Towards 6G System Architecture

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MOSA!C LAB
Mobile Network Softwarization & Service Customization
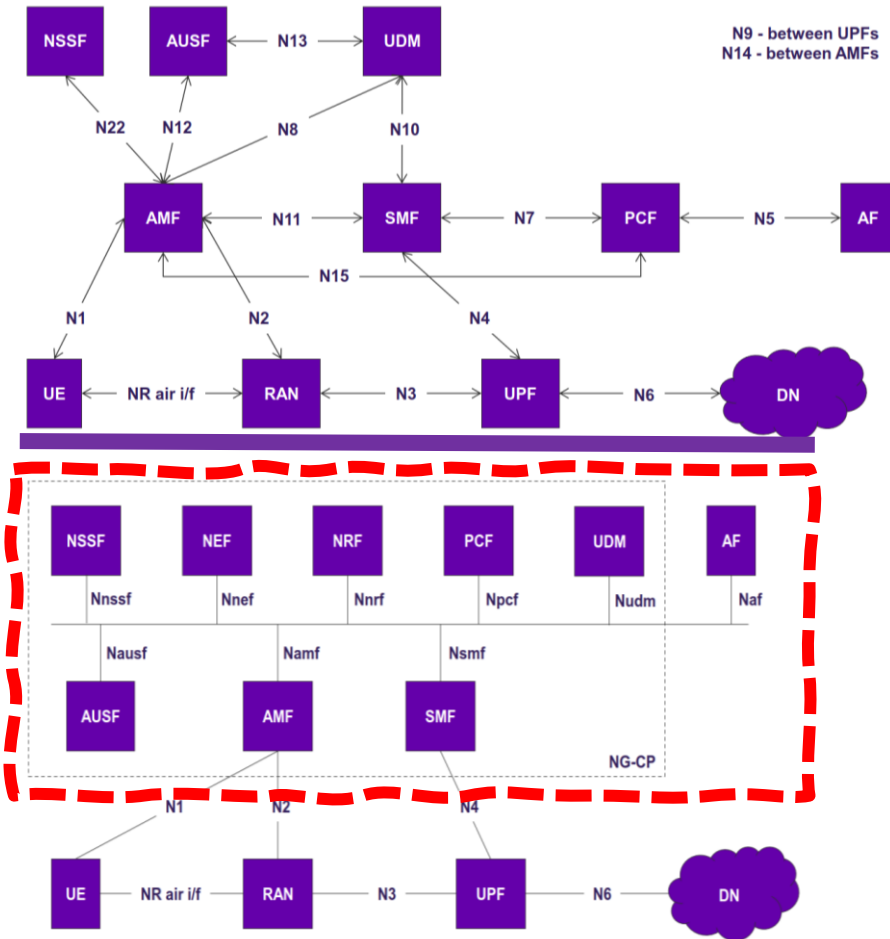
The journey to 5G ...
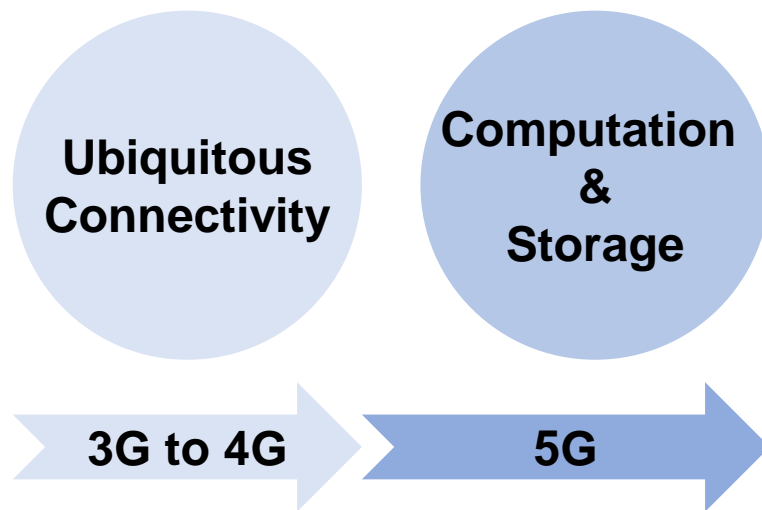
IT Principles in 5G

- **Heavy involvement of Cloud Computing**
  - IaaS
  - PaaS
  - SaaS

- **Strong Adoption of IT principles**
  - Micro Service Concept
  - Integration Fabric Concept
  - Network Function Virtualization
  - Network Slicing & Softwarization
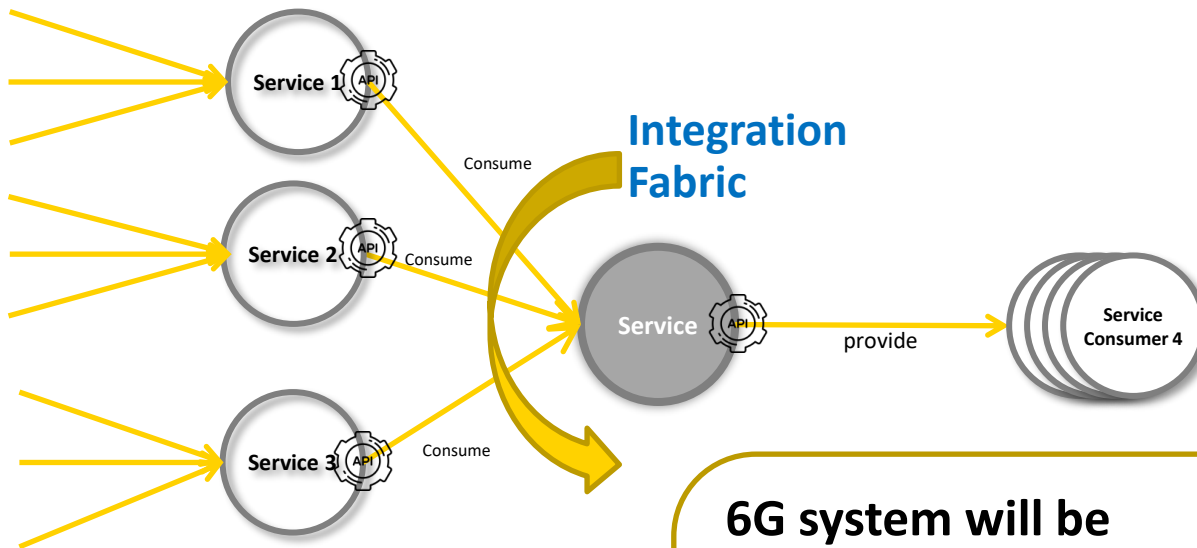 - Service Based Architecture

Some SBA Principles Adopted ...

- **Loosely coupled** services, flexibility in service oriented control plane ✔

- **Modularity,** in operational and management independence ✔
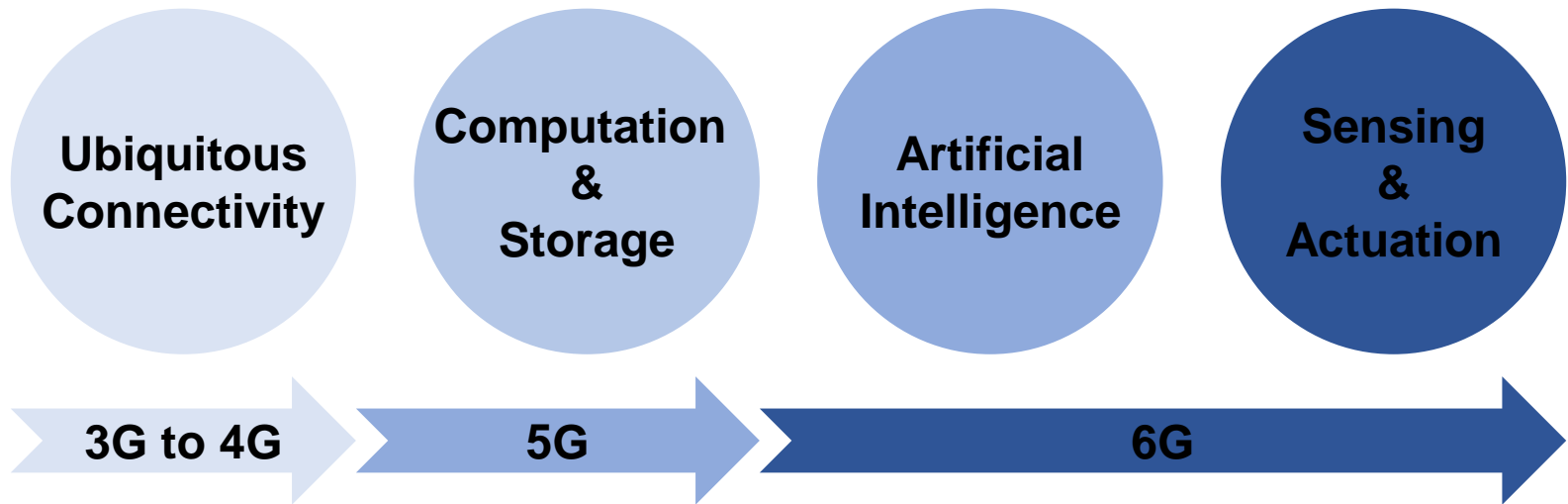
6G System Architecture – What kind?

Service Registration & Discovery Function

Service 1 — API
Consume

Integration Fabric

Service 2 — API — Consume

Service — API — provide — Service Consumer 4
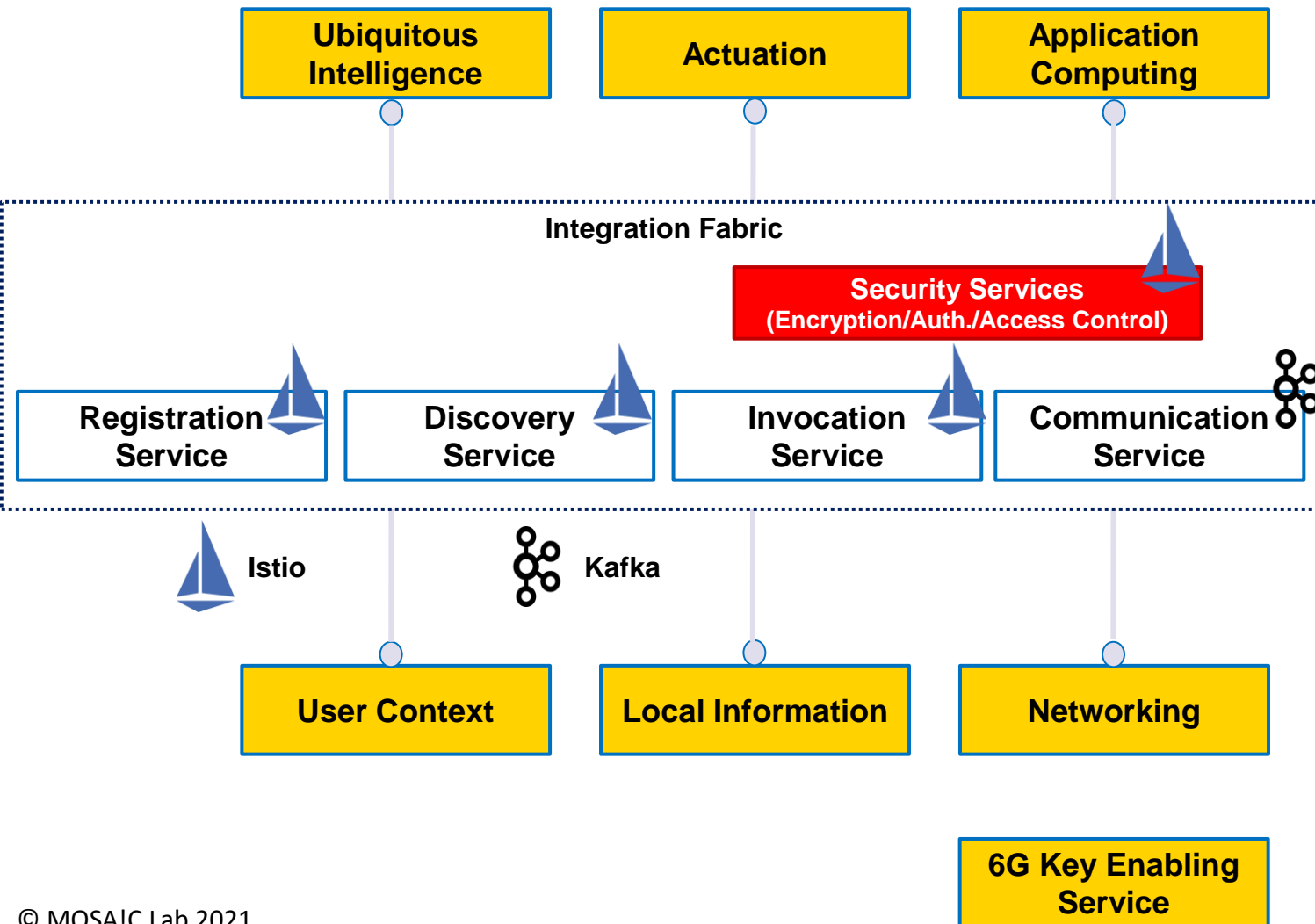
Service 3 — API — Consume

6G system will be
- truly could native,
- entirely SBA-based,
- composed of a set of services, **discoverable & able to provide services** to other authorized services through specified APIs.
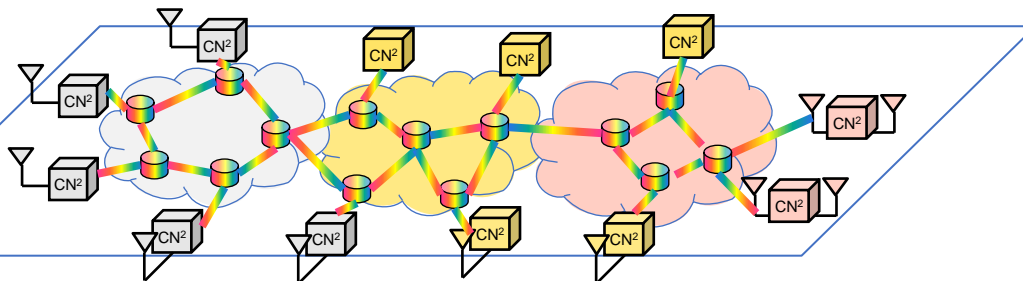
6G – The way forward

6G System Architecture: Service of Services

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6G System Architecture – Components

Multi-Tech/Admin Domains of Physical Computing and Network Infrastructure.
Each Infra with its own Physical Infra Manager.

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Cross-Domain Resource Management and Orchestration

Domain WIM

Domain NFV

NFVO

VNF Manager

CISM

VIM
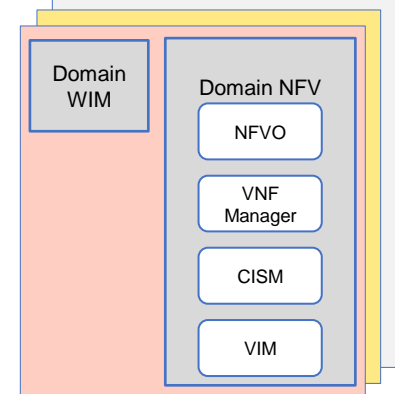
Multi Domain Slicing
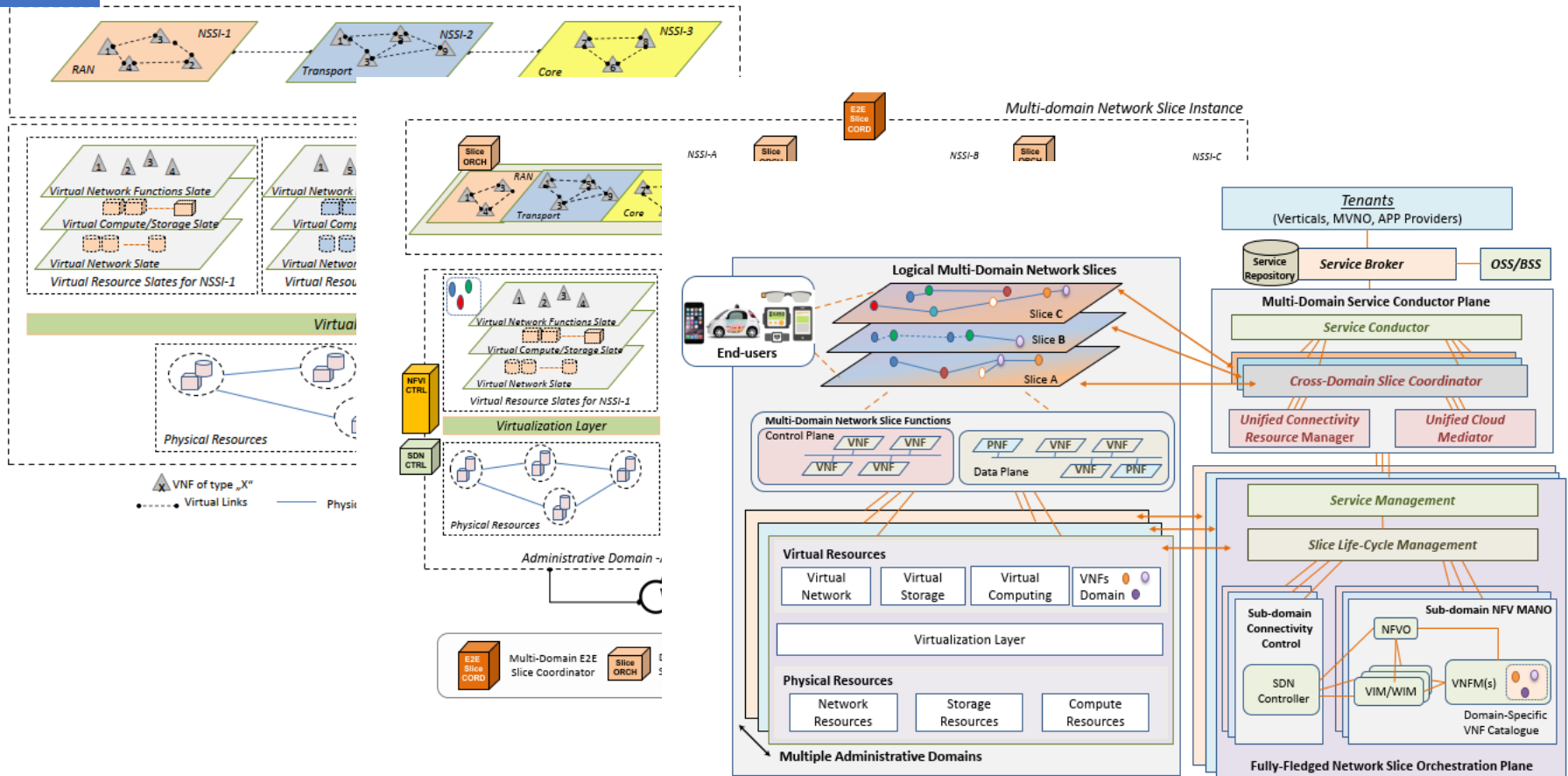
T. Taleb, I. Afolabi, K. Samdanis and F. Z. Yousaf, "On Multi-domain Network Slicing Orchestration Architecture & Federated Resource Control," in IEEE Network Magazine, Vol. 33, No. 5, Sep. 2019, pp. 242 - 252

6G System Architecture – Components

6G Service Developer

MS AE DE Act

CI/CD Pipeline

DevOps-aware NextGen 6G Service Development ToolKit

In-Network Supporting Functions

(Virtua Control Plane

(Virtual) Data Plane

(Virtual) RAN

User Equipment

(Virtual) Transport Network

DB/FE

Service Logic

Cross-Domain Resource Management and Orchestration

Domain WIM

Domain NFV

NFVO

VNF Manager

CISM

VIM

CN²

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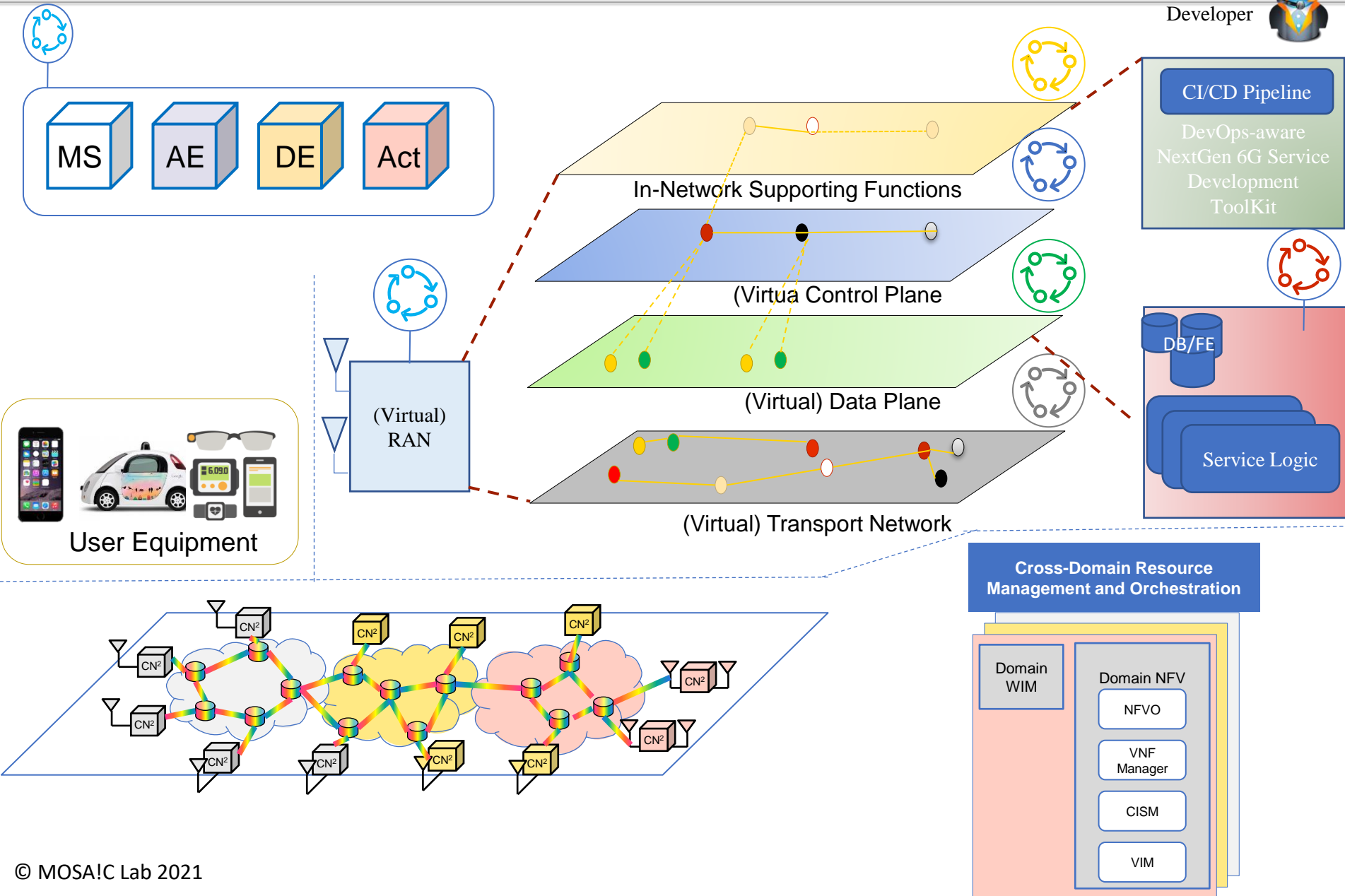
6G Service Management – Cognitive Closed Loop

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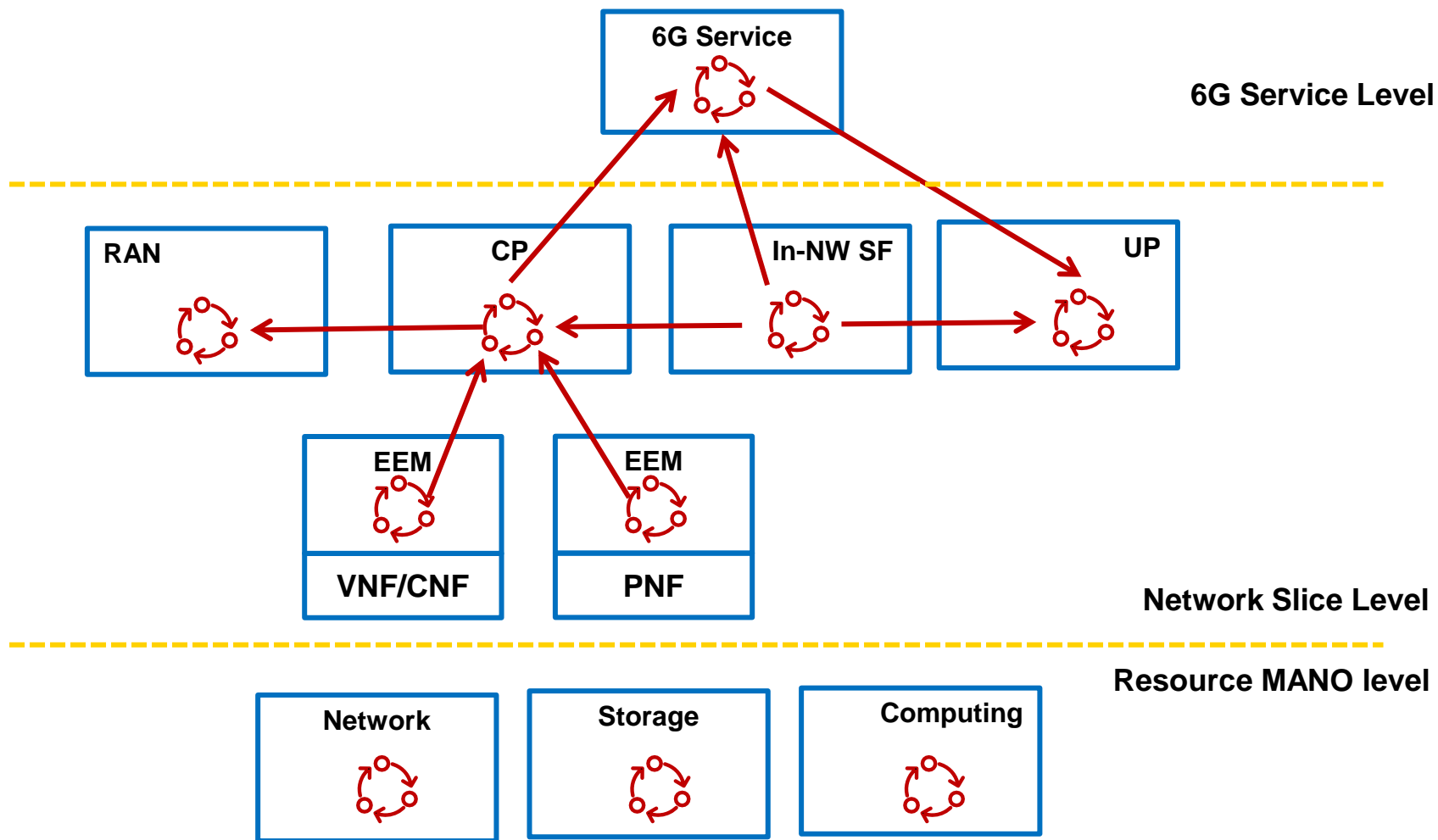
Extend the concept of cloud computing beyond DCs ….

… all the way towards mobile users

CI/CD Pipeline

DevOps-aware NextGen 6G Service Development

RAN Slice

NS for development & testing

6G Service 3

CI/CD Pipeline

DevOps

NS for production

6G Service 2

NS for production

Logic

DevOps

6G Service 1

production

production

DevOps

API

Resource Orchestration

Mobile Connectivity + Transport Networking + In Networking Computing + Decentralized Computing + Smart Storage + DevOps offered as One E2E Service (atomic)

- On-Demand
- Elastic
- Multi-Tenant, and
- Pay-As-You-Go

Towards service extensibility ...
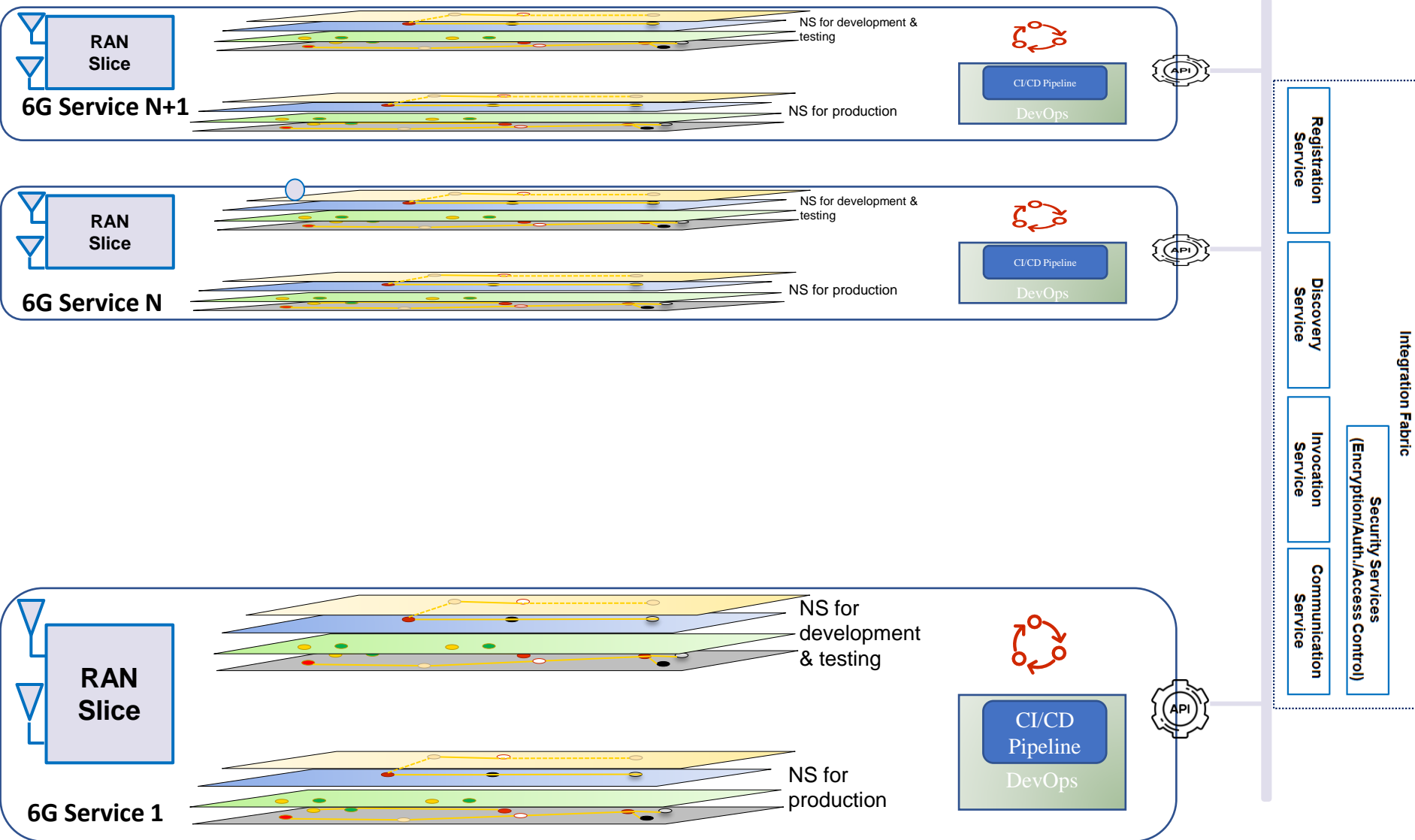
Towards true network openness ...

Shared RAN

(eMBB, URLLC, mMTC) Network Slice for connectivity service

(Managed by MO)

Storage & Compute Resources for 5G Service DB & Logic
(Administrated by SP)

5G Service Provider

Administrative Boundary of SP

One E2E Atomic Cloud Service including
Mobile Connectivity + Transport Networking + In Networking Computing +
Decentralized Computing + Smart Storage + DevOps

(Administrated by SP)

6G Service Provider

Administrative Boundary of SP

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Some take away for B5G/6G networking ...

- **True Cloud Nativeness**

- **"NW of Networks" vs "Service of Services"**

- **Network of "Closed Loops"**

- **"DevOps" in Networking**

- **Disruptive & Revolutionary**

- **Adopted by Telco/3GPP?**
  - **Time will tell**

Thank you for your attention!

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