# 5G automation and qualification frameworks serving energy networks

**IEEE 5G Summit**

**Thessaloniki, 11 July 2017**

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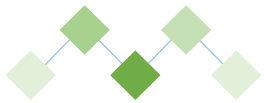
## 5G-PPP Vision

# Mobile communications infrastructures for all

- 1000 times higher mobile data volume per geographical area.
- 10 to 100 times more connected devices.
- 10 times to 100 times higher typical user data rate.
- 10 times lower energy consumption.
- End-to-End latency of < 1ms.
- Ubiquitous 5G access including in low density areas



# SONATA – What

- **Title:** Service Programming and Orchestration for Virtualized Software Networks
- **Relation to 5G-PPP**: 5G-PPP Phase I project

- **Core objectives – Highlights**
  - Reduce time-to-market of networked services
  - Optimize resources and reduce costs of service deployment and operation
  - Accelerate industry adoption of software networks

# SONATA – How

1. **SONATA Service Platform**
   - Management of complex NSs throughout their entire lifecycle
   - Customizable MANO framework (at network and function level)
   - Extended monitoring of all VNF and NS resources

2. **Software Development Kit**
   - A service graph editor that allows a visual creation and modification of VNF chains
   - A light-weight NFV-based emulator capable of generating a virtual multi-PoP test environment on a developer's machine
   - Support for VNF and NS performance profiling, to assist in capacity and resource planning for virtualized services

# 5GTANGO – What

- **Title:** 5G Development and Validation Platform for global Industry – specific Network Services and Apps
- **Relation to 5G-PPP**: 5G-PPP Phase II project

- **Core Objectives – Highlights**
  - Further reduce the time-to-market for networked services
  - Derive new business models through the customisation and adaptation of the network to vertical applications' requirements.
  - Accelerate the NFV uptake in industry through the validation at scale of Network Service capabilities of the 5GTANGO platform in vertical show cases.

# 5GTANGO - How

1. **Uptake the work of the SONATA project and further extend the SDK and the SONATA Service Platform**
   - SDK support for new VNFs and chained NS
   - Service Platform out-of-the-box support for more VIMs, WIMs, NFVIs, etc.
   - Scalability and Stability improvements with a focus on interoperability

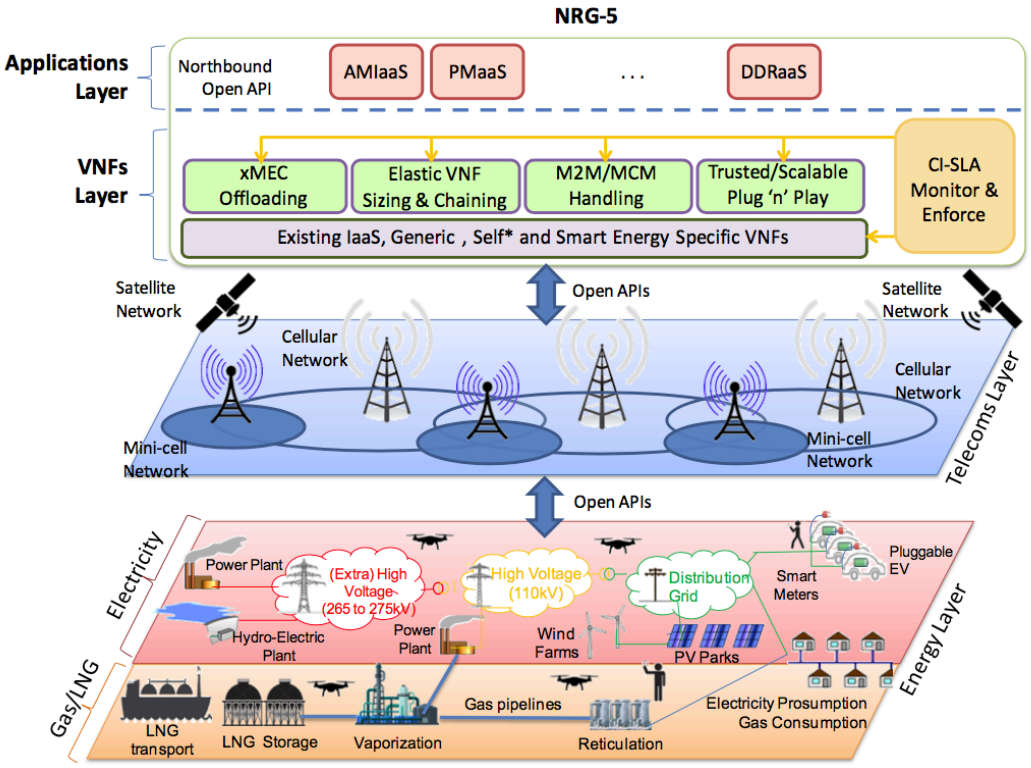
2. **Design and implementation of a Validation and Verification Store**
   - VNF/NS Repository
   - Enriched catalogues (VNFs and NS)
   - Automated tests as a certification process for complying network services of VNFs vendors and third party developers

# NRG-5 – What

- **Title:** Enabling Smart Energy as a Service via 5G Mobile Network advances
- **Relation to 5G-PPP**: 5G-PPP Phase II project

- **Core Objectives – Highlights**
  - Achieve decentralized, secure and trusted plug ‘n’ play operation for smart energy field devices
  - Output New generic and energy utility-centric VNFs to render the realization of next-generation Smart Grid services possible
  - Explore new operational modes and business models for the smart energy utilities

# NRG-5 – How




1. Definition of an extended MEC software stack for fast and optimal deployment of generic and utility-centric VNFs

2. Build on MCM communications through the development of generic- and utility-centric VNFs

3. Realize an extended 5G ETSI-MANO framework integrating analytics in the OSS/MANO layers addressing smart energy applications requirements

# NRG-5 – Use cases and trials

- **Realizing the decentralized, trusted, lock-in free "Plug & Play vision"**
  - vAAA, vBCP, vTSD, vSON, vMME
- **Enabling aerial predictive maintenance for utility infrastructures**
  - vPMaaS, vMPA, vDFC
- **Enabling resilience and high availability via Dispatchable Demand Response**
  - vPMU, vESR, vDER

- **3 Laboratories**
  - Generic SDN micro Data Centre
  - Coordinated transatlantic IoT/LTE Testbed
    - University Pierre et Marie Curie
    - Rutgers State University of New Jersey
  - 5G/Smart Grid Laboratory
    - University RWTH Aachen
- **2 real-life pilots**
  - ASM Terni, Italy (D/R Control)
  - ENGIE, France (GAS/LNG Control)

# Goal: To deliver energy-centric 5G technology qualification & validation

1. Adopt SONATA SDK and Service Platform for accelerating the design and implementation of ETSI-MANO compliant, generic- and utility-centric VNFs

2. Closely collaborate with 5GTANGO as to the evolution of:
   - Service Platform and SDK improvements requirements
   - Definition of specific requirements as to the validation and verification of VNFs that exhibit peculiarities as to their performance requirements

3. Explore the possibilities that 5G can unlock to smart energy systems and Utilities
   - New operational models
   - New business models

# Lookup details

- SONATA
  - Website: http://www.sonata-nfv.eu/
  - Contact: SONATA-Contact@5g-ppp.eu

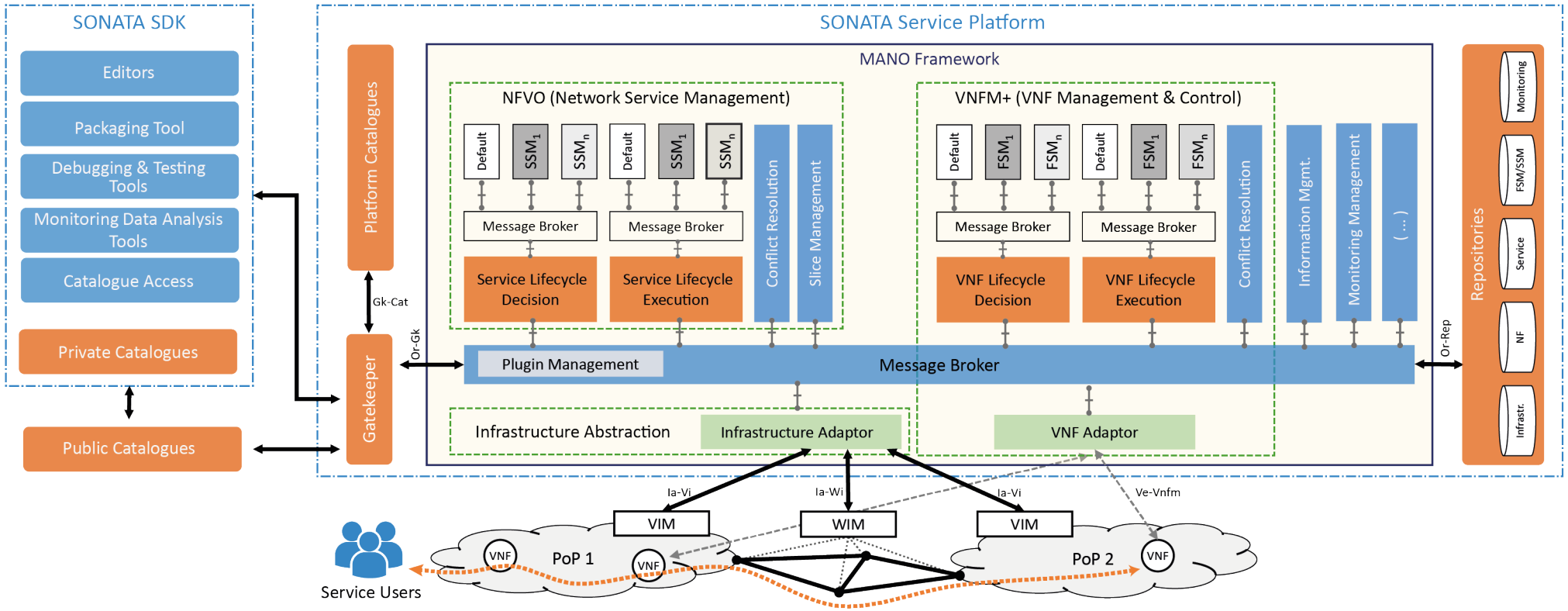
- 5G-TANGO
  - Website: http://www.5gtango.eu/
  - Contact: 5gtango-Contact@5g-ppp.eu

- NRG-5
  - Website: http://www.nrg5.eu/
  - Contact: NRG-5-Contact@5g-ppp.eu

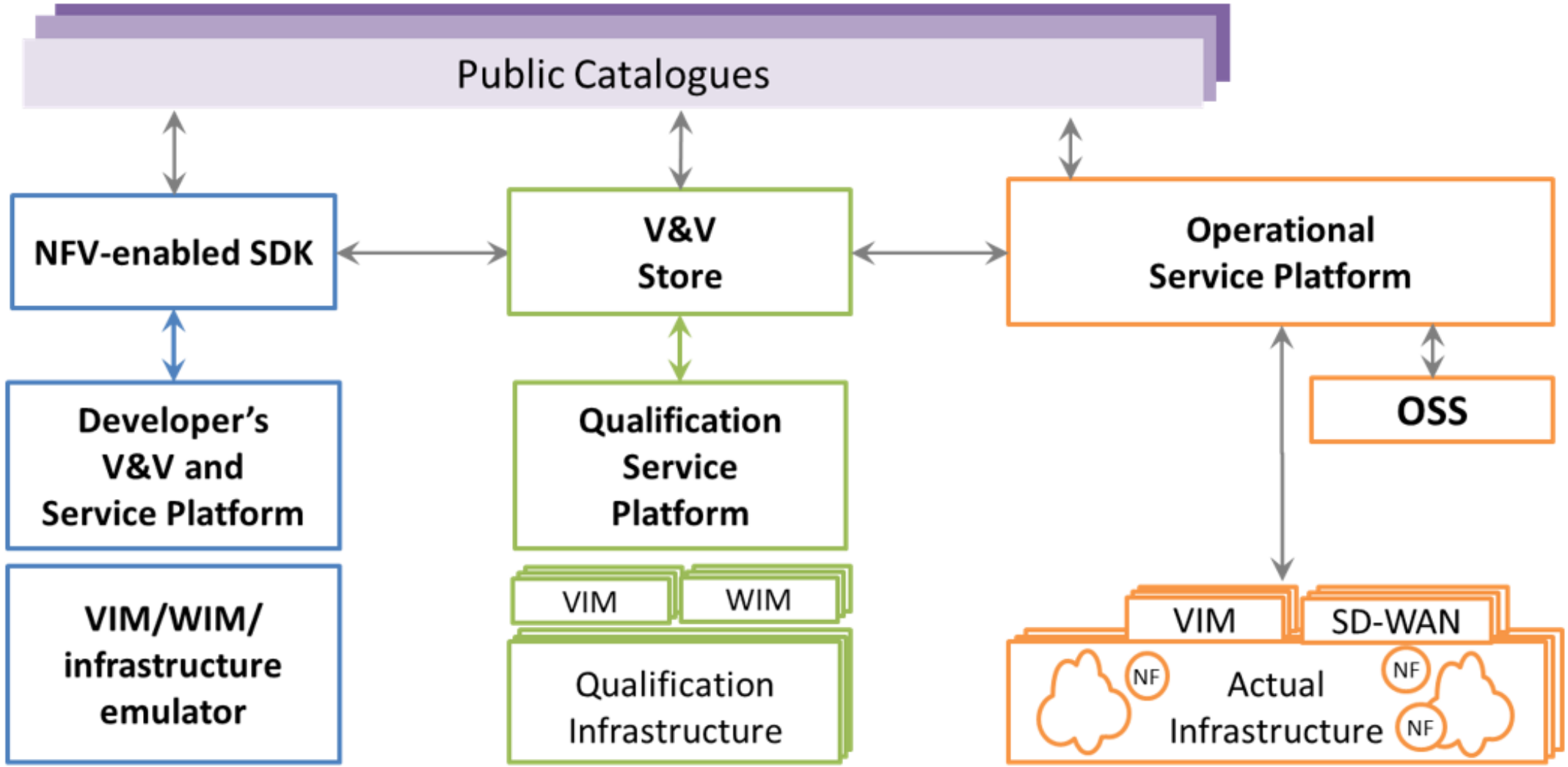
# Thank you!

# BACKUP SLIDES

# SONATA – How


SONATA SDK
Editors
Packaging Tool
Debugging & Testing Tools
Monitoring Data Analysis Tools
Catalogue Access
Private Catalogues
Public Catalogues
SONATA Service Platform
Platform Catalogues
Gk-Cat
Gatekeeper
Or-Gk
MANO Framework
NFVO (Network Service Management)
Default
SSM1
SSMn
Message Broker
Service Lifecycle Decision
Service Lifecycle Execution
Conflict Resolution
Slice Management
VNFM+ (VNF Management & Control)
FSM1
FSMn
VNF Lifecycle Decision
VNF Lifecycle Execution
Information Mgmt.
Monitoring Management
( ... )
Repositories
Monitoring
FSM/SSM
Service
NF
Infrastr.
Or-Rep
Plugin Management
Message Broker
Infrastructure Abstraction
Infrastructure Adaptor
VNF Adaptor
Ia-Vi
Ia-Wi
Ve-Vnfm
VIM
WIM
PoP 1
PoP 2
VNF
Service Users

# 5GTANGO - How


Public Catalogues
NFV-enabled SDK
V&V Store
Operational Service Platform
Developer's V&V and Service Platform
Qualification Service Platform
OSS
VIM/WIM/ infrastructure emulator
VIM
WIM
Qualification Infrastructure
VIM
SD-WAN
NF
NF
NF
Actual Infrastructure