

**FUTURE
AT HEART**

WHITE PAPER/ TELECOM/ OSS

OSS

FOR LEAN OPERATORS

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Telefónica, Internet Para todos (IpT) and NTT DATA decided to launch a new generation OSS being pioneers in an Open Source based stack that will enable the operation of the new Rural NaaS IpT.

IpT is a **Telefonica** social responsibility initiative to provide broadband and value services to the most remote areas where telecommunication services usually don't reach and at the same time generate new business opportunities for the Company.

IpT nature and the business model that supports it, demands a low cost structure without sacrificing network services and quality, therefore it requires IpT to be a lean Rural NaaS provider. In order to achieve this, it is necessary to support itself on disruptive technologies such as AI, advance analytics, machine learning and open source solutions.

Additionally to this, the new OSS generation has to be sufficiently flexible and open in order to support new business models among the partners that build up the ecosystem: conventional CSPs, IpT and providers that deploy and integrate ICT solutions. These business models will be necessary in the near future in order to monetize all opportunities arising along 5G and network virtualization.

IpT therefore demands a great deal of innovation to answer efficiency, flexibility and allow Telefónica test new technologies and paradigms that later on will move towards its current operations.

» 01

CURRENT ISSUES



01. CURRENT SITUATION

Telco industry is on its way to adopt new network technologies, such as 5G, C-RAN, NFV and SDN, which represents an opportunity to grow and where OSS layer will play a fundamental role to monetize the opportunity in scale.

Current OSS were adopted when the main business was to build and operate a network under the most efficient and reliable scenario. These systems were characterize by the following:



- **Vertical application:** most of these systems cover mainly a specific functional area and were integrated horizontally for interoperation. This scenario implies that new service deployment will be slow, costly and complex.



- **Highly manual:** often traditional OSS are handled through CLI (Command Line Interface) for addressing general activities or to resolve a specific problem. This requires a great deal of validations and manual tasks to ensure an end-to-end operation for a determined process.



- **Isolated and inconsistent data pools:** due to its vertical nature current OSS platforms lead us to have biased and specific views based on functional application, lack of consistency between systems and difficult to find an holistic network view.



- **Slow and costly integration:** traditional OSS lack of well-defined interfaces exposure, requiring a great deal of point to point integrations, as well as poor reuse of such interfaces.



- **Deployment high cost:** traditional tools are based on COTS (Commercial off the Shelf) and tailor made developments to cover specific functional area, which implies a high investment to cover each individual need.

However, inside the digital trend nowadays, we foresee that CSP business evolves to further complexity and dynamic pace, therefore OSS role has dramatically change to become wider. The new role aims to connect business, customer and partners system to the infrastructure that provides not only connectivity but digital services as well.

It is clear that a new focus is needed, one more radical in order to fulfill efficiency and agility for CSPs; a new OSS layer is needed that can embrace cloud based technologies, virtualization, data & analytics oriented architectures, API based integration, as well as freedom provided by open source tools.



» 02 OPPORTUNITY

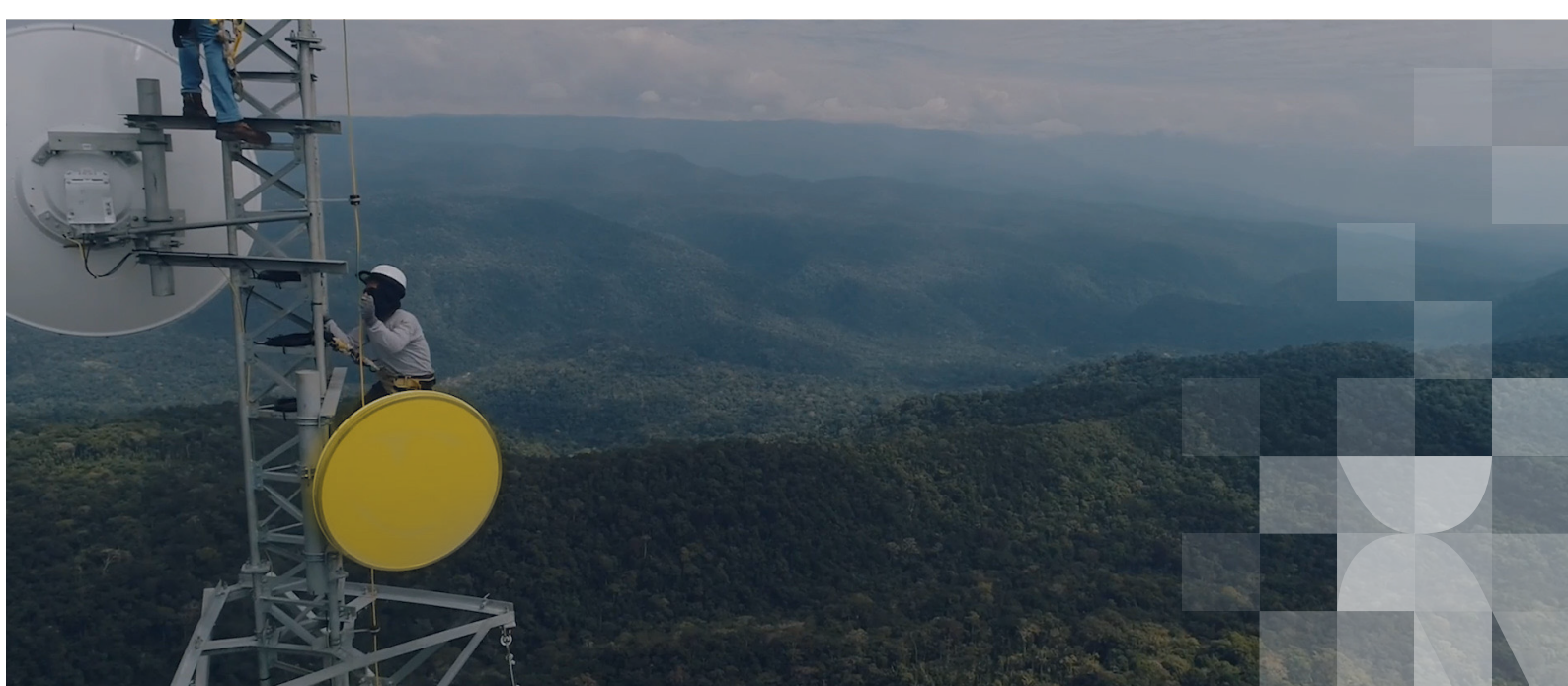


02. OPPORTUNITY

Future CSP will be agile, flexible and efficient since new products and services will be co-created together with customers to answer unique and specific needs.

Offers will be created based on multiple partners products and services forcing a new way of handling catalog under a fully share, open and reliable environment. "Pay as you use", "as a service" and "revenue share" models will be supported under a contractual or licensing flexible scheme.

One of the crucial aspects to launch new functionalities is to increase business agility, today Telco industry moves in a scale based on months in order to reach software or network changes, which also require long testing and certification periods. New OSS generation will have to aim in a far smaller scale.



Under this context, new generation OSS will have to attend new business models based on efficiency, flexibility, and agility that network evolution requires under the following pillars:



1. Agility

Be agile in managing new services deployment



2. Operational efficiency

Massive operational processes automation



3. Cost efficient

Minimize cost structure on CAPEX/OPEX



» 03

STRATEGY



03. STRATEGY

As part of its recent launch and expansion, IpT needs to define, build and put into service a new generation OSS stack which main function is to support a mobile network for rural areas full deployment and operation processes.

In order to reach its goal and taking advantage of the “Green field” nature for this Rural Network as a Service (Rural NaaS) provider it was decided an innovative and disruptive strategy based on a foundational architecture and a series of vertical prioritized applications.

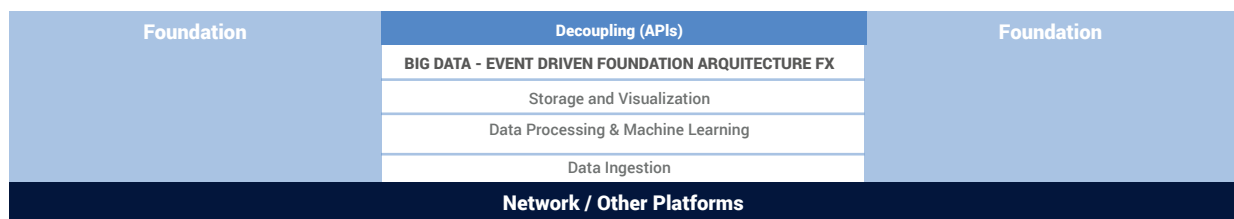
Processes



Applications



Foundation



The foundational architecture meets a double purpose:

- Establish a common data analytics layer which will be the unique source for AI/ML algorithms and that can be used by the vertical applications to support its main processes (cognitive layer).
- Enable a de-coupled and integration layer that allows all architecture components access update, consistent and reliable information (event-driven architecture).

Above the foundational architecture, vertical modules that support company's network processes are deployed.

3.1 Cognitive Layer

The cognitive layer consists of different horizontal components and allows information to be exploited in all operation flows. Additionally, this layer is the data source of the prediction algorithms that automate the operation through policies and business rules.

It is composed of the following components:

- **Ingestion:** Sources are consumed and modeled in "real time" and then published on the solution's messaging bus.
- **Processing:** In this layer streaming and batch data processing engines are found, and here is where the calculations, methodologies, aggregations, enrichments, among other are implemented.
- **Analytical Data Store:** It consists of one or several repositories that allow storing calculated indicators, alarms and in general all the information for visualization tool or external applications.
- **Visualization:** It allows the exploration and exploitation of data through a graphical interface or access to data visualization dashboards use case based.
- **Cloud:** All architecture components are deployed on virtualized infrastructure on public or private cloud environments.

3.2 Event-driven architecture

It allows bidirectional communication between the functional modules and the cognitive architecture. It is composed by:

- **Integration Micro Services:** They are automatic processes that synchronize the information of the different modules through a messaging queue or by accessing the corresponding data repository for each use case. The microservices architecture provides flexibility and scalability
- **API Management:** It allows to decouple the implemented functionalities and define how to expose the information in a standardized way to internal components or external platforms, allowing to centralize the communication, homogenize the method of interaction and the data model between the different actors.

3.3 Vertical Prioritized Applications

The deployment of functional (vertical) modules or applications is carried out progressively prioritizing the most critical use cases for network deployment and operation. Therefore, the functional modules of Inventory, Work Order Management (WOM) and Lean NOC (Network Operation Center monitoring tool) have been prioritized as part of the case study.

Inventory

The main activity of IpT is linked to mobile infrastructure management in a Rural NaaS (Rural Network as a Service) model, being necessary as a key piece to have an inventory solution that allows managing all the elements associated with deployments within its perimeter.

The two selected tools that best met the evaluation criteria were:

- **Active and Available Inventory (A&AI):** It is an ONAP subsystem that provides real-time views of resources and services and their relationships. A&AI not only builds a record of available and assigned active elements, but also maintains updated views of the multidimensional relationships between the assets, including their relevance to the different components of ONAP.
- **Third party IM:** tool that provides an inventory of hierarchical resources, with graphical interface and that provides capabilities to link elements. Due to confidentiality agreements and upcoming formal release, third party prefers to keep its participation not public.

Work Order Management

IpT, as responsible for mobile network infrastructure deployment and operation, needs to have a Work Order Management solution that allows the flows management derived from the operational processes associated with the deployment and maintenance of the network.

For this module, in the case proposed JIRA was selected, an open and flexible solution not dedicated to specific processes and that allowed a holistic vision of the business (common management of logistics processes, provision, operation, maintenance, among other). Even is the only non-Open Source tool in the ecosystem is a proven-cost effective solution.

Lean NOC

The purpose of Lean NOC module is to add up network operation information related to the different infrastructure elements managed by IpT (including radio access, transport and energy) allowing an integrated visualization of network situation, in order to automate assurance processes.

This module enables a series of use cases in IpT:

- **Alarms and events management:** It covers all activities needed to manage millions of events and alarms records generated by the network, properly coordinate service teams and facilitate events' resolution.
- **Incident Management:** It includes the integral model to register, assign, classify and describe the attention and solution of the failures covering the automatic cases that are obtained from the correlation of events and the manual cases that are generated by the lines.
- **Complex Event Processing (CEP) Engine:** It is an NTT DATA accelerator that has templates and data structures necessary to configure and store the definitions of the complex events that are required. It also provides mechanisms to generate and configure alarms when the degradation of KPIs / KQIs or alarms from network are identified.

» 04 CONCLUSIONS



04. CONCLUSIONS

- **Currently CSPs' business** is much more dynamic and complex, this requires a new OSS generation that meets agility, flexibility and efficiency needs that the business seeks.
- **Design principles and new technologies** such as data & analytics, AI / ML, micro services architecture, network virtualization, open source, cloud will be technology enablers and will be combined in this new generation OSS.
- In the **new OSS approach**, vertical applications are combined by a horizontal analytics core on which decoupled functional modules are built to support the operational process and enable new business models based on partner ecosystems.
- **Data** plays the key role in this approach, being critical its analysis and AI/ML application helps us realize the concepts of Zero Touch Operation and Close Control Loop that make the operation of new network technologies viable.
- **Low cost operators** or those focused on a specific market niche are clear candidates to rely on this approach to take advantage of the business opportunities offered by new network technologies ecosystem.
- **Network as a Service (Naas)** Operators such as Internet para Todos (IpT) can serve as a test bench to experiment and test new technologies and paradigms that will subsequently be applied in traditional B2C / B2B end customer network operators.

