1: EXTENDING Wi-Fi

by Francis Chao
fchao2@yahoo.com

OPCUG

Users helping users
for over 40 years

TuCSon Computer Society

apcug

Web location for this presentation:

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“Meeting Notes”

SUMMARY

You can extend Wi-Fi to increase coverage area for computers, tablets, cell phones, televisions, or cameras that are connected to the existing Wi-Fi routers in your home or business.

TOPICS

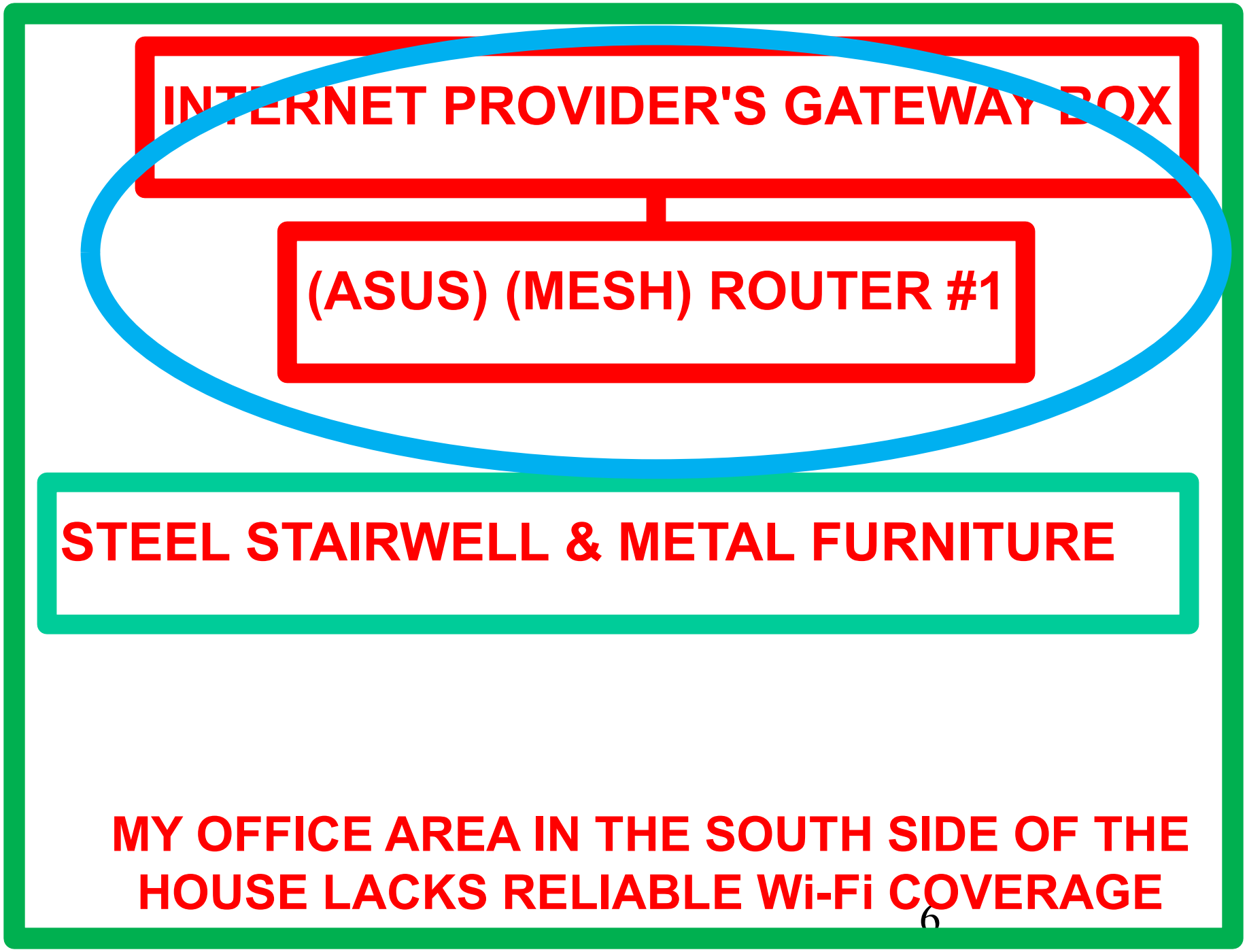
- Wi-Fi Extenders
- Wi-fi Mesh
- Wi-Fi Backhaul Options
- Wi-Fi Adapters
- Wi-Fi Troubleshooting

INTERNET PROVIDER'S GATEWAY BOX

(ASUS) (MESH) ROUTER #1

STEEL STAIRWELL & METAL FURNITURE

MY OFFICE AREA IN THE SOUTH SIDE OF THE HOUSE LACKS RELIABLE Wi-Fi COVERAGE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STEEL STAIRWELL & METAL FURNITURE
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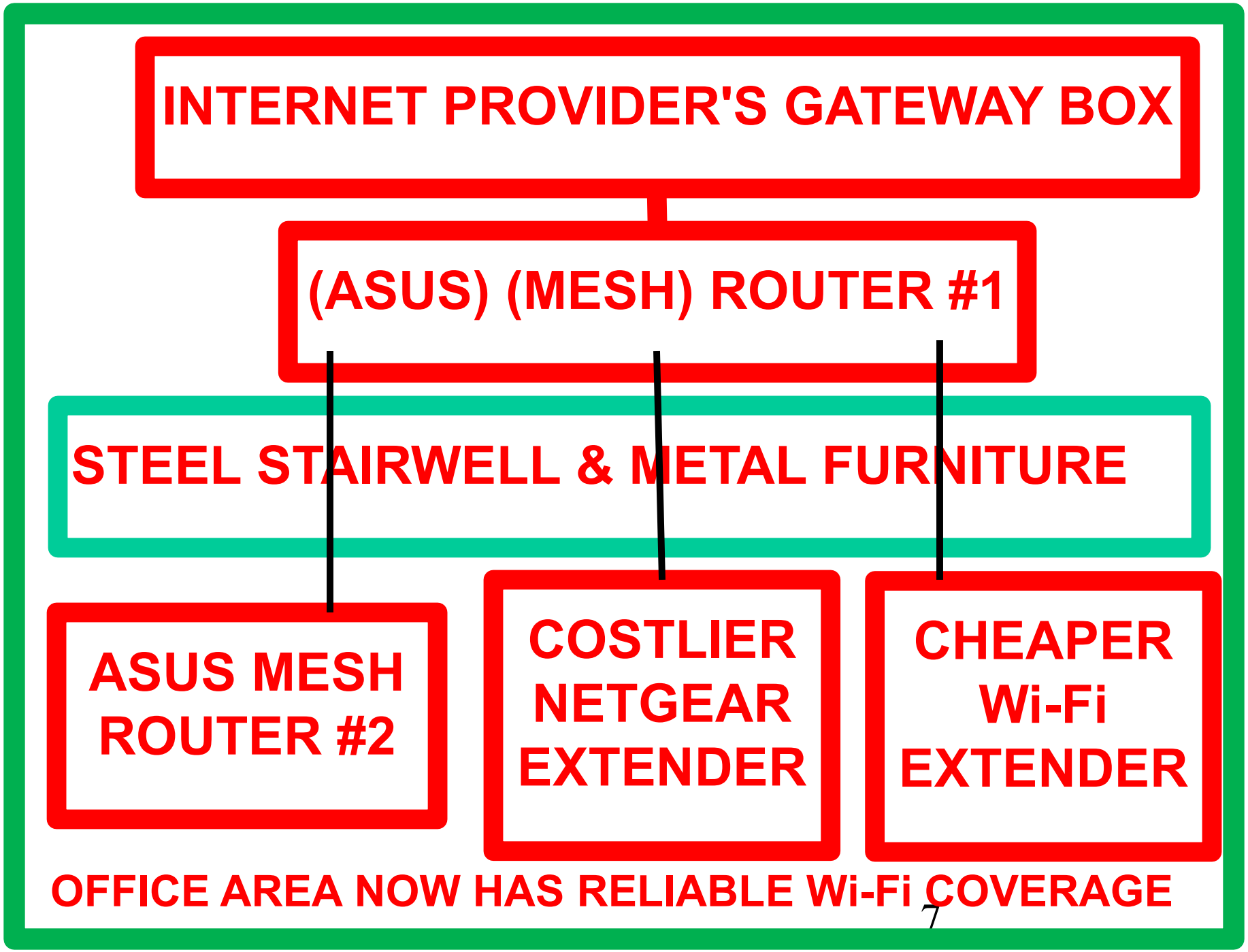
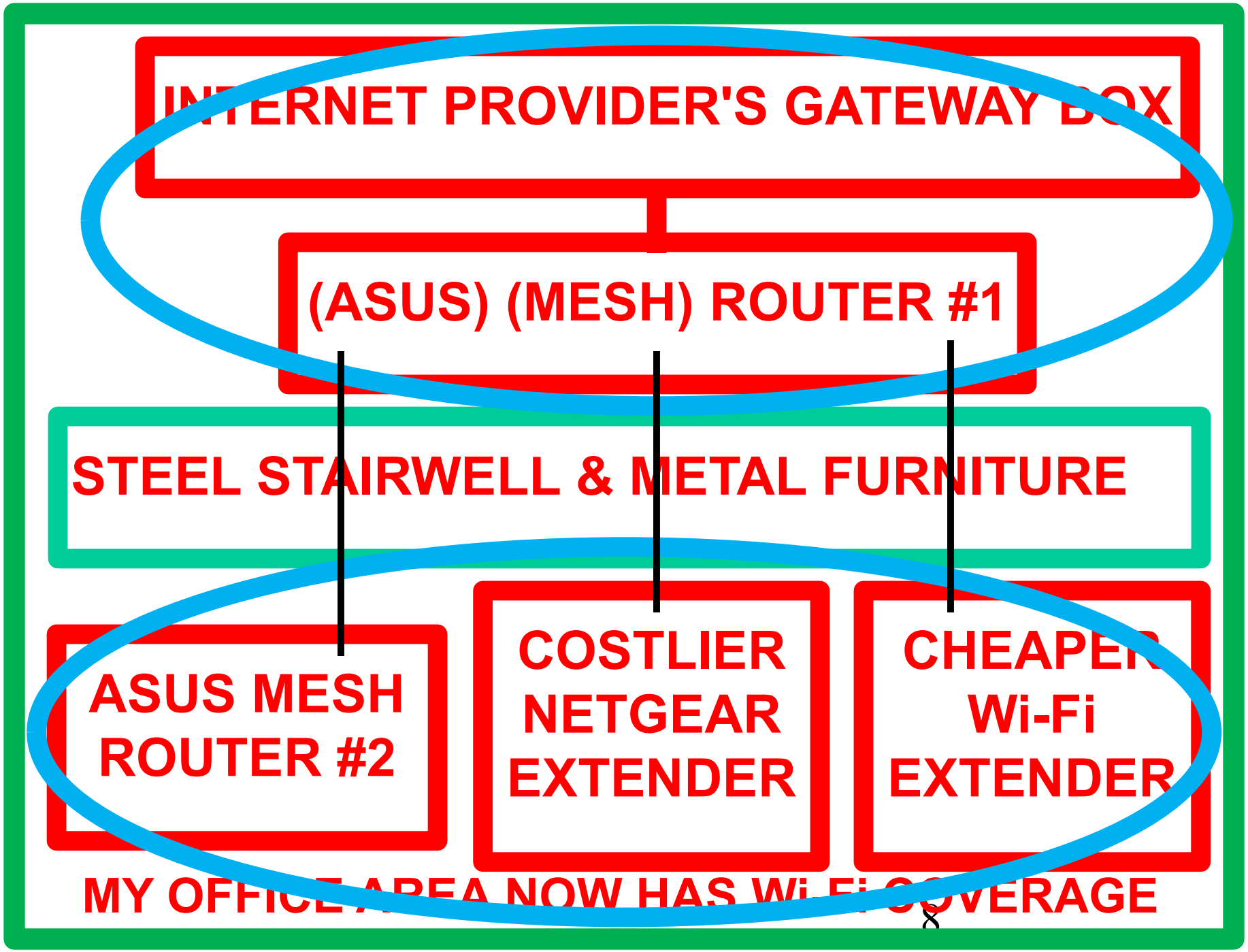

INTERNET PROVIDER'S GATEWAY BOX
(ASUS) (MESH) ROUTER #1
STEEL STAIRWELL & METAL FURNITURE
ASUS MESH ROUTER #2
COSTLIER NETGEAR EXTENDER
CHEAPER Wi-Fi EXTENDER
OFFICE AREA NOW HAS RELIABLE Wi-Fi COVERAGE


INTERNET PROVIDER'S GATEWAY BOX
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STEEL STAIRWELL & METAL FURNITURE
ASUS MESH ROUTER #2
COSTLIER NETGEAR EXTENDER
CHEAPER Wi-Fi EXTENDER
MY OFFICE AREA NOW HAS Wi-Fi COVERAGE

OPTIONS FOR EXTENDING Wi-Fi

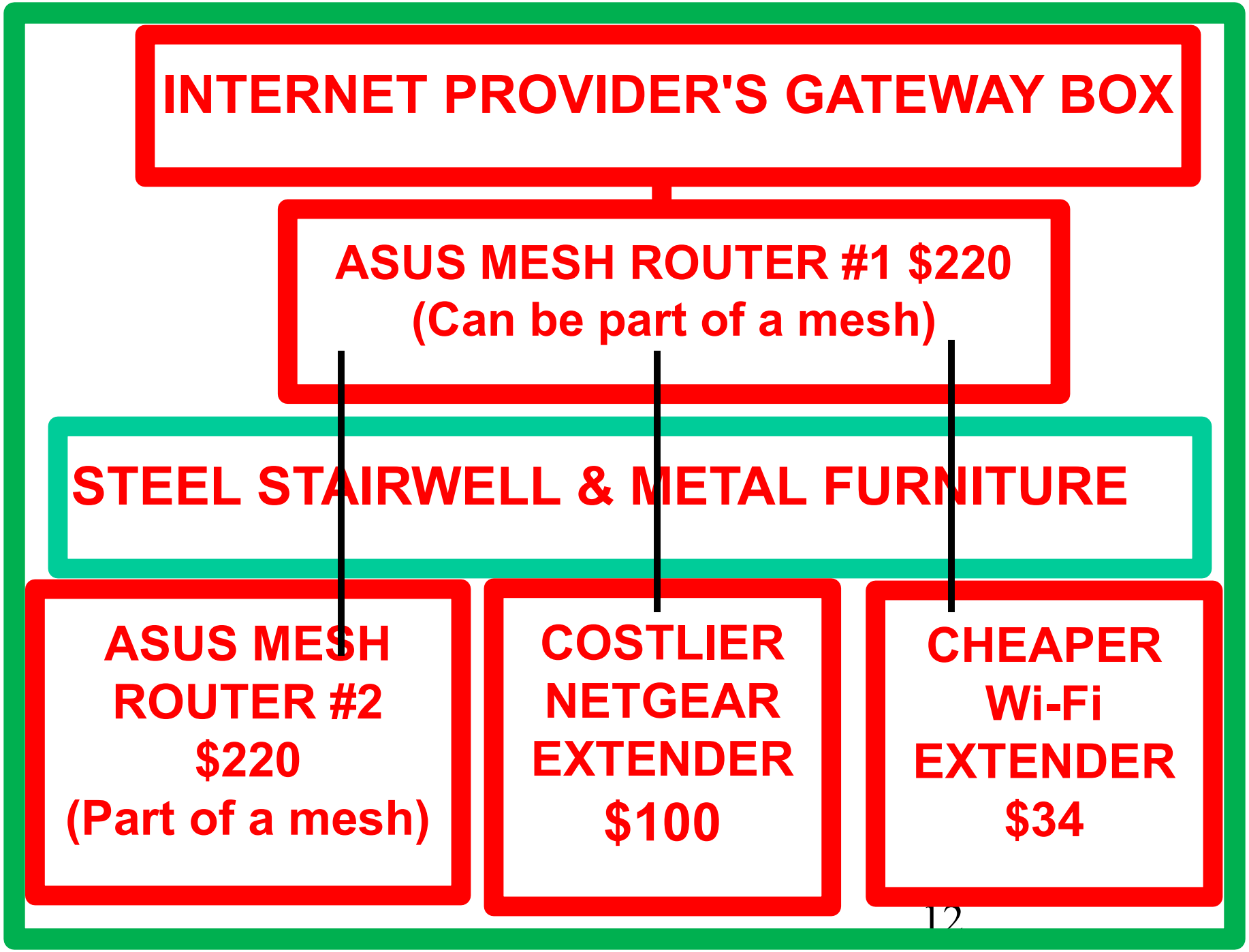
- The vertical black lines represent the connections between the router in the North side of the house and the South side of the house.
- These connections are called **backhaul connections**.
- Backhaul connections can be either wireless or wired.

OPTIONS FOR EXTENDING Wi-Fi (continued)

- For your home or business, you only need to have one of these three options for extending the coverage of a wireless Wi-Fi network:

OPTIONS FOR EXTENDING Wi-Fi (continued)

- With each increased-cost option, you get better penetration through walls and obstructions and greater Internet & local network speeds:

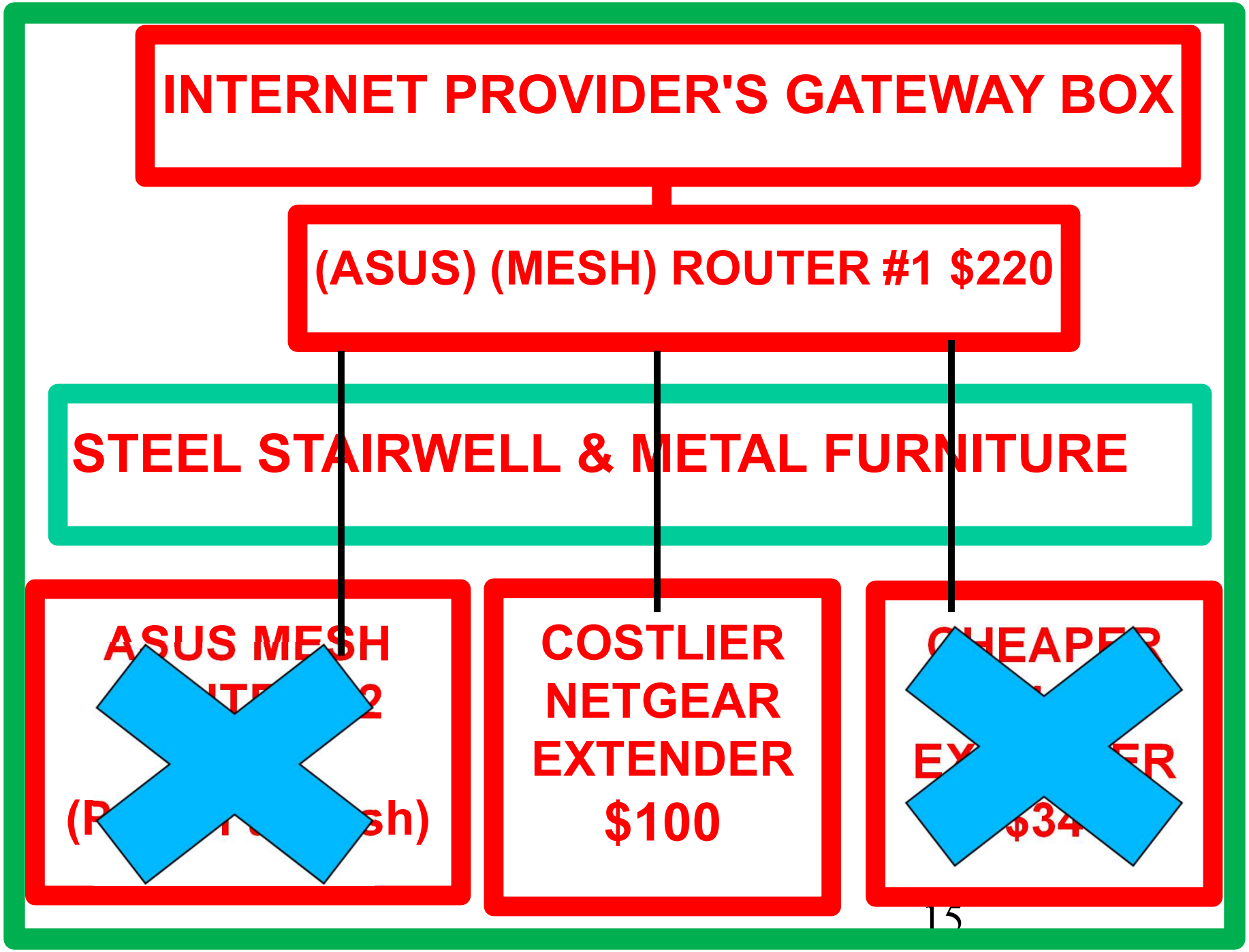

INTERNET PROVIDER'S GATEWAY BOX
ASUS MESH ROUTER #1 $220
(Can be part of a mesh)
STEEL STAIRWELL & METAL FURNITURE
ASUS MESH ROUTER #2 $220
(Part of a mesh)
COSTLIER NETGEAR EXTENDER $100
CHEAPER Wi-Fi EXTENDER $34

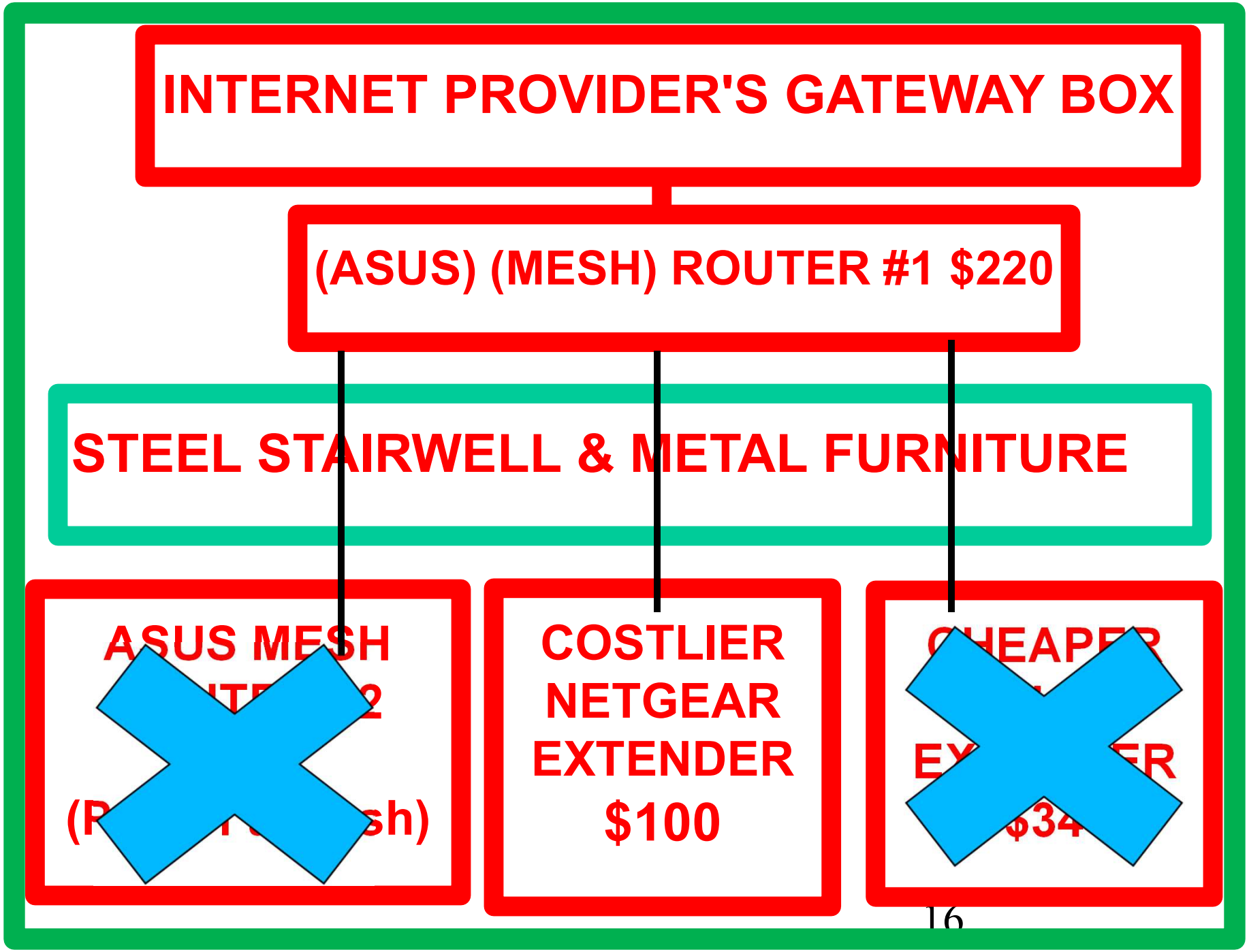
OPTIONS FOR EXTENDING Wi-Fi (continued)

- The vertical black lines represent the connections between the router in the North side of the house and the equipment on the South side of the house.

OPTIONS FOR EXTENDING Wi-Fi (continued)

- These connections are called **backhaul connections**.
- Backhaul connections can be either wireless or wired.


INTERNET PROVIDER'S GATEWAY BOX
(ASUS) (MESH) ROUTER #1 $220
STEEL STAIRWELL & METAL FURNITURE
COSTLIER
NETGEAR
EXTENDER
$100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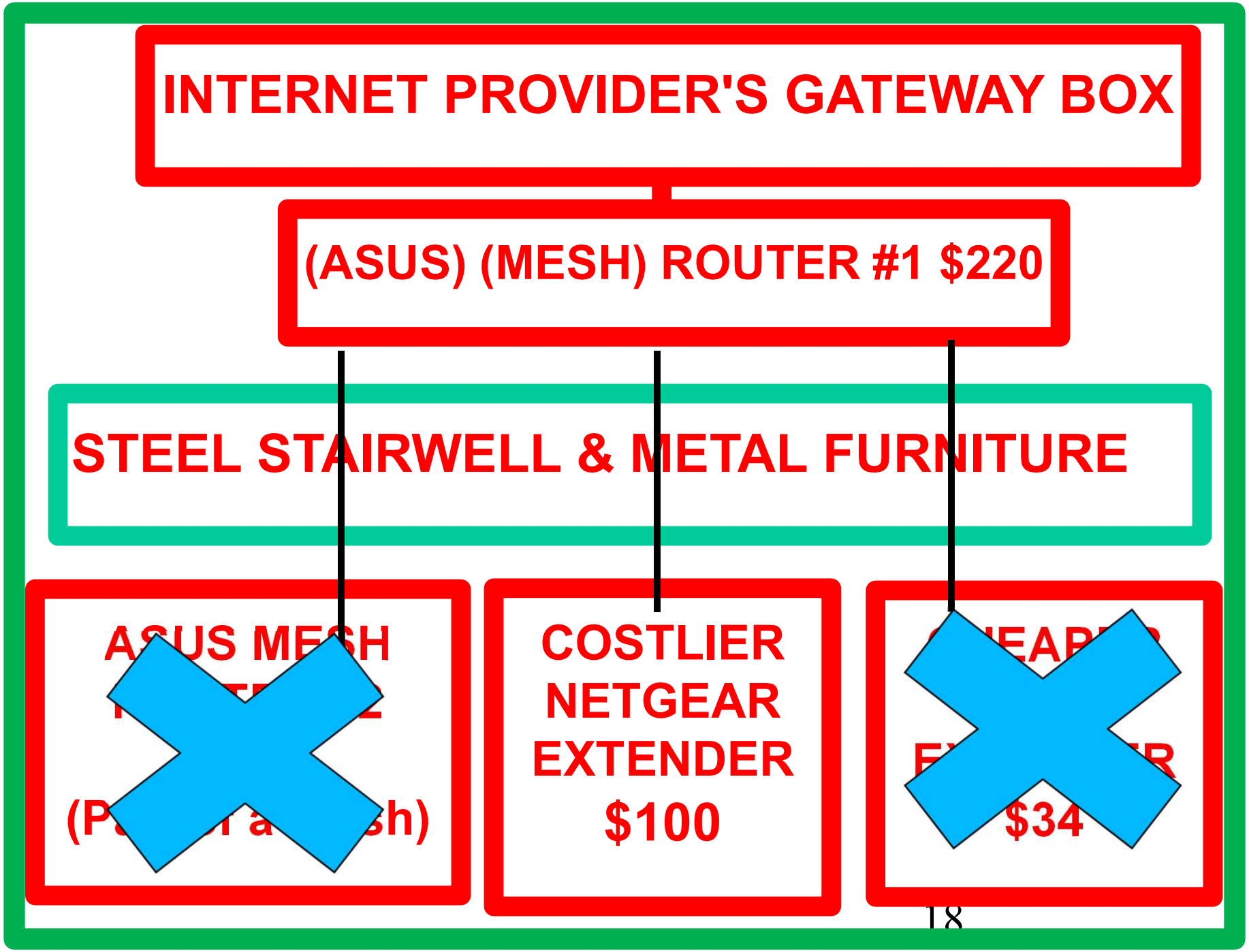
(ASUS) (MESH) ROUTER #1 $220
STEEL STAIRWELL & METAL FURNITURE
COSTLIER
NETGEAR
EXTENDER
$100

COSTLIER EXTENDER CONFIGURATION DETAILS

- For the cheap extender option and the costly extender option, I do not need a mesh-capable router at the North end of the house: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EXTENDER
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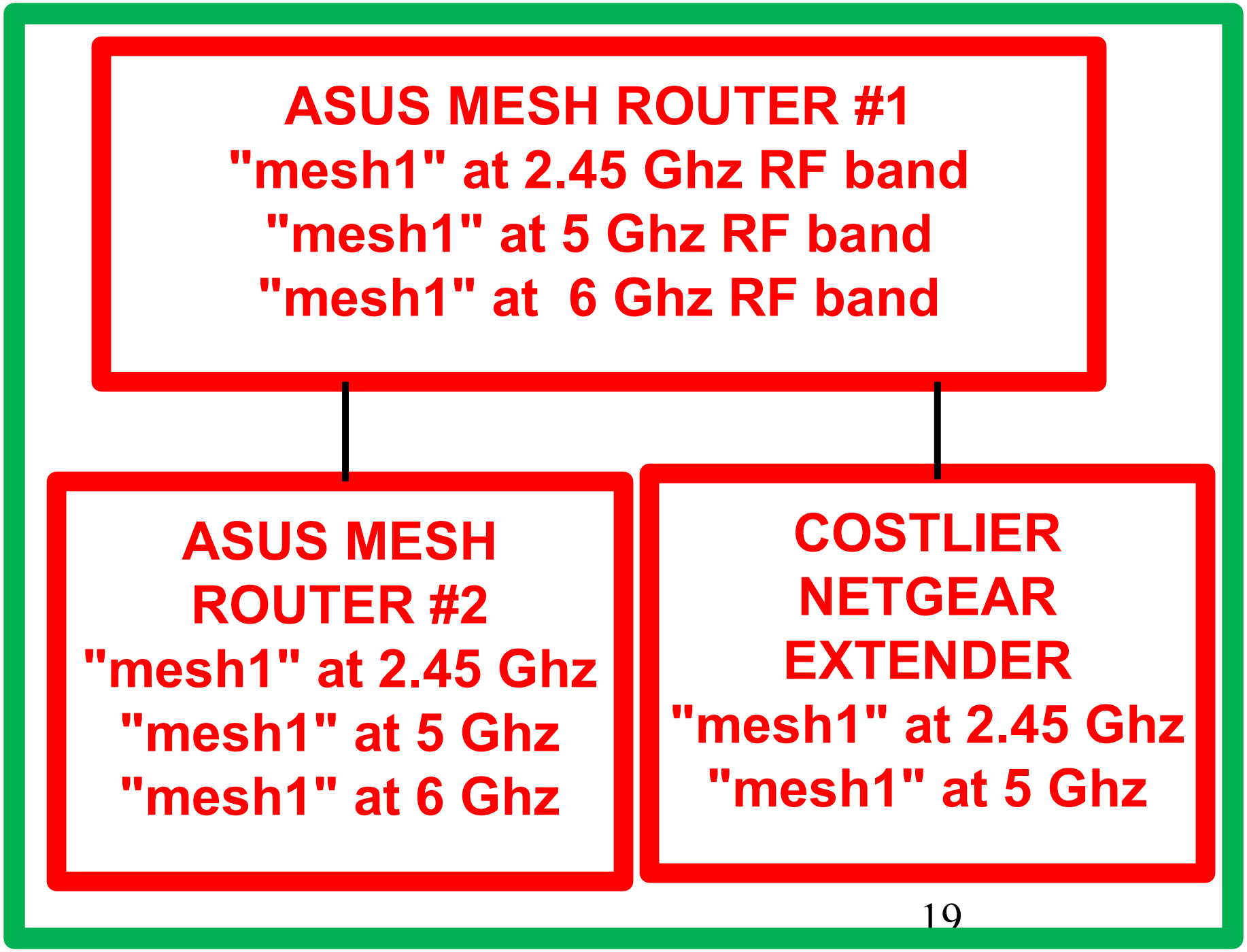
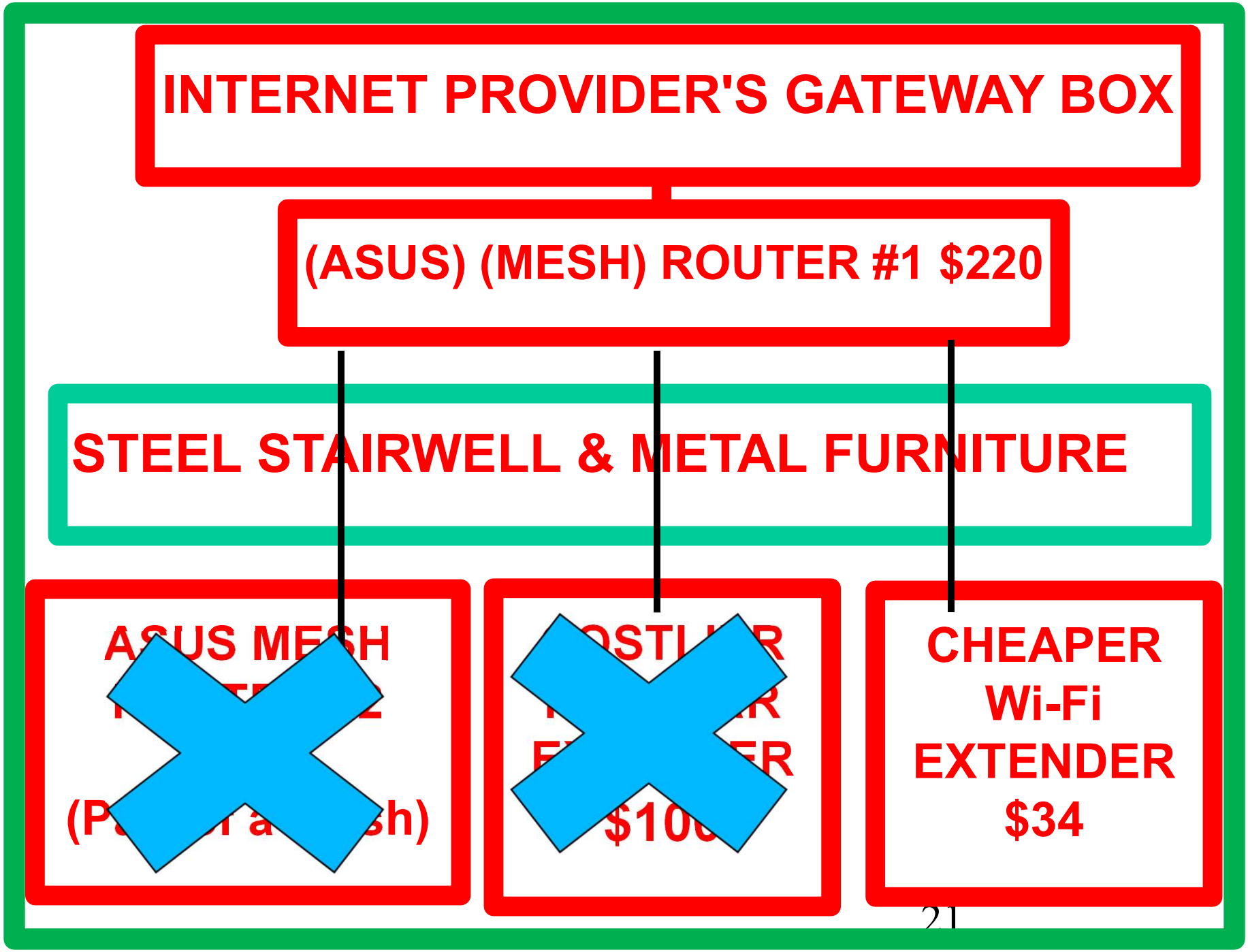
$34


ASUS MESH ROUTER #1
"mesh1" at 2.45 Ghz RF band
"mesh1" at 5 Ghz RF band
"mesh1" at 6 Ghz RF band
ASUS MESH ROUTER #2
"mesh1" at 2.45 Ghz
"mesh1" at 5 Ghz
"mesh1" at 6 Ghz
COSTLIER NETGEAR EXTENDER
"mesh1" at 2.45 Ghz
"mesh1" at 5 Ghz

COSTLIER EXTENDER CONFIGURATION DETAILS (continued)

- https://www.amazon.com/dp/B0DMBXDY75?ref_=ppx_hzsearch_conn_dt_b_fed_asin_title_1&th=1
- This Wi-Fi extender has a Gigabit Ethernet port so it is fast enough if your Internet provider is providing you with upload and/or download speeds greater than 100 Megabits per second.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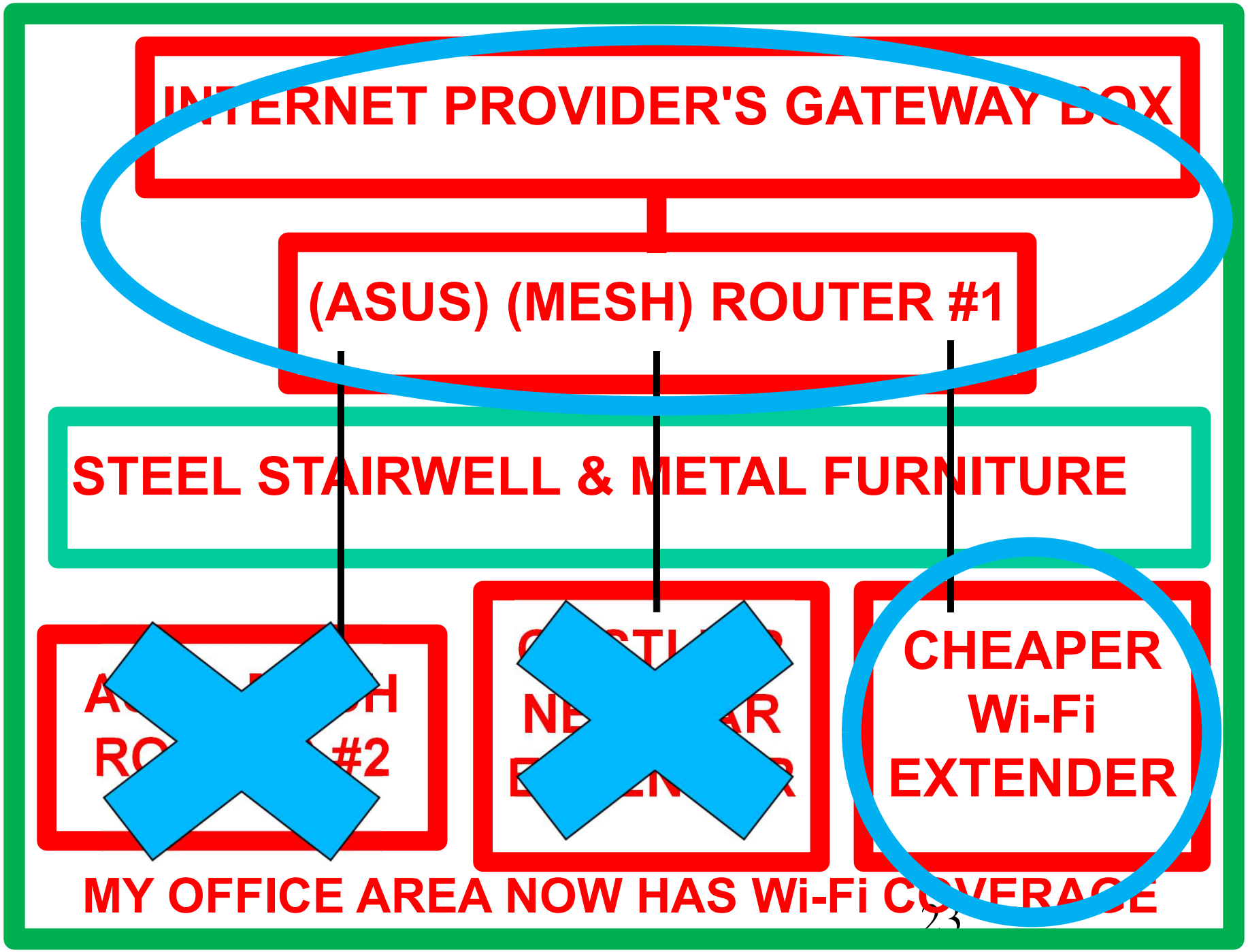
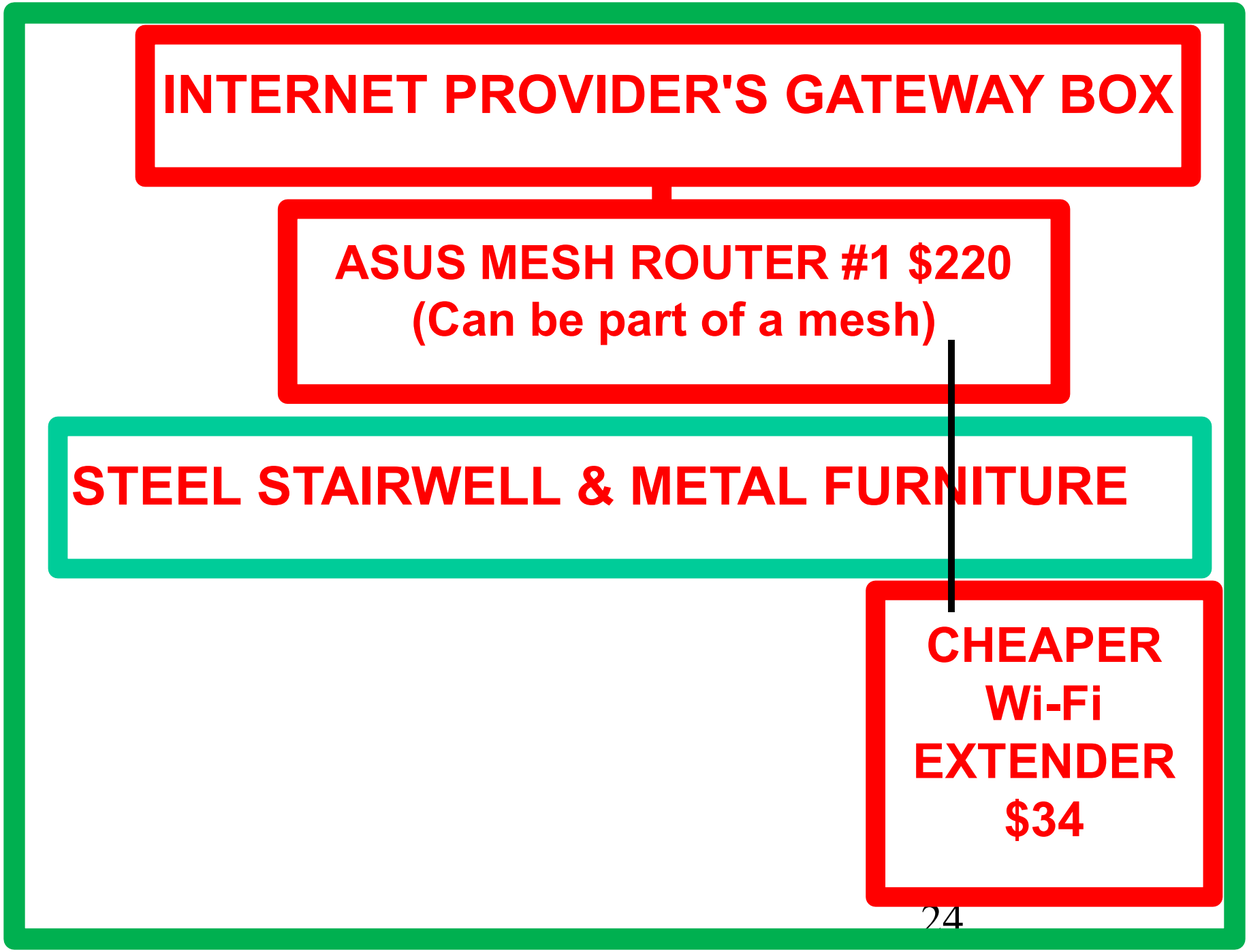
(ASUS) (MESH) ROUTER #1 $220
STEEL STAIRWELL & METAL FURNITURE
CHEAPER
Wi-Fi
EXTENDER
$34

CHEAPER EXTENDER CONFIGURATION DETAILS

- https://www.amazon.com/dp/B0D5YR7HKF?ref_=ppx_hzsearch_conn_dt_b_fed_asin_title_3
- This Wi-Fi extender is adequate if your Internet provider is providing you with upload and download speeds below 100 Megabits per second because it only has a "Fast Ethernet" port


INTERNET PROVIDER'S GATEWAY BOX
(ASUS) (MESH) ROUTER #1
STEEL STAIRWELL & METAL FURNITURE
CHEAPER
Wi-Fi
EXTENDER
MY OFFICE AREA NOW HAS Wi-Fi COVERAGE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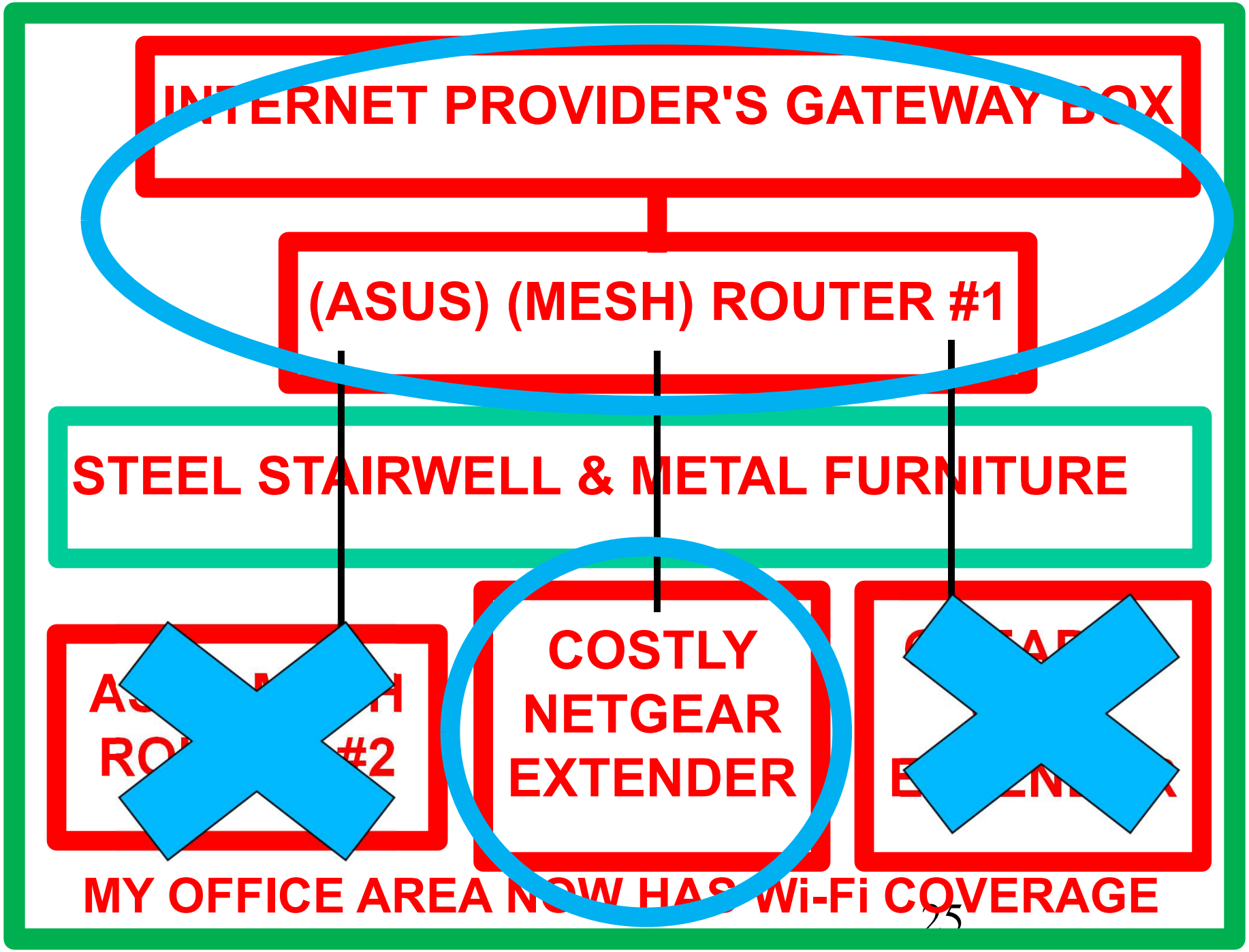
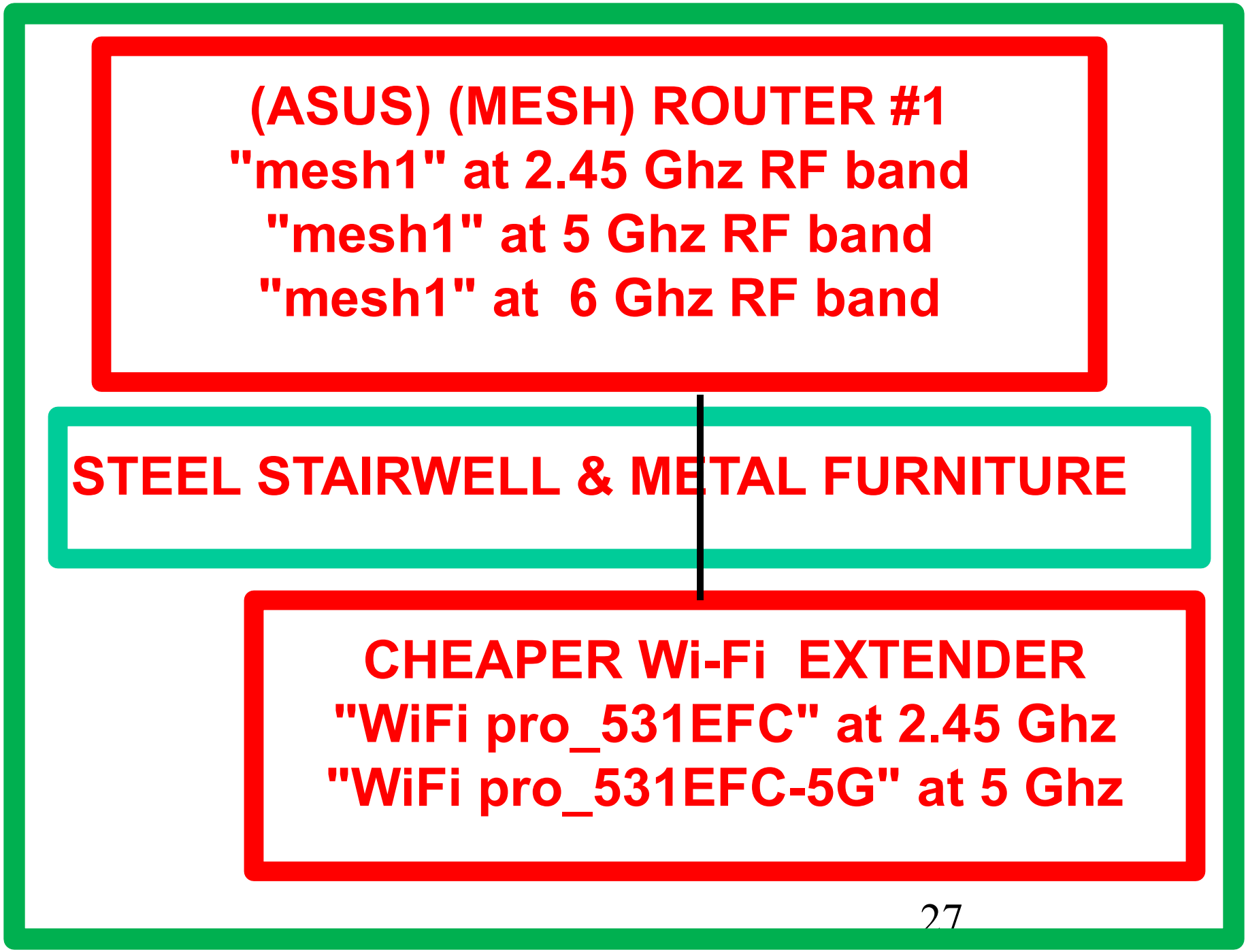

INTERNET PROVIDER'S GATEWAY BOX
(ASUS) (MESH) ROUTER #1
STEEL STAIRWELL & METAL FURNITURE
COSTLY
NETGEAR
EXTENDER
MY OFFICE AREA NOW HAS Wi-Fi COVERAGE

CHEAP EXTENDER CONFIGURATION DETAILS (continued)

- For the cheap extender option, user equipment that is located at the South end of the house will display both "WiFi pro_531EFC"
- and
- "WiFi pro_531EFC-5G"


(ASUS) (MESH) ROUTER #1
"mesh1" at 2.45 Ghz RF band
"mesh1" at 5 Ghz RF band
"mesh1" at 6 Ghz RF band
STEEL STAIRWELL & METAL FURNITURE
CHEAPER Wi-Fi EXTENDER
"WiFi pro_531EFC" at 2.45 Ghz
"WiFi pro_531EFC-5G" at 5 Ghz

CHEAP EXTENDER CONFIGURATION DETAILS (continued)

- For the cheap extender option, user equipment that is located at the South end of the house will display both "WiFi pro_531EFC"
- and
- "WiFi pro_531EFC-5G"

CHEAP EXTENDER CONFIGURATION DETAILS (configuration)

- For the cheap extender option, user equipment that is located at the North end of the house will display "mesh1" because any item of user equipment can only display a case-sensitive SSID only once.

CHEAP EXTENDER CONFIGURATION DETAILS (continued)

- For the cheap extender option, user equipment that is located at the South end of the house will display both "WiFi pro_531EFC"
- and
- "WiFi pro_531EFC-5G"

"USER EQUIPMENT" (=UE) VIEWPOINT

- In the Wi-Fi standards, the term "User Equipment" refers to any computer, tablet, cell phone, camera, refrigerator, or television that is used to connect to a Wi-Fi router or a Wi-Fi extender.

"USER EQUIPMENT" (=UE) VIEWPOINT (continued)

- In a mesh system of routers, every transmitter-receiver on a Wi-Fi router and on a Wi-Fi extender will broadcast the same exact case-sensitive "Service Set Identifier" (SSID) unless you configure the specific transmitter-receiver to not to do so.

"USER EQUIPMENT" (=UE) VIEWPOINT (continued)

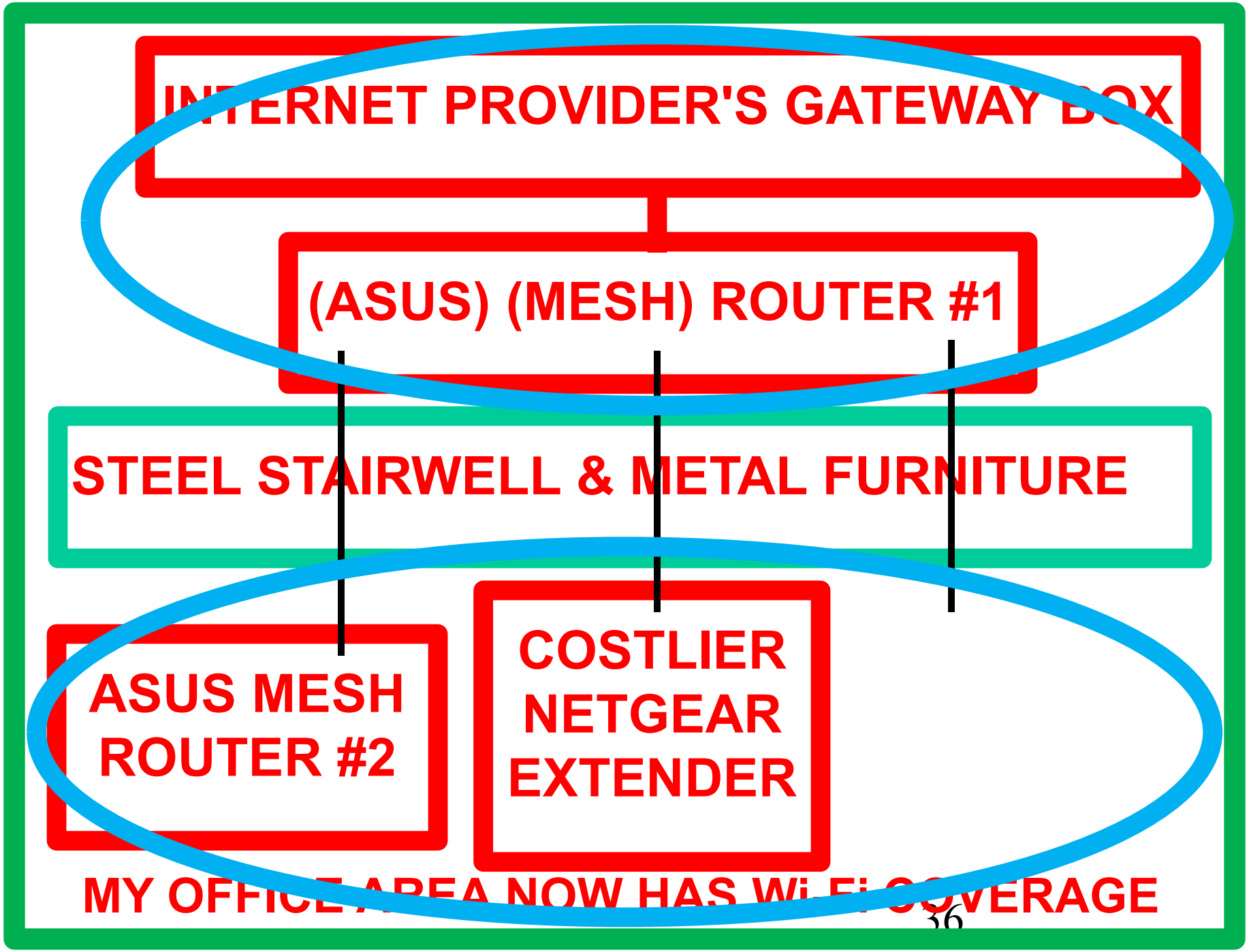
- SSIDs are case sensitive so "mesh1", "Mesh1, "mEsh1", "meSh1" and "mesH1" would be seen as separate SSIDs by your user equipment.

"USER EQUIPMENT" (=UE) VIEWPOINT (continued)

- When you use a UE device (a computer, a tablet, a cell phone, a smart TV, or a Wi-Fi camera) to look at available wireless Wi-Fi networks, any single SSID that is displayed can represent 1 to n number of Wi-Fi transmitter receivers in 1 to n number of physical Wi-Fi routers and Wi-Fi extenders

"USER EQUIPMENT" (=UE) VIEWPOINT (continued)

- All devices broadcasting with transmitter-receivers identifying as as an SSID of "mesh1" in my example: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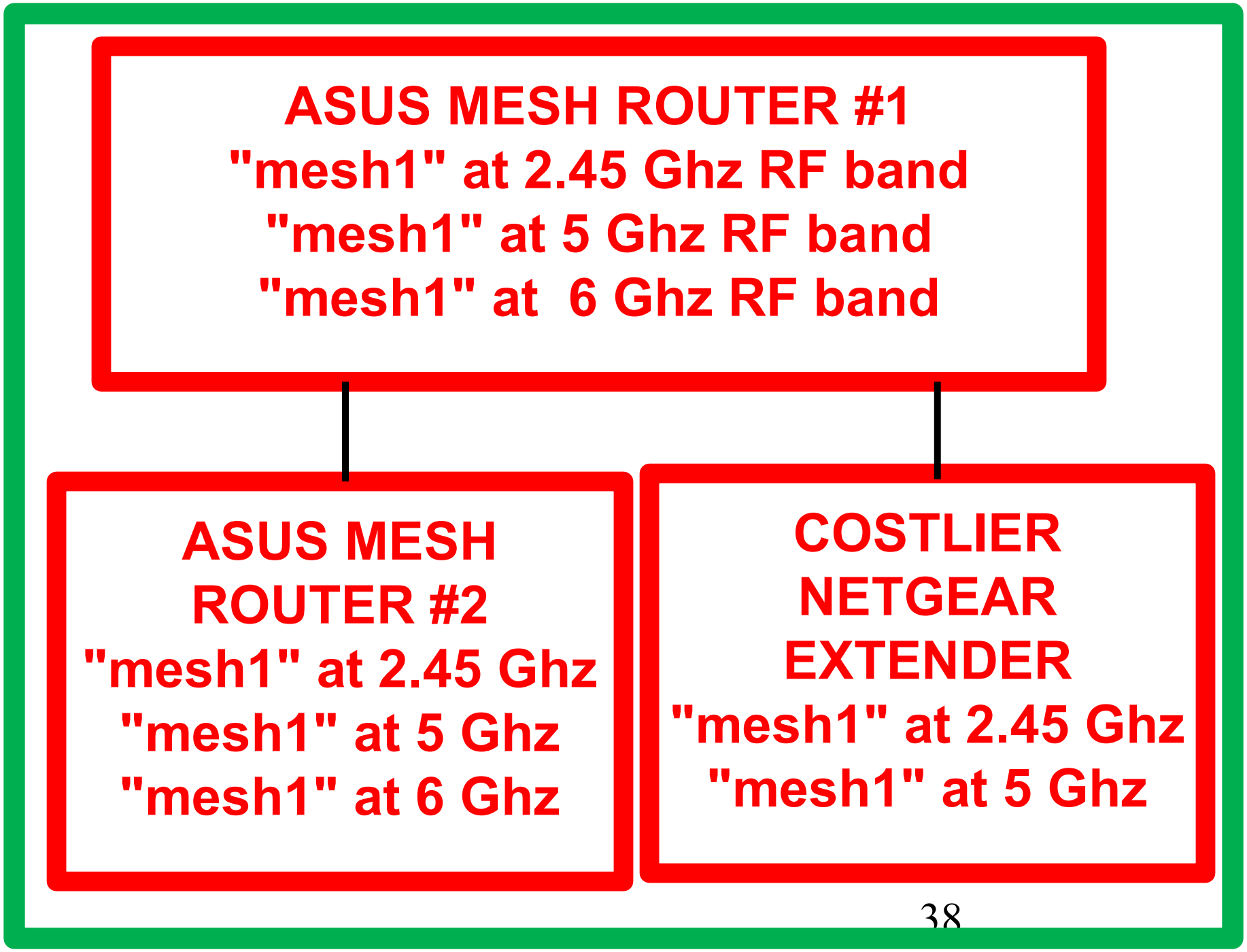
(ASUS) (MESH) ROUTER #1
STEEL STAIRWELL & METAL FURNITURE
ASUS MESH ROUTER #2
COSTLIER NETGEAR EXTENDER
MY OFFICE AREA NOW HAS Wi-Fi COVERAGE

"USER EQUIPMENT" (=UE) VIEWPOINT (continued)

- My iPhone shows only one "mesh1" even though it see's all transmitter-receivers identifying as as an SSID of "mesh1"
- Even though my iPhone sees all transmitter-receivers identifying as an SSD of "mesh1", my iPhone will only let me connect to the transmitter-receiver that has the strongest radio signal.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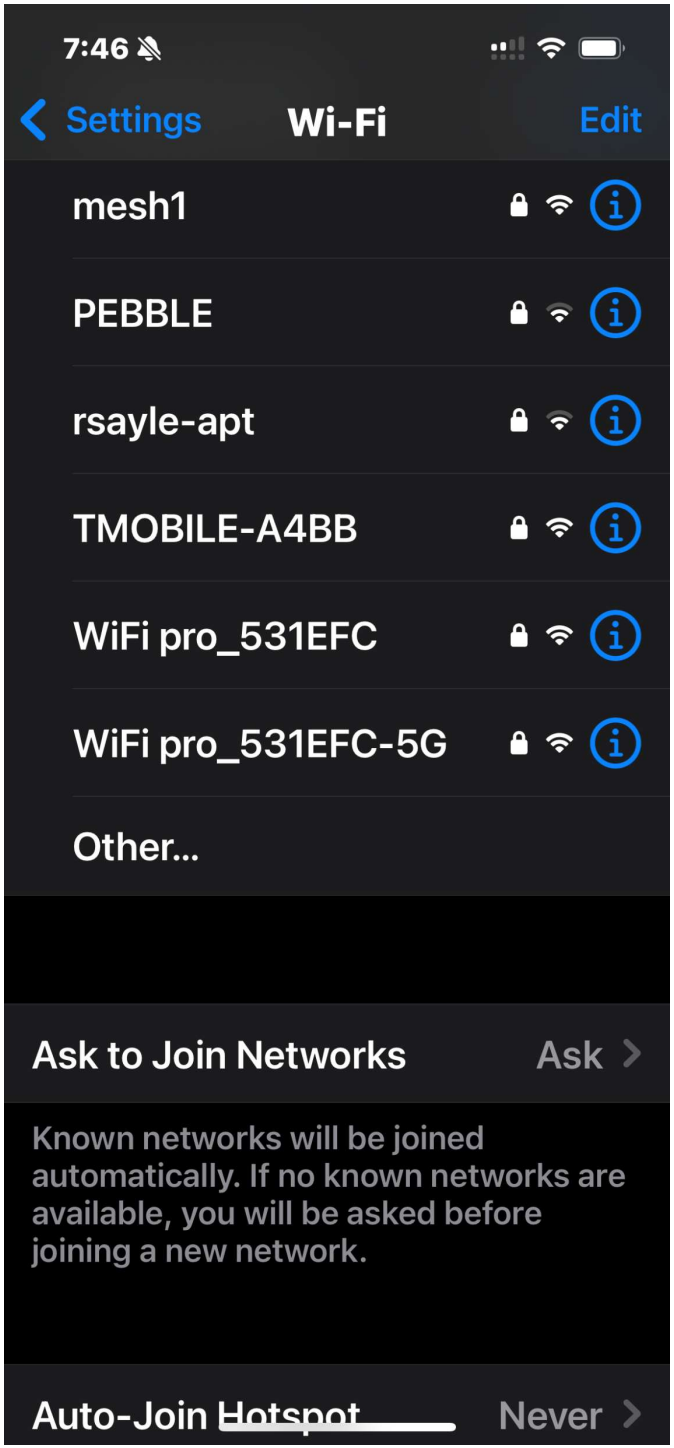
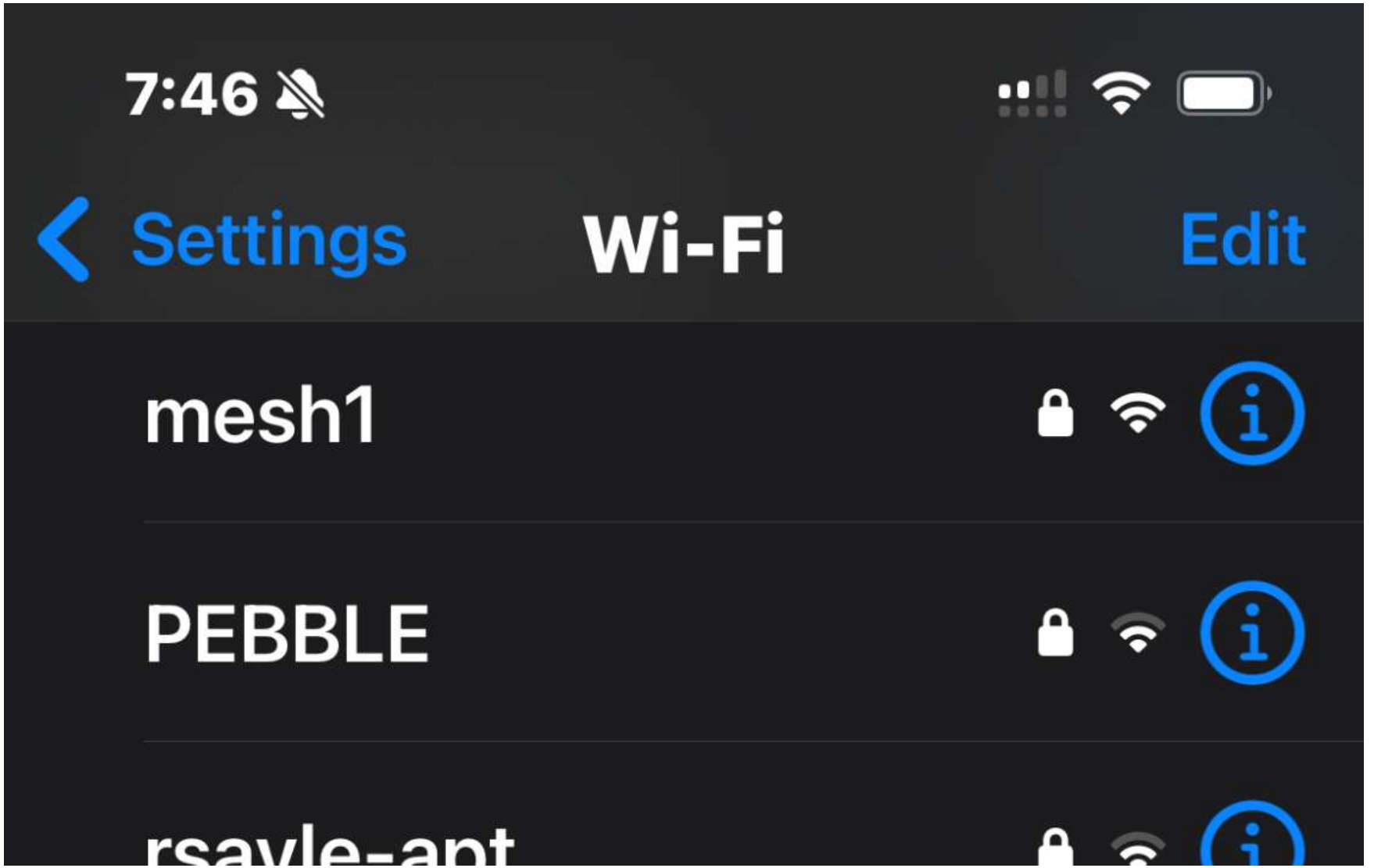
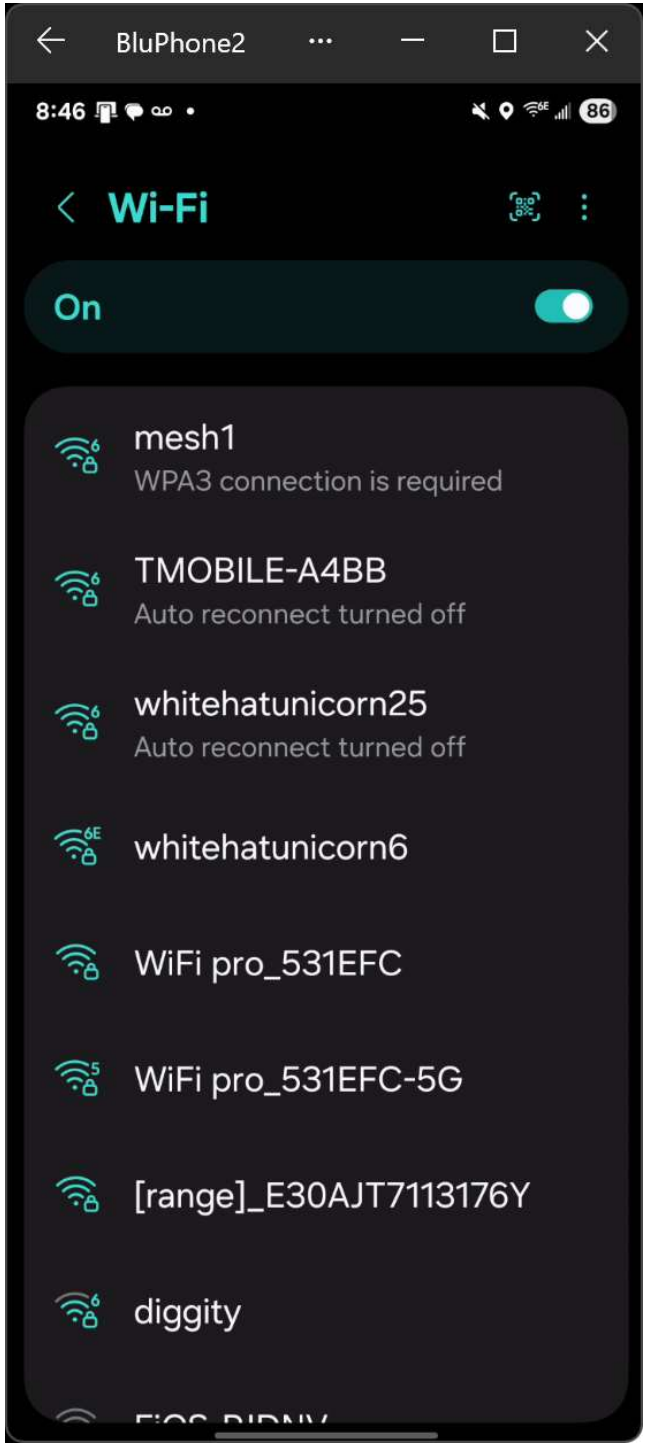
"mesh1" at 2.45 Ghz
"mesh1" at 5 Ghz
"mesh1" at 6 Ghz
COSTLIER NETGEAR EXTENDER
"mesh1" at 2.45 Ghz
"mesh1" at 5 Ghz

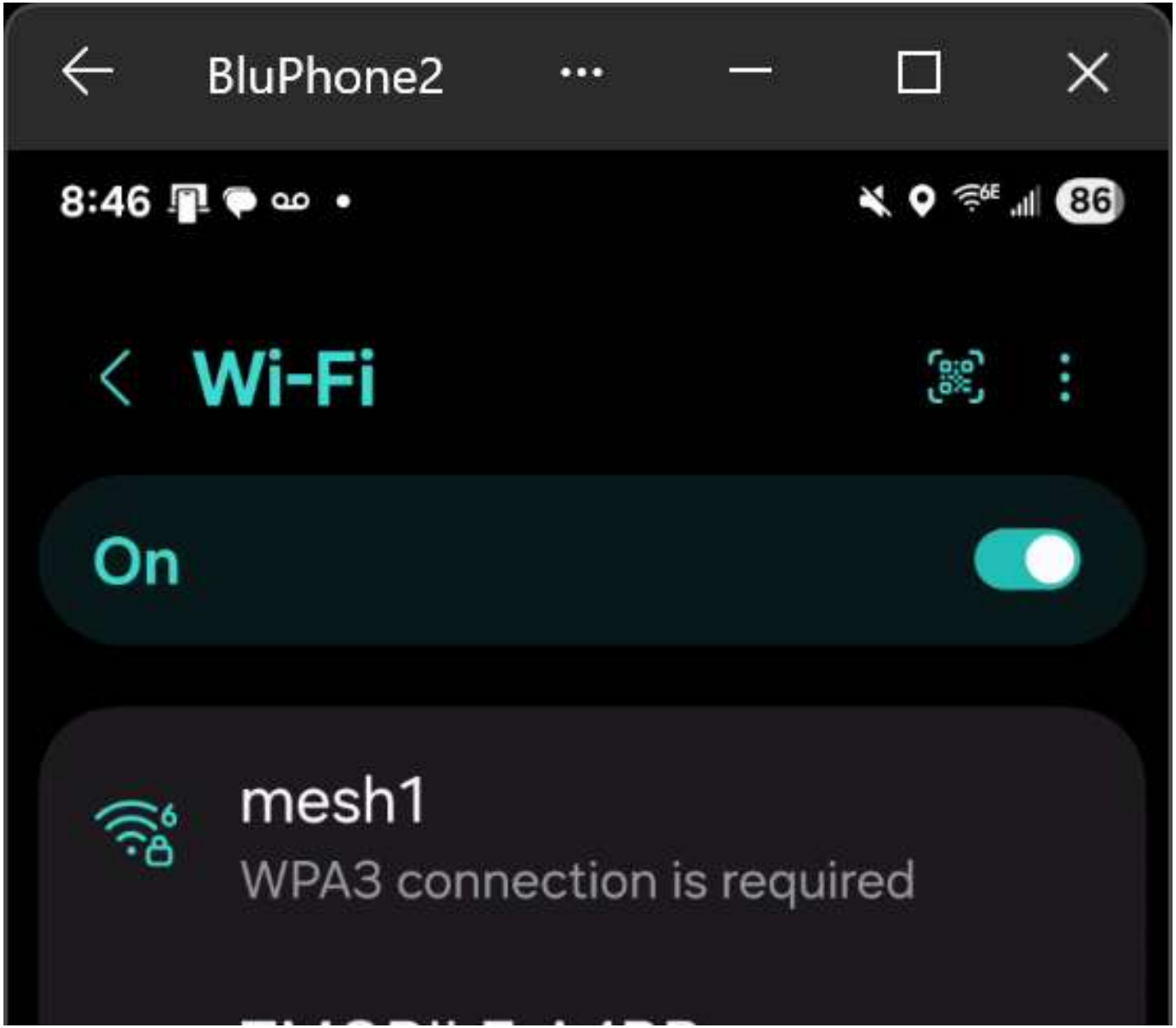

7:46
Settings
Wi-Fi
Edit
mesh1
PEBBLE
rsayle-apt
TMOBILE-A4BB
WiFi pro_531EFC
WiFi pro_531EFC-5G
Other...
Ask to Join Networks
Ask
Known networks will be joined automatically. If no known networks are available, you will be asked before joining a new network.
Auto-Join Hotspot
Never


7:46
Settings
Wi-Fi
Edit
mesh1
PEBBLE
rsayle-apt

"USER EQUIPMENT" (=UE) VIEWPOINT (continued)

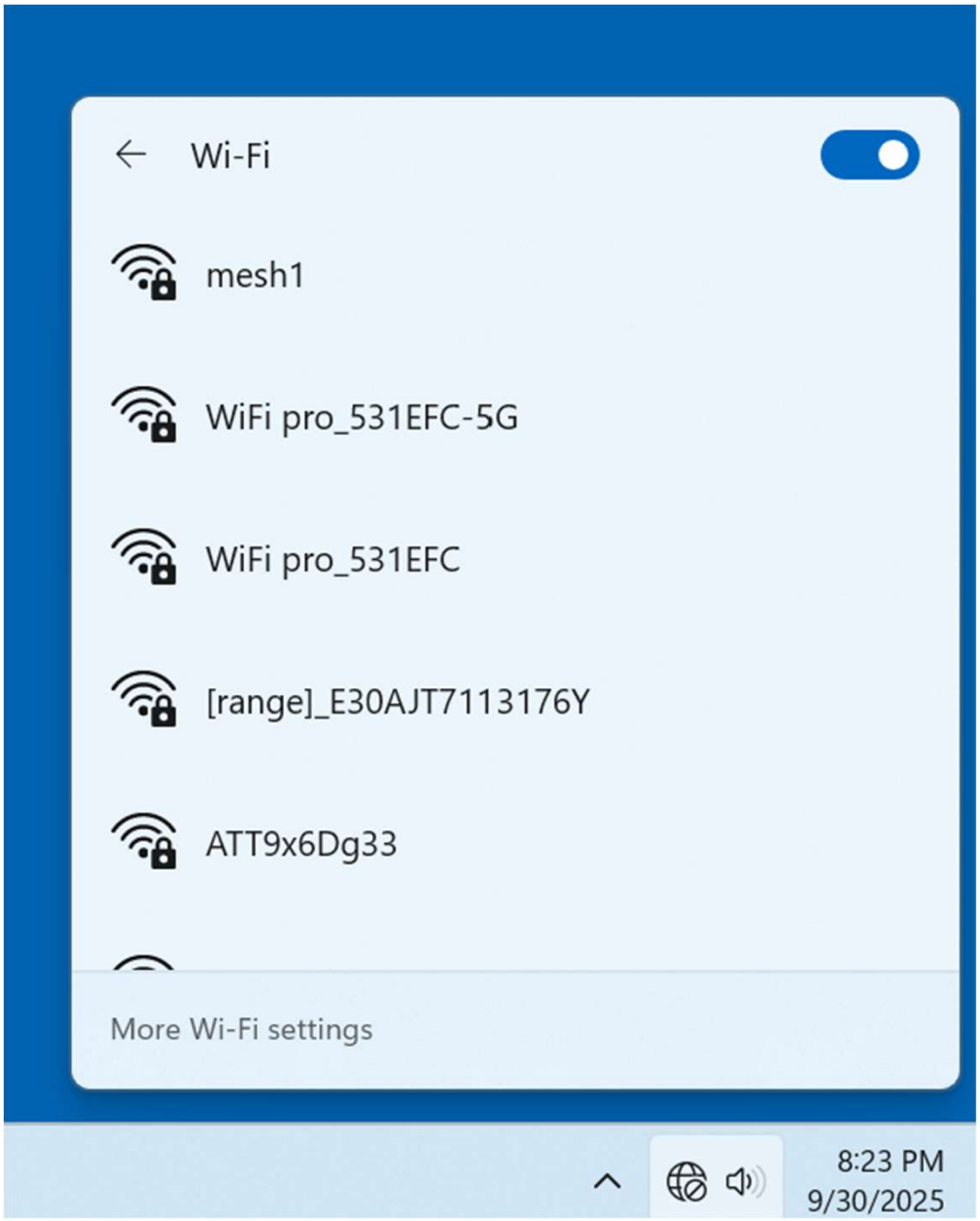
- My Samsung cell phone shows only one "mesh1" even though it see's all transmitter-receivers identifying as as an SSID of "mesh1".
  Even if my Samsung cell phone sees all transmitter-receivers identifying as an SSD of "mesh1", my iPhone will only let me connect to the transmitter-receiver that has the strongest radio signal.

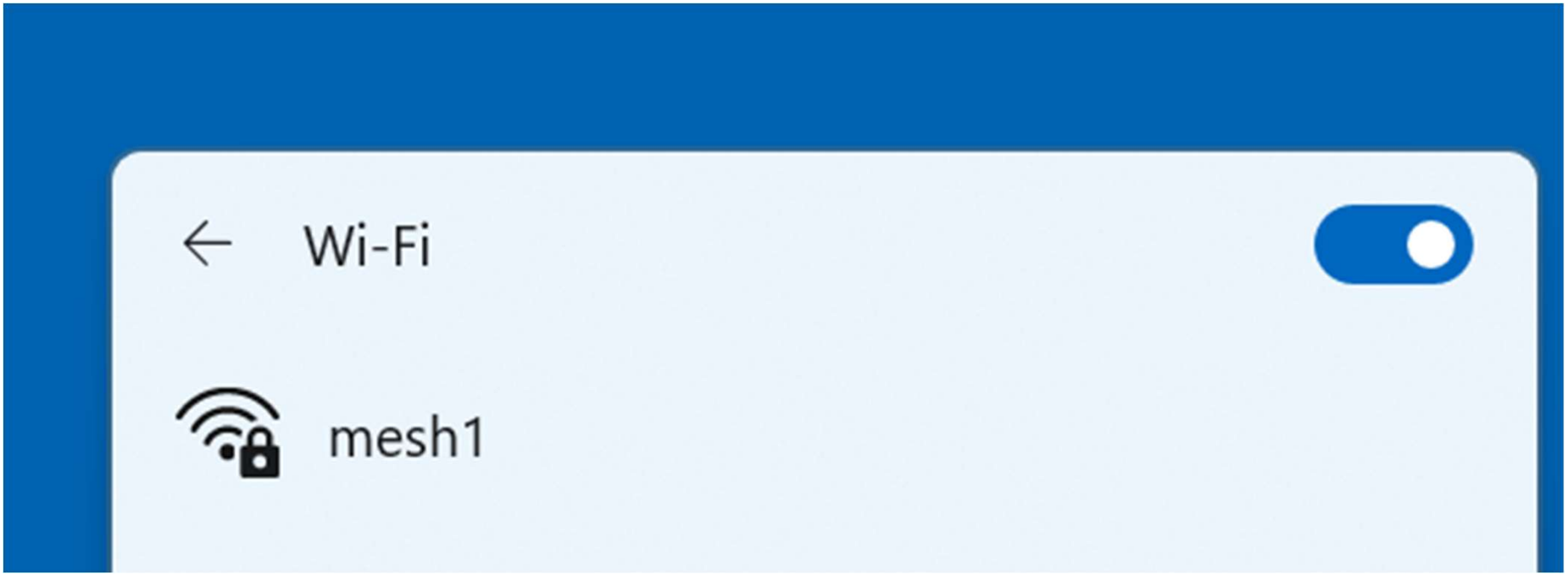

BluPhone2
8:46
86
Wi-Fi
On
mesh1
WPA3 connection is required
TMOBILE-A4BB
Auto reconnect turned off
whitehatunicorn25
Auto reconnect turned off
whitehatunicorn6
WiFi pro_531EFC
WiFi pro_531EFC-5G
[range]_E30AJT7113176Y
diggity


BluPhone2
8:46
86
Wi-Fi
On
mesh1
WPA3 connection is required

"USER EQUIPMENT" (=UE) VIEWPOINT (continued)

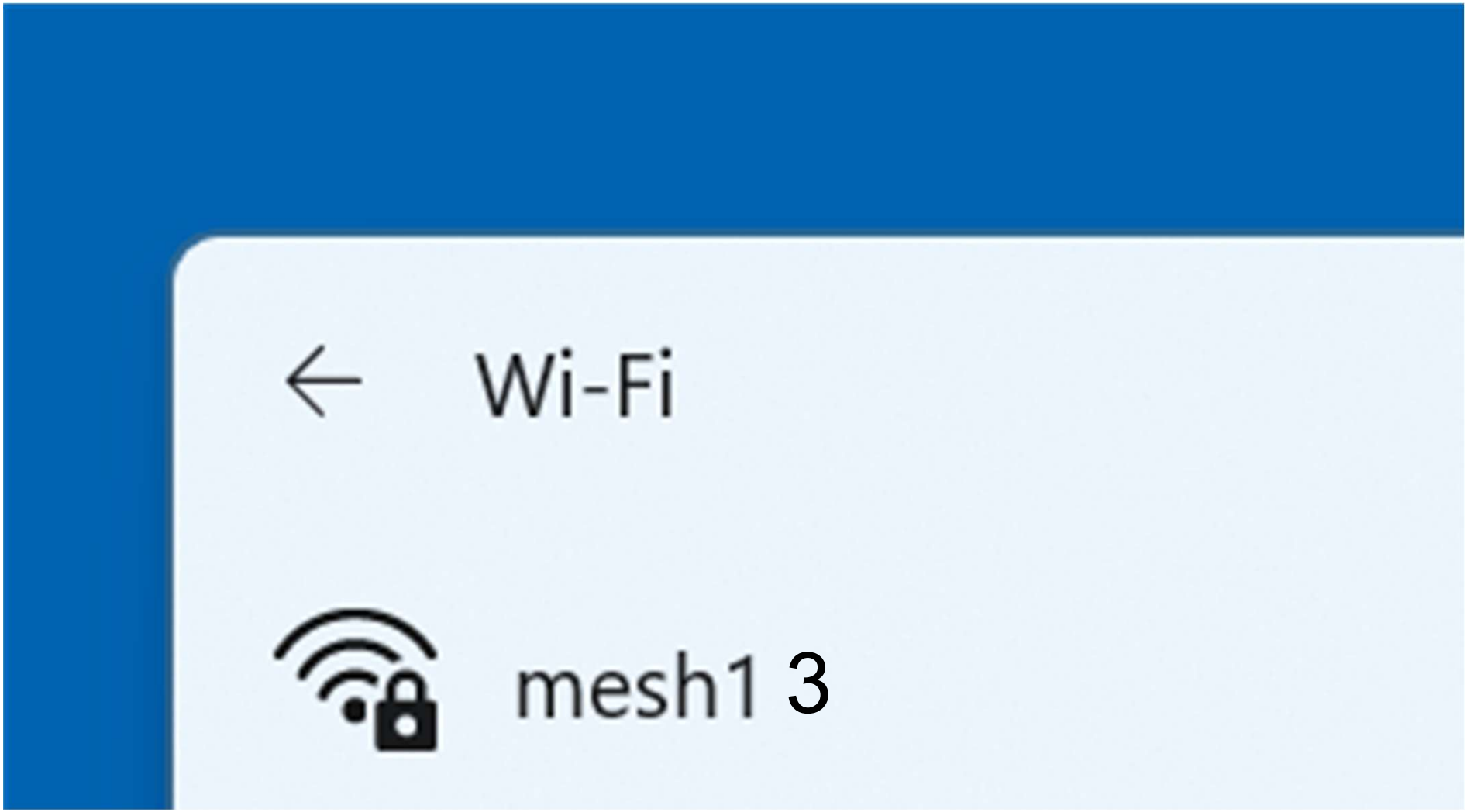
- My Windows 11 computer shows only one "mesh1" even though it see's all transmitter-receivers identifying as as an SSID of "mesh1".
  Even if my Windows 11 computer sees all transmitter-receivers identifying as an SSD of "mesh1", my iPhone will only let me connect to the transmitter-receiver that has the strongest radio signal.


Wi-Fi
mesh1
WiFi pro_531EFC-5G
WiFi pro_531EFC
[range]_E30AJT7113176Y
ATT9x6Dg33
More Wi-Fi settings
8:23 PM
9/30/2025


Wi-Fi
mesh1

"USER EQUIPMENT" (=UE) VIEWPOINT (continued)

- Windows 11 and Windows 10 sometimes shows a
  space <number>
  after the actual SSIDs that it detects.
  Please ignore this oddity as explained at
  https://learn.microsoft.com/en-us/answers/questions/4020055/why-is-there-a-number-after-the-wifi-im-connected


Wi-Fi
mesh1 3

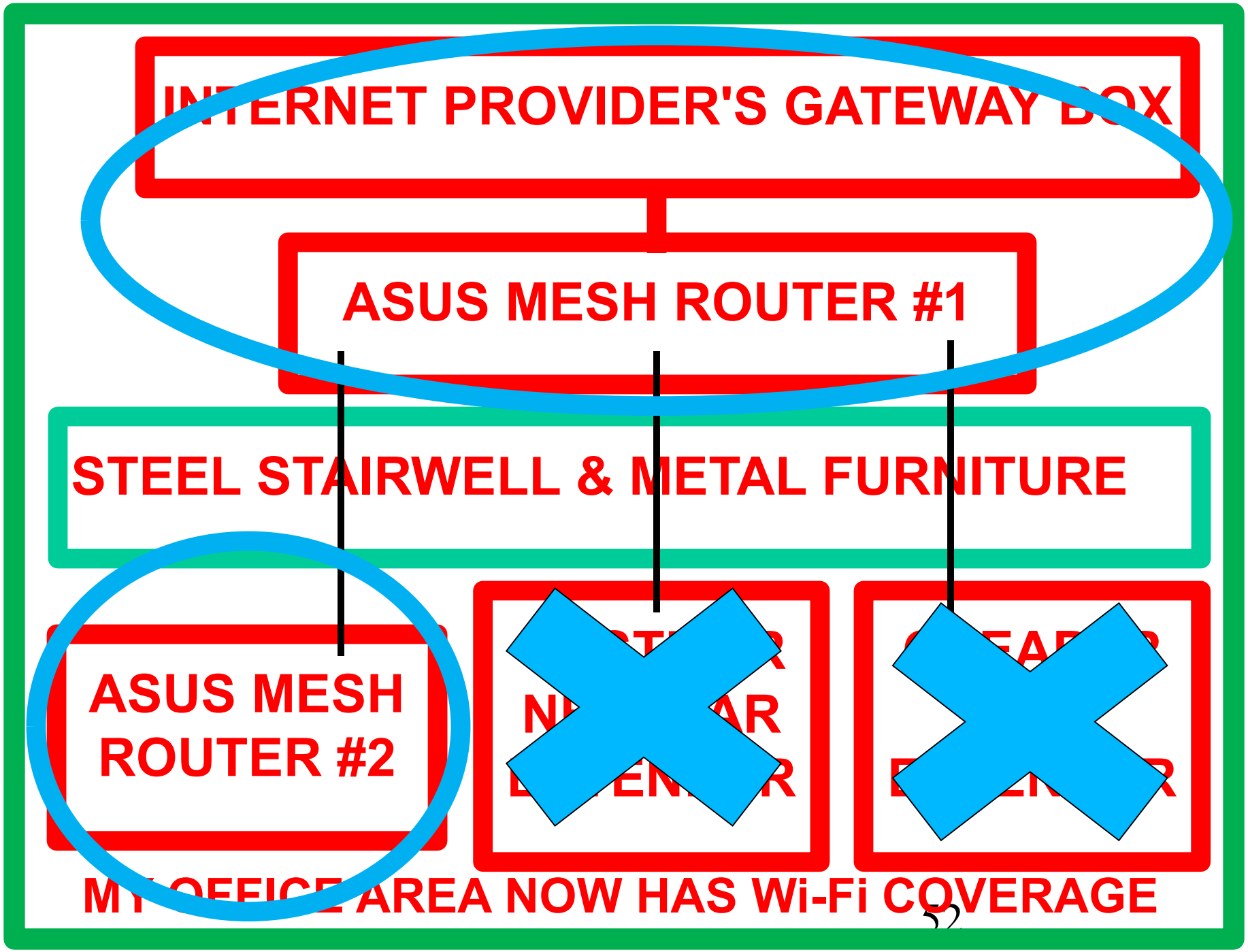

Wi-Fi
mesh1 3

"USER EQUIPMENT" (=UE) VIEWPOINT (continued)

- The actual SSIDs that are being detected are the charactors to the left of the space <number>

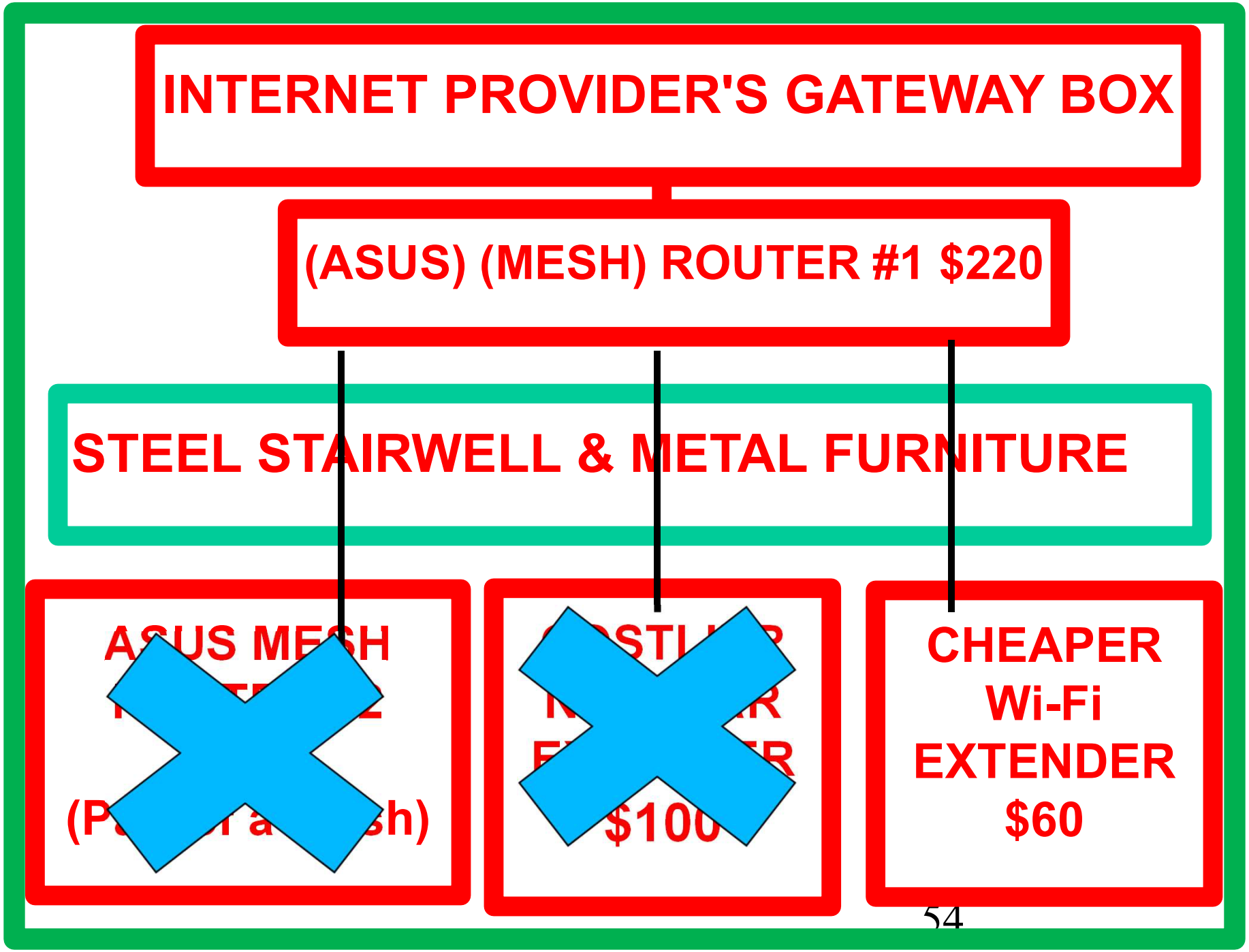
"USER EQUIPMENT" VIEWPOINT (continued)

- For the mesh option, I need to have a mesh-capable router at both the North end of the house and the South end of the house
  and both routers have to belong to the same "mesh" system which, in practice", means that both routers have to belong to the same mesh group of the same manufacturer:


INTERNET PROVIDER'S GATEWAY BOX
ASUS MESH ROUTER #1
STEEL STAIRWELL & METAL FURNITURE
ASUS MESH ROUTER #2
MY OFFICE AREA NOW HAS Wi-Fi COVERAGE

TWO MODES OF OPERATION FOR MOST Wi-Fi EXTENDERS

- Repeater mode
- Access Point mode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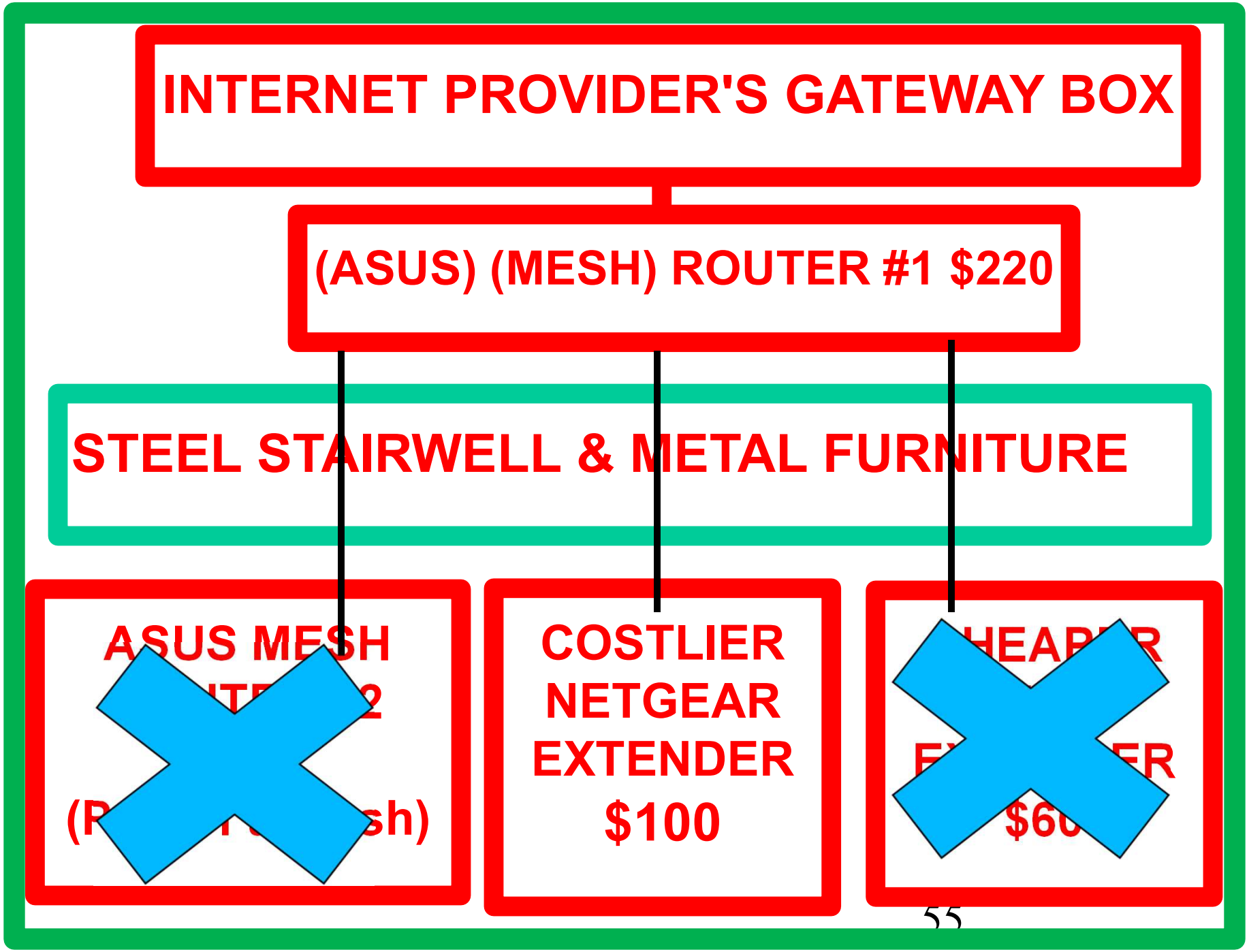
(ASUS) (MESH) ROUTER #1 $220
STEEL STAIRWELL & METAL FURNITURE
CHEAPER
Wi-Fi
EXTENDER
$60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(ASUS) (MESH) ROUTER #1 $220
STEEL STAIRWELL & METAL FURNITURE
COSTLIER
NETGEAR
EXTENDER
$100

TWO MODES OF OPERATION FOR MOST Wi-Fi EXTENDERS (continued)

- Repeater mode
  reduces Internet download and upload speeds down to 20 to 40 percent of the source signals that are being repeated
- Access Point mode
  does not reduce Internet download and upload speeds by much but requires Ethernet or Ethernet equivalent to connect the Wi-Fi extender to the existing router

Repeater Mode: As a wireless signal extender

A. Extend your Wi-Fi signal without using any cables to reduce wiring troubles.

B. Extend your Wi-Fi signal with a cable, connect your device and extender stably.

Repeater Mode: As a wireless signal extender

A. Extend your Wi-Fi signal without using any cables to reduce wiring troubles.

B. Extend your Wi-Fi signal with a cable, connect your device and extender stably.

Repeater Mode: As a wireless signal extender

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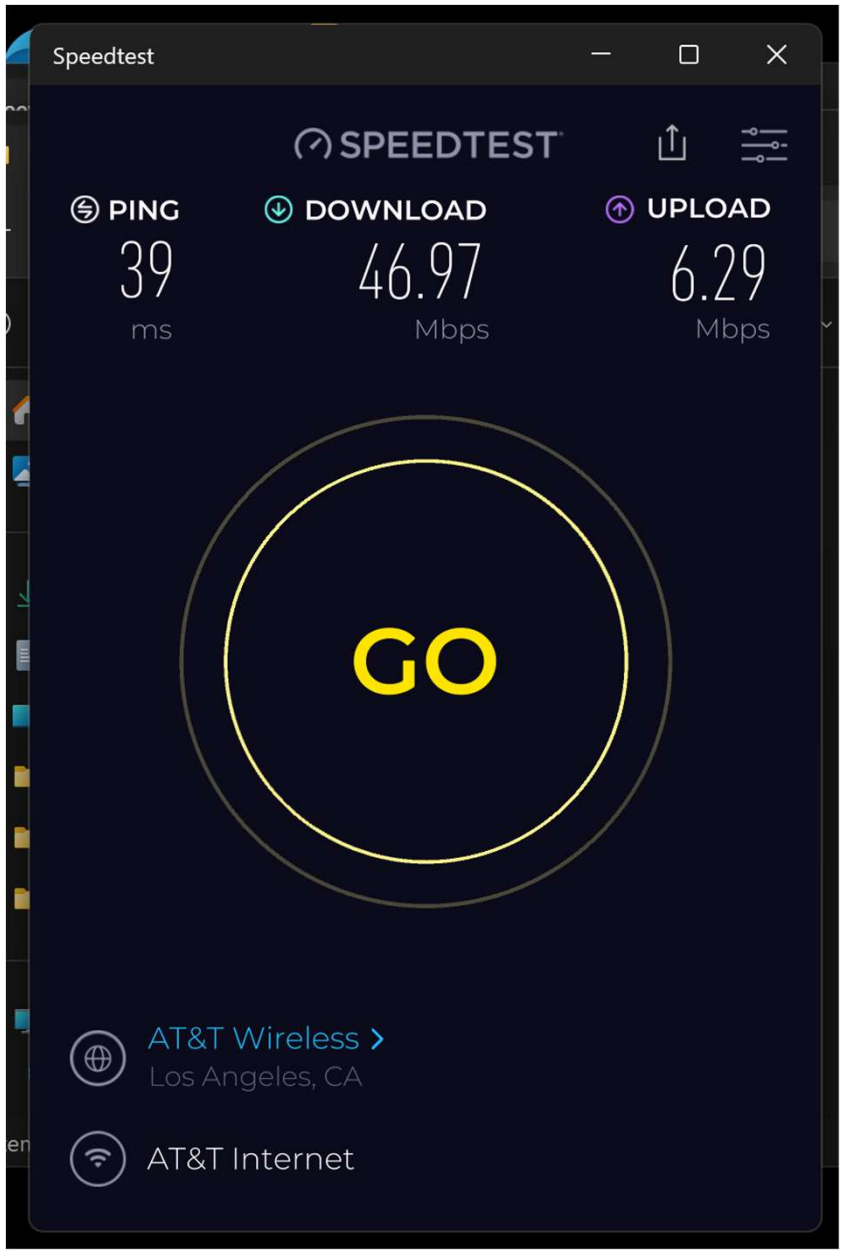
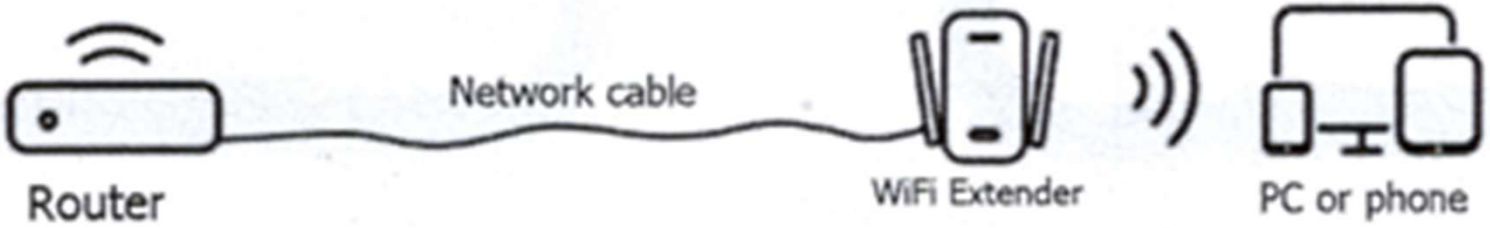

Speedtest
SPEEDTEST
PING
39
ms
DOWNLOAD
46.97
Mbps
UPLOAD
6.29
Mbps
GO
AT&T Wireless
Los Angeles, CA
AT&T Internet

AP Mode: As a wired signal extender (access point)

Get better WiFi speed by connecting the router and the extender with network cable in the poor WiFi signal area.



AP Mode: As a wired signal extender (access point)

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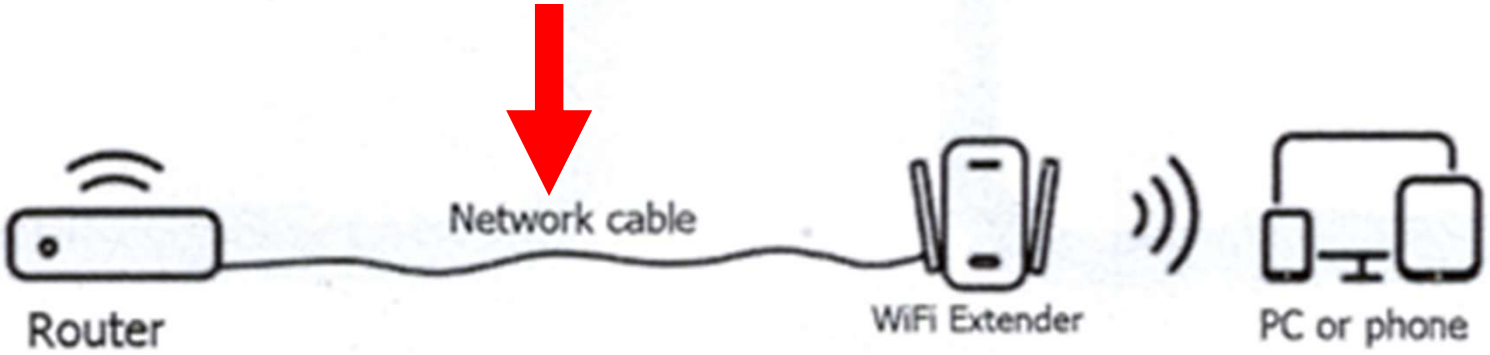
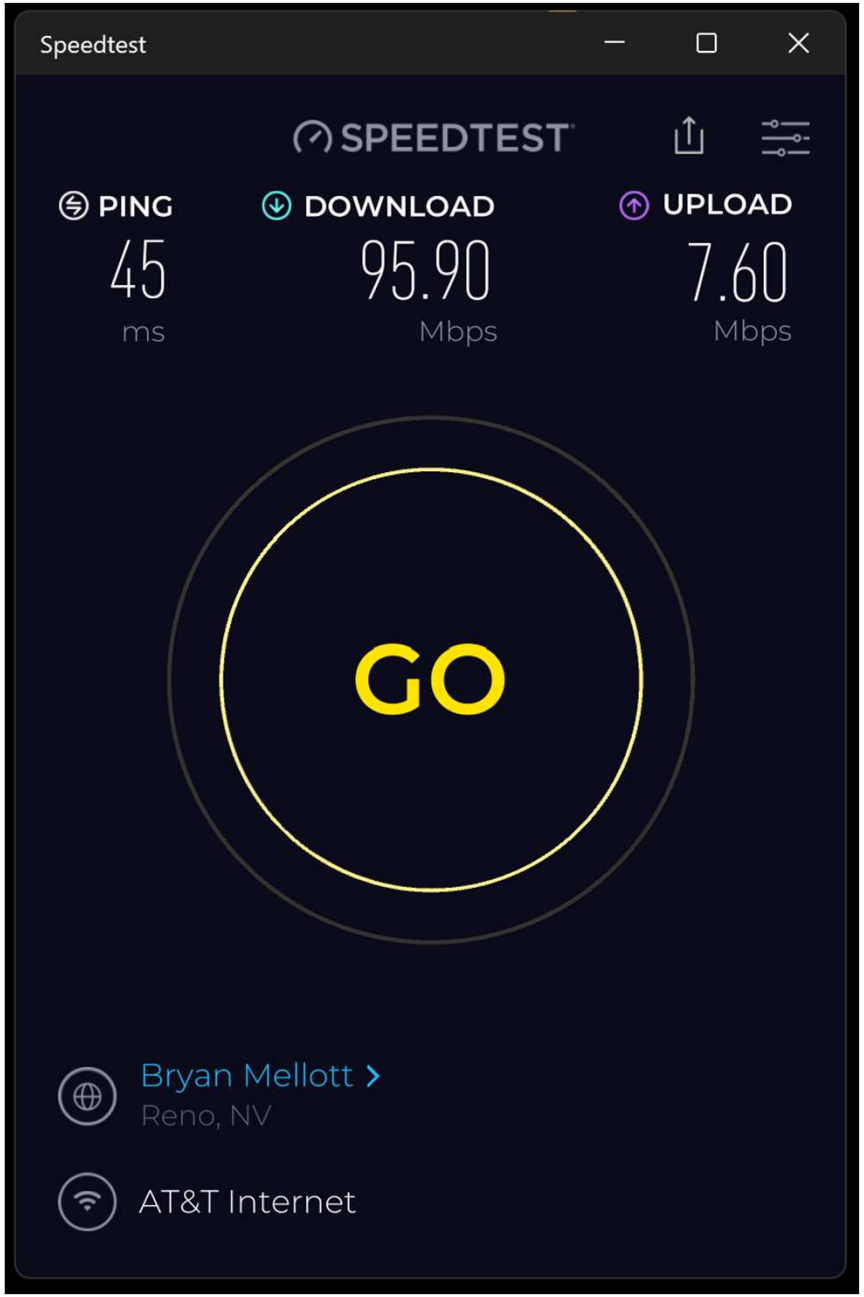



Speedtest
SPEEDTEST
PING
45
ms
DOWNLOAD
95.90
Mbps
UPLOAD
7.60
Mbps
GO
Bryan Mellott
Reno, NV
AT&T Internet

REQUIREMENTS FOR Wi-Fi EXTENDERS (continued)

- In "Repeater Mode", a 100 Megabits per second Ethernet port on a Wi-Fi extender will bottleneck the download and upload speeds of an Internet provider that is providing Internet speeds faster than 100 Megabits per second, if you are using the Ethernet port to connect to a downstream computer, tablet, or camera.

Repeater Mode: As a wireless signal extender

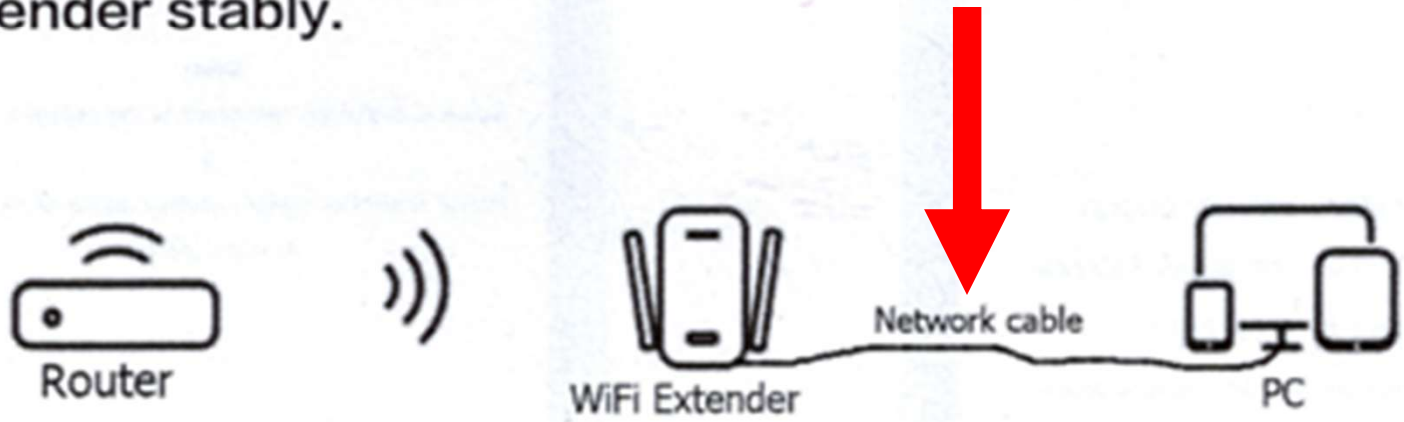
A. Extend your Wi-Fi signal without using any cables to reduce wiring troubles.

B. Extend your Wi-Fi signal with a cable, connect your device and extender stably.

Repeater Mode: As a wireless signal extender

A. Extend your Wi-Fi signal without using any cables to reduce wiring troubles.

B. Extend your Wi-Fi signal with a cable, connect your device and extender stably.

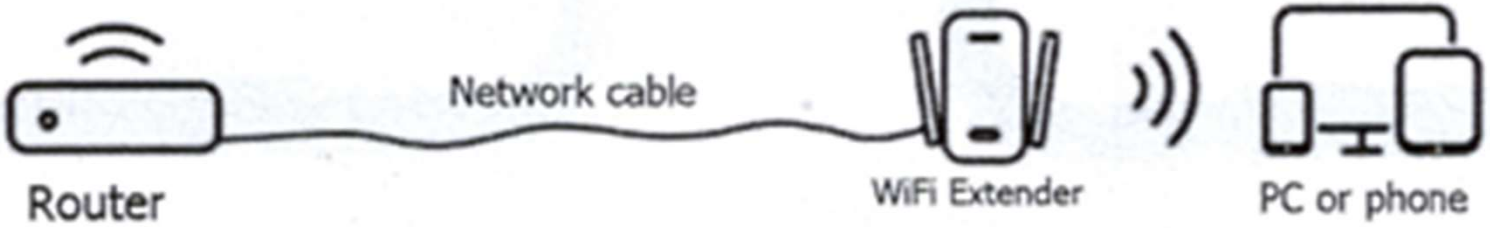


REQUIREMENTS FOR Wi-Fi EXTENDERS (continued)

- In "Access Point Mode", a 100 Megabits per second Ethernet port on a Wi-Fi extender will bottleneck the download and upload speeds of an Internet provider that is providing Internet speeds faster than 100 Megabits per second, since the Ethernet port is used to connect the Wi-Fi extender to the existing router in "Access Point Mode".

AP Mode: As a wired signal extender (access point)

Get better WiFi speed by connecting the router and the extender with network cable in the poor WiFi signal area.



Wi-Fi Generations

Generation	IEEE Standard	Maximum Linkrate (Mbit/s)	Adopted	Radio Frequency (GHz)
Wi-Fi 7	802.11be	721 to 46120	2024	2.4/5/6
Wi-Fi 6E	802.11ax	600 to 9608	2020	2.4/5/6
Wi-Fi 6	802.11ax	600 to 9608	2019	2.4/5
Wi-Fi 5	802.11ac	433 to 6933	2014	5
Wi-Fi 4	802.11n	72 to 600	2008	2.4/5
(Wi-Fi 3)*	802.11g	6 to 54	2003	2.4
(Wi-Fi 2)*	802.11a	6 to 54	1999	5
(Wi-Fi 1)*	802.11b	1 to 11	1999	2.4
(Wi-Fi 0)*	802.11	1 to 2	1997	2.4

2: Wi-Fi MESH

by Francis Chao
fchao2@yahoo.com

TuCSon COMPUTER SOCIETY

apcug

An International
Association of Technology
& Computer User Groups

Web location for this presentation:

http://aztcs.apcug.org

Click on "Meeting Notes"

SUMMARY

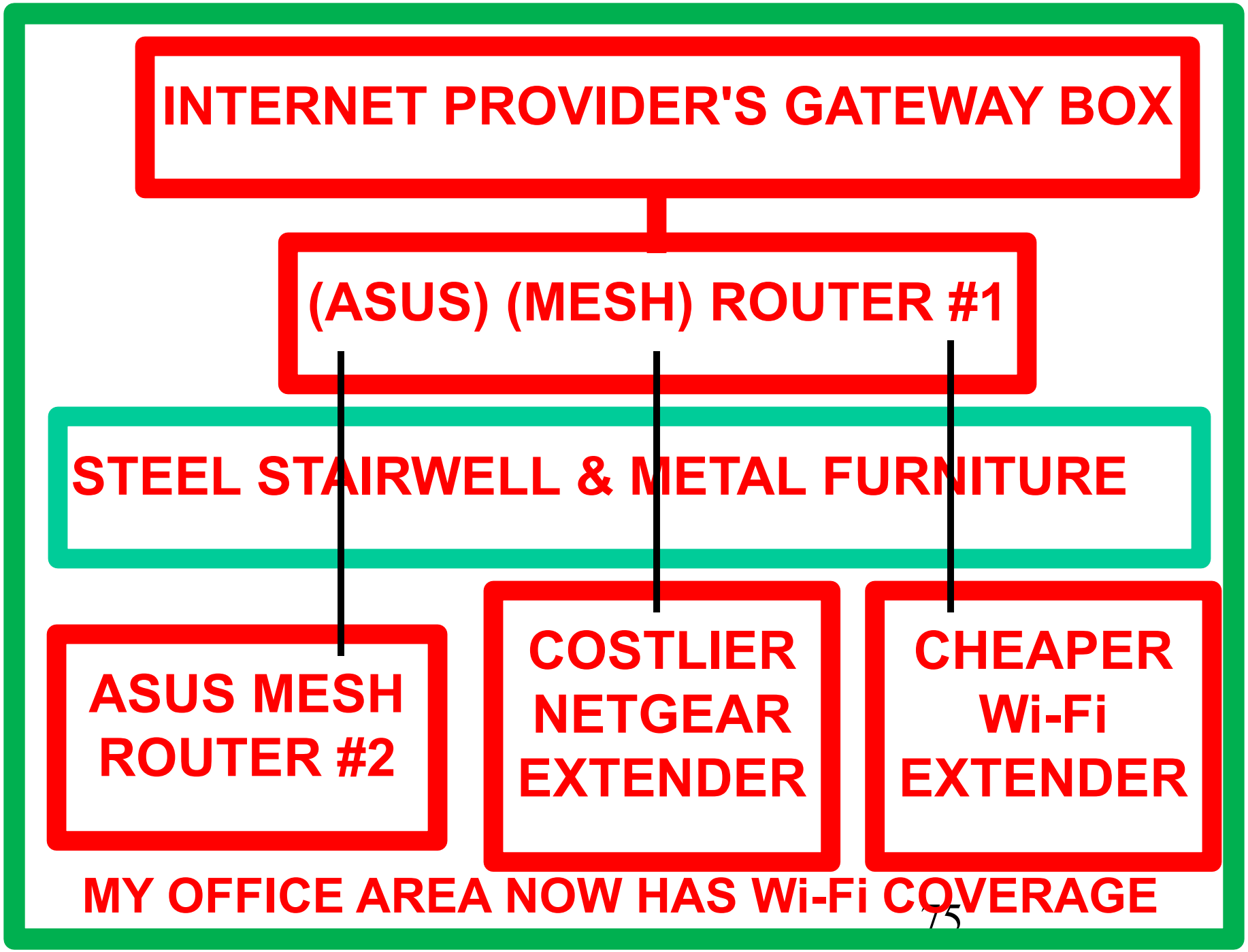
To increase the range and signal strength of a Wi-Fi local network, router, you can use a "mesh" which consists of two or more routers working cooperatively together to provide a coordinated Wi-Fi system.

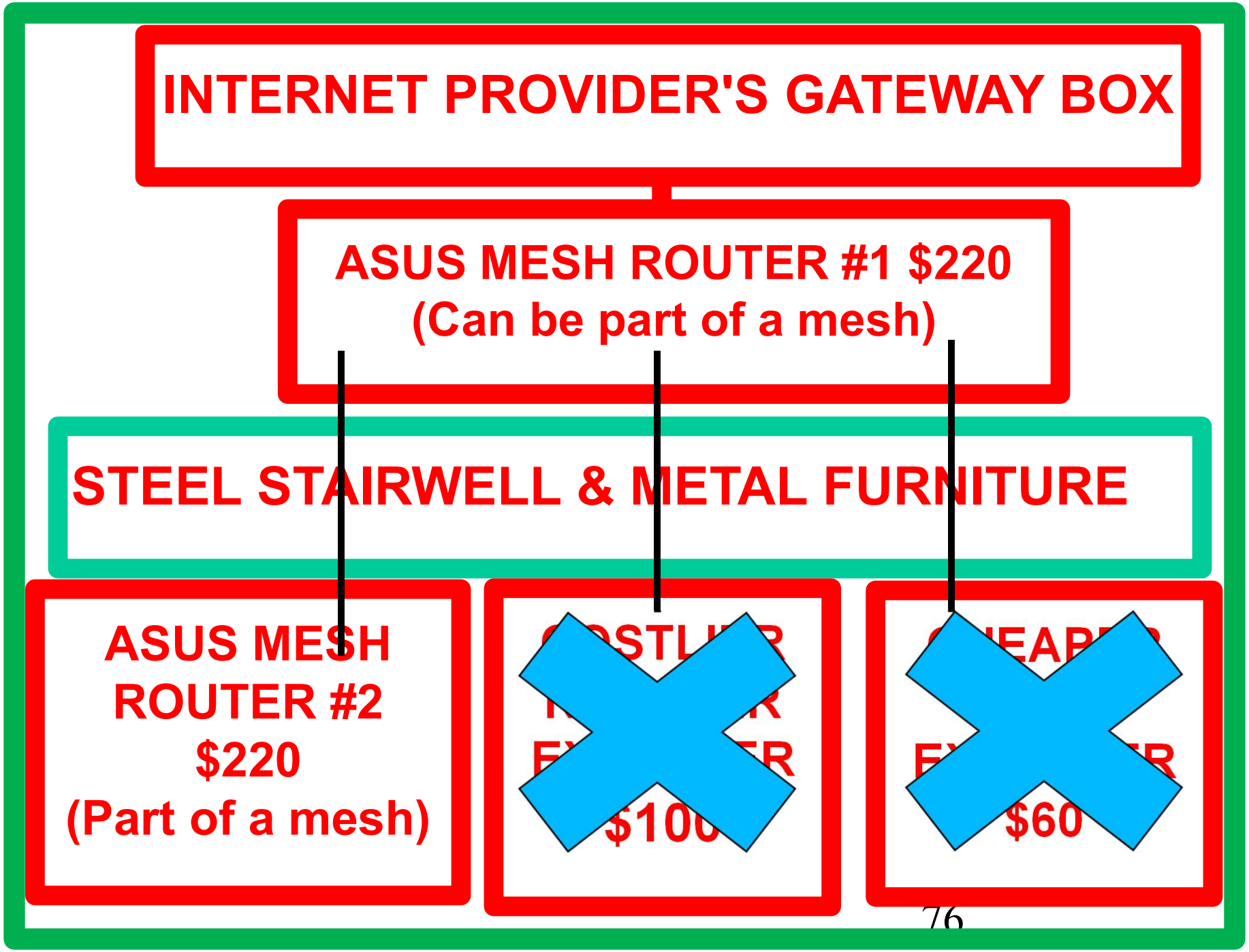
TOPICS

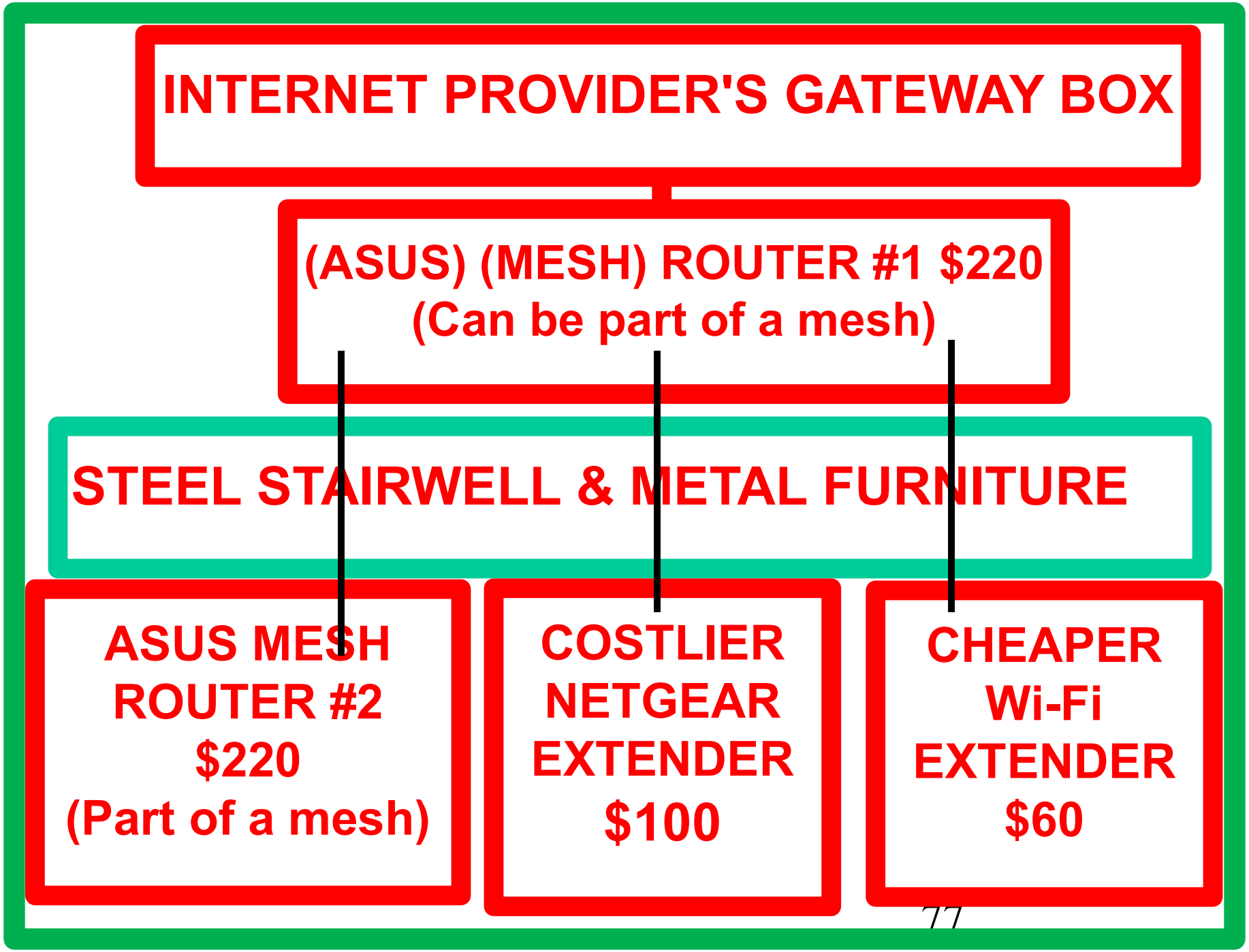
- Mesh Advantages

MESH ADVANTAGES

- A "mesh" is a named grouping of two or more connected Wi-Fi routers that work together to provide you with:
  a larger coverage area,
  self-healing recovery from router failures, and
  hand-offs when user equipment moves between the actual coverage of each individual router

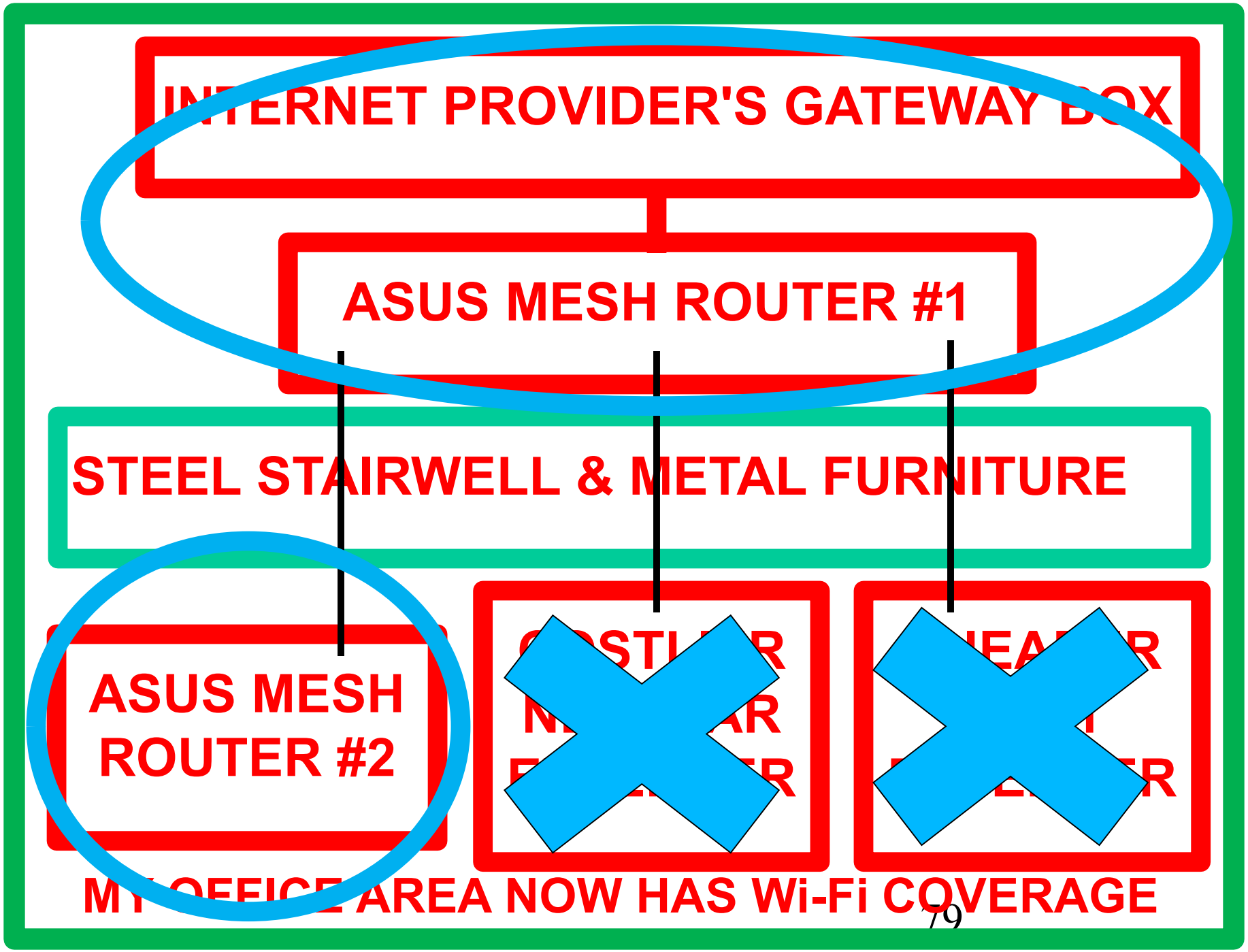

INTERNET PROVIDER'S GATEWAY BOX
(ASUS) (MESH) ROUTER #1
STEEL STAIRWELL & METAL FURNITURE
ASUS MESH ROUTER #2
COSTLIER NETGEAR EXTENDER
CHEAPER Wi-Fi EXTENDER
MY OFFICE AREA NOW HAS Wi-Fi COVERAGE


INTERNET PROVIDER'S GATEWAY BOX
ASUS MESH ROUTER #1 $220
(Can be part of a mesh)
STEEL STAIRWELL & METAL FURNITURE
ASUS MESH ROUTER #2 $220 (Part of a mesh)
$100
$60


INTERNET PROVIDER'S GATEWAY BOX
(ASUS) (MESH) ROUTER #1 $220
(Can be part of a mesh)
STEEL STAIRWELL & METAL FURNITURE
ASUS MESH ROUTER #2 $220 (Part of a mesh)
COSTLIER NETGEAR EXTENDER $100
CHEAPER Wi-Fi EXTENDER $60

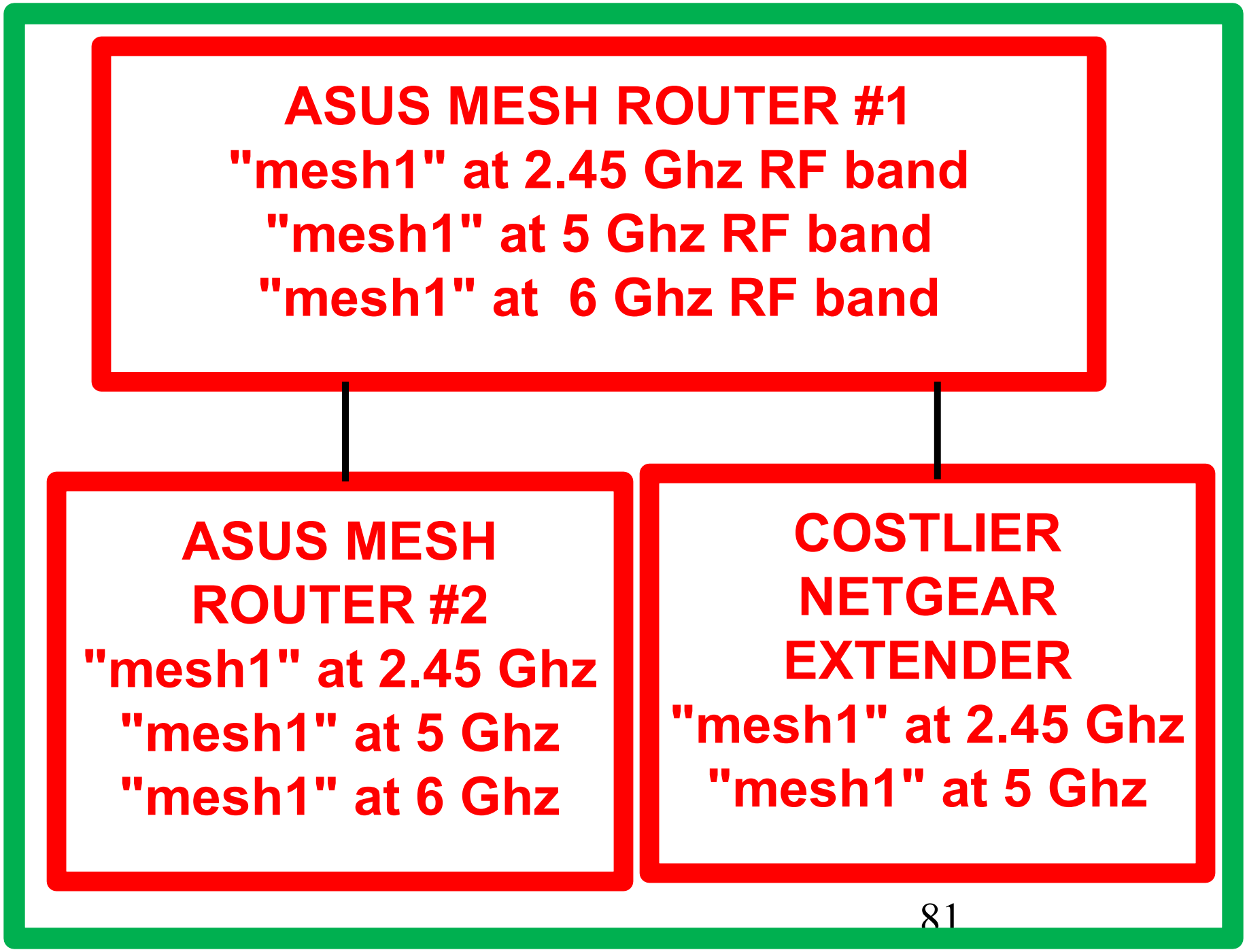
MESH ADVANTAGES (continued)

- For the mesh option, I need to have a mesh-capable router at both the North end of the house and the South end of the house
and both routers have to belong to the same "mesh" system which, in practice", means that both routers have to belong to the same mesh group of the same manufacturer:


INTERNET PROVIDER'S GATEWAY BOX
ASUS MESH ROUTER #1
STEEL STAIRWELL & METAL FURNITURE
ASUS MESH ROUTER #2

MESH ADVANTAGES (continued)

- In our live example, the two "ASUS" routers are part of a mesh.
  However, the Netgear Wi-Fi extender is not part of the mesh, even if it broadcasts the same "mesh1" SSID as the two "ASUS" routers.


ASUS MESH ROUTER #1
"mesh1" at 2.45 Ghz RF band
"mesh1" at 5 Ghz RF band
"mesh1" at 6 Ghz RF band
ASUS MESH ROUTER #2
"mesh1" at 2.45 Ghz
"mesh1" at 5 Ghz
"mesh1" at 6 Ghz
COSTLIER NETGEAR EXTENDER
"mesh1" at 2.45 Ghz
"mesh1" at 5 Ghz

MESH ADVANTAGES (continued)

- For the mesh option, I need to have a mesh-capable router at both the North end of the house and the South end of the house
and both routers have to belong to the same "mesh" system which, in practice", means that both routers have to belong to the same mesh group of the same manufacturer:

MESH ADVANTAGES (continued)

- Mesh routers have more powerful transmitter-receivers and most have extra transmitter-receivers dedicated to backhaul communications:
  In my home, the two ASUS mesh routers let me use wireless Wi-Fi **backhaul** links to "punch through" the metal stairwell where none of the extenders that I have tried are able to do so !

MESH ADVANTAGES (continued)

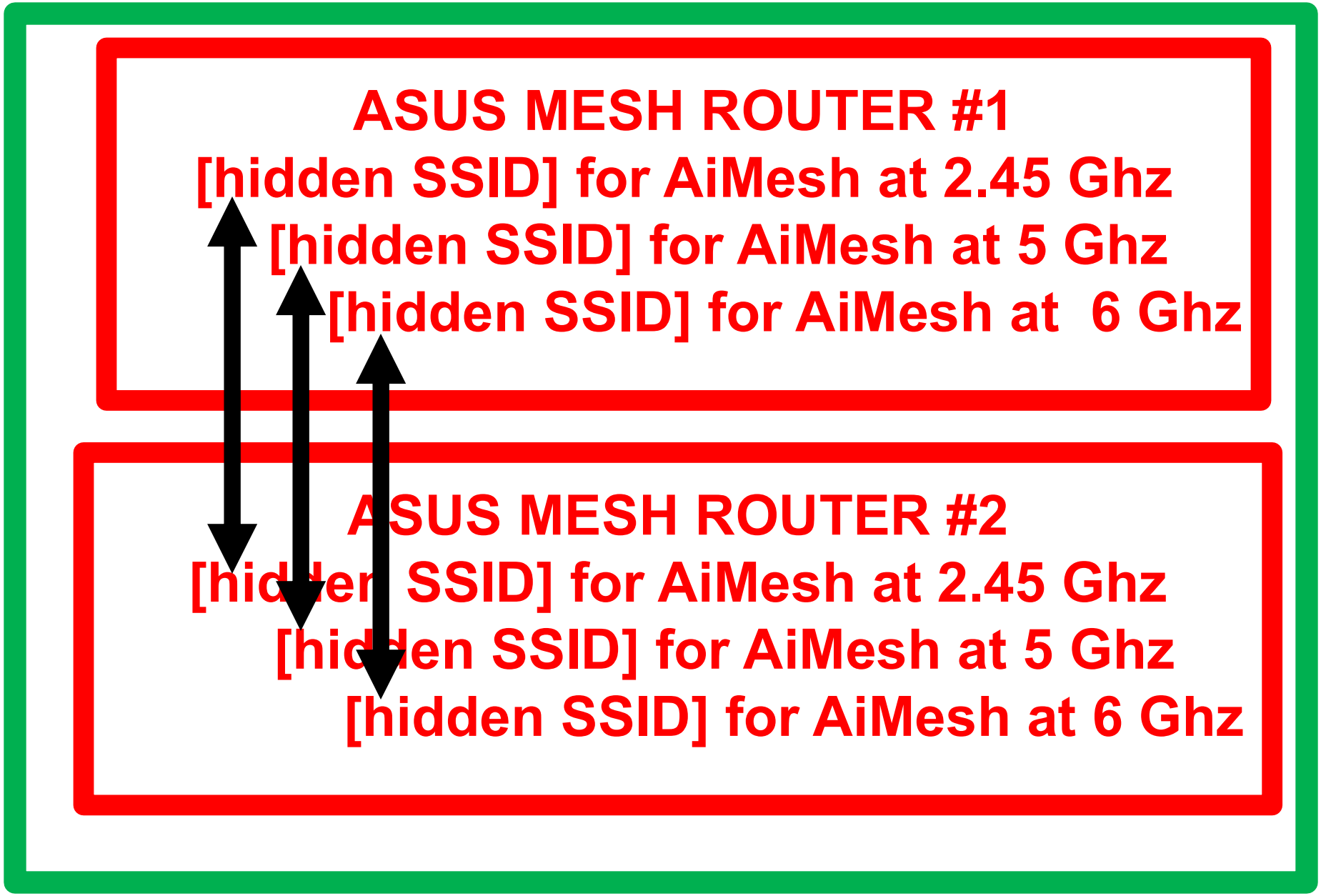
- The following diagram shows the extra Wi-Fi transmitter-receivers that the two ASUS mesh routers use for backhaul communications and administration of the "AiMesh" mesh group.
  The "AiMesh" brand of mesh is proprietary to the ASUS company.

MESH ADVANTAGES (continued)

- These extra transmitter-receivers are not seen by my user equipment but you can see them using Wi-Fi analysis software apps:

ASUS MESH ROUTER #1
[hidden SSID] for AiMesh at 2.45 Ghz
[hidden SSID] for AiMesh at 5 Ghz
[hidden SSID] for AiMesh at 6 Ghz

ASUS MESH ROUTER #2
[hidden SSID] for AiMesh at 2.45 Ghz
[hidden SSID] for AiMesh at 5 Ghz
[hidden SSID] for AiMesh at 6 Ghz


ASUS MESH ROUTER #1
[hidden SSID] for AiMesh at 2.45 Ghz
[hidden SSID] for AiMesh at 5 Ghz
[hidden SSID] for AiMesh at 6 Ghz
ASUS MESH ROUTER #2
[hidden SSID] for AiMesh at 2.45 Ghz
[hidden SSID] for AiMesh at 5 Ghz
[hidden SSID] for AiMesh at 6 Ghz

MESH ROUTERS HAVE ADVANTAGES OVER Wi-Fi EXTENDERS (continued)

- This moderately-priced pair of Asus mesh routers is the best deal that we have been able to find.
  You will need two of them for an entry-level mesh configuration:
  https://www.amazon.com/dp/B0DHWCQ3FP
  (You have to have two of these to create a Wi-Fi mesh setup.)

ASUS RT-BE92U BE9700 Tri-Band WiFi 7 Router, Supports New 320MHz Bandwidth & 4096-QAM, MLO, AI WAN Detection, AiMesh Support, Subscription-Free Network Security & Comprehensive VPN Features

Visit the ASUS Store

3.3 ★★★½☆ 270 ratings

500+ bought in past month

$249.99

FREE Returns

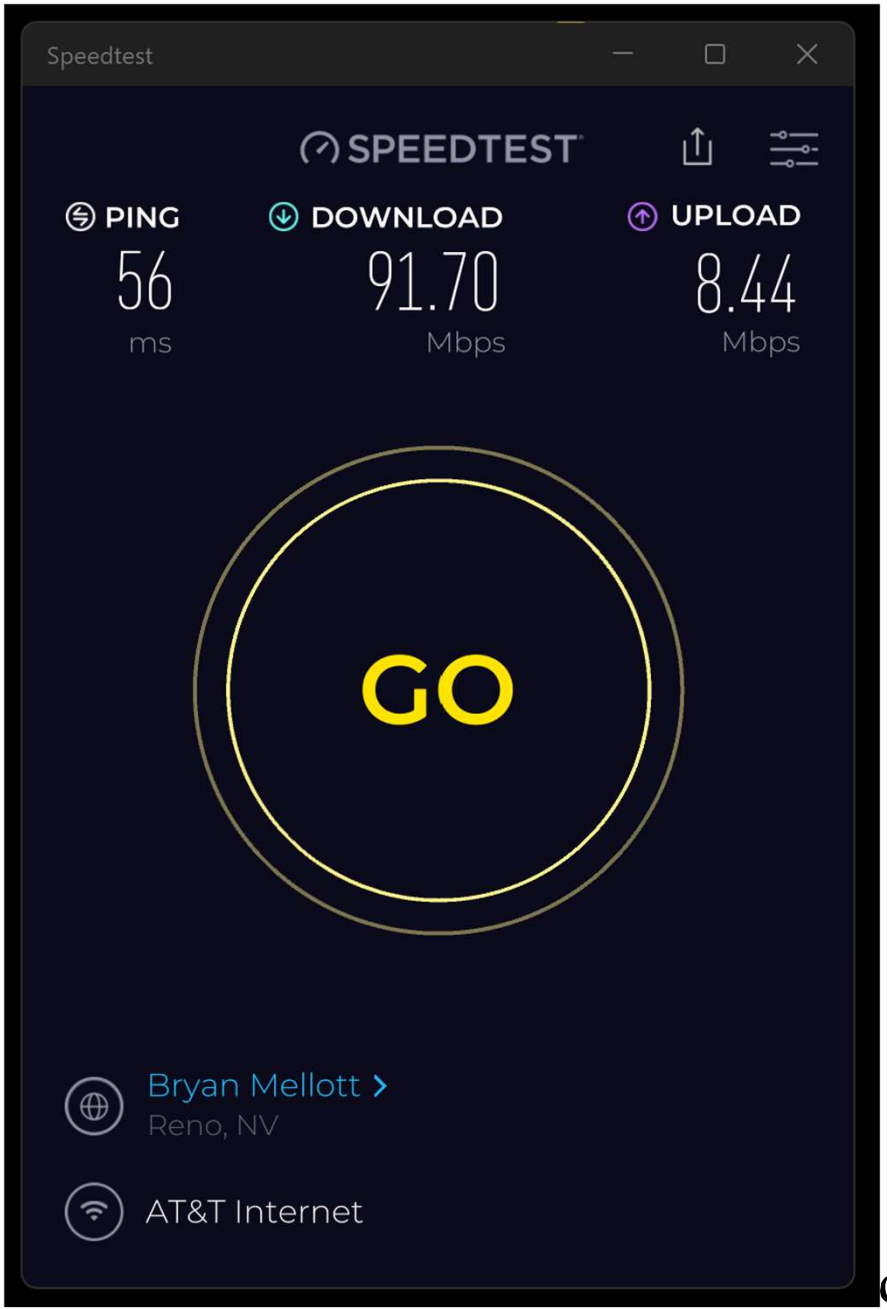
Thank you for being an Amazon customer. Get $50 off: Pay $199.99 ~~$249.99~~ upon approval for Amazon Visa.

Available at a lower price from other sellers that may not offer free Prime shipping.

Brand	ASUS
Model Name	RT-BE92U
Special Feature	320MHz channels in the 6 GHz, Alexa Compatible, Internet Security, VPN, AiProtection, WiFi 7 (802.11be), Wirelss router, AiMesh Node, Access p... See more
Frequency Band Class	Tri-Band

See more

About this item


Speedtest
SPEEDTEST
PING
56
ms
DOWNLOAD
91.70
Mbps
UPLOAD
8.44
Mbps
GO
Bryan Mellott
Reno, NV
AT&T Internet

FOR GREATER AREA COVERAGE, YOU CAN USE THE NETGEAR'S VARIOUS MESH CONFIGURATIONS

- https://www.amazon.com/stores/page/54AA6656-F644-4E52-B9CC-7F8ADDF0921B/?_encoding=UTF8&pd_rd_plhdr=t&pd_rd_i=B0D4JB6QJD

FOR GREATER AREA COVERAGE, YOU CAN USE THE NETGEAR'S VARIOUS MESH CONFIGURATIONS (continued)

- We do not recommend the lowest option that Netgear offers (the rightmost option) because it is unable to communicate at the most current Wi-Fi 7 (802.11be) level of Wi-Fi capability

970 SERIES

Our most powerful & advanced Orbi.
The ultimate WiFi experience

Technology: **WiFi 7 Quad-band**
Speed: **Up up to 27 Gbps**
Coverage: **Up to 10,000 sq. ft.**
Devices: **Up to 200**
Internet Port: **10 Gig**

SHOP NOW

870 SERIES

Exceptional performance for
highly-connected households

Technology: **WiFi 7 Tri-band**
Speed: **Up to 21 Gbps**
Coverage: **Up to 9,000 sq. ft.**
Devices: **Up to 150**
Internet Port: **10 Gig**

SHOP NOW

770 SERIES

Flawless connectivity to power work,
streaming, gaming & more

Technology: **WiFi 7 Tri-band**
Speed: **Up to 11 Gbps**
Coverage: **Up to 8,000 sq. ft.**
Devices: **Up to 100**
Internet Port: **2.5 Gig**

SHOP NOW

370 SERIES

The most affordable Orbi for
reliable, whole-home coverage

Technology: **WiFi 7 Dual-band**
Speed: **Up to 5 Gbps**
Coverage: **Up to 6,000 sq. ft.**
Devices: **Up to 70**
Internet Port: **2.5 Gig**

SHOP NOW

970 SERIES

Our most powerful & advanced Orbi.
The ultimate WiFi experience

Technology: **WiFi 7 Quad-band**

Speed: **Up to 27 Gbps**

Coverage: **Up to 10,000 sq. ft.**

Devices: **Up to 200**

Internet Port: **10 Gig**

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Devices: **Up to 150**

Internet Port: **10 Gig**

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770 SERIES

Flawless connectivity to power work,
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Technology: **WiFi 7 Tri-band**

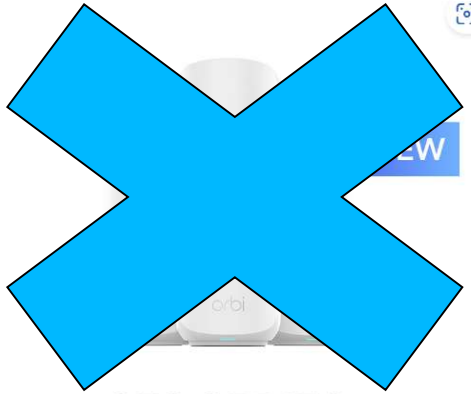
Speed: **Up to 11 Gbps**

Coverage: **Up to 8,000 sq. ft.**

Devices: **Up to 100**

Internet Port: **2.5 Gig**

SHOP NOW



370 SERIES

The most affordable Orbi for
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Technology: **WiFi 7 Dual-band**

Speed: **Up to 5 Gbps**

Coverage: **Up to 6,000 sq. ft.**

Devices: **Up to 70**

Internet Port: **2.5 Gig**

SHOP NOW

Wi-Fi MESH UNITS, AND Wi-Fi EXTENDERS (continued)

Wi-Fi mesh brands:

- Amazon's "Eero 6"
- Amazon's "TruMesh"
- ASUS's "AiMesh"
- ASUS's "ZenWiFi"
- Google's "Nest Wifi"

Wi-Fi MESH UNITS, AND Wi-Fi EXTENDERS (continued)

Wi-Fi mesh brands (continued):

- Linksys' "Atlas"
- Linksys' "Velop"
- Netgear's "Orbi"
- (TP-Link's "Deco")
- (TP-Link's "EasyMesh")

SECURITY CONCERNS FOR TP-LINK ROUTERS

- https://nationalinterest.org/blog/techland/states-have-a-tp-link-problem

- https://www.wired.com/story/tp-link-router-ban-investigation/

SECURITY CONCERNS FOR TP-LINK ROUTERS (continued)

- https://www.digitaltrends.com/computing/tp-link-router-alternatives/

- https://www.slashgear.com/1855885/tp-link-router-ban-explained-is-it-safe-to-buy/

SECURITY CONCERNS FOR TP-LINK ROUTERS (continued)

- https://www.msn.com/en-us/news/technology/where-are-tp-link-routers-made-and-why-does-the-us-government-want-to-ban-them/ar-AA1HcCBY
- https://www.micklerandassociates.com/blog/should-i-remove-tp-link-devices

3: Wi-Fi BACKHAUL

by Francis Chao
fchao2@yahoo.com

TuCSon COMPUTER SOCIETY

apcug

An International
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& Computer User Groups

Web location for this presentation:

http://aztcs.apcug.org

Click on “Meeting Notes”

SUMMARY

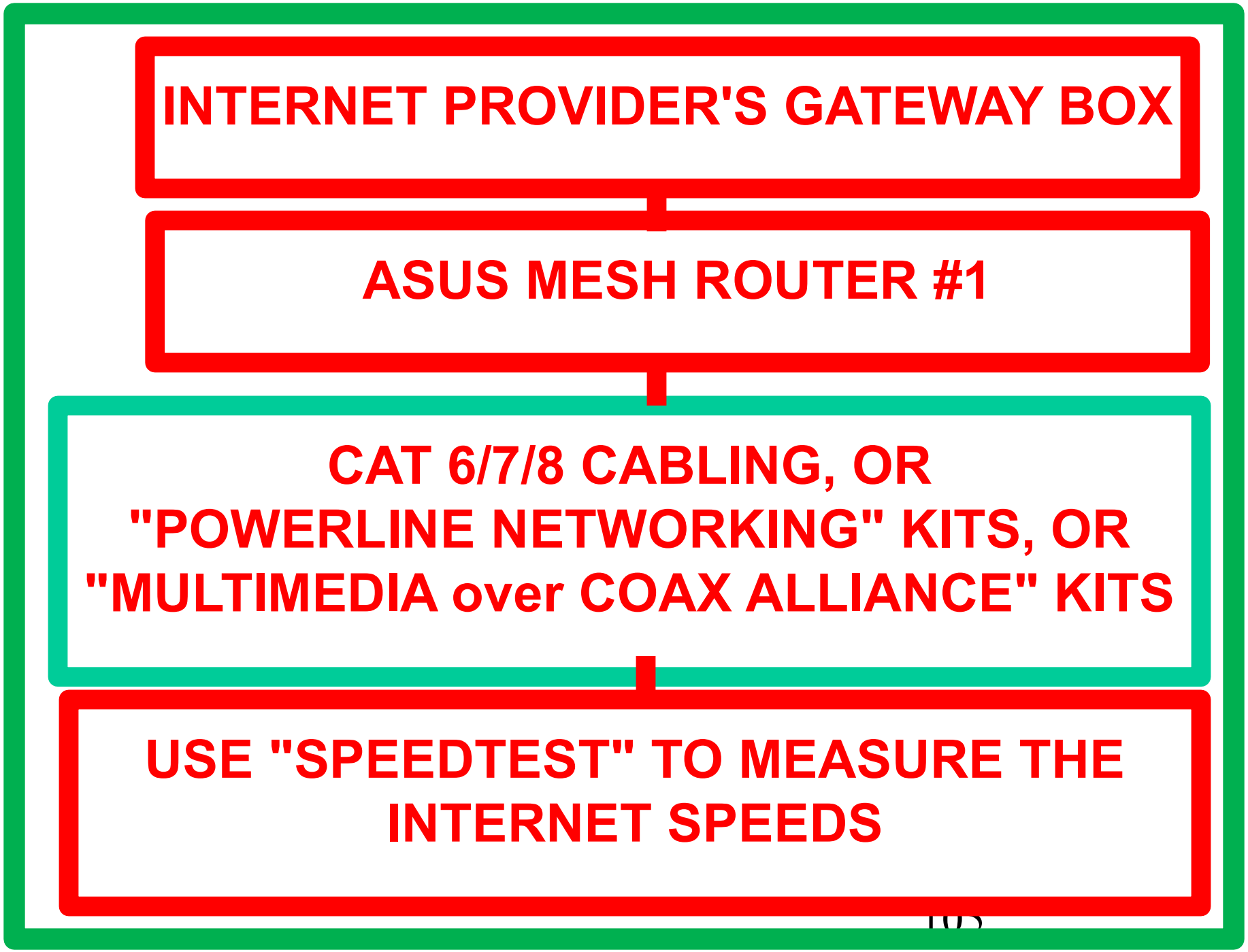
There are three ways for you to connect Wi-Fi extender and mesh devices to expand the coverage of a wireless Wi-Fi network, without having to resort to wireless Wi-Fi backhaul connection.

TOPICS

- Wired and Wired Equivalent Methods
- Speed Comparison of the three Technologies

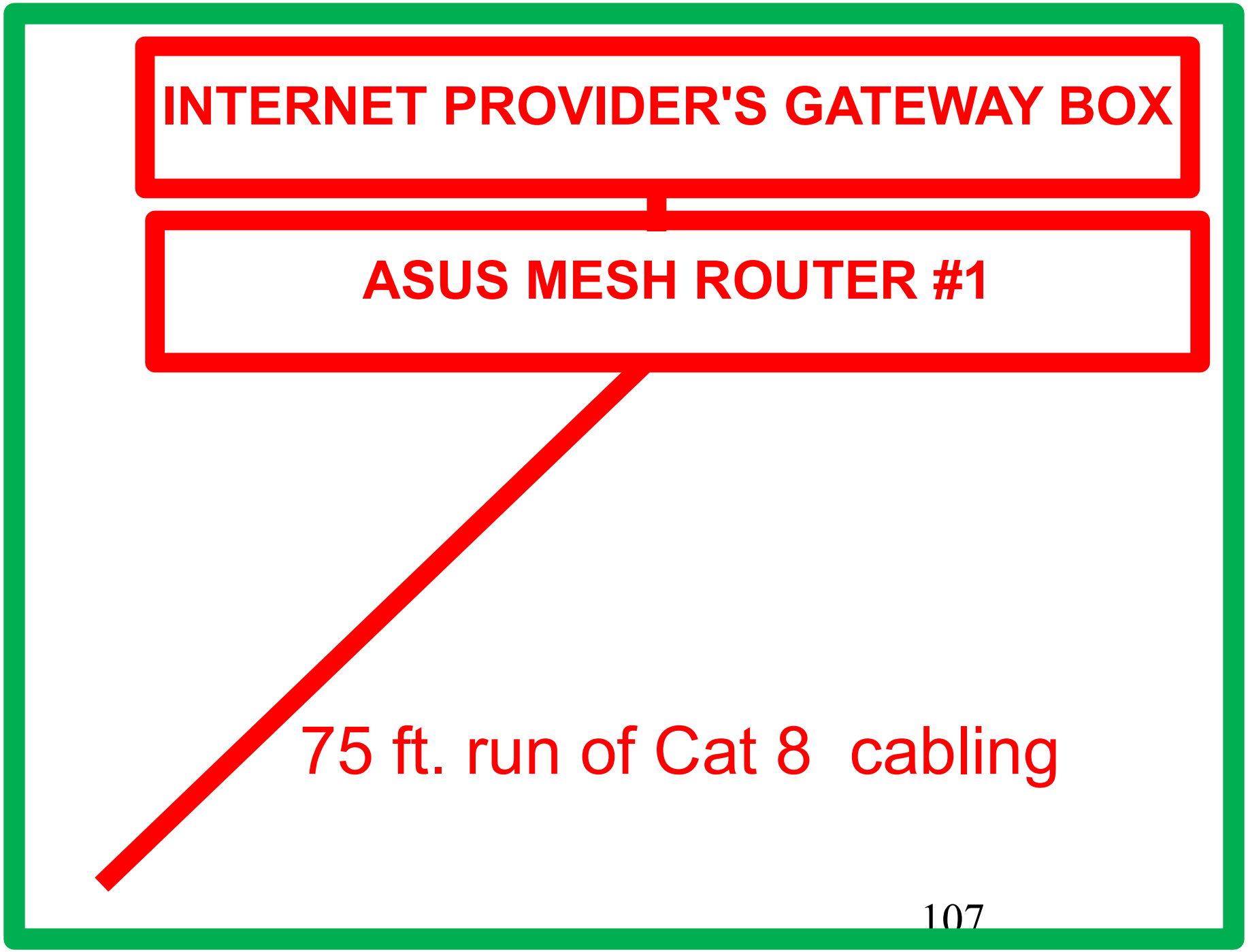
OPTIONS FOR THE BACKHAUL CONNECTION

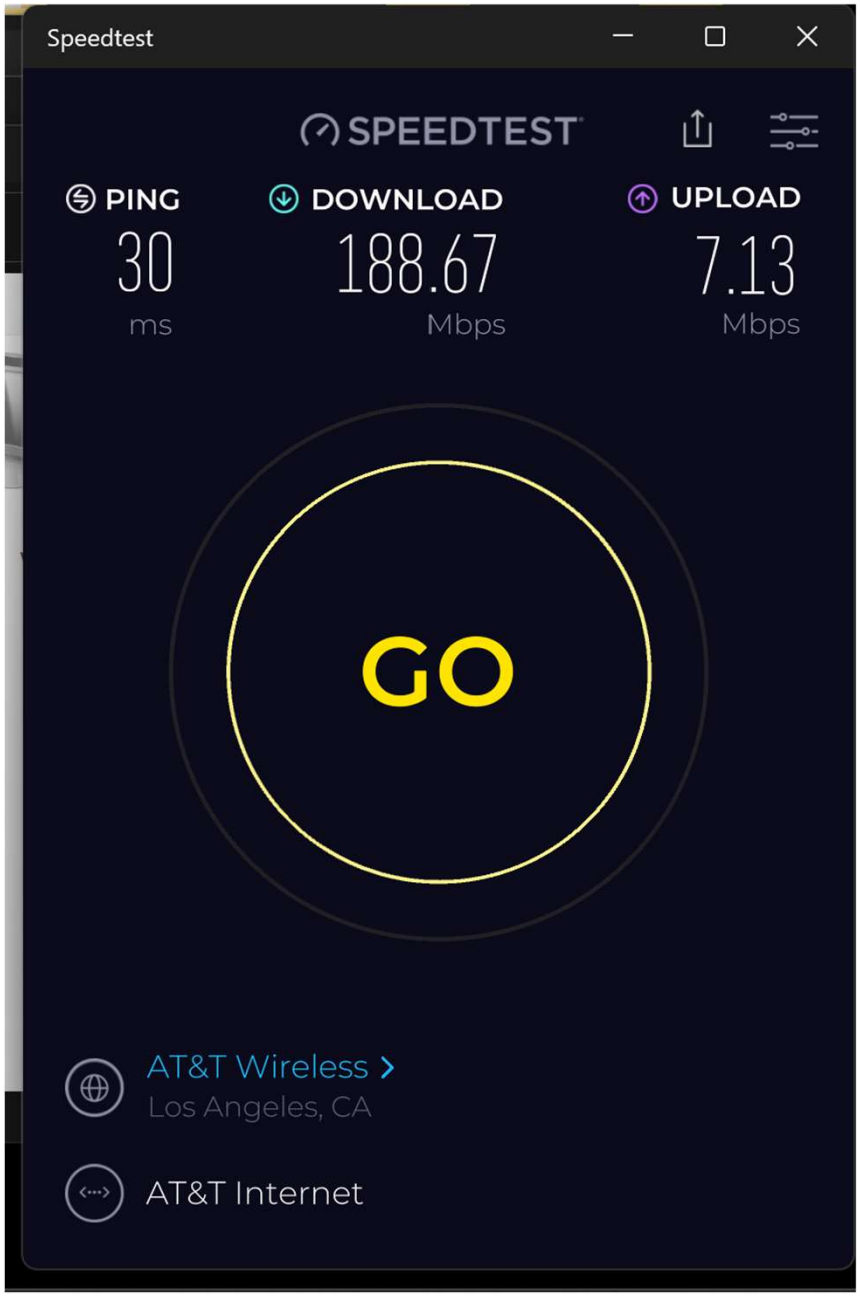
- Option 1:
  a CAT 6 cable or a CAT 7 cable or a CAT 8 cable
- Option 2:
  a "Powerline Networking" kit
- Option 3:
  a "Multimedia over Coax Alliance" (MoCA) kit


INTERNET PROVIDER'S GATEWAY BOX
ASUS MESH ROUTER #1
CAT 6/7/8 CABLING, OR
"POWERLINE NETWORKING" KITS, OR
"MULTIMEDIA over COAX ALLIANCE" KITS
USE "SPEEDTEST" TO MEASURE THE
INTERNET SPEEDS

CAT 8 ETHERNET CABLING

- CAT 8 Ethernet cabling is the baseline that we will use to compare the two wired-equivalent technologies:


INTERNET PROVIDER'S GATEWAY BOX
ASUS MESH ROUTER #1
75 ft. run of Cat 8 cabling


Speedtest
SPEEDTEST
PING
30
ms
DOWNLOAD
188.67
Mbps
UPLOAD
7.13
Mbps
GO
AT&T Wireless
Los Angeles, CA
AT&T Internet

"POWERLINE NETWORKING" KIT

- For most of us, a powerline networking kit is much easier and cheaper to install relative to a CAT 6 cable or a CAT 7 cable or a CAT 8 cable or an RG6 coax cable:

"POWERLINE NETWORKING" KIT (continued)

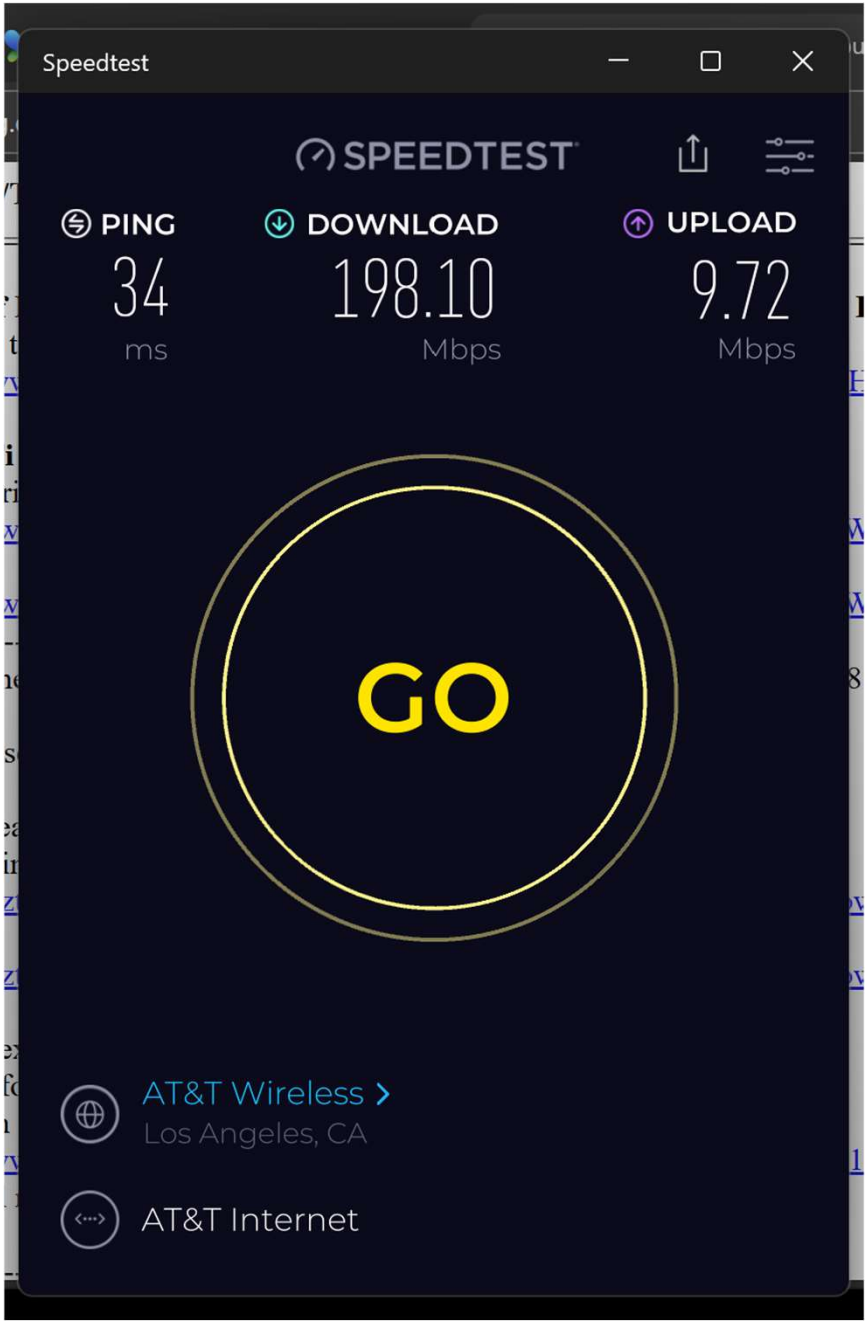
- This Powerline Networking kit is faster and less expensive than any other that we have ever tested: https://www.amazon.com/dp/B07TBJML4R

POWERLINE NETWORKING KIT

- ..from South wall to Northwest corner:

INTERNET PROVIDER'S GATEWAY BOX

ASUS MESH ROUTER #1

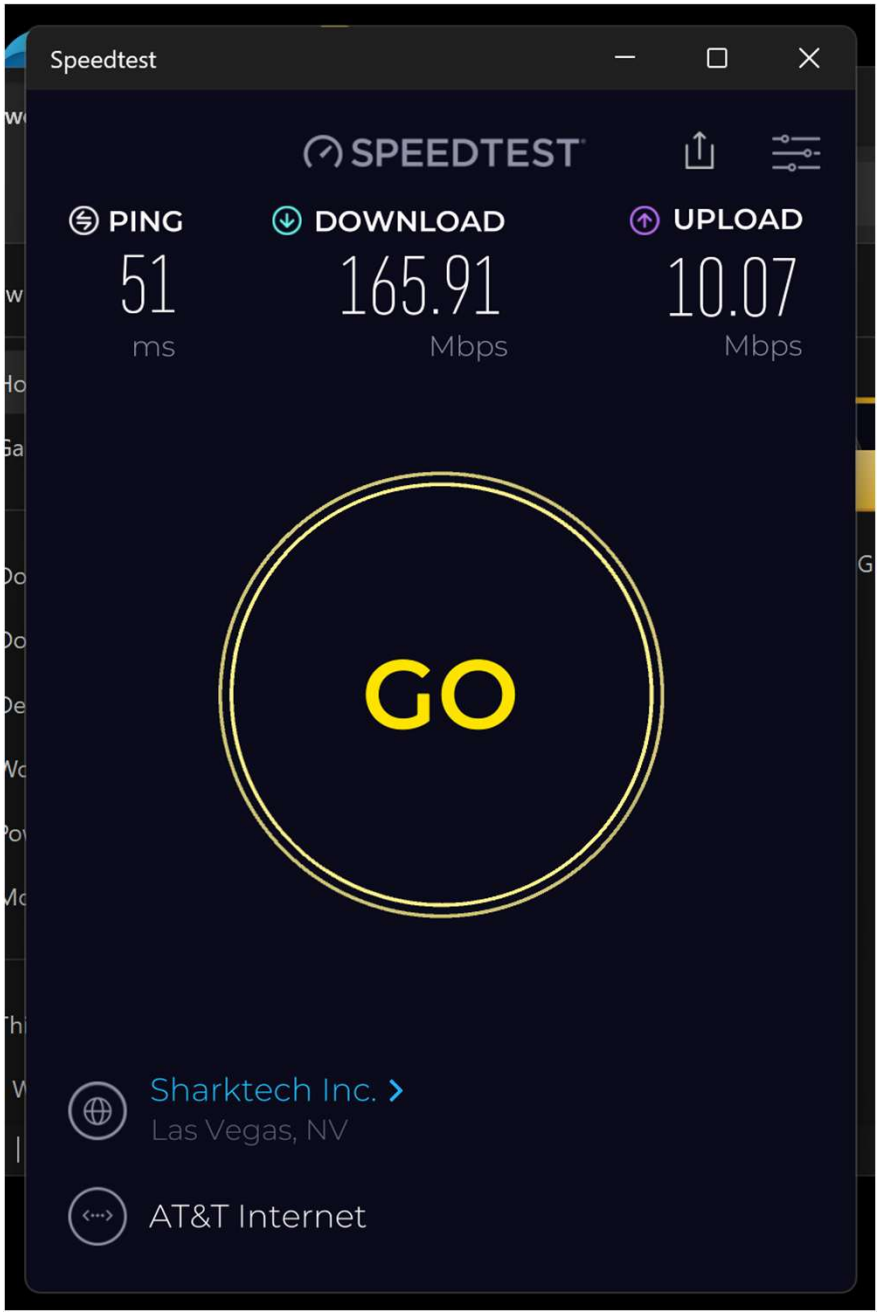

Speedtest
SPEEDTEST
PING
34
ms
DOWNLOAD
198.10
Mbps
UPLOAD
9.72
Mbps
GO
AT&T Wireless
Los Angeles, CA
AT&T Internet

POWERLINE NETWORKING KIT (continued)

- ..from South wall to center of the North wall:

INTERNET PROVIDER'S GATEWAY BOX

ASUS MESH ROUTER #1

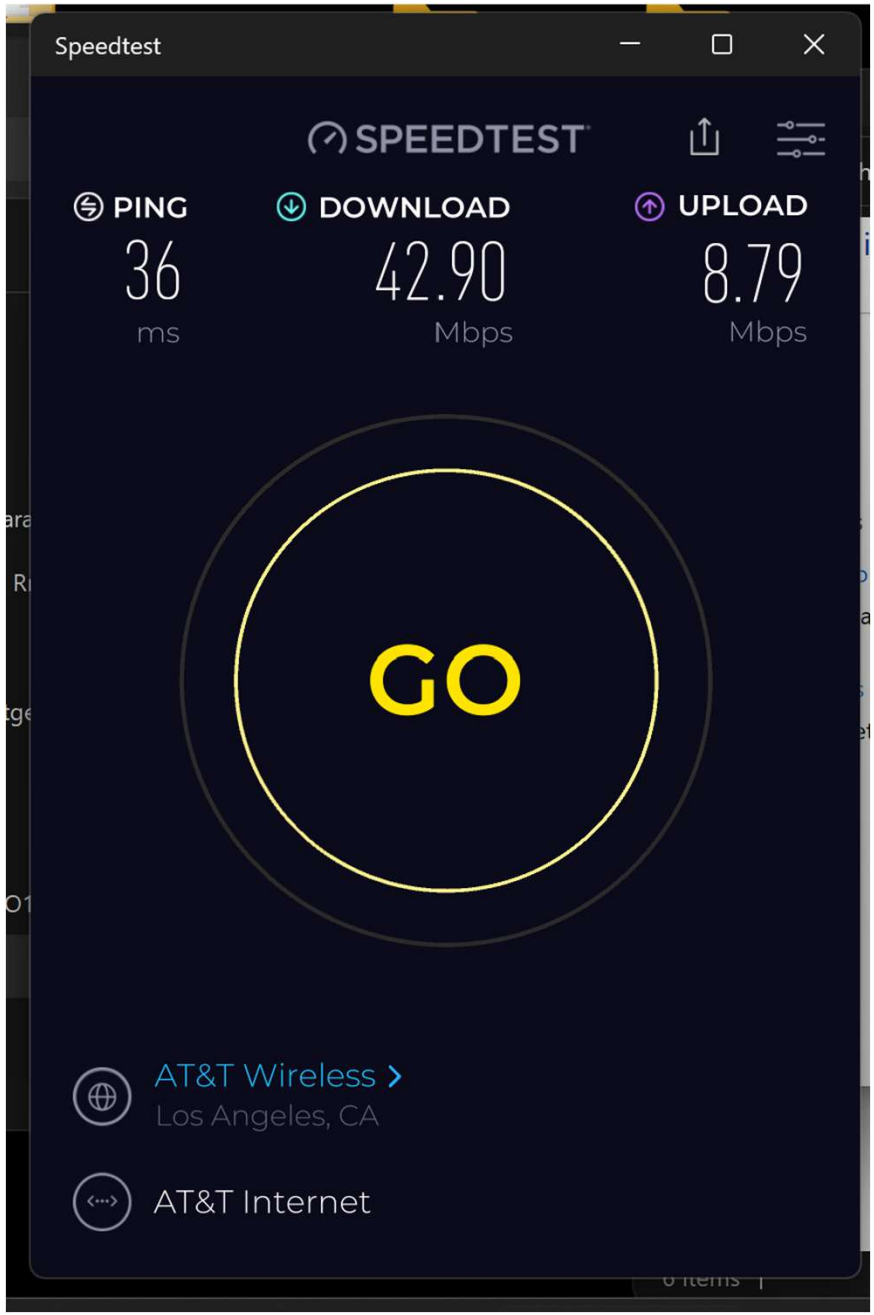

Speedtest
SPEEDTEST
PING
51
ms
DOWNLOAD
165.91
Mbps
UPLOAD
10.07
Mbps
GO
Sharktech Inc.
Las Vegas, NV
AT&T Internet

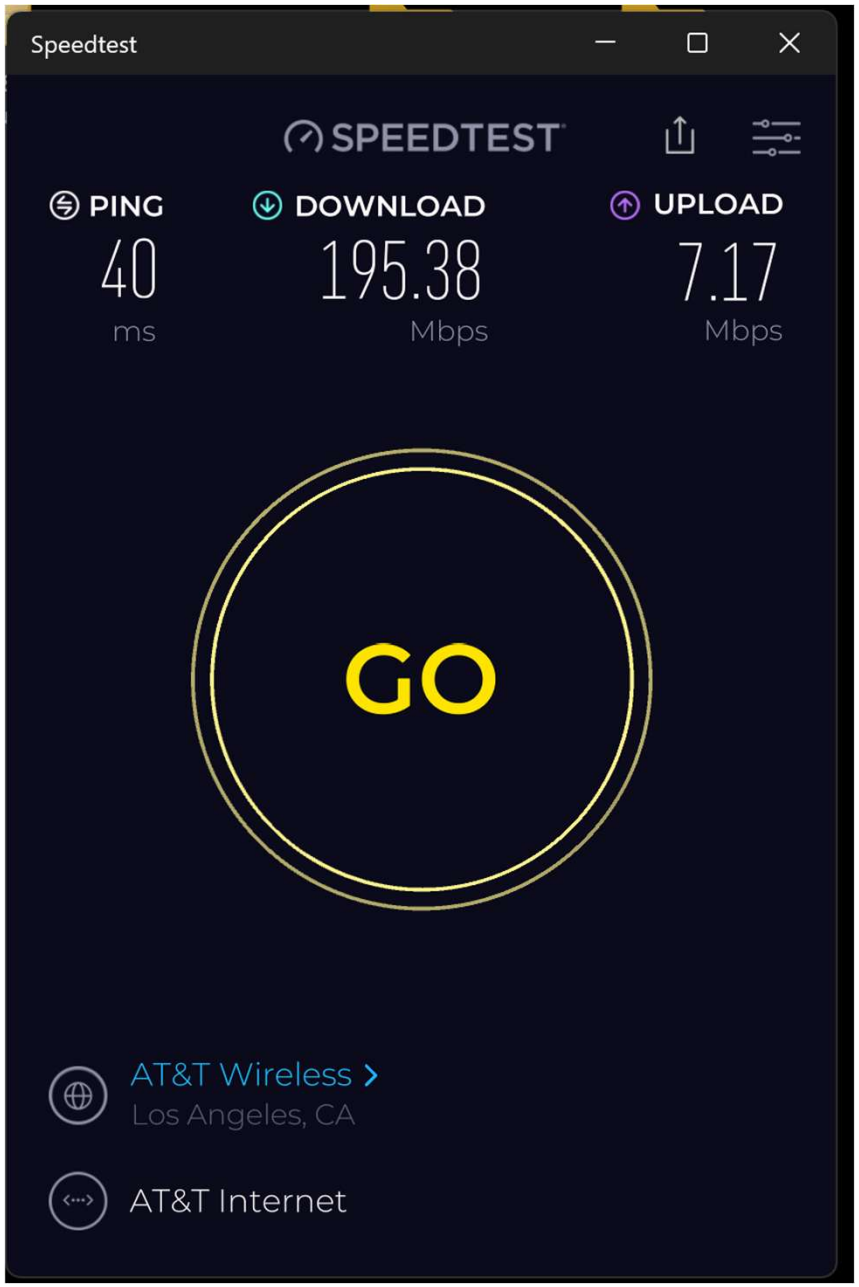
POWERLINE NETWORKING KIT

- ..from South wall to center of the Northwest corner, the Powerline Networking kit was as fast as Cat 8 cabling so you can find a combination of electrical outlets that can allow a Powerline Networking kit to operate as fast as Cat 8 cabling!!

INTERNET PROVIDER'S GATEWAY BOX

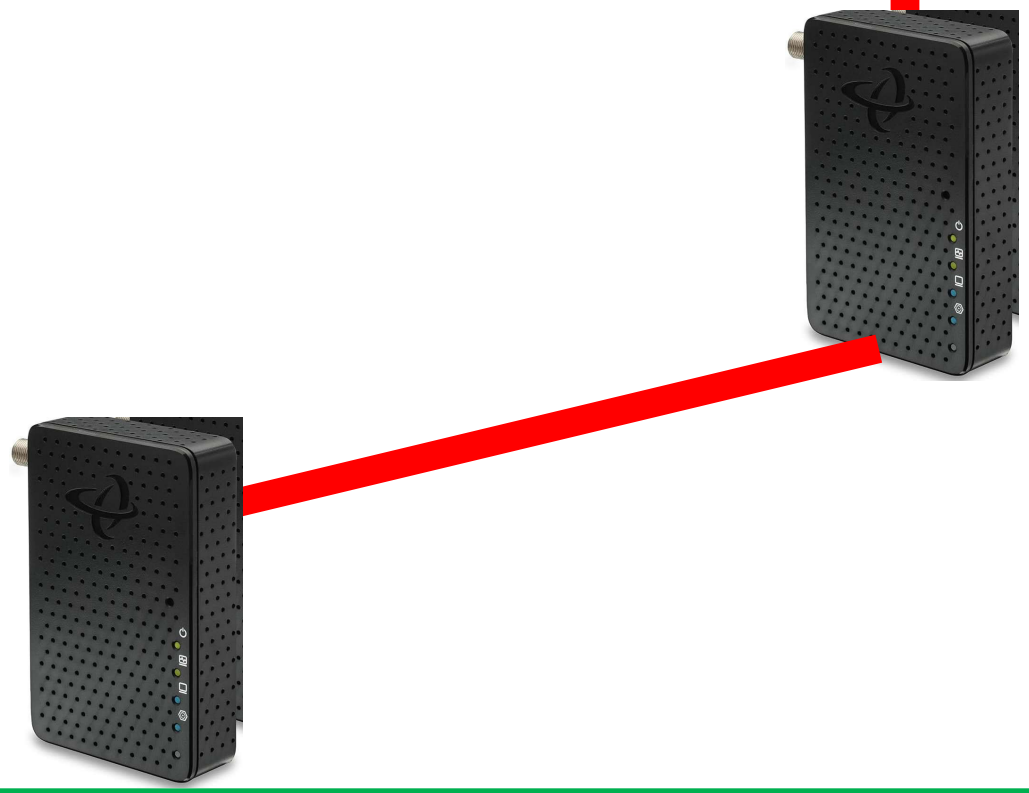
ASUS MESH ROUTER #1


Speedtest
SPEEDTEST
PING
36
ms
DOWNLOAD
42.90
Mbps
UPLOAD
8.79
Mbps
GO
AT&T Wireless
Los Angeles, CA
AT&T Internet


Speedtest
SPEEDTEST
PING
40
ms
DOWNLOAD
195.38
Mbps
UPLOAD
7.17
Mbps
GO
AT&T Wireless
Los Angeles, CA
AT&T Internet

INTERNET PROVIDER'S GATEWAY BOX

ASUS MESH ROUTER #1



MULTIMEDIA over COAX ALLIANCE (MoCA0 KIT

- This "G.hn Wave 2" MoCA kit is the fastest one that we have ever tested.
  It has a nominal local area network speed of 2.5 Gigabits per second in both directions:

MULTIMEDIA over COAX ALLIANCE ("MoCA") KIT (continued)

- https://www.amazon.com/dp/B0C47MJT83
- Unfortunately, I had to run 75-ohm RG6 coaxial coast from the South side of the house to the North side

INSTALL CAT 6 OR 7 CABLING FOR THE LOWEST COST OF ETHERNET CABLING (continued)

- and https://aztcs.apcug.org/meeting_notes/winhardsig/networks/Ethernet/Cat7-6-5-installation.pdf
  and
- https://aztcs.apcug.org/meeting_notes/winhardsig/networks/Ethernet/Cat7-6-5-installation.pptx

INSTALL CAT 8 CABLING FOR THE FASTEST POSSIBLE ETHERNET CONNECTION

- as explained at
  is explained at
  https://aztcs.apcug.org/meeting_notes/winhardsig/networks/Ethernet/Cat8-installation.pdf
  and
  https://aztcs.apcug.org/meeting_notes/winhardsig/networks/Ethernet/Cat8-installation.pptx

4: Wi-Fi ADAPTERS

by Francis Chao
fchao2@yahoo.com

Web location for this presentation:

http://aztcs.apcug.org
Click on
“Meeting Notes”

SUMMARY

You can probably add a Wi-Fi 6E adapter or a Wi-Fi 7 adapter to your existing Windows 10 or 11, MacOS, or Linux computer to speed up it's wireless connection to a Wi-Fi router.

TOPICS

- Netgear USB Wi-Fi Adapter
- Fenvi PCIe Wi-Fi Adapter
- BrosTrend USB Wi-Fi Adapter

NETGEAR USB Wi-Fi 7 ADAPTER

- Netgear's "Nighthawk" USB adapter works for any Windows 11 computer. It will not work in any Windows 10 or earlier computer and it will not work with any macOS computer: https://www.amazon.com/NETGEAR-Nighthawk-WiFi-Adapter-A9000/dp/B0F9HTJXXC/

NETGEAR Nighthawk WiFi 7 USB 3.0 Adapter (A9000) – BE6500 Tri-Band Wireless Gigabit Speed (Up to 6.5 Gbps) – 6 GHz Band – Works with Any Router or Mesh System – for Windows 11 PC

Visit the NETGEAR Store

4.5 ★★★★½ 1,077 ratings

Amazon's Choice

400+ bought in past month

Lowest price in 30 days

-10% $89.99

List Price: ~~$99.99~~

FREE Returns

Thank you for being an Amazon customer. Get $50 off: Pay $39.99 ~~$89.99~~ upon approval for Amazon Visa.

Available at a lower price from other sellers that may not offer free Prime shipping.

FENVI PCiE Wi-Fi 7 ADAPTER

- FENVI's PCIe Wi-Fi adapter works well for Windows 11 or 10 computers that have Intel processors: https://www.amazon.com/Tri-Band-802-11be-8774Mbps-Network-Motherboards/dp/B073GW9SW9/

Click to see full view

FENVi PCIE WiFi Adapter for Desktop WiFi 7 BE200 Tri-Band PCIe Network Adapter with 8774Mbps Speed and BT5.4, Compatible with Windows 11/10, Not for AMD Motherboards

Visit the F FENVI Store

4.3 ★★★★½ 338 ratings

$51.99

FREE Returns

Thank you for being an Amazon customer. Get $50 off: Pay $1.99 ~~$51.99~~ upon approval for Amazon Visa.

Brand	F FENVI
Hardware Interface	Bluetooth, PCI
Color	Red
Compatible Devices	Desktop, Keyboard, Laptop, Mouse, Tablet
Data Link Protocol	Bluetooth
Data Transfer Rate	450 Megabits Per Second

BROSTREND USB "Wi-Fi 6" ADAPTER FOR LINUX

- As of October 2025, no Wi-Fi 7 adapters are available for Linux computers.
- The following BrosTrend USB Wi-Fi adapter works for Linux or Windows 11 or 10 computers: https://www.amazon.com/BrosTrend-USB-WiFi-Linux-Adapter/dp/B0BTHQNK5S/

Click to see full view

BrosTrend AX1800 USB WiFi 6 Linux Compatible Linux WiFi Adapter for PC & Raspberry Pi 2+, Supports Ubuntu, Mint, Debian, Kubuntu, Mate, Zorin, Windows 11/10 etc, 2X Long Range Wi-Fi Antennas Dual Band

Visit the BrosTrend Store

4.2 ★★★★☆ 331 ratings

50+ bought in past month

$40.99

4: Wi-Fi ANALYSIS

by Francis Chao
fchao2@yahoo.com

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SUMMARY

To analyze and resolve Wi-Fi problems, you can install "Netspot Free Edition" into a Windows.., Android, or macOS or you can install the totally-free "Homedale" portable app into Windows.. or Android.

TOPICS

- Requirements for Analyzing Your Wi-Fi Environment
- Free Wi-Fi software for your computer and/or cell phone
- Received Signal Strength Indication (RSSI)
- Selecting the right Wi-Fi channel

REQUIREMENTS FOR ANALYZING YOUR Wi-Fi ENVIRONMENT

- A computer or cell phone that is capable of receiving and connecting to Wi-Fi signals in the 2.45 GHz radio frequency band and/or the 5 radio GHz frequency band and/or the 6 GHz radio frequency band
- A software app that runs in the operating system of the above computer or cell phone

"NETSPOT FREE EDITION"

- "Netspot Free Edition" is a product of the Etwok company which is located in Atlanta, Georgia
- **"NetSpot Free Edition"** is available for a Windows computer or an Android cell phone or a macOS computer.

"NETSPOT FREE EDITION" (continued)

- You can find **"Netspot.."** in the "Play Store" app of any Android cell phone. "Netspot.." is also available in the "Microsoft Store" of a Windows.. computer.

"NETSPOT FREE EDITION" (continued)

- To download and install the free "NetSpot Free Edition" for a Windows.. or macOS computer, use a Web browser to go to https://www.netspotapp.com/netspotpro.html
  Then scroll or page-down to get to the **free edition** of "Netspot Free Edition".

"NETSPOT FREE EDITION" (continued)

- The **free edition** of "Netspot Free Edition" will be near the bottom of the Web page.
  Then click on the "Download now" button, etc.

"NETSPOT FREE EDITION" (continued)

- "Netspot Free Edition" shows you any 2.45 GHz or 5 GHz or 6 GHz band transmitter-receiver "access points" that your wireless adapter is capable of receiving.

"HOMEDALE"

- **"Homedale"** is a free product of the "Cronon GmbH company which is located in Germany.
- **"Homedale"** runs in Windows.. and macOS
- You can download **"Homedale"** at https://the-sz.com/products/homedale/

RECEIVED SIGNAL STRENGTH INDICATION (RSSI)

- Measured by your Wi-Fi network adapter
- Unit-less value defined by the designer of a Wi-Fi network adapter
- 0 is highest signal strength while -100 is the lowest

RECEIVED SIGNAL STRENGTH INDICATION (RSSI) (continued)

- No direct relationship to milliwatts (mW) or decibels per milliwatt (dBm)

RECEIVED SIGNAL STRENGTH INDICATION (RSSI) (continued)

- If the RSSI of your device is lower than that of your neighbor's wireless routers then your wireless router or wireless extender is probably malfunctioning, especially since the strength of radio signals decline by the square of the distance.

RECEIVED SIGNAL STRENGTH INDICATION (RSSI) (continued)

- See https://en.wikipedia.org/wiki/Received_signal_strength_indication

RADIO FREQUENCY CHANNELS USED BY Wi-FI (continued)

- However, even if your computer or cell phone can detect 6 Gigahertz Wi-Fi signals, most of the previously-mentioned apps will mislabel 6 Gigahertz Wi-Fi signals as 2.45 or 5 Gigahertz Wi-Fi signals operating at the non-existent "Channel 0" or the non-existent "Channel -1"

ADDITIONAL INFORMATION ON Wi-Fi CHANNELS

- See also https://en.wikipedia.org/wiki/List_of_WLAN_channels