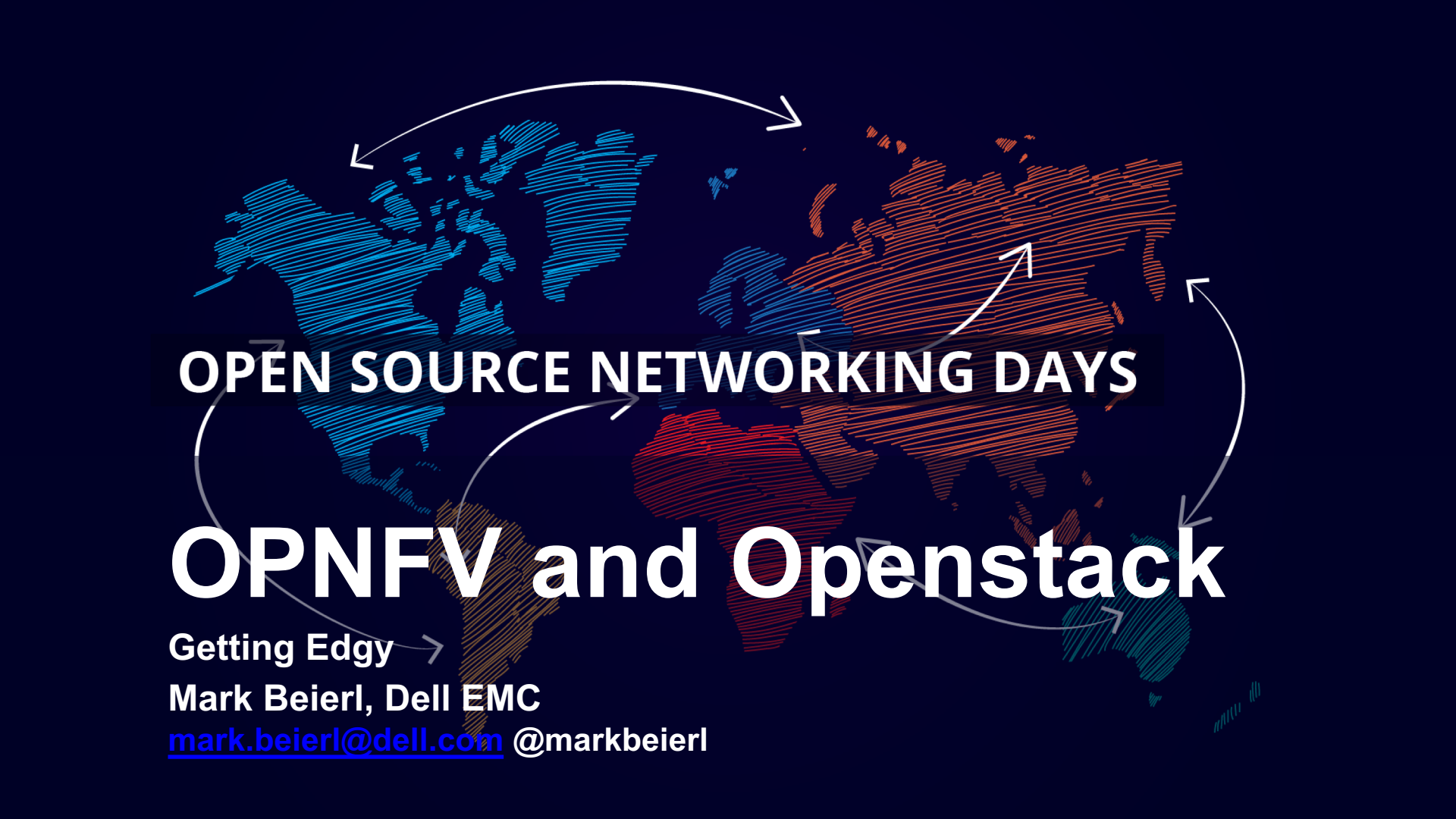


OPNFV and Openstack

Getting Edgy

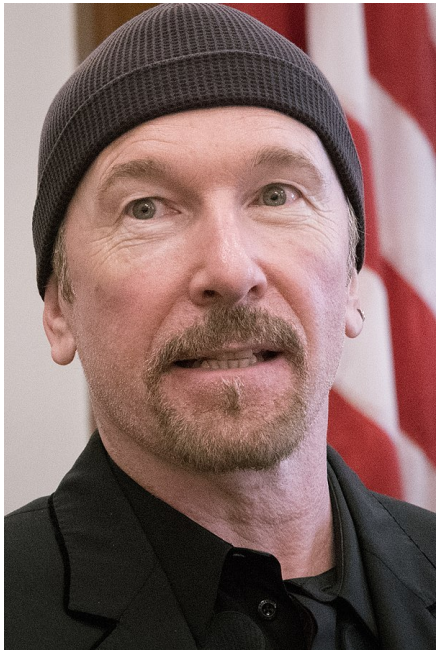
Mark Beierl, Dell EMC
mark.beierl@dell.com @markbeierl

What Exactly is The Edge?

- There is only one universally accepted definition for The Edge

David Howell Evans

(Lead guitarist, U2)



What Exactly is The Edge?

“The edge is anything that’s not cloud.” — Keith Townsend, The CTO-Advisor

“The edge is the bumper of a car.” — Anonymous

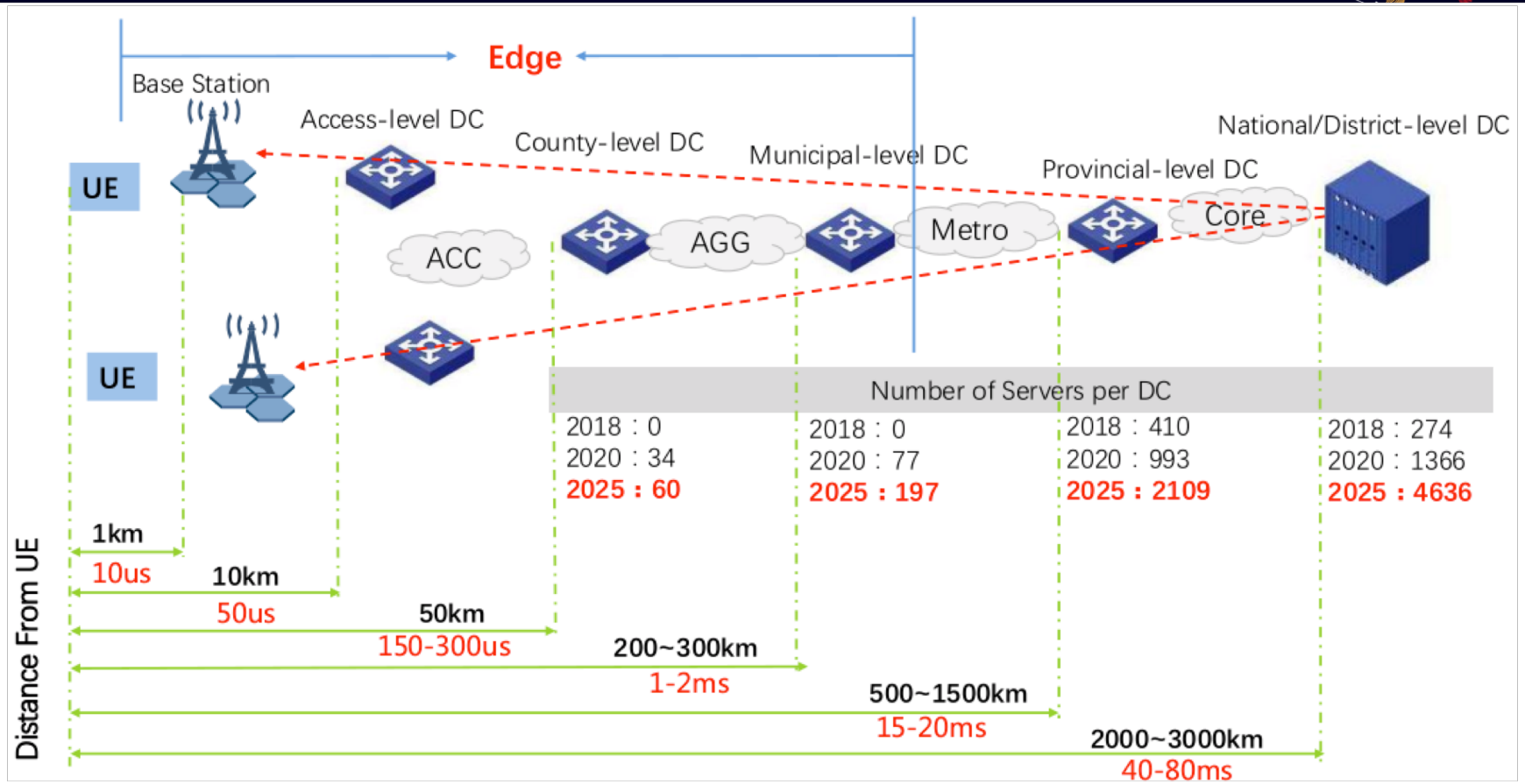
“Edge computing is compute that’s closer to the consumer.” — Mark Imbriaco, Pivotal

https://www.linuxfoundation.org/blog/2018/06/edge-computing-just-got-its-rosetta-stone/

Features For The Edge

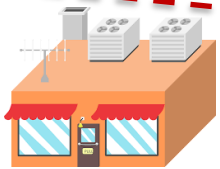
- Light weight control
- Resource Heterogeneity
- Remote provisioning
- Hardware/software acceleration
- Autonomous

Where Is The Edge? Telco China Mobile Example

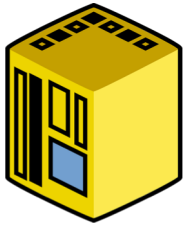


Retail Example – Clip Art Only

Edge



Stores



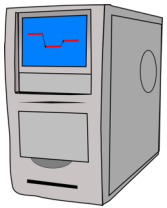
Regional Hub

Central Datacentre

Healthcare Example – Also Clip Art

Edge

Sensor Network



IoT Gateway

Central Datacentre

And Why is This Important?

- Faster data processing and analysis
- Less network traffic (backhaul)
- Increased efficiency
- Lower costs
- Increased security/compliance
- Legacy interoperability

What's Missing from OpenStack?

- Scale (# of edge sites)
  - Single pane of glass at the regional datacentre
  - Services not multi-cloud aware
  - Availability when network not reliable
- Federation
  - Single source of truth for services
- Caching

What is OPNFV?

- Founded in 2015, became LF project 2018
- Integration with other open source projects to meet the needs of NFV requirements
- New Features
- Testing of the entire stack

What is OPNFV Doing?

- Established Edge WG
  - Solicit feedback from End User Advisory Group
  - Provide unified view of activities to collaborate and avoid duplication
  - Maintain list of perceived gaps in upstream
  - Develop position in regards to ETSI MEC

What is OPNFV Doing?

- Collaborating with upstream
  - Defining use cases, test cases
  - Keystone and Glance for edge testing
  - Seeking to integrate StarlingX as scenario
  - Define and create execution environments
- Creating Edge Deployment
  - Define Edge scenario for testing

OPNFV Edge Projects

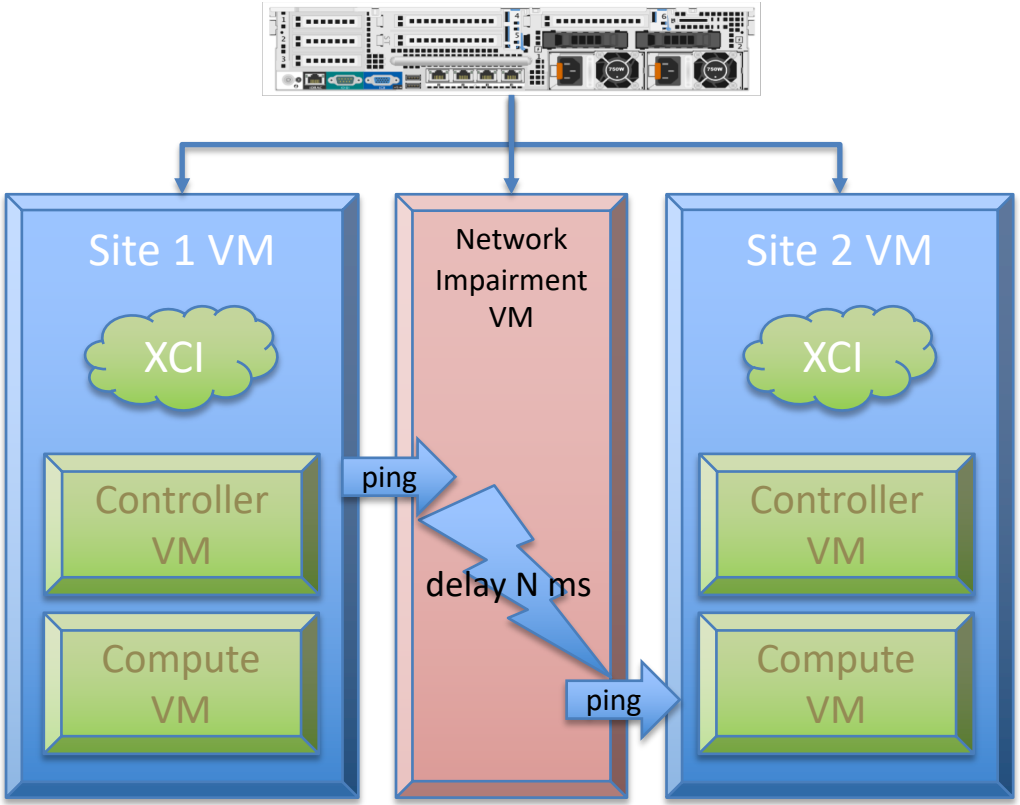
- Auto – ONAP integration
- C-RAN – Use case definition for mobile radio access networks
- Cloud Edge – Reference Platform
- Clover – VNF containerization
- DPACC – Data plane acceleration
- Rocket – Acceleration API

OPNFV XCI

- Cross (X) Community Installer
- Based on Bifrost/Ironic
- OpenStack installation from Master
- Scale/sizing
  - Mini – everything in VMs on single server
  - HA – 3 controller, 2 compute bare metal

OPNFV Edge Simulation

- OPNFV XCI
  - Mini flavour installs OpenStack from master in VMs
  - 2 full OpenStack environments in 1 server
- Impairment VM



OPNFV Keystone Federation Testing

- Work in progress
- Set up two sites with network impairment
- Deploy Keystone on both
- Regional site Keystone is IdP
- Edge site Keystone uses Shibboleth as SP

Value of Keystone Testing

- Prove federation works
  - It does, but not the way originally envisioned
- Discover limitations
  - Authentication when network is down
  - Synchronization of passwords
  - Centralized limits enforcement

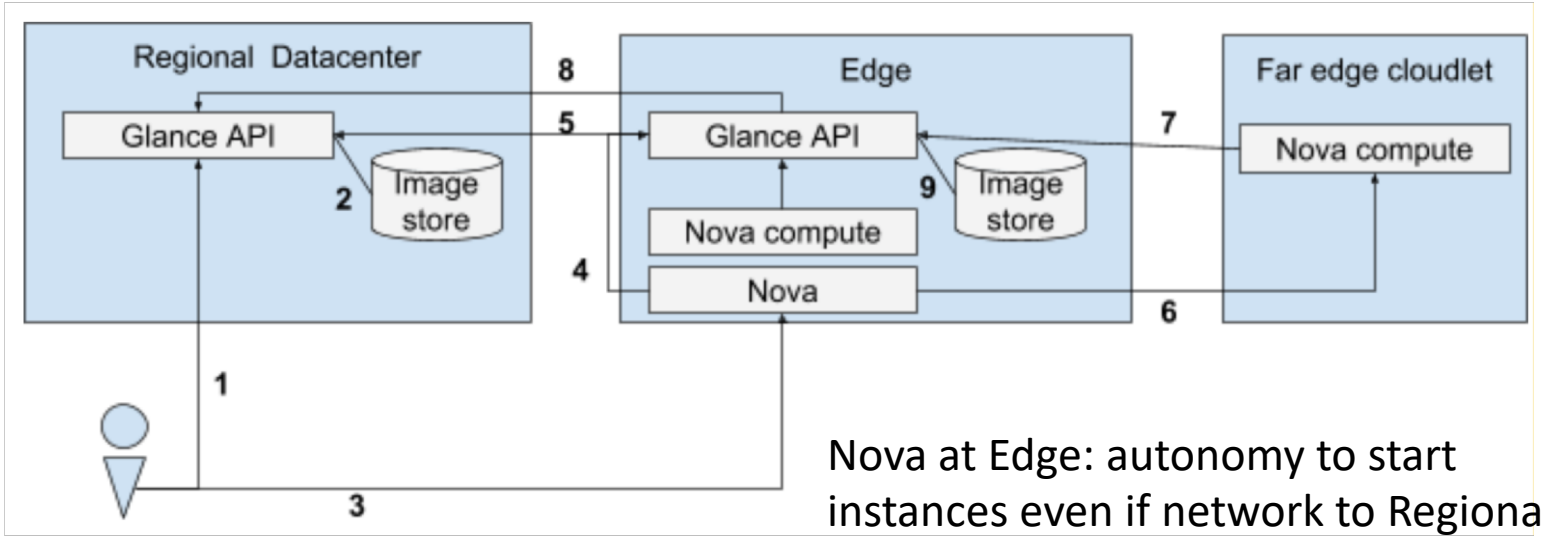
Glance Image Handling at the Edge

As a user of Glance, want to upload an image in the regional datacenter and boot that image in an edge datacenter: fetch the image to the edge datacenter with its metadata.

OPNFV Glance Testing

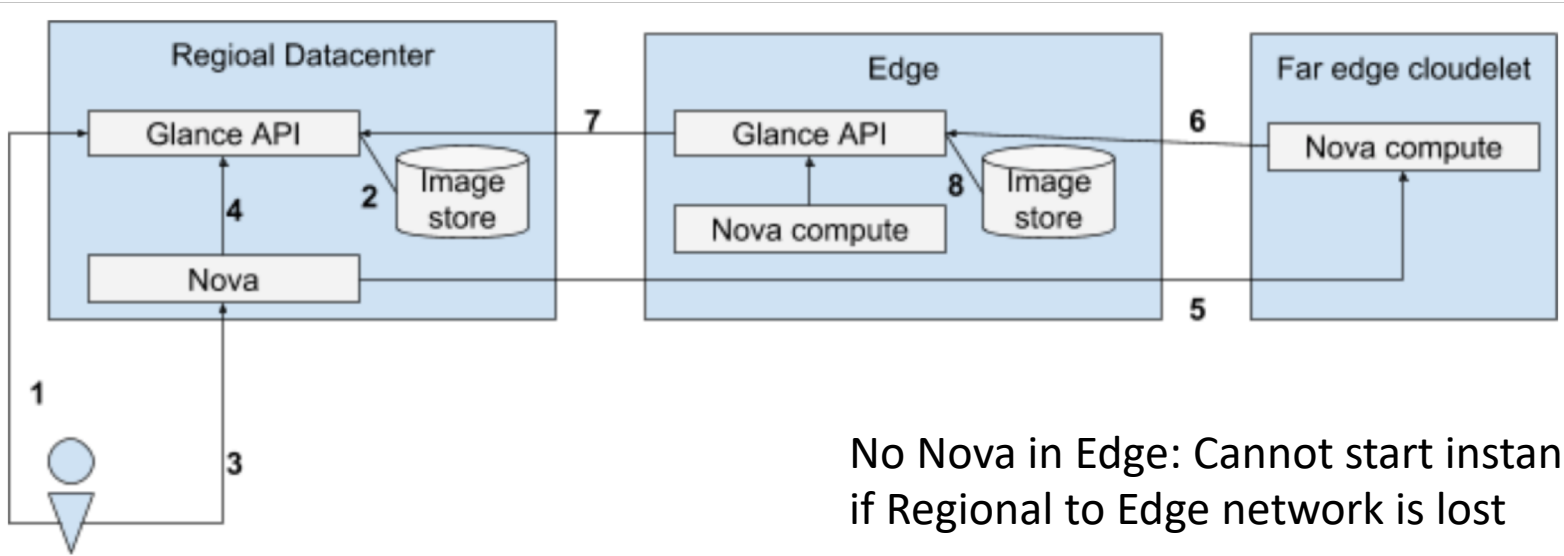
- Image distribution to edge sites
- How is Glance affected by
  - Latency? Packet Loss?
  - Interruption of network
  - Image Size?

Glance Image Caching – Distributed Control



Nova at Edge: autonomy to start instances even if network to Regional is lost

Glance Image Caching – Centralized Control



No Nova in Edge: Cannot start instances if Regional to Edge network is lost

OPNFV Investigation Points for Edge

- Acceleration
- Containers and Kubernetes
- OpenStack - light weight
- SDN Controller
- Orchestration

Where Do We Go From Here?

- Participate!
  - OpenStack Edge Working Group
  - OPNFV
  - StarlingX
  - Akraino
  - Airship

References

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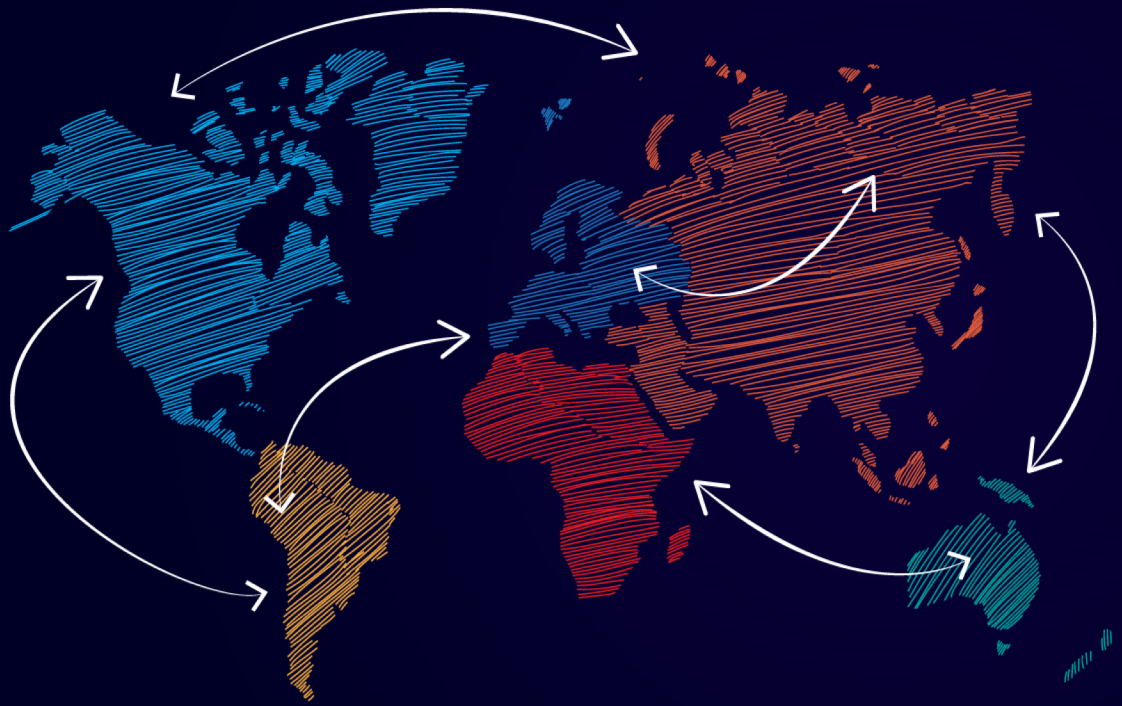
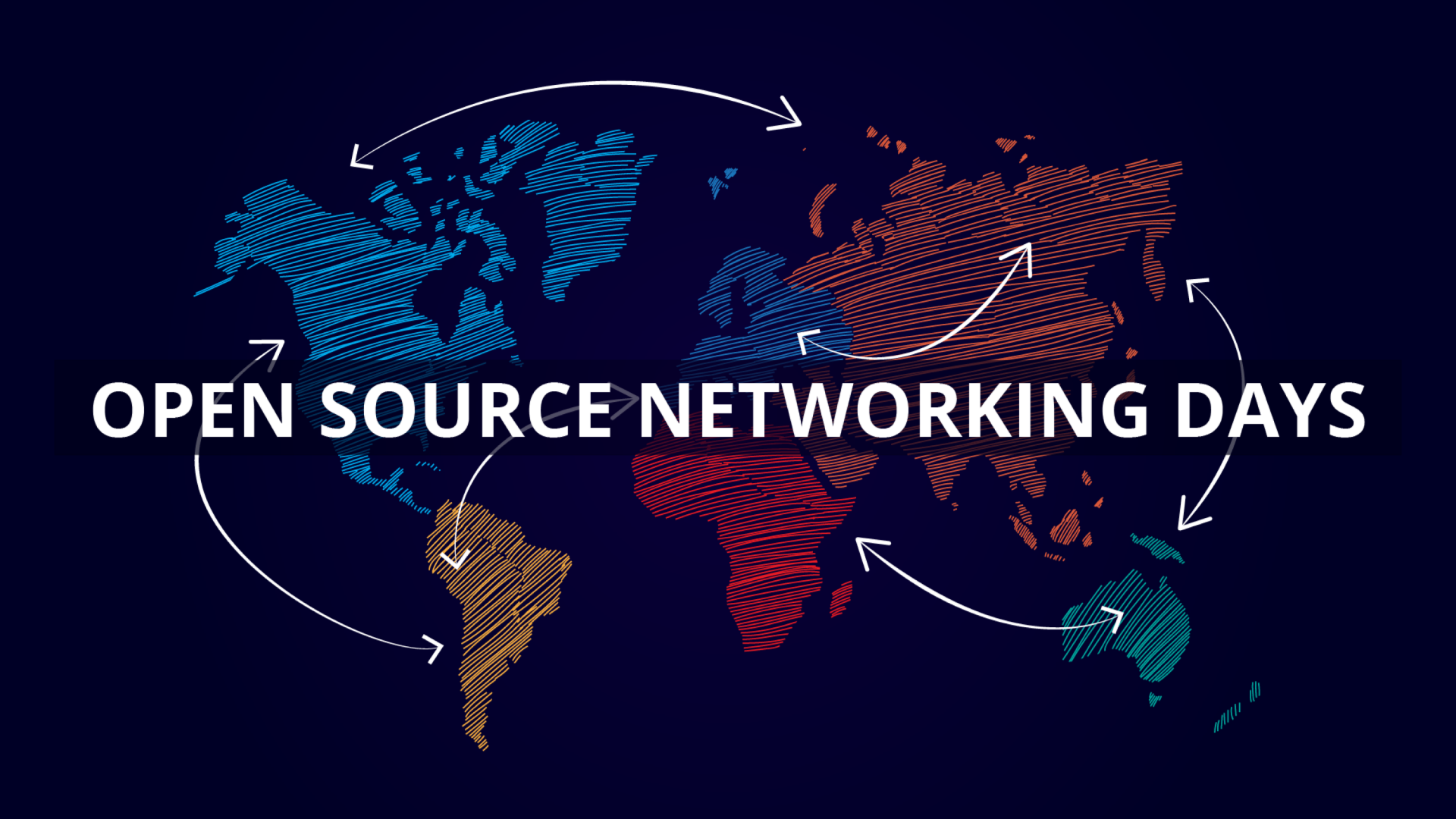


Q&A?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