



CAMARA
THE TELCO GLOBAL API ALLIANCE

Presentation

22.03.2024

APIs enabling seamless access to Telco network capabilities



CAMARA
THE TELCO GLOBAL API ALLIANCE

Telco network capabilities exposed through APIs provide a large benefit for customers. By simplifying telco network complexity with APIs and making the APIs available across telco networks and countries, CAMARA enables easy and seamless access.

5G network capabilities Introduction



Telco network capabilities are functions partly available already in 4G but new and much more powerful in the 5G network. These functions enable to get information out of the network but also to configure the network.

The on-demand, secure and controlled exposure of these capabilities pave the way for transforming operator networks into service enablement platforms, facilitating the application-to-network integration, which will be key to deliver enhanced and service-tailored customer experience in the 5G era.

5G network capabilities

Introduction



Reachability and Location of UEs
Identify (last known) location of drone



of UEs in geographic region
Traffic jam or Corona warning



of UEs in slice, network congestion
Adapt resolution for video transmission



Quality on Demand / Traffic influence
Enable augmented reality



Wake up UEs
Support low energy IoT devices



Block UEs in geographic region
Crisis management

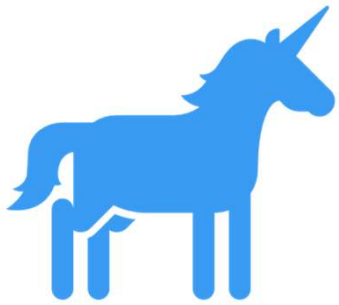


What is the CAMARA Project?

Key problems we try to solve



CAMARA
THE TELCO GLOBAL API ALLIANCE



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.



Accessibility

We go to the developers where they are so the project is open sourced in the Linux Foundation. Allowing API users to work directly with CSPs creating the service.



Demand driven

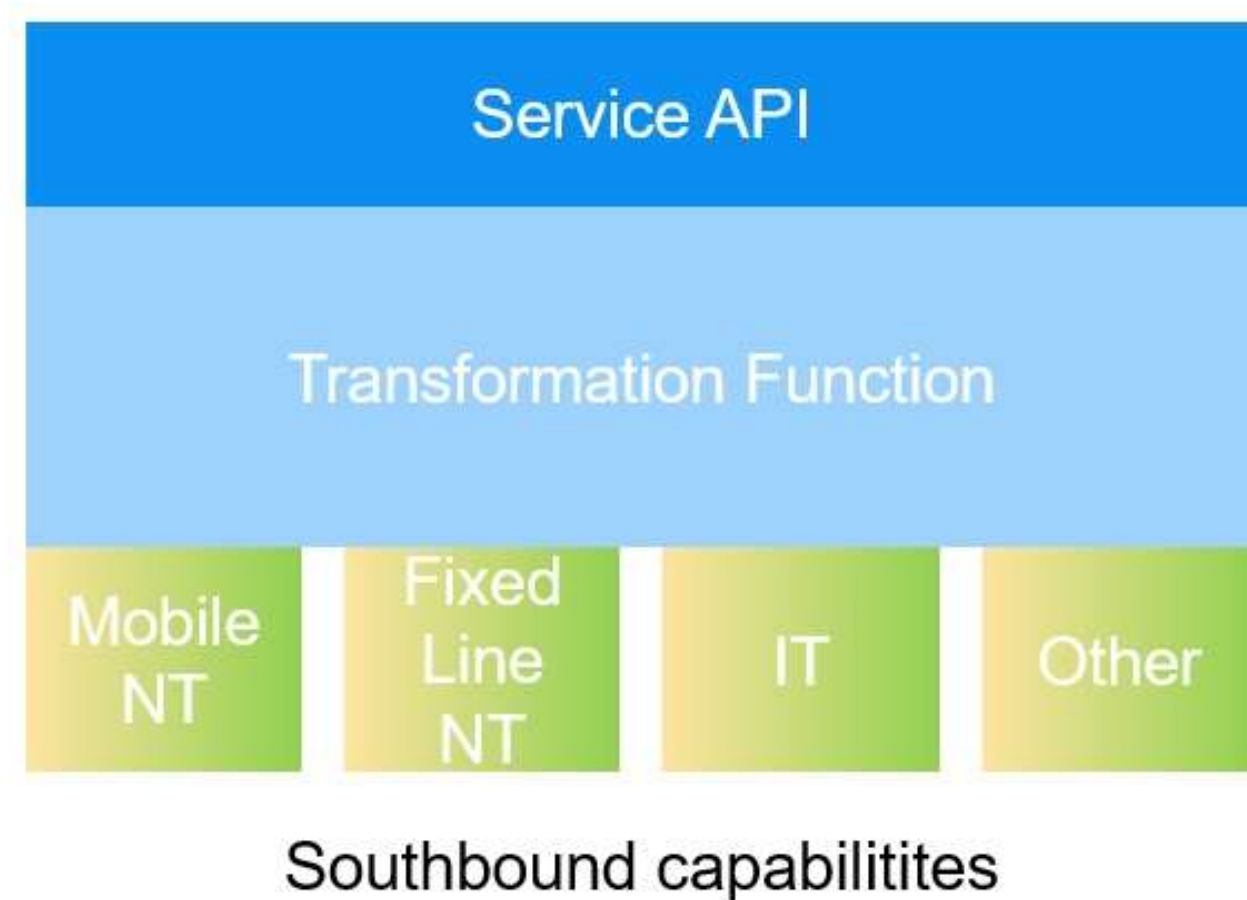
We develop the APIs and design it in the way our customers need it. The demand is collected from organizations like GSMA OPAG but also from customers directly.

Abstraction API Architecture



Abstraction from Network APIs to Service APIs is necessary:

- To simplify telco complexity making APIs easy to consume for customers with no telco expertise (user-friendly APIs)
- To satisfy data privacy and regulatory requirements
- To facilitate application to network integration

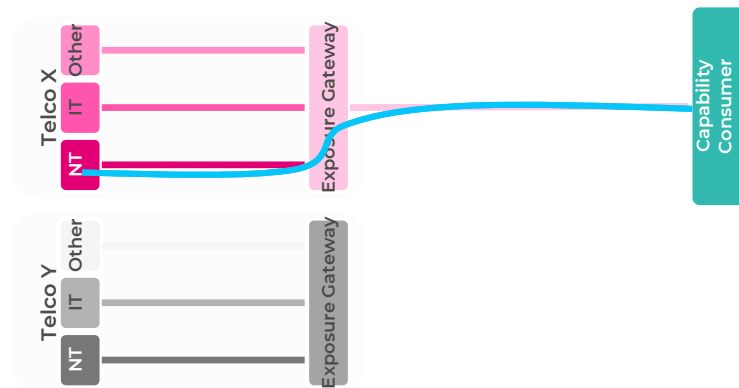


Abstraction API Distribution Options

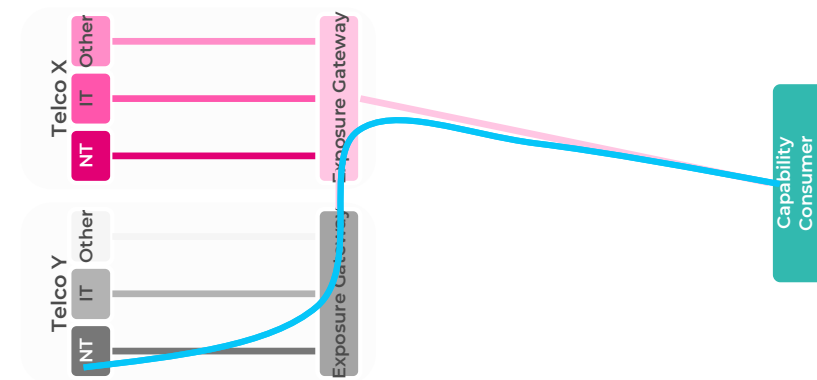


CAMARA
THE TELCO GLOBAL API ALLIANCE

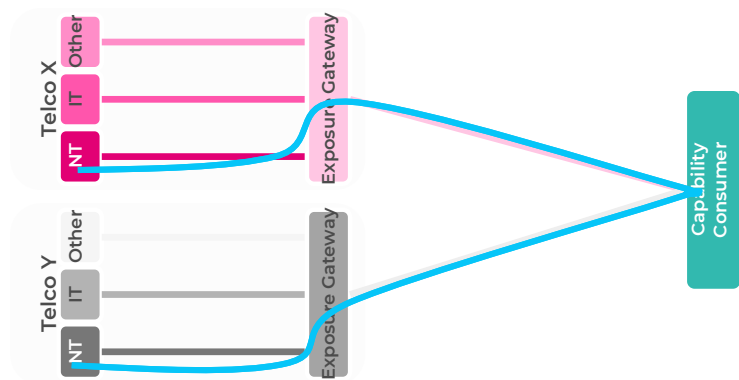
A. Single-Operator Relationship



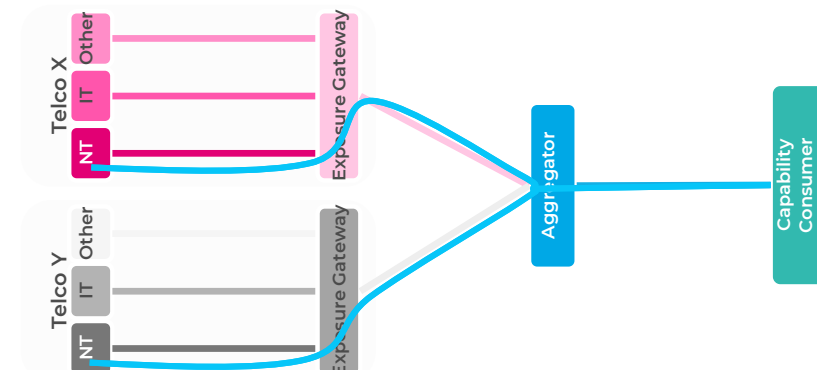
B. Single-Operator "API Roaming"



C. Multi-Operator Relationship



D. Operator Aggregation



Availability Benefit



Availability across telco networks and countries is necessary:

- To ensure seamless customer experience
- To accelerate technology development and commercial adoption (minimize implementation effort)
- To accelerate education and promotion
- To support application portability

CAMARA Mission



CAMARA is an open source project within Linux Foundation to define, develop and test the APIs. CAMARA works in close collaboration with the GSMA Operator Platform Group to align API requirements and publish API definitions and APIs. Harmonization of APIs is achieved through fast and agile created working code with developer-friendly documentation. API definitions and reference implementations are free to use (Apache2.0 license).



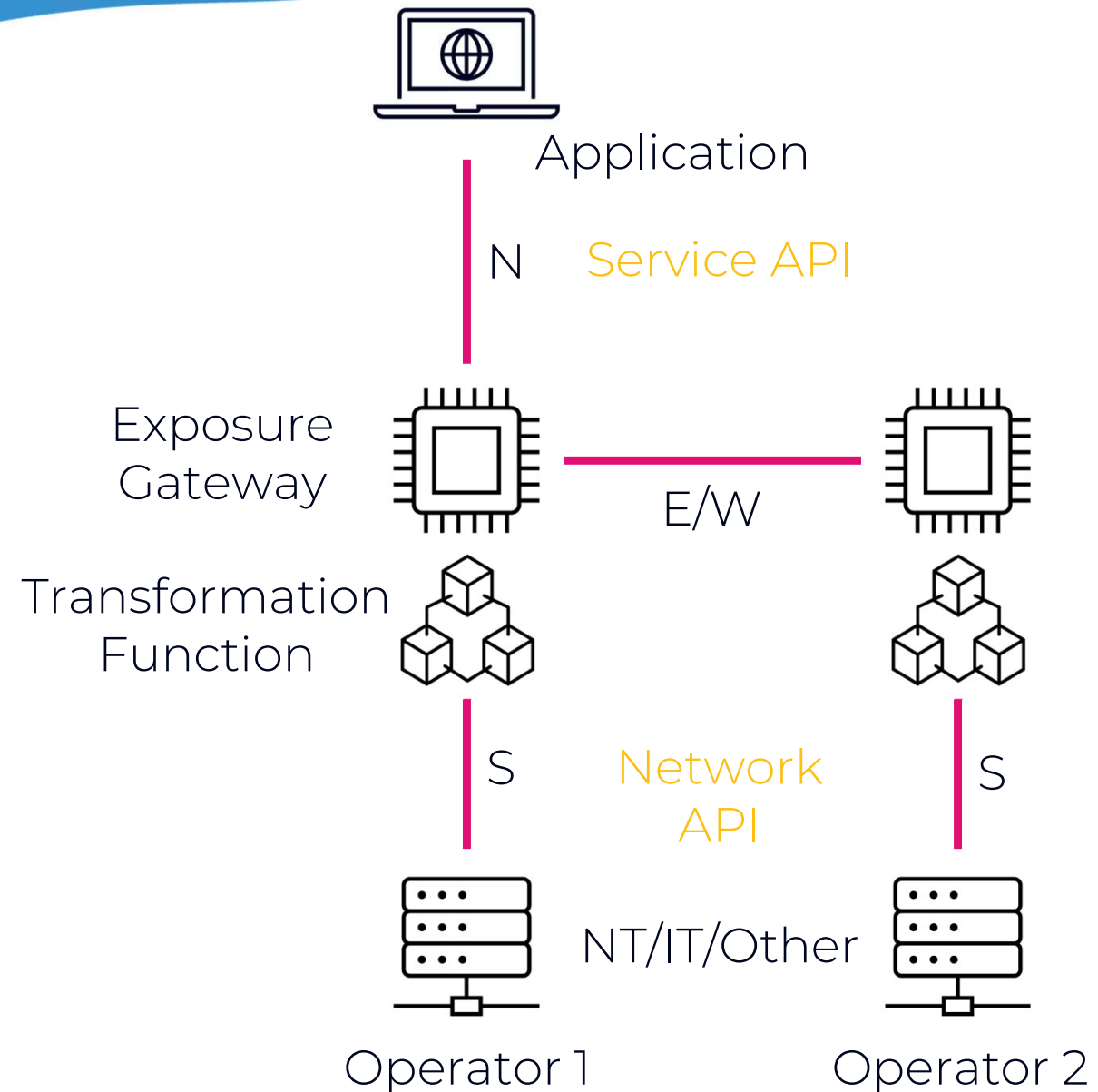
CAMARA Scope



CAMARA
THE TELCO GLOBAL API ALLIANCE

From functional perspective the scope is limited to **telco APIs**, that means APIs in the domain of telco mobile networks, telco fixed line networks, telco edge cloud, etc. or supporting these.

Thereby the focus is on the **northbound interface** (between telco operator and aggregator or capability consumer). East-/westbound interface APIs are out of scope for CAMARA.

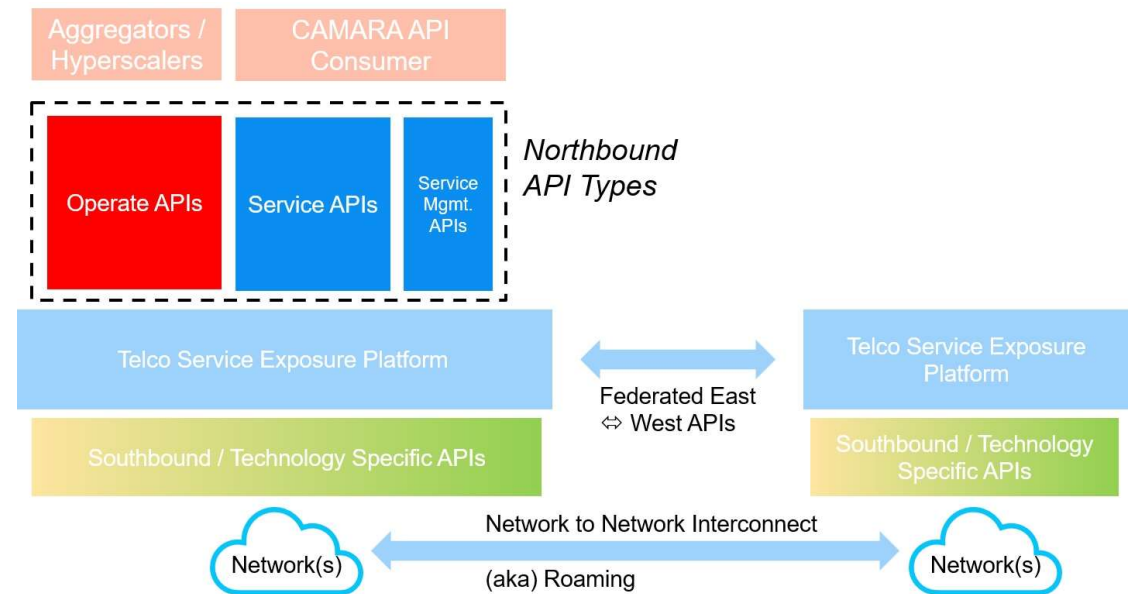


CAMARA Scope



We differentiate between 3 types of Northbound APIs:

- **Service APIs:** APIs intended for end consumers and integrated by developers to invoke a certain telco capability.
- **Service Management APIs:** APIs intended for end consumers to manage or get data about offered Service APIs in application runtime, e.g., check service availability or performance information.
- **Operate APIs:** Operational and maintenance APIs provided by a telco to channel partners for the purpose of service fulfillment and assurance to their [channel partner] customers. This may include service provisioning for a mobile user, technical API performance monitoring, fault ticketing, information exchange such as product catalog, pricing, settlement, etc.

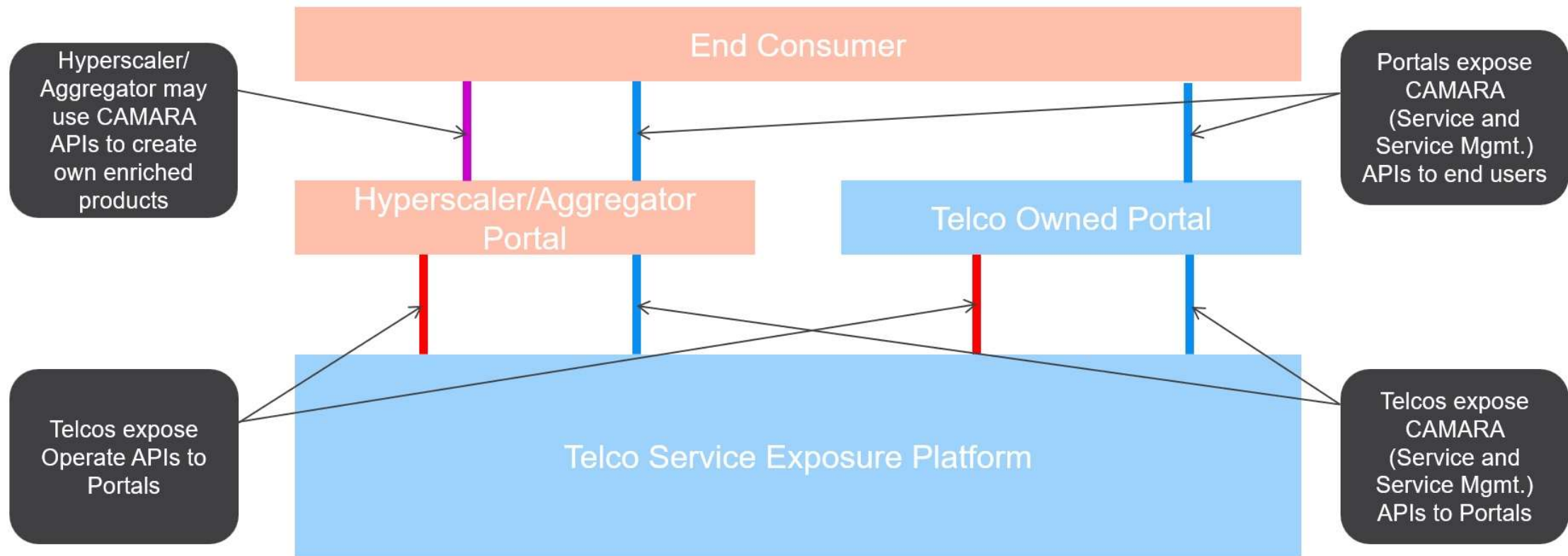


Service APIs and Service Management APIs are in scope of CAMARA. Operate APIs are out of scope of CAMARA (these are already covered by other SDOs = Standards Development Organizations like TM Forum).

CAMARA Scope

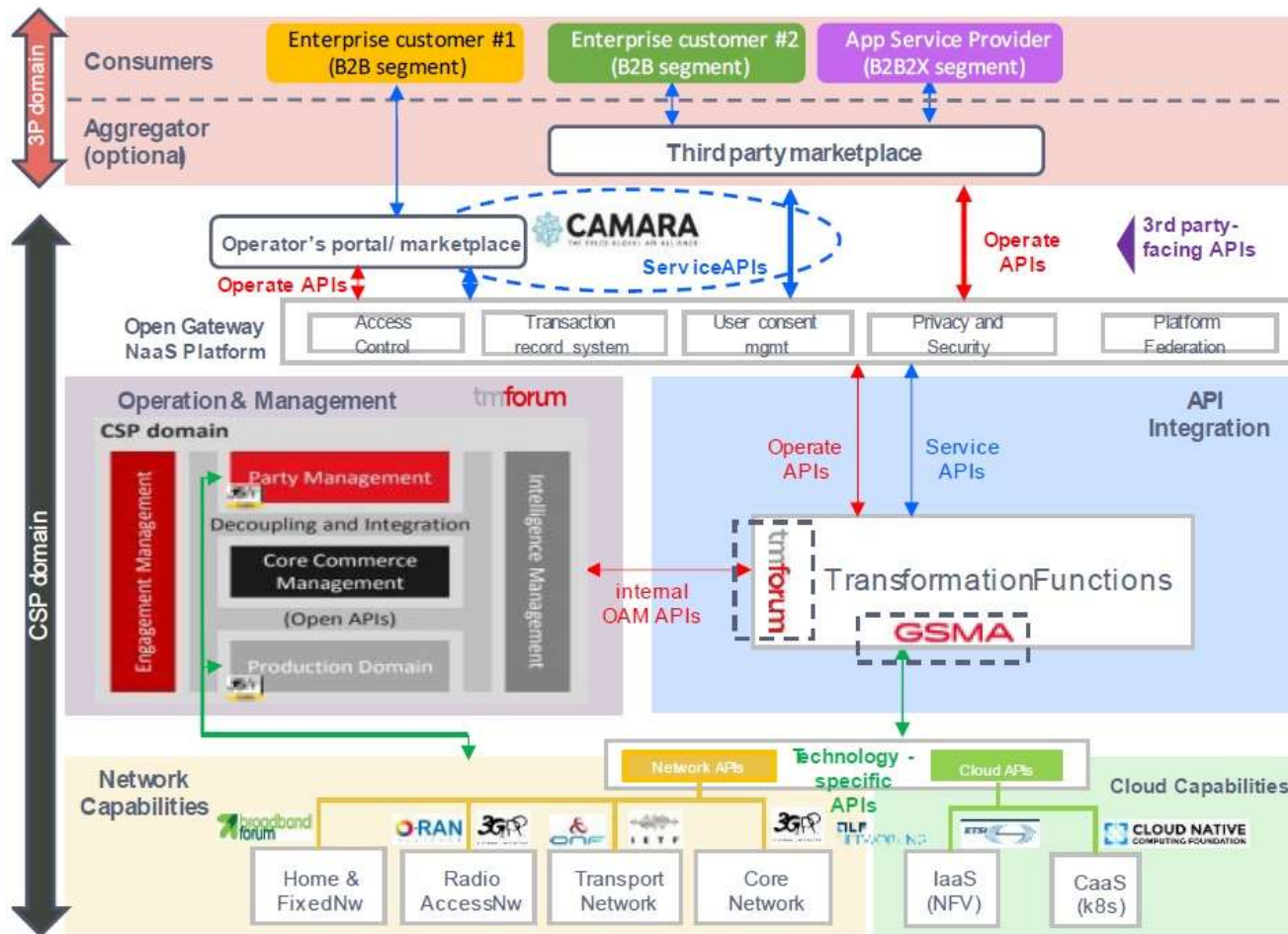


CAMARA
THE TELCO GLOBAL API ALLIANCE



Hyperscalers and aggregators have the possibility to create own enriched products based on the CAMARA APIs and expose that in addition to the CAMARA APIs.

CAMARA Scope



3rd Party-facing APIs

Service APIs
 App-centric, developer-oriented
 Apache2.0 lic, user -friendly, easy-to-use
 Example: QoS, verify location, device status, Sim Swap,....
 Includes some management functionality used from the apps (in-app OAM APIs)

Hosted by **CAMARA**

Contributed by OpenGateway partners, directly or supported by bodies like

Operate APIs
 Management oriented
 Easy-to-implement, easy-to-use, simple
 Example: register, account, monitor, issue mgmt, order/purchase, pay...
 Provides an easy integration of the NaaS Platform with marketplaces /portals

Contributed by OpenGateway partners, hosted by **tmforum**

Technology-specific APIs
 Technical capability oriented, standard, (FRAND) deterministic
 Example: policy setting parameter setting information check...

Contributed by specific domain SDOs

CAMARA project defines CAMARA APIs.

TMForum develops the Operate APIs.

Several SDOs cover the different technology domains that provide the telco capabilities.

More details can be found in the whitepaper “The Ecosystem for Open Gateway NaaS API Development” (jointly published by GSMA, CAMARA, Linux Foundation and TMForum) available [here](#).

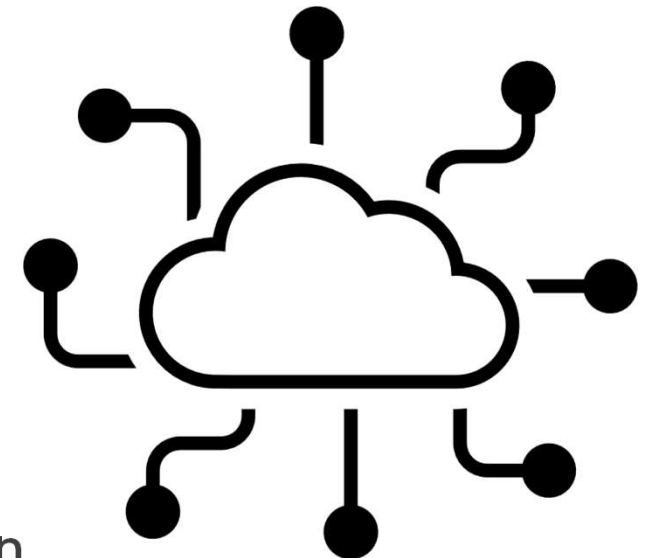
The scope of the CAMARA Project is:

- **Collect API requirements** from GSMA Operator Platform Group and other sources
- **Define Service APIs and Service Management APIs**
- Create test plans / cases / tools from an API consumer perspective
- **Develop and test Service APIs and Service Management APIs**
- Create developer friendly **documentation**

The following deliverables are provided by the CAMARA Project:

- **Service API and Service Management API definitions and documentation**
- Optionally Service API and Service Management API code and
- Test plans, cases and tools for the APIs all contained in deployment packages.

Project resources can be found in the **GitHub repository**: <https://github.com/camaraproject>.



CAMARA

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

... and where we are now



CAMARA
THE TELCO GLOBAL API ALLIANCE



- 103 Named Partners
- 342 (+160*) companies participating in CAMARA
- 23 Active API development repos
- 992 (+981*) people joined CAMARA
- Development "home" for GSMA Open Gateway

* Number in brackets indicates companies and people who are in contact but haven't joined

CAMARA Logos



CAMARA
THE TELCO GLOBAL API ALLIANCE

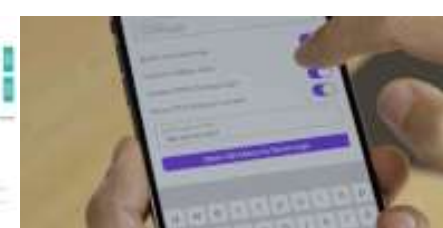
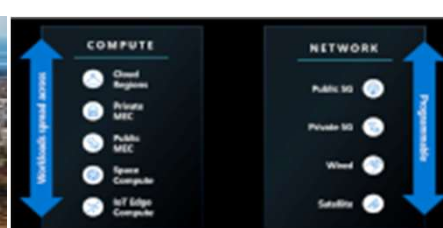
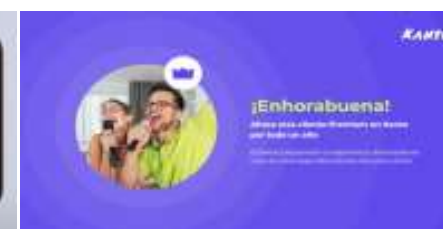


CAMARA API Showcases



CAMARA
THE TELCO GLOBAL API ALLIANCE

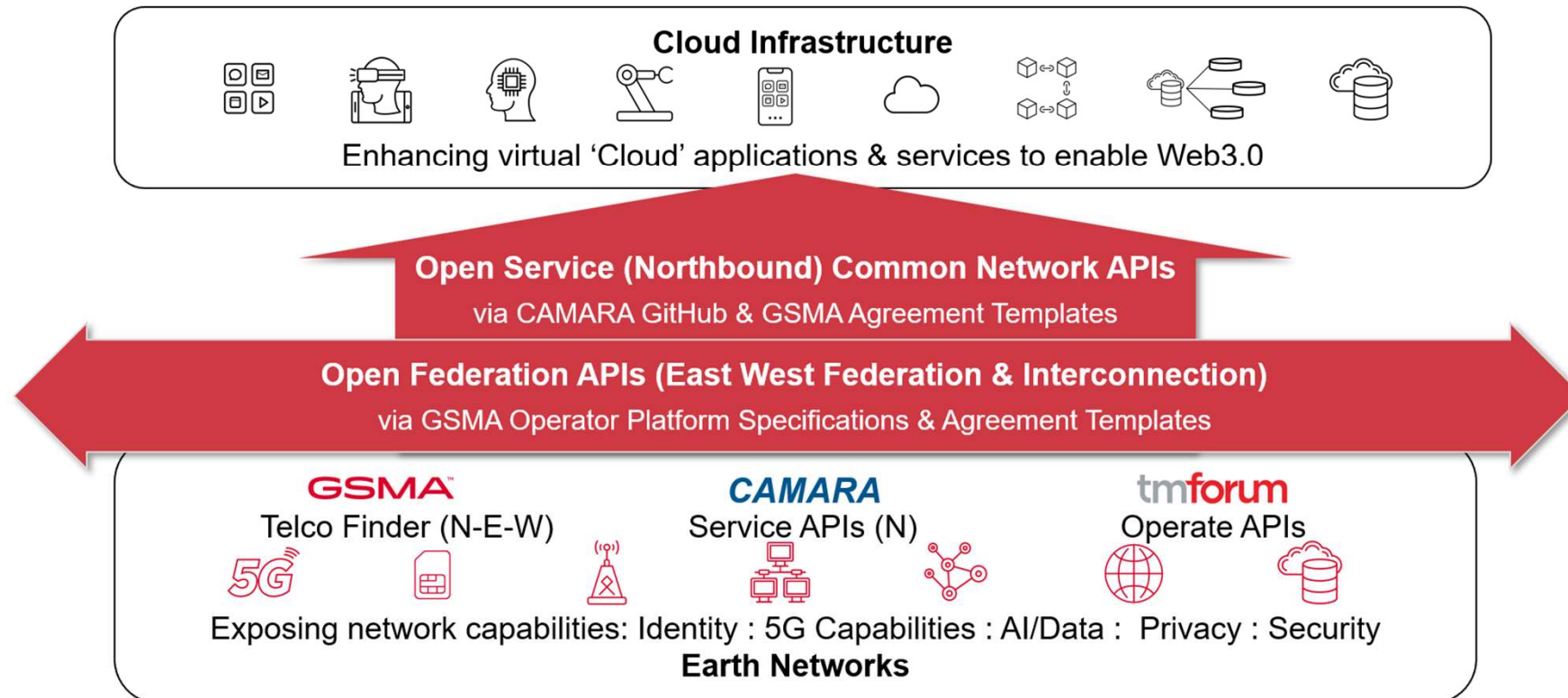
<https://camaraproject.org/resources/>



CAMARA - Collaboration with GSMA Open Gateway



A common glue between Cloud Infrastructure and Earth Networks



Specification by Doing Code, not documentation



Current CAMARA API Families (1)



Blockchain Public Address

Manage a blockchain public address associated to a phone number

Call Forwarding Signal

Determine if a "call forwarding" service is enabled

Carrier Billing CheckOut

Purchase, pay, and follow up on fulfilment of products

Click to Dial

Establish web-based communication by clicking an object

Connectivity Insights

Alerts the consumers if and when the QoS threshold has breached

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

Device Swap

Check if the MSISDN has had a change of device in the last 30 days

Edge Cloud

Provide and manage network and compute resources for an application

Home Devices QoS

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

Know Your Customer

Allows service providers to validate user information with operators

Network Slice Booking

Reserve, dynamically provision, query, dynamically delete a slice

Number Verification

Allows users to verify the phone number of the connected device

OTP Validation

To offer secure user authentication to service providers

Population Density Data

Get dynamic population density data in a specific area for a future date & time

Current CAMARA API Families (2)



Quality on Demand

Allows users to set mobile connection quality and get notifications

Region User Count

Query the number of active users in the specified area

Short Message Service

Send SMS to the destination address(es)

Site to Cloud VPN

Create and configure site to cloud network service by one click

SIM Swap

Allows users to get information on SIM pairing changes

Web RTC

Add real-time communication capabilities to applications

CAMARA Working Groups:

API Backlog

Maintains the API Backlog for CAMARA

Commonalities

Guidelines and assets mandatory for all CAMARA Sub Projects

Marketing / Outreach

Plans and performs marketing activities for CAMARA

Release Management

Guidelines and assets for Release Management in CAMARA

CAMARA

Where are we going next...



CAMARA
THE TELCO GLOBAL API ALLIANCE

1

Additional APIs and roadmap sync across CSPs, Aggregators and Hyperscalers

2

API lifecycle management consistency, Documentation of API versioning and availability globally

3

Support federation through GSMA and OAM through TM Forum

CAMARA Contacts



Customers (enterprises and startups), aggregators, cloud operators, telco operators, and network equipment vendors are welcome to join CAMARA. Participation is free, without any fees or obligation to work. For details or in case of questions please use the contact page at <https://camaraproject.org/contact/>.

If you are interested in joining CAMARA, please subscribe to all+subscribe@lists.camaraproject.org. You may unsubscribe from CAMARA and these communications at any time.

If you are interested to show your logo on the CAMARA website as “Participating Organization” you can send it to adm@lists.camaraproject.org. Participation is also free.

If you would like to join as CAMARA sponsor or associating organization please don't hesitate to use the enrollment link <https://enrollment.lfx.linuxfoundation.org/?project=camarafund>.





CAMARA

THE TELCO GLOBAL API ALLIANCE