

# OPEN NETWORKS

NTT data





# 1. Network Challenges in the Industry

Nowadays Communication Service Providers (CSPs) and Neutral Network Operators face huge challenges diversity that are common in the industry regarding network transformation. Different strategies have been implemented with more or less success, though the main challenges still remain, and we can summarize them as follows:



## How to increase / accelerate network infrastructure or capacity roll-out?

Network Executives (CTIOs, CTOs, Engineering Directors & Managers) are the main responsables for service footprint and quality at early stages, which are base concerns for target markets. 5G evolution will drop a bigger challenge because they will need to increase their roll out capacity to at least double due to site granularity compared to 4G; no matter it simplifies construction models, they will need to act in more places at the same time in order to reach coverage.

## CAPEX prioritization

Investment every day is more limited within the industry, business cases are not as obvious in the past, penetration and markets saturation are a constant worldwide; therefore, CSPs and Neutral Networks Operators' Executives must be in the capability to take smart decisions, coherent with financial outcomes expected by the Company and at the right moment; where, when, and why to invest?

## OPEX efficiency

Since OPEX and network growth are practically a one-to-one formula, current networks during time tend to increment the operational cost; each day network executives are challenged in trying to control expenditure pressure. In the meantime, revenues trend is in the decrease path thanks to services commoditization. Based on this, network executives are daily challenged to find the correct formula to make their operations more efficient without allowing the network to become a risk regarding service continuity.

## Survive technology evolution

It is a fact that ICT has arrived for good, disaggregation and Open-Source industry programs bring with them a great deal of benefits and every day they penetrate even further into the company's architectures previously controlled by monolithic/on-premises/proprietary technologies. Cloud, NFV, SDN, 5G, Open RAN, Edge Computing, among others, not only challenge the industry in terms of technology transformation but in terms of the huge impact on people profiles and processes that currently supports the network. Transformation is structural and key for network executives to anticipate what is next in terms of technology, people, and processes.

## Guarantee user experience

In the fierce competition for a market that is reaching its limit in terms of penetration of voice and data connections, being distinguished is the key lever for keeping users' loyalty. Network executives are entirely responsible for ensuring customers are delighted with the experience they perceive from network usage, and therefore constantly generating alternatives on giving the best of the network to their user base.





## 2. Open Networks Offering

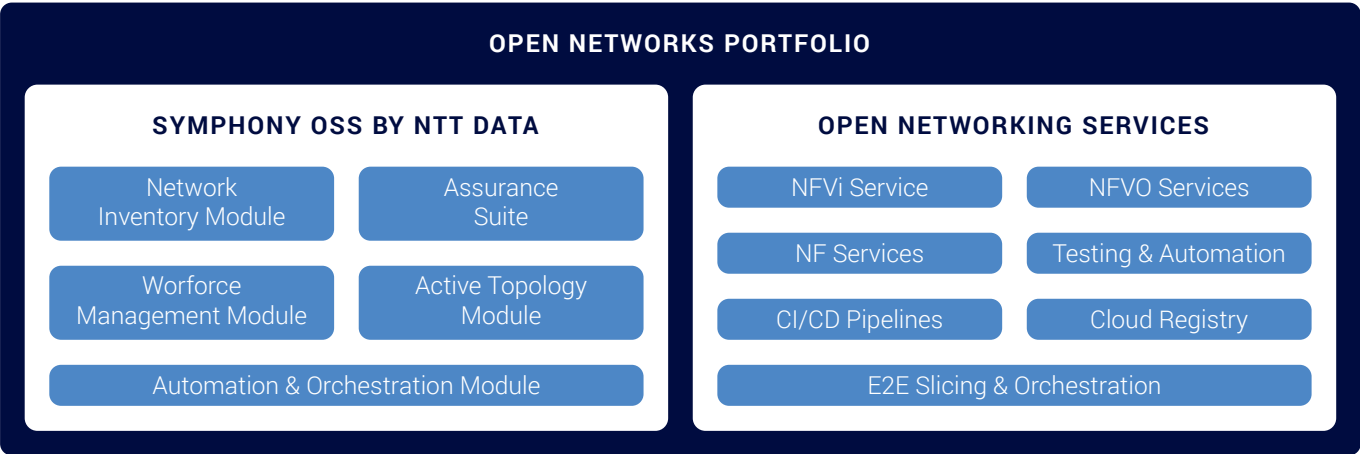
To tackle the challenges mentioned previously, CSPs and Neutral Network Operators are forced to break their status quo by redefining their strategies, tactics, operational models, in general rethink from scratch the way of managing network and services' lifecycle.

NTT DATA has centered its value offering in supporting CSPs and Neutral Network Operators evolve to this new stage of network transformation by introducing NTT DATA Open Networks solutions.

NTT DATA Open Networks leverages network disaggregation and 5G disruption to provide consultancy and solutions that help our customers in

finding new value through innovation, achieving cost efficiencies using commodity infrastructure, and driving operational excellence based on automation and orchestration.

*"Many of the NTT DATA Open Networks' solutions are based on open-source assets supported by relevant consortia such as Open Networking Foundation (ONF), Linux Foundation Networking (LFN), Telecom Infra Project (TIP). They are also based on main Standard Organizations such as TM Forum, ETSI, 3GPP among others, covering two main networking categories."*



## 2.1 Symphony OSS by NTT DATA



Symphony OSS is an **open-source solution** that includes NTT DATA Open Networks' assets focused on automation through an event-driven architecture. It is a future-proof **cloud native** stack but continue to assess the latest trends and capabilities in a quickly evolving marketplace for cloud and microservices development techniques.

The solution's architecture is oriented towards **zero-touch automation** and allows end user to trigger and run processes that support the business and

operation through simple clicks, simplifying daily operations. It is based on **open APIs** specifications and microservices complying with industry standards (eTOM, TM Forum and TAM) and has been deployed over **private and public clouds** (AWS, Azure, GCP).

Symphony OSS supports Communications Service Providers (CSPs) and Neutral Network Operators to manage fulfillment and assurance processes **independently of network size, vendors' quantity, users' quantity, profiles**, among

others, maximizing their Total Cost of Ownership (TCO) by taking advantage of the open-source tools landscape.

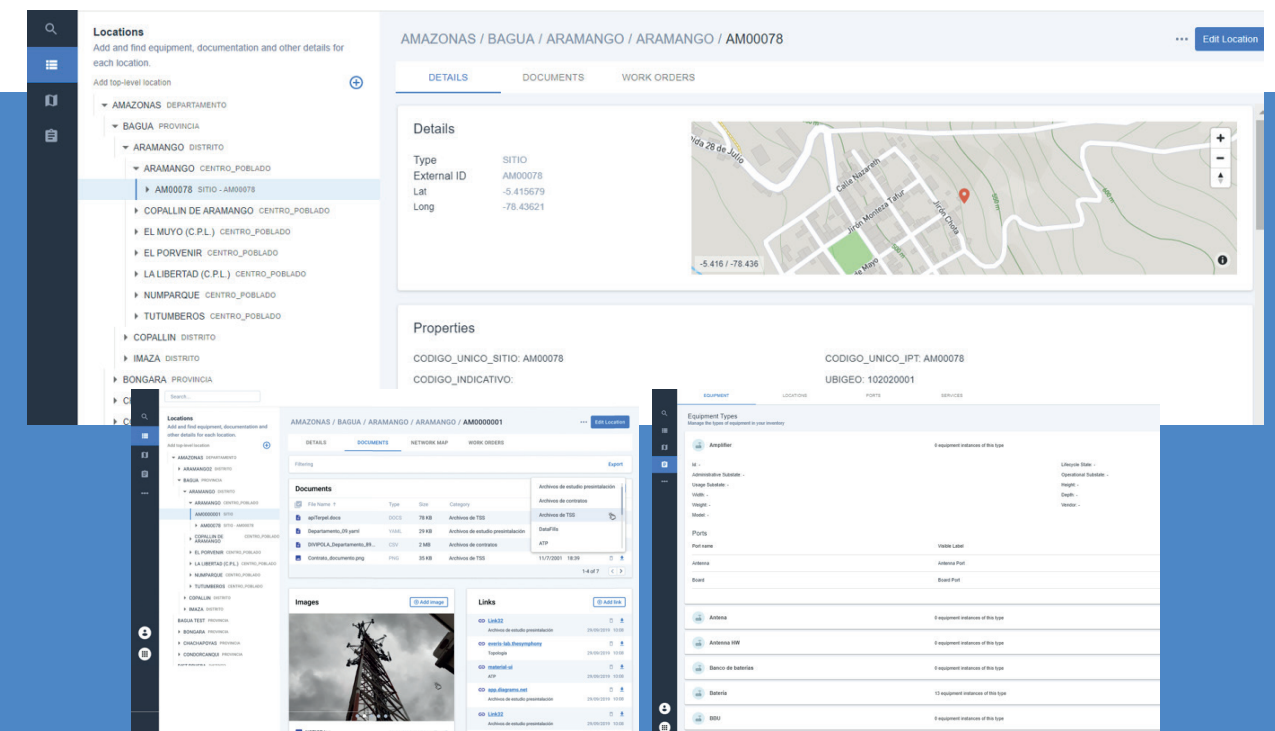
We are pioneers in **future OSS vision** by proposing a **disaggregated, open, cloud-based, and data-driven architecture** with the main purpose of enabling **closed-loop automation** inside the most important network processes (evolution, deployment, resources management, operations and much more).

### Network Inventory Module

Network Inventory Module is a full **cloud based & open-source** application enriched and supported by NTT DATA oriented to manage inside plant network assets. This module enables the user to manage, configure and track resources and locations from any network domain.

The solution adapts to any infrastructure domain model and use case particularities, no matter **legacy or disaggregated** network, redefining a new flexible way to manage the network lifecycle.

Network Inventory supports Communications Service Providers (CSPs) and Neutral Network Operators to manage the network infrastructure **independently of network size, vendors' quantity, users' quantity**, among others, maximizing their Total Cost of Ownership (TCO).





Assurance Suite

This comprehensive suite is a **cloud based & open-source** architecture oriented to enable data driven operation by combining fault management, performance management, service quality & customer experience management under an end-to-end enriched visibility.

This solution provides a catalog of the main entities of the assurance processes, where users can define through a single pane of glass, entities as counters, KPIs,

threshold, formulas, KQIs, among others. It supports northbound interfaces from a broad list of vendors on **legacy & disaggregated** networks, as well as **IT infrastructure** manufacturers.

By integrating this solution with the existing ticketing systems, maximum efficiency is achieved in network monitoring, minimizing front office's efforts by **reducing diagnostic time** and failure or service degradation attention.



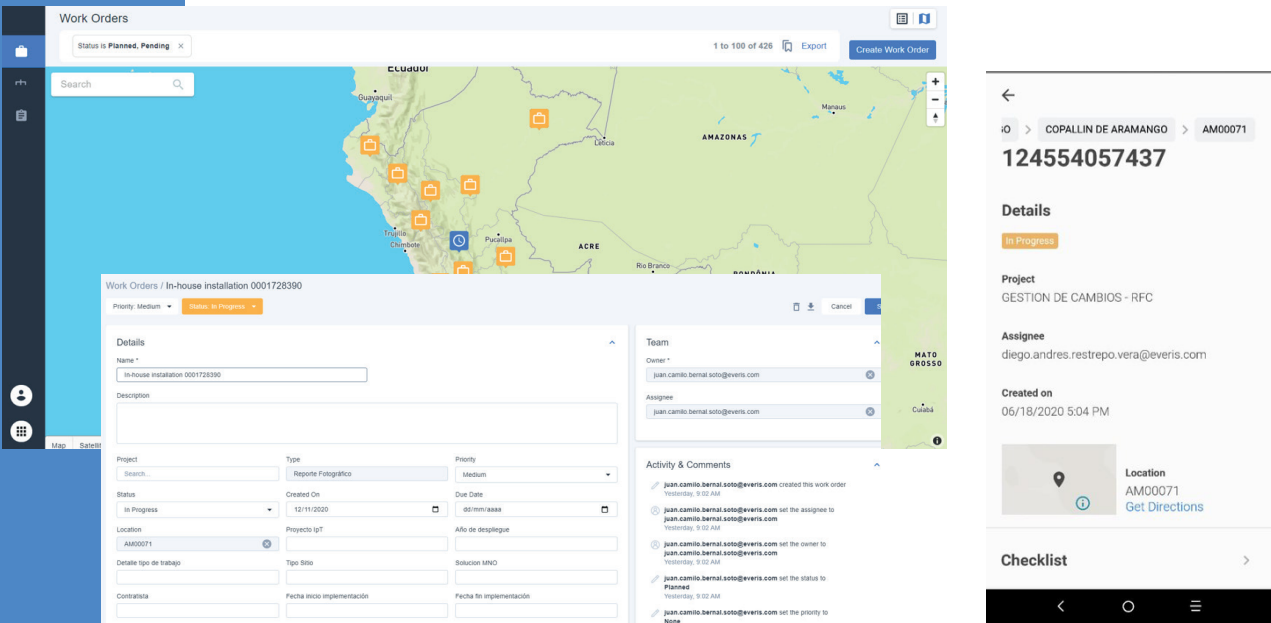
Workforce Management Module

Workforce management module is a full **cloud based & open-source** web application enriched and supported by NTT DATA oriented to manage field tasks with the flexibility of modelling work orders and connect with field force through its Android® Mobile App.

This module allows Communications Service Providers (CSPs) and Neutral Network Operators to easily create, manage and track projects as well as to schedule tasks (work orders) and assign them to the field force. All these via a

user-friendly web UI that enables the user to perform complex operations at the touch of a button.

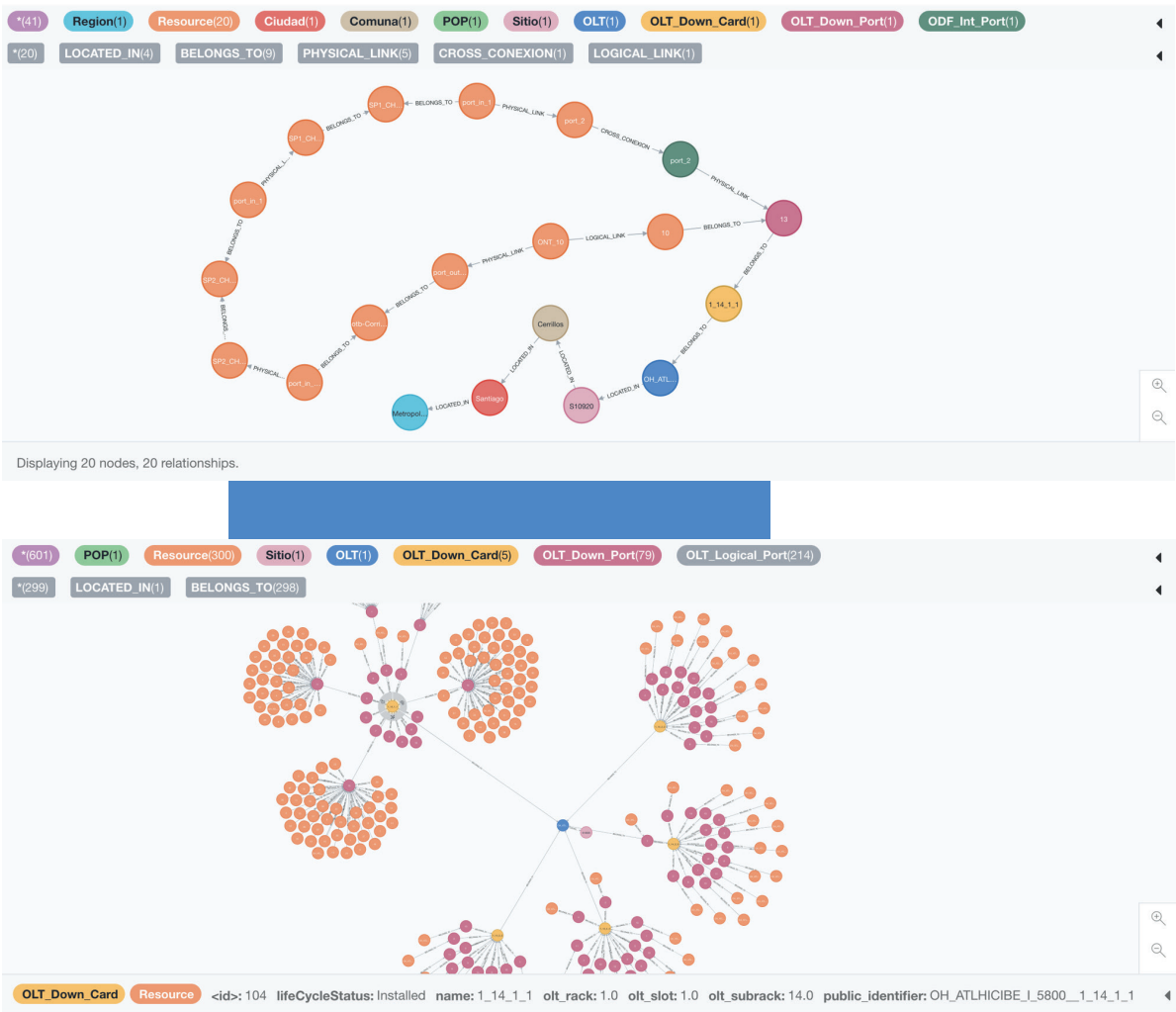
This solution supports operators to manage the field force **independently of users' quantity, profiles**, among others, maximizing the Total Cost of Ownership (TCO). Our solution is supported by a **Decision Model and Notation (DMN)** component to provide business rules definition to manage ad-hoc operational business processes from a simple and functional point of view.



Active Topology Module

Active Topology Module is a solution for having a **unique validation point** of the network & IT infrastructure resources, network functions and services occupation or availability under a near-real time approach, to support **autonomous decision** making on assurance and fulfillment processes based on the network topology. In addition, Active Topology helps navigating and identifying specific resources to a specific service and it is used to enrich performances KPIs and alarms.

Our solution is based on a **graph database** which supports understanding a complex relation between resources and services on a simple user interface, helping operational teams to perform their duties with a clear network visibility on a **real time** basis.



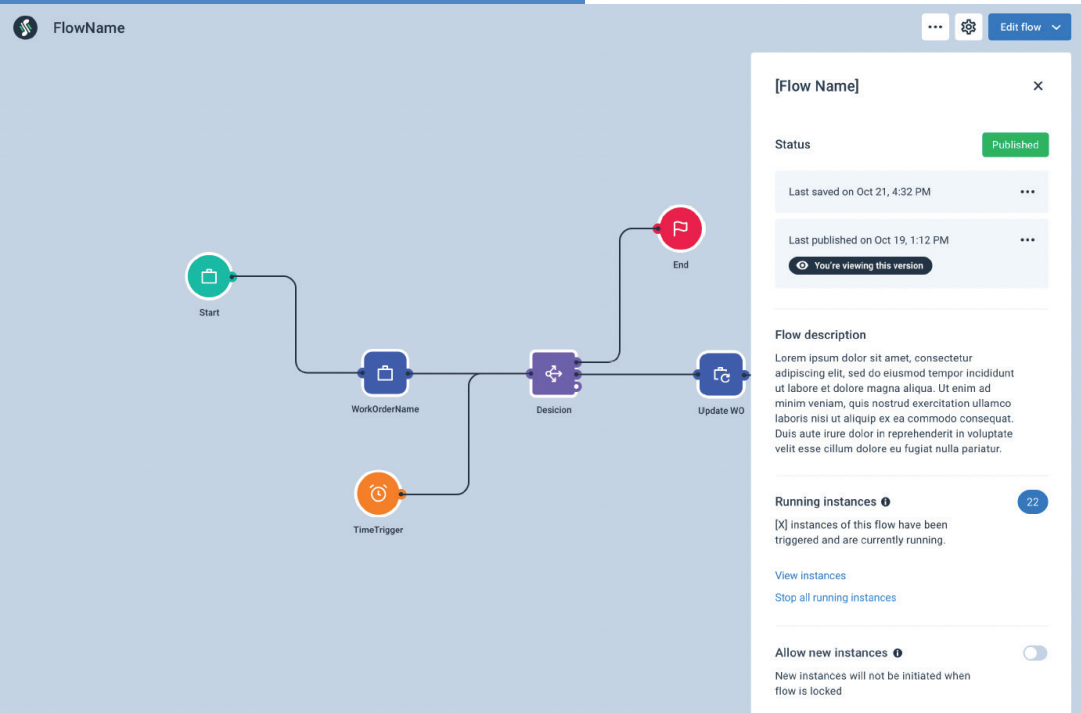
Automation & Orchestration Module

Automation & Orchestration Module delivers a **cost-efficient** solution with leading technology and standardization methodologies to assure the automation of main processes such as provisioning, activation, design and assign among others. This is a catalog-driven and fully orchestrated solution that minimizes manual work and supervision efforts.

From the assurance management point of view, our solution is oriented to allow end-to-end operational process orchestration between OSS vertical applications (Inventory, Ticketing, etc.) from a streamlined process-based flow.

From the fulfillment management point of view, our solution is oriented to allow the control of business processes related with **service and network fulfillment** managing the Customer Facing Service (CFS) and their associated Resource Facing Service (RFS). It is based on three main components:

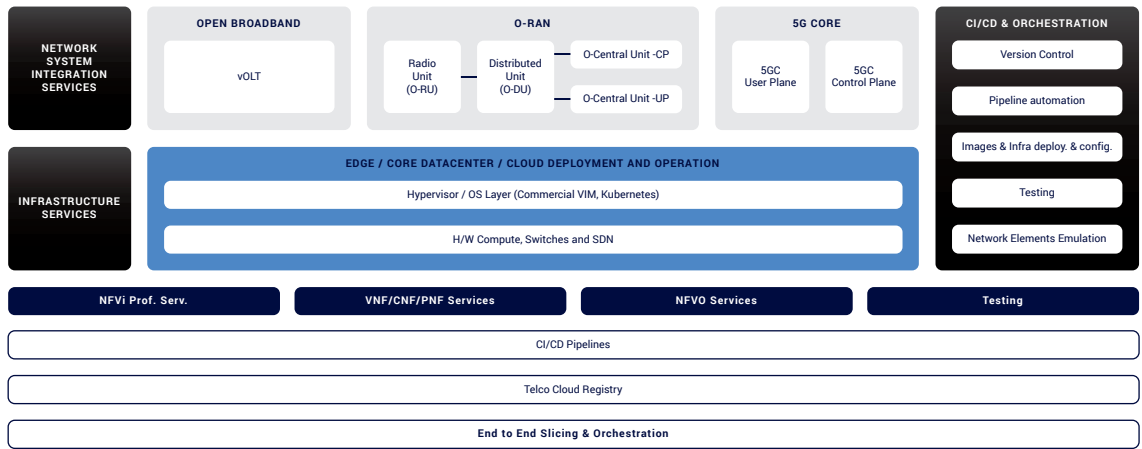
- Service Catalog for the definition of services offered by Communications Service Providers (CSPs) and Neutral Network Operators.
- Service Inventory to manage the instances of services planned or in operation for clients.
- Service Orders to control the tasks oriented to activate, deactivate, or modify a service.





## 2.2 NTT DATA Open Networking

NTT DATA Open Networking leverages network disaggregation and 5G disruption to provide consultancy and solutions that help our customers in finding new value through innovation, achieving cost efficiencies using commodity infrastructure, and driving operational excellence based on automation and orchestration. As an important feature, many of the NTT DATA Open Networking solutions are based on open-source solutions supported by relevant consortia such as ONF, Linux Foundation Networking or Telecom Infra Project, covering several networking categories.



**Professional Services for Network Functions Virtualization Infrastructure (NFVi).** Services on: Capacity Planning, Design, Implementation, Support and Maintenance on Virtualization Infrastructure for Telco Cloud, Edge Compute and Central Office POD.

**Professional services for Network Functions (NF).** Services related to on-boarding and certification on Network Functions for virtual, cloud or physical environments.

**Professional services for Network Functions Virtualization & Orchestration (NFVO).** Consulting, development, deployment, and integration services for Open-Source MANO (OSM), as authorized consultant from ETSI-OSM.

**Testing & Testing Automation.** NFVi, NFVO and NF functional and non-functional testing design, testing execution, testing automation, NF emulation, as well as traffic emulation for certifying virtualized network as a whole.



**CI/CD Pipelines.**  
Assets and professional services to automate onboarding and network self-healing ensuring Network Functions versions and updates lifecycle management in a zero-touch base.

**Telco Cloud Registry.**  
Assets and professional services to adopt future proof data model based on Linux Foundation Networking-ONAP to set a unique source of truth on infrastructure availability and occupancy

to support autonomous network functions fulfilment and assurance related processes.

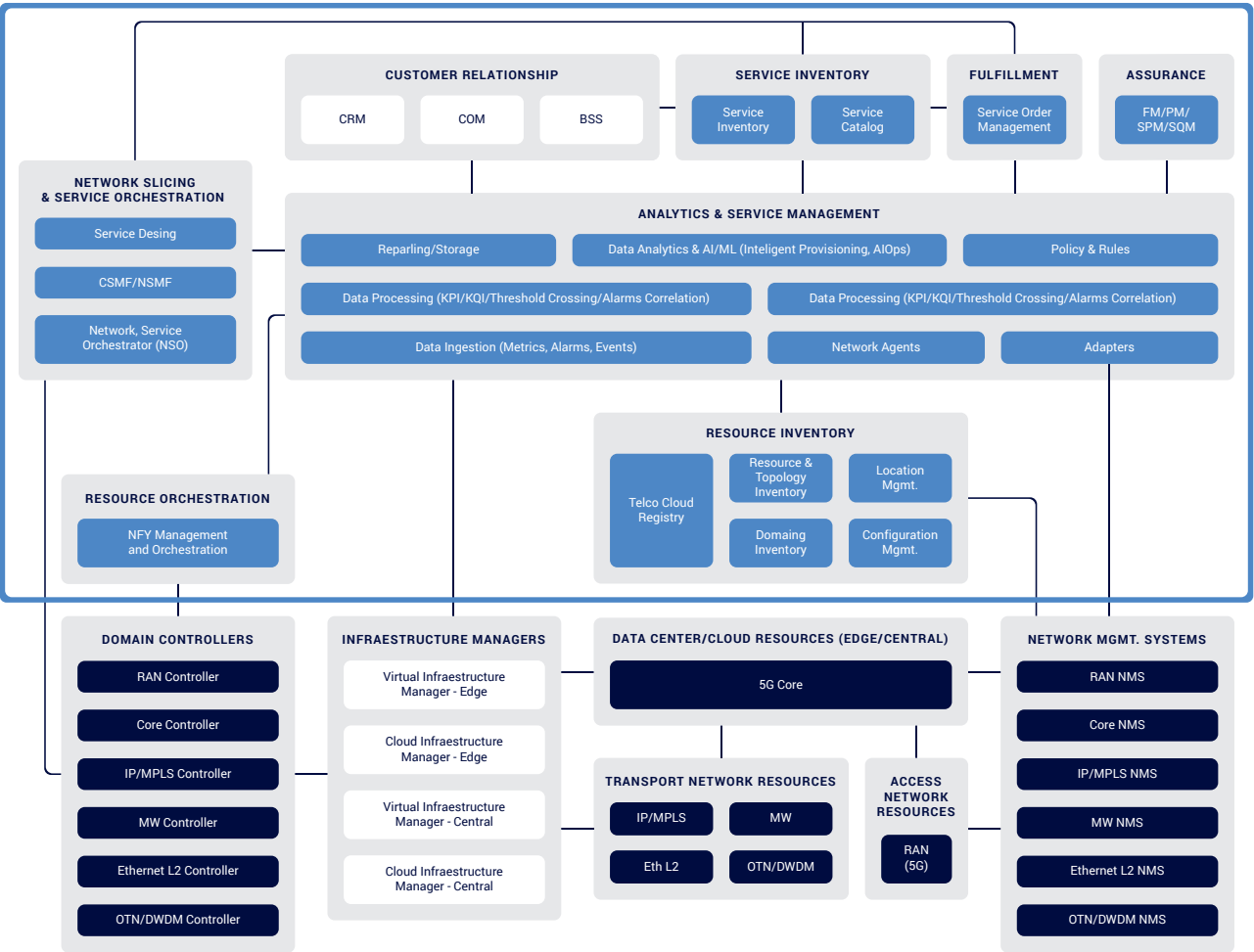
**End-to-End Slicing & Orchestration.**  
Assets and professional services to ensure multi-domain orchestration and slice management based on Linux Foundation Networking-ONAP architecture.

### 3. Why Choose NTT DATA?

NTT DATA combines the capabilities and experience of a global telecommunication and mobile network provider, with an exceptional pedigree as IT service provider, specialist applications developer and industry subject matter expert. We bring together all the skills needed, therefore, to build and evolve the advanced networking solutions that enterprises of every size and in every market require.

We are proven innovators, with an annual R&D budget of around 3.5 billion USD, NTT DATA is a leading proponent and support of Open Standards, placing us in a leadership position for concepts built on collaborative working, co-creation and joint innovation. We are developing 5G based solutions to support our own operations as a global enterprise, so even the most advanced concepts we take to market are mature and proven to add value.

As a strong commercial player, with a decades long commitment to the telephony and mobility markets, we are a natural go to market partner for any telco determined to move up the value chain and become an essential service provider to ambitious enterprises, today and into the future.





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