

Open Source
MANO

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

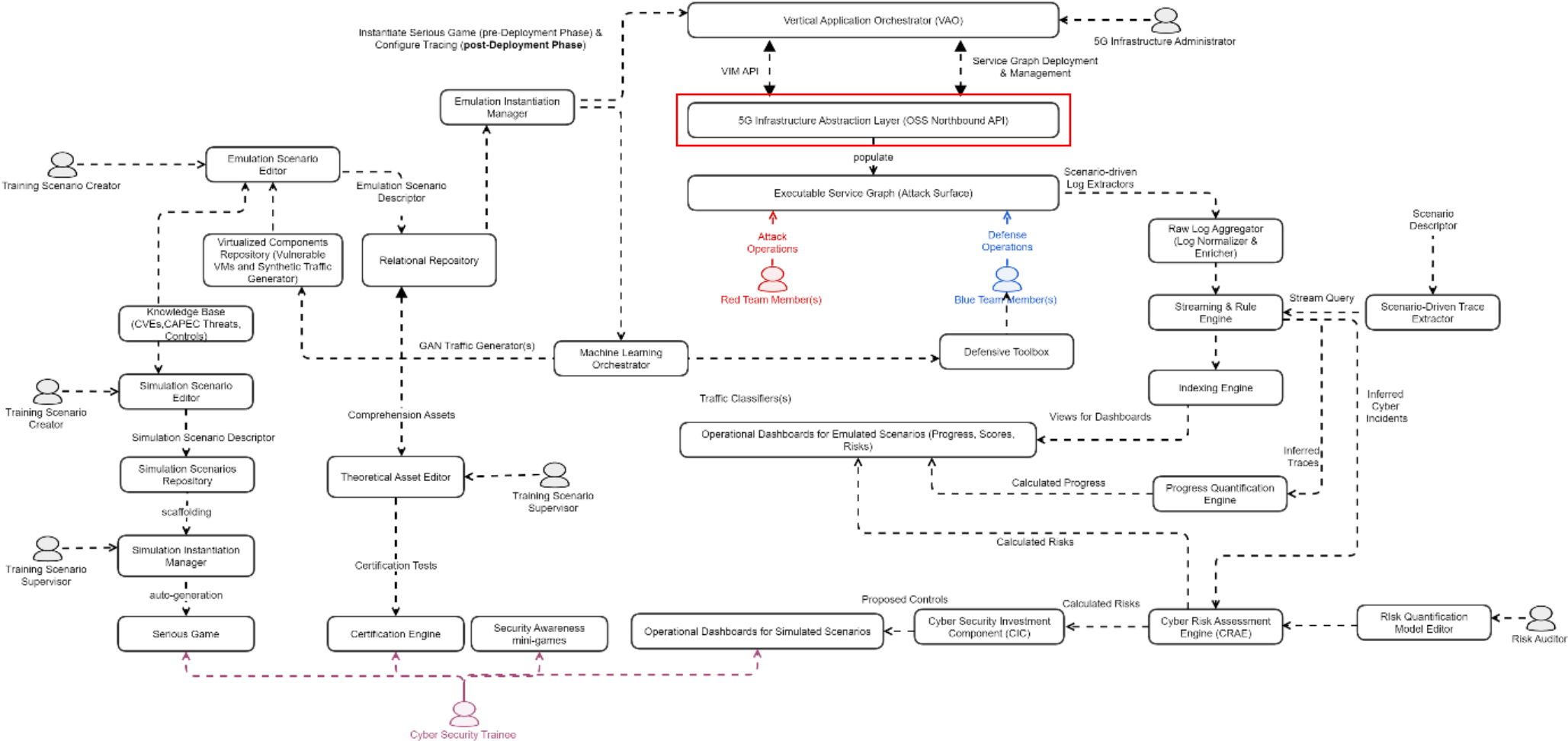
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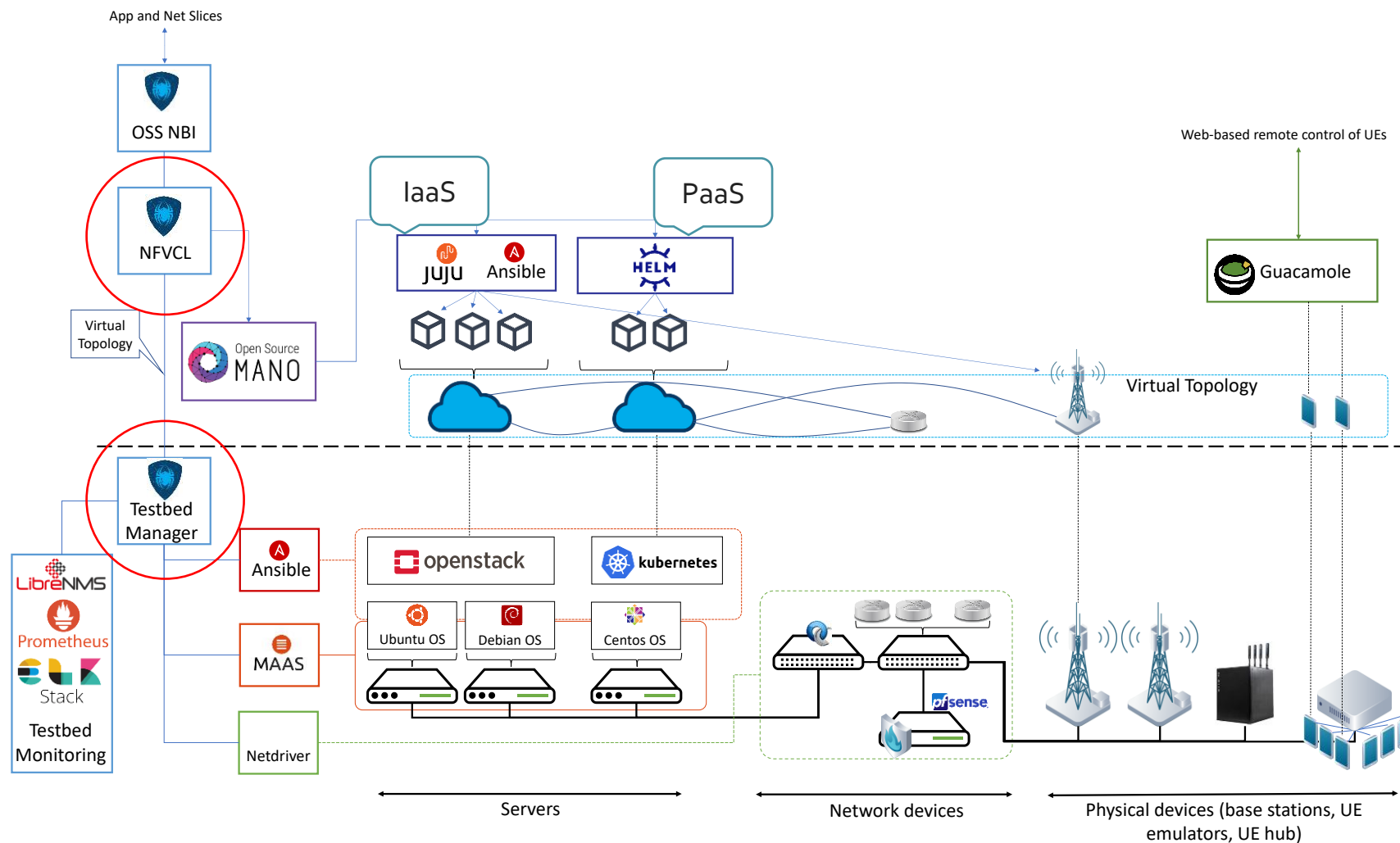
The SPIDER Project

- 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.

The SPIDER Architecture



The SPIDER NFV Platform



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.

[Home](#) > Dashboard

OpenStack instances

Name	Project	Zone	Web UI	Installation status	Health
os-0 ⓘ	--	DevOps Testbed	http://os-0.maas	Successful	Healthy
os-2 ⓘ	GUARD	DevOps Testbed	http://os-2.maas	Successful	Healthy
os-3 ⓘ	5G-INDUCE	DevOps Testbed	http://os-3.maas	Successful	Healthy
os-4 ⓘ	ESAOTE	DevOps Testbed	http://os-4.maas	Successful	Healthy
os-5 ⓘ	EBREWERY	DevOps Testbed	http://os-5.maas	Successful	Healthy
os-6 ⓘ	SPIDER	DevOps Testbed	http://os-6.maas	Successful	Healthy

Administrative domains

Name	Programmability
DevOps Testbed ⓘ	Full

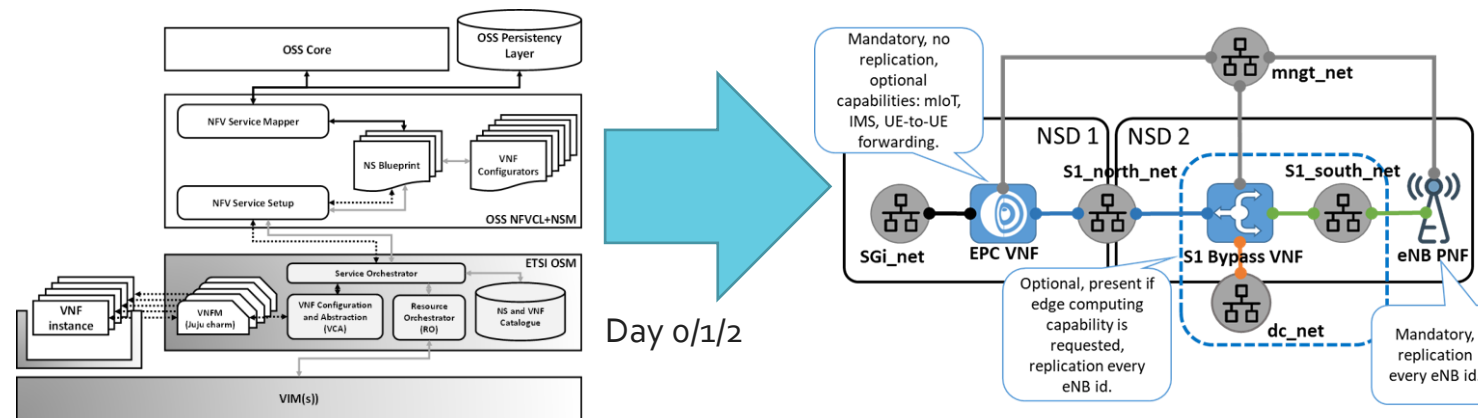
Projects

Name	Zone
5G-INDUCE ⓘ	DevOps Testbed
EBREWERY ⓘ	DevOps Testbed
ESAOTE ⓘ	DevOps Testbed
GUARD ⓘ	DevOps Testbed
SPIDER ⓘ	DevOps Testbed

1 of 2 – The Testbed Manager Demo

The NFV Convergence Layer

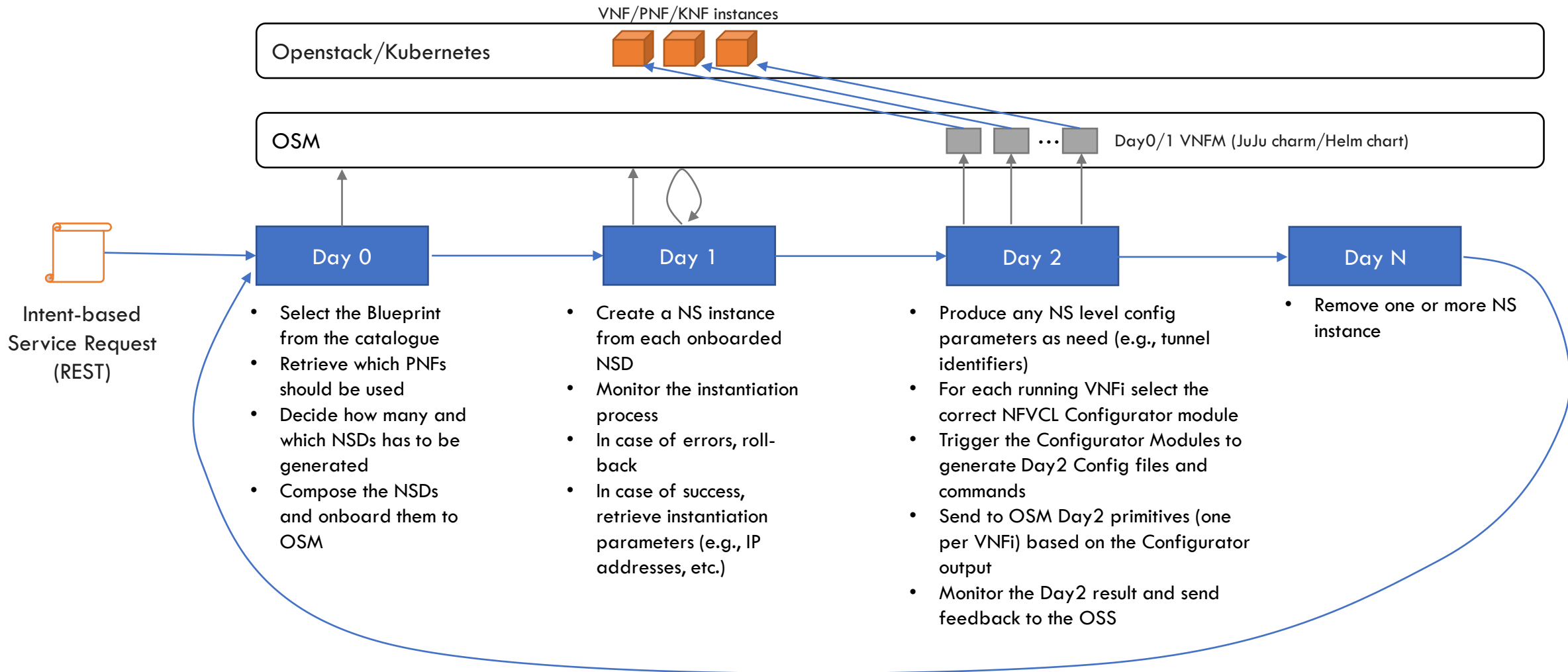
- Build and dynamically manage complete network environments via multiple NSs.
- Blueprint: metamodel that produces generalized NS templates. The number and the type of NFV services is dynamically selected by the blueprint according to the requested parameters.
- Support basic VIM terraforming operations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



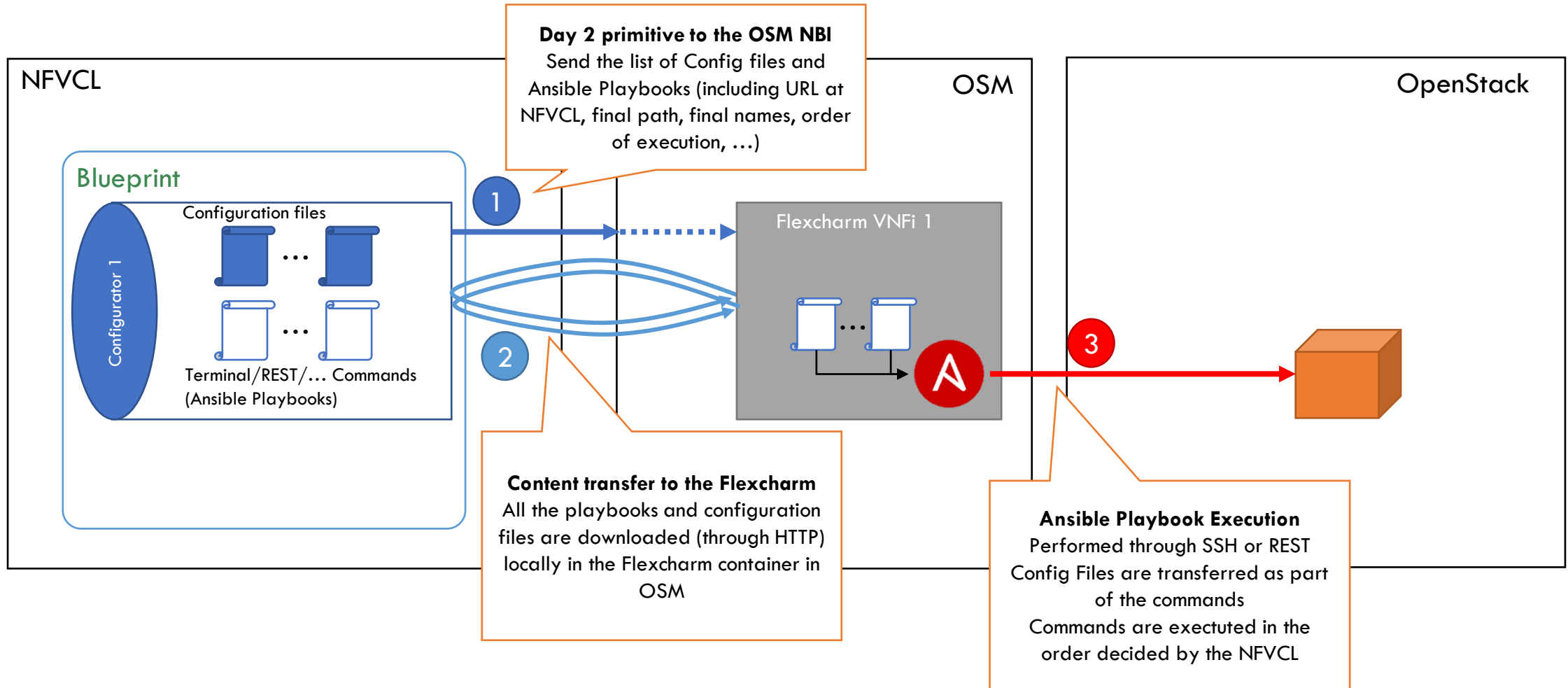
The Network Service Blueprint

- 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).

The NFVCL Workflow



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



```

root@k8s-controller-y-1-vm-0: ~
Terminal Sessions View X server Tools Games Settings Macros Help
Session Servers Tools Games Sessions View Split MultiExec Tunneling Packages Settings Help X server Exit
Quick connect... 2. /home/mobax... 3. /home/mobax... 4. /home/mobax... 5. /home/mobax... 6. root@k8s-co...
Every 2.0s: kubectl get pods -n tb1150 k8s-controller-y-1-vm-0: Thu Nov 18 08:29:12 2021
NAME READY STATUS RESTARTS AGE
amf-nfvcl-helm-repo-open5gs-0-1-3-0022538496-open5gs-deploaczdpw 3/3 Running 0 10h
ausf-nfvcl-helm-repo-open5gs-0-1-3-0022538496-open5gs-depl4mq8m 3/3 Running 0 10h
hss-nfvcl-helm-repo-open5gs-0-1-3-0022538496-open5gs-deplo2zb4 3/3 Running 2 (10h ago) 10h
job-nfvcl-helm-repo-open5gs-0-1-3-0022538496-open5gs-m--1-pmq24 0/1 Completed 2 10h
mme-nfvcl-helm-repo-open5gs-0-1-3-0022538496-open5gs-deplo79hx2 3/3 Running 0 10h
nfvccl-helm-repo-open5gs-0-1-3-0022538496-open5gs-mongodb-5b4kbm 3/3 Running 0 10h
nfvccl-helm-repo-open5gs-0-1-3-0022538496-open5gs-webui-6f4jc99k 3/3 Running 3 (10h ago) 10h
nrf-nfvcl-helm-repo-open5gs-0-1-3-0022538496-open5gs-deplo24jb7 3/3 Running 0 10h
nssf-nfvcl-helm-repo-open5gs-0-1-3-0022538496-open5gs-depl8q2wl 3/3 Running 0 10h
pcf-nfvcl-helm-repo-open5gs-0-1-3-0022538496-open5gs-deplohl6ns 3/3 Running 2 (10h ago) 10h
pcrf-nfvcl-helm-repo-open5gs-0-1-3-0022538496-open5gs-deplxfnmm 3/3 Running 3 (10h ago) 10h
sgwc-nfvcl-helm-repo-open5gs-0-1-3-0022538496-open5gs-deplzvfzm 3/3 Running 0 10h
sgwu-nfvcl-helm-repo-open5gs-0-1-3-0022538496-open5gs-deplgfb8q 3/3 Running 0 10h
smf-nfvcl-helm-repo-open5gs-0-1-3-0022538496-open5gs-deplo1qdvd 3/3 Running 0 10h
udm-nfvcl-helm-repo-open5gs-0-1-3-0022538496-open5gs-deplon7s72 3/3 Running 0 10h
udr-nfvcl-helm-repo-open5gs-0-1-3-0022538496-open5gs-deplonhb8t 3/3 Running 2 (10h ago) 10h
upf-nfvcl-helm-repo-open5gs-0-1-3-0022538496-open5gs-deplors5k9 3/3 Running 0 10h
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2 of 2 –The NFVCL Demo