

Monetizing 5G Voice

Enriched calling with IMS Data Channel

NOKIA



IMS as a value-adding platform

The move to 5G opens up many new avenues for innovation and puts network operators at an advantage as our industrial and public infrastructure adopt advanced automation. One of the more monetizable technologies is not new with 5G. IMS, already a standard since 2002, offers potential in 5G for providing enriched, value-added voice and data services using the IMS data channel.

Under 4G/LTE today, standardized IMS is used to deliver VoLTE and VoWiFi services to nearly 3 billion users worldwide. Well established, IMS is especially well-suited to 5G because it's architecture decomposes many of the network functions, including decoupling signaling from media services. This provides for a highly scalable and flexible system that works well with 5G's cloud-native, microservices approach.

As a default part of the architecture, the IMS data channel can be used to provide rich communication services and, under 5G, can be expanded to provide support for high bandwidth applications such as in-call content sharing (peer-to-peer or through an application server), HTML-content such as on-phone menu systems and chat assistants, and even in-call advertising. Industrial use cases could include robotics, augmented reality for remote inspections or telesurgery, as well as general enterprise communications such as content sharing and chat. These kinds of value-added services will enable operators to monetize their 5G investment by enabling business customers to improve both customer-facing and internal voice services.

IMS is mature sub-system with a well-established set of capabilities that can be used with 4G and 5G to offer rich communications to subscribers.



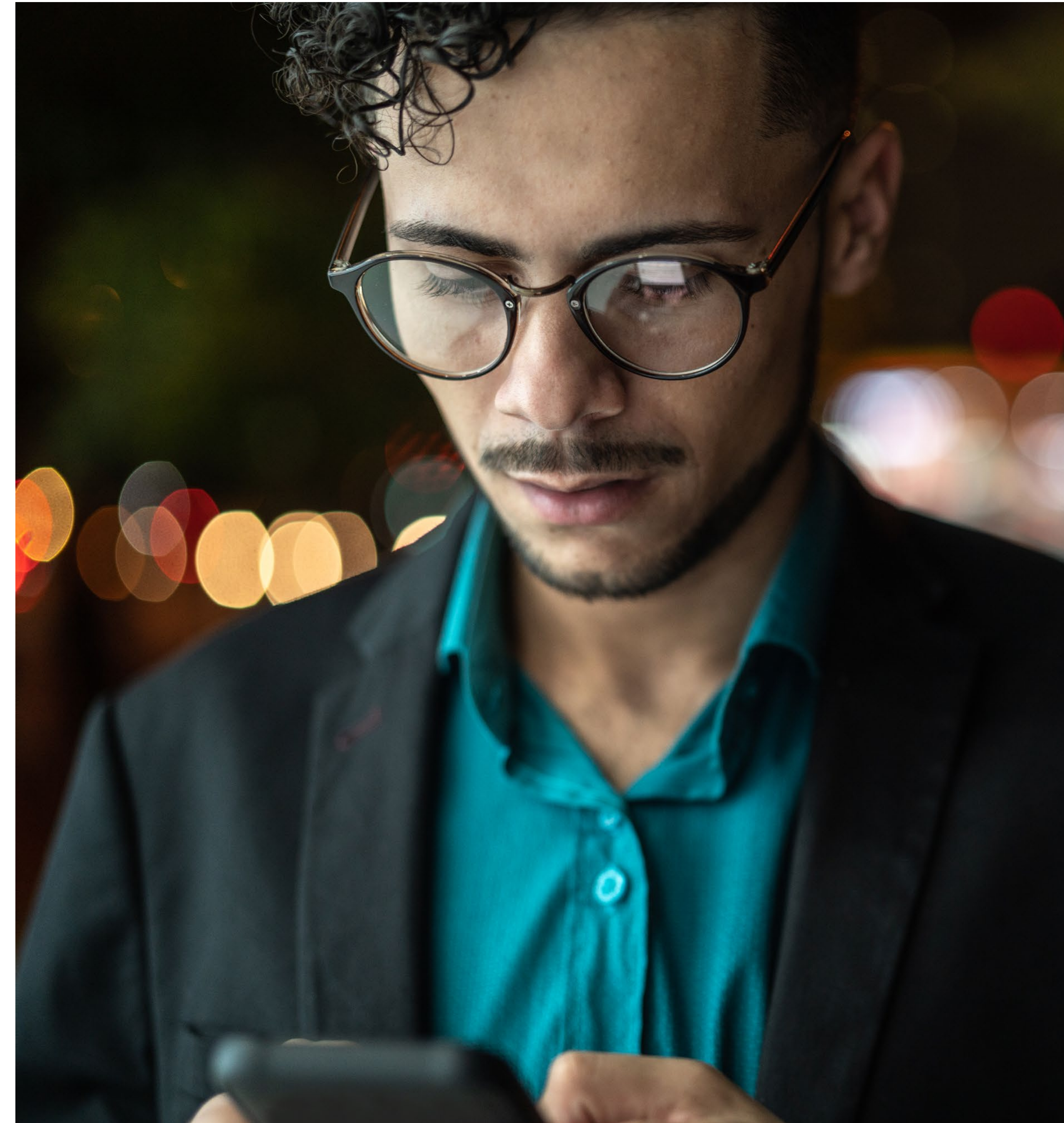
What is IMS data channel?

The IP Multimedia System (IMS) framework was first developed in the early 2000s and was intended to add data functions to mobile devices. Under 4G, a slimmed down version of IMS was also used to provide voice services (VoLTE) based on the SIP protocol embedded in IMS. Under 5G, 3GPP has again incorporated IMS and expanded its capabilities by adding the concept of a data channel signaling function, a data channel application repository, a data channel media function, and a data channel application server. This will enable a number of interesting use cases for operators.

The changes under 5G make the IMS data channel much more capable than in previous mobile generations, and potentially more useful than existing over-the-top (OTT) services. Most OTT multimedia communications applications suffer from the flaw that in order to communicate with each other, two users have to have both downloaded the application beforehand. Additionally, the communication application is

not always available across platforms. For instance, although an Android smartphone can join a Facetime call, it cannot host one.

The key innovation in 5G IMS allows two users that connect using a standard voice phone call to invoke the IMS data channel and immediately share an application that is downloaded to their devices (user equipment or UE) during the call setup. The call is set up using control plane messaging, which creates three data channel types for communication with the IMS server and data-channel-related functions. This allows for cloud-based application processing during the call by the data-channel-related functions and the downloading of apps onto the client device from the repository. As well, a direct interaction is possible if both terminals have received the application (see Figure 1). The bi-directional data depending on the use case can be peer-to-peer or peer-to-application/application-to-peer data transfer.

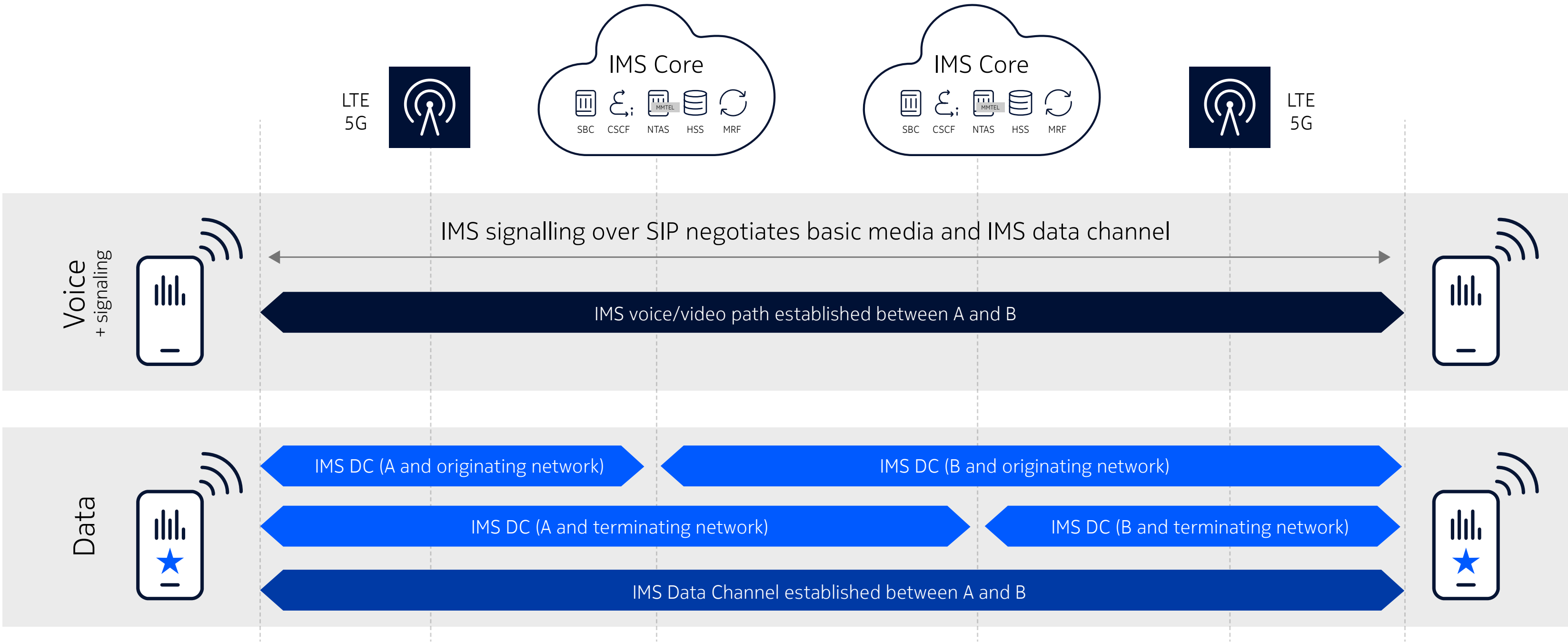


Establishing an IMS data session

In terms of the user experience, the application data will download on the bootstrap data channel and is tailored to the capabilities of each smart-phone operating system. This makes the experience seamless. Data applications are delivered to the terminal using HTML and Javascript, enabling interactive graphical user interfaces that complement the voice call, either with other individuals or enterprise automated call systems. The architecture is also open for third-party application developers to offer functionality and monetization using advertising.

Unlike previous VoLTE services, 5G VoNR (Voice over New Radio) services will have access to more bandwidth when using higher spectrum ranges such as mmWave. This means that IMS data channel services can also include bandwidth- intensive applications such as video or augmented and virtual reality. The operator has the discretion during setup to assign whatever bandwidth or latency parameters it wants.

Nokia has implemented the IMS data channel capability in our 5G Core Network solution, and we now offer operators the ability to add these capabilities to their 5G VoNR (Voice over New Radio) service offerings. This will open up a number of exiting areas for service innovation and monetization.



Enterprises and the IMS data channel

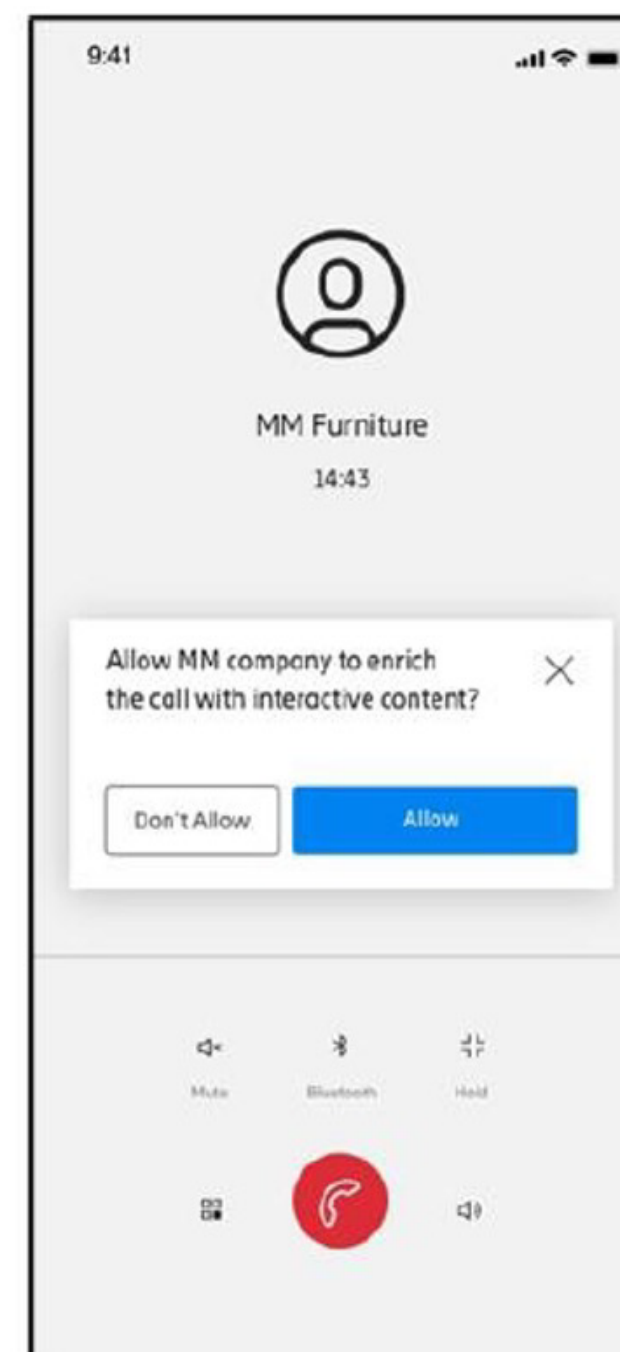
One of the key customer segments for IMS data channel use cases is enterprises, both in terms of business-to-customer calls and internal calls between employees. For instance, a customer calling into a business's toll-free number looking for some kind of support, as well as being offered a voice messaging decision-tree, can be offered a visual interface showing a choice of options directing them more quickly to what they need help with.

For internal enterprise communications, the data channel can be used for everything from biometric authentication to video conference calls and document sharing. Many of the same functions currently offered by OTT enterprise messaging applications can be delivered over the IMS data channel. This includes many rich communication services such as enriched calling cards, chat, social presence information and geolocation.

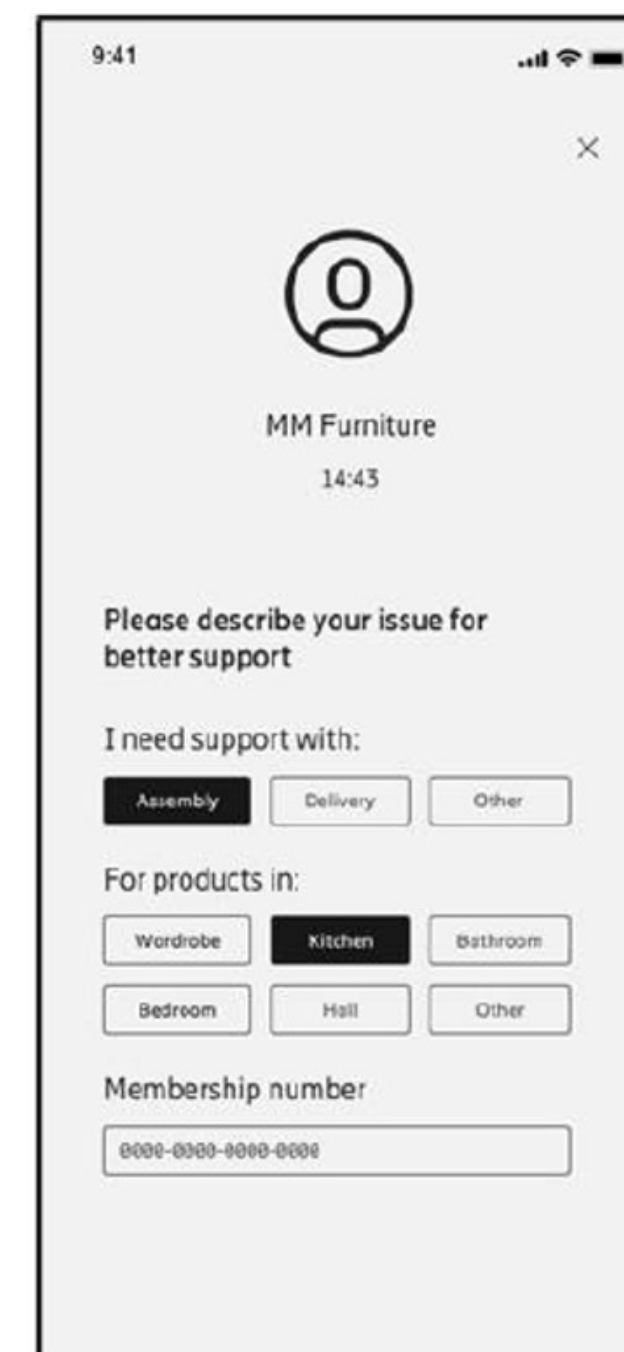
Basic call with native dialer



User consent to receive IMS DC



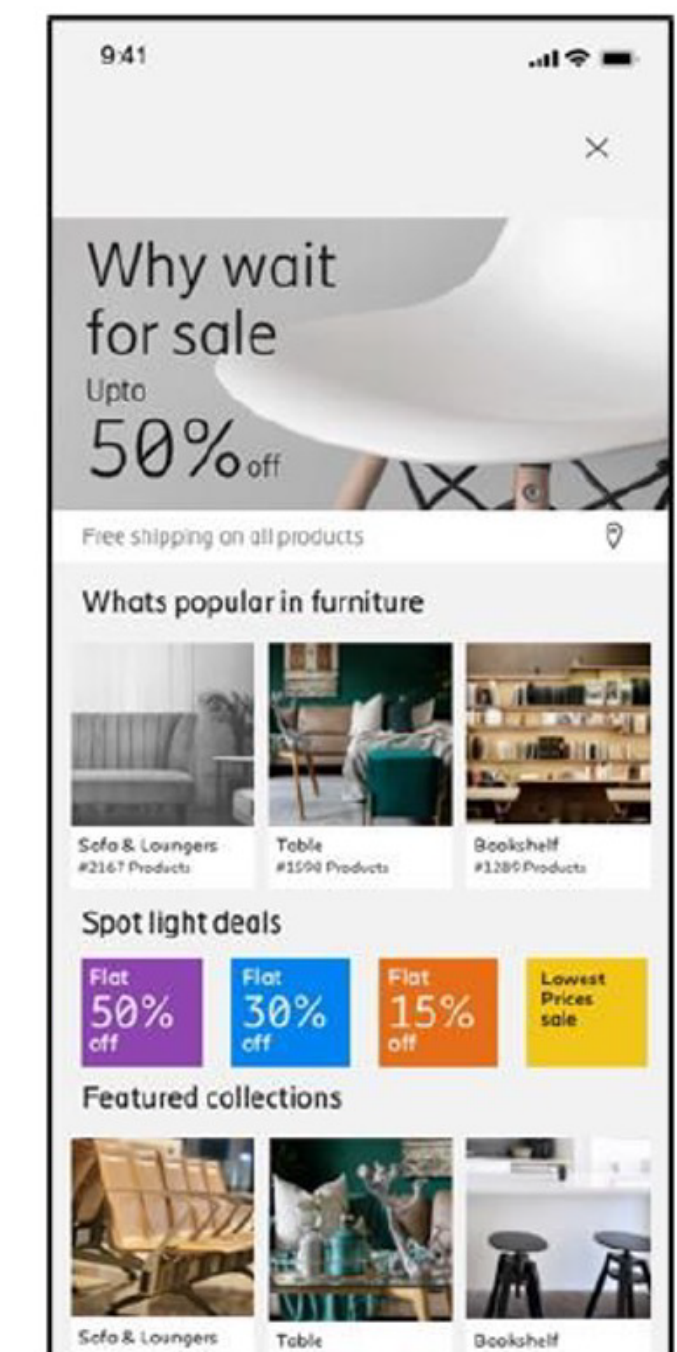
IMS DC-based visual menu (alternative for voice and DTMF)



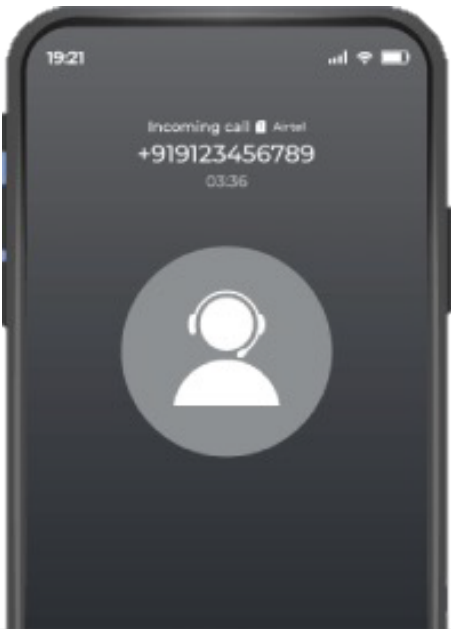
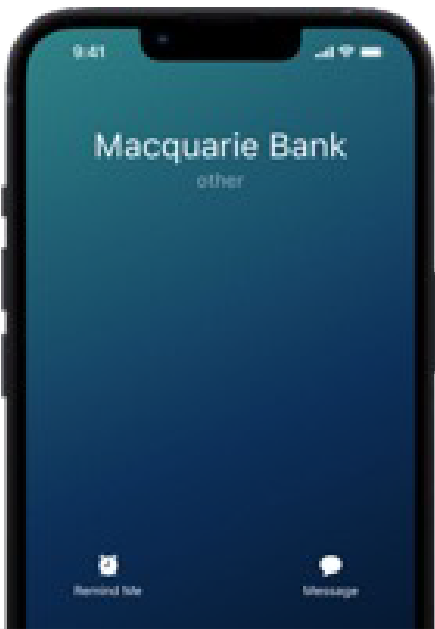
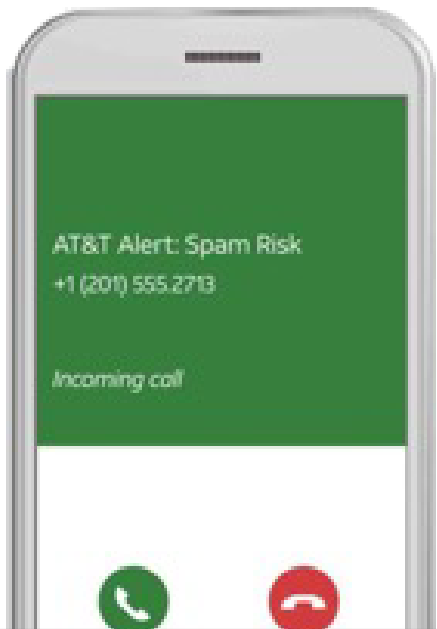
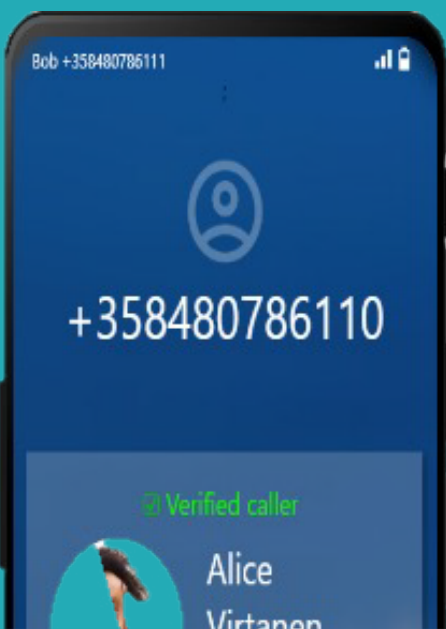
IMS DC-based visual feedback on waiting queue



IMS DC-based advertisement



Evolution of caller ID

		Phone number	Caller name	Caller logo	Verified name	Enriched Caller ID
Data Source						
		Only basic telco identity (MSISDN on SIP/ISUP)	Caller name added by network (display name on SIP/ISUP)	Caller logo is added by network (logo url in Call-info on SIP) - used together with Caller Name	Verification of caller ID by network (STIR/SHAKEN)	Verified Caller ID enriched with name, logo, position, location, call intent, etc. (IMS Data Channel)
		User Network (internal or API)	User Network (internal or API)	User Network (internal or API)	User Network (internal or API)	Network only (IMS DC application)

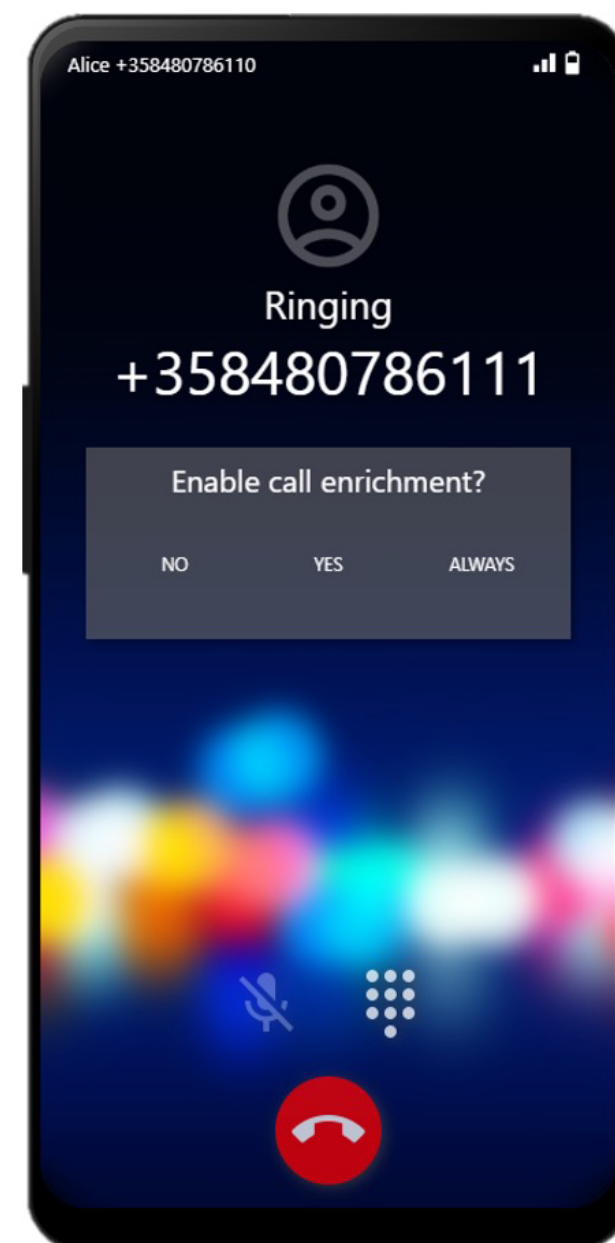
Consumers and IMS data channel

In the consumer-to-consumer communications market, the IMS data channel improves the customer's overall experience offering everything from shared gaming and AR/VR applications to photo and screen sharing. It provides an accessible platform for developing innovative services that engage consumers and invite them to spontaneously reach out to friends for a unique shared experience.

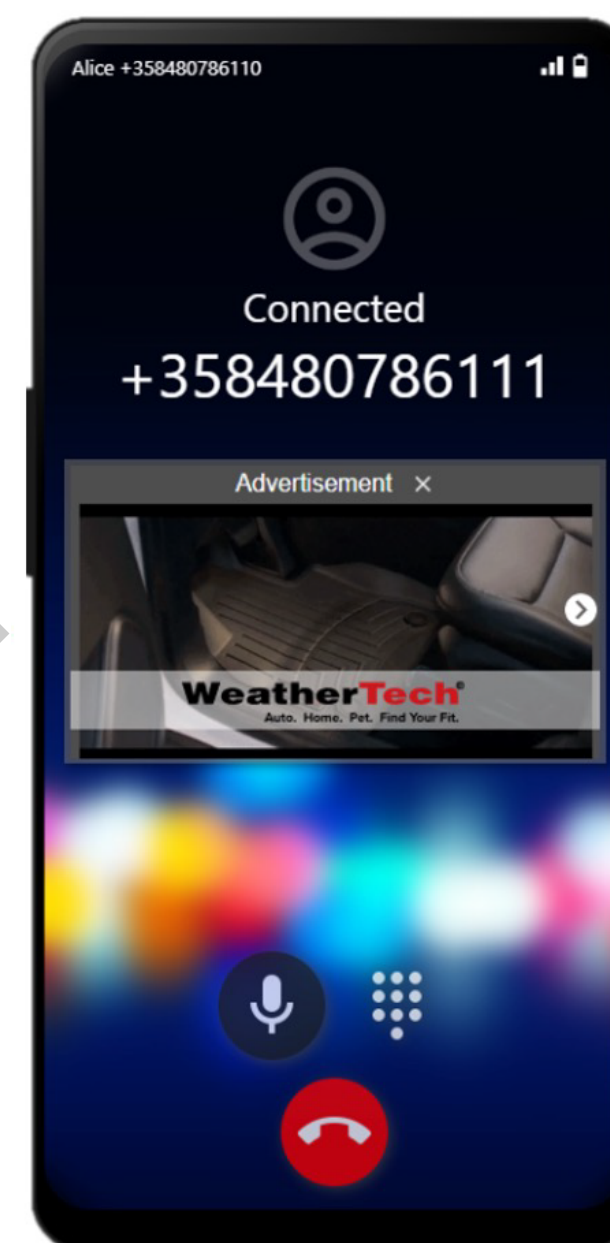
Advertising

One of the most monetizable aspects of the IMS data channel is the ability to insert personalized advertising into IMS data channel services as an alternative to paid services.

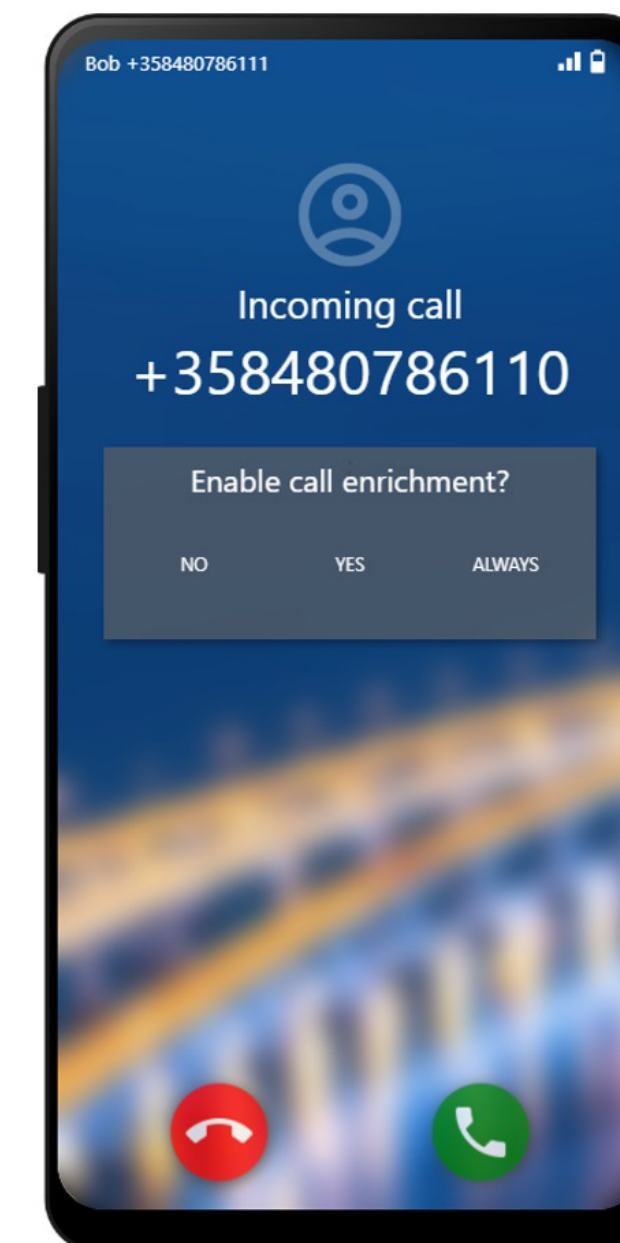
Alice's consent
to accept IMS DC



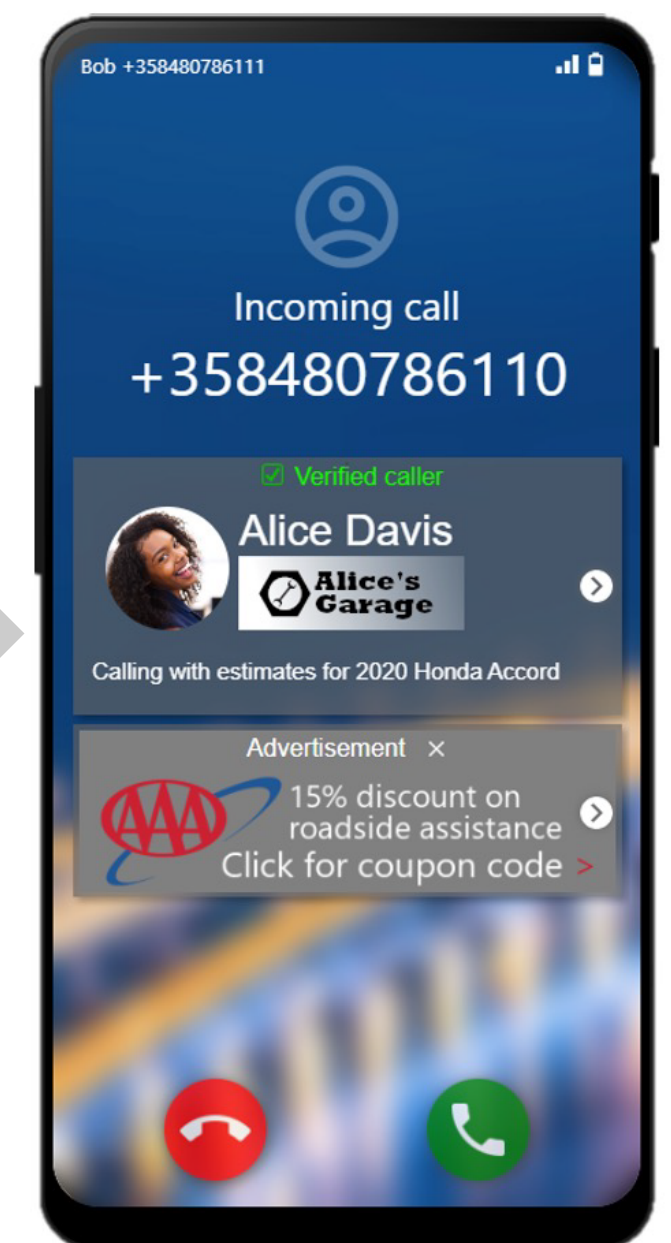
Advertisement is
displayed to Alice



Bob's consent
to accept IMS DC

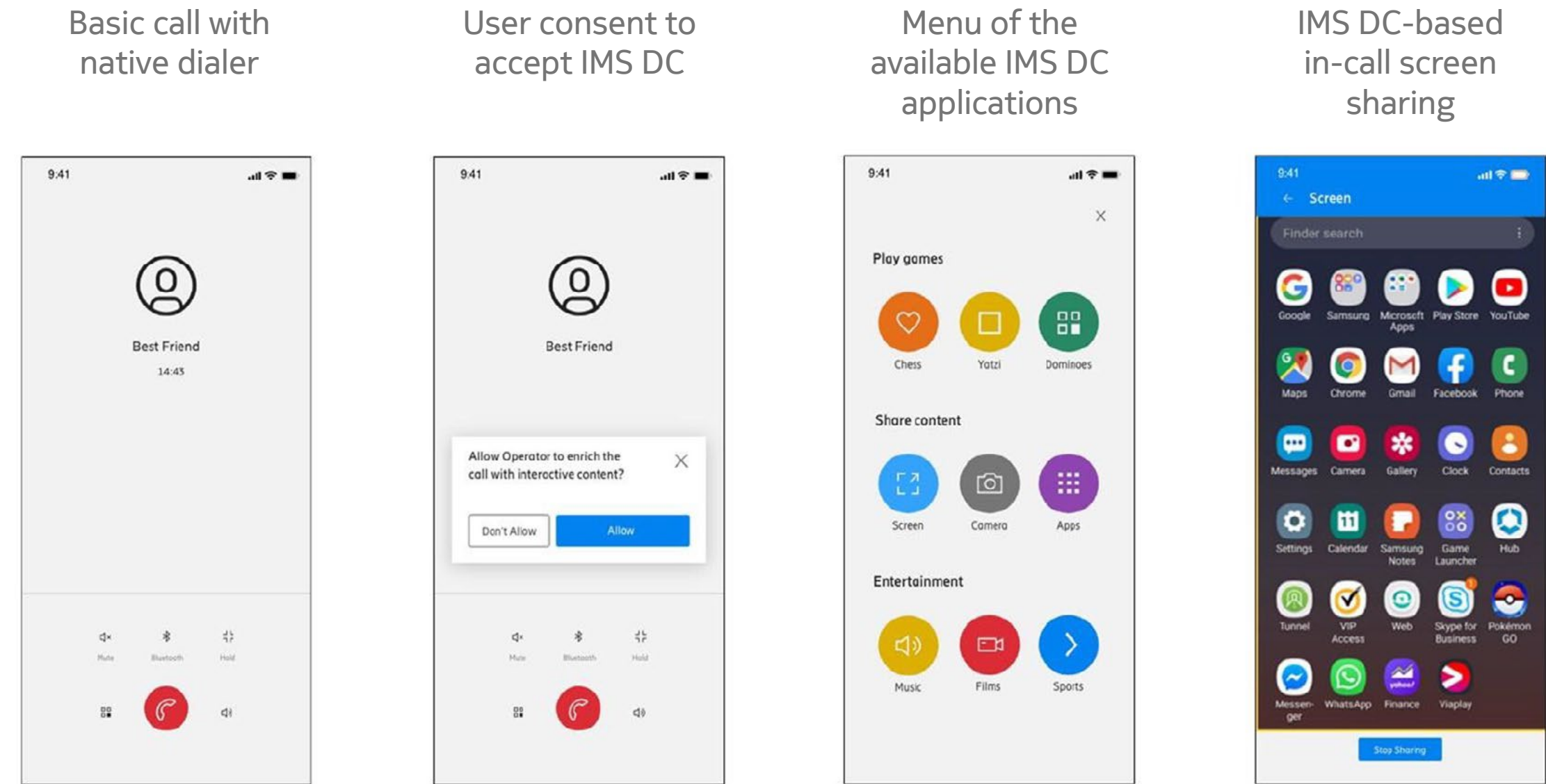


Enriched Caller ID
+ advertisement are
displayed to Bob



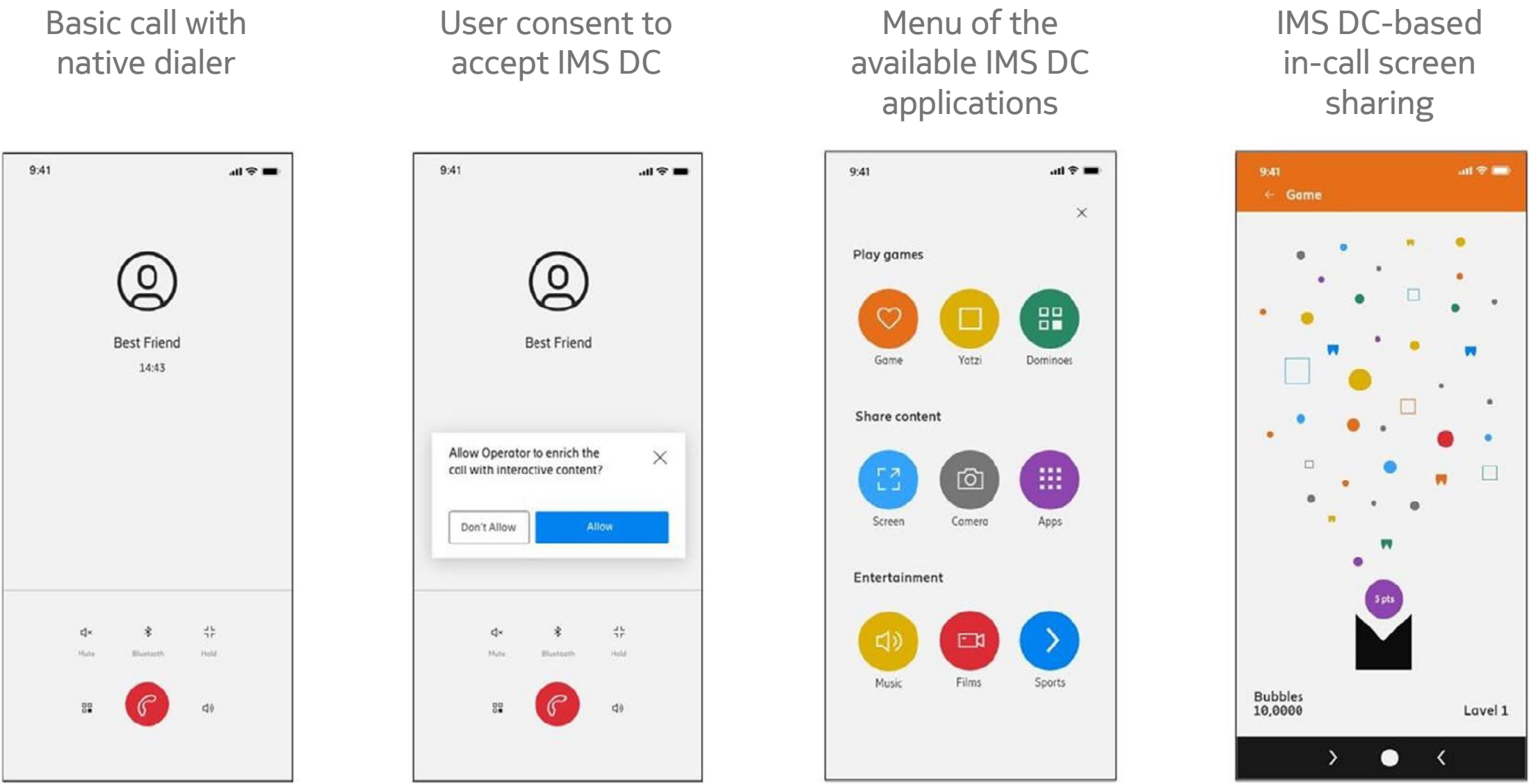
Screen sharing

Today’s smartphone users like to share their experiences with friends and family. The ability to see what I’m seeing, whether it is a photo, a video or even an application that they are having trouble with, with IMS data channel, this kind of experience is just a phone call away.



Social gaming

Young people today love to play online games with their friends. With their smartphones in hand, they can continue these connections by playing games over the IMS data channel.



Social gaming, screen sharing and advertising represent a starting point for how operators can use the IMS data channel to improve the customer experience and introduce new revenue- generating services. Support for third-party applications also means that operators can extend the reach and availability of established apps that their customers already use, offering them a simpler and more secure way to continue to do what they already love.



Why Nokia?

Nokia is the world leader in delivering IMS core networks with over 120 VoLTE and 10 VoNR deployments at the time of writing this article. We are a trusted partner to communications service providers all over the world, providing support for over 1,000 projects every year covering a wide range of product and solution deployments along with service-led portfolios and services. From pre- to post-launch, we offer delivery and maintenance services that assure a seamless process for operators and full satisfaction for the users of the network. Our best-in-class, digitalized services are suitable for either greenfield environments or migrating legacy networks. We aim for industry-leading speed, efficiency and reliability, making Nokia Core Network services a trusted partner through the entire lifecycle of your network.

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About Nokia

At Nokia, we create technology that helps the world act together.

As a B2B technology innovation leader, we are pioneering networks that sense, think and act by leveraging our work across mobile, fixed and cloud networks. In addition, we create value with intellectual property and long-term research, led by the award-winning Nokia Bell Labs.

Service providers, enterprises and partners worldwide trust Nokia to deliver secure, reliable and sustainable networks today – and work with us to create the digital services and applications of the future.

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