Certifying 5G equipment vendors

How experience and expertise made a difference.

case study

EXFO

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Background

EXFO was selected by China Academy of Information and Communications Technology (CAICT), a governmental body, to test and certify network equipment vendors. The Chinese telecom industry is currently undergoing intense transformations as operators prep up their networks for 5G. EXFO's expertise and leadership in testing next-gen networks is widely recognized worldwide and CAICT turned to our experts to help them with vendor certification.

Challenge

Testing new technologies thoroughly in today's highly complex network environments requires experience and expertise in dealing with changes and unknowns. 5G specifications and standards are in constant evolution. For the tests to be relevant, quick adaptation is a necessity.

To certify diverse network equipment, our experts simulated traffic and tested the network by mimicking real-world conditions and behaviors. When it comes to 5G, two deployment modes exist: non-standalone mode and standalone mode.

The **non-standalone mode** is simply an upgrade from 4G whereby the software is upgraded to handle some 5G services.

The **standalone mode** is much more comprehensive and requires new architecture, new network components and new protocol stacks.

Other test companies (i.e., EXFO's competitors) were not able to meet the standalone mode requirements in carrying out the test plan. EXFO had to go it alone to certify the vendors assigned by CAICT.

Solution

The solution used to perform the various tests was EXFO's virtual QualityAssurer simulator platform loaded with software-based features (e.g., emulation of millions of subscribers, thousands of network elements, control- and user-plane traffic generation and analysis, traffic profiling to simulate real world conditions).

Testing capabilities in a nutshell:

- Millions of simulated subscribers and thousands of simulated network elements
- Line rate user plane traffic generation and analysis
- User specified mix of user plane traffic
- Generates and analyzes hundreds of thousands of signaling messages per second
- User specified mix of procedures at a very granular level
- Extreme flexibility to adapt quickly on the ground

The key differentiator that allowed EXFO's solution to meet all test plan requirements is the fact that it is *adaptable by design*.

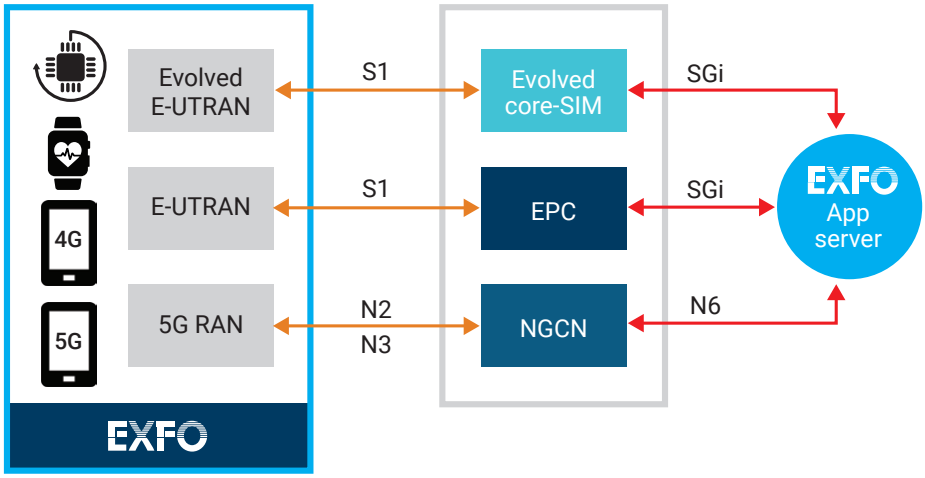

Figure 1. 5G core end-to-end testing

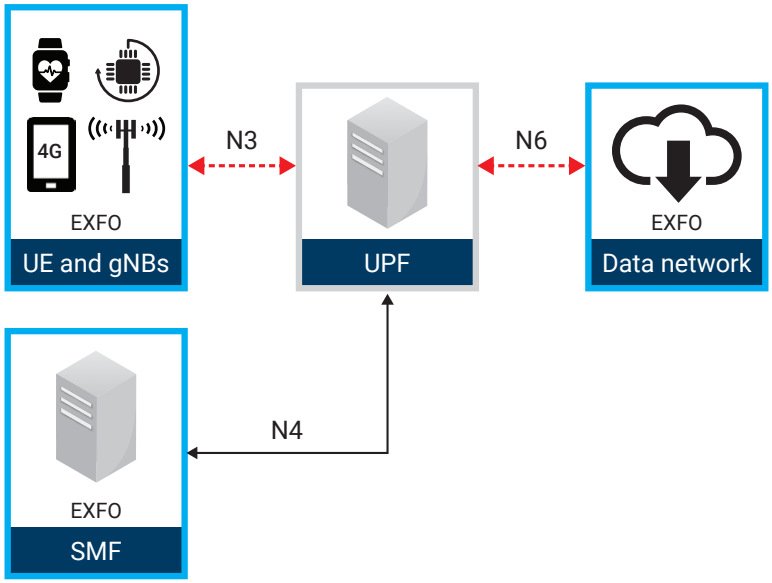

Figure 2. 5G network element testing

The key differentiator that allowed EXFO's solution to meet all test plan requirements is the fact that it is *adaptable by design*. This inherent flexibility is crucial in 5G, NFV or any other rapidly evolving wireless technology. The adaptable platform allows for further development and customization by the people on-site, using an intuitive graphical interface. For instance, the simulator solution was able to easily integrate external testing features from local partners for the user-plane to test voice, video and data. The solution could easily adapt to subtle variations in the implementations of the various vendors. This flexibility was also key in being able to create uncommon test scenarios such as negative testing. This resulted in a more thorough testing of the elements than would be have been possible with other tools.

EXFO's professional services were a key factor in CAICT's ability to evaluate the 5G equipment of different vendors in a timely manner.

Result

Every lab has different traffic profiles they want to generate. Our experts were able to easily generate many traffic profiles and replicate real-world conditions as needed by the customer (including behavior patterns, traffic models and stress tests).

The virtualized, software-based solution was easy to deploy and enabled testing anywhere in their labs.

Subjecting the network and devices under test to traffic generated as per CAICT's specifications resulted in several issues being identified. Vendors then had a chance to address these issues before their equipment got deployed in live networks. Finding these issues in a live network with real subscribers would have been much more cost prohibitive, while causing inconvenience to subscribers and damaging the reputation.

Conclusion

This partnership with CAICT adds to EXFO's expertise in working with institutions to certify network vendors on-site. Working directly with the vendors, our solution helped them identify and address potential and critical issues with their 5G VNFs.

EXFO's professional services were a key factor in CAICT's ability to evaluate the 5G equipment of different vendors in a timely manner.