Voice over 5G

A vision for the future of voice services

5G and the future of voice

The move to 5G networks is underway with many service providers around the world having introduced 5G NSA (Non-Standalone) services and a few beginning to trial 5G SA (Standalone). Much has been written about 5G's abilities, from ultra-broadband to ultra-low latency, but it also promises to create new and compelling applications for voice services.

5G is a much more flexible network technology that will be used for more than mobile services, encompassing virtually any access type from mobile to fixed wireless and even wireline access. 5G will complete the voice core evolution to IMS, which in mobile networks, began with LTE. Where LTE has options to use either CS voice (CSFB) or IMS voice (VoLTE), 5G relies entirely on the IMS core to deliver voice and video communications. Long hailed as the voice technology of the future, with 5G, IMS will finally fulfill its promise.

Enterprise voice revival

With the commoditization of voice services by OTT enterprise players, it might seem that enterprise voice services are a bad bet, but this is where the move to IMS is an opportunity for CSPs to become relevant in the enterprise space again. Good quality, secure voice and video service are key requirements for many enterprise customers due to demanding conditions on the customer side.

5G is expected to transform enter-prises, being a key technology in enabling Industry 4.0 digitalization and automation of operations and communications. Many enterprises will be turning to CSPs to provide 5G-based private wireless services, which will present opportunities to offer Vo5G services integrated into applications and use cases.

Playing well with the many developers in the extended enterprise ecosystem will be key to this expansion of voice services into these new vertical applications. Integrating services with 5G voice will be founded on open APIs that enable the IMS core functionality to be used as a programmable asset to create these services. Voice as a component can be tightly integrated for revenue in addition to the underlying connectivity service. This is the future of 5G voice services.

The importance of voice

Over the last few decades, the wonders of the telephone have been all-but forgotten in the rush to embrace the internet and streaming video, but voice communications are still our most powerful communic-ations medium. Digital services such as Apple's Siri and Amazon's Alexa testify to the enduring interest in voice-driven interfaces. Advances in artificial intelligence (AI) and machine-learning (ML) neural networks are making voice recognition and synthesization ever more accurate and many anticipate voice will assume new relevance in future applications.

Voice services have for a long time been the cash cow of the CSP's business, although this varies widely today. Subscribers to mobile services expect voice to be a key part of what they are purchasing, but they are less and less interested in paying for the service, often expecting it to be bundled in with the subscription. Subscribers require voice to be integrated with their subscription, and they do need to be able to make and receive calls with anybody. OTT VoIP can complement an operator-provided voice service, but never replace it.

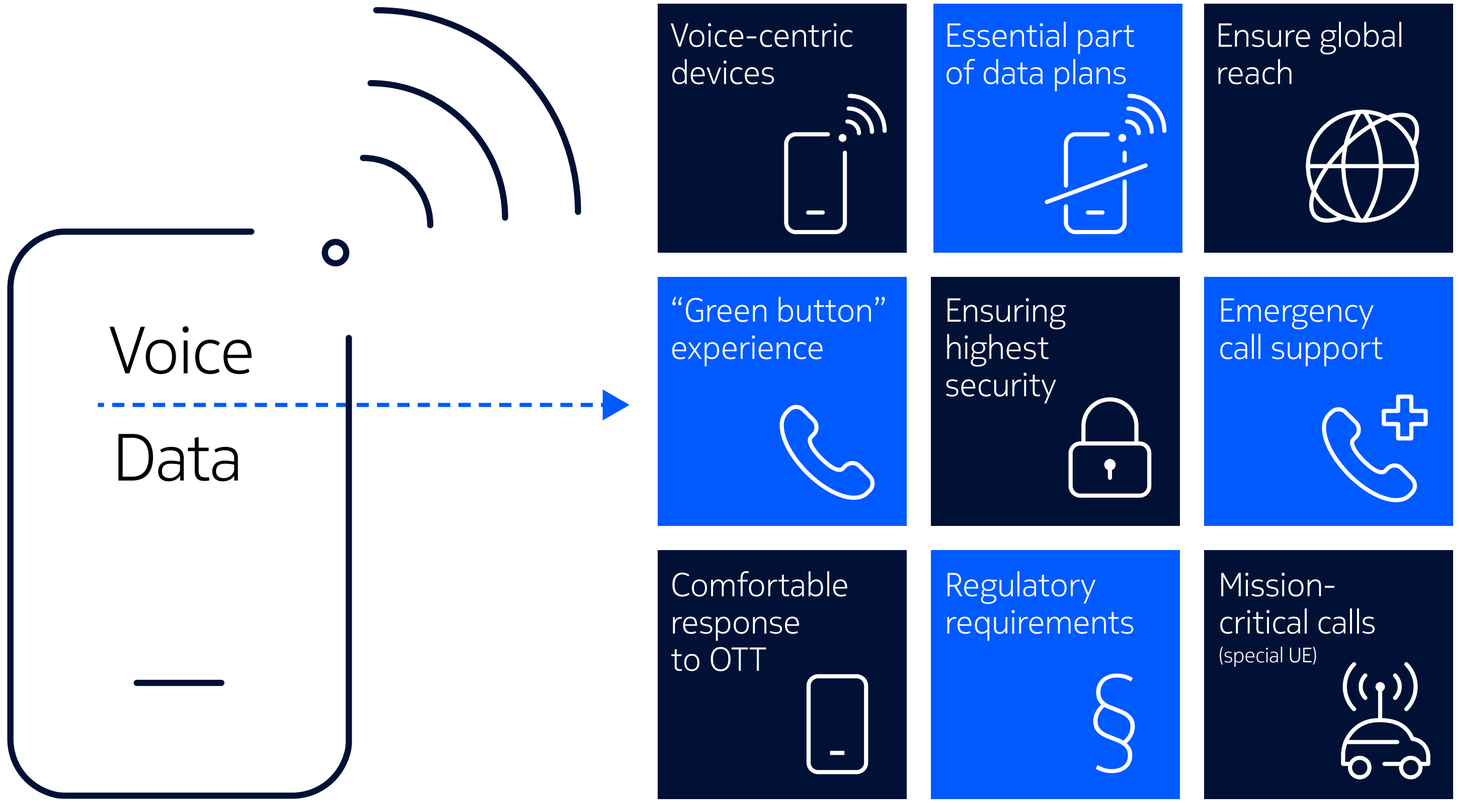


Figure 1: Voice as a vital part of future CSP services

This is where IMS holds potential to help them develop value-added services that integrate voice within other applications and especially enterprise services. IMS, which is the core voice technology ensuring QoS in both VoLTE and Vo5G, is both standardized and optimized. It is a much more powerful technology than the OTT VoIP used by many enterprise voice services. The quality of calls and video is superior and fully integrated in the handset, which makes it more user-friendly. High-definition voice and video calls can be integrated with other services as well.

Figure 2: The access agnostic IMS core

Voice evolution path

Today, VoLTE services have been adopted unevenly worldwide, but VoLTE will draw even with CS-based voice services soon and is expected to be greater than 50 percent of voice services worldwide by the end of 2021. In some North American telcos, VoLTE is close to 100 percent of voice services because of the popularity of the latest handsets from manufacturers such as Apple and Samsung, which use VoLTE for superior voice quality. The spread and success of VoLTE is establishing the relevance of IMS and building the foundation for 5G voice services. This is because the IMS core used by 4G/LTE is virtually the same as in 5G.

Many CSPs, however, are still using 2G and 3G CS voice, as opposed to VoLTE. This fallback position can still be supported in 4G, and thus for 5G NSA as well, but it will disappear as an option with 5G SA. 5G NSA deployments use 4G/LTE as the primary control network, which makes it possible to use CS voice (CSFB) as a voice option. The drawback is that the much faster 5G data connection is lost, and data is carried by 2G/3G while the call takes place.

Under 5G SA, initially handsets will fall back to 4G/LTE during the voice call setup and use VoLTE and IMS. This functionality is called as EPS FB. The main reason for this approach is better indoor and outdoor coverage in LTE compared to 5G. When 5G coverage evolves, it will be a natural step to move voice calls to 5G voice over New Radio (VoNR).

The final evolutionary step for CSPs will be full 5G voice (VoNR). It will work much the same as VoLTE today, using the IMS core for voice functionality, but accessing the higher performance capabilities of 5G for both voice and data, with no penalty during voice calls. Theoretically, this could lead to single 5G radio handsets, although this a long way out, since 4G/LTE coverage will continue to be important because 5G radio, depending on the spectrum it is using, will have a shorter range (especially true with millimeter wave). Also, even long-term, LTE support will be needed for roaming.

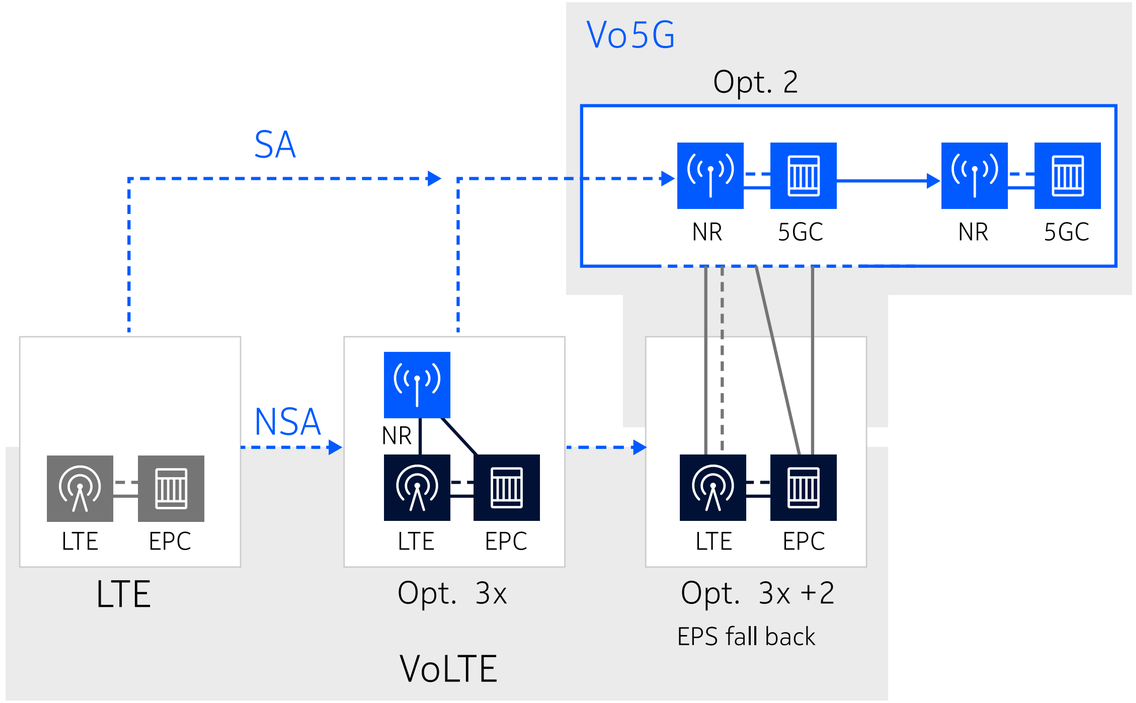


Figure 3: Voice evolution to 5G voice

Evolving the IMS core

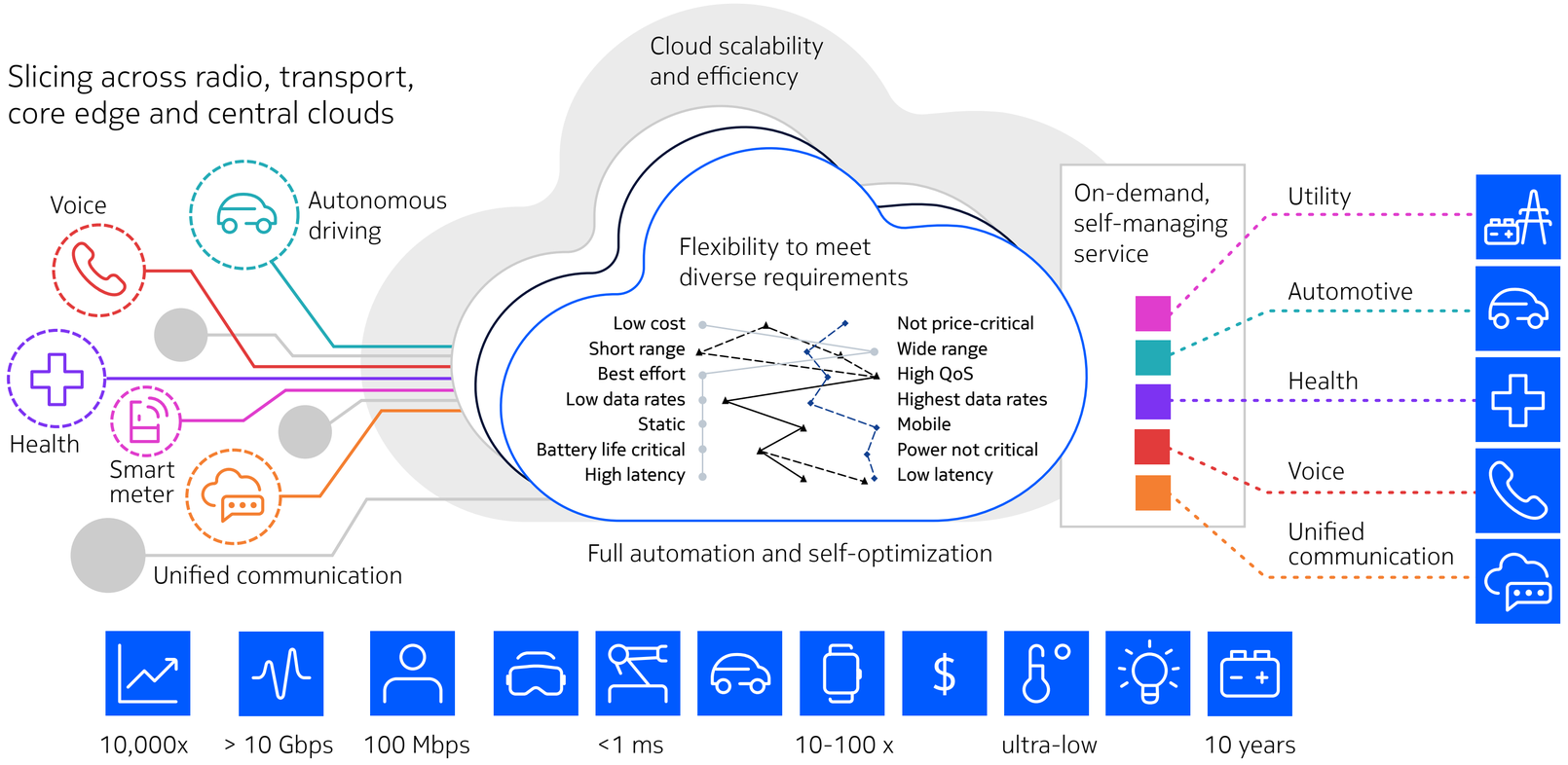
If the end goal of 5G is to deliver voice services over the IMS core, then CSPs have a golden opportunity to prepare for 5G now by upgrading their IMS core under 4G/LTE. Because the 5G core network is cloud-native, it will be crucial that the IMS core be cloud-native as well. It will enable a more agile and automatable network architecture for more efficient operations. And it will be fully integrated in other 5G capabilities such as slicing and open API capabilities, which enable faster development of new and custom services for large enterprise customers.

CSPs can move to a cloud-native IMS core under 4G/LTE today and be fully 5G-ready.

A new era for enterprise voice

Beyond higher speeds, the benefits of 5G for CSPs in the consumer market relate more to operational efficiencies. The cloud-native design of 5G will allow them to harness the speed of DevOps and automate much of the backend of the network. This will make them more competitive, agile and responsive to consumers, bringing new features and services to market with greater speed.

If possible, this improved operational agility will be even more important in the enterprise market. Customization of services and integration with enterprise applications can make CSPs a critical part of the enterprise's online ecosystem of partners. Using 5G network slicing, it will be possible for CSPs to offer tailored network solutions such as private wireless solutions supporting Industry 4.0 use cases for local and global enterprise customers. By using APIs to expose their services, they can leverage a wide and growing ecosystem of enterprise-focused developers to provide the connectivity foundation for the coming age of automation.



*5G Novel radio multi-service adaptive network architecture

Figure 4: Voice is a key component of the future 5G enterprise offer in different verticals

The future of voice

This is equally true of voice as it is of ultra-reliable ultra-low latency and massive-IoT capabilities. 5G voice has the potential to be the key interface for many use cases and applications. The IMS core will provide enterprises with reliability and predictability because of its ability to control QoS. Open APIs can expose the IMS core to enterprise application developers making it possible for them to choose it over VoIP.

For mission-critical and even business- critical applications and use cases, ensuring reliability and predictability is essential. In other words, 5G voice can reinsert CSPs into the growing and lucrative business services market after having been displaced by OTT enterprise services. It is a competitive market, but CSPs have a key differentiator as long as the voice component is efficient, easy to integrate in the larger 5G service offer and universally available.

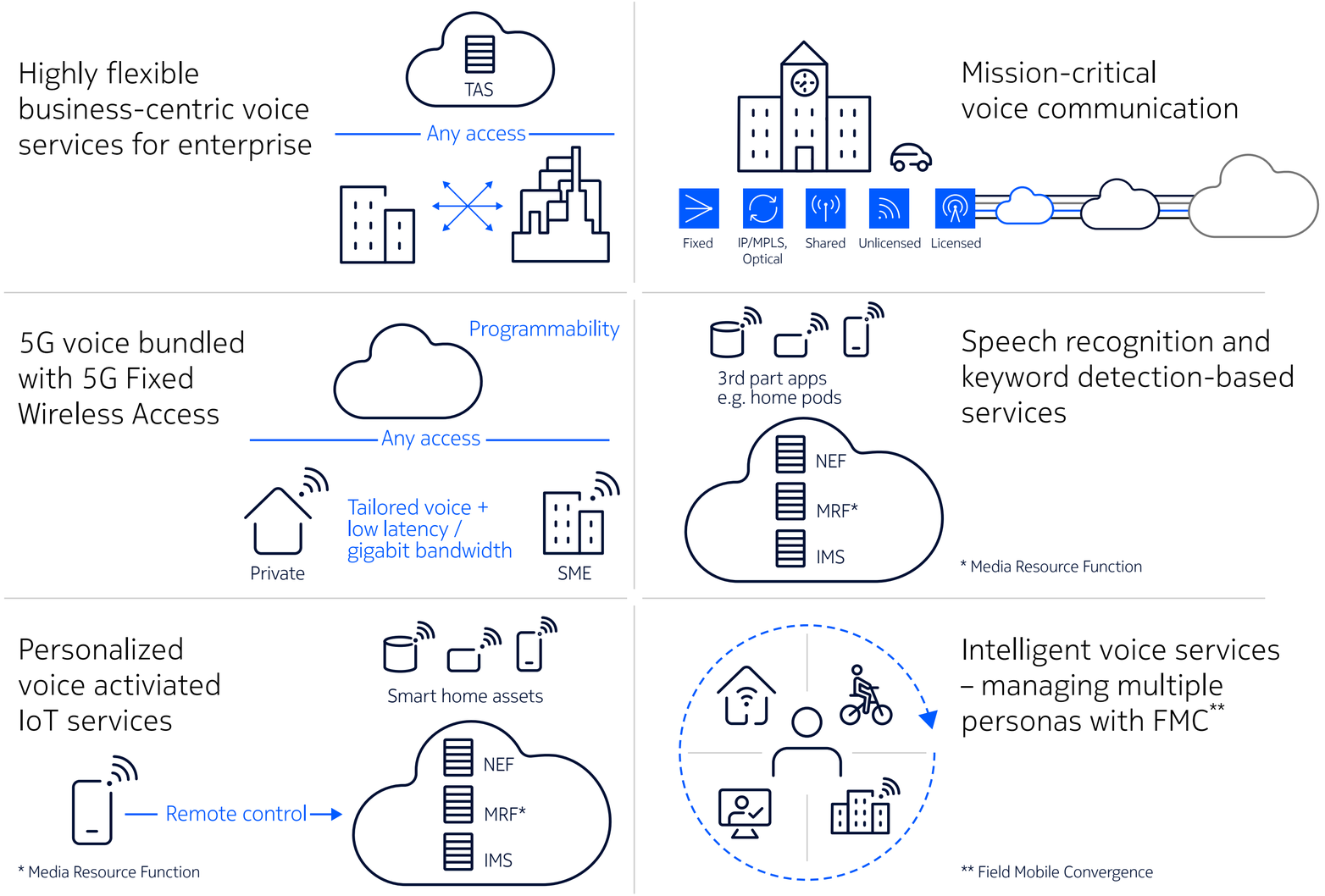


Figure 5: Use case evolution, bundling voice with new 5G using APIs

Get more insights and information

If you are interested in digging a little deeper into the topics discussed here, we have a series of six white papers in which we discuss Vo5G and the impact it will have on future CSP services.

1. Voice over 5G:
The future of voice services
(This white paper). We discuss the current state of voice, and what the introduction of 5G means for voice services.

2. Voice over 5G:
Deployment scenarios
We go into more detail about the various ways in which 5G will be deployed and how voice is supported in those models.

3. Voice over 5G:
Readying the VoLTE network
We explain how voice is currently supported in 4G VoLTE deployments, and what needs to be done to prepare the network for 5G. Hint: It depends on the 5G deployment model being used.

4. Voice over 5G:
Evolving your circuit switched network
Explaining steps that operators who do not currently have 4G VoLTE deployments need to take to prepare for 5G.

5. Voice over 5G:
Enterprise communication impacts
We cover how the CSP business expands with 5G to offer completely new enterprise services, and the role that voice will play in those services.

6. Voice over 5G:
The ecosystem for voice networks
We go into more depth on APIs and openness in 5G that allows carriers to partner with third parties for much faster service creation, enhanced innovation, and reduced time to launch new offers to the market.

Discover more here

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