SOFTFIRE

Software Defined Networks and Network Function Virtualization Testbed within FIRE+

A Federated and Orchestrated Virtualisation Testbed for Network Functions Virtualisation and Software Defined Networking in 5G Systems

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IETF NFVRG meeting, IETF 101 London, March 2018

A Multi-site Federated Testbed

Partner Organisations

- ❖ EIT Digital
- ❖ Deutsche Telekom, Germany
- ❖ Ericsson, RMED CloudLab, Italy
- ❖ Fraunhofer FOKUS, Germany
- ❖ REPLY Security Monitoring, Italy
- ❖ Technical University of Berlin, Germany
- ❖ University of Surrey, 5G Innovation Centre, United Kingdom
- ❖ Assembly Data System, Italy

References

"Constructing a Federated Testbed and an Orchestrated Virtualisation Infrastructure", SoftFIRE White Paper, available at:
https://www.softfire.eu/wp-content/uploads/SoftFIRE-White-Paper-1-Constructing-a-Federated-and-Orchestrated-Virtualisation-Infrastructure_FINAL.pdf

Targets

- **To demonstrate and assess the level of maturity of a set of adopted open source software solutions for NFV and SDN**
- **To integrate these solutions in a federated testbed environment**
- **To enable the use of the testbed by an ecosystem of third parties**
- **To support the third parties by providing them with a programmable and extensible platform for testing their NFV/SDN experiments, especially for 5G solutions and applications**

- Three key elements are considered in order to drive solutions towards industrial adoption:
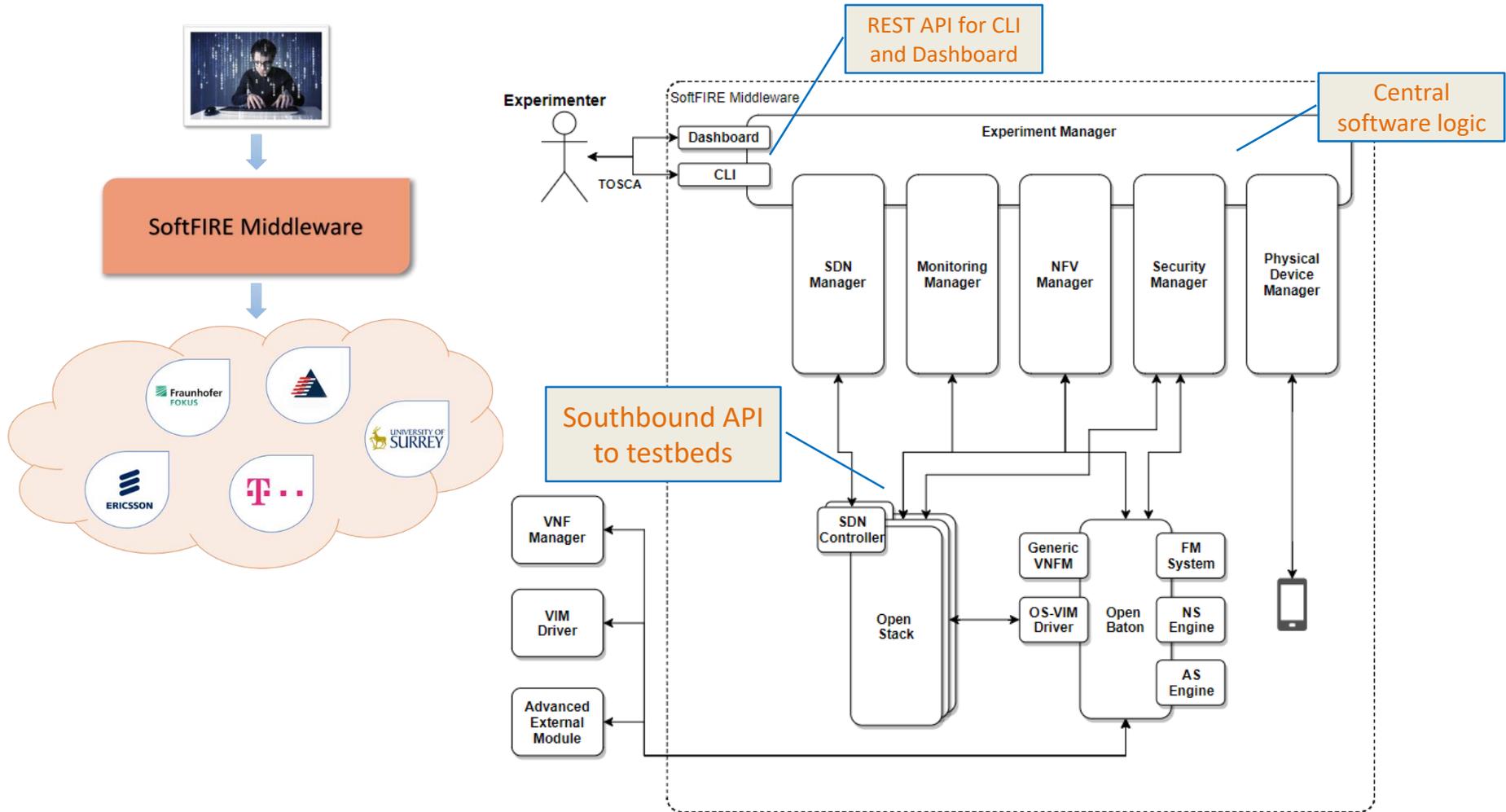 - *interoperability*
  - *programmability*
  - *security*

SoftFIRE Middleware

References

"SoftFIRE Approach to Experiment Management: Why and How", SoftFIRE White Paper, available at:
https://www.softfire.eu/wp-content/uploads/SoftFIRE-White-Paper-2-SoftFIRE-Approach-to-Experiment-Management-Why-and-How.pdf

Experimenter Use of Resources

Experiment definition via the SoftFIRE Middleware

Upload a [CSAR](#) zip file containing experiment definitions:

```
|-- Definitions
|----- experiment.yaml
|-- Files
|----- nsd.csar
|-- TOSCA-Metadata
|----- Metadata.yaml
|----- TOSCA.meta
```

References

"SoftFIRE (v3) usage manual for NFV/SDN/MEC and 5G experimenters", SoftFIRE deliverable D2.4, available at:

https://www.softfire.eu/wp-content/uploads/SoftFIRE-D2.4-v3_usage_manual_for_NFV-SDN-MEC-_and_5G_experimenters_v1.0.pdf

Experimenter Access and Support
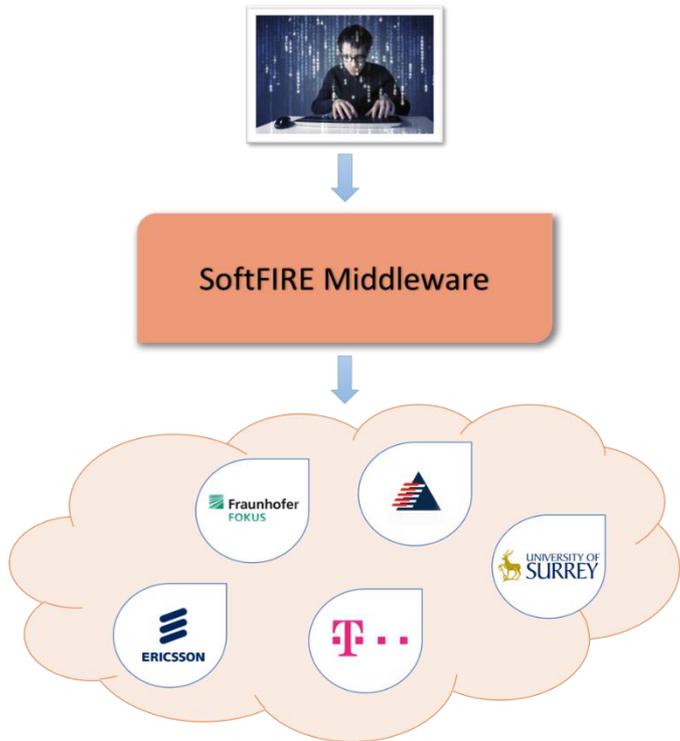
Experimenter Web Portal:
https://portal.softfire.eu/login/

Issue ticketing system:
https://redmine.softfire.eu/login?back_url=https%3A%2F%2Fredmine.softfire.eu%2F

Connectivity setup with OpenVPN:
http://docs.softfire.eu/getting-started/#openvpn-setup

Experimenter Support:
https://softfire.slack.com

Past Experimentation Events

Focus: Interworking and interoperability
Goal: Scientific excellence and/or industrial innovation

Project objectives in its experimentation waves:

- *Objective 1:* Extensions to the current federated testbed or new functionalities
  - Testbed enhancements in terms of orchestration, control, or virtualisation capabilities
  - Architectural extensions based on NFV/SDN
  - 5G applications
  - Benchmarking of NFV/SDN components
  - Extensions to open source SDN/NFV components
- *Objective 2:* Production and/or validation of new services, systems, and applications with NFV/SDN, especially for 5G scenarios

Experimentation Wave format:
- ➢ Proposals and feasibility check
- ➢ 3-month access to the platform, remote access
  - o Some on-site experimenter presence
- ➢ Evaluation of technical reports and videos

References
"First Wave of Experiments on SoftFIRE": https://www.softfire.eu/open-calls/first-open-call/
"Second Wave of Experiments on SoftFIRE": https://www.softfire.eu/open-calls/second-open-call/
"Third Wave of Experiments on SoftFIRE": https://www.softfire.eu/open-calls/first-open-call/

Past Experimentation Waves on SoftFIRE Platform

SOFTFIRE

1st Wave: https://www.softfire.eu/open-calls/first-open-call/

Experiment Topics:

- NFV/SDN based satellite network emulation
- NFV and network edge
- Semantic code generation for 5G network experimentation
- Defence against network attacks

2nd Wave: https://www.softfire.eu/open-calls/second-open-call/

Experiment Topics:

- Network service monitoring
- VNF placement and chaining algorithms
- Intrusion detection for NFV
- Programmable L7 OVS
- Dynamic connectivity for NFVI-PoPs
- SDN based wireless VR gaming
- Resource allocation for 5G cloud
- Mobility driven policy management extension NFV orchestration
- Distributed data storage for smart cities with SDN
- 5G mobile backhaul as a service
- QoS and fault tolerance in real-time computation in drone scenarios
- Adaptive video streaming with SDN

3rd Wave: https://www.softfire.eu/open-calls/third-open-call/

Experiment Topics:

- IoT interoperability in NFV
- Mitigation of botnets for 5G
- Blockchain SDN
- OneM2M edge processing
- Policy based user access to networks
- Augmented Reality performance in 5G cloud
- Balancing request for backend zones
- Slice QoS monitoring in a vCDN
- NFV framework testing with Open Baton
- 5G MEC caching
- Network security monitoring
- Video service improvement with MEC in 5G
- Flexibility in networks

Coming soon!

- ➤ White paper on 1st and 2nd Waves of Experiments
- ➤ White paper on 3rd Wave of Experiments

References
"First Wave of Experiments on SoftFIRE": https://www.softfire.eu/open-calls/first-open-call/
"Second Wave of Experiments on SoftFIRE": https://www.softfire.eu/open-calls/second-open-call/
"Third Wave of Experiments on SoftFIRE": https://www.softfire.eu/open-calls/first-open-call/

Other Events

SOFTFIRE

Hackathons

1st Hackathon: https://www.softfire.eu/events/first-hackathon/, Berlin, May 2017

2nd Hackathon: https://www.softfire.eu/events/second-hackathon/, Berlin, November 2017

Innovation Hackathon:
https://www.softfire.eu/events/innovation-hackathon/
Rome, April 2018

Open Days

Purpose:
1. To allow experimenters to explore the platform before participating in an event, and see:
   - all functionalities offered,
   - what is possible to do,
   - what is not currently supported,
   - what can be improved

2. To provide live tutorials to prospective experimenters

Open Days 2017: https://www.softfire.eu/softfire-open-days/
September 2017, October 2017

Open Days 2018:
https://www.softfire.eu/softfire_open_day_innovation_hk/
March 2018

Coming soon!
- White paper on 1st and 2nd Waves of Experiments
- White paper on 3rd Wave of Experiments

References
"First Wave of Experiments on SoftFIRE": https://www.softfire.eu/open-calls/first-open-call/
"Second Wave of Experiments on SoftFIRE": https://www.softfire.eu/open-calls/second-open-call/
"Third Wave of Experiments on SoftFIRE": https://www.softfire.eu/open-calls/first-open-call/

Partner Use Case: Orchestrated Virtual Mobile Core Network Slices in SoftFIRE

Key

VNF	Virtual Network Function
VNFD	VNF Descriptor
NS	Network Service
NSD	Network Service Descriptor
CPN	Control Plane Node
UPN	User Plane Node
CM	Cluster Member
CC	Cluster Controller
PPE	Packet Processing Entity
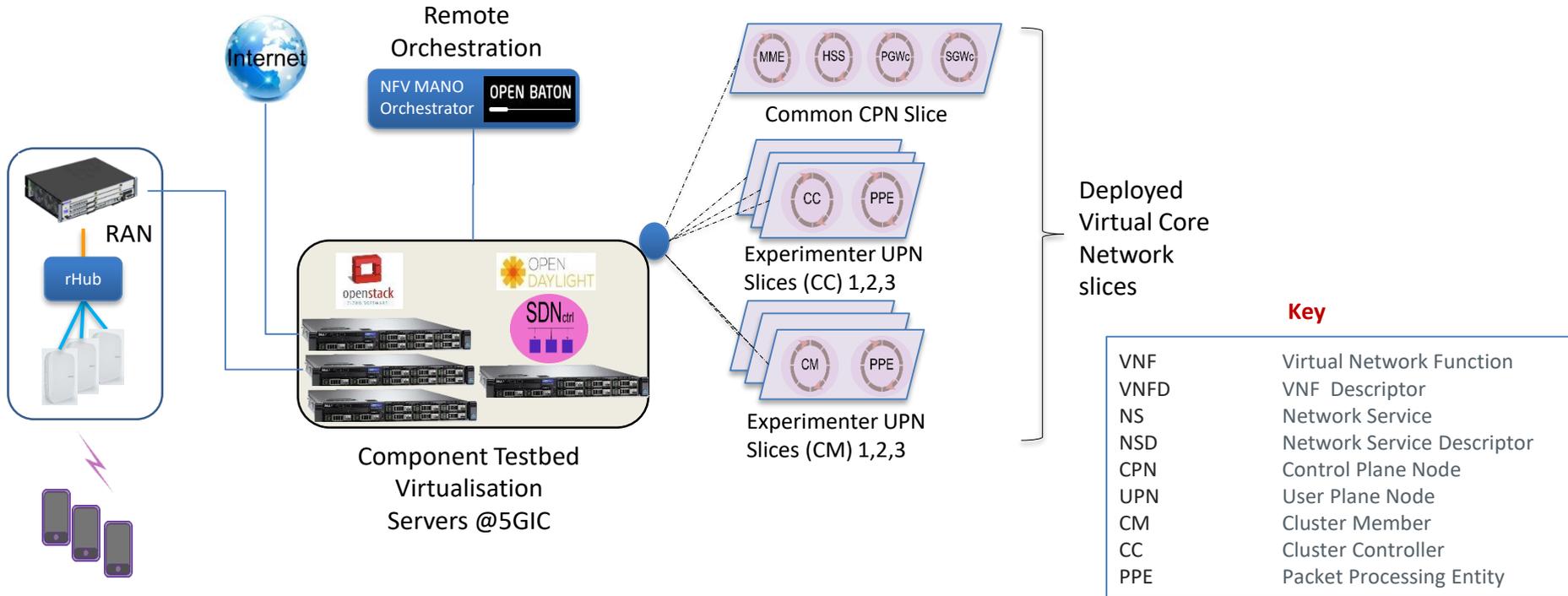
References (as part of SoftFIRE project dissemination output)

- *"5G Mobile Core Network Slicing on an Orchestrated and Virtualised Infrastructure"*, SoftFIRE White Paper, available at: https://www.softfire.eu/wp-content/uploads/SoftFIRE-White-Paper-on-Network-Slicing.pdf
- "*Virtualising and Orchestrating a 5G Evolved Packet Core Network*", D. Lake, G. Foster, S. Vural, Y. Rahulan, B-H. Oh, N. Wang, R. Tafazolli, IEEE Conference on Network Softwarization (NetSoft), 2017
- "*Performance Evaluation of a Virtualized Mobile Core Network in Indoor Environments*", B-H. Oh, S. Vural, N. Wang, R. Tafazolli, under review.

We would like to...

- Share our experience with FIRE projects, and other NFV, SDN, 5G themed projects

- Maintain our open-source Middleware software, and extend our community

- Contribute to standardisation bodies, such as IETF, IEEE, 3GPP, and others.
  - Our white papers and deliverables as technical input
  - Presentations at key events

Useful Links

➢ EU SoftFIRE Project: https://www.softfire.eu/
➢ SoftFIRE Middleware: http://docs.softfire.eu/softfire-middleware/
➢ Getting Started: http://docs.softfire.eu/getting-started/
➢ SoftFIRE Experiment Manager: http://docs.softfire.eu/experiment-manager/
➢ User Stories: https://www.softfire.eu/user-stories/
　　➢ Including Interviews, and technical demo videos
➢ Github repository: https://github.com/softfire-eu
　　➢ Experiment manager, information model, example experiments, SDN proxies, middleware managers, SDK, and others …