Chaos Engineering Applied to the Fintech Domain

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Raj Vadheraju
Enterprise Architect
FIS

Neelanjan Manna
Software Engineer
Harness/LitmusChaos

FinTech Problem Statement and Solution

A problem statement : Non-banking services companies would like to offer banking services and products. E.g. A cab company would like to offer auto-loan

Users

End users benefit from embedded FinTech products

Products

FinTech consumers provide superior CX with innovative products

Interfaces

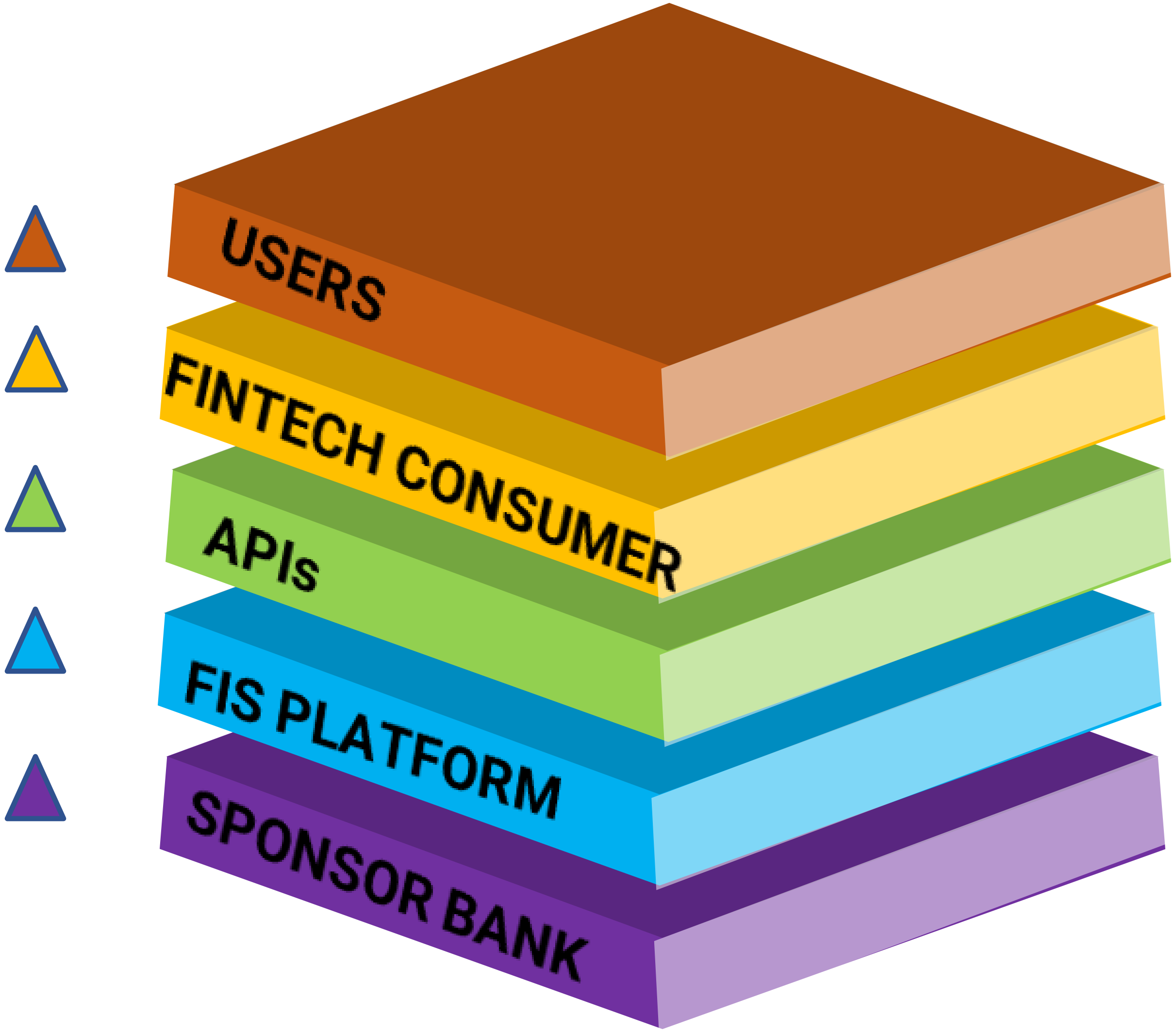
FIS offers APIs to FinTech consumers to launch their products

Platform

FIS platform manages the banking ecosystem for sponsor bank

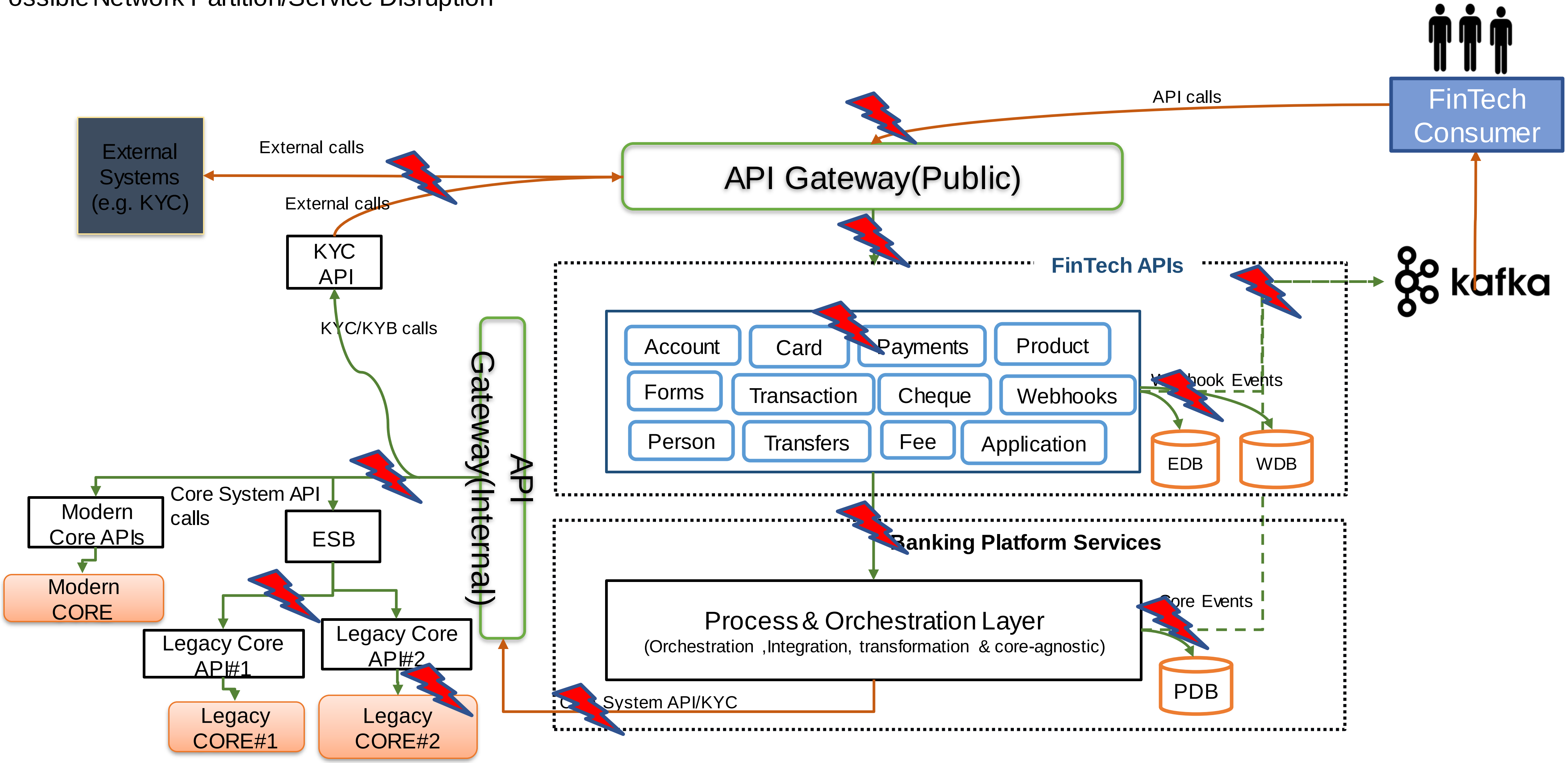
Bank

FIS hosts bank or partners with Bank to offer Banking, Payment and Card services



FinTech Technical Architecture

⚡ = Possible Network Partition/Service Disruption

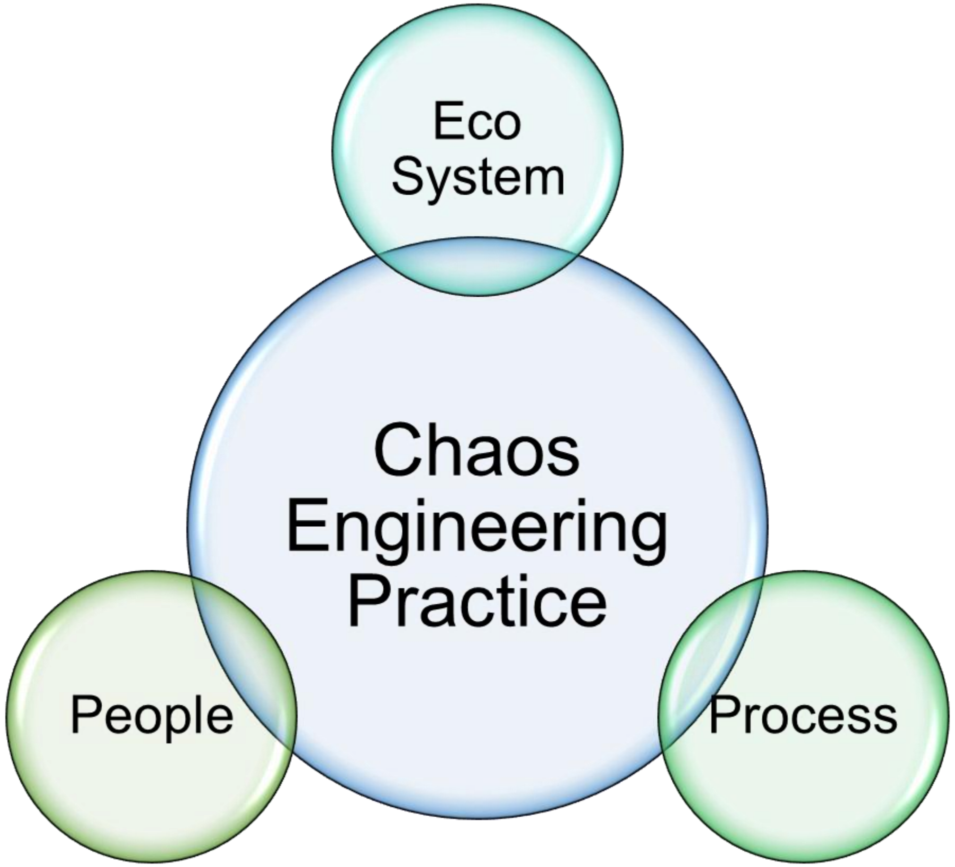


Chaos Engineering - Definition and Practice

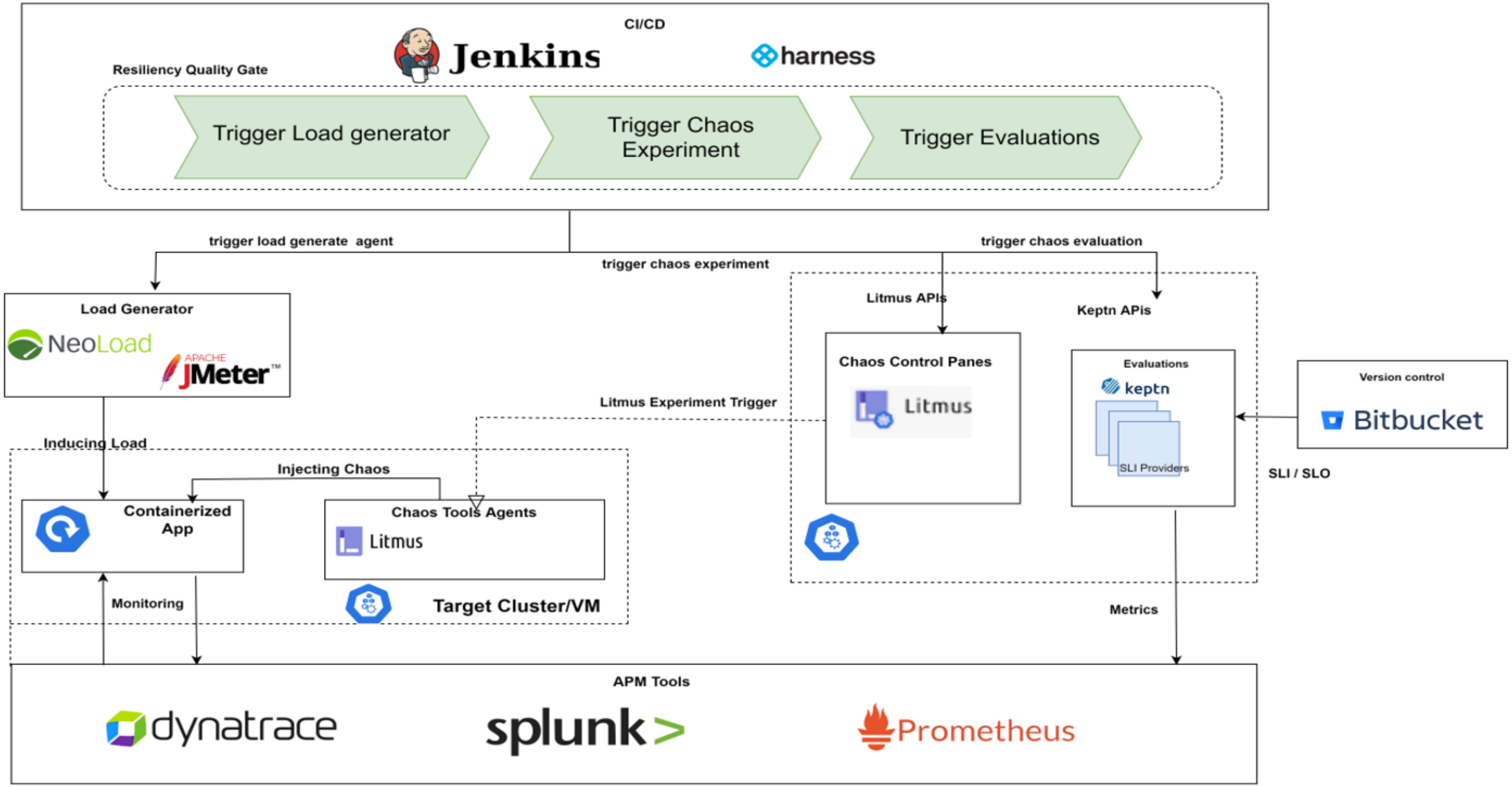
Definition

https://principlesofchaos.org/ defines is as - "*the discipline of experimenting on a system in order to build confidence in the system's capability to withstand turbulent conditions in production.*"

Practice



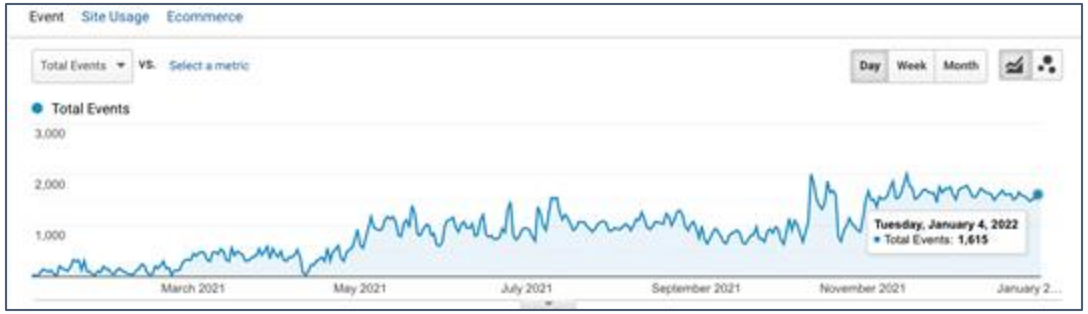
Chaos Engineering Eco-System



LitmusChaos – A CNCF Incubating Project

Litmus is an open source platform for practicing chaos engineering in a cloud native way.

- Started in 2017; 4+ years of active development
- 350K+ Litmus installations; 30x usage growth in the last 3 quarters, 50+ chaos experiments, 100+ contributors
- Stable platform : 2.0 released
  50+ enterprises using 2.0
- **CNCF Incubating project**

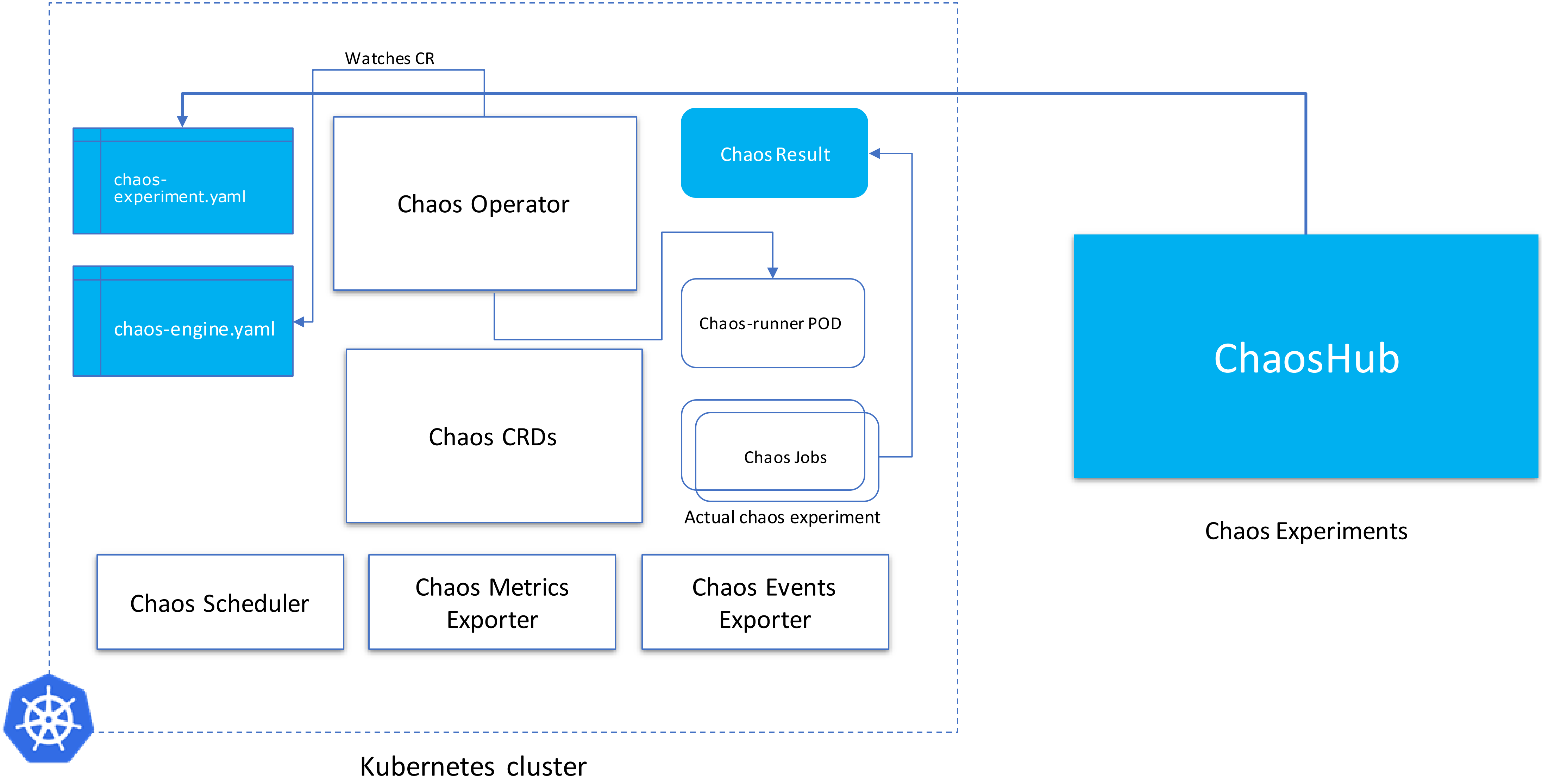


30x growth in per-day installations of Litmus in the last 3 quarters; 1500 installations per day

Litmus is **adopted** by

intuit okteto NetApp Red Hat wescale kublr
lenskart.com halodoc keptn vmware KITOPI anuta networks
wipro ZEBRIUM orange OpenEBS Pravega
KUBESPHERE KLANIK neudesic ifood Pôle emploi.fr Container Solutions

Chaos Orchestration: Bird's Eye View



Simplifying Enterprise-Grade Chaos Engineering

Cloud Native Chaos Experiments

Validate your entire infrastructure including pods, nodes, VMs, disks and more.

Least Privilege Principled Chaos Injection

Safety focused granular RBAC support along with just-in-time execution of privileged containers.

Declarative Pre-Checks and Hypothesis Validation

Add declarative probes for pre-checks and hypothesis validation against a number of probe types.

Conditionally AutoStop Chaos Injection

Conditionally abort on-the-fly chaos injection to ensure safety of the target resources at all times.

Custom Chaos Recovery Actions

Introduce custom steps for chaos remediation and recovery for conditional execution.

Declarative Custom Tasks

Add custom tasks to be run alongside chaos injection steps to simulate real-world conditions, such as synthetic load generation.

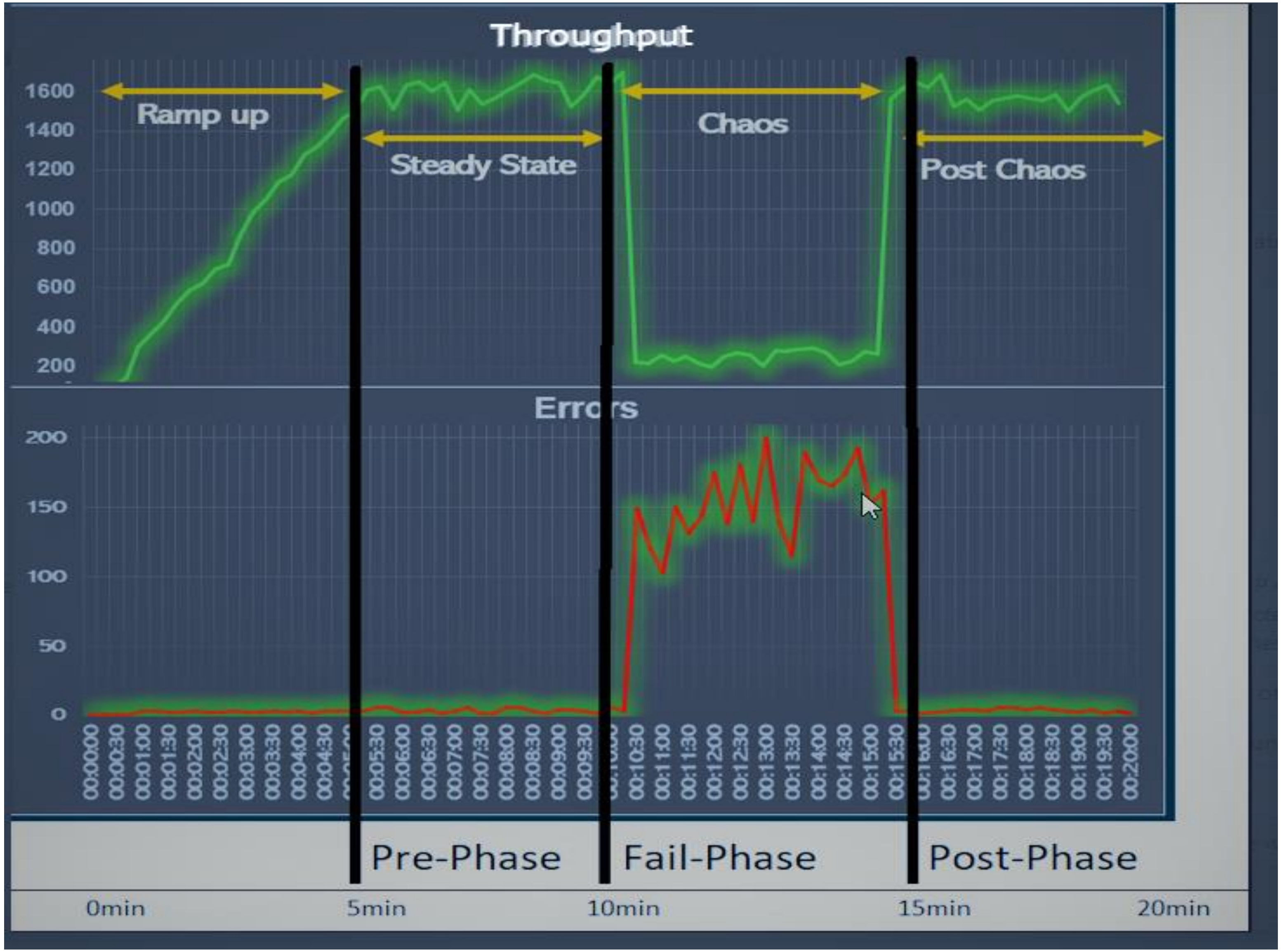
Quantification of System Resiliency

Quantified evaluation of system resiliency via a resiliency score based on the experiment results.

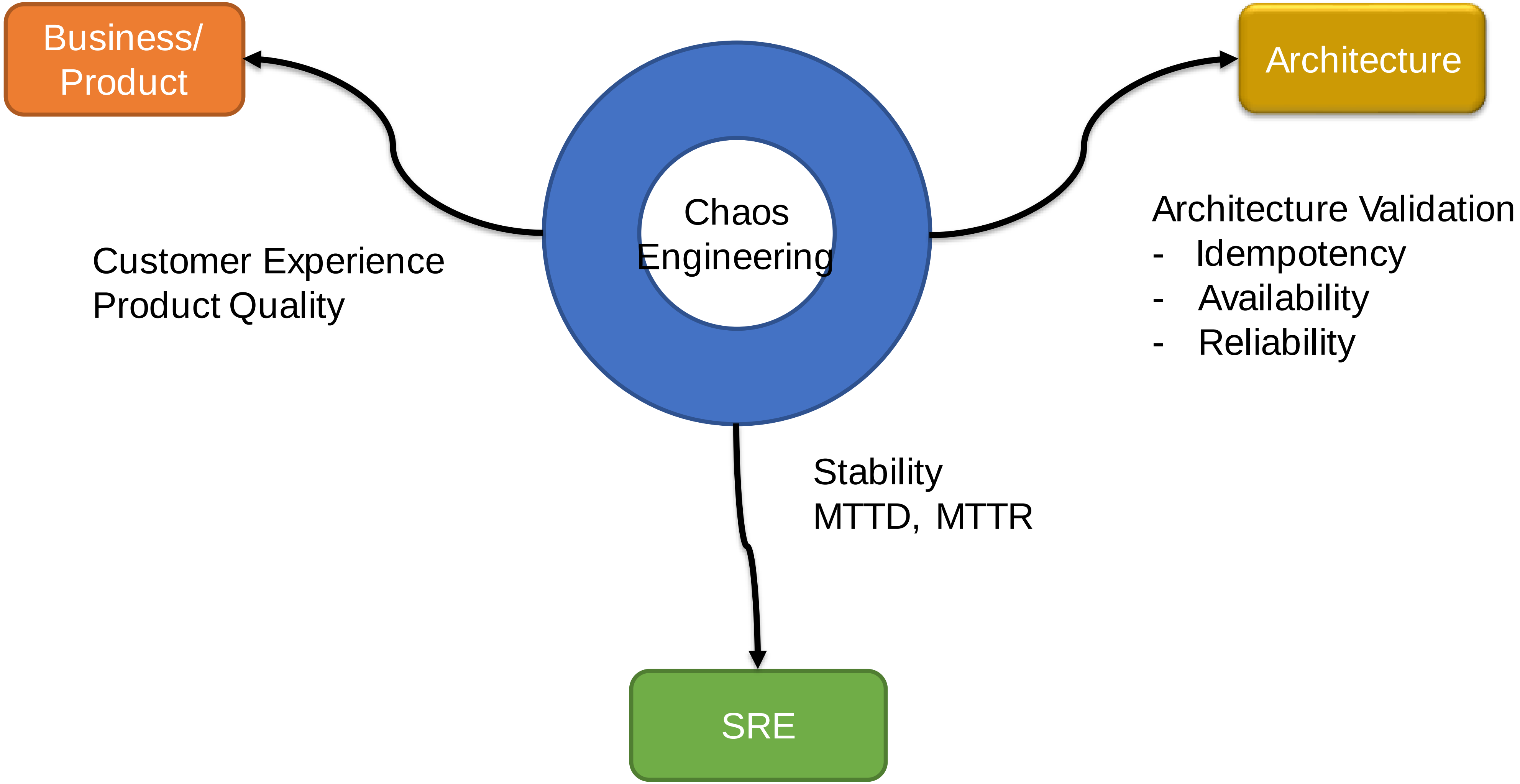
Litmus Chaos Experiments

Experiment	Objective	Metrics to be monitored
Pod HTTP Latency	Ability to handle "timeout" exception and recover from it	• Thread pool Utilization • Connection pool utilization • Error rate • Throughput
Pod Memory Hog	Ability to memory saturation and its side effect of container OOMKilled situation	• Pod/Container memory usage • Service response time • Kubernetes pod event - OOMKilled
Pod HTTP Status Code	Ability to handle HTTP 5xx errors from an application component	• e.g. Account creation rate • Error rate

Chaos Evaluation – An Example



Chaos Engineering – Stakeholder Value



Business/ Product

Architecture

Chaos Engineering

Customer Experience
Product Quality

Architecture Validation
- Idempotency
- Availability
- Reliability

Stability
MTTD, MTTR

SRE