



NOKIA

*Power of Ecosystems  
& Programmable  
Networks*

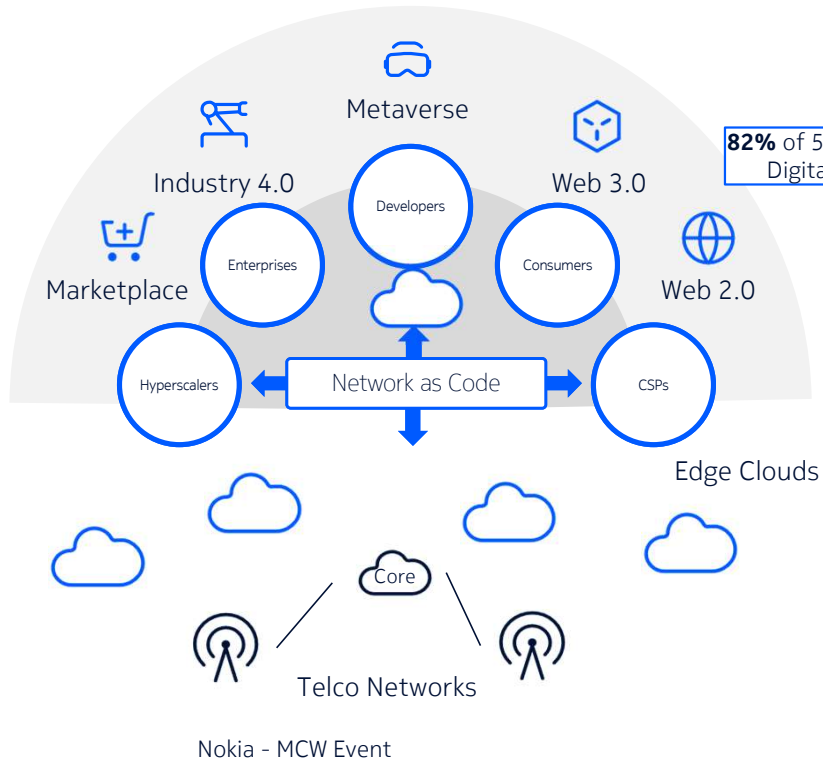
Atul Purohit

Nokia CNS Market CTO, Europe

# Innovation and disruption

5G is a big supercomputer on cloud, looking for use cases

- ✓ NaaS (internal) : Separation of Concerns / Network & IT / TMF 909A
- ✓ NaaS (external) : Exposure via APIs to external systems / B2B

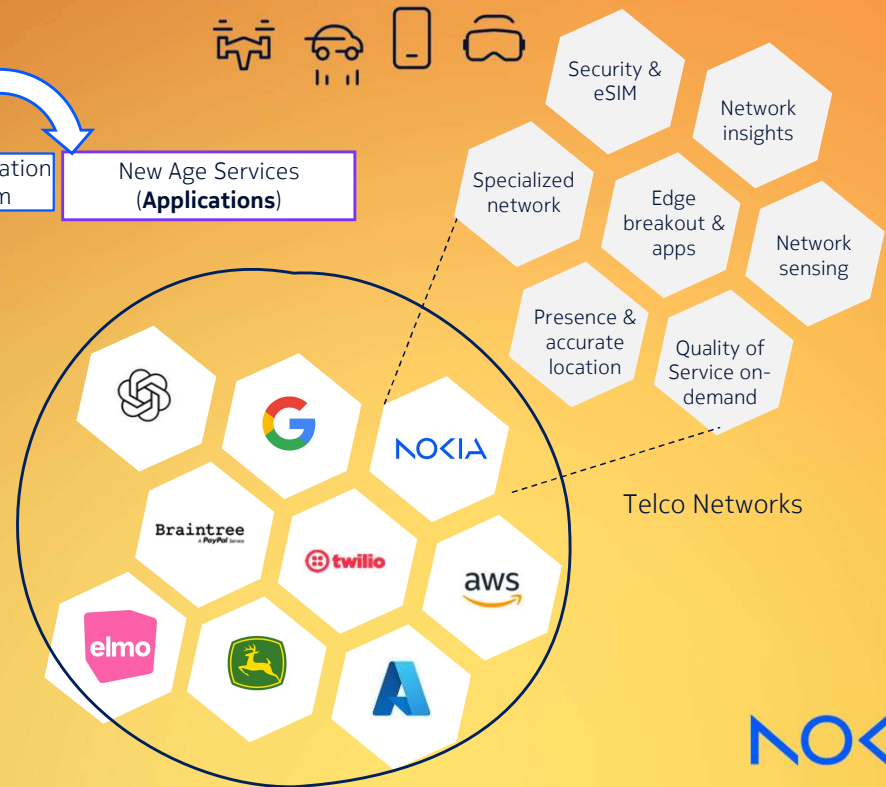


82% of 5G value creation Digital ecosystem

New Age Services (Applications)

Programmable network capabilities available for ecosystems will drive innovation of new services & experiences

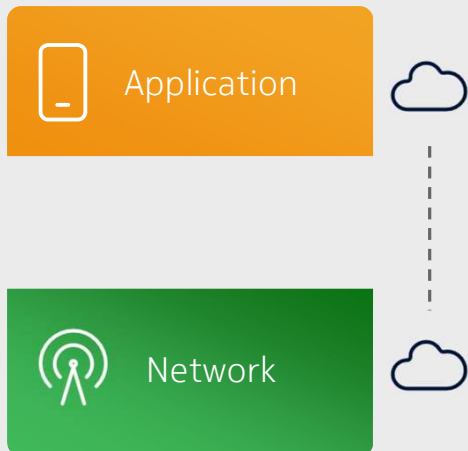
Public cloud ----- Edge clouds ----- Devices



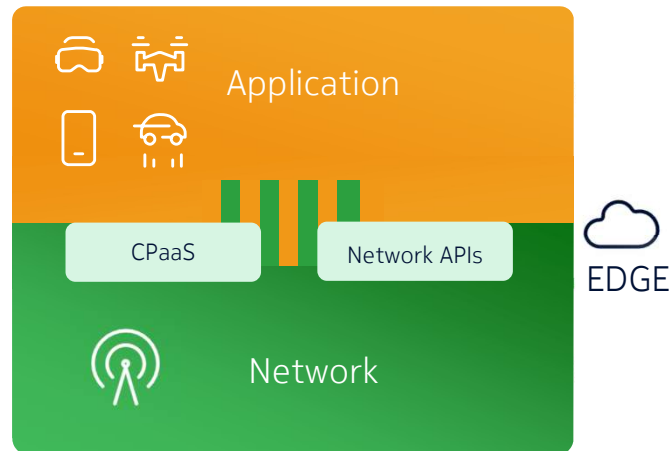
# What are programmable networks?

Changing the relation between applications and networks

## Over-the-top



## Innovations and agility for developer ecosystem



Better, new apps!

Optimized network use & monetization

295 Operators in 114 Countries – 5G Launch

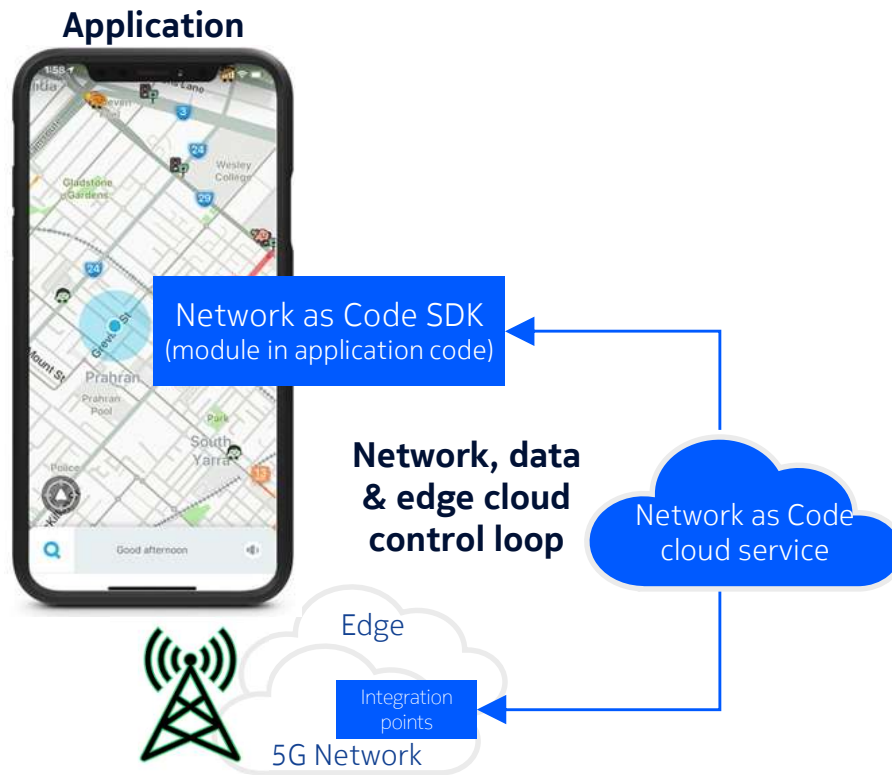
82% of CSPs, not yet Monetizing

Moving up the Value Chain

Reduce the Distance with Ecosystems

# What is Network as Code (NaC)?

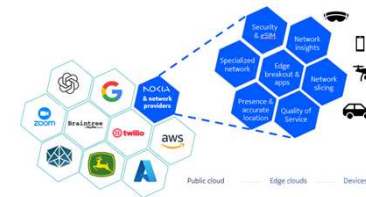
Simple way to embed network capabilities in applications & monetize 5G



**Developers:** embed network capabilities in simplest and most natural way and create altogether new type of apps and experiences

**CSPs:** way to monetize 5G beyond connectivity and make network foundational and differentiating part of new service chains

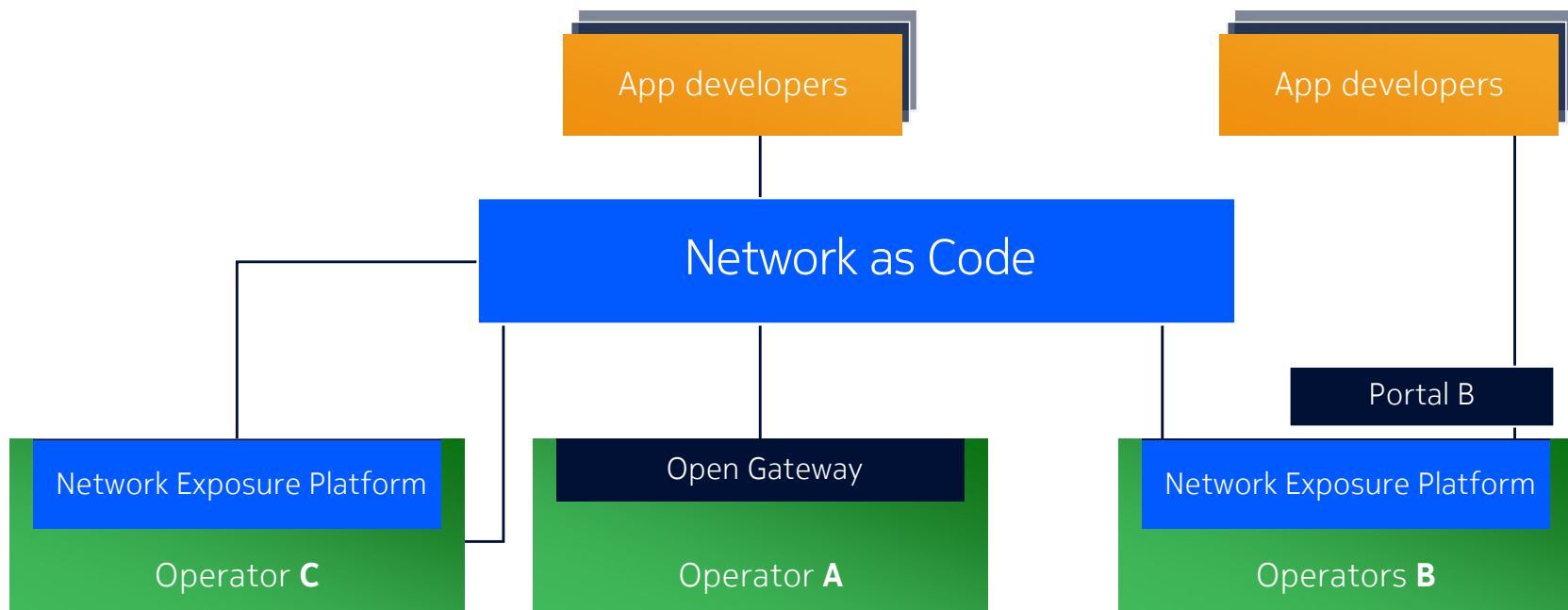
Capability exposure by network providers will drive innovation of new services & experiences by ecosystems



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# API monetization : Addressing multiple GTM and tech strategies

Nokia's implementation of GSMA OGI and Operator platform

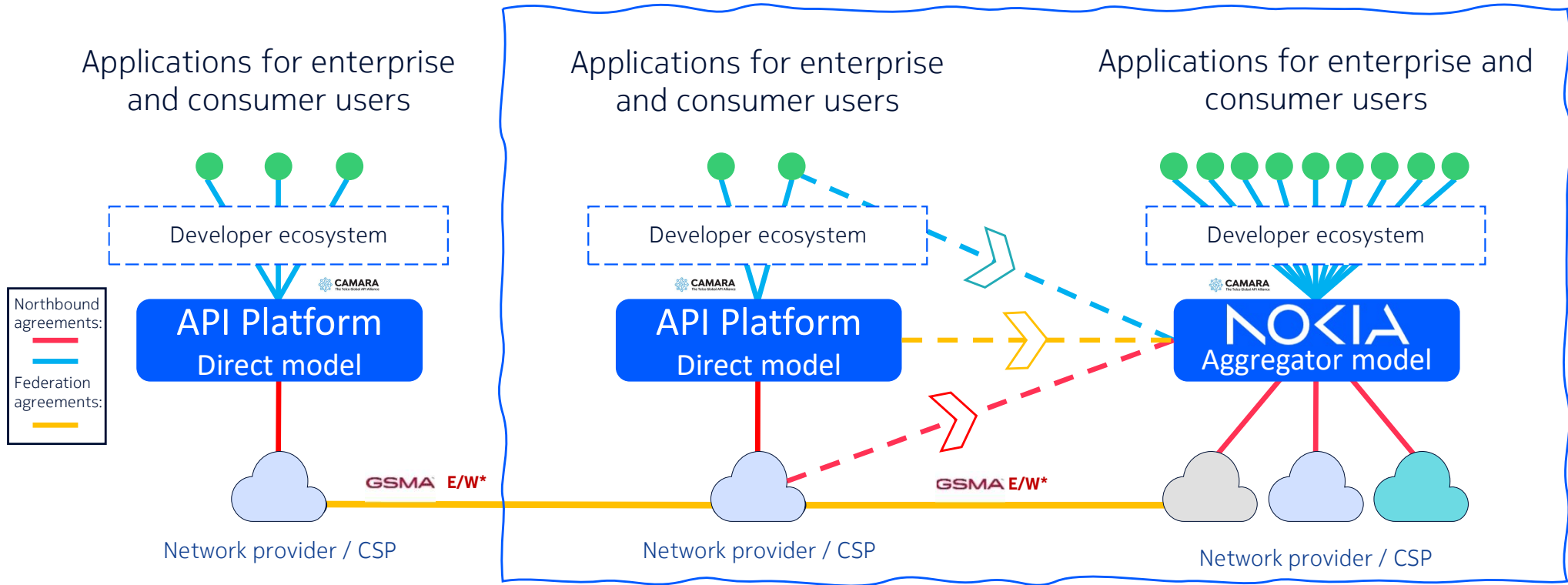


Platform of Choice : GSMA DevCon Hackathon MWC 2024  
 Platform of Choice : Orange Group VIVA Tech 2024 Paris

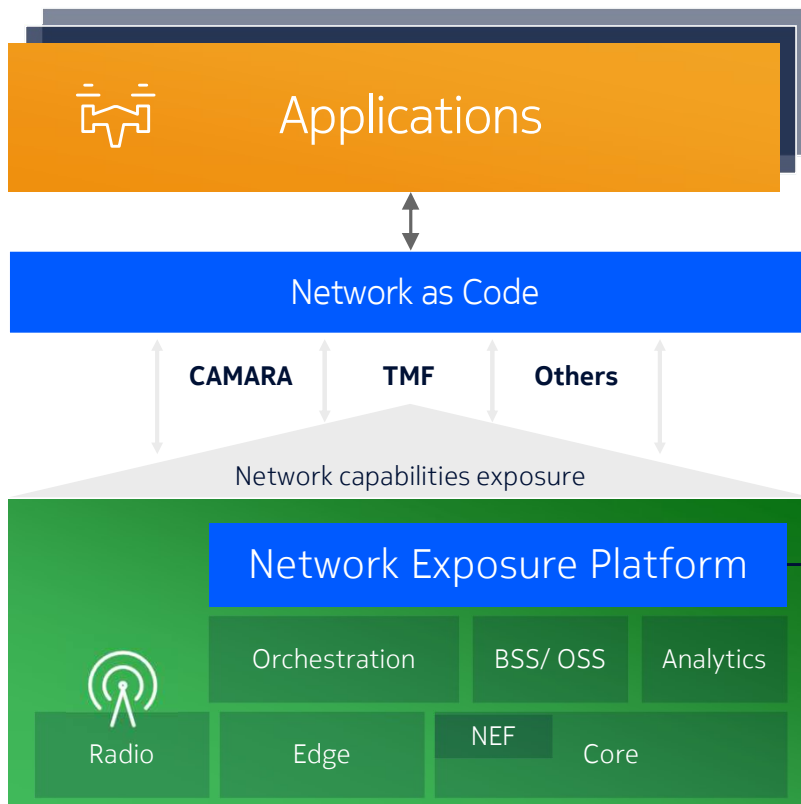


# The telecom / network API concept

## The paths to programmable networks



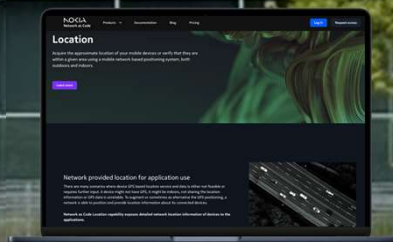
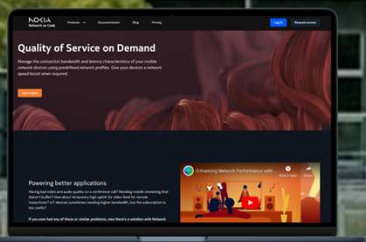
# Network as Code: Gateway to Ecosystems, Network Exposure Platform: Streamline API Service Delivery, Network Exposure Function: Expose 5GC



- Based on **GSMA operator platform**
- **Secure** exposure of network and operation capabilities
- **CAMARA & TMF APIs** exposed
- Support for **non-standard** / Other APIs
- **Expansion** of current NEF capabilities, no major re-architecting needed

# Remote operations of drones over programmable network

 CITYMESH  
the art of connectivity





Remote operations of drones over  
programmable network

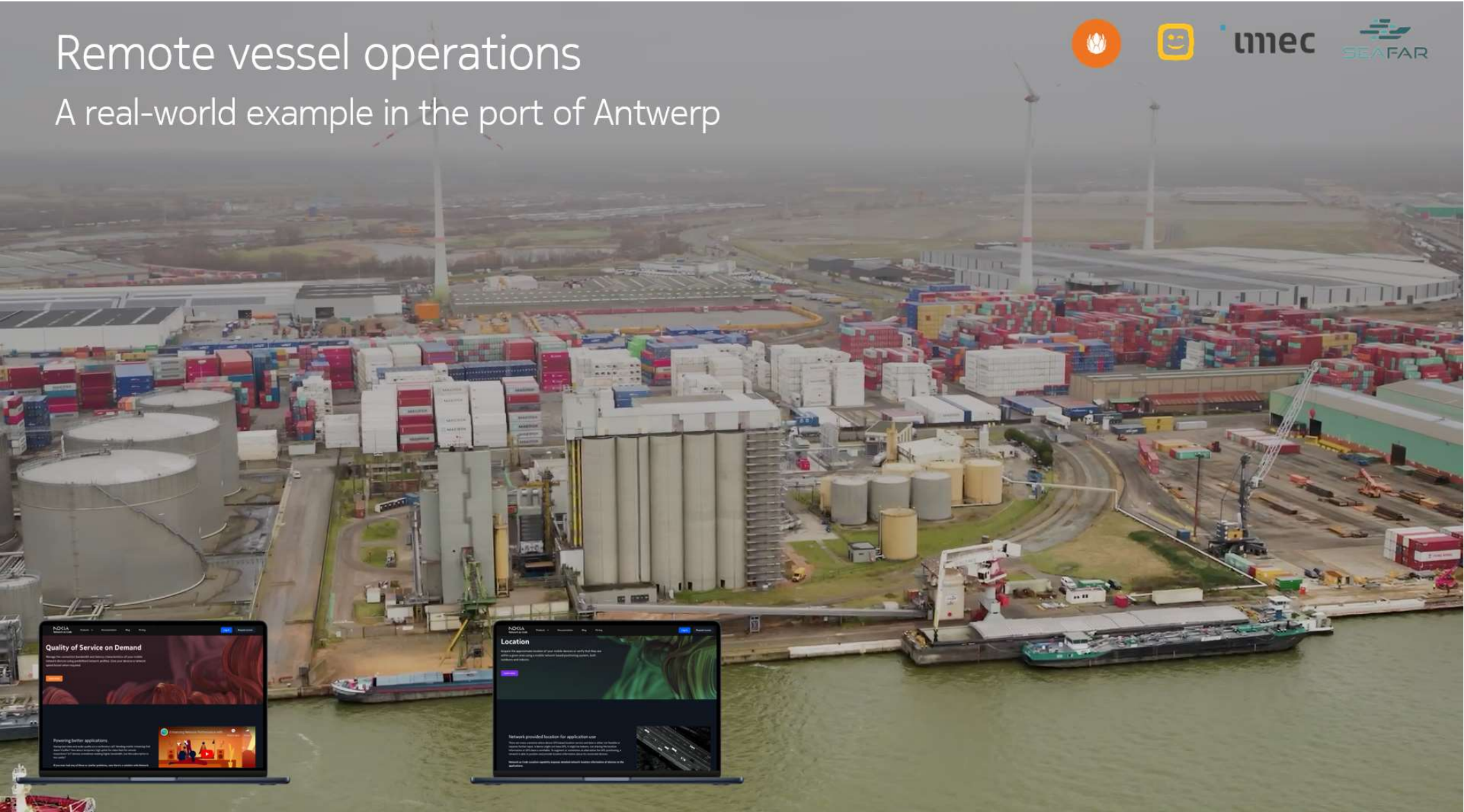


# Remote vessel operations

## A real-world example in the port of Antwerp



umec

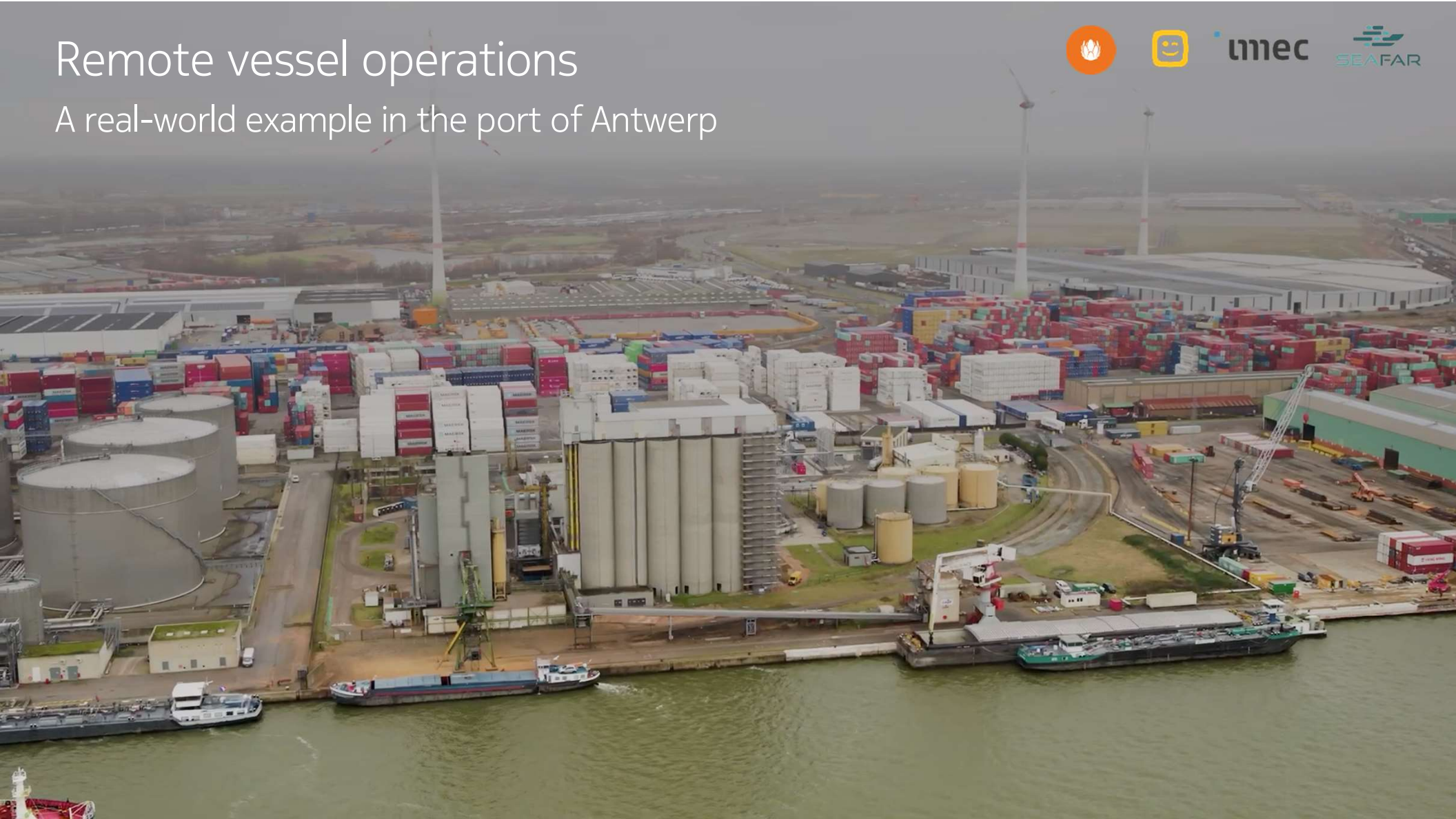


# Remote vessel operations

A real-world example in the port of Antwerp

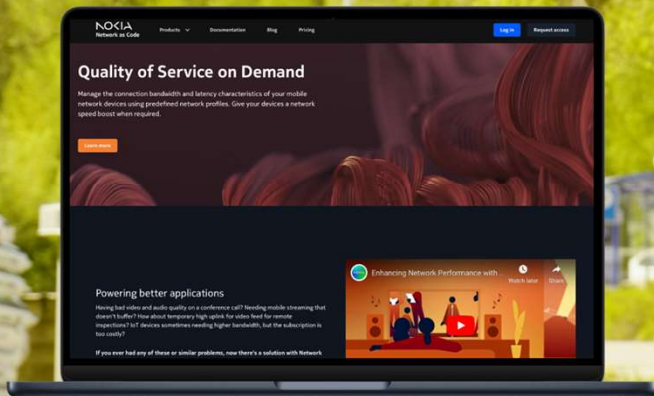


umec



**elmo**<sup>®</sup>  
remotely controlled car

**elisa**



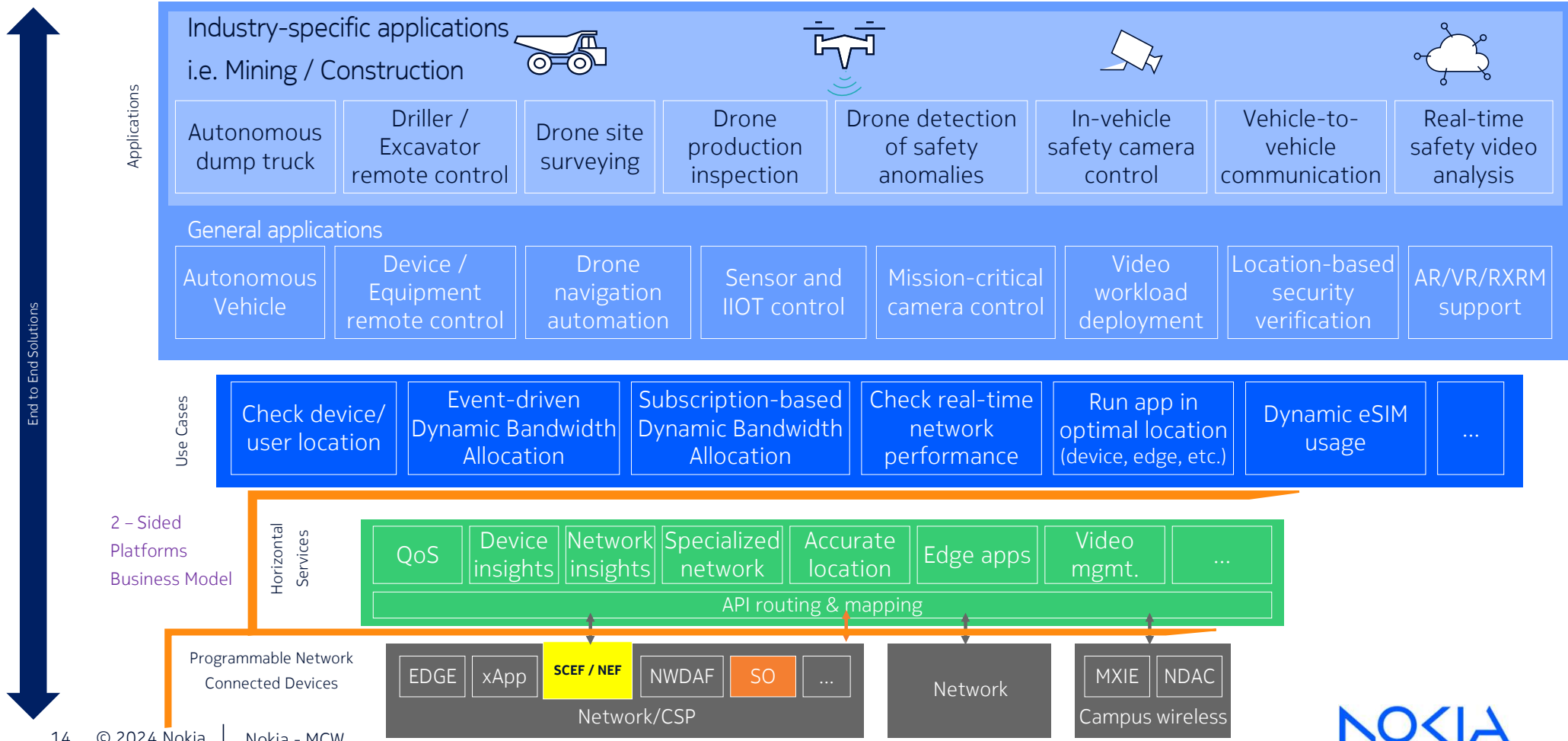
Enhancing Connectivity for Remote Driving with  
Network as Code and Elmo Cars ([youtube.com](https://www.youtube.com))

# Seeding the ecosystem

Nokia + Orange France hackathon : VivaTech Paris



# Network as Code: Hierarchy of Applications and Use Cases



# Network as Code - YouTube

## & the UC / Ecosystem Partnership list is increasing...

Network as Code Youtube Channel

The image shows a screenshot of the 'Network as Code' YouTube channel page. On the left, there are two identical channel banners. Each banner features a young man wearing headphones and a red jacket, with the text 'It's time to open up your network' and the Nokia logo. Below the banner, it says 'Network as Code', 'Nokia', and '21 videos'. A 'Play all' button and three menu icons are visible.

On the right, there is a list of five videos:

- 1 It's time to open up your network – with Nokia**  
Nokia • 889 views • 1 year ago  
Video thumbnail: 1:07
- 2 Be open for the future – with Nokia**  
Nokia • 332 views • 1 year ago  
Video thumbnail: 0:34
- 3 Unlocking the Power of 5G Networks with Nokia's Network as Code**  
Nokia • 1.4K views • 7 months ago  
Video thumbnail: 1:12
- 4 Getting Started with Network as Code**  
Nokia • 340 views • 9 months ago  
Video thumbnail: 1:34
- 5 Nokia Programmable Networks enabling Nokia Arena VR concert experience**  
Nokia • 1.1K views • 8 months ago  
Video thumbnail: 1:01

# Network as Code journey update

Q3'  
23

MWC Las Vegas '23:  
• Official launch

Dish

Q4'  
23

- Second software drop
- Developer portal available

TMO

BT Group

Innova

Telia

Q1'  
24

MWC Barcelona'24:  
• GSMA hackathon platform

NOS Portugal

LG/Telenet

Telecom Argentina

Q2'  
24

- Network Exposure Platform launch
- VivaTech hackathon

Infobip

Google

Turkcell

Orange

CSP (NDA)

H2'  
24

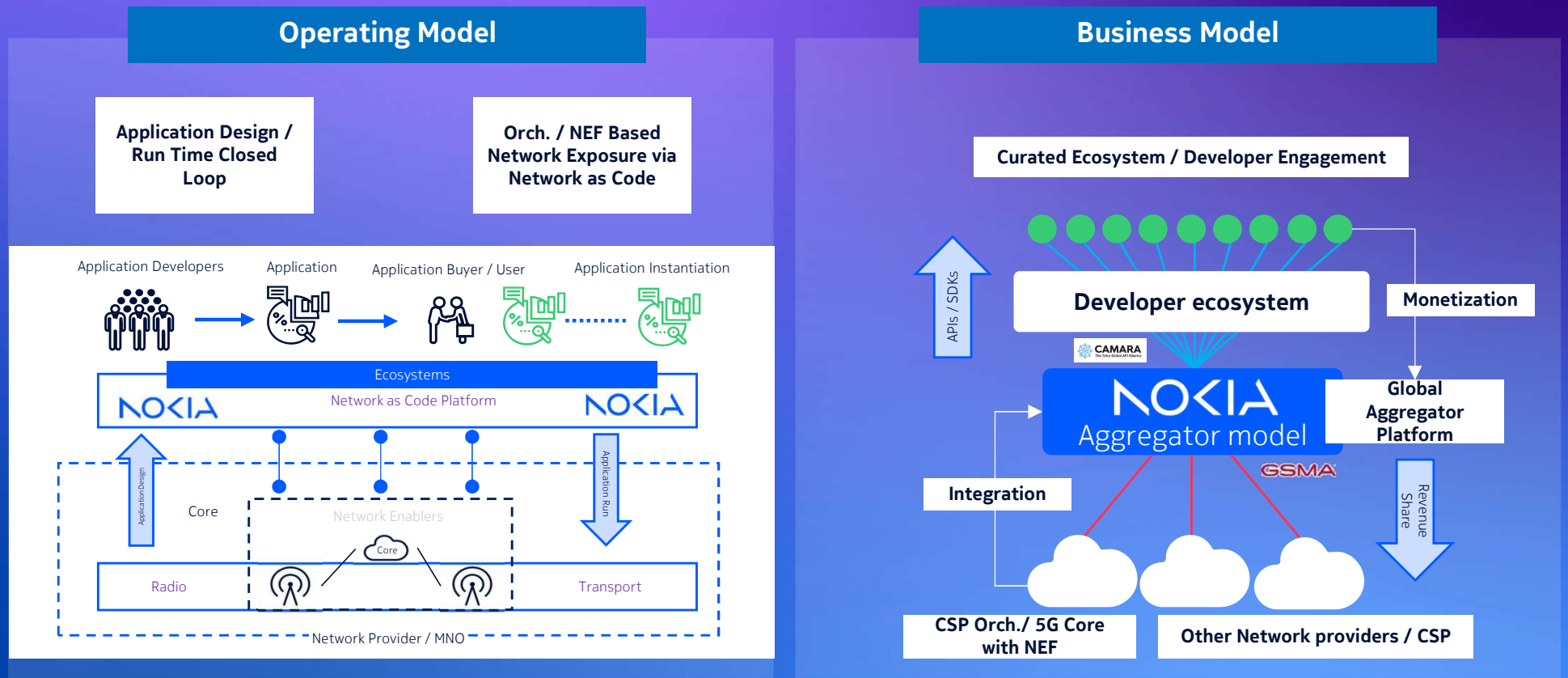
- Network Exposure Platform available

Watch this space!



# Operating & Business Model for Network Monetization Partnership

## An Overview



Applications  
with Network as Code SDK



Network as Code

Service provider  
networks



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