Qualcomm® Smart Cities and IoT-as-a-Service

Sanjeet Pandit

Senior Director, Business Development and Head of Smart Cities

Qualcomm Technologies, Inc.
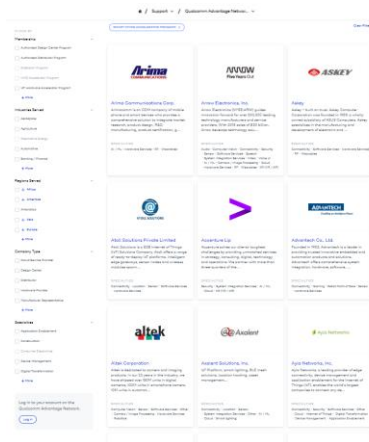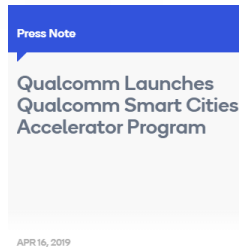
Qualcomm® Smart Cities Accelerator Program

January 2019

Qualcomm smart cities

- Qualcomm Technologies forms Smart Cities/Smart Connected Spaces business focus area for IoT BU
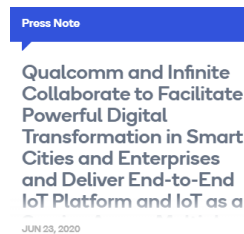
April 2019

Press Note

Qualcomm Launches Qualcomm Smart Cities Accelerator Program

APR 16, 2019

Qualcomm advantage network — smart cities accelerator member

September 2019

Qualcomm® Smart Cities Accelerate 2019
September 17-18
San Diego, CA

Over 550 registered
400+ attended
260+ companies
18 CIOs/9 City Managers
60+ Partner Demos

#SmartCities   @Qualcomm

June 2020

Press Note

Qualcomm, JLC Infrastructure and IGNITE Collaborate to Enable Key Segments with Smart Cities Solutions

JUN 8, 2020

Press Note

Qualcomm and Infinite Collaborate to Facilitate Powerful Digital Transformation in Smart Cities and Enterprises and Deliver End-to-End IoT Platform and IoT as a

JUN 23, 2020

- Collaborations with 3rd parties to enable IoTaaPlatform and funding allocation to jump start smart cities projects

December 2020

Qualcomm Smart Cities Accelerate 2020
Wednesday, December 9 | Virtual
9:00 am – 12:00 pm
7:00 pm – 10:00 pm

Qualcomm smart campus

Qualcomm® IoT Services Suite Announced:
- Education-as-a-Service
- Construction Management-as-a-Service
- Logistics-as-a-Service
- Connected Healthcare-as-a-Service

Enable ecosystem matchmaking within Qualcomm Advantage Network

- Select curated members

- Feed filtered ecosystem listing for smart cities accelerate program members

- Search available to find specific members and verticals

~300 Members to Date
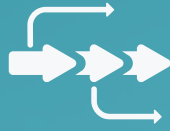
Technology selection

CAPEX / OPEX
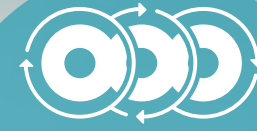
Data management & integration

Large scale deployment

Interoperability

Practicality of support services

Smart Cities: Technical challenges to be addressed
Sheer scope of smart connected spaces can seem too big and costly to tackle by itself

Massive IoT

Mobile mmWave evolution
Unlicensed / shared spectrum

Infrastructure financing
and funding mechanisms

Smart
Connected
Spaces

Ubiquitous platforms
& end-end solution

Industrial IoT
with URLLC

Command and control
dashboards and analytics

Edge AI
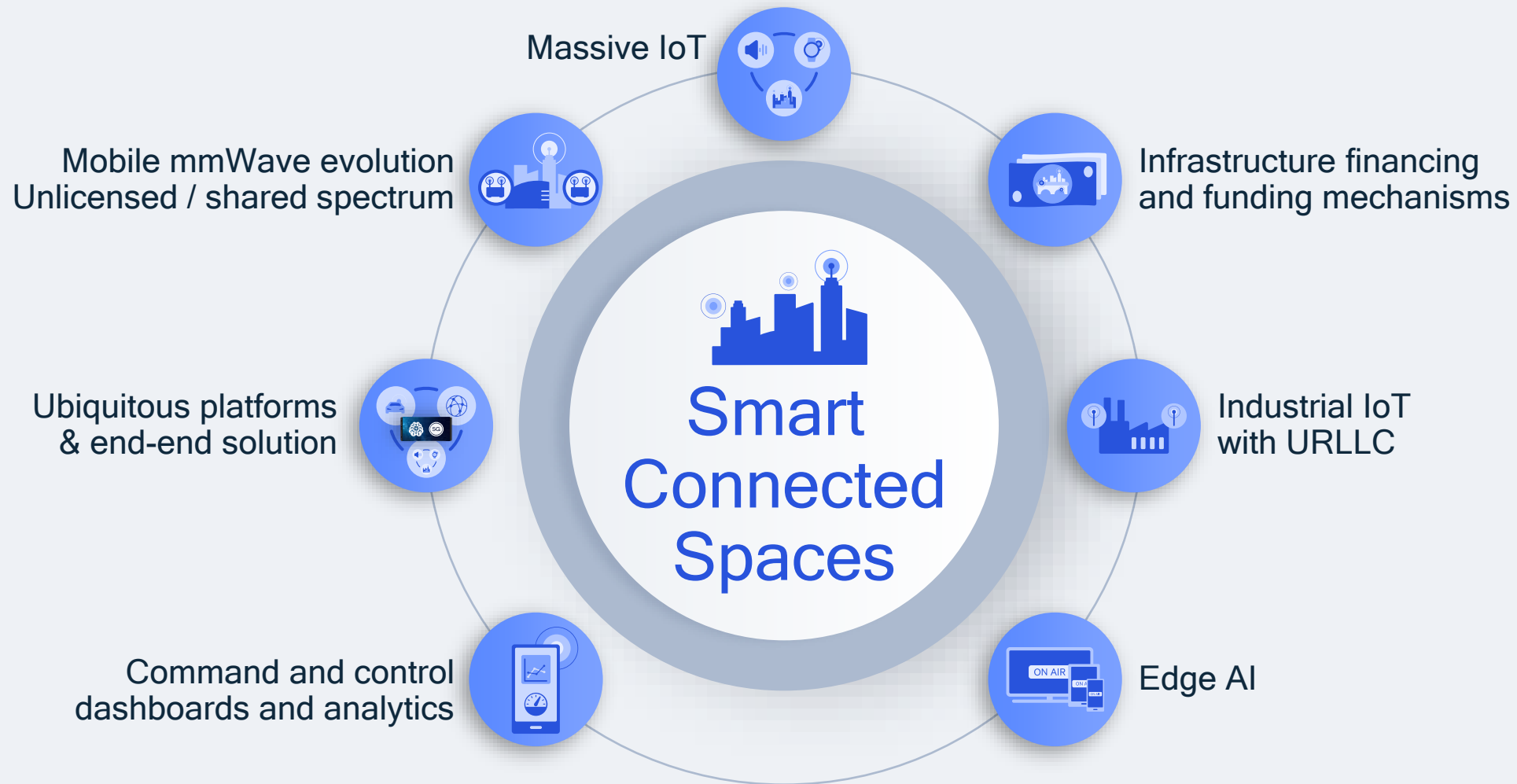
Qualcomm Technologies is at the center of
Smart Connected Spaces use cases and verticals

By harnessing the power of digitization...

Qualcomm® Smart Cities Solutions

Qualcomm Technologies Deliverables

Qualcomm Smart Cities Solutions

IoT/Ecosystem Collaboration and Development

Vertical Solutions Portfolio

Use case → Engineering development → Solution deployment

Product Portfolio

Connectivity, Security, Mobility, Edge, Cloud, AI
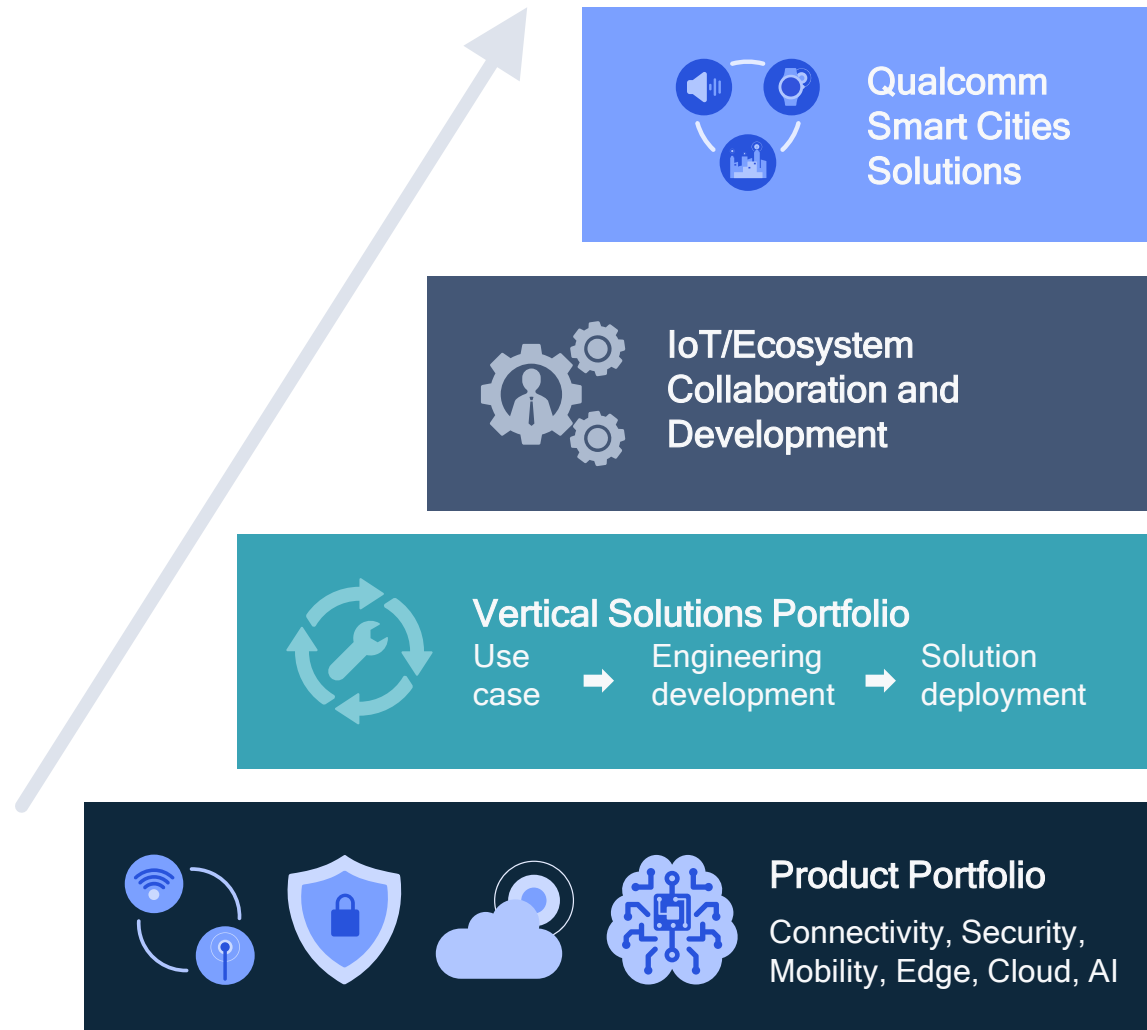
Vertical Expertise

- Intelligent N/W connectivity using Bluetooth, Wi-Fi, 3G, 4G LTE, 5G
- Superfast Edge Processing & AI
- The Intelligent Wireless edge
- City Infra through secured interoperability

Solution Offer Development

- Vertical solution development
- Rapid POC & Deployment at Scale
- On-device AI, processing, sensing, vision, -- augmented by edge cloud
- GTM Acceleration

Large deal capture engagements

- Sales/collaboration enablement
- Vertical community building
- Large ecosystem
- Advancing AI research to make efficient AI ubiquitous
- Complete, end-to-end solution delivered for Smart City verticals for deployment with minimal customization

End-to-end portfolio to enable Smart Spaces

Data Collection and Sensing

Smart Cameras

Third-Party Cameras

Wi-Fi

Infrastructure, Machine and Building IoT Sensors

Business, Social and Operational Data

Edge Processing and Analysis and 4G/5G

Data Management

Public or Private Cloud

Archive

On-Premises

AI Applications

Video Analytics

Dash Boards

Predictive & Prescriptive Analytics

Geospatial Visualization & Automated Workflows

Data Insights

Smart Spaces

Cities

Retail

Factories

Logistics

Transit

Campus

Stadiums

Airports

Intelligent data operations: Orchestration, Governance, Security, Privacy Protection and Compliance
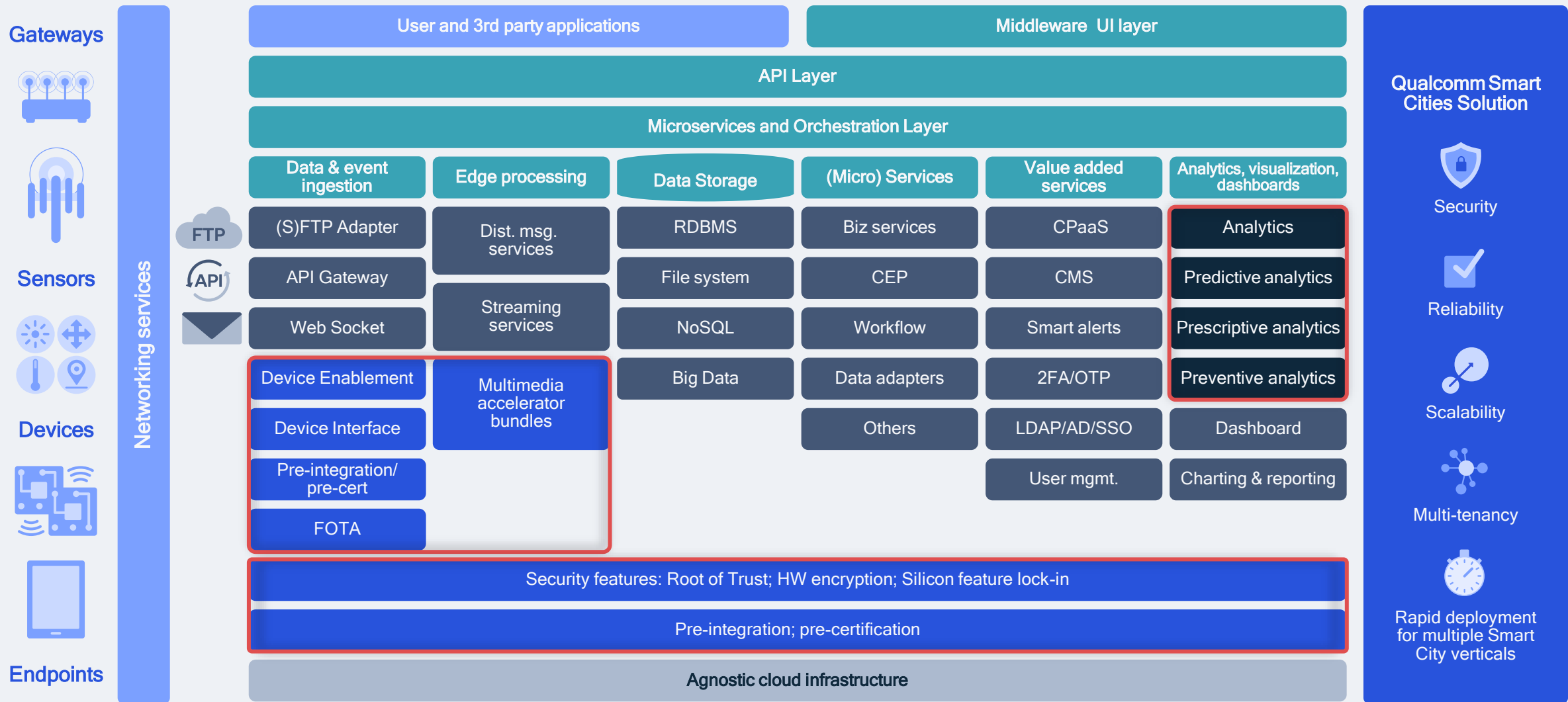
Qualcomm Smart Cities enablement platform: Product architecture

Left column labels
- Gateways
- Sensors
- Devices
- Endpoints
- Networking services

Top layers
- User and 3rd party applications
- Middleware UI layer
- API Layer
- Microservices and Orchestration Layer

Column categories

Data & event ingestion	Edge processing	Data Storage	(Micro) Services	Value added services	Analytics, visualization, dashboards
(S)FTP Adapter	Dist. msg. services	RDBMS	Biz services	CPaaS	Analytics
API Gateway	Streaming services	File system	CEP	CMS	Predictive analytics
Web Socket		NoSQL	Workflow	Smart alerts	Prescriptive analytics
		Big Data	Data adapters	2FA/OTP	Preventive analytics
			Others	LDAP/AD/SSO	Dashboard
				User mgmt.	Charting & reporting

Device Enablement box
- Device Enablement
- Multimedia accelerator bundles
- Device Interface
- Pre-integration/ pre-cert
- FOTA

Bottom layers
- Security features: Root of Trust; HW encryption; Silicon feature lock-in
- Pre-integration; pre-certification
- Agnostic cloud infrastructure

Qualcomm Smart Cities Solution
- Security
- Reliability
- Scalability
- Multi-tenancy
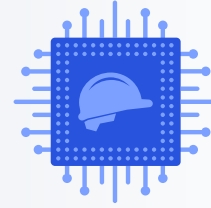- Rapid deployment for multiple Smart City verticals

FTP
API

9

Operations Command and Control Center – Architecture overview

Qualcomm®
IOT Services Suite

Education **as-a-S**ervice

Construction **M**anagement **as-a-S**ervice
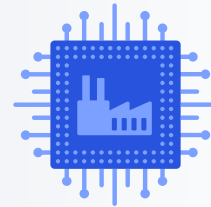
Logistics **as-a-S**ervice
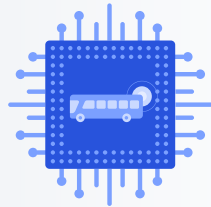
Healthcare **as-a-S**ervice

Qualcomm® IoT Services Suite

Collaborations with Qualcomm Smart Cities Accelerator Members

- Education-as-a-Service: OneScreen and Hovercam

- Construction Management-as-a-Service: Everguard and Guardhat

- Logistics-as-a-Service: Cloudleaf and Tag-N-Track

- Connected Healthcare-as-a-Service: Ceiba, LucidAct, Veemed, and Zyter

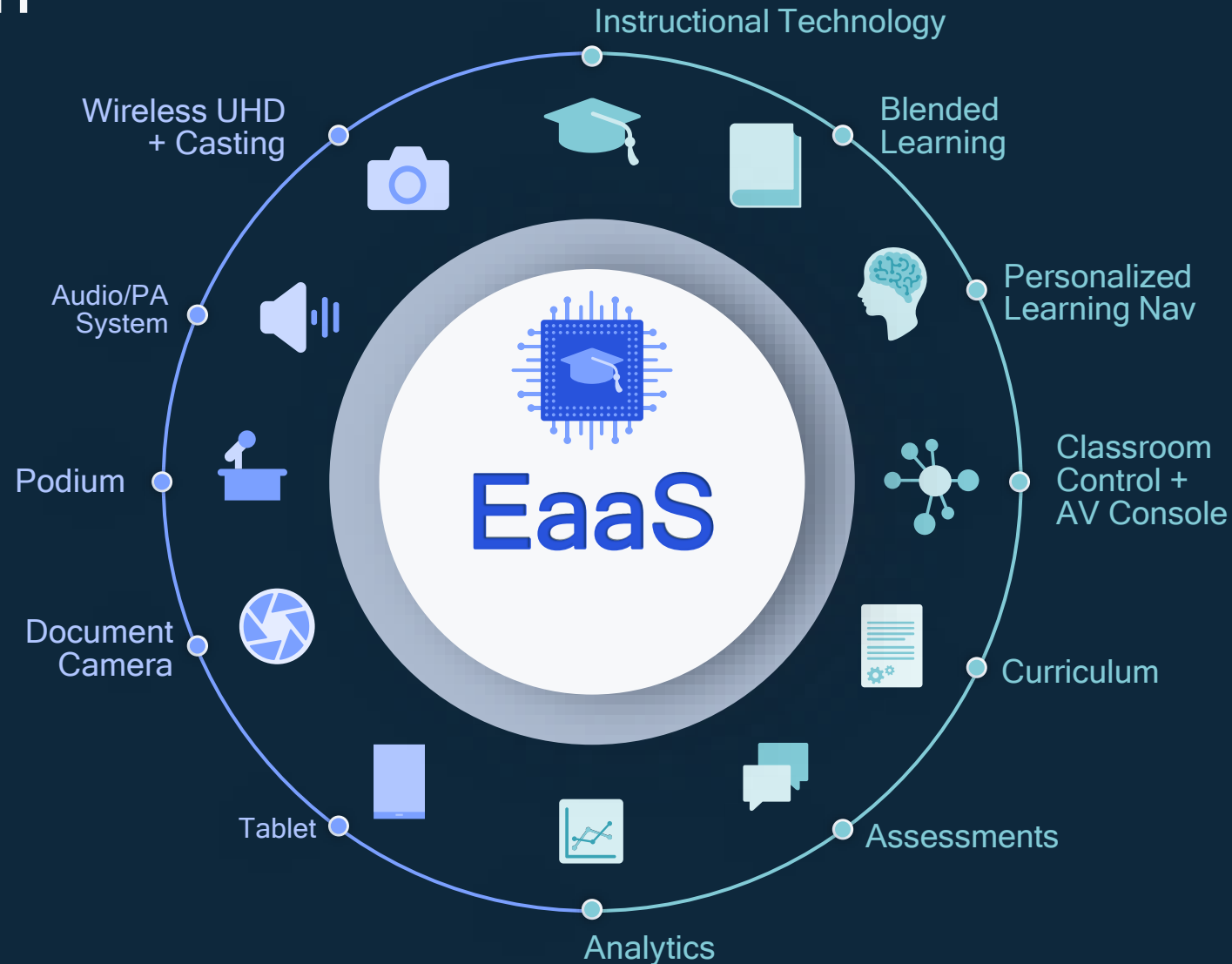## Delivering IoT-as-a-Service through digital transformation

7. Audio System

2. Classroom display(s) Snapdragon 8cx

5. Student Notepad Qualcomm® Snapdragon™ 7c Compute Platform

6. Student Notebook Snapdragon 7c

3. Video camera system Qualcomm® QSC605

1. Teaching station Snapdragon 8cx

4. Go Safe Qualcomm® APQ8053

Education-as-a-Service Touchpoints

Fully integrated service features for Education

Instructional Technology

Wireless UHD + Casting

Blended Learning

Audio/PA System

Personalized Learning Nav

Podium

EaaS

Classroom Control + AV Console

Document Camera

Curriculum

Tablet

Assessments

Analytics

Qualcomm Technologies Hardware

Qualcomm Smart Cities Solutions Suite Platform Software
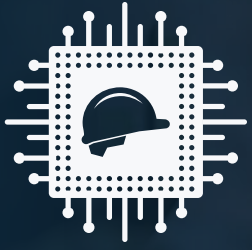
CMaaS
Construction Management as-a-Service

Lack of Digitization:
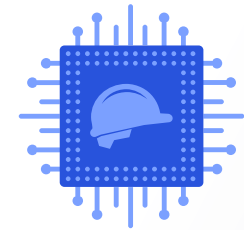80% processes are manual
Under utilized Technology

CMaaS
touch points

Construction safety
industry is
multi-functional

Ripe for disruption

Perimeter
Inspection

Health Kiosk

Cloud

CMaaS

Hard Hat
Connected Worker
Wearable AI Camera
Thermal Safety Scan
Digital workflow
Remote Collaboration
Connected Health Kiosk
Drones for inspection
Perimeter Lidar
AI Camera for NLOS
Popup Private Network

WoS Screen

Const. Wearables

Thermal
Camera

Connected Safety
Helmet

Connected AI

Workflow Automation

Camera
Access &
Control

Lidar

5G

Private Network + V-RAN

LaaS
Logistics as-a-Service

Location and positioning technologies are becoming key drivers for logistics:

- Temperature monitoring

- Predictive analytics model to pre-empt excursions and take preventive action

- Edge intelligence stack that's expandable to future use cases (e.g., video analytics, fraud detection)

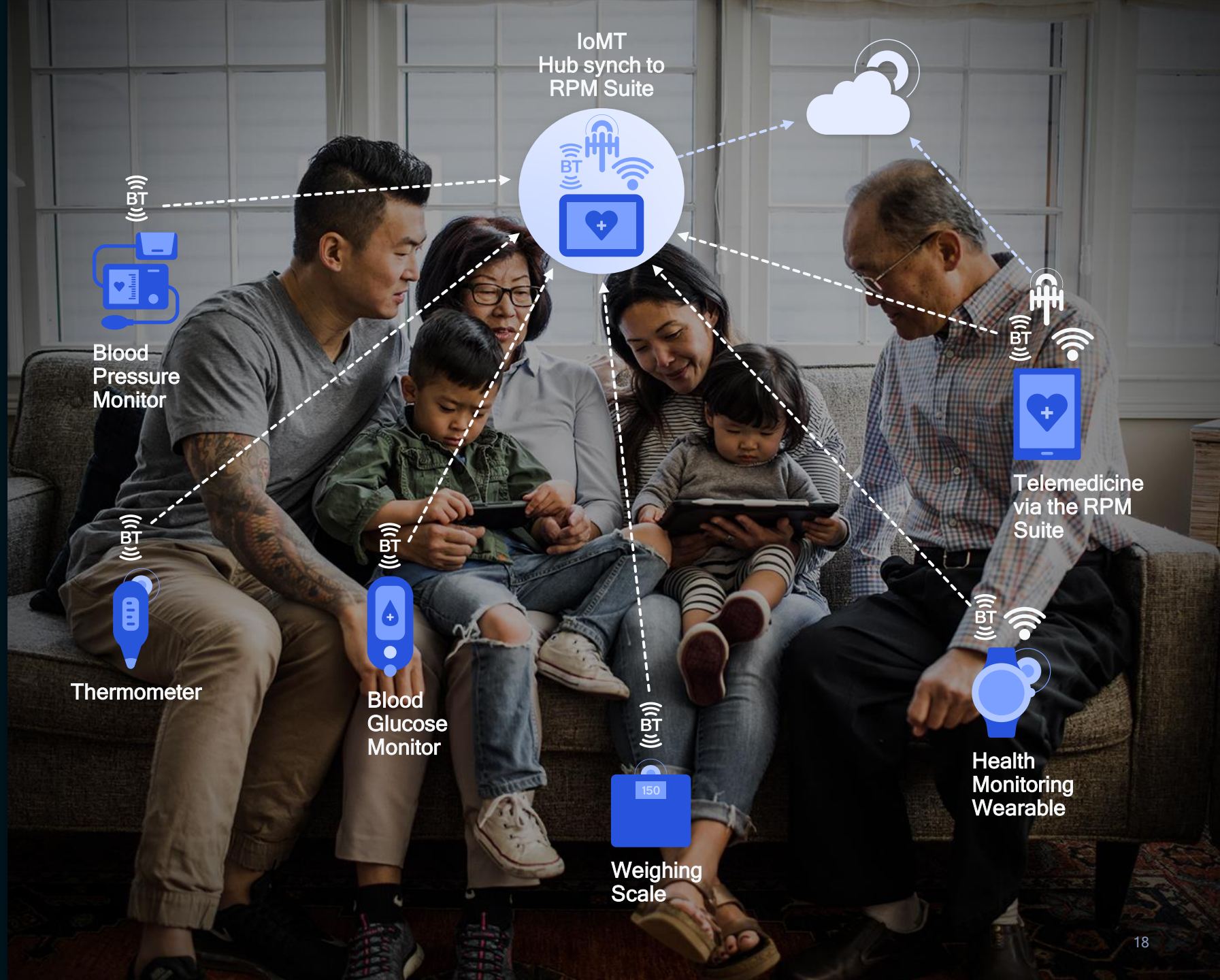- Heterogenous connectivity for a global logistics management

Edge analytics

AI Security camera

Asset management and analytics

Vehicle monitoring

Cargo sensors and temperature

HaaS
Healthcare as-a-Service

Accelerating the shift to Telemedicine

Remote patient monitoring touchpoints

IoMT Hub synch to RPM Suite

Blood Pressure Monitor

Thermometer

Blood Glucose Monitor

Weighing Scale

Telemedicine via the RPM Suite

Health Monitoring Wearable

Tele-ICU
Each room with above Integrated Smarts

Internet of Medical Things (IoMT) Hub

- Wi-Fi, BLE Enabled
- 30 day cache back-up function
- Interoperable and compatible with 95% of the ICU devices on the market.
- Bidirectional data capture and distribution, digitizing the entire ICU

E-Clinic

- Dashboards providing all vital patient information
- Doctor/Nurse consultation Notes
- Remote Live Waveforms
- EMR / EHR Management
- Instant Alarms & Consultation Broadcasts
- Available on web, mobile and podiums

AI based Diagnosis

- Predictive Analytics Engine accurately predicts Sepsis, Septic Shock, Mortality, Length of Stay and Acute Kidney failure
- AI Based Sepsis Diagnostic Alert
- Predict the patient's trajectory based on data from other patients with similar conditions

Monitors

GCS

Respiratory

BGL

HCO3

Blood Gas

Pumps

HCT

Urine Output

IoMT Hub

PH

Temperature

Fluid Balance

Smart Factory
Manufacturing | Smart Sensors
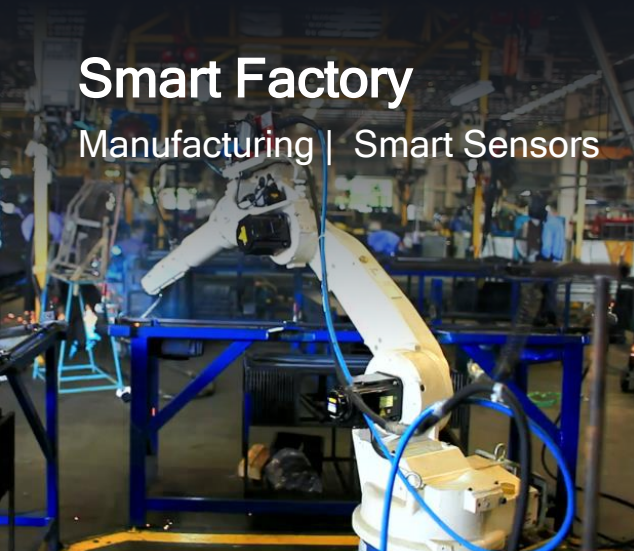
Smart Education
Schools and Universities

Smart Utility Monitoring
Power | Water | Grid

Smart Logistics
Warehousing | Asset Mgmnt

Smart Building and Automation
Airports / Ports

Smart Safety and Security
Cameras | Surveillance

Smart Healthcare
Remote Patient Monitoring/Tele-ICU

Smart Agriculture
Smart Livestock

Smart Connected Spaces focus areas

Qualcomm

Thank you

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