Future Internet Research and Experimentation

Co-funded by the Horizon 2020 Framework Program of the European Union

5G TRIANGLE

TRIANGLE: an end-to-end testing ecosystem for 5G

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When I say "5G Testing"…

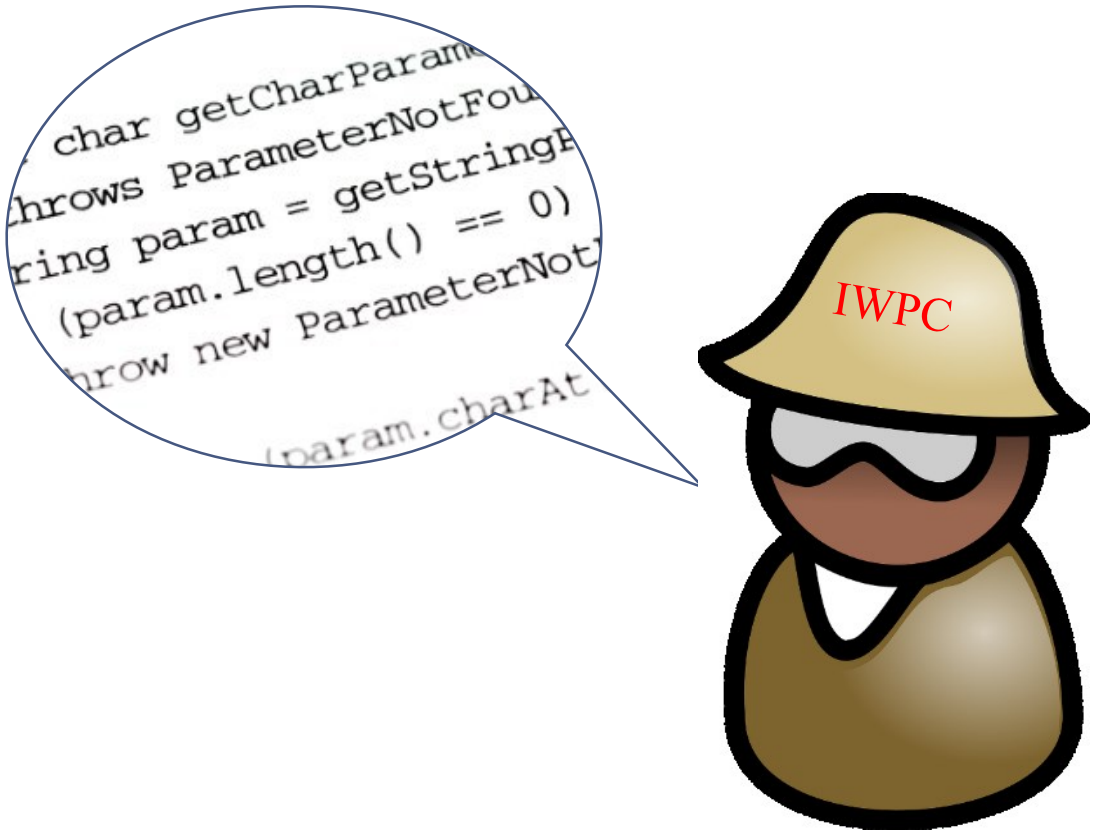
… what do you think about?

Yes! This is the one!

Do you speak Software-ese?

- Let's look at a domain that is getting closer: Software.

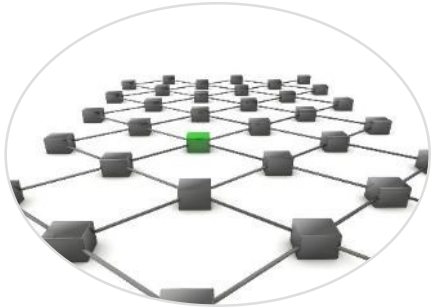
- What are they testing?
  - Unit testing
  - Integration testing
  - Component interface testing
  - System testing
  - Operational Acceptance testing



Extensive coverage of ALL the system

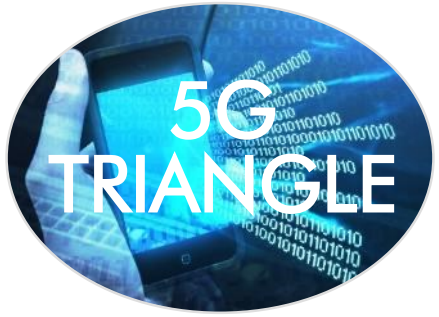
End-to-End Testing Ecosystem

Transport
- Deployment scenarios
- Carrier-grade SDN
- SLA/B2B services



Services
- Business Integrations
- Dynamic QoS
- Integrated vs CDN

Mobile App
- Live in-the-wild
- Connected behavior
- Device coverage



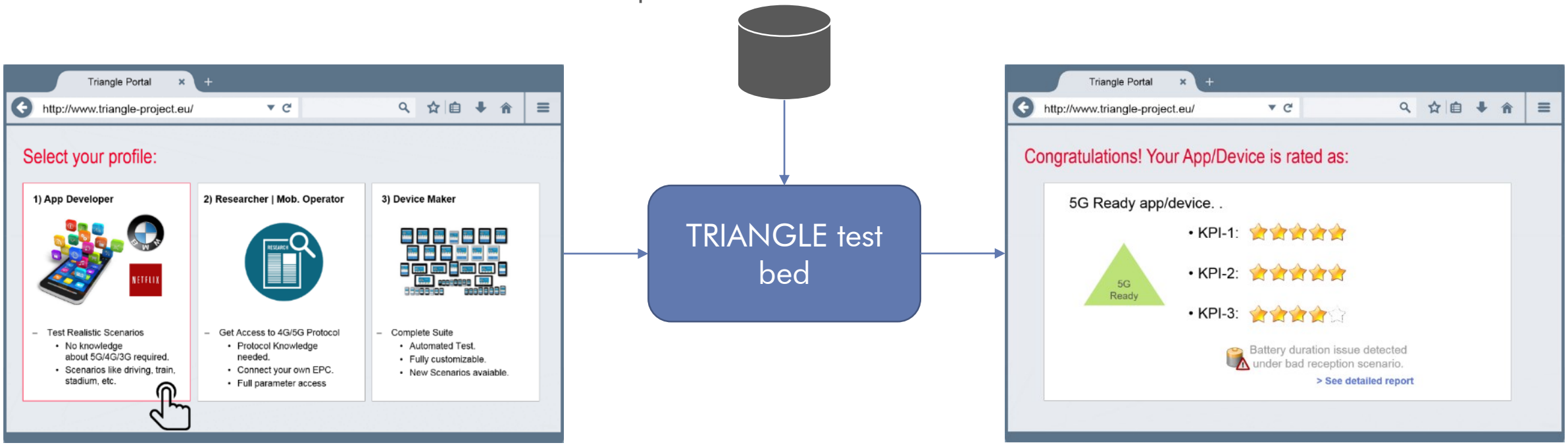
EPC
- Deployment configurations
- Network conditions
- Subscription levels

Device
- Power consumption
- Compliancy
- Chipset Performance

RAN
- New Waveforms
- RAN configuration
- Deployment scenarios

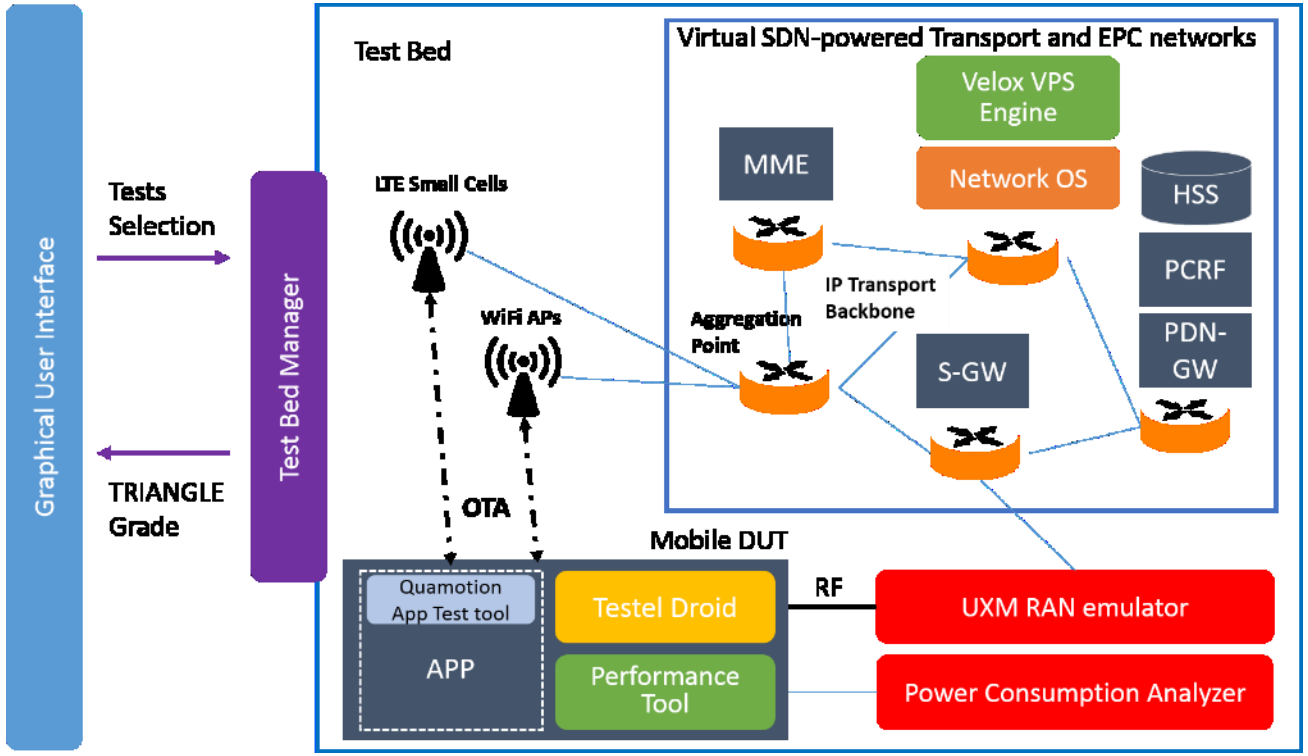
Fitting specific interests

Pre-brewed configurations defined by TRIANGLE experts



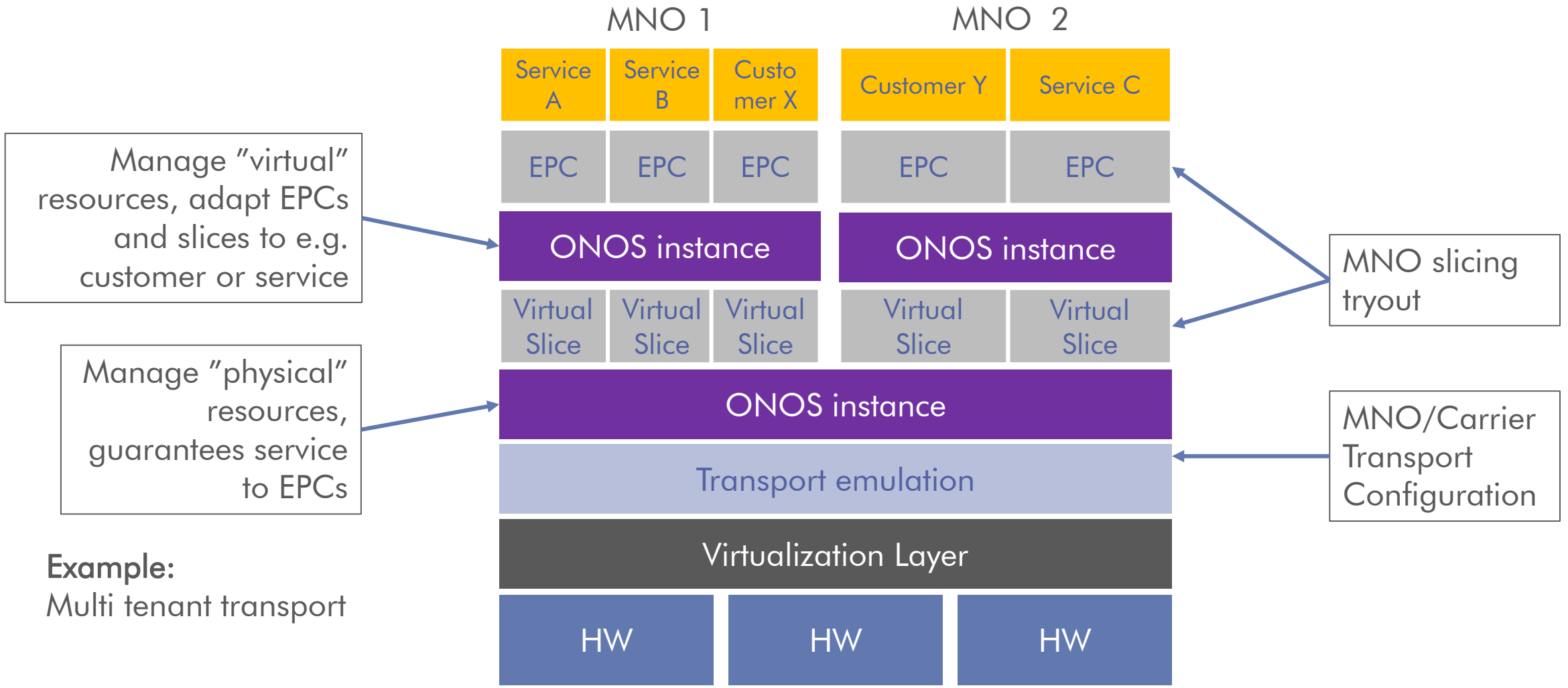
The Test Bed - Testing Possibilities

- Higher level scenario testing (e.g. crowded cafè, high speed train)
- Hardware testing (RF, power consumption)
- Capacity testing (call box)
- RAN configuration testing
- EPC sterss test
- SDN algorithm and configuration test
- Transport or slice configuration test
- Service testing



Currently based on 4G and its evolution, expected final architecture

What is the benefit for MNOs



Example:
Multi tenant transport

Who we are

The project

- "5G Applications and Devices Benchmarking" – TRIANGLE
- Co-funded by the **Horizon 2020** Framework Program of the EU
- Started Jan-1st 2016
- Expected duration of 3 years
- Six partners: 2 Industrial, 2 SMEs, 2 Academia

The EU Framework

- **Horizon 2020** is a financing scheme for supporting European research.
- **5G-PPP** Projects are financed under the same umbrella.
- **FIRE** is a branch of the program financing massive test bed activities.

Project Partners

This project has received funding from the *European Union's Horizon 2020 research and innovation programme* under grant agreement No 688712

Wishlist

- Is E2E testing a valid approach that can be absorbed by the telco industry?
- What would you, especially MNOs, require from a 5G certification process?
- What would convince companies to use the test bed service?
  - Device manufactures?
  - Network Operators?
  - Network Vendors?
- Which 5G forward leaning features should we implement to be more attractive?
- If it was a commercial Test-as-a-Service (TaaS), would it be a piece to include in your business model?

COME OUT
AND
PLAAYY!