Chromecasting in Captive Networks

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"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

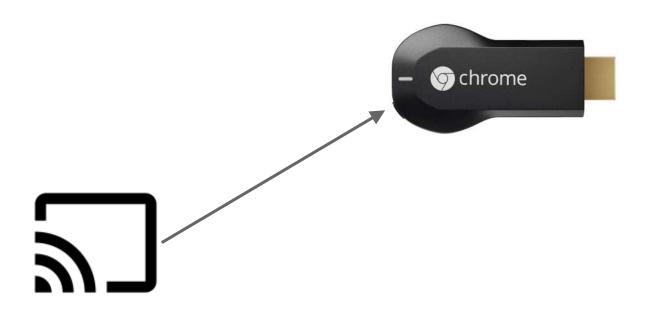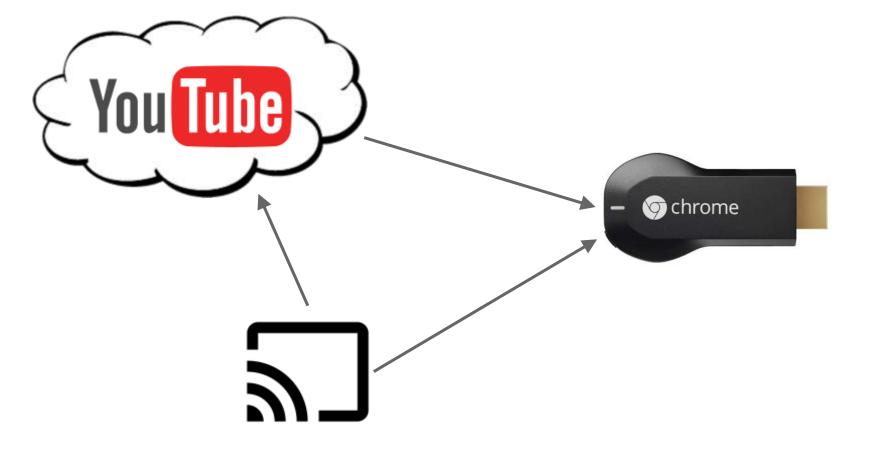 - Web pages

  - Apps or sites supporting the "cast" button
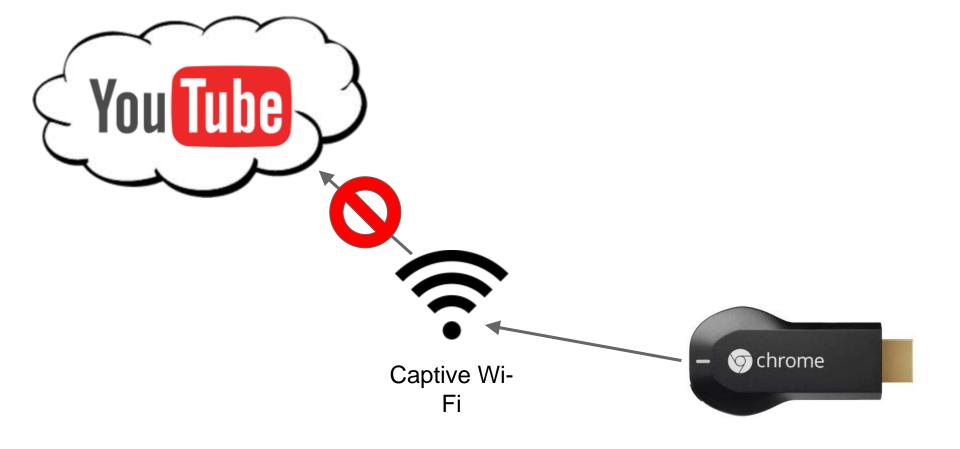
1st Generation (2013)

2nd Generation

Chromecast Audio

Chromecast Ultra

USB

HDMI

Reset Button

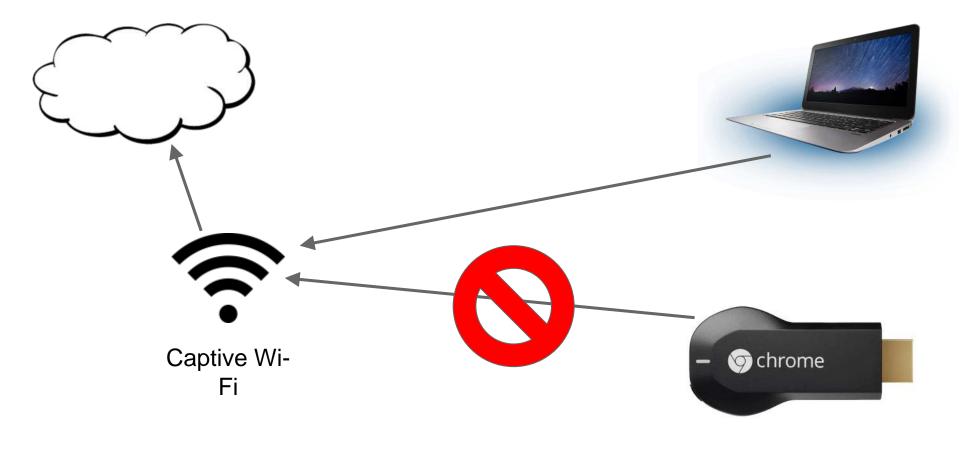Casting

Direct from the Cloud

Captive Portal

Captive Portals

- Network that requires interaction with Login / Landing page

- Used because…

  - Payment

  - Authentication

  - EULAs

  - Liability

  - Timeout

Captive Wi-Fi

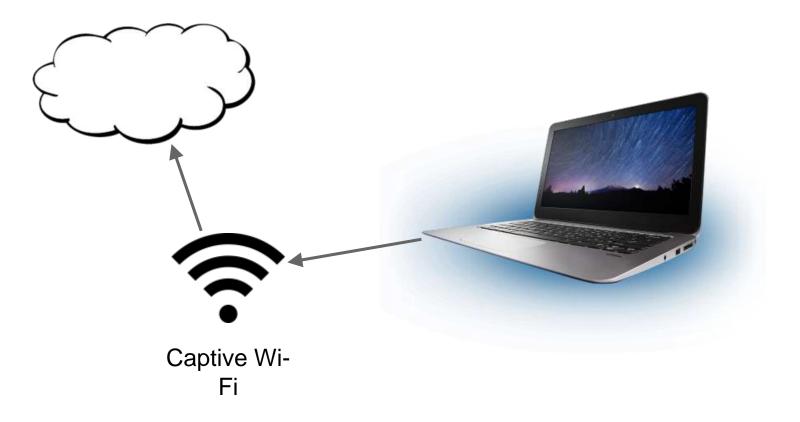Blocked by Captive Portal

WRT54-GL

dd-wrt

Captive Wi-Fi

MAC Address

- Media Access Control Address

- 48-bit (IPv4)

    - 01-23-45-67-89-ab

- "Unique" hardware identifier

- Devices can lie

Captive Wi-Fi

Captive Wi-
Fi

Shared Login

2.4GHz Spectrum

"figgy"
Channel 6

"Stanford Visitor"
Channel 6

Captive Wi-Fi

chrome

Shared Login

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

Router Subnet

NAT

- Network Address Translation

- Route local subnet to single (usually) external IP address
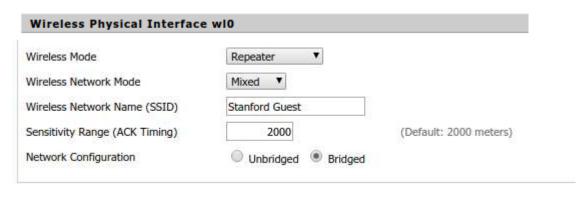
- Use the 65536 ports to share the connection

- Semi-transparent to host network

- Incoming connections are special

  - NAT traversal

  - Punch a hole

  - Special exceptions in routing tables

"figgy"
Channel 6
192.168.3.x

"Stanford Visitor"
Channel 6
10.x.x.x

Captive Wi-Fi

LINKSYS

chrome

Shared Login

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 wl0

Wireless Mode	Repeater ▼
Wireless Network Mode	Mixed ▼
Wireless Network Name (SSID)	Stanford Guest
Sensitivity Range (ACK Timing)	2000 (Default: 2000 meters)
Network Configuration	○ Unbridged ● Bridged

Virtual Interfaces

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

Wireless Network Name (SSID)	figgy
Wireless SSID Broadcast	● Enable ○ Disable
AP Isolation	○ Enable ● Disable
Network Configuration	○ Unbridged ● Bridged

Add   Remove

Multiple Wireless Interfaces

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]

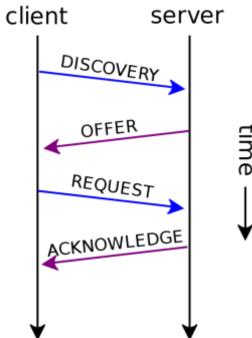| Security Mode | WPA2 Personal ▼ |
WPA Algorithms	AES ▼
WPA Shared Key	••••••••••••	☐ Unmask
Key Renewal Interval (in seconds)	3600	(Default: 3600, Range: 1 - 99999)

Authentication

DHCP

- Dynamic Host Configuration Protocol

- Router assigns IP address

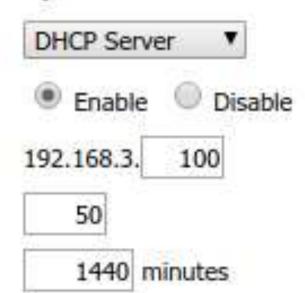- UDP Dance on ports 67, 68

Network Address Server Settings (DHCP)

DHCP Type	DHCP Server ▼
DHCP Server	⦿ Enable ⚪ Disable
Start IP Address	192.168.3. 100
Maximum DHCP Users	50
Client Lease Time	1440 minutes

DHCP Server

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?