

NEUTROON

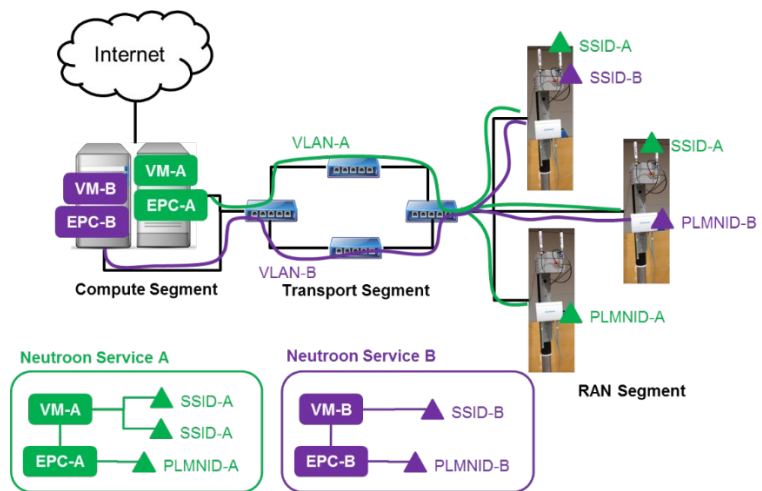
Multi-tenant management framework for future 5G neutral and private infrastructures

Neutron is a novel framework developed by i2CAT to manage private and neutral 5G infrastructures composed of Compute, Transport and RAN segments in a holistic manner. Neutron aims at effectively lowering the entry barrier for vertical sectors to operate private 5G infrastructures, and to empower neutral host operators to enhance the flexibility of current RAN sharing agreements towards the vision of providing 5G networks “as a Service”.

Framework architecture

Composed by the following functional elements:

- **The Neutron Northbound Interface:** Allows the infrastructure provider to configure the physical layer and to provision Chunks. Enables tenants to provision Services.
- A front-end service or Machine Learning framework are the typical consumers of the Neutron NBI.
- **Virtual Infrastructure Manager:** Virtualizes the compute, RAM and storage resources available in a Neutron compute domain.
- **Service Orchestrator:** Orchestrates network and application services instantiated over the VIM within a Neutron Compute domain.
- **RAN Controller:** Neutron features a RAN controller that enables the deployment of virtual Wi-Fi and LTE services. Future features will include instantiation support for on-demand services over 5G NR infrastructure.
- **Multi-vendor Transport Network Controller:** Manages the deployment of on-demand transport services. Specific transport adapters are used to control technologies from different vendors, without impacting the rest of Neutron components.
- **Neutron Slice Manager:** Orchestrates the provisioning of Chunks and Services interacting with VIM, the Transport Controller and the RAN Controller. Aggregates telemetry from the various RAN, transport and compute domains and offers an integrated telemetry endpoint for each Neutron Chunk and Service.



Main features

- **Hard slicing of infrastructure resources:** Built for multi-tenancy and subject to the capabilities of the underlying hardware, Neutron provides the ability to isolate physical resources in the RAN, Transport and Compute domains for a particular tenant. A Neutron Chunk is a set of RAN, transport and Compute resources assigned to a particular tenant.
- **Integrated management of 5G services:** A Neutron Service is an integrated 5G service defined as: i) a virtual multi-technology radio slice that allows the customers of a tenant to connect to the tenant’s service, ii) a set of virtual network or application functions hosted in the Neutron compute resources, and iii) a dedicated transport network service connecting the virtual radio slice with the tenant’s network or application functions.
- **Multi-tenancy:** Neutron distinguishes the role of the infrastructure operator and the role of the tenant. The infrastructure operator is allowed to configure the physical infrastructure and to define infrastructure chunks that are assigned to different tenant. Tenants are allowed to instantiate integrated 5G services of their allocated chunks.

Key Benefits

- Pure open software which triggers a faster Time-to-Market (TTM) for new 5G service introduction in public networks and private venues.
- Significant Total Cost of Ownership (TCO) reduction for Network Infrastructure owners.
- Vendor Agnostic open software.
- Optimized flexibility, automation, virtualization and resources allocation.
- Reduces skills required by the network infrastructure owner to operate the network.



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About i2CAT

i2CAT is a nonprofit research and technology center that promotes R&D activities in advanced digital technologies. The center has pioneered a new model of innovation based on collaboration between companies, public administrations, academia and users. Our activities are focused on three objectives:

- **Research:** playing a key role in EU Framework Programme for Research and Innovation, participating in 23 H2020 projects.
- **Strategic projects:** leading local initiatives and projects to deploy digital strategies and policies of the public administrations.
- **Technology:** Fostering R&D collaboration with companies to develop innovative market-oriented solutions.

Applications & uses cases

- **Industry 4.0:** Provide production planning teams with the ability to easily analyze network data and automatically adjust factory processes, as well as provide access and expertise to the newest technologies, such as AR-powered mechanics or video analysis of processes to support predictive maintenance.
- **Public venues:** Deploy connectivity for staff and visitors, as well as multiple data analytics tools to improve overall monitoring and operational performance. Extra data inputs from upcoming devices and sensors within venues can increase the use of intelligent equipment, while the network slicing guarantees safe and stable network access for different user groups.
- **Rural areas:** Offer a new value proposition for current underused spectrum through a neutral host model. This facilitates local stakeholder based in rural areas to warrant greater stability and faster connectivity while decreasing the inherent cost of offering such a high-end service.



Gran Capità 2-4, Nexus I building, 2nd floor, 08034 Barcelona
Ph (+34) 93 553 25 10 · Fax (+34) 93 553 25 20 · Email techtransfer@i2cat.net