

Lessons for Open Source Networking from the Growth of Cloud Native

Dan Kohn, Executive Director, [@dankohn1](https://twitter.com/dankohn1)

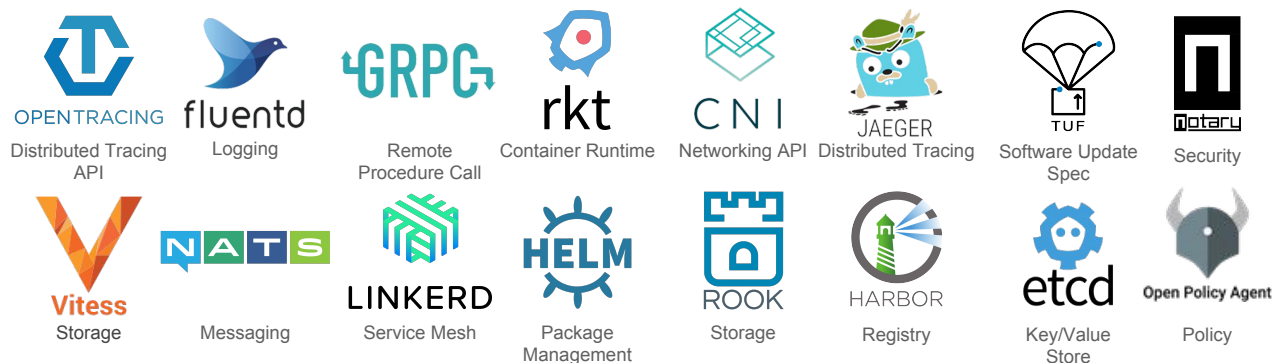
Cloud Native Computing Foundation

- Nonprofit, part of the Linux Foundation; founded Dec 2015

Graduated



Incubating

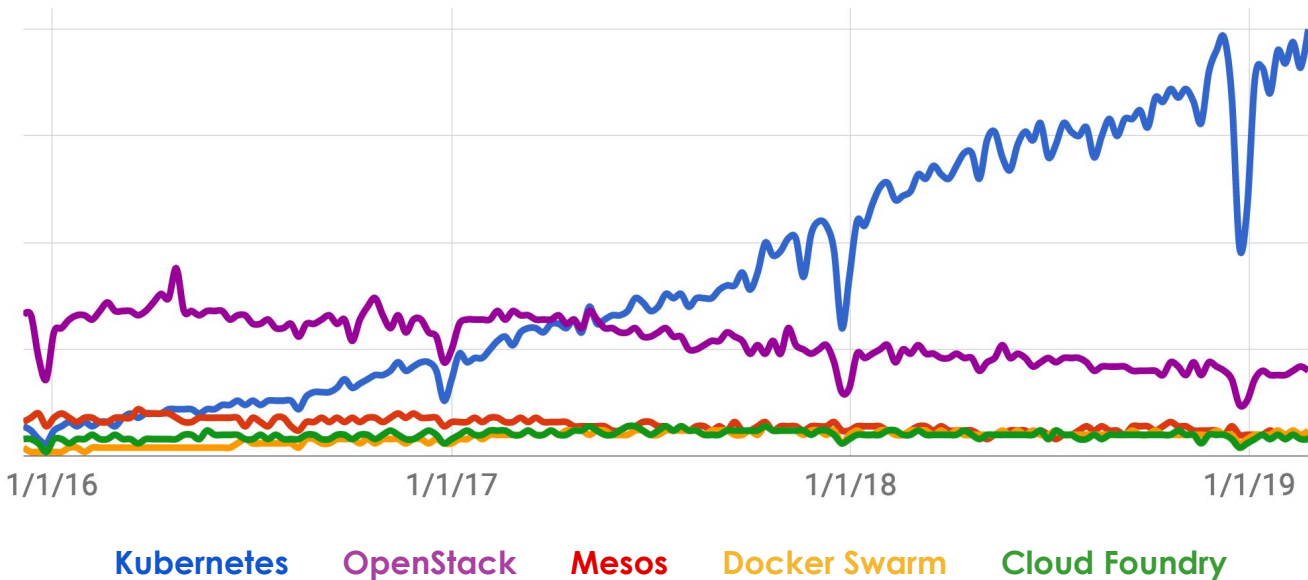


- Platinum members:

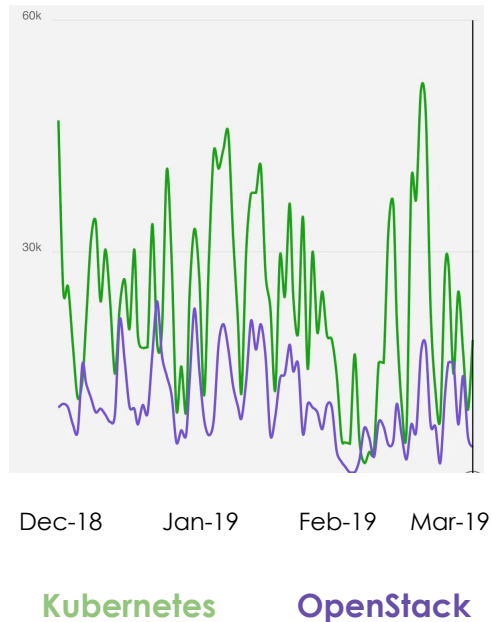


Kubernetes in Search Trends

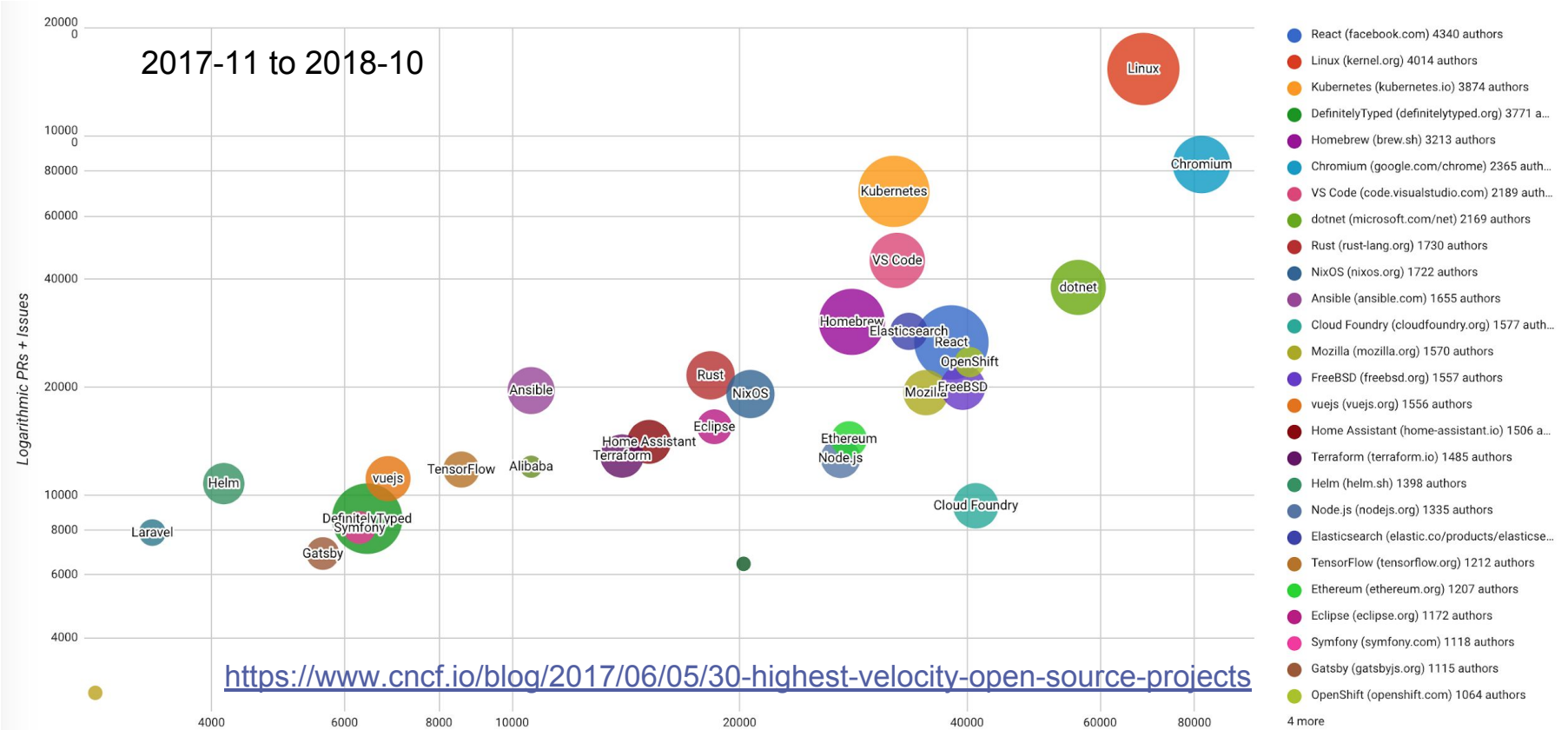
Google Trends



WeChat



30 Highest Velocity Open Source Projects



83 Certified Kubernetes Partners



1. Loose coupling

Host a number of loosely integrated projects

2. Minimize toil

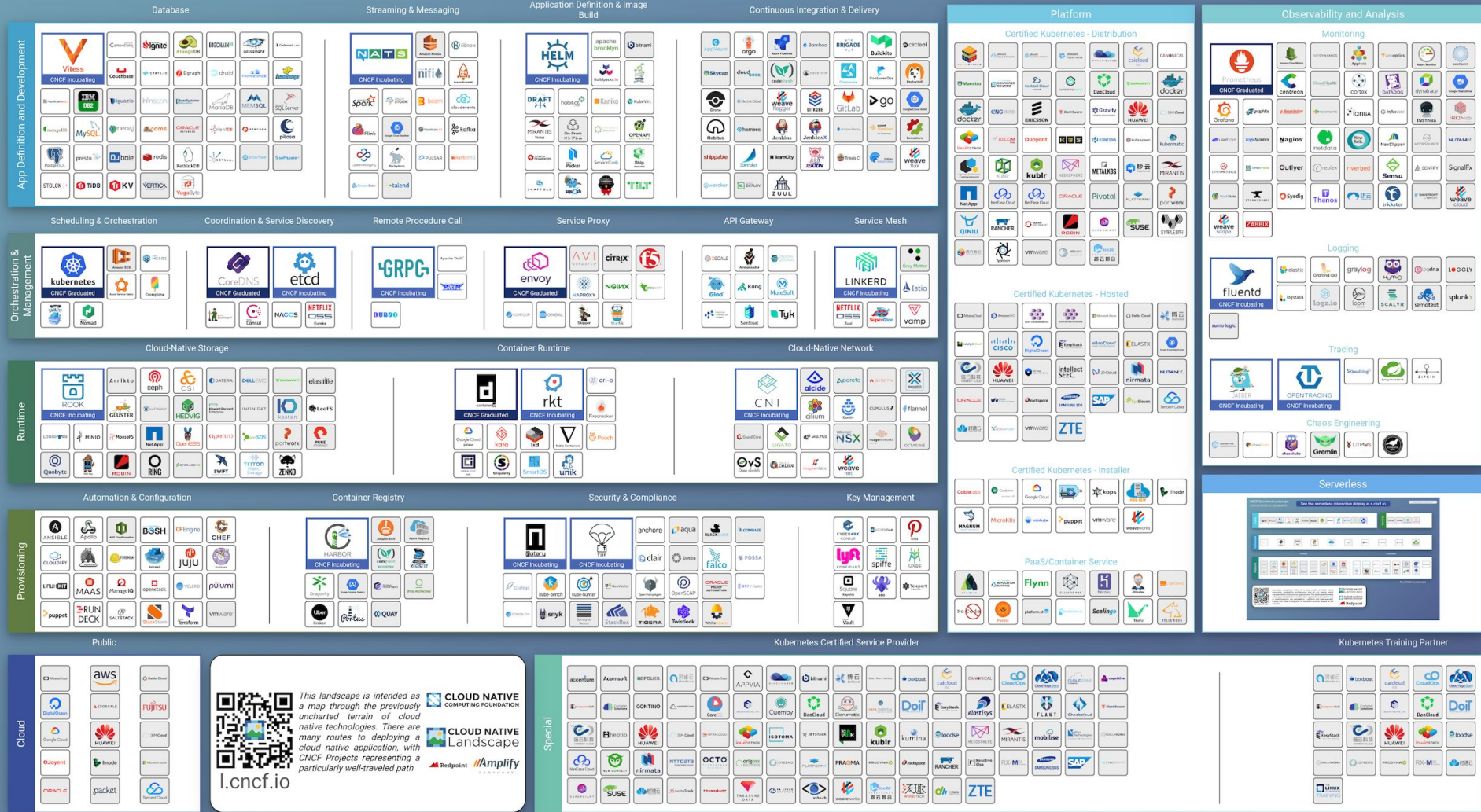
Provide the infrastructure for collaboration



CLOUD NATIVE
COMPUTING FOUNDATION

3. Market a vision

Show the options but offer a recommended path



CLOUD NATIVE TRAIL MAP

The Cloud Native Landscape (landscape.cncf.io) has a large number of options. This Cloud Native Trail Map is a recommended process for leveraging open source, cloud native technologies. At each step, you can choose a vendor-supported offering or do it yourself, and everything after step #3 is optional based on your circumstances.

HELP ALONG THE WAY

A. Training and Certification

Consider training offerings from CNCF and then take the exam to become a Certified Kubernetes Administrator or a Certified Kubernetes Application Developer cncf.io/training

B. Consulting Help

If you want assistance with Kubernetes and the surrounding ecosystem, consider leveraging a Kubernetes Certified Service Provider cncf.io/csp

C. Join CNCF's End User Community

For companies that don't offer cloud native services externally cncf.io/enduser

WHAT IS CLOUD NATIVE?

Cloud native technologies empower organizations to build and run scalable applications in modern, dynamic environments such as public, private, and hybrid clouds. Containers, service meshes, microservices, immutable infrastructure, and declarative APIs exemplify this approach.

These techniques enable loosely coupled systems that are resilient, manageable, and observable. Combined with robust automation, they allow engineers to make high-impact changes frequently and predictably with minimal toil.

The Cloud Native Computing Foundation seeks to drive adoption of this paradigm by fostering and sustaining an ecosystem of open source, vendor-neutral projects. We demonstrate state-of-the-art patterns to make these innovations accessible for everyone.

l.cncf.io

v20190403



1. CONTAINERIZATION

- Commonly done with Docker containers
- Any size application and dependencies (even PDP-11 code running on an emulator) can be containerized
- Over time, you should aspire towards splitting suitable applications and writing future functionality as microservices

3. ORCHESTRATION & APPLICATION DEFINITION

- Kubernetes is the market-leading orchestration solution
- You should select a Certified Kubernetes Distribution, Hosted Platform, or Installer: cncf.io/k
- Helm Charts help you define, install, and upgrade even the most complex Kubernetes application



5. SERVICE PROXY, DISCOVERY, & MESH

- CoreDNS is a fast and flexible tool that is useful for service discovery
- Envoy and Linkerd each enable service mesh architectures
- They offer health checking, routing, and load balancing



7. DISTRIBUTED DATABASE & STORAGE

When you need more resiliency and scalability than you can get from a single database, Vitess is a good option for running MySQL at scale through sharding. Rook is a storage orchestrator that integrates a diverse set of storage solutions into Kubernetes. Serving as the "brain" of Kubernetes, etcd provides a reliable way to store data across a cluster of machines.



9. CONTAINER REGISTRY & RUNTIME

Harbor is a registry that stores, signs, and scans content. You can use alternative container runtimes. The most common, all of which are OCI-compliant, are containerd, rkt and CRI-O.

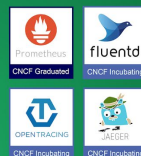


2. CI/CD

- Setup Continuous Integration/Continuous Delivery (CI/CD) so that changes to your source code automatically result in a new container being built, tested, and deployed to staging and eventually, perhaps, to production
- Setup automated rollouts, roll backs and testing

4. OBSERVABILITY & ANALYSIS

- Pick solutions for monitoring, logging and tracing
- Consider CNCF projects Prometheus for monitoring, Fluentd for logging and Jaeger for Tracing
- For tracing, look for an OpenTracing-compatible implementation like Jaeger



6. NETWORKING & POLICY

To enable more flexible networking, use a CNI-compliant network project like Calico, Flannel, or Weave Net. Open Policy Agent (OPA) is a general-purpose policy engine with uses ranging from authorization and admission control to data filtering.



8. STREAMING & MESSAGING

When you need higher performance than JSON-RPC, consider using gRPC or NATS. gRPC is a universal RPC framework. NATS is a multi-modal messaging system that includes request/reply, pub/sub and load balanced queues.



10. SOFTWARE DISTRIBUTION

If you need to do secure software distribution, evaluate Notary, an implementation of The Update Framework.

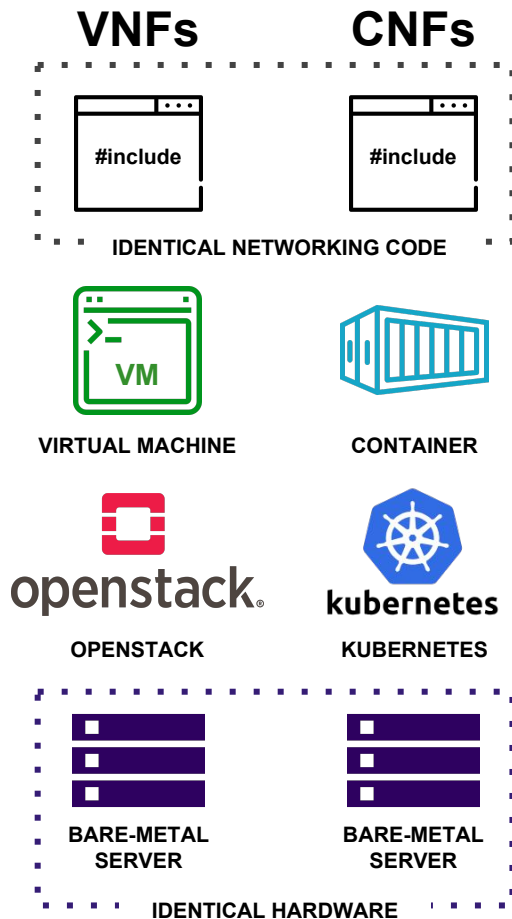


Cloud Native Trail Map

Trail Map: l.cncf.io

CNF Testbed

- Open source [initiative](#) from CNCF
- Compare performance of:
 - Virtual Network Functions (VNFs) on OpenStack, and
 - Cloud native Network Functions (CNFs) on Kubernetes
- Identical networking code packaged as:
 - containers, or
 - virtual machines (VMs)
- Running on top of identical on-demand hardware from the bare metal hosting company [Packet](#)
- See [presentation](#) for more information

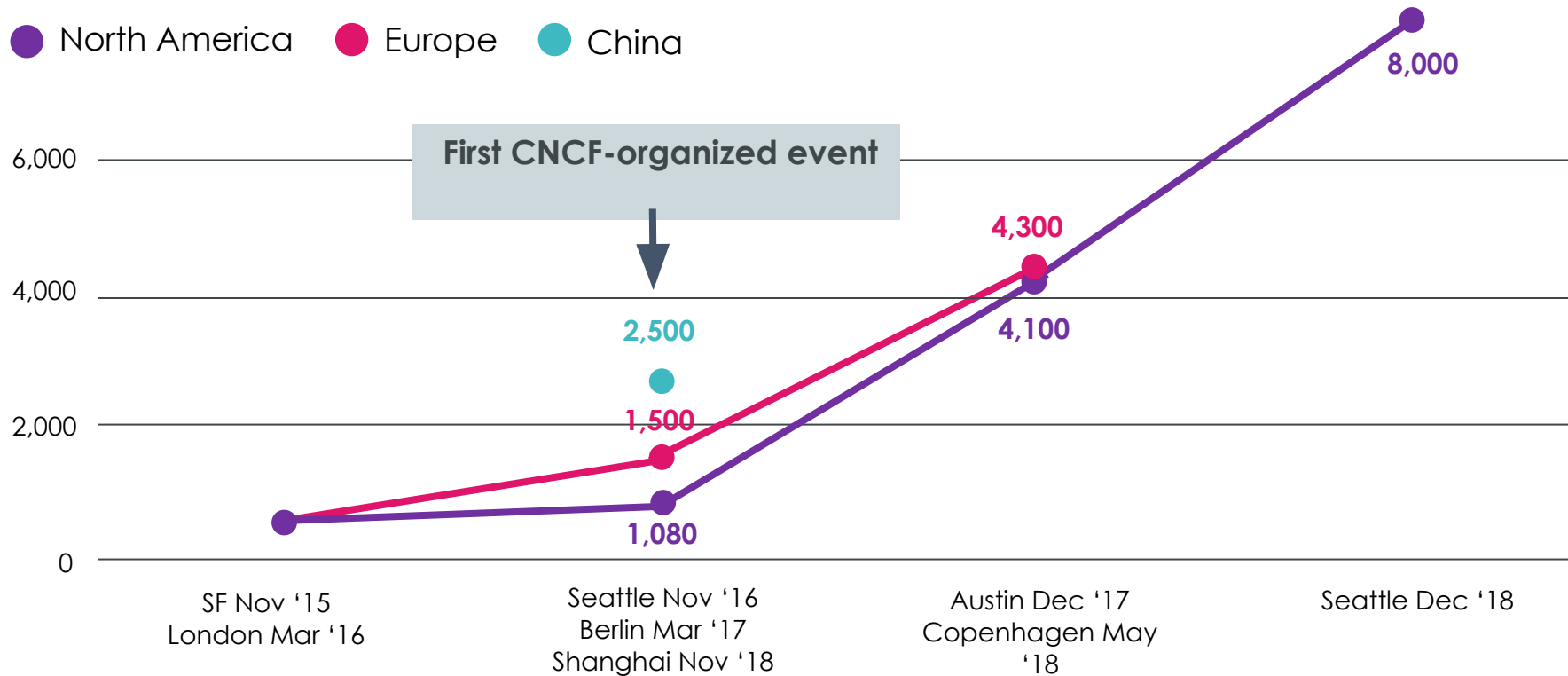


KubeCon + CloudNativeCon

- Europe 2019 (sponsorships open)
 - [Barcelona](#): May 20-23, 2019
- China 2019 (sponsorships open)
 - [Shanghai](#): June 24-26, 2019
- North America 2019 (sponsorships open)
 - [San Diego](#): November 18-21, 2019



KubeCon + CloudNativeCon Attendance



Please follow up with Dan Kohn

dan@linuxfoundation.org, [@dankohn1](#) on Twitter

This presentation is available at:

<https://github.com/cncf/presentations>



CLOUD NATIVE
COMPUTING FOUNDATION