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# The Impact of Wi-Fi 7 on Cable Networks

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# Agenda

- Why Wi-Fi 7?
- Timeline
- Release 1 Features
- Release 2 Features
- Security
- Conclusion

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# Why Wi-Fi 7?



- Speed
  - Wider channels
  - Higher modulation
  - 30 - 40 Gbps
- Better use of RF bandwidth
  - Multi-link operation
  - AP coordination
- For operators
  - Ensure home networks can keep up with demands

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# 802.11be (EHT) Development Timeline

802.11be task group

802.11be Release 1 features

- Multi-link operation
- Low-complexity AP coordination
- 320 MHz channels
- 4K QAM
- Multiple resource units per AP
- Preamble puncturing

802.11be Release 2 features

- MIMO enhancements
- HARQ
- Low-latency operations
- Advanced AP coordination

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# Release 1 Features

- Multi-Link Operation (MLO)
- Low Complexity AP Coordination
- 320 MHz Channels
- 4K QAM
- OFDMA Enhancements
  - Multiple RUs per STA
  - Preamble Puncturing
  - PPDU Frame Format

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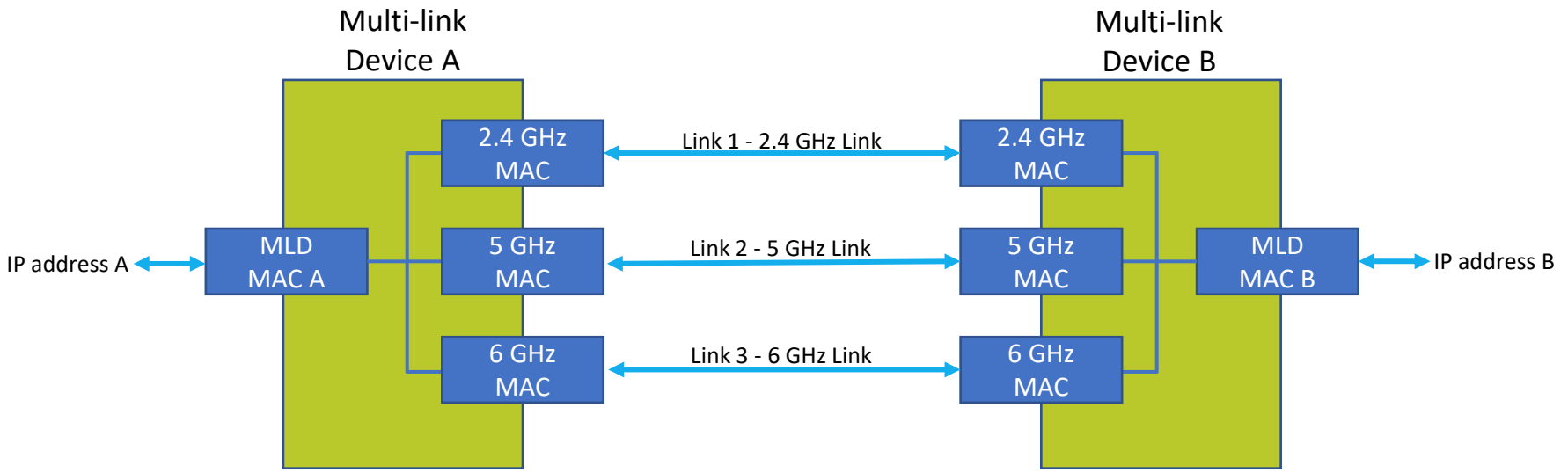
# Multi-Link Device

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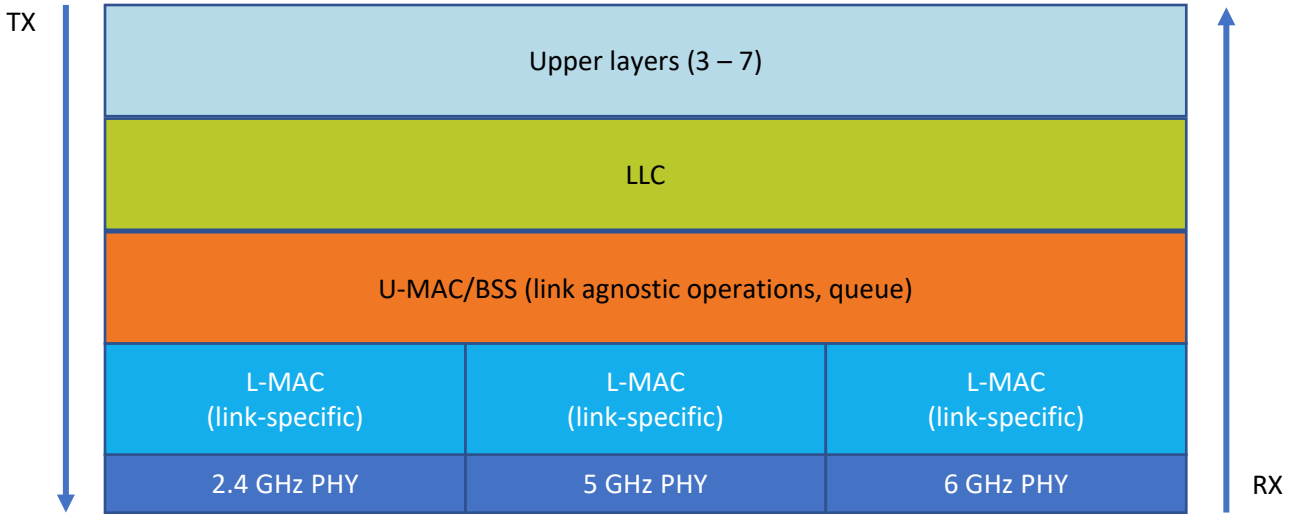
# Multi-Link OSI Architecture

- Each interface has a unique L-MAC
- U-MAC handles coordination between links
- LLC and upper layers treat as one MAC address, the U-MAC

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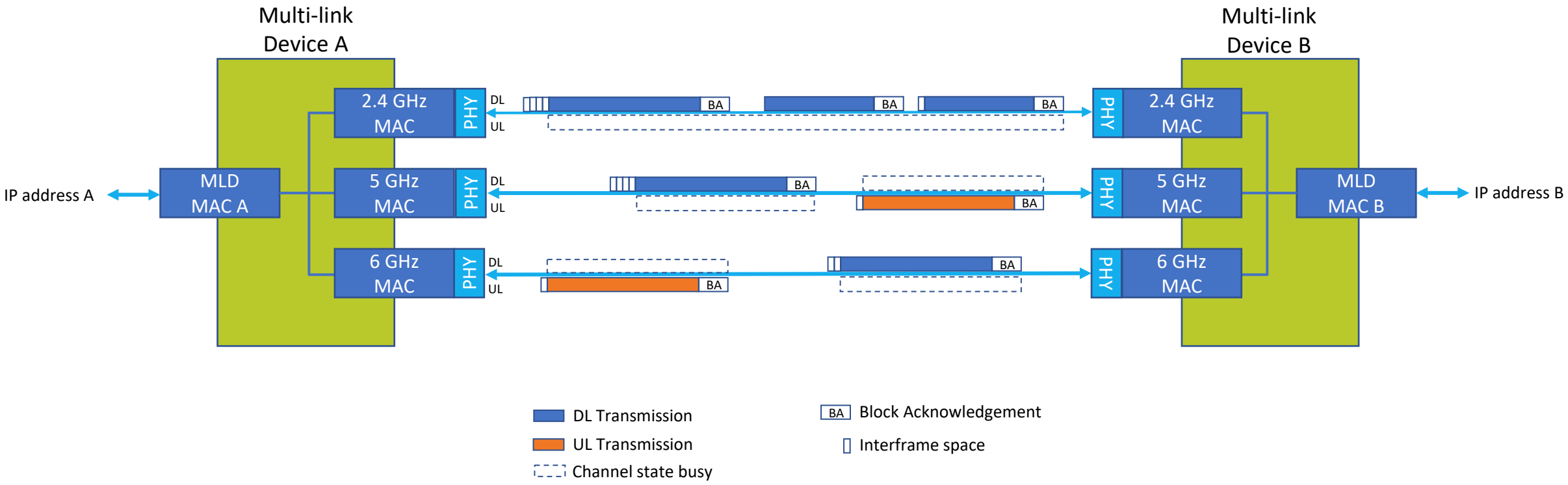
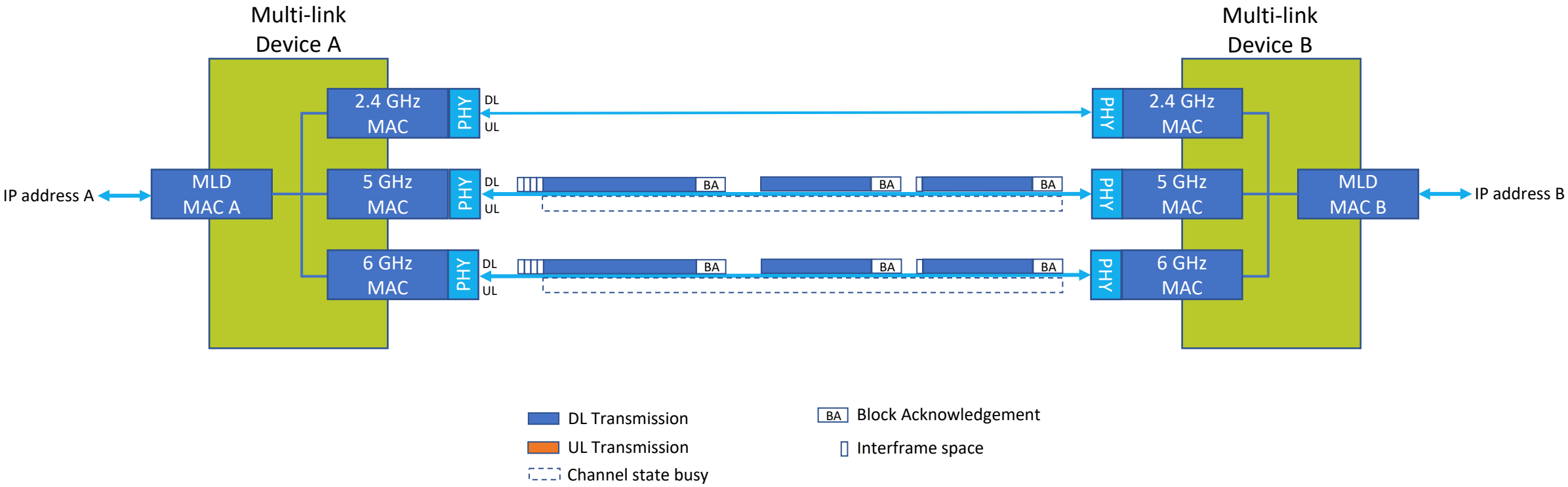
# Simultaneous Transmission Reception (STR)

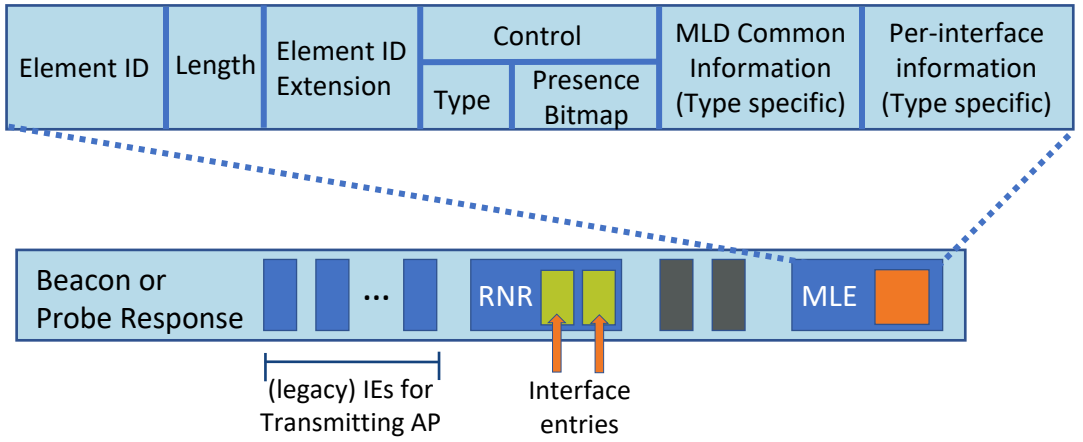


# Non-Simultaneous Transmission Reception (NSTR)



# Beacon and Probe Response Frame

- Basic MLE – Multi-link element
  - Information that is common across all the interfaces.
    - MLD MAC (aka U-MAC)
    - Set of enabled links
    - STR capabilities.
- RNR – Reduced neighbor report
  - Information about other links

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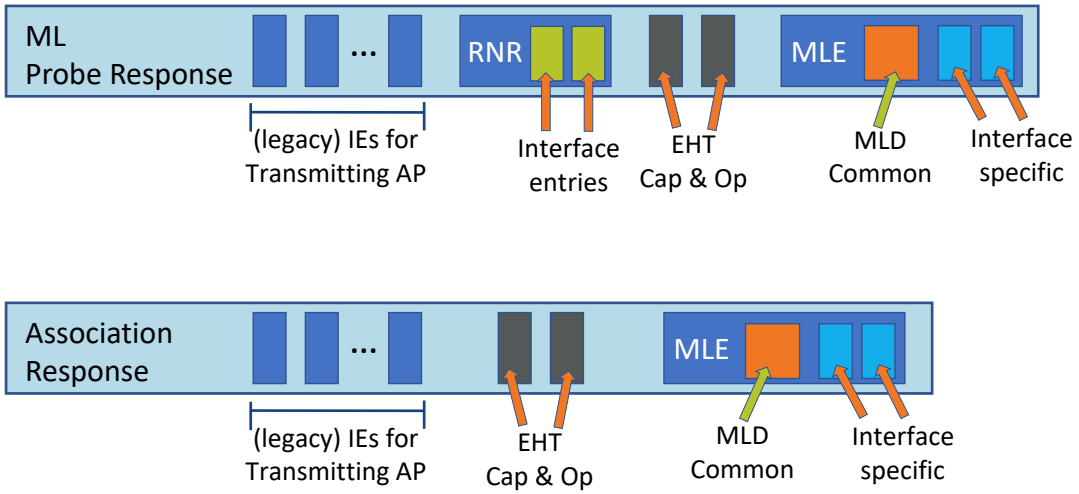
# ML Probe Response and Association Response

- More details MLE is used
  - Includes all information in basic MLE.
  - Adds information that is not common across the other interfaces.

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# Release 1 – AP Coordination

- Coordinated Spatial Reuse
- Coordinated OFDMA (Co-OFDM)

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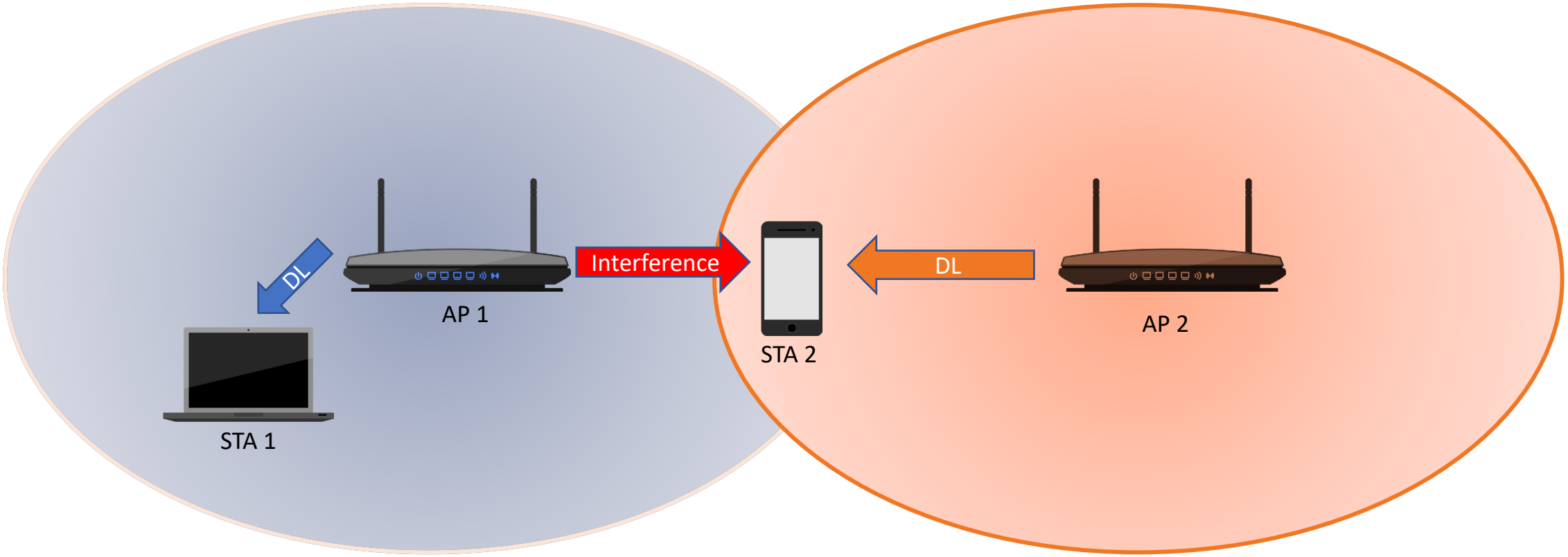
# Wi-Fi 6 Spatial Reuse

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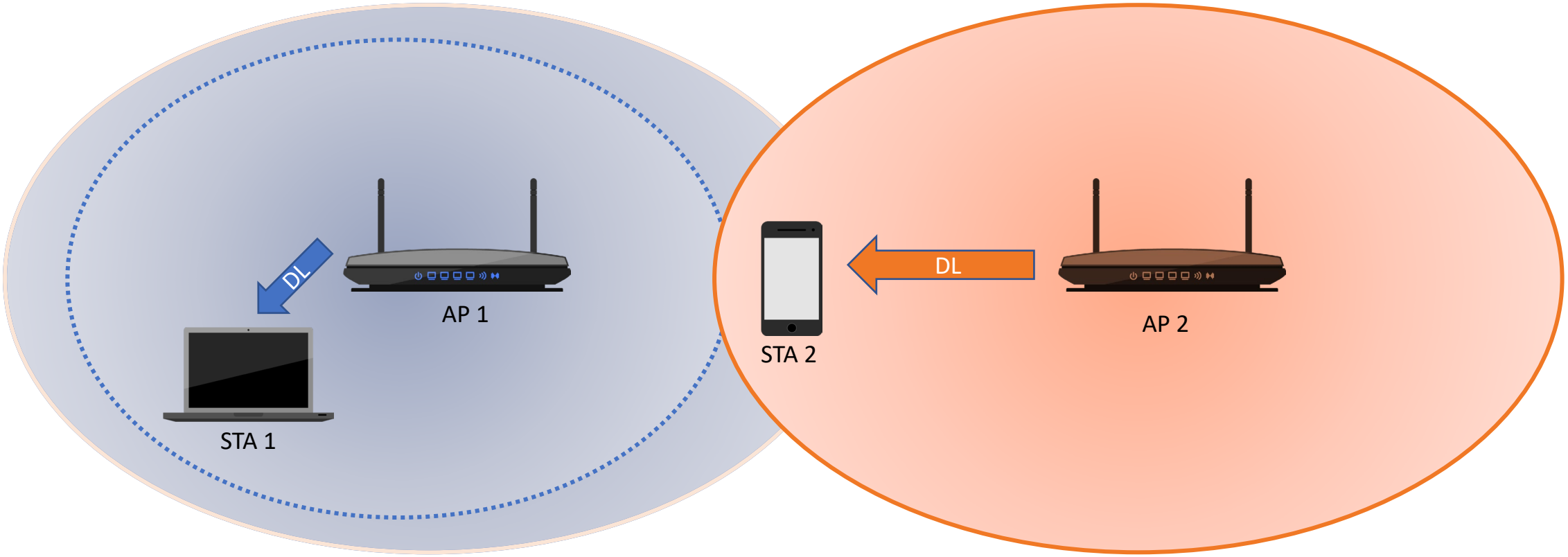
# Wi-Fi 7 Coordinated Spatial Reuse

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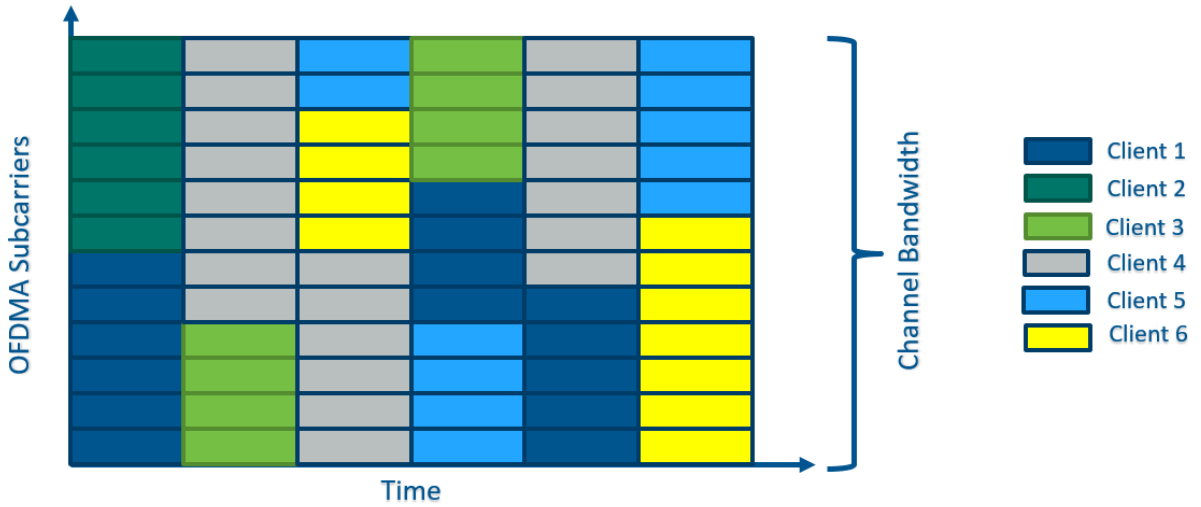
# Coordinated OFDMA

- APs can share RU slots as long as they don't interfere

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# PHY Upgrades



- 320 MHz Channels
  - Single 320 MHz Channel
  - Two 160 MHz Channels
  - 240 MHz Channel
    - 160 MHz + 80 MHz
- 4K QAM
  - 4096 QAM
  - 12 bits per symbol
  - 40 dB SNR

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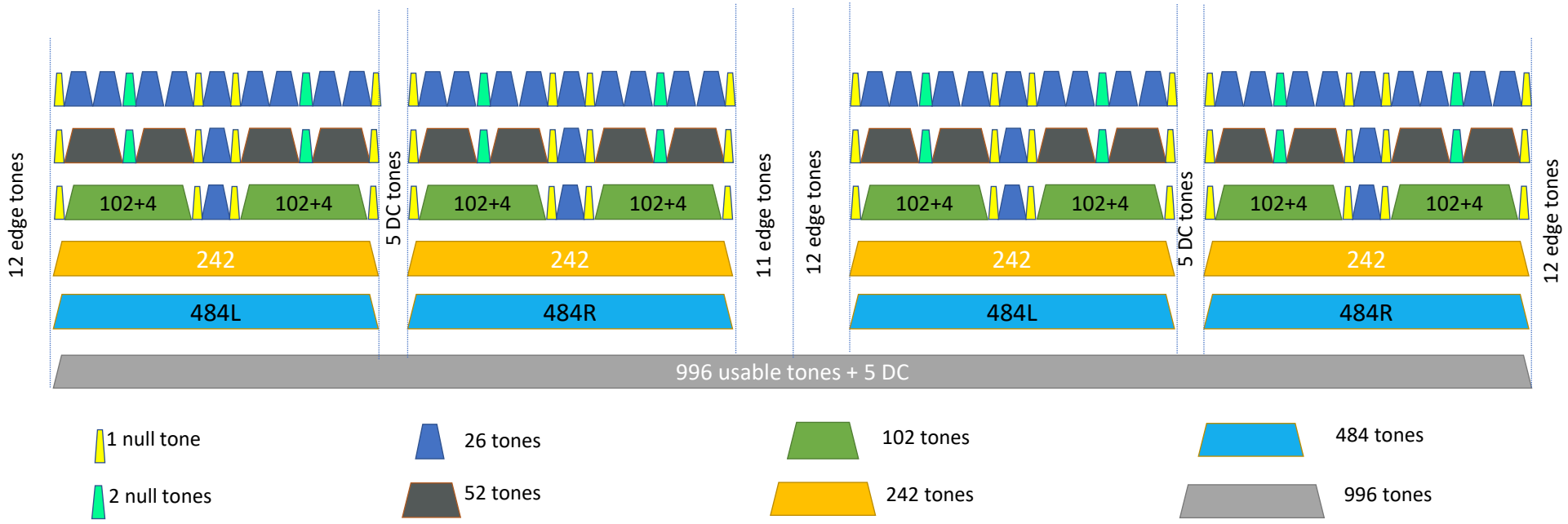
# 80 MHz Tone Map

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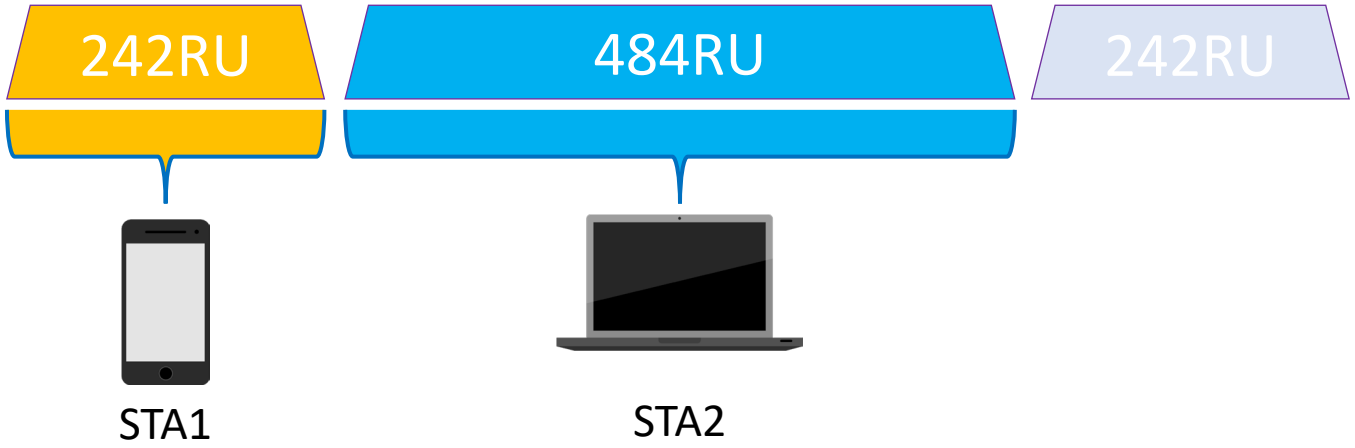
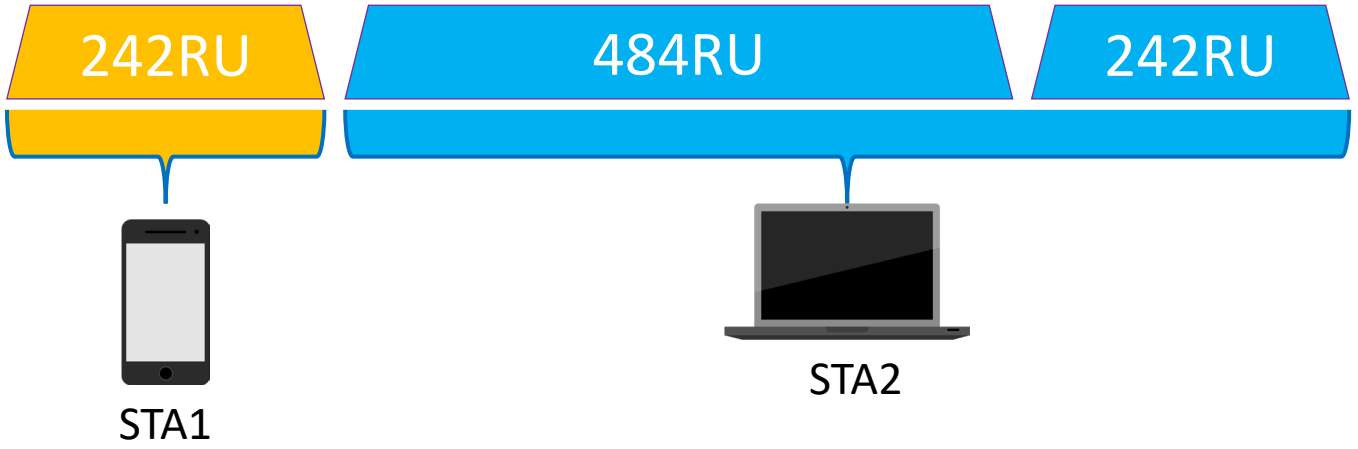
# OFDMA – Multi-RU



# Multi-RU per STA

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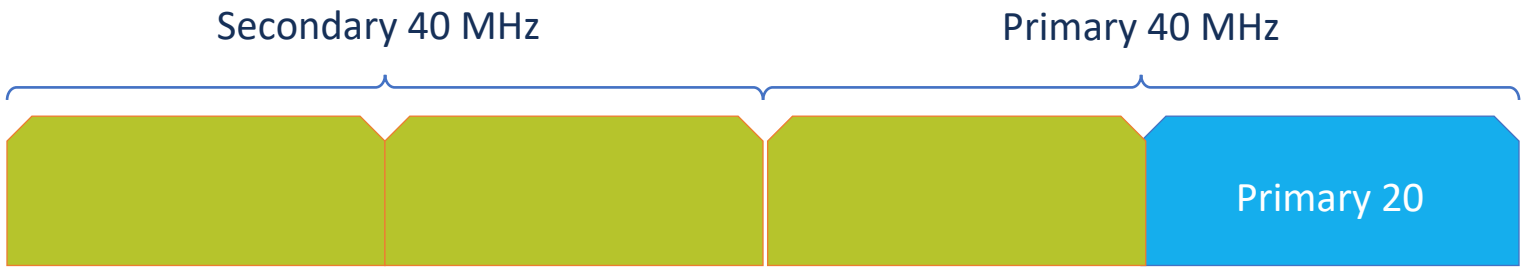
# Channel Bonding – 80 MHz Channel

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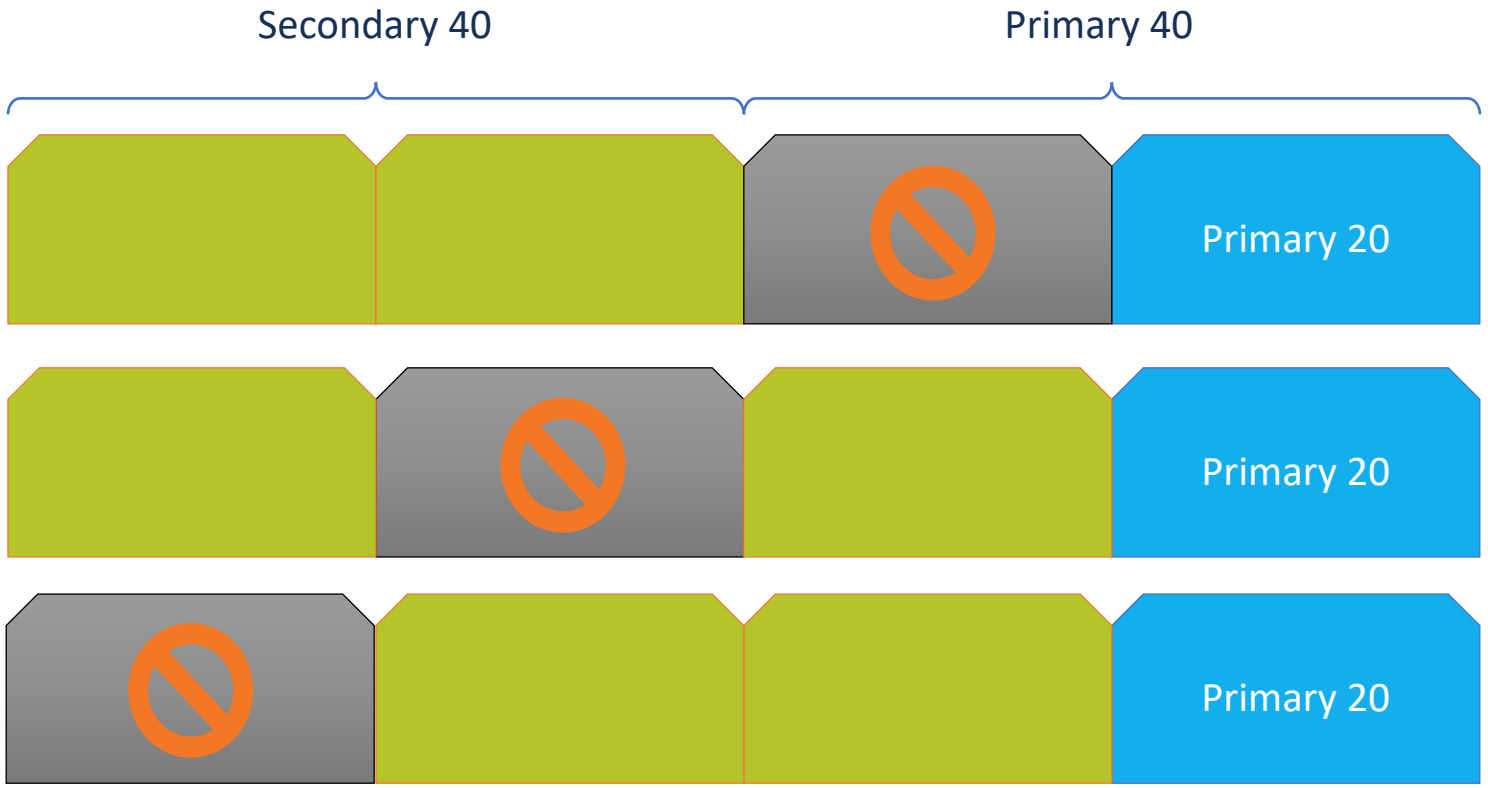
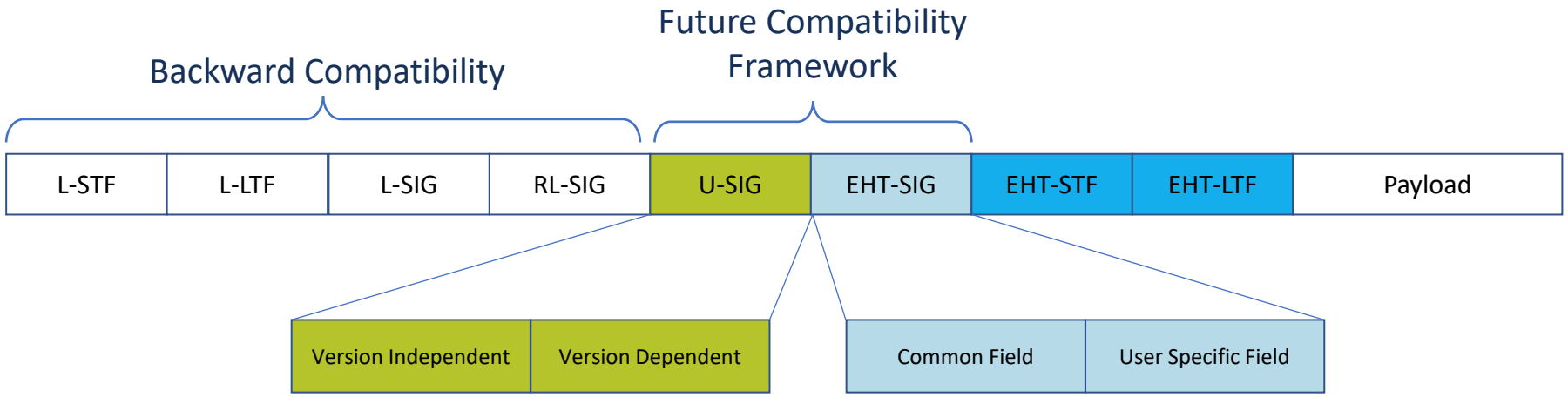
# OFDMA – Preamble Puncturing



# OFDMA – PPDU


Backward Compatibility
Future Compatibility Framework
L-STF
L-LTF
L-SIG
RL-SIG
U-SIG
EHT-SIG
EHT-STF
EHT-LTF
Payload
Version Independent
Version Dependent
Common Field
User Specific Field

# Release 2 Features

- MIMO Enhancements
- Hybrid automatic repeat requests (HARQ)
- Low Latency Operation
- Advanced AP Coordination

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# Wi-Fi Alliance Specification

- Will the same security requirements from Wi-Fi 6 and 6E be carried over as they are for Wi-Fi 7?
- Will there be a separate Wi-Fi 7E certification, similar to 6E?
- Will multi-link devices support legacy security standards on non-6GHz channels?

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# Wi-Fi 7

- Wi-Fi 7 is fast
  - 30 – 40 Gbps
  - 320 MHz channels
  - 4K QAM
- Wi-Fi 7 is more than speed.
  - Technologies such as multi-link operation, AP coordination, preamble puncturing, and multi-RU per station improve the use of the available spectrum.
- Wi-Fi 7 can help operators, and customers get the most out of the 10G networks.

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# Thank You!


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