CENGN Annual Report

FY 2015

June 2015

FOUNDING MEMBERS

Alcatel·Lucent · allstream · bti · CISCO · EWA Enabling a More Secure Future · EXFO

Invest Ottawa | Investir Ottawa · JDSU · JUNIPER NETWORKS · Mistral VENTURE PARTNERS · ROGERS · TELUS

Overview

Canada has a long history of leadership in innovative communications technology. There is a strong research and development base in Canadian companies and universities and talent is readily available, with new and serial entrepreneurs ready to create new products, applications and services

CENGN and our members will bridge the gap between research and commercialization, which is critical to building succesful companies.

Vision

To establish Canada as a global leader in the commercialization of the technologies that will underpin the next generation of converged global communication networks.

Mission

Canada's Centre of Excellence in Next Generation Networks (CENGN)'s mission is to accelerate the commercialization of network technologies and applications and to ensure Canadian companies are leaders in the $5 trillion global IT market. CENGN brings together major players in the global telecommunications sector to provide a unique multi-vendor platform populated with state of the art network equipment, which allows companies and researchers to access a "real world" environment. CENGN will provide firms significant market advantage by accelerating product commercialization and reducing product development time and costs. By developing talent, strengthening existing companies and catalyzing new ones, as well as attracting new investments into Canada, CENGN will also increase sector-related jobs.

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Letter from the President

CENGN (Centre of Excellence in Next Generation Networks) was a concept that originated several years ago by the ICT Telecom Industry leaders in Ottawa. Spurred by a number of megatrends in the industry that will significantly cause business to transform (SDN, NFV, IoT, Mobility, Security), we recognized that Canada will have to embrace these trends and become a leader in innovation.

This idea was translated into a winning proposal from the Canadian Federal Government's Networks of Centres of Excellence CECR program. A key component of enabling the commercialization acceleration of these new technologies is the development of a multivendor, physical and virtualized lab. From the very beginning we embraced a development model that consists of People, Process and Platform.

People: The CENGN team along with its Members and Partners have architected, designed and implemented a Software Defined Network (SDN) OpenStack environment.
Process: CENGN selected to use a combined DevOps and Agile process for the development of the platform and the execution of member projects.
Platform: A vendor-neutral Open Data Centre, WAN and OpenStack environment that will allow projects to run concurrently with automation (NFV, IoT, Mobility and Security).

CENGN's first year has been marked with many early successes. We have grown our consortium to include twelve members and a multitude of partners, we have engaged with over 350 SMEs nationally, we have brought in over 25 students and trained them in SDN, and we have developed CENGN's Common Platform (CCP) - a critical component in launching our first five commercialization acceleration projects. These projects, pursued in conjunction with our members, will be a primary focus for our operations in the upcoming year. From our Canadian roadshow, to our call for project submissions, there has been an overwhelmingly positive response to CENGN and to our activities thus far.

The key to CENGN's continued success is our Members and Partners. It is the synergies achieved from working closely with these companies that have propelled our successes to date. With them, we are well on our way to ensuring that Canada is a global leader in the commercialization of relevant transformational technologies.

Ritch Dusome, President and CEO

Letter from the Chairman

It is a pleasure to present this first annual report on CENGN. Though it is less than a year since we learned that we had been successful in our bid for one of the Networks of Centres of Excellence (NCE) Centres of Excellence for Commercialization and Research (CECR) awards, and we are already making an impact. We have acquired excellent facilities in the heart of the Kanata high tech community, close to many of our members. We have developed a strong governance model and a stellar Board of Directors. We are well on the way to building the technical infrastructure, thanks to generous in kind contributions. We have acquired a strong team and are launching our first commercialization projects.

I look forward to our first full year of operation. I am confident that we have everything in place to increase our membership and become an internationally recognized centre of excellence where researchers, start-ups, small- and medium-size enterprises (SMEs) and multinational enterprises (MNEs) can come together to commercialize technology and build Canada's position as a leader in the communications sector.

Mike Scott, Chairman of the Board

Strategic Objectives

• Establish a globally unique multi-vendor test platform that connects companies and researchers across Canada to state of the art equipment and network facilities and allows them to collaborate on next generation network technologies and virtualized services

• Bring together major equipment providers and service providers to identify and support the commercialization of technologies and services emerging from Canada's research institutions, SMEs and start-ups;

• Build the supply chain between start-ups, SMEs and multinationals and between solution providers and network operators to shorten timelines and focus product development;

• Catalyze the development of new cloud based services in areas strategic to Canada such as healthcare, financial services, energy, resource and environmental protection;

• Train the next generation of communication networks specialists to provide Canada with a highly skilled workforce;

• Build upon the $600 Million federal government investment in CANARIE, a world class fiber optic research network, by enabling companies and researchers to interact on commercialization activities leveraging CANARIE's infrastructure; and

• Monetize the test platform by offering it as a service for validation, certification, conformance and performance testing to SMEs and a facility where organizations such as service providers, financial institutions and Shared Services Canada can independently validate vendor products.

Founding Members

Tier 1

Alcatel·Lucent

CISCO

EXFO

Invest Ottawa | Investir Ottawa

JUNIPER NETWORKS

TELUS

Tier 2

allstream

bti

EWA

JDSU

Mistral VENTURE PARTNERS

ROGERS™

Partnerships

Partners

ixia

EMPOWERED®

INOCYBE TECHNOLOGIES

canarie

Industry Associations

ETSI World Class Standards

ONF OPEN NETWORKING FOUNDATION

OPNFV

sdn central

Government Organizations

Research Networks

Academic

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 Systems, 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 both in the Telecom Services sector with Bell Canada, and in Product Management at Cisco Systems, harbouring a unique talent for managing projects through to successful completion.

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.

Students

CENGN strives to grow a talent pool that is second to none. To date, CENGN has had 25 student placements, with contributions in the fields of project management, marketing and engineering. These placements include seventeen internships and eight co-op placements. Of these placements, two interns and two co-op students stayed on for a second placement after their first term at CENGN while two interns also joined CENGN as full time employees.

The project management team is actively managing CENGN commercialization projects by bringing multi-organizational teams together, creating and delivering status reports and assisting in the procurement of assets. Meanwhile, the product management team is developing CENGN training, testing and consulting services, conducting market research and performing competitive and pricing analyses.

Marketing students participate in the development and production of key marketing collateral and support the organization with marketing communications. They learn to liaise with and actively manage industry relationships and to work cross-functionally with CENGN's members' and partners' marketing departments.

Our engineering students undergo intense and targeted SDN training. They are exposed to cutting edge OpenStack development including Puppet and Mirantis. They also learn best practices in the DevOps methodology.

Board of Directors

Sam Bucci
Senior Vice President & General Manager,
IP Transport Division,
Alcatel-Lucent

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,
Vice President Sales and Marketing,
Christine Walther Communications

Rob Keates,
Manager of IP/Optical Standards,
TELUS

Bruce Lazenby,
President and CEO,
Invest Ottawa

Michael McCallen,
Business Development Director,
Network and Service Enablement,
JDSU

Mike McGann,
Director,
Wealth Management,
ScotiaMcLoed

Dr. 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
and Enterprise Solution Architect,
Cisco

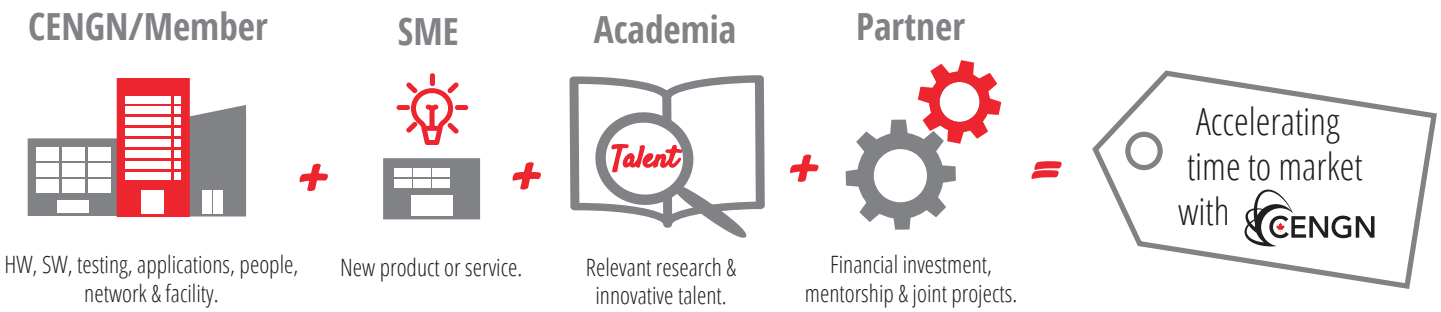
Projects and Services

In fiscal year 2015, the focus has largely been on the commercialization acceleration projects – to ensure that all processes and tools are in place to launch the first 12 projects. In fiscal year 2016, there will begin to be a shift to include and grow the services side of the business.

Commercialization Acceleration

CENGN's model for commercialization is completely industry-driven, focused on finding the best companies to solve real-world problems. The concept of the commercialization projects (as seen in the diagram below), is to combine an SME with a CENGN Member and apply support from Partners and students to accelerate commercialization and create a better product/service. Based on this premise, the CENGN consortium identified seven specific NGN technology areas that require innovative solutions:

- SDN
- NFV
- SD-WAN
- IoT
- Data Centre/ Cloud
- Network Transport
- Security
- Network Applications
- Network Mobility.



Testing and Lab Services

Testing as a Service (TaaS)

Automated provisioning of Test services, including hosting of application under test on a customizable cloud environment with traffic generation and monitoring.

Performance Testing

To evaluate stability, endurance and capacity of your products under variable conditions. Specialization in Virtual Network Functions performance testing across multiple cloud implementations.

Integration and Verification Testing

Functional verification of the product and integration of the product in a virtual environment.

Certification Testing

Including SDN and Security Certifications.

Training

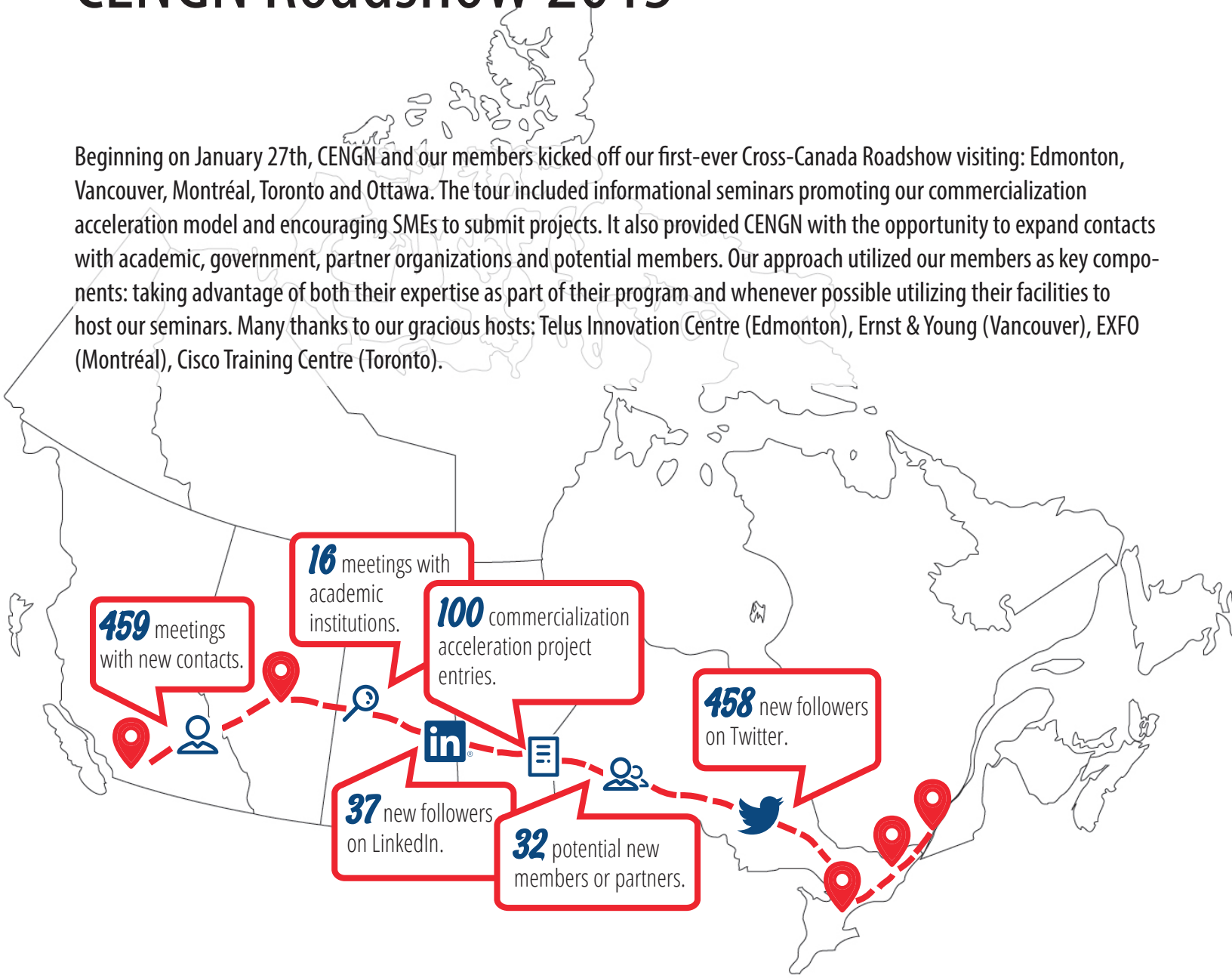
Moving from hardware to software-dominated networks will lead to a significant change in the skill sets required by companies and employees in the sector. CENGN is leading in training this next generation of talent by utilizing its own talented team, leveraging the resources of its members and partnering with best in class companies. CENGN's training curriculum will include both CENGN-developed training and partner-lead training. The first CENGN-branded training on SDN fundamentals will be delivered in Fall 2015. Future training programs will be in the areas of NFV, IPv6, Openstack, Data Centre architecture and DevOps environments.

Consulting Services

CENGN is the go-to organization for up to date knowledge of communications technologies and markets. We leverage the expertise of our staff and members to provide consulting services for clients. Contract our engineering team to accelerate your time to market. CENGN can provide companies with professional resources designed to accelerate the commercialization of products, services or applications through our team of seasoned experts.

CENGN Roadshow 2015

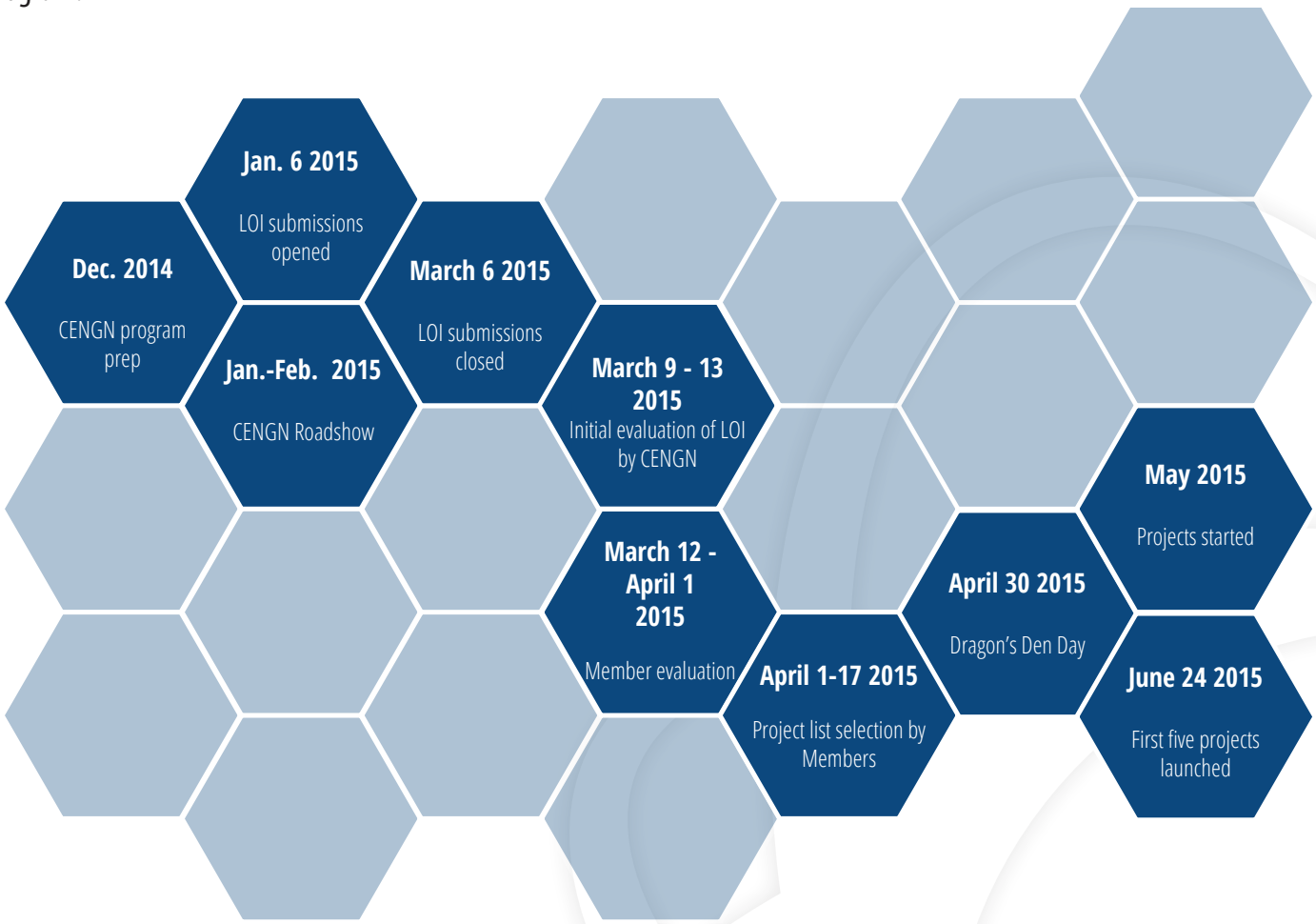
Beginning on January 27th, CENGN and our members kicked off our first-ever Cross-Canada Roadshow visiting: Edmonton, Vancouver, Montréal, Toronto and Ottawa. The tour included informational seminars promoting our commercialization acceleration model and encouraging SMEs to submit projects. It also provided CENGN with the opportunity to expand contacts with academic, government, partner organizations and potential members. Our approach utilized our members as key components: taking advantage of both their expertise as part of their program and whenever possible utilizing their facilities to host our seminars. Many thanks to our gracious hosts: Telus Innovation Centre (Edmonton), Ernst & Young (Vancouver), EXFO (Montréal), Cisco Training Centre (Toronto).



The goal of the cross-Canada roadshow was to build awareness of CENGN in Canada, and to encourage SMEs to submit project proposals so that we could begin our first commercialization acceleration projects.

Projects

The following process was developed for the initial evaluation and selection of projects for the commercialization acceleration program.



CENGN continually reviews submissions, and matches successful applicants with its members to accelerate commercialization using CENGN's comprehensive multi-vendor testing and validation facilities, for both OpenStack and Enterprise, that are unique in the world. Successful projects receive up to an equivalent of $100K in technical and financial support, accelerating product introduction by reducing the time and cost associated with development.

To date, five commercialization acceleration projects have been launched.

Technology

This year's primary focus in terms of technology has been the development of the CENGN Common Platform (CCP). This system, comprised of the technical team, their processes and the platform itself, are at the core of CENGN's operations. The CCP will house a number of the commercialization acceleration projects and will also be the source of CENGN's testing and lab services.

People

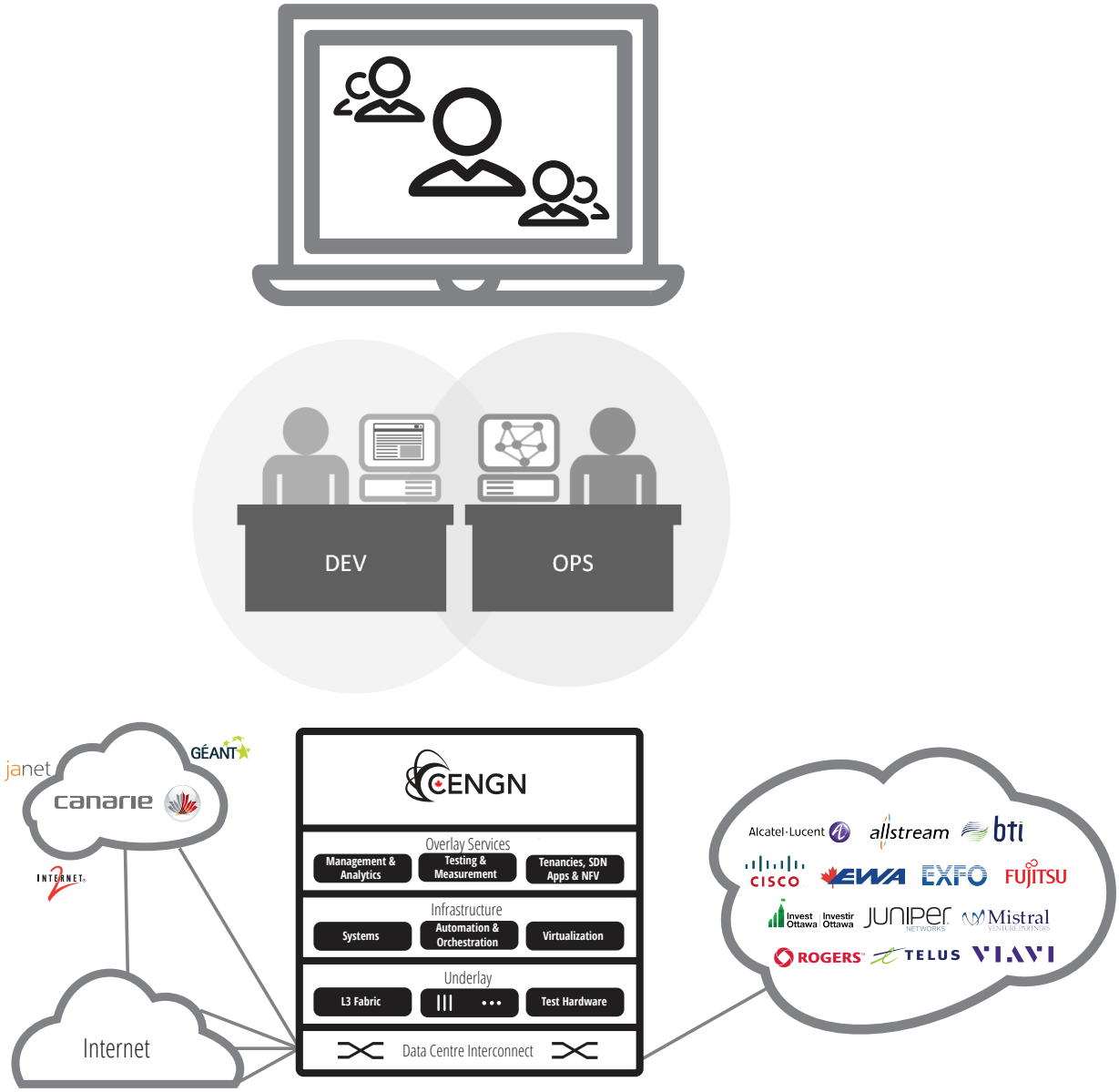
CENGN's technical team has been divided into two main groups. The first group, made up of the technical leads, junior engineers and two co-op students, focuses on building the CCP. Meanwhile the second group, made up entirely of interns and co-op students, supports the first.

Process

CENGN's technical team follows the agile DevOps methodology, integrating development and operations to allow for products to be tested and launched in iterations. The team works in two week sprints and places a strong emphasis on close documentation in order to develop the proper processes. To date, 588 issues have been logged by the team.

Platform

The platform component of the CCP consists of hardware and software supplied by our members and partners. Our unique multivendor physical and virtualized lab enables companies to test and validate the new and emerging software-defined networking (SDN) and network functions virtualization (NFV) technologies, applications and services before moving them to production.


DEV
OPS
janet
GÉANT
canarie
INTERNET2
Internet
CENGN
Overlay Services
Management & Analytics
Testing & Measurement
Tenancies, SDN Apps & NFV
Infrastructure
Systems
Automation & Orchestration
Virtualization
Underlay
L3 Fabric
Test Hardware
Data Centre Interconnect
Alcatel·Lucent
allstream
bti
CISCO
EWA
EXFO
FUJITSU
Invest Ottawa
Investir Ottawa
JUNIPER NETWORKS
Mistral VENTURE PARTNERS
ROGERS
TELUS
VIAVI

Training

Moving from hardware to software-dominated networks will lead to a significant change in the skill sets required by companies and employees in the sector. CENGN is leading in training this next generation of talent by utilizing its own talented team, leveraging the resources of its members and partnering with best in class companies.

CENGN offered two training sessions in its inaugural year:

- **SDN Fundamentals:** designed to address decision makers of a Software Defined Networking strategy.
- **SDN Bootcamp:** overing the critical skills needed to deploy an SDN-based solution. These training sessions were offered in conjunction with one of CENGN's partners, Inocybe.

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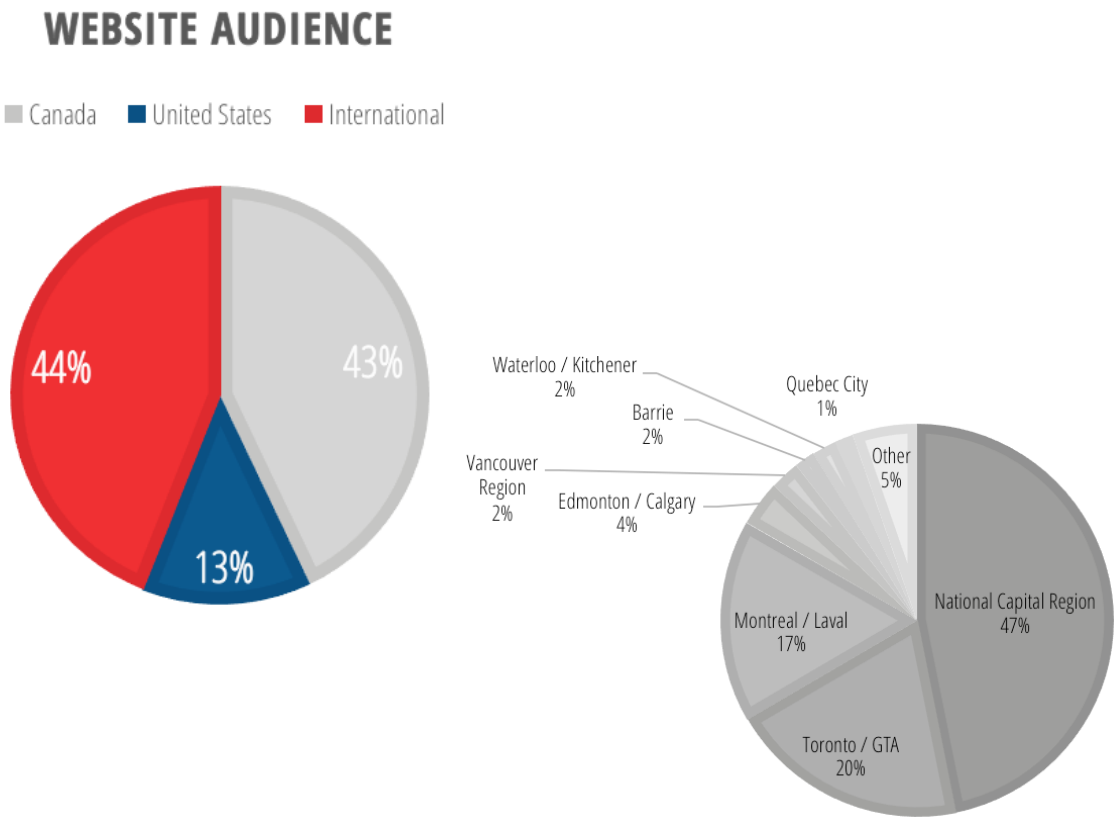
Key Web Statistics



CENGN's web presence has developed strong foundations in its first year. With a web audience spanning the globe and over 1000 social media followers, CENGN is well on its way to becoming a recognized brand around the world.

In The News

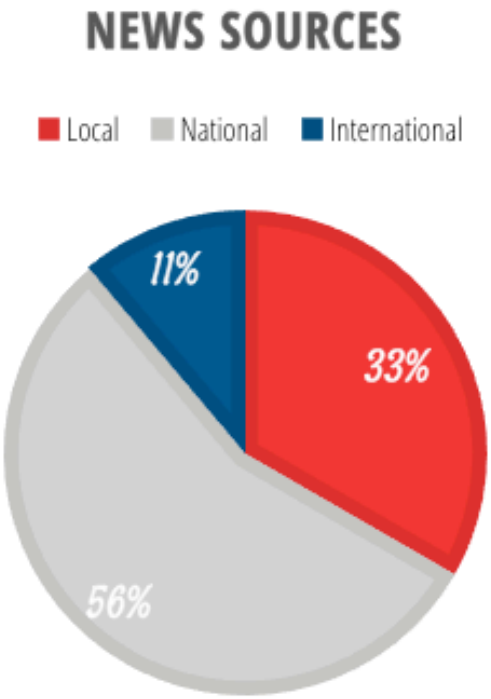
To date, CENGN has appeared in the news over 30 times, having been featured in articles from a variety of local, national and international news sources.

"Next generation networks is a $5 trillion market, and presents megatrend opportunities for countries and companies that can move quickly," said CENGN's President and CEO Ritch Dusome. "Recognizing Canada's telecom strengths, that's why Multinational Enterprise (MNE) leaders from around the world have come together to back CENGN commercialization projects with the combined power of 199,000 people, $11 billion of R&D and $84 billion of revenue."

- January 27 | Montreal Tribune

"In November 2014, the CENGN announced it had received $11.7 million in funding, spread over five years, from the Networks of Centres of Excellence of Canada, an arm of the federal government that promotes the country's ability to do research and compete with other countries. As part of its mandate, the organization hopes to use its funding to help SMBs. Companies would need to go through a submissions process to receive help from CENGN, but if it's selected, an SMB can receive commercialization acceleration support worth anywhere from $50,000 to $100,000. The goal would be to get its technology to market within three to 15 months."

- Febuary 3 | IT Business Canada



"This project will be a major showcase of Canadian innovation in networking technology," Jodoin said. "Hosting this project at CENGN will provide NoviFlow with international visibility as well as make available to us all the infrastructure elements needed to convincingly demonstrate complex SDN solutions in a realistic network environment."

- June 16 | SDN Zone

CENGN's Presence

2014

Nov. 6
CENGN Launch
Ottawa

2015

Jan. 27 - Feb. 10
CENGN Roadshow
Edmonton, Vancouver, Montreal, Toronto, Ottawa

Feb. 14 - 17
NetDev 0.1
Ottawa

April 27 - 28
OCE Discovery
Toronto

May 5 - 6
Wavefront Summit
Ottawa

May 5 - 8
NFV World Congress
San Jose, USA

May 11 - 15
IEEE Symposium
Ottawa

May 15
MCETECH Conference
Montreal

May 18 - 22
OpenStack Summit
Vancouver

May 20
Europe Global Export Forum
Toronto

June 1 - 3
Canadian Telecom Conference
Toronto

June 18
OCP Canada Day
Ottawa

June 25
CENGN AGM
Ottawa

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