



E2E Network Slicing

This Project Group Charter establishes the scope, intellectual property and copyright terms used to develop the materials identified in this Project Group. Only Participants that execute this Working Group Charter will be bound by its terms and be permitted to participate in this Project Group and shall be considered “Contributors” in the Project Group as defined in the **Telecom Infra Project IPR Policy document**.

TIP Board of Directors Approval Date: 11/1/2017

1. PROJECT GROUP NAME

E2E Network Slicing

2. PURPOSE

This project will identify e2e use cases that can be researched, developed and demonstrated to help meet some of the key challenges in the 5G network slicing arena. It aims to exploit the opportunity afforded by TIP membership to involve different players: telecom operators, equipment vendors, orchestration suppliers, application providers, network integrators & technologists.

Further, the project group will build on its identified use cases to drive opportunities for trial and deployment at scale, to benefit operators in real-world scenarios.

3. PROJECT GROUP SCOPE

The project will agree a number of use cases to focus on, and explore a range of topics and concepts around network slicing for next generation networks such as:

- i. Exploring options for how network slicing can be applied in a multi-vendor, multi-domain and multi-operator context for a range of candidate use cases and services. This will help develop solution ideas to enable the slices to behave differently for different application needs.
- ii. Exploring solutions to be able to communicate the value to stakeholders and operators, ahead of decisions to trial and deploy in real world networks. This could involve for example
 - a. Integration of two operators’ “sliced” networks, each with one or more domains under the management of local orchestrators and controllers.
 - b. Setting up the required control plane and user plane connectivity to

- enable e2e traffic to flow across the two operators' slices.
- c. Exploring the northbound management and orchestration challenges of building e2e network services that span multiple operator slices and domains.
- d. Complex cases eg where a given device connects to 4 slices and is moving across 2 operators in a 5G network – this would need to include the design of the network, slice management, the device; provisioning of slices in advance or on demand, the device attach to the network; the cases where the device has an IP stack or does not etc
- iii. Exploring use case design & implementation, with a feedback loop into industry bodies such as 3GPP and ETSI NFV.
- iv. Exploring wider application of network slicing, and the associated benefits and challenges to operators and customers.
- v. Since network slicing is a key aspect of 5G ecosystem, it would be desirable to build a representation of 5G network domains and functions/architecture
- vi. It has been suggested that this work could complement that done by the 5GEx group, who have focused on APIs between orchestrators. This needs further exploration and discussion, but there could be an opportunity to more closely link the work of this group and the 5GEx output. (Alternatively, this project could proceed with a representation of the 5GEx APIs, and look to integrate with a more compliant set of 5GEx APIs in the future)
- vii. The project group recognizes that there are several other industry groups focused on Network Slicing. Our work will aim to complement their work while avoiding duplication. The project group will aim to focus on use cases and problems that other groups are not addressing.
- viii. The project group aims to ensure that it deals with network slicing as truly e2e - from UE to radio/access network, backhaul, mobile core and application/service provider (noting that partial slices may be a valid use case). The group will seek to work with other TIP groups, such as the vRAN and Edge groups, to explore the integration of true e2e network slicing across those group domains, as part of the wider e2e context, and where appropriate, may influence their work.

4. PROJECT GROUP DELIVERABLES

- i. The group will initially build a set of candidate deliverables in a phased approach, starting with initial use case scoping, project milestones and activities. Further deliverables will be identified and agreed, such as:
 - a. Technical paper(s) and published material as agreed by the group members
 - b. A working lab demonstrator/prototype or other proof of concept environment, to be agreed by the group
 - c. Solution elements such as open APIs, reference architecture prototypes etc that could be leveraged by interested operators for trial and deployment consideration

- i. The project work will use emerging and agreed standards (eg 3GPP) and conventions for network slicing as building blocks in the solutions. Where appropriate, this work should also lead towards contributions to ETSI NFV and 3GPP as they specify network slicing standards

Tentative timeline

- ii. Phase 1 [Target for Q4`17]: Define Project Group work scope
- iii. Phase 2 [Target for Q1`18]:
 - a. Identify the requirements for Network Slicing building blocks and set of target applications to evaluate
 - b. Describe use cases
 - c. Output: Reports on requirement and use cases
- iv. Phase 3 [Target for Q3/Q4 `18]:
 - a. PoC of use cases
 - b. Deployable implementation (Stretch goal and need to be agreed by Working group)
 - c. Output: PoC, Architecture documents, Interface/API

5. PATENT LICENSING

The patent license for all Contributions, Draft Specifications and Final Specifications within this Project Group shall be:

[Check one box]

- RAND License Option**, as set forth in Section 5.2.1 of the Telecom Infra Project IPR Policy.
- Royalty-free License Option**, as set forth in Section 5.2.2 of the Telecom Infra Project IPR Policy.

6. FINAL DELIVERABLE COPYRIGHT LICENSING

Project Group agrees to grant the following copyright license for the Final Specification:

[Check one box]

- Creative Commons Copyright Attribution 4**, Each Project Group Contributor agrees that its Contributions are subject to the Creative Commons Attribution 4.0 International license - <http://creativecommons.org/licenses/by/4.0/legalcode>.
- Full Release of Copyright into the public domain**, Each Project Group Contributor agrees to release its Contributions to the public domain and waive all copyrights associated with them.

7. INITIAL PROJECT CHAMPIONS

BT, HPE, NTT, Orange, Core Net Dynamics, Viavi, Airhop Communications, Cloudstreet

8. CHAIR AND(OR) CO-CHAIR OF PROJECT GROUP

Co-Chair

Andy Corston-Petrie, BT

Co-Chair

Marie-Paule Oдини, HPE

9. PARTICIPATION CRITERIA

- i. Identification of willing operators, vendors, application providers, OEMs, system integrators etc to be active participants in the project workFit of the proposed contributions to the project group scope
- ii. Technical fit of the proposed contributions to the architectural framework of the project group
- iii. Commitment from the members to contribute non-proprietary open components or open extension / API to the overall solution
- iv. Productive interaction with a system integrator