

# Report & Key Takeaways from the 5G Network Slicing PoC Demo-2

**ETSI PoC Name:** 5G Network Slices Creation, Autonomic & Cognitive Management & E2E Orchestration; with Closed-Loop (Autonomic) Service Assurance for the IoT (Smart Insurance) Use Case

**Demo-2 Name:** C-SON Evolution for 5G, Hybrid-SON Mappings to the ETSI GANA Model, and Federation of GANA Knowledge Planes for E2E Autonomic (Closed-Loop) Service Assurance for 5G Network Slices through a Real Implementation

**Date:** February 13<sup>th</sup> 2018

**Location:** Demo hosted by Orange in Paris, France

**Address :** Orange Gardens, 40 - 44 AVENUE DE LA REPUBLIQUE / 92320 – CHATILLON

**Remark/NOTE:** This Demo is the second Demo of a series of Planned Demos on various aspects of the overall ETSI 5G Network Slicing PoC, and so more Demos are expected in the duration of the PoC over 2018/2019. **Demo-1** of the overall PoC covered the aspect of Smart Insurance Providers as Key Requesters and Consumers of 5G Network Slices Delivery Services by Service / Slice Providers.

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## 1. Key Takeaways from the Demo-2

Supported by the Presentation (refer to the Slides) and the Demo-2, as well as the discussions and comments during Demo-2, the following are the key takeaways from Demo-2:

- **Cellwize C-SON and its framework for policy control of D-SON implements the ETSI GANA (Generic Autonomic Network Architecture) Knowledge Plane for the RAN**
- **Cellwize provides an implementation of the GANA Knowledge Plane for the Backhaul to some degree**
- **The Cellwize C-SON Implementation Opens a Door and Opportunity Towards a Specification/Standardization of an MBTS (*Model-Based-Translation Service as a mediation service between Knowledge Plane and NEs*) for RAN (an MBTS that also covers 5G)**
- **The GANA model empowers Autonomic (Closed-Loops) Service Assurance for 5G Network Slices**
- **This ETSI 5G PoC is clarifying the Required Carriers'(Operators') *Framework for E2E Autonomic (Closed-Loop) Service Assurance for 5G Network Slices* → E2E Autonomic Slice Assurance shall be achievable through the Federation of GANA Knowledge Planes for RAN (C-SON), Front-/Backhaul and 3GPP Core Network, complemented by lower level autonomics, for Multi-domain state correlation and programming by the GANA KPs (RAN, DC, MEC, Backhaul, Core Network)**
- **There is a need for Integration/Convergence of Autonomic Service Assurance with Orchestrated Assurance in the Carrier/Operator's Environment**
- **Further Study on how to exploit and evolve ONAP Components to address ETSI GANA Requirements should now be triggered and contributions to ONAP and other Open Source Projects like TIP (Telecom Infra Project) and BBF CloudCO and Open BroadBand should now be launched**
- **We are calling upon the IPv6 Community to Showcase in this PoC and Discuss more on IPv6 Features that play a role in Autonomic Management and Service Assurance in 5G, and IPv6 expectations in 5G Traffic Flows and QoS Tuning**
- **Hybrid-SON Model (Combining C-SON and D-SON) is an illustration of ETSI GANA model for the RAN**
- **The content from Demo-1 and Demo-2 will be used to compile a White Paper with the aim to publish it within the first half of 2018.**

## Other Points made by the PoC Steering Committee

- **This PoC Consortium is not “closed-consortium”, and welcomes new members in the course of the PoC duration, which goes beyond 2018.**
- **This Demo-2 is only the second Demo of a series of Planned Demos on various aspects of the overall ETSI 5G Network Slicing PoC, and so more Demos are expected in the duration of the PoC over 2018/2019.**
- **In educating the audience/participants who attended the Demo-2 session about the background of ETSI NTECH AFI WG, from the time it was still an ISG (an ETSI pre-**

standardization instrument) and published a number GSs', TRs' and TSs' to today, it was emphasized that the ETSI NTECH AFI WG has always sought to consolidate and work on Requirements and Use Cases for Autonomics (Self-Management of Networks) that emulate realistic Telecom Operator and Enterprise network environments based on Joint Network Operators' Inputs and Requirements that can be facilitated much better in the ETSI environment.

- In addition to being driven by Operators' Inputs and Requirements, ETSI NTECH AFI WG continues to encourage other groups in other SDOs to consider the Frameworks and Requirements from ETSI NTECH AFI WG in helping introduce/specify/develop/ Protocols and APIs that can be used to implement the ETSI GANA based architectural principles, use cases and requirements for autonomics being produced in ETSI NTECH AFI WG (for example, groups in some SDOs could work on the required "protocols" and "APIs" and source inputs on architectures and requirements and network operator use cases for autonomics from ETSI NTECH AFI WG). To this end, ETSI NTECH AFI WG has established liaisons with various SDOs (including BBF (Broadband Forum), TMForum, NGMN, 3GPP, ITU-T, IETF, NSF-CAC, and other groups) in order to encourage industry harmonization and help (together with the groups in other SDOs/Fora) in reduction or avoidance of duplication of work.
- ETSI NTECH AFI WG and many groups strongly believe in encouraging industry harmonization approaches that help **reduce or avoid duplication of work** in SDOs/Fora by participating to the initiative on Joint SDOs/Fora Industry Harmonization Initiative on Unified Standards and Architectures (see example reports of the Joint SDOs/Fora Harmonization Initiative here: <https://www.tmforumlive.org/wp-content/uploads/2015/06/Report-on-Joint-SDOs-Industry-Harmonization-for-Unified-Standards-on-AMC-SDN-NFV-E2E-Orchestration-ver3.01.pdf>; and also a Joint SDOs/Fora Industry Panel Session held yearly at IEEE Globecom).

## 2. Implementation of Action Point suggested by Participants at the Demo-2

Regarding Need for Interaction/Liaison between ETSI NTECH AFI WG and ONAP, one of the comments received during the Demo-2 Presentation was on the ***“Need for Interaction/Liaison between ETSI NTECH AFI WG and ONAP”*** in order to encourage the launch of an activity on ***“ONAP for GANA requirements (i.e. GANA components that can be implemented using ONAP components)”***:

- **ETSI NTECH AFI WG has started implementing the Action Point:** ETSI NTECH AFI WG is preparing a Liaison Statement (LS) to ONAP

## 3. Plans for the Next Demos in the scope of this PoC

After this Demo-2, the PoC consortium is now planning for Demo-3, Demo-4 and a series of Demos that will follow after. The following is a list of some Demo Items in planning (more Demo Items will be defined along the PoC duration), with each Demo focusing on selected items:

- Implementation of the **Knowledge Planes (KPs) Federation Reference Point(s) defined in the ETSI TR 103 404**, involving the collaborations of GANA Knowledge Plane for RAN (C-SON), GANA Knowledge Plane for Backhaul and GANA Knowledge Plane for Core Network to realize *E2E Self-Optimization and Self-Healing Strategies for Network Slices* across the network segments. The demo should also target to illustrate the various types of KPIs and control messages that should be exchanged by the Knowledge Planes, starting with KPIs the RAN GANA Knowledge Plane (namely C-SON) may exchange with the other Network Segments Knowledge Planes to effect E2E Service Assurance of Network Slices.
- **APIs that must be exposed by RAN Virtualization Platforms to GANA Knowledge Plane for RAN (namely C-SON)** such that Slice Specific Metrics/KPIs can be exposed/communicated to the Knowledge Plane to feed into its Closed-Loop (Autonomic) Service Assurance operations for the Slices. The APIs should also enable the RAN Knowledge Plane (C-SON) to dynamically adapt (Self-Optimize) individual Slice instances according to the Slice Consumer (change Management process) or to trigger creation of new slice instances as part of service remediation and self-healing strategies. How the APIs should be an integral part of the MBTS (*Model-Based-Translation Service as a mediation service between Knowledge Plane and NEs*) for RAN is also expected to be addressed.
- **OSS Interface with the GANA Knowledge Plane within the transition phase**
- Dynamic Probing for Orchestrated Assurance and Enabling **Integration/Convergence of Autonomic Service Assurance with Orchestrated Assurance**
- **GANA ONIX System (Overlay Network for Information eXchange for publish/subscribe services for Info., sort of a Real-Time Inventory) of Federated Information Servers** and Scaling a Single ONIX System to be shared by Knowledge Plane for RAN, Knowledge Plane for Backhaul and Knowledge Plane for Core Network
- **MBTS for RAN; MBTS for Backhaul; and MBTS for Core Network**
- **Federation of GANA Knowledge Planes** for Backhaul, GANA Knowledge Plane for the Core Network, and GANA Knowledge Plane for RAN (C-SON)
- **Artificial Intelligence (AI) in DE (Decision Element) Autonomics Algorithms**, for DEs at specific GANA Levels of Abstraction of Autonomics/Self-Management (with focus on **GANA Levels 2, 3 and 4**)

### Remark

- Component Suppliers who could be interested to showcase Capabilities that address such GANA Framework Concepts and Requirements can contact the PoC Leader (see contact details in section 6) in order to join the PoC Project and showcase their Capabilities.
- Network Operators can join the other Operators in the PoC in providing insights on how the PoC should continue to emulate the realistic 5G deployment scenarios as viewed from the Operators' perspective and in contributing to the PoC's efforts of being driven by joint/common Operator requirements.

## 4. List of Participants' Companies/Organizations who attended the Demo

*Orange, Telenor, Vodafone, T-Mobile, BT, Nokia, Ericsson, Huawei, Ciena, Intel, Samsung, HPE, ALTRAN, Cellwize, Kapsch, Incelligent, ETRI, MEF, ETSI, IPv6 Forum.*

There are other Companies that were not able to attend the event due to time zone difference reasons for example, and have requested for slides and the video recording of the session(which is available upon request by contacting the contact given at the end of this report) . And so dedicated Demo-2 re-play sessions have been organized upon request (for *NTT and others*).

## 5. Current members of the ETSI PoC Consortium (new members are welcome)







- Orange
- Verizon
- NTT
- Altran
- Asocs Networks
- Cellwize
- Huawei
- Incelligent
- QualyCloud
- IPv6 Forum








## 6. How to contact us



ETSI NTECH 5G PoC wiki: <http://ntechwiki.etsi.org/>

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