Experimentation on federated testbeds in Fed4FIRE

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Fed4FIRE
Federation for FIRE
(Future Internet Research & Experimentation)

2012-2016

Fed4FIRE+
2017-2021
Goals of federation

Make it easy for experimenters to use multiple testbeds

- Single account
- Single (or small number) of tools, choice of tools

Multiple testbeds

- To scale up
- To use/combine special resources (e.g. wireless robots)
- Redundancy (e.g. testbed in maintenance)
- To re-use experiments (class exercises, scientifically, …)
- To compare environments (e.g. wireless, openflow hardware, …)
Design principles

- Multiple identity providers
- Standardized APIs
- Multiple tools
- Multiple testbeds

Testbeds trust IdPs in federation

All of them can appear and disappear!
Monthly usage: #slivers, #users

Sliver: depends on testbed, multiple nodes typically

#unique users April 2019-September 2019: 234
#unique users October 2018-September 2019: 340

Average sliver duration: 96 hours
Projects (1 project = set of experiment runs)
#Testbeds usable with Fed4FIRE account: +65
https://fedmon.fed4fire.eu (October 2019)
Monitoring federation is key (https://fedmon.fed4fire.eu)
Fed4FIRE as a meta-testbed
Remotely Experiment with new technologies
Fed4FIRE as Meta-testbed

Enables all kind of experimentation because of bare metal hardware of all kinds of equipment

Including creation of new platforms, testbeds, …
Company wants to deliver global video service

- Cost efficient
- Redundant
Design: start with US and EU users
Demo Deployment
Single testbed prototype
Upscaling
Day night emulation
Network Function Virtualization experiments on Fed4FIRE
Virtual Network Infrastructure Topology

- Open vSwitch
- Click kernel
Automating with Experiment Specification (eSpec)
What is an Experiment Specification?

Espec bundles:

- Resource Specification
- Files to be uploaded
- Commands to be executed
- Extras: SSH, RNG
Fed4FIRE as meta-testbed

Combine computing, networking and storage for all your needs
(SDN/NFV/SDX/5G/machine learning/IoT/cloud)
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