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Communications

BE DIGITAL: 5G SMART ECOSYSTEMS ARE THE

FUTURE

Oracle's portfolio of integrated and secure 5G network, digital experience, and cloud and SD-WAN solutions is helping service providers and enterprises deliver Smart Cities, Smart Homes, Smart Workplaces and more.

COMMUNICATIONS SERVICE PROVIDERS AND ENTERPRISES CAN CAPTURE TRILLIONS OF DOLLARS IN SMART ECOSYSTEMS OPPORTUNITIES SPANNING SECURE CONNECTIVITY, DIGITAL SERVICE ENABLEMENT, APPLICATIONS AND SERVICE PROVISIONING, AND A WIDE RANGE OF INTERNET OF THINGS AND CONSUMER APPLICATIONS.

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INTRODUCTION: SMART ECOSYSTEMS ARE THE FUTURE IN A DIGITAL WORLD

Customers' expectations are changing quickly – whether it's a digital consumer or a digital worker. Today, consumers are using their voices to interact with digital assistants, which in turn manage their digital services — from video streaming to social networks. They are not likely to think about the consequences of their interactions in terms of security or fraud vulnerabilities. They care mainly about whether their digital assistants understand the context of who they are and what they are looking for in a personalized way. They are expecting an intuitive experience where their voices are all that's needed to get the information they need. They expect interactions with no delays that feel like real time.

Likewise, today's employees are using touch to digitally interact with their co-workers. They expect to securely collaborate and communicate with their teams in real time using voice, video or text across any application or device in any location. They also expect their personal settings — including information sharing, privacy, and engagement preferences.
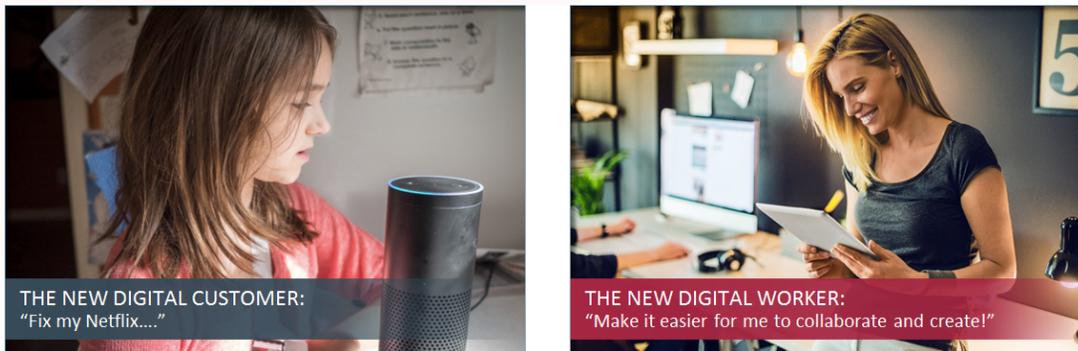

Figure 1. Rapidly Changing Expectations of Digital Customers

Underlying these customer interactions are smart ecosystems – whether it is a smart home, a smart workplace or a smart city – where participants and 'things' can engage, transact, and share information using a common digital platform.

Successful smart ecosystems often include:

- Integrated network and cloud infrastructure, systems, software, and applications that leverage analytics, artificial intelligence (AI), and machine learning (ML) to deliver a more personalized, seamless, and secure digital experience;

- Multiple partners and customers who can deliver shared services using common infrastructure and applications; and

- Accessibility from many different devices and Internet of Things (IoT) sensors.

The city of Chicago, one of the world`s leading smart cities, is an excellent example of an ecosystem that brings together data, information, partnerships, monetization models, and cloud and connectivity infrastructure to improve citizens' lives and further improve the city`s balance sheet. Some of the Chicago's smart services include:

- Snow Removal – City residents use apps to track when their street will be plowed and see where snowplows are located.

- Pollution Monitoring – Sensors monitor pollution levels in Lake Michigan and provide alerts.

- Public Transit – Residents can track public transit, and public transit systems are set up so that traffic lights turn green sooner when a bus is coming.

- Smart Lighting – The city has installed Light Emitting Diode (LED) lights that will cut energy costs by 60 percent, and has IoT sensors to alert maintenance workers when lights burn out. This improves safety and saves millions of dollars.

CAPTURING THE 5G SMART ECOSYSTEMS OPPORTUNITY

Oracle Communications surveyed hundreds of network and IT executives globally during 2018 to understand the smart ecosystems market opportunity. These surveys revealed that there are four key requirements for success in this new world of smart ecosystems and digital services**:**

- **Security is the #1 network challenge** followed by quality of service, costs and better control.[1]

- **91 percent of respondents have said that speed and agility are the top priority** to rapidly launch, fulfill, and evolve digital services using creative business models.[2]

- **45 percent of respondents are exploring digital customer engagement tools**. This will improve the customer experience across all channels based on customer context, preferences and behaviors.[3]

- **73 percent of respondents are accelerating deployment of cloud-based communications** which are critical in playing a meaningful role in these new ecosystems.[4]

Smart ecosystems are a huge market opportunity. By 2026, the 5G smart ecosystem opportunity alone is predicted to reach US $1.2 Trillion.[5] Today, Communications Service Providers (CSPs) mainly provide connectivity services for these ecosystems whether they are over mobile or fixed networks. However, connectivity services' growth and profitability have slowed as market disruptors successfully deliver over-the-top voice, messaging and video applications and services. In the 5G smart ecosystems value chain shown in Figure 2, connectivity services represent about 18 percent of the total smart ecosystems opportunity or about US $217 Billion.

[1] https://www.oracle.com/corporate/pressrelease/enterprise-complexity-092518.html

[2] https://www.oracle.com/corporate/pressrelease/digital-service-ecosystems-101018.html

[3] https://www.oracle.com/corporate/pressrelease/digital-service-ecosystems-101018.html

[4] https://www.pwc.com/lk/en/assets/oracle/Infographics/C/cloud-redefines-customer-exp-info-3843093.pdf

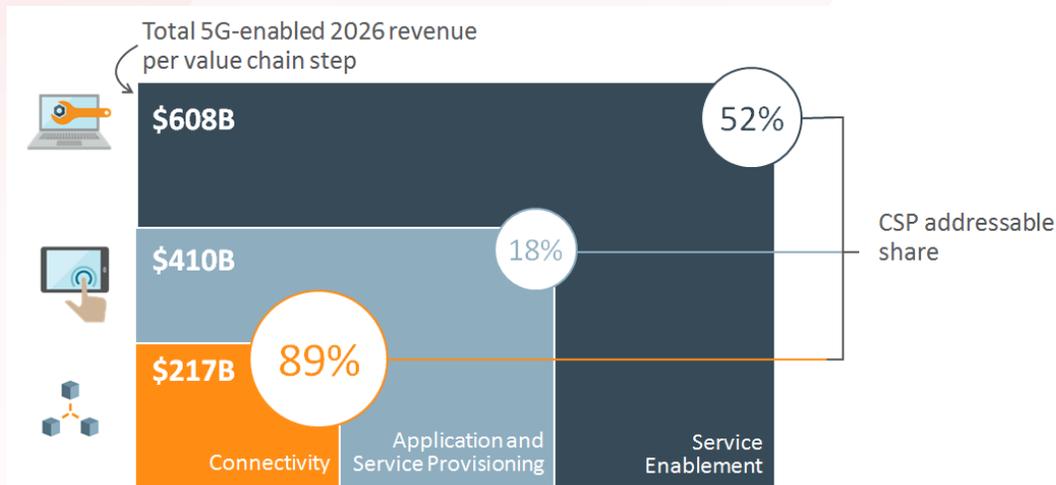[5] http://www.5gamericas.org/files/7114/9971/4226/Ericsson_The_5G_Business_Potential.pdf

Figure 2. The 5G Smart Ecosystem Value Chain: Unlocking a US$1.2 Trillion Opportunity

CSPs can play a bigger role in 5G smart ecosystems by expanding beyond connectivity to application and service provisioning and enabling digital services like connected cars, entertainment and IoT management. And they are certainly eyeing this broader $1 Trillion opportunity. A recent Oracle survey revealed that 49 percent of network and IT executives are exploring 5G-enabled smart city services. CSPs are also looking to 5G to increase their penetration of the enterprise market. According to a GSMA survey, 69 percent of CEOs rated enterprise services as the most important revenue growth opportunity from 5G, with almost 90 percent of network operators seeing enterprise as the dominant source of revenue compared to 54 percent from consumers.[6] This will require a deeper understanding of network, service, and application requirements across targeted verticals such as healthcare, finance, utilities, manufacturing and government. It will also require dedicated business units and new partners with deep enterprise expertise.

Many enterprises such as governments, manufacturing, automotive and utility companies are also looking to build their own private networks using 4G and 5G network slicing, Cloud, and software-defined - wide area network (SD-WAN) technologies to meet their specific smart ecosystems connectivity and application requirements.[7] This can provide compelling competitive advantages including: better communications and network agility and speed; improved security and control; and the ability to analyze and act on data and intelligence more rapidly to enhance services and operations efficiency.

Smart Ecosystems will open up the market to new business models and new solution providers. Some possible models are shown in Figure 3.

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[6] 5G-The Enterprise Opportunity, Chetan Sharma Consulting, 2018.

[7] https://www.technologyreview.com/s/612477/companies-fed-up-with-crappy-wi-fi-are-deploying-5g-instead/amp/

Network Slice Provider	CSP	Enterprise	End Customer

Cloud Based Smart Ecosystem Platform:
- 4G/5G Core Network Slice with connectivity management
- IoT platform with device management
- Industry Vertical Applications
- Monetization with a comprehensive Customer Experience suite

- Provides Smart Ecosystem Platform like Network Slice Services via 'Private Labeling'
- Creates compelling turnkey Consumer and Enterprise Services
- Rapidly evolve and deploy New Service Bundles
- Enables Shared Services Model through Ecosystem Partner Settlement.

- Creates New Services Using Smart Ecosystems Platform
- Multiple Models for procuring service from CSP and Monetizing them:
  – 'Private Label' Turnkey Solutions
  – Direct Purchase of platform services like network slices, monetization and customer experience.

Innovative Business Models Lead to:
- Enhanced Customer Experience
- Increased Loyalty and Engagement
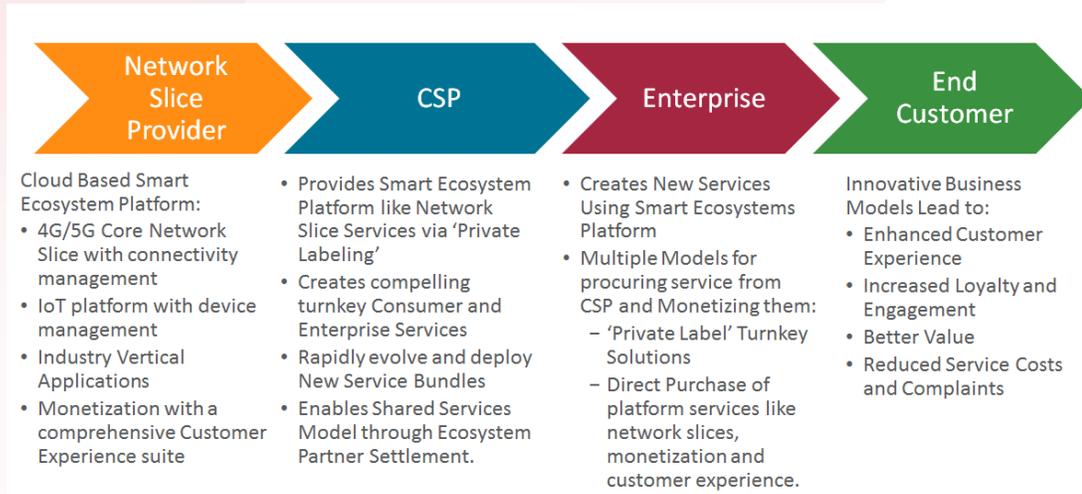- Better Value
- Reduced Service Costs and Complaints

Figure 3. Smart Ecosystem Business Models

THREE KEY INNOVATIONS DRIVING SMART ECOSYSTEMS

Three key innovations will underpin successful Smart Ecosystems including: network slices-as-a-service using integrated Cloud and 4G/5G/SD-WAN network infrastructure; a Cloud-based digital business engine; and end-to-end security across Cloud and Networks as well as secure identity management. The interplay of these innovations is highlighted in Figure 4.
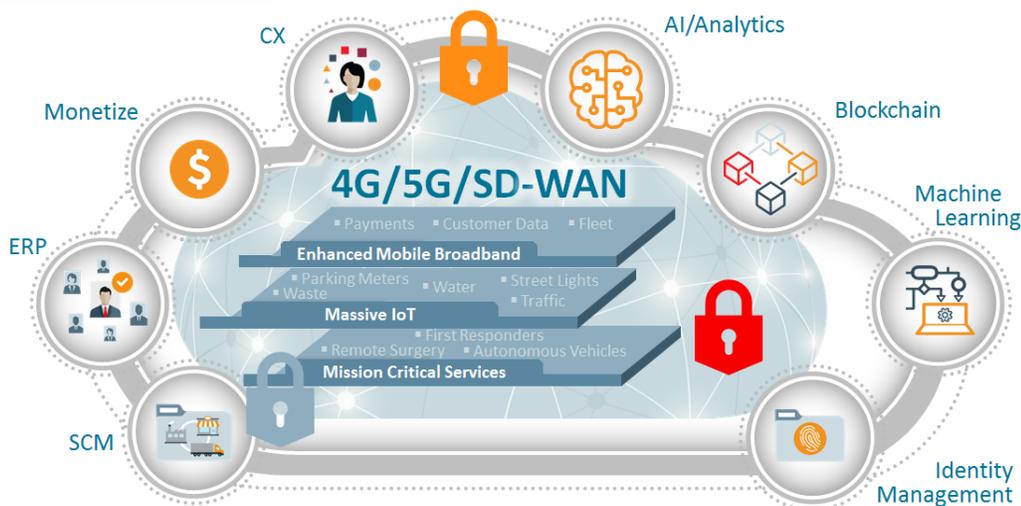

Figure 4. Smart Ecosystems Innovations

Innovation #1: Network Slices-as-a-Service with Integrated Cloud and 4G/5G/SD-WAN Networks

5G brings exciting new concepts to mobile networks including policy-driven network slicing and service-based and cloud-native architectures. Coupled with SD-WAN technology that provides secure, application-aware cloud connectivity, and IT-centric cloud services, these innovations allow CSPs and enterprises to:

- Create new revenue-generating digital services using purpose-built, dynamic network slices that allow for an incremental and cost-effective approach to 5G evolution, and meet the precise requirements of vertical applications, devices, users and customer segments. Some examples include:

    o An enhanced mobile broadband slice with high data rates, high security, and high mobility for sporting events, customer data, payments, and fleet management;

    o A massive IoT slice with high scalability and big data sets for street lights, traffic management, smart meters, and water/waste management;

    o A mission-critical services slice with high reliability, low latency, and high security for first responders, autonomous emergency vehicles, and emergency healthcare; and

    o A private smart factory slice with high reliability, low latency, high security and high data rates for automated production.

- Scale, secure, and analyze billions of transactions and zettabytes of data generated by digital services using AI and ML;

- Manage billions of devices as more people and 'things' become connected and communicate with each other; and

- Simplify and automate network and cloud functions.

Innovation #2: Cloud-Based Digital Business Engine

A modern, cloud-based digital business engine will be required to profitably monetize 5G and Cloud-based smart ecosystems services and meet the high expectations of today's digital consumers and workers. This digital business engine will allow CSPs and enterprises to:

- Monetize digital services and customer data using a wide range of usage, subscription, transaction, sponsorship, and slice-as-a-service models;

- Modernize digital engagement to empower customers and deliver a differentiated brand experience;

- Deliver integrated vertical applications for smart cities, smart homes and smart worksites;

- Apply cloud-based AI, ML, Security and Blockchain capabilities to deliver personalized customer experiences based on new insights and business models;

- Efficiently instantiate, scale and orchestrate new network slice-based offerings that combine existing physical and new 5G and SD-WAN virtual network functions; and

- Enable complex partner ecosystems with shared cloud, network, commercial and customer experience infrastructure and systems.

Innovation #3: End-to-End Security across Cloud, Networks, and Identity Management

Cloud and network infrastructure are becoming more complex and increasingly susceptible to cybercrime and fraud. End-to-end security innovation is required to manage and secure smart ecosystems and communications, and protect against expensive outages, loss of sensitive data, fraud, and network breaches. This requires four levels of security:

- Core network security including applying policies and AI-based signaling analytics to detect and act on anomalous events, and prevent fraud;

- Enterprise network security using SD-WAN technology which provides fail-safe, policy-driven cloud connectivity coupled with session border control to prevent fraud, automatically detect, alert and block traffic, and analyze call patterns. Automated enterprise policy creation and enforcement can identify attackers, their locations and tools used to prevent future breaches;

- Cloud infrastructure security that is highly automated, detective and predictive to remediate threats. Autonomous databases with integrated AI, ML and analytics capabilities scan for security threats and apply security updates while running, and manage, tune and patch themselves. This is critical to prevent cyber attacks and data theft, and enable users to innovate faster on a highly secure platform; and

- Secure identity management that leverages mobile device, network information, 'know your customer' attributes and biometrics to securely verify, authenticate and authorize users and things for digital services within smart ecosystems.

SMART ECOSYSTEM CASE STUDIES

Oracle is working with customers and partners today to successfully deliver digital services and smart ecosystems as highlighted in Table 1. Over the next few years, many of these smart ecosystems will be enabled by 5G.

Table 1: Smart Ecosystem Case Studies

	SMART ECOSYSTEM CASE STUDIES
Smart City	Smart city services are connecting traffic, public safety, weather, parking, and vehicles and applying cloud-based analytics and AI to data to become more efficient, safe and enjoyable. These services are being delivered by CSPs, cities, Cloud and network solution providers and automotive companies. Chicago is a great example of a Smart City offering intelligently connected services enabled by Oracle. In the future, dedicated 5G network 'slices' will advance smart cities with real-time uncompressed video surveillance and mobile environmental drones (high data rates/priority/Quality of Service (QoS), low latency) as well as smart-meter readings (low date rates/priority/QoS, higher latency).
Smart Home	Partnerships among CSPs, entertainment providers, utilities and home maintenance and appliance suppliers will enable smart home services such as streaming events with augmented and virtual reality, and consumer robotics that control cleaning, utility usage, outdoor maintenance, and security surveillance.
Smart Cars	Connected, autonomous vehicles powered by advanced data insights using AI, ML and analytics promise a more personalized driving experience. New subscription service models will reshape vehicle ownership models. 5G network slices for smart cars with low latency, high data rates, and high priority/QoS will be important for real-time transmission of vehicle data for efficient, safe and secure transportation. Bell Canada and Concentrix are using Oracle to monetize and deliver connected vehicle services for Hyundai, Kia, and Ford.
Smart Learning	Smart learning services such as online courses, digital book subscriptions, and study assistance are being offered today. These services often require real-time video transmission over mobile and fixed networks as well as sophisticated subscriptions. Oracle is working with Chegg today to deliver innovative digital subscription services over their connected learning platform.
Healthcare	Healthcare institutions, first responders, medical device manufacturers and CSPs are coming together to offer connected health – monitoring wearables that analyze and transmit data to health centers and first responders to improve care. With a dedicated 5G network slice, these services will be delivered with high reliability/priority/QoS and low latency.
Smart Manufacturing	Manufacturers, agricultural industries, device and sensor providers and CSPs are providing real-time connected device monitoring and control on and off-site to improve operations and security. For example, automated sensor-driven harvesters are using data-drive machine learning to optimize crop yields based on environmental conditions.
Finance	Financial institutions, software providers, systems integrators and CSPs are joining forces to provide secure, mobile, real-time currency, payments and banking transactions using new cloud-based Blockchain and AI technologies.

CONCLUSION

The future belongs to service providers and enterprises that can capture the trillions of dollars in 5G and Cloud opportunities across Smart Cities, Smart Homes, Smart Workplaces and more. By taking advantage of three key innovations – network slices-as-a-service using integrated Cloud and 4G/5G/SD-WAN network infrastructure, a Cloud-based digital business engine, and end-to-end security across Cloud and networks – service providers and enterprises can exceed their customers' digital experience expectations and grow their businesses.

WHY ORACLE COMMUNICATIONS?

Oracle is the leading provider of communications and cloud solutions enabling customers to connect, engage, and monetize their services. Count on Oracle to help you capture the smart ecosystems opportunity:

- Robust, secure and integrated Cloud and 4G/5G/SD-WAN network infrastructure

- Cloud and communications expertise across service providers and enterprises

- Best-in-class software-as-a-service for digital businesses

- A complete suite of intelligent, network-enabled smart ecosystem applications

- IoT platform services such as device, application and connectivity management, security, and analytics

- Flexible deployment – on-premise, hybrid and cloud

- World-class customer success organization

For further information, visit www.oracle.com/communications

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Integrated Cloud Applications & Platform Services

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