Open Networking
potential impact across Russia and CIS
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nag.news  nag.company  nag.academy
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Повестка встречи

- Вводный обзор Open Compute Project (ОCP) и их целей

- Open Networking — не только дезагрегация сетевых устройств

- Примеры перехода от традиционных сетевых к открытым

- Опыт Netris.ai в работе с концепцией Open Networking

- Вопросы
Задавайте вопросы

При необходимости уточнить что-либо по ходу вебинара, пишите в чат.

Факультативные вопросы следует записывать в специальный раздел. (нажмите на “?” в меню справа и введите ваш вопрос)

Если хотите задать вопрос конкретному спикеру, укажите кому.
Meet GAIA-X: This is Europe's bid to get cloud independence from US and China giants

France and Germany launch GAIA-X EU cloud independence project.

Top 20 regions outside the US by open source use (clones and forks)

After the United States, open source use picked up speed in China, India, and Germany this year. Developers in China forked and cloned 48% more projects than last year.
<table>
<thead>
<tr>
<th><strong>OEM</strong></th>
<th><strong>ODM/White Box</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>(Original Equipment Manufacturer)</td>
<td>(Original Design Manufacturer or “unbranded”)</td>
</tr>
<tr>
<td>Buys platform components from the manufacturer</td>
<td>Manufactures platform components</td>
</tr>
<tr>
<td>Resells those components under their own brand name</td>
<td>Provide full product development services</td>
</tr>
<tr>
<td>Create products that can serve the broadest possible market</td>
<td>Can manufacture specialised solutions</td>
</tr>
<tr>
<td>Support and managed services</td>
<td>Support centred on product</td>
</tr>
</tbody>
</table>
ODM/White Box + Open Source
The old innovation pipeline

TECHNOLOGY → OEMs → USERS
Open Hardware Innovation Model

TECHNOLOGY

 USERS

OPEN Compute Project®
Facebook to Build Its Own Data Centers

Facebook has decided to begin building its own data centers, and may announce its first facility as soon as tomorrow. The fast-growing social network has previously leased server space from wholesale data center providers.

Rich Miller | Jan 20, 2010
What can we remove from the system?

Can we raise operating temperatures and have the servers survive?

Can we increase relative humidity operational ranges to make the system much more efficient?

Do we need a centralized power supplies?

Open Compute Project
A collaborative community focused on redesigning hardware technology to efficiently support the growing demands on compute infrastructure.
200+ companies
6K engineers
189 contributions
Our Projects

Networking
Server
Storage
Rack & Power
Advanced Cooling

Data Center
Telco
HW Mgmt
Open System Firmware
HPC
Security

Modular DC
openEDGE

https://www.opencompute.org/projects
Efficiency
Scale
Impact
Openness
Server bezels....gratuitous differentiation
Tool less OCP vanity free open source cubby servers
Open Rack Unit Innovations - Server Fans “Cube Law”

- 40 mm Fans
- EIA “U”
- 80 mm Fans
- OCP “OU”
“Creative Destruction” of Server Efficiency

https://www.opencompute.org/events/past-summits

https://www.opencompute.org/events/past-summits
OCP Adoption around the World

New hardware layer 35% Reduction in TCO
30% Reduction in OPEX

Marketing media company w/ 70+ locations worldwide implementing OCP for compute

French aerospace, defense, transportation company evaluating OCP Compute

French CSP with data centers across Europe and N. America

[Link to presentation]
[Link to article]
Drivers of OCP Adoption

- Cost Reduction
- Standardisation
- Energy Efficiency
- Reliability

Source: IHS Markit
Disaggregate Networking
“OCP-certified switches have moved past the trial and wait-and-see phases”

Devan Adams, principal analyst at Omdia Inc

https://www.fiercetelecom.com/telecom/open-compute-project-switches-rule-bare-metal-roost-report
What is Open Networking?
Benefits:

- Disaggregation provides **FREEDOM** of choice and removes vendor lock-in.
- Greater **CONTROL** over Network Infrastructure through open software platforms.
- Rapid **INNOVATION** through a community & devOps approach.
Accton Technology

- The Leading Network ODM - Servicing Tier-1 Customers
- Founded 1988, IPO Taiwan 1995 (TWSE: 2345)
- $1.8B USD Revenue 2019, 5,145 Employees Worldwide
- 9 R&D Locations with more than 1,000 Engineers
- State-Of-The-Art High-Volume Manufacturing in Taiwan and China

Edgecore Networks

- Brand launched in 2004, wholly owned subsidiary of Accton
- Go-to-market business to network operators - DC, Telecom, and Enterprise
- Manages customer, partner and open community relationships
- Leading contributor of network designs to OCP, TIP participant, ONF – Charter Partner
- More than 10M Ethernet Ports shipped in 2019!
ONF & CORD in Context of Open Source Ecosystem

Open Source ecosystem is creating a comprehensive stack that is poised to deliver robust solutions, from white box peripherals to end-to-end solutions.
Most Design Contributions to Open Source

Industry 1st: 10G to 400G DC switches, New Telco/MSO Use Cases
## Strong Software Ecosystem

### COMMERCIAL SOFTWARE

<table>
<thead>
<tr>
<th>Data Center</th>
<th>CSP</th>
<th>Enterprise</th>
<th>OPEN SOURCE SOFTWARE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cumulus Linux</td>
<td>rtbrick</td>
<td>Cumulus Linux</td>
<td>SONIC from Microsoft</td>
</tr>
<tr>
<td>Big Switch Networks</td>
<td>DriveNets</td>
<td>Pica8</td>
<td>Open Networking Linux (ONL) from OCP</td>
</tr>
<tr>
<td>IP Infusion</td>
<td>IP Infusion</td>
<td>CGS Tower Networks</td>
<td>OpenSwitch from Linux Foundation</td>
</tr>
<tr>
<td>Pluribus Networks</td>
<td>Arcus</td>
<td>Pluribus Networks</td>
<td>Stratum from ONF</td>
</tr>
<tr>
<td>CGS Tower Networks</td>
<td>Radisys</td>
<td></td>
<td>ONOS from ONF</td>
</tr>
<tr>
<td></td>
<td>Volta Networks</td>
<td></td>
<td>DANOS from Linux Foundation</td>
</tr>
<tr>
<td></td>
<td>CGS Tower Networks</td>
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<td></td>
<td>ADVA</td>
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<td></td>
<td>Infinera</td>
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</tbody>
</table>

### DISAGGREGATED

- Netris.ai
- Apstra
- Field-proven for Cloud IDC best practice design
- Scale-Out in easy and smaller increments – Pay-As-You-Grow
- Simpler Network – Fewer Protocols to build larger network
- One-hop away predictable latency
- Multiple paths with ECMP for rich redundancy

Proven Cloud IDC CLOS/Leaf-Spine Design
Small-scale IDC with Spine-MLAG Design

SEBA (Software Enabled Broadband Access)
Option 1:
Introduce DCSG in Sub-Access or with new access fiber rings

Option 2:
Introduce DCSG in existing access or aggregation rings:
1. For service quality & capacity Enhancements
2. Upgrade of legacy equipment

5G Mobile Backhaul Network with Open Cell Site Router
Smart Campus with SDN

SDN Controller
1. ONOS controller
2. Ryu controller
3. ODL controller

SDN Switches
1. PicOS CrossFlow mode compatible switches
2. OF-DPA compatible switches

OpenFlow 1.0/1.3.1
About SONiC

SONiC Is Changing Networking Landscape
SONiC  Software for Open Networking in the Cloud

configuration and management tools

- Jenkins
- ANSIBLE
- kubernetes
- SWARM
- puppet
- CHEF
- 1ST party

SONiC components:
- Database
- Platform
- SWSS
- Utility
- TeamD
- LLDP
- RedisDB
- SYNCD

Switch Abstraction Interface (SAI)

Linux

Network switches with Linux and SONiC implementations.
OCP ecosystem enriched by SONiC

- Switch ASICs: SAI compatible
- Network Hardware: OCP approved
- Base OS installer: ONIE, ONL

Solution Provider

- SW components
- 3rd party module
- Build Your Own application
Edgecore OCP Platform with SONiC
Edgecore Global LAB (LAAS)

Where can you try Open Networking?

Mobile Labs available across Europe & APAC

Leaf & Spine

Central Office – 10G PON
NETRIS
The new automatic netops
LEADERSHIP TEAM

We were building and operating networks like you

Alex Saroyan  
CEO / Product, co-founder

Tigran Martirosyan  
Development, co-founder

Arsen Arakelyan  
Customer success, co-founder

Armen Hovhannisyan, PhD  
Network Architecture
BASED IN

Silicon Valley, California

Business
Product
Marketing
Sales

Yerevan, Armenia

Architecture
Development
Support
STRATEGIC ADVISORS

Mike Dvorkin
Inventor of Cisco ACI, thought leader in policy-driven infrastructure automation

Carly Stoughton
Go-to-market executive and product marketing expert specializing in infrastructure and AI
PUBLIC CLOUD

Allows us to focus on delivering great applications, by abstracting away configuration details

- Public cloud is flexible but very expensive
- Especially at scale
PRIVATE/HYBRID CLOUD

We need cloud user experience in our private infrastructures

1. Cost
2. Unpredictability of budget
3. Data/Edge processing
4. Lock-in
5. Business continuity

73% of respondents are migrating applications away from the public cloud back to private infrastructure

85% of enterprises rank hybrid cloud as the ideal IT operating model

Private Cloud CAGR: 30%, Local Cloud as-a-Service CAGR: 177% (src: idc)
TOOLS ARE AVAILABLE

Provide the same user experience
BUT NETWORK HAS A UX PROBLEM

Shockingly hard for anyone who's used to the public cloud

95% of outages attributed to propagation of bad configuration

$200B lost due to Network outages [2019 in US]
OPEN NETWORKING SWITCH?
Can open-source approach to networking hardware help here?
**WHAT IS IT?**

<table>
<thead>
<tr>
<th>Applications</th>
<th>Operating system</th>
<th>Abstraction layer</th>
<th>Merchant silicon</th>
<th>Switch</th>
</tr>
</thead>
<tbody>
<tr>
<td>FRR(routing daemon), Collectd(streaming), usual suspects</td>
<td>Linux Kernel (Switchdev), SAI, Commercial (Cumulus switchd)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>48 x 25/10G + (6-8) x 100/40G, 32 x (100-400)G</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>
HOW DO I CONFIGURE IT?

1) Find the mix you need
2) Configure manually using CLI & config files
3) Develop scripts that will configure CLI & config files
HOW DO I MONITOR & TROUBLESHOOT?

1) Using open source tools
2) Using commercial tools
3) By Developing your own arsenal fine tuned for your specific use case

Grafana

elasticsearch + logstash + kibana

influxdb

Prometheus
DEVOPS? APPLICATION PLATFORM?

Will require continuous investment of time and money

There are many moving parts.

The Glue == cloud UX

There's a lot of value in glue.
Netris is an automatic NetOps software that operates your physical network providing you with **cloud** user experience.

Simple policies by human & applications

Your “Config-less” Network running like a cloud

- **NetOps**
- **DevOps**
- **SecOps**
- **Infra**
- **Policies**

- **Border Router**
- **Load Balancer**
- **NAT, VPN**
- **L2/L3 Switching**

- **Machine-generated config**
- **Feedback loop**

Tools:
- kubernetes
- Terraform
- VMware vSphere
- switchdev
- SONIC
- Cumulus Networks
- DPDK
NETRIS

a **safe automatic operations** tool for modern open network architectures

1. Automate your netops
2. Eliminate costly manual errors
3. Get Cloud-like UX

**Automatic network with better UX**

- **80%**
  - OPS cost saving
- **90%**
  - OPS time
- **99.999%**
  - Uptime

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APPLICABLE USE-CASES + WHY NOW?

Everyone who experienced public cloud expects **cloud UX**

**Cloud repatriation**
1. **Cost**
2. **Budget unpredictability**
3. **Data/privacy**

- **81%** migrated some apps from public cloud to private/hybrid cloud

- **85%** Of enterprises rank hybrid cloud as the ideal IT operating model

**ML, Edge/Local processing**
1. **Model training cost**
2. **Latency**
3. **Cost of moving data**

“We have noticed that AI companies simply don’t have the same economic construction as software business. At times they can even look more like traditional service companies.” **Martin Cassado, A16z**

- **40%** plan to move on-prem
- **75%** savings to train models on-prem
- **77%** AI will be critical for their organization

**Local Kubernetes**

- **87%** of orgs. on k8s

- **1.5B** containers are running now

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src: IDC cloud & AI adoption survey 2019  
src: Cray: state of enterprise AI adoption 2019  
src: Container adoption survey
<table>
<thead>
<tr>
<th></th>
<th>Legacy Solution</th>
<th>Netris</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equipment</td>
<td>Cisco</td>
<td>Edge-core</td>
</tr>
<tr>
<td>Network OS</td>
<td>ACI</td>
<td>Cumulus Linux</td>
</tr>
<tr>
<td>Network CapEx</td>
<td>1x</td>
<td>0.1x (<strong>90%</strong> savings)</td>
</tr>
<tr>
<td>Network OpEx</td>
<td>1x</td>
<td>0.2x (<strong>80%</strong> savings)</td>
</tr>
<tr>
<td>Net change time</td>
<td>2-5 days</td>
<td>2-5 mins</td>
</tr>
</tbody>
</table>
THANK YOU

Let’s keep in touch

alex@netris.ai
https://netris.ai
http://netrisai.slack.com/
OCP Marketplace
https://www.opencompute.org/products

Past Events (recordings and slides)
https://www.opencompute.org/events/past-summits
https://www.opencompute.org/events/past-events

Social
https://www.youtube.com/user/OpenComputeProject
https://www.linkedin.com/groups/4152886/
@OpenComputePrj
https://www.facebook.com/groups/opencompute/
Open. For Business.

The Open Compute Project (OCP) is reimagining hardware, making it more efficient, flexible, and scalable. Join our global community of technology leaders working together to break open the black box of proprietary IT infrastructure to achieve greater choice, customization, and cost savings.

https://www.opencompute.org/solutions
Questions?
Thank You