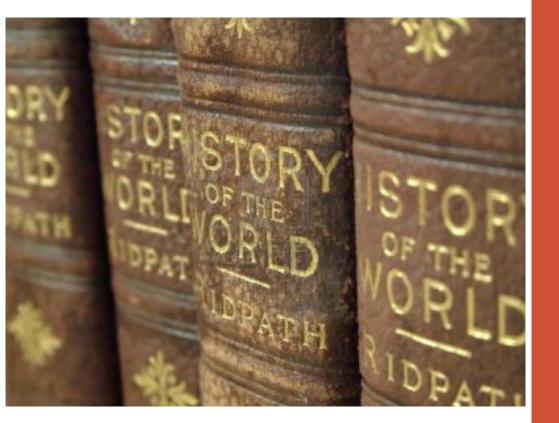


Experimentation on federated testbeds in Fed4FIRE

Brecht Vermeulen

imec



Fed4FIRE Federation for FIRE

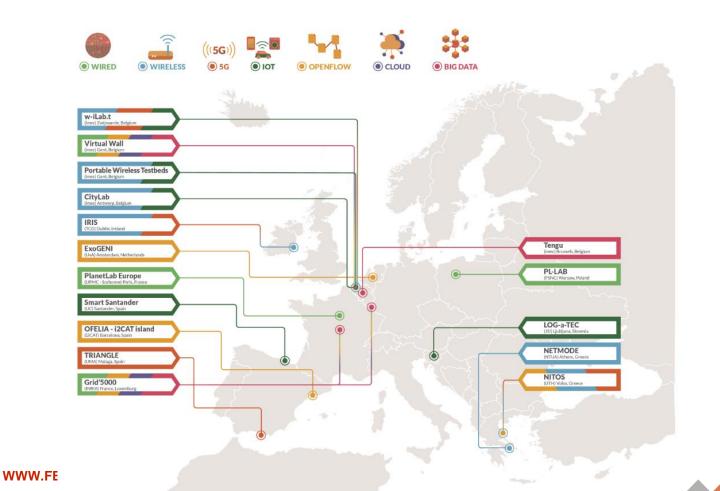
(Future Internet Research & Experimentation)

2012-2016

Fed4FIRE+ 2017-2021

Fed4FIRE assets – facilities (doc.fed4fire.eu)





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, ...)

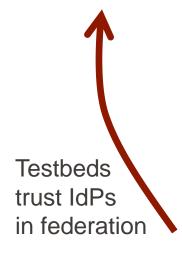


Design principles

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	Password	Password	
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Multiple identity providers



Standardized APIs

Multiple tools





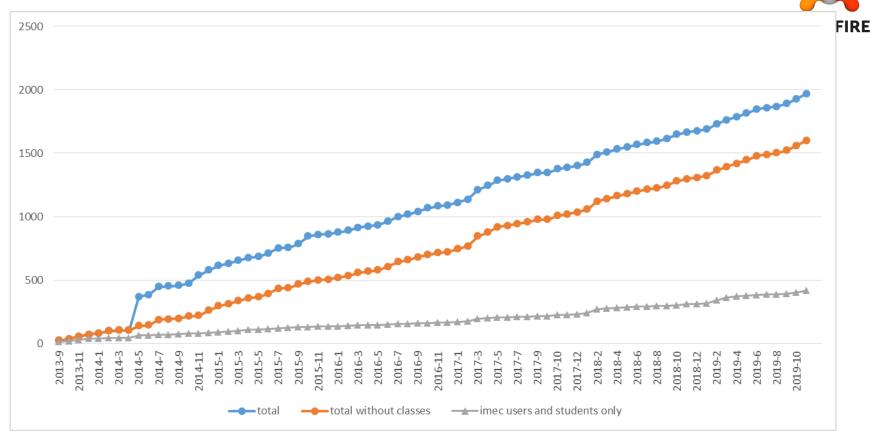
Multiple testbeds

WWW.FED4FIRE.EU

All of them can appear and disappear !



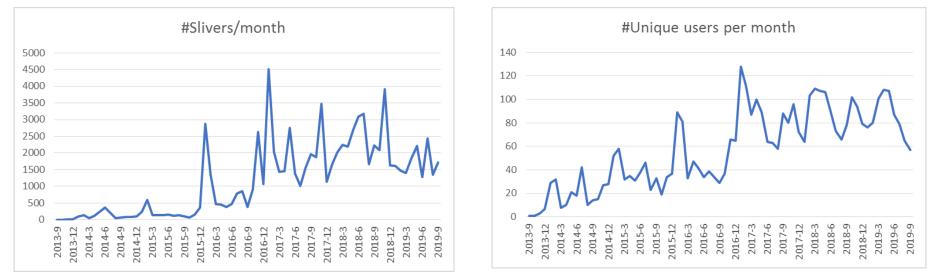
Users



6

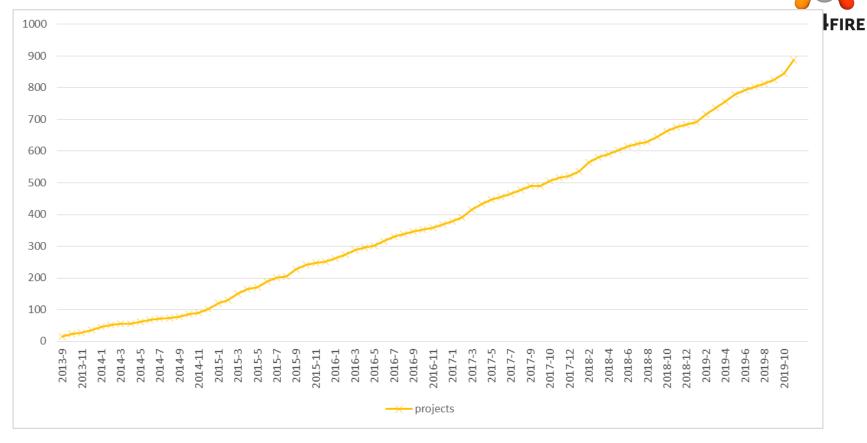
Monthly usage: #slivers, #users





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 <u>https://fedmon.fed4fire.eu</u> (October 2019)





Monitoring federation is key (https://fedmon.fed4fire.eu)

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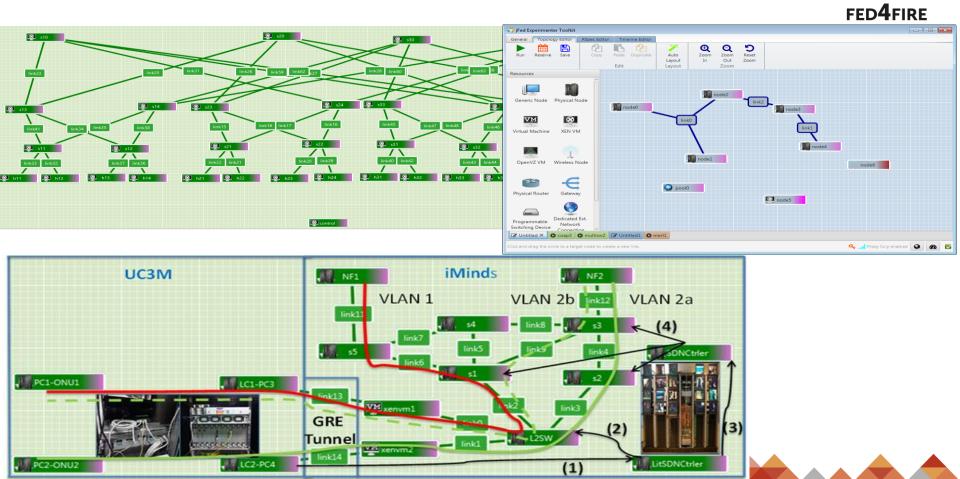
FED4FIRE



Fed4FIRE as a meta-testbed

Remotely Experiment with new technologies

jFed tool: easy access for testbeds (jfed.ilabt.imec.be)







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

15







Cost efficientRedundant

Design: start with US and EU users

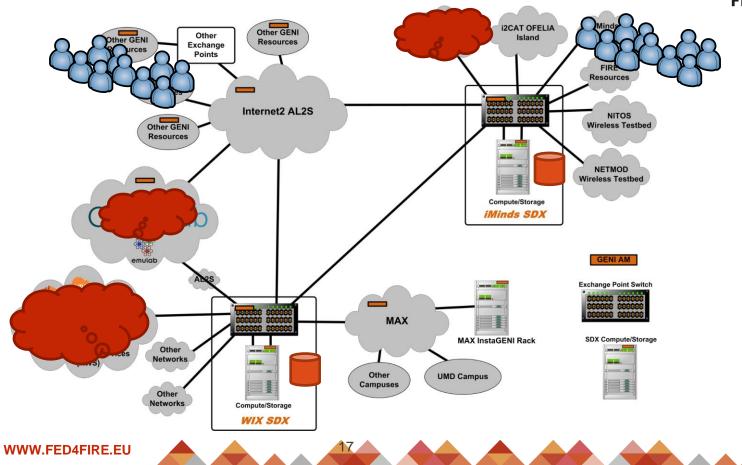




16

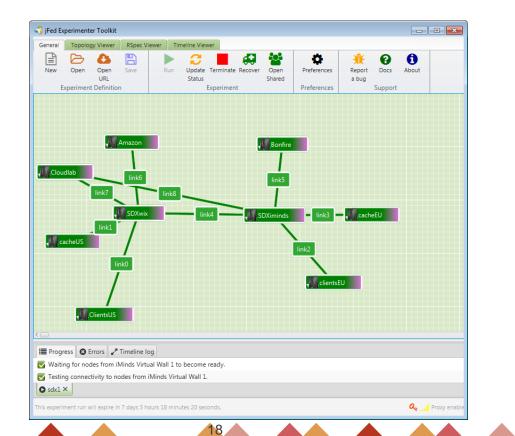
Demo Deployment





Single testbed prototype





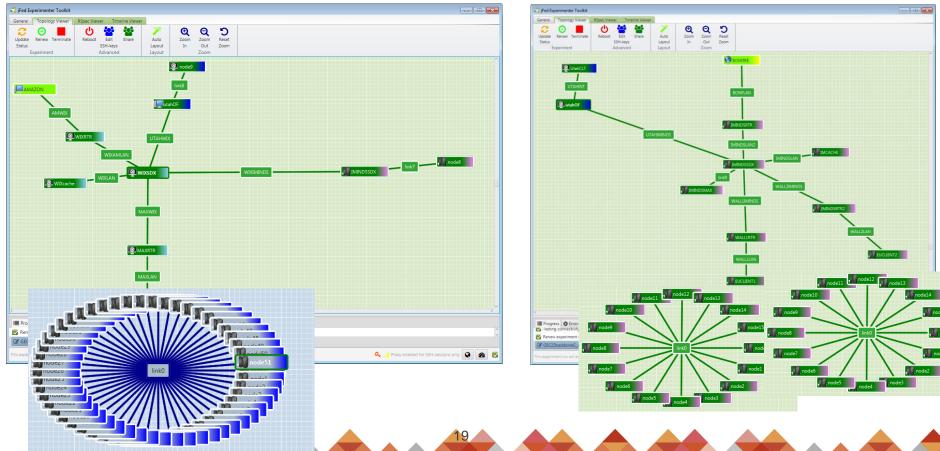
Upscaling

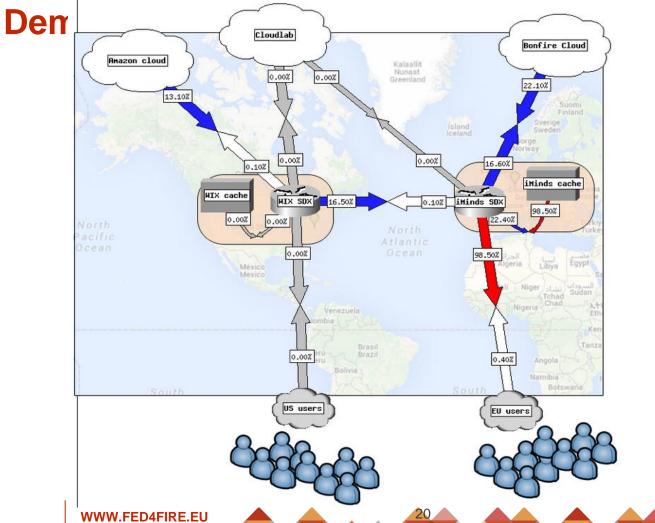


node15

, node0

node1





or corecor non 20 Eo.



i ai	fic Load
	0-1%
	1-10%
	10-25%
	25-40%
	40-55%
	55-70%
	70-85%
	85-100%

Day night emulation





21

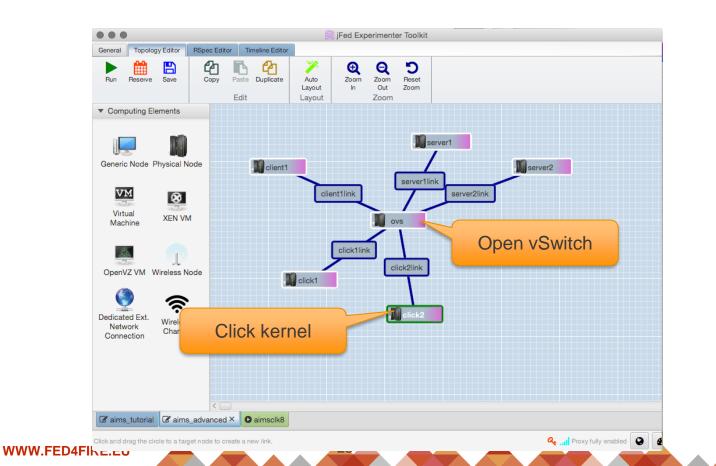
Network Function Virtualization experiments on Fed4FIRE





Virtual Network Infrastructure Topology







Automating with Experiment Specification (eSpec)

What is an Experiment Specification?



Espec bundles:





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





QUESTIONS?



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