



LitmusChaos and Argo workflow

*Uma Mukkara (MayaData)
Sumit Nagal (Intuit)*

Chaos workflows with Litmus and Argo



CloudNativeCon

North America 2020

Virtual



Uma Mukkara

VP of DevOps and COO, Mayadata



Sumit Nagal

Principal Software Engineer, Intuit

About Me



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Co-founder & COO at  **MayaData**

Co-Creator of
OpenEBS and Litmus projects



My interests

- Cloud Native Data Management
- Cloud Native Chaos Engineering

Primary job

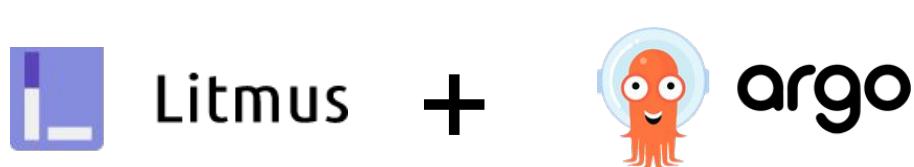
- Maintainer at LitmusChaos
- Work with SREs
- SaaS operations
- DevOps

In this session



Virtual

- Introduction to LitmusChaos
- Introduction to Argo workflow
- Demo of a chaos workflow using Litmus and Argo



Introduction to LitmusChaos



About Litmus



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Litmus



CLOUD NATIVE
SANDBOX

- **Mission statement** : Help Kubernetes SREs and developers in bringing out weaknesses in Kubernetes deployments
- **Maintainers**: From MayaData, Intuit and Amazon
- **ChaosHub**: <https://hub.litmuschaos.io>

37

Experiments

17971

Installed

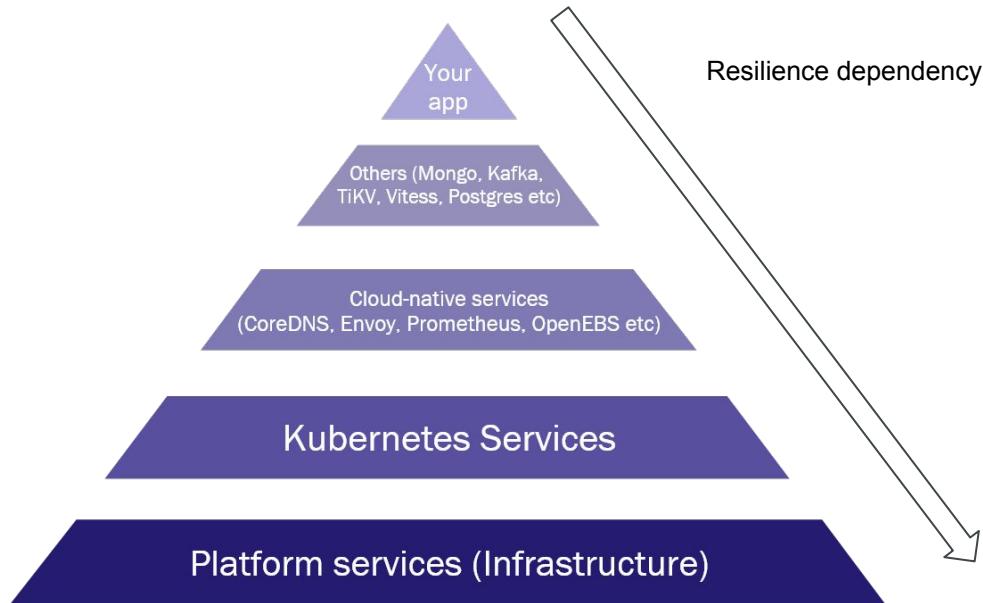
149459

Experiment Runs

1264

Github Stars

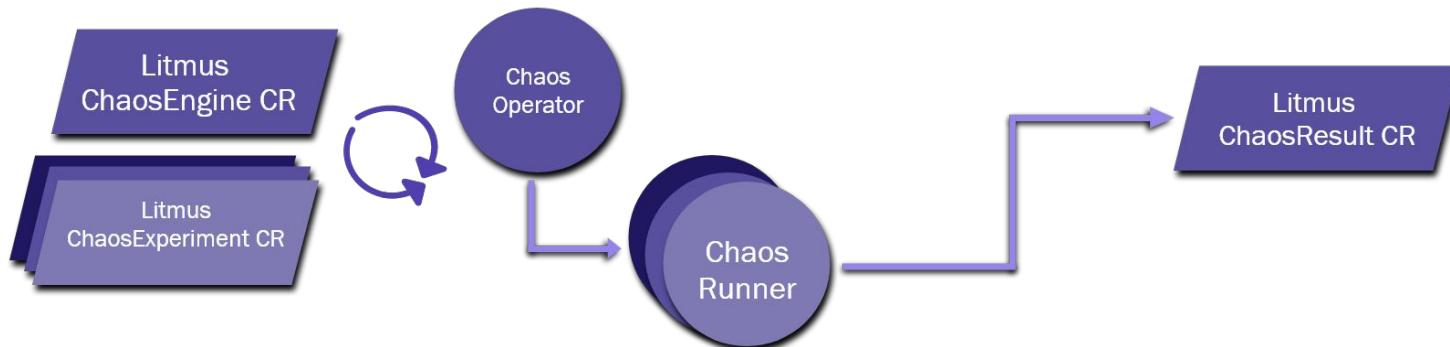
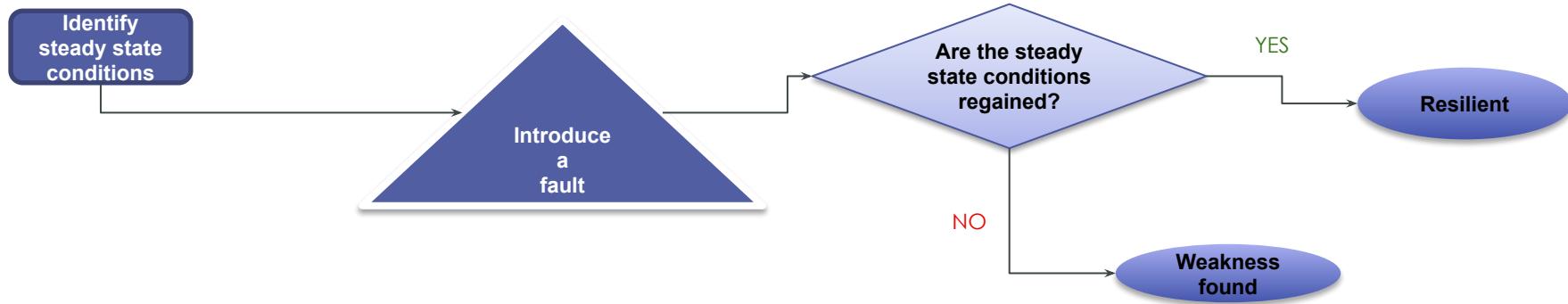
Chaos Engineering for Kubernetes - Why?



>90% of Resilience of your application depends on -

other cloud-native components and the infrastructure

Chaos Engineering for Kubernetes - How?



Scaling chaos engineering



Virtual

LitmusChaos workflow

Argo workflow

Consolidate results

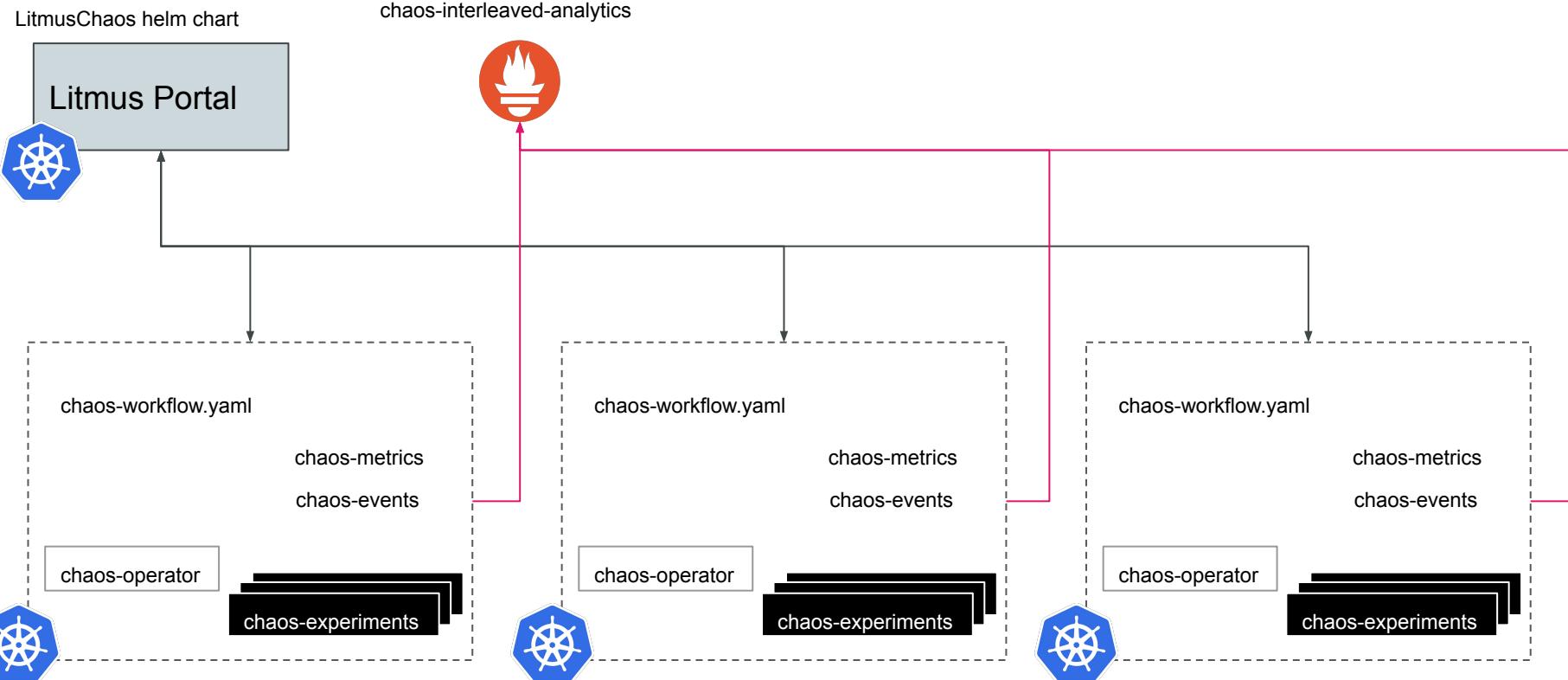
Litmus Experiments



Chaos Engineering using



LitmusChaos - Architecture



LitmusChaos - Chaos Hub

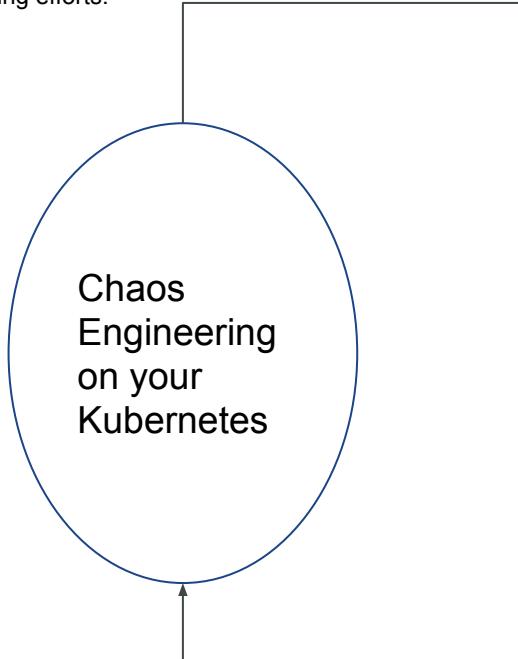


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Push your application's chaos experiment to the hub. Your application users will use it in their chaos engineering efforts.



70% of your chaos needs are readily available on the hub

The screenshot shows the Litmus ChaosHub interface. At the top, it displays "Litmus v 1.9.0" and a "Star" button. On the right, there are "Contribute" and "Get Started" buttons. The main heading is "Chaos Experiments for Kubernetes". Below the heading, a subtext reads: "Litmus ChaosHub hosts chaos experiments for Kubernetes. The experiments are declarative and tunable. Use the hub interface to tune them to your needs, deploy them and take that step towards resilience." To the right is a cartoon illustration of a penguin scientist in a lab coat pushing a shopping cart filled with test tubes. Below the heading are four statistics: "37 Experiments", "17973 Installed", "149466 Experiment Runs", and "1264 Github Stars". The main content area shows a grid of 15 experiment cards. Each card includes an icon, the experiment name, and the number of runs. The experiments listed are:

Experiment Name	Runs
generic/all-experiments	137.9k+ runs
openebs/all-experiments	2.2k+ runs
cassandra/all-experiments	2.2k+ runs
kafka/all-experiments	2.1k+ runs
coredns/all-experiments	1.1k+ runs
kube-aws/all-experiments	0 runs
generic/pod-delete	64.4k+ runs
generic/pod-cpu-hog	18.5k+ runs
generic/k8-pod-delete	11.9k+ runs
generic/container-kill	9.9k+ runs

At the bottom of each card, there is a small "Infra-Chaos" badge and a run count. The footer of the slide has a light gray background with the text "Litmus ChaosHub" and "LitmusChaos" repeated several times.

Generic

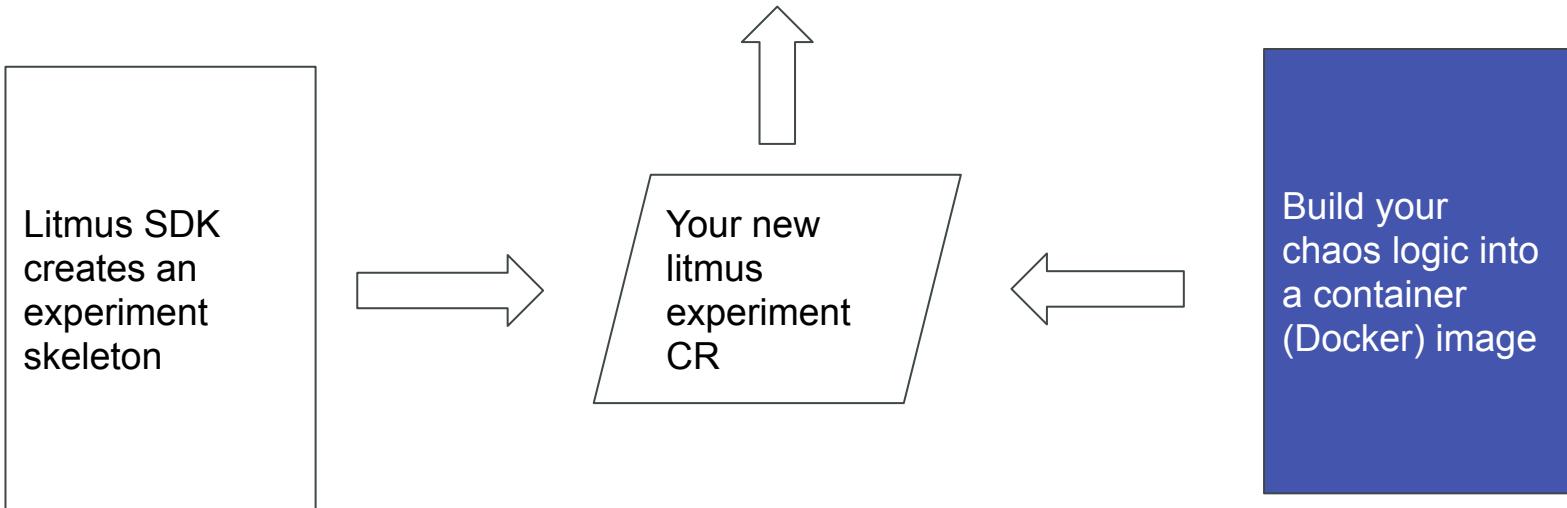
Pod Delete	Kubelet Service Kill
Container Kill	Pod Network Duplication
Pod Network Latency	Node Taint
Pod Network Loss	Docker Service Kill
Pod Network Corruption	Pod Autoscaler
Pod CPU Hog	Service Pod - Application
Pod Memory Hog	Application Service
Disk Fill	Cluster Pod - kiam
Disk Loss	Pod IO Stress
Node CPU Hog	Node IO Stress
Node Memory Hog	
Node Drain	

22 generic chaos experiments

More application specific chaos experiments

Litmus makes it easy to build a new chaos experiment

Use your experiment in a chaos workflow



1. Start with LitmusChaos stable helm chart
2. Login into Litmus Portal
3. Start scheduling with a pre-defined chaos workflow

LitmusChaos - Getting started



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Welcome to **Litmus!**

Your one-stop-shop for Chaos Engineering on .

Browse, create, manage, monitor and analyze your chaos workflows.

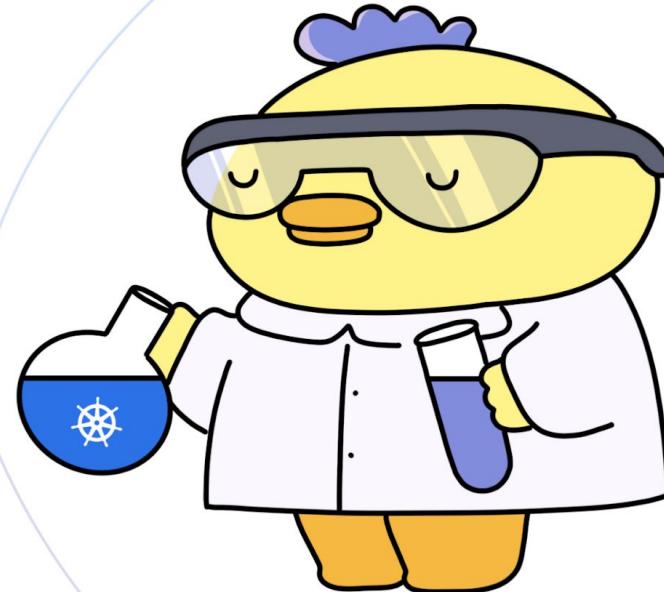
With your own private ChaosHub, you can create your new chaos experiments and share them with your team.

Username

Password



Login



LitmusChaos - Getting started



Virtual



Workflows



Manna Ajesh ▾
admin . Owner . Manna Project

Chaos Workflows

Schedule a workflow

Browse workflows

Schedules

Templates

Analytics

Search

Workflow Status
All

Target Cluster
All

Select a period >

Status	Workflow Name	Target Cluster	Reliability Details	# of Steps	Last Run	⋮
Succeeded	argowf-chaos-kube-proxy-chaos-1602778593	Internal	Overall RR: 100%	13	3 hours ago	⋮
Succeeded	argowf-chaos-node-cpu-hog-1602779265	Internal	Overall RR: 100%	7	3 hours ago	⋮
Succeeded	argowf-chaos-pod-memory-hog-1602779529	Internal	Overall RR: 100%	7	3 hours ago	⋮
Succeeded	argowf-chaos-kube-proxy-chaos-1602818469	Internal	Overall RR: 100%	13	3 hours ago	⋮
Succeeded	argowf-chaos-kube-proxy-chaos-1602863302	Internal	Overall RR: 100%	13	3 hours ago	⋮

LitmusChaos - Getting started



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Litmus

Create-workflow

Target Cluster Choose a workflow Tune workflow Reliability score Schedule Verify and Commit

MA Manna Ajesh ▾
admin . Owner . Manna Project

Home Workflows Targets Community Settings

Select or design workflow

Select one of the pre-defined chaos workflows or design your own workflow.

7 pre-defined workflows

- node-cpu-hog**
Contributed by MayaData
Injects a CPU spike on a node
- node-memory-hog**
Contributed by MayaData
Injects a memory spike on a node
- pod-cpu-hog**
Contributed by MayaData
Injects a CPU spike on a pod
- pod-memory-hog**
Contributed by MayaData
Injects a memory spike on a pod
- pod-delete**
Contributed by MayaData
Deletes a pod

- kube-proxy-chaos**
Contributed by MayaData
- namespaced-scope-chaos**
Contributed by MayaData

LitmusChaos - Getting started



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Litmus

Create-workflow



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Kubernetes conformance test

Home

Workflows

Targets

Community

Settings

node-cpu-hog ~ 7 points



pod-memory-hog ~ 8 points



pod-cpu-hog ~ 10 points



node-memory-hog ~ 6 points



pod-delete ~ 8 points



LitmusChaos - Getting started



Workflows / Details / D3144cee-3b62-4322-8adf-f3c3c1ad7f86



Manna Ajesh
admin . Owner . Manna Project

Back

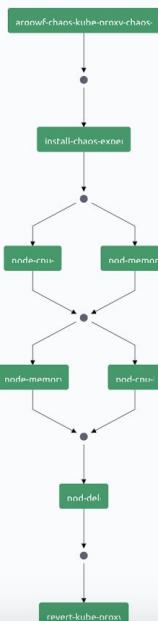
Info

argowf-chaos-kube-proxy-chaos-1602778593

Click on test to see detailed log of your workflow

Workflow

Nodes



Workflow name:
argowf-chaos-kube-proxy-chaos-1602778593

State: Succeeded
Start time: 6 days ago
End time: 6 days ago
Duration: 9.0 minutes
Namespace: litmus

Executed Nodes:

- argowf-chaos-kube-proxy-chaos-1602778593
- node-cpu-hog
- node-memory-hog
- install-chaos-experiments
- pod-delete
- pod-cpu-hog
- pod-memory-hog
- revert-kube-proxy-chaos

Cluster: Self-Cluster

Litmus is a complete framework for finding weaknesses in Kubernetes platforms and applications running on Kubernetes.

Litmus uses cloud-native chaos engineering principles. Developers and SREs automate chaos in a cloud-native way.

Thank you.

Next: Introduction to Argo



About Me



Virtual

Work: **intuit**



Play:



Jenkins



splunk>



OverOps

Reliability Team

- Providing **paved** roads to build high-Quality products, services, and experiences by enabling open source **tools** and **infrastructure** to achieve **reliability**.

Solutions

- Chaos Engineering
- Performance Engineering
- Infrastructure for running Chaos and Performance

Intuit Developer Platform

- 4000 Developers
- 230 Clusters
- 9000 Namespaces
- 2500 Services

About - Intuit Development Platform



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Intuit API (v4)

JSK + Config +
Experimentation

Dev Patterns

Argo
workflows



Streaming/
Messaging

Serverless
Framework

UX Fabric

Discover



Lean/Play



Onboarding



Monitoring



Management



Multi-Cluster
Mgmt (IKSM)

GitHub



(Apps as Code)

IBP Jenkins

(Build & Test - CI/d)



Reliability
Engineering



JFrog
Artifactory



Argo CD



Metrics/Analytics

(Team Speed Dashboards)

Multi-Cluster Service Mesh and Gateway



Service Catalog



Intuit Kubernetes Service (IKS)

(Core Kubernetes with Intuit Network & Security policies & best practices)

Continuous Operations

(Monitoring, Analytics, Remediation)



Kops



EKS

AWS Infrastructure

VPC, ALB/NLB, S3, RDS, DynamoDB, Elasticache, ...



Olympus
(SSO & AWS Roles)



IDPS
(Secrets)



Splunk
(Logging)



Wavefront
(Monitoring)



Appdynamics
(Monitoring)



PagerDuty
(Alerts)



NetGenie
(Certs))

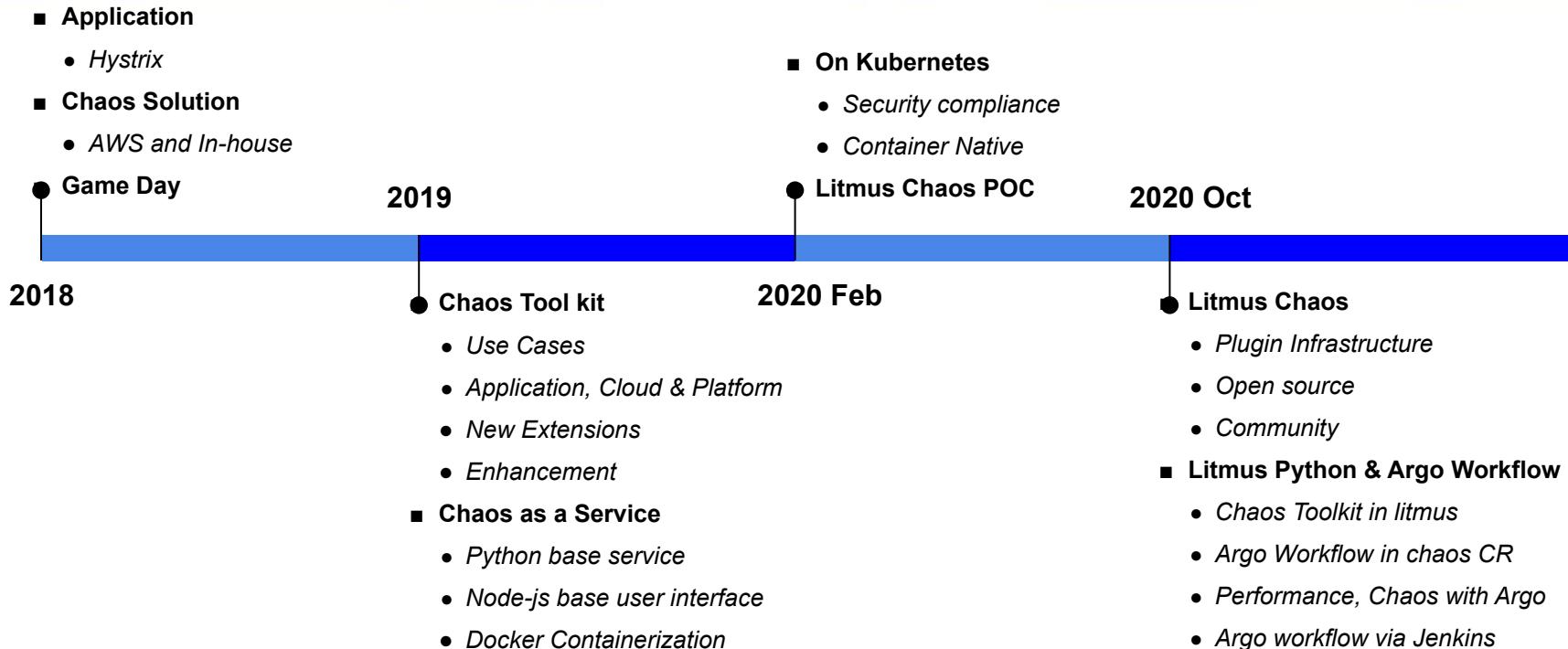


ServiceNow
now.
(CM)

Chaos Journey Line



Virtual



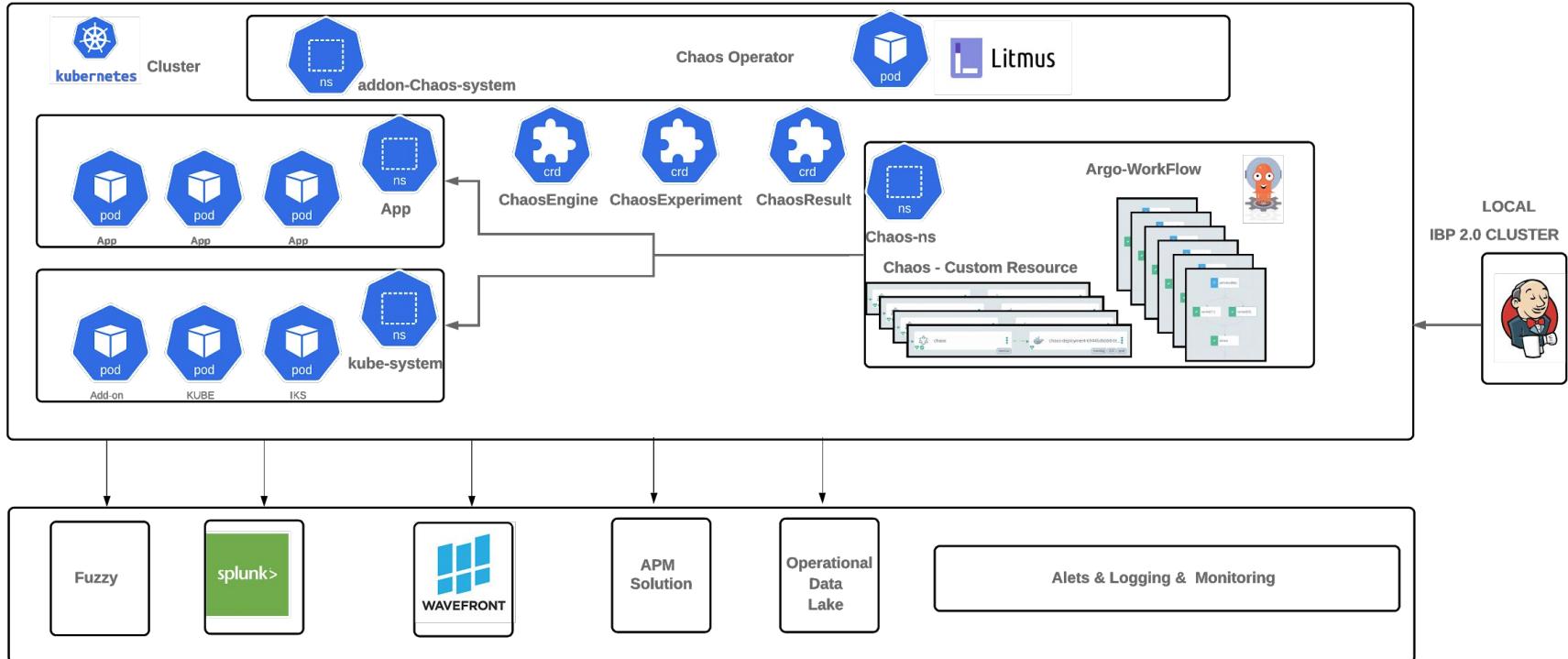
Chaos Design



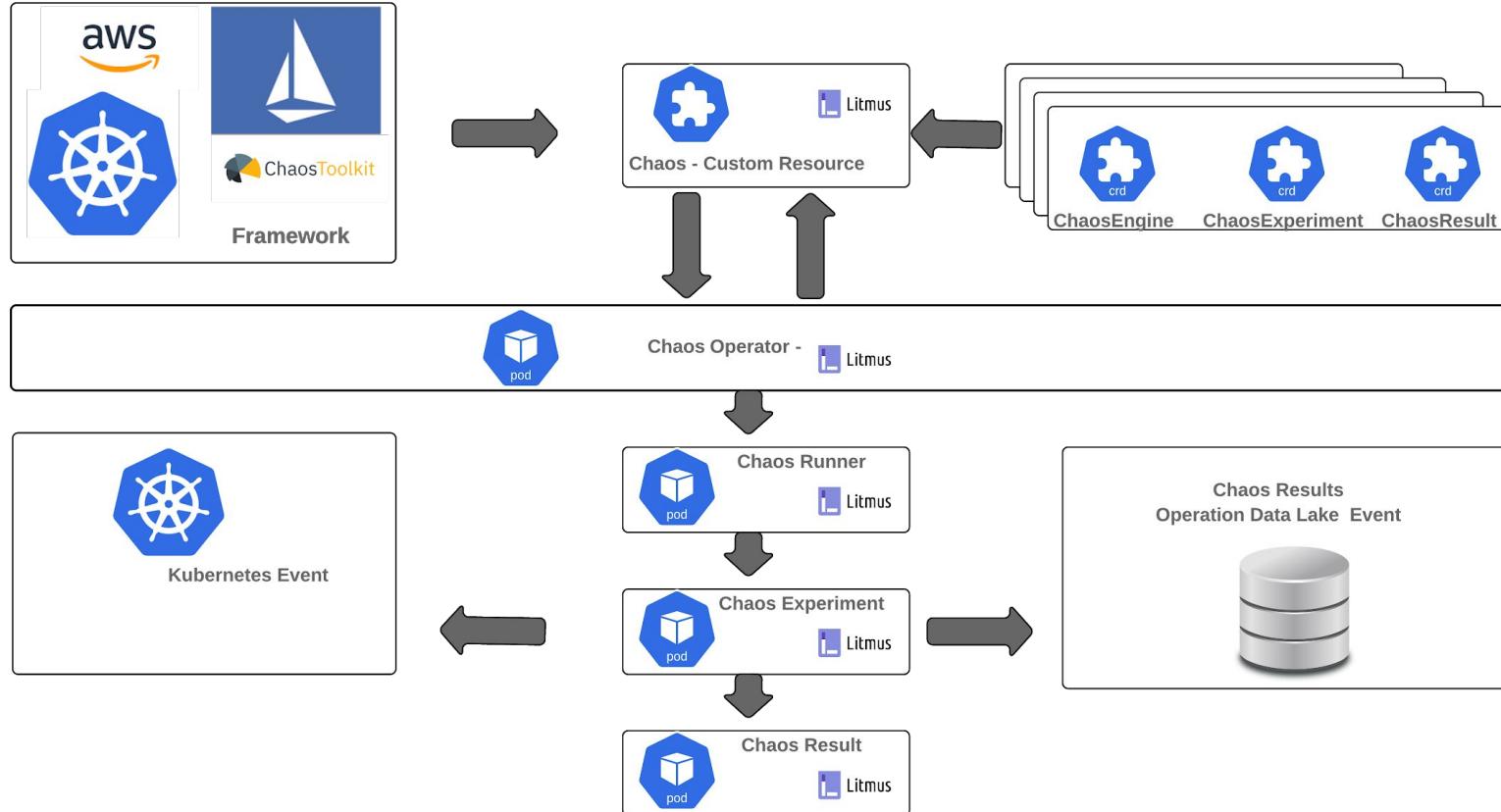
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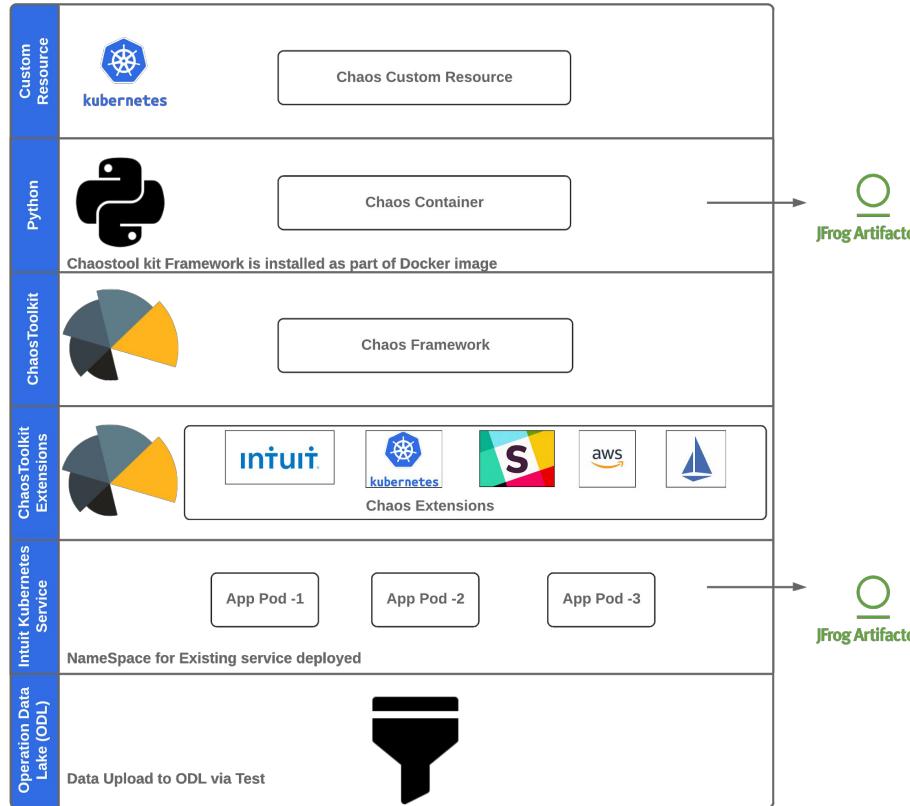
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Chaos Execution



Chaos Framework



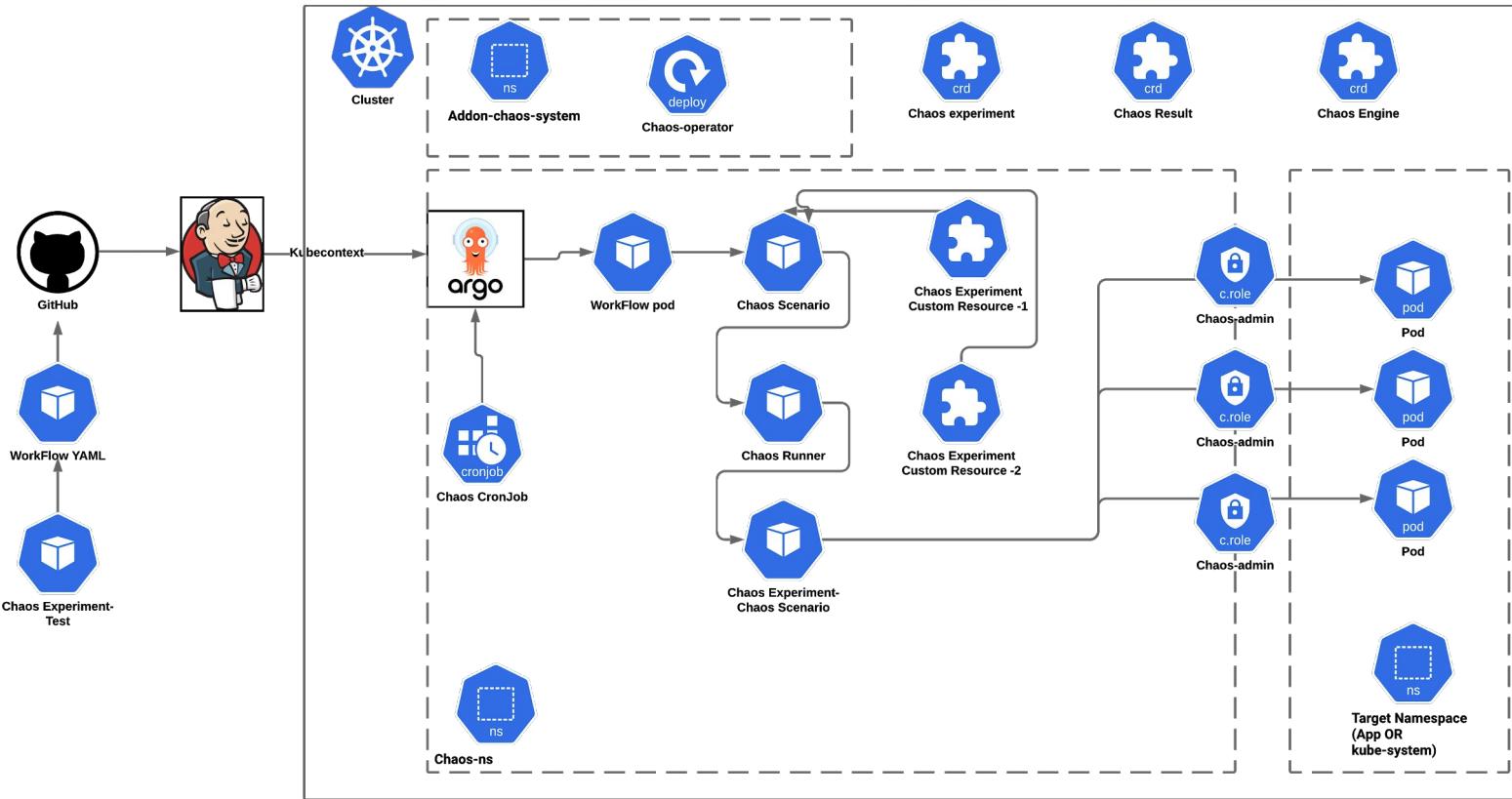
Chaos Workflow



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Why Argo Workflow

CICD

- Automation
- Infra as Code

Cost

- Optimum resource utilization
- Saving cost

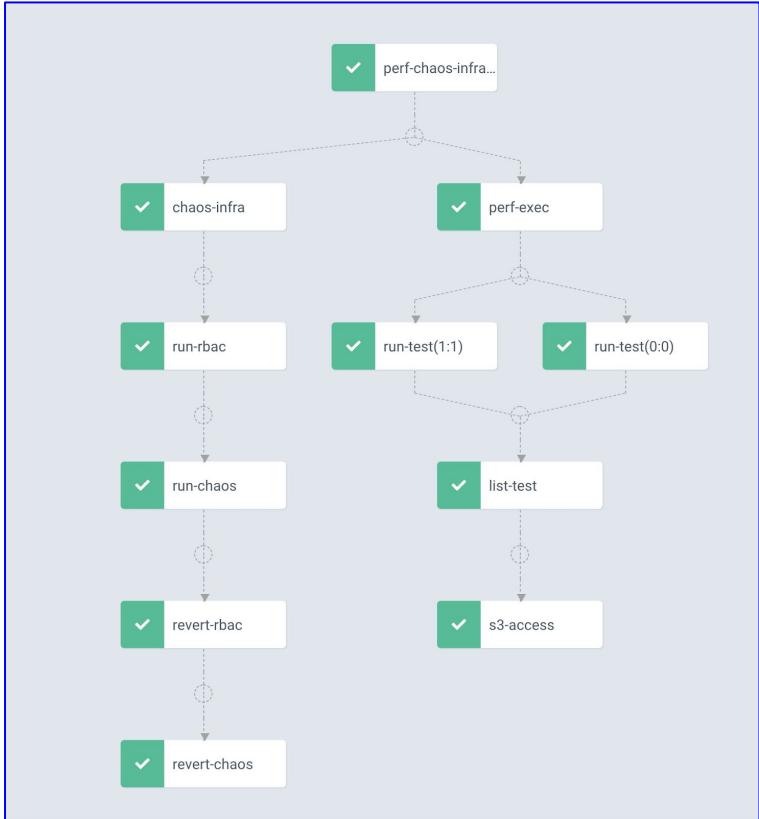
Reliability

- Chaos with Performance
- Building Complex scenario
- Trust & Confidence

Ease

- Self Service
- OnBoarding
- Lifecycle

Chaos Argo Workflow



Demo



Virtual

- <https://github.com/litmuschaos/litmus/tree/master/demo/kubecon-demo>

Our Litmus Chaos Contribution



Virtual

Framework

- <https://github.com/litmuschaos/litmus-python>

WorkFlow

- <https://github.com/litmuschaos/chaos-workflows>

Charts

- <https://github.com/litmuschaos/chaos-charts>

Docs

- <https://github.com/litmuschaos/litmus-docs>

On Litmus

- <https://github.com/litmuschaos/chaos-runner>
- <https://github.com/litmuschaos/litmus>
- <https://github.com/litmuschaos/chaos-exporter>

github.com/litmuschaos/litmus

github.com/argoproj/argo

Thank you



@uma_mukkara
@sumitnagal



Q&A



@uma_mukkara
@sumitnagal



Demo



Chaos Workflow - Litmus / Argo

