Wired backhauling for Wi-Fi technologies

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About MaxLinear

Connecting the world

- MaxLinear is a **fabless SoC design company** and **World leading supplier** of **SoCs for Communications**.
- We provide **highly integrated solutions in CMOS technology** that are **cost-effective, scalable and easy to use**.

Founded	NYSE	Ships	Products	Employees
2003	MXL	>1B/yr	>200	>1500

- **Diversified markets**.
  - › Broadband Access, Connectivity, Infrastructure, Industrial & Multi-Market.
- **Global presence**.
  - › Headquarters in Carlsbad – California (USA).
  - › Design or Sales/Marketing locations in USA, Canada, Europe, Israel, China, Japan, South Korea, Taiwan, India and Singapore.
- **Active contributions to relevant SDOs and forums.**

ITU ETSI IEEE CEN CENELEC broadband forum HomeGrid FORUM Any wire. Anywhere. It just works. WIRELESS BROADBAND ALLIANCE WiFi ALLIANCE MoCA Multimedia over Coax Alliance

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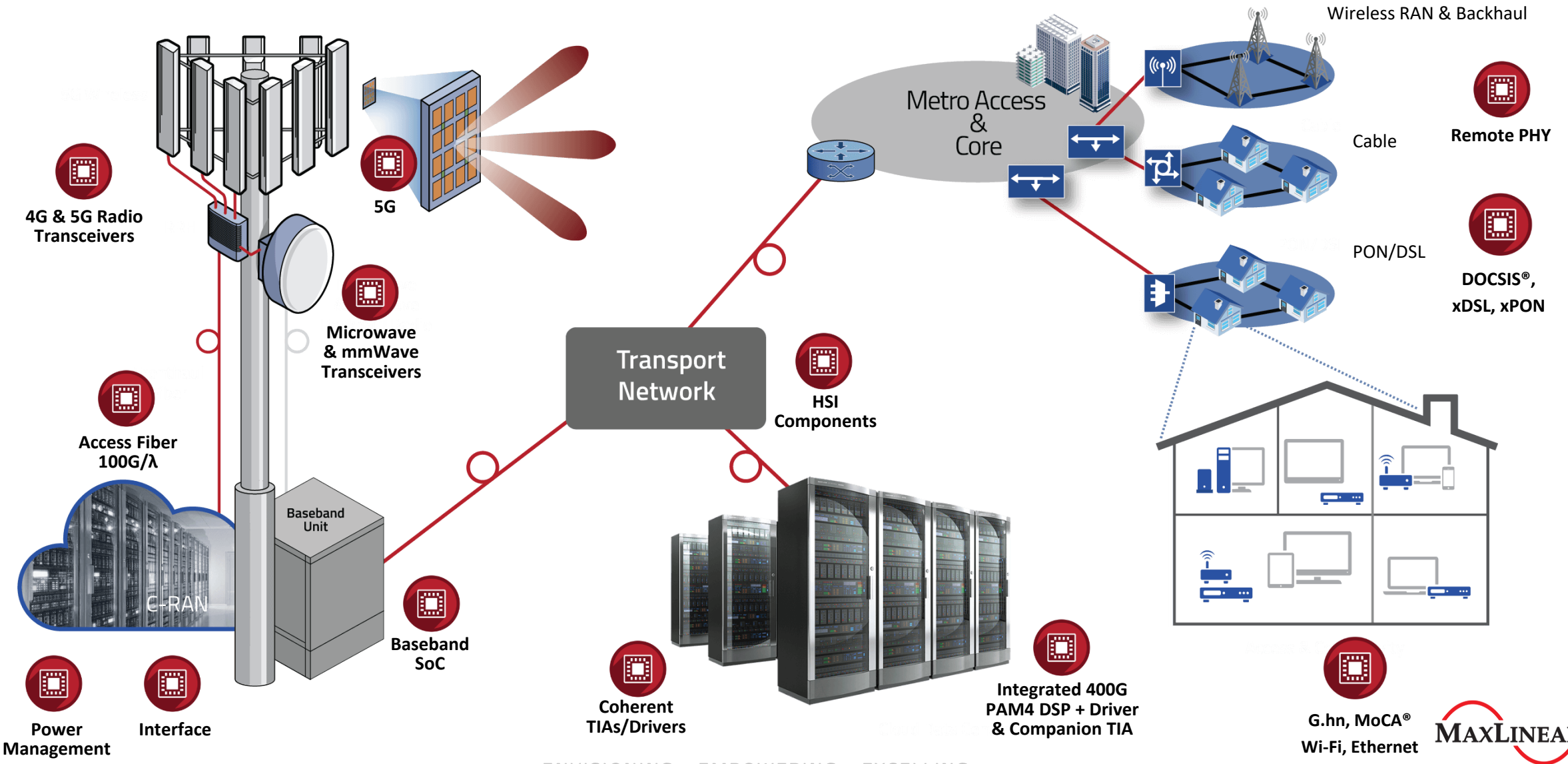

From Traditional Triple Play to VOD/OTT and beyond

Multiple Clients → More end-user service consumption on more devices

Market Dynamics

SPEED	CAPACITY	ROBUSTNESS	LATENCY
Multi-Gigabit last mile networks to the home demand complementary technologies to preserve speeds within the home	**Increased** Capacity for more and more connected devices	Consumers expect **robust, consistent performance, coverage** and **security**	Consumers expect **robust, consistent performance, coverage** and **security**

Post Covid-19 Effect

Hybrid Model: Work and Learn From Home and Office
Intensified Infrastructure and Wireless Connectivity Upgrades
IT managed Self Installations

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In-home distribution networks

Wi-Fi mesh is one suitable solution for full-house coverage

Still **challenges** ahead:

- Provide robust and cost-effective backhaul.
- Usage optimization of radio resources.

Wired home infrastructure networks

Enabling robust and cos-effective Wi-Fi mesh backhauling

Access → Home

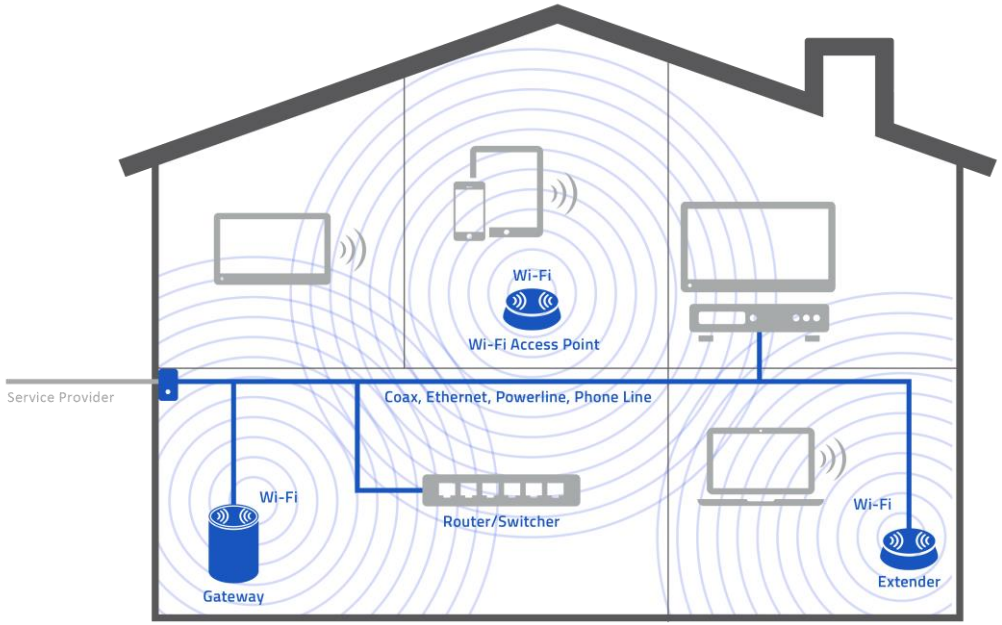
There are several possibilities, and FTTR is a very interesting option for the optical backhaul.

MaxLinear technologies for Wi-Fi backhauling

Broadband Data Connectivity

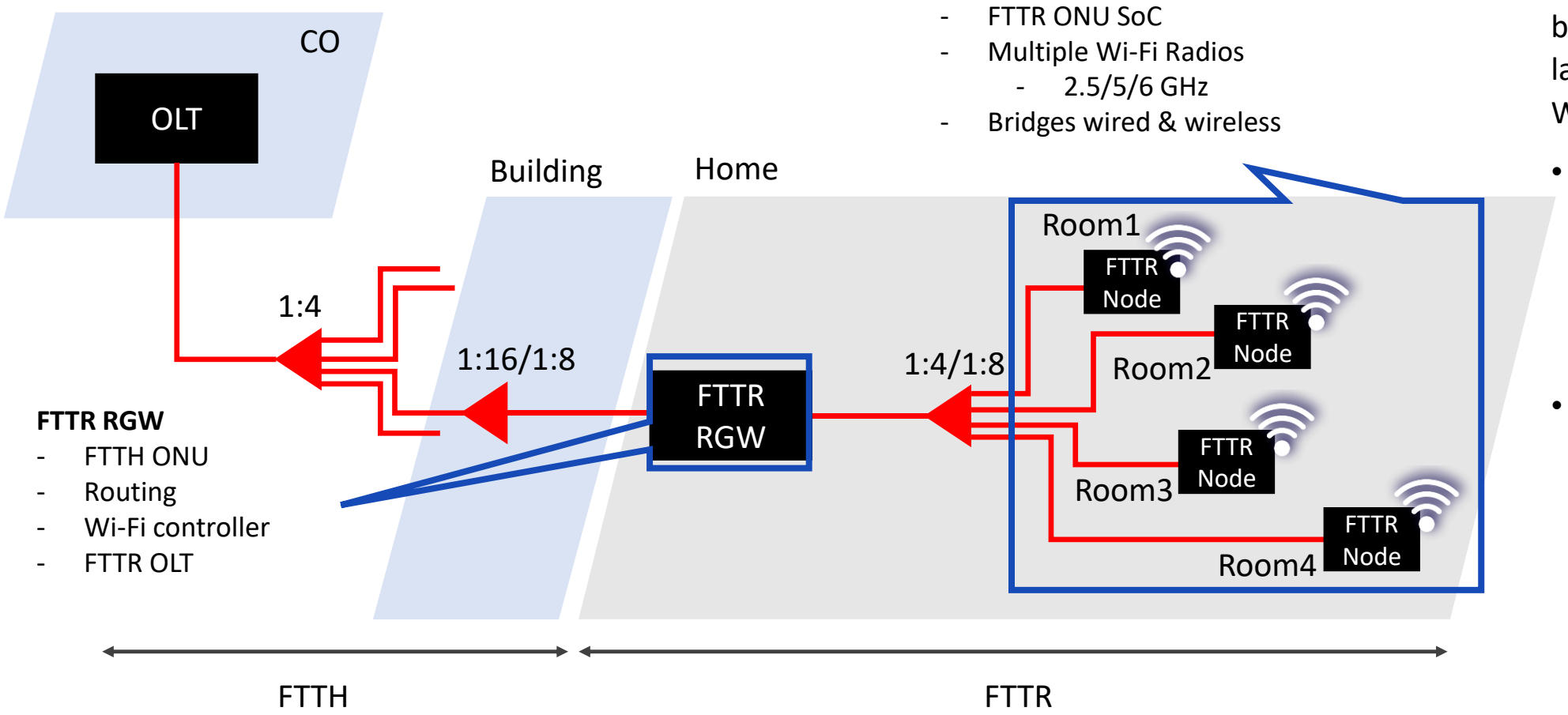
Application / Characteristics	Backhaul	Fronthaul
Retail Low/middle performance Easy install	Powerline, Wi-Fi	Wi-Fi
High-end Brownfield Pre-existing infrastructure Easy install, high performance Retail/Service provider	Coax, G.hn, MoCA®	Wi-Fi
High-end Greenfield Lower latency Higher performance Requires new infrastructure	Ethernet (Cat6), Fiber	Wi-Fi

Managed in the same way



FTTR for Wi-Fi mesh optical backhauling

GSTP-FTTR Use cases and requirements of FTTR



FTTR Nodes
- FTTR ONU SoC
- Multiple Wi-Fi Radios
  - 2.5/5/6 GHz
- Bridges wired & wireless

FTTR RGW
- FTTH ONU
- Routing
- Wi-Fi controller
- FTTR OLT

FTTR could complement current deployment options by providing a robust, low latency and high throughput Wi-Fi backhauling option for:

- Greenfield deployments (whenever other types of cabling are not available, e.g. Ethernet, Copper, Coax).
- High-end in-home installations, where other technologies do not provide enough performance/robustness (e.g. Wi-Fi, Powerline).

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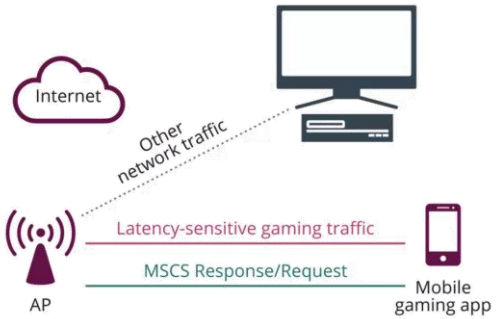
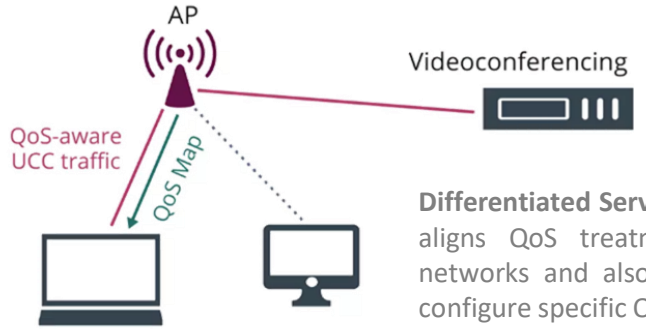
FTTR Technologies for Wi-Fi backhauling

MxL Short and Mid/Long-term vision

- Short-term solution can be covered by the reuse of current GPON/XGS-PON.
  - › XGS-PON can deliver up to 10Gbps, enough bandwidth and low latency for the Wi-Fi NodeBs.
- Mid/Long-term solutions may require higher integration (QoS and low latency) with novel Wi-Fi networks will be needed.
  - › Wi-Fi 7 QoS Management.

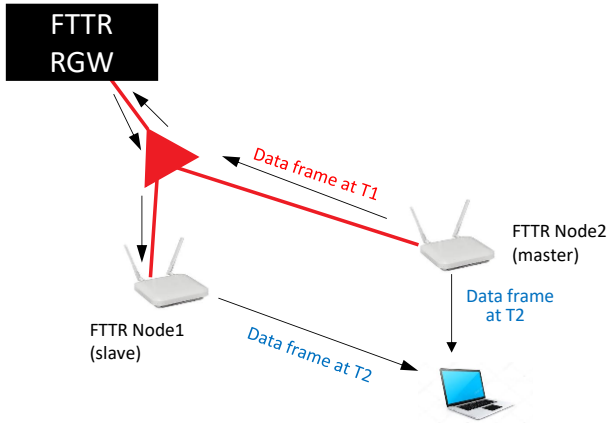
Mirrored Stream Classification Service (MSCS): enables a client device to request the AP to apply specific QoS treatment of downlink IP data flows using QoS mirroring.





Differentiated Service Code Point (DSCP) mapping: aligns QoS treatment across Wi-Fi and wired networks and also enables network managers to configure specific QoS policies.

- FTTR could also enable new Wi-Fi features in future:
  - › For example, multi-AP beamforming for Wi-Fi 8.
    - – Very precise timing coordination between APs, which can be achieved by fiber.



MaxLinear in ITU-T Q3/SG15 and BBF WT-488

- MaxLinear participates in the definition of FTTR technologies by:
  - Working on the terminology and architecture of wired backhauled Wi-Fi networks (G.hetnet, BBF WT-488).
  - Working on the requirements for G.fin (High speed fibre-based in-premises transceivers).
  - Characteristics, topologies and performance of FTTR networks.

Thank you!