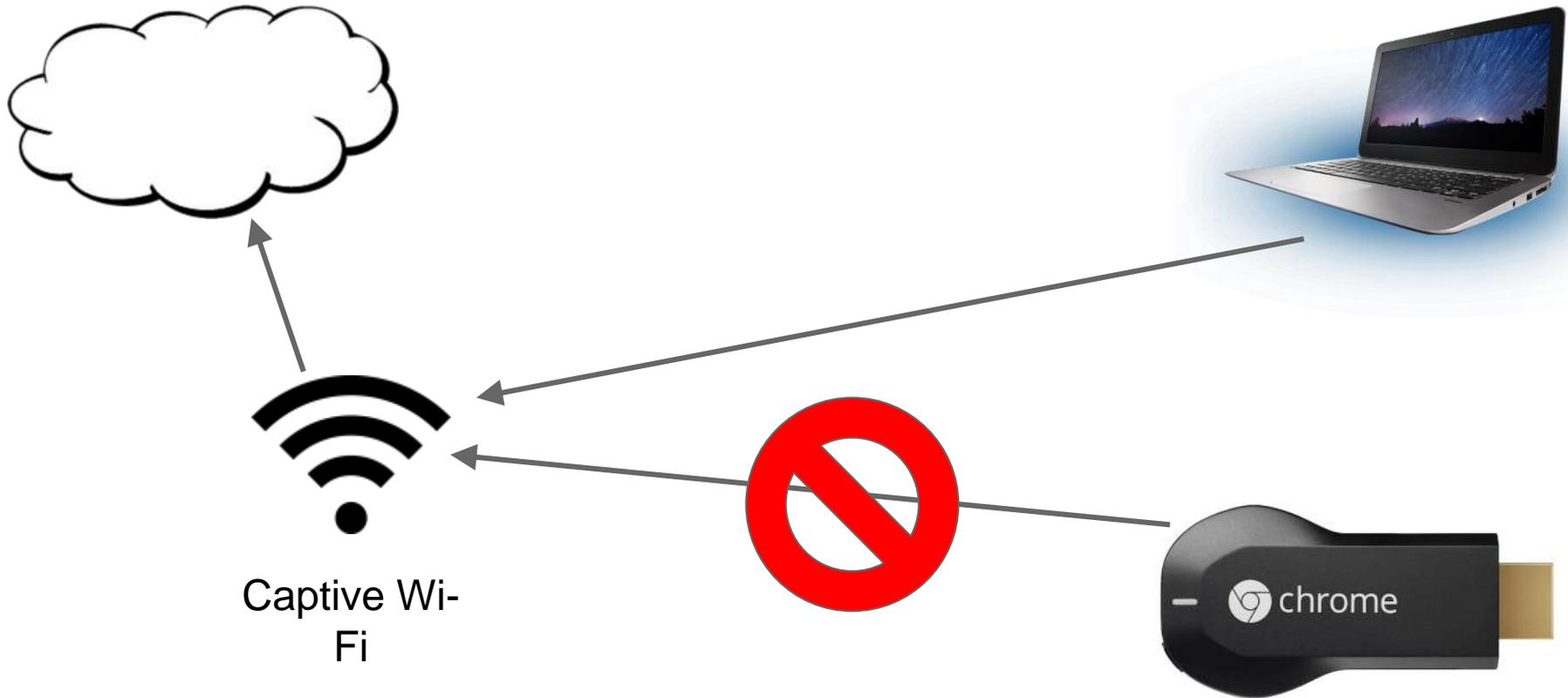
Enter the name you would like to assign to this route.

Destination LAN NET:

This is the remote host to which you would like to assign the static route.

Subnet Mask:

Determines the host and the network portion.



Shared Login

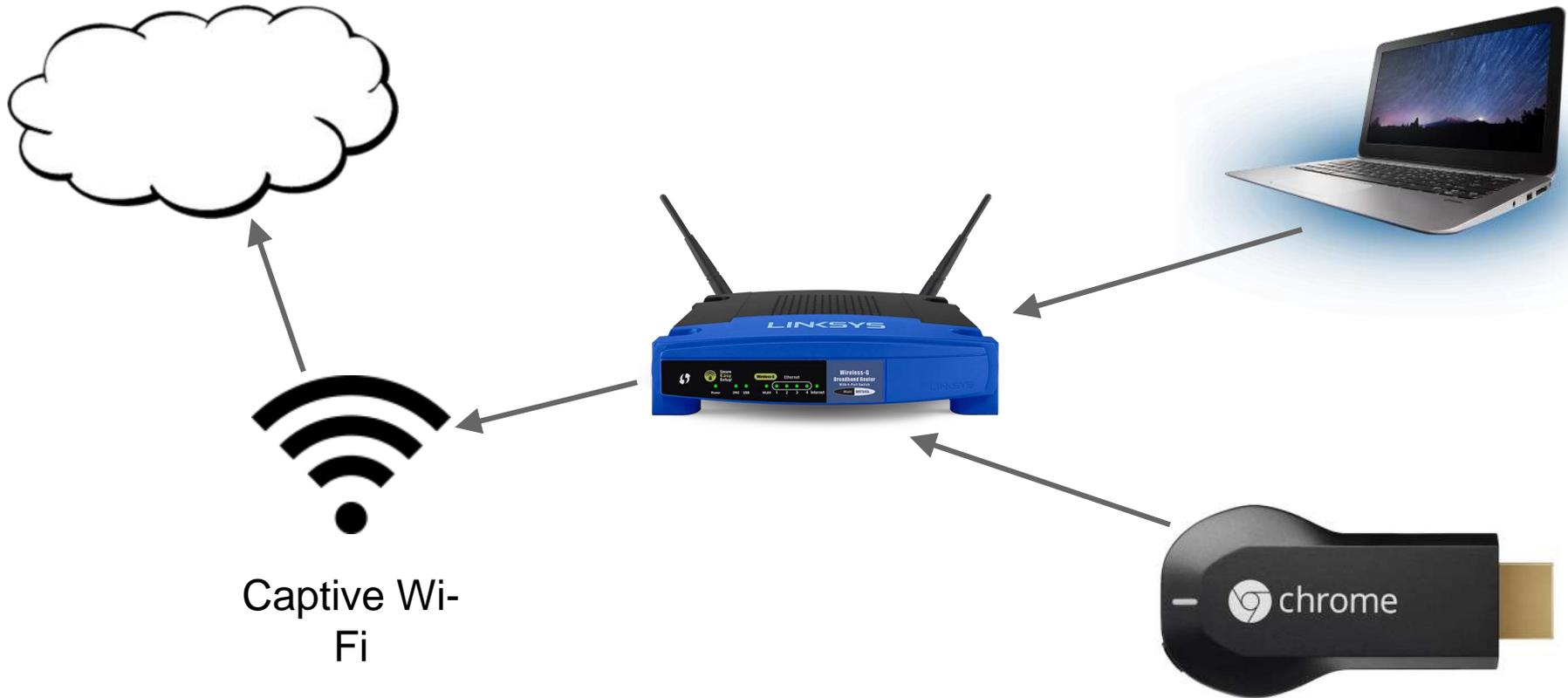
MAC Address

- Media Access Control Address
- 48-bit (IPv4)
 - 01-23-45-67-89-ab
- “Unique” hardware identifier
- Devices can lie

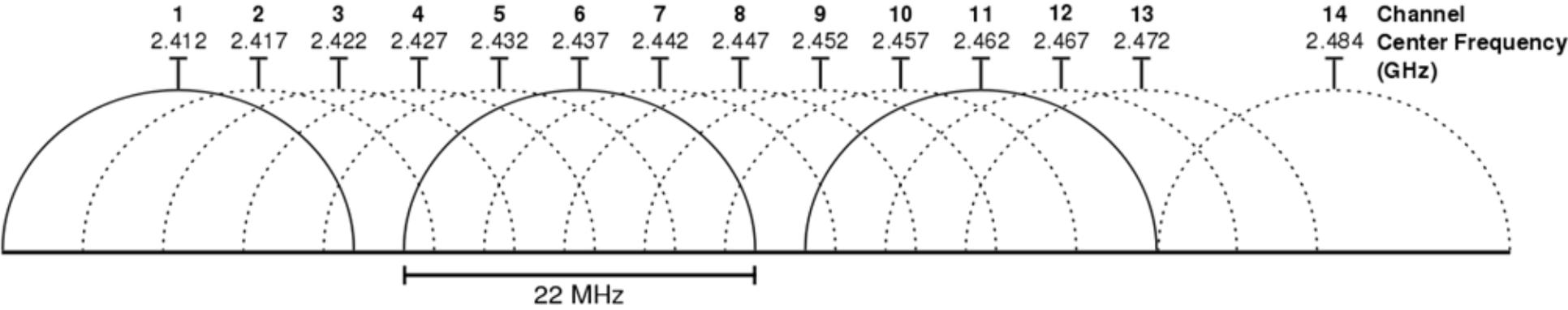


Captive Wi-Fi

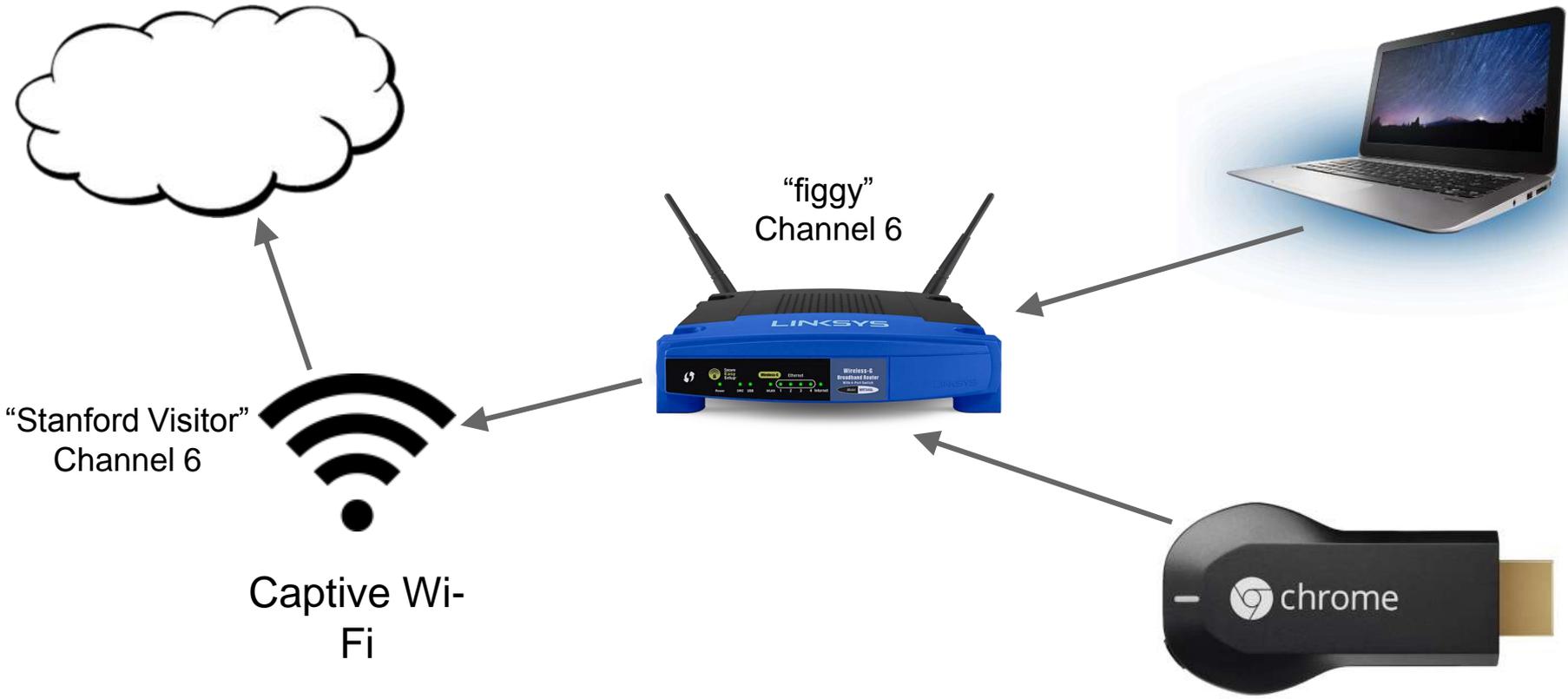




Shared Login



2.4GHz Spectrum



Private Subnets

- 10.0.0.0 - 10.255.255.255
(Class A - 24-bit)
- 172.6.0.0 - 172.31.255.255
(Class B - 20-bit)
- 192.168.0.0 - 192.168.255.255
(Class C - 16-bit)

Network Setup

Router IP

Local IP Address

192 . 168 . 3 . 1

Subnet Mask

255 . 255 . 255 . 0

Gateway

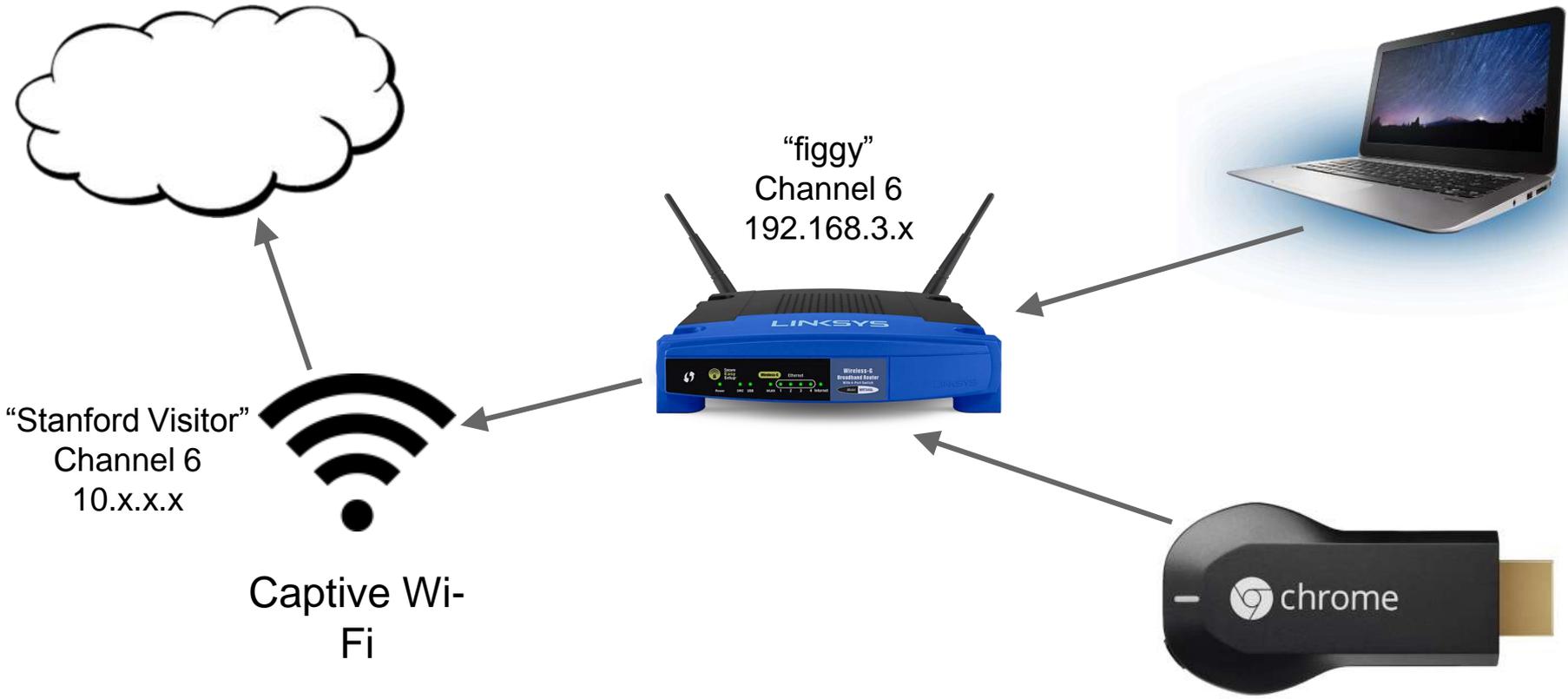
0 . 0 . 0 . 0

Local DNS

0 . 0 . 0 . 0

NAT

- Network Address Translation
- Route local subnet to single (usually) external IP address
- Use the 65536 ports to share the connection
- Semi-transparent to host network
- Incoming connections are special
 - NAT traversal
 - Punch a hole
 - Special exceptions in routing tables



Modes

- AP (Access Point)
 - Connect from Wi-Fi to Wired
- Client
 - Connect Wired to another Wi-Fi Router
 - Separate Network
- Client Bridge
 - Connect Wired to another Wi-Fi Router
 - Same Subnet
- Adhoc
 - Peer to Peer mode (no normal routing to Internet)
- **Repeater**
 - Separate virtual network connected to another Wi-Fi Router
 - Separate Network
- Repeater Bridge
 - Separate virtual network connected to another Wi-Fi Router
 - Same Subnet

Wireless Physical Interface w10

Wireless Mode	<input type="text" value="Repeater"/>
Wireless Network Mode	<input type="text" value="Mixed"/>
Wireless Network Name (SSID)	<input type="text" value="Stanford Guest"/>
Sensitivity Range (ACK Timing)	<input type="text" value="2000"/> (Default: 2000 meters)
Network Configuration	<input type="radio"/> Unbridged <input checked="" type="radio"/> Bridged

Virtual Interfaces

Virtual Interfaces w10.1 SSID [figgy] HWAddr [02:1C:10:11:B1:5B]

Wireless Network Name (SSID)	<input type="text" value="figgy"/>
Wireless SSID Broadcast	<input checked="" type="radio"/> Enable <input type="radio"/> Disable
AP Isolation	<input type="radio"/> Enable <input checked="" type="radio"/> Disable
Network Configuration	<input type="radio"/> Unbridged <input checked="" type="radio"/> Bridged

Add

Remove

Security Mode

WPA2 Personal ▼

WPA Algorithms

AES ▼

WPA Shared Key

.....

Unmask

Key Renewal Interval (in seconds)

3600

(Default: 3600, Range: 1 - 99999)

Virtual Interfaces **wl0.1 SSID [figgy] HWAddr [02:1C:10:11:B1:5B]**

Security Mode

WPA2 Personal ▼

WPA Algorithms

AES ▼

WPA Shared Key

.....

Unmask

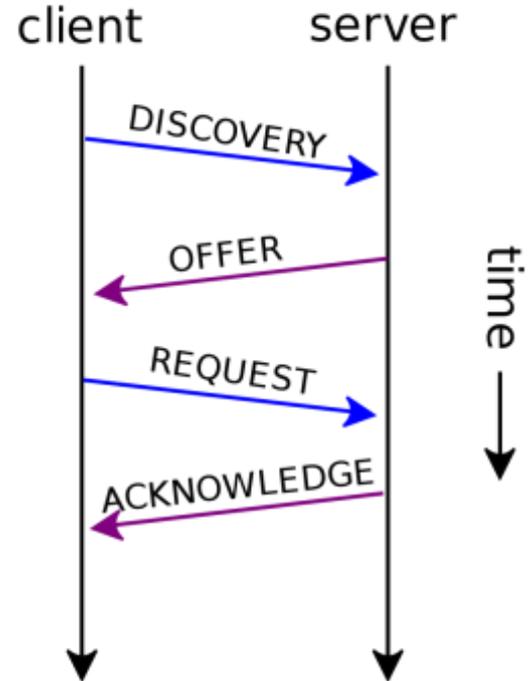
Key Renewal Interval (in seconds)

3600

(Default: 3600, Range: 1 - 99999)

DHCP

- Dynamic Host Configuration Protocol
- Router assigns IP address
- UDP Dance on ports 67, 68



Network Address Server Settings (DHCP)

DHCP Type

DHCP Server ▼

DHCP Server

Enable Disable

Start IP Address

192.168.3.

Maximum DHCP Users

Client Lease Time

minutes

Alternatives

- Many (but not all routers) can do this
- Routers specially advertised to support it
 - WISP (Wireless Internet Service Provider) routers
 - “Travel” routers

More Uses

- Internet of Things
 - Actually get to the internet
- Other streaming services
- Guest Wi-Fi

Questions?

