

# IBN for network slicing in 5G-EVE project

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# 5G-EVE<sup>(\*)</sup> objectives

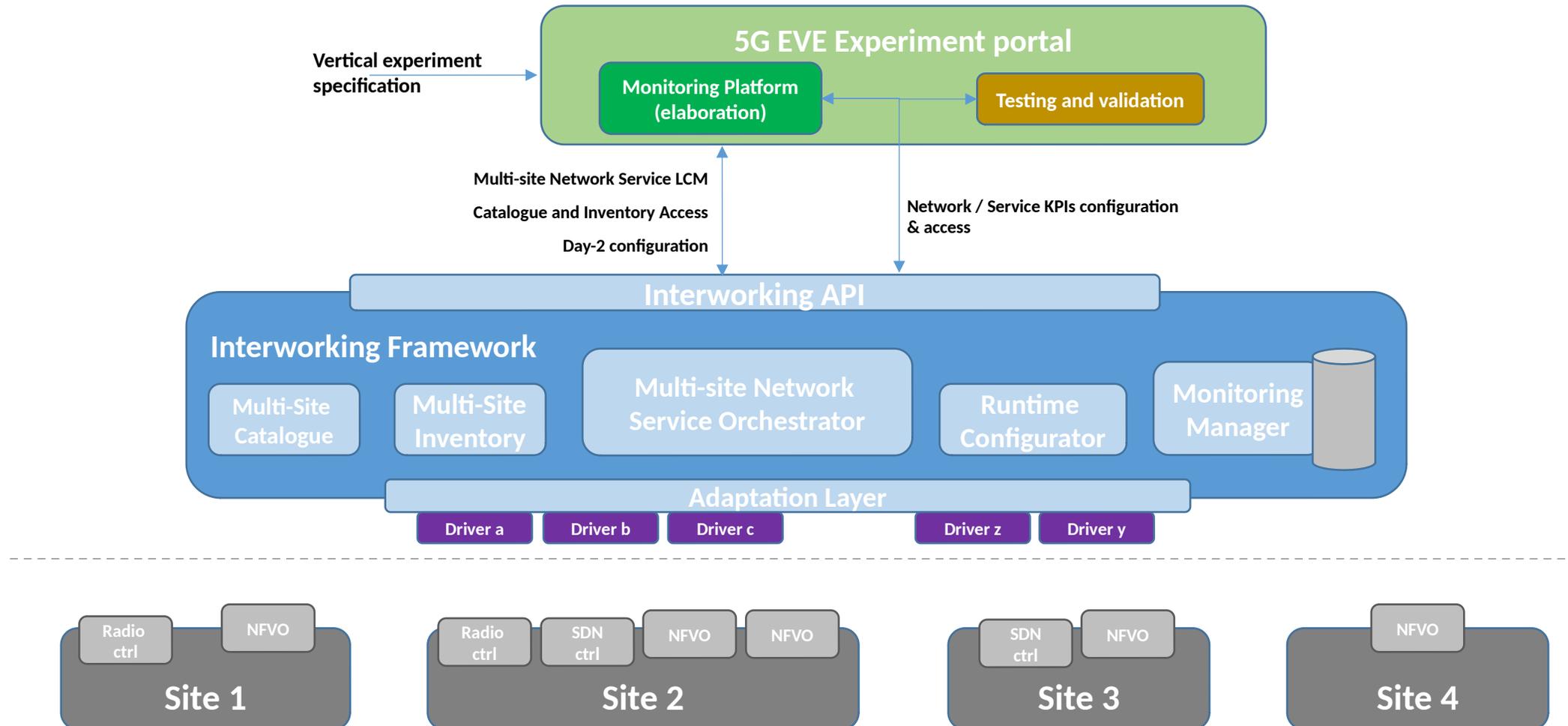
- Create a 5G end to end facility to enable experimentation and validation with full sets of 5G capabilities
- Interworking site facilities in Greece, Spain, France and Italy offering vertical industries a validation platform through a unified functional and operational API.
- Build an operational abstraction that provides vertical industries with a single operational interface to the 5G end to facility.
  - APIs, tools, and mechanisms that ease the verticals to deploy their multi-site trials.



(\*) <https://www.5g-eve.eu/>



# 5G-EVE experimental framework



# IBN in 5G-EVE

- To provide a way for the vertical experimenters to instantiate an experiment (experiment design and definition phase).
- The intention of the user is collected and translated into the most suitable Vertical Service Blueprint (VSB)
  - Description of Vertical's intended service needs in networking terms
  - Creation of an experiment descriptor (ExpD) assisted via natural language
- To define an experiment, the experimenters have two choices: i) through a free text format or ii) by providing the necessary information in the Guided Selection part of the GUI.
- Documented in Deliverable 4.1 (to be released as public document in the next months)

# Tool design

- GUI allowing the experimenters to provide their intention, using one of the two ways available (Free Text – Guided selection)
- A Translation tool collecting the information provided and creating a Blueprint schema
  - This component recognize keywords in the intention provided and to translate them into specific actions/functionalities for the various blueprints.
  - Iterative interrogation of the user to refine the originally expressed intent
- A database where the confirmed experiments are stored.
  - Through the DB the application also checks the availability of the resources in each site/facility according to the scheduled experiments.
- An Apache Tomcat Server hosts the whole application and makes it available to the users to access the Intent-Based Interface.
- Available at: <https://github.com/5GEVE/5G-EVE-WP4-intent-based-tool>

# Free text format

- The experimenters may define their intention by using natural language
- The translation tool checks the intention and matches specific keywords to certain fields of the VSB
  - To identify specific keywords and map them into specific actions
  - The keywords identified so far are the sectors, the services, and the following expressions in order to define where to run the experiment and the 5G EVE site facility
- In case there are empty fields the users are prompted to provide the missing information
  - Iterative interrogation of the user until all basic VSB fields can be filled
- Also, in case the experimenters have provided invalid information, such as a passed date, or negative numbers, or a country that cannot support a specific service, a message is returned to them by stating the problem encountered.



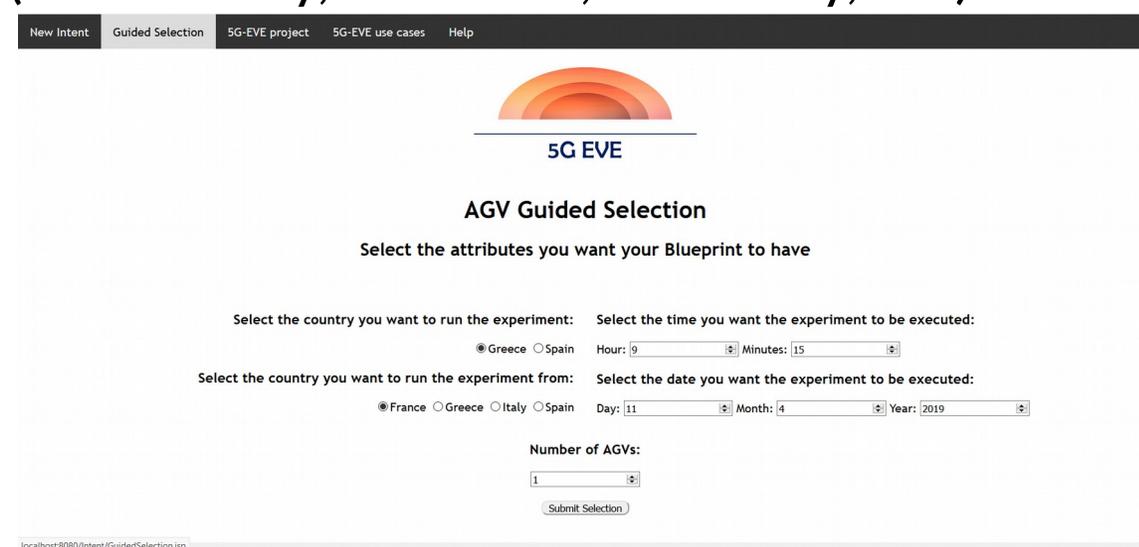
The screenshot shows the 'Intent Expression' page of the 5G EVE platform. At the top, there is a navigation bar with the 'WINGS ICT SOLUTIONS' logo and menu items: 'New Intent', 'Guided Selection', '5G-EVE project', '5G-EVE use cases', and 'Help'. Below the navigation bar is a header with a rainbow logo and the text '5G EVE'. The main heading is 'Intent Expression'. A text input field contains the sentence 'I want to run an experiment with #2 agvs in Greece from Spain'. Below the input field is a 'Continue' button. At the bottom of the page, there is a footer with the text '5G European Validation platform for Extensive trials'.

# Guided selection

- In case of the Guided Selection the experimenters may select the service, they want to run, from a list of the available services
- Some fields are also automatically filled from the intent-based mechanism
  - These fields contain information about the range of some KPIs needed to run the specific experiment, according to pre-set information collected from the verticals for a given kind of experiment (e2e latency, data rate, reliability, etc)



The screenshot shows the VINGS ICT SOLUTIONS website. The navigation bar includes "New Intent", "Guided Selection", "5G-EVE project", "5G-EVE use cases", and "Help". The main content area features a "5G EVE" logo and the heading "Guided Selection". Below this, there are several service categories: Smart Transport, Smart Tourism, AR Interaction, Business Augmented Booth, Industry 4.0, Autonomous vehicles in manufacturing environments - AGVs, Media & Entertainment, and Utilities. The footer text reads "5G European Validation platform for Extensive trials".



The screenshot shows the "AGV Guided Selection" form. The navigation bar is the same as in the previous screenshot. The form includes a "5G EVE" logo and the heading "AGV Guided Selection". Below this, there is a section titled "Select the attributes you want your Blueprint to have". The form contains several input fields: "Select the country you want to run the experiment:" with radio buttons for Greece (selected) and Spain; "Select the time you want the experiment to be executed:" with input fields for Hour (9) and Minutes (15); "Select the country you want to run the experiment from:" with radio buttons for France (selected), Greece, Italy, and Spain; "Select the date you want the experiment to be executed:" with input fields for Day (11), Month (4), and Year (2019); and "Number of AGVs:" with a dropdown menu set to 1. A "Submit Selection" button is located at the bottom of the form. The footer text reads "localhost:8080/Intent/GuidedSelection.jsp".

# Next (research) steps

- To generalize the concept developed in 5G-EVE to the processing of GSMA/3GPP Slice Templates
  - **Generic Slice Template (GST)** is transformed into the different **Network Slice Types (NESTs)** required to run the service
  - From the Network Slice Type (NEST) it can be extracted parameters and constraints for the transport network (link to IETF work)
  - Move passed VSB fields. From intent  $\Rightarrow$  to slice provisioning & network component configuration
- To document this in a draft targeting IETF#107

