CENGN Annual Report

MEMBERS

CISCO

EWA
Enabling a More Secure Future

EXFO

FUJITSU

Invest Ottawa | Investir Ottawa

JUNIPER NETWORKS

NOKIA

ROGERS

TELUS

VIAVI

WIND

zayo

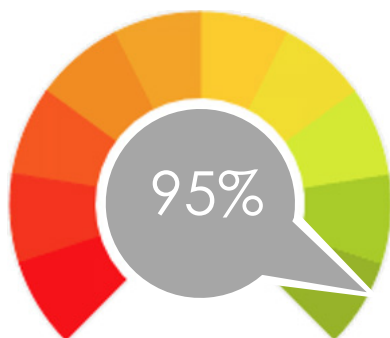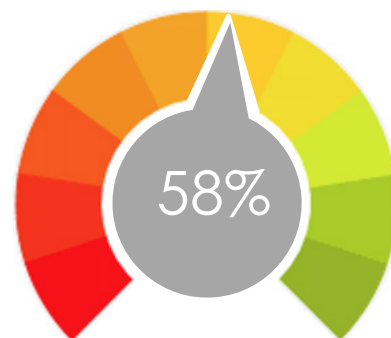# Our Vision

Canada's Centre of Excellence in Next Generation Networks (CENGN), is a national not for profit consortium of industry, academic and research leaders dedicated to accelerating the commercialization of next generation communications solutions.

CENGN's vision is to ensure Canada is a leader in Next Generation Networking (NGN) and to create an ecosystem to accelerate the growth of Canadian Information and Communications Technology (ICT) companies.
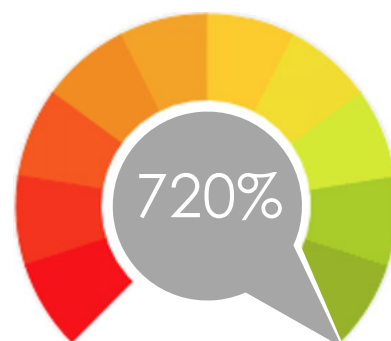
Key Performance Indicators

Members/Partners
19/20

95%

SME's
7/12

58%

Students
28/26

108%

Training
216/30

720%

CENGN

Table of Contents

Letter from the Chairman

Welcome to the second annual report of CENGN. This report covers our first full year of operations and as you read it I am sure you will discover the enormous progress that has been made towards the objectives that we set out in our application to Networks of Centres of Excellence (NCE).

Despite industry consolidation we have grown our membership and have engaged with numerous small to medium enterprises (SMEs) and other organisations. We have built a strong technical and commercial team, and with the generous in-kind support from a number of our members, we have established our Smart Industry Innovation Infrastructure testbed that is central to all of our operations. We have used the testbed to launch and complete our first commercialisation projects by bringing together start-ups and SMEs and our multinational enterprise (MNE) members. It is also with great pride that we can report that the testbed is recognised as one of only 12 global Pharos labs.

A key part of our mission is to train the workforce that will be necessary to support Canada's leadership in the revolution that is occurring in the industry. Our internship program is central to our operations and extremely popular with students, the majority of whom have found subsequent employment in the sector. As an Open Networking Foundation (ONF) certified SDN training and certification partner we are well placed to support our industry members and partners as they look to reskill their workforce.

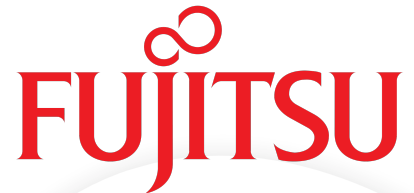I invite you to read this report and see what CENGN has achieved and share our progress towards being a global centre of excellence in next generation networks.

Mike Scott, Chairman of the Board

Members

CISCO   EXFO   FUJITSU

Invest Ottawa | Investir Ottawa   JUNIPER NETWORKS

NOKIA   TELUS

Tier 2

EWA   ROGERS   VIAVI

WIND   zayo

CENGN

5

Partnerships

Partners

Industry Associations

CENGN

Government and Other Organizations

Canadian digital media NETWORK

Canada

COMMUNITECH

IEEE Canada

Mitacs

MaRS

NCE RCE
Networks of Centres
of **Excellence** of Canada | Réseaux de centres
d'**excellence** du Canada

Ontario Centres of Excellence
Where Next Happens

Ottawa

Ontario

wavefront

Research Networks

canarie

cybera

SAVI

Academic

UNIVERSITY OF ALBERTA

ALGONQUIN COLLEGE

UNIVERSITY OF CALGARY

Carleton UNIVERSITY

DALHOUSIE UNIVERSITY

GEORGIAN COLLEGE

McGill

RYERSON UNIVERSITY

UNIVERSITY of GUELPH

UNIVERSITÉ LAVAL

UNIVERSITY OF TORONTO

uOttawa

University of Victoria

UNIVERSITY OF WATERLOO

YORK UNIVERSITÉ UNIVERSITY

CENGN

Letter from the President

Technology is always evolving and it is expected that new innovation will constantly be redefining the ICT industry. However, over the last year we have seen a rise in disruption, as open standards and software play an increasingly significant role in the sector. There has been an unprecedented number of mergers and acquisitions among the industry giants including CENGN members BTI Systems being acquired by Juniper Networks, Allstream being acquired by Zayo and of course the acquisition of Alcatel-Lucent by NOKIA.

With disruption comes opportunity and I am pleased with the many successes CENGN has had over the last year. We have added two new industry leaders to our consortium, Fujitsu and WindRiver and our partnerships have grown to include IXIA, Kontron, Canonical, Empowered, Inocybe Technologies, and Willis College.

In 2016, we deployed our CENGN Smart Infrastructure testbed (CSI). The CSI includes a Data Centre and wide area network (WAN) that runs a production grade OpenStack environment with software-defined network (SDN) controllers and a variety of hardware from Cisco, Juniper, Fujitsu, Nokia, Accton, Quanta, SuperMicro and Kontron. The industry is moving very quickly and the platform is continually being updated to ensure it is truly next generation. The CENGN architecture is a Hybrid Model based on ETSI network function virtualization infrastructure (NFVi) standards and Open Source. It is multi-vendor by design, and can continually evolve and integrate different products and service depending on the requirement of the SME and researchers. The CSI is used to execute CENGN Member/SME proof-of-concepts (PoC), testing, and validation. The CSI can support multiple industry testbeds in the areas of 5G/Wireless, Smart City, Cybersecurity, Public Safety, and others.

CENGN and our members are experts in SDN, Network Functions Virtualization (NFV), OpenDaylight, and multi-vendor software. We are utilizing this expertise and our Smart Industry Innovation Infrastructure testbed to enable industry innovation, collaboration and validation. To date we have engaged with over 400 SMEs nationally, and we have executed numerous Proof of Concepts including: Noviflow-Telus – Integration of an Open Source Software-Defined Router in the Cloud, Corsa-BTI Systems – Multi-site Multi-Domain Data Centre Capacity Management, Expeto-CENGN – Scalable Virtual EPC Deployed in Seconds, Juniper Networks-Inocybe Technologies - Open Smart Infrastructure and Services.

The move from hardware to software dominated networks is creating significant changes in the skill sets required by the ICT industry. CENGN, an ONF certified SDN training and certification partner, is trying to fill this skills gap and to date we have trained and certified over 250 students, industry and government professionals. To offset our student training and internship costs, CENGN successfully partnered with the Ontario Centres of Excellence (OCE), and Mitacs on programs that enable students to work on CENGN technology projects both on-site and at industry member locations.

We also launched our testing and consulting services. For a fee, companies gain access to the CSI and multi-vendor equipment, a cloud infrastructure/high speed WAN and expertise that they could otherwise not afford. Likewise, larger companies can de-risk their development/ testing activities by using CENGN's lab first and working with our membership, before deployinging new technologies in their own production environments.

We have also made great strides to ensure that CENGN is an International Centre of Excellence. We have built strategic partnerships with key organizations and international media and analysts. Last year, we became a member of the ONF, ETSI, and are listed in the company directory on the website of SDX Central – the premier news source for next-generation networking technology. We were also the world's first associate member of the Linux Foundation's OPNFV collaboration project focused on accelerating NFV's evolution through an integrated, open platform. Our membership with OPNFV has resulted in CENGN deciding to host an OPNFV Pharos Test Lab with our member Cisco Systems and Kontron, a German equipment company. The lab is one of only 12 Pharos labs in the world. These labs are leveraged to develop, integrate, and validate new NFV and NFVi solutions. The CENGN Pharos lab will establish our (and Canada's) reputation as a serious powerhouse in NGN, by providing NFV testing infrastructure in Canada that is critical for the success of the OPNFV platform, and the NGN industry in general.

Over the last year we have been featured in over 50 media articles and attended and spoke at numerous tradeshows and conferences with our marquee event being the SDN & OpenFlow World Congress in Germany. CENGN was a technology sponsor at the event and we had two speaking slots and booth space. In an effort to showcase Canadian technology we utilized the booth to promote Canadian SMEs and to showcase 2 live PoCs and 3 project overviews supporting SMEs in promoting their products in a live environment to potential customers, and building Canada's brand as a world leader in SDN/NFV technology. The 2 live PoCs were finalists in the ONF SDN Solution Showcase. This provided the companies that we featured in the PoCs – Corsa/BTI, Expeto, CENX, NoviFlow, an opportunity to bring potential customers to our booth to see their PoCs.

I am looking forward to the upcoming year, as we look to extend our "CENGN Smart Infrastructure" which is open and inclusive, first across the province and then across Canada. The platform can dynamically and securely accommodate a myriad of projects, PoCs and testbeds, providing an opportunity to ensure that Canada and Canadian companies are global leaders in the commercialization of relevant transformational technologies.

Ritch Dusome, President and CEO

CENGN's Team

Executives

Ritch Dusome, President and CEO

Ritch has held this position since the inception of CENGN, bringing with him over 28 years of Data Centre, Networking and Internet Experience working at a variety of companies including; CENGN, Cisco, Bell Canada, TD Bank.

Michael Weir, VP of Technology and Operations

Michael has been operating, selling and researching network related products and services for the past 20+ years, holding senior technical, sales and management positions with Cisco, Alcatel-Lucent, Communication Test Design Inc., Huawei Enterprise and Bell Canada.

Kelly Daize, VP Business Development and Marketing

Kelly has over 15 years of experience in both technology companies and not-for-profit organizations. She has successfully won and managed large government programs, and has a proven track record working with all levels of government.

Bhavani Krishnan, VP Program and Product Management

Bhavani has over 25 years of experience in both the Telecom Services sector with Bell Canada, and Product Management at Cisco, and is recognized in the industry for her leadership skills, technical savvy, and business acumen.

Chris Charlebois, Director of Finance

Chris brings over 20 years of experience in various management positions in the high tech industry. Prior to joining CENGN, he held CFO positions at LPI Level Platforms and Magor Communications Inc.

CENGN

Students

Every year at CENGN we bring in approximately 40 of Canada's most tech-savvy student interns in the fields of product management, marketing and engineering. Students are involved in various industry led projects and gain real world experience on cutting-edge technology. The students who work at CENGN, or at our members facilities, are provided a robust training program. Last year CENGN trained and certified 216 students in next generation networking technologies (SDN, NFV, ODL, OpenSource). CENGN also hosts international students and internships from the OPNFV. CENGN is growing a talent pool that will ensure that Canada keeps pace with industry demand and continues to grow the Canadian Digital Economy.

Student Interns take ODL Training from CENGN Partner, Inocybe Technologies

"I have been given an opportunity to build a next-generation network, from the ground up, that will be the base for developing and testing so many leading-edge technologies from really cool companies across Canada – it's really exciting!"

– Ochuko, Junior Software Engineer (Former CENGN Co-op Student)

Board of Directors

Sam Bucci
Vice President & General Manager,
IP Transport Division and SDN Networking
NOKIA

Sandra Crocker,
Associate Vice-President,
Strategic Partnerships and Operations,
Carleton University

Code Cubitt,
Managing Director,
Mistral Venture Partners

Ritch Dusome,
President and CEO,
CENGN

Robert Fitts,
Director,
Corporate Development
EXFO Inc.

Joe Hickey,
Board Member,
Independent

Rob Keates,
Manager of IP/Optical Standards,
TELUS

CENGN

Blair Patacairk,
Managing Director,
Invest and Trade,
Invest Ottawa

Michael McCallen,
PLM Director Virtualized Intelligence
(EtherASSURE & Smart SFPs)
VIAVI

Mike McGann,
Director,
Wealth Management,
ScotiaMcLoed

Matt Pearson,
Ottawa Leader,
SR & ED and Business Incentives,
Ernst & Young

Mike Scott,
Chairman

Deborah Weinstein,
Lawyer,
LaBarge Weinstein LLP

Peter Wilenius,
Vice President,
Business Development,
CANARIE Inc.

Steven Wood,
Principal Engineer,
Enterprise Solution Architect,
Cisco

SDN and Openflow World Congress -Snapshot

CENGN attended numerous international events, the focus being on the SDN & OpenFlow World Congress in Dusseldo
Government's Canada Trade Commissioners to bring attention to two live demonstrations involving Canadian SMEs. B
Showcase, resulting in media outreach (Telecom TV).

Bhavani Krishnan, CENGN's VP Program and Product Management, and Ryley Mackenzie, Expeto Wireless' CEO, showcase their live "Scalable Virtual EPC Deployed in Seconds" Proof-of-Concept

Ritch Dusome, CENGN's President & CEO, explores CENGN Member Juniper Networks and CENGN Partner Inocybe's "Open Smart City Infrastructure and Services" Proof-of-Concept

"We had lots of interest in our new products which were demonstrated at 2 different booths, and this led to two customer leads for new business. We expect to land revenue from at least one of them in Q2 2016."

Ottawa Member, BTI Systems – Re: BTI – Corsa PoC

orf Germany. We worked with the Federal
Both were finalists in the ONF SDN Solution

SDN & OpenFlow World Congress 2015
Directory of Canadian Companies

cture and Services

) and Inocybe (CENGN Partner)

r programmable infrastructure
onment, followed by a real

strate networks leveraged

to different market

ment, security etc.

ENGN Partner

YBE
LOGIES

GN Member

Per.
ETWORKS

CENGN   ONTARIO
CANADA

Government of Canada   Gouvernement du Canada
Trade Commissioner Service   Service des délégués commerciaux

Government of Canada   Gouvernement du Canada
Trade Commissioner Service   Service des délégués commerciaux   ONTARIO   CENGN
CANADA

Alcatel-Lucent Cloud retweeted
CENGNCanada @CENGNCan... 41d
A glimpse of Vitrage,
@ALU_Cloud's root cause analysis
#opensource project, at #layer123's
World Congress
pic.twitter.com/NAGkJHvvZp

HPE NFV retweeted
CENGNCanada @CENGNCan... 41d
"ETSI NFV ISG started with 70
co's... there are now over 240"
Prodip Sen of @hpnfv #layer123
pic.twitter.com/0pIP26uByl

"Very relevant with many business development opportunities."

Ottawa SME, Corsa Technologies, Re: BTI – Corsa Poc

CENGN Smart Infrastructure

One Smart Industry Innovation Infrastructure for Internet of Things (IoT), Healthcare, 5G/Wireless, Smart City, Public Safety, and Cybersecurity testbeds.

CENGN's Smart Infrastructure is open and inclusive and can securely and dynamically accommodate a myriad of projects, PoCs and testbeds each running on their own customized Cloud. The architecture is based on ETSI NFV standard-NFVi with an Openstack based production environment with a flexible deployment tool that allows on-demand creation of Cloud infrastructures. It is multi-vendor by design, and can continually evolve and integrate different products and services depending on the requirement of the SME or researcher.

The infrastructure also includes access to a real-world WAN and Optical Transport Network (OTN) deployed and managed using innovative SDN technologies. The network includes both dark fibre and Optical wavelength connections (100G+) enabling SMEs and researchers to perform proof-of-concept tests on a 'live' high bandwidth WAN.

The CSI is used to execute PoCs, and perform testing. The CSI can support multiple industry testbeds in the areas of 5G/Wireless, Smart City, Cybersecurity, Public Safety, and others.
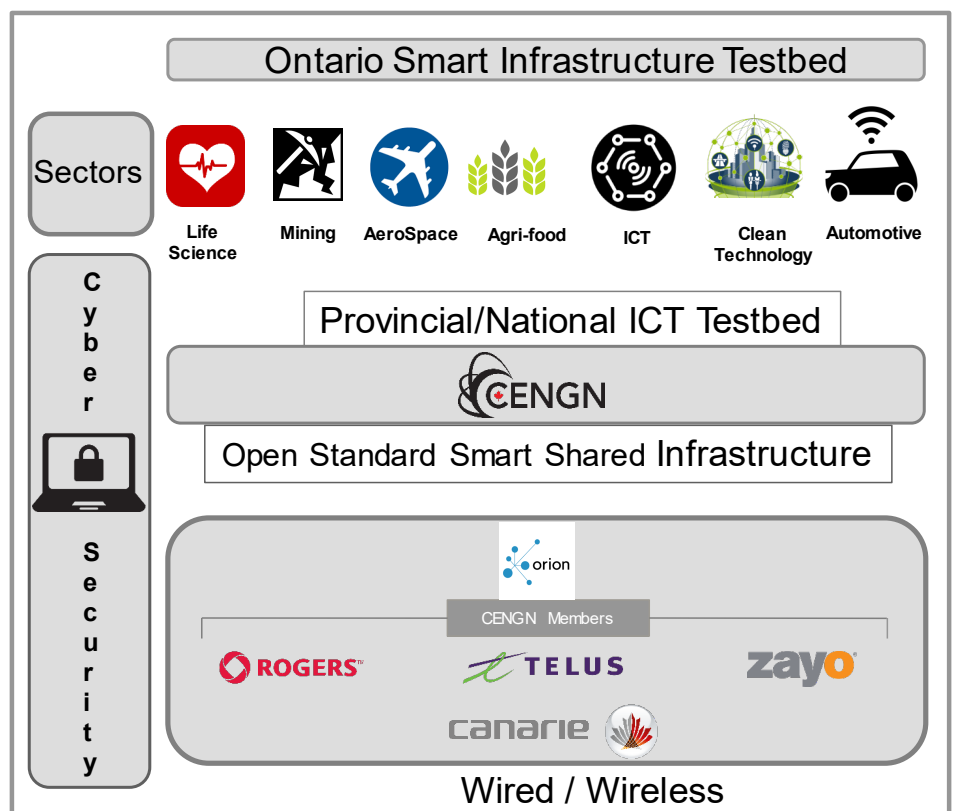
Highlights of 2016
Commercialization Projects

CENGN launched a successful first call for commercialization projects, and received over 100 submissions from SMEs across Canada in all of the member-defined project areas. Projects were heavily promoted through marketing collateral, at key global events, online via CENGN's website and social media channels, and media partners.

The following pages will highlight the projects listed below:

1. **Corsa-BTI Systems – Multi-site Multi-Domain Data Centre Capacity Management**
This PoC demonstrates the ability of a network under Software-Defined Network control to respond dynamically to elephant flows both on the Packet and Optical Layers.
https://www.cengn.ca/2015-11-05-cengn-demo-bti-corsa-web/

2. **Expeto-CENGN – Scalable Virtual EPC Deployed in Seconds**
This PoC demonstrates a revolutionary method for rapidly deploying and managing an end-to-end, cloud-based LTE core network.
https://www.cengn.ca/2015-11-05-cengn-demo-cengn-expeto-web/

3. **Juniper Networks-Inocybe Technologies – Open Smart Infrastructure and Services**
This PoC showcases a complete end-to-end Smart City programmable infrastructure and network including management and services, initially in a lab environment, followed by a real world pilot project.
https://www.cengn.ca/projects/proof-of-concepts/juniper-inocybe-smart-city/

4. **Noviflow-Telus – Integration of an Open-Source Software-Defined Router in the Cloud**
In this PoC deployment, CENGN teamed up with our members TELUS and Noviflow, to deploy the Atrium SDN stack in CENGN's OpenStack-based cloud infrastructure.
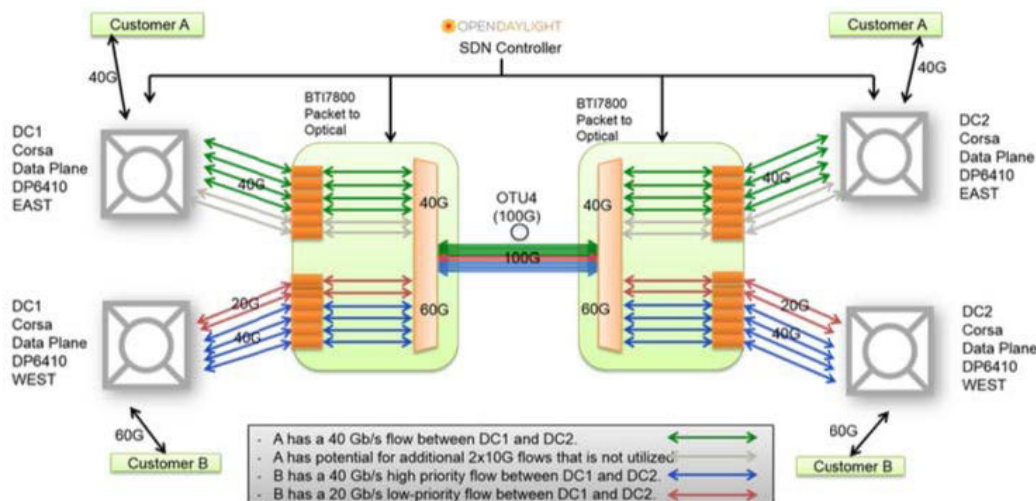https://www.cengn.ca/telus-noviflow-proof-of-concept-webinar-whitepaper/

Multi-Site Multi-Domain Data Center Capacity Management
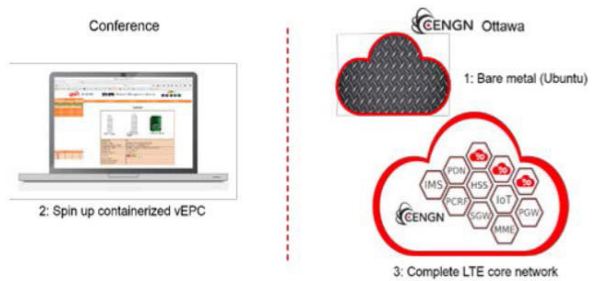
Company	Device/Network
CORSA	DP6410 Data Plane (Qty 2) located 1 each at Ottawa and Montreal 24x10G, OpenFlow 1.3, System Version tested 1.2.0 build.
bti	BTI 7802 Intelligent Cloud Connect (Qty 2) located 1 each at Ottawa and Montreal 12x10G, BIC, 100G Coherent Line, NETCONF/YANG, Version tested 2.0.0 18131
canarie	Wavelength: Coherent wavelength runs between Ottawa and Montreal (200+KM) on the CANARIE production network
CENGN INOCYBE TECHNOLOGIES	CENGN (Ottawa) hosted ODL controller. Inocybe Lithium build controls both above and below.
ixia	XM2 chassis (Qty 2) located 1 each at Ottawa and Montreal 16x10GE LC + Ixia Customer running on Windows server at CENGN

Current inflexible networks with connectivity service features tightly coupled with network infrastructure, require operators to configure devices individually, often manually, and to over-provision to handle unpredictable traffic flow. This lack of automation capabilities make it difficult to respond to time-sensitive changes in bandwidth requirements.

This PoC demonstrates the ability of a network under SDN control to respond dynamically to elephant flows both on a Packet Layer and Optical Layer. The demo context is Data Centre VM Migration that is unscheduled and needs to be done immediately.

- A has a 40 Gb/s flow between DC1 and DC2.
- A has potential for additional 2x10G flows that is not utilized
- B has a 40 Gb/s high priority flow between DC1 and DC2.
- B has a 20 Gb/s low-priority flow between DC1 and DC2.

Scalable Virtual EPC Deployed in Seconds

Company	Device/Network
Expeto	EPIC (Evolved Packet Core Integrated Cloud) solution, Web UI 2XeNodeB, UEs
CENGN	vEPC hosted in CENGN Data Centre
octasic	eNodeB
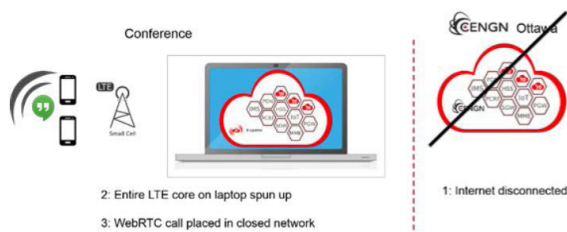
To successfully compete and grow their subscriber base in a highly penetrated market, mobile network operators (MNOs) need to be agile and flexible. This means they have to be able to deploy, manage and scale their networks quickly and with precision, as well as roll out targeted services faster than their competitors - all while coexisting with legacy networking infrastructure.

Metro mobile networks that rely on Evolved Packet Core (EPC) technology are limited by their inflexible architecture and geography, and do not easily accommodate on-demand subscriber growth, new service offering deployments, or sudden changes like natural disasters.

This PoC demonstrates a revolutionary method for rapidly deploying and managing an end-to-end, cloud-based LTE core network. This will include the dynamic deployment and enablement of hardware, software and associated SDN/ NFV elements.

Open Smart City Infrastructure

The traditional approach to network deployment is that each service provider builds its own access infrastructure for each client, whether business or residential.

This project demonstrates "infrastructure as a service" through a complete end-to-end smart network infrastructure with a converged ODL controlled multi-tenant network. The Smart City Infrastructure is able to manage numerous service providers that are dynamically operated by a single administrator. Through "Virtual Network Slicing", multiple service providers can independently operate and manage their "Network Slice" using a "Service Provider Provisioning Portal". Smart City tenants can utilize an "end-user self-provisioning portal" to request and obtain on-demand innovative Smart City services with subscriber and application aware policy enforcement.

Company	Device/Network
INOCYBE TECHNOLOGIES	PurePlay OpenDaylight, Infrastructure Controller, Whitebox Switch
CENGN	Hosted in CENGN Data Centre -Smart City Services -Juniper and Inocybe Infrastructure Controller
JUNIPER NETWORKS	Contrail, Contrail service orchestration, vSRX/SRX, vMX, SD-WAN, Service Control Gateway (SCG)

SMART CITY INFRASTRUCTURE
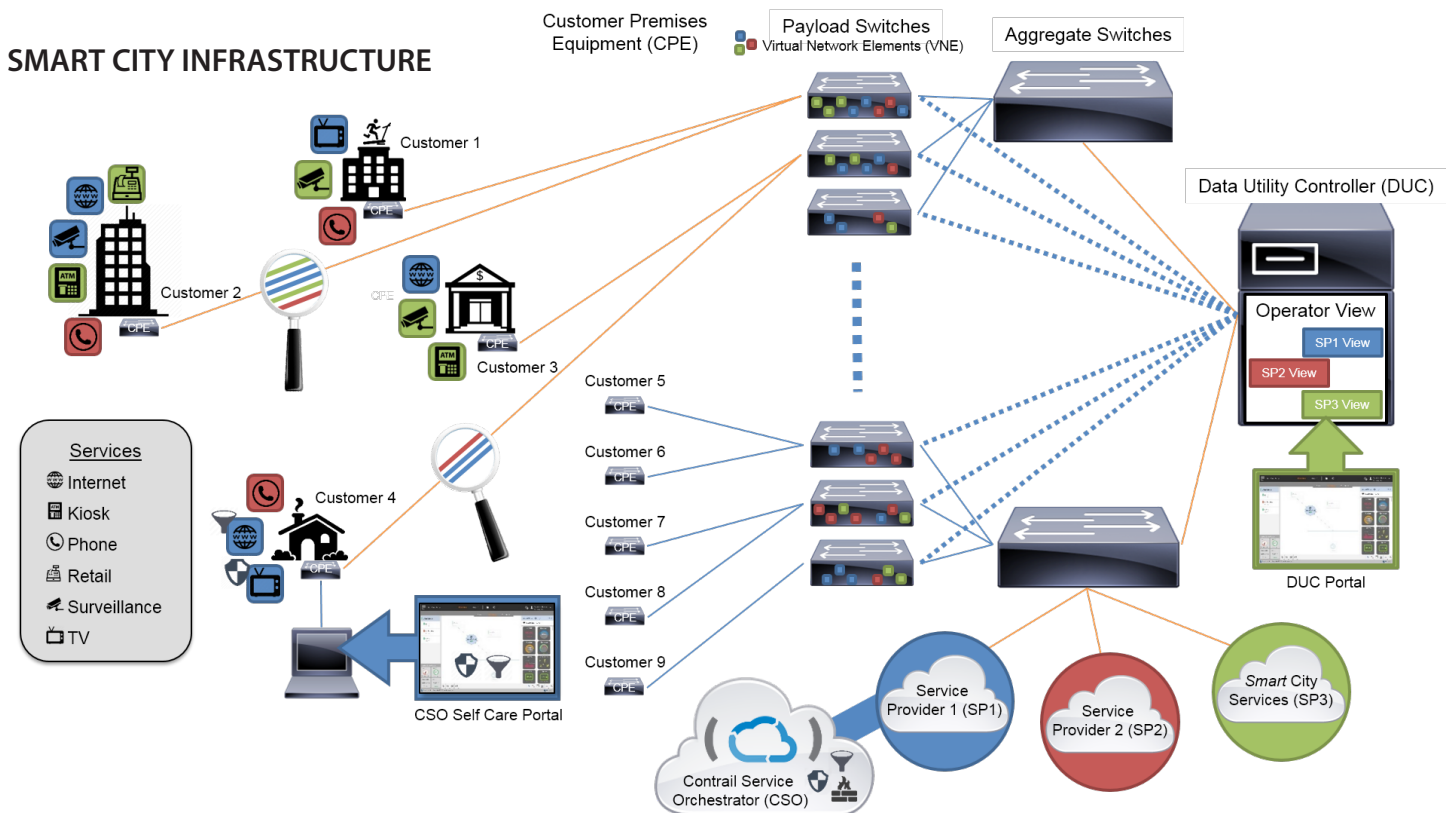
Integration of an Open-Source SD Router in the Cloud

Company	Device/Network
NoviFlow	NoviKit 250 SDN Switch
ON.LAB	ONOS SDN Controller
TELUS	Use Case Definition
CENGN	Cloud Infra for SDN Controller and Application

The Open Networking Foundation (ONF) is a key organization that promotes the adoption of SDN through open standards development. The ONF Atrium project is a first-of-its-kind effort to integrate different open source SDN software to build an end-to-end network solution. CENGN teamed up with our member – TELUS and Noviflow, to deploy the ONF Atrium SDN stack in CENGN's OpenStack-based cloud infrastructure. Noviflow's NoviKit 250 software-defined switch is used as the forwarding plane for the ONF Atrium router. In this PoC demonstration, it was shown that the ONF Atrium SDN stack was able to operate as a BGP router that peered with both software-defined and traditional BGP routers.
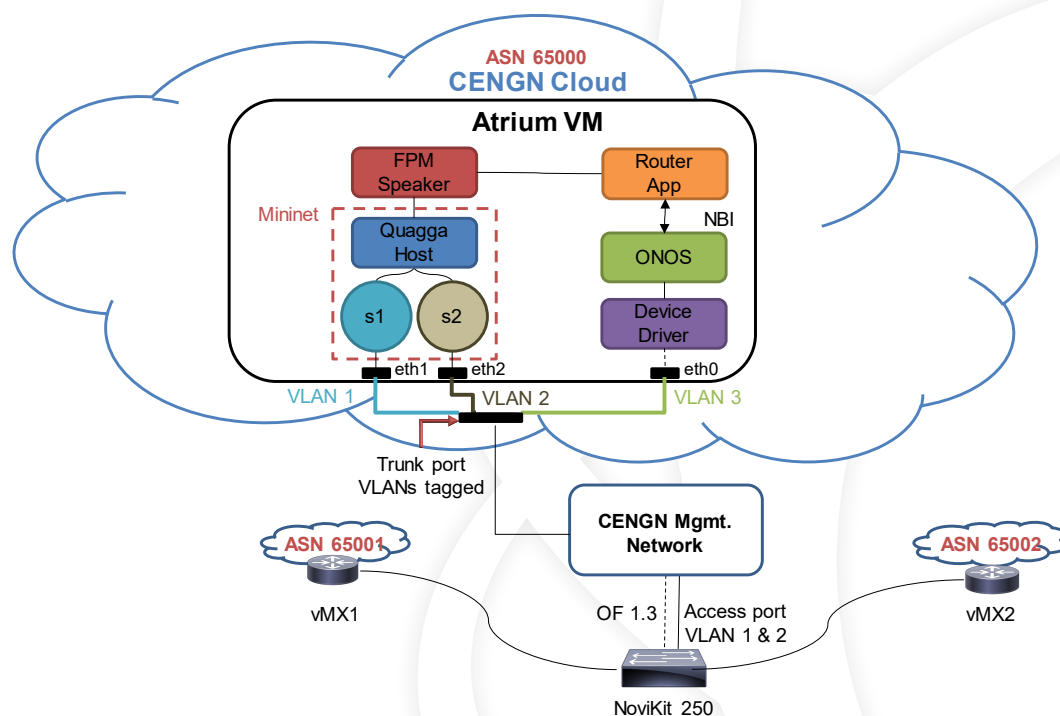
Services

In order to establish Canada as a global leader in NGN, CENGN focuses on accelerating innovation, increasing productivity and facilitating the export of product and solutions for Canadian companies, as well as growing a skilled talent pool through training and internship programs. CENGN services include:

PoC as a service: CENGN leverages its smart infrastructure, consisting of a state-of-the-art data center and WAN, to conduct various PoC projects for validation of emerging NGN solutions. The POC projects include software-defined WAN (SD-WAN), cloud management and orchestration solutions, hybrid network solutions consisting of traditional and virtual networking, and IoT to name a few.

Training: CENGN provides NGN training to corporate employees, students and interested individuals in order to grow the skilled human resource pool in Canada. It also provides first-hand training to students through internship and COOP programs by involving them in various PoC projects at CENGN.
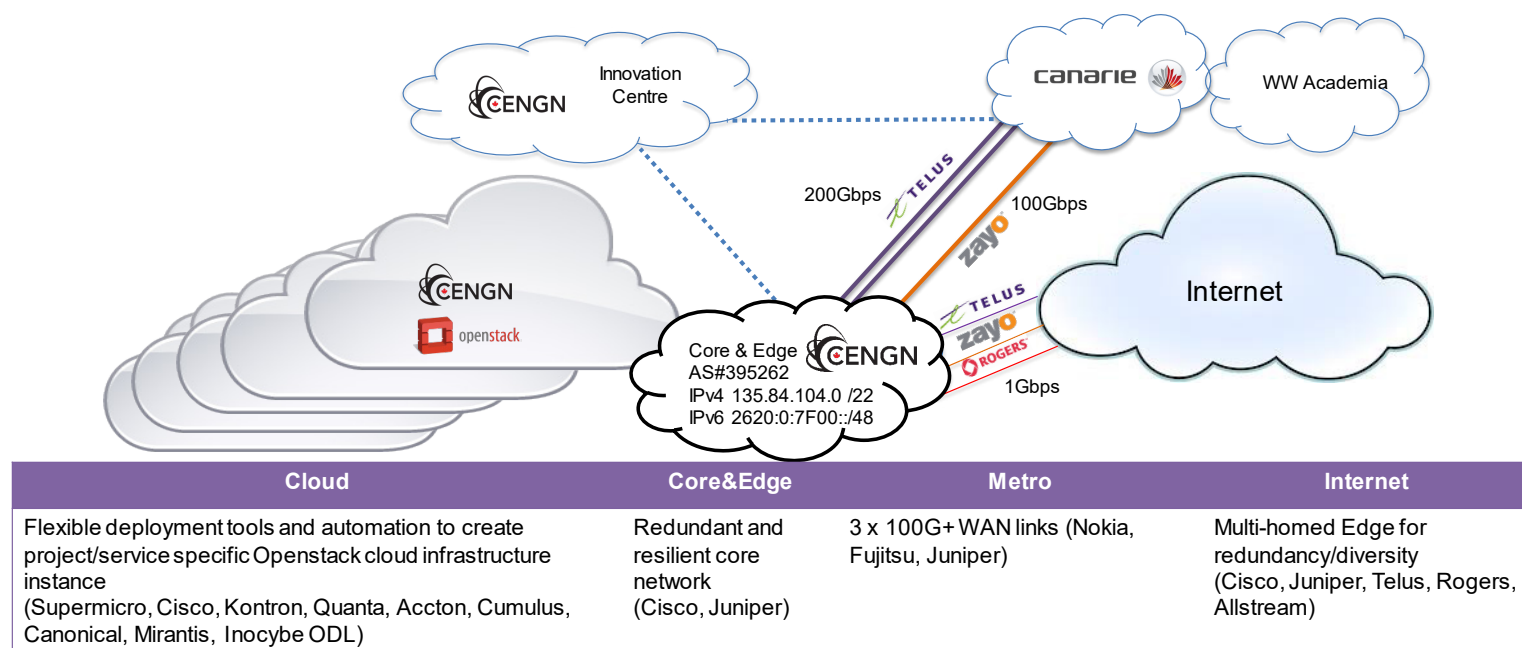
Testing and validation of NFV and SDN services:
- OPNFV Pharos Lab; ETSI-NFV community testbed
- ETSI-NFV architecture compliance test
- VNF interoperability and functional testing
- VNF chaining validation
- SDN controllers and applications validation

Professional consultation:
- Technical services on emerging NGN solutions, e.g., SDN, cloud computing, NFV and IoT
- Business development and commercialization of products and solutions from SMEs and startups

CENGN Smart Infrastructure

Cloud	Core&Edge	Metro	Internet
Flexible deployment tools and automation to create project/service specific Openstack cloud infrastructure instance (Supermicro, Cisco, Kontron, Quanta, Accton, Cumulus, Canonical, Mirantis, Inocybe ODL)	Redundant and resilient core network (Cisco, Juniper)	3 x 100G+ WAN links (Nokia, Fujitsu, Juniper)	Multi-homed Edge for redundancy/diversity (Cisco, Juniper, Telus, Rogers, Allstream)

Training

Moving from hardware to software dominated networks is creating a significant change in the skill sets required by the ICT industry. In fiscal 2016, CENGN continued to leverage its own technical team, and the resources of its members and partners to offer a second to none training curriculum in the latest NGN technologies.

CENGN is an ONF certified SDN training and certification partner. We have trained over 216 students and industry employees and plan to further expand our training to include Juniper and Cisco Certification Academies.

Our courses offer a wide range of both hands-on and in class training to prepare Canada for the latest in Next Generation Network technology:

• SDN training in collaboration with SDN ESSENTIALS
• OpenDaylight (ODL) training and bootcamp in collaboration with its partner Inocybe
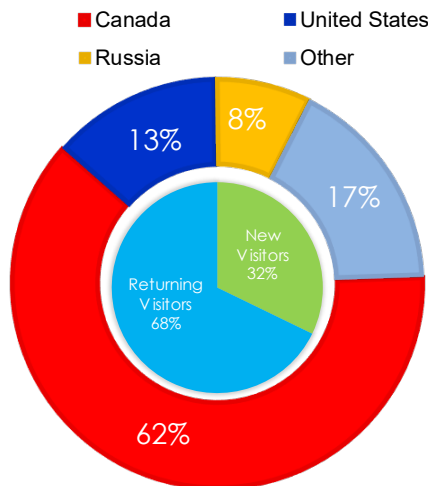• ONF Certified SDN Associate (OCSA) Certification

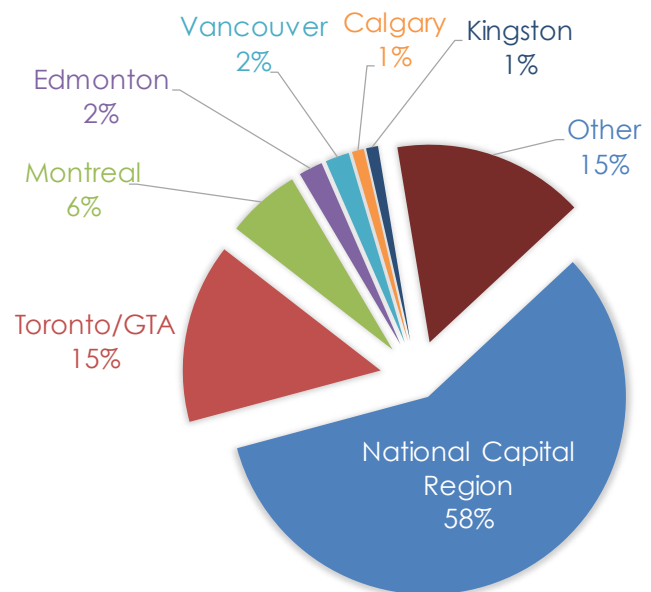Learn more about our training sessions by visiting: https://www.cengn.ca/training

SDN Training for the NRC Canadian Photonics Fabrication Centre

Website and Social Media

WEB PRESENCE BY COUNTRY

Legend:
- Canada
- United States
- Russia
- Other

Canada 62%
United States 13%
Russia 8%
Other 17%
Returning Visitors 68%
New Visitors 32%

India 🇮🇳
China 🇨🇳
United Kingdom 🇬🇧
Japan 🇯🇵
Germany 🇩🇪
France 🇫🇷

CENGN's web presence has developed strong foundations in its first few years. With a web audience spanning the globe and over 1500 twitter followers, CENGN is well on its way to becoming a recognized brand around the world.

WEB PRESENCE IN CANADA

Vancouver 2%
Calgary 1%
Kingston 1%
Edmonton 2%
Other 15%
Montreal 6%
Toronto/GTA 15%
National Capital Region 58%

SOCIAL MEDIA PRESENCE

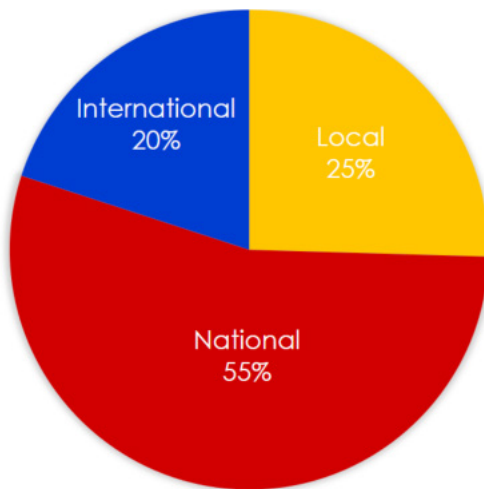
101% increase in followers
Over 1500 Followers
FY2016

CENGN continues to grow its following and to interact with users of Twitter, Linkedin, and Instagram. To expand their web prescence further, CENGN is currently working on creating pages on other web platforms, notably Wikipedia and Facebook!

CENGN

NEWS SOURCES

To date, CENGN has appeared in the news over 50 times, having been featured in articles from a variety of local, national and international news sources

"Given the highly dynamic nature of CENGN's lab and network, due to the various projects being simultaneously performed by our fast-growing list of members, partners and SME clients, it is vital to have visibility into the lab and network performance at all times," said Ritch Dusome, CEO of CENGN.

July | Light Reading

"CENGN is kind of a cross between an open source group working on network functions virtualization (NFV) code and a non-profit advocate to help businesses in Canada."

November | SDxCentral

"CENGN has the ability to open doors quickly, key for a start-up company like ours," says David Whittaker, Product Manager at Corsa. "In a very short timeframe we were able to install our equipment in their lab, connect to the CANARIE 100 Gbps research network and partner with an established player like BTI to demonstrate the successful application of technology in a real-world environment. Having that calibre of partners and first reference customer gets you noticed when you start selling this gear to big global customers."

March | Ottawa Business Journal

"CENGN joined OPNFV as the first Associate member. Open to academic and nonprofit organizations that are passionate about helping to accelerate open source NFV, Associate membership requires significant technical contributions to the project."

November | OPNFV

Past Events

2015

Apr. 16	April 27 – 28	May 5 – 6	May 5 – 8
Career Fair Kanata North	OCE Discovery Toronto	Wavefront Summit Ottawa	NFV World Congress San Jose, USA

May 11 – 15	May 15	May 18 – 22	May 20
IEEE Symposium Ottawa	MCETECH Conference Montreal	Open Stack Summit Vancouver	Europe Global Export Forum Toronto

June 1 – 3	June 18	June 25	Jul. 16
Canadian Telecom Conference Toronto	OCP Canada Day Ottawa	CENGN AGM Ottawa	SAVI Showcase Toronto

Sept. 27	Sep. 28 – 29	Sep. 29–30	Oct. 30
SDN Symposium Banff	Innovation 360 Gatineau	Cybera Summit Banff, Alberta	TiECon Ottawa

2016

Oct. 12	Oct. 13 – 16	Nov. 4–5	Mar. 14–16
OPNFV Germany, DE	SDN and Open-Flow World Congress Germany, DE	OPNFV Summit Dallas, Texas	Open Networking Summit Santa Clara, CA

CENGN

CENTRE OF EXCELLENCE
IN NEXT GENERATION
NETWORKS

CENGN

CENTRE OF EXCELLENCE
IN NEXT GENERATION
NETWORKS

CENGN Headquarters
555 Legget Drive, Tower A, Suite 600
Ottawa, ON, Canada, K2K 2X3

www.cengn.ca | info@cengn.ca
@CENGNCanada