# Wireless Connectivity:  Future Evolution of the Mobile Network
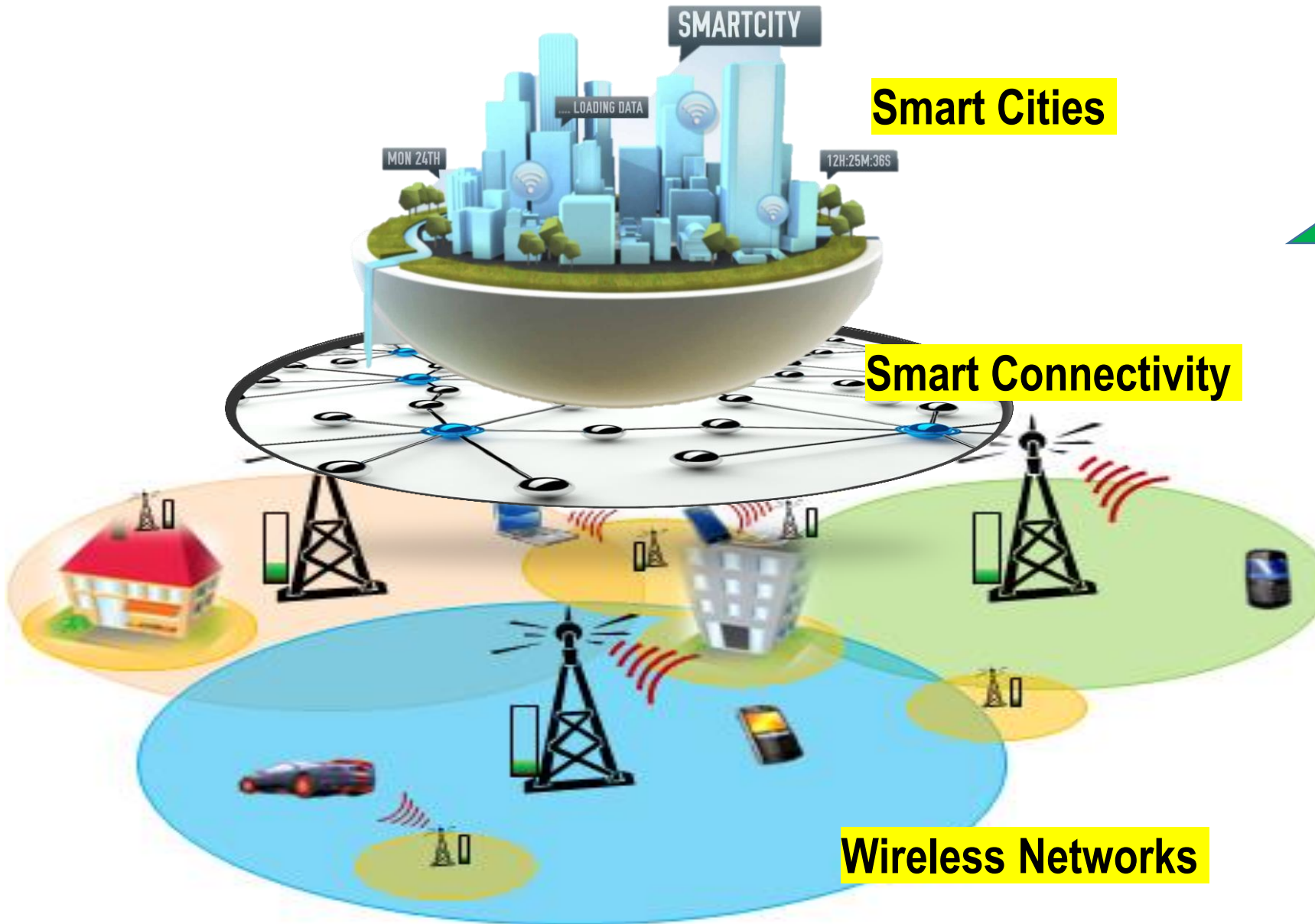
**Simon Yeung**

*26 May 2017*

*Executive Director, Comba Telecom Systems Holdings*

*President, Comba Telecom Systems International*

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# Smart Cities and Wireless Networks
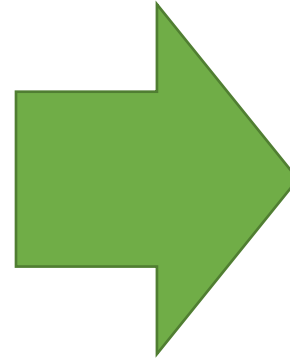


**Smart Cities**

**Smart Connectivity**

**Wireless Networks**

**Smart Cities** require **Smart Connectivity**

**Smart Connectivity** require **Wireless Networks**

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# Wireless Networks Today

**THEN**



**Mobile Operators**

**NOW**



**Building Owners**

**Enterprises**

**Municipalities & Govt**

- **Mobile operators** are no longer the sole providers of wireless networks
- Increasingly, **enterprises and municipalities** are getting engaged

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# Increasing Traffic: Evolution of In-Building Systems

**PAST**

- Macro Network was built without consideration of indoor coverage. After network is built, customer complaints about coverage indoors.
- Operators building a repeater-driven inbuilding DAS system.
- Coverage was the main priority

# Increasing Traffic: Evolution of In-Building Systems

**PRESENT**

- Focus shifts to meeting data capacity demand with the proliferation of smartphones and mobile devices
- Active DAS and Offload focus

**PAST**

- Macro Network was built without consideration of indoor coverage. After network is built, customer complaints about coverage indoors.
- In response, operators building a repeater-driven inbuilding DAS system.
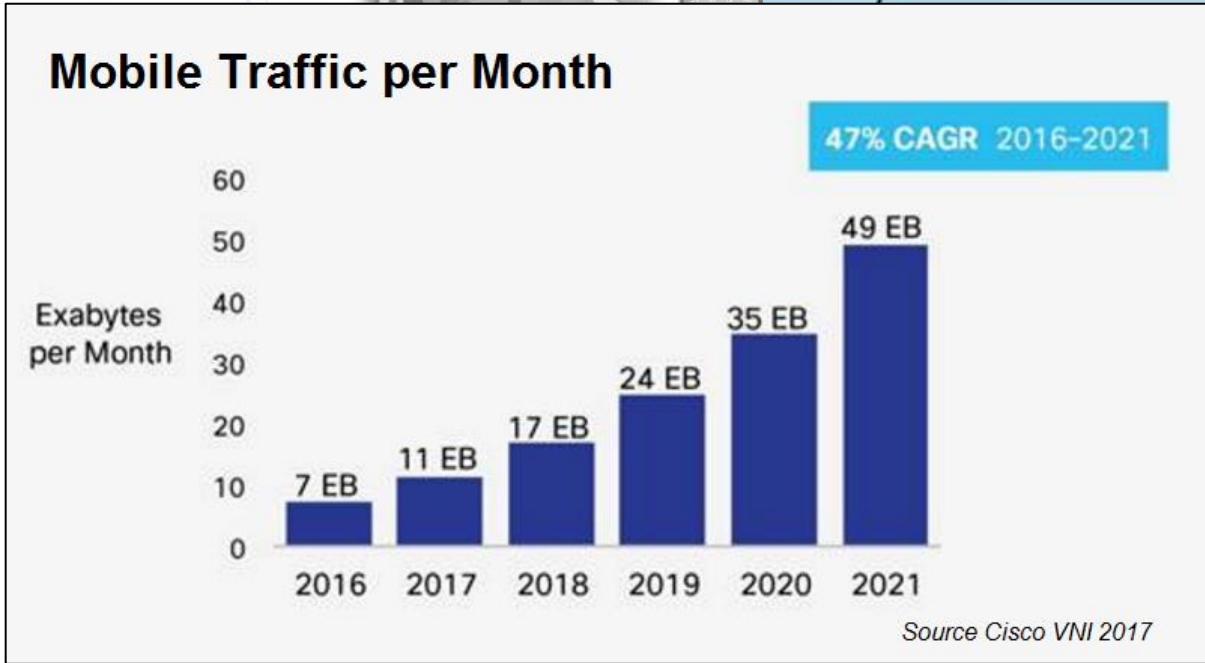- Coverage was the main priority

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# Increasing Traffic: Evolution of In-Building Systems
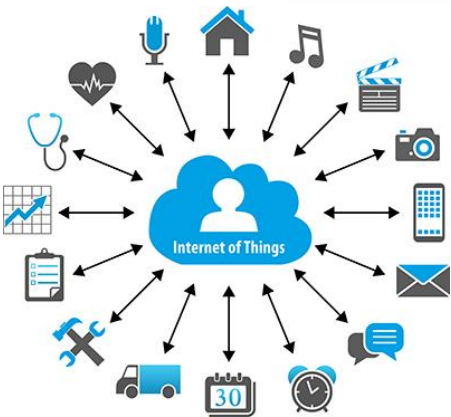
FUTURE

- Mobile Data Usage exploding: +47% CAGR 2016 – 2021 to hit 49 EB per month
- 80% of traffic from indoors
- IoT and Smart City trends → further strain on network faster speeds , higher volumes, lower latency
- A need for wireless networks to evolve

## Mobile Traffic per Month

47% CAGR 2016-2021

Exabytes per Month

| Year | Traffic |
|------|---------|
| 2016 | 7 EB |
| 2017 | 11 EB |
| 2018 | 17 EB |
| 2019 | 24 EB |
| 2020 | 35 EB |
| 2021 | 49 EB |

Source Cisco VNI 2017

## Connected Devices

| | | 2016 | 2022 | CAGR |
|---|---|------|------|------|
| | Wide-area IoT | 0.4 | 2.1 | 30% |
| | Short-range IoT | 5.2 | 16 | 20% |
| | PC/laptop/tablet | 1.6 | 1.7 | 0% |
| | Mobile phones | 7.3 | 8.6 | 3% |
| | Fixed phones | 1.4 | 1.3 | 0% |
| | | 16 billion | 29 billion | 10% |

Source: Ericsson Mobility Report Nov 2016

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# Enterprise Mobile Infrastructure

- The Rise in Enterprise-led Mobile Infrastructure ($3B market is born)

## Airport Case Study
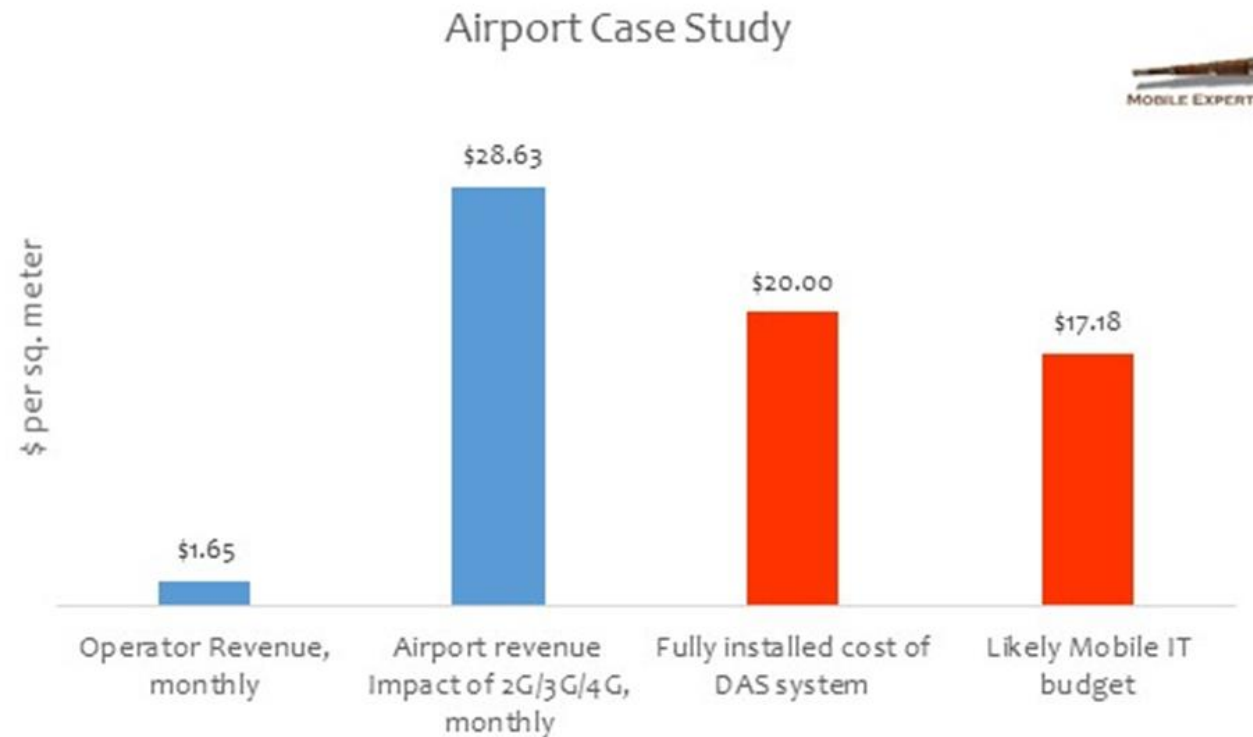


Analysis conducted into 8 vertical markets: stadiums, airports/subways, hotels, hospitals, retail, hi-rise, corp HQ and light industrials

- The building owners have stronger economic incentives to deploy mobile infrastructure than mobile operators

- The cost of a fully installed DAS system is similar to the existing IT spending of the building owner

Airports, stadiums, Shopping malls owners are driving solutions for unique customer experience

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# Evolution of Mobile Network

📶 Evolve from wireless product & system to total solution & value added services

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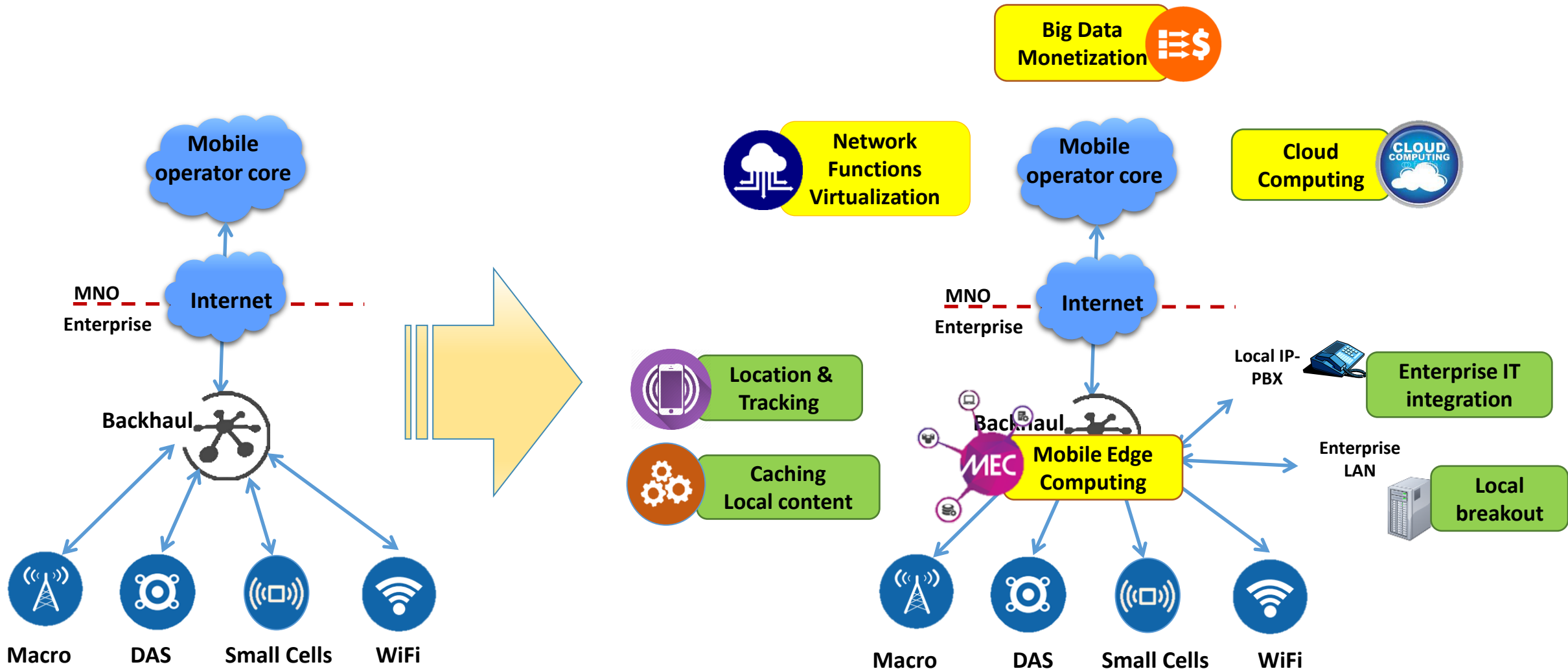
# Future of the Wireless Industry

- Focused has changed from the Mobile Networks to the Wireless Networks

- Nobody is big enough & has everything for the Wireless industry
  - Partnership, alliance, M&A to form ecosystem

- Future Heterogeneous Network
  - "Carrier Grade"  ---- Low Latencies,  Reliable, the Holy Grail
  - Enterprise Grade, General , AdHoc……..
  - Apps, Front end, back end,  Cloud, smart sth…..

Multi tier networks to address multi-tier requirements



*Wireless Vendor's Smart Home Ecosystem*
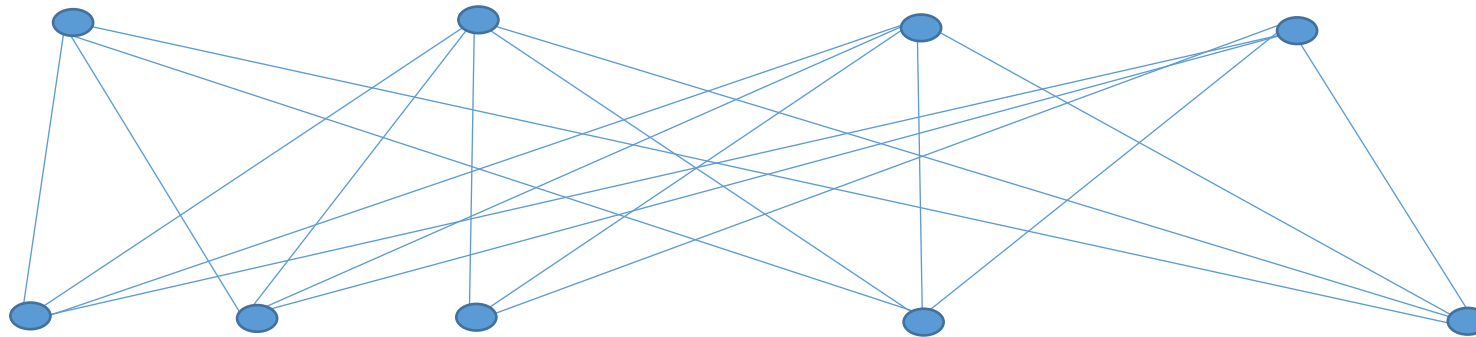
IOT   NB-IOT   Cloud  Media ……Connected Cars   M2M   Voice
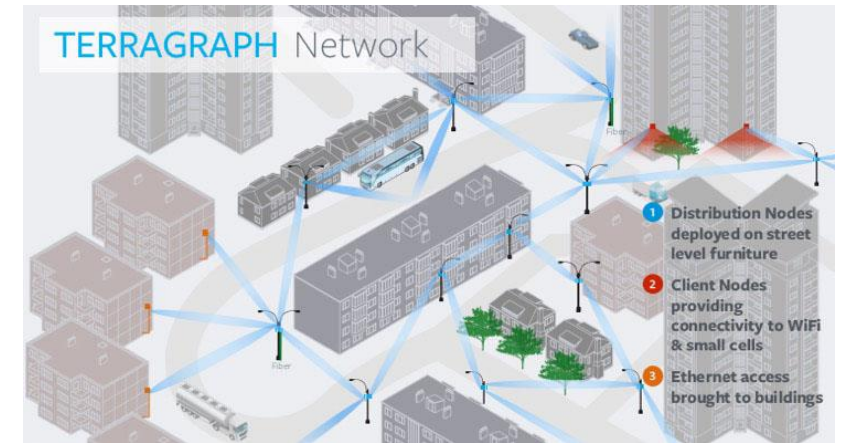
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# Facilitating the future

- Network Functions Virtualization NFV, enterprise, driving total solutions,

- Internet industry norm coming to Wireless industry
  - open source codes (Facebook, Intel, Google)

- MEC with focus on enterprise specific apps, indoor positioning and Big Data driving additional services and requirement from non-operator business

- Can provide a cost effective ubiquitous wireless solution
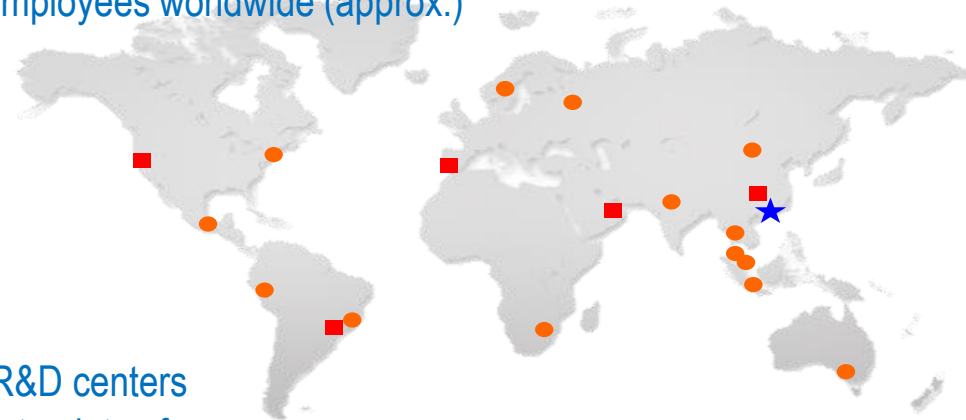- Comba Telecom has always been in the space



TERRAGRAPH Network

1 Distribution Nodes deployed on street level furniture
2 Client Nodes providing connectivity to WiFi & small cells
3 Ethernet access brought to buildings

# Smart Cities & Connected Enterprises

## Connected Enterprises / Smart Cities

### Wireless Evolution of Enterprises

2G — 3G — LTE — WiFi — NEUTRAL HOSTS — IoT — 5G

**OPERATOR-LED**     **ENTERPRISE-LED**

### Services / Applications

**MEC**     **Data Monetization**     **Location Technology**     **NFV**

### Comba Capabilities

- **Unrivalled Property Coordination and Project Experience**
- **Strong Technology Solutions Base**
- **Direct Contact with Enterprise**
- **Superior Service Capabilities**

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# Comba Telecom at a Glance

## Global

**7,000** employees worldwide (approx.)

**4** main R&D centers
**60+** direct points of presence

## Solution Segments

Wireless Transmission

Antennas & Subsystems

Wireless Enhancement

Small Cells

Services

Wi-Fi

## Financials

2016 Revenue: **USD 767m**

$150 — 2005
.... 
$869 — 2014
$873 — 2015
$767 — 2016
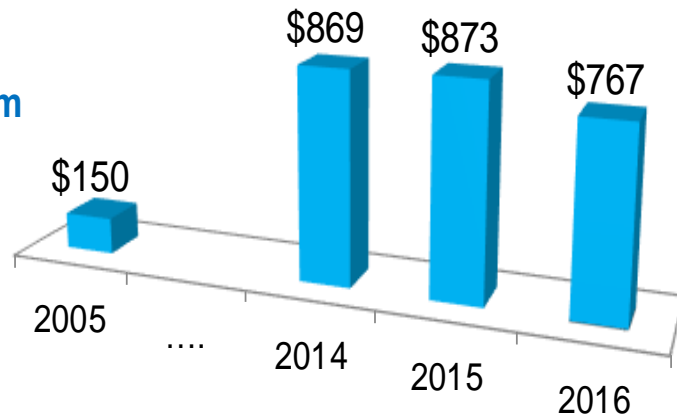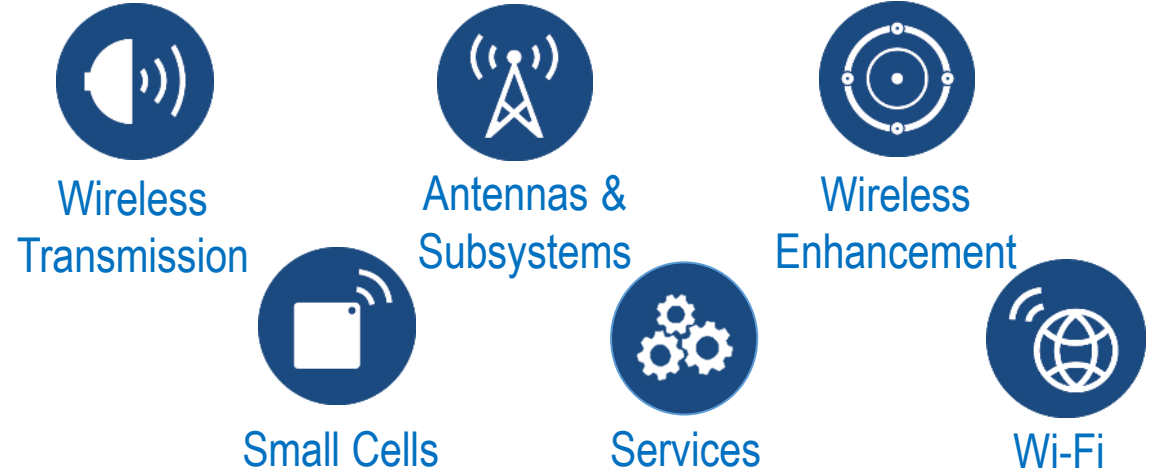
## Market Leadership

**Base Station Antennas**

**Tier 1** Global Supplier

*EJL Wireless Research 2016*

**Distributed Antenna Systems**

**#1** Vendor in APAC
**Top 4** Global Vendor

*IHS Technology 2016*

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# Thank You

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