Ciena Presentation for CCSS

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2025-02-04

Ciena is a networking systems, services, and software company

We enable customers to adapt and respond in real-time to ever-changing demands through the creation and deployment of the Adaptive Network

1,600+
customers across the Americas, EMEA, and APAC

85%
of the world's largest service providers being served

8,600+
employees in 35+ countries

Ciena in Canada

- Presence in the region grew significantly in 2010 after the Nortel acquisition
  - Ciena **gained 1600+ employees** in the acquisition
  - Ciena has been proudly operating in Canada for over 21 years

- **Ottawa** is the home of Ciena's **R&D Global Headquarters**
  - Ciena has **3500+** R&D specialists, **over half are in Ottawa**

Offices

- **Ottawa**, Ontario
  425K Sq. Ft.
- **Montreal**, Quebec
  54K Sq. Ft.
- **Quebec City**, Quebec 22K Sq Ft.

Academia/ R&E Networks

- **Multi-million dollar annual investments** with multiple universities throughout the country

Patents

- 2000 globally
- **~1400 Originated in Canada**

Employees

- **~2600**

Business in Canada

- Optical Tech → **No. 1** in North America by market share **No. 2** Globally
- Largest presence in: **Ottawa, Quebec City, & Montreal**
- A significant portion of Canadians use services from at least one provider below
- Ciena's combined unique reac**h likely touching 80% – 90% of the population**

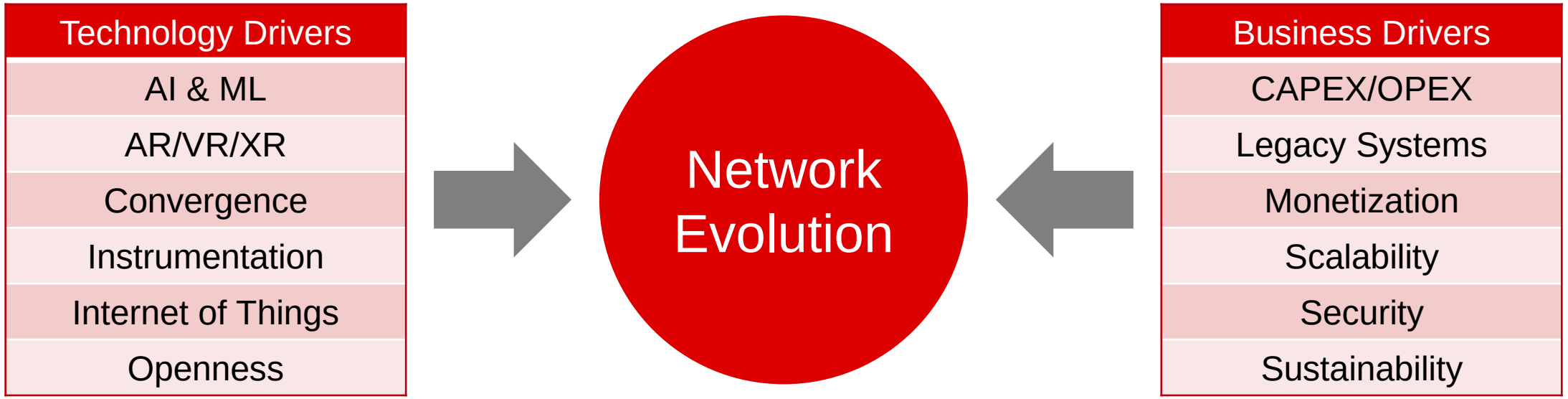
Customers	Channel Partners
▪ **Rogers Cable** ▪ **Bell Canada** ▪ **Videotron** ▪ **TELUS** ▪ Barret Xplore ▪ CANARIE, ▪ F6 Networks ▪ Fibrenoire ▪ MTS Allstream	▪ Allstream ▪ EMC ▪ Presidio ▪ Westcon

Humans and machines require enhanced connectivity in a cloud-driven world

Convergence of physical and digital worlds is setting new expectations from networking.

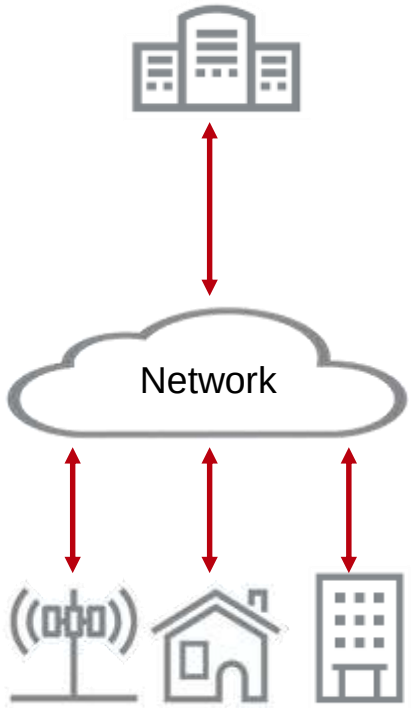
For cloud to provide real value, data is always in motion, and this is why networking is critical.

Network must evolve due to ongoing technology and business drivers



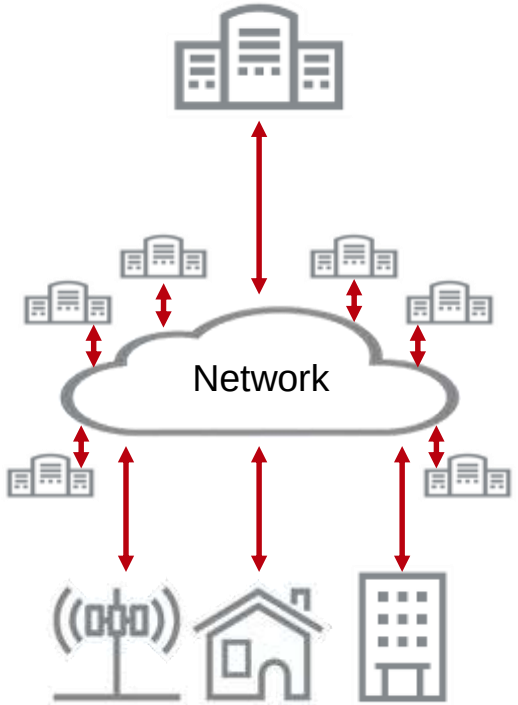
How are networks evolving and where are we headed?

Core Cloud



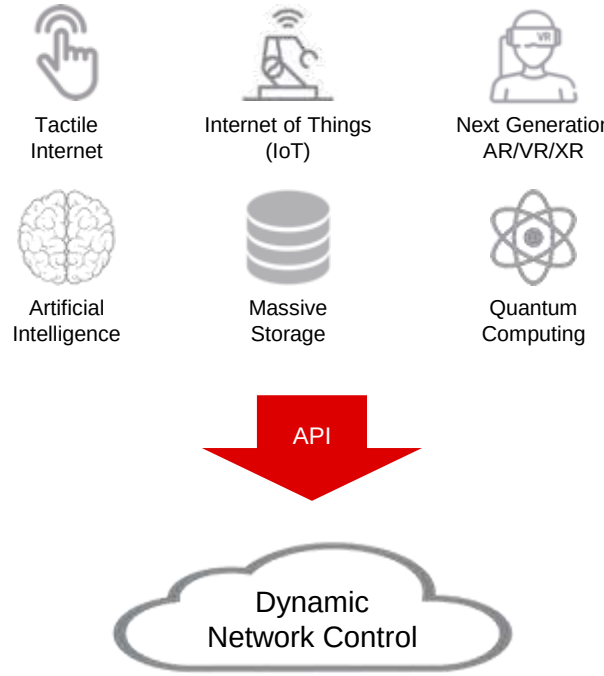
Billions of users connected to core data centers

Edge Cloud



Intelligent network fabric between edge and core data centers

App-driven Network



Highly immersive, interactive, and dynamic communications

The need for an Adaptive Network has never been greater to intercept this network evolution

What do we mean by an “Adaptive” Network?

Adaptive:

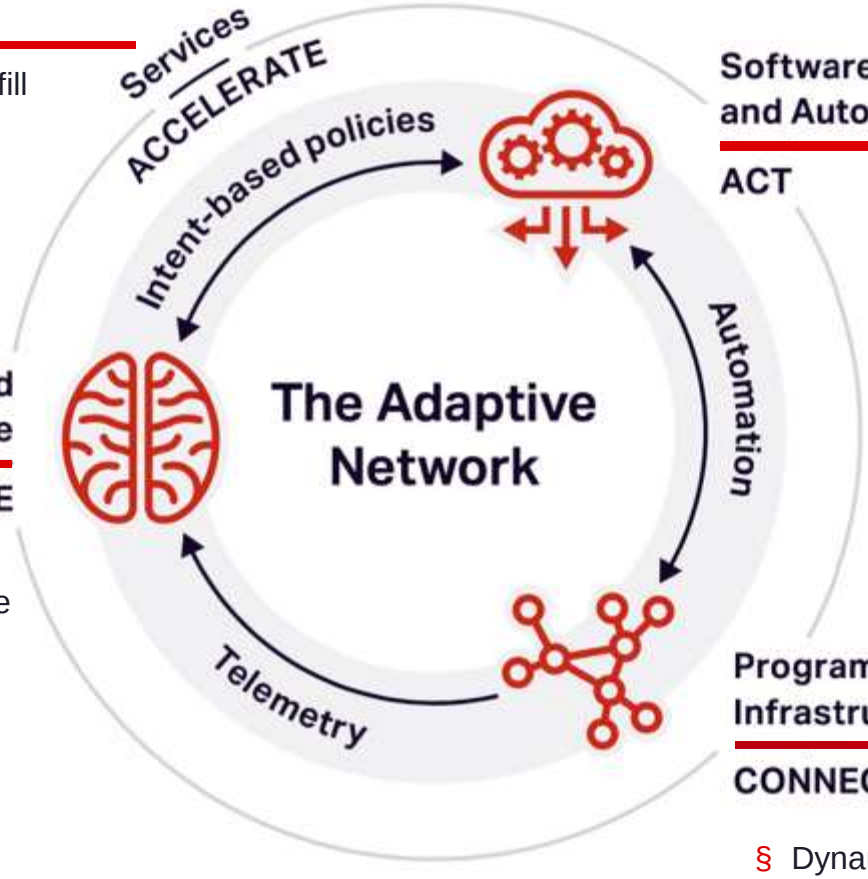
“Providing operators with the ability to rapidly address changing business conditions and be first to market by anticipating your customers’ needs and addressing them before your competition.”

How?

An **Adaptive Network** can self-configure, self-optimize, and self-heal in near real-time to proactively and reactively address changing conditions, leveraging openness, scalability, security, and sustainability principles.

How does the Adaptive Network work?

§ Services to support all transformation phases and fill in skills gaps for new products and technologies



Software Control and Automation

ACT

§ Leverages analytics and intelligence insights

§ Management and automation of services across multi-layer, multi-vendor, multi-domain networks

Analytics and Intelligence

SENSE

§ Leverages instrumented infrastructure telemetry

§ Proactively predict potential problems and anticipate network trends—before they occur

Programmable Infrastructure

CONNECT

§ Dynamic pool of virtual and physical resources

§ Manageable via common, open software interfaces

§ Highly instrumented to understand the network state

Physical realities of building H/W products

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Dev[*]Ops

What is DevOps?

DevOps combines development (Dev) and operations (Ops) to increase the efficiency, speed, and security of software development and delivery compared to traditional processes. A more nimble software development lifecycle results in a competitive advantage for businesses and their customers.

From **Gitlab**

Today, DevOps is a standard practice across many industries, accelerating software delivery and improving system reliability.

DevOps started gaining popularity in the **late 2000s and early 2010s** as organizations sought to bridge the gap between software development (Dev) and IT operations (Ops). Here's a timeline of its rise:

Key Milestones in DevOps Popularity

• **2007-2008**: The term "DevOps" emerged from discussions in the agile development community, particularly from **Patrick Debois**, who later organized the first **DevOpsDays** conference.

• **2009**: **John Allspaw and Paul Hammond** presented the now-famous talk *"10+ Deploys per Day: Dev and Ops Cooperation at Flickr"*, emphasizing the need for closer collaboration between developers and operations teams.

• **2010**: The first **DevOpsDays** conference was held, spreading awareness and shaping the movement.

• **2011-2014**: Large companies like **Netflix, Facebook, and Amazon** showcased how DevOps principles (automation, CI/CD, monitoring) enabled rapid software delivery at scale.

• **2015-2018**: DevOps became mainstream with tools like **Docker, Kubernetes, Terraform, and Jenkins** driving adoption. → **Ciena Joins the Party**

• **2019-Present**: The rise of **GitOps, DevSecOps, and AIOps** further expanded the DevOps ecosystem.

Octavian joins the DevOps team ~ 2017

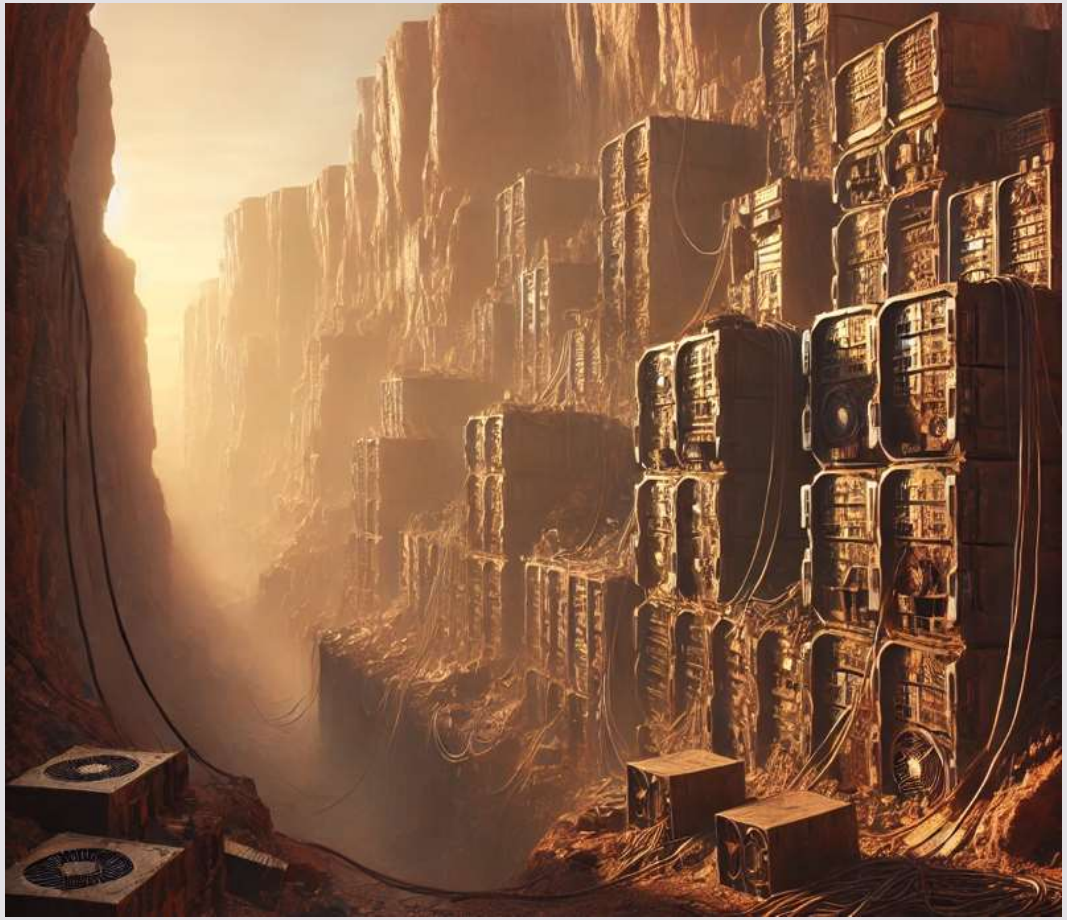
me

also me about an hour later

Beginning was hard …

- Fires, fires, fires everywhere
- ”Debugging” → “It’s the environment”
- “Can you rebuild the cloud?”
- ”I really need to push out this code change” on Friday Afternoon
- Random blow up of the day
- Garbage cleaning – logs, logs, and more logs

Where was the pain coming from?



Pre DevOps - tons of technical debt, antiquated systems, manual process

Eventually you reach stability

What do we do as a “DevOps” team?

Fundamental objective of the Infrastructure and Off-Switch Tools (IOST) team

- Improve the development experience for the R&D community: **accelerate development, reduce manual toil and improve product quality.**

Team mandate

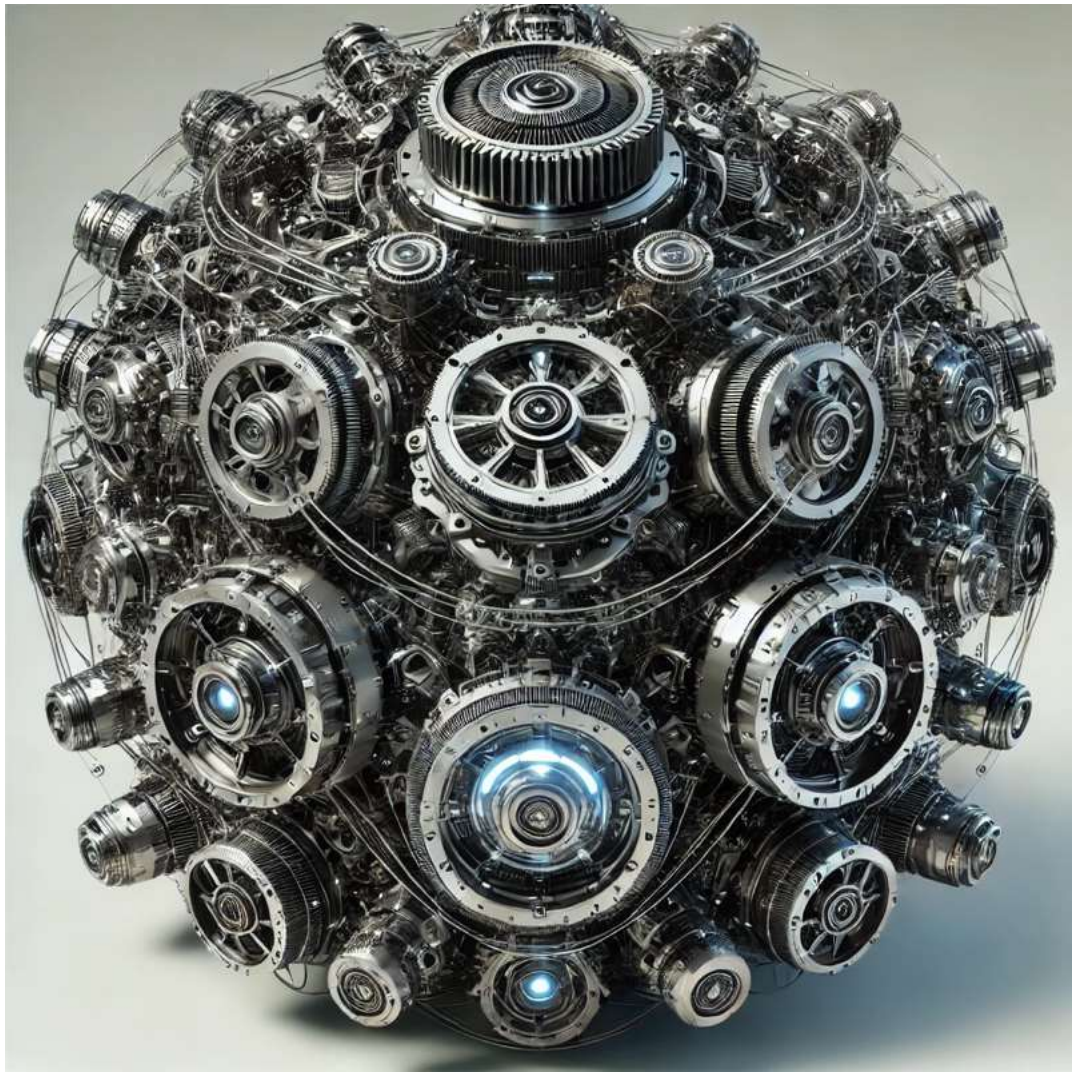
- Build on existing test and metrics services
- Increase the efficiency of Ciena private cloud resources
- Advance the integration of test and automated issue reporting into development and build process
- Provide common security infrastructure for the DevEngine and specific product applications
- Develop new solutions/system and enhance existing systems which address the needs of the design community

CPO DevOps Team Mandate

Focus on identifying opportunities and managing the delivery of robust solutions that enhance services impacting Software Release and Development teams (Ottawa, Alpharetta, and Gurgaon)

- Develop CPO **DevOps Solutions** for 6500, RLS, Modem, ONID, WaveRouter, Waveserver, ELS, and FPGA Products
- Collaborate with similar teams across Ciena to improve and evolve DevOps **Continuous Integration, Tools, and Workflow** Solutions to deliver innovative solutions for our product (and others)
- Leverage tools, to focus on **Designer Workflows**, and the **Integration of Code** to continue to drive improvements to **Quality and Stability** of our Products
- Focus on **Automation and Data-Driven** Practices to deliver robust solutions and enhance speed of delivery of services impacting our large software development team
- Follow an **Agile Workflow** for the management, implementation, and deployment of improvements to our DevOps solutions
- Integration of **Security Best Practices and Solutions** (Coverity, BlackDuck) into our DevOps Workflows to deliver a Secure SDLC

The DevOps Build Engine



logos: **some** of the opensource and custom solutions deployed by IOST team

dagster

mlflow Spark

FAO 6500-DevOps

Apache

HashiCorp Vault

Jenkins

BIND 9

ANSIBLE

openstack.

uWSGI Express JS

Flask django

Grafana kibana

OpenSearch

mongoDB.

telegraf

influxdb

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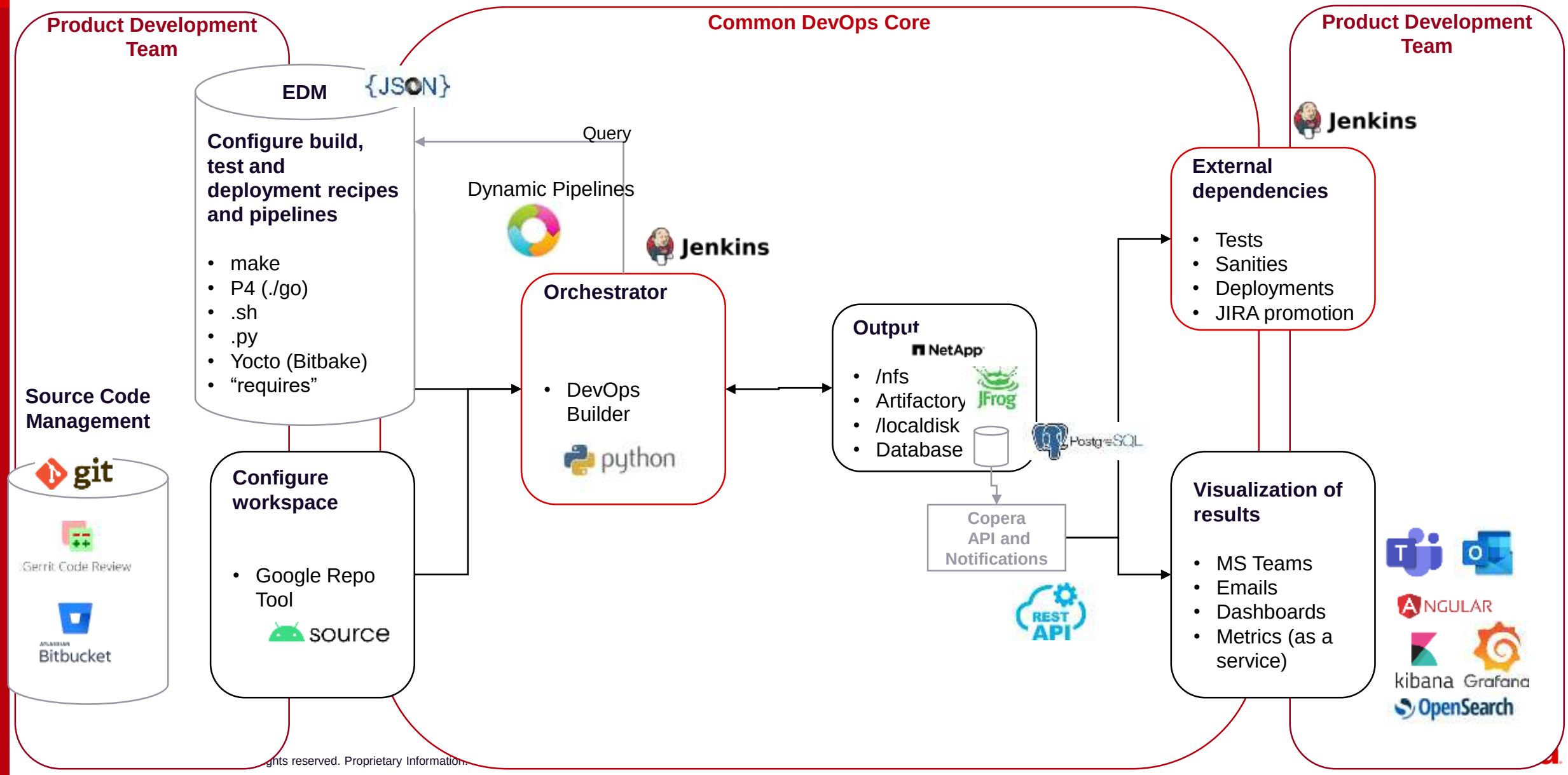
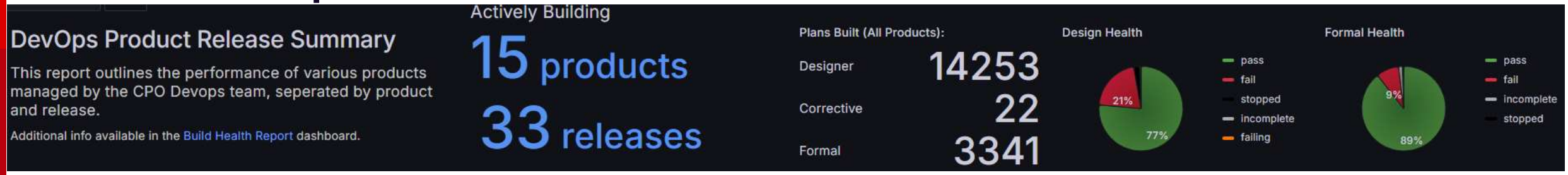
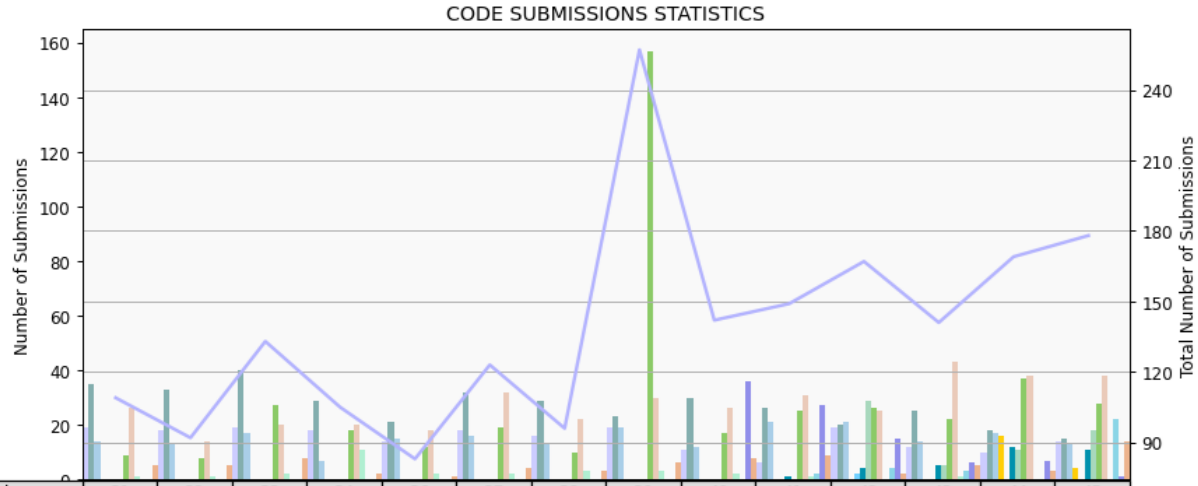
CPO DevOps – Continuous Integration and Deployment High Level Overview



Build Health Report



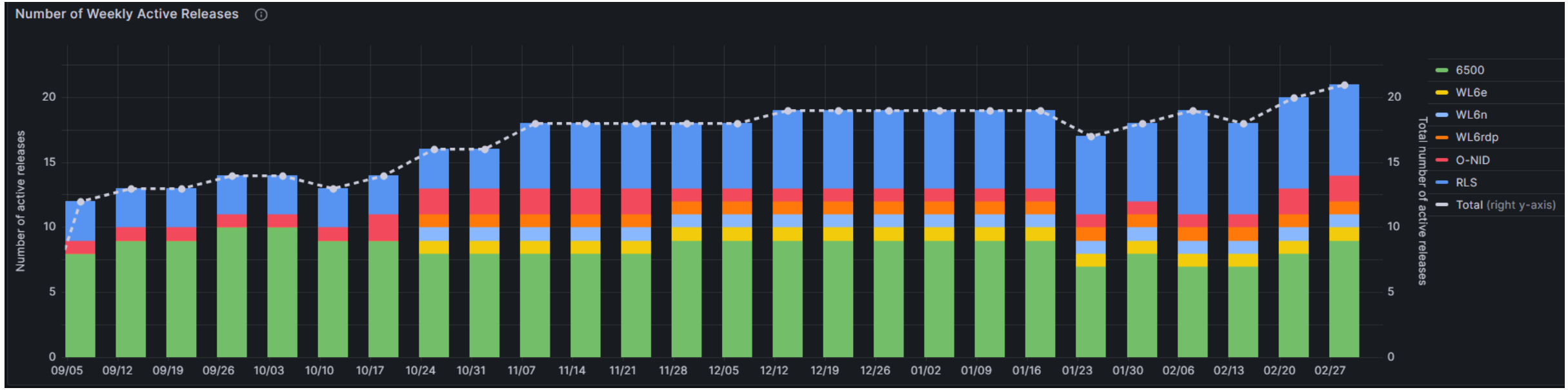
- **6500** – OWB (13.55, 15.65), 16.1, 16.5, 16.9, 16.91, 16.95, 17.0 (Switching), 17.5 (Transport)
- **RLS** – 3.1.50, 3.1.70, 4.0
- **ONID** – 2.0.0
- **WaveLogic** – WL6e 0.1, WL6e 1.0, WL6n 0.0, WL6rdp 0.0, WL6se 0.0, modem-sdk 0.1, ECS4 0.0
- **WaveRouter** – 10-09-02, 10-10-00
- **Waveserver** – 3.1.0
- **Virtual Waveserver** – 1.1.0
- **Bifrost** – 0.0.0

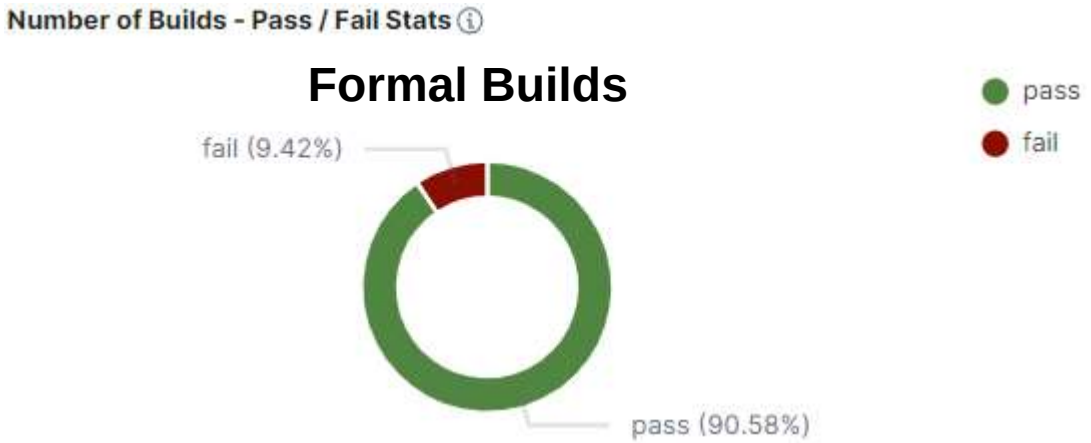


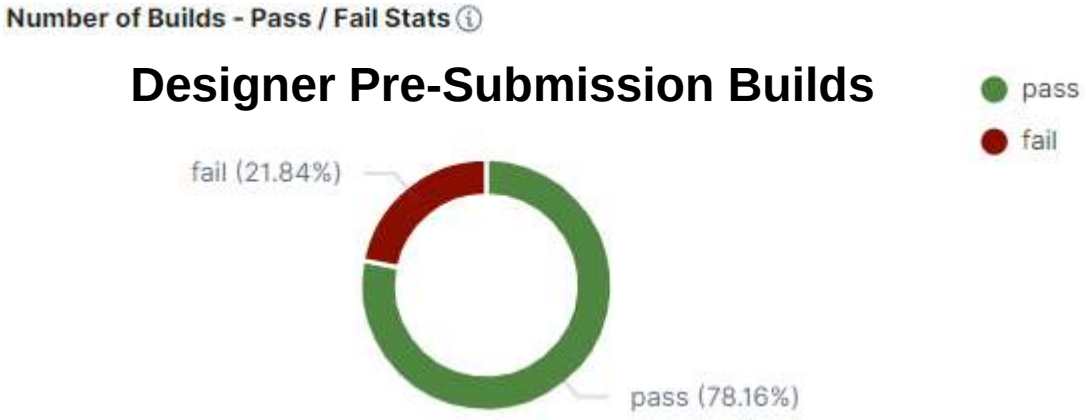
Product	Release	31	32	33	34	36	37	38	39	40	41	42	43	44	45
6500	17.00	19	18	19	18	14	18	16	19	11	6	19	12	10	14
6500	17.50	35	33	40	29	21	32	29	23	30	26	20	25	18	15
6500	16.10	14	13	17	7	15	16	13	19	12	21	21	14	17	13
6500	16.50	0	0	0	0	0	0	0	0	0	0	0	0	16	4
6500	13.55	0	0	0	0	0	0	0	0	0	0	2	0	0	0
6500	16.91	0	0	0	0	0	0	0	0	0	1	4	5	12	11
6500	16.95	0	0	0	0	0	0	0	0	0	0	29	5	11	18
onid	2.0.0	9	8	27	18	12	19	10	157	17	25	26	22	37	28
rls	4.0	26	14	20	20	18	32	22	30	26	31	25	43	38	38
rls	3.1.70	1	1	2	11	2	2	3	3	2	1	0	1	0	0
modem-wl6e	0.1	0	0	0	0	0	0	0	0	0	2	4	3	0	22
modem-wl6e	1.0	0	0	0	0	0	0	0	0	36	27	15	6	7	1
modem-wl6n	0.0	5	5	8	2	1	4	3	6	8	9	2	5	3	14
	Total	109	92	133	105	83	123	96	257	142	149	167	141	169	178

CPO DevOps Product Introduction
Last 6 months Updated: 03/04/2024

- Number of Weekly Active Releases
- Formal Build Pass Rate
- Designer Pre-Submission Build Pass Rate – Prevents Formals







Metrics & Observability – Dashboard Samples

DevOps Product Service Mapping

Updated: 11/13/2024

Common DevOps Core	6500	RLS	Modem (WL5)	Modem (WL6)	ONID	WaveRouter	BIFROST	Waveserver / Virtual WS	ELS	FPGA
Autoprops	Yes	Yes	Yes	Yes	Yes	No	No	TBD	TBD	TBD
Build Architecture	Yes	Partial	No	Yes	Yes	Partial	No	Yes	WIP	TBD
Build Engine	Yes	Yes	Yes	Yes	Yes	Yes	WIP	Yes	WIP	TBD
Dashboard	Yes	Yes	No	Yes	Yes	Yes	WIP	Yes	Yes	TBD
Design Build	Yes	Yes	Yes	Yes	Yes	Partial	Requested	Yes	TBD	TBD
Design Workflows	Yes	Yes	Yes	Yes	Yes	TBD	No	TBD	TBD	TBD
Gerrit	Yes	Yes	Yes	Yes	Yes	TBD	No	TBD	TBD	TBD
Governance and Ops	Yes	Yes	Yes	Yes	Yes	Yes	No	WIP	TBD	TBD
Infrastructure	Yes	Yes	Yes	Yes	Yes	Yes	WIP	Yes	TBD	WIP
Metrics	Yes	Yes	No	Yes	Yes	TBD	No	WIP	TBD	TBD
Security	Yes	Yes	Yes	Yes	Yes	TBD	Requested	WIP	TBD	TBD
Supporting Tools	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	WIP
Test Automation	Yes	Yes	No	Yes	Yes	Ready	No	WIP	TBD	TBD

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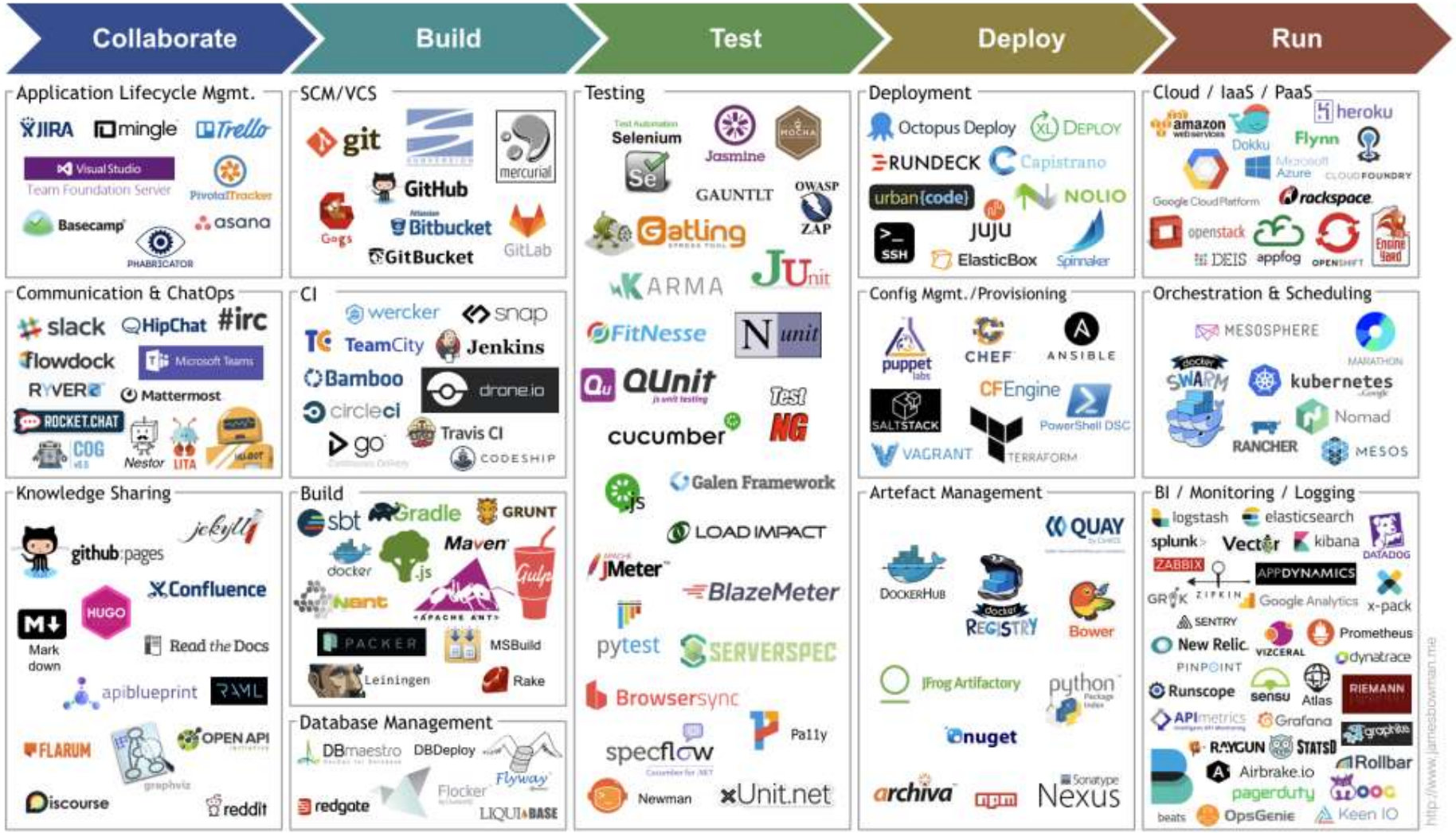
Complexity – An Ocean of DevOps Tools and Platforms



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Where is DevOps headed?

Bottom Line: DevOps is Becoming Smarter, More Automated, and More Secure

In **2025**, DevOps will continue to **shift left** (integrating security & compliance early), **leverage AI & automation**, and **move toward self-service platforms**. The **DevOps engineer role** will increasingly focus on **architecting platforms** rather than just CI/CD management.

SSDLC – secure software development lifecycle

ML OPS – machine learning operations

Some DevOps engineer qualities

- **Generalist role:** it’s not a pure dev position, you wear many hats
- **Proactive mindset:** anticipates failures and builds resilient systems.
- **Strong debugging skills:** can diagnose issues across code, infra, and cloud.
- **Empathy for developers & ops teams:** Bridges the gap between both.
- **Security-first approach:** Always considers security implications in automation.
- **Obsessed with automation:** Eliminates toil and manual work wherever possible.

Thanks for your time ☺

How is cloud infrastructure leveraged at Ciena?

Cloud @ Ciena

Cloud @ Ciena

Ciena Cloud Based Applications

Customer Facing Products

- Tools for SDN, network management, security
- Cloud native solutions for managing adaptive networks: BluePlanet, Navigator

R&D Cloud Infrastructure

DevOps and the R&D Development Engine

- Multiple teams building on-prem private cloud infrastructure to support R&D teams
- On-prem driven by cost and security concerns
- Ability to leverage all major cloud vendors – disaster recovery

“IT” Cloud Services

Supporting Essential Business Needs

- Company wide applications/services deployed typically in public cloud infrastructure: AWS, GCP, Azure, Oracle

R&D - H/W & S/W Teams

Developing Next Gen Products

- Product teams building the H/W and S/W products that form the infrastructure of the internet and Cloud
- Deployed to data centers and terrestrial links driving cloud businesses for customers like AWS, GCP among others

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DevOps Solutions

Quality of Life

- Dashboard UX / UI
- Reporting
- Dependent Merges
- Product Support Model
- DevOps Knowledge
- Build Acceptance Tests

Optimization

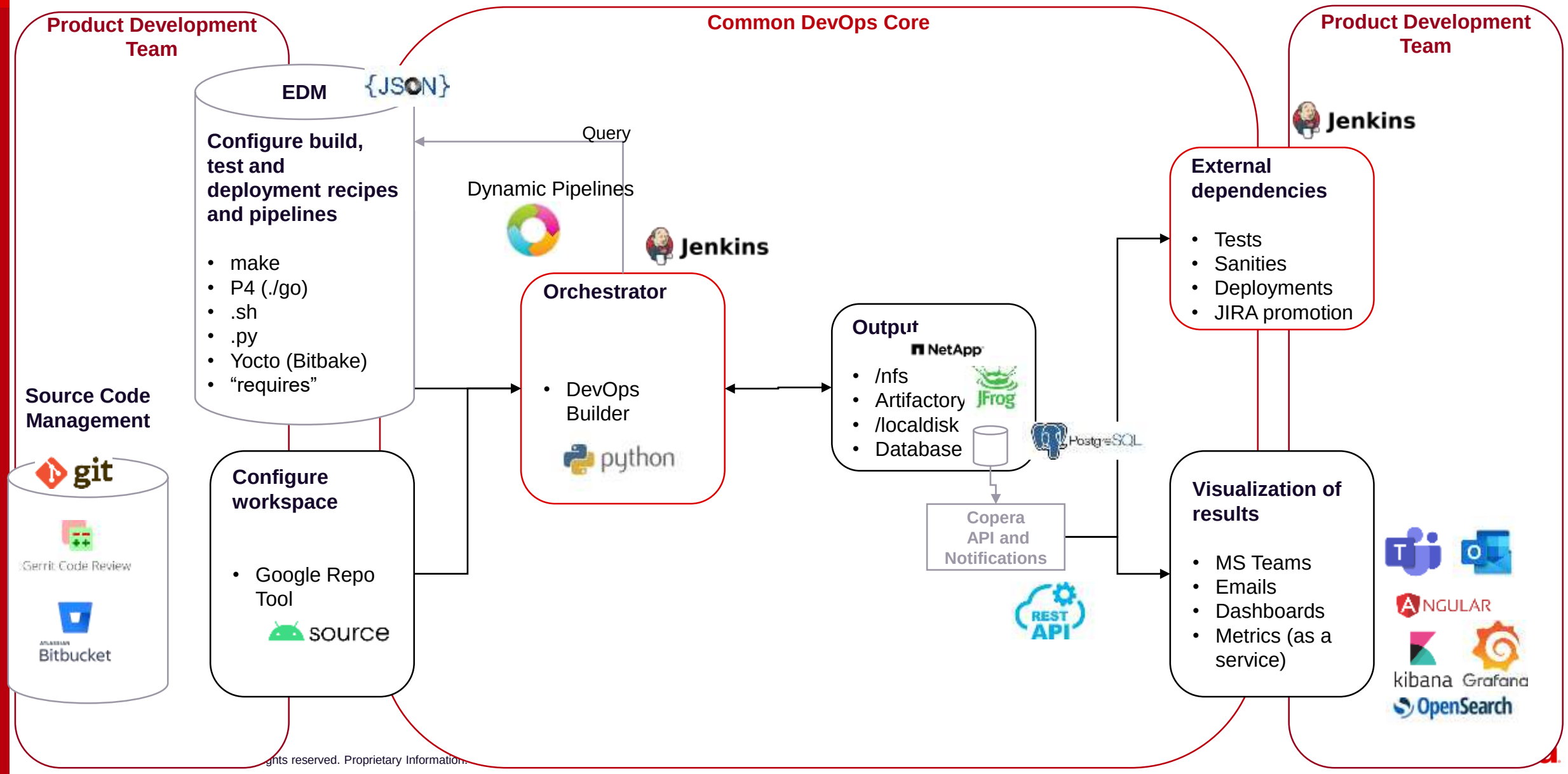
- R&D Managed OpenStack Infra
- Dynamic Compute
- Build Optimization
- Scalability
- Complex Code Auto-Propagation
- Turnkey Pipelines
- Automate First Mentality

Security

- Black Duck Scan
- Coverity Scan
- Audit Ready (BT/NCSC)

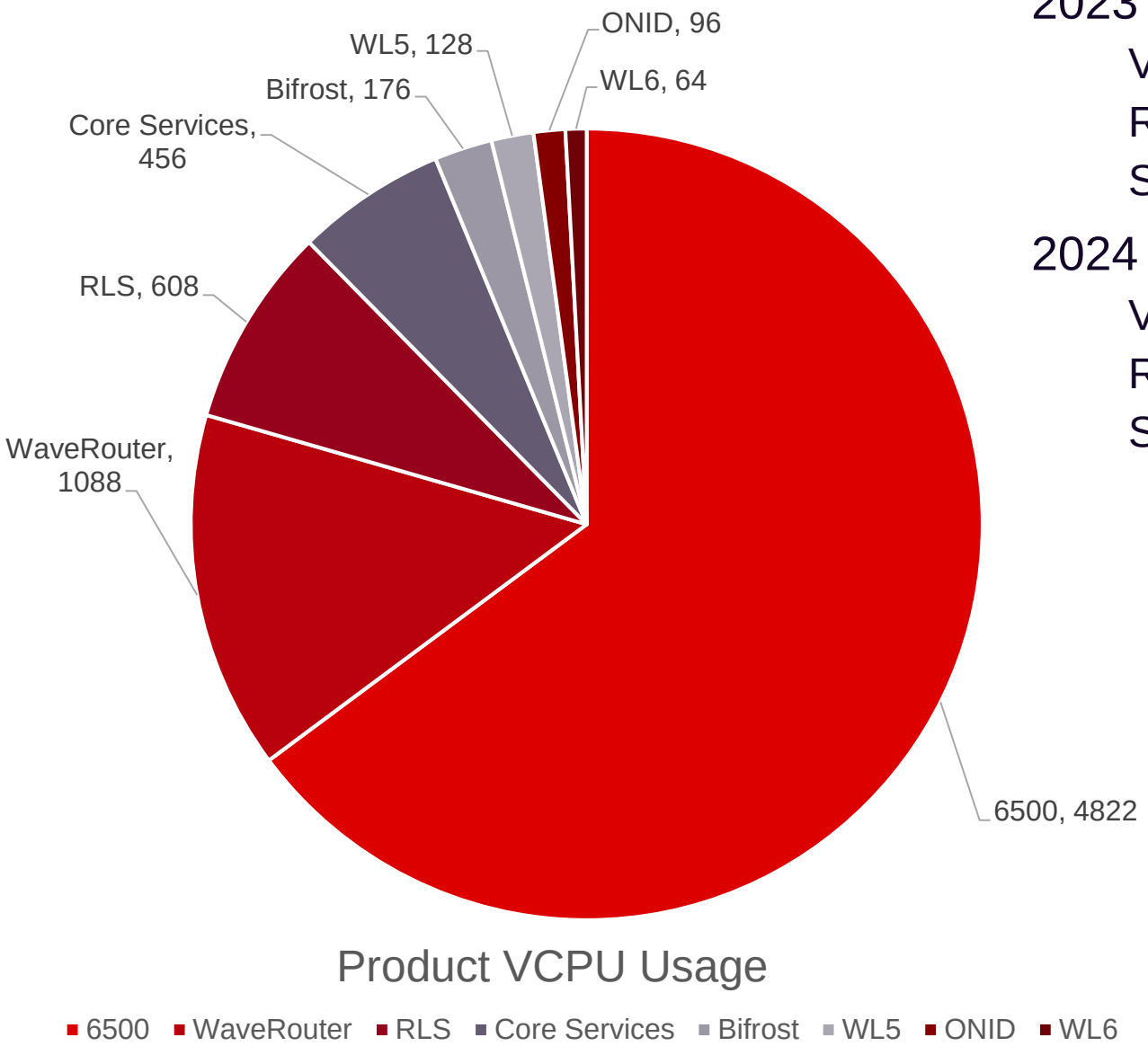
Benefits Product and DevOps Growth

CPO DevOps – Continuous Integration and Deployment High Level Overview



OpenStack Infrastructure

Updated: 04/20/2024

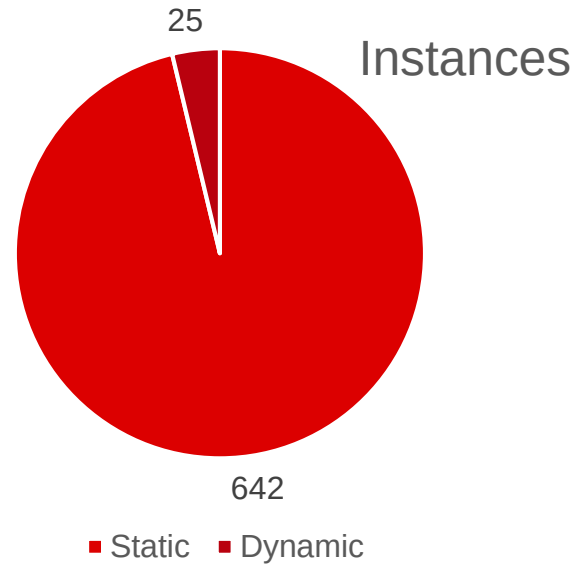


2023 – Capacity

- VCPU: 8,416
- RAM: 37 TB
- STORAGE: 162.1 TB

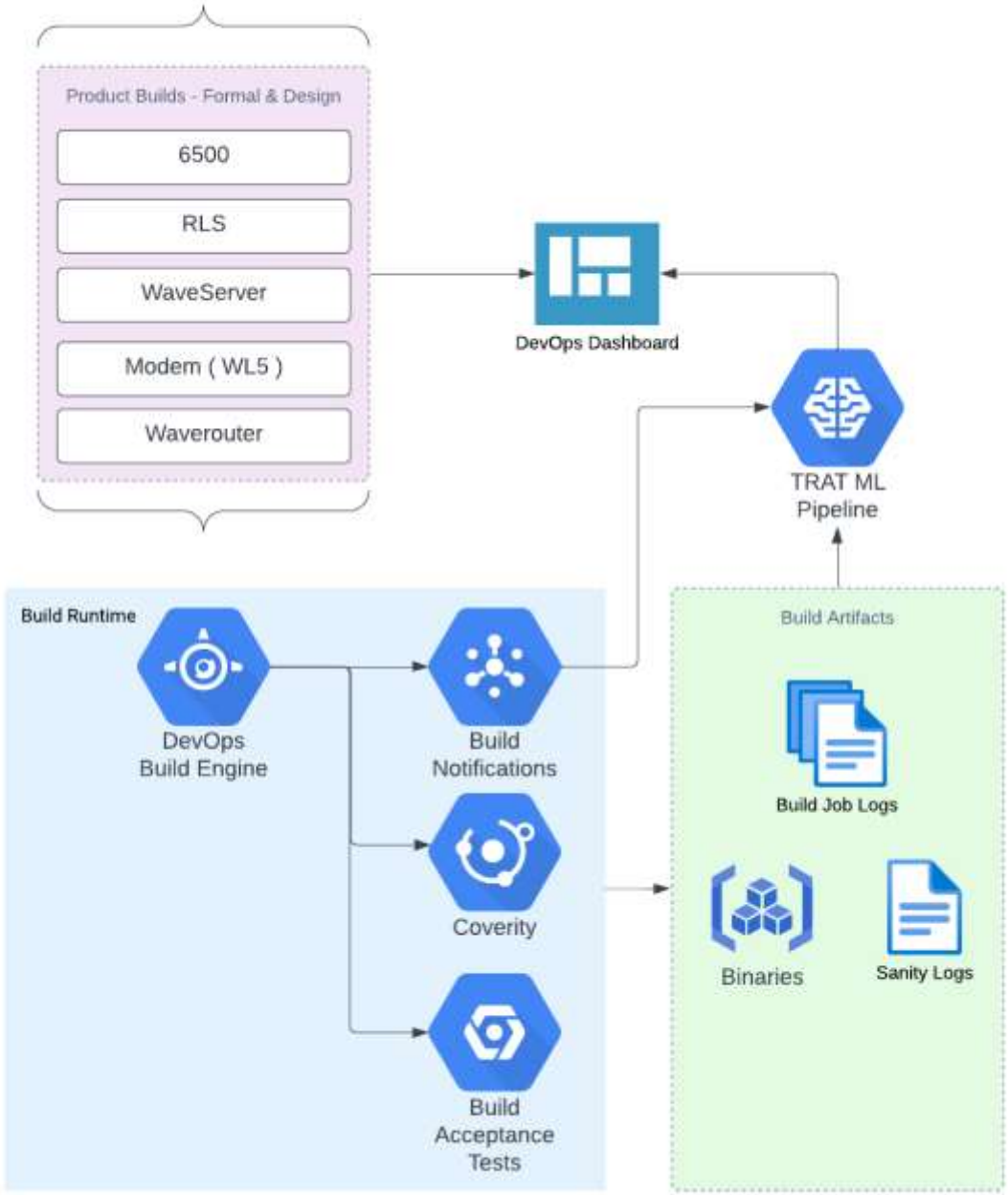
2024 – Current Capacity

- VCPU: 8,966 (includes 550 of the 1,100 requested)
- RAM: 39.6 TB (includes 2.6 of the 3 TB requested)
- STORAGE: 146.5 TB (includes 10 of the 20 TB requested)



TRAT ML

ML Based Error Detection & Triage In the DevOps Flow



Investment in Canada's *Early in Career* Community

Investment in Early in Career Communities
Deliberate Strategy to cultivate local talent

- Ciena is home to **co-ops, interns, & graduates** across the globe.
  - 2023: **~30 events** sponsored / participated in
    - **Capstone Research**
    - Resume workshops
    - "**Hackathons**"
    - Career Fairs & Information Sessions
      - Not just for hiring, but **making connections & working with the community**

- **50% conversion rate** of Interns to New Grad Hires
- **90% of Interns** are hired in Canada
  - ~300 interns
  - ~100 new grads

- Ciena maintains **long-standing relationship** agreements on many **advanced research projects & educational programs** with local colleges & universities.
  - *Carleton University*
  - *University of Ottawa*
  - *McMaster University*
  - *University of Waterloo*
  - *Queen's University*
  - *British Columbia**
  - *Algonquin College**
  - *McGill University**

UNIVERSITY OF WATERLOO

Carleton UNIVERSITY

- Schools of Advancement
- **Industry partnerships** focused on research & funding money

Women in Engineering

- Through local universities (promoted to Ciena originally)
- **Mentorship programs**

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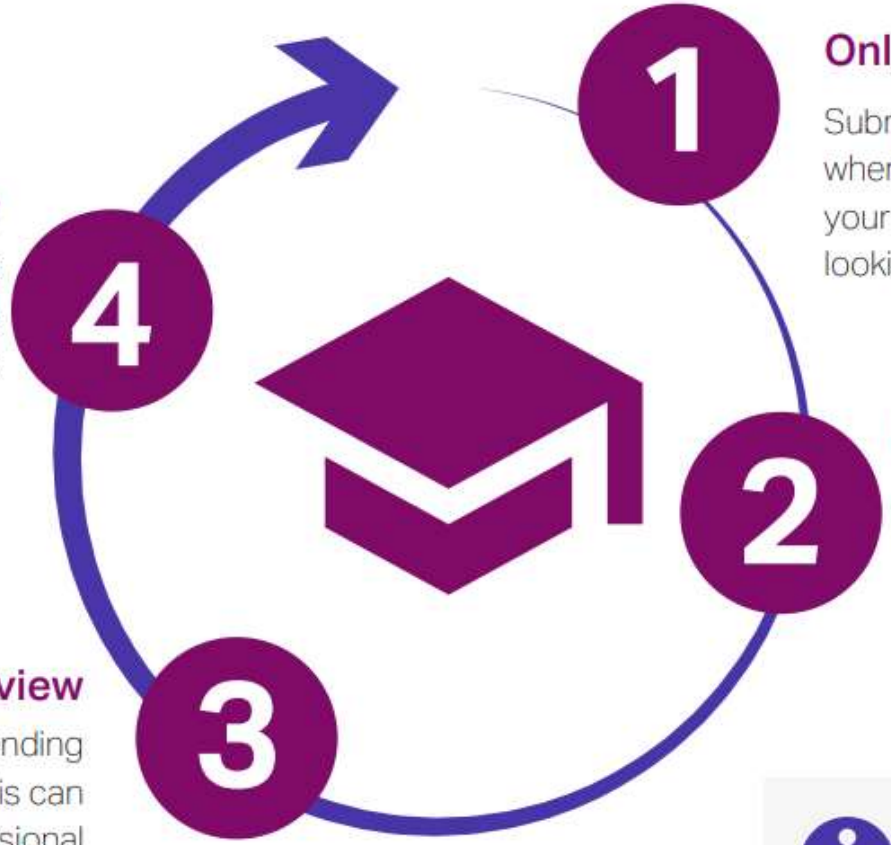
Our Recruitment Process



1 Online Application

Submit your application at careers.ciena.com where our Talent Acquisition team will review if your background matches the profile we are looking for.

2 First Interview

Your first interview is all about getting to know you and how you work. Don't worry, it's not about getting it right, it's about seeing how your mind works.

3 Second Interview

Your second interview varies depending on the route you are taking. This can include technical or professional discussions.

4 Offer

If successful, you will be contacted by your recruiter where you can discuss your offer.

Have questions or require accommodation for your application? Don't hesitate to get in touch with your recruiter.

Tips for Interviewing at Ciena

We asked several members of our Talent Acquisition team to provide advice on how to ace job interviews at Ciena. Here's what they said.

Be yourself

You are your most unique selling point.

Research the role and the company

An organization is not limited to its products and services

Be prepared to tell us a story

Short anecdotes reveal your strengths and character.

Ask yourself: Why Ciena?

Make sure you want us as much as we want you.

Familiarize yourself with Ciena products and services

How you relate to our products may impact how much you'll thrive here.

Build Rapport

The key to a callback is a memorable interview.

Learn more

Thank You