

Radio-as-a-Service (RaaS™)

Phluido Inc.
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Vision

Bring C-RAN benefits and full-stack 4G eNB virtualization wherever fiber-grade fronthaul is not available

- **Solution: Radio-as-a-Service (RaaS™)**
 - Centralized baseband processing
 - Fully SDR
 - CoMP, mobility enhancements
 - Scalability
 - Resource pooling
 - **RaaS Fronthaul-over-IP (RaaS-FIP™)**
 - Fronthaul conveyed over generic IP pipes, with no constraints on the physical medium

Benefits

- Added value

- Lower TCO
 - No planning needed (orchestration)
 - General-purpose commodity HW (x86 or ARM)
 - Fronthaul works on any physical link (even public internet!)
- Performance
 - Interference management
 - Mobility enhancements
- Flexibility and scalability
- OAM, analytics, testing, updates and upgrades
- Enhanced positioning
- Mobile edge computing (caching, video analytics, location services, etc.)

Key technology

- RaaS 4G Virtualized RAN (vRAN) Stack

- Fully software, highly optimized, leverages x86 and ARM SIMD
- PHY/MAC enhancements for supporting non-fiber-grade fronthaul
- Rel-11 standard-compliant (radio interface and S1 toward the network)

- RaaS-FIP Protocol

- Patented transport + application protocol stack for supporting non-fiber-grade fronthaul. Replaces CPRI

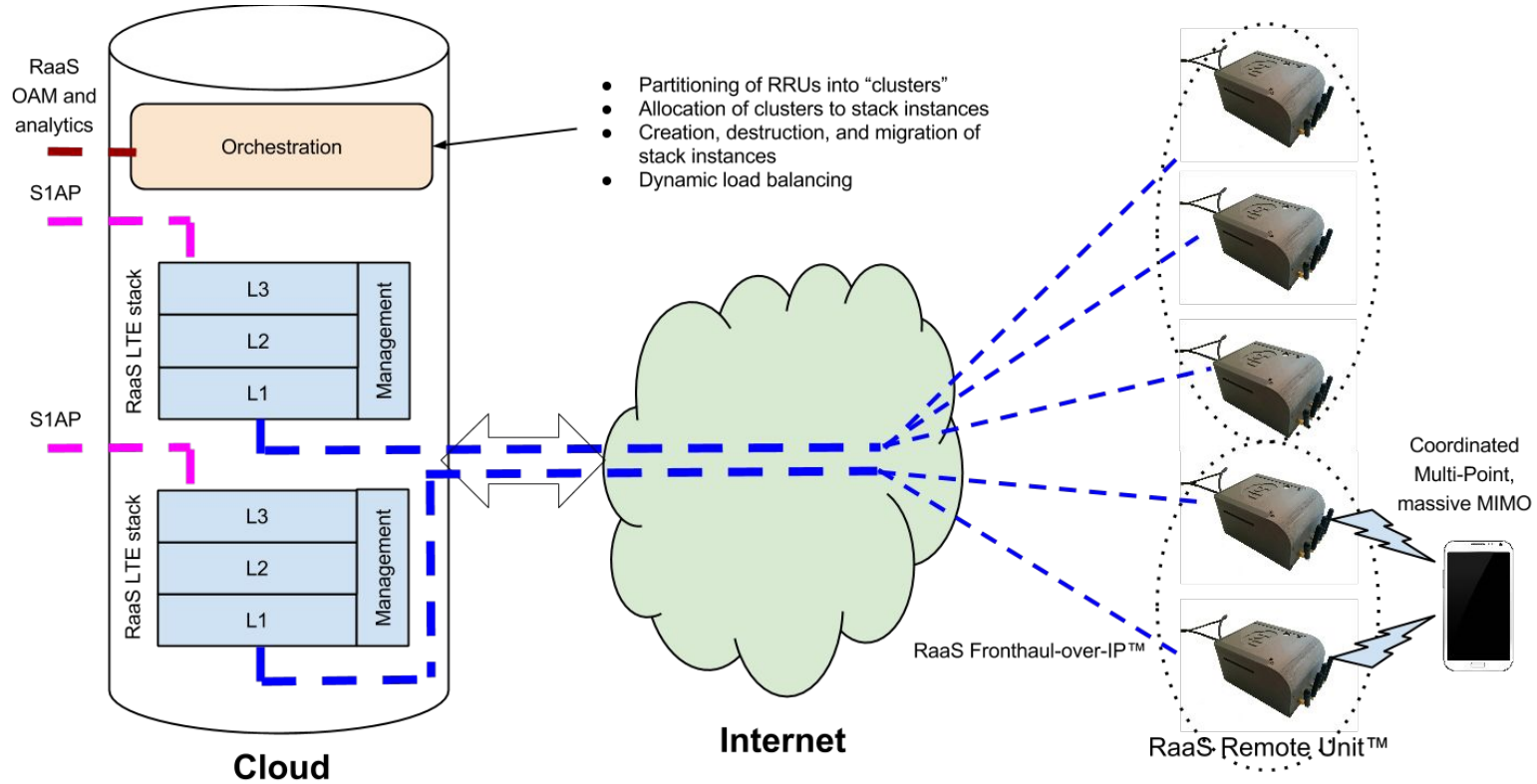
- RaaS Remote Unit

- Essentially a C-RAN RRH, with firmware upgrade. No modem needed

Use cases

- Any deployment with non-fiber-grade last mile
 - Macro high+power RRUs + low-power RRUs
 - Outdoor small cells
 - E.g., small cells on lamp posts, traffic lights, etc., where fiber can't usually be deployed
 - Indoor small cells
 - Existing in-building shared ethernet, or even wireless fronthaul
- Demo setup
 - RaaS software-defined stack running on AWS virtual machine (Northern California)
 - Handful of RaaS remote units in San Diego
 - We showcase CoMP and all other benefits of C-RAN

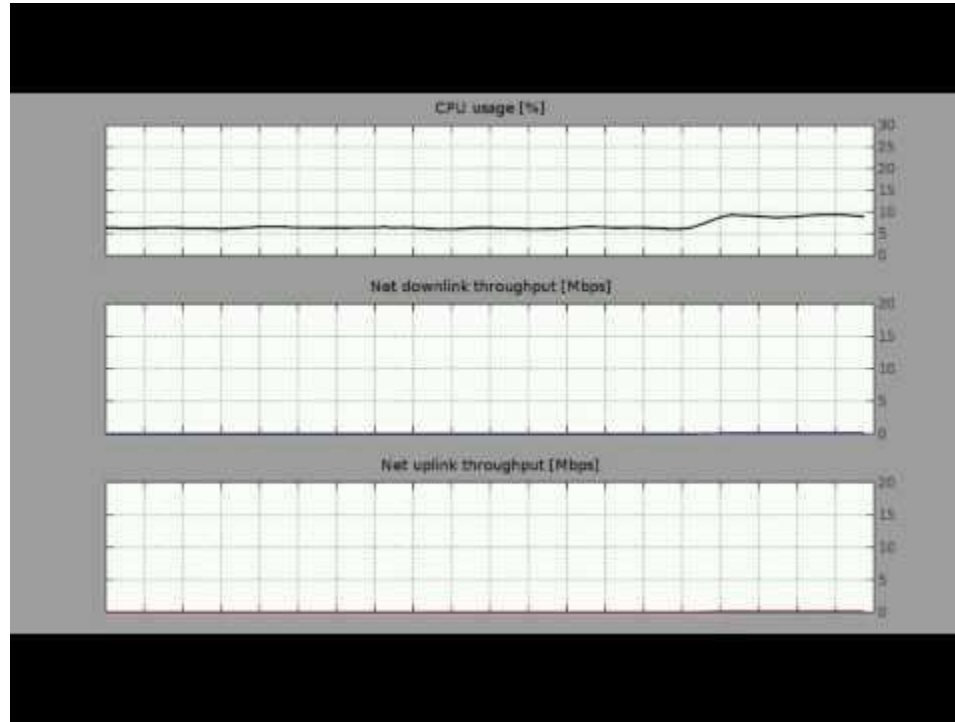
Architecture



RaaS-FIP

- **Huge fronthaul compression compared to CPRI**
 - Radio-load dependent (few Mbps for unloaded RRUs)
 - Smart **fronthaul-aware** MAC scheduler works jointly with the RaaS-FIP
 - Full radio load: 15x (downstream) and up to 10x (upstream) compression gain vs CPRI
- **Robust to fronthaul latency and jitter**
 - Up to 30ms round-trip latency supported
 - Time-sensitive MAC procedures remain fully standard compliant through our proprietary enhancements
- **Future-proof → 5G ready!**

RaaS Prototype Video



<https://www.youtube.com/watch?v=WrfvMY735Dk>