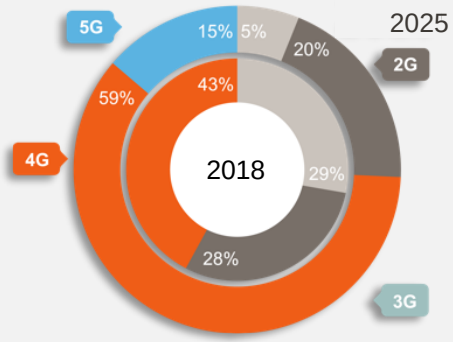

Parallel
WIRELESS
Reimagine Your Network. Reimagine Your Economics.
PARALLEL WIRELESS CLOUD NATIVE
OPEN RAN

OPEN RAN AND PARALLEL WIRELESS

All G World

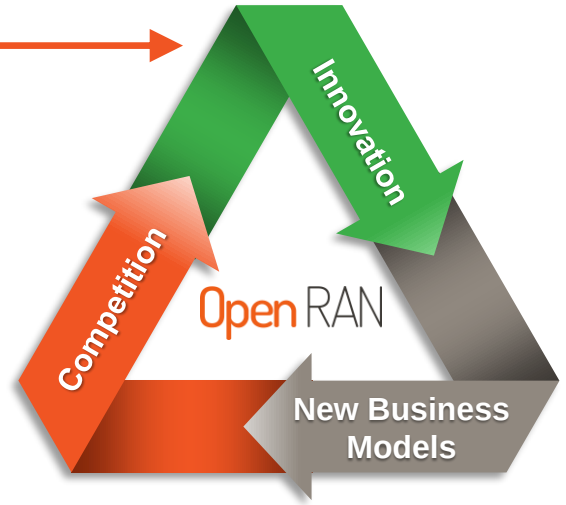
Technology Mix



Vodafone

"Traditional Solutions Not for Many Business Use Cases

- *Define and build flexible RAN solutions: software-defined, general purpose hardware*
- *Accelerate path to commercial deployments 2G/3G/4G technologies to bring more people online"*



Why PW

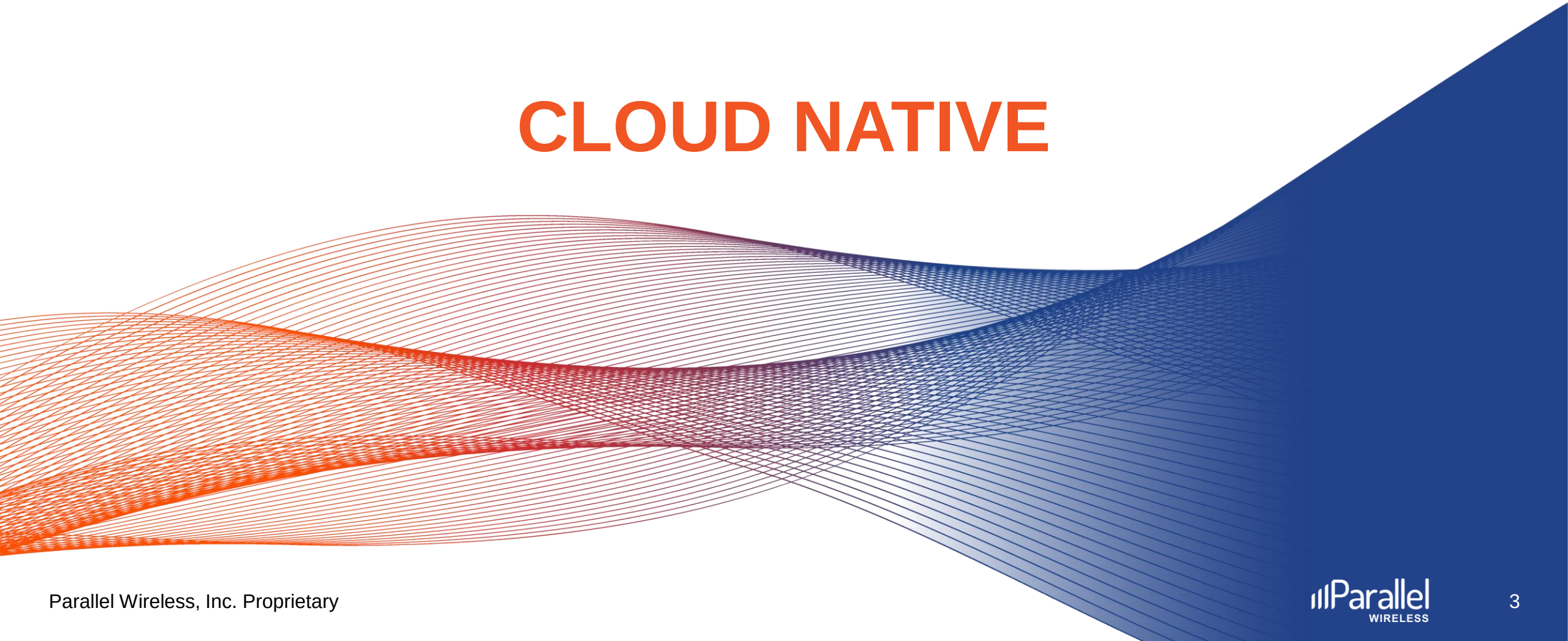
5G 4G 3G 2G Open RAN // 5G Core and Edge // Analytics and Network Intelligence

OPEN | UNIFIED | CLOUD-NATIVE | SECURED | TRUSTED

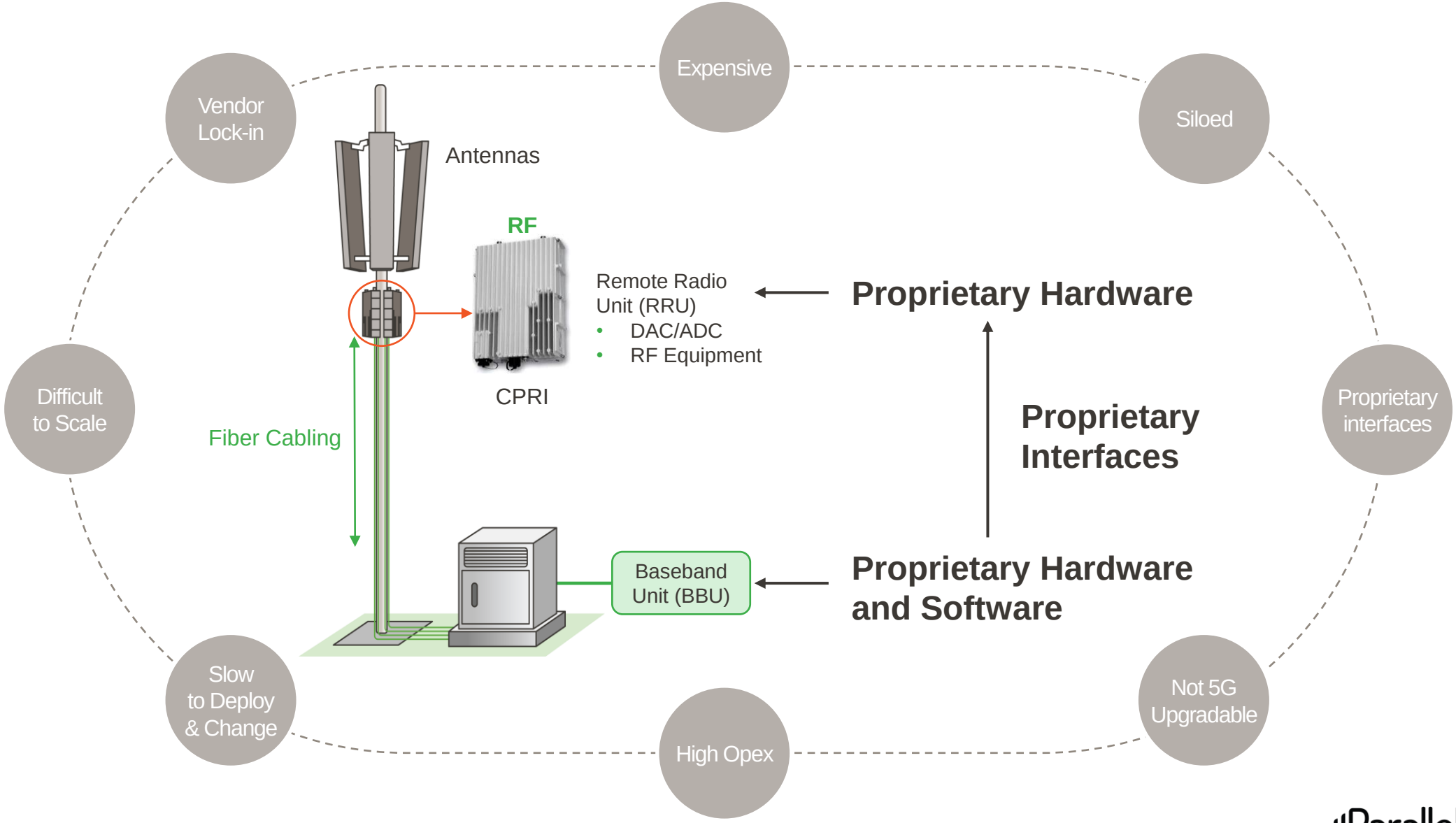
- No Vendor Lock-In
- Cloud-Native 5G 4G 3G 2G
- Easy to Deploy, Manage & Upgrade
- Coverage and Capacity
- Deployed on 6 Continents

Parallel WIRELESS

CLOUD NATIVE



TRADITIONAL RAN



OPENRAN: DISAGGREGATING HARDWARE AND SOFTWARE

Reduced CAPEX

Hw/Sw Disaggregation

Open Interfaces

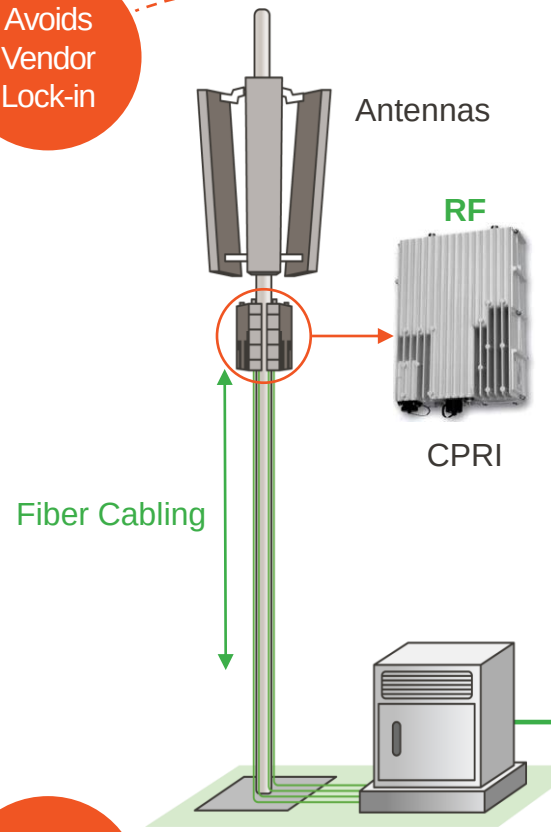
5G Upgradable

Reduced Opex

Agile/ Flexible

Scalable

Avoids Vendor Lock-in



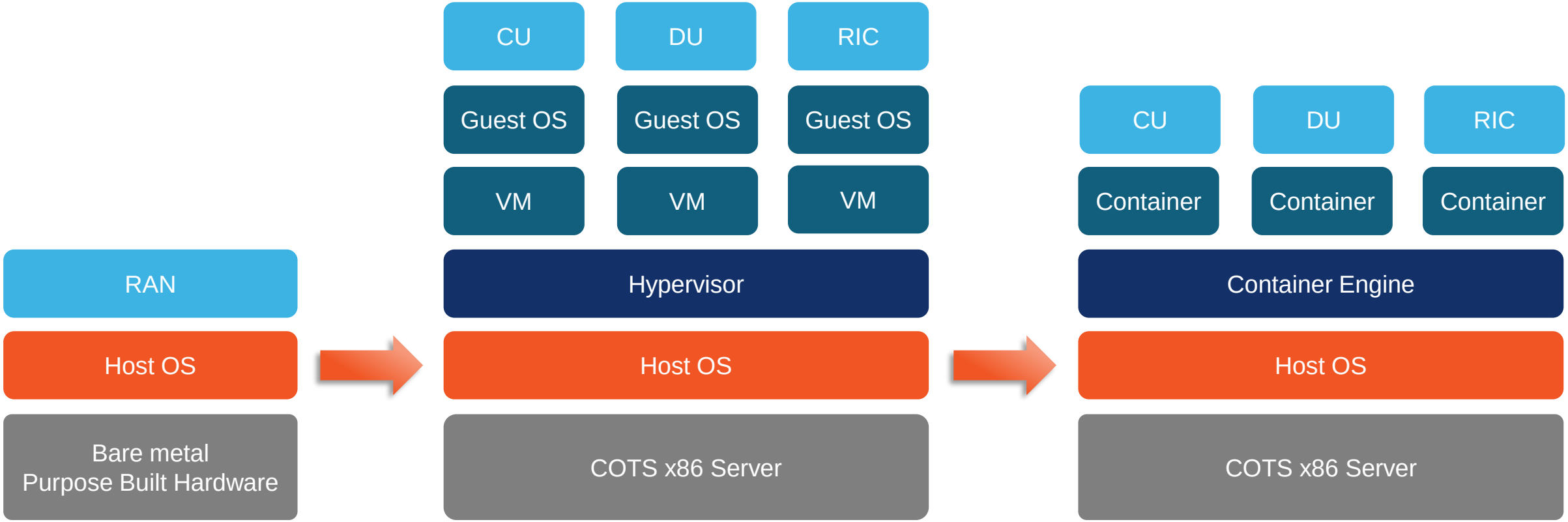
Remote Radio Unit (RRU)
- DAC/ADC
- RF Equipment

COTS-Based Hardware (SDR)
Can be purchased from any ODM/OEM/RAN hardware vendor

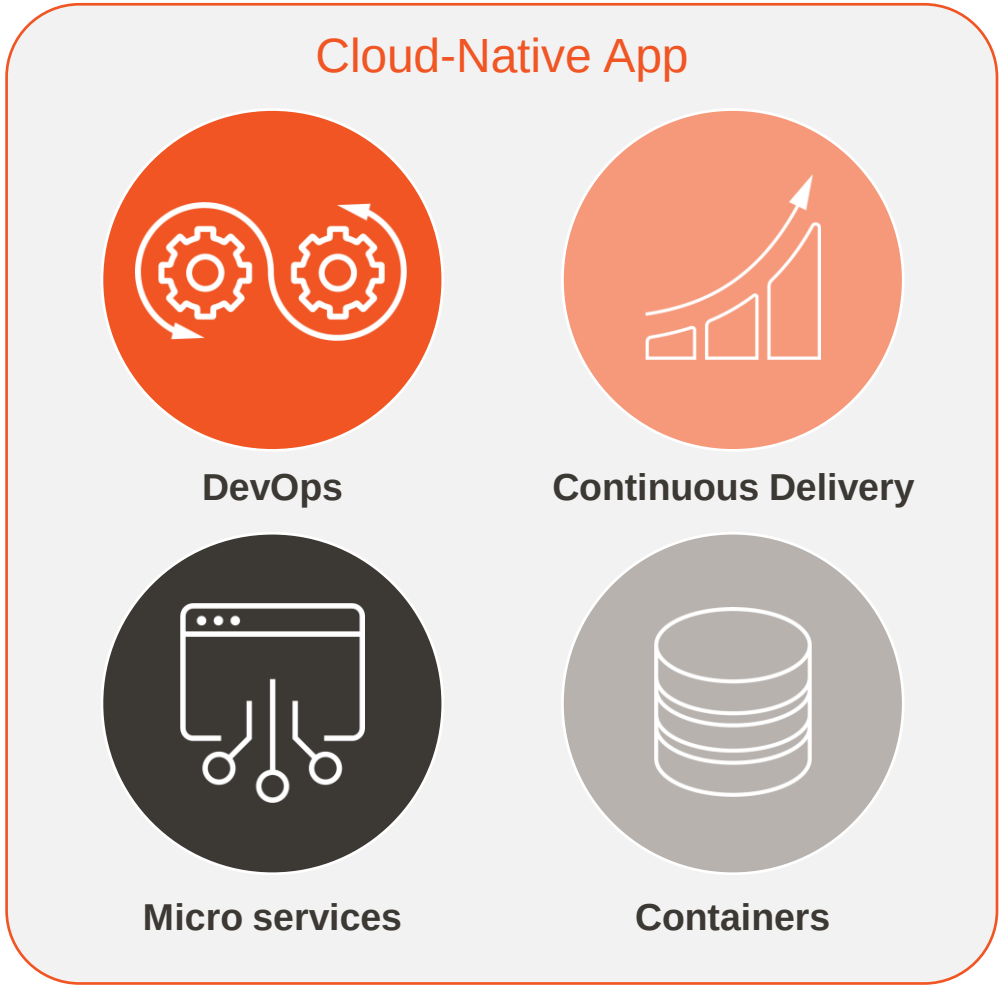
Open Interface
Any vendor software can work on this hardware

COTS Server and Proprietary Software with Virtualized Functions

EVOLUTION OF VIRTUALIZATION FOR OPEN RAN



KEY TENETS OF CLOUD-NATIVE APPLICATIONS



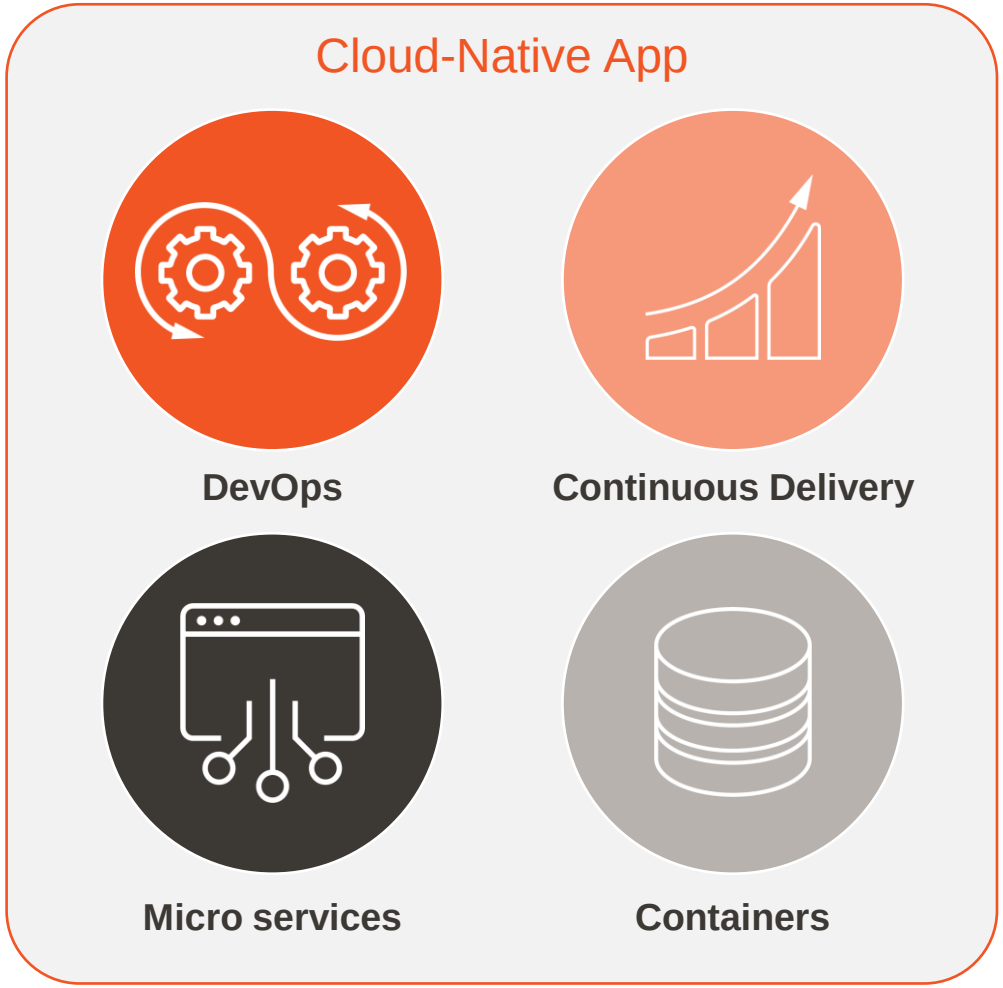
Microservices:
- Loosely coupled components
- State separated
- Independently deployable
- Organized around business capabilities

Containers:
- Light weight, standalone
- Executable package
- OS level virtualization

Continuous Delivery:
- Continuous integration of changes
- Build, Test, Release rapidly and frequently
- Reduce Cost, time and risk

DevOps:
- Agile Practices
- Bring Dev and Ops together
- Shorten Dev lifecycle

CLOUD-NATIVE OPENRAN



Microservices:

- **Modularize OpenRAN functions CU/DU/RIC**
- Share common microservices
- Independent in-service upgrade/downgrade microservices

Containers:

- **Instantiate/Scale/Heal Open RAN functions faster**
- Increase Resource Utilization Efficiency

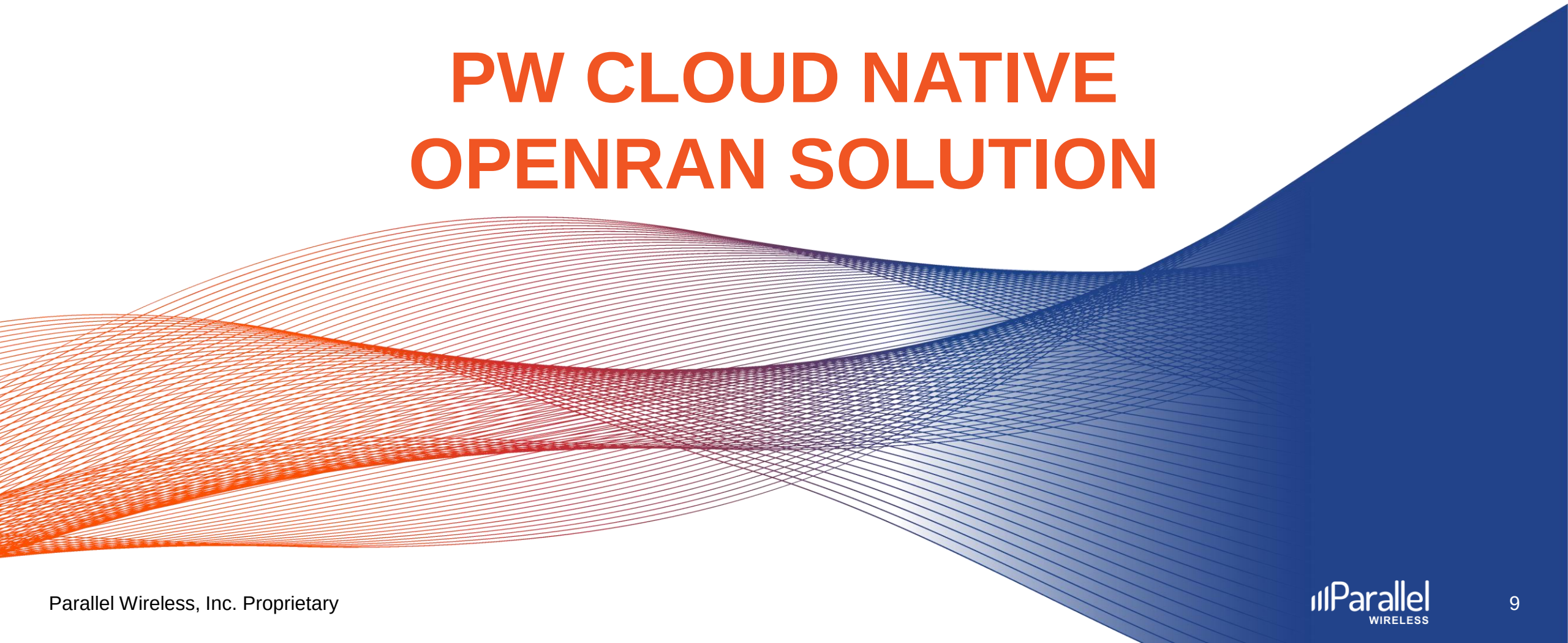
Continuous Delivery:

- **Deliver Open RAN features, bugs and functions iteratively**
- Faster time to market

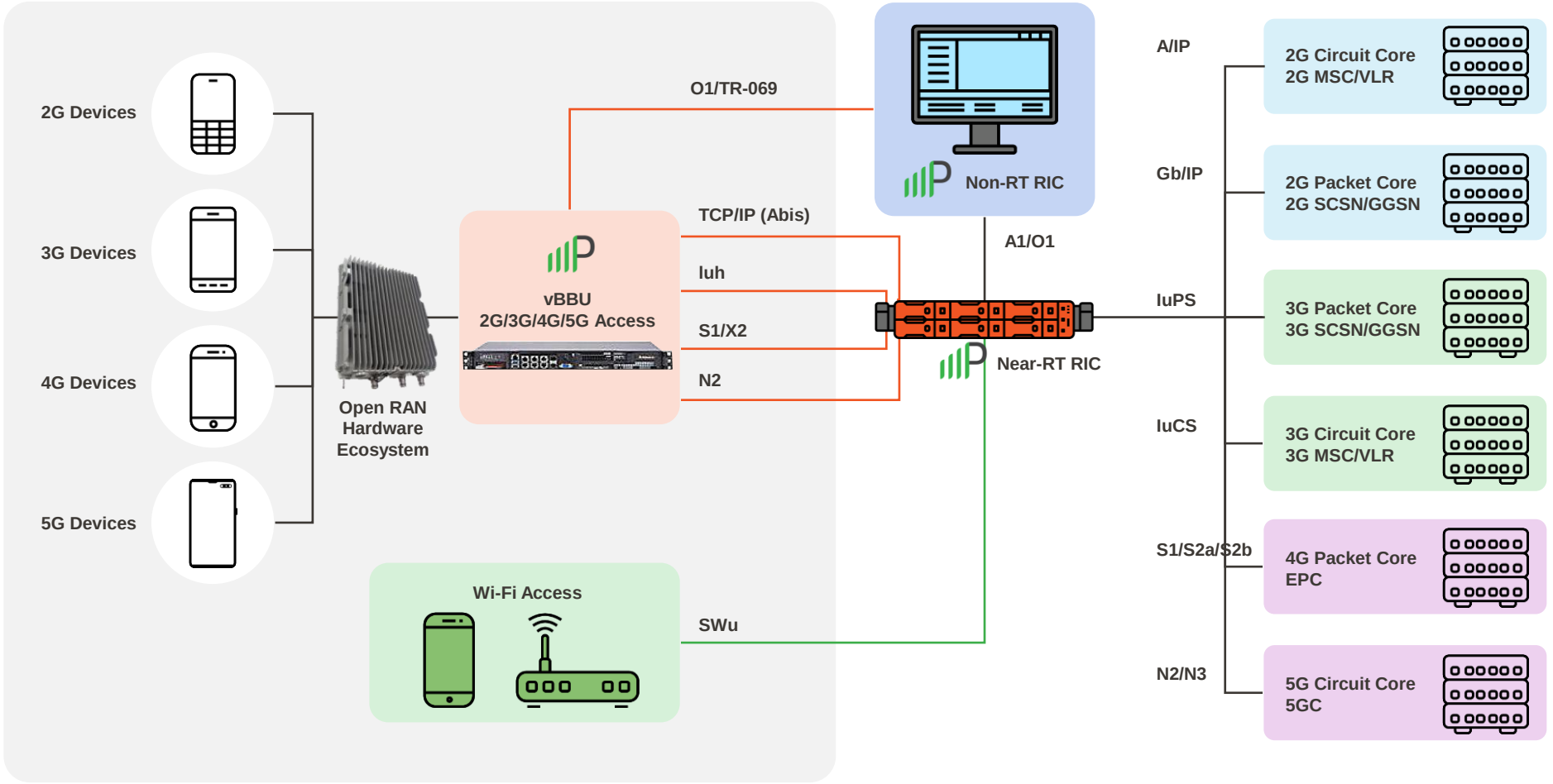
DevOps:

- **Build once deploy anywhere Open RAN solution**
- Better collaboration between Dev and Ops teams

PW CLOUD NATIVE OPENRAN SOLUTION



PARALLEL WIRELESS OPEN RAN SOLUTION



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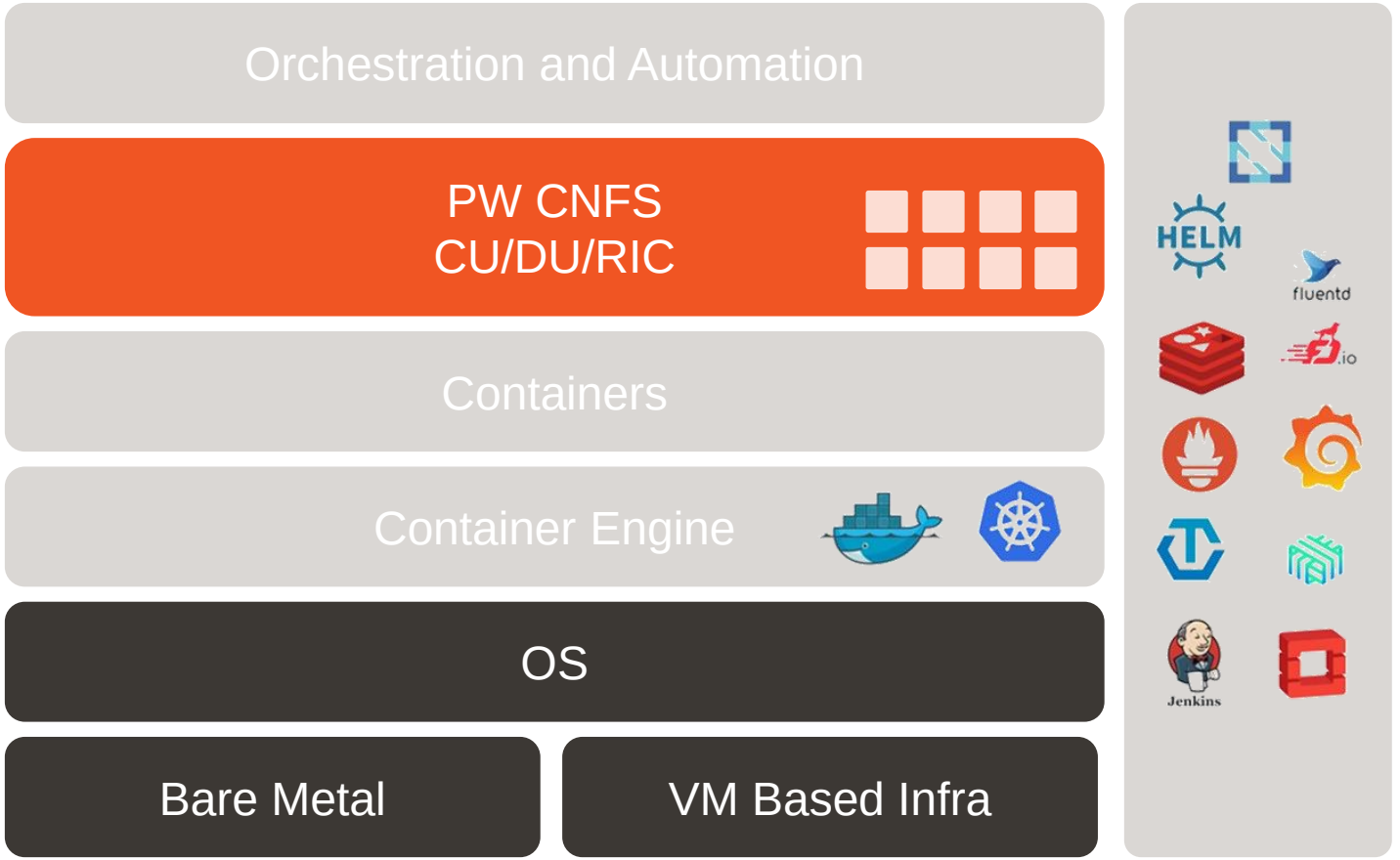


- Any G Open RAN solution
- Cloud Native Software based
- Provides Operators
  - Agility
  - Flexibility
  - Elasticity

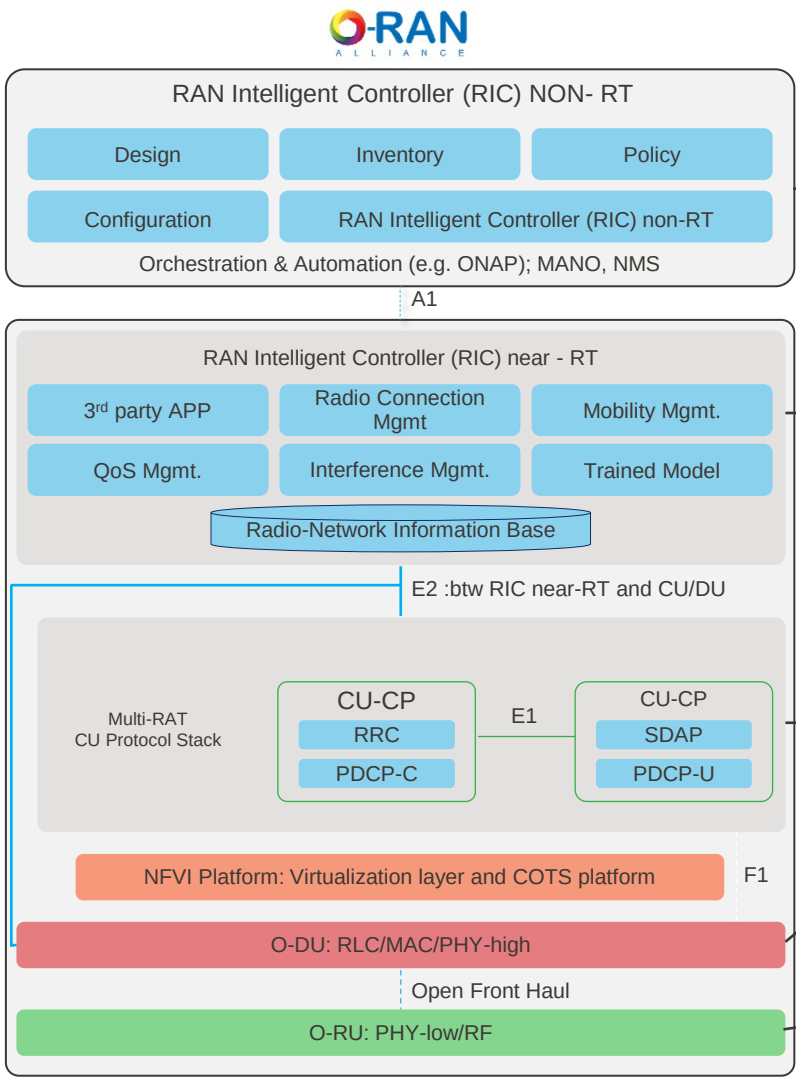
CLOUD NATIVE OPEN RAN SOLUTION

- **Technical Features:**
  - Automated orchestration and management
  - Distributed network functions
  - DevOps to improve customer satisfaction
  - Utilize open-source components
  - Public/Private/Hybrid cloud hosted solution

- **Technical Benefits:**
  - Provides operators
    - Agility
    - Flexibility
    - Elasticity

- **Business Benefits:**
  - Cloud Native and Open RAN are need of the hour for operators
  - Increases profitability
  - Reduces cost

PARALLEL WIRELESS OPEN RAN SOLUTION



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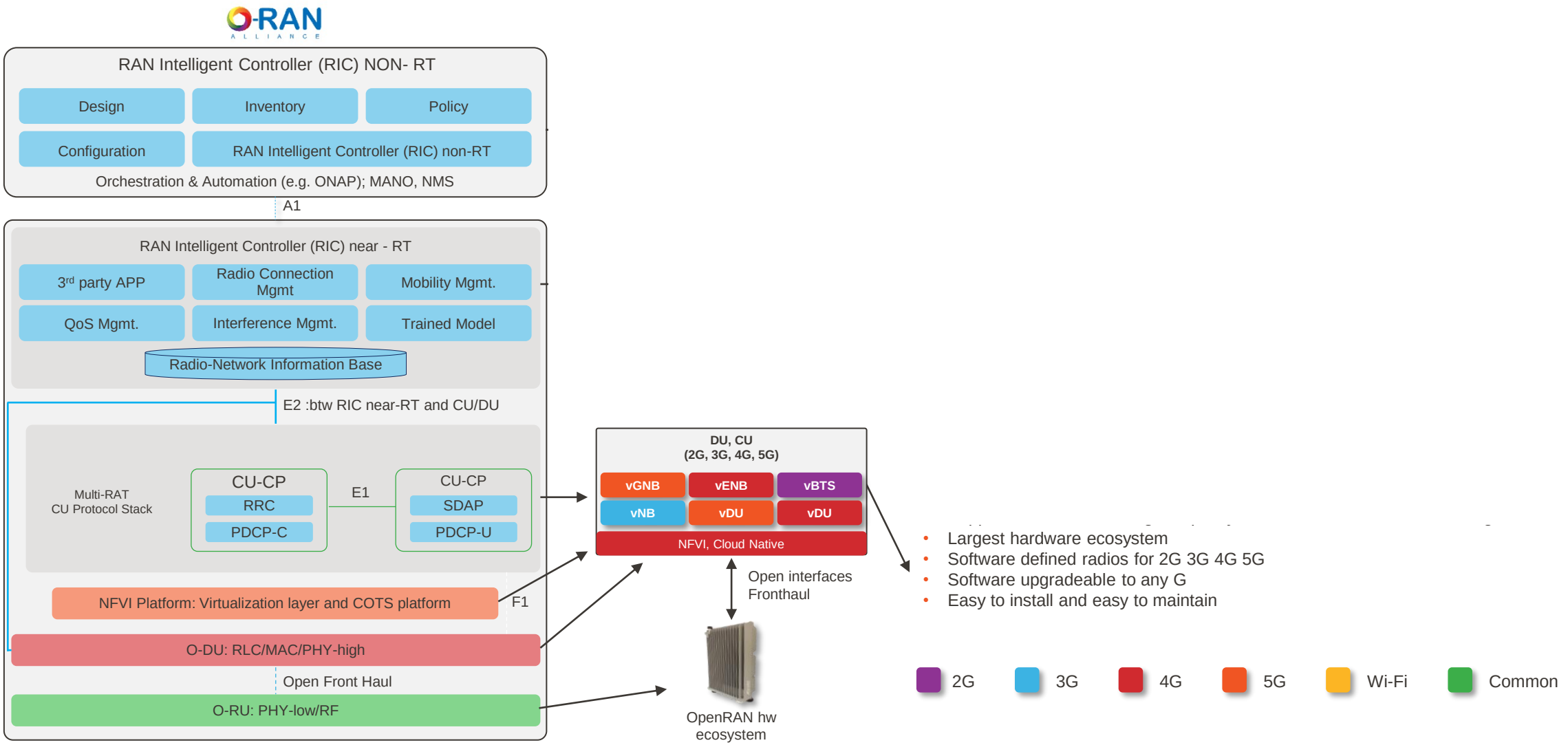

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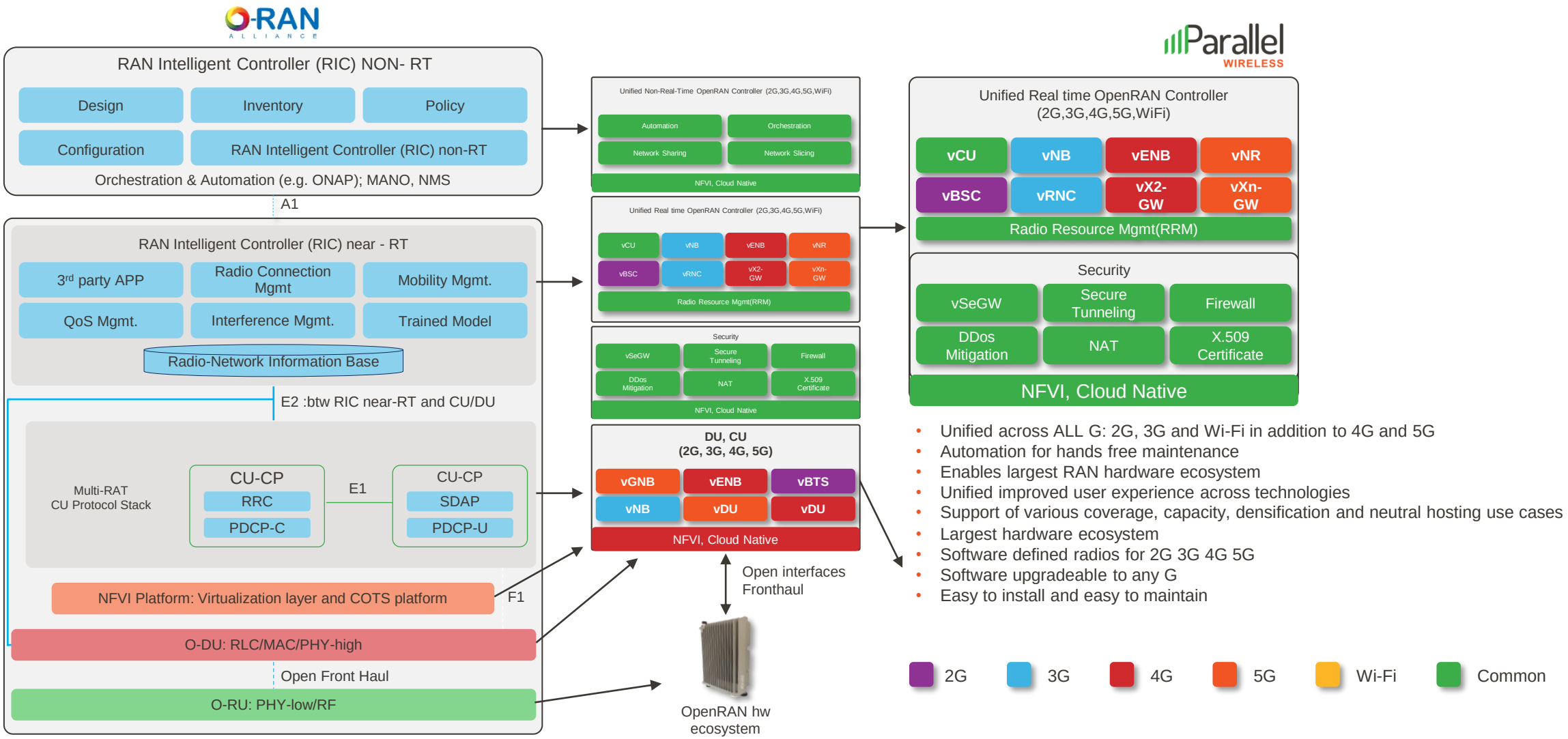
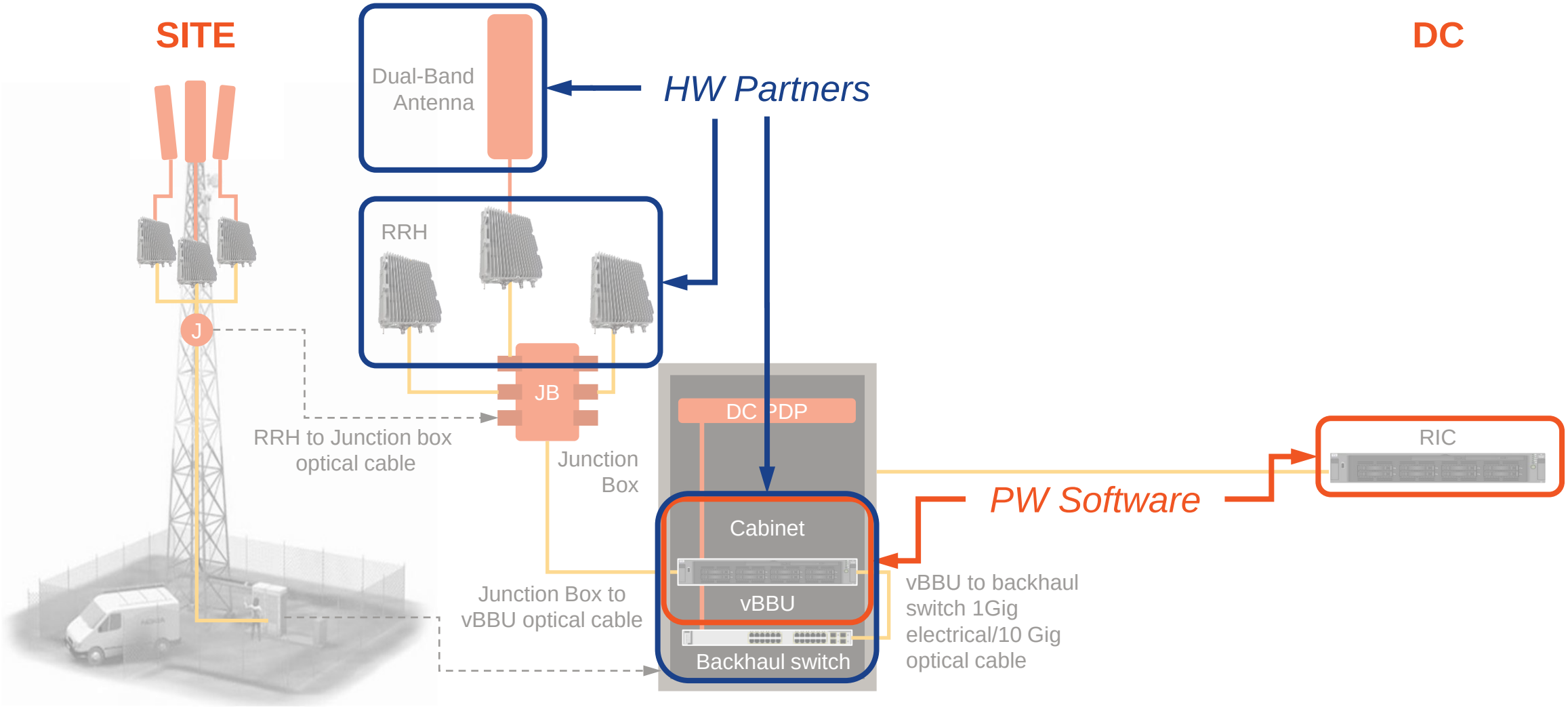
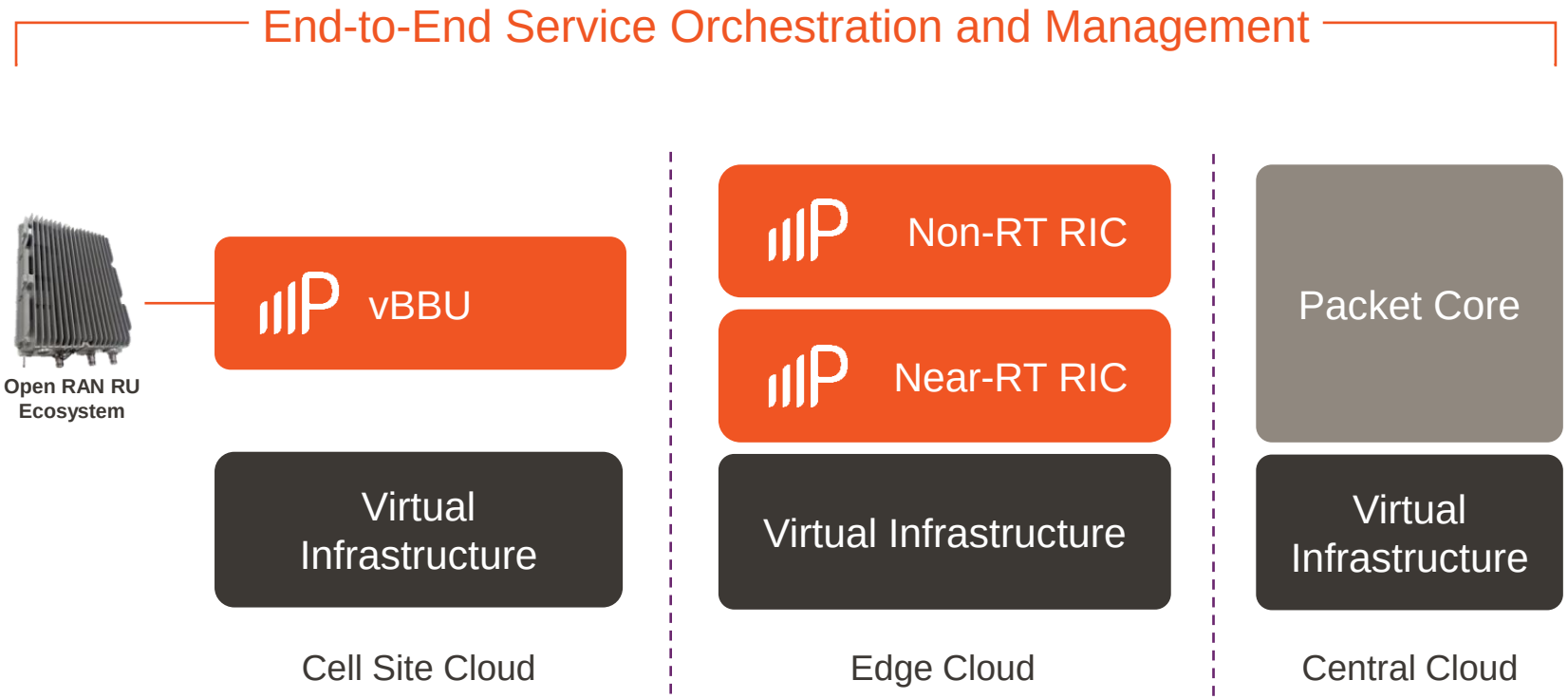


- Unified across ALL G: 2G, 3G and Wi-Fi in addition to 4G and 5G
- Automation for hands free maintenance
- Enables largest RAN hardware ecosystem
- Unified improved user experience across technologies
- Support of various coverage, capacity, densification and neutral hosting use cases
- Largest hardware ecosystem
- Software defined radios for 2G 3G 4G 5G
- Software upgradeable to any G
- Easy to install and easy to maintain

E2E ARCHITECTURE



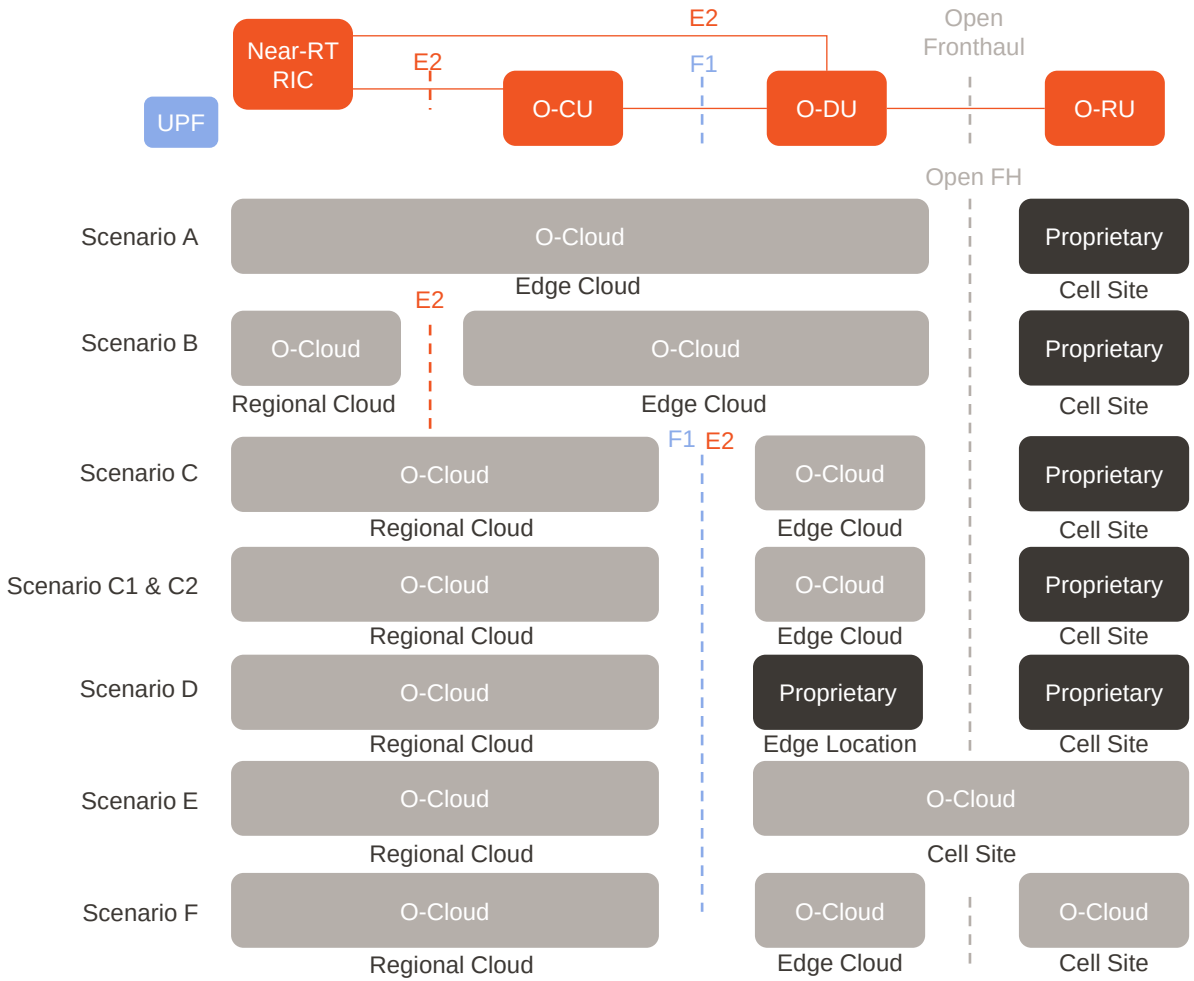
DEPLOYMENT MODEL: RU-CU-DU COLLOCATED AT CELL SITE



Use Case:

- Areas with limited FH capacity
- Latency needs of DU are met

DEPLOYMENT SCENARIOS

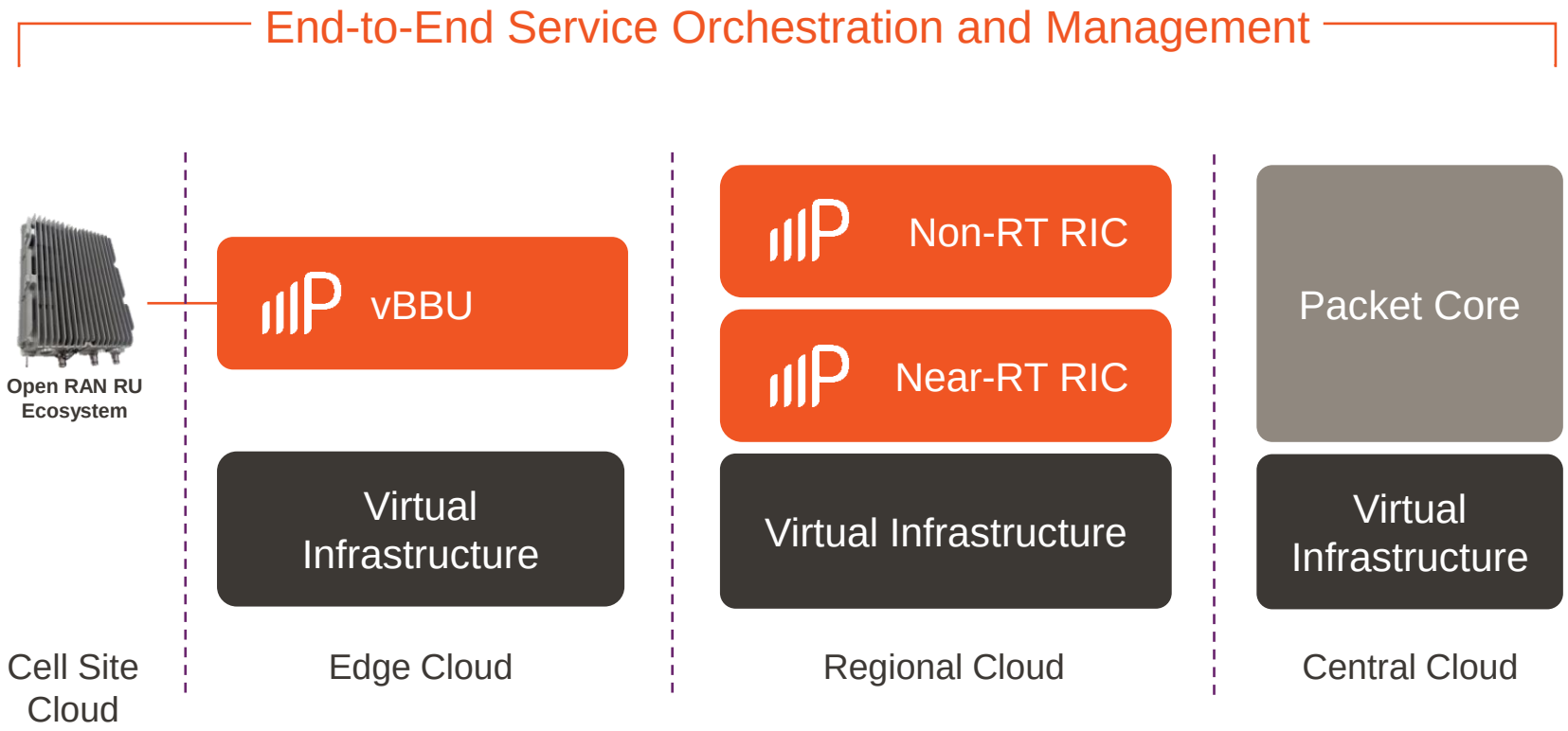


Factors Influencing Deployment model:

- Environment
- Space availability
- Transport capacity
- Acceleration hardware
- Indoor vs outdoor
- Frequency bands
- Macro vs small cells
- Application needs
- Cost to install
- Cost to maintain

Source: ORAN

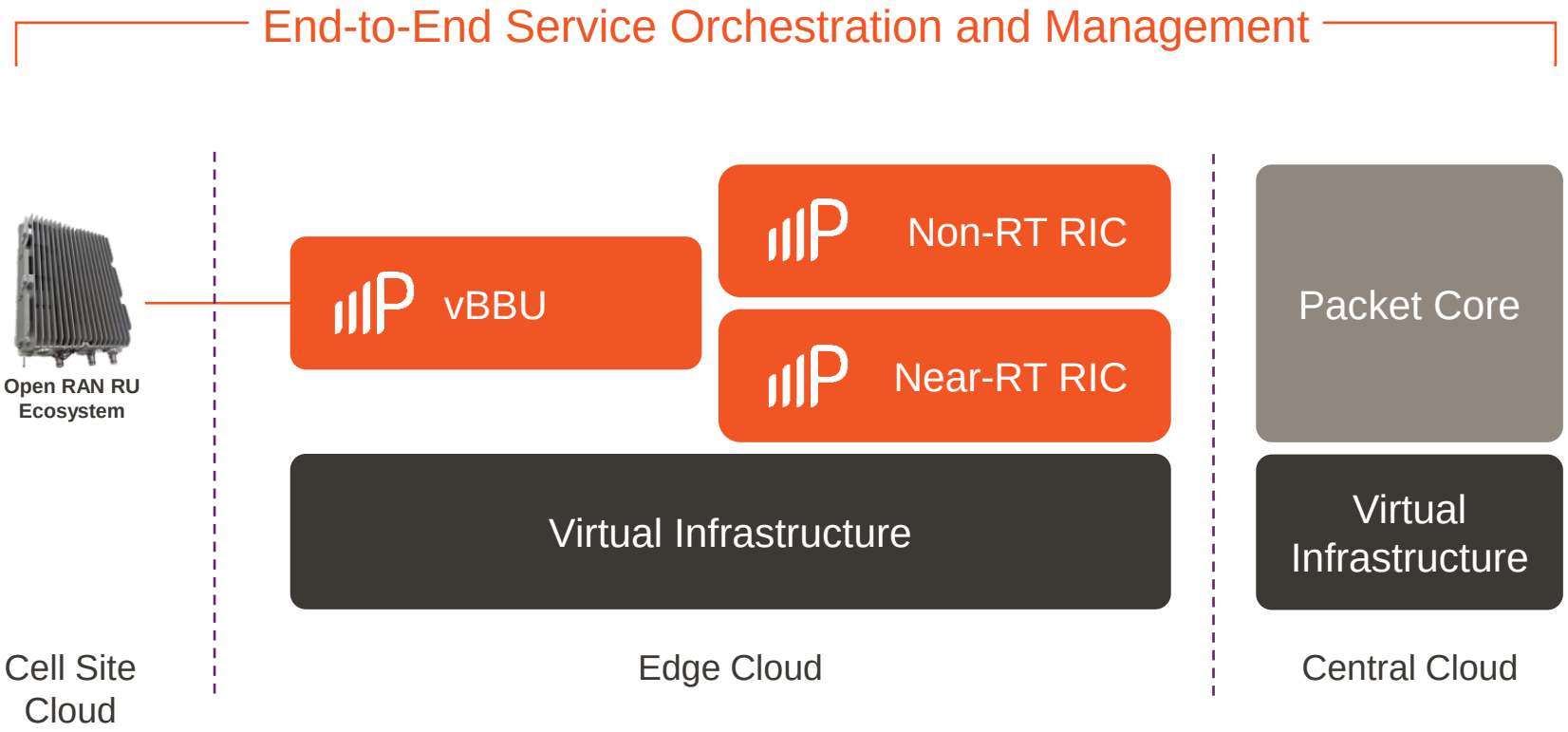
DEPLOYMENT MODEL SCENARIO B: CU-DU COLLOCATED AS VBBU



Use Case:

- Areas with limited FH capacity
- Spread out RUs
- Latency needs of DU are met
- Mix of Small and Macro cell

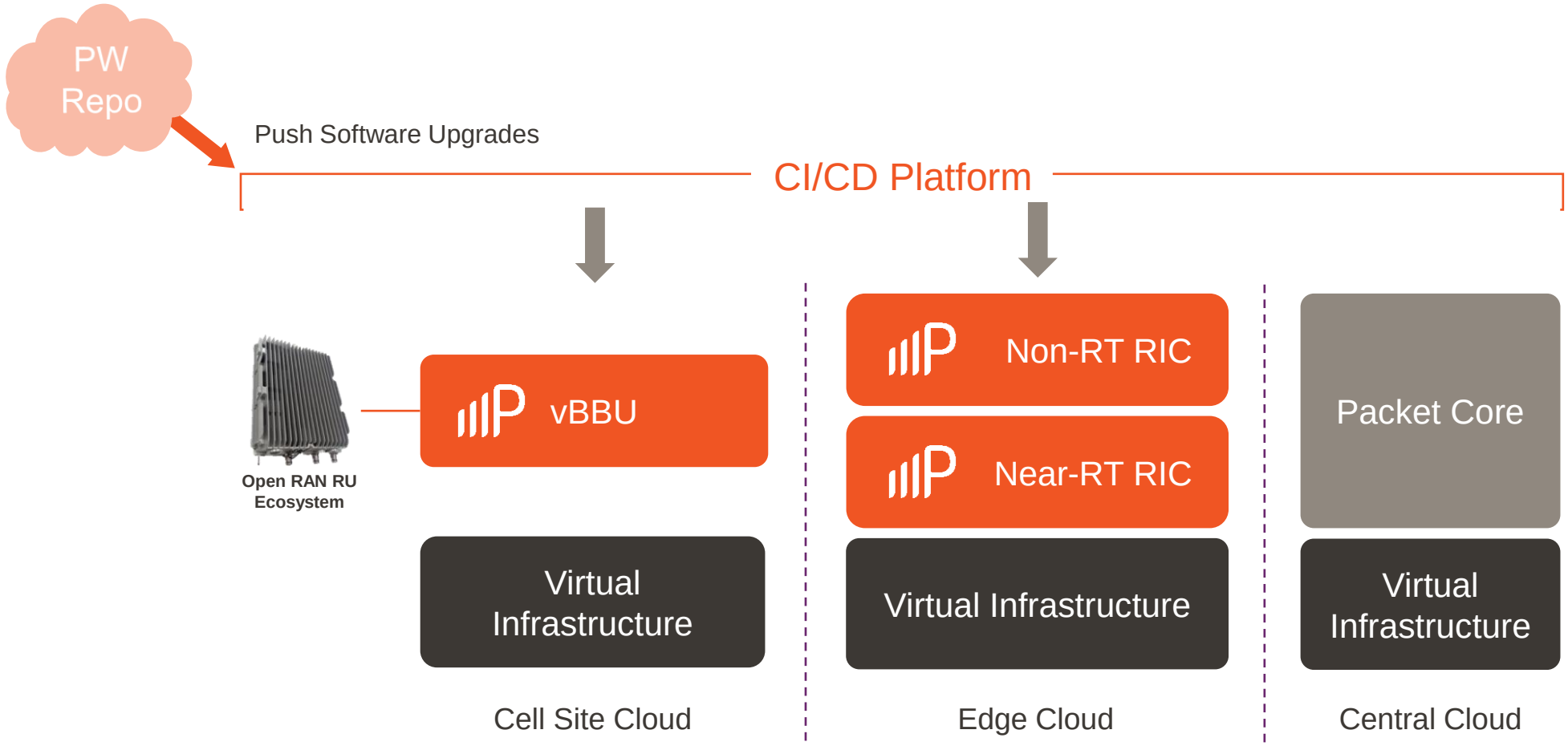
DEPLOYMENT MODEL SCENARIO A: CU-DU (VBBU) COLLOCATED WITH RIC



Use Case:

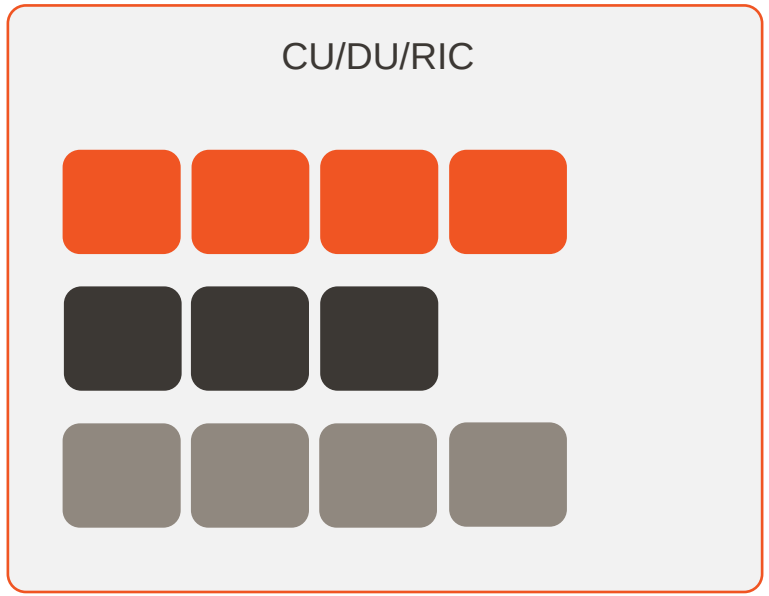
- Suited for Dense Urban Areas
- Excellent FH capacity
- Latency needs of DU are met

CONTINUOUS DELIVERY & DEPLOYMENT



FUNCTION LIFECYCLE MANAGEMENT EVOLUTION

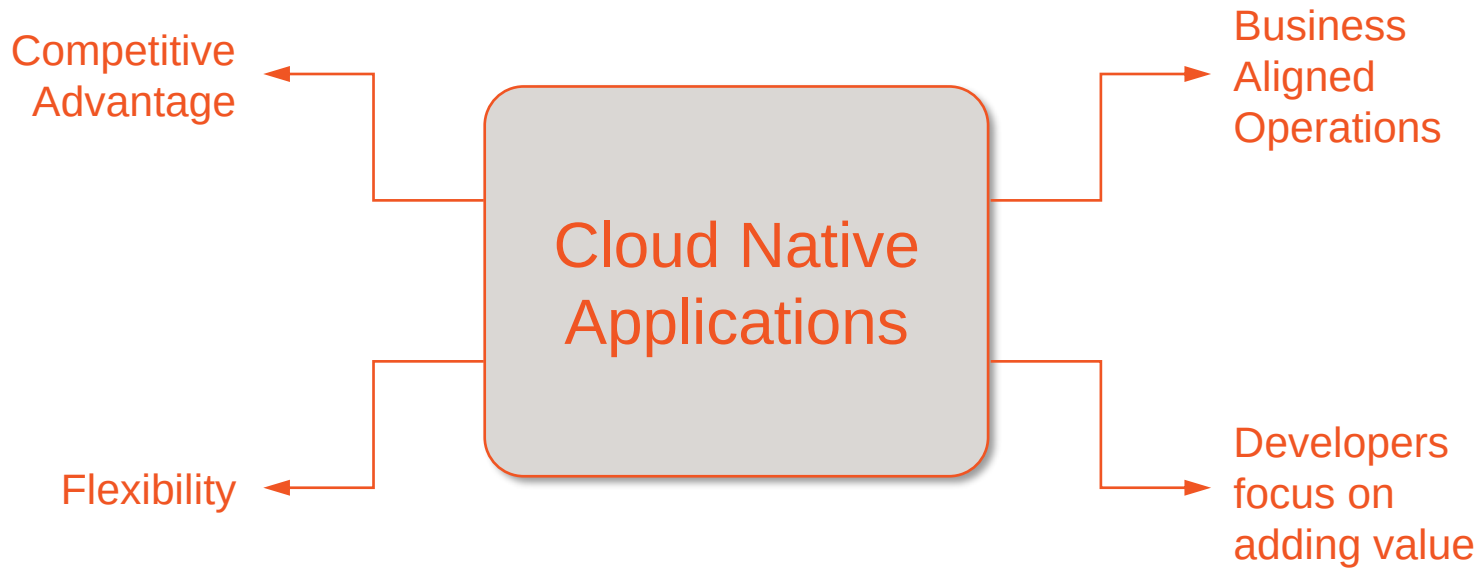
Monolithic Traditional RAN



- Microservices get added as needed
- Instances get added as load increases
- Instances get deleted as load decreases
- Self healing on failure

DEPLOYMENT STRATEGIES

GAINS WITH CLOUD-NATIVE APPLICATIONS



DEPLOYMENT CHECKLIST

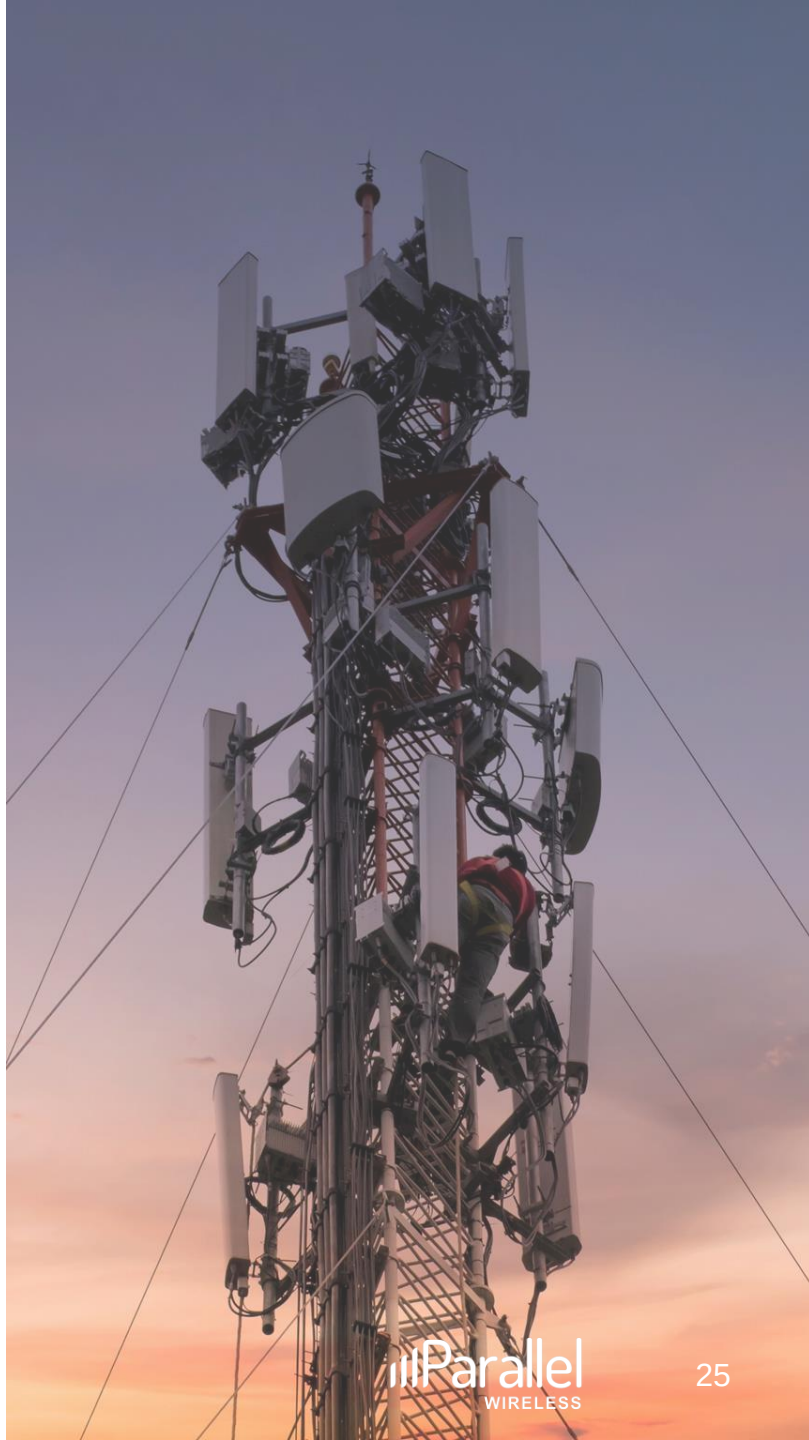
With Parallel Wireless OpenRAN, deploying or expanding networks is much simpler

Lowest TCO

Site Acquisition	✗ High cost to build new towers	✓ Does not require expensive towers, OpenRAN can be installed ANYWHERE
Equipment	✗ Higher cost, longer deployment times with legacy RAN	✓ Interoperable OpenRAN approach enables vendor diversity and cost reduction
Installation	✗ Special installers on site	✓ Self-configuration and self-optimization with OpenRAN Controller and Business Intelligence (SON) module
Maintenance	✗ Requires site visits which increases OPEX	✓ Automated for lower OPEX
Backhaul	✗ Demands on transport	✓ Flexible and future proof backhaul including satellite and microwave removes the expense and complexity of fiber backhaul

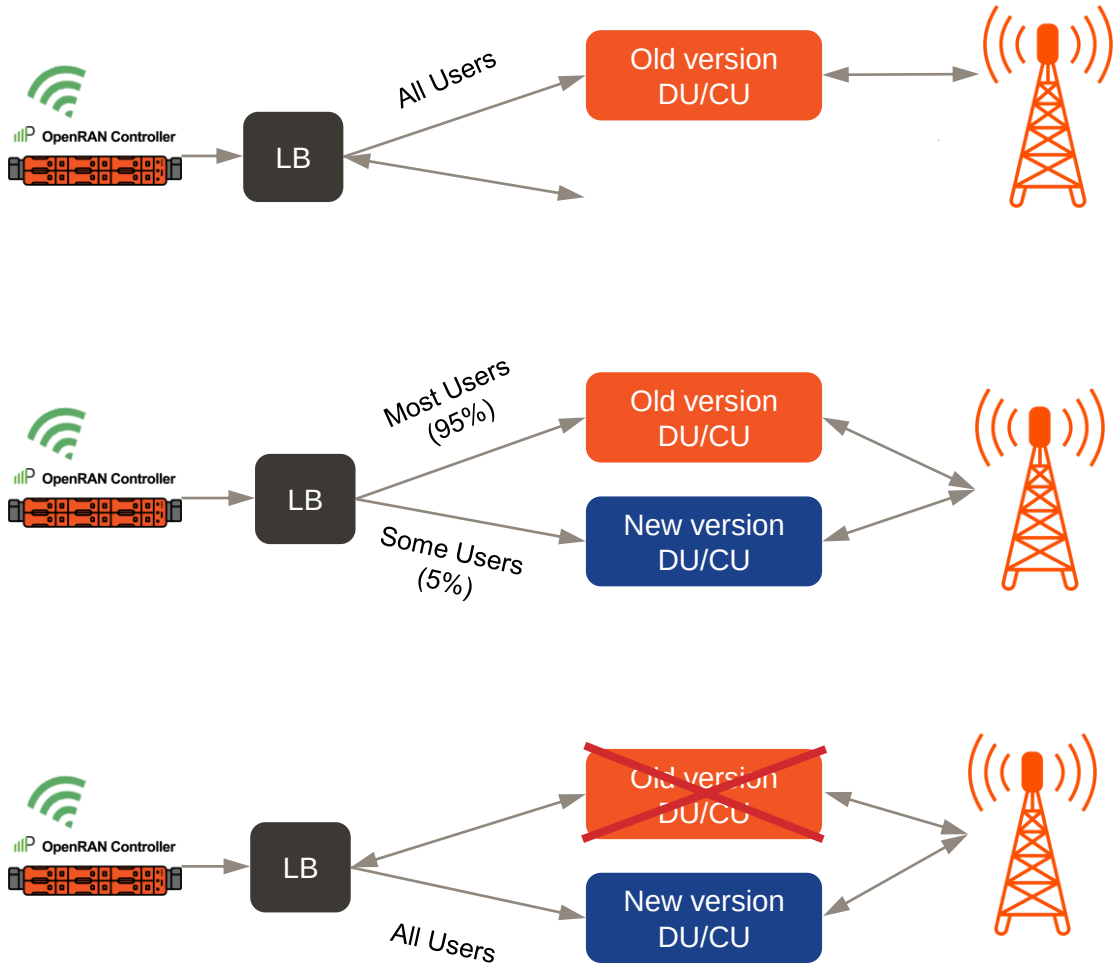
Increases the cost to the end-user, takes longer to deploy

Enable coverage fast and cost-effectively!



UPGRADE/DOWNGRADE OPEN RAN WITH CLOUD NATIVE

Canary release is a technique to reduce the risk of introducing a new software version in production by slowly rolling out the change to a small subset of users before rolling it out to the entire infrastructure and making it available to everybody.



SUMMARY

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