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# Chaos Engineering Training: Infallible Infrastructure

2 days (14 hours)

## Presentation

Modern IT infrastructures have become so complex that their reliability is in question. Chaos engineering is one of the answers to the problem of IT system resilience. Our training course will introduce you to the principles and foundations of chaos engineering. You will learn the implementation process (observability, steady state, hypothesis, experimentation, validation). In addition, you'll practice by experimenting with your own chaos scenarios, such as latency injection at network level. By the end of the course, you'll know how to use planned tests to strengthen the resilience and reliability of your IS, and optimize user satisfaction. A complementary module dedicated to chaos engineering with Kubernetes is also included. You can also automate your actions with PowerfulSeal and Jenkins.

## Objectives

- Chaos engineering and its benefits
- Set up chaos engineering experiments
- Understand and apply the process (hypothesis, test and steady state)
- Know how to react during a test period and analyze results

## Target audience

- DevOps
- Directors
- Developers
- Infrastructure architects
- Safety engineers

## Prerequisites

Experience in system administration.

# Our Chaos Engineering training program

## Engineering chaos

- The current development context
- The complexity of modern infrastructures and the impact of the human factor
- History of the concept
- How can chaos engineering benefit your infrastructure?
- Chaos engineering vs SRE
- System principles and evolution
- Estimate risks and costs (SLI, SLO and SLA) using chaos engineering

## The fundamentals

- The different practices
  - Sandbox
  - Staging
  - Production
- The process
  - Ensuring observability
  - Defining a steady state
  - Formulating a hypothesis
  - Launch the experiment
  - To validate or not the hypothesis
- Good testing practices

## The observability of chaos

- The USE method
- Log centralization
- Introducing OpenTracing
- Deploy OpenTracing and use time series
- Opentracing control

## The hypothesis

- How do you define its stationary state?
- Why and how do you define a hypothesis?
- Incident analysis
- System failure analysis
- Formulating a viable hypothesis
- Preconceived hypothesis models

- Create your hypothesis backlog

### Experiment

- The importance of testing to respond to real-life situations
- Defining experimental conditions
- Prioritize your experiences
- Analyze performance gaps
- Determine whether the hypothesis is valid
- Drafting of the experimentation report
- Optimize your system and re-apply the process

### Tools presentation

- Chaos Monkey
- Chaoskube
- Chaos mesh
- Litmus
- PowerfulSeal
- ChaosToolkit
- Gremlin

### In practice

- Install ChaosToolkit CLI
- Create your own chaos drivers
- Add human interaction
- Error injection
  - System latency
  - Query failures
- Control operations

## Complementary module (+1 day): Engineering chaos with Kubernetes

### Experimenting with Kubernetes

- Introduction to Kubernetes and its usefulness for the SRE
- Adapting the method to applications using Kubernetes
- Launching a Kubernetes cluster

- Experiment
  - Pod attack
  - Server latency
  - Attacking virtual machines

### Automate your experiments

- Installing PowerfulSeal
- Automate experimentation
- Testing your hypothesis
- Continuous chaos
  - Planning chaos tests with cron
  - Install Jenkins
  - Adding tests to Jenkins
  - Planning experiments

## Companies concerned

This training course is aimed at both individuals and companies, large or small, wishing to train their teams in a new advanced computer technology, or to acquire specific business knowledge or modern methods.

## Positioning on entry to training

Positioning at the start of training complies with Qualiopi quality criteria. As soon as registration is finalized, the learner receives a self-assessment questionnaire which enables us to assess his or her estimated level of proficiency in different types of technology, as well as his or her expectations and personal objectives for the training to come, within the limits imposed by the selected format. This questionnaire also enables us to anticipate any connection or security difficulties within the company (intra-company or virtual classroom) which could be problematic for the follow-up and smooth running of the training session.

## Teaching methods

Practical course: 60% Practical, 40% Theory. Training material distributed in digital format to all participants.

## Organization

The course alternates theoretical input from the trainer, supported by examples, with brainstorming sessions and group work.

## Validation

At the end of the session, a multiple-choice questionnaire verifies the correct acquisition of skills.

## Sanction

A certificate will be issued to each trainee who completes the course.