



SS8[®]

LAWFUL INTERCEPTION
IN 5G NETWORKS

Lawful Interception in 5G Networks

From 4K videos and movies streamed over the Internet, to photo sharing, video conferencing, and social networking, real-time Internet communications are an integral part of our lives. Increasingly, consumers have come to expect the same user experience provided by a wireless connection similar to a high-speed wired connection.

Mobile network operators view 5G as a way to compete on an equal footing with cable and landline telecommunications providers for broadband data users. With potential download speeds of multi gigabit per second, 5G is offering wireless subscribers a true broadband experience. Communication service providers that provide voice and/or data services (such as 5G) to their customers are required to assist law enforcement in conducting investigations in the form of Lawful Interception (LI).

All major communications service providers planning to provide 5G service to their customers should not forget that they will need to make significant changes and enhancements to their LI capabilities. These changes are required to comply with the legally mandated capabilities and requirements in every country. SS8's Xcipio Lawful Intercept platform is ready to tackle these challenges and is the first LI platform deployed for initial 5G trials and deployments.

Here are some of the challenges the communications service providers and the law enforcement agencies are likely to face when deploying systems to comply with the lawful intercept requirements.

5G REPRESENTS A HUGE LEAP IN POSSIBLE DATA TRANSFER SPEEDS

The potential data generated by a single 5G user can exceed well over gigabit speeds. Early testing of 5G technology demonstrates real-world speeds of 3 to 5 Gbps, which is 50 to 100 times greater than the 4G networks. Most LI deployments in 4G networks today generate this level of data from the entire 4G network. This means a single LI target can exceed the entire capacity of the existing LI system. Previous LI systems will not be able to scale up the 5G network speeds. More importantly, LI solutions must be able to scale as the subscriber base grows and new applications and devices are added.

THE CHANGING NATURE OF WIRELESS INTERNET ACCESS AS A RESULT OF 5G SPEEDS

Today, most people rely on wireline access for broadband Internet to their businesses and homes, such as cable, fiber to the home, DSL, etc. Wireless internet access is mostly used on mobile devices such as smart phones. One of the first core applications of 5G is Fixed Wireless Access (FWA). This means people will be able to install a 5G modem at small businesses, homes and apartment buildings for wireless broadband Internet access. Considering an average household today has at least two HDTVs, and many network connected devices, it is expected that average sustained throughput for one subscriber will be around 60 to 100Mbps, again that's 50 to 100 times more than the 4G networks.

NEW BREED OF COMMUNICATIONS APPLICATIONS / DEVICES AND INTERNET OF THINGS (IOT)

In the last decade, new transportation apps like Uber and Lyft, social media platforms like Facebook, Instagram and others, benefited tremendously from the reliable connectivity and speed provided by the 4G networks and devices. 5G provides even higher speeds and much lower latency, which was a limitation in the 4G networks. 5G will enable Internet of Things (IoT) which is at the core of digital transformation. Autonomous vehicles, robotic surgery, sensors and other devices used in critical infrastructure and home monitoring are just few potential applications of 5G enabled IoT. These new devices not only increase the traffic levels in the 5G networks, but as these IoT applications become widely available, they create more devices and means to intercept. The question that comes to mind is, how do you intercept a self-driving car's network traffic if a law enforcement agency was to get a court order in a kidnapping or terrorism situation?

INTEGRATION OF 5G WITH 4G AND OTHER LEGACY NETWORKS

2G networks are still widely deployed, but it is expected that many operators will want to retire 2G technology and reuse the spectrum for more modern systems. Even if 2G technology may continue to exist, these would not be expected to interoperate with 5G systems, or be supported by the 5G devices. Therefore, we expect no integration between 2G and 5G LI systems. However, 3G Universal Mobile Telecommunications Systems (UMTS) are widely deployed and could continue to be primary technology for worldwide roaming in certain parts of the world well beyond 2020. Therefore, UMTS technology is expected to co-exist alongside 5G for some time. If 3G UMTS systems are used for roaming, we expect some limited integration between the 3G and 5G LI systems. 4G LTE is extensively deployed and is still growing in many countries. In order to meet commercial and technical goals of 5G, it is important that 5G technology tightly integrates with 4G LTE. We also expect the same IMS core to provide voice and multimedia capabilities to both 4G and 5G networks. Carriers require that services continue to be provided by both 4G and 5G technologies for an extended period of time. Therefore, we expect very tight integration between 4G and 5G LI systems. LI solutions must have deep and wide exposure to networks elements from 3G, 4G and 5G systems, and a long history of integrating with multiple vendors and across different technologies.

SS8 Xcipro is 5G ready technology that can support 3G, 4G and 5G networks all on a single LI platform.

XCIPIO FOR 5G LAWFUL INTERCEPT DEPLOYMENTS

The migration to 5G significantly increases LI technology requirements for wireless network operators. The amount of peak and average bandwidth generated by each individual intercept will increase significantly as new services and applications are delivered over 5G. IPv6 support has been an underlying requirement for 4G LTE networks, and adoption of 5G will require full IPv6 support as new IoT devices are introduced. To our knowledge, all carriers looking to deploy 5G are planning to take advantage of the virtualization technology. 5G networks shall utilize Network Function Virtualization (NFV) to reduce their overall CAPEX and OPEX. The LI technology must be able to support virtualization and full integration with the orchestration layer.

As compared to other lawful intercept technology products, SS8's Xcipro product line enjoys significant differentiators for monitoring and interception on 4G LTE networks:

- Leading scalability and performance with up to 7Gbps per target
- Full support for IPv6
- Fully virtualized and cloud ready
- Wide and deep infrastructure support for 3G, 4G and 5G interoperability
- Supports global and country specific handover interfaces

LEADING SCALABILITY AND PERFORMANCE

Using the state of the art microservices architecture which enables flexible and on-demand scaling, Xcipio LI solution simplifies increasing capacity. Xcipio uses on-board intelligence to maintain awareness of the usage levels and availability of the pool of content processors. Xcipio does this by continually checking the load on individual components and evaluating where new filter streams should be directed. This real-time intelligence enables Xcipio to redistribute filter streams in the event of failure, preventing or minimizing any data loss resulting from an outage.

An Xcipio solution can scale to tens of gigabits of aggregated intercept traffic with individual intercepts supported at multi-gigabit speeds. This built-in scalability enables a telecommunications provider to start with the capacity that is needed and easily add more LI capacity as their network bandwidth, subscribers, or number of court orders increases.

FULL SUPPORT FOR IPV6

Full IPv6 support up and down the network is a critical capability because failure to support IPv6 in any part of the network or session could obscure traffic and interrupt intercept and monitoring of subscribers without the network operator even realizing this is happening. For this reason, SS8 has taken great pains to ensure 100% IPv6 readiness no matter where in the network or subscriber device the IPv6 activity resides. Further, comprehensive IPv6 support will become even more critical because the new 5G devices and services are being served via IPv6 and not IPv4. In other words, IPv6 compatibility is mandatory for lawful interception solutions.

FULLY VIRTUALIZED AND CLOUD READY

Network Function Virtualization (NFV) combines advanced virtualization of network functions with the automation capabilities of cloud computing platforms, and it has become the new standard within the telecommunications industry. Fully virtualized based on OpenStack, Xcipio can run either on physical servers or within a cloud infrastructure based on the operator's preference. Microservices architecture allows flexible and on-demand scaling for cost-effective deployments. Integration with the orchestration layer, supporting ETSI NFV standards, ensures easy management and self-healing capabilities without operator intervention.

WIDE AND DEEP INFRASTRUCTURE SUPPORT FOR 3G, 4G AND 5G INTEROPERABILITY

As a recognized technology and deployment leader in the lawful intercept and intelligence market, SS8 embraces interoperability as a core element of integrated innovation. SS8 has performed extensive integration and tested interoperability and compatibility with a variety of partners all over the world. This enables SS8 to provide additional, complementary technologies and services to create a complete end-to-end lawful intelligence solution for customers within any network infrastructure.

Xcipio supports all the leading vendors of network infrastructure. For wireless operators, this breadth of support covers manufacturers of 2G, 3G, 4G and now 5G networks. Equally as impressive as the wide support for leading vendors is the depth of support for network elements offered by these vendors. The strong relationships with these technology partners results in proactive development, technology and roadmap alignment, and interoperability testing to simplify the integration of Xcipio into any 5G environment.

In addition to directly connecting to network infrastructure, Xcipio supports interfacing with legacy lawful interception solutions. Xcipio's umbrella approach provides a single point for management, operation and administration. This single point results in more efficient LI operations and lowers costs by leaving legacy systems in place.

SUPPORTS GLOBAL AND COUNTRY SPECIFIC HANDOVER INTERFACES

SS8 is globally recognized as a leader in the communication interception and forensics market. Xcipro offers operators the ability to comply with national and international standards for delivery of intercepted information to law enforcement. This support includes standards from 3GPP, ETSI, ANSI, and other recognized organizations. SS8's extensive experience around the world provides operators field-proven compliance coupled with a perspective on regulatory requirements around the world.

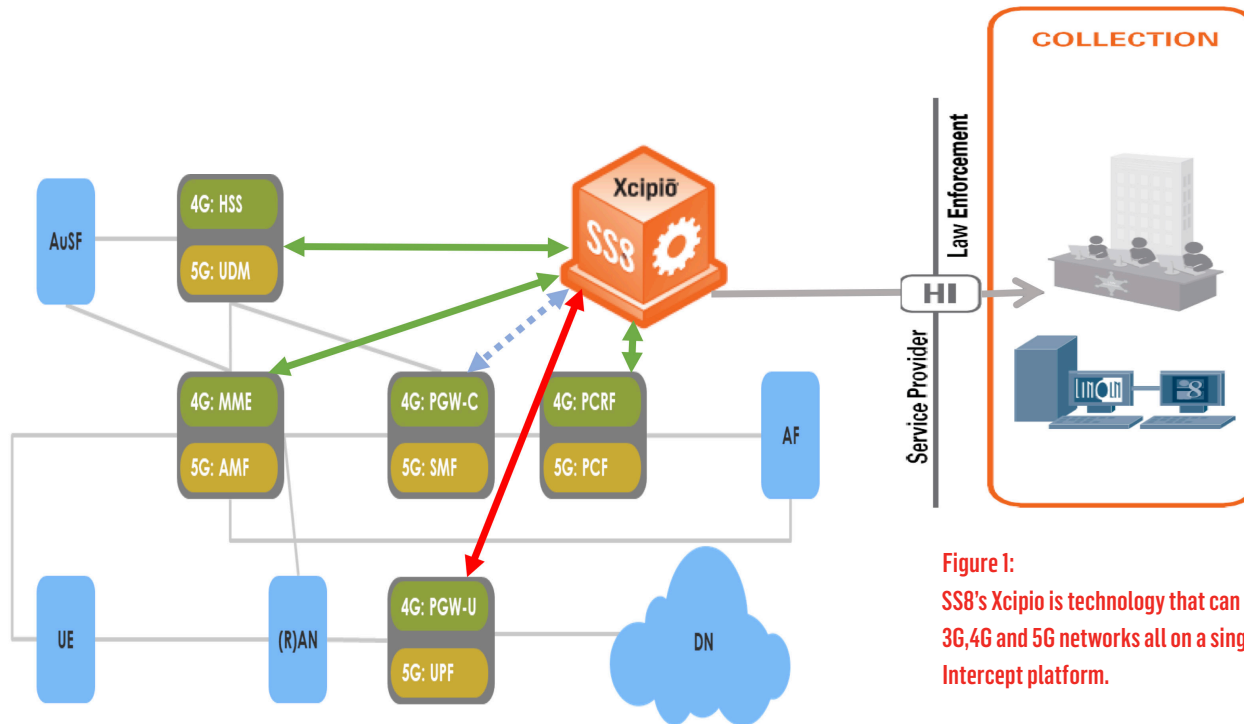


Figure 1: SS8's Xcipro is technology that can support 3G, 4G and 5G networks all on a single Lawful Intercept platform.

SUMMARY

The transition to 5G networks by wireless providers will radically increase technology demands on lawful intercept and intelligence tools. 5G networks will not only exponentially increase bandwidth per subscriber to multi-gigabit levels, low latency offered by the 5G networks will enable IoT and a set of new applications and services. SS8 has demonstrated its leadership in the space by continually enhancing the Xcipro architecture to be ready for the challenges that our customers face. Xcipro provides wireless network and broadband operators the most comprehensive, efficient, and technologically advanced solution to the new monitoring and intercept demands of 5G networks.

About SS8

From communications analytics for telecom providers, to monitoring centers for law enforcement and intelligence agency investigations, to recursive analysis for enterprise threat detection, SS8 holds the key to helping stop or prevent crimes, and threats to life.

