



# Digital Marketplaces Using Novel Infrastructures

**Rodney G. Wilson**  
Chief Technologist, Research Networks



# Ciena portfolio

## Converged packet optical

Monetize and optimize bandwidth with scale, agility, flexibility and openness. Award-winning WaveLogic Photonics and packet/OTN switching accelerate service delivery.



## Packet networking

Best-in-class packet-based products offer edge to core service delivery and aggregation with a common Service-Aware Operating System (SAOS) to differentiate and decrease time to revenue.



## Automation software & services

Automate services and deliver a relevant and valuable user experience—from service creation to orchestration and delivery across both physical and virtual domains.

blueplanet®

## Network mgmt. & planning

A customizable dashboard, service template, and proactive fault isolation make network management easy. Both the NOC and end-customer can visualize service performance data along with analytics and planning tools to ensure SLAs are properly met.

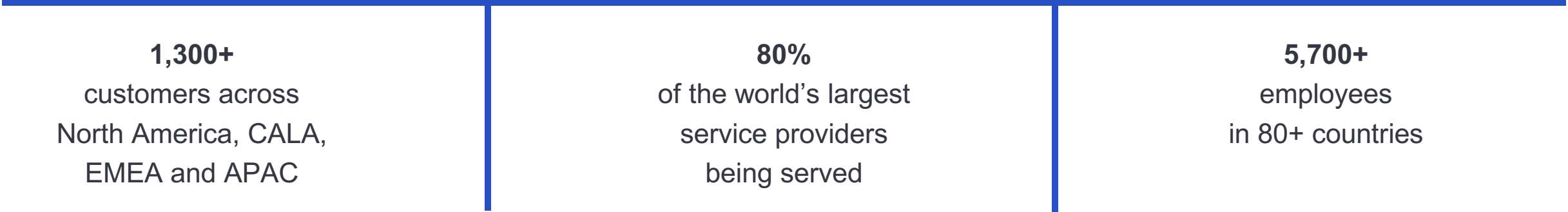


## CIENA SPECIALIST SERVICES

An extensive team of specialists, flexible resources, and customized analyses to maximize your network investment.

## We're a network strategy and technology company

We focus on inspiring and enabling rewarding experiences that lead to exceptional outcomes.



# ENCQOR

## Canadian 5G Novel Infrastructure Innovation Project

*Confidential information – For discussion only – No obligation on the parties*



DIGITAL INFRASTRUCTURE  
GROWTH  
ICT ADOPTION  
INNOVATION  
COMPETITIVENESS  
COLLABORATION & PARTNERSHIP

### ENCQOR

Evolution of Networked Services through a Corridor in Québec & Ontario for Research and Innovation

**PARTNERSHIPS THAT FUEL INNOVATION FOR STRONGER  
NETWORKS & SMARTER COMMUNITIES**

# 5G Broadband Networks Testbed



A MAJOR  
ONTARIO / QUÉBEC / CANADA  
COLLABORATION PROJECT

A MAJOR INVESTMENT  
IN INNOVATION  
**400 M\$**  
OVER 5 YEARS IN THE DIGITAL  
TECHNOLOGIES SECTOR

50-50 Public Private Partnership

## Synergy & Collaboration Digital Ecosystem:

- 1,000 SMEs
- 18+ Institutions
- 800 Students
- 10's Organizations (NPO)
- National & Int'l links (Eureka, FIWare, GENI)

## Target SP/Operators



SMART CITIES   E-ENERGY   PUBLIC SAFETY   E-HEALTH   CONNECTED EDUCATION   E-TRANSPORTATION   E-MANUFACTURING



### Disruptive Technologies

- 5G
- Open Programmable Networks
- Next Gen Components
- IoT
- Cloud Services
- Big Data Analytics
- Cyber Security

**ciena.**

Wired  
Broadband Solutions

**ERICSSON**

Wireless  
Broadband Solutions

**IBM**

Components for  
Next Generation  
Networks

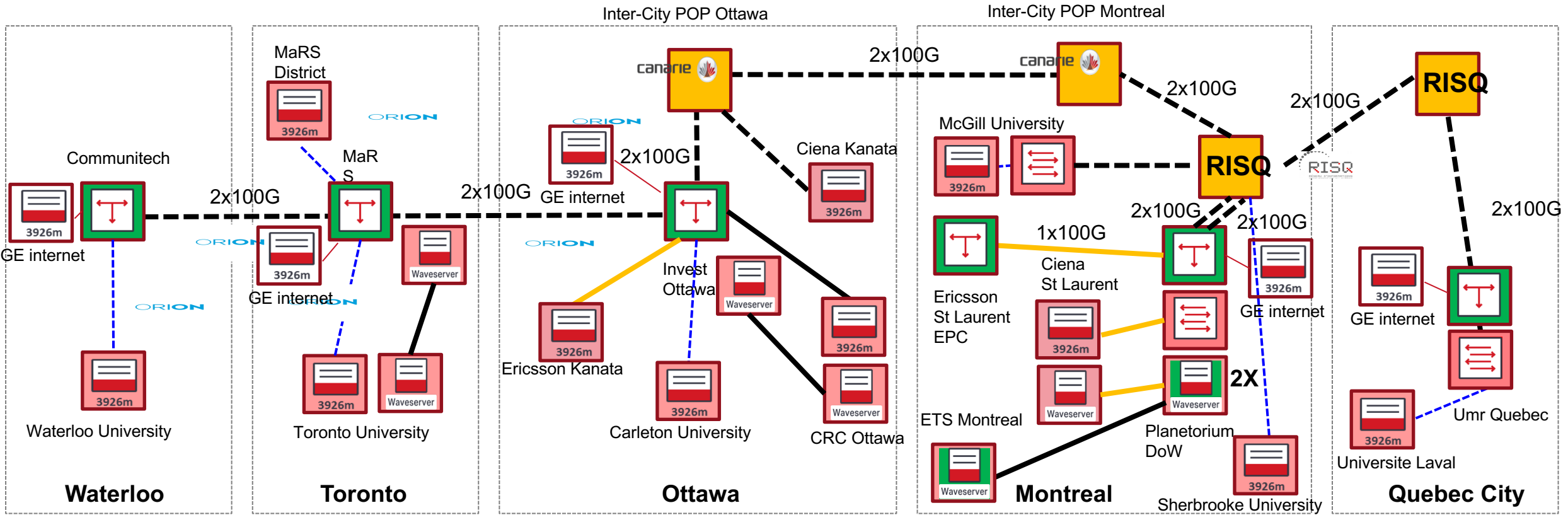
**CGI**

Smart Grid  
Services

**THALES**

Smart Cities and  
Smart Mobility

# ENCQOR Topology – 5G Innovation Platform



## Academic Satellite Sites



Colo Optical Inter-city : CANARIE & RISQ



Innovation Sites : 6500-T12 Packet OTN



5170

Industry / Academic Partnership Satellite Sites



5170

## Services over dark fiber, managed service view

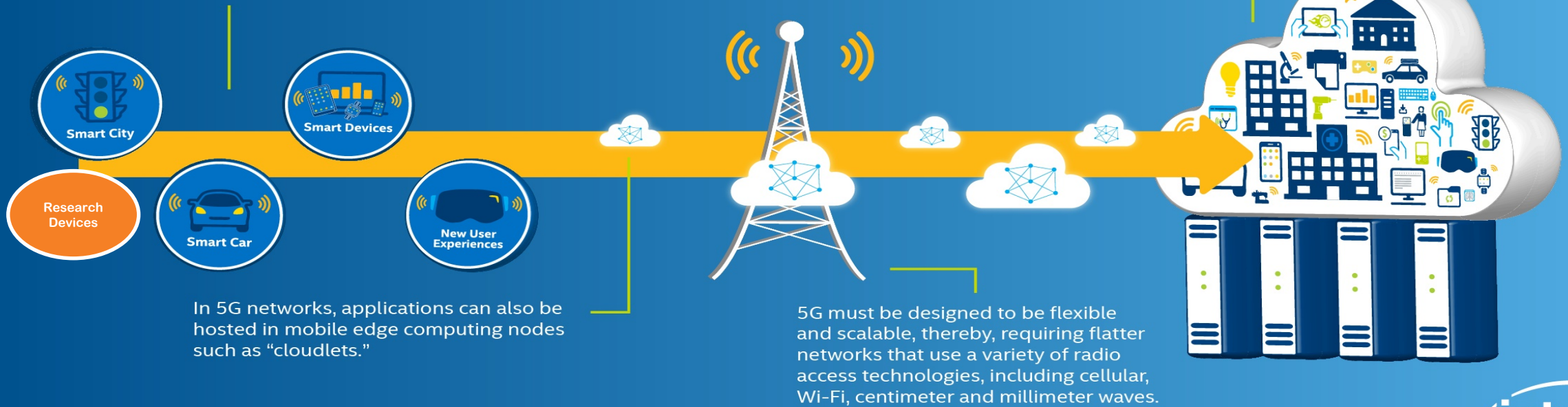
- Private build – dark fiber (mx10GE to 100G/200G for Waveserver)
- Private build – dark fiber to Industry / Academic Partnership Sites (to be secured)
- R&E backbone (mx100G OTU4/wavelength to future WLAI)
- R&E access (2 x 10GE Ethernet Private Line initially)

# 5G: FROM DEVICE TO DATA CENTER

By 2020, 50 billion smart devices are expected to be in use.\* 5G will help support the massive growth in the Internet of Things and enable devices to communicate with each other seamlessly through the convergence of mobile communications and computing. 5G networks will also diffuse intelligence across the entire network, from the device to the data center.

Using fast wireless connection to cloud computing and data services, and to other connected devices, 5G will enable a variety of new capabilities, user experiences and devices such as self-driving cars with built-in intelligent traffic routing, improved city infrastructures, intelligent machines and sensors, augmented reality and more.

5G's combination of high-speed wireless communications and efficient cloud computing means that even the tiniest devices can access virtually unlimited computing power.



In 5G networks, applications can also be hosted in mobile edge computing nodes such as “cloudlets.”

5G must be designed to be flexible and scalable, thereby, requiring flatter networks that use a variety of radio access technologies, including cellular, Wi-Fi, centimeter and millimeter waves.

© Intel Corporation  
\* Cisco Global Cloud Index: Forecast and Methodology, 2013–2018 (white paper).



# Discussion

