Unleashing the power of differentiated connectivity

How Ericsson and Singtel are pioneering business opportunities with 5G standalone

ERICSSON

In partnership with

Singtel

Introducing network slicing in Singapore

Singtel's partnership with Ericsson has allowed them to take their offerings to the next level with more connectivity differentiation to meet a growing market demand for personalization.

EXECUTIVE SUMMARY

Since it's widescale deployment, 5G continues to present endless possibilities for communication service providers to meet growing market demands and monetize new services for customers.

Working together since the early 1980's, Singtel and Ericsson have implemented and upgraded multiple mobile networks; from GSM, to 3G, then 4G. And, with a purpose to empower every generation, it's no surprise that Singtel is now at the forefront of innovation for 5G.

In 2022, Singtel - in partnership with Ericsson - became the first operator to achieve over 95% standalone 5G nationwide coverage, three years ahead of regulatory targets, making Singapore one of the first countries in the world to be fully covered by standalone 5G.

5G standalone (SA), based solely on 5G new radio (NR) and new cloud-native 5G core (5GC), unlocks the full potential of 5G, making implementation more effective, and allowing upgrades and new functionalities to be deployed much faster, unlike non-standalone, which relies on 4G Evolved Packet Core and 4G radio network.

By implementing solutions such as 5G new radio (NR) and cloud-native dual-mode 5G Core, along with Operations Support Systems (OSS) and Business Support Systems (BSS), Singtel opened up a wealth of new opportunities, allowing them to deliver up to 10 times greater data speeds, halved latency, and enhanced network capacity, achieving global recognition and numerous international and national awards.

"The partnership with Ericsson enabled us to provide customers with cutting edge telecommunications services, and that has played a significant role in Singapore's technological advancement," says Anna Yip, CEO, Business Development, Singtel Group Deputy CEO, Singtel Singapore.

The promise of premium experiences is one of the many driving forces behind the rollout of 5G, but as these experiences become more immersive, using 4K video and Artificial Intelligence, the demand on networks increases, putting a potential strain on application performance.

Beyond premium experiences, service provider customers have also increased their requirements for more service personalization. One way to effectively achieve this is though network slicing.

Tightly associated with 5G SA, network slicing technology allows for the capacity to partition the mobile network in multiple independent virtual networks which exist on the same physical infrastructure, with each slice acting as its own independent traffic avenue.
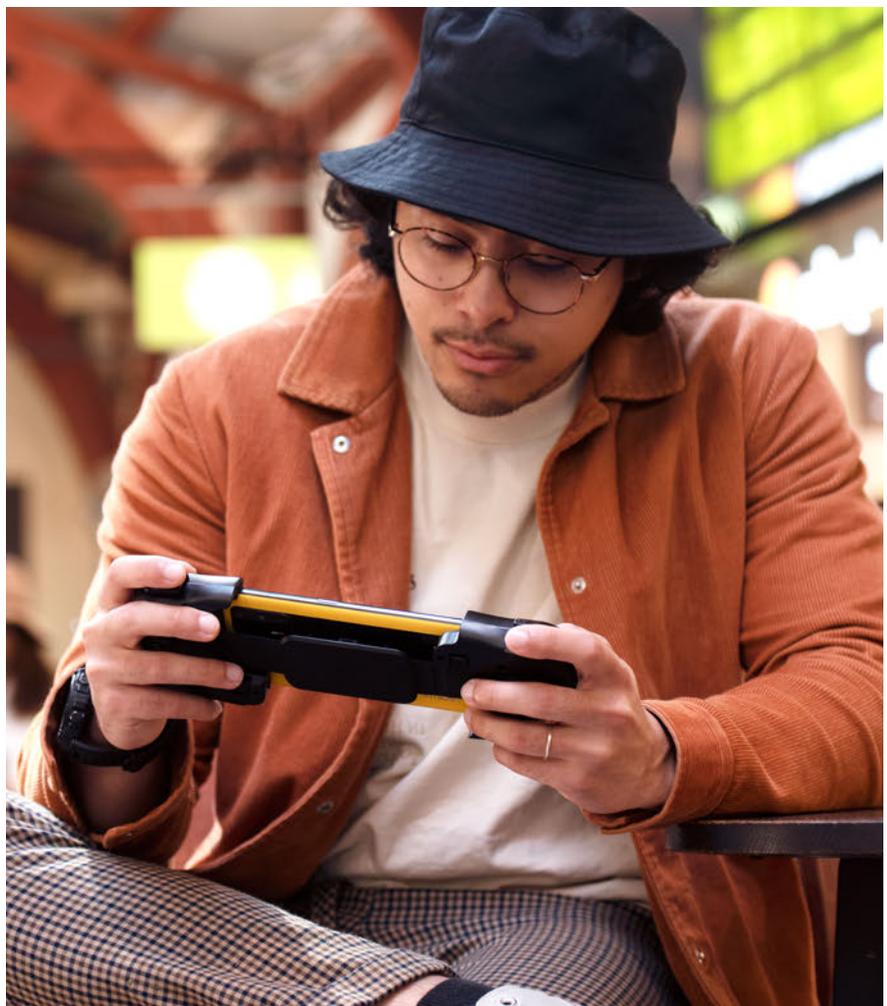
This enables unique connectivity experiences and performance levels for each slice of the network that can then serve users or applications with different needs.

With well-defined performance characteristics, it enables service providers to go from offering one-size-fits-all wireless service to differentiated connectivity, with customer-adapted network slices for specific use cases and enhanced user experiences.

Using an end-to-end approach (E2E), Ericsson has developed the most complete network slicing portfolio, enabling automated and fast service delivery of new and innovative use cases.

"Network slicing is one capability that we want to push the boundary on," says Shilpa Aggarwal, Vice President, Product Marketing-Commercial at Singtel. "We believe it offers unparalleled opportunities for our customers, enabling the development of tailored services and dedicated resources with optimized performance and consumer market network."

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Anna Yip
CEO, Business Development,
Singtel Group Deputy
CEO, Singtel Singapore

Figure 1: key milestones in Singtel's 5G standalone journey
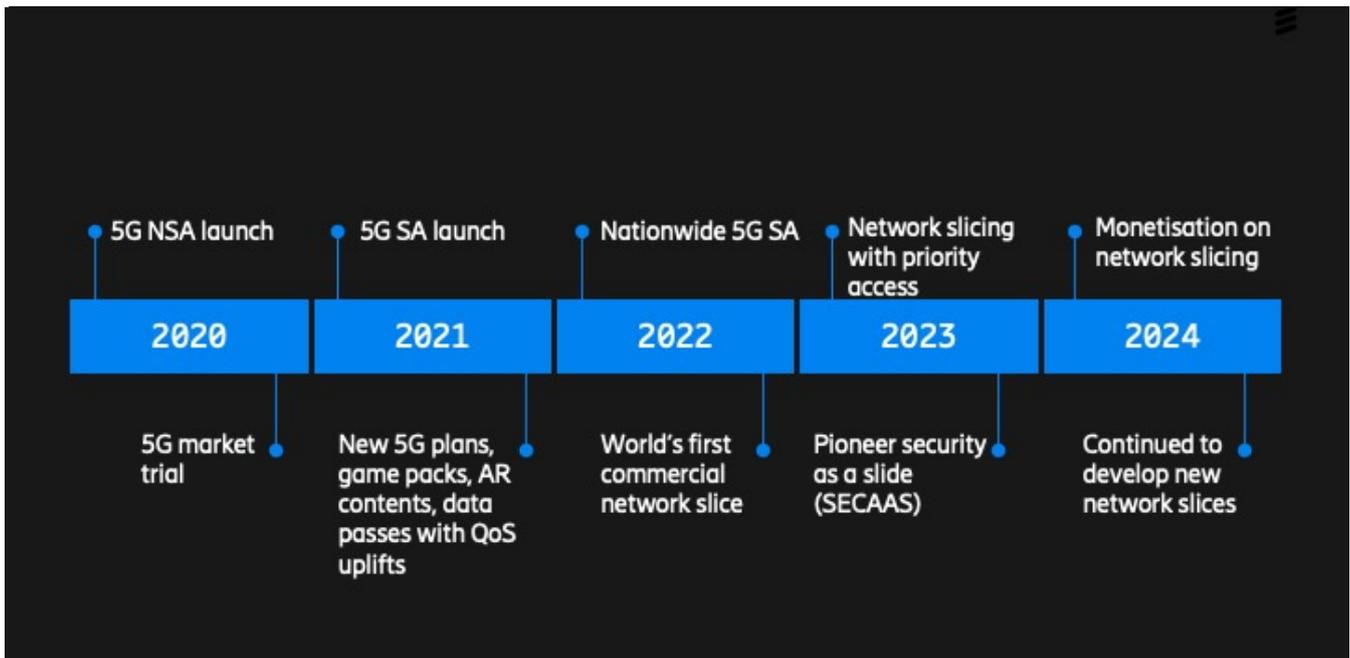
Singtel's differentiated connectivity journey

Leading the commercialization of network slicing from experimentation to scale, and beyond.

2022 – Singapore Grand Prix – experimenting with network slicing

In 2022, just one month after becoming the one of the first countries in the world to be fully covered by 5G SA, Singtel put the network slicing capability to the test during the Grand Prix season in Singapore.

With hundreds of thousands of spectators, it was expected that radio conditions would face heavy loads. Singtel and Ericsson came up with the idea to apply network slicing technology to deliver a differentiated experience to spectators, offered through its digital application, CAST.

Using Ericsson's Radio Resource Partitioning in the RAN network and 5G slicing throughout the RAN, Transport and Core, Singtel dedicated a slice of the network just for their Sports Plus subscribers, ensuring these customers

could experience the high-speed connectivity and ultra-low latency of the dedicated 5G network slice.

"Fans were able to watch races from anywhere on their devices, even within high-traffic areas, because of the capacity dedicated to this service," Anna Yip explains. "While locals and tourists were still able to enjoy digital experiences, from making video calls to augmented reality gaming and more, with 5G."

Becoming the world's first service provider to deploy 5G network slicing at a major sporting event, Singtel demonstrated the commercial opportunities of differentiated connectivity services and were ready to ramp up network slicing for a wider range of applications.

"It's about exploring the capability of the technology, understanding the needs of our customers, and marrying the two to create a solution," explains Hai Thoo, Vice President of Mobile Engineering, Singtel.

Based on the Grand Prix experience, Singtel recognized the business potential of deploying network slices to support new use cases in other geographically limited areas, such as shopping districts, convention centres, stadiums, school campuses, factories, airports and mines.

Network slicing-based services could also be dynamically created and deployed in these limited geographical areas, fulfilling a specific need at the time it is required.

Figure 2: Grand Prix Season Slicing and Partitioning
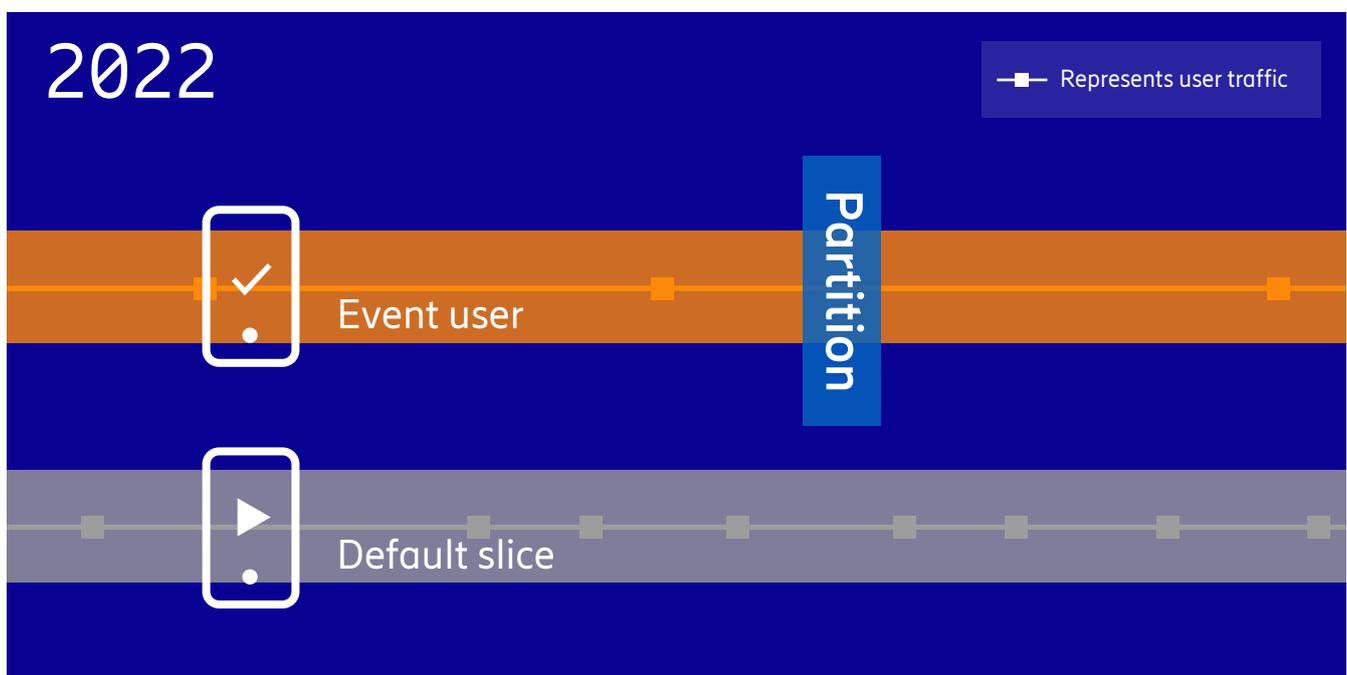
2023 – Singapore National Day – reaching scale

In August 2023, they turned their focus to another major event in Singapore, the National Day Parade, where around 40,000 attendees lined the streets to commemorate the public holiday.

To ensure subscribers enjoyed a smooth 5G experience, Singtel worked closely with Ericsson to boost network capability, increasing its 5G mobile capacity by 230%, and implemented state-of-the-art network features to support Singapore's 58th birthday celebrations.

Besides spectators tapping into 5G to stream the celebration, the network required heavy utilization by security staff and event organisers to co-ordinate the show's activities, so this time Singtel had reserved three slices of the network; one for spectators, one for subscribers and priority users and a third for public safety, used by event organizers and the Ministry of Defence.

Using Ericsson's Priority Based Admission Control (PBAC) feature, Singtel could ensure that subscribers and prioritized users, such as public safety and crowd control officers, had guaranteed access to a reserved network connection in the crowd. Despite the increase in mobile traffic and surges during peak times, these users enjoyed seamless 5G connectivity throughout the whole event.

"For the first time in the history of mobile telephony, we were able to segregate the air interface and dedicate a segment of the network for event organizers and security agencies, as they coordinated the event," says Hai Thoo. "It was a major achievement for both Ericsson and Singtel."

The inherent security of 5G, network slicing and PBAC technology ensured that public safety personnel had priority over regular traffic, like web browsing or YouTube, to complete mission critical communications without interruptions, such as strategic maintenance, responding to emergencies, checking live video feeds and crowd management.

Figure 3: National Day Parade slicing with Priority Based Admission Control
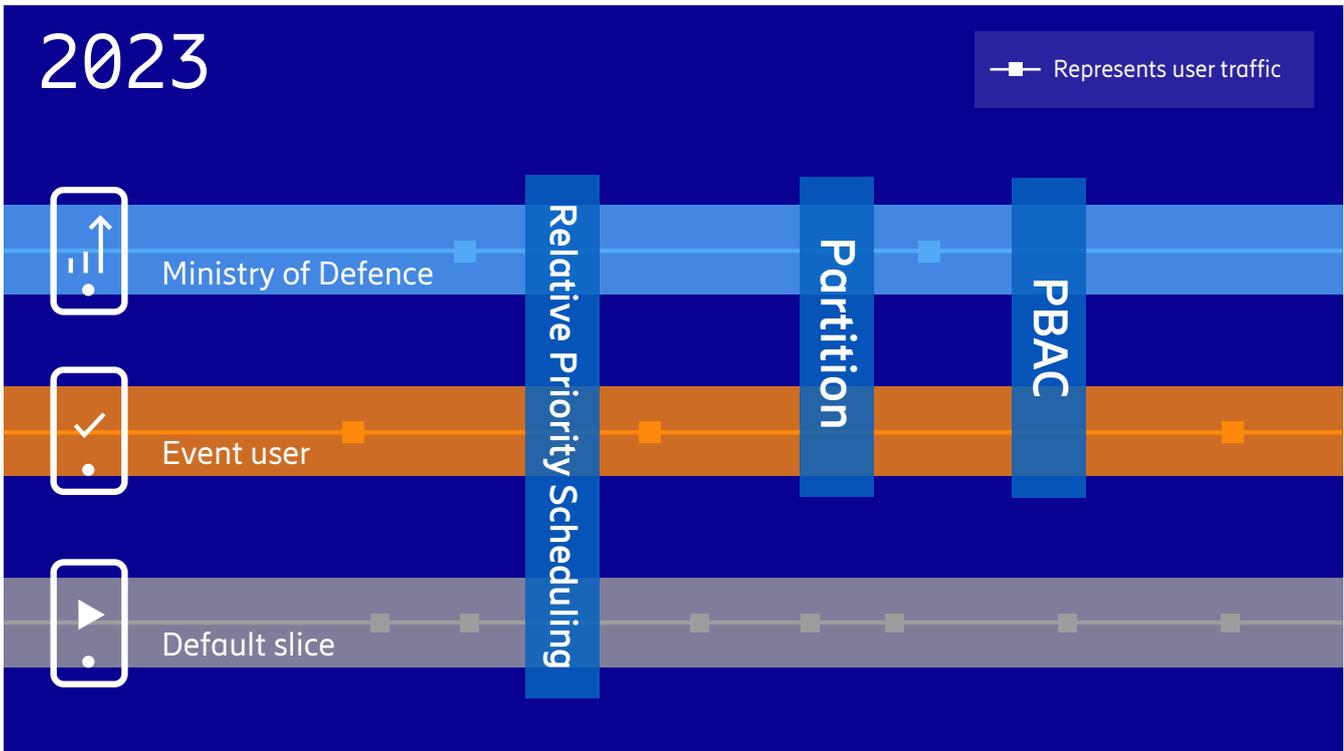
2024 – Taking the next step to commercialize user experiences

As they break ground with 5G, not just in Singapore and Asia, but in Europe and around the globe, Singtel is continuing to identify possible use cases to monetize their 5G SA network with differentiated connectivity offerings.

"Where we are going now is something called User Equipment Route Selection Policy, which enables application-based differentiation," says Zsolt Kormanyos, CTO, Global Customer Unit, Singtel at Ericsson.

USRP is an advanced network slicing technology which only works in 5G SA networks. It enables devices to automatically switch between different network slices depending on which application they are using.

Running on Ericsson's dual-mode 5G Core (5GC), USRP channels data traffic through a dedicated optimal path between smart devices and Singtel's 5G network.

It establishes reliable, secure connectivity to the network for end users and means app owners can activate a customized slice of Singtel's 5G network to boost the performance of their apps and enhance the user experience.

The core domain handles a wide variety of essential functions in the mobile network,

such as the Access and Mobility Management Function (AMF), the User Plane Function (UPF) and the Policy Control Function (PCF). The AMF and PCF control access to the 5G network and network behaviour respectively, while the UPF works as the go-between from the 5G network and the data network.

5G Core network functions are completely software-based and designed as cloud-native, allowing higher deployment agility and flexibility on multiple cloud infrastructures.

Figure 4: Different application and performance levels
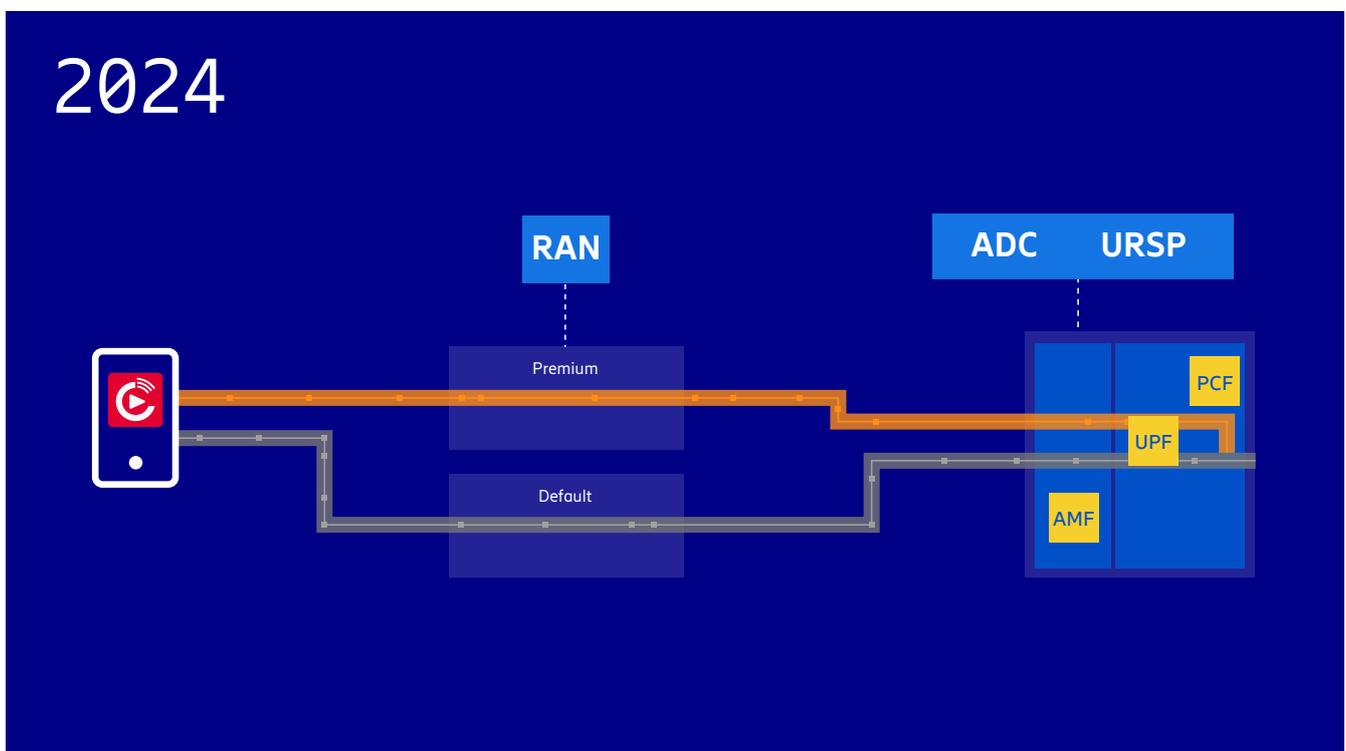
"This innovative technology enables real time identification of traffic at the application level and passes them through a dedicated network slice," explains Shilpa Aggarwal. "The network prioritizes the bandwidth and aligns seamlessly, so customers have an optimal,

unparalleled experience on apps that matter to them."

Along with Application Detection Control (ADC), it will enable the development of a host of use cases especially beneficial for applications that require higher data

performance, such as enterprise communications, gaming and media streaming, as well as other applications such as artificial intelligence and augmented or extended reality.

Capturing the value of differentiated connectivity

Monetizing 5G SA with performance-based business models is a must for service providers.

Building a network capable of delivering differentiated connectivity experiences to users and applications is part of the journey, but the end goal for service providers is to capture the value from more personalized experiences.

For that, a business model transformation is needed, moving from current best-effort models to performance-based models tailored to meet diverse end-user and application needs for enhanced connectivity.

By offering slices of reserved network, Singtel can continue to tap into performance-based business models and explore use cases in a range of industries, from manufacturing to transport and education. With this differentiated connectivity comes the chance to monetize 5G, offering customers the chance to pay more for optimized performance.

"We can offer premium slices for a range of experiences from high-definition video streaming to online gaming and virtual reality applications, catering to evolving customer preferences," adds Shilpa Aggarwal. "We believe this will bring more power into the hands of the consumer."

Through enhanced end-to-end network slicing, 5G SA introduces new possibilities for monetization powered by differentiated and guaranteed quality of service (QoS) offerings.

"The way to monetize 5G is to differentiate the value of connectivity, because different connectivity has a different value," says Zsolt Kormanyos.

Differentiating between a lower priced standard offering and the higher cost, more premium service allows businesses to create a tiered model, where, just like at the Singapore Grand Prix, subscription

customers can pay a premium to gain access to the best app performance even when there's high network congestion.

"Singtel and Ericsson share in the vision that 5G will be transformational for consumers and enterprises. Hence, the two companies are keen to push the boundaries of 5G technology together."

New pricing models are already in the works, including unlimited data, plans tiered by specific speeds, bundled content-rich apps, and the possibility of on-demand performance enhancement.

Figure 5: How Singtel's business model is expected to evolve
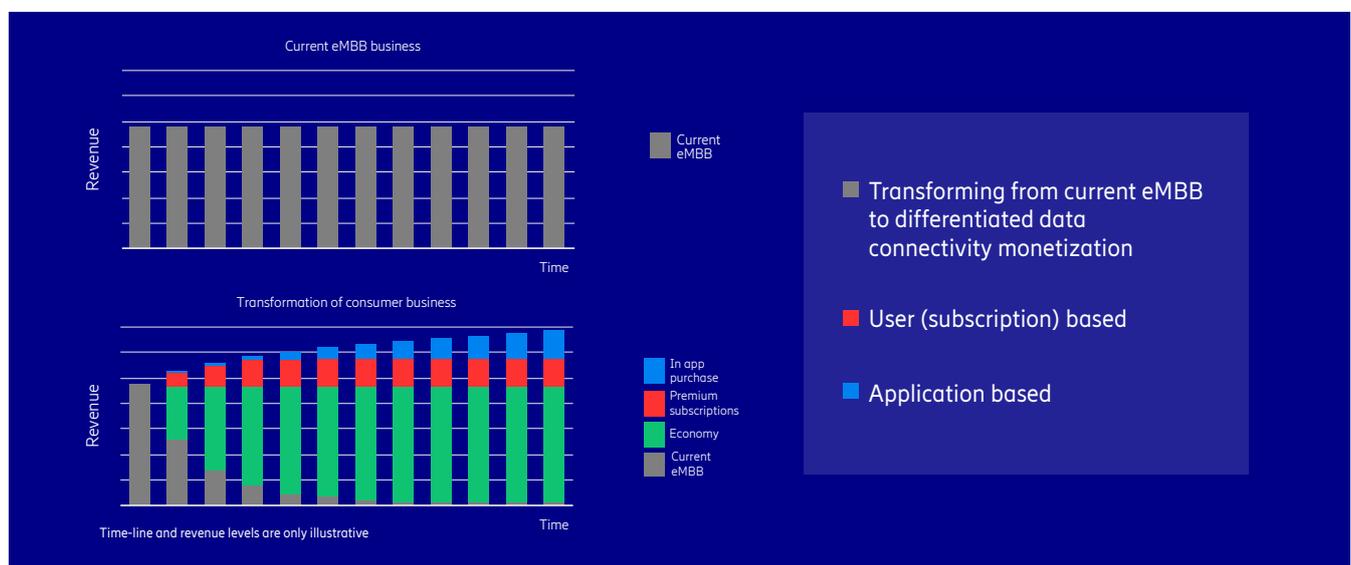
Endless learnings from investing in the journey

Singtel stays ahead of the curve as it continues on its differentiation path to enable new use cases for consumers and enterprises.

5G SA rollouts are rapidly increasing among leading service providers worldwide, unlocking transformative new revenue possibilities across enterprises, consumers, governments, and public services.

The guaranteed performance of 5G SA and network slicing continue to increase opportunities to monetize investments by dynamically optimizing allocation and prioritization of radio resources across multiple slices for the fulfilment of service-level agreements.

Together with Ericsson, Singtel is continuing to charter new territories, push boundaries and shape the future of connectivity, bringing value to new use cases for both consumers and enterprises.

Navigating where or how to start the journey of differentiated connectivity was never going to be easy. As an industry leader, Singtel demonstrated exemplary commitment to innovating and maximising the potential of standalone 5G and network slicing to develop differentiated solutions for consumers and enterprises. It is this unwavering dedication to innovation and customer-centricity that has led to its numerous accolades and awards.

"The work we've done in Singapore is so important," explains Zsolt Kormanyos, "There is a huge opportunity, and we are paving the way for the rest of the market who can use our journey as a learning opportunity."

With a partnership spanning 30 years, and a shared vision to unleash the potential of 5G connectivity for consumers and enterprises, Singtel has worked closely with Ericsson throughout the process, attending regular meetings and completing all-important network tests,

with a level of trust and agility required from both partners.

"The partnership with Ericsson brings a good understanding of the past and present market need and the technology capability to shape the future of 5G and beyond," says Hai Thoo, "You have to dream, and then take steps to turn that dream into reality, and we believe in 5G and its differentiating value in order to serve the very needs of our customers."

Together with Ericsson, Singtel will continue to explore new avenues to enhance network performance, expand coverage and is now inspiring consumers, enterprises and governments by collaborating and developing 5G use cases with startups and enterprises in areas such as robotics, VR, AI, drones, and maritime, as well as with GovTech Singapore.

About Singtel

Singtel is Asia's leading communications technology group, providing a portfolio of services from next-generation communication, 5G and technology services to infotainment to both consumers and businesses. The Group has presence in Asia, Australia and Africa and reaches over 760 million mobile customers in 21 countries. Its infrastructure and technology services for businesses span 21 countries, with more than 428 direct points of presence in 362 cities.

For consumers, Singtel delivers a complete and integrated suite of services, including mobile, broadband and TV. For businesses, Singtel offers a complementary array of workforce mobility solutions, data hosting, cloud, network infrastructure, analytics and cyber security capabilities.

Singtel is dedicated to continuous innovation, harnessing technology to create new and exciting customer experiences and shape a more sustainable, digital future.

For more information, visit www.singtel.com

About Ericsson

Ericsson enables communications service providers to capture the full value of connectivity. The company's portfolio spans Networks, Digital Services, Managed Services, and Emerging Business and is designed to help our customers go digital, increase efficiency and find new revenue streams.

Ericsson's investments in innovation have delivered the benefits of telephony and mobile broadband to billions of people around the world. The Ericsson stock is listed on Nasdaq Stockholm and on Nasdaq New York.

www.ericsson.com