

nApps: how to build 5G enabled services for the automotive sector

NEXTWORKS
HEADING THE FUTURE

Matteo Andolfi

R&D Senior Software Engineer

Nextworks

m.andolfi@nextworks.it



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Agenda

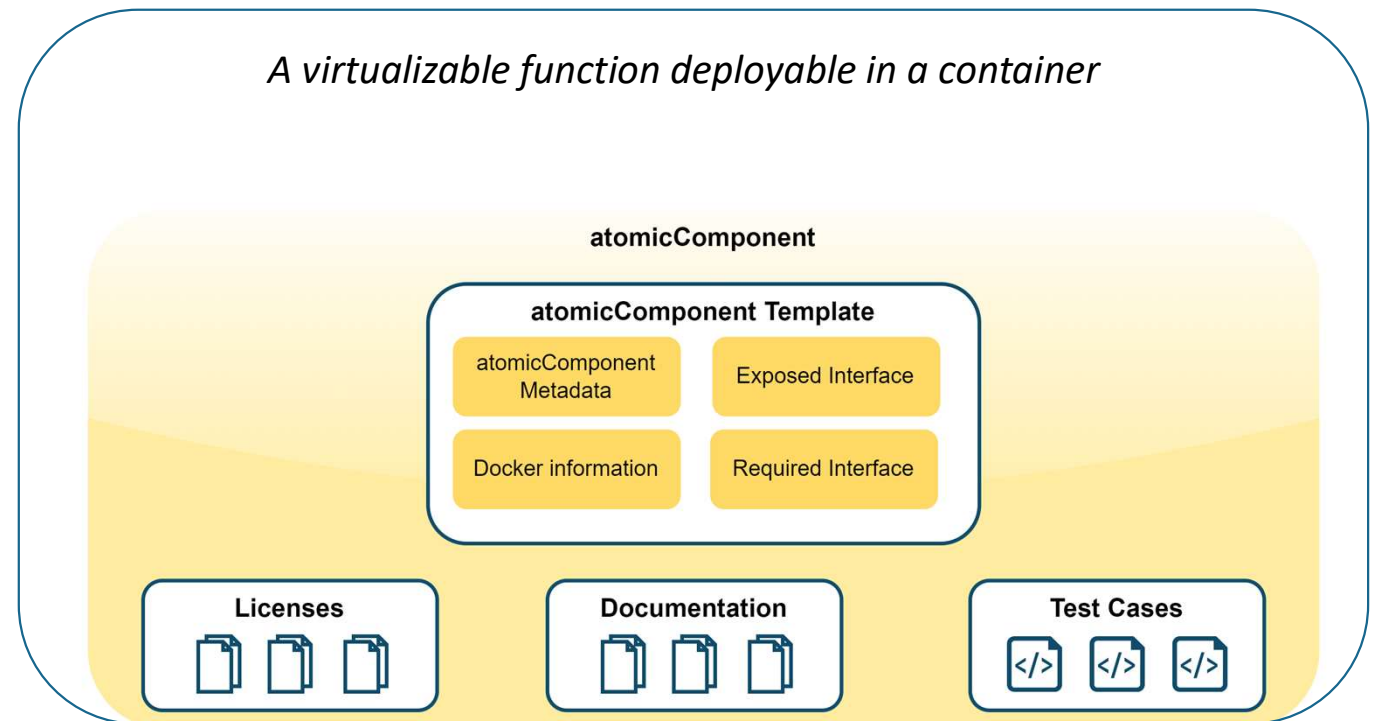
- Definitions
- nApps modeling
- nApps example



Definitions



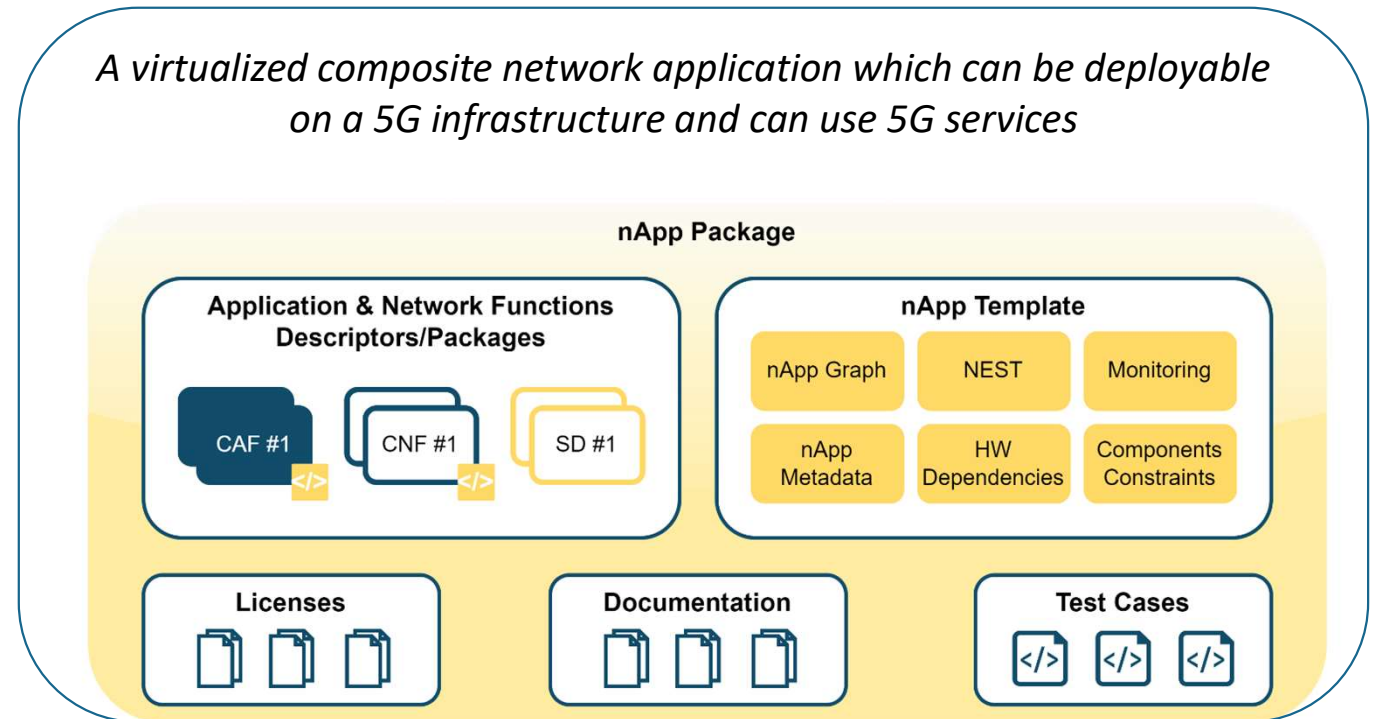
- Atomic component (AF/NF)
- Network Application (nApp)
- Vertical Service



Definitions



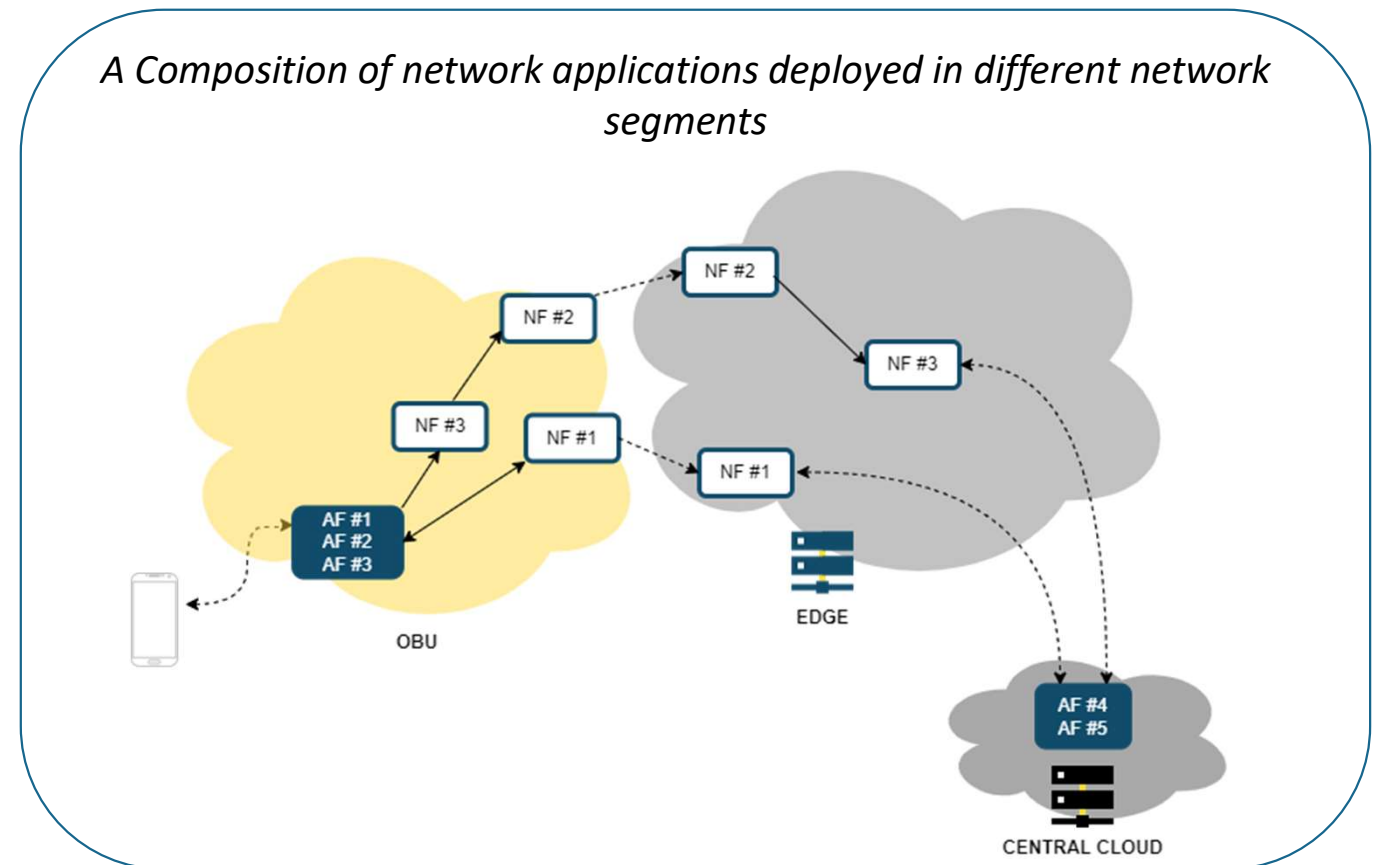
- Atomic component (AF/NF)
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Definitions

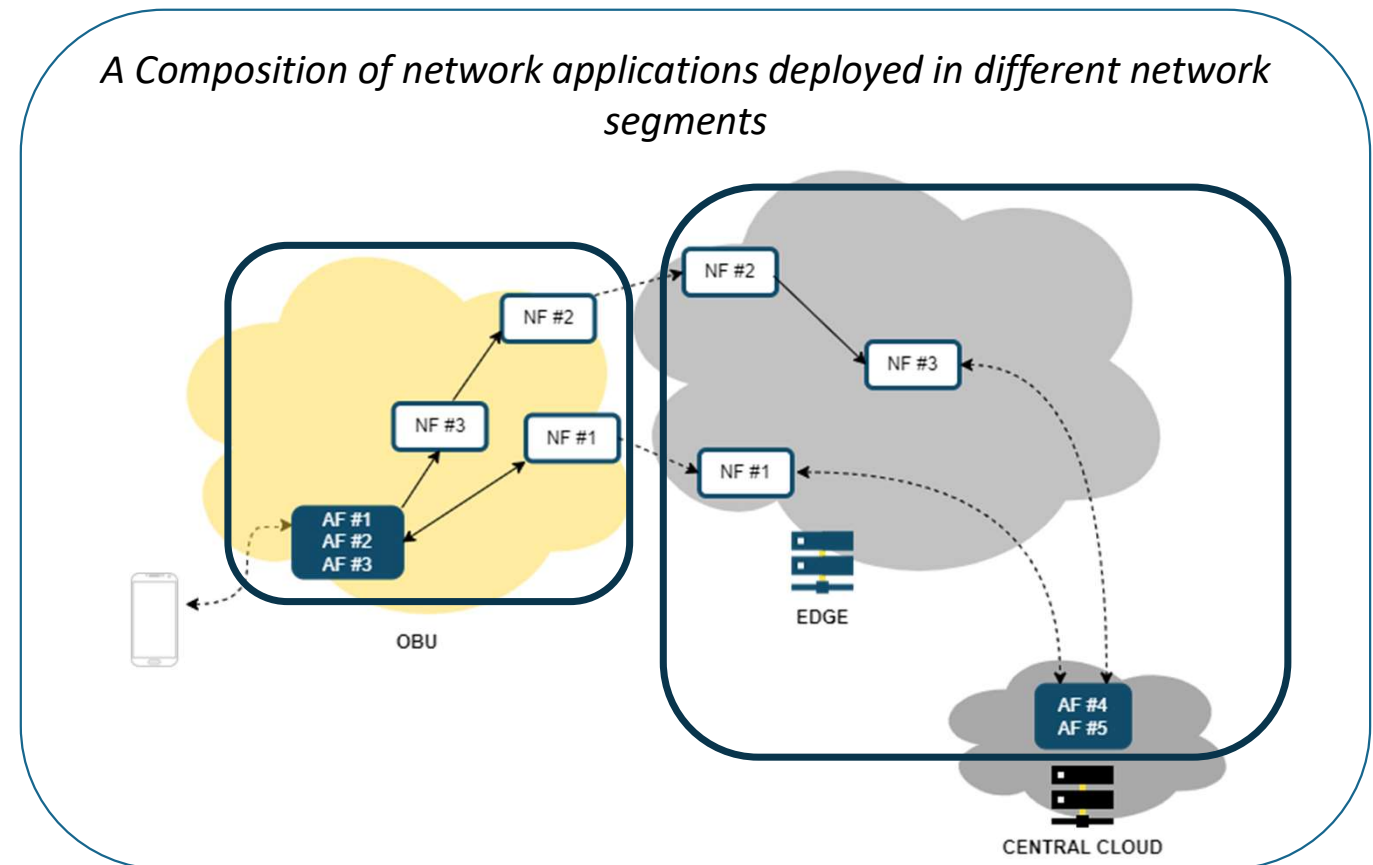


- Atomic component (AF/NF)
- Network Application (nApp)
- Vertical Service



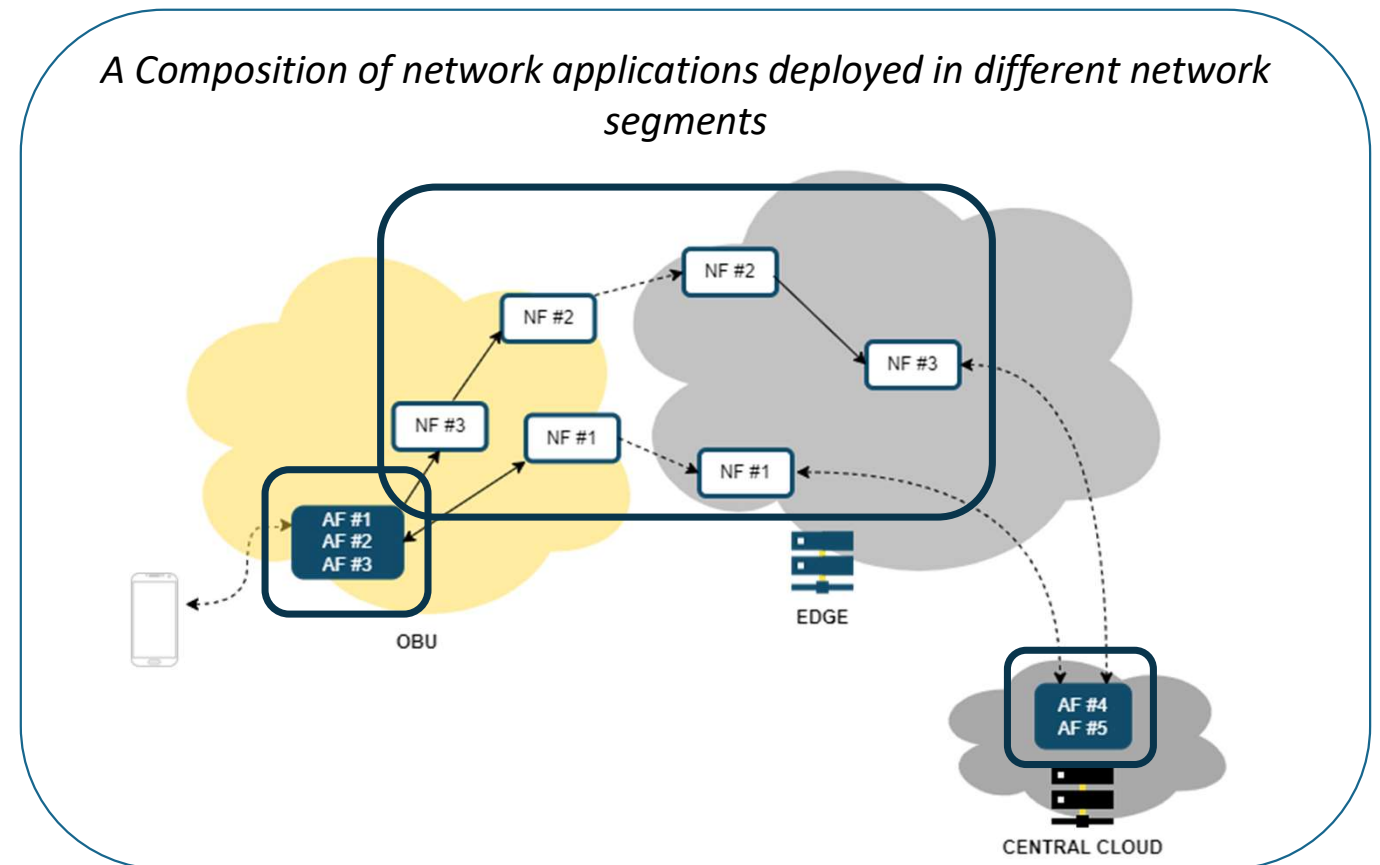
Definitions

- Atomic component (AF/NF)
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Definitions

- Atomic component (AF/NF)
- Network Application (nApp)
- Vertical Service



nApp composing process. Adding Components (1/4)



Add Atomic Component: General information

[Components](#) > [Create](#)

Components | Create

General | Distribution Parameters | Minimum Execution Requirements | Health Check | Container Execution | Environment variables | Exposed Interfaces | Required Interfaces | Plugins | Volumes | Devices | Labels | Advanced Options

General

Name *

Architecture *

Elasticity Controller *

(Public) If this option is checked, anyone could see this component

Save

nApp composing process. Adding Components (2/4)



Add Atomic Component: Docker image parameters

Components > Create

Components | Create

Navigation tabs: General, **Distribution Parameters**, Minimum Execution Requirements, Health Check, Container Execution, Environment variables, Exposed Interfaces, Required Interfaces, Plugins, Volumes, Devices, Labels, Advanced Options

Distribution Parameters

Docker Image *

Type the docker image

Docker Credentials

Use private Docker registry (Username, Password fields)

Docker Username

Type your username

Docker Password

Type your password

Use custom docker registry

Custom Docker Registry

Type the docker registry

Test Connection

(Public) If this option is checked, anyone could see this component

Save

nApp composing process. Adding Components (3/4)



Add Atomic Component: Minimum Execution Requirements

Components > Create

Components | Create

Navigation tabs: General, Distribution Parameters, **Minimum Execution Requirements**, Health Check, Container Execution, Environment variables, Exposed Interfaces, Required Interfaces, Plugins, Volumes, Devices, Labels, Advanced Options

Minimum Execution Requirements

vCPUs *

RAM (MB) *

Storage (GB) *

Hypervisor Type *

GPU-Enabled

(Public) If this option is checked, anyone could see this component

Save

nApp composing process. Adding Components (4/4)



Add Atomic Component: Exposed and Required Interfaces

← Minimum Execution Requirements Health Check Container Execution Environment variables **Exposed Interfaces** Required Interfaces Plugins Volumes Devices Labels Advanced Options →

Exposed Interfaces

[Add a new one](#)

Name: Port: Interface Type: Core Access Transmission Protocol: TCP UDP TCP/UDP + -

← Minimum Execution Requirements Health Check Container Execution Environment variables Exposed Interfaces **Required Interfaces** Plugins Volumes Devices Labels Advanced Options →

Required Interfaces

Label: Select an Interface: + -

nApp composing process. Linking components (1/3)



MAESTRO applications development and orchestration

MyTestNetApp

(Public) If this option is checked, anyone could see this Application

Search a component

Search...

- + Traefik
- + LambdaProxy
- + MariaDB
- + MongoDB
- + phpMyAdmin
- + WordPress
- + HttpEcho

MongoDB41

Save

MAESTRO applications development and orchestration

MyTestNetApp

(Public) If this option is checked, anyone could see this Application

Search a component

Search...

Generic info:
ID: v2c68vit9w
Name: WordPress

WordPress64

Required Interfaces:
1. **Interface: mariaDBSQLInterface**
Search a candidate component

Search...

Exposed Interfaces:
1. Interface: WordPressAccessInterface

WordPress64

MariaDB35

Save

nApp composing process. Linking components (2/3)



The screenshot shows the MAESTRO web interface for configuring an nApp. At the top, the MAESTRO logo is on the left, and a search bar contains "MyTestNetApp". Below the search bar is a menu icon. A checkbox labeled "(Public) If this option is checked, anyone could see this Application" is present. A search bar for components is labeled "Search a component" and contains "Search...". The main content area is divided into sections: "Generic Info:" with fields for "ID: t3tsy1ve7a" and "Name: MariaDB"; "MariaDB35" with edit and delete icons; "Required Interfaces:" with "1. N/A"; and "Exposed Interfaces:" with "1. Interface: mariaDBSQLInterface". A green "Save" button is at the bottom of this section. Below the main content area is a green "Onboard nApp" button. To the right of the interface is a diagram showing a green node "WordPress64" connected to a blue node "MariaDB35" via a line labeled "mariaDBSQLInterface".

nApp composing process. nApp package



A screenshot of the MAESTRO nApp editor interface. The top bar shows the MAESTRO logo and the application name 'MyTestNetApp'. Below the logo, there is a checkbox for '(Public) If this option is checked, anyone could see this Application'. A search bar is labeled 'Search a component'. The main content area shows 'Generic Info' with ID 't3tsy1ve7a' and Name 'MariaDB'. Below that, the name 'MariaDB35' is displayed with edit and delete icons. Under 'Required Interfaces', it lists '1. N/A'. Under 'Exposed Interfaces', it lists '1. Interface: mariaDBSQLInterface'. A green 'Save' button is at the bottom. To the right, a diagram shows a green node 'WordPress64' connected to a blue node 'MariaDB35' via a line labeled 'mariaDBSQLInterface'.

Onboard nApp

- Build of nApp package
- Commit of the nApp package to 5G-IANA Gitlab
- Execution of CI/CD pipeline to onboard the nApp package
- Onboard the nApp package on the nApp catalogue

nApp provisioning



Create new

Applications

Name
Search by Name

Filter Reset

Identifier	Name	Organization	Visibility	Date Created	
qmepvg98xp	CMSApp	Admin_Organization	Public	12/11/2022 - 19:09	Create Instance Delete

Application Instances

Name Status Application

Search by Name -- Select -- -- Select --

Filter Reset

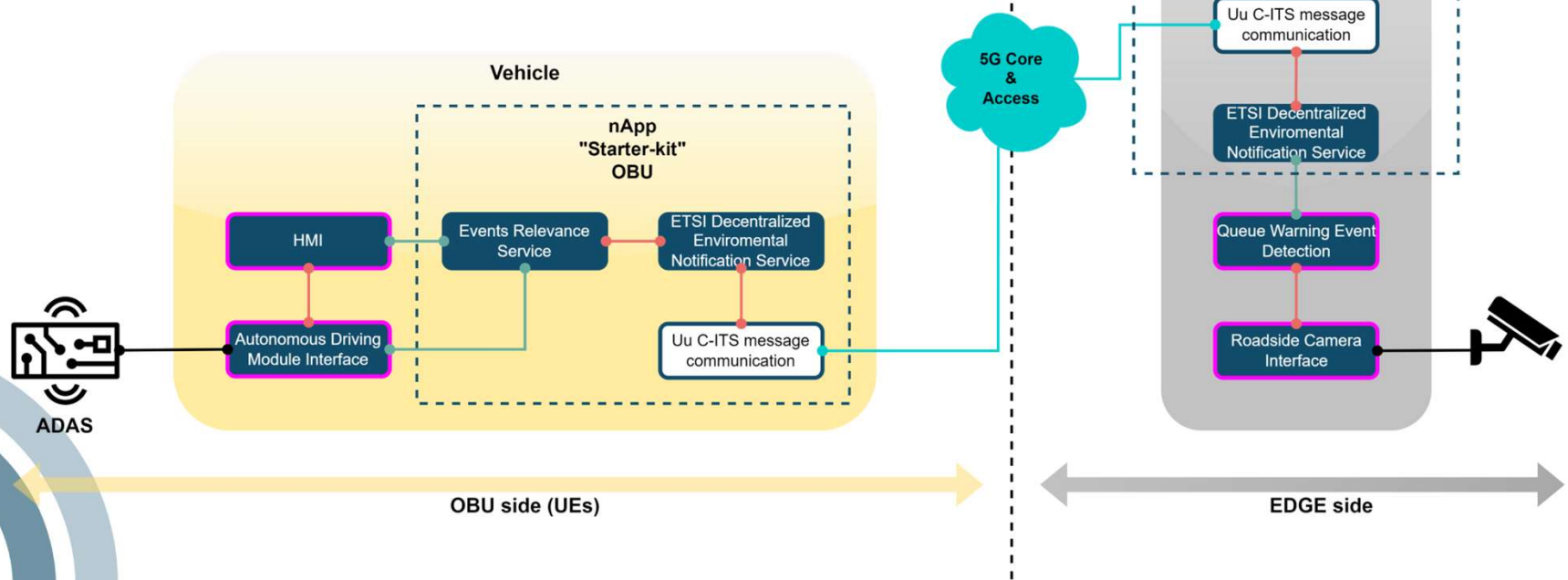
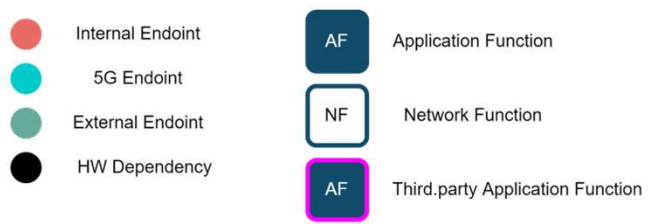
Identifier	Name	Application Name (Hex ID)	Status	Date Created	
ebhqr7a4q	billy	mbtrst (mt33au5i55)			View Graph Profiling Elasticity Policies Security Dashboard Soc-Policies Analytics SLO Un-deploy
exfy8mivab	DS	DBMS (atnwnbjjj6)	DEPLOYED	17/11/2022 - 16:45	
c58826jsjt	ubitest	UWSv2 (p0sg4x1gqn)	DEPLOYED	29/09/2022 - 12:03	



nApp for automotive vertical service (1/2)



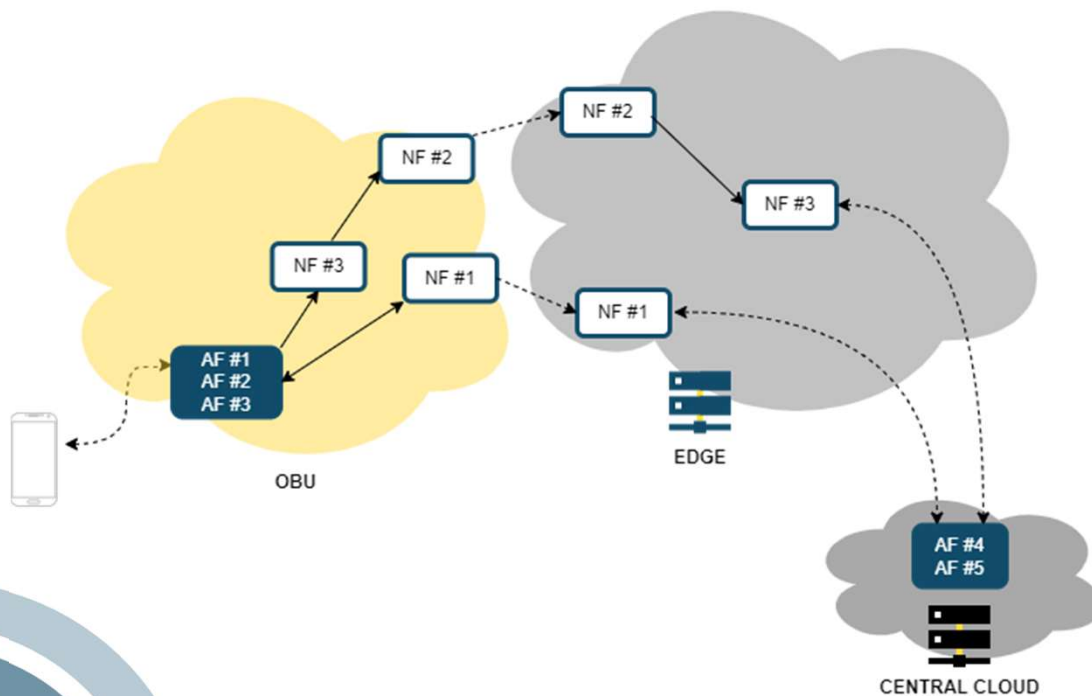
← Queue Warning Event Service →



nApp for automotive vertical service (2/2)



UC5 Real-time Road network risk assessment



Atomic Component	Interfaces
AF#1 Position and time service	AF#2, AF#3, mobile phone
AF#2 Hazardous event receiver and display	AF#1, AF#3, mobile phone and display
AF#3 Hazardous driving behaviour detection	AF#1, A#2, mobile phone
AF#4 Elastic Search Service	AF#5
AF#5 Log Reporting Service	AF#4
NF#1 Uu data communication	AF#1, AF#2, AF#3
NF#2 C-ITS messages communication	NF#3
NF#3 ETSI Decentralized Environmental Notification Service	NF#2, AF#1, AF#2, AF#3, AF#4, AF#5

Conclusion



- Atomic Components and nApps are building blocks to create Vertical Services
- The building blocks can be easily chained together in a graphical way
- In 5G-IANA we provide a set of nApps, called «starter kits» available to use for integrating them into third-party vertical services

www.5g-iana.eu

Thank you for your attention!

Any questions?

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