

# ***BVCC General Meeting***

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**“Do You Need a Mesh WiFi Router?”**

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# Overview

- **Factors that affect WiFi Coverage**
- **Solutions to WiFi coverage problems**
- **Why a "mesh" router system can be a better solution**

# Factors That Affect WiFi Coverage

- **WiFi signals affected by distance AND by objects between router and device**
  - Furniture, walls (wood, brick, metal), angle of passage through walls, full storage closets
  - centralized router location not always possible
  - 5 GHz (faster & more channels) more affected by objects than 2.4 GHz band

# Factors That Affect WiFi Coverage

- **Interference from neighbors' WiFi**
  - **2.4 GHz (which travels better through walls) only has only 3 channels that don't partially overlap (1, 6, 11)**
  - **All it takes is 3 neighbors with WiFi and there are likely places in your house where one of their 2.4 GHz signals competes with and may be stronger than yours**

# Factors That Affect WiFi Coverage

- **If your router WiFi signal is weak or competing with strong interference, your devices either can't connect successfully or the connection will communicate at a slower speed.**

# Solutions to WiFi Coverage

- **Add additional WiFi "access points" (a WiFi transmitter/receiver) nearer to areas with marginal WiFi, and connect those access points to your main WiFi router by some means**
- **Use Wi/Fi access points with more powerful transmitters, more sensitive receivers – upgrade capability of existing devices you need to connect (may not be possible)**

# Solutions to WiFi Coverage

- **Business enterprise solutions tend to be too expensive and complex for home use.**
- **Affordable home solutions until recently were limited to**
  - **WiFi extenders**
  - **Using an additional WiFi router**

# WiFi Extenders

- **Simple configuration – connect to existing WiFi and it becomes another access point with different SSID but same password that relays communication from any connected devices to the main WiFi router as if they were connected to the main router.**
- **Downsides:**
  - **Consumes part of WiFi bandwidth talking with main router**
  - **Requires finding an intermediate location between main router location and location with bad WiFi reception where WiFi Extender has acceptable WiFi to both locations – not always possible.**
  - **Small-sized extenders may not have as much range as a typical WiFi router**
  - **A device must explicitly connect to main router or to the extender**



# A WiFi Router as Access Point

- **To work well and not end up with devices in your home that can't talk to each other, requires special configuration of the router – typical router manuals don't provide much help on how to do this.**
- **Requires a wired Ethernet connection between the access-point WiFi router and the main WiFi router – might not be easy to do if you are using WiFi to that part of the house because you don't have wired Ethernet there.**
- **Uses a different SSID, and a device must explicitly connect to main router or to the alternate access-point router.**

# Drawback of Above Approaches

- **Device is "aware" it is talking to a distinct WiFi source**
  - **Device will possibly have a different LAN IP address assigned depending on which WiFi access point is used.**
  - **An application running on a mobile device being moved around the house may see a disruption of service when the transition to a different access point occurs**

# An Alternative – Mesh Routers

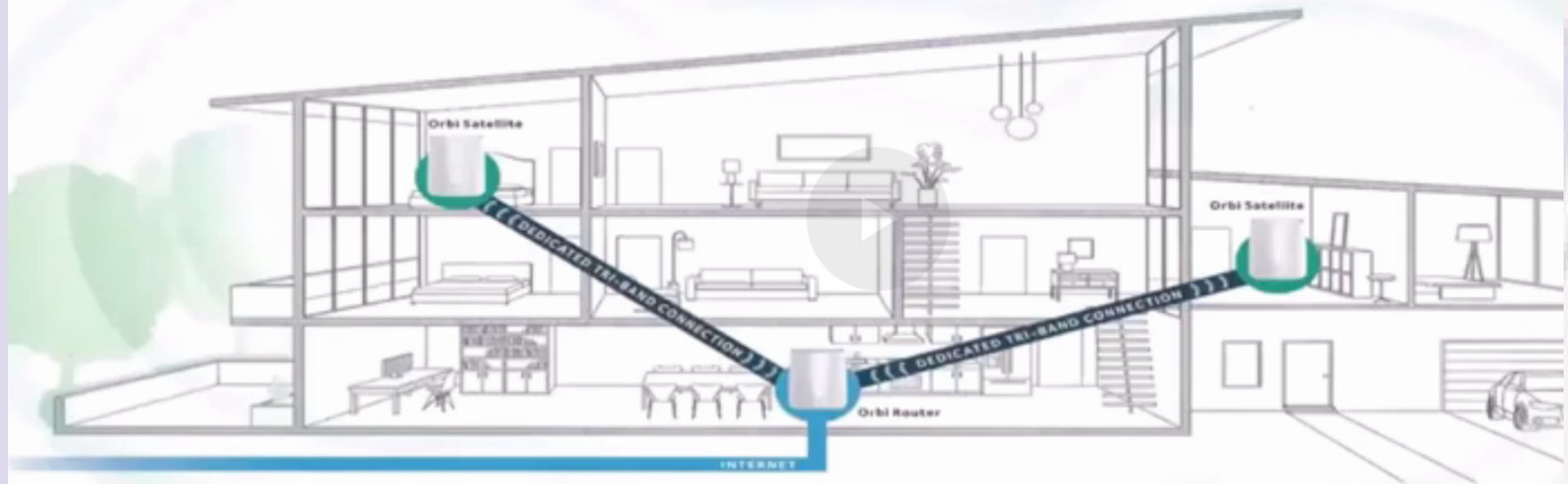
- **Mesh Router system consists of a router and one or more "Satellite" access-point devices, that behave like a single WiFi router with antennas in multiple locations.**
  - **Named for LAN connection topology – a WiFi device acts as if it is connected to all the access points at the same time**
  - **Cox Panoramic WiFi is most-likely an example of a mesh router**
  - **Depending on models, the interconnection between router and satellites could either be a wired Ethernet cable, or a wireless RF connection**
  - **Mobile devices should seamlessly transfer to the best access point when moving around the house**

# Mesh Routers

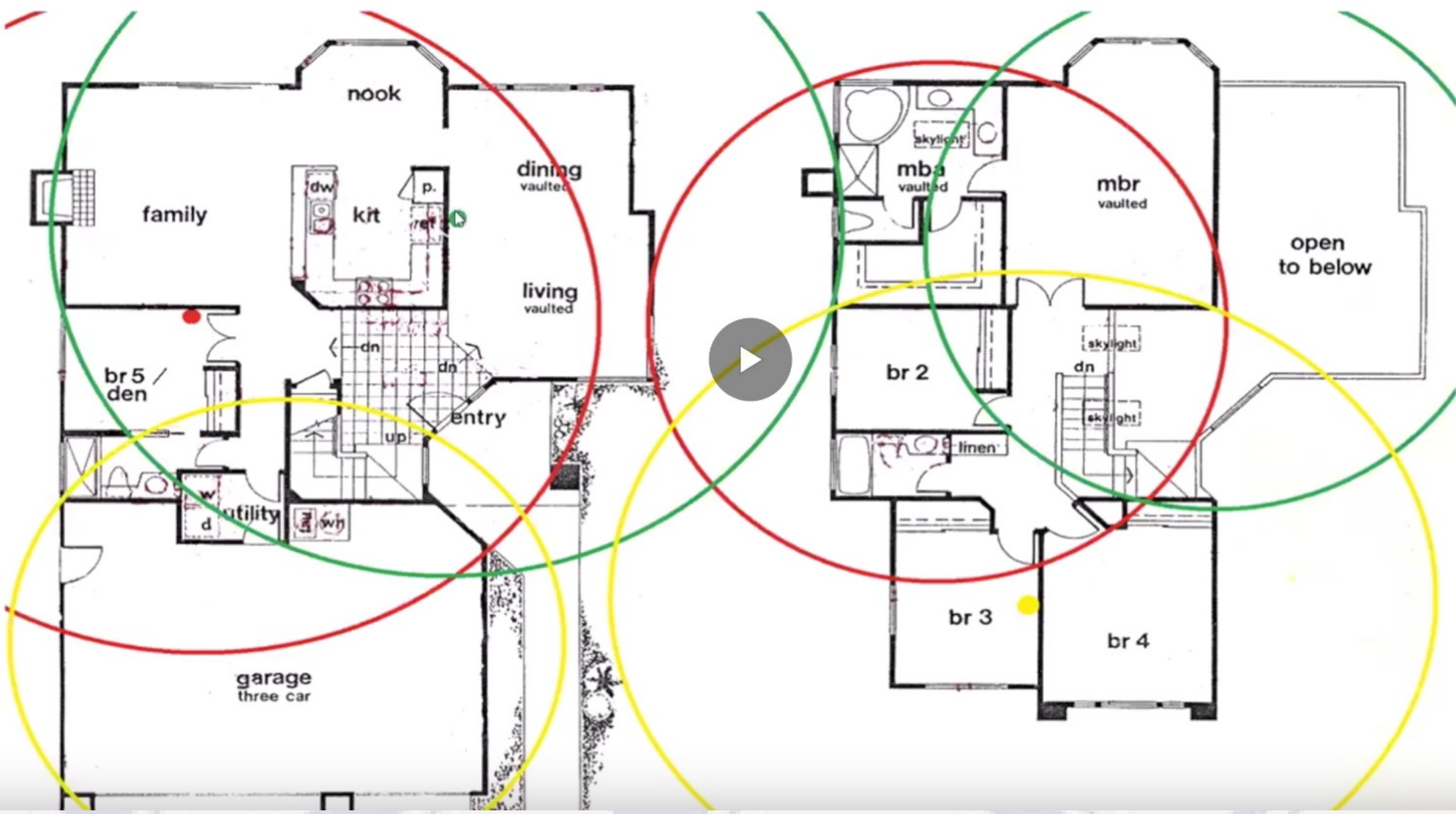
- **Depending on models, the interconnection between router and satellites could be either a wired Ethernet cable, or a wireless connection.**
  - typically wireless
  - Uses an RF signal frequency and protocol that is separate from and does not take up part of the user-device WiFi signal bandwidth.
  - Establishes RF connection directly with router if possible, via another satellite if not possible ("star" vs "daisy chain" topology).

# Orbi Typical Coverage

7,500 Square Feet of Orbi WiFi Coverage



Dedicated Tri-band Connection ensures devices connect directly to maximum internet speeds



# Mesh Routers

- **A number of mesh routers are now available for home use at Wal-Mart, Best Buy, on-line, etc.: Google Wifi, Netgear Orbi, TP-Link Deco, Samsung SmartThings**
  - **Typically packaged with one or two satellites and additional satellites can be separately purchased for really large houses**
  - **Price range (router + 1 or 2 devices) – \$200 - \$300+, roughly comparable to the price of two upscale routers.**
  - **Netgear Orbi (AC3000 version) top rated in performance in 2019, Samsung SmartThings rated as least expensive**

# Mesh Routers

- **Netgear Orbi offerings are confusing – multiple models with multiple WiFi speeds, model numbers, and kit numbers, all called Orbi. so if you think you've found a great deal, carefully check the AC rating and how many satellites are included.**
  - **Current top of the line AC3000 model in a kit with one satellite is RBK50, \$322 (with tax) from Amazon. Additional AC3000 satellites are model RBS50, but only need more satellites for exceptionally large houses. The router by itself is RBR50.**
  - **Bottom of the line is an AC2200 model kit RBK30 with one satellite that directly plugs into an outlet and has no Ethernet ports. This was recently on sale at Wal-Mart for \$150 (now \$199)**
  - **Then to be really confusing there is a slightly more expensive AC2200 kit RBK22 that is like RBK30, except the satellite is larger with an external AC adapter and has several Ethernet ports on the satellite.**
  - **There is supposedly a new, faster (AX6000), more expensive (\$700, w one satellite) Orbi model coming out in October.**



# My House

- **2450 SqFt with 2<sup>nd</sup> floor work area on the SE corner and my office area in NW corner of 1<sup>st</sup> floor. Need good WiFi at extreme corners of house – not possible with one router at either of those locations.**
- **Best semi-central location for WiFi router in stairwell closet results in no 5 GHz and weak 2.4 GHz signal in my office (obstructions: 5 walls, metal fireplace box, large closet filled with many boxes), and marginal 5 GHz signal in Living Room for Roku box w main TV (obstructions: 4 walls, one at steep angle, full kitchen cabinets, etc.)**
- **Have tried various routers and combinations over last decade, including WiFi router in office with a 2<sup>nd</sup> Ethernet-connected WiFi router upstairs.**
- **Realized my current AC1900 router was ancient by technology standards (just over 4 years old). Time for an upgrade. Wanted something advanced enough to last another four years – chose Netgear Orbis AC3000 router + 1 satellite.**

# Netgear Orbi AC3000 (RBK50)



# Netgear Orbi AC3000 (RBK50)

- **Peak total throughput 3000 Mbps (three concurrent WiFi devices) – peak 802.11ac performance to one device, 552.1 Mbps**
- **Peak range (router only) 150 ft**
- **Gigabit Ethernet ports: router: 3 LAN + 1 WAN; satellite: 4 LAN**
- **USB 2.0 port on router & satellite: shared printer, some have used shared hard drive (not officially supported)**

# Orbi Setup

- **Router needs power & Internet access on WAN port, Satellite(s) need only power**
- **Power up router & wait for solid white ring light**
- **Turn on 1<sup>st</sup> satellite – after white ring wait for signal strength indication (blue, amber, magenta)**
- **Repeat for additional satellites**

# Orbi Setup

- **Can use computer connected to any Orbi unit via Ethernet cable, or via WiFi using smart phone or other computer devices with WiFi and default WiFi settings on Orbi Router**
- **Use Netgear Orbi app (smart phone or tablet), or via web browser and [orbilogin.com](http://orbilogin.com). Orbi app can also be used to control router after setup.**

# Orbi Setup

- **Change SSID, WiFi network key, admin login password**
- **Register your Orbi system with Netgear – this will get an annoying number of promotional emails per week (unsubscribe from all but security/firmware updates)**
- **Check for firmware updates**

# Orbi Setup – Firmware Updates

- **Each Orbi unit must have same firmware update – takes about 5 min?. Setup interface suggests reasonable to update all units concurrently, but never got completion indication. After 30 minutes, cycled power on all units, and was able to talk to router again.**
- **Subsequent research suggests one should update satellite first, then after that succeeds do the router.**
- **If get into a state where the router is unable to find the satellite device automatically, go through the procedure for adding additional satellites using the Sync button.**

# Orbi Setup

- **Many other options as typical for most routers**
- **Supports parental controls – works with "Disney Circle" subscription service**
- **Also interfaces with Alexa**
- **Can subscribe to Netgear Armor (Bitdefender) for \$70/yr for additional security at both router and device level**





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Logout

Router Firmware Version V2.3.5.30

Auto

BASIC ADVANCED

- Home
- Internet
- Wireless
- Attached Devices**
- Parental Controls
- Guest Network
- Add Orbi Satellite

Attached Devices

1		AppleTV 4 192.168.1.100	192.168.1.100	D0:03:4B:F0:53:16	5G	Orbi Router 78:D2:94:C1:31:34
2		Apple liz iPad 192.168.1.93	192.168.1.93	8C:FE:57:0E:E7:54	5G	Orbi Router 78:D2:94:C1:31:34
3		---	192.168.1.101	D8:31:34:33:C0:EE	5G	Orbi Satellite-1 78:D2:94:C1:7D:1A
4		Apple jce iPad 192.168.1.99	192.168.1.99	34:51:C9:F1:C0:25	5G	Orbi Satellite-1 78:D2:94:C1:7D:1A
5		Linux PC bp6375 192.168.1.102	192.168.1.102	10:BF:48:D6:8F:30	Wired	Orbi Router 78:D2:94:C1:31:34
6		Apple jce iPhone7 192.168.1.98	192.168.1.98	B8:53:AC:31:F2:81	5G	Orbi Satellite-1 78:D2:94:C1:7D:1A
7		Apple liz iPhone 192.168.1.92	192.168.1.92	70:14:A6:49:A4:6C	2.4G	Orbi Router 78:D2:94:C1:31:34
8		SmartHome smarthome Insteon hub 192.168.1.96	192.168.1.96	00:0E:E3:39:F8:81	Wired	Orbi Router

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Help Center

Show/Hide Help Center

# Orbi Experiences

- **Only a single SSID for 2.4 GHz & 5 GHz**
- **Default LAN subnet base IP address was 192.168.1.0**

# Performance

- **For a 1.9 GiB sftp file, data transfer between two computers on my LAN ran at approximate rates of**
  - **340 Mbps – satellite WiFi → router Ethernet**
  - **360 Mbps – router WiFi → router Ethernet**
  - **390 Mbps – satellite Ethernet → router Ethernet**
  - **930 Mbps initial, dropping to 740 Mbps – router ethernet → router ethernet**
  - **peak transfer if any WiFi/RF involved is reduced but still respectable**
  - **There is some bottleneck in my gigabit Ethernet infrastructure (computers, router, or switch) that keeps sustained transfers below 930 Mbps**
  - **Any device trying to communicate with 150 Mbps Internet service should not be constrained by my LAN**

Questions

BWS