



**CAMARA**  
THE TELCO GLOBAL API ALLIANCE

# Presentation

28.10.2025

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APIs enabling seamless access to  
Telco network capabilities



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.

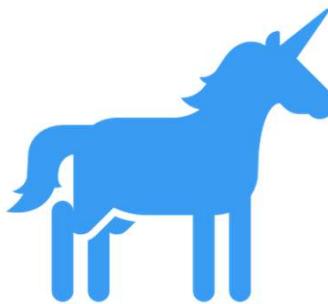


CAMARA Mission

# What is the CAMARA Project? Key problems we try to solve



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## Scale

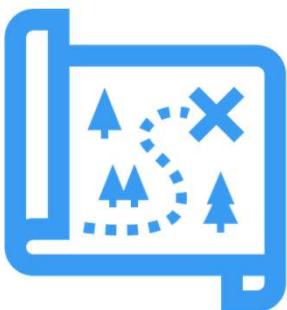
Developers dream of being the next unicorn...

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.

# Key problems we try to solve

## Consistency Benefit



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**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

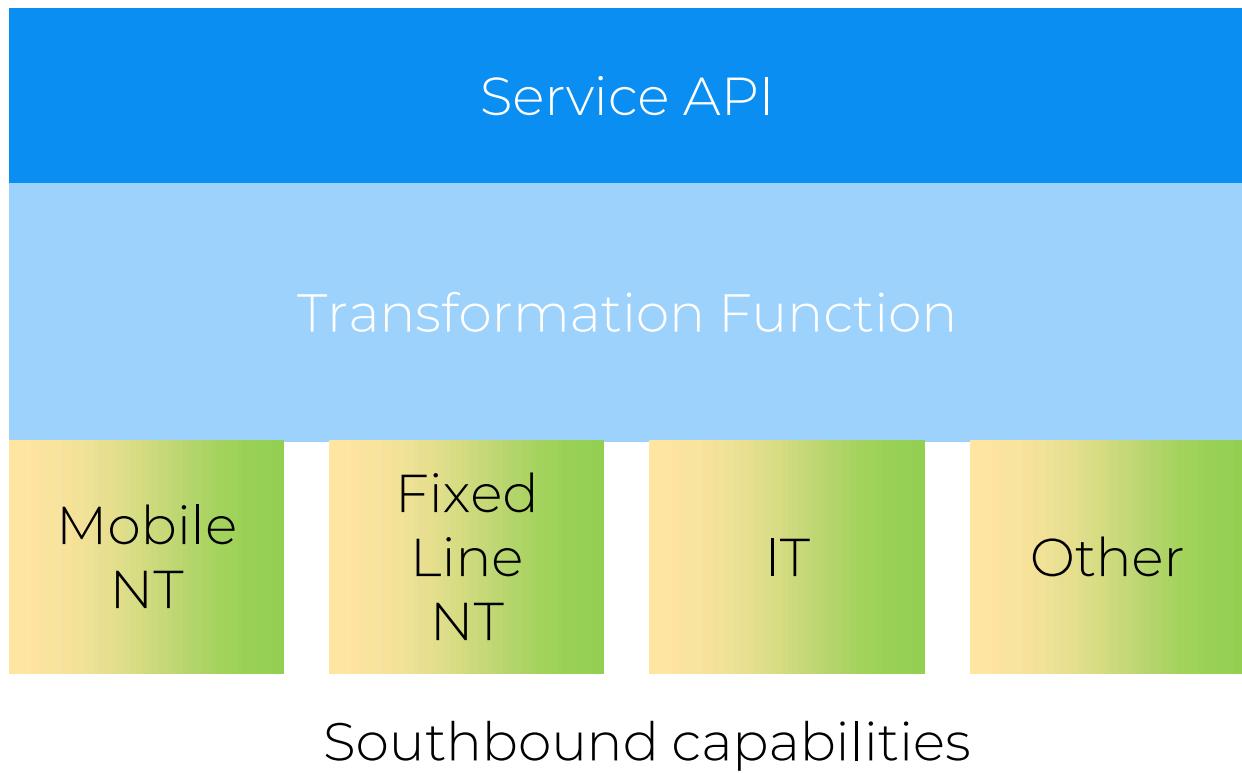
# Key problems we try to solve

## Simplicity Benefit



**Abstraction** by transformation from network capabilities 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



**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. 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).

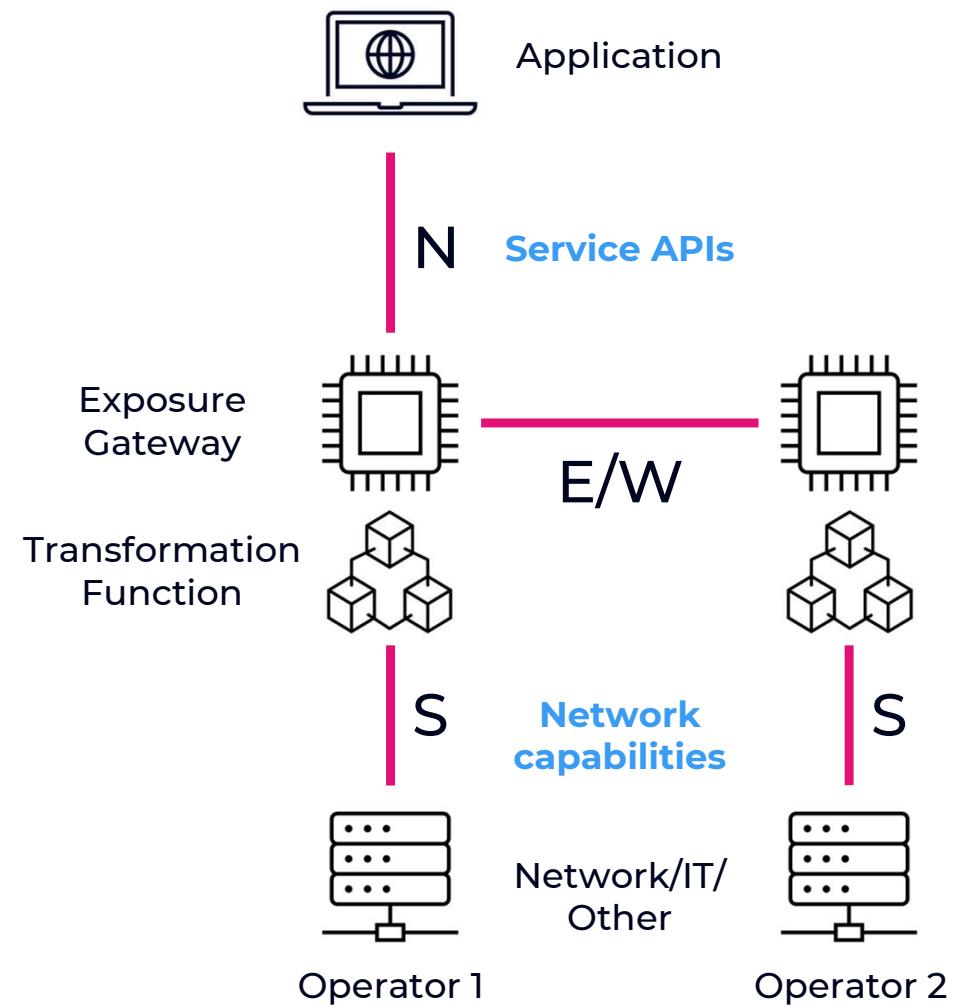


# CAMARA Scope



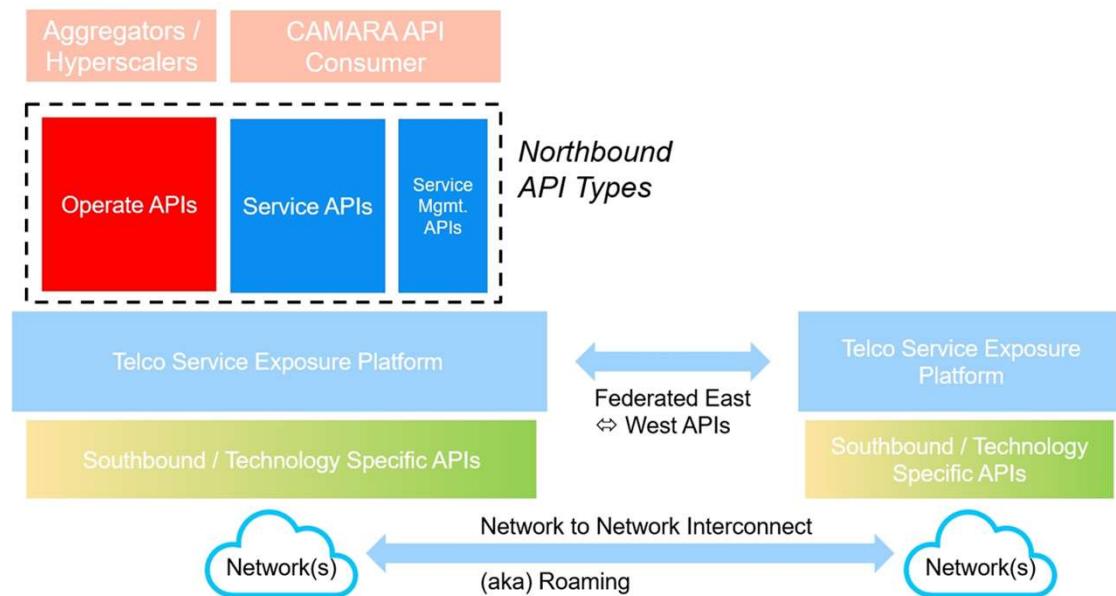
From functional perspective the scope is limited to **telco APIs**, that means APIs in the domain of telco mobile networks, telco fixed line networks, telco edge cloud, etc. or supporting these.

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.



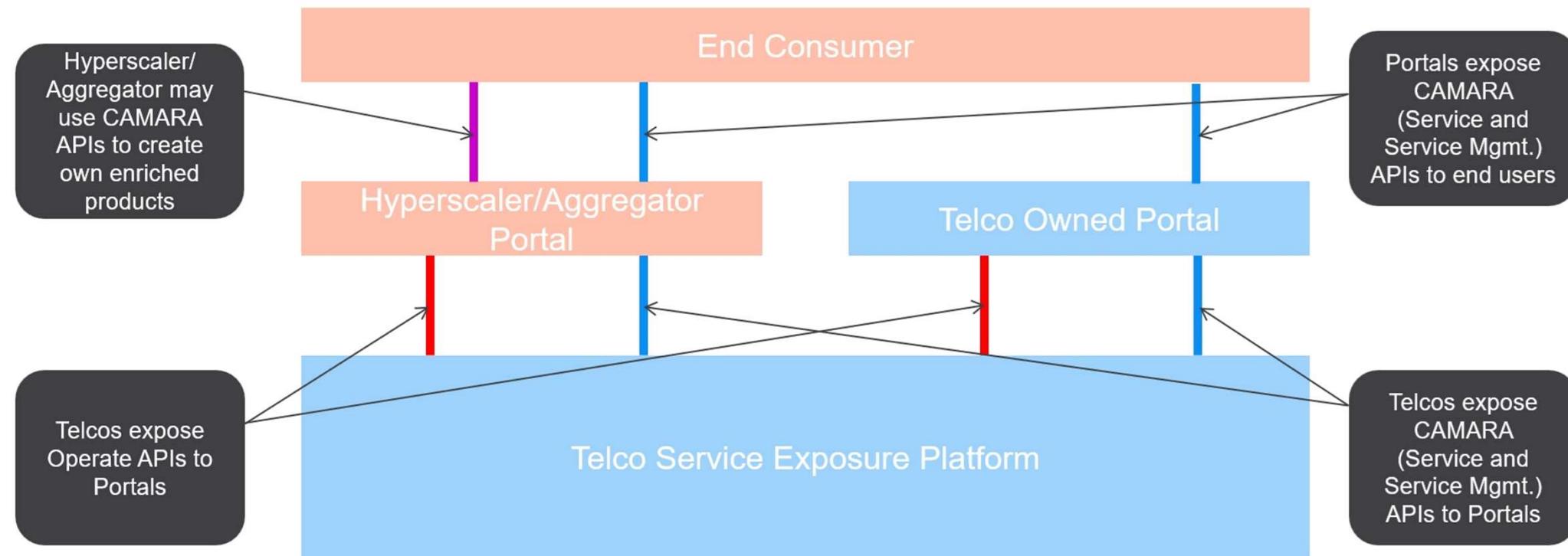
## We differentiate between 3 types of Northbound APIs:

- **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 / Collaboration with Open Gateway and TM Forum

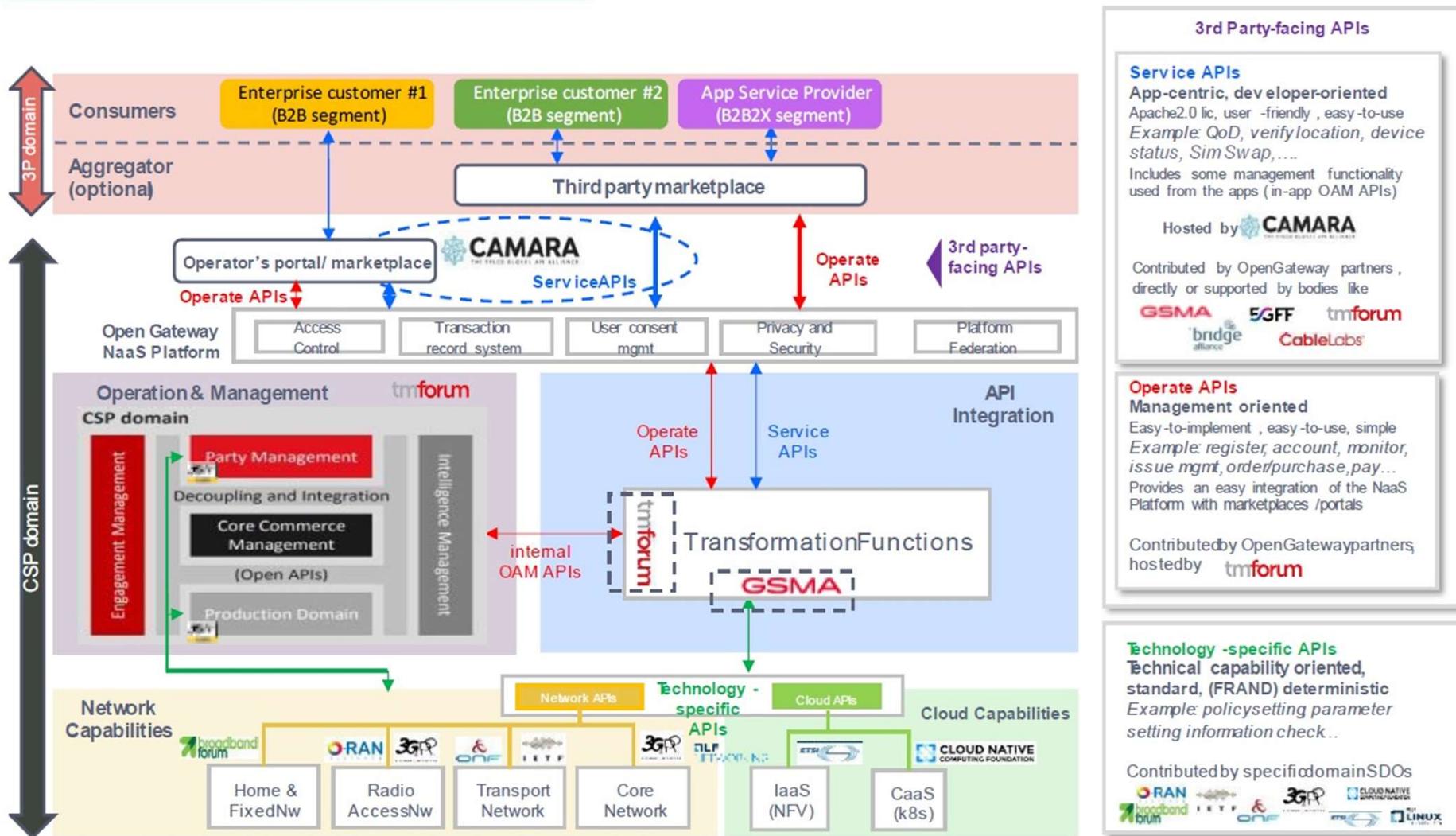


Hyperscalers and aggregators have the possibility to create own enriched products based on the CAMARA APIs and expose that in addition to the CAMARA APIs.

# CAMARA – Scope / Collaboration with Open Gateway and TM Forum



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CAMARA project defines CAMARA APIs.

TMForum develops the Operate APIs.

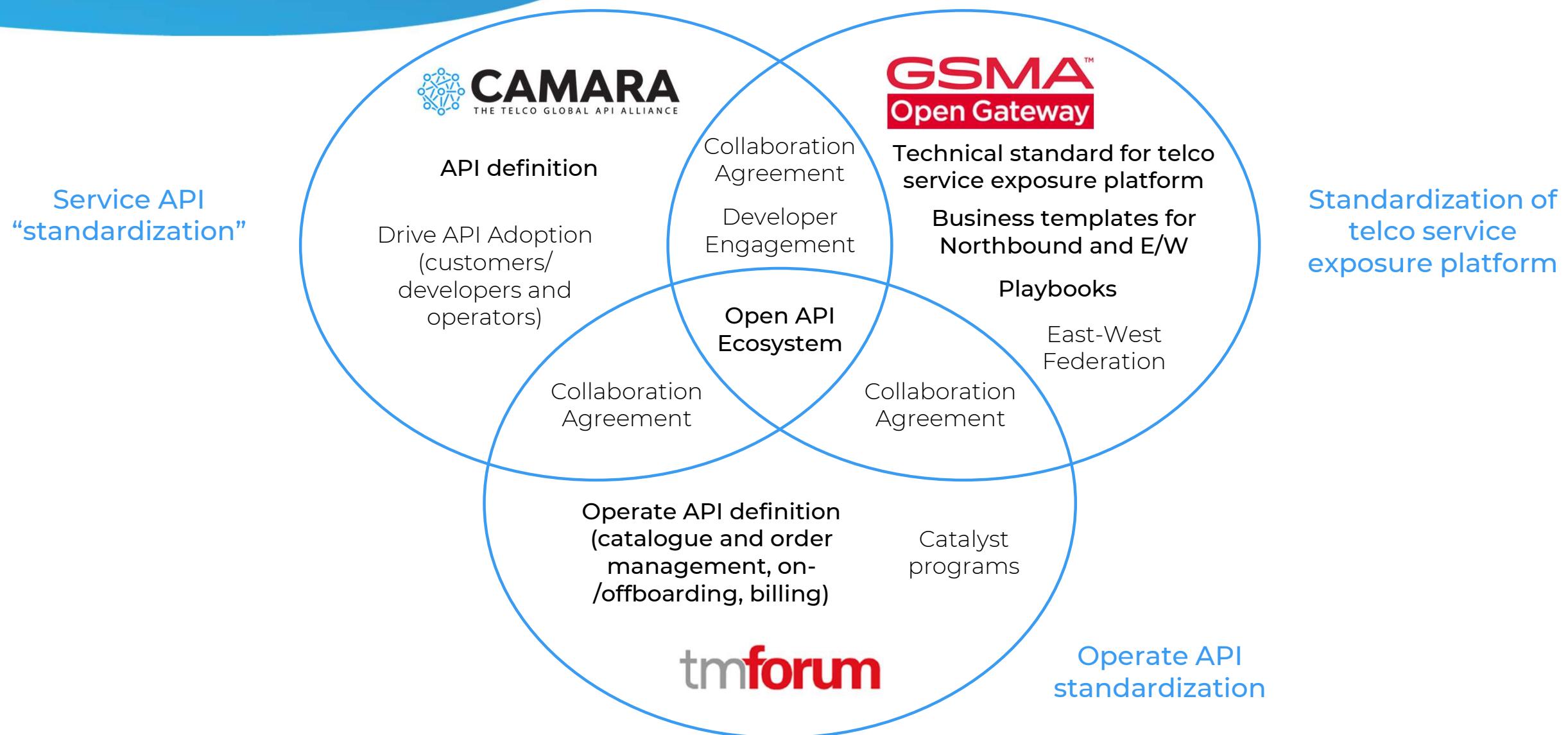
Several SDOs cover the different technology domains that provide the telco capabilities.

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](#).

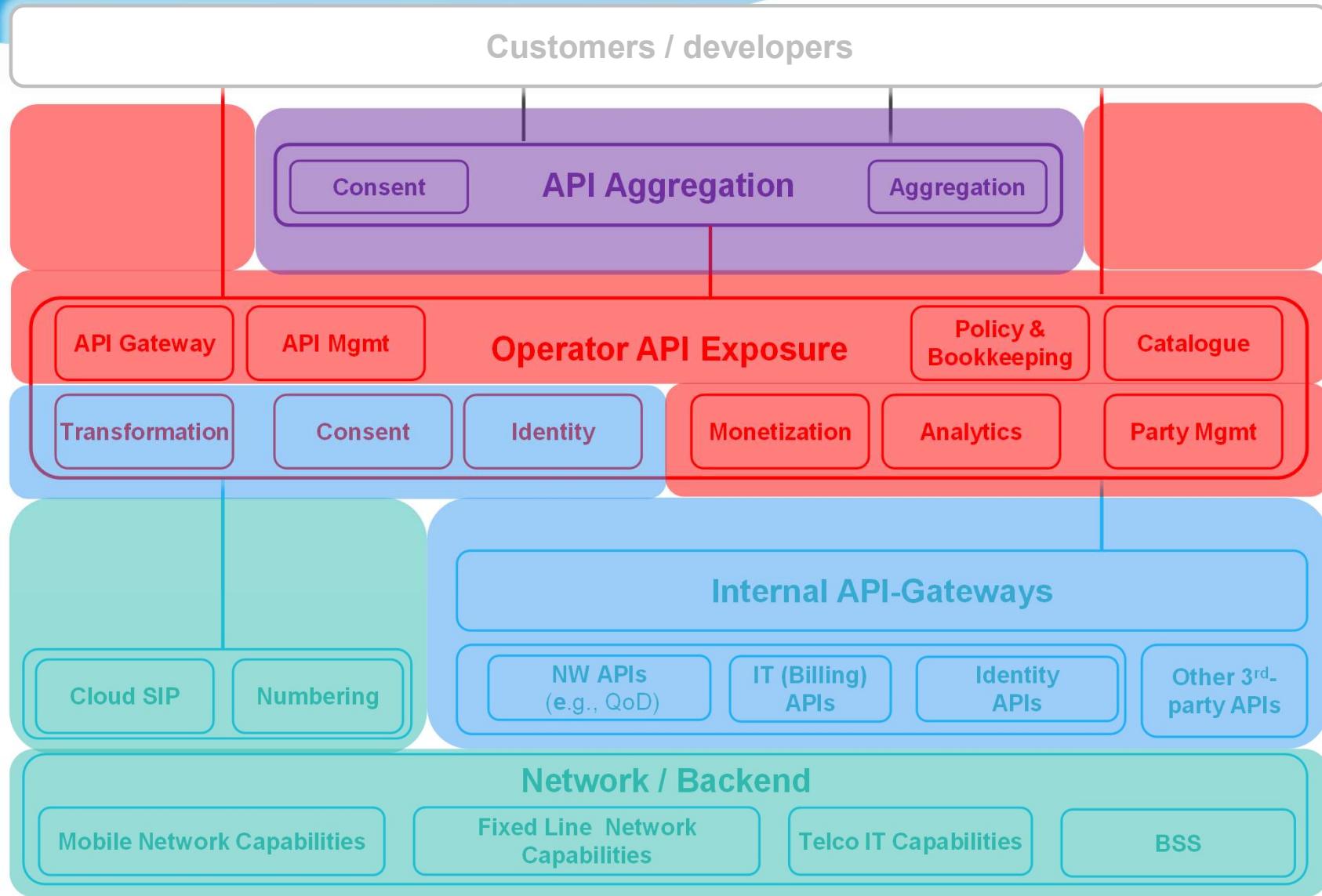
# CAMARA – Scope / Collaboration with Open Gateway and TM Forum



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# Role of CAMARA, Open Gateway and aggregators



**Aggregators in each market**

**tmforum**  
**GSMA™**  
**Open Gateway**



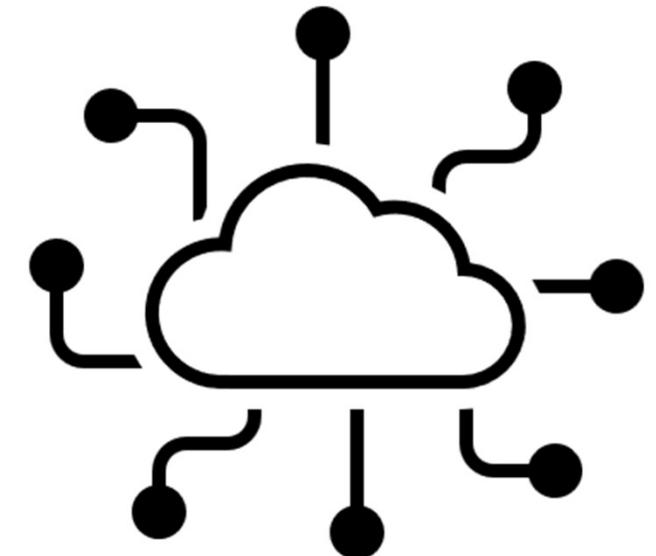
## The scope of the CAMARA Project is:

- 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>.

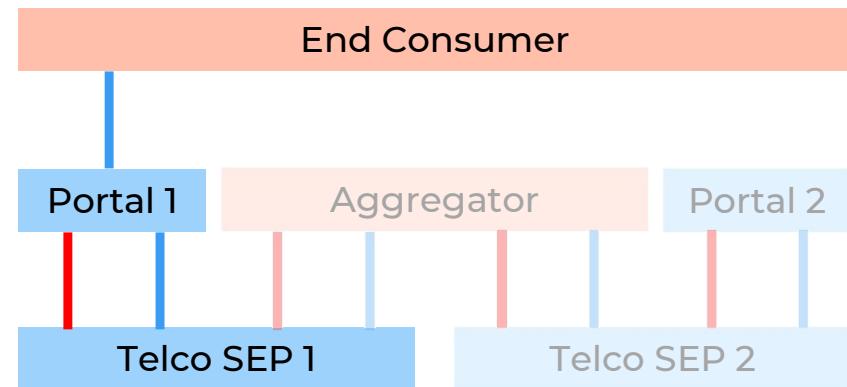


# CAMARA API Distribution Options



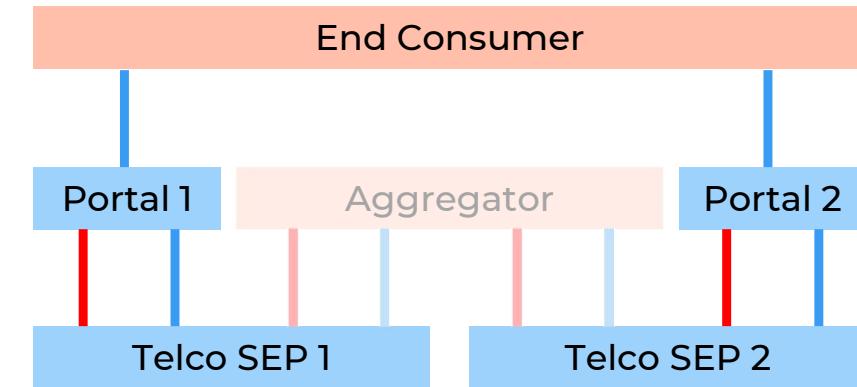
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## Single-Operator Relationship

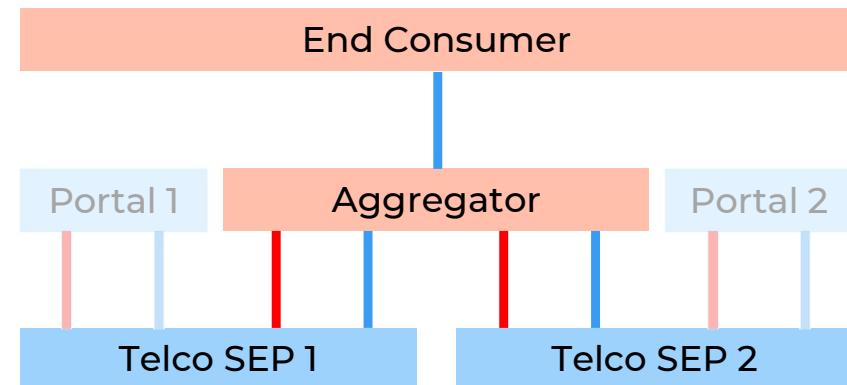


Blue lines =  
CAMARA APIs  
  
Red lines =  
Operate APIs  
  
SEP= Service  
Exposure  
Platform

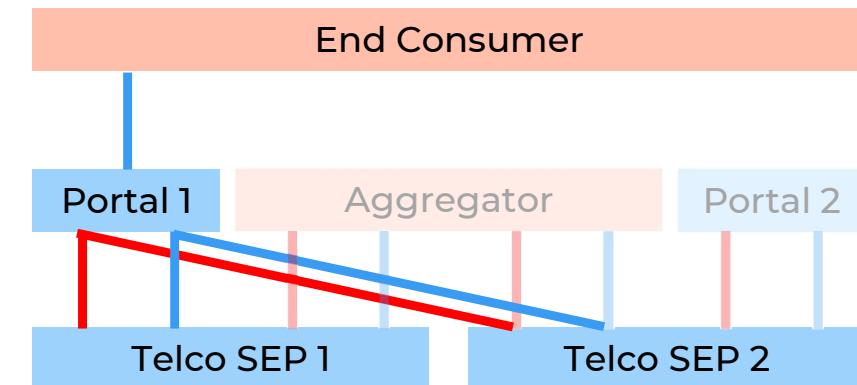
## Multi-Operator Relationship



## Operator Aggregation



## Single-Operator “API Roaming”



What is different now in comparison  
to former API exposure trials?



- **Simplicity** – Telco complexity is hidden behind simple, easy to use APIs
- **Demand driven** - Listening to API consumer's voice and demand
- **Availability** – Open APIs with great support of many operators on many platforms
- **Alignment** - With standardization bodies like TM Forum, GSMA or ETSI-MEC
- **Sustainability** – We have the CEOs behind (e.g. Open Gateway MoU, API Venture)
- **Telco maturity** – Telcos are now more digital and cloud oriented
- **Privacy** – Well defined

# 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



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Members	Premier	General												Associate				
	accenture	T	ERICSSON	Microsoft	NOKIA	orange	Telefónica	T Mobile	verizon	vodafone	ALEPH ZERO	CableLabs	Charter	IN-DY KITE	KYXSTART	shabodi	OpenD	
<b>Participating Organizations</b>																		
INCE	A1	ACL Digital	anixtric	AND Digital	akross	almueqet	AMANTYA	amdocs	apis training	ARGELA	AT&T	aws	axiata	Axiata Digital Labs	BCTI	BearingPoint	airtel	
CENTILLION	Chenosis	中国移动	中国电信	china unicom	cinnox	cisco	cloudfonex	cognizant	Colony	comviva	coure	craasAA	csl.	cthingsco	DATAVERSE	DETECON	DOMOS	
edgeContinuum	Edge	e&	ETIYA	EUREKA	EVIDEN	fs	FUJITSU	GAPASK	Google Cloud	GSMA	HCL Software	Hewlett Packard Enterprise	Hexagon	HKT	iamcrypto	IBM	ETIZEX	Innovation Tested
intel	INTELACOM	IN	iP	iPification	ipall networks	Italtel	IP PLATFORMS	KDDI	kpn	kt	KUBERMATIC	LATENCETECH	Lenovo	LG U+	THE LINUX FOUNDATION	lytn	M	M 800
MAVENIR	MICROCKS	MojoAuth	QUEST	nabstraction	NEARBY COMPUTING	Netcracker	NOMINATE	NOMN	NOS	NTT	NTT DATA	openxpand	Open Sesame	optare	Optiva	ORACLE	VIRTUAL 5G LAB	
Kadisys	Rakuten Mobile	Red Hat	REPLAY	ROGERS	StC	SCENERA	SEKURA	Simpl	sinch	Singtel	SK telecom	SPRY FOX	STARHUB	startekologic	stechs	SUMMIT	swisscom	
TelcoFlo	telenor	Telkomsel	TM	TELUS	ETIM	TruSense	UNRYO	VIAVI	VIRTUS	WRCastle	Whale Cloud	xacria	SECURITY PULSE	XFLOW	YAANA	ZTE		

- 178 Named Partners
- 476 companies participating in CAMARA
- 9 API Sub Projects  
29 Sandbox Projects  
73 APIs  
5 Working Groups
- 1332 people joined CAMARA
- Development "home" for GSMA Open Gateway

# CAMARA Logos



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Members	Premier	General												Associate								
	accenture	T-Mobile	ERICSSON	Microsoft	NOKIA	orange™	Telefónica	T-Mobile	verizon	vodafone	ALEPH ZERO	CableLabs®	Charter	IN-DY KITE	KYXSTART	shabodi	oma	OpenID				
Participating Organizations																						
INCE	A1	ACL Digital	comercio móvil	AND Digital	akross	almajeet SYSTEMS	AMANTYA	a·amdocs	apis training	ARGELA	AT&T	aws	axiata	AXIATA DIGITAL LABS	BCTI	BearingPoint.	airtel	bouygues	bridge alliance	BT Group	broadpeak	Capgemini
3DE CENTILLION	Chenosis	中国移动 China Mobile	中国电信 China Telecom	China unicom 中国联	cinnox	cisco	cloudonix	cloudone	CodeB	cognizant	Colony	comviva	COLRE	CPaaSA	csl.	CTHINGS CO.	DETECON CONSULTING	DOMOS	DriveU.auto	EANTC	ecosteer.	
edgeContinuum	EdgeXR	e& teknoloji	ETIYA	EUREKA	EVIDEN	F5	FUJITSU	GAPASK	Google Cloud	GSMA	HCL Software	Hewlett Packard Enterprise	Hexagon	HKT	HUAWEI	iamcrypto	IBM	ENIZEX ICCS	IEEE 5G/6G Innovation Testbed	infobip	INFO LYSIS	Infosys
intel	INTRACOM	IP	IPification	Iquall Networks	Italtel	Io PLATFORMS	Join Together	KDDI	kpn	kt	KUBERMATIC	LATENCETECH	Lenovo	LG U+	THE LINUX FOUNDATION	LOTUSFLARE	lytn	M	M800	MATRIX SOFTWARE	MEO	
MAVENIR	MICROCKS	MojoAuth	QUEST TECHNOLOGIES	nabstract.io	NEARBY COMPUTING	Netcracker	NEX	NGMN	NOS	NTT	NTT DATA	openxpand	Open Sesame	optare solutions	Optiva	ORACLE	VIRTUAL 5G LAB	plusmo	PRYVX	quobis:		
Kadisys	Rakuten Mobile	Red Hat	REPLAY	ROGERS.	STC	SCENERA	SEKURA	Simpel	sinch	Singtel	SK telecom	SPRY FOX	STARHUB	startellogic	stechs	SUMMIT	swisscom	syniverse.	tos	TATA ELXSI		
TelcoFlo	telenor	Telkomsel	telpon	TELUS	ETIM	TruSense™	UNRYO	UTI	VIAVI	VIRTUS	Wray castle	Whale Cloud	xacria	XSECURITY PULSE	XFLOW RESEARCH	YAANA	ZTE					

# Release Management Motivation and Benefits



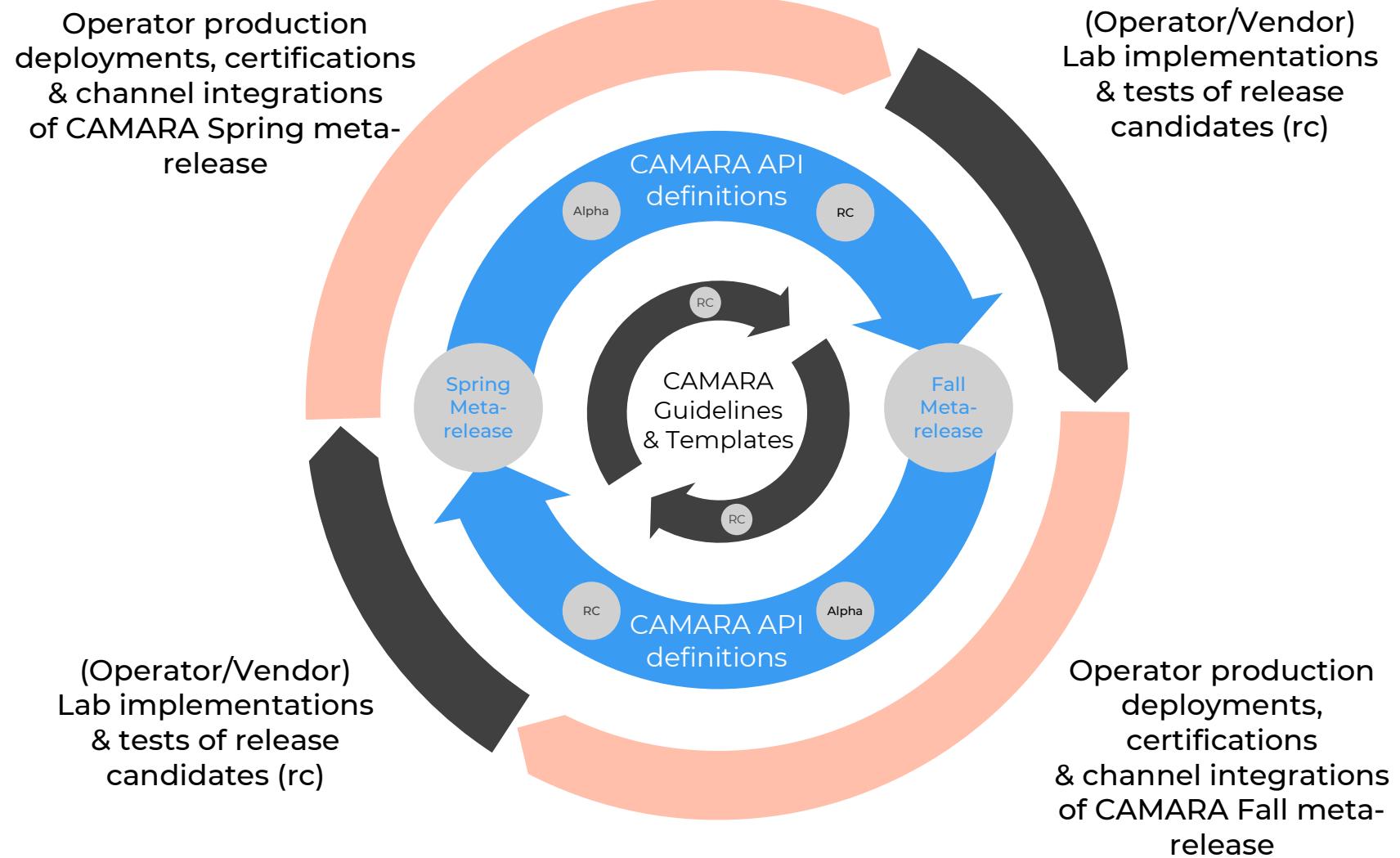
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- A **CAMARA meta-release** combines a set of CAMARA API versions into a **consistent** release.
- There are **two meta-releases per year** (in spring and fall).
  - API providers (e.g. Network operators, Channel Partners) can plan their implementations and deployments in production.
  - API consumers can plan the integration in their platform and applications.
- All API versions in a meta-release **fulfill defined quality criteria** and are **compliant to the CAMARA guidelines** from CAMARA Commonalities and Identity and Consent Management of that meta-release.
- **CAMARA meta-releases** ensure the
  - Availability of consistent API definitions (by use of guidelines, templates, and linting),
  - Quality of API definitions (by use of checklists, test definitions, and release management),
  - Stability of API definitions (clear criteria for stable versus initial API versions) and
  - Reliability of schedule and deliverables (with defined milestones and release candidates).
- **CAMARA meta-releases** provide the foundation for API version management in production.

# Release Management Release Cycle



- 2 meta-releases per year
  - Fall (in September)
  - Spring (in March)
- Continuous and overlapping cycles
  - Update of CAMARA guidelines
  - Development and updates of API definitions in CAMARA
  - Lab implementations and production deployments at network operators
- Tests of API release candidates
  - In operator (lab) implementations
  - Based on CAMARA test definitions
- Feedback in all phases
  - From (lab) implementations and deployments to CAMARA API definitions and guidelines
  - From API definition work to CAMARA guidelines



For details see: <https://wiki.camaraproject.org/display/CAM/Meta-release+Process>

# CAMARA Fall 25 meta-release

## 60 #total CAMARA APIs

10

### STABLE APIs

- device-reachability-status
- device-roaming-status
- device-swap
- location-verification
- number-verification
- one-time-password-sms
- qos-profiles
- quality-on-demand
- sim-swap
- simple-edge-discovery

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### NEW INITIAL APIs (v0.y.z)

- application-endpoint-discovery
- application-endpoint-registration
- blockchain-public-address-validation
- brand-registration
- consent-info
- dedicated-network
- dedicated-network-accesses
- dedicated-network-profiles
- device-data-volume
- device-data-volume-subscriptions
- energy-footprint-notification
- knowledge-base

- most-frequent-location
- network-slice-booking
- optimal-edge-discovery
- predictive-connectivity-data
- qa-assistant-manage
- qa-assistant-service
- qos-booking
- qos-booking-and-assignment
- subscription-status
- traffic-influence
- verified-caller

27

### SPRING25 UPDATED INITIAL APIs (v0.y.z)

- application-profiles
- blockchain-public-address
- call-forwarding-signal
- carrier-billing
- carrier-billing-refund
- connected-network-type
- connected-network-type-subscriptions
- connectivity-insights
- connectivity-insights-subscriptions
- customer-insights

- device-identifier
- device-reachability-status-subscriptions
- device-roaming-status-subscriptions
- geofencing-subscriptions
- kyc-age-verification
- kyc-fill-in
- kyc-match
- kyc-tenure
- location-retrieval
- number-recycling

- population-density-data
- qos-provisioning
- region-device-count
- sim-swap-subscriptions
- webrtc-call-handling
- webrtc-events
- webrtc-registration

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# CAMARA API Overview



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API Overview							
Authentication and Fraud Prevention	Location Services	Communication Services	Communication Quality	Device Information	Computing Services	Payments and Charging	Service Management
Call Forwarding Signal	Geofencing Subscriptions	WebRTC Call Handling	Application Profiles	Connected Network Type	Simple Edge Discovery	Blockchain Public Address	
Customer Insights	Location Retrieval	WebRTC Event Subscription	Connectivity Insights	Connected Network Type Subscriptions		Carrier Billing	
Device Swap	Location Verification	WebRTC Registration	Connectivity Insights Subscriptions	Device Identifier		Carrier Billing Refund	
Know Your Customer Age Verification	Population Density Data		Home Devices QoD	Device Reachability Status			
Know Your Customer Fill In	Region Device Count		QoD Provisioning	Device Reachability Status Subscriptions			
Know Your Customer Match			QoS Profiles	Device Roaming Status			
Know Your Customer Tenure			Quality on Demand	Device Roaming Status Subscriptions			

- <https://camaraproject.org/api-overview/>
- Mature APIs
- APIs in earlier development

# API Descriptions



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[Home](#) [About](#) [API Overview](#) [API Descriptions](#) [Working Groups](#) [Events](#) [Resources](#) [Contact](#)

## API Description

The “Call Forwarding Signal” (CFS) API provides the API consumer with information about the status of the Call Forwarding Service on a specific phone number. The main scope of the CFS API is anti-fraud to avoid fraudsters to use the Call Forwarding Service to carry on a scam. Other use cases are anyway supported by the CFS API that also provides additional endpoints to detect the general Call Forwarding Service settings.



The API consumer invokes the CFS API to determine if a specific phone number has an active “call forwarding” setup. “Call forwarding” is a network service that redirects incoming calls to another phone number (configured in the service). The CFS API can be used by a bank to verify if a “call forwarding” option is active on the customer’s phone number to avoid frauds. A call from the

API Portfolio: Authentication and Fraud Prevention

- SubProject Wiki: [Call Forwarding Signal](#)  
(incl. how to meet the team)
- API Wiki: [Call Forwarding Signal](#)
- API Repository: [Call Forwarding Signal](#)

API Repository Status: [Incubating](#)

API Status: [Initial](#)

API Version(s) and Release Date(s):  
→ [v0.2.0](#) (2024-09-15), Fall24 meta-release  
→ [v0.3.0](#) (06.03.2025), Spring25 meta-release

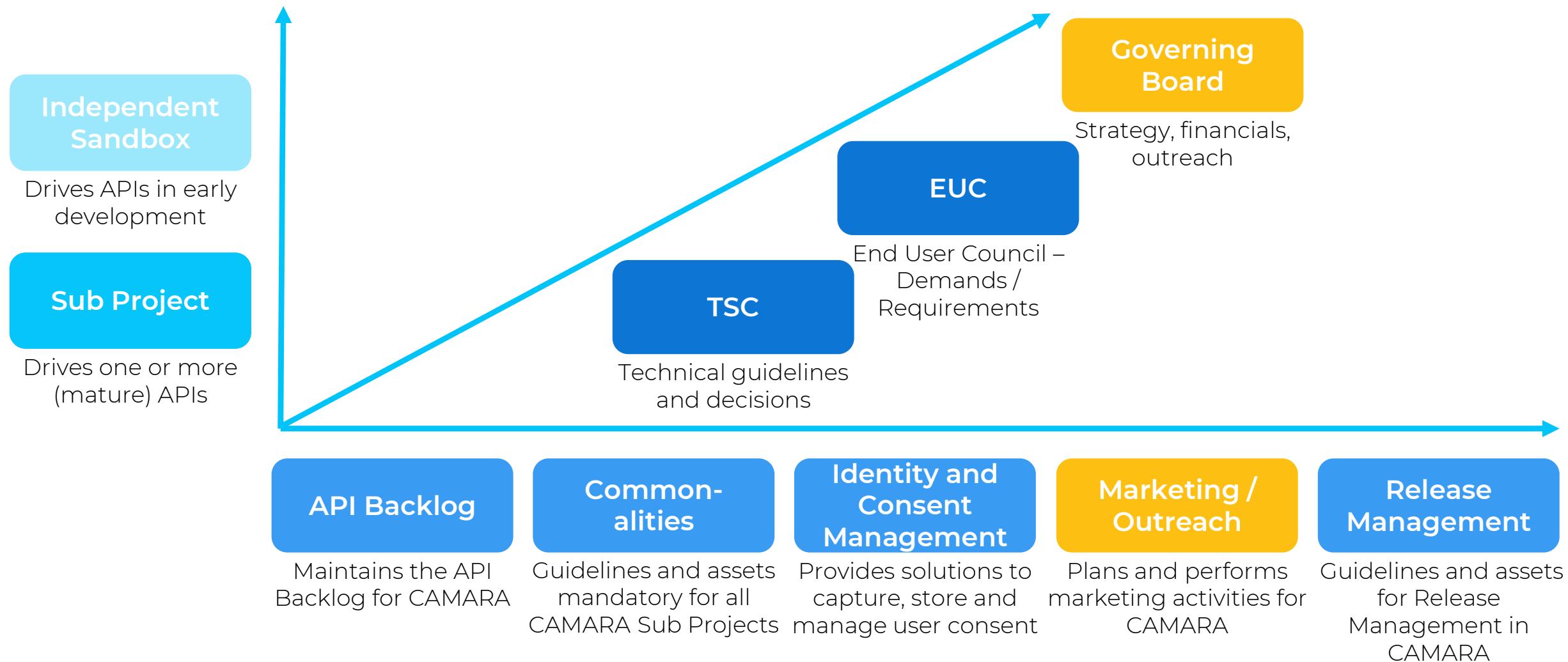
API availability: Information which APIs are available in which country and network, and how to get access can be found on the [GSMA public launch status page](#).

- API description
- Use Cases
- Benefits
- Links to
  - Sub Project (contacts)
  - API Wiki
  - API repository
  - API version(s)
  - GSMA public launch status

# How CAMARA Works



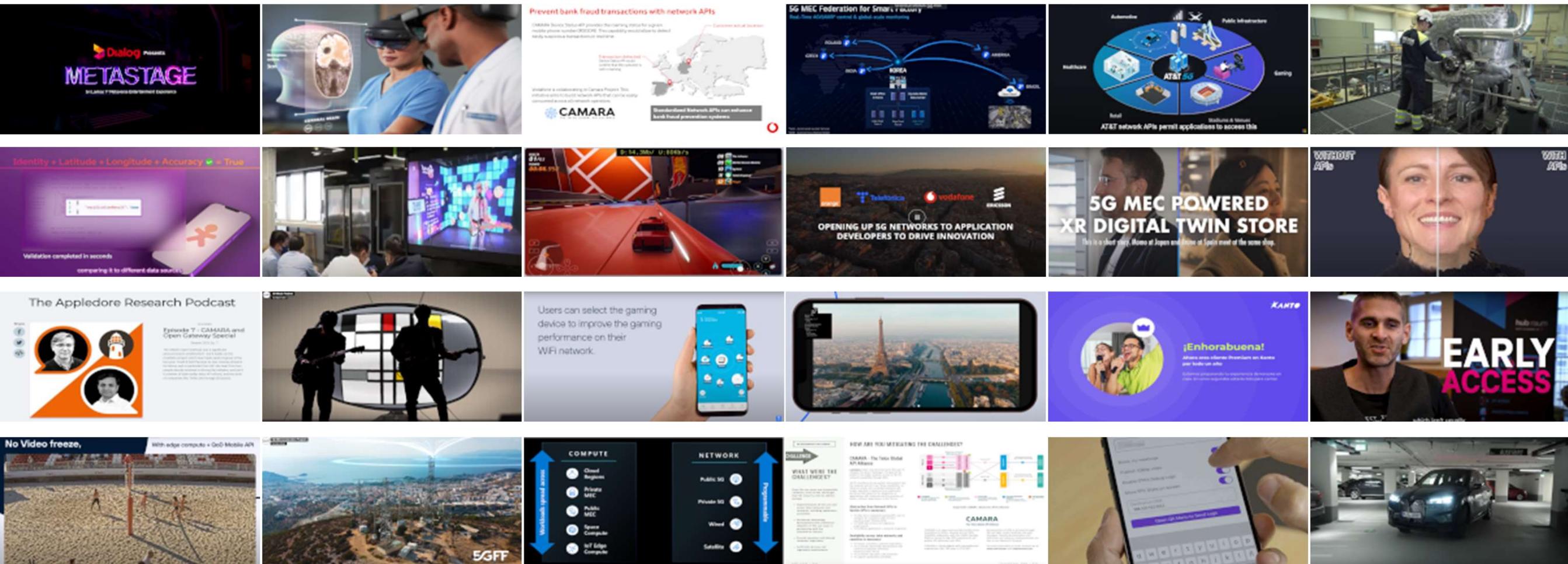
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# CAMARA / Open Gateway API Showcases

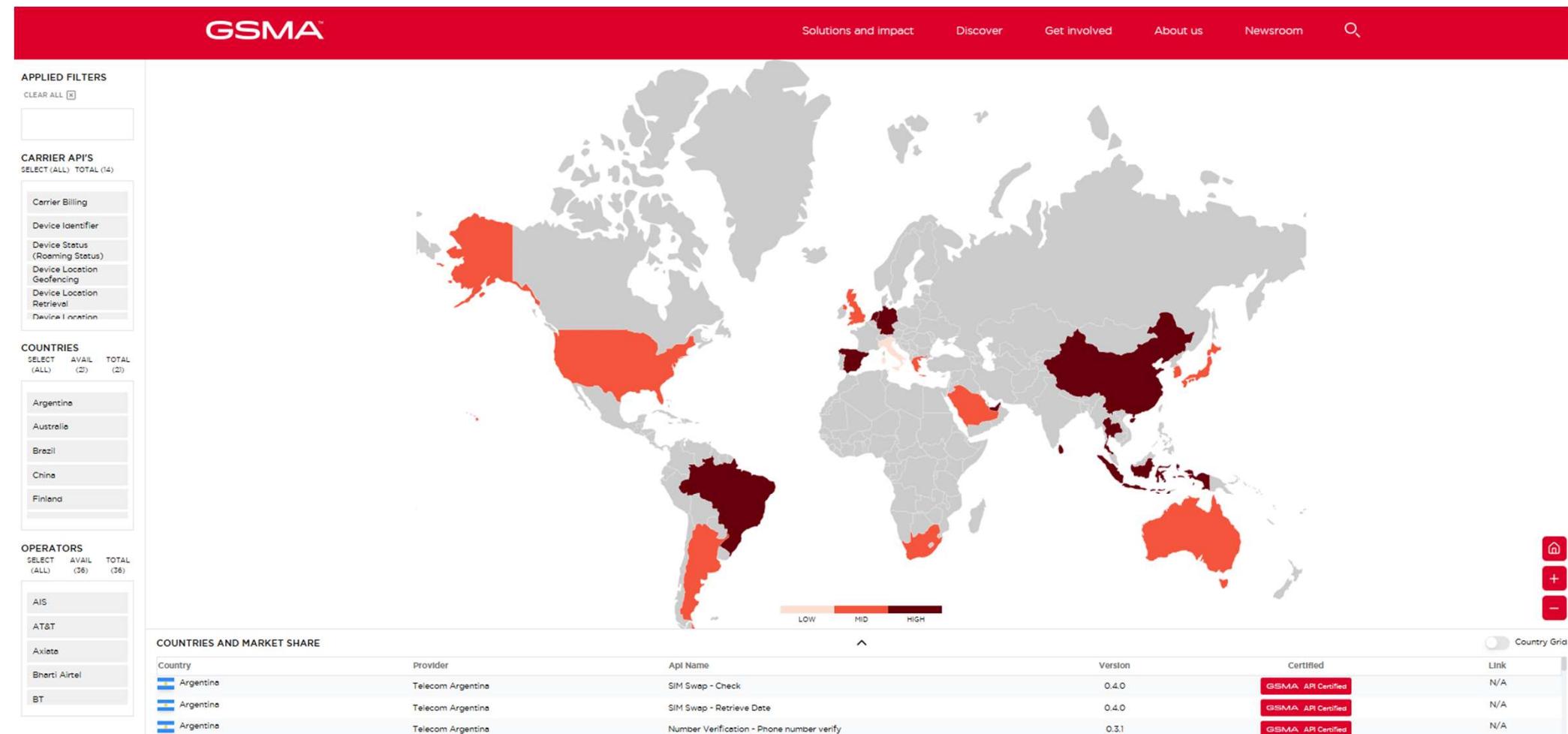


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<https://camaraproject.org/resources/>

# CAMARA / Open Gateway API public launch status



<https://open-gateway.gsma.com/>

# CAMARA / Open Gateway API public launch status



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## Commitment

**132**

**79** operator groups  
and **53** Channel  
Partners supporting the  
Open Gateway MOU

**291**

operator networks  
represented

**>80%**

of mobile  
connections  
represented

## Assets

**66**

APIs published in  
**CAMARA**  
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**34** APIs in Development

## Technical

Standardization through certification  
Certified APIs

## Commercial

Open Service Agreement, Channel  
Partner On-Boarding and E-W  
Federation Agreement Templates

## Impact

**273**

commercial API  
launches

**20**

market champion launches  
with align GTM services,  
engaged with **68** Markets

**16,082**

media mentions in 2025,  
22K in 2024

# 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



# Potential Business Use Cases



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## Authentication and Fraud Prevention



Secure Auth  
Fraud Prevention

Number Verify,  
Sim Swap, etc.

## Location Services



Location Verification  
Location Retrieval  
Location Geofencing

Location APIs

## Communication Quality



Safeguarding of Transactions  
Remote Control  
AR/VR/XR  
Gaming

Quality on Demand

## Device Information



Proactive User Information

Device Data Volume

## Computing Services



Edge Application hosting  
Latency optimization

Simple Edge Discovery

Network APIs offer the opportunity

- For customers to optimize their use cases and applications
- For operators to monetize their investment in 5G infrastructure

**It's a win-win!**

# Benefit for developers to use CAMARA APIs



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- 1** Reduces friction for developers to access network information across telcos globally.
- 2** Increases usage and value of telco networks by providing easy access to network capabilities.
- 3** Enables developers to create new applications or improve existing ones with access to these capabilities.



**Additional revenue on existing assets, leveraging SDN and NFV capabilities**

# Developers Getting Started with CAMARA APIs



The screenshot shows the CAMARA website homepage. At the top, there's a navigation bar with "THE LINUX FOUNDATION PROJECTS" and the CAMARA logo. Below the logo is a banner with the text "APIs enabling seamless access to Telco network capabilities". A red arrow points from the text above to the "API Descriptions" menu item in the navigation bar. The "API Descriptions" menu is expanded, showing a list of service categories: Authentication and Fraud Prevention, Location Services, Communication Services, Communication Quality, Device Information, Computing Services, Payments and Charging, and Service Management. To the right of this menu is another column of service categories: Call Forwarding Signal, Customer Insights, Device Swap, Know Your Customer Age Verification, Know Your Customer Fill In, Know Your Customer Match, Know Your Customer Tenure, Number Recycling, Number Verification, One Time Password SMS, Sim Swap, Sim Swap Subscriptions, and Verified Caller.

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Home About API Overview API Descriptions Working Groups Events Resources Contact

Latest News: CAMARA Spring25 meta-release announced on LinuxFoundation KubeCon + CloudExpo

# APIs enabling seamless access to Telco network capabilities

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.

- Authentication and Fraud Prevention
- Location Services
- Communication Services
- Communication Quality
- Device Information
- Computing Services
- Payments and Charging
- Service Management

- Call Forwarding Signal
- Customer Insights
- Device Swap
- Know Your Customer Age Verification
- Know Your Customer Fill In
- Know Your Customer Match
- Know Your Customer Tenure
- Number Recycling
- Number Verification
- One Time Password SMS
- Sim Swap
- Sim Swap Subscriptions
- Verified Caller

# Developers Getting Started with CAMARA APIs



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## API Description

The “Location Verification” API determines whether a mobile device is within the proximity of a specified geographical area. The API request includes the target area, defined as a circle with a specified center (latitude and longitude) and a radius or accuracy threshold. The API response confirms whether the location detected by the mobile network operator falls within the requested accuracy range.



Depending on the version of the API, other request and response parameters can be used. For example, the request can specify the maximum accepted age of the location information used in the verification, and the response can give information about such age and how the detected location matches the requested one.



## Use Cases

- Fraud prevention in location-dependent transactions for Banking and Financial Services:  
For example, if someone attempts to withdraw cash from an ATM or make a payment using your credit card number in a city within your country where you are not physically present

API Portfolio: Location Services

■ SubProject Wiki: [Device Location](#)  
(incl. how to meet the team)

■ API Wiki: [Location Verification](#)

● API Repository: [Device Location](#)

API Repository Status: **Incubating**

API Status: **Stable**

≡ API Version(s) and Release Date(s):

- [v0.2.0](#) (27.02.2024), second alpha version
- [v1.0.0](#) (10.09.2024), Fall24 meta-release
- [v2.0.0](#) (10.03.2025), Spring25 meta-release

API availability: Information which APIs are available in which country and network, and how to get access can be found on the [GSMA public launch status page](#).

# Developers Getting Started with CAMARA APIs



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The screenshot shows a GitHub repository page for 'DeviceLocation'. A large orange arrow points from the left towards the repository name 'DeviceLocation' at the top. The page includes a navigation bar with links for Code, Issues (16), Pull requests (4), Discussions, Actions, Projects, Wiki, Security, Insights, and Settings. Below the navigation is a search bar and a button to 'Edit Pins'. The repository title 'DeviceLocation' is shown with a 'Public' badge. It features a main branch dropdown, a list of 30 branches, and 9 tags. A 'Go to file' search bar and an 'Add file' button are also present. The main content area displays a list of commits, including:

Author	Commit Message	Date
bigludo7	Merge pull request #320 from camaraproject/backToWip	200c846 · last month
	.github	last year
	code	last month
	documentation	2 months ago
	lint_function	last year
	.spectral.yml	last year
	.yamlint.yaml	last year
	CHANGELOG.md	2 months ago
	CODEOWNERS	10 months ago
	GOVERNANCE.MD	3 years ago
	LICENSE	3 years ago
	MAINTAINERS.MD	2 months ago
	README.md	2 months ago

The right sidebar contains sections for About, incubating-api-repository, Readme, Apache-2.0 license, Activity, Custom properties, 32 stars, 25 watching, 33 forks, Report repository, Releases (6), r2.2 (Latest on Mar 10), + 5 releases, and Packages.

# Developers Getting Started with CAMARA APIs



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## Integrate API call in own code, e.g. for Sim Swap:

- Get API definition and documentation from <https://camaraproject.org/api-overview/> (open&free!)
- Get API availability from GSMA public launch status map (linked in API description)
- Get API access e.g. from DT, Orange, Telefonica (linked in map)

The screenshot shows the CAMARA API Overview page. The top navigation bar includes links for Home, About, API Overview (which is highlighted), API Descriptions, Working Groups, Events, Resources, and Contact. Below the navigation is a grid of service categories:

Authentication and Fraud Prevention	Location Services	Communication Services	Communication Quality	Device Information	Computing Services	Payments and Charging	Service Management
Call Forwarding Signal	Geofencing Subscriptions	WebRTC Call Handling	Application Profiles	Connected Network Type	Simple Edge Discovery	Blockchain Public Address	
Customer Insights	Location Retrieval	WebRTC Event Subscription	Connectivity Insights	Connected Network Type Subscriptions		Carrier Billing	
Device Swap	Location Verification	WebRTC Registration	Connectivity Insights Subscriptions	Device Identifier		Carrier Billing Refund	
Know Your Customer Age Verification	Population Density Data		Home Devices QoD	Device Reachability Status			
Know Your Customer Bill In	Region Device Count		QoD Provisioning	Device Reachability Status Subscriptions			
Know Your Customer Match			QoS Profiles	Device Roaming Status			
Know Your Customer Tenure			Quality on Demand	Device Roaming Status Subscriptions			

The screenshot shows the CAMARA API Description page for the "Sim Swap" API. The top navigation bar is identical to the Overview page. The main content area includes:

- API Description:** A detailed description of the "Sim Swap" API, explaining its purpose (monitoring and detecting SIM card changes) and how it can be used for fraud prevention, account protection, and transaction validation.
- API Portfolio:** Authentication and Fraud Prevention.
- SubProject Wiki:** Number Insights (incl. how to meet the team).
- API Wiki:** Sim Swap.
- API Repository:** Sim Swap.
- API Repository Status:** Incubating.
- API Status:** Stable.
- API Version(s) and Release Date(s):**
  - v0.4.0 (14.11.2023)
  - v1.0.0 (04.04.2025), Fall'24 meta-release, patch release
  - v2.0.0 (13.03.2025), Spring'25 meta-release
- API Availability:** Information which APIs are available in which country and region.

The screenshot shows the GSMA Open Gateway public launch status map. The map highlights Germany in red, indicating a high level of API deployment. A legend at the bottom right shows a color scale from green (Low) to red (High). The map title is "GSMA Open Gateway".

API'S DEPLOYED (40)					
Markets	Channel Partner	Provider	API Name	Version	Certified
Germany	Infobip	Deutsche Telekom	SIM Swap - Check	0.4.0	GSMAA API Certified
Germany	Infobip	Telefónica	SIM Swap - Check	0.4.0	GSMAA API Certified
Germany	Infobip	Vodafone	SIM Swap - Check	0.4.0	GSMAA API Certified

Benefit for developers  
to work in CAMARA



As a typical Open Source Project **CAMARA is driven by contribution!**

People who contribute define priorities and drive the direction.

Working in CAMARA on API definitions, API documentations and API code (transformation functions) enables to

- **Bring in own demand** and contribute a solution
- **Influence the definition** of new APIs and API versions
- Ensure that own requirements are considered
- **Provide code which can be used globally**
- **Learn** about CAMARA, Open Gateway and the Network API ecosystem
- **Get deep knowledge about the APIs**
- **Become maintainer and TSC member** to influence technical decisions in CAMARA

# Joining CAMARA as Developer



To join the CAMARA mailing list send an (empty) email to [all+subscribe@lists.camaraproject.org](mailto:all+subscribe@lists.camaraproject.org).

A screenshot of the CAMARA Members page. The left sidebar shows navigation options: Home (Owner), Subscription, Admin, Pending, Members (which is selected and highlighted in blue), and Activity. The main content area shows the user's profile: All / Members / markus / markus.kuemmerle@telekom.de (Mod). A "Membership" dropdown menu is open, showing "User Details" and "Email Address". The email address listed is markus.kuemmerle@telekom.de. A note at the bottom states: "Note: Changing this email address changes the email address for this person's account, affecting all of their other subscriptions." The entire screenshot has a blue border.

The CAMARA GitHub <https://github.com/camaraproject> can be accessed without any prerequisite. To create issues and start contributing to CAMARA you need a free GitHub account.

# Joining CAMARA as Developer



Each API in CAMARA is developed in a separate repository under a Sub Project or as an Independent Sandbox with (example QoD):

- A dedicated lead repository (containing API definition and API documentation)
- 0...n provider implementation repositories (containing API code)
- A dedicated mailing list and meeting schedule to discuss progress/issues on the APIs

The screenshot shows a list of GitHub repositories under the "QualityOnDemand" organization:

- QualityOnDemand** [Public] - Description: Repository to describe, develop, document and test the QualityOnDemand API family. Languages: Java, Apache-2.0. Stars: 37. Updated 3 days ago.
- QualityOnDemand\_PI1** [Public] - Description: Provider Implementation of QualityOnDemand by Deutsche Telekom. Languages: Java, Apache-2.0. Stars: 5. Updated 2 hours ago.
- QualityOnDemand\_PI2** [Public] - Description: Provider Implementation of QualityOnDemand by Orange. Languages: Kotlin, Apache-2.0. Stars: 0. Updated on Nov 9, 2023.
- QualityOnDemand\_PI3** [Public] - Description: Provider Implementation of QualityOnDemand by Spry Fox Networks. Languages: Go, Apache-2.0. Stars: 0. Updated on Apr 24, 2023.

**sp-qod@lists.camaraproject.org**

Sub Project "Quality on Demand"

## Group Information

- 95 Members
- 27 Topics , Last Post: May 17
- Started on 07/05/22
- RSS Feed

## Group Email Addresses

Post: [sp-qod@lists.camaraproject.org](mailto:sp-qod@lists.camaraproject.org)

Subscribe: [sp-qod+subscribe@lists.camaraproject.org](mailto:sp-qod+subscribe@lists.camaraproject.org)

Unsubscribe: [sp-qod+unsubscribe@lists.camaraproject.org](mailto:sp-qod+unsubscribe@lists.camaraproject.org)

Group Owner: [sp-qod+owner@lists.camaraproject.org](mailto:sp-qod+owner@lists.camaraproject.org)

Help: [sp-qod+help@lists.camaraproject.org](mailto:sp-qod+help@lists.camaraproject.org)

# Joining a Sub Project as Developer



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To join a Sub Project please have a look into its Readme.md (example Quality on Demand):

last commit april issues 10 open pull requests 2 open contributors 27 repo size 11.5 MiB License Apache 2.0 release r2.2  
Incubating API Repository

## QualityOnDemand

Incubating API Repository to evolve and maintain the definitions and documentation of QualityOnDemand Service API(s) within the Sub Project [Quality On Demand](#)

### Scope

- Service APIs for "Quality on Demand" (see APIBacklog.md)
  - The Service APIs provide the API consumer with the ability to:
    - retrieve the possible quality options (profiles) from the network (qos-profiles)
    - set the quality for a connection of a mobile device or a home device within the access network
      - dynamically, for a selected session of a specific duration (quality-on-demand)
      - provisioned, applying the same quality each time the device connects to the network (qod-provisioning)
    - get a notification if the network cannot fulfill the requested quality profile (quality-on-demand, qod-provisioning)
  - Describe, develop, document and test the APIs (with 1-2 Service Providers)
  - Started: October 2021
  - Incubating stage since: February 2025
- Meetings are held virtually: [Meeting registration / Join](#)
- Schedule: bi-weekly, Friday, 2 PM CET/CEST (13:00 UTC, 12:00 UTC during European DST). For date/time of next meeting see previous [meeting minutes](#).

### Status and released versions

- Note: Please be aware that the project will have frequent updates to the main branch. There are no compatibility guarantees associated with code in any branch, including main, until a new release is created. For example, changes may be reverted before a release is created. For best results, use the latest available release.
- The latest available and released version 0.10.1 is available [here](#)
  - API definition v0.10.1 with inline documentation:
    - [View it on ReDoc](#)
    - [View it on Swagger Editor](#)
    - OpenAPI [YAML spec file](#)
  - The previous released version v0.9.0 is available within the [release-0.9.0 branch](#)
  - For changes between v0.10.0 and v0.9.0 see the [CHANGELOG.md](#)
  - Provider implementations (PI) are available within separate repositories (partly for previous releases):
    - [QualityOnDemand\\_PI1](#) by Deutsche Telekom
    - [QualityOnDemand\\_PI2](#) by Orange
    - [QualityOnDemand\\_PI3](#) by Spry Fox Networks

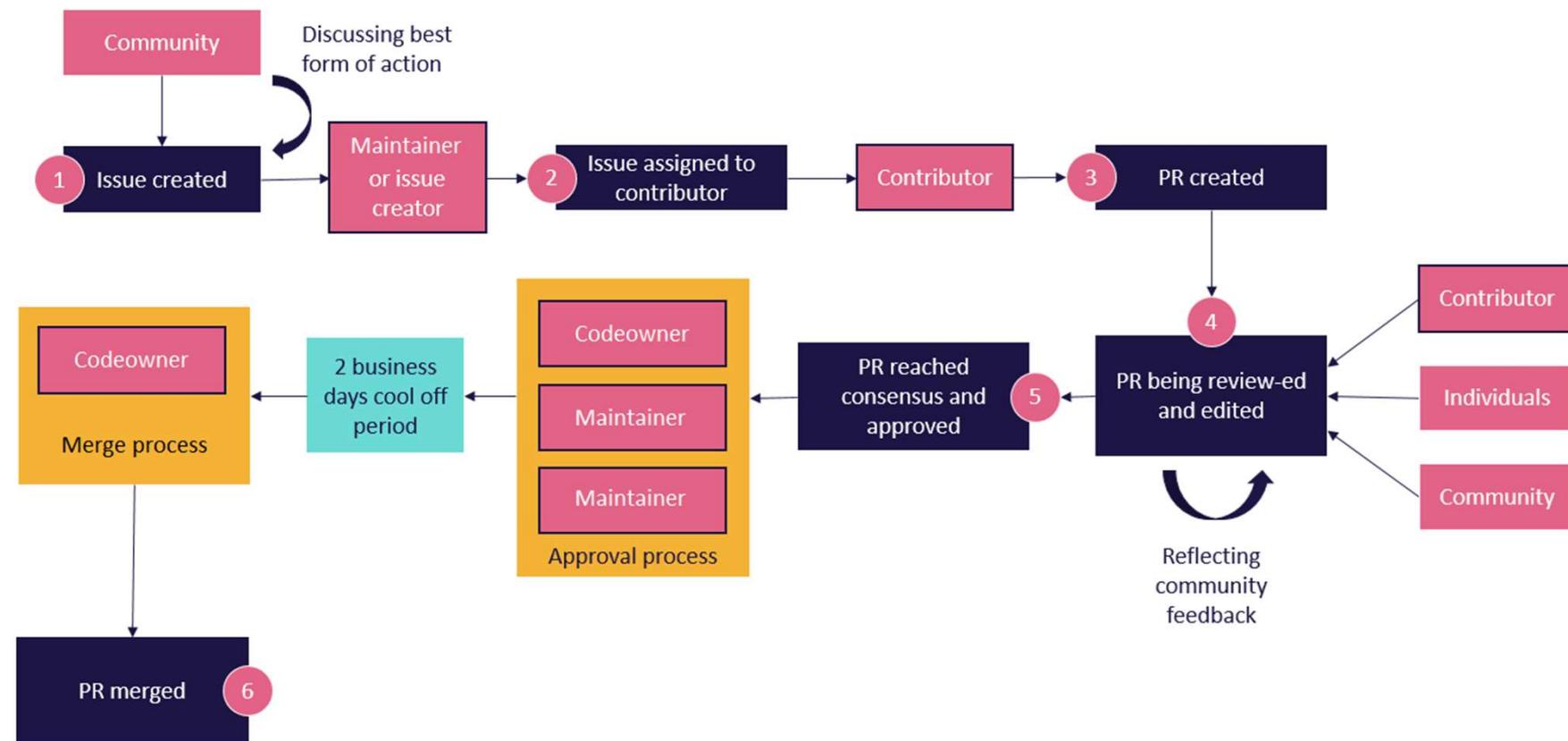
### Contributorship and mailing list

- To subscribe / unsubscribe to the mailing list of this Sub Project and thus be / resign as Contributor please visit <https://lists.camaraproject.org/g/sp-qod>.
- A message to all Contributors of this Sub Project can be sent using [sp-qod@lists.camaraproject.org](mailto:sp-qod@lists.camaraproject.org).

# Contributing to CAMARA



In the Project the “Fork and pull model” is used. Changes and contributions to CAMARA shall follow this process:



<https://github.com/camaraproject/Governance/blob/main/ProjectStructureAndRoles.md>

Benefit for operators to implement  
CAMARA APIs in their networks



Operators have made high investments in

- Spectrum licenses
- Infrastructure (cell towers, fibre)

Operators haven't been successful in

- Increasing prices for connectivity contracts

CAMARA APIs open opportunities

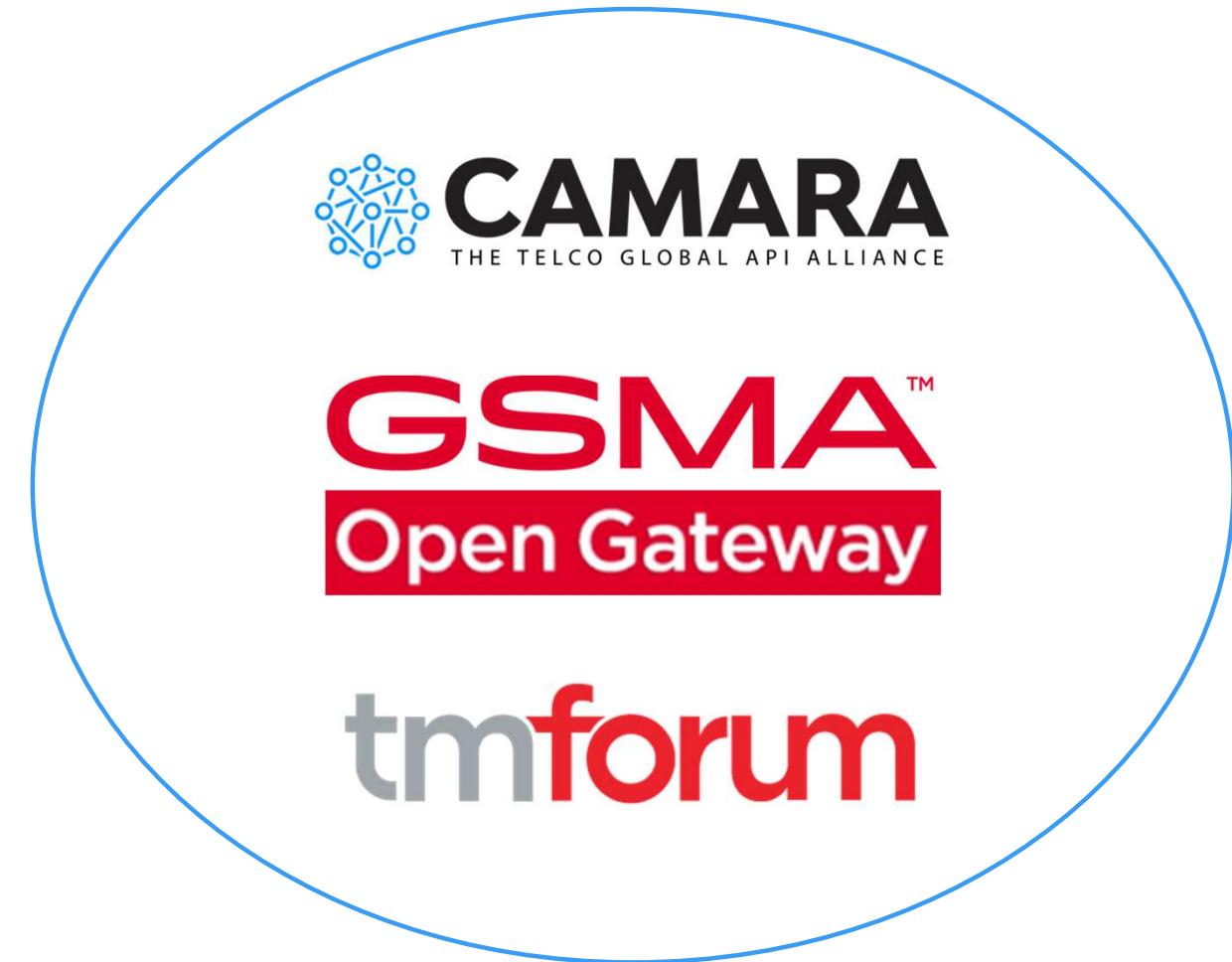
- To monetize the high investments
- To improve customer experience
- For market positioning



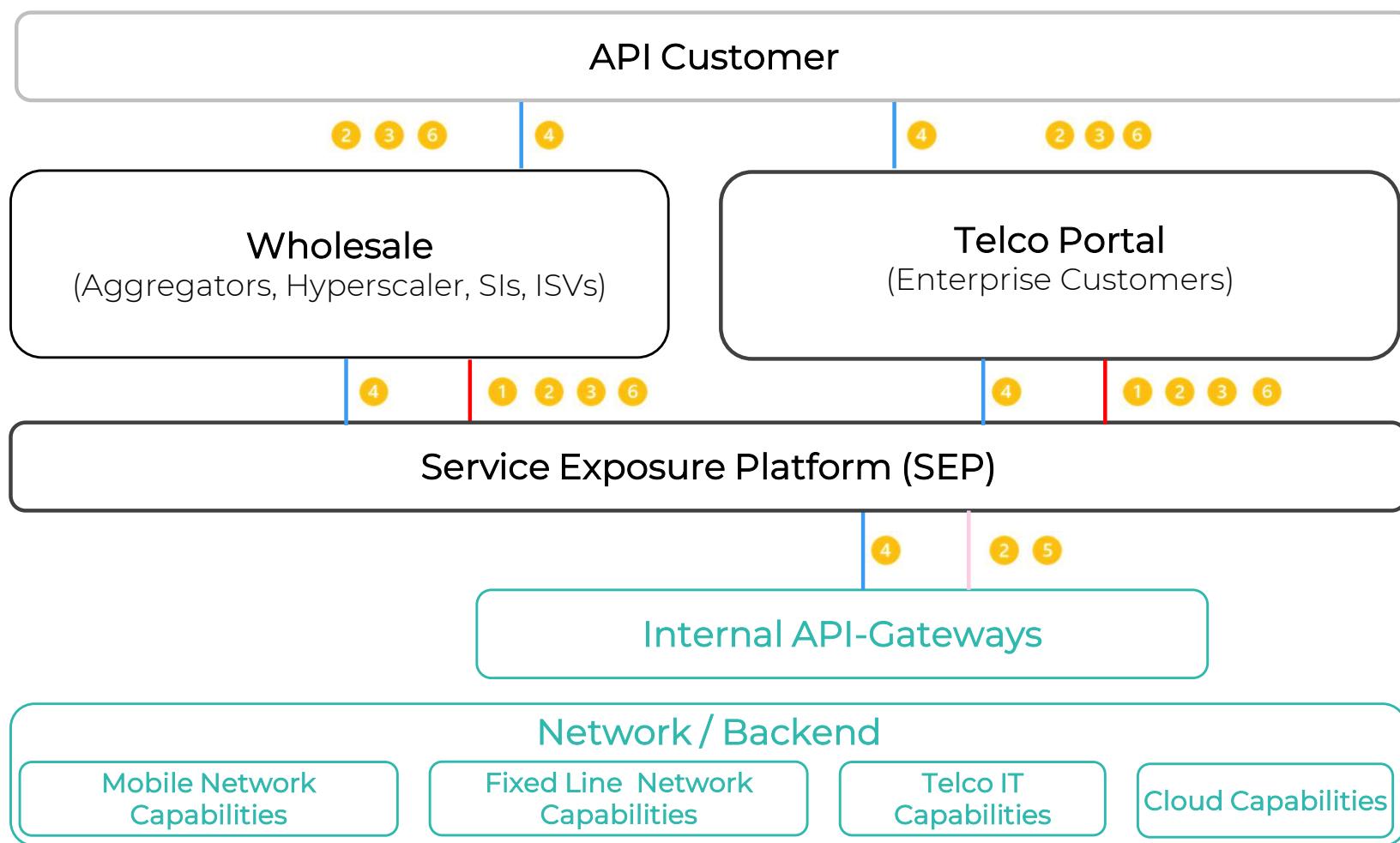
# What have operators to do to implement Network APIs?



- Implement CAMARA APIs based on the network capabilities
- Implement an exposure infrastructure, with TMForum Operate APIs
- Define commercial products
- Sell it



# What have operators to do to implement Network APIs?



## Possible API workflows

1. Catalog published from SEP to portals
2. Customer onboarding to SEP
3. Customer orders API, SEP sends credentials to access API
4. If necessary SEP requests user consent for API. Capacity management is done.  
Customer uses API. SEP performs metering and rating.
5. SEP initiates billing for wholesale and retail
6. Customer offboarding

# Benefit for operators to work in CAMARA



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## Collaborative Innovation

- Industry Collaboration
- Standardization: contribute to development of industry standards, ensuring interoperability and consistency across networks and services
- Bring in your requirements!

## Networking and Partnerships

- Access to a growing global network of industry leaders
- Technological Advancements
- Knowledge Exchange

## Shared Resources

- Collaborative projects often lead to cost savings through shared resources and reduced duplication of efforts
- Benefit from the collective research efforts

# Benefit for operators to work in CAMARA



## Why Join CAMARA as a sponsor /member?

Seat on the Governing  
Board to influence  
CAMARA strategy

Elevate your Brand

Signal Support &  
Commitment to open API  
development

Discounts on Linux  
Foundation events &  
programs

Help ensure the Project  
continues to provide  
needed governance &  
infrastructure

Platform to showcase  
thought leadership

# Operators Getting Started with CAMARA



Individuals and organizations who are application developers / API consumers (e.g. enterprises and startups), aggregators, cloud operators, telco operators, network equipment vendors, system integrators, and software vendors are welcome to join CAMARA.

For organizations:

- If you are interested to show your logo on the CAMARA website as "**Participating Organization**" send a .SVG version of it to [adm@lists.camaraproject.org](mailto:adm@lists.camaraproject.org). Participation is free, without any fees or obligations.
- If you would like to become a **CAMARA sponsor** please don't hesitate to use the [enrollment link](#). The cost is depending on the kind of membership and the number of employees.
- Associate Members of The Linux Foundation can also join as "**Associating organization**" for free, without any fees or obligations.

# Operators Getting Started with CAMARA



## Why Organizations Join CAMARA?

Aside from having a seat at the collaborative table to shape the future of the open telco API ecosystem, organizations join CAMARA as a sponsoring member to:

	<b>Influence strategy and direction of the open telco API ecosystem</b>  CAMARA sponsor organizations play a pivotal role in shaping the open telco API ecosystem by participating in the CAMARA governing board to influence strategic decisions and prioritize marketing activities. Sponsors contribute financial and technical resources to accelerate development, support testing initiatives, and enhance developer tools and documentation for broader usability.		<b>Accelerate time to market</b>  IDC recently projected revenues for telecom and network APIs to reach \$6.7 billion in 2028, up from just \$700 million in 2023. Be part of the ecosystem from the ground up! Together with partner organizations GSMA Open Gateway and TM Forum, CAMARA APIs help operators monetize high investments in areas like spectrum licenses and infrastructure.		<b>Elevate your brand</b>  Those participating in cross-industry collaboration to evolve open APIs have the chance to showcase their efforts broadly and gain visibility as a pioneering expert in the openTelco API space. CAMARA members have access to multiple industry platforms, including speaking and networking opportunities (both virtually and in-person); authoring white papers, blogs, and other publications; press and analyst engagement; and so much more, including access to Linux Foundation channels that reach developers, operators, hyperscalers, enterprises, vendors, and other from around the world.		<b>Collaborate with global thought leaders</b>  Access to a varied community of leading industry organizations across Telecom, Cloud, hyperscalers, aggregators enterprises, start-ups, and vendors, all collaborating to shape the ecosystem for more accessible and aligned open APIs. Connect with individuals and companies from across the globe, learn from peers and technical entrepreneurs while fostering new partnerships and business opportunities.		<b>Communicate commitment to ensuring the availability of accessible, quality open APIs</b>  Aligning with CAMARA signals your commitment to ensuring broad accessibility of open Telco APIs. Let your customers, partners, and shareholders know you support!
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# CAMARA

## Where are we going next...



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1

Additional APIs and roadmap sync across CSPs,  
Aggregators and Hyperscalers

2

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

3

Drive API Adoption (application developers and operators)

# CAMARA Contacts



**CAMARA**  
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Individuals and organizations from application developers / API consumers (e.g. enterprises and startups), aggregators, cloud operators, telco operators, network equipment vendors, system integrators, and software vendors are welcome to join CAMARA.

To access CAMARA technical resources like API definitions, API specifications or API code just visit the [CAMARA GitHub](#). All resources are reachable without any prerequisite. To create issues and start contributing to CAMARA you need a free GitHub account without any further prerequisite. This participation is free, without any fees or obligation to work.

If you are interested to be included in the CAMARA communication, please subscribe to [all+subscribe@lists.camaraproject.org](mailto:all+subscribe@lists.camaraproject.org). You may unsubscribe from CAMARA and these communications at any time. Participation is free.

If you are interested to show your logo on the CAMARA website as “Participating Organization” you can send it to [adm@lists.camaraproject.org](mailto: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>. Cost is depending on the kind of membership and the number of employees.





# CAMARA

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