

Autonomous Vehicles Driving Demand for 5G V2X & Edge Compute

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M2M Dependencies on Communications Network

Connected Car Most Demanding Use Case

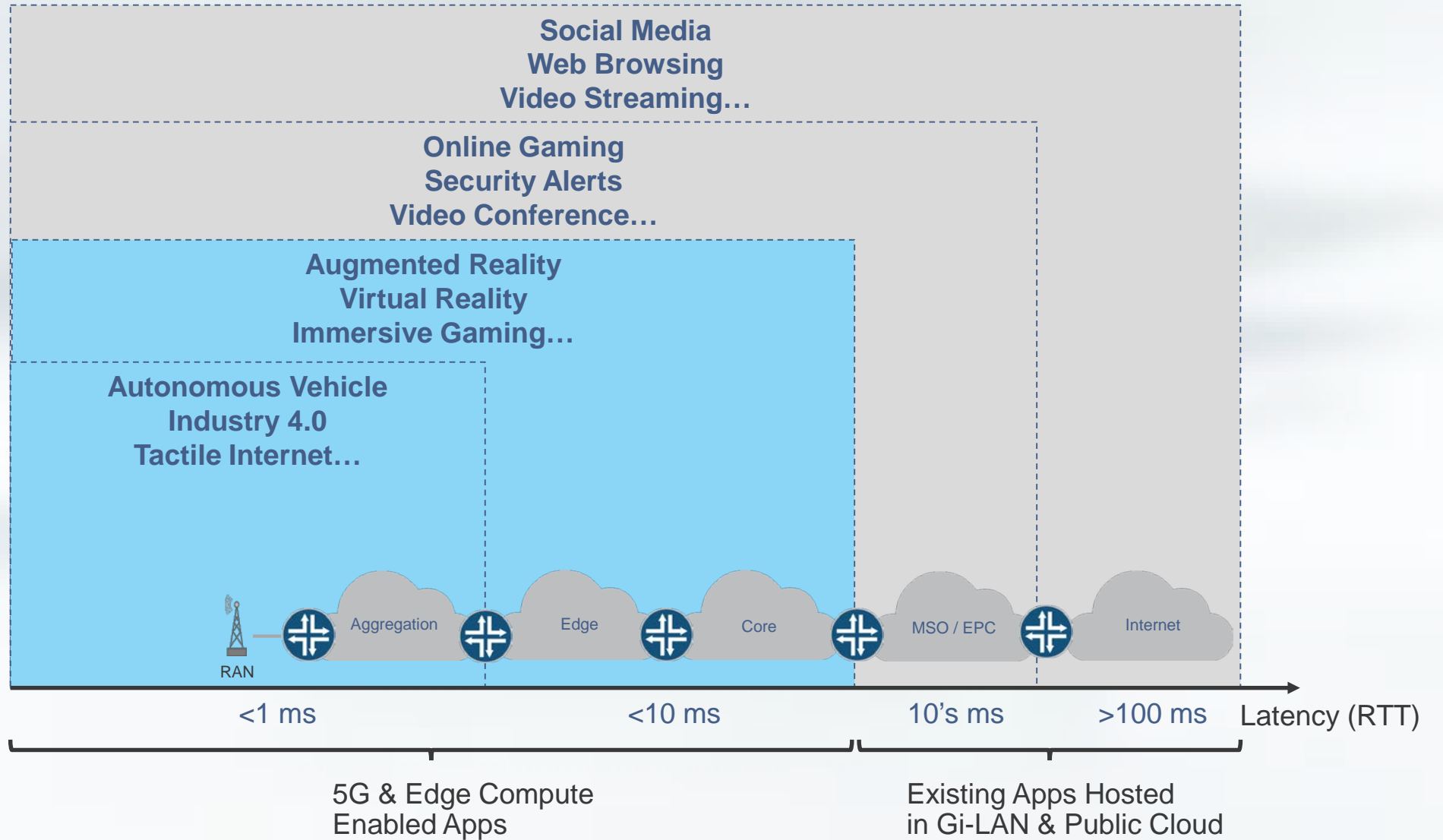
Why Ottawa for autonomous vehicle testbed?

- 90% of Canada's telecom R&D takes place in Ottawa
- Ottawa is home to more than 180 security companies with expertise in network security, cloud mobile, biometrics and encryption

M2M Application	Bandwidth requirements	Latency requirements	Security/privacy issues	Continuity of communication	
Fleet management & Vehicle tracking					Low
Public transport					
Connected car					
Telemedicine					
Smart home					
Smart watches/wristbands					
Smart electricity metering					
Street lighting					High

The Need for 5G & Edge Compute

Edge Compute Enabled by MEC, CUPS, M-CORD, NGCO...



5G Ready Distributed Service Provider Cloud

End to End Network Slicing

RAN

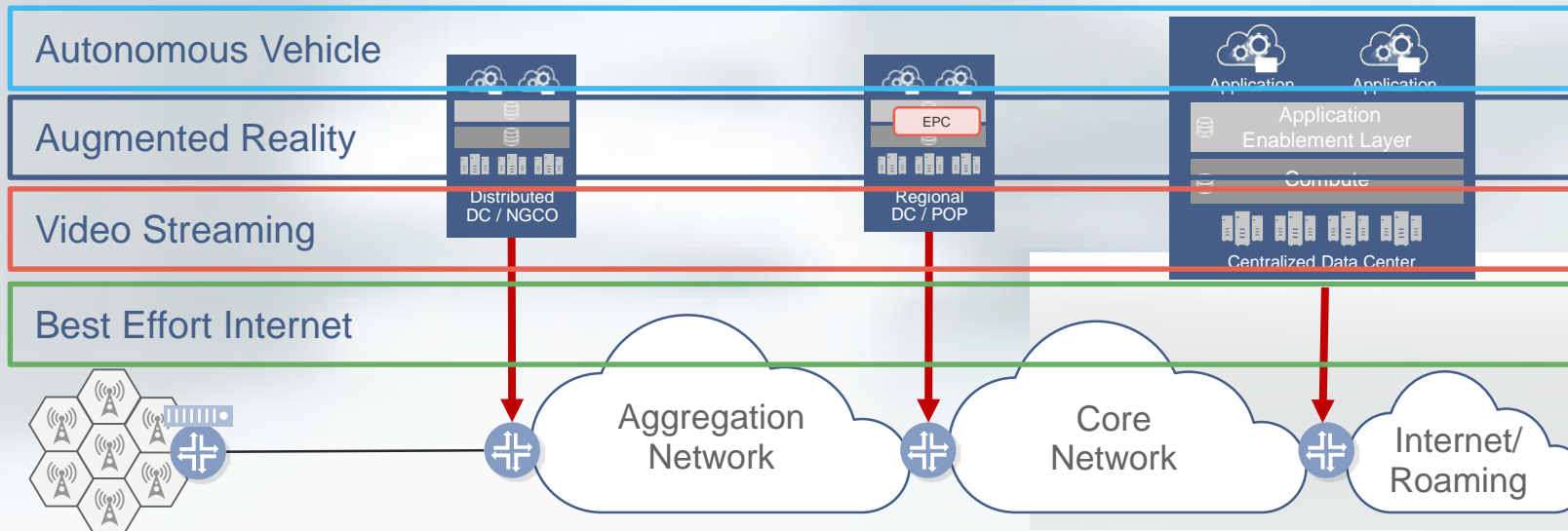
- Per use case radio with QoS
- Per UE slice selection

Edge/Core

- C- and U-plane separation/slicing
- QoS per use case / service / UE

Service Complex

- SDN controlled overlay
- Multi-tenancy
- Dynamic policy-based chaining
- Virtual network functions
- Dynamic segmentation per use case and per user



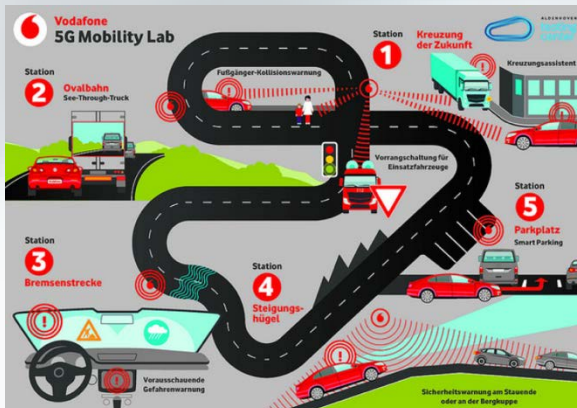
Underlay Infrastructure

- L2 and L3 VPNs
- QoS
- Multi-layer topology-based service LSPs
- Platform (router) disaggregation
- Optical integration
- Security

Vodafone 5G Mobility Lab

Aldenhoven Germany

- Facility to develop & test automotive applications, where low latency & security are key requirements
- Juniper deploying MEC into the site using SDN automation, virtual security and ETSI MEC compliant MEC Server



Satellite Applications Catapult (SAC) 5G Test Bed

Buckinghamshire UK

- Test Bed enables collaborative projects on 5G Use Case development, such UK Government Dept. Digital Culture Media & Sport (DCMS)
- Juniper has been selected to provide:
 - **SDN Controller** – Automation of MEC & Telco Cloud VNF Connectivity: **CONTRAIL CLOUD**
 - **Orchestration** – Orchestration of MEC & Telco Cloud VNFs: **Contrail Service Orchestration**
 - **SecGW & MEC Edge Security**: Provision of Base Station IPsec and Edge Security **vSRX**
 - **Routing**: Connectivity across IP & Optical layer: **MX & ACX** as IP Access Network (Cell Site, Hub Site and Core site routers)

