

Open Baton – the first comprehensive and standard compliant NFV Framework that brings Network Function Virtualisation (NFV) onto a new stage for developing your own Network Services

ETSI NFV represents a concerted telco operator initiative fostering the development of virtual network infrastructures by porting and further adapting network functions to the specific cloud environment. ETSI NFV has defined a large set of virtualisation use cases, spanning from the cloudification of the main core network functions such as IMS, Evolved Packet Core, and Radio Access Networks, as well as providing on demand and complete virtualised infrastructures as IaaS or PaaS to third parties, such as enterprises and professional radio. That enables providing elastic deployments of cost efficient network infrastructures. One of the main concerns of ETSI NFV is to prove the feasibility of the cloud deployments of the typical network functions through proof of concept trials and prototypes as well as providing indications for further standardization in the areas of underlying infrastructures, software architectures, networking and management, and orchestration to improve performance and grant security of the overall infrastructure. ETSI NFV limits itself to this level of indications, considering that other standardization bodies and de-facto open source standards such as 3GPP and OpenStack should finalize the specific implementation work.

Open Baton is the first ETSI NFV MANO compliant framework and was part of the OpenSDNCore (www.opensdncore.org) project started almost three years ago by Fraunhofer FOKUS with the objective of providing a compliant implementation of the ETSI NFV specification. Open Baton is easily extensible. It integrates with OpenStack, and provides a plugin mechanism for supporting additional VIM types. It supports Network Service management either using a generic VNFM or interoperating with VNF-specific VNFM. It uses different mechanisms (REST or PUB/SUB) for interoperating with the VNFMs. It integrates with additional components for the runtime management of a Network Service. For instance, it provides autoscaling and fault management based on monitoring information coming from the the monitoring system available at the NFVI level.

This half a day workshop will provide a comprehensive mirror of the current status of the NFV ecosystem mainly focusing on the Management and Orchestration (MANO) domain. During the proposed tutorial it will be outlined the open technology ecosystem currently available in the context of SDN and NFV. Particular attention will be given to the new open source toolkit Open Baton recently launched by Fraunhofer FOKUS and TU Berlin. First a general overview of this project will be given, and it will be shown how can be possible to create a virtualised Network Service in few steps.

Later sections will go into the detail in order to show the simplified way to make use of the plugin mechanism that allows you to integrate the cloud environment (e.g. OpenStack) and monitoring system (e.g. Zabbix) of your choice. Moreover, it will be shown how you can develop your own VNF Manager that might be in charge of managing the whole lifecycle of your simple or complex Network Function. Additionally, it will be shown how new and recently published components, such as the Fault Management System or the AutoScaling Engine, can be/are integrated into the Open Baton Framework by using the powerful event mechanism and several tools enabling the communication between the NFVO and your own external component.

Intended Audience

The target audience of this tutorial should be interested in the scope of Next Generation Mobile Networks particular in the topics access and core network as well as applications. The tutorial introduces the domain Next Generation (Mobile) Networks in its basics and provides the audience with expert knowledge in this field and the related open research aspects.

Tutorial Outline

This half-day tutorial will be held as lecture and hands-on, and is structured into 4 sections;

Section 1: Network Function Virtualization

- What are the real benefits of NFV, and what are the challenges for Network Operators
- Introducing the ETSI NFV architecture
- Overview of the different open source activities:
 - OPNFV, OpenMANO, OpenSourceMANO, Open-O, OpenStack, Docker, Tacker, Cloudify, Juju

Section 2: Introducing Open Baton NFV-Framework

- Overview
 - Defining what is Open Baton
 - Functionalities
 - Main components
- Deeper view into the components
 - NFVO Architecture, Data Model, Features
 - VNFM Architecture, Generic VNF Manager and generic EMS, Features
 - Event Mechanism
 - SDKs/Dashboard
- How to use OpenBaton for building your first Network Service

Section 3: Practical Examples of using Open Baton

- Define a Network Service from the scratch by making use of the Generic VNF Manager
- Extend the Generic VNF Manager or bring up your own VNF Manager easily by using the provided SDKs
- Making use of the Event mechanism to integrate your external management system such as a Fault Management System or an AutoScaling Engine
- Develop your own plugin (VIM, Monitoring) easily in order to make use of various platforms you want to apply

Section 4: Hands-on – Get familiar with the framework

- Implement your own VNF Manager
- Define your own Network Service
- Learn about the whole lifecycle – from your idea to the running service

Questions & Closing remarks

Prerequisite knowledge

Basic knowledge in the field of cloud computing and/or network function virtualization is advantageous, but not essential.

Technical requirements for the Hands-on section

In order to actively participate to hands-on session and execute the practical exercises by your own, you need to have a laptop/desktop with at least 2 cores and more than 4GB of RAM running a Linux Operating System (either ubuntu or OS X). In case you use windows, you may run everything in a virtual machine running on virtualbox.

Materials to be provided to attendees

The slides presented during the tutorial are given to the audience afterwards plus acronyms and literature lists.

About the Speakers

Giuseppe Antonio Carella

Giuseppe Carella is a Senior Researcher at the Fraunhofer FOKUS and at the Technische Universität Berlin (TUB). He received his M.Sc. in Engineering of Computer Science from the Alma Mater Studiorum University of Bologna in 2011. During his studies he focused on Next Generation Network Infrastructure, especially in IMS services, like presence and messaging. In 2012 he joined the Next Generation Networks (AV) team at the Technical University Berlin, where he started investigating topics related with SDN and NFV in the context of his PhD studies. His strong background in Cloud Computing is the basis of his research and contributed to the virtualization of the software-based Network Functions developed at Fraunhofer FOKUS, namely OpenEPC and Open5GCore. He is currently leading the team developing the OpenBaton toolkit which is used by many researchers all around the globe for further investigating SDN and NFV related topics.

More details: <http://www.av.tu-berlin.de/carella>

Michael Pauls

Michael Pauls received his M.Sc. in Computer Science from the Technical University of Berlin in 2016. During his studies he focused mainly on communication systems and next generation network infrastructures. He realized his Master thesis “Design and Implementation of an Autoscaling Engine for Carrier-grade Virtualized Network Functions (VNFs)” during his 2-year employment at the TU Berlin and gained a lot of expertise, especially in this domain. After finishing his studies he started to work as Research Assistant at TU Berlin at the chair of “Architekturen der Vermittlungsknoten” (NGNI) with ambitions of writing his PhD. During this time at the university he became an expert in the emerging concept of Network Function Virtualization (NFV) by being mainly involved in projects such as the prototyping of the first and unique standard compliant NFV framework, called Open Baton, and, additionally, he is one of the main developers in the European project NUBOMEDIA taking care of the orchestration of components at the IaaS and PaaS level.

More details: http://www.av.tu-berlin.de/team/michael_pauls/