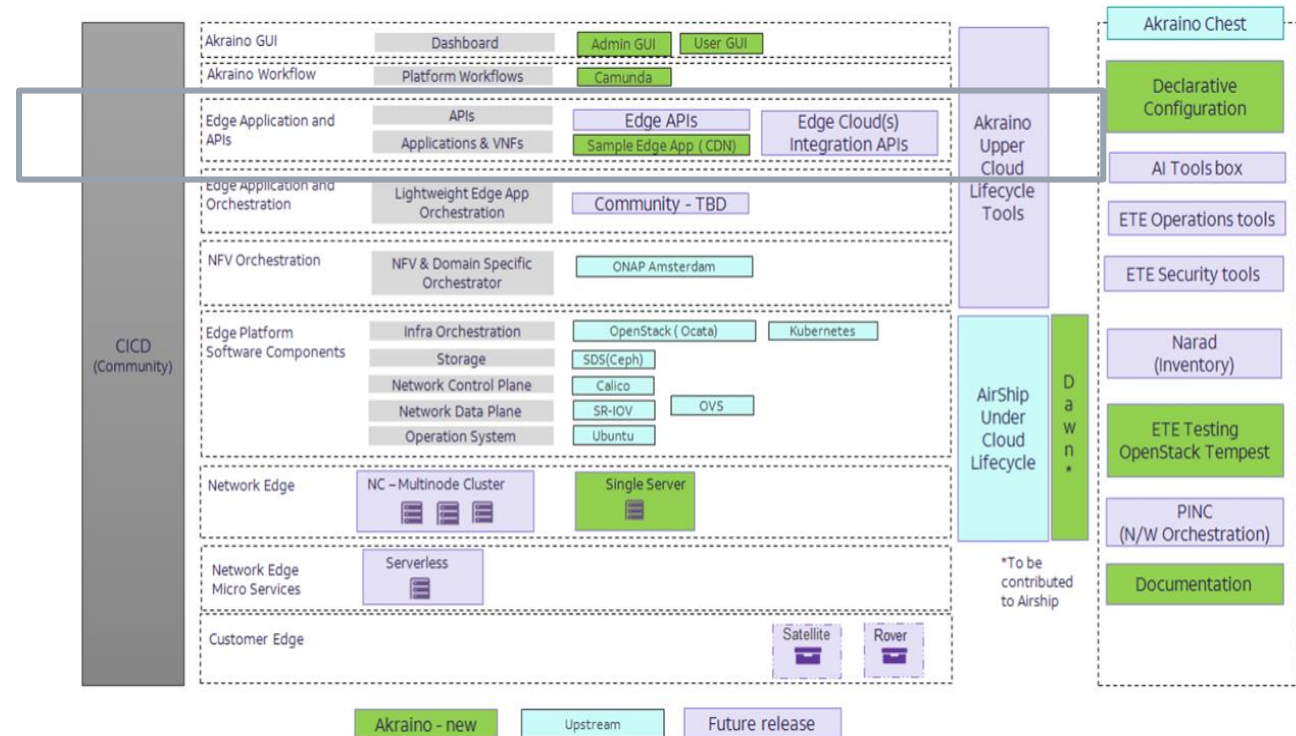# API framework

API Framework is a collection of mechanisms to enable applications in distributed cloud. The framework offers services that bring applications and services together by allowing application to offer or consume services either locally or remotely. The basic functionalities of API framework are **service registration, services discovery, new service notifications and service availability notifications.** The services can be offered by a platform that provides this API framework or applications that are associated with this framework, and with these functionalities a microservices environment can be created.

The basic communications protocol is over RESTful Http, but for services that require more powerful or one to many communications, **the API framework supports discovery for alternative transports such as MQTT, AMQP, Kafka or other transports.**

The API framework in scope of the work, is built on OpenAPI2.0/3.0 definitions of ETSI MEC available at forge.etsi.org

Akraino Telco Cloud Reference Arch

NOKIA

Building blocks to enable Apps in Distributed Cloud
Focused on application enablement & APIs

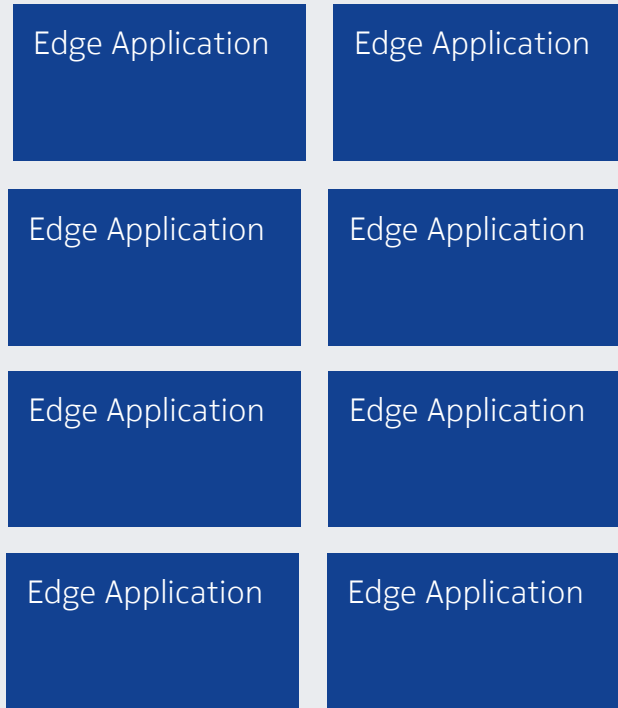| **Application Enablement (API Framework)**	**API Principles**	**Specific service-related APIs**	**Management and Orchestration related APIs**
A framework for delivering services which may be consumed or offered by (*locally hosted or remote*) authorized applications. It enables: • registration, announcement, discovery and notification of services; • communication support for services (query/response and notifications).	A set of API principles and guidance for developing and documenting APIs inside or outside ETSI which *ensures that a consistent set of APIs* are used by developers. *The work was inspired* by the TMF and OMA best practices. The APIs are designed to be *application-developer friendly* and easy to implement so as to *stimulate innovation* and foster the development of applications.	Services *expose network and context information* via specific service-related APIs. A different set of services may be applicable at different locations	Facilitate the running of applications *at the correct location at the right time*, based on technical and business parameters

Enables a myriad of new use cases across multiple sectors as well as innovative business opportunities
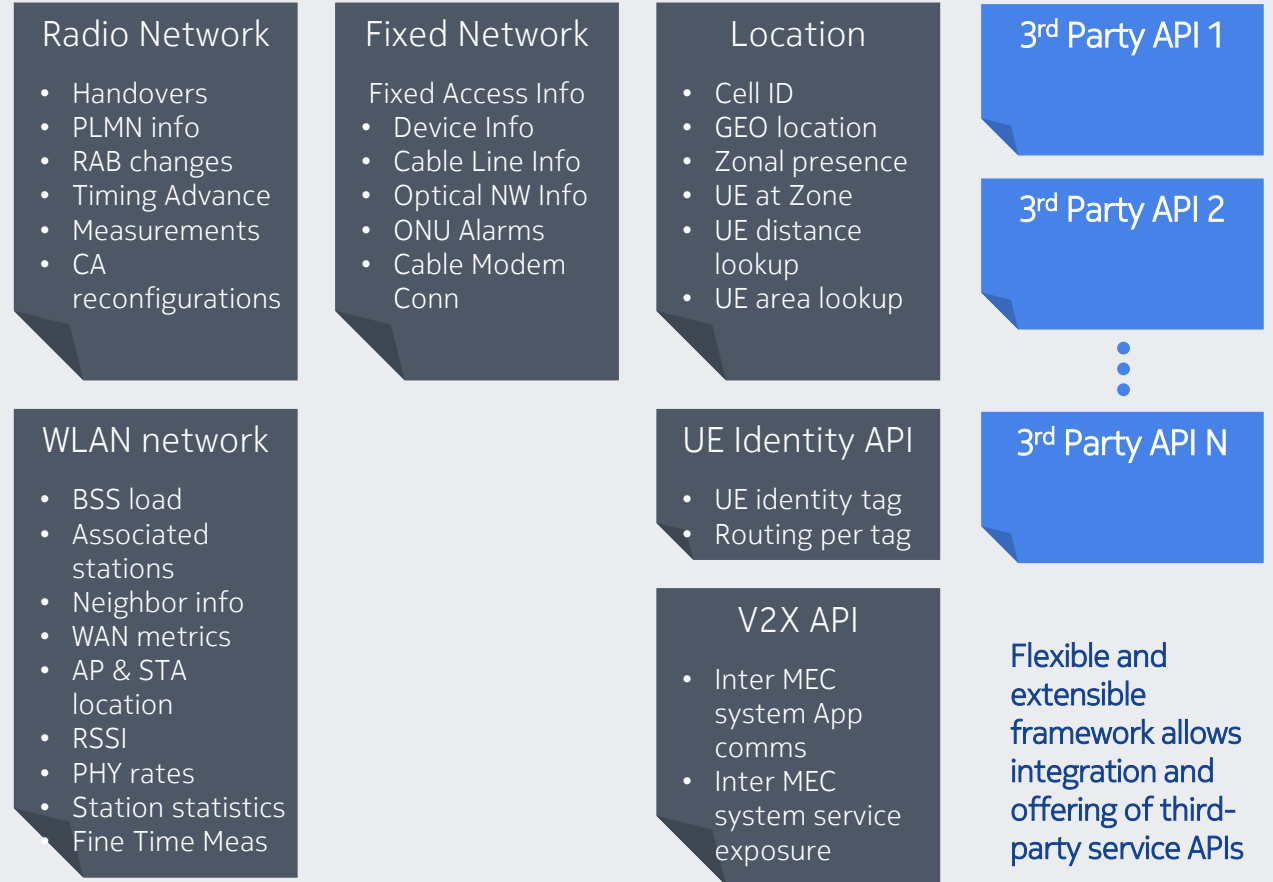
Examples of service-related APIs (ETSI MEC)
Flexible framework to allow services ecosystem in distributed clouds

Edge applications

Edge Application	Edge Application
Edge Application	Edge Application
Edge Application	Edge Application
Edge Application	Edge Application

Subscribe - Notify

Queries

RESTful HTTP

Message Bus

MEC specific service-related APIs

Radio Network
- Handovers
- PLMN info
- RAB changes
- Timing Advance
- Measurements
- CA reconfigurations

Fixed Network

Fixed Access Info
- Device Info
- Cable Line Info
- Optical NW Info
- ONU Alarms
- Cable Modem Conn

Location
- Cell ID
- GEO location
- Zonal presence
- UE at Zone
- UE distance lookup
- UE area lookup

3rd Party API 1

3rd Party API 2

WLAN network
- BSS load
- Associated stations
- Neighbor info
- WAN metrics
- AP & STA location
- RSSI
- PHY rates
- Station statistics
- Fine Time Meas

UE Identity API
- UE identity tag
- Routing per tag

V2X API
- Inter MEC system App comms
- Inter MEC system service exposure

3rd Party API N

Flexible and extensible framework allows integration and offering of third-party service APIs

NOKIA

API Framework
About tools

ETSI Standard	GS MEC 011
YAML	https://forge.etsi.org/swagger/editor/?url=https://forge.etsi.org/gitlab/mec/gs011-app-enablement-api/raw/master/Mp1.yaml
Swagger Codegen tool	https://swagger.io/tools/swagger-codegen/
OpenAPI Generator tool	https://github.com/OpenAPITools/openapi-generator
Message Transport	REST based
Message Format Supported	JSON
Language used	Go
Data Base	MariaDB
API Framework	Designed as Microservice(s), orchestration through K8S/Helm

NOKIA