

ETSI NFV Approach to Managing Cloud-Native and AI Infrastructures

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NFV(26)000089r3

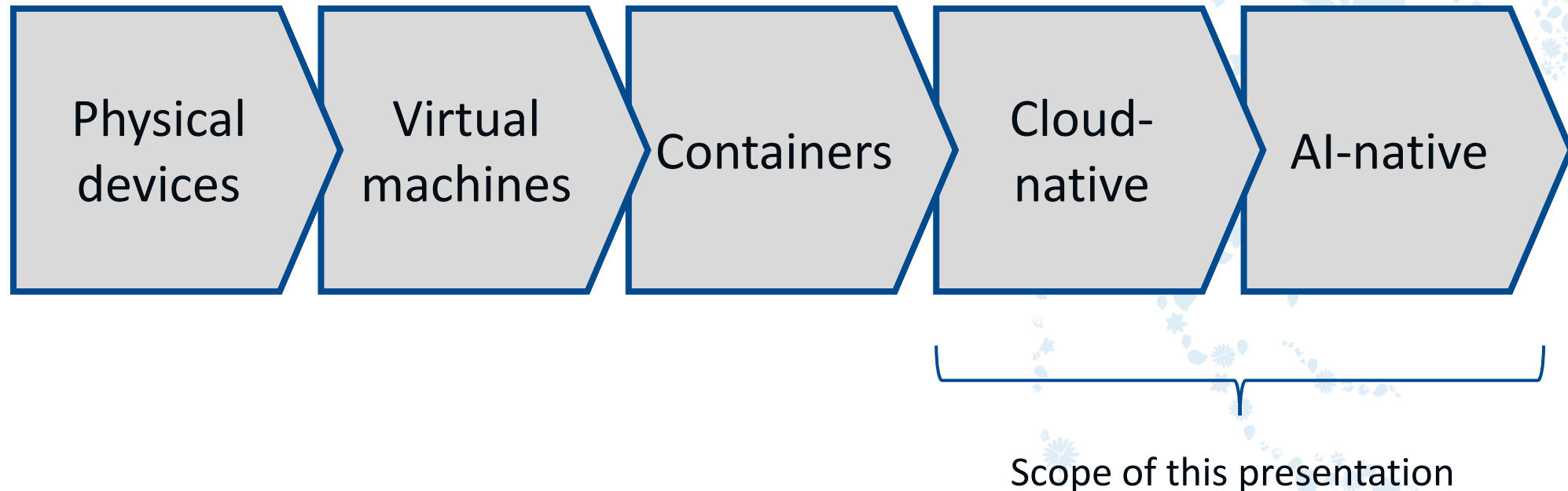
June 2026



Evolving technologies

Telecom industry takes advantage of constantly-changing technologies...

How does this impact Telecom Infrastructure?



Cloud-Native Applications

Cloud-native technologies

- Containers
- Modularity
- Stateless services
- Standardised service exposure
- More flexible deployment models
- Faster lifecycle management

Impacts to infrastructure

- Compute, storage, and networking
- Focus on efficiency and scalability



AI-Native Applications

AI workloads in the network

- Highly dynamic
- Adaptive
- Intelligence-driven
- Agents (see next page)

Impacts to infrastructure

- New computational technologies (GPU, NPU, TPU, etc) for training and inference
- Ultra-large-scale and energy-aware computing
- AI-native cloud-network integration
- Real-time communication for AI applications



Agents in an AI-Native network

AI agents add new capabilities in an AI-Native network

- Task-oriented
- Fully autonomous

Impacts to infrastructure

- Interconnection of cloud-edge-terminal AI agents
- Security, trust and governance
- Model and agent lifecycle management with built-in observability
- Edge-cloud collaboration for distributed inference
- Multi-operator and multi-domain federation
- Memory and state persistence



White Paper proposes changes to NFV infrastructure

ETSI White Paper “AI-native Infrastructure, next phase of Telco Cloud evolution” highlights the infrastructure changes to support cloud-native and AI-native networks

- Dynamic and intelligent resource pooling and scheduling
- Intent-driven operating model
- Hardware acceleration and integrated scheduling for AI computing (GPU/NPU/TPU and related xPUs)
- Storage systems for AI applications (High Bandwidth Memory, Key/value cache, memory isolation/sharing)
- Connectivity with differentiated bandwidth/latency assurances
- Elastic connectivity between users, edge sites, and central resources
- Bare-metal containers for high-performance workloads
- Secure sandboxes

Release 6 - Telco Cloud Architecture

In Release 6, ETSI moved to a new Telco Cloud Architecture

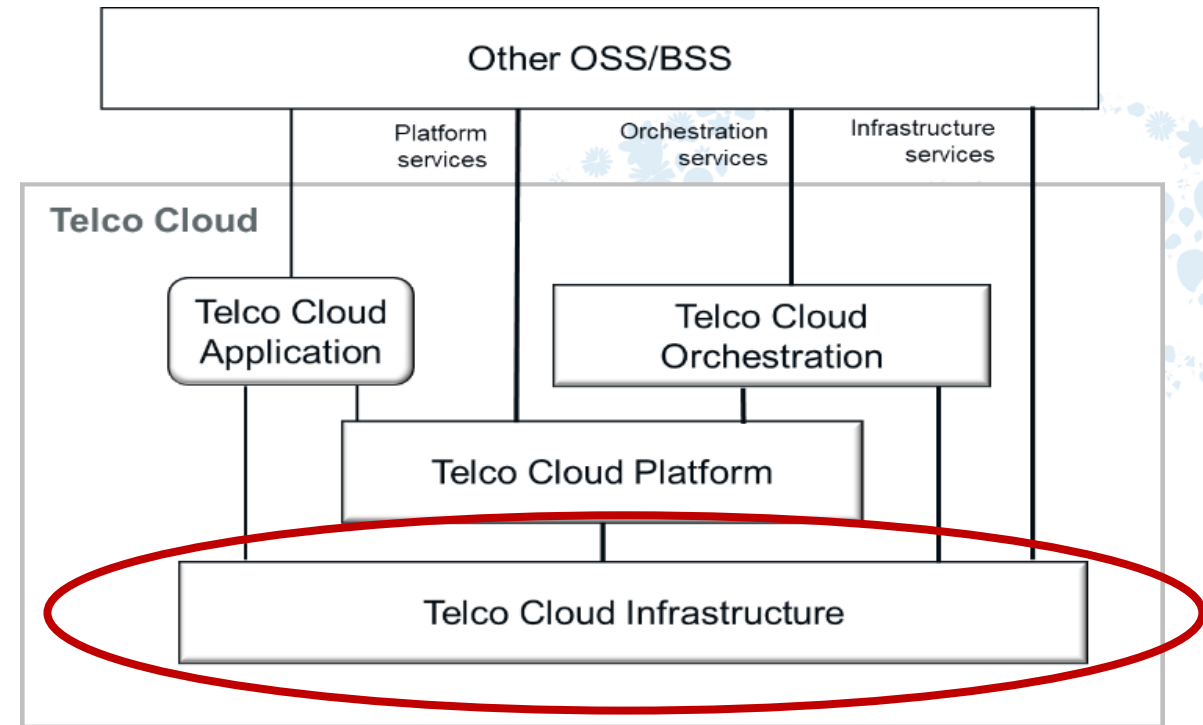
Cloud-first, with support for hosting AI applications

Introduced a new architectural block

Telco Cloud Infrastructure

TCI provides Infrastructure services to

- Telco Cloud Applications
- Telco Cloud Platform
- Telco Cloud Orchestration
- OSS/BSS



For details see ETSI GS NFV008-1 (architecture) and NFV008-2 (requirements)

Release 6 - Telco Cloud Infrastructure

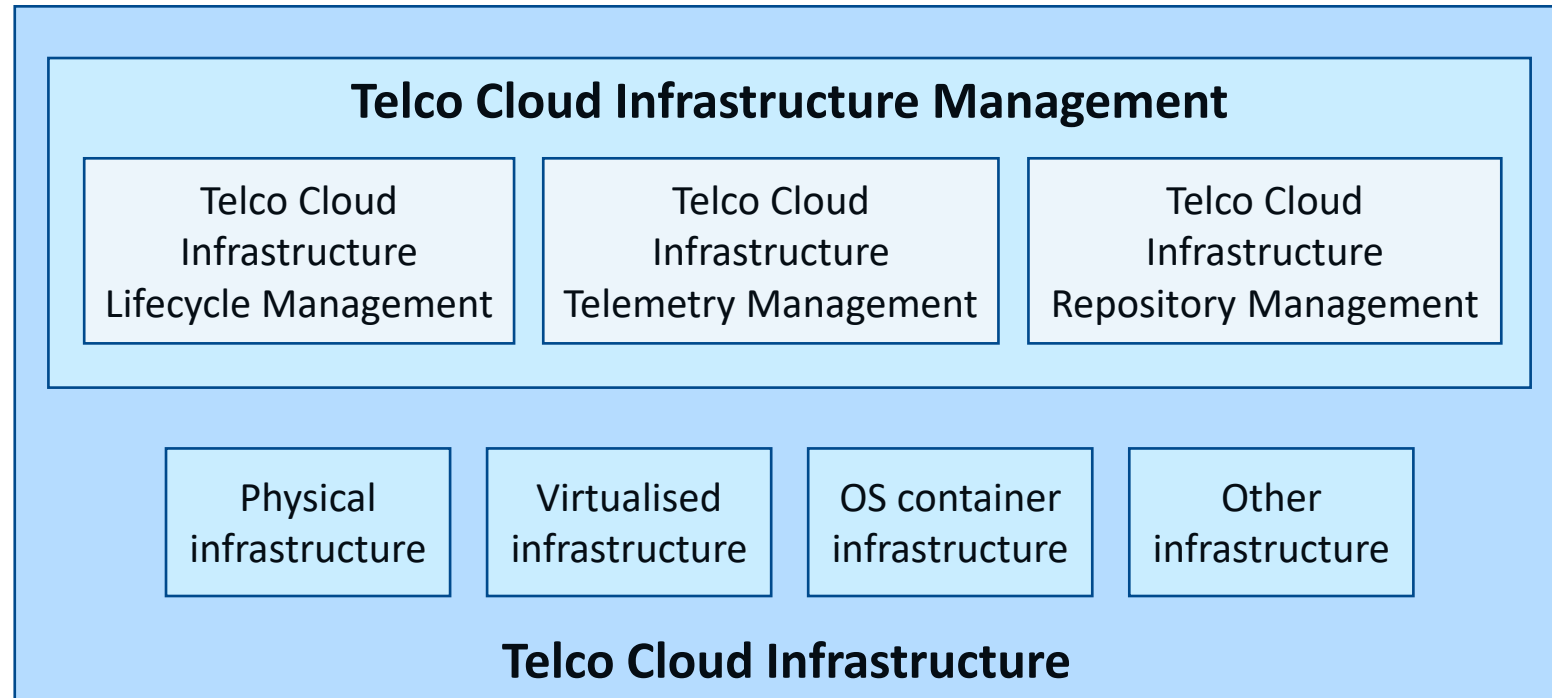
Telco Cloud Infrastructure provides infrastructure and the related management

TCI supports

- Physical infrastructure,
- Virtualised infrastructure
- OS container infrastructure
- Any new type of infrastructure

TCI Management supports

- Resource lifecycle management
- Resource OAM (telemetry)
- Others (repository management)



Release 7 - Infrastructure for Agentic Applications

Release 7 - Ongoing study EVE031

“Report on Telco Cloud Infrastructure support for telco AI Agents”

New infrastructure capabilities to support AI Agents in an AI-Native network

- Runtime environments (e.g. Amazon Bedrock AgentCore, Microsoft Agent Framework, Azure AI Foundry Agent Service, Google Agent Development Kit, Vertex AI Agent Engine, etc.)
- Tool-calling frameworks (e.g. Model Context Protocol)
- Memory systems (High Bandwidth Memory, Key/value cache, memory isolation/sharing)
- Planning and reasoning engines
- Multi-agent coordination
- Security sandboxes (e.g. Container-based, MicroVM-based, Hardware isolation, etc.)
- etc...

For more information

ETSI White Paper No. 71 **AI-native Infrastructure, next phase of Telco Cloud evolution**

https://www.etsi.org/wp-content/uploads/ETSI-WP-71_AI-native_Infrastructure_next_phase_of_Telco_Cloud_evolution.pdf

NFV008-1 **Architectural framework for Telco Cloud**

https://www.etsi.org/deliver/etsi_gs/NFV/001_099/00801/

NFV008-2 **Functional and Non-Functional Requirements for Telco Cloud**

https://www.etsi.org/deliver/etsi_gs/NFV/001_099/00802/

Draft EVE031 **Report on Telco Cloud Infrastructure support for telco AI Agents**

<https://docbox.etsi.org/ISG/NFV/Open/Drafts/>

