Web of Things – Panel session
Emerging IoT Researches and Technologies
IoT-Week, Geneva, June 8th 2017

F-Interop H2020 Project

- www.f-interop.eu
- 1 November 2015 – 31 October 2018
- *develop and provide online interoperability and performance test tools to support emerging technologies from research to standardization and market launch*
- 9 partners

State of the Art: Face-to-Face Events

Similar requirements from all SDOs:

Goals of these events:

- Make better standards
- Reduced time-to-market
- Increase adoption

Example: ETSI plugtests

- 6TiSCH: Jul'15, Feb'16, Jul'16
- oneM2M: Sep'15, May'16, Nov'16
- CoAP: Mar'12, Nov'12, Nov'13, Mar'14

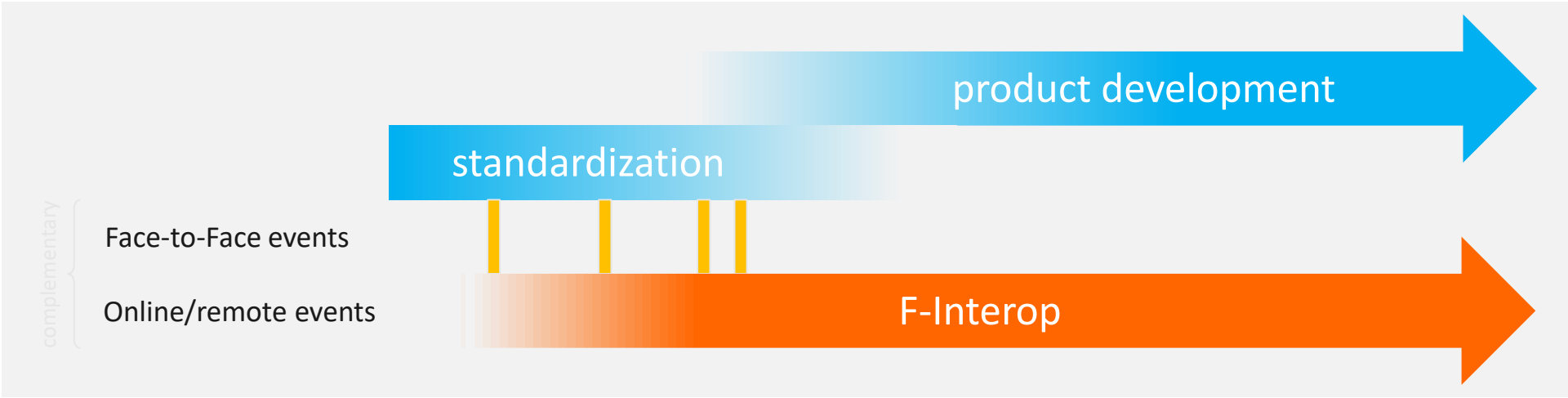
Joint 6TiSCH/6lo Agenda (JULY 2016)			
Time	Friday 15	Saturday 16	Sunday 17
08:30		Room Opening	Room Opening
09:00 11:00		TEST SESSION #3	TEST SESSION #7
11:00 13:00	SET-UP	TEST SESSION #4	TEST SESSION #8
13:00 14:00	LUNCH 12:30 to 13:30 WELCOME 13:30 to 14:00	LUNCH	LUNCH
14:00 16:00	TEST SESSION #1	TEST SESSION #5	TEAR-DOWN 14:00 to 15:00
16:00 18:00	TEST SESSION #2	TEST SESSION #6	
18:00 19:00	WRAP UP	WRAP UP	

Challenges with Face-to-Face Events

From a user's point of view

Few and far apart	Short	Face-to-face
• *Once or twice a year*	• *2-5 days typical*	• *Cost of traveling*

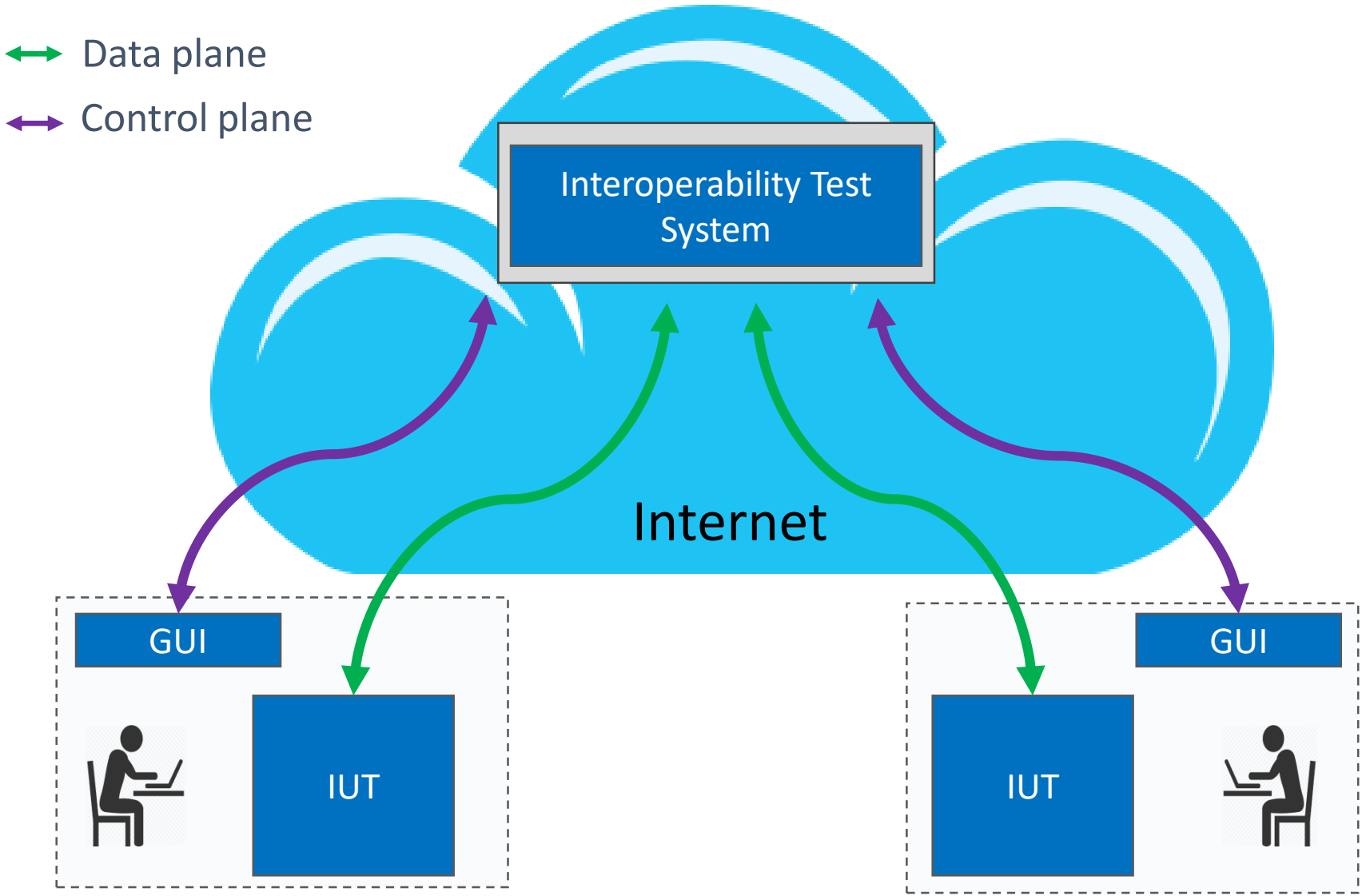
In practice, attended by large companies working on standardization ☹



Online	Remote

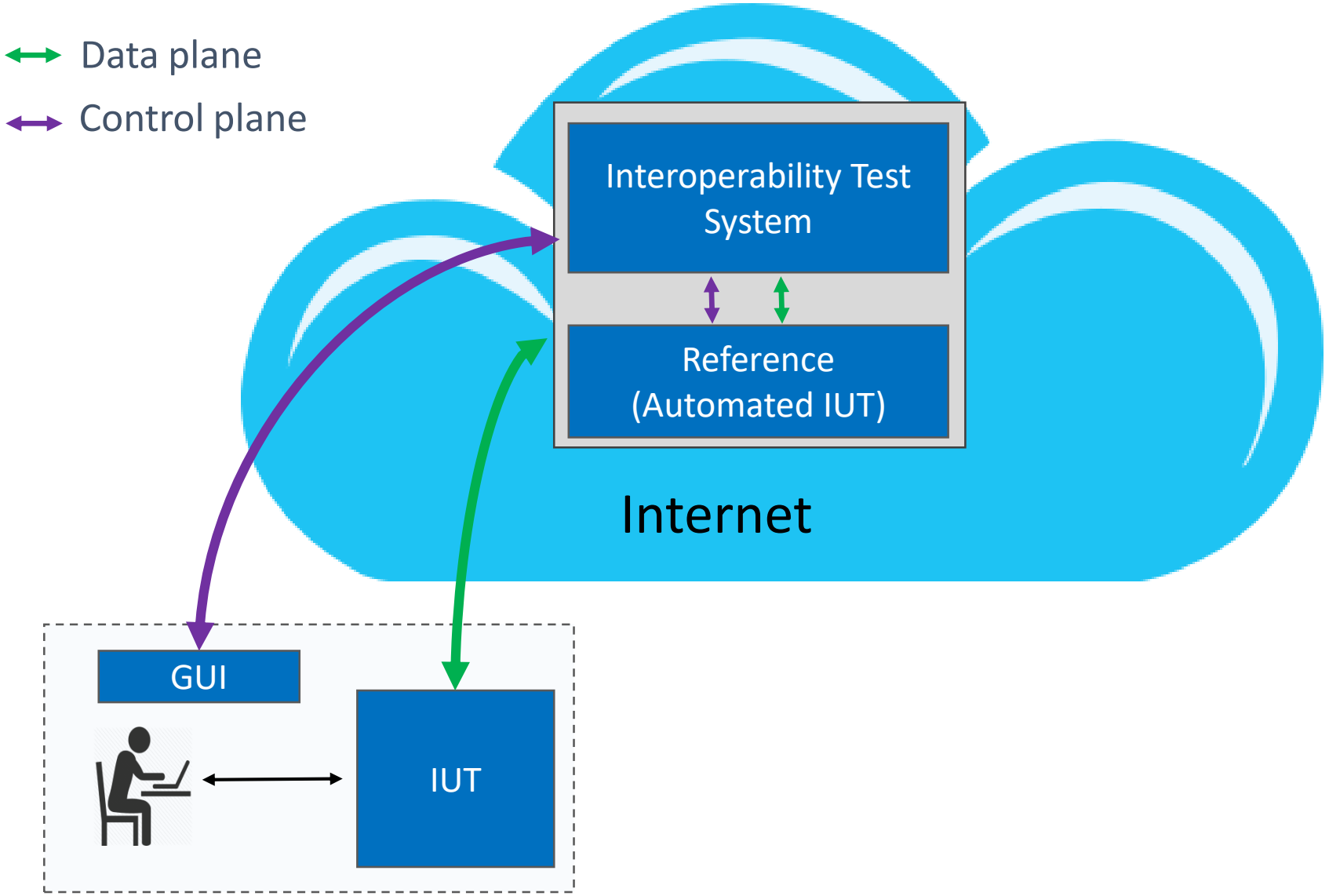
Inclusive of SMEs, more standards-based products on the market, faster ☺

Remote interoperability testing – Overview



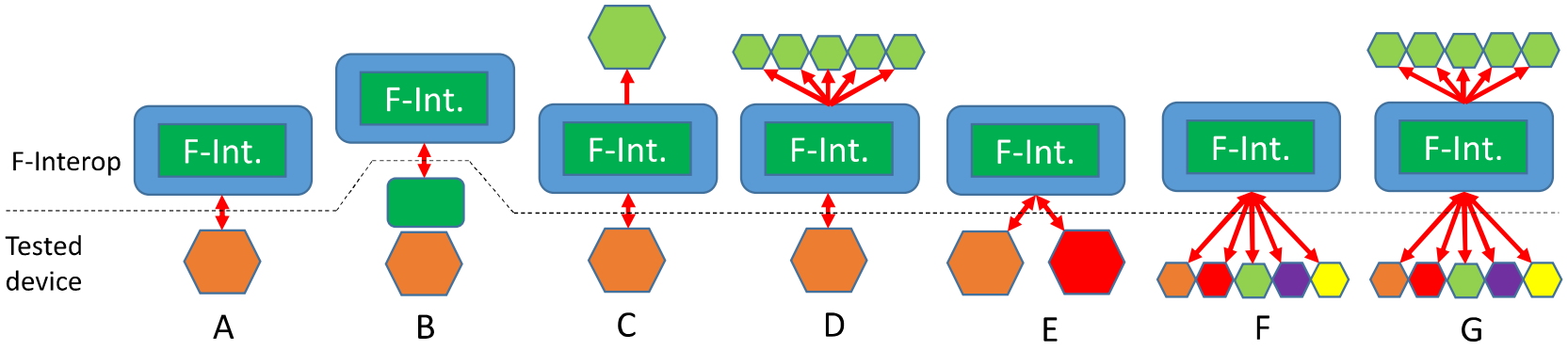
IUT : Implementation Under Test

Remote reference-based interoperability testing



IUT : Implementation Under Test

Different Configurations

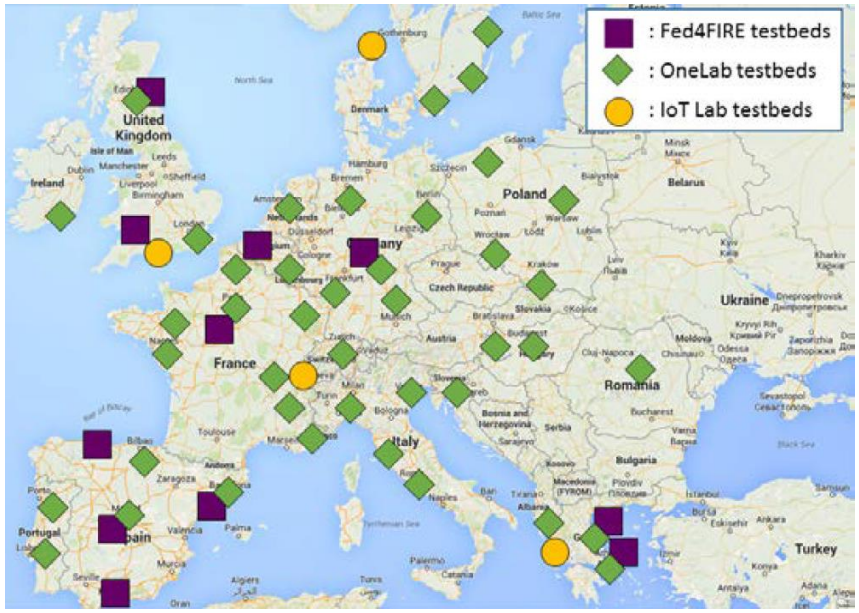


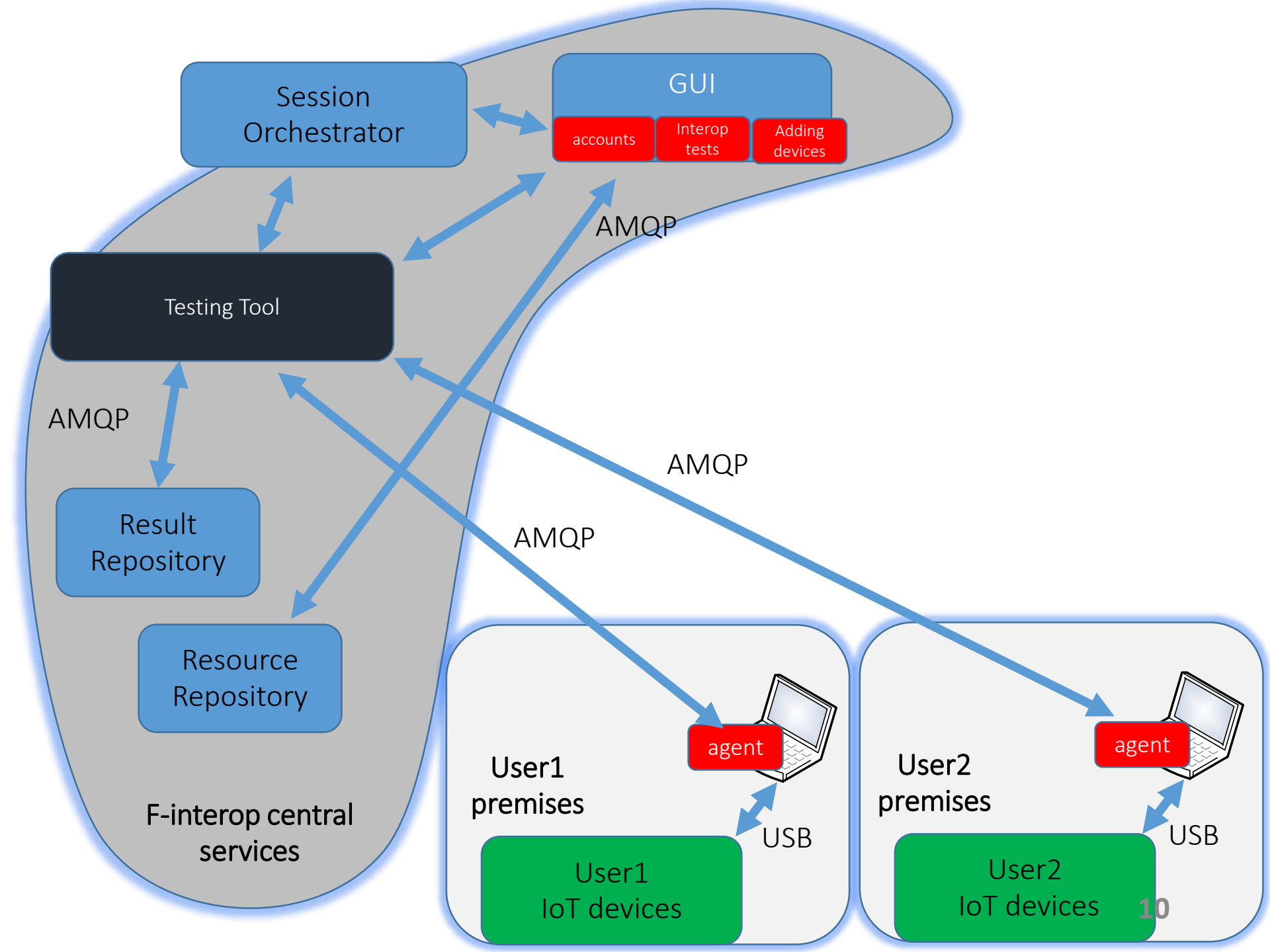
A. Tested Device ←→ F-Interop test server
B. Deported test with downloaded resource
C. Remote interop with 2 participants
D. Interop against testbed
E. Local interop
F. Remote interop with N participants
G. Remote interop with N participants and testbeds

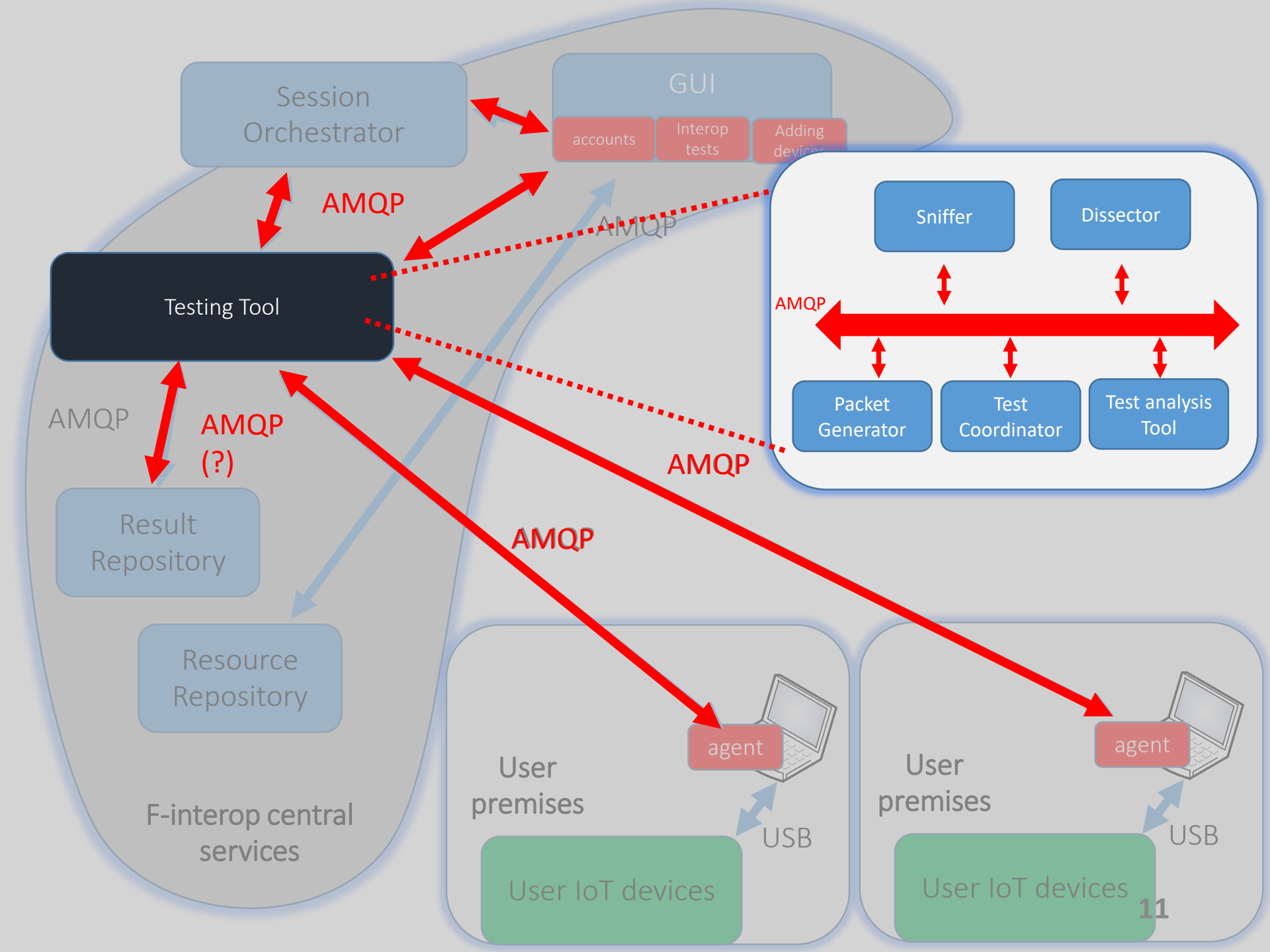
Testbeds

32 testbeds, 4755 nodes

- **Fed4FIRE** (www.fed4fire.eu/testbeds)
  - 24 testbeds
  - ~1000 nodes
- **OneLab** (onelab.eu)
  - Includes 6 IoT-lab deployments (including 2728 IoT nodes)
- **IoT lab** (www.iotlab.eu)




Session Orchestrator
GUI
accounts
Interop tests
Adding devices
AMQP
Testing Tool
AMQP
AMQP
Result Repository
AMQP
Resource Repository
F-interop central services
User1 premises
agent
USB
User1 IoT devices
User2 premises
agent
USB
User2 IoT devices


Session Orchestrator
GUI
accounts
Interop tests
Adding devices
AMQP
AMQP
Testing Tool
Sniffer
Dissector
AMQP
Packet Generator
Test Coordinator
Test analysis Tool
AMQP
AMQP (?)
AMQP
AMQP
Result Repository
Resource Repository
F-interop central services
User premises
agent
USB
User IoT devices
User premises
agent
USB
User IoT devices

Targeted Standards

- The ETSI plugtests specifications are used as starting point to build an architecture that allows them to be done remotely

- Initially standards of the IoT realm
  - CoAP
  - 6TiSCH

- Next step
  - Web of Things (WoT)

- Contributions/extensions are expected by design
  - Including:
    - oneM2M
    - 6LoWPAN

WoT interop test case example (1/2)

Properties

Identifier	**TC_WOT_BASE_01**
Objective	Read Boolean Property
References	3.2.3.1 Property, 3.2.4.1 Simple Data
Pre-test conditions	Exposing Thing provides boolean Property
Test sequence	
1. Stimulus	Consuming Thing sends `Retrieve` to Property
2. Check	Consuming Thing sends - protocol operation bound to `Retrieve` - no payload - to Property URI
3. Check	Exposing Thing sends - positive response code - payload formatted according to TD
4. Verify	Consuming Thing displays read value

Source: https://github.com/w3c/wot/blob/master/plugfest/2016-beijing/plugfest-test-cases-beijing-2016.md

WoT interop test case example (2/2)

Identifier	**TC_WOT_DISC_02**
Objective	Register Thing with Repository
References	3.2.6.2.2 Repository
Pre-test conditions	Exposing Thing has Thing Description, TD Repository is reachable
Test sequence	
1. Stimulus	Exposing Thing or commissioning tool sends `Create` with the TD to Repository registration resource
2. Check	Exposing Thing or commissioning tool sends - protocol operation bound to `Create` - valid TD in payload - to registration URI
3. Check	Repository resonds with - positive response code - Location of the registration handle
4. Verify	TD Repository look-up returns Exposing Thing

Source: https://github.com/w3c/wot/blob/master/plugfest/2016-beijing/plugfest-test-cases-beijing-2016.md

How the WoT community make use if this?

- Use F-Interop platform for remote interop events, plugtests
- Use WoT testing tools as support tooling for face to face events (plugtests, plugfests)
- Extend WoT testing tool to other WoT testing needs
  - testing tool will be an open source project
- Provide to F-Interop some reference implementations (golden images) of virtual devices promoting good practices used in WoT

Next Milestones

- July 2017
  - requirements for WoT testing tool
- November 2017
  - functional platform available
  - first WoT CoAP interop tests
- March 2018
  - WoT interop tests (advanced version)
- June 2018
  - **minimal WoT interop testing tool**
  - use in WoT plugfest/plugtests

Thank you for your attention

Please, feel free to contact us directly or later via email:

Federico.Sismondi@inria.fr, Cesar.Viho@irisa.fr