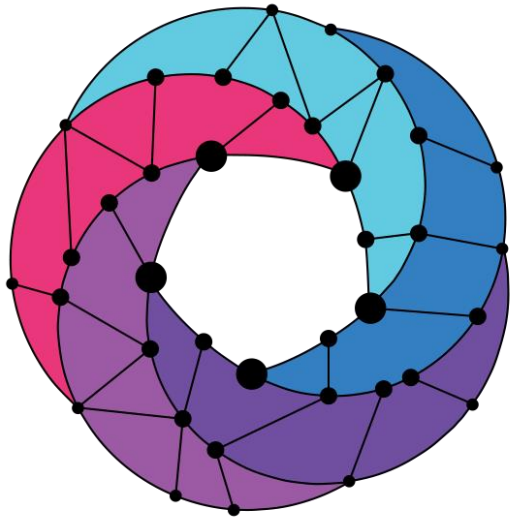


Open Source
MANO

The SPIDER Platform – Deployment and Management of Virtual Topologies in 5G Programmable Environments

Roberto Bruschi – University of Genoa, Italy
Chiara Lombardo – CNIT, S2N National Lab, Genoa, Italy

© ETSI

ETSI

The SPIDER Project

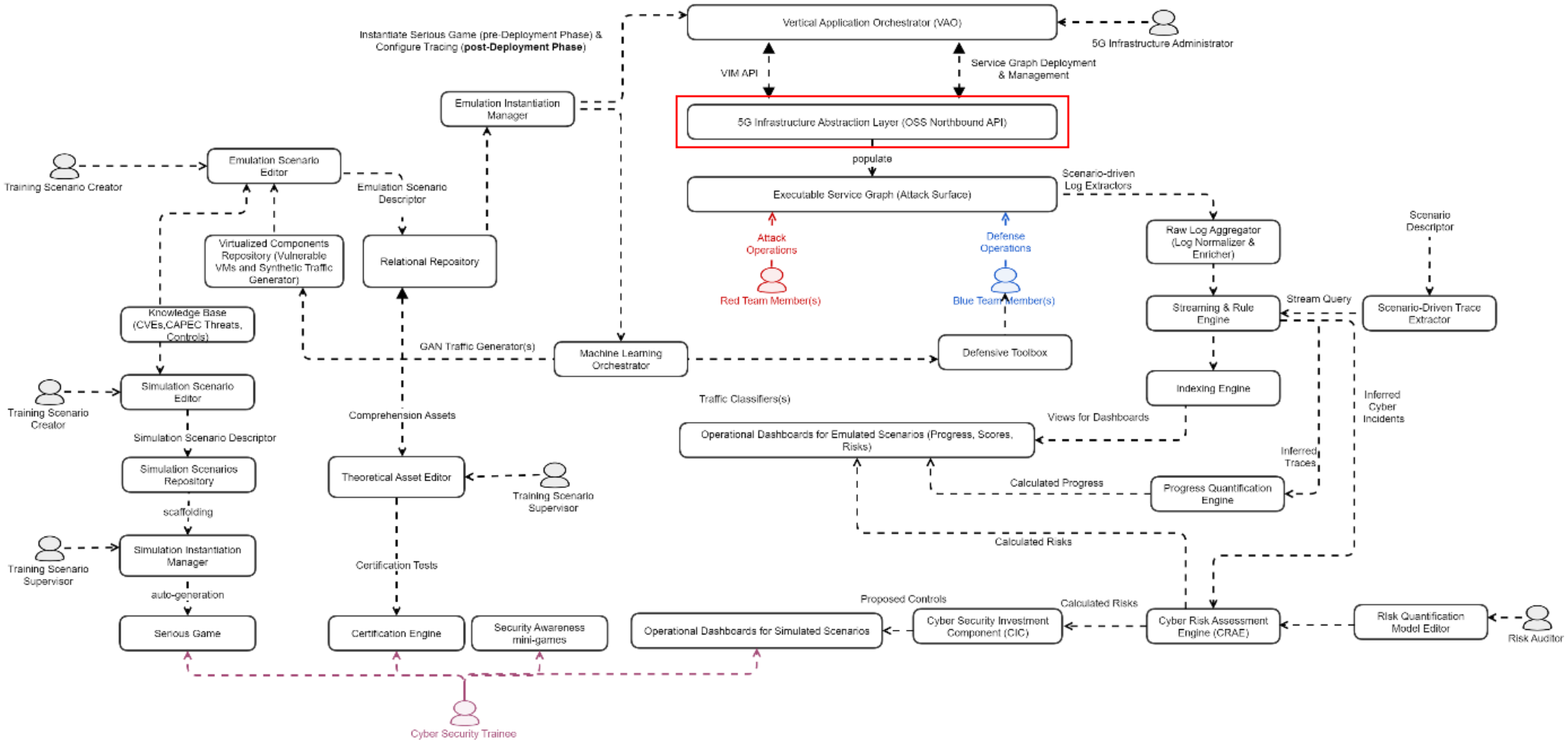
Open Source MANO

- Goal: deliver a next-generation, extensive and replicable cyber range platform for 5G offering cybersecurity emulation, training and investment decision support.
- SPIDER features integrated tools for cyber testing, including advanced emulation tools, active learning training methods, and real time econometric models.
- SPIDER supports both self-paced and team-based exercises and allows multiple stakeholders to rely on the same platform in a secure and isolated fashion.

© ETSI

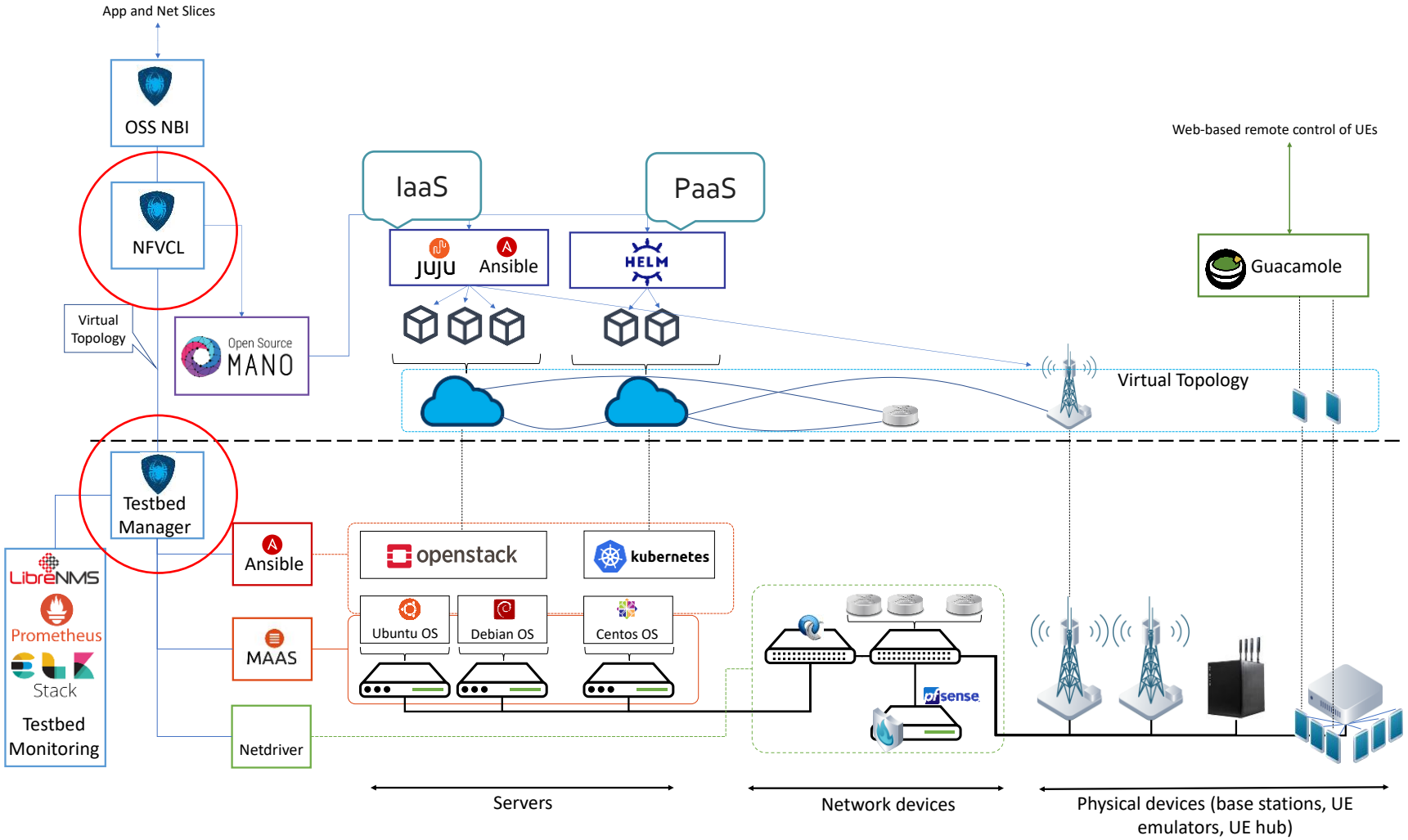
The SPIDER Architecture

Open Source MANO



© ETSI

The SPIDER NFV Platform



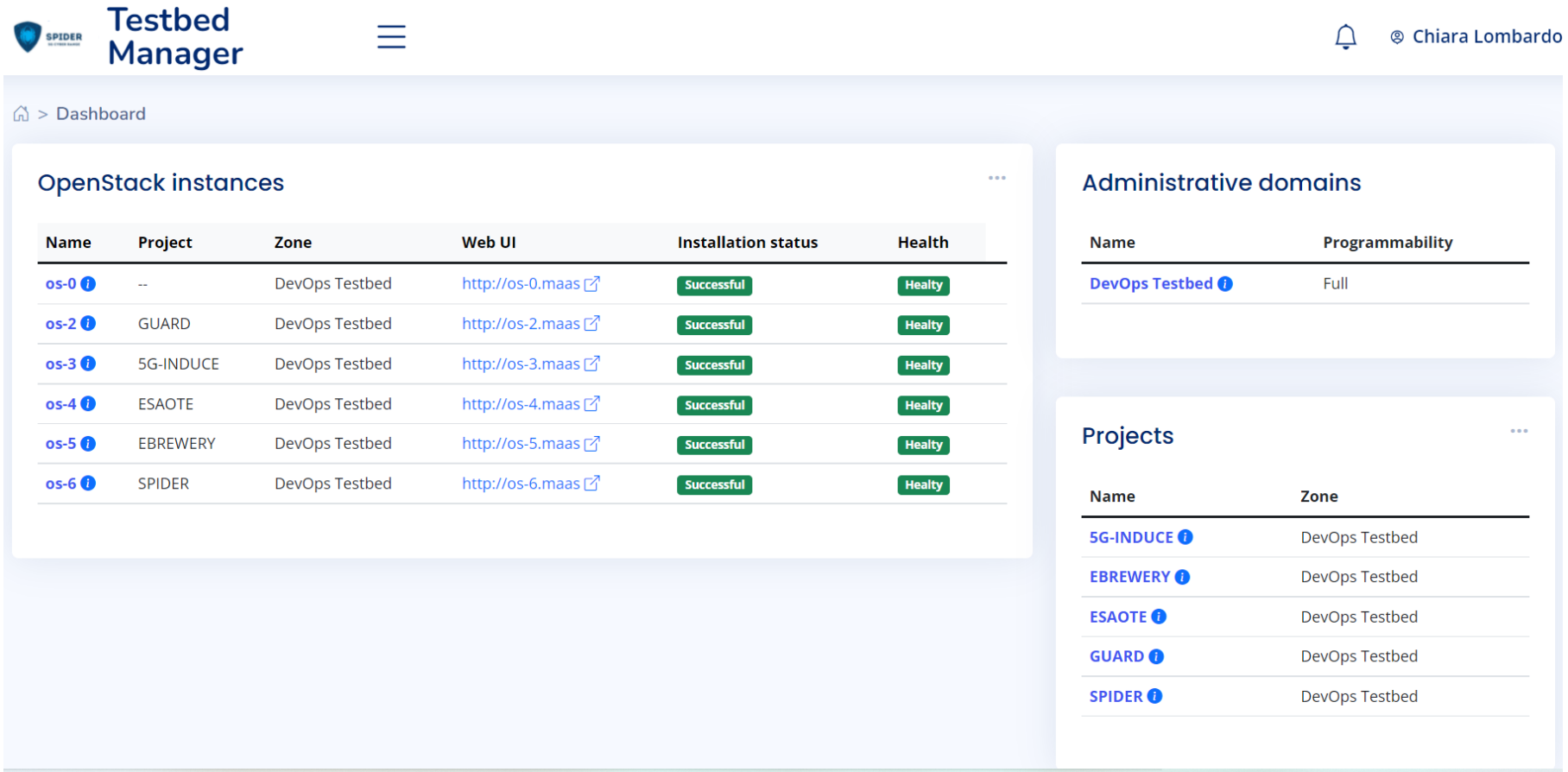
© ETSI

The Testbed Manager

- The Testbed Manager allows to manage all the available physical, computing and network components, thanks to a GUI that is linked to all the software tools active in the system.
- It provides the users with a safe and isolated working environment, as well as allows for automatically setting up the platform for an exercise and restoring it when it is finished.
- For each exercise, the starting configuration is saved and includes the OpenStack networks and routers, the required VMs, etc. After an exercise is run, it is possible to automatically restore the whole configuration by clicking on a button. This operation invokes MaaS that proceeds with restoring the saved configuration from the operating system up to the OpenStack instance.

© ETSI

Testbed Manager



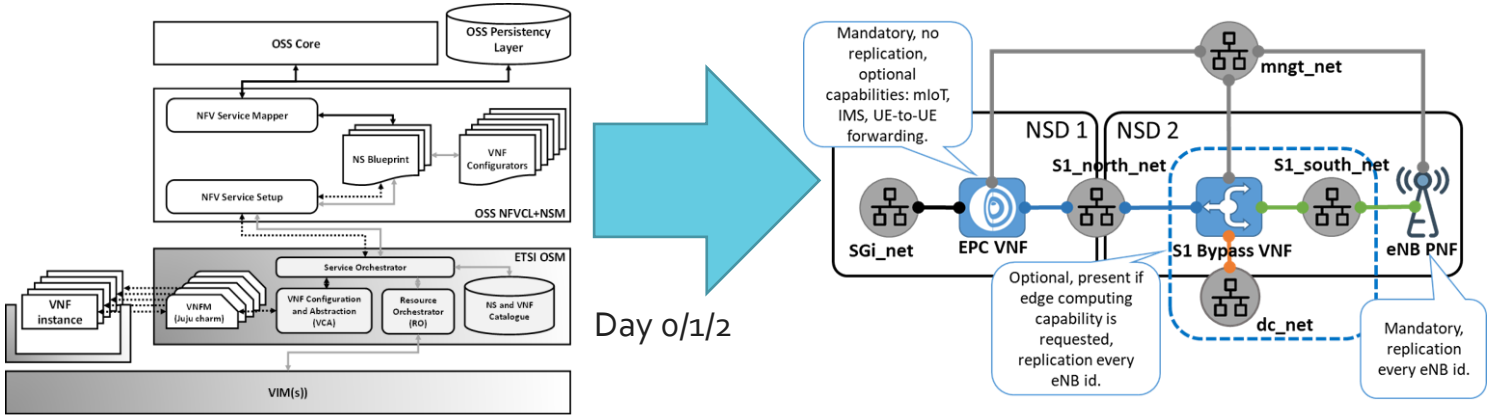
1 of 2 – The Testbed Manager Demo

© ETSI

The NFV Convergence Layer

Open Source MANO

- Build and dynamically manage complete network environments via multiple NSs.
- Blueprint: metamodel that produces generalized NS templates. The number and the type of NFV services is dynamically selected by the blueprint according to the requested parameters.
- Support basic VIM terraforming operations and maintain a topology of the virtual network infrastructure. Networks in the topology can be used as end-points for NFV services.



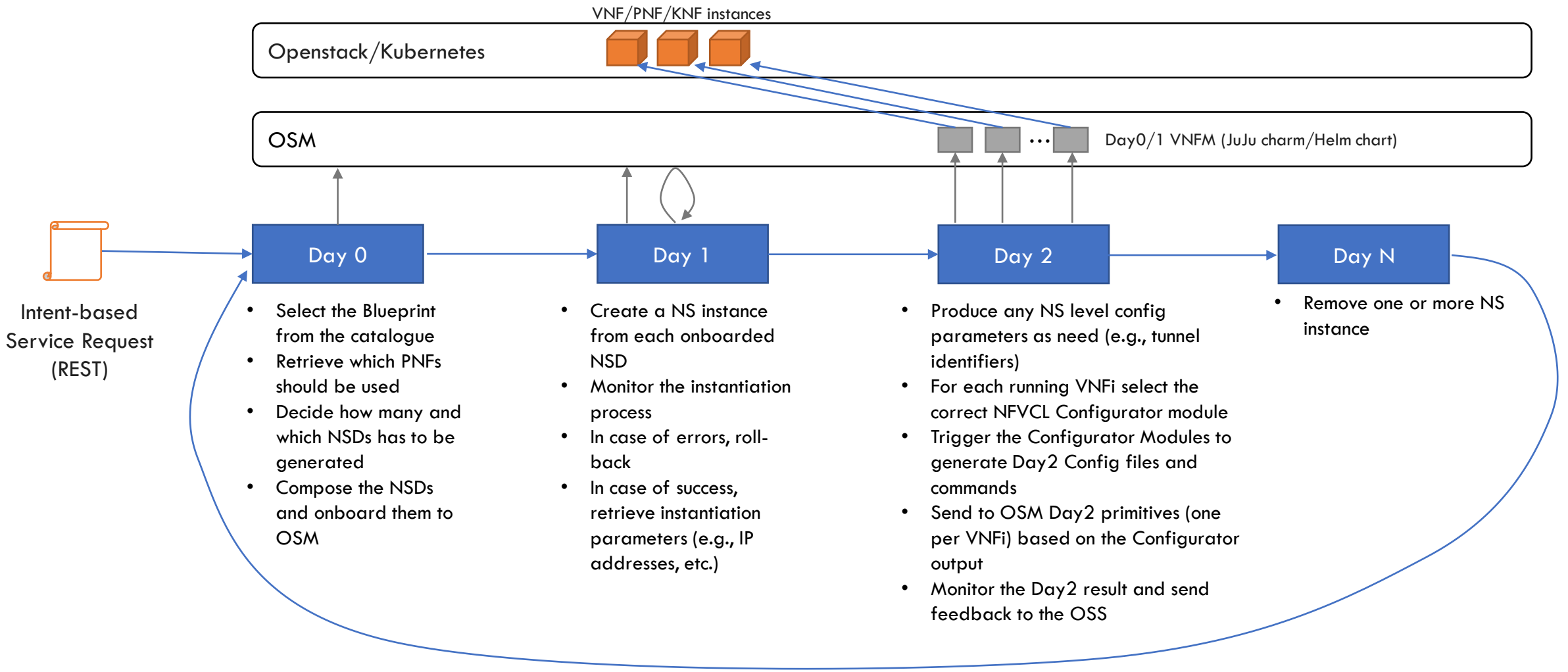
© ETSI

The Network Service Blueprint

- The NS Descriptor (NSD) specified by ETSI NFV is composed of a pre-determined, unmodifiable number of different VNFs and links.
  - No standard VNF Manager, only a standard “container for VNFM” (i.e., Juju)
- Network service blueprint: a new, generalized structure can be seen as an LCM manager of a coordinated set of NFV NSs to realize a comprehensive network service (e.g., a radio-mobile network, a VoIP system, etc.):
  - Day 0: terraforming VIMs with needed resources, types of PNFs/VNFs/KNFs, their inter-connections, and the virtual networks to be used towards the outside.
  - Day 1/2: run-time information collection (e.g., dynamic IP addresses, KPIs, etc.), configuration files and commands (both as templates filled by run-time data) to run on SW processes inside PNFs/VNFs/KNFs.
  - Day N: cleaning resources and instances (even in a part of NSs within the blueprint).

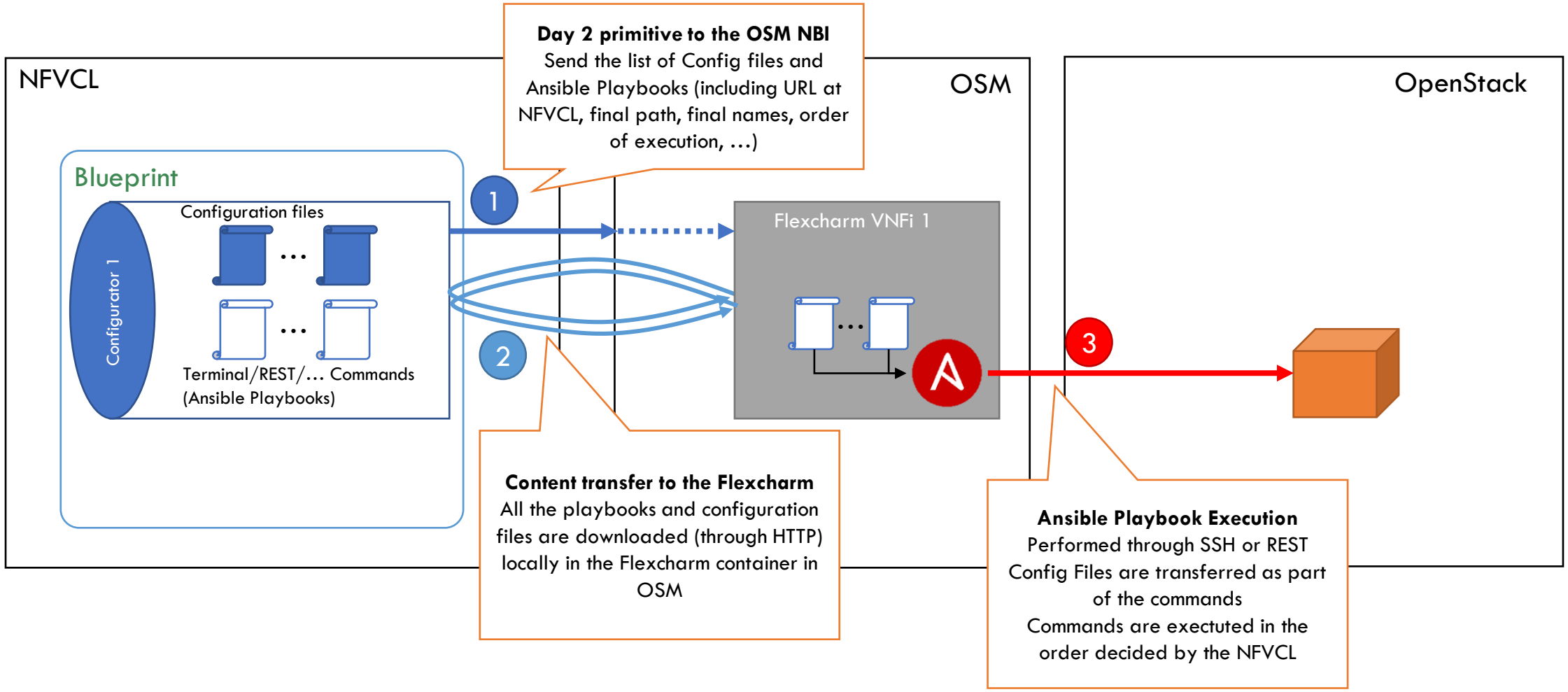
© ETSI

The NFVCL Workflow

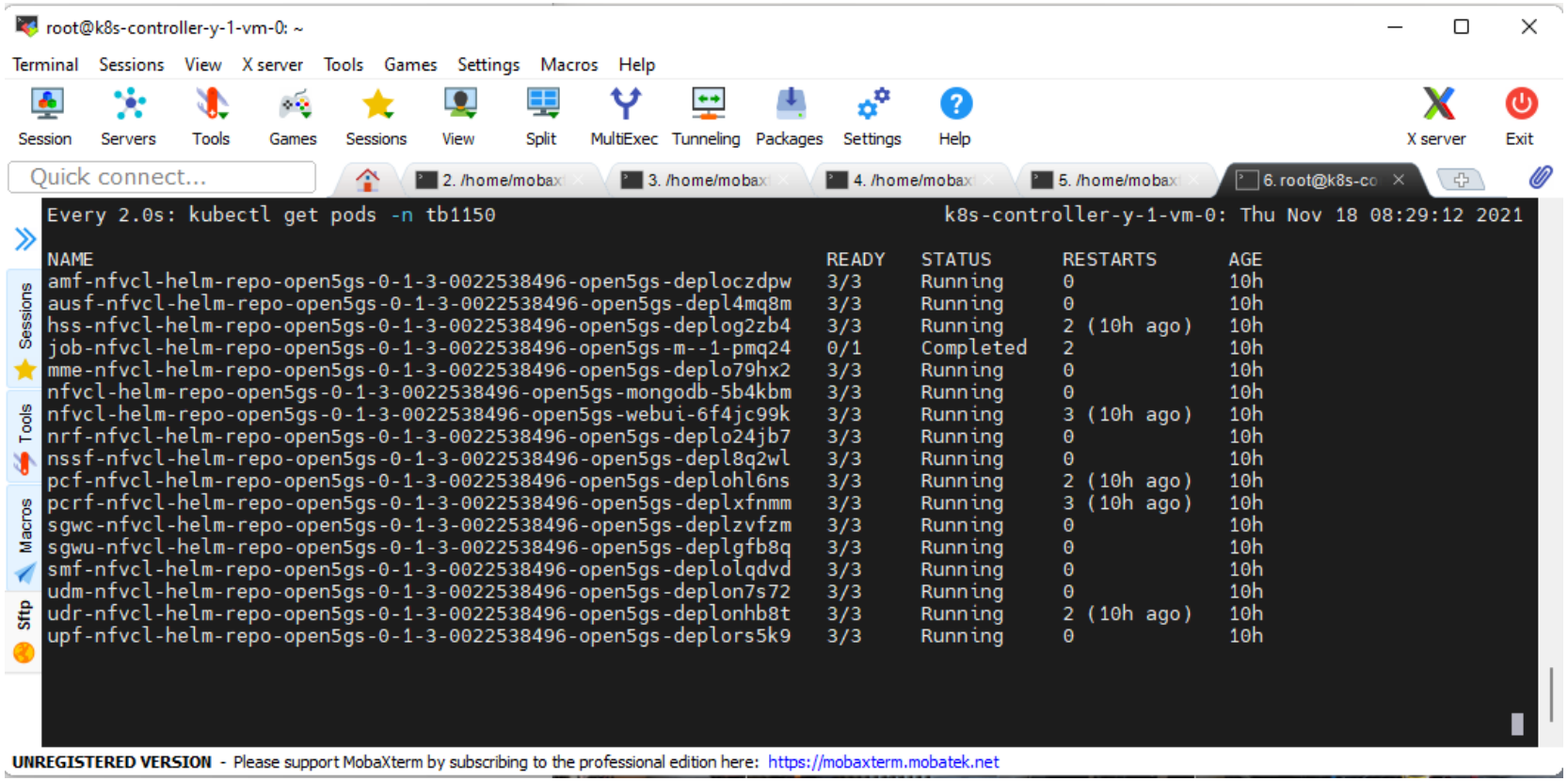


© ETSI

Day-2 Operations with the Flex-charm (for VNFs and PNFs)



© ETSI



2 of 2 –The NFVCL Demo

© ETSI