Programmable Network Slicing for M-CORD

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The target of Network Slicing is to provide **dedicated** logical networks with network customer **specific functionality**, without losing the economies of scale of a common infrastructure.

3GPP Definition

- A Network Slice is a network created by the operator customized to provide an optimized solution **for a specific market scenario** which demands **specific requirements with end to end scope.**
- A Network Slice is composed of **all the network functions** that are required to provide the required telecommunication services and network capabilities, and **the resources to run these network functions**.

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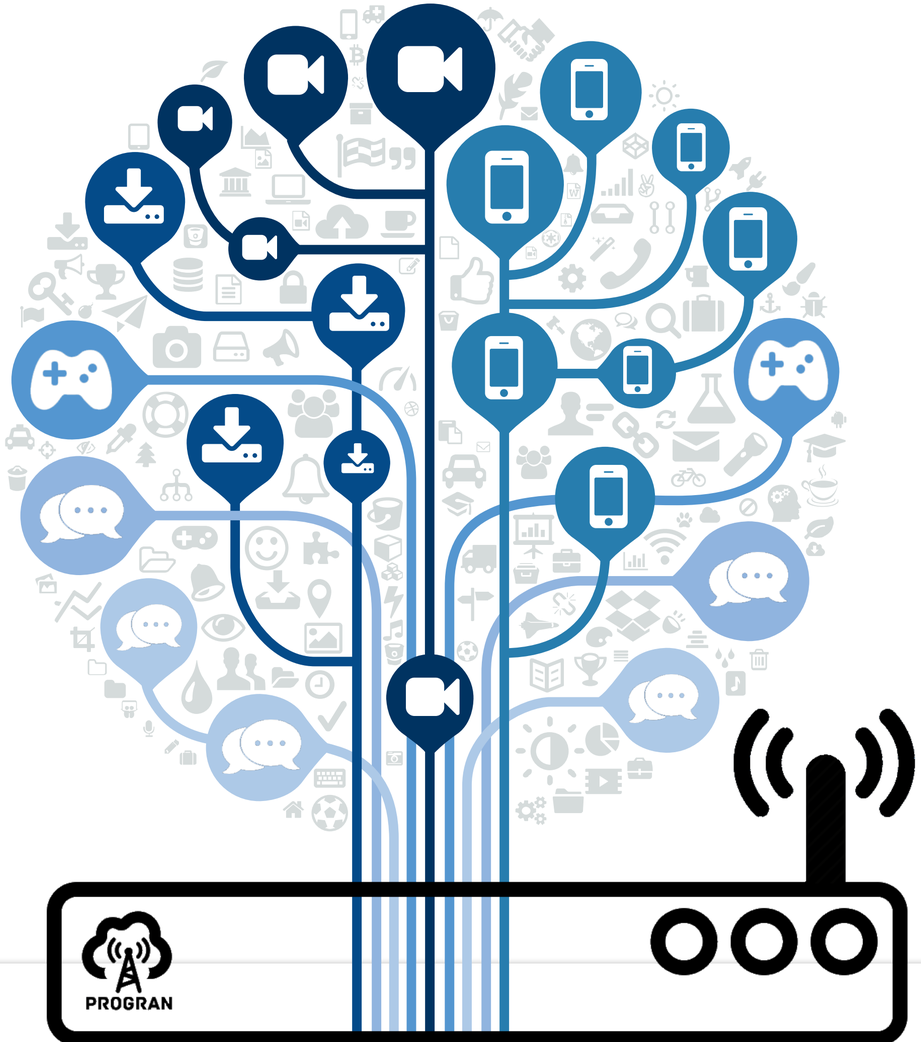
RAN Slicing with ProgRAN

Dynamically Programmable RAN

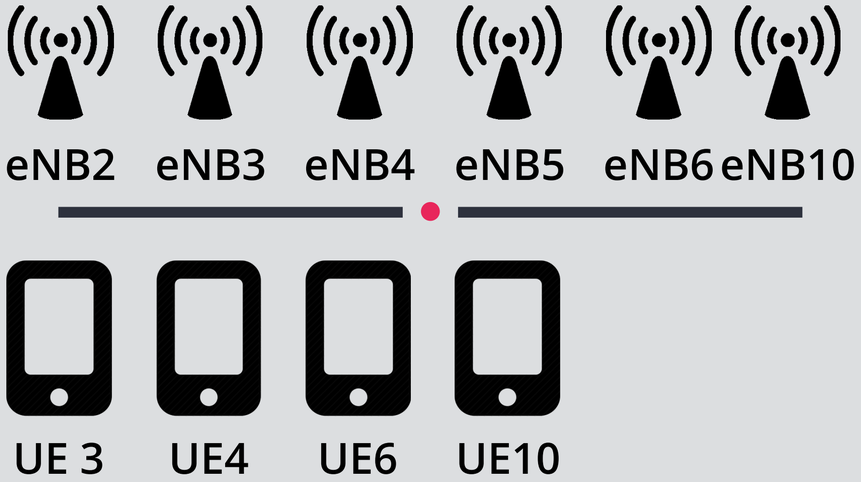
Programmable Profile Based Software-Defined RAN Virtualization

- ProgRAN is a programmable, SDN-based radio access network (RAN) framework for 5G.
- ProgRAN virtualizes the "wireless channel resources" as well as the "radio resource management" modules in base stations and allows a remote controller to conduct remote configuration in any sub-area within the RAN.
- The configuration may be highly adaptive and does not require a rebooting of any device and thus there is no downtime.



- **ProgRAN decouples the control and data planes in the RAN**
  Control Plane in the RAN: Scheduling, Handoff Management, Admission Control, SON Management, Link Aggregation & Multi-RAT Management
- **ProgRAN logically centralizes the control of RAN**
  The control applications of RAN run on eNodeBs to ensure sufficiently fast control reactions. Invoking, modification and termination of these is overseen by a RAN controller.
- **ProgRAN provides the ability to program the behavior of RAN using a well-defined interface**
  ProgRAN offers a "Profile" based programmability of the RAN. During programming alterations, no downtime is required.

P1



VALID FROM-UNTIL

Time based and/or event-triggered

Multi-RAT Management:

Link Aggregation: Band 3 LTE and Wi-FI for D/L
Band 3 LTE for U/L

Scheduling: **UL**: RR, **DL**: PF

Handoff Control: Slow Triggered

Admission Control: All flow types for all UEs

SON MLB Parameter: Regular

Downlink

65% 35%

Uplink

25% 75%

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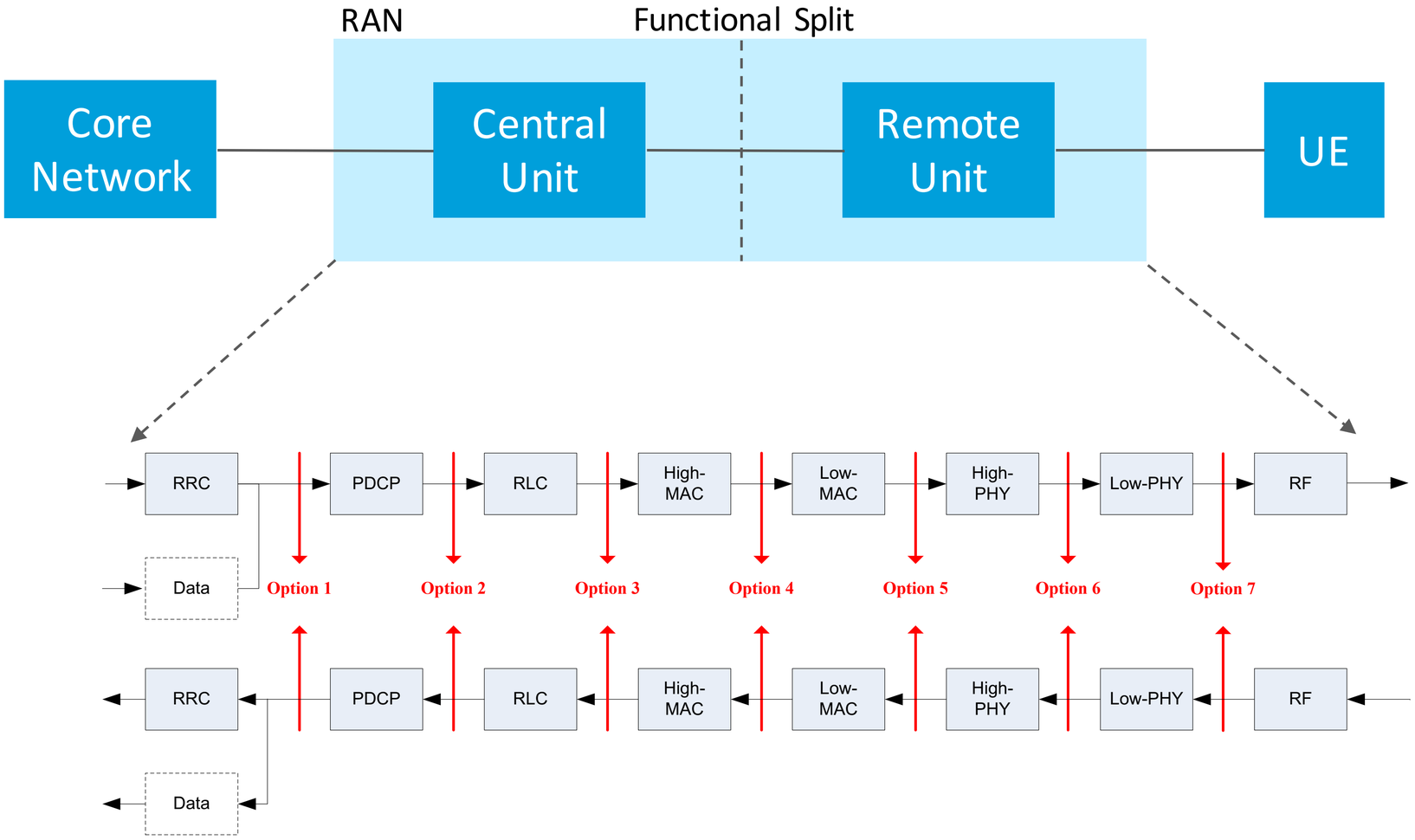
RAN Disaggregation

C-RAN Options in 3GPP Draft TR 38.801 v0.1.0,



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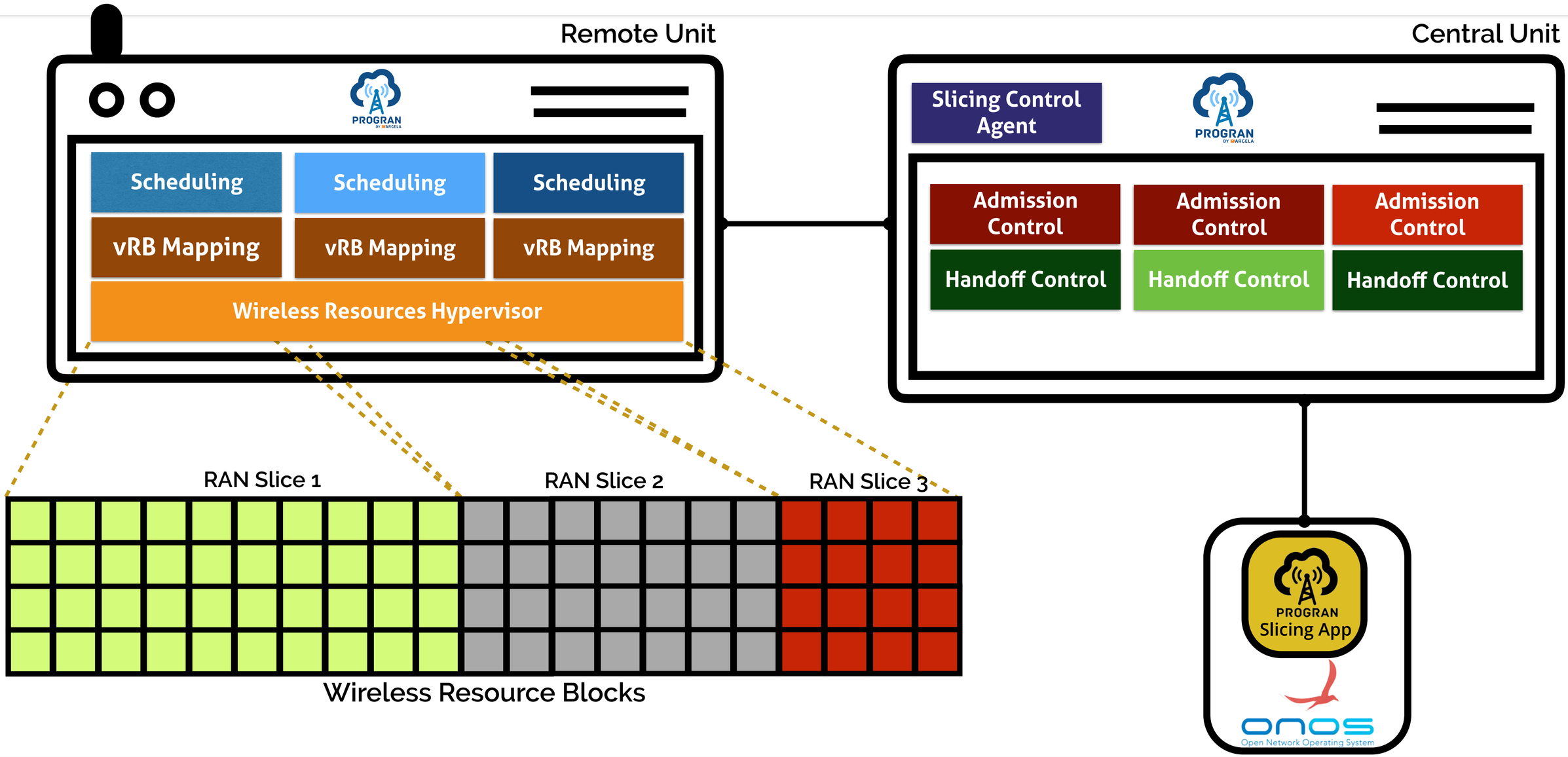
ProgRAN-Based RAN Slicing on M-CORD

Operation



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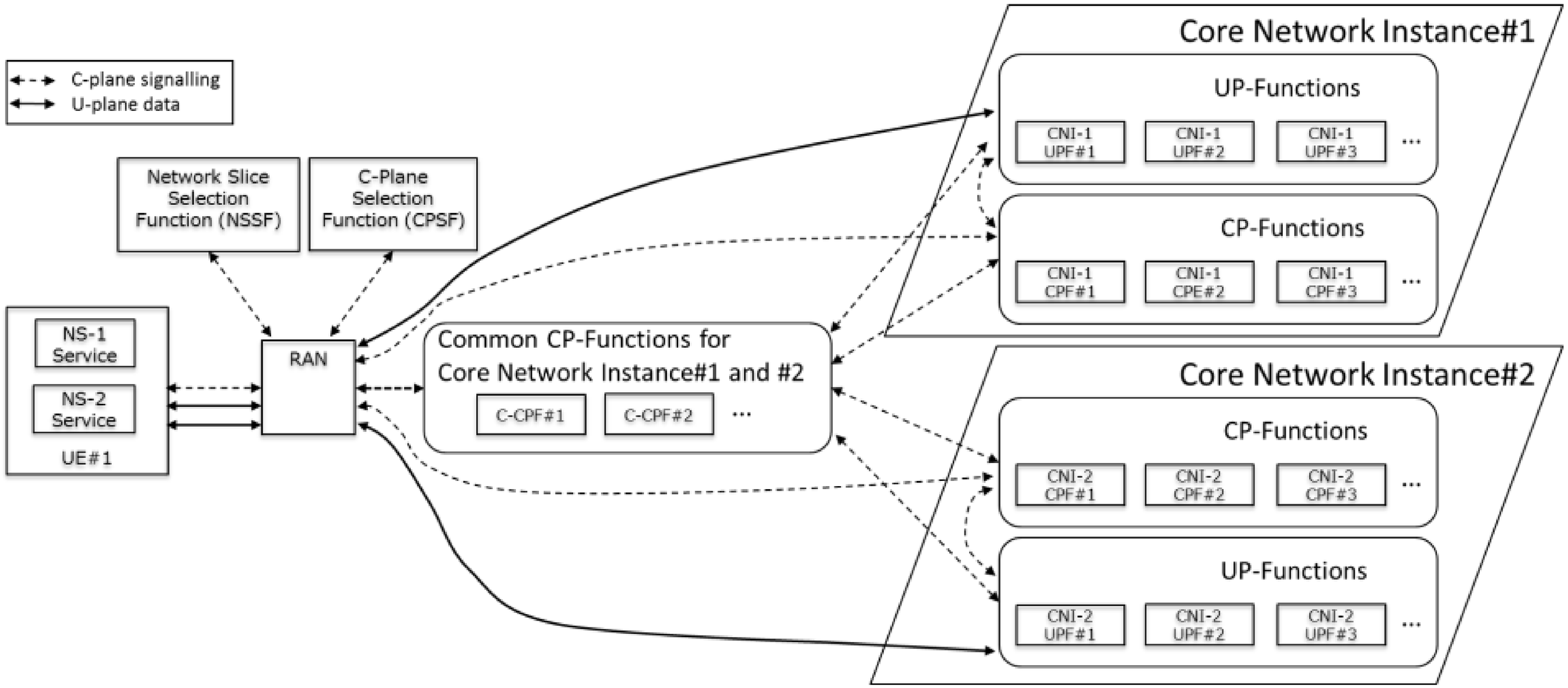
CN Slicing

From 3GPP TR 23.799



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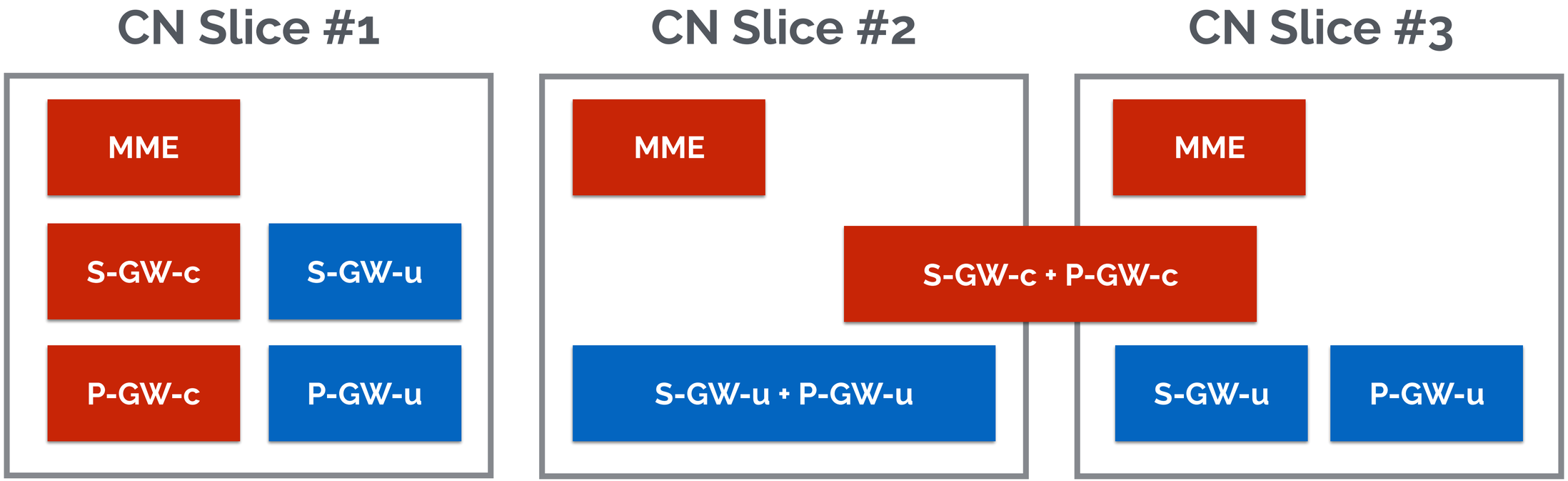
CN Slicing on M-CORD

Programmable Modular Disaggregation



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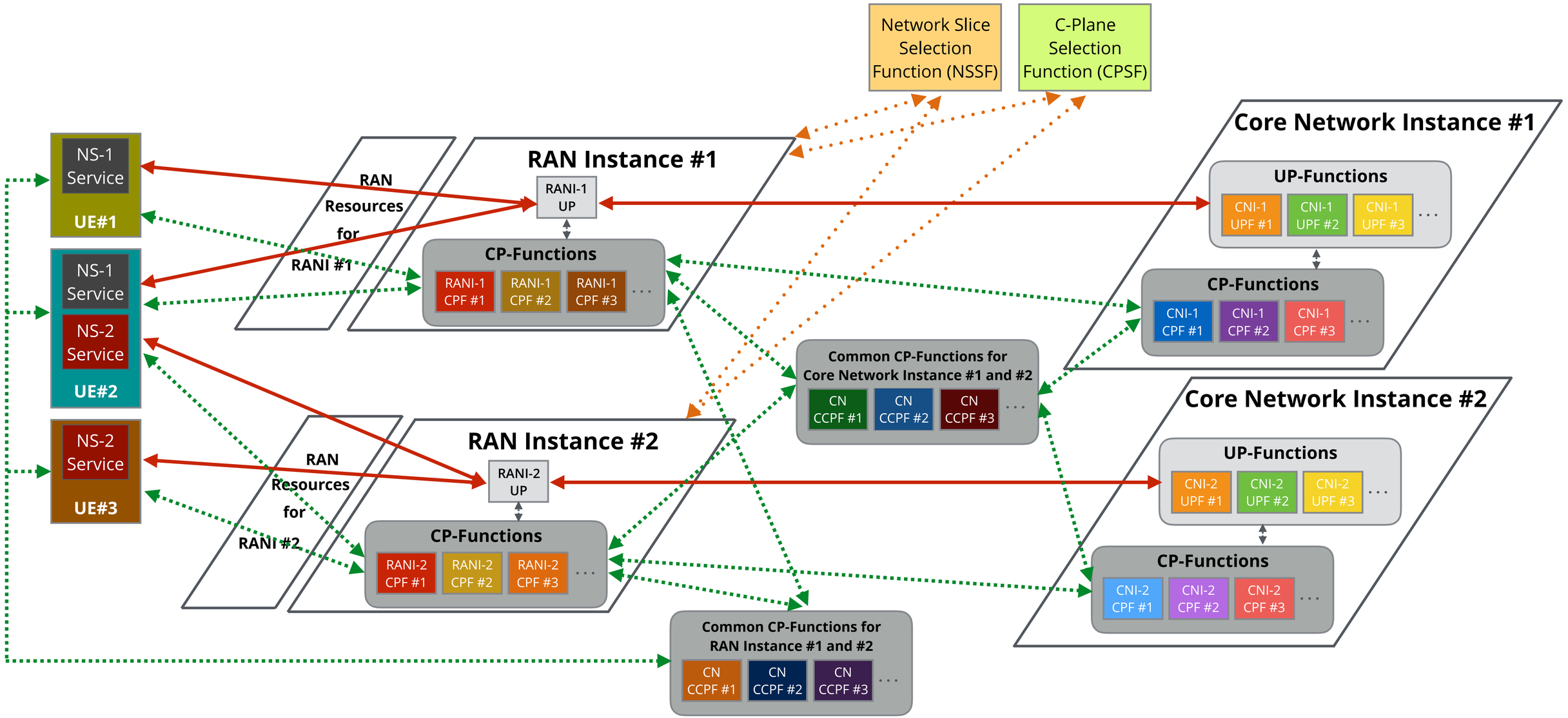
E2E Network Slicing on M-CORD

Programmable Modular Disaggregation



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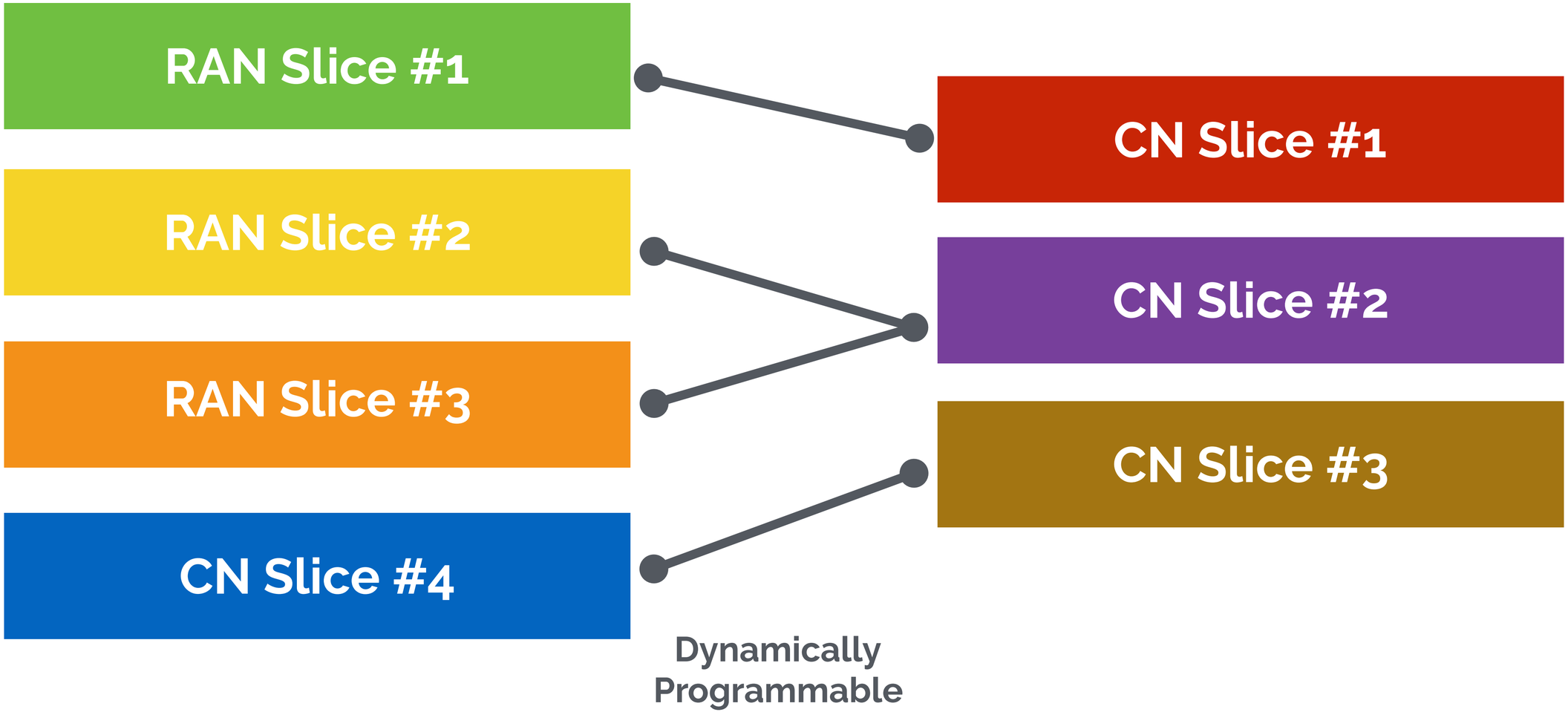
E2E Network Slicing on M-CORD

Modular Programmable Disaggregation



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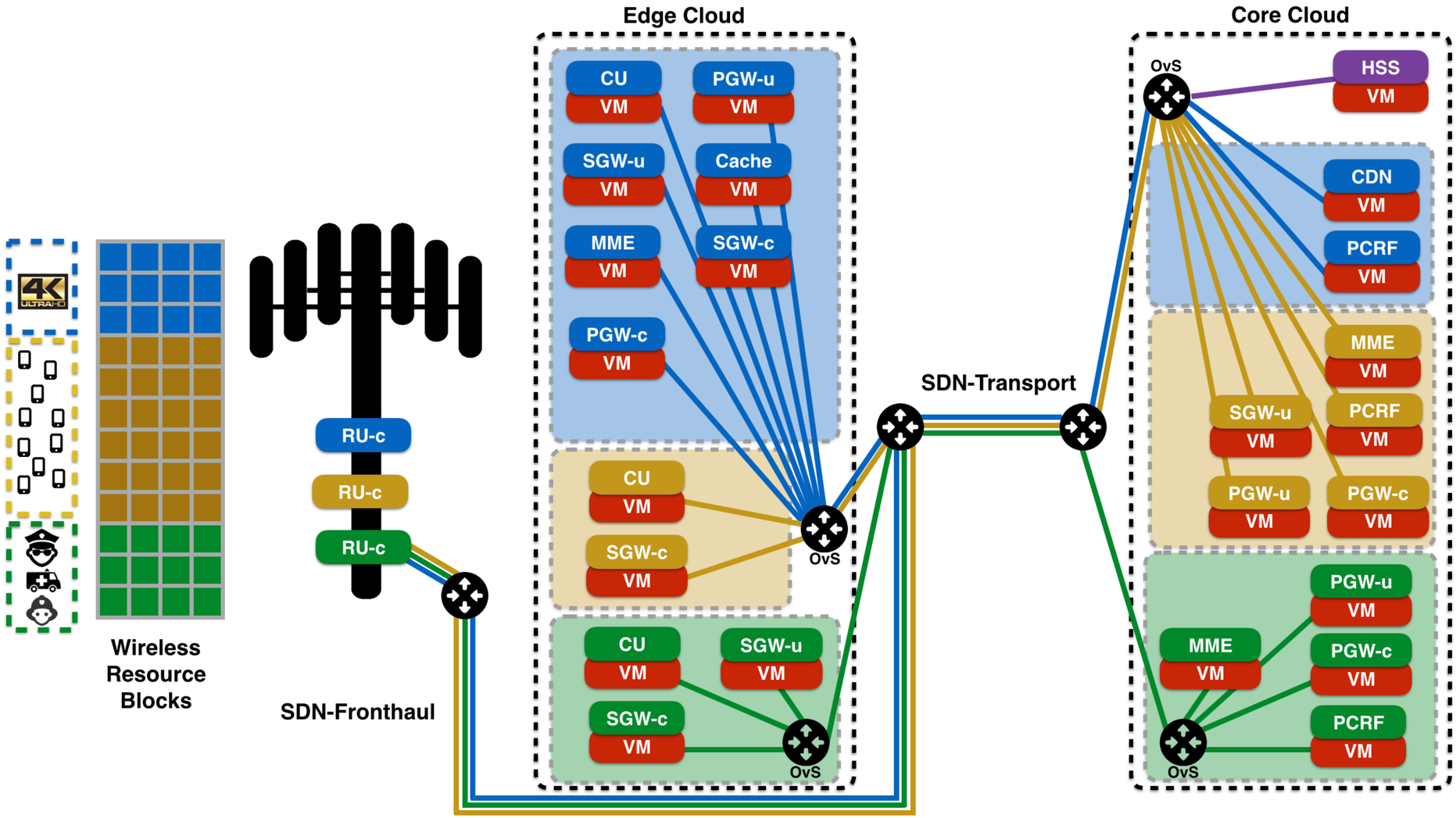
E2E Network Slicing on M-CORD

Network Slicing on M-CORD



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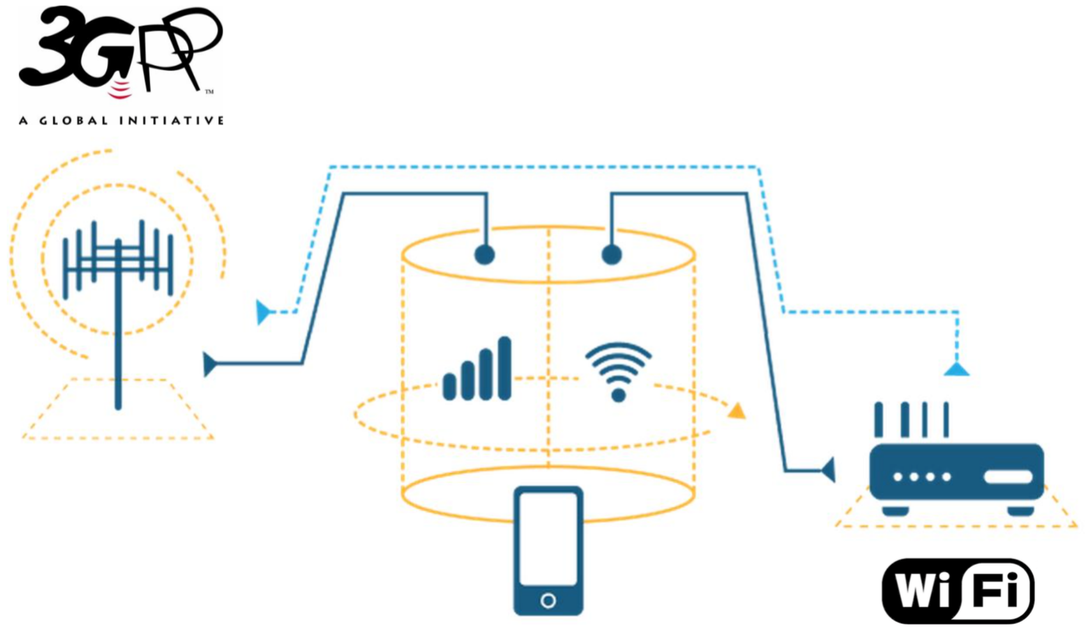
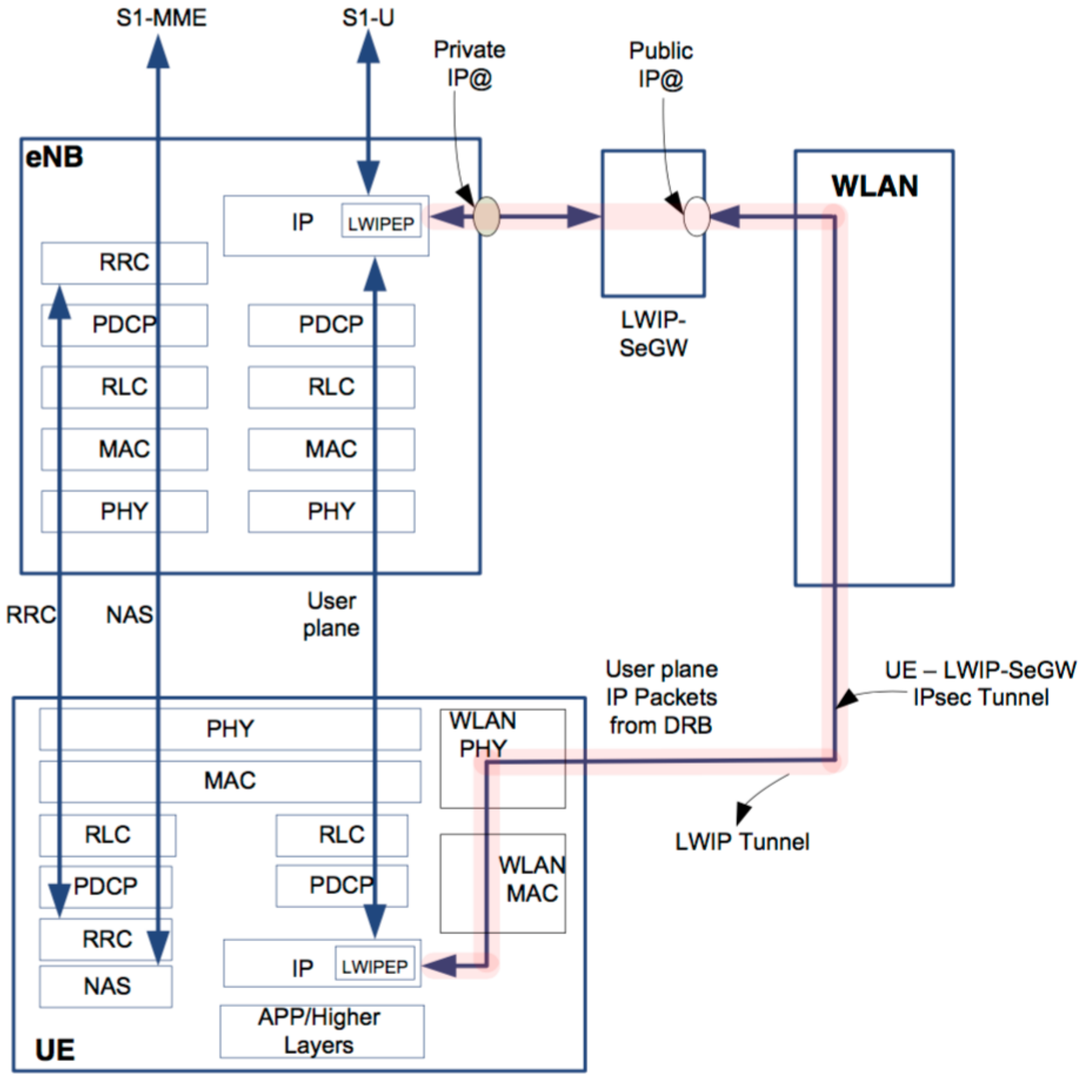
Multi-RAT on M-CORD: LWIP

3GPP Rel. 13 LWIP





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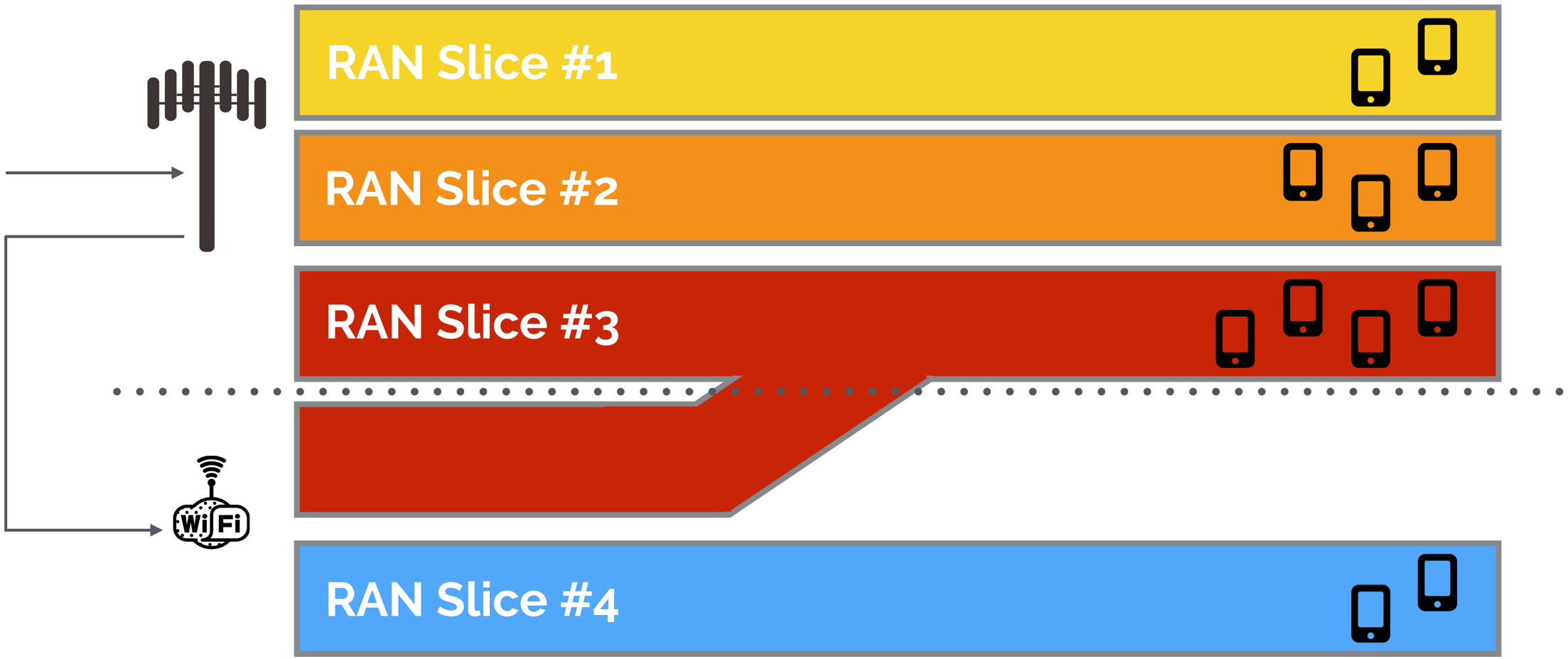
On-Going Work: Multi-RAT Link Aggregation & Network Slicing

3GPP Rel. 13 LWIP



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