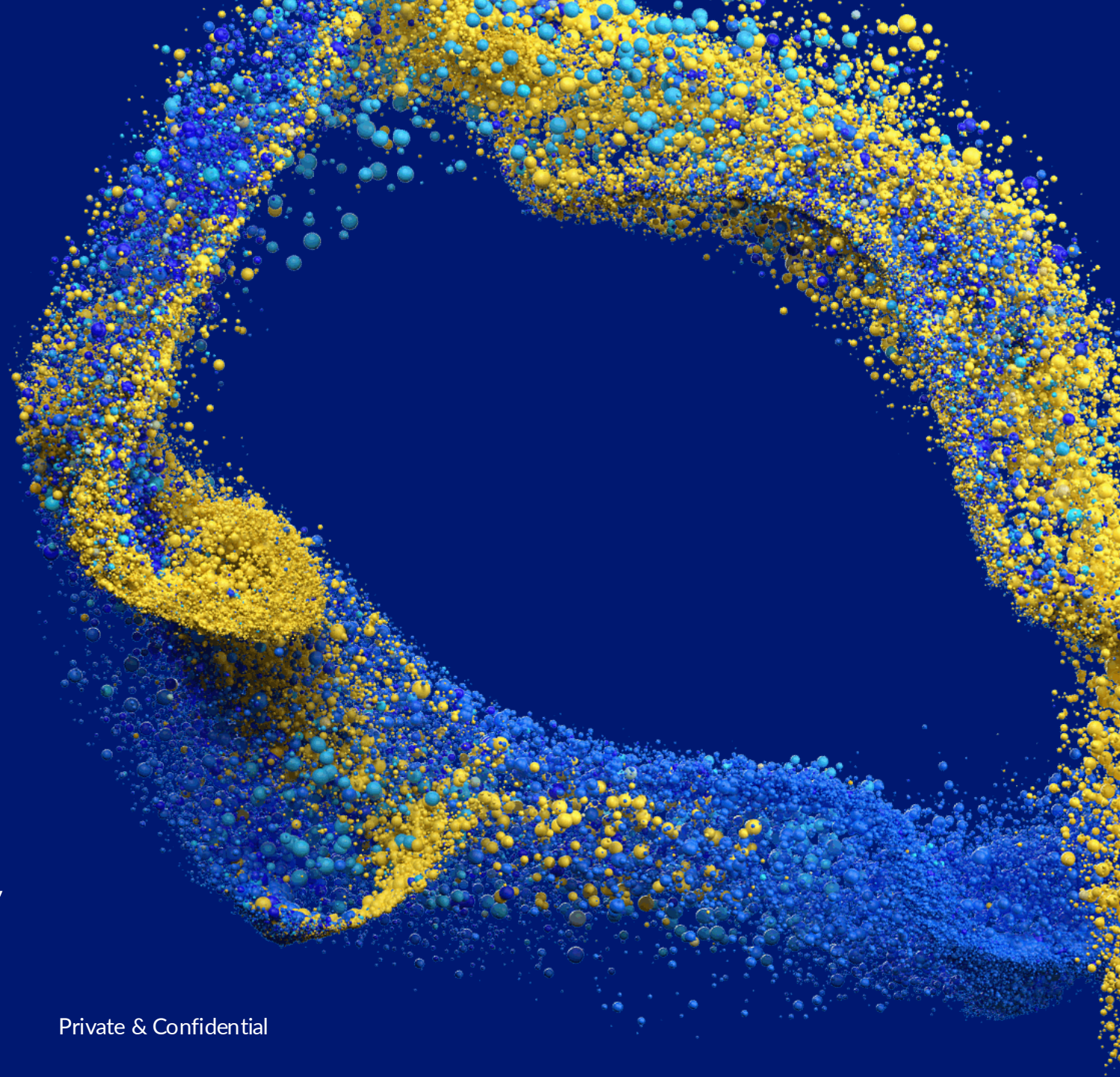


IoT Protocols and Architecture: **Enabling Scalable Managed Connectivity**

Speaker Profile

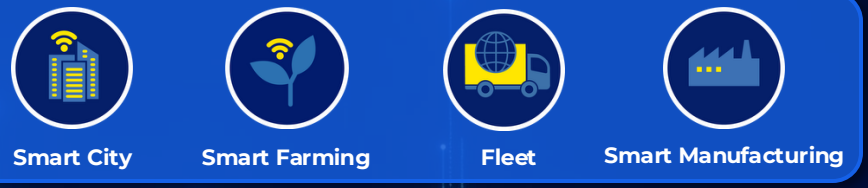
Telecommunications professional with nearly 20 years of experience across Malaysia and abroad. Started career in RF solution design for 2G, 3G, and 4G networks and have since expanded into Enterprise Connectivity Solutions, delivering end-to-end communication infrastructures for complex business environments.

Kelvin Lim
Head Of Enterprise Connectivity & Platform Solutions CelcomDigi

The Evolution of **Technology**

The IoT (Internet-Of-Things)
Ecosystem Stack

Application
Captured data/information is analyzed and presented in more meaningful form for consumption



IoT Platform
Manage/monitor ***Devices*** and stores captured data/information from devices

Connectivity Management
Managing and monitoring the connectivity such as status, utilization and quota

Connectivity
Transporting data between devices and backend system

Devices/Sensors
Equipment which captures/presents information between the analog and digital world

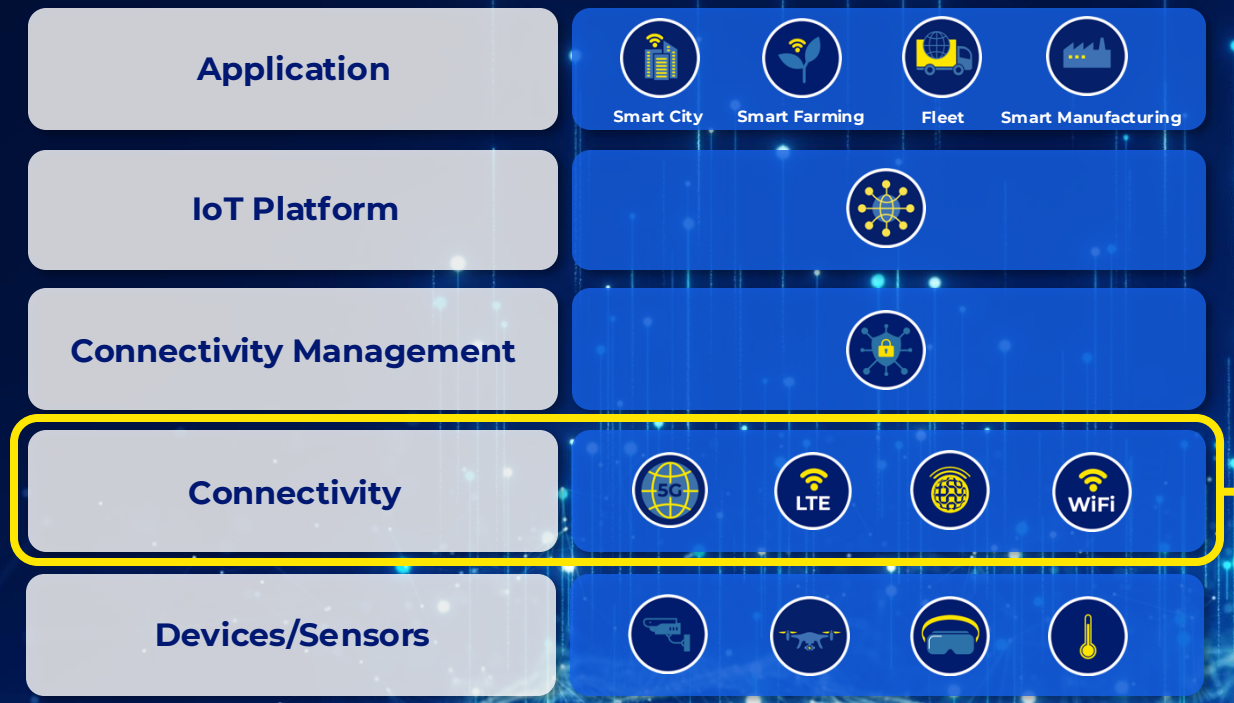
The IoT (Internet-Of-Things)
Ecosystem Stack

What is my objective?

"I want to know hourly, the temperature around KL"

"I want to monitor the amount of traffic in front of my retail stores"

The **Connectivity Layer**



What's the size and speed of my data requirement?

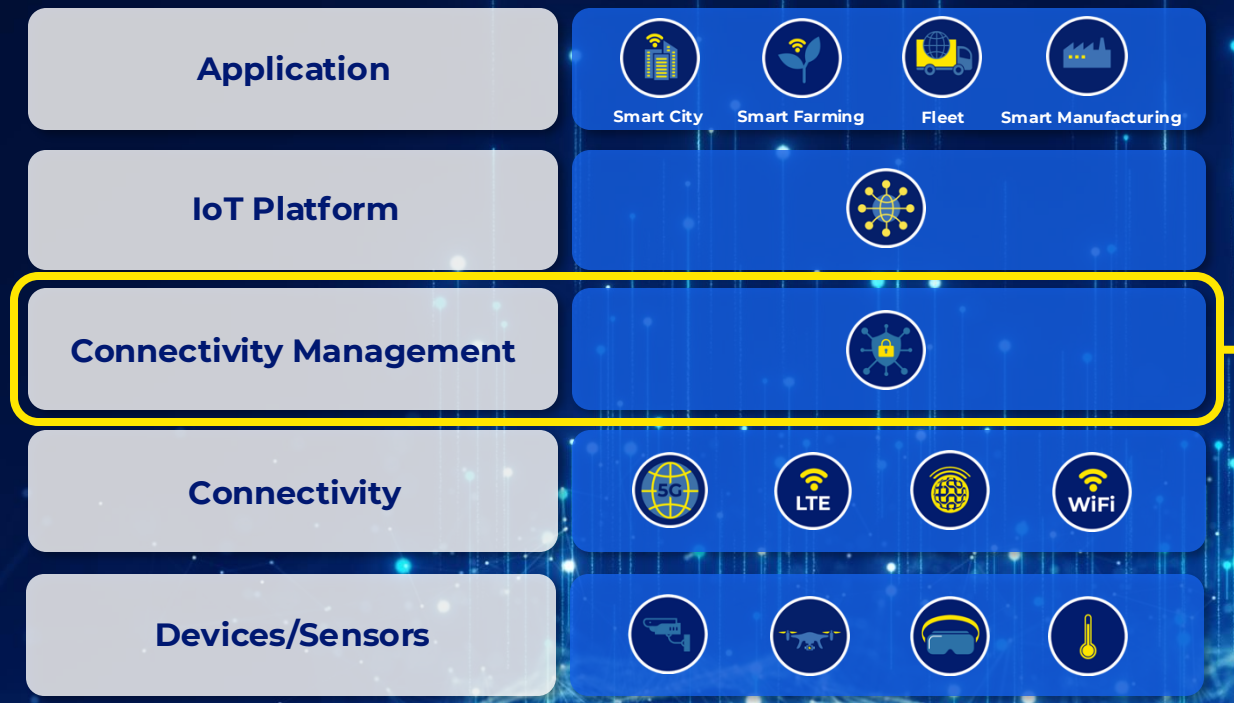
"I need smooth video streaming of my store CCTV's"

"I only send small amounts of data once or twice a day"

IoT Protocols

Protocol	Common Use Cases
MQTT (Message Queuing Telemetry Transport)	- Remote monitoring (smart meters, sensors) - Industrial IoT telemetry - Smart home devices (e.g., thermostats, lighting)
CoAP (Constrained Application Protocol)	- Smart city devices (streetlights, parking sensors) - Environmental monitoring - Low-power, battery-operated devices
HTTP/HTTPS	- Devices with sufficient resources (e.g., cameras, gateways) - REST API-based IoT platforms - Cloud-connected consumer electronics
AMQP (Advanced Message Queuing Protocol)	- Industrial systems with strict reliability needs - Financial or business-critical IoT data exchange - Cloud-to-cloud messaging
WebSockets	- Real-time dashboards and device control - Smart appliances - Live tracking systems
LwM2M (Lightweight M2M)	- Large-scale device management - Firmware updates (FOTA) - Telco and NB-IoT deployments
OPC UA (Open Platform Communications – Unified Architecture)	- Industrial IoT (IIoT) - Factory automation and machine-to-cloud integration
DDS (Data Distribution Service)	- Autonomous vehicles - Robotics and drones - Defense and aerospace systems

The **Connectivity Layer**



How to I monitor and manage my connectivity?

"I want to know how much data quota has been utilized"

"I want to know the status of my network"

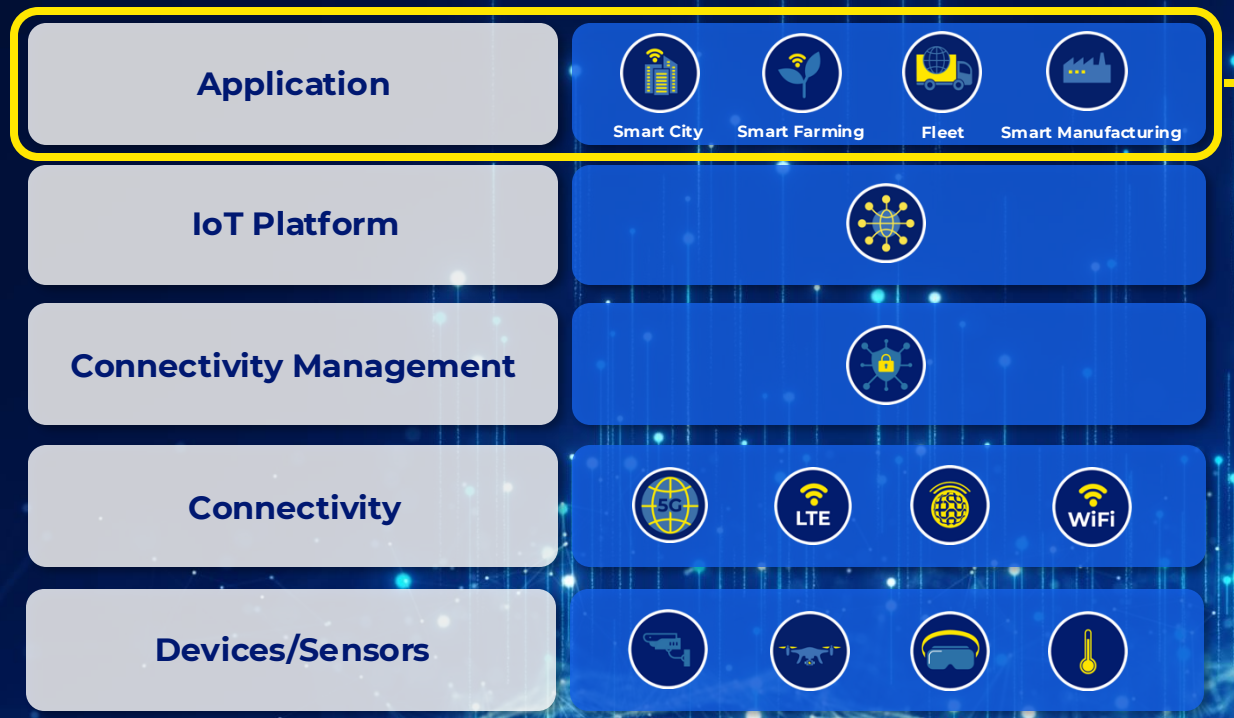
The **Connectivity Layer**

How do monitor and manage my IoT devices?

"I want to know the statuses of my devices/sensors"

"I want to store my collected data for further analytics"

The **Connectivity Layer**



How do I make sense of my data?

"I want to know how often my drivers are speeding"

"I want to know how many customers entering my store buys something"

Thank You