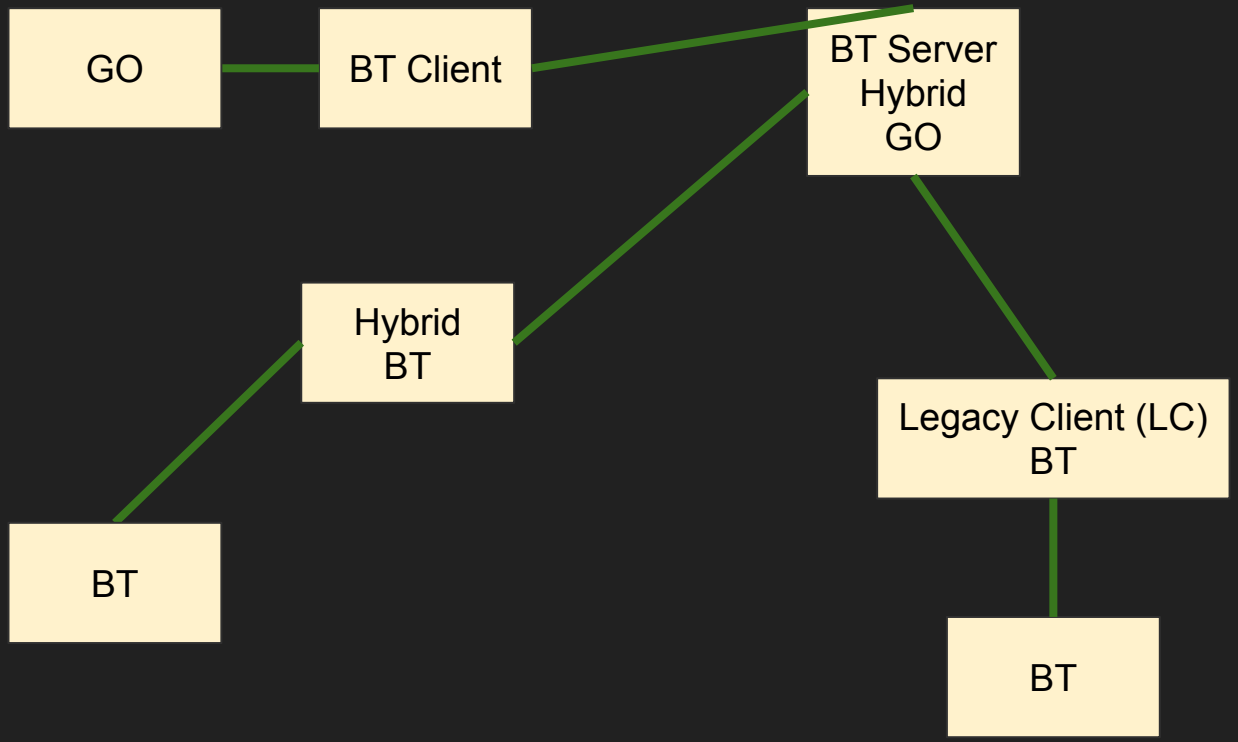
Mesh Connectivity

Abstract View

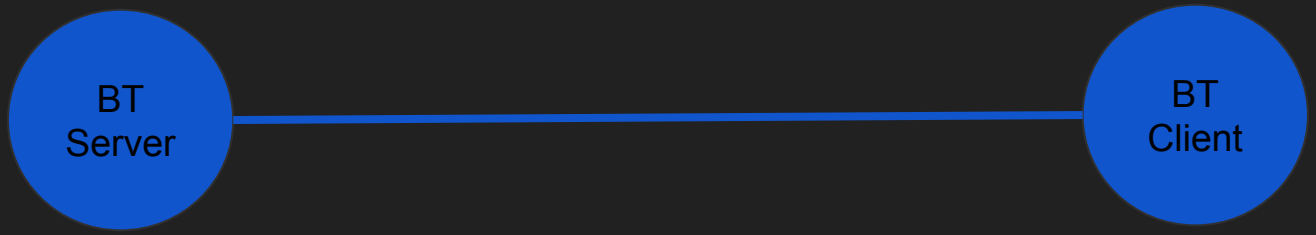
Sample Mesh topology



Connectivity Stack

1. BT
2. Hybrid
    a. Only hybrid
    b. Hybrid - Group Owner
3. WiFi P2P
    a. Group Owner
    b. Legacy Client

Bluetooth



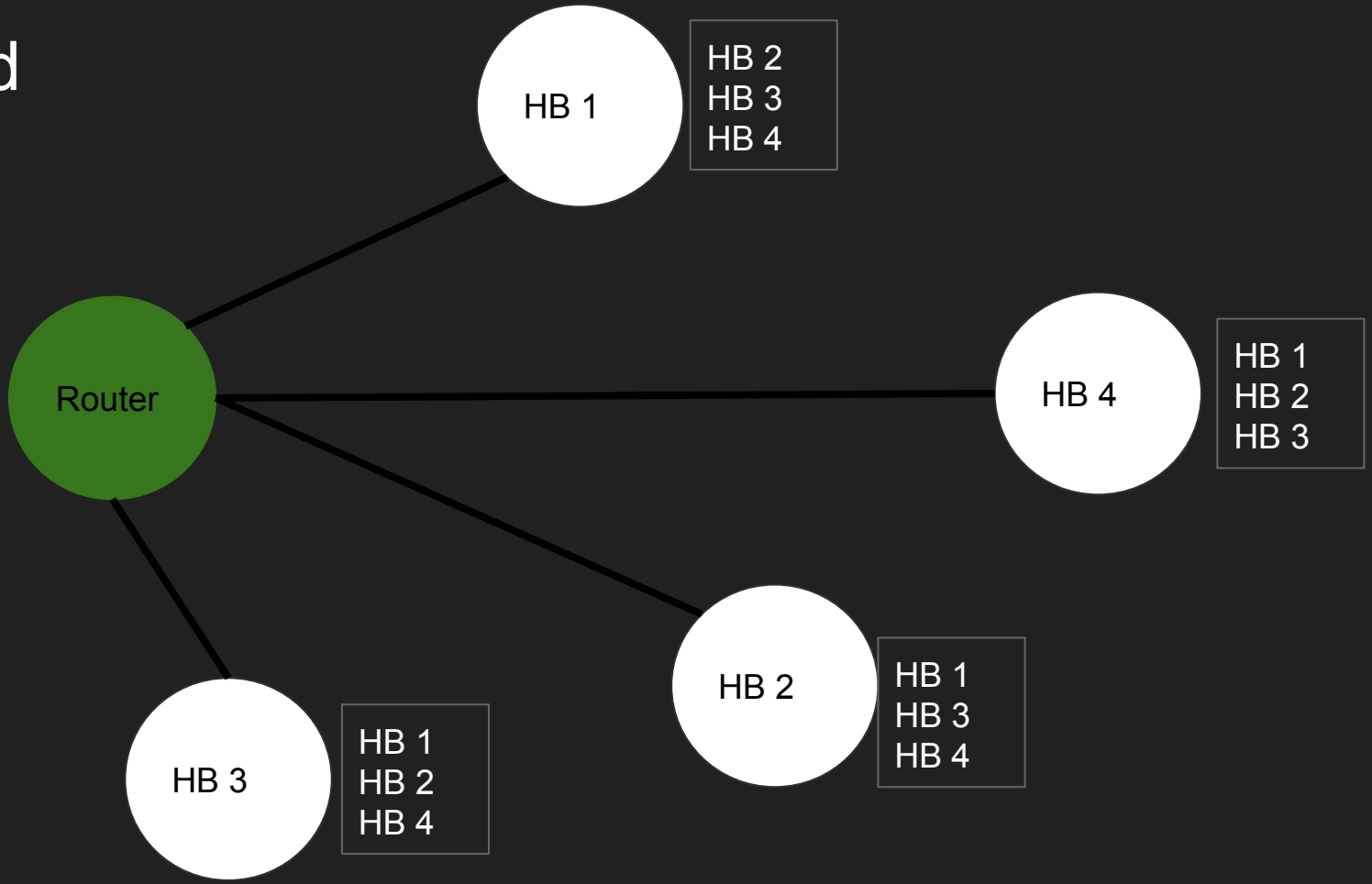
BT Advantages

1. Less discovery cost
2. Fast connection
3. Usable to extend network

BT Disadvantages

1. Persists connection
2. Less bandwidth
3. Less range

Hybrid


HB 1
HB 2
HB 3
HB 4
Router
HB 4
HB 1
HB 2
HB 3
HB 2
HB 1
HB 3
HB 4
HB 3
HB 1
HB 2
HB 4

WiFi Advantages

1. High BW
2. Long range as of WiFi

WiFi Disadvantages

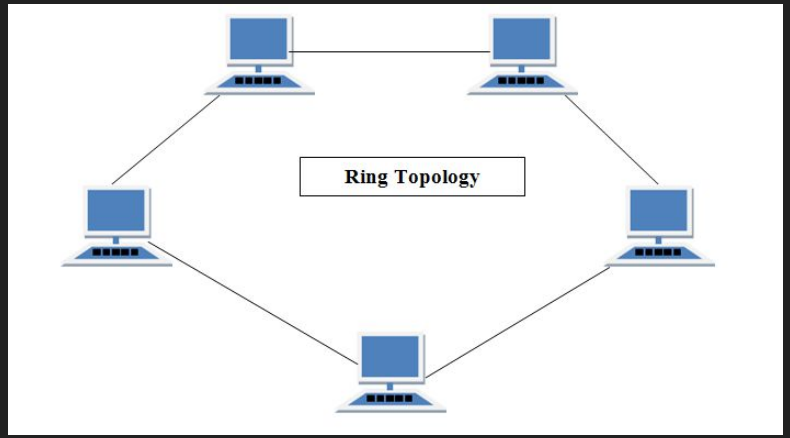
1. Persists connection
2. Scanning WiFi network scope is limited now with Android
    a. No scope from Android 10
3. Scanning cost energy
4. No way to create Hotspot from 8.0(Oreo) without dynamic system generated password
5. No scope to effectively create Hotspot in 7.1.X
6. Hotspot has very limited API support
    a. Mostly achieved with Java reflection

WiFi P2P

P2P (Close to Star)

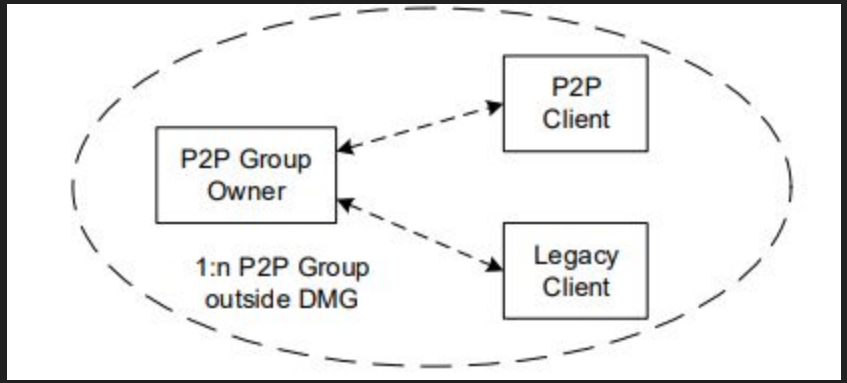
Client-Server or Star

WiFi P2P



RING TOPOLOGY

WiFi P2P


P2P
Client
P2P Group
Owner
Legacy
Client
1:n P2P Group
outside DMG

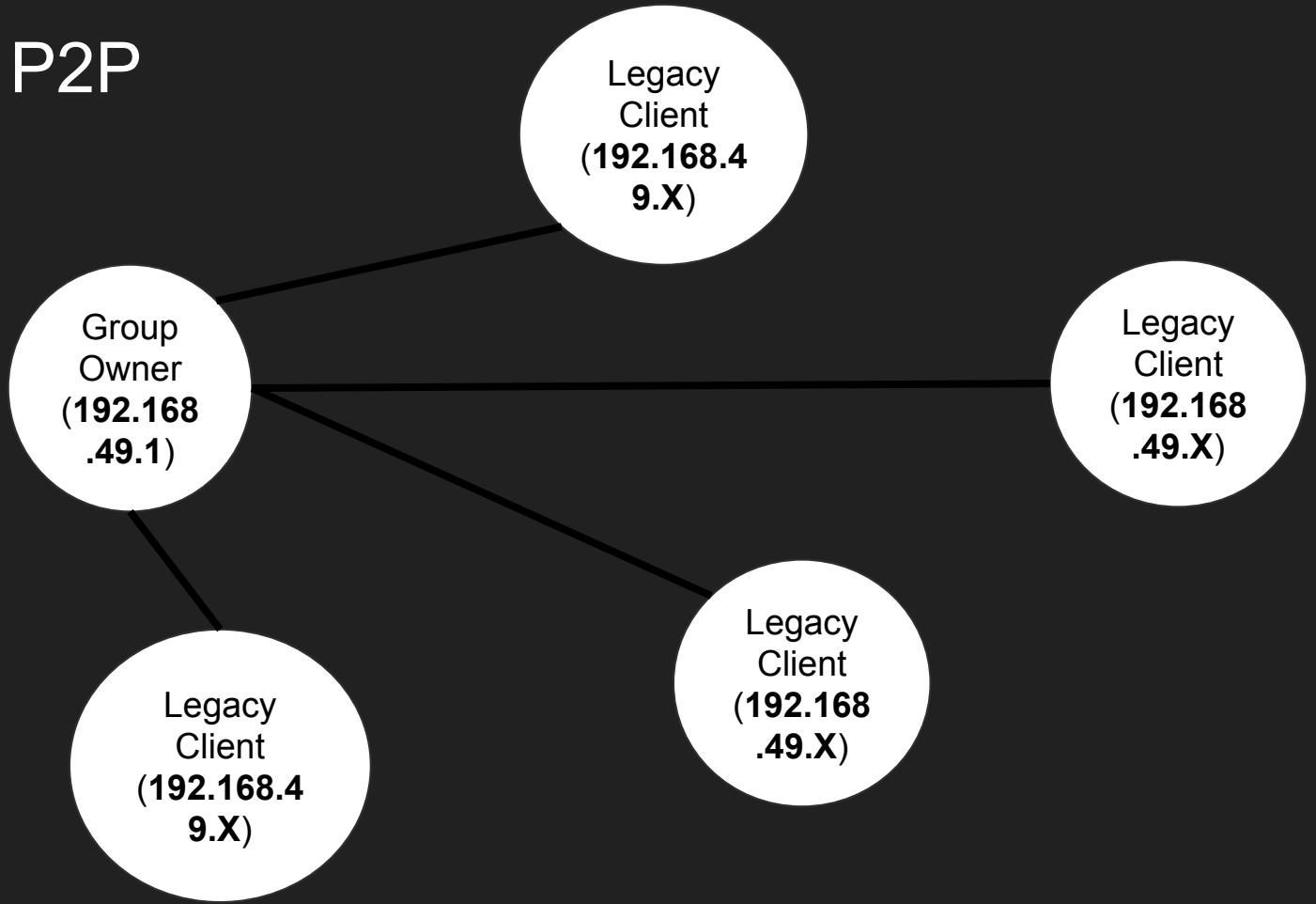
WiFi P2P

Let’s check a P2P feature

WiFi P2P - Breakthrough Points

- Enabling P2P does not hamper WiFi adapter existing behavior
  - Except if AP or hotspot
- Enabling P2P and participation in that group atypically does not require user interaction
  - Exception in Android 10

WiFi P2P


Legacy Client (192.168.49.X)
Group Owner (192.168.49.1)
Legacy Client (192.168.49.X)
Legacy Client (192.168.49.X)
Legacy Client (192.168.49.X)

WiFi P2P Advantages

1. No persistent connection
2. High BW
3. Long range as of WiFi

WiFi P2P Disadvantages

1. Enforce dynamic SSID and password from system
    a. From Android 10 customized SSID, password is possible
2. Good part is that we can bypass above

Risks with our P2P approaches

1. Legacy Client side connection API is being limited

Potentiality of our P2P approaches

- Dual band going to be supported
- WiFi Easy connect
  - Possibility of having some indifferent path as this is replacement of WPS
- Android 10 allows fixed SSID and password GO
  - An exploitable feature
- Full WiFi Mesh with traditional hotspot or AP
  - *Already working on this*

NEXT

How much I missed, simply because I was afraid of missing it

THANKS

References

1. WiFi p2p technical specification
2. developer.android.com
3. source.android.com