



## The importance of RAN to Core validation as networks evolve to support 5G

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The industry standard for  
base station development



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# 01

## 5G – what changes?

**Diverse, fragmented and unpredictable network traffic**

Complex architecture with multiple vendors and distributed services makes achieving end-to-end system performance more challenging



# 5G - Diverse, fragmented and unpredictable network traffic

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# What is needed? -Supporting the **HUGE** demand

Mobile apps, services and connectivity



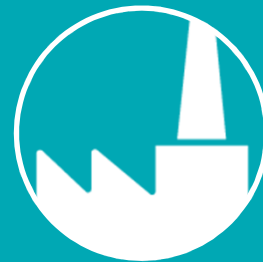
## Acceleration of technologies

Delivering capacity and connectivity, cost effectively



## More network resource and more efficiency

Spectrum, equipment, power



## Faster time to market

More flexible service deployment



## EcoSystems

Technology challenge & complexity  
Critical to collaborate and partner

### Wireless standards:

4.5G, 4.9G, IoT & 5G  
[C-RAN, Carrier Aggregation 3CC+, Massive MIMO, NB-IoT, LAA

### Spectrum:

Unlicensed; re-farming; higher frequencies

### Increased coverage:

Wi-Fi Offload, Densification, FWA; In-building; DAS; Small Cell

### Support Multiple standards

HetNets, Devices and Modules

### New Network architectures

Network slicing; disaggregation; Service chains, virtualisation

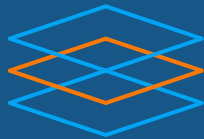
### Open standard software

# Understanding the new landscape

## Changes to the network architecture



### Functional Disaggregation and Network Slicing



#### Optimise network performance by dividing up the functions

By architecture: NB-IoT, RT/non RT, C-plane/U-Plane, 4G/5G

By service: business or industry e.g. healthcare, automotive, utilities and public safety

### NFV/SDN



#### Accelerate service deployment through virtualisation

A new service could be available within a week as opposed to 18 months

Bandwidth demand, competition and consumer sophistication the time-to-market for services and applications is more important than ever

### Mobile Edge Computing



#### Bringing services closer to the users

Supporting new 5G applications needs lower latency and higher bandwidth, creating a requirement to move core processing power to the edge of the network, enabling services and content to be activated closer to the user

### Security



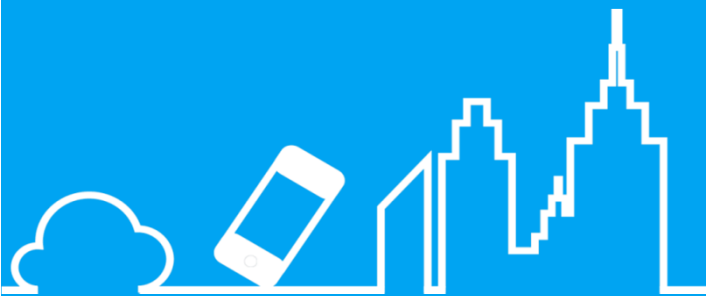
#### Preparing for cyberattacks

The influx of IoT devices with lower security settings poses an increased threat to Operators networks, therefore continuous stress testing is required to ensure networks are fully prepared for cyberattacks

# 02

## Validation - A new mind-set

New methodologies can be applied to validation, to allow chipset vendors, OEMs and mobile operators to achieve reliable high-performance designs that work successfully at scale within a complex architecture

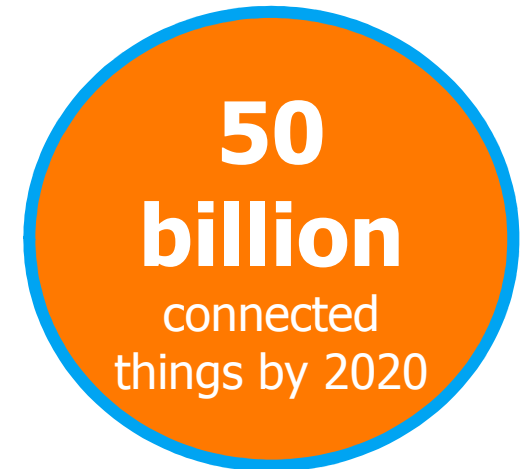


## The Challenge - Massive Connectivity

- Users have come to expect a consistent service and this expectation will only increase as more and more users and businesses become dependant on 5G services
- 5G KPI – 1 million connections per Km<sup>2</sup>

## The Solution – Prepare

- Networks need to be rigorously test in a realistic environment
- It's no longer just about the number of users, it's about the number of 'things'
- Simulating highly realistic device **and** application traffic will ensure the network is robust enough to cope with the complexity and demands at scale



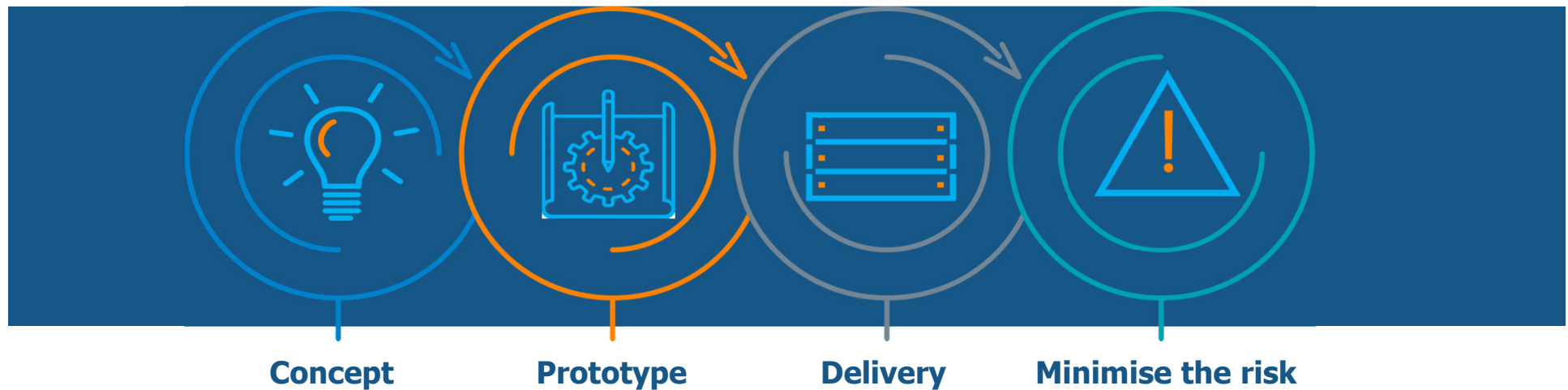


## Testing by design: start validating at the design phase

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Minimise the risk and cost

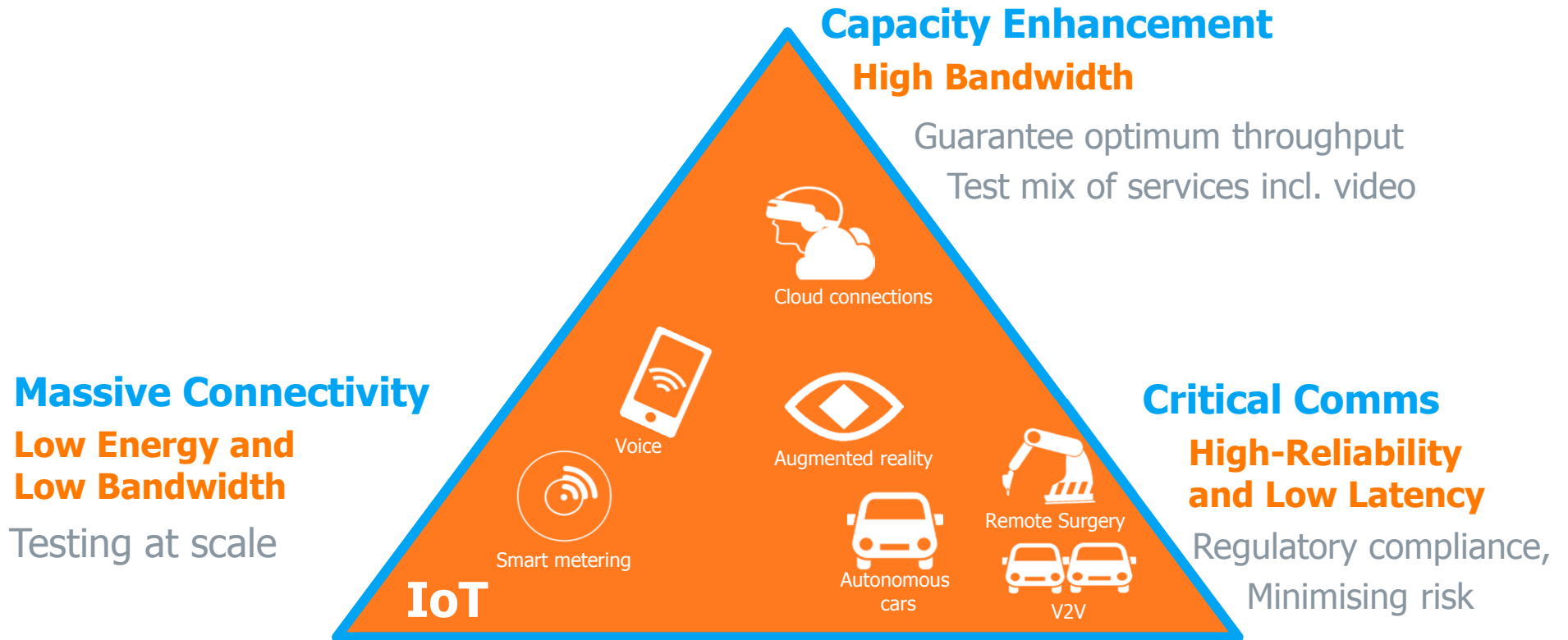
Simplify and minimise the risk of developing and deploying 5G base stations and services



- Testing by design and rigorous testing of individual elements both functionally and at scale; the earlier you test, the earlier you find problems
- New sophisticated testing techniques will be required to support and accelerate the development of 5G, start at the ground level and work your way up, refining processes along the way to understand, validate and improve system design and performance
- Using a platform that can validate 5G and is capable of verifying networks operating across multiple radio frequencies will ensure success

# What are the test implications?

Performance usage scenarios



# Accelerating development times



What is required?

- An agile test-bed that can address immediate KPIs for 5G
- A test platform that can facilitate the smooth transition from legacy to future standards, in-line with the industry's 5G progression
- A flexible test solution that enables users to upgrade or adapt functionality and test parameters, tailoring the solution to specific scenarios and requirements

5G Targets and KPIs							
1 ms end-to-end latency	Close to 100% reliability	10 Tbps/km2 traffic density	1/10x energy per bit	0.1-1 Gbps anywhere/ anytime	10 Gbps peak rate	Shared infrastructure	1 million connections per km2

# RAN to Core



## The convergence of the radio access network (RAN) and core networks

Moving computing power to the mobile edge, converges the radio access network (RAN) and core network, requiring a new approach to network testing and validation

### End-to-end validation

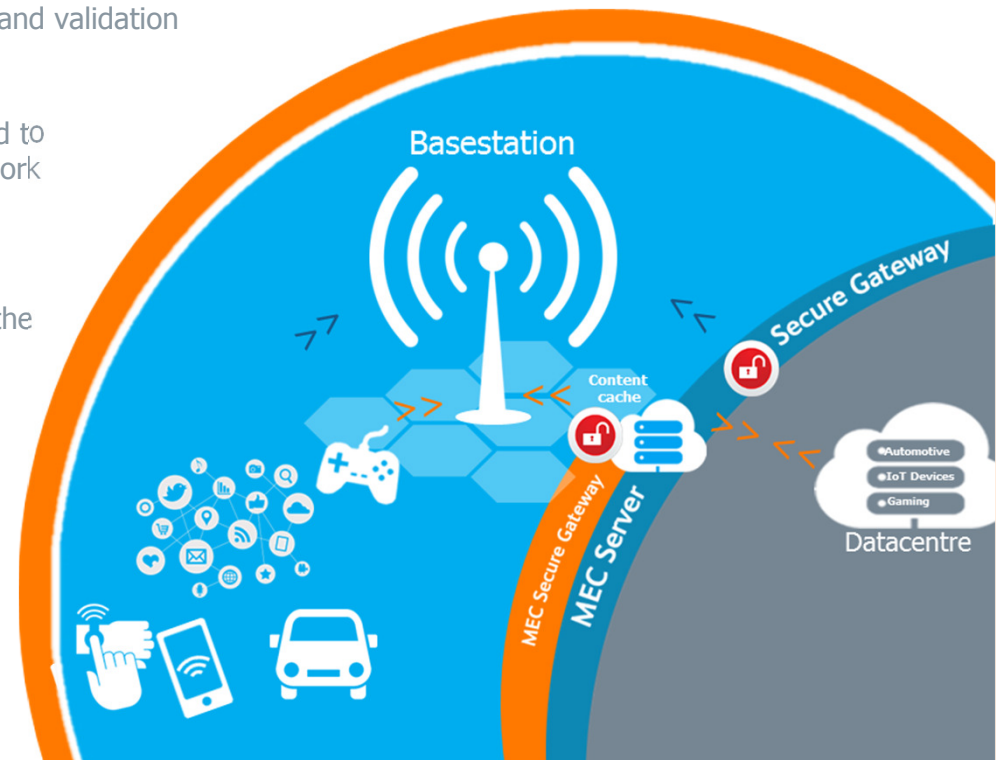
A complete end-to-end test solution from RAN to core is required to stress tests the impact of RAN traffic on the edge and core network

### Realism and scale

Go beyond basic boundary performance testing!  
Simulate highly realistic device and application traffic to ensure the network is robust enough to cope with the complexity and demands at scale

### Security

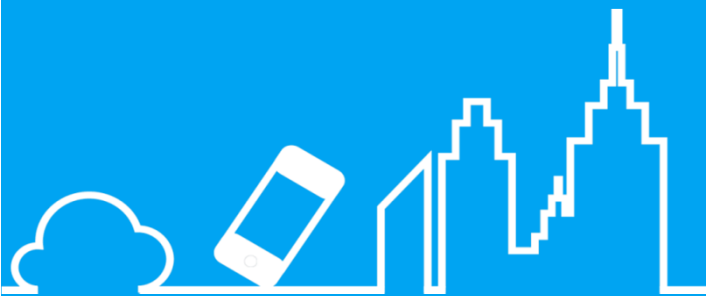
Rigorous testing of physical and virtual SeGW functions is essential to ensure that networks are robust, and any hazardous IP packets are blocked before they enter the core network



# 03

## Cobham Wireless on 5G

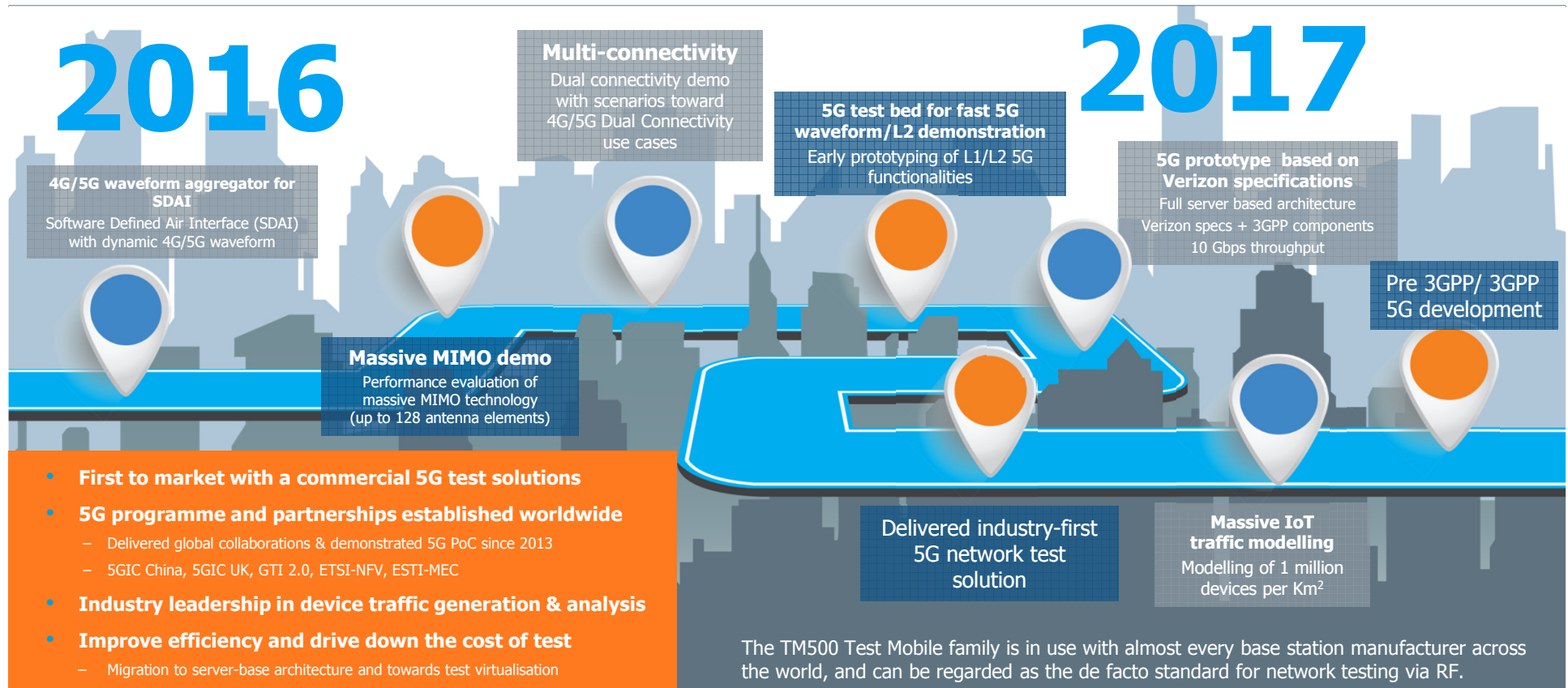
Helping the industry accelerate the development and deployment of next generation mobile and broadband services



# Cobham Wireless: accelerating 5G deployment



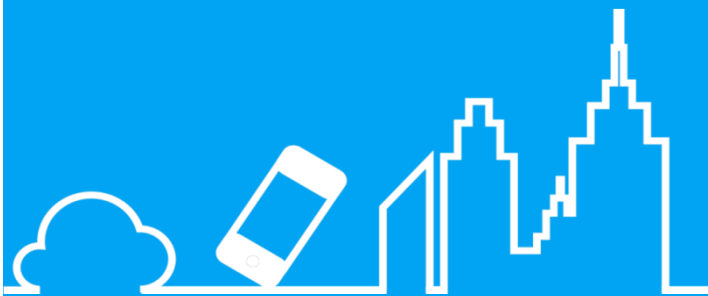
Extensive research and solid partnerships with leading 5G organisations



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Providing you with the confidence to deploy the infrastructure needed to support next generation technologies



Thank you