ETSI NFV Conference

Evolving NFV towards the Next Decade
Celebrating the 10th Anniversary of ETSI NFV

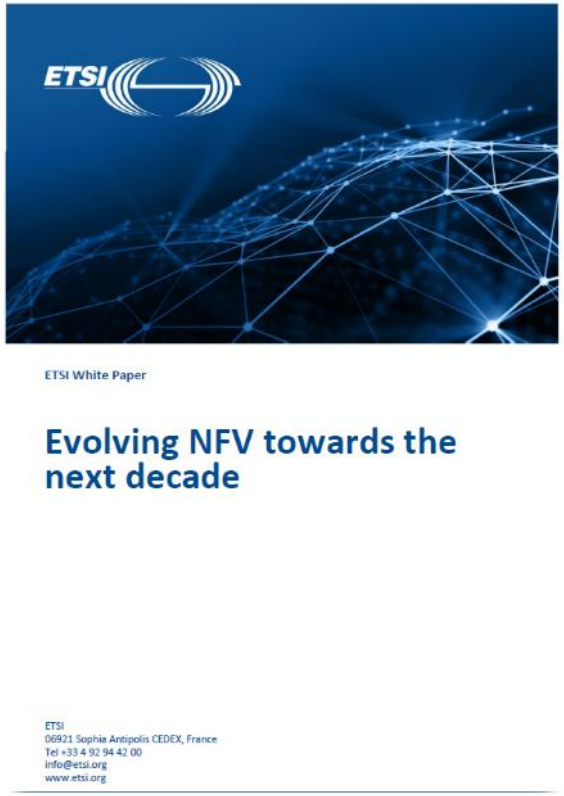
ETSI ISG NFV 10-year Anniversary Whitepaper

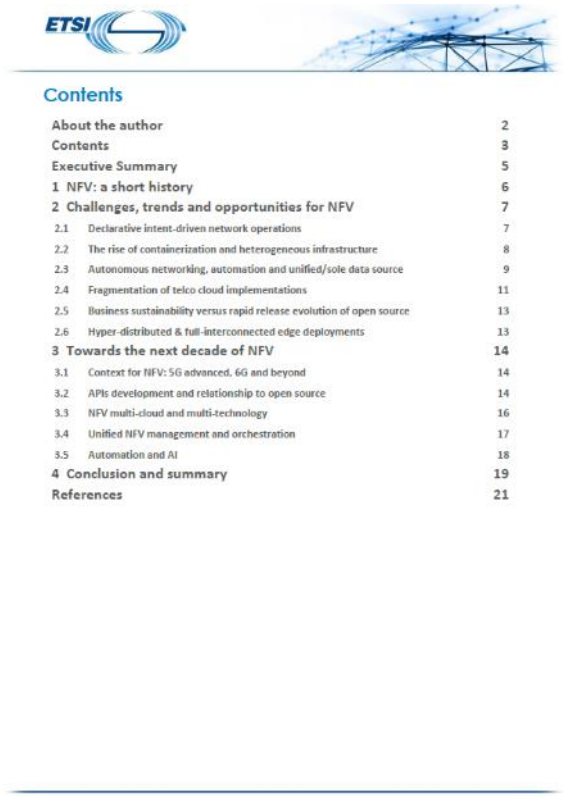
Presented by: Joan TRIAY and Hui DENG

07/03/2023

Skeleton of the New Whitepaper

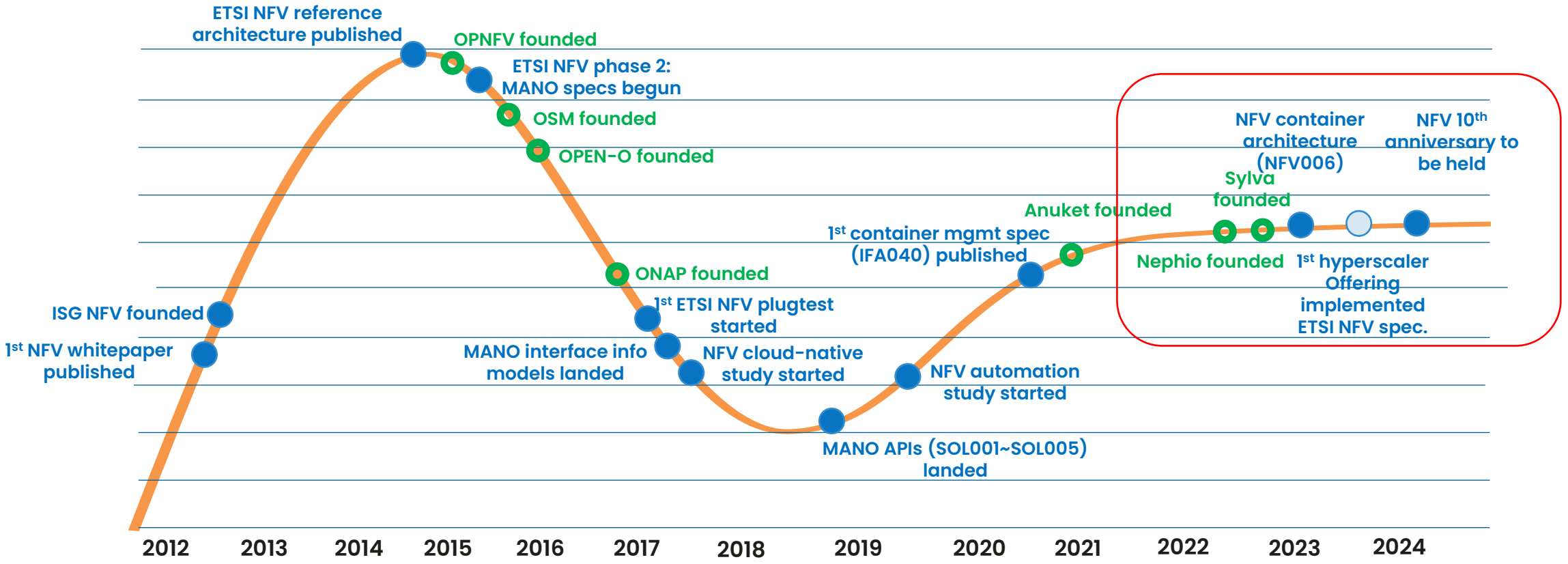
- NFV: a short history
- Challenges, trends and opportunities for NFV
- Towards the next decade of NFV
- Conclusion and summary





Major Milestones of NFV During Past 10 Years

- NFV: a short history



Challenges, trends and opportunities for NFV

- Declarative intent-driven network operations
- The rise of containerization and heterogeneous infrastructure
- Autonomous networking, automation and unified/sole data source
- Fragmentation of telco cloud implementations
- Business sustainability versus rapid release evolution of open source
- Hyper-distributed & full-interconnected edge deployments

Declarative intent-driven network operations

- Challenges, trends and opportunities for NFV

Traditional Imperative: Command by command, step by step

- Are you OK for initiating a VNF?
- Yes, go on.

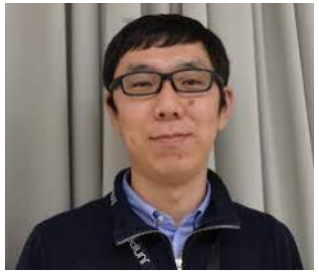
- Give this VNF that size of vCPU resource
- OK, get it.

- Find the closet DC to ETSI Building for locating this VNF
- Roger.

- Set its IP address 12.34.56.78
- Copy, will do.

……

Declarative: What to achieve instead of how to do

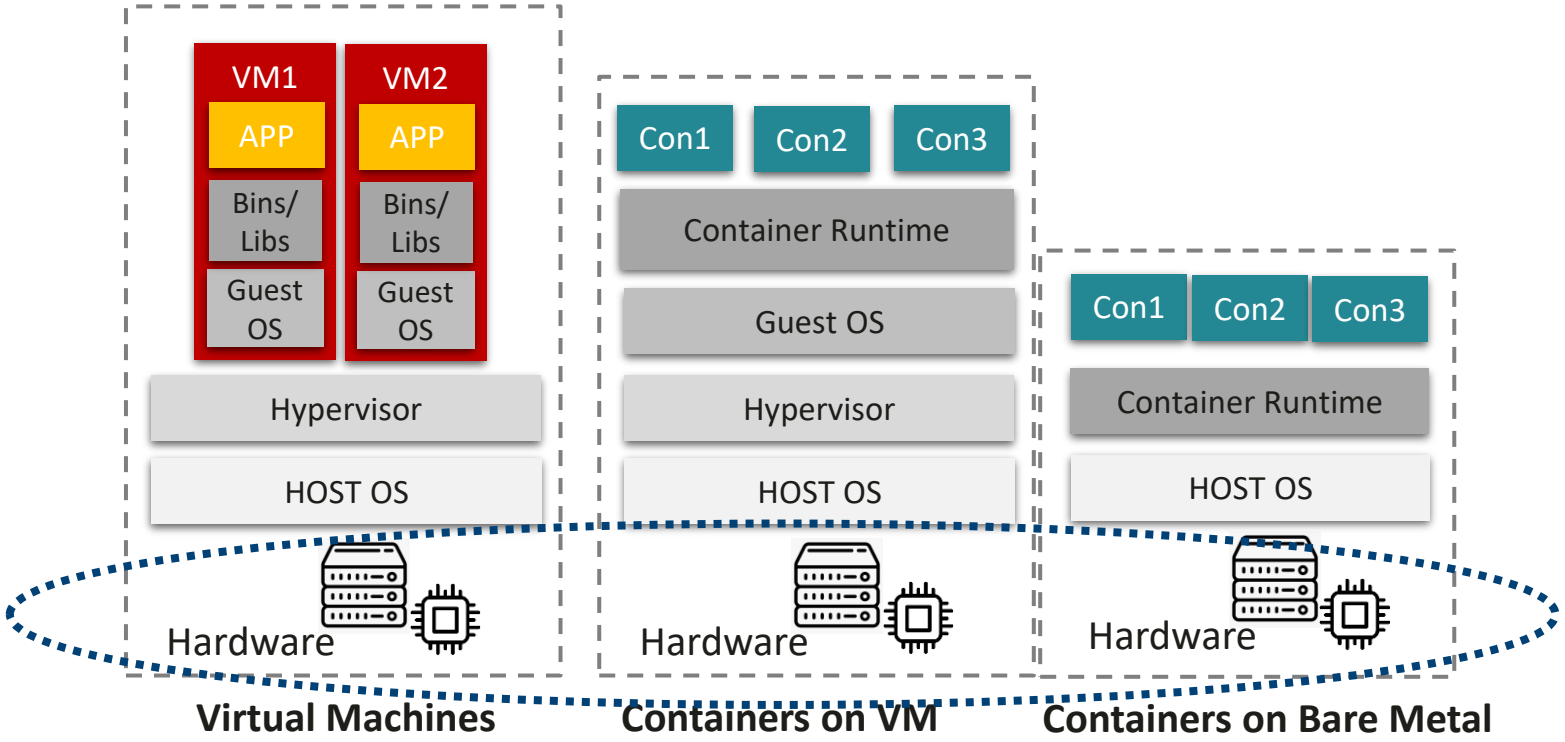


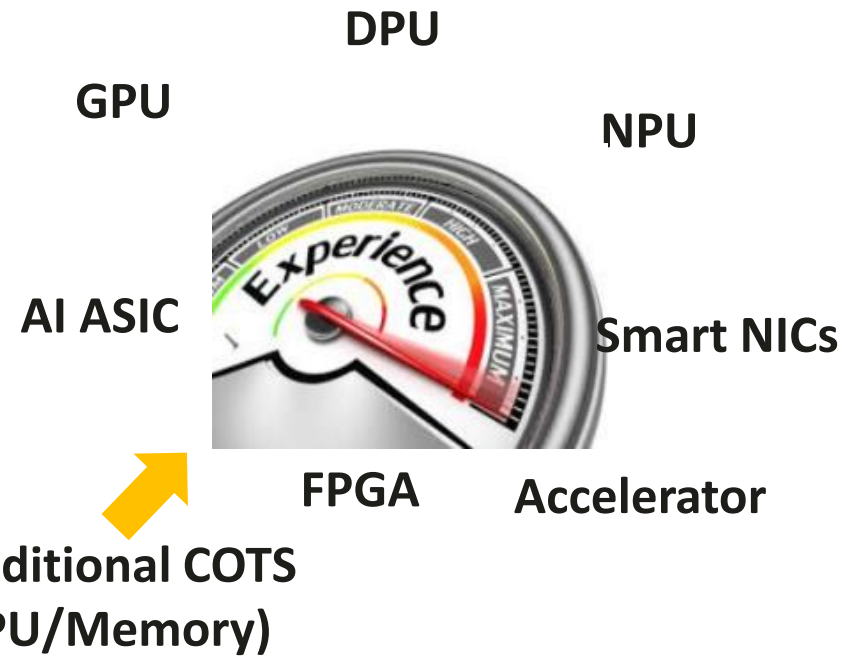
- I'd like a new VNF with proper resource to improve e-meeting video quality in 300 delegates' mobile devices, ASAP.

- Sure. Will figure out how to achieve and have it done in 5 minutes

Rise of containerization and heterogeneous infrastructure

- Challenges, trends and opportunities for NFV





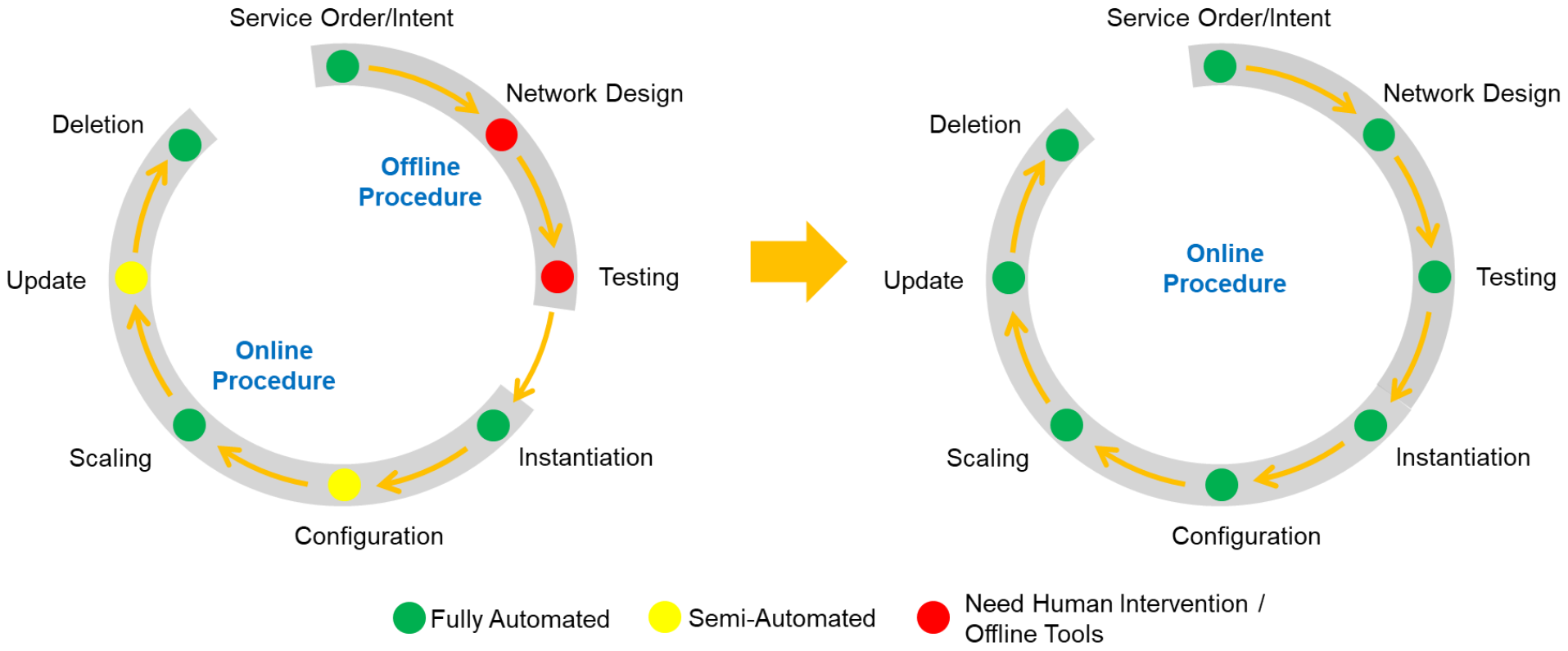
Leverage new generation of virtualization technology

E.g., micro VM, Kata Container, Unikernel, WebAssembly, Serverless

Deploy emerging heterogeneous infrastructure

Autonomous networking, automation and unified/sole data source

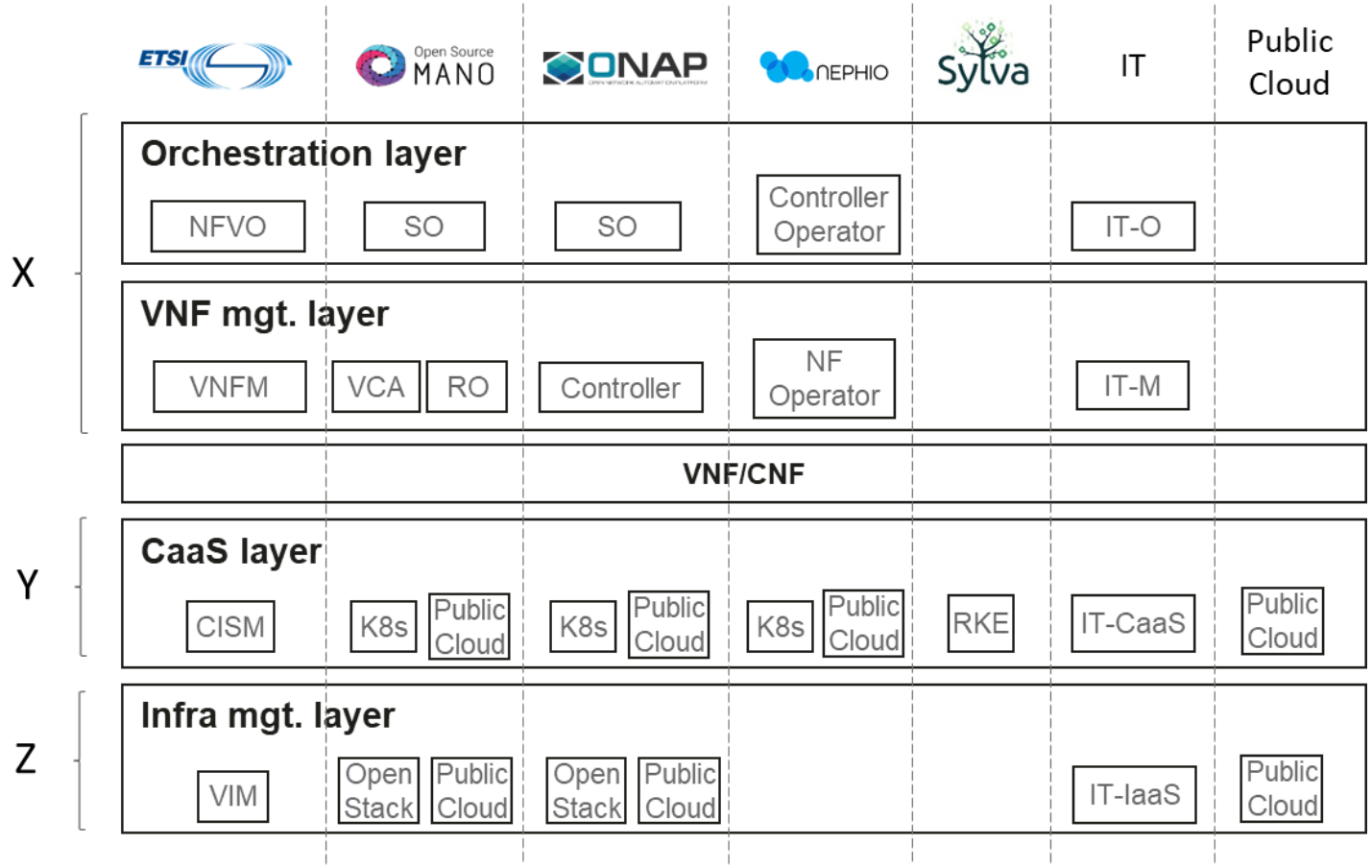
- Challenges, trends and opportunities for NFV



Transition to end-to-end automation

Fragmentation of telco cloud implementations

- Challenges, trends and opportunities for NFV



The choices of cloud native implementations for telecom network operators

Business sustainability vs rapid release evolution of open source

- Challenges, trends and opportunities for NFV

Open Sources	Releases	End of Support
Kubernetes	Every 4 months	latest version N, N-1, n-2 (1 Year)
OpenStack	Every half year	1 to several years

How can we deal with unexplored challenges in the operations and maintenance process of our telco networks due to lack of long-term support of open source components?

99.999 Availability

Topology geometry awareness

How can we leverage and enhance open source in our telco cloud to meet our carrier-grade demands?

High performance

Backward compatibility

Multi-vendor

Hyper-distributed & full-interconnected edge deployments

- Challenges, trends and opportunities for NFV

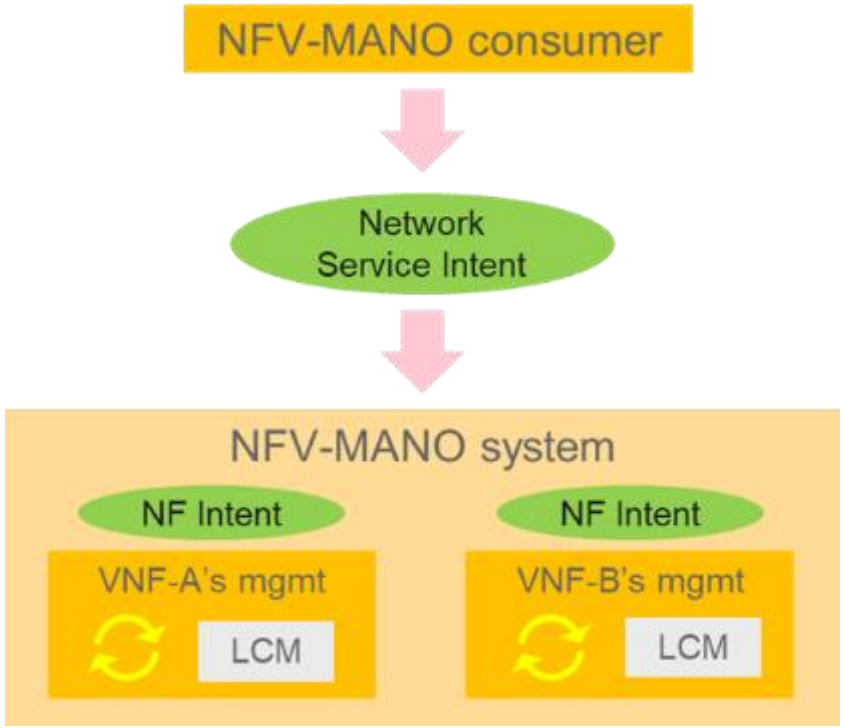
Telco Cloud is expanding and becoming more distributed

Towards the next decade of NFV

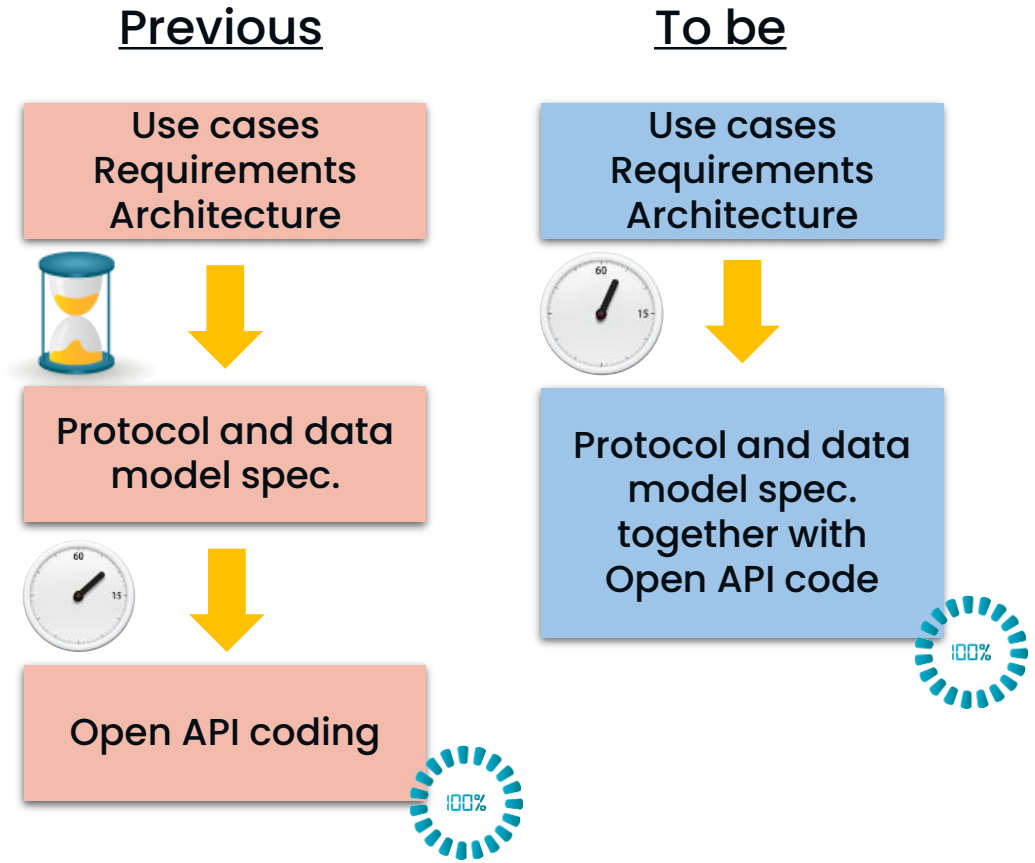
- APIs development and relationship to open source
- NFV multi-cloud and multi-technology
- Unified NFV management and orchestration
- Automation and AI

APIs development: declarative and code-first

- Towards the next decade of NFV



Exemplary simplification of a declarative intent-driven NFV-MANO system

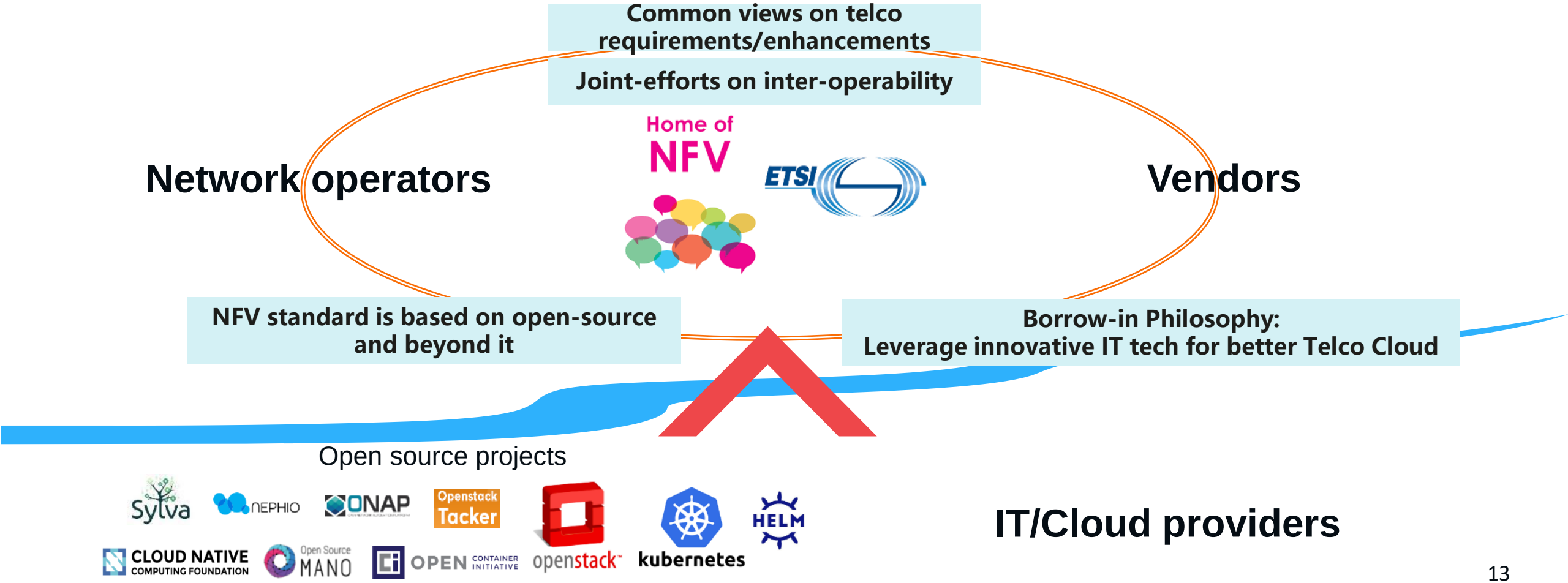


Shorten standard development with code-first for APIs

Relationship to open source: borrow-in philosophy

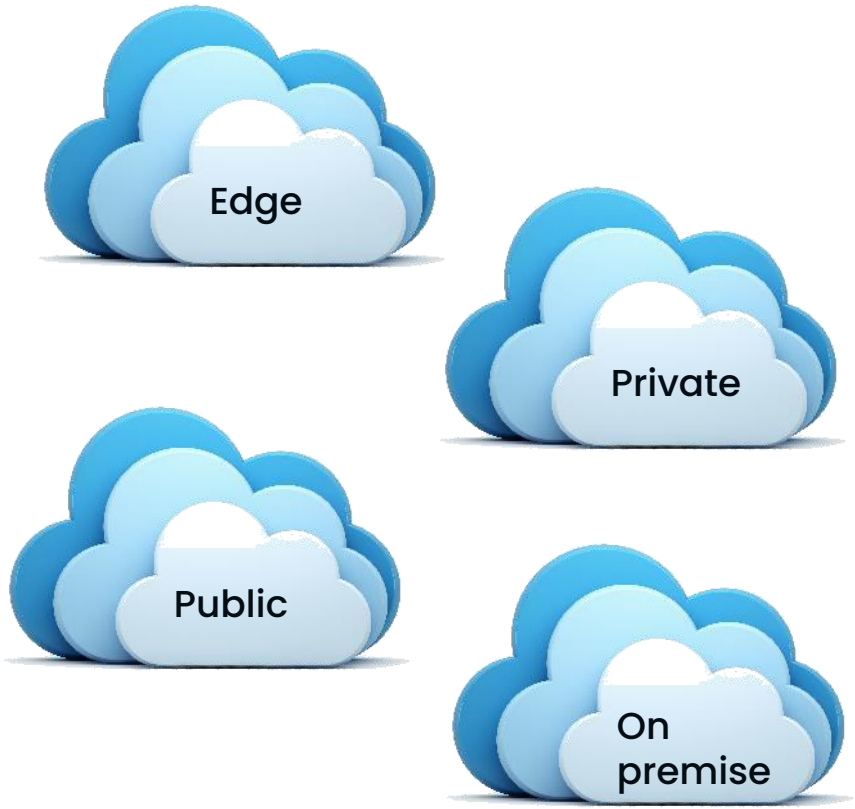
- Towards the next decade of NFV

"Stones from other hills can be borrowed in to polish the jade of our hill."
- Classic of Poetry, 9th & 8th century B.C., China



NFV multi-cloud and multi-technology

- Towards the next decade of NFV



Multi-cloud

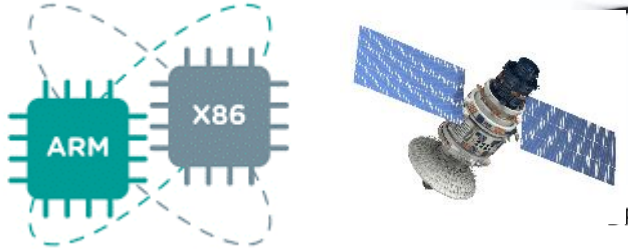
NFV

New generation of virtualization technology

Micro VM, Kata Container, Unikernel, WebAssembly, Serverless

Emerging heterogeneous infrastructure

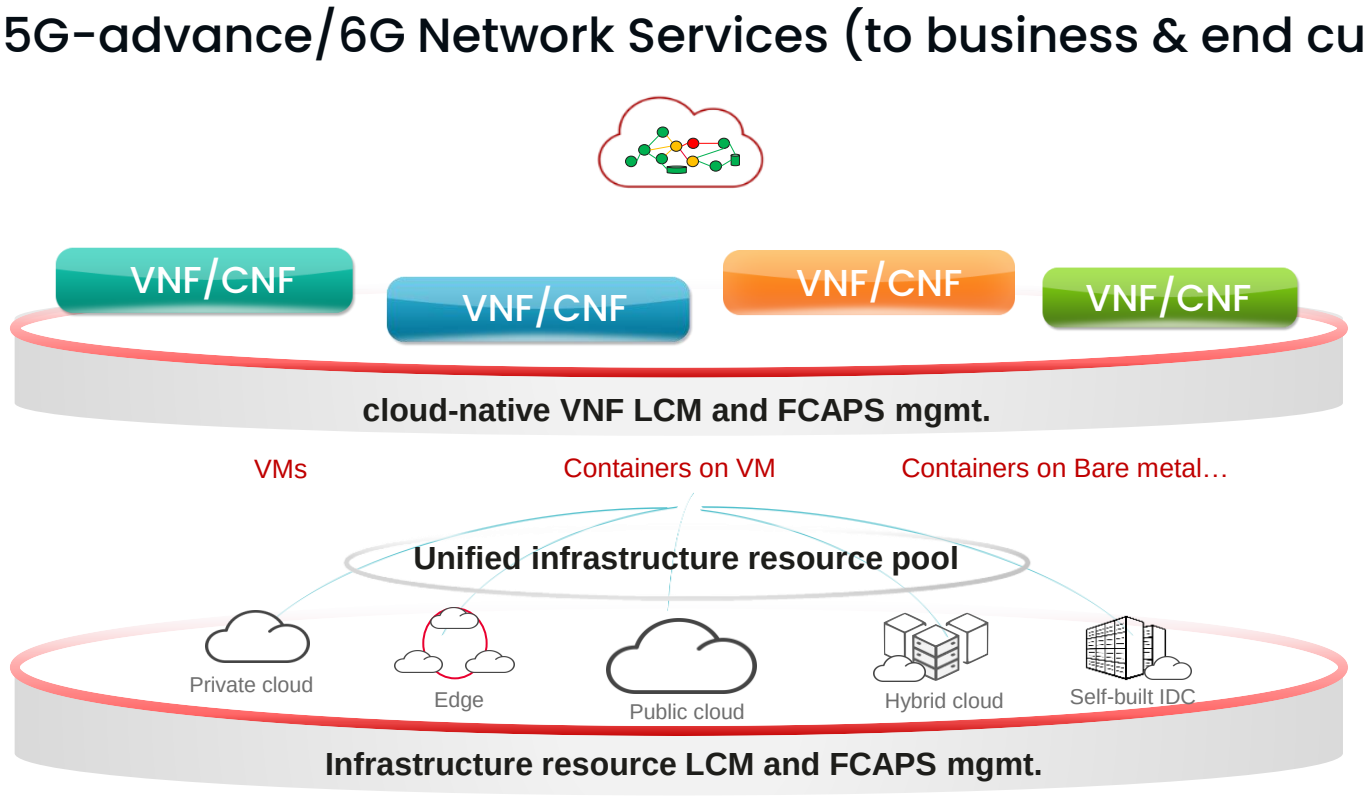
SR-IOV, DPDK
CPU Pinning, NUMA



Multi-technology

Unified NFV management and orchestration

- Towards the next decade of NFV



LCM: Life-cycle management
FCAPS: fault, configuration, accounting, performance and security management

Automation and AI

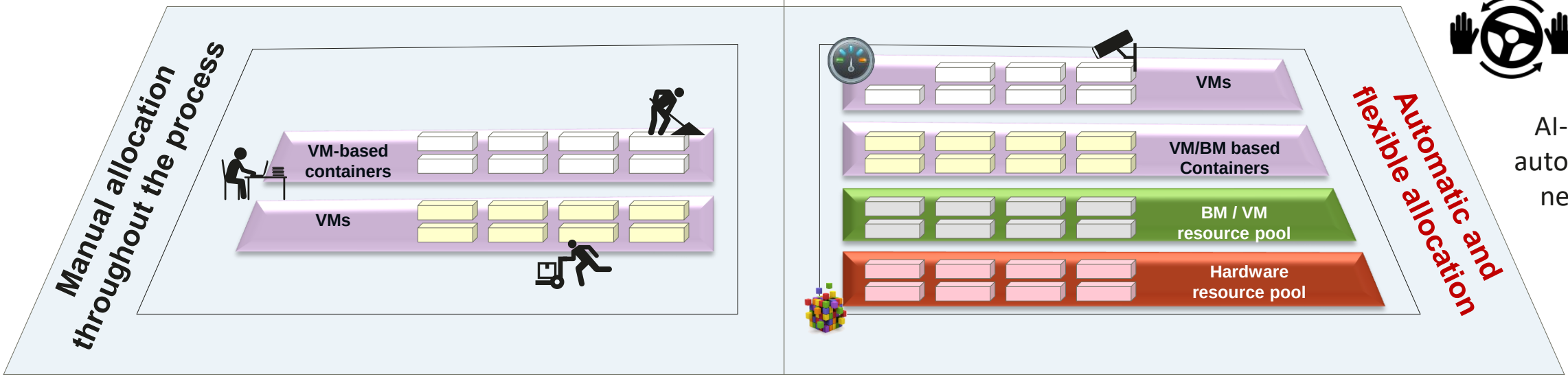
- Towards the next decade of NFV

Single telco industry
| VNF
| VM-based

Telecom service

Telco network for Vertical industries
| VNF/CNF
| Container/VM-based

Telecom service



AI-inside autonomous network

Thanks to the editing team and reviewers

- This 10-year anniversary whitepaper is produced as a collective effort within the ETSI ISG NFV, and on its behalf the following editing team (listed in alphabetical order)
  - Xuhui CAI (China Mobile)
  - Hui DENG (Huawei, ETSI ISG NFV Vice-Chair)
  - Lingli DENG (China Mobile)
  - Shen GAO (China Telecom)
  - Arturo MARTIN DE NICOLAS (Ericsson)
  - Yoshihiro NAKAJIMA (NTT DOCOMO, ETSI ISG NFV Chair)
  - Janusz PIECZERAK (Orange, ETSI ISG NFV Vice-Chair)
  - Joan TRIAY (NTT DOCOMO)
  - Xuliang WANG (China Telecom)
  - Baoguo XIE (ZTE)
  - Hammad ZAFAR (NEC)
  - …

Thank you for your attention

©ETSI 2023 – All rights reserved

Follow us on: