
KubeCon
CloudNativeCon
Europe 2023

Chaos Mesh

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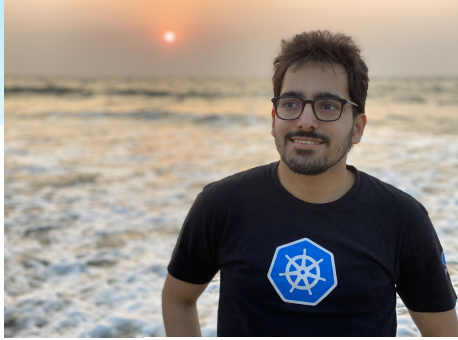
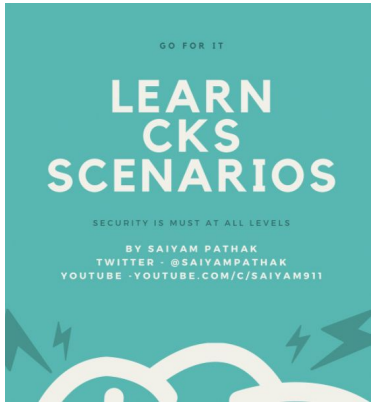


- Director of Technical Evangelism at Civo
- Building the Next Gen simplified Kubernetes service on Civo
- CNCF Ambassador
- Author - Learn CKS Scenarios - https://gumroad.com/l/cksbook
- Organizes: CNCF, Docker, Rancher, Influx Meetups
- Founder - Kubesimplify
- @saiyampathak on twitter



Storyline

- What is Chaos Engineering?
- Where does Chaos Engineering fit in?
- Chaos Engineering principles
- Introduction to Chaos Mesh
- What’s new in Chaos Mesh
- Demos!
- Get involved

Cultural changes &
Complexity
=
The biggest challenges
to using containers

2020 CNCF Survey

Complexity...

Simple Systems

- Linear
- Predictable Output
- Comprehensible

Complex Systems

- Nonlinear
- Unpredictable Behavior
- Impossible to build a complete mental model

Chaos Engineering Book (Chapter 1)

Testing is hard...

Enter Chaos Engineering...

The discipline of experimenting on a system in order to build confidence in the system's capability to withstand turbulent conditions in production.

What is Chaos Engineering (principlesofchaos.org)

Testing versus Experimentation

Testing makes an assertion on a property of the system based on existing knowledge, and then validate that property.

Experimentation proposes a hypothesis, which is proven or disproven. As long as the hypothesis is not disproven, confidence grows in the hypothesis. If it is disproven, then we learn something new, and figure out why the hypothesis was wrong.

Practicing Chaos Engineering...

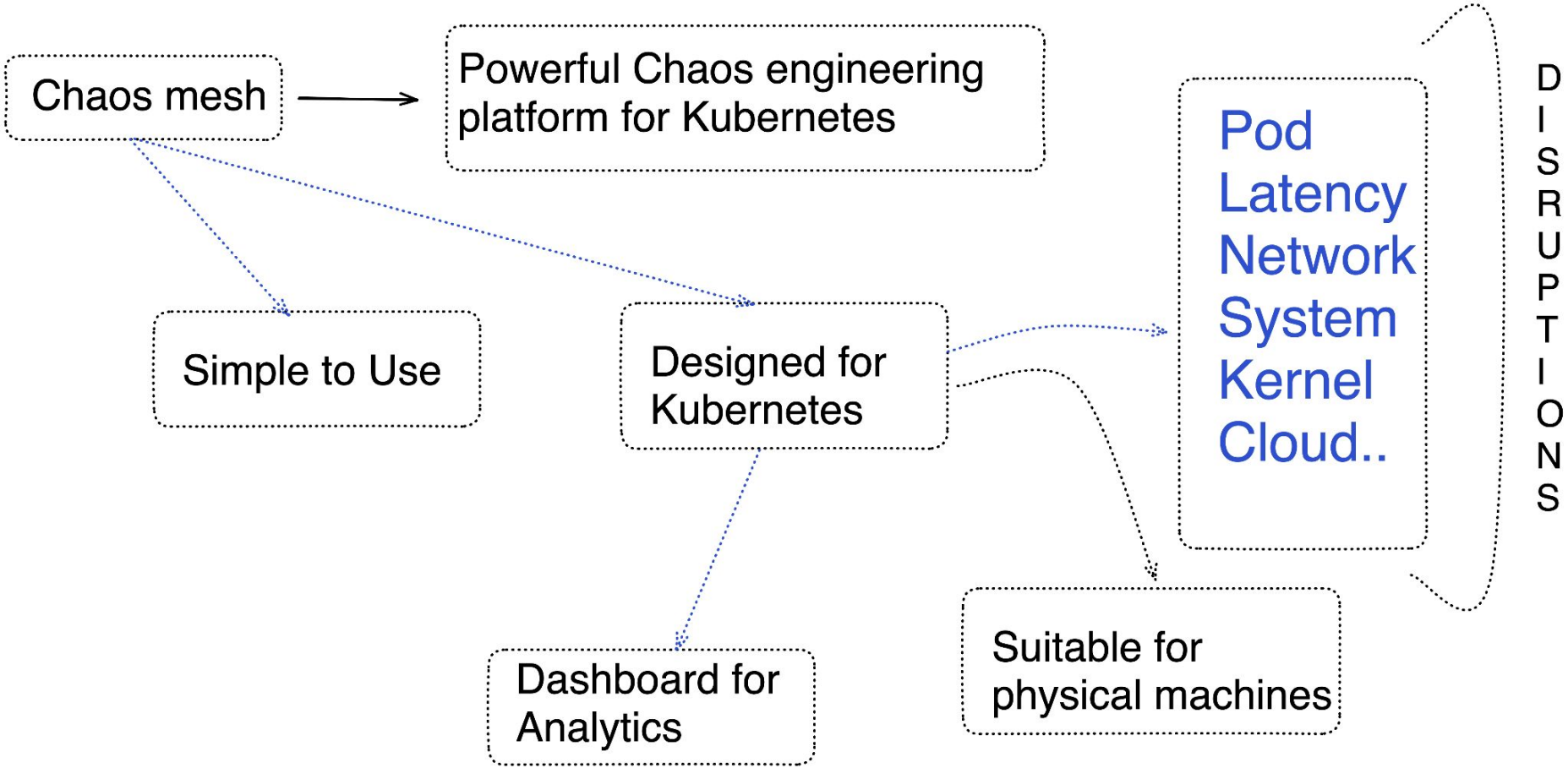
From Principles of Chaos:

1. Define ‘steady state’- so you know what normal behavior looks like.
2. Hypothesize that steady state will continue in the control group & experimental group.
3. Introduce variables that reflect real world events to the system.
4. Try to disprove the hypothesis by looking for a difference in steady state between the control group and the experimental group.

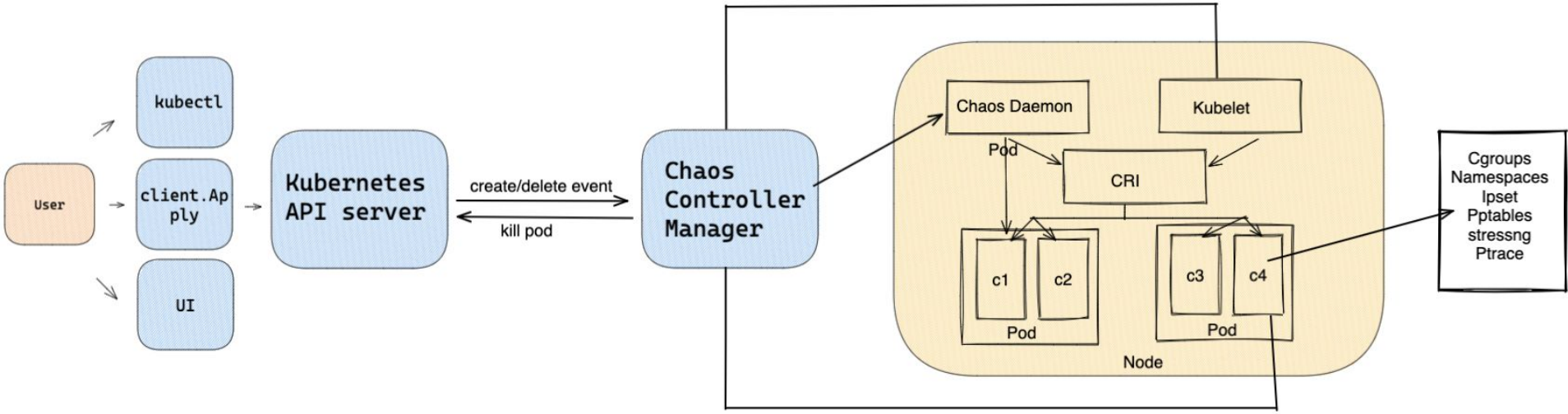
Advanced Principles

- Build a hypothesis around steady state behavior
  - Measurable outputs versus internal attributes.
  - Outside in approach
- Vary real world events
  - Examples: Turn things off, Slow things down, send invalid responses etc.
- Run Experiments in Production
  - Guarantees authenticity.
- Minimize Blast Radius
  - Remember you’re in production :)
- Continuous!
  - Road to Continuous Verification

Introduction to Chaos Mesh


Chaos mesh
Powerful Chaos engineering platform for Kubernetes
Simple to Use
Designed for Kubernetes
Dashboard for Analytics
Suitable for physical machines
Pod
Latency
Network
System
Kernel
Cloud..
DISRUPTIONS

Chaos Mesh Architecture


kubectl
User
client.Apply
UI
Kubernetes API server
create/delete event
kill pod
Chaos Controller Manager
Chaos Daemon
Kubelet
Pod
CRI
c1
c2
Pod
c3
c4
Pod
Node
Cgroups
Namespaces
Ipset
Pptables
stressng
Ptrace

What's new in Chaos Mesh?

Version 2.0

PodChaos, NetworkChaos, JVMChaos, I/OChaos, StressChaos, HTTPChaos, GCPChaos, DNSChaos, KernelChaos, TimeChaos, AWSChaos, AzureChaos, BlockChaos & PhysicalMachineChaos

Version 2.5

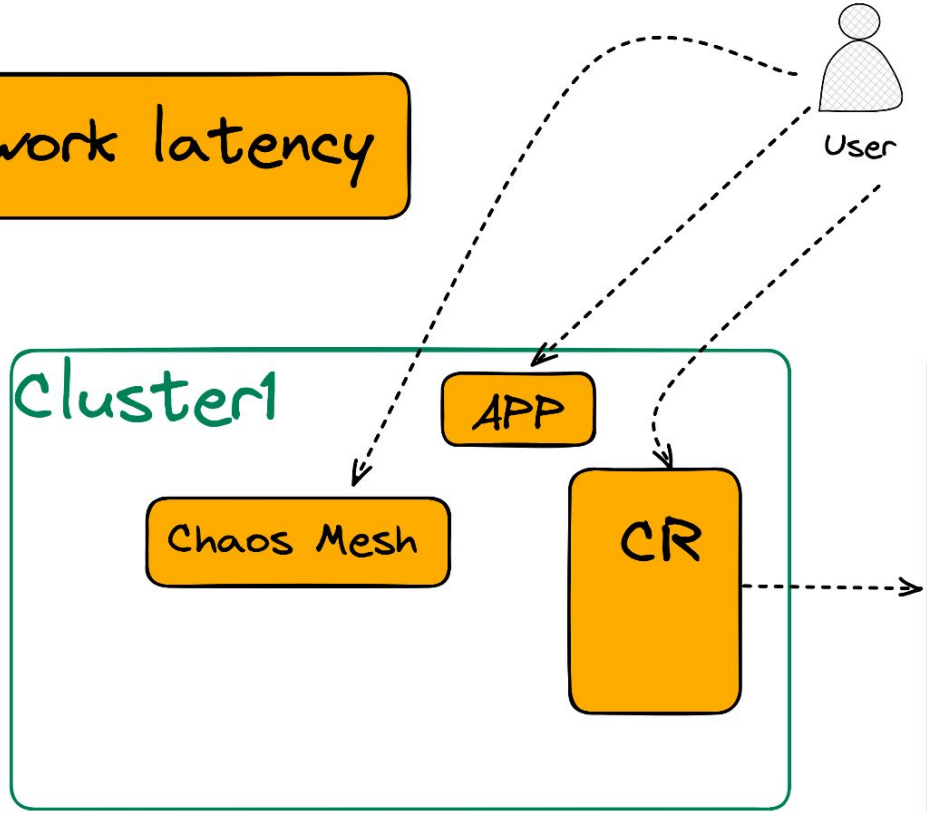
Multi-Cluster Chaos Experiments
HTTPChaos TLS Support
Enabled new workflow UI by default

HTTP chaos with TLS is a way to bypass the TLS using self signed cert

Demo’s

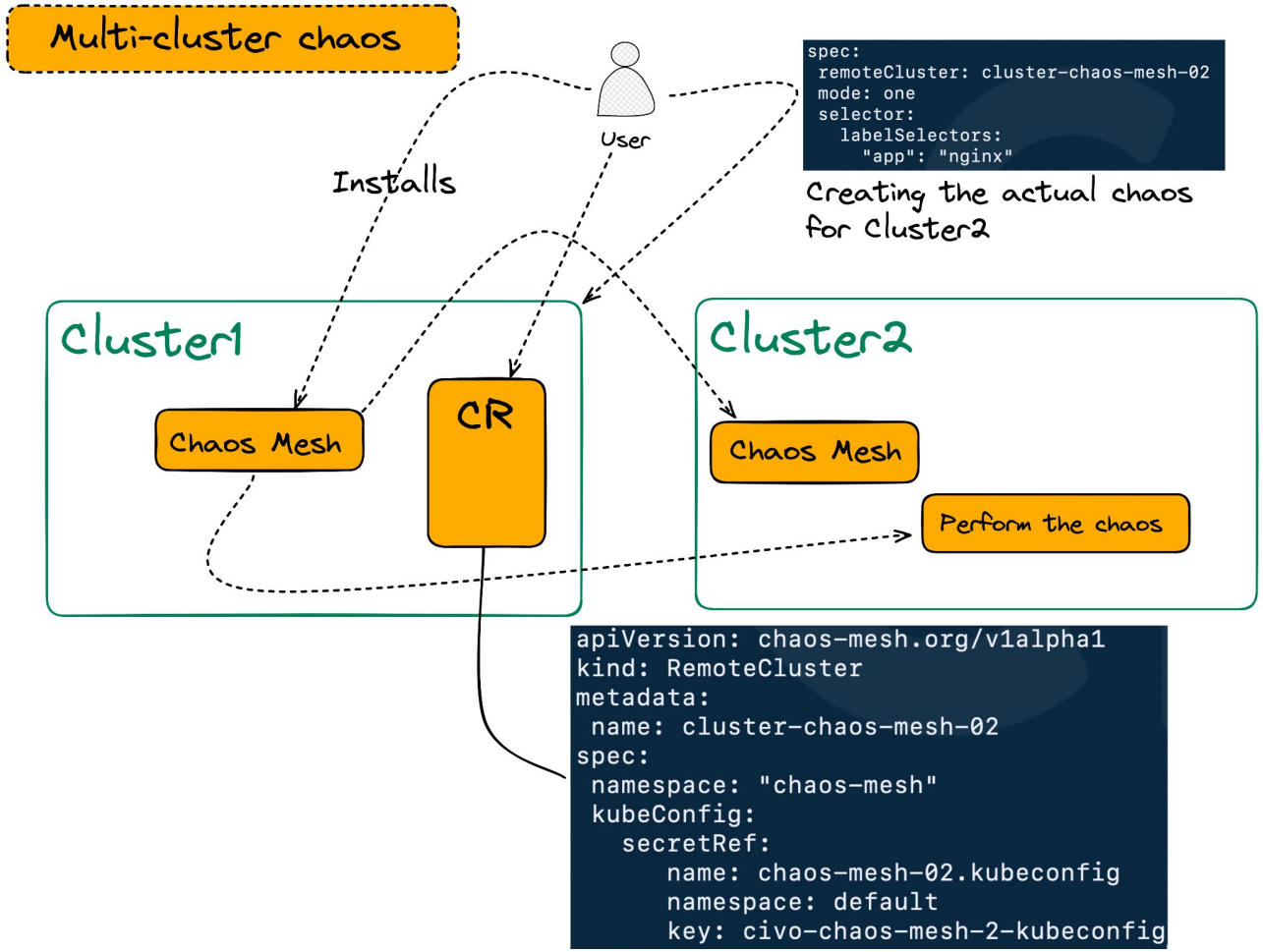
Demo1

pod network latency



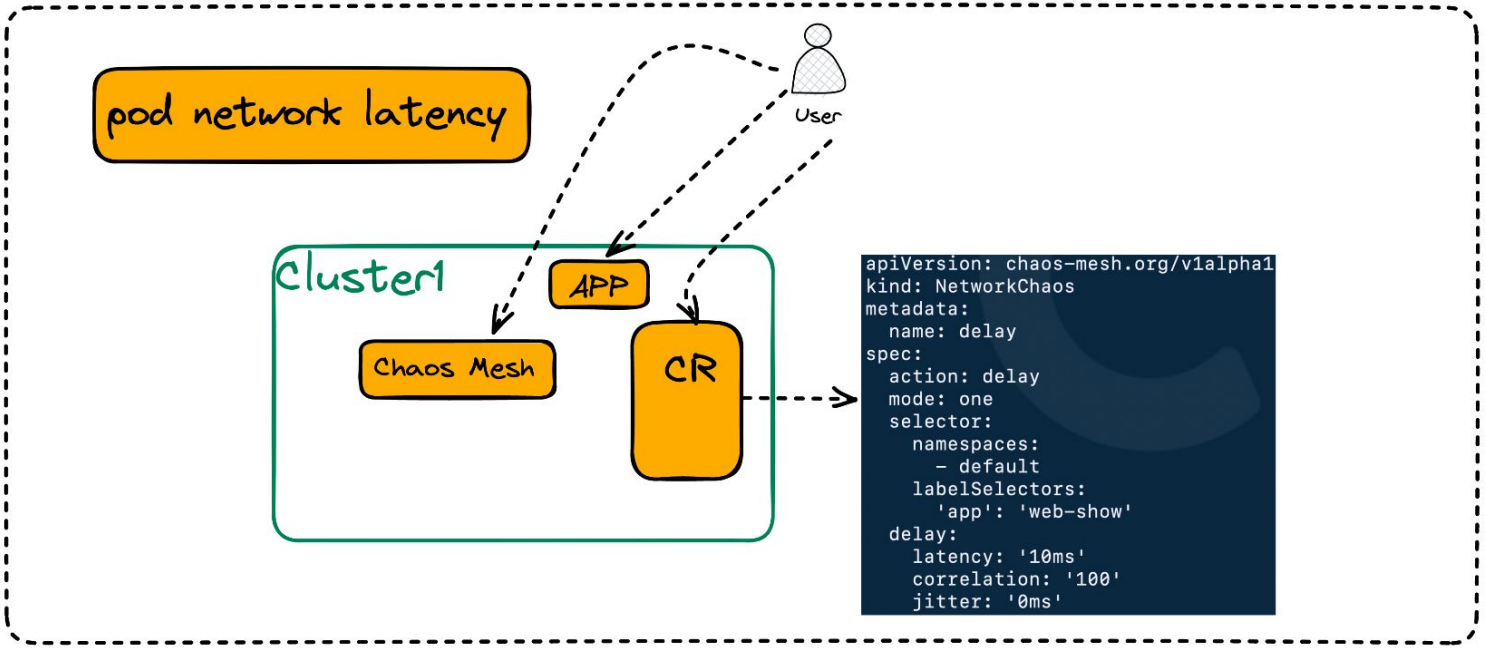

```yaml
apiVersion: chaos-mesh.org/v1alpha1
kind: NetworkChaos
metadata:
  name: delay
spec:
  action: delay
  mode: one
  selector:
    namespaces:
      - default
    labelSelectors:
      'app': 'web-show'
  delay:
    latency: '10ms'
    correlation: '100'
    jitter: '0ms'
```

Demo2


Multi-cluster chaos
User
Installs
spec:
remoteCluster: cluster-chaos-mesh-02
mode: one
selector:
labelSelectors:
"app": "nginx"
Creating the actual chaos for Cluster2
Cluster1
Chaos Mesh
CR
Cluster2
Chaos Mesh
Perform the chaos
apiVersion: chaos-mesh.org/v1alpha1
kind: RemoteCluster
metadata:
name: cluster-chaos-mesh-02
spec:
namespace: "chaos-mesh"
kubeConfig:
secretRef:
name: chaos-mesh-02.kubeconfig
namespace: default
key: civo-chaos-mesh-2-kubeconfig

Demo3

Workflow



Recommendations

- Chaos Engineering is nascent.
- Learn the theory of Chaos Engineering.
- Talk to the maintainers and practitioners.
- **Communicate Communicate Communicate** your experiments!
- Chaos Engineering is expected to grow even more.
- Work towards continuous chaos.
- Keep eye on new features in Chaos mesh and the project is ever getting better day by day.
- Join the Chaos Community
    - https://groups.google.com/g/chaos-community
    - https://www.meetup.com/en-AU/Kubernetes-Chaos-Engineering-Meetup-Group

Getting involved

Docs

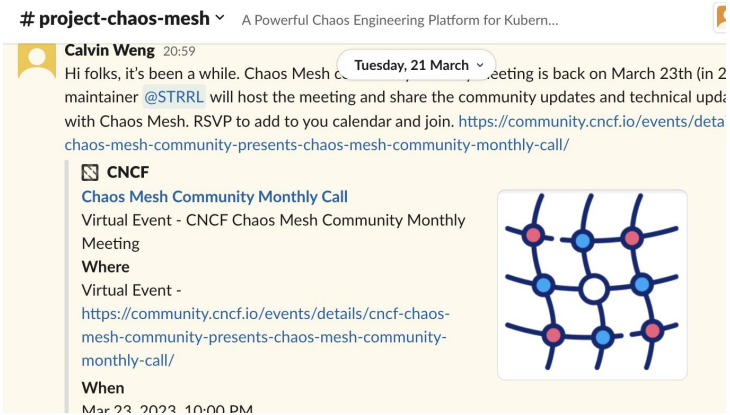
New experiments

Feedback

New features

slack

CNCF Slack
#project-chaos-mesh



Thank you!

@SaiyamPathak

Resources

- Chaos Principles: https://principlesofchaos.org/
- Chaos Mesh Documentation: https://chaos-mesh.org/docs/
- GitHub Repo: https://github.com/chaos-mesh/chaos-mesh