

Experiment #5

Interoperability testing for mission-critical communications [Streamwide]

Overview and Objectives

Streamwide is a French-based company, which delivers two different All-in-One communication and collaboration applications:

- *Team on the run* a business-critical solution, which promotes global teams' remote collaboration, adapted to any type of organization size and flexible to adapt to any company's specific business needs. The main features of *Team on the run* are instant team communications, collaboration from anywhere, secure exchange of sensitive information, and efficiency increase, thanks to digital and automated processes. The main customers of this solution are utilities, facility management, healthcare organizations, transportation companies and smart cities.
- *Team on mission* is a new generation mission-critical communication solution. *Team on mission* is a solution that secures all types of real-time communications (Voice, Data, Video), provides interoperability with existing LMR systems, and is 3GPP compliant.

Both solutions are developed to work over broadband networks using 4G and 5G technologies that provide in particular QoS management (over Rx interface in particular). Streamwide already knows all the benefits that both technologies bring to their solution in term of reliability, bandwidth and jitter, but wanted to participate in the 5G-EPICENTRE project experimentation to integrate their own solution on a 5G Standalone testbed, with a specific PCF.

During the experimentation, Streamwide's objective was to perform some interoperability tests between Streamwide MCX server and the CTTC 5G Standalone testbed, with a specific PCF for the reservation and release of resources for their MCPTT features.

Testbed Readiness and Deployment

The deployment of Streamwide's application on the 5G-EPICENTRE platform was done through a KVM Virtual Machine (VM). The preparation involved the deployment of a client-server Virtual Private Network (VPN), to facilitate secure remote connections to the Barcelona 5G-EPICENTRE testbed. This setup allows Streamwide to deploy their AS on a KVM VM provided by CTTC, which interfaces with the PCF via the N5 connection. The VPN client provided by the testbed supports multiple sessions, accommodating at least three concurrent connections as requested by Streamwide. Additionally, we have provisioned the necessary virtual resources, including a VM with 4 vCPUs, 16GB of memory, 300GB of disk space, and dual network interfaces to segregate private and public flows. Remote access to two Samsung S22 devices has also been established, allowing Streamwide to install and test their application effectively. This robust and flexible testbed setup ensures an environment for Streamwide to validate the functionality and performance of their N5 interface.



In the described setup (Figure 1), the call between two mobile phones is established through a detailed architecture involving multiple components and services. The mobile phones connect to a 5G core/RAN network, which then connect to the Streamwide K8s cluster. The cluster hosts streams and SWAPI services. The connection between the 5G core and the Streamwide VM is facilitated through the N5 interface. This setup ensures that the core network can communicate effectively with the Streamwide services. Additionally, the entire setup is connected to Streamwide premises, where the setup includes Super Admin, Company Admin, and the Interface between both sites is done through VPN. Therefore, the call is routed from one mobile phone through the 5G core/RAN, into the Streamwide VM and its services within the Kubernetes cluster, and finally to the second mobile phone, ensuring end-to-end connectivity and communication. Figure 2 shows screenshots of the Streamwide application while establishing a call and once established.

Experiment Execution and Results

Figure 3 presents an example of a trace in which N5 signalling was used to establish a call according to its requirements. Session 1 is a call that was not answered. The smartphone hangs after 30 seconds. Session 2 and 3 is a successful call between 2 smartphones. The duration of the call is around 10 seconds.

Overall evaluation

Streamwide were very pleased with tests done during 5G-EPICENTRE, and the work done in cooperation with the 5G-EPICENTRE team. It has allowed Streamwide to demonstrate interoperability between the Streamwide MCX server and the 5G-EPICENTRE 5G Standalone testbed with a specific PCF for the reservation and release of resources for our MCPTT features.

From the perspective of 5G-EPICENTRE, the collaboration allowed CTC to demonstrate the capabilities of our platform in handling advanced MCPTT features through the N5 interface. This partnership also showcased the importance of interoperability, in enhancing communication solutions for diverse sectors. The successful tests underscore the potential of 5G-EPICENTRE in facilitating innovative developments in the 5G landscape.

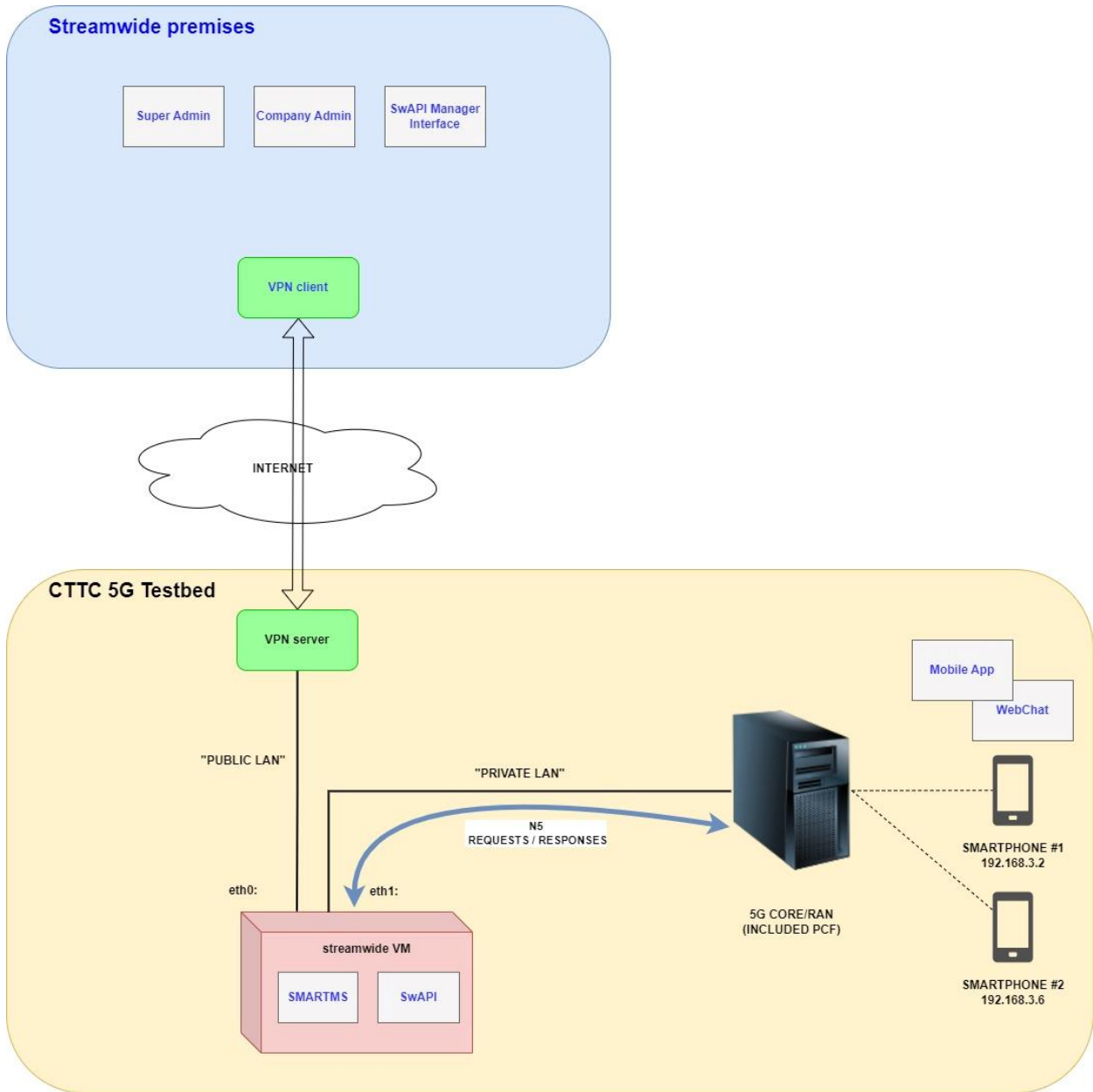


Figure 1: Streamwide main components

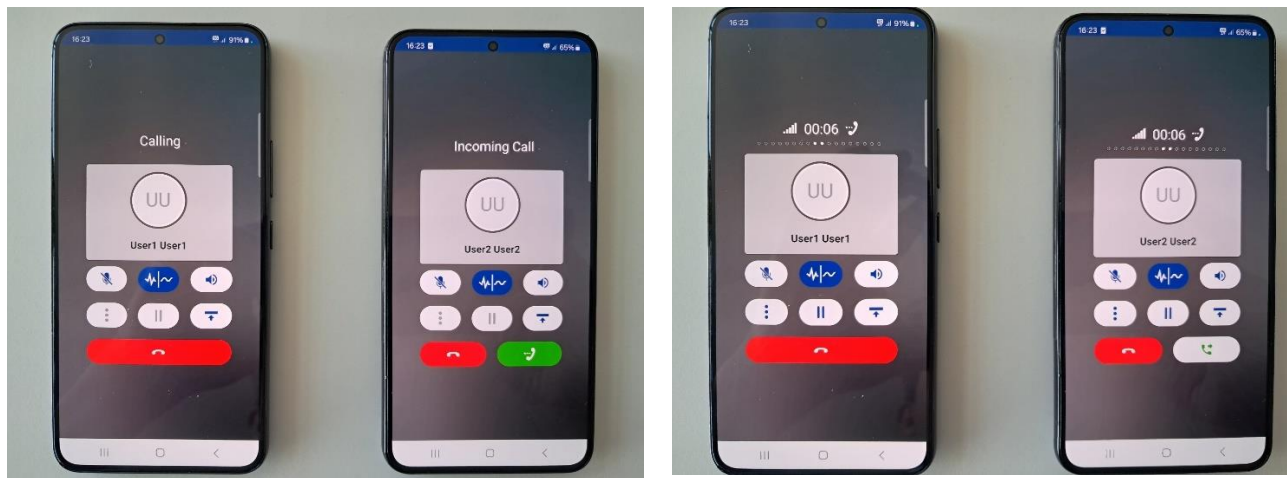


Figure 2: Screenshot of (a) smartphone #1 calling smartphone #2 and (b) two smartphones during a call through the Streamwide service

Time	Time diff	RAN	CN	UE ID	IMSI	Cell	Info	Message
16:22:57.973			N5					10.1.14.217:60226 POST http://10.1.14.52:5561/npcf-policyauthorization/v1/app-sessions
16:22:57.974	+0.001		N5					10.1.14.217:60226 Status: 201
16:23:28.020	+30.046		N5					10.1.14.217:52474 POST http://10.1.14.52:5561/npcf-policyauthorization/v1/app-sessions/0000000000000001/delete
16:23:28.021	+0.001		N5					10.1.14.217:52474 Status: 204
16:23:37.399	+9.378		N5					10.1.14.217:39840 POST http://10.1.14.52:5561/npcf-policyauthorization/v1/app-sessions
-			N5					10.1.14.217:39840 Status: 201
16:23:48.148	+10.749		N5					10.1.14.217:44496 POST http://10.1.14.52:5561/npcf-policyauthorization/v1/app-sessions
-			N5					10.1.14.217:44496 Status: 201
16:23:59.140	+10.992		N5					10.1.14.217:33894 POST http://10.1.14.52:5561/npcf-policyauthorization/v1/app-sessions/0000000000000003/delete
-			N5					10.1.14.217:33894 Status: 204
16:24:00.310	+1.170		N5					10.1.14.217:33902 POST http://10.1.14.52:5561/npcf-policyauthorization/v1/app-sessions/0000000000000002/delete
-			N5					10.1.14.217:33902 Status: 204

Figure 3: Screenshots with N5 requests in the 5G core

For more information, do not hesitate to visit the website <https://www.5gepicentre.eu/> and/or contact the 5G-EPICENTRE team.

Follow Us on our social media for more Results

