How to get the best out of Mesh WiFi @ Home

Agenda

- Wi-Fi Mesh Technologies @ Home
- An Overview of WDS
- Wi-Fi Easy Mesh
- IEEE 802.11s (Wi-Fi Mesh)
- Wi-Fi SON – Self Organizing Networks
- Multiple Mesh Technologies - Pros & Cons
- Qubercomm’s NMesh overview
- Throughput & Other Metrics

WiFi Mesh Technologies @ Home Today

WDS

Wi-Fi Easy Mesh

NMESH

Adaptive Network Intelligence

Wireless Mesh

WiFi SON

WDS

WDS stands for Wireless distribution System and this is supported by all AP vendors.

Connect all the Wireless Access Points in a home wirelessly

Wireless bridging - AP-AP communication only. Wireless STA connections are not allowed.

Connection uses 4 address frame format as specified in IEEE 802.11 Specification

Repeater - Both AP-AP & STA-AP connection are allowed

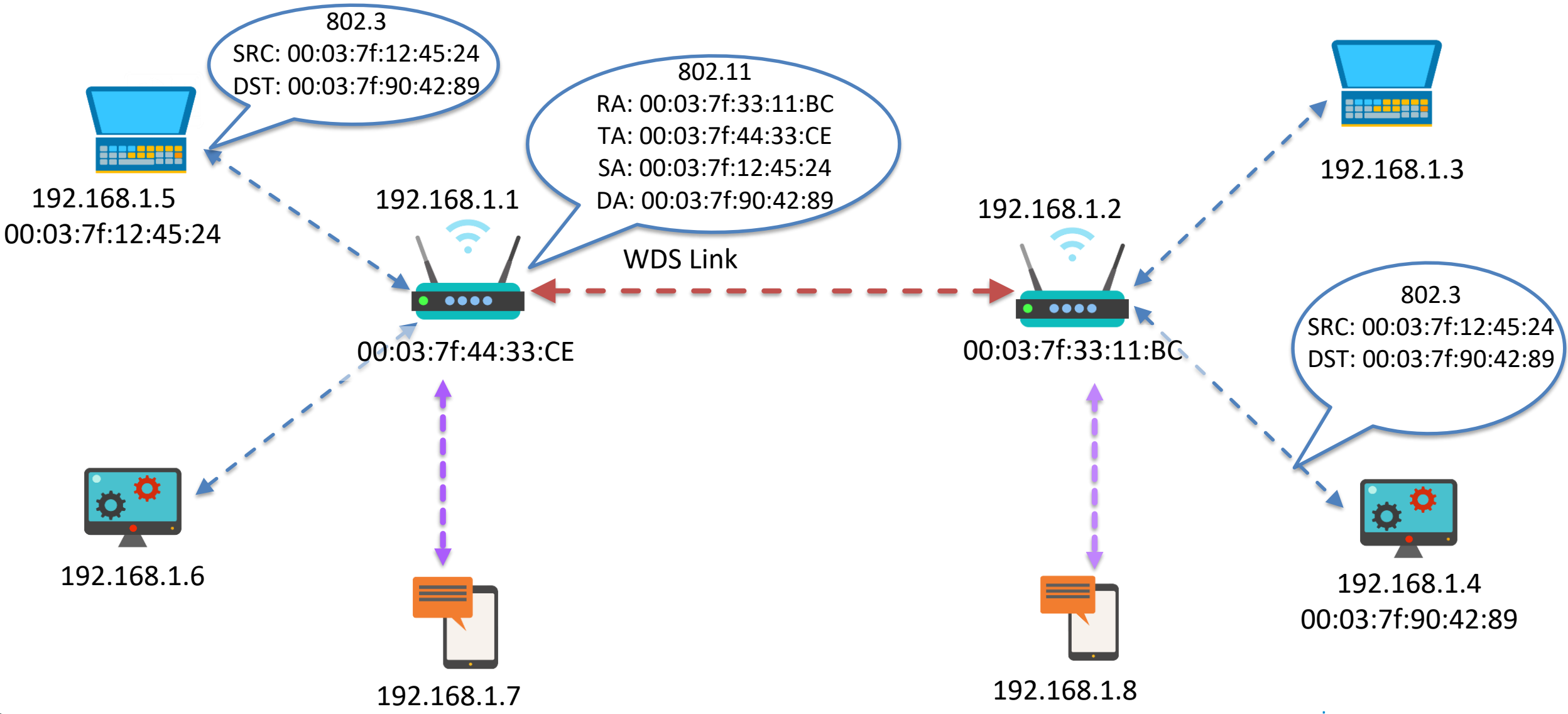
Enables wireless bridging functionality as it preserves the originator's MAC address across wireless links

Each hop reduces the throughput by 50% due to half duplex nature of wireless.

Implementation differs from vendor to vendor

Not interoperable with other AP vendor's product. Even same vendor APs do not work reliably

WDS



Ubercomm
Compute. Connect. Cloud

WiFi Mesh (IEEE 802.11s)

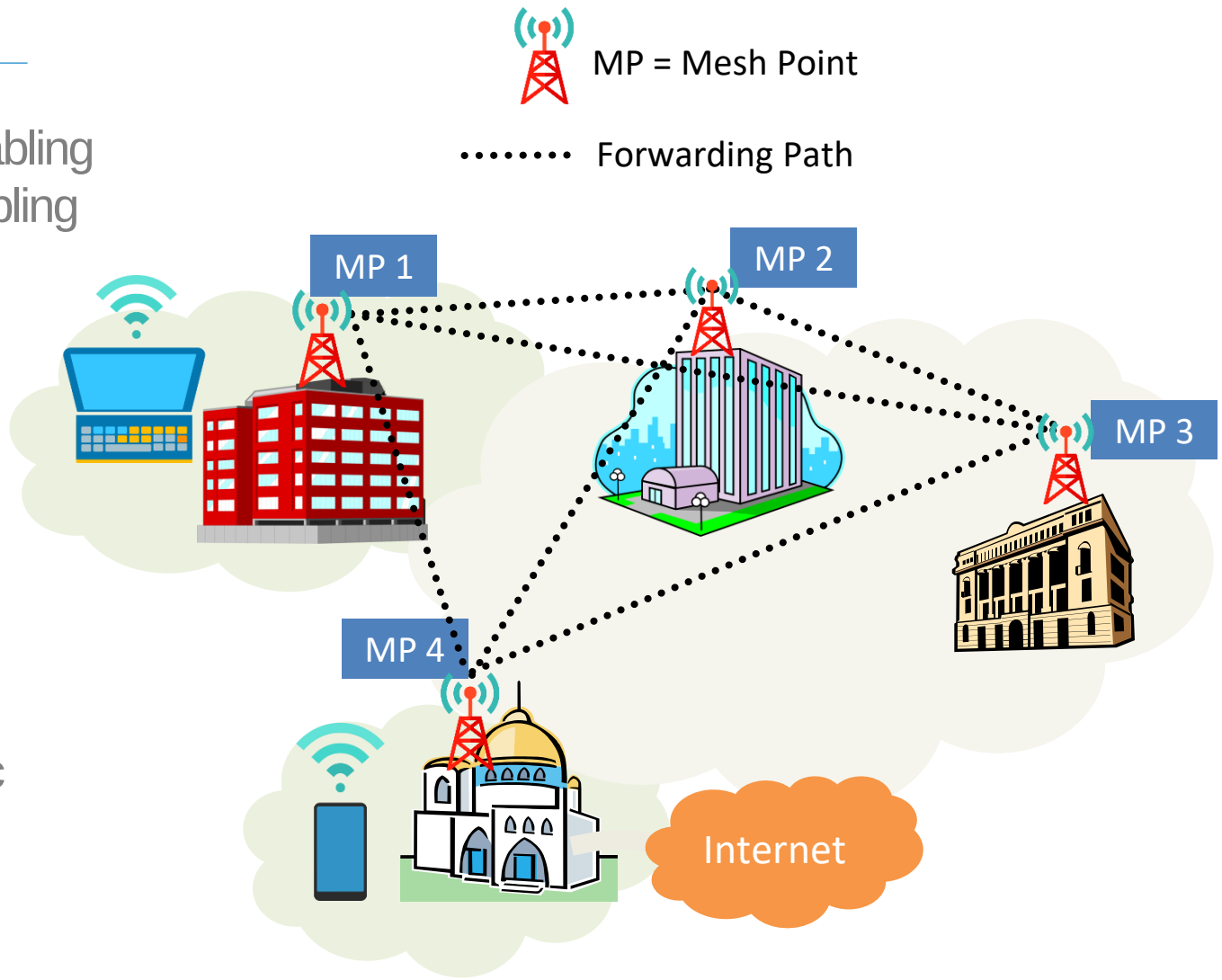
Provides Flexibility. Avoids additional cabling costs. Also alleviates 100m ethernet cabling limitation.

Shortest path selection as compared to fixed cable path in wired link.

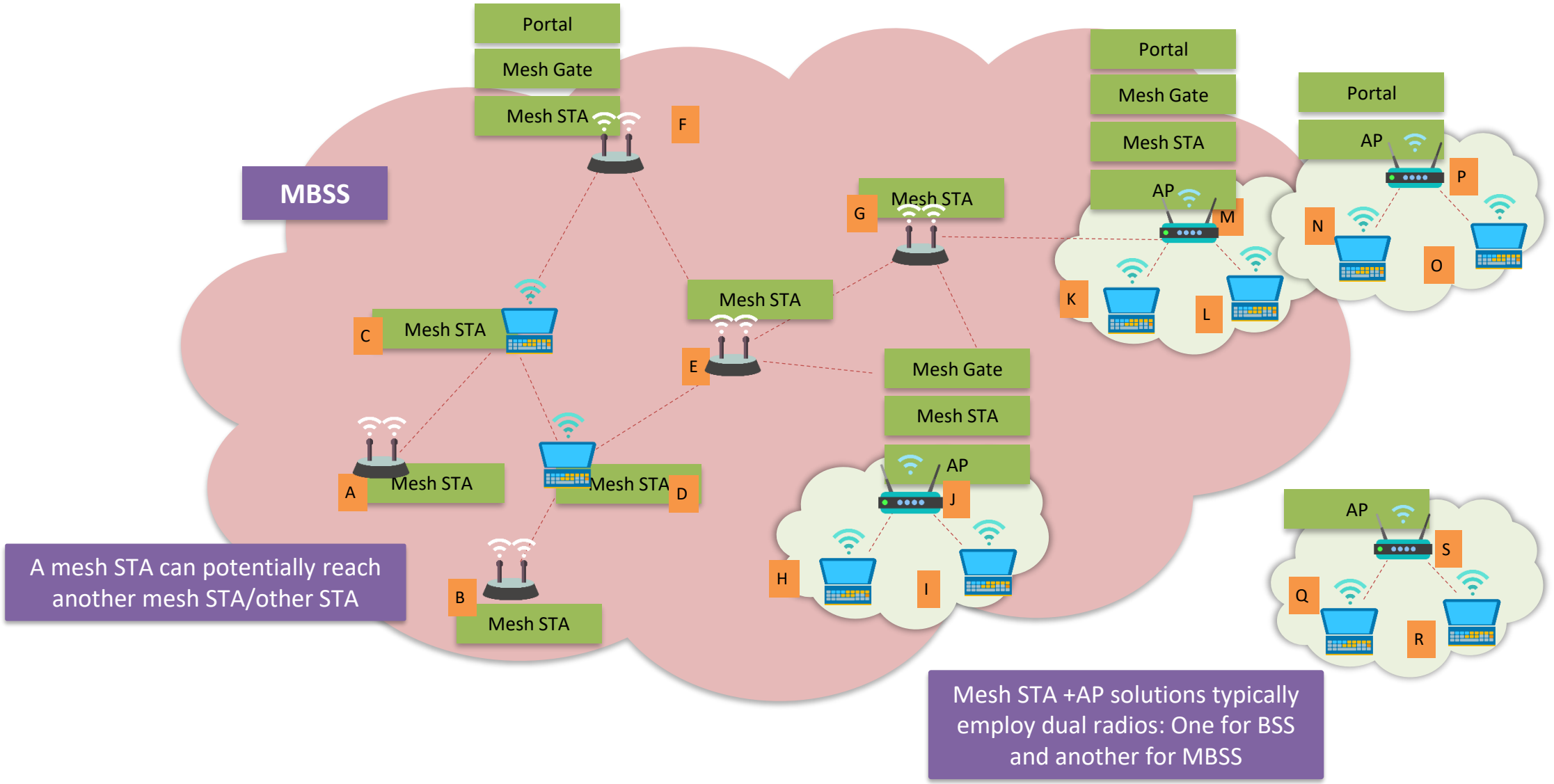
Self forming - Easy mesh network expansion

Self healing - Specs supports automatic fail over

Suitable even for Large campus / Stadiums



Sample Mesh Network



Wi-Fi SON (Self Organizing Network)

Wi-Fi SON offers infrastructure to configure and manage Wi-Fi networks much easily. Allows the devices to be on boarded with a click of a button and finally selects the best link for every device in the Wi-Fi mesh network

Band Steering

AP Steering

Adaptive Path Selection

Airtime Fairness

Wireless, Wired & PLC Backhaul

Guest Network Handling

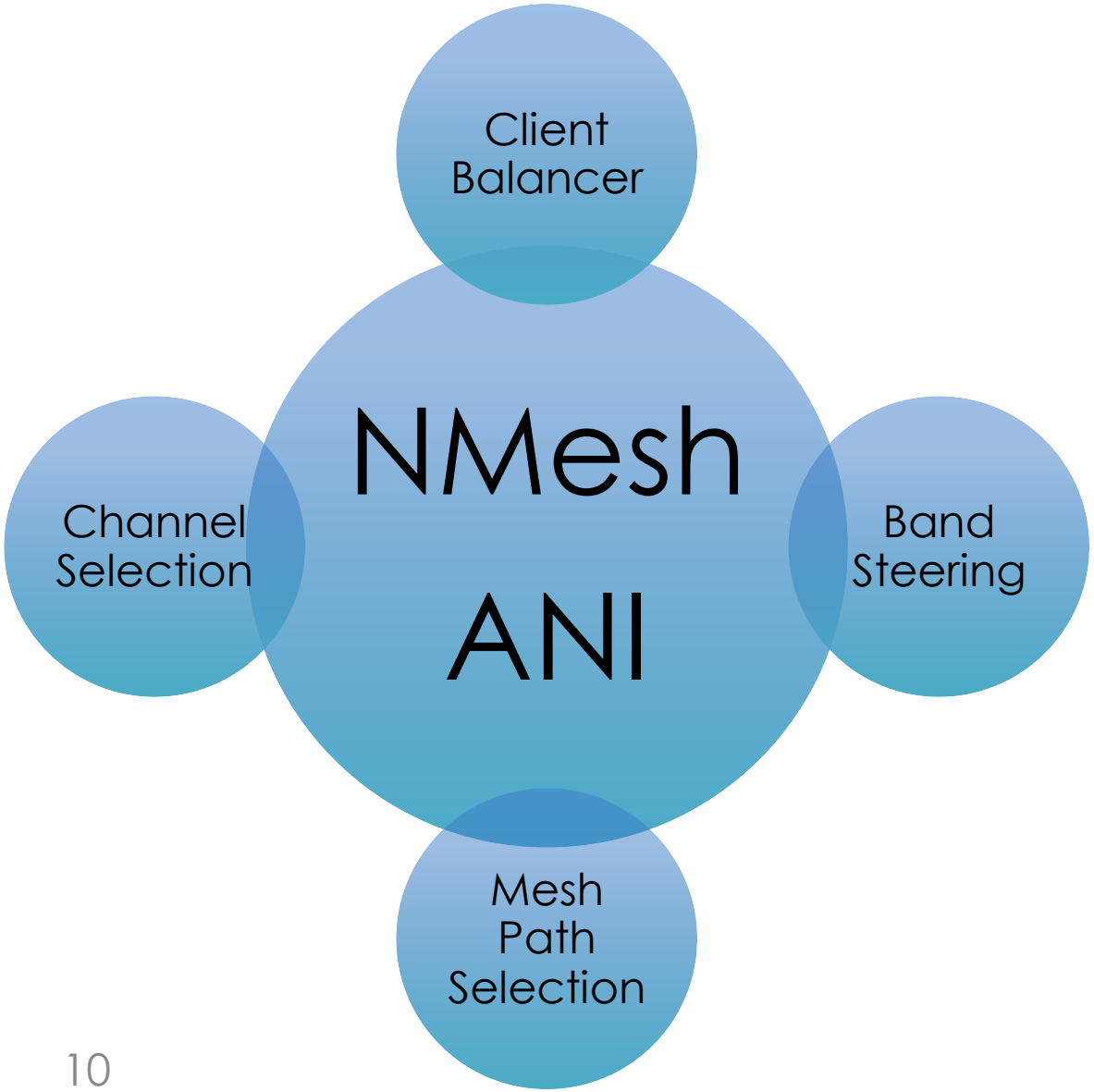
Interference Avoidance

Not interoperable with other AP vendor's product

Multiple Mesh Technologies – Pros & Cons

WDS	Easy Mesh	IEEE 802.11s	WI-Fi SON
Node2Node traffic traffic to go through ROOT AP	Node2Node traffic to go through ROOT AP	Node2Node traffic can go directly	Node2Node traffic to go through ROOT AP
Only one active path from one node to another	Only one active path from one node to another	Multiple Paths maintained between peers	Only one active path from one node to another
No interoperability across vendors natively	Interoperable across vendors	Interoperable across vendors	Basic functionalities are interoperable.
No Power Save Feature supported.	No Power Save Feature supported.	Mesh specification supports multiple levels of power save.	No Power Save Feature supported.
Only 4 addressing	Only 4 addressing	6 addressing is possible	Only 4 addressing
No messages defined for communication	IEEE 1905.1 is used for nodes communication	IEEE 802.11s defines native messages	IEEE 1905.1 is used for node communication
Link fail over is out of scope	Link fail over is supported?	Link fail over is handled in the specification natively.	Vendor specific Link fail over is supported.

ANI - Adaptive Network Intelligence



Flexibiilty: Agnostic of mesh protocols (11s, EasyMesh or WDS Mesh)

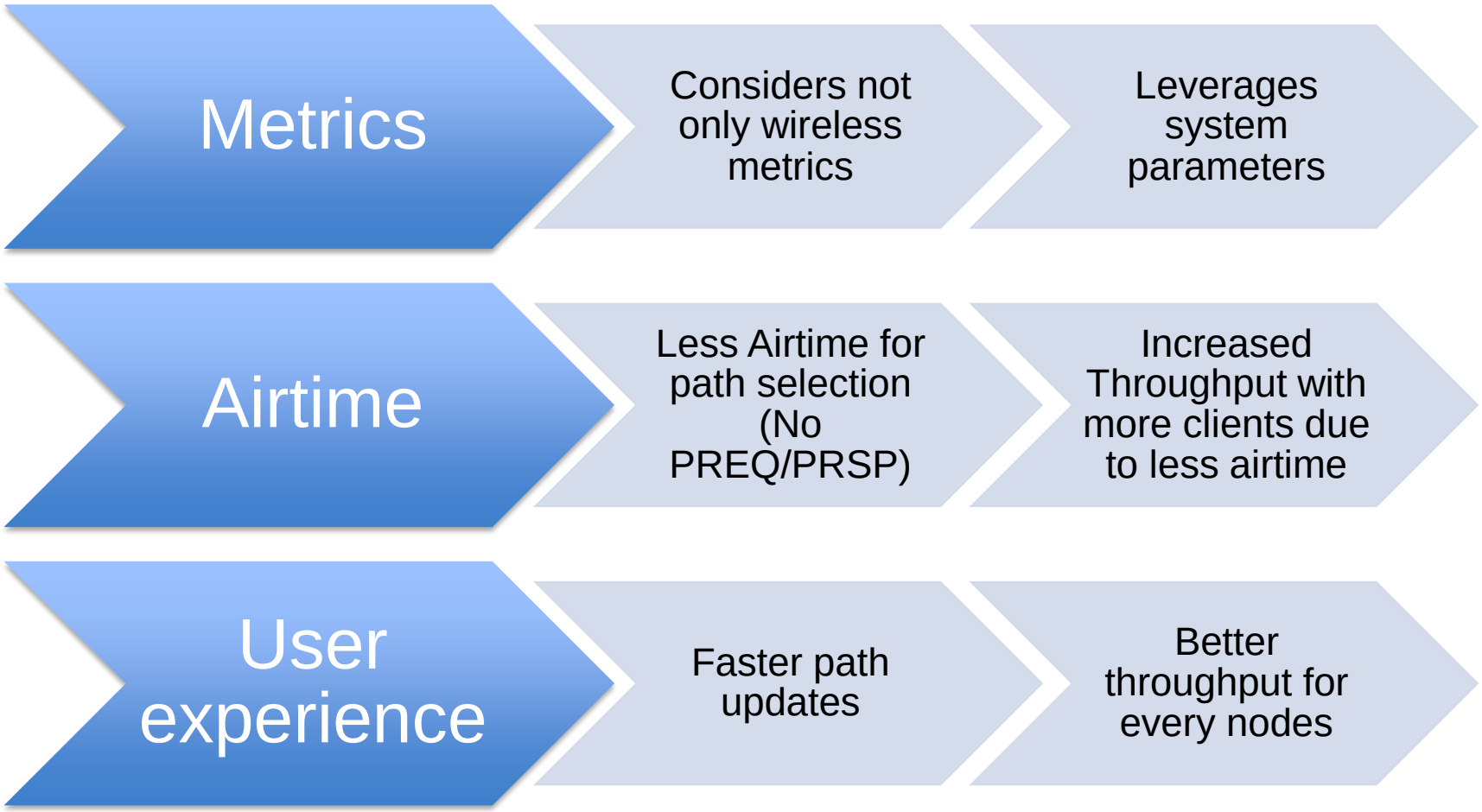
Performance: Up to 10X better throiughput than traditional mesh

Optimized for Power: Optimzed for Power consumption

Improved User Experience: Implementation to focus on user experienece

Cloud: Completely cloud managed and capable of interfacing with an existing cloud infrastructure

MPATH: ANI vs 11s



ANI: ANI/NMESH Vs Other Mesh Systems

NMESH ANI		WDS/EASYMESH/SON
01 Best Path to all: ANI provides best path to each and every node and not limited to only uplink node		01 Best Path to Uplink: Best Path is limited to only upstream link.
02 Suited for > nodes: Suited for larger mesh networks also.		02 Meant for < nodes: Suited for smaller no.of mesh nodes
03 Better Throughput: Throughput is better in all cases of topology		03 Lesser throughput: Topology dictates better throughput. Throughput may not be good in all topology
04 Patented Onboarding: Protected with Qubercomm's Patent Pending onboarding mechanism.		04 Simple Onboarding: Regular Onboarding and not strict approval process for onboarding a client.

Throughput Metrics - Root Node

Vendor	TCP		UDP		Comments
	D/L	U/L	D/L	U/L	
Vendor-1	564, 598	286, 277	546, 548	280, 286	IEEE 802.11s
Vendor-2	591, 588	457, 466	628, 582	458, 493	IEEE 802.11s
Vendor-3	517, 531	211, 200	491, 488	110, 116	WDS
Vendor-4	596, 648	505, 470	671, 692	538, 493	WDS
Qubercomm NMesh	595, 582	616, 625	691, 698	706, 680	IEEE 802.11s

Throughput Metrics - Mesh Node

Vendor	TCP		UDP		Comments
	D/L	U/L	D/L	U/L	
Vendor-1	226, 204	129, 125	240, 269	76, 60	IEEE 802.11s
Vendor-2	224, 227	220, 223	218, 166	197, 195	IEEE 802.11s
Vendor-3	125, 130	125, 105	125, 125	110, 116	WDS
Vendor-4	441, 430	438, 411	441, 495	535, 491	WDS
Qubercomm NMesh	234, 232	263, 259	275, 288	332, 355	IEEE 802.11s