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1 The Power of Open APIs to Federate Cloud Networks

2 To Infinity and Beyond with 5G-Advanced

3 Strengthening 5G Security in 2023

4 Driving Supply Chain Resiliency for Open RAN Development

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Parallel WIRELESS

Whale Cloud

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5G FUTURES SUMMIT AGENDA

Wednesday 1 March | Hall 6, Theatre 2 | 9:00 – 16:00 (CET)

1 Session 1: The Power of Open APIs to Federate Cloud Networks
Time: 9 - 10:20am

2 Session 2: To Infinity and Beyond with 5G-Advanced
Time: 10:50am – 12:15pm

3 Session 3: Strengthening 5G Security in 2023
Time: 1:20 – 2:20pm

4 Session 4: Driving Supply Chain Resiliency for Open RAN Development
Time: 2:50 – 4pm

SESSION 1 AGENDA

Session 1 Speakers

- **Juan Carlos Garcia Lopez**, SVP Technology Innovation and Ecosystems, Telefónica

- **George Zhao**, Deputy Chief Marketing Officer, Whale Cloud

- **Neil Tomkinson**, Chief Information Officer, U Mobile

- **Nathan Rader**, VP Cloudified Production, Deutsche Telekom

Session 1 Panel

- **Namal Jayathilake**, CTO, Axiata Digital Labs

- **Dr. Ong Geok Chwee,** CEO, Bridge Alliance

- **Nathan Rader,** VP Cloudified Production, Deutsche Telekom

- **Nicholas Zylberglajt,** CEO, Unmanned Life

- **Marcelo Zhou**, Chief Business Advisor, Whale Cloud

GSMA

Open Gateway

The NaaS Initiative

Questions

- Why the OpenGateway initiative?

- On which basis is OpenGateway launched?

- Which kind of commitment it represents?

- Who participates so far?

- What is the value chain and the ecosystem?

Why the initiative?

- Telcos need to evolve the Infrastructure, Network and Services to the new Digital Era: **All-software** and **Cloud-native**. A new way of deploying, operating and managing networks, and deliver services

- Need to **monetize** the new set of sophisticated network and computing capabilities that enable premium characteristics for the next generation of services

- Prepare for new communication paradigms, that will help humans to **interact** with the (physical and virtual) worlds and **augment** their capabilities with the assistance of machines

Some previous work has set the ground

2020 — Setting the basis with scope on Telco Edge Computing

2021 — Scope extended to NaaS and API definition

2022 — Creating an open environment for API development

2023 — Moving to commercial phase

GSMA
Operator Platform
Group
- Architecture framework
- Technical requirements
- SDO alignment

GSMA
Telco Edge Cloud
Forum
- Business models
- Commercial requirements
- Trials and PoCs

GSMA
+ Operator Platform API
SubGroup
- Define customer-facing, resource-facing and interoperator interfaces

CAMARA
THE TELCO GLOBAL API ALLIANCE
+ Community at
Linux Foundation
- Open-source API development
- Test and validation
- Single repository for Telco APIs

GSMA
Open Gateway
Initiative
- Industry agreement for NaaS API commercial deployment

What is the Industry committing to?

First set of APIs for MWC...

SIM Swap

Quality On Demand

Device Status (Connected or Roaming)

Verify Location

Number Verification (www.numberverify.org)

Carrier Billing – Check Out

Number Verification (SMS 2FA)

Edge Site Selection and Routing

hosted in **CAMARA** THE TELCO GLOBAL API ALLIANCE
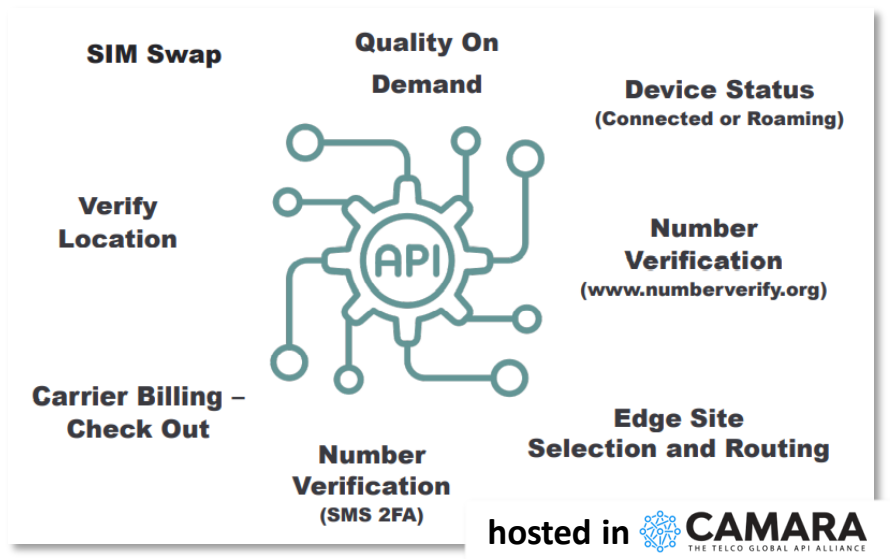
...to be extended in phases along 2023

And a common business framework...

GSMA™

Openverse Northbound Agreement Template

Version 0.1

[Publication Date]

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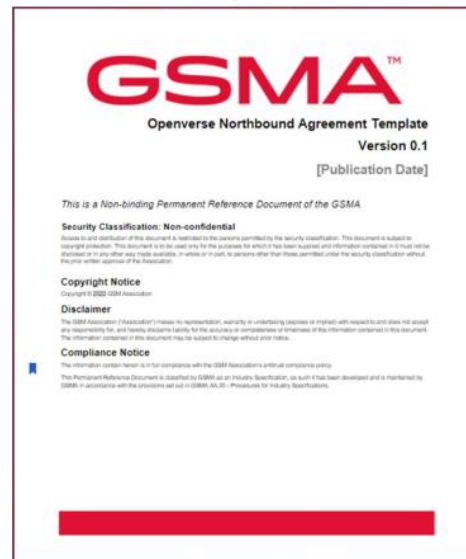
...to enable a uniform universal service

What is the Industry committing to?

Mechanisms for connecting aggregators and other operators…

A business framework…
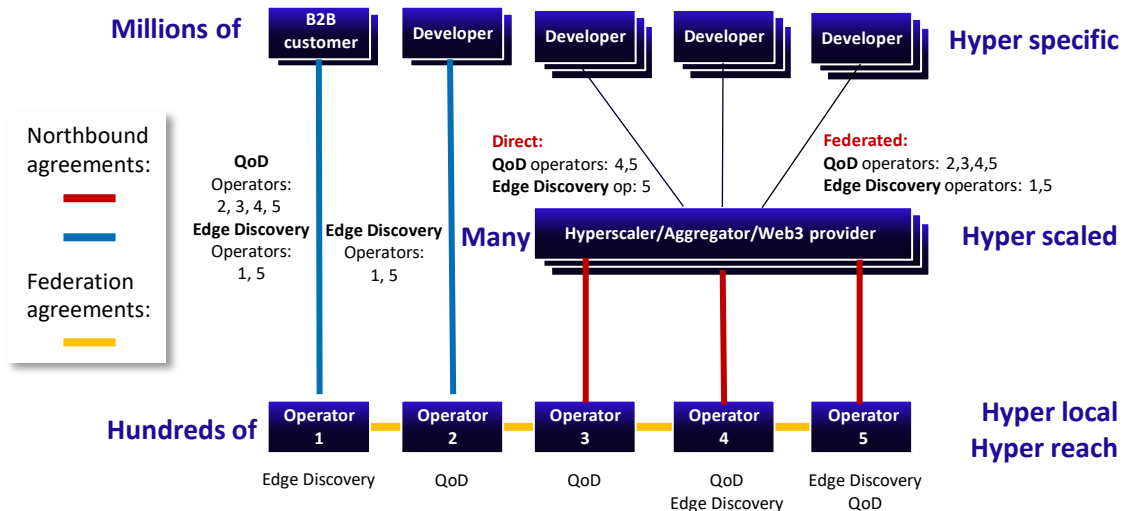
…that facilitates the creation of a NaaS Network with global reach
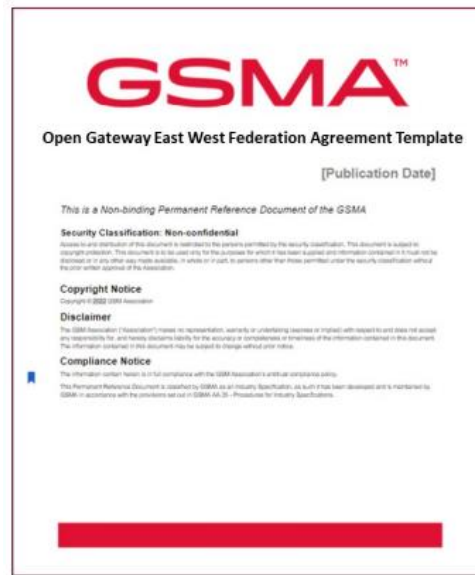
…built on telco's interconnect and roaming experience

What is the Industry demonstrating NOW!

Immersive Music Concerts

Digital Twin Stores

Global Music Bands
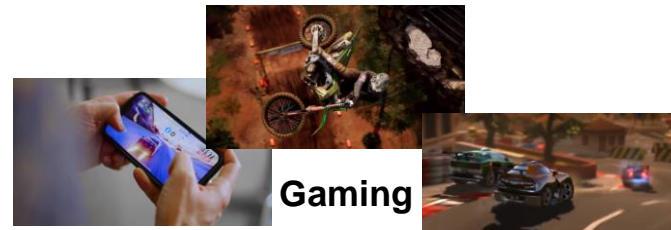
Gaming
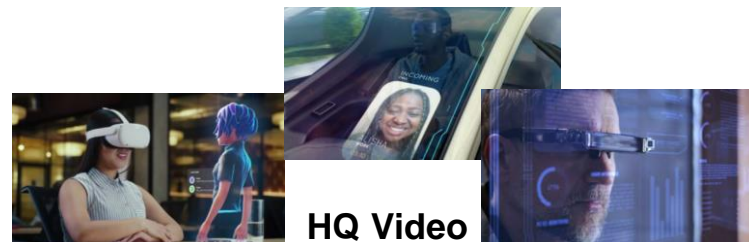
HQ Video Conferencing

MWC
GSMA

What is the objective for 2023?

Launch OpenGateway API Services in 2023
supported by an interoperable and federated Network:
- with **open standard interfaces** to enable seamless universal connectivity and other technical capabilities
- within a **common business framework**, for the relationship with customers, aggregators and other operators.

Commercial Launch of APIs
at main developer ecosystems

Enable API LifeCycle Mgt
to take NaaS to mass production

Early Adopter Programs
at main developer ecosystems

Implement federation
to facilitate global reach

Use Cases
demonstrating API value at MWC

NOW

Consolidate API factory
Technical and business governance

Enrich API portfolio
focused on value for the customer

2023

20 MOU Signatories enabling 45% of Mobile Connections

Telefónica — José María Álvarez-Pallete, Chairman & CEO

airtel — Gopal Vittal, CEO

américa móvil — Daniel Hajj, CEO

vodafone — Nick Read, CEO

axiata — Hans Wijayasuriya, Joint Acting Group CEO

Singtel — Kuan Moon Yuen, Group CEO

verizon — Rima Qureshi, EVP, Chief Strategy Officer

T — Dominique Leroy, Board Member Europe

AT&T — John Stankey, CEO

MTN — Saad Syed, MD Chenosis

orange — Christel Heydemann, CEO

TIM — Pietro Labriola, CEO

kt — Hyeonmo Ku, President & CEO

T — Vicki Brady, CEO

LIBERTY GLOBAL — Michael Fries, CEO

stc — Olayan AlWetaid, Group CEO

KDDI — Makoto Takahashi, CEO

telenor — Sigve Brekke, CEO

中国移动 China Mobile — Gao Tongqing, EVP

swisscom — Christoph Aeschlimann, CEO

...an open community that grows

Open Gateway requires a collaborative effort of many Industry stakeholders
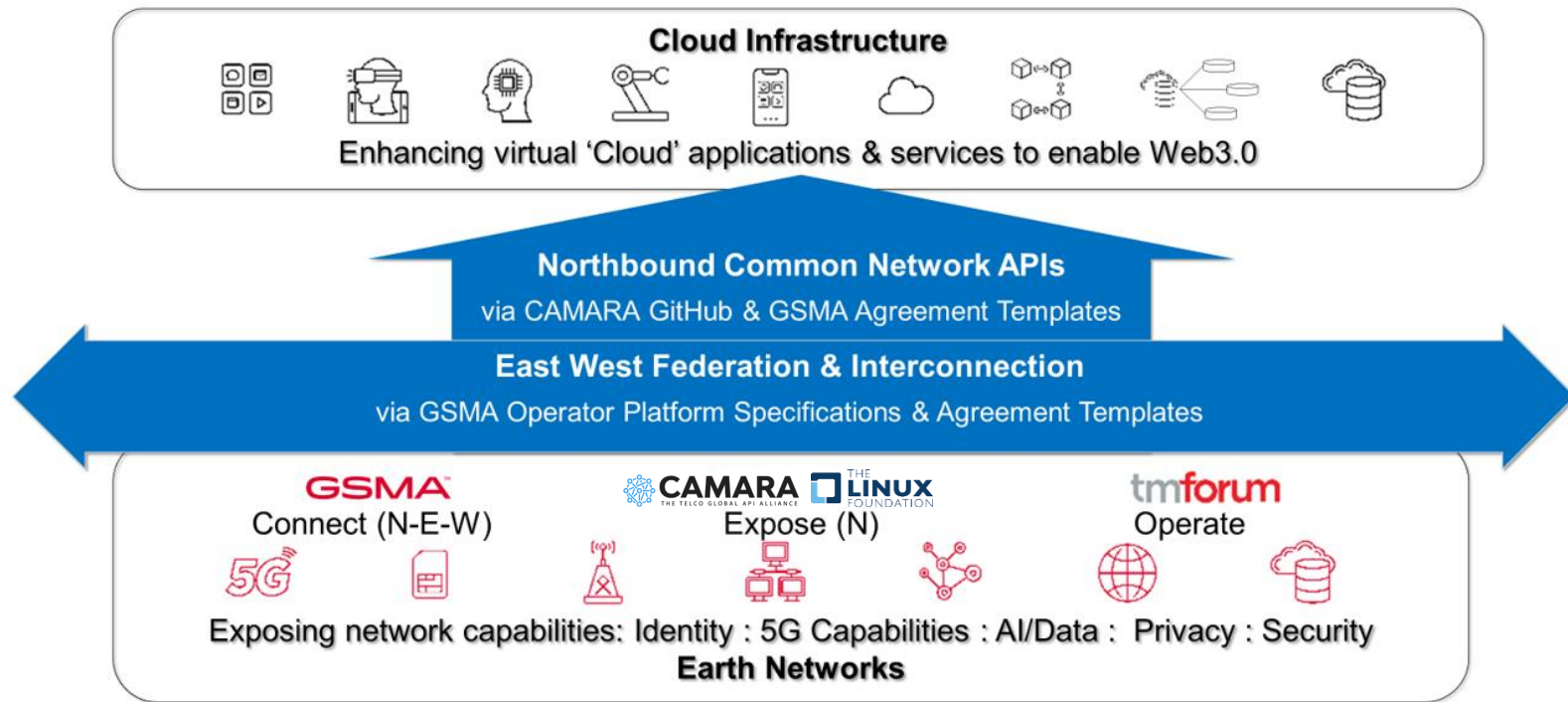
Introducing U Mobile

- U Mobile is Malaysia's 3rd Largest Mobile Operator

- Award-Winning Mobile Operator known for challenging industry norms through innovation

- Current subscription base is over 8 million

- Industry is recovering and growth is expected from various business segments

Industry Subscriptions Overview

Total Mobile Subscriptions FY2021 YoY +3.5m (8%)	**47.2 million**
Major Mobile Operator Subscriptions FY2021 YoY +1.8m (5%)	**39.3 million**

Snapshot of Malaysian Mobile Market Performance

Prepaid

+4%

26.5

25.6

FY2020   FY2021

Postpaid

+7%

12.8

12.0

FY2020   FY2021

Major Mobile Operation Service Revenue

(RM bil)

FY2018

FY2019   ⬇ 2%

FY2020   ⬇ 7%

FY2021   ⬆ 1%

☐ Prepaid ■ Postpaid
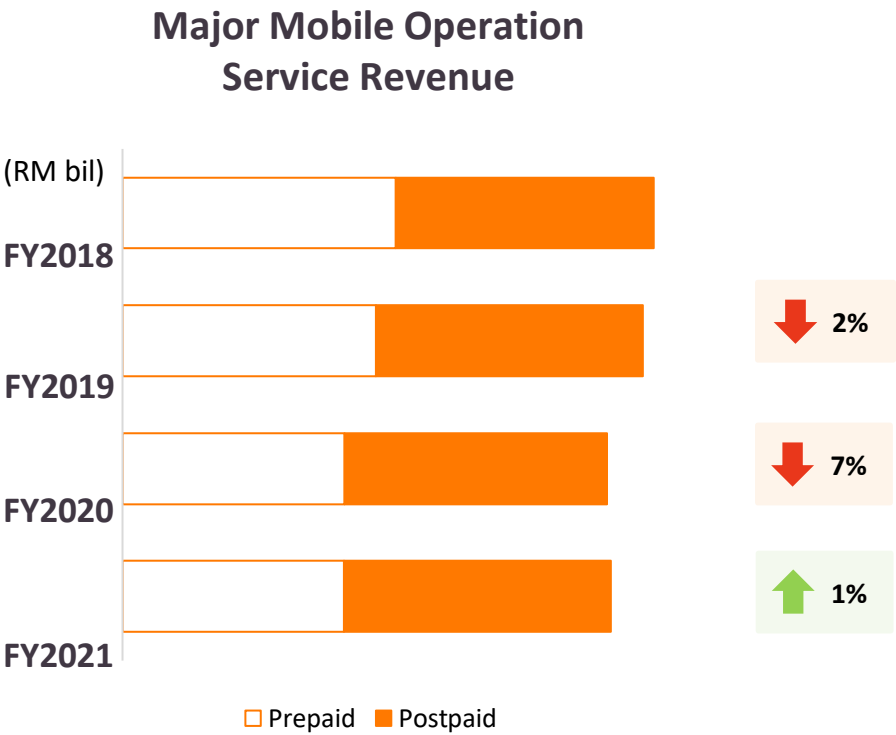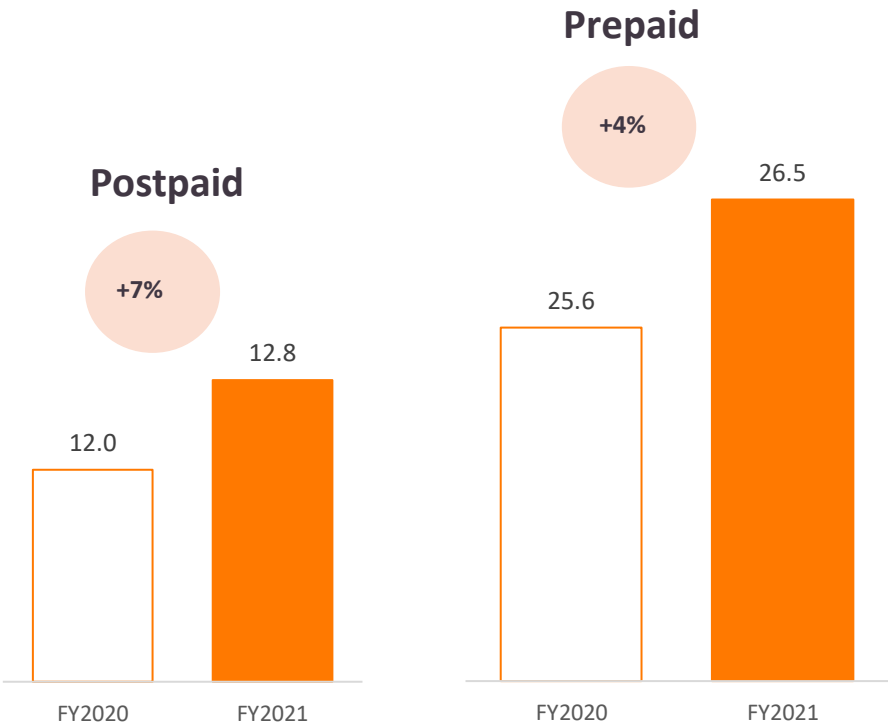
Industry is enjoying recovery post-Covid

Broadband & Enterprise have also been key growth drivers

Steady growth in Broadband penetration is expected in the subsequent years

Fixed Broadband Subscribers (mil)

+14%
+12%
+19%

2.9 — 2019
3.3 — 2020
3.7 — 2021
4.4 — 2022
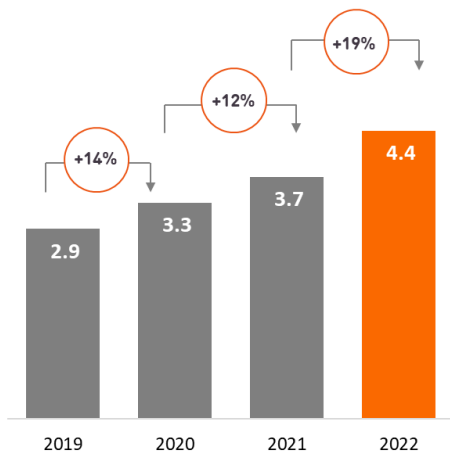
Enterprise business has been a significant revenue with steady growth in the ICT space

Enterprise Revenue (Precentage)

	2018	2019	2020	2021
Enterprise ICT	4%	5%	6%	7%
Enterprise fixed	44%	43%	42%	42%
Enterprise mobility	52%	52%	52%	52%

■ Enterprise mobility   ■ Enterprise fixed   ■ Enterprise ICT
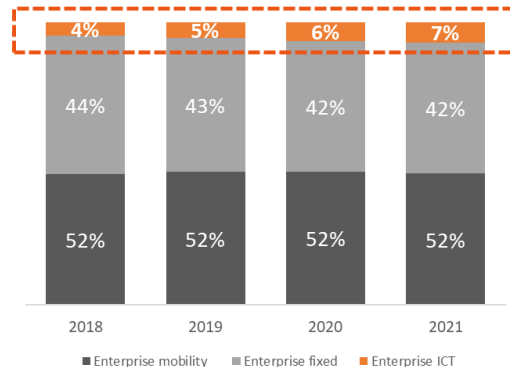
* Source: Analysys Mason

Since 5G rolled out commercially, U Mobile has been focused on promoting awareness & adoption

5G Consumer Showcase

360 Launch
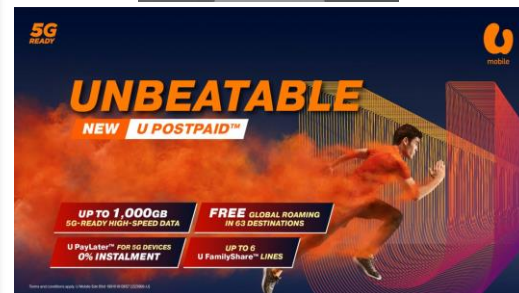
5G Services

Chinese New Year 2023 5G AR - spicious Talking Angpaos

The Focus Areas Moving Ahead

Tapping into 5G to innovate services for subscribers

Developing Digital Ecosystem for Enterprise

Customising connectivity solutions for Enterprise

Digital Transformation to facilitate growth

U Mobile embarked on a digital transformation with Whale Cloud.

The initiative which started in 2019 is codenamed PiXel and Whale Cloud is tasked to provide U Mobile with:

- IT Transformation Consulting
- Flexible & Convergence BSS Stack
- Adopting end-to-end DevOps pipeline CI/CD

Transformation Targets

- Improve Time to Market
- Omni-Channel Experience
- Reduce Cost to Serve
- Enable Digital Partner
- Operational Excellence
- Revenue Increasing

Paving the way for unleashing future 5G values

Building Digital Foundation

Pixel - Digital CRM

T3 - Convergent Charging & Billing

Goals

- Consolidating back ends for digital efficiency and quick time to market
- Consistent and seamless CX across multiple touch points
- Streamlining and optimizing processes in both touch points and back office
- Enabling digital partners based on the open standard platform

Customer Experience & Engagement

Digital Marketing

Digital Commerce

Goals

- APP marketing, gamification
- Supporting enriched and diversified SKUs in 5G era

New Service Rollout

B2B Plug-ins

Cloud Networks

IoT Plug-ins

Goals

- Full-fledged B2B capability, especially for 5G scenarios like network slice and IoT
- Monetizing Cloud services including 5G MEC use cases

Ecosystem Enabler

Marketplace

Super APP

Goals

- Leveraging telco user base, buiding marketplace, onboarding various supply chain resources, supporting multiple business models
- Technical readiness to build local Super APP via technologies like open platform and mini-program

5G brings new challenges for telco IT

Heavy Investment

- Densified RAN
- Higher capacity backhaul
- Mobile edge rollout
- New tech. adoption
- More energy consumption

More Use Cases

FWA

Smart Manufacturing

Cloud Game

Autonomous Vehicles

Remote Healthcare

Smart City

Drone

Various Business Models

- Use case enabler
- Integrated platform
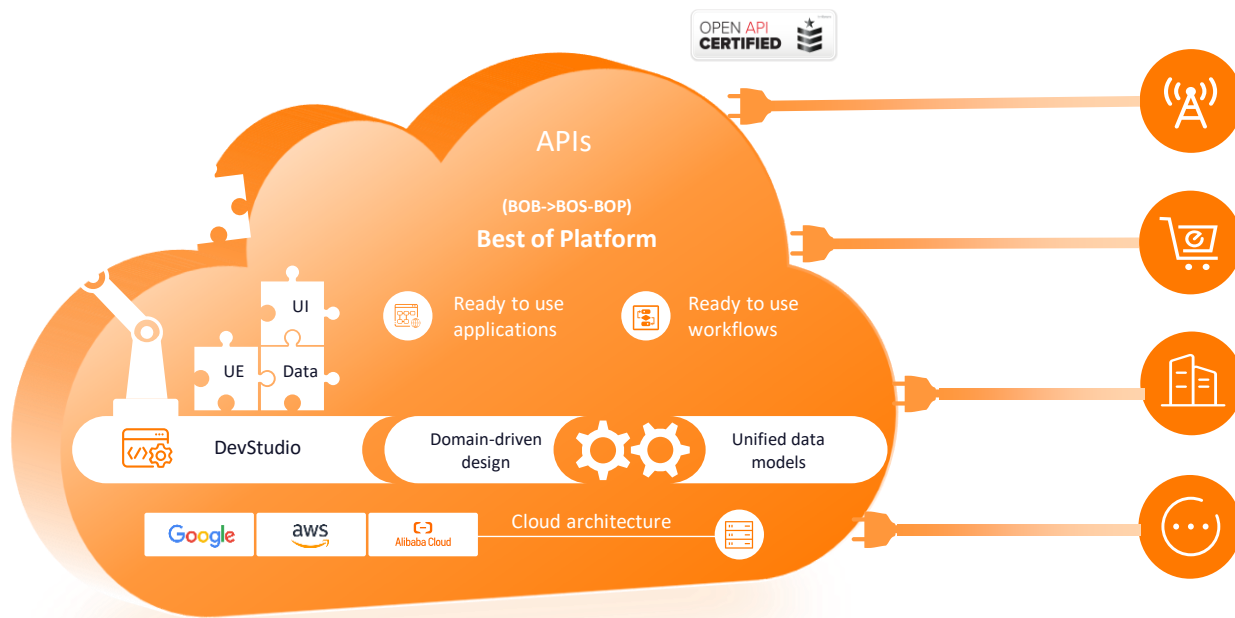- Ecosystem orchestrator
- XaaS
- …

For telco IT

- **Velocity** - quick 5G Rollout
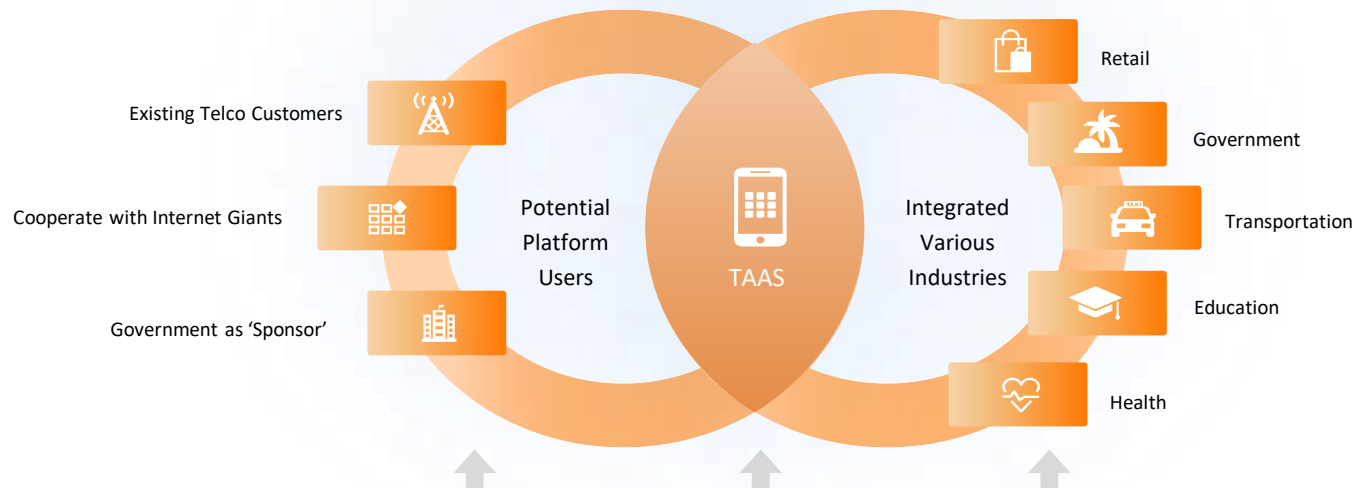- **Openness** - adaptable for 5G business contexts
- **Continuous Evolution** - extendable for future network& business innovation

Quick 5G business support and monetization based on Open Platform

OPEN API CERTIFIED

APIs

(BOB->BOS-BOP)
Best of Platform

Ready to use applications

Ready to use workflows

UI
UE | Data

DevStudio

Domain-driven design

Unified data models

Google | aws | Alibaba Cloud | Cloud architecture

- **OPEN** platform with ready-to-use business plug-ins

- **OPEN** APIs for easy 3PP integration

- **OPEN** DevStudio for quick TTM

- **OPEN** architecture for hybrid/multi-cloud

Get telcos ready for future business Innovation

Existing Telco Customers

Cooperate with Internet Giants

Government as 'Sponsor'

Potential Platform Users

TAAS

Integrated Various Industries

Retail

Government

Transportation

Education

Health

Telco as a Service

Communication as a Service
(Bulk SMS, 5G RCS Message,…)

Channel as a Service
(APP, POS and Dealer…)

Data as a Service
(KYC, Segmentation…)

Network as a Service
(NSaaS, 5G private network, …)

Infrastructure as a Service / Platform as a Service
(Local Public Cloud / MEC)

Restricted

To sum up

- Being one of the earliest local service providers to launch 5G, U Mobile is promoting innovative use cases and 5G offerings in the consumer market.

- U Mobile invests in 5G for the growing enterprise segment, aiming at being an ecosystem platform player.

- To pave the way for the future, U Mobile has successfully transformed its core IT with open digital architecture, continuously evolving to support digital CX and new services in the 5G era.

- As the strategic partner, WCT adopts the Open Platform approach to enable telcos like U Mobile to fail fast and win faster in 5G innovation with velocity, openness and continuous evolution.

- As 5G is changing telcos' business, together with global telco clients, WCT is exploring innovative TaaS models based on the Open Platform.

CAMARA Project
Where we started...

- Launched at MWC Barcelona 2022

- 22 Launch Partners

- Supported by GSMA and Linux Foundation

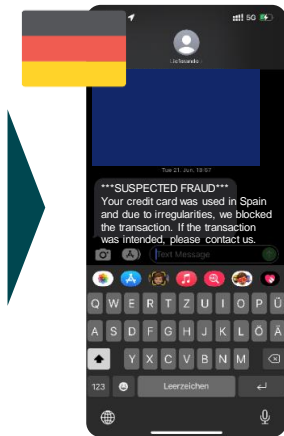- Simple idea to "standardize" developer facing APIs

CAMARA Project
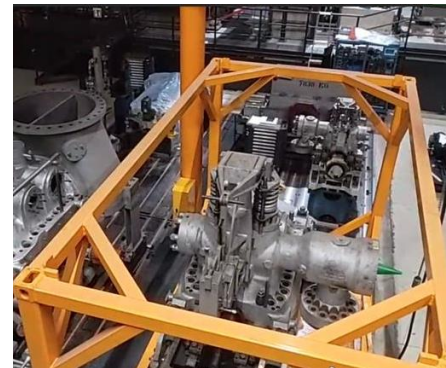## Where we are a year later…

- 59 Named Partners
- Many more active companies working in the projects
- 12 Active API development repos
- 80+ regular participants in Open Steering Calls
- 250+ people on the CAMARA mailing lists
- Development "home" for GSMA Open Gateway

CAMARA Project
What are Network APIs …

Location Verification

Quality on Demand

CAMARA Project
What else are we working on…

CAMARA
THE TELCO GLOBAL API ALLIANCE

Anonymized Subscriber ID

Identify a client device trying to access network services

Carrier Billing Checkout

Purchase, pay, and follow up on fulfilment of products

Device Identifier

Check the identity of the subscribers' device

Device Location

Check the location of a device.

Device Status

Check the network connection and roaming status of a device

Edge Cloud

Provide and manage network and compute resources for an application

Home Devices QoD

Request prioritization of traffic on a specific device on the home network.

Identity and Consent Mgmt

Provides solutions to capture, store and manage user consent

Number Verification

Allows users to verify the phone number of the connected device

OTP Validation

To offer secure user authentication to service providers.
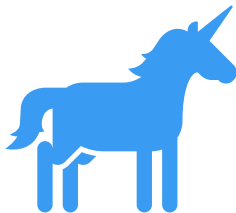
Quality on Demand

Allows users to set mobile connection quality and get notifications

SIM Swap

Allows users to get information on SIM pairing changes

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What is the CAMARA Project?
3 key problems we are trying to solve...

Scale

Developers dream of being the next Unicorn... If Apps, Products, or Services are built on our APIs they want them in all relevant markets and networks globally.

Consistency

Multi-Nationals want consistency across all markets they operate in... they do not want APIs that only work in a single network in a single country. They do not want to try and build for the differences of each network.
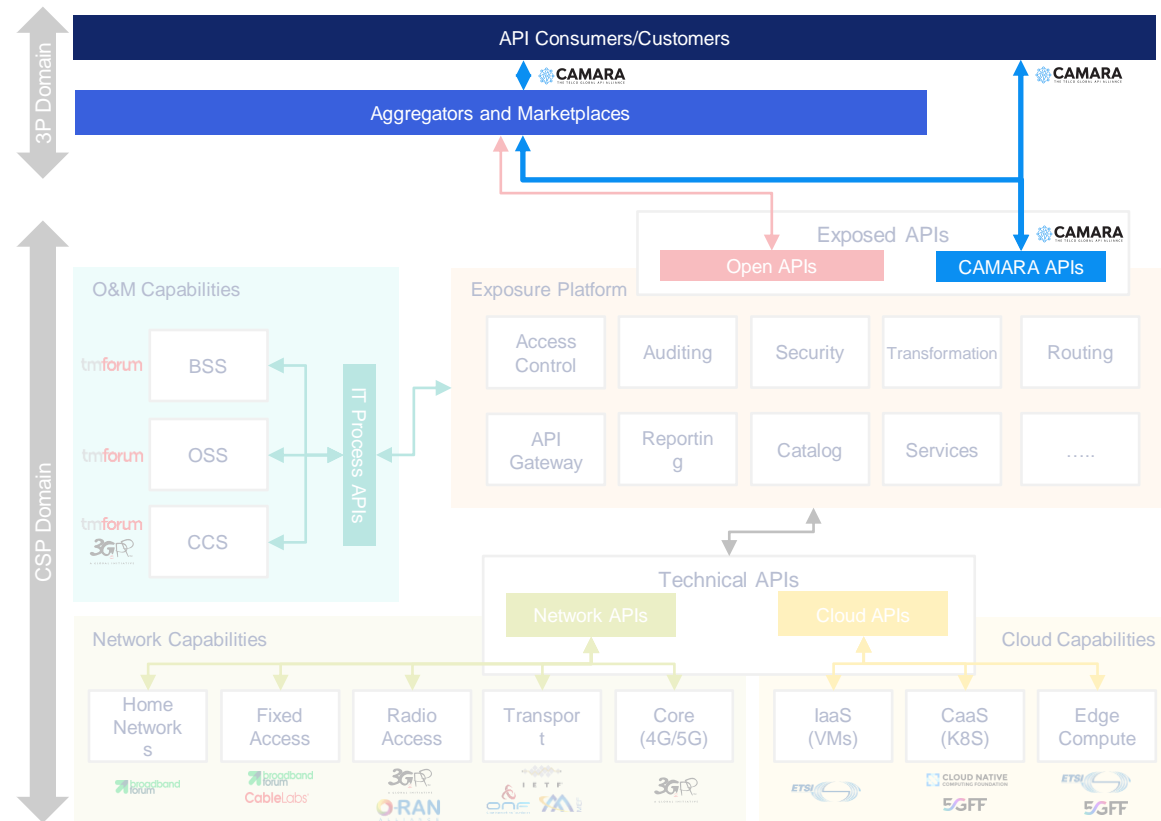
Simplicity

Telco Networks are complex, and every network is different.... Developers want simple, intent-based APIs.

CAMARA Project
Interactions with other initiatives…

CAMARA — THE TELCO GLOBAL API ALLIANCE

3P Domain

API Consumers/Customers

CAMARA

Aggregators and Marketplaces

CAMARA

CSP Domain

Exposed APIs — CAMARA

Open APIs | CAMARA APIs

O&M Capabilities

- tmforum — BSS
- tmforum — OSS
- tmforum 3GPP — CCS

IT Process APIs

Exposure Platform

| Access Control | Auditing | Security | Transformation | Routing |
| API Gateway | Reporting | Catalog | Services | ….. |

Technical APIs

Network APIs | Cloud APIs

Network Capabilities

- Home Networks
- Fixed Access
- Radio Access
- Transport
- Core (4G/5G)

Cloud Capabilities

- IaaS (VMs)
- CaaS (K8S)
- Edge Compute

GSMA Open Gateway

CAMARA is the location where GSMA Open Gateway members work on developer facing APIs

CAMARA — THE TELCO GLOBAL API ALLIANCE

CAMARA APIs	Open APIs	Technical APIs
Developer oriented, User Friendly	Service Management, Flexible, Extensible	Domain Specific Focus, Standardized, (FRAND)
Single Place for Developers to use Telco APIs both for user and management activities	Interaction between CSPs and Aggregators to manage Products, Services, and Users	Multiple SDOs and initiatives that work to develop domain specific technical APIs

CAMARA Project
Where are we going next...

1	Additional APIs and roadmap sync across CSPs and Hyperscalers
2	Creation of Technical Steering Committee (TSC) and strengthening of project governance
3	API lifecycle management consistency
4	Documentation of API versioning and availability globally and ensuring federation through GSMA and OAM through TMForum

CAMARA Project
How can you get involved…

camaraproject.org

- Join the mailing list

- Contact us for more information

github.com/camaraproject

- Join the working groups

- Attend the calls

- Contribute to the codebase

PANEL DISCUSSION

Moderator

Henry Calvert
Head of Networks
GSMA

Namal Jayathilake
CTO
Axiata Digital Labs

Dr. Ong Geok Chwee
CEO
Bridge Alliance

Nathan Rader
VP Cloudified Production,
Deutsche Telekom

Nicholas Zylberglajt
CEO
Unmanned Life

Marcelo Zhou
Chief Business Advisor
Whale Cloud

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5G FUTURES SUMMIT

THANK YOU

Join us from 5:45pm today at the Industry City stage for networking drinks - see you there!

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