Containerized Test Automation

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Agenda

- Testing of microservices
- CI/CD on container platforms
- Integration testing with Citrus
- Demo
- Summary

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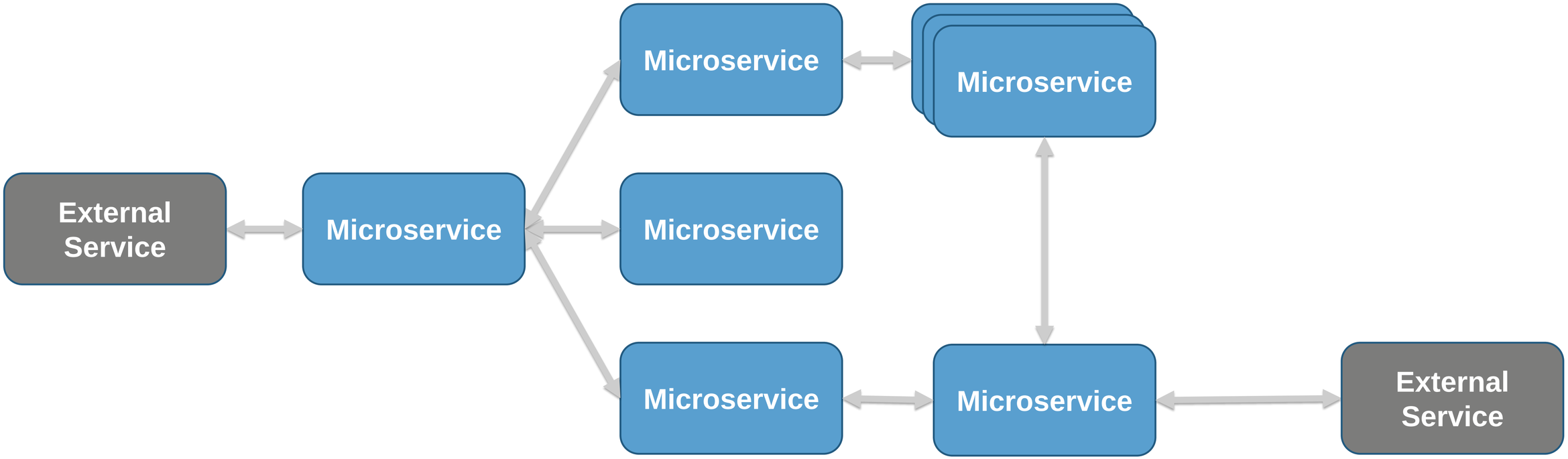
Testing of microservices

- Testing of microservices is… different
- Microservice architectures ease and complicate testing
- Different testing challenges compared to monoliths
- Different tech stack



Testing of microservices – The good parts

- Isolated functionality
- Less functionality in a single service compared to monoliths
- Easy to start and deploy
- Message interfaces between services
- Decoupled services connected via network

Testing of microservices – The bad parts

- Message interfaces between services
- Decoupled services connected via network
- A lot of third party systems
- Various message transports

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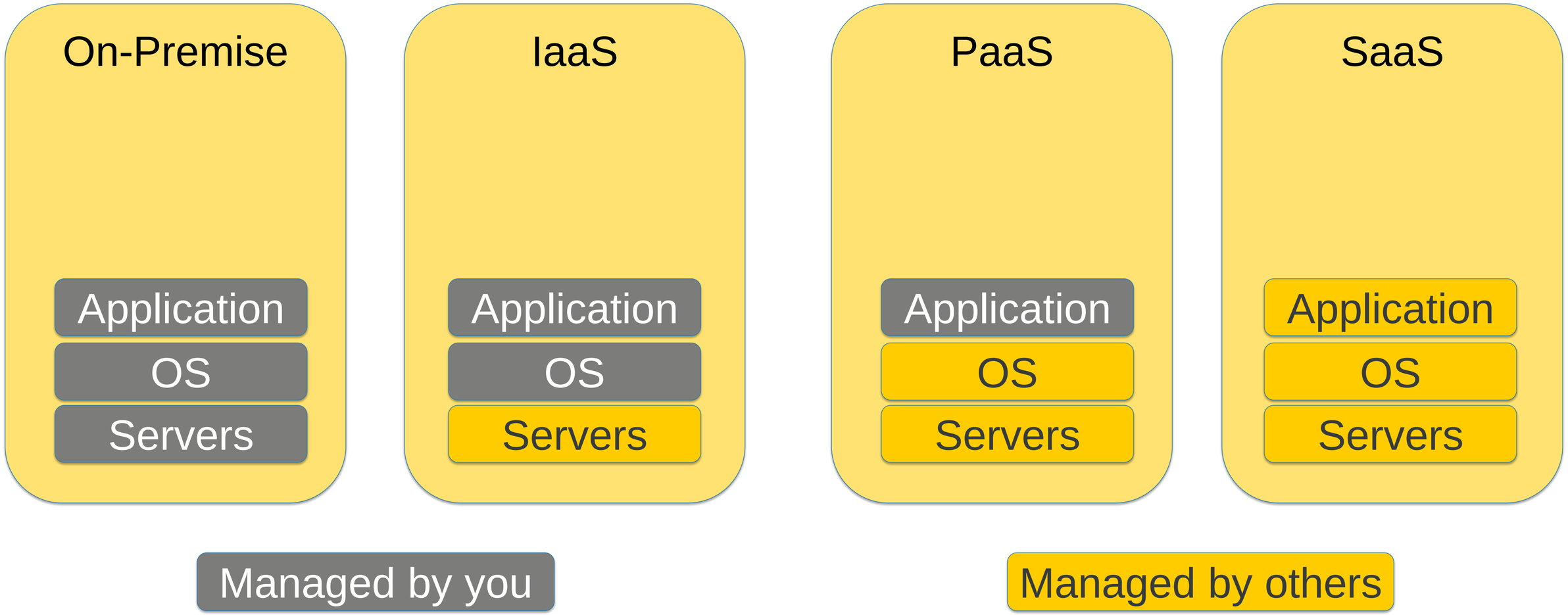
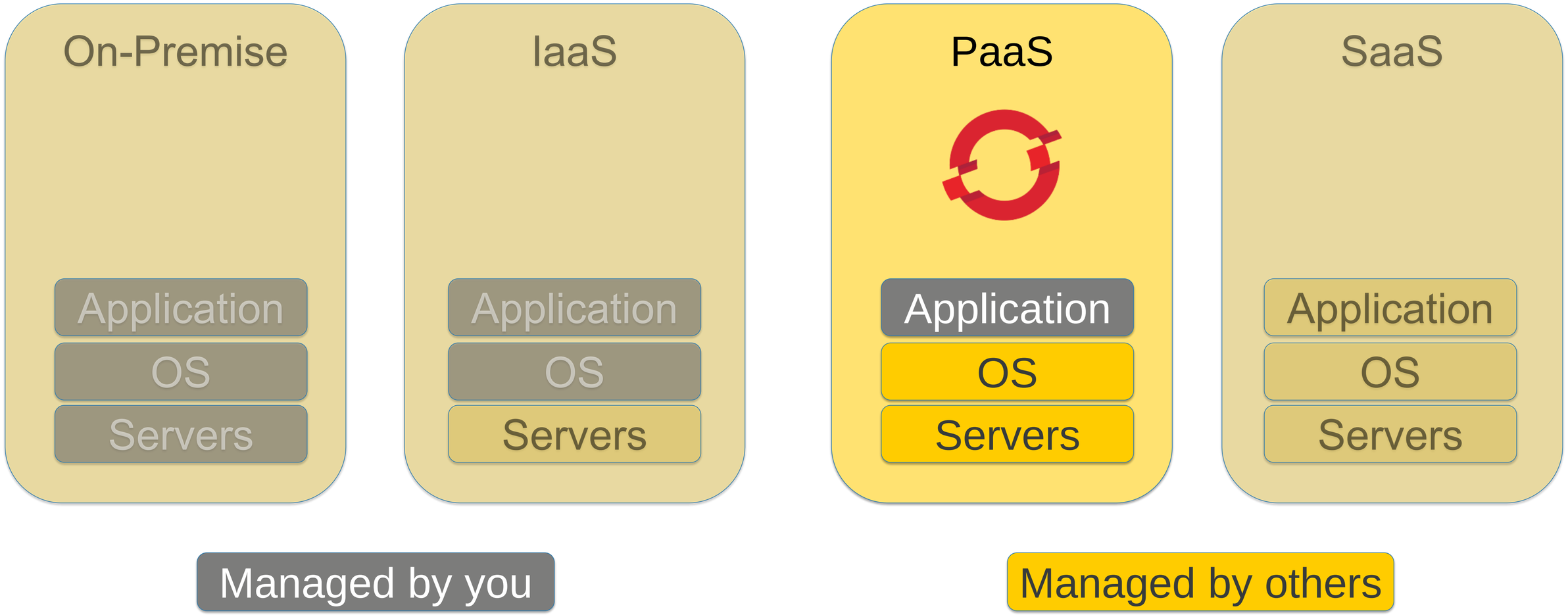
CI/CD on container platforms – Container Platforms

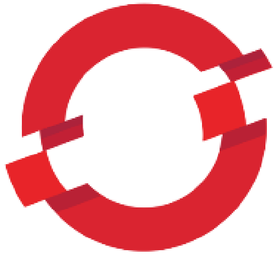


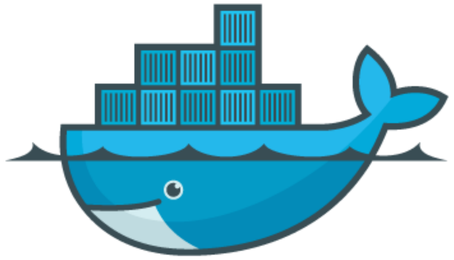
CI/CD on container platforms – Container Platforms



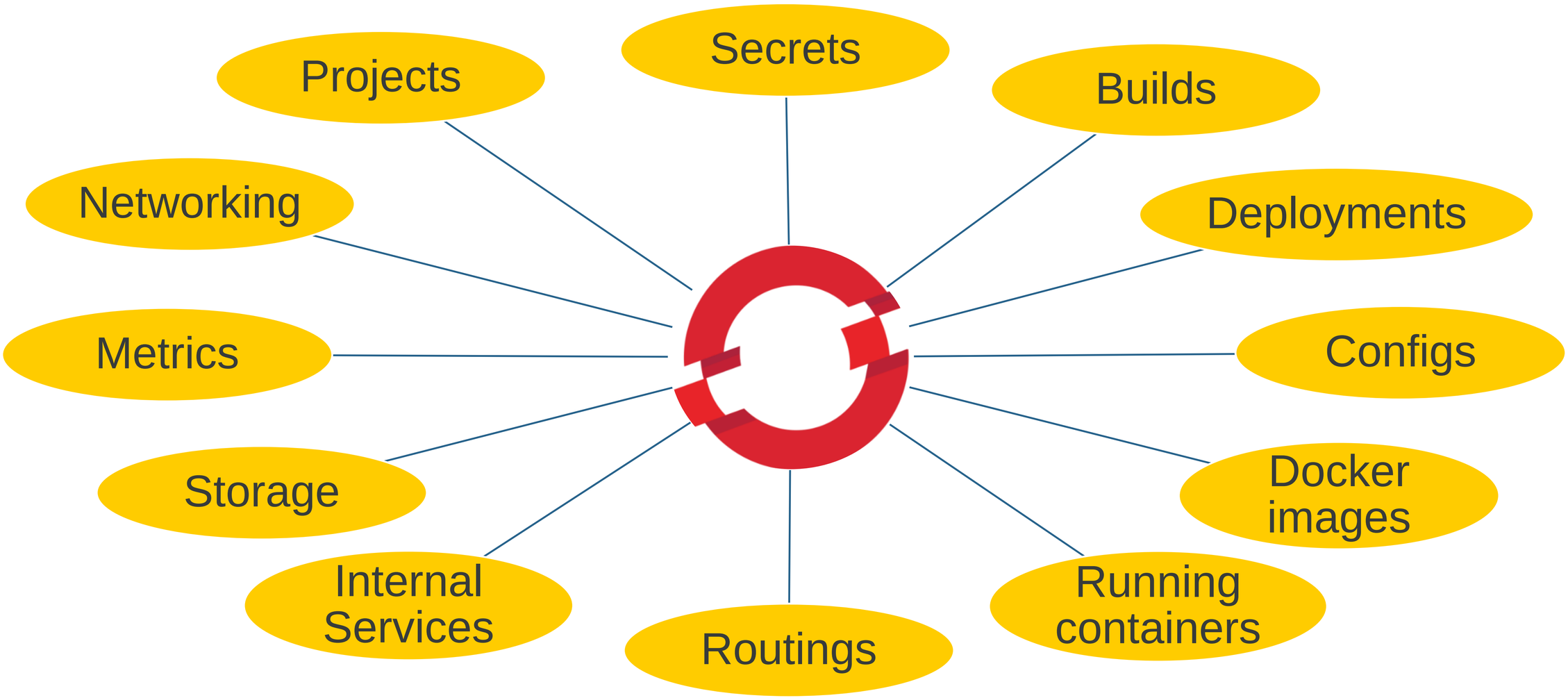
CI/CD on container platforms – Container Platforms

- Developed and maintained by RedHat since 2011
- Open source container platform OKD (Apache Licence 2.0)
- Professional support options
- Public OpenShift cloud available
- Based on Kubernetes
- Uses Docker containers
- Additional platform specific features



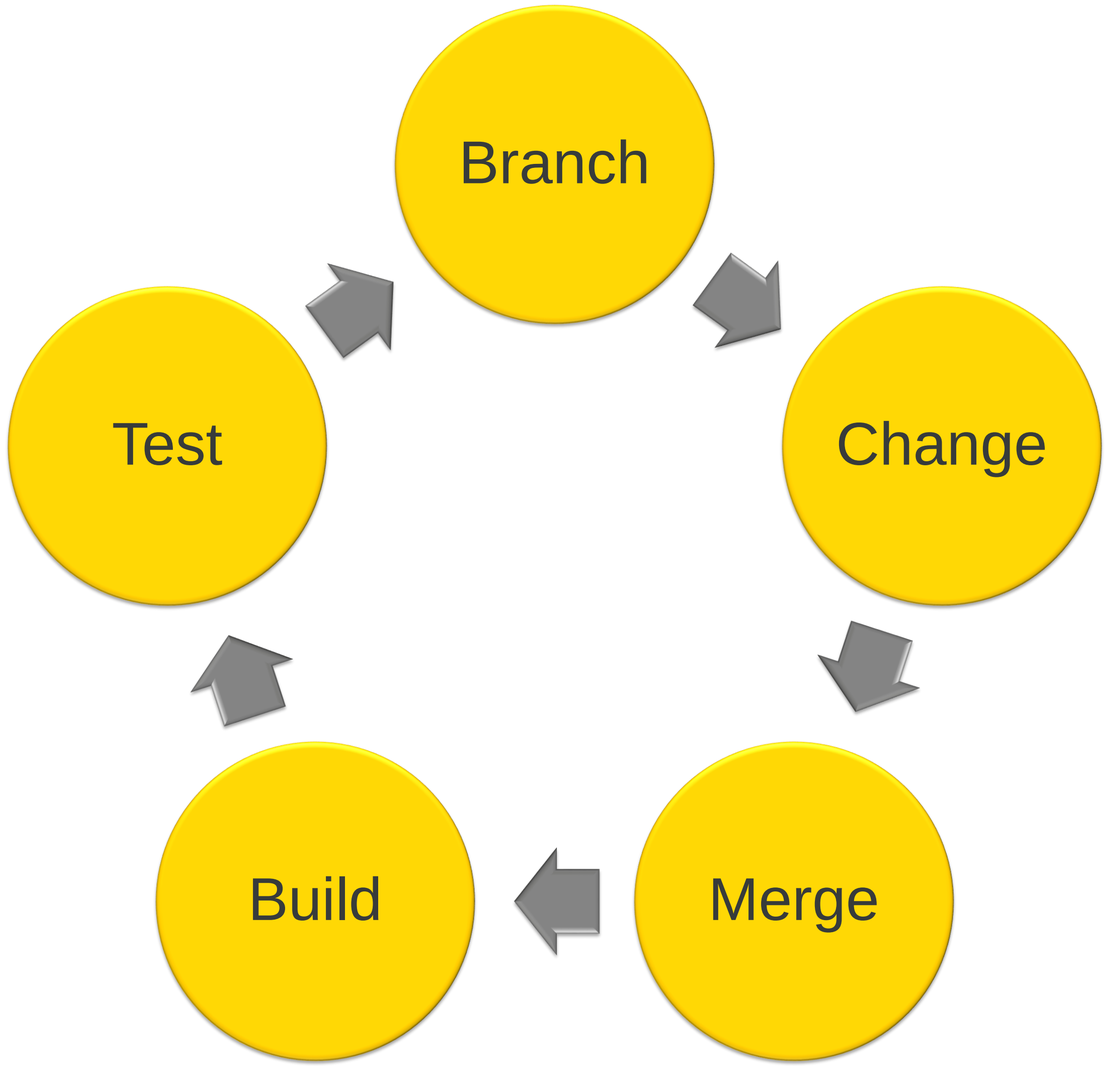


CI/CD on container platforms – Container Platforms



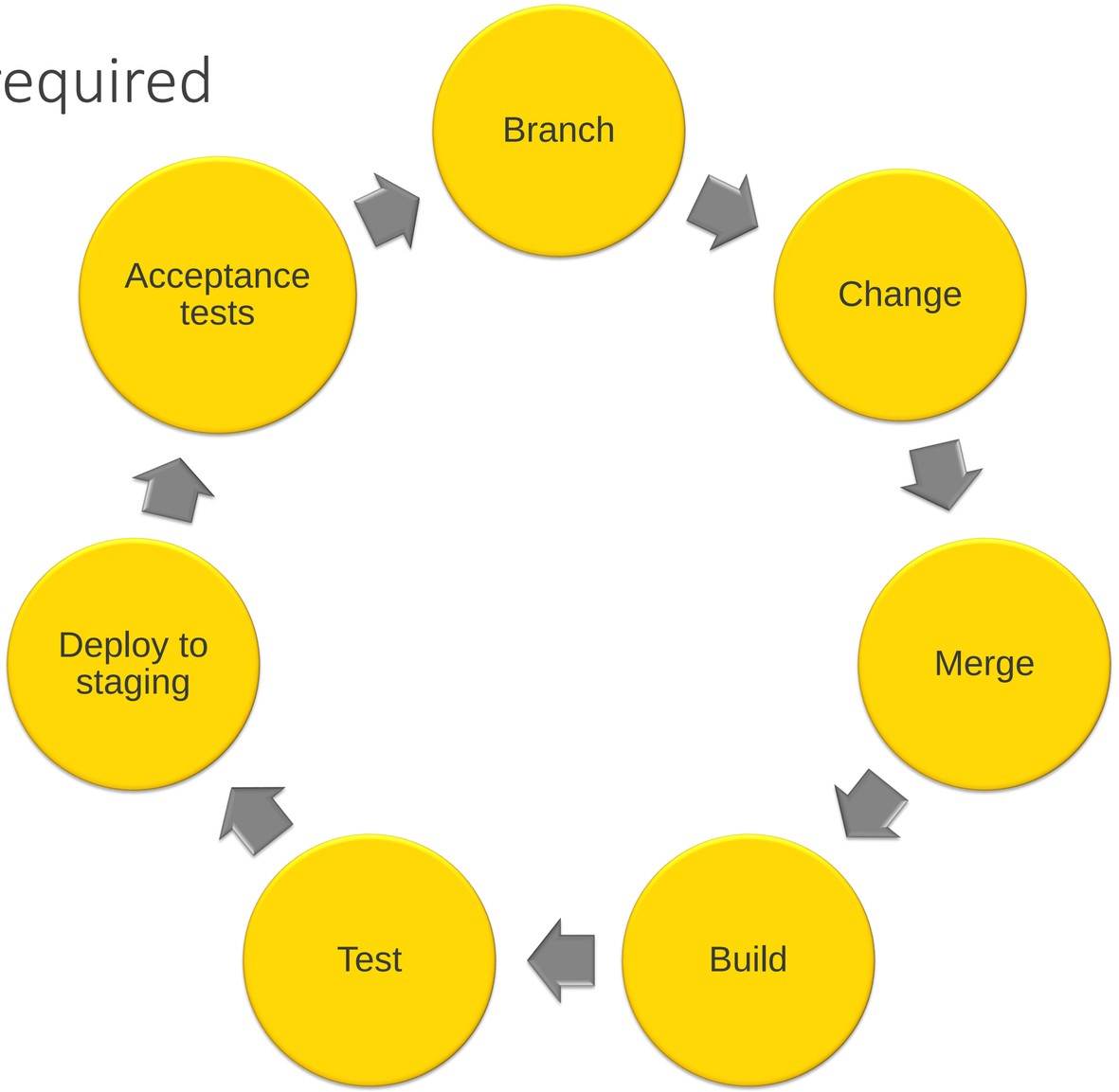
CI/CD on container platforms – CI

- Born from extreme programming
- Merge your code early and often
- Build your code automated after change
- Test your code automated after change
- Goal
  - Early feedback on changes
  - Reduce merge conflicts



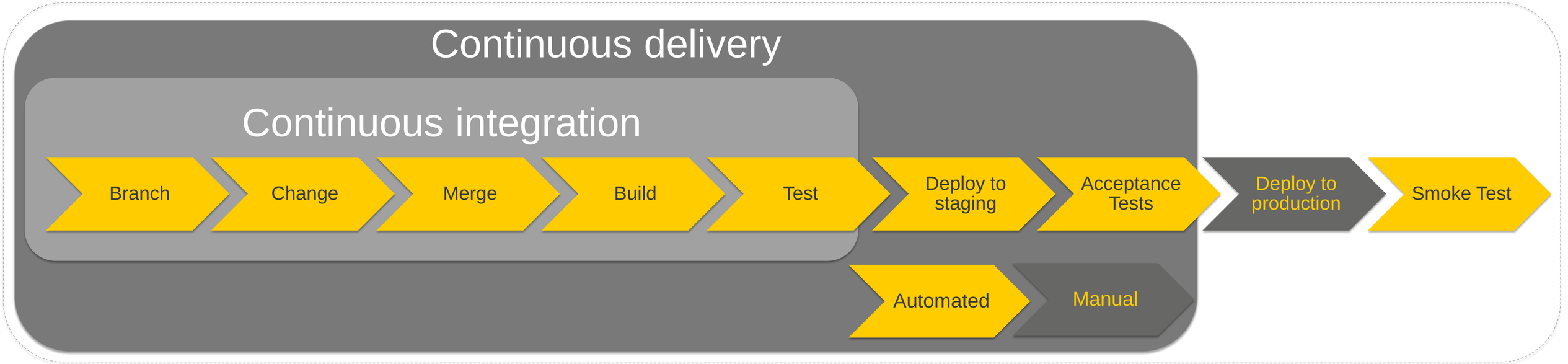
CI/CD on container platforms – CD

- Release your software whenever it’s required
- Extends continuous integration by
  - Deployment into a staging environment
  - Acceptance tests



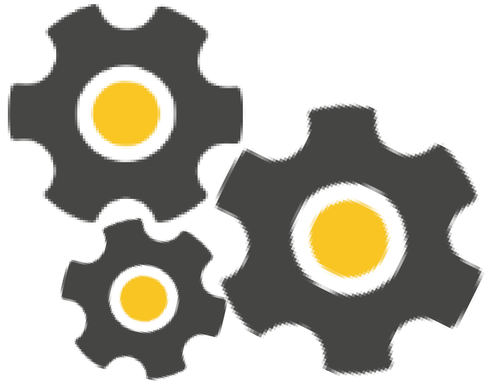
CI/CD on container platforms – CI/CD pipelines

- Automate everything from code change to pre production
- Increase visibility of issues while building, testing, deploying your product
- Allows fast feedback loops
- Empowers you to deliver continuously
- Enables continuous deployment



CI/CD on container platforms – CI/CD pipelines

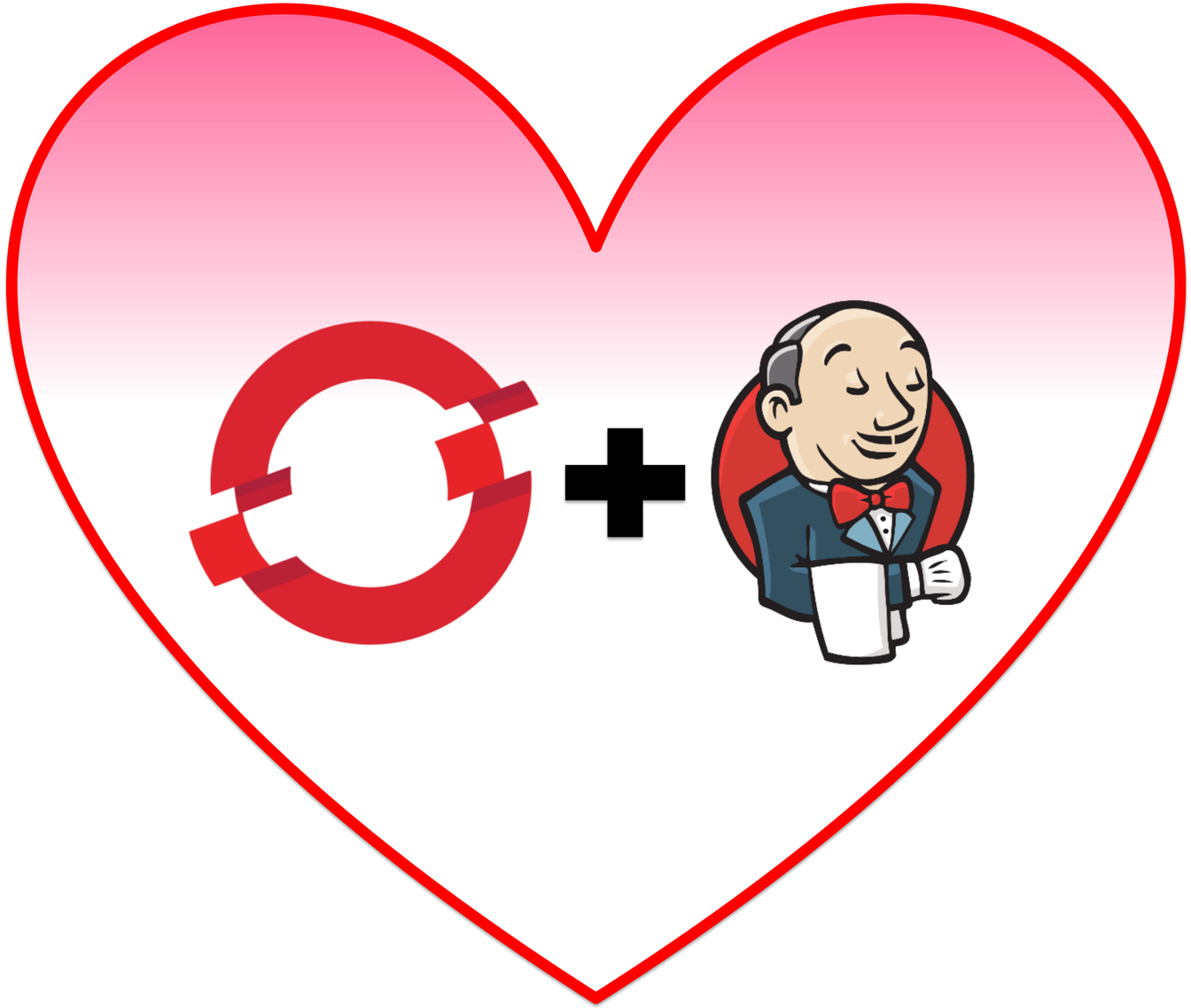
- Modern CI/CD life cycles have to be enabled by software
  - Configuration as code
- Various software solutions on the market
  - Travis CI
  - GitLab CI
  - OpenShift with Jenkins
  - etc.
- Provide a configurable platform to specify build pipelines



CI/CD on container platforms – CI/CD pipelines

- Define your individual pipeline
- Bind it to your source control
- Deploy the pipeline to your Jenkins
- Get some coffee

CI/CD on container platforms – CI/CD pipelines



CI/CD pipelines – Build the software – Build configs

- Build configs specify how to build software
- YAML or JSON format
- Different strategies for various use cases
  - jenkinsPipelineStrategy
  - sourceStrategy
  - dockerStrategy
  - customStrategy

CI/CD pipelines – Build the software – Jenkins

- We need a Jenkins file to define the pipeline
- We need a jenkinsPipelineStrategy build config
- Build a Jenkins containing the Jenkins file
- Jenkins and build configuration stored in the git repository

```
node{

    checkout scm


}
```

+

```
- apiVersion: v1
  kind: BuildConfig
  metadata:
    labels:
      build: ${APPLICATION_NAME}-pipeline
      component: backend
      app: ${APPLICATION_NAME}
    name: ${APPLICATION_NAME}-pipeline
  spec:
    failedBuildsHistoryLimit: 5
    runPolicy: Serial
    source:
      git:
        uri: ${INFRASTRUCTURE_REPOSITORY_URL}
      sourceSecret:
        name: gitlab-ssh
      type: Git
    strategy:
      jenkinsPipelineStrategy:
        jenkinsfilePath: infra/jenkins/Jenkinsfile
      type: Source
```

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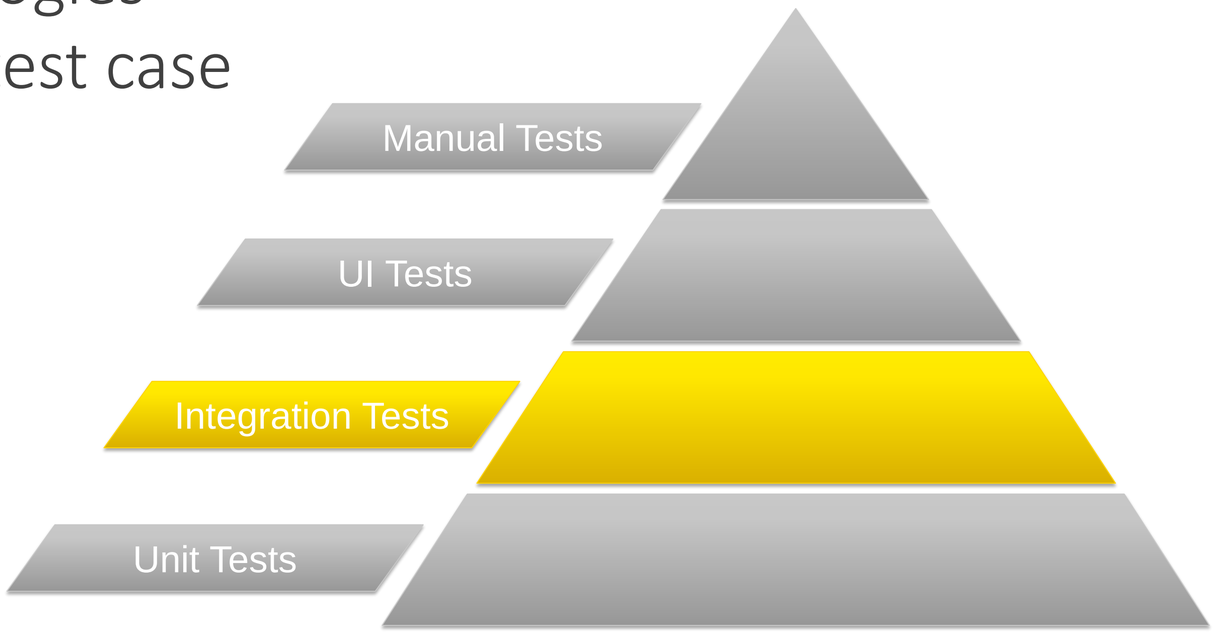
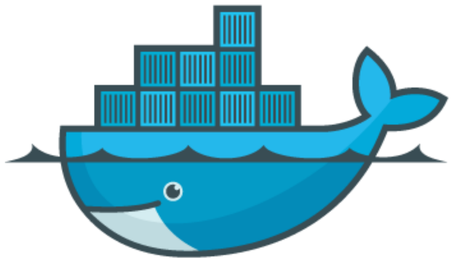
Integration testing with CITRUS

- Open source framework
- Focus on automated integration testing
- No mocks – real messages
- Powerful message validation capabilities
- Supports a vast amount of technologies
- Transports combinable in a single test case



Integration testing with CITRUS

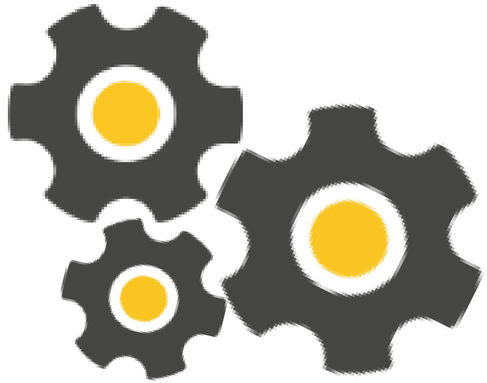


Integration testing with CITRUS

Endpoint	Description
citrus-http	HTTP client and server
citrus-jms	JMS consumer and producer
citrus-ws	SOAP WebServices client and server
citrus-mail	Mail client and server
citrus-docker	Docker client
citrus-camel	Apache Camel components
citrus-kubernetes	Kubernetes client
citrus-selenium	Selenium browser
citrus-ftp	FTP client and server
citrus-vertx	Vert.x consumer and producer
citrus-ssh	SSH client and server
citrus-jdbc	JDBC server simulation
...	...

Integration testing with CITRUS

- Rich Java- and XML-DSL to write tests
- Integrates with JUnit and TestNG
- Integrates with common build tools
  - Maven
  - Gradle
  - Ant
- Therefore tests are easily executable with Jenkins



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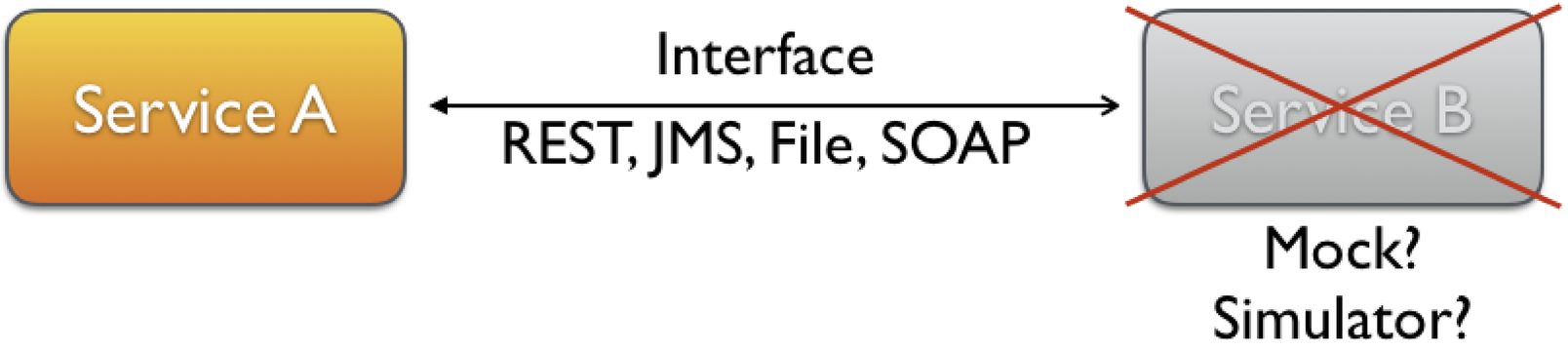

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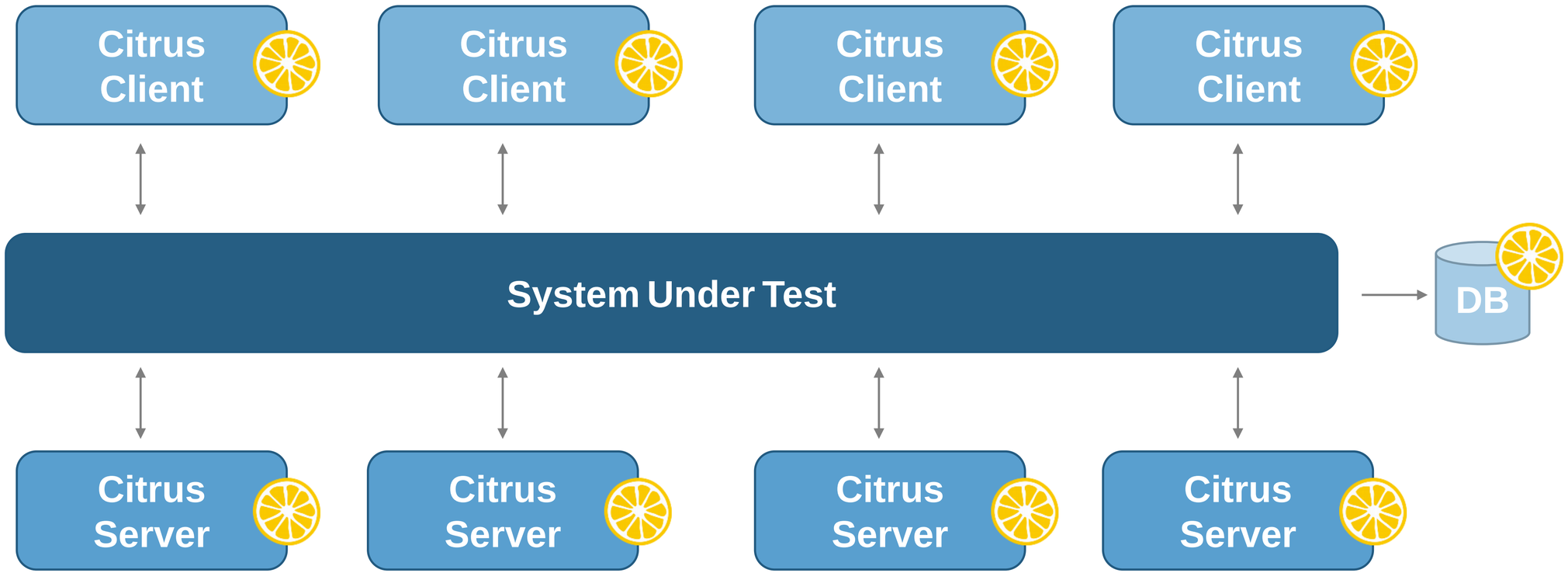

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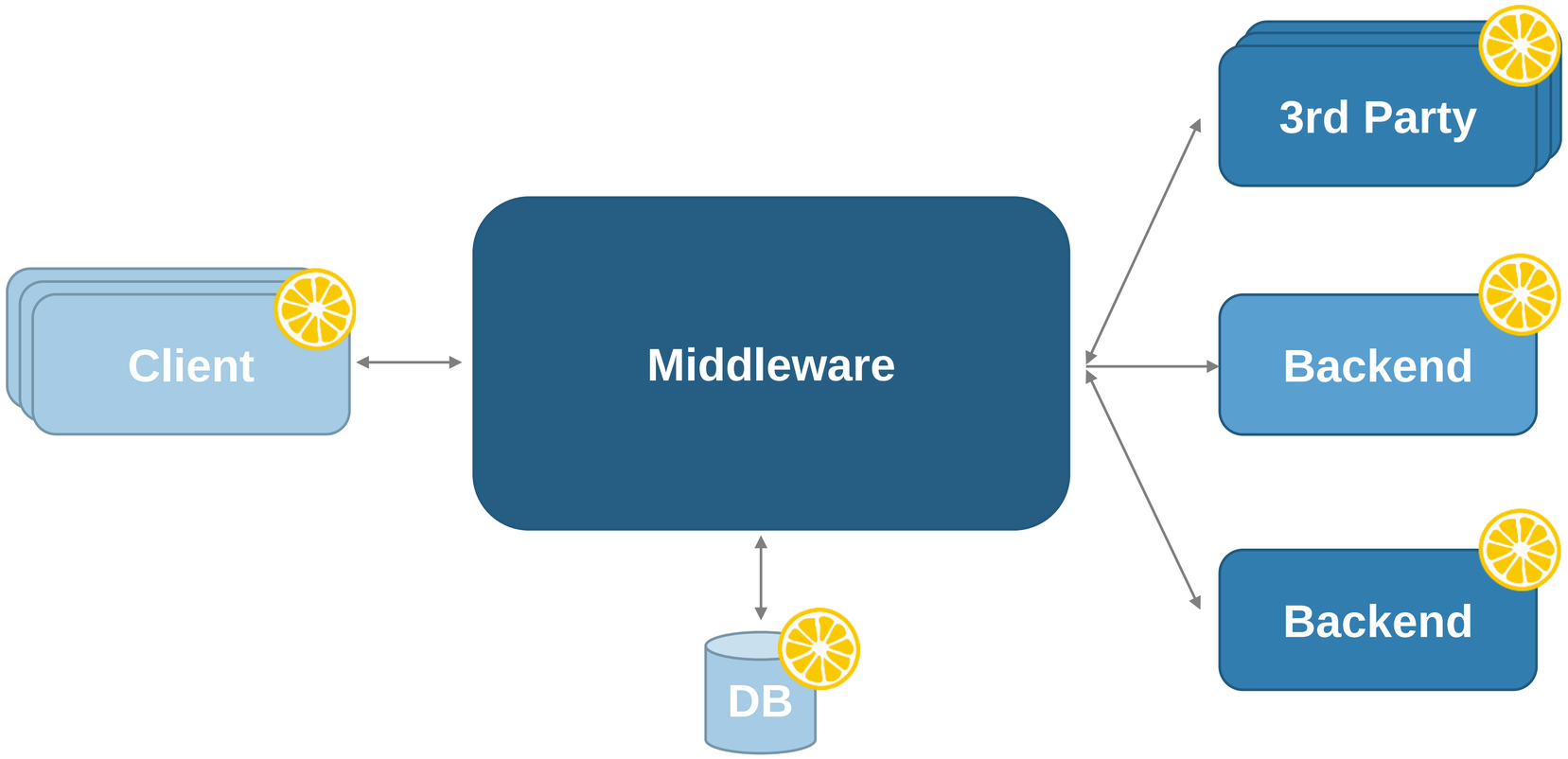

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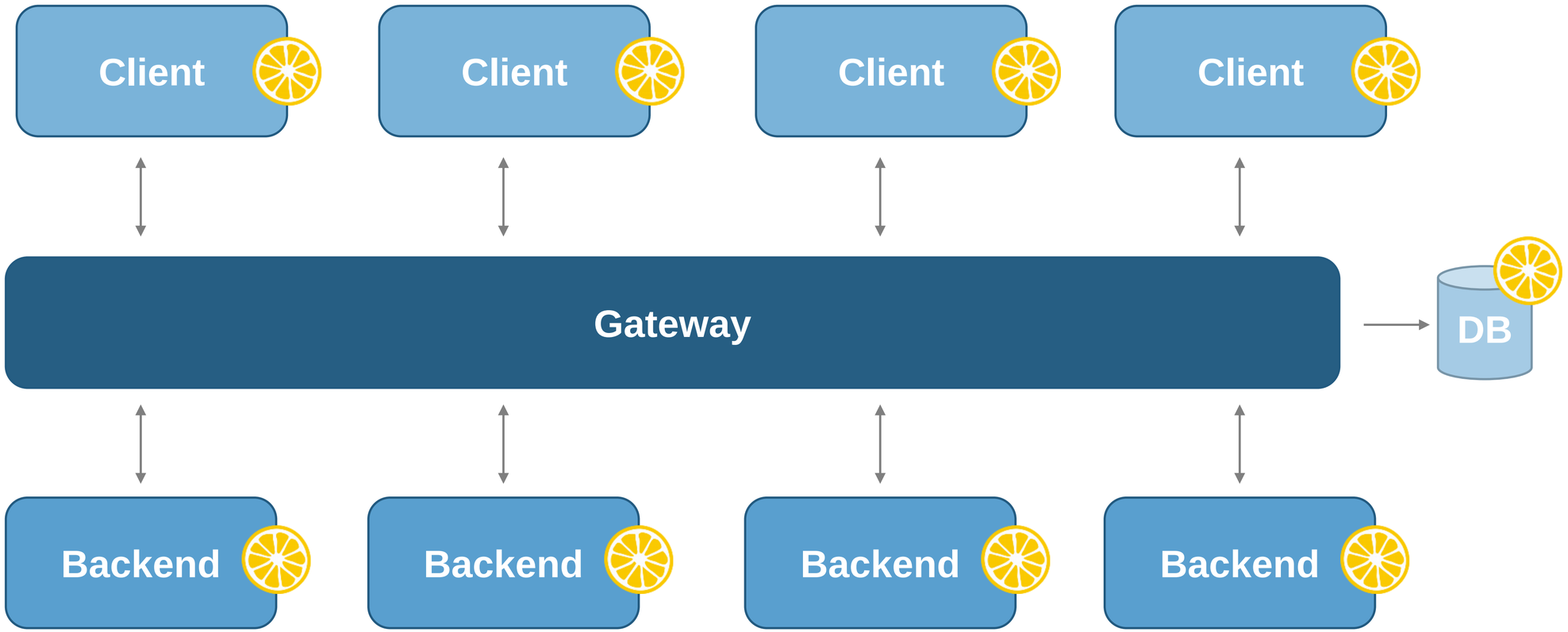

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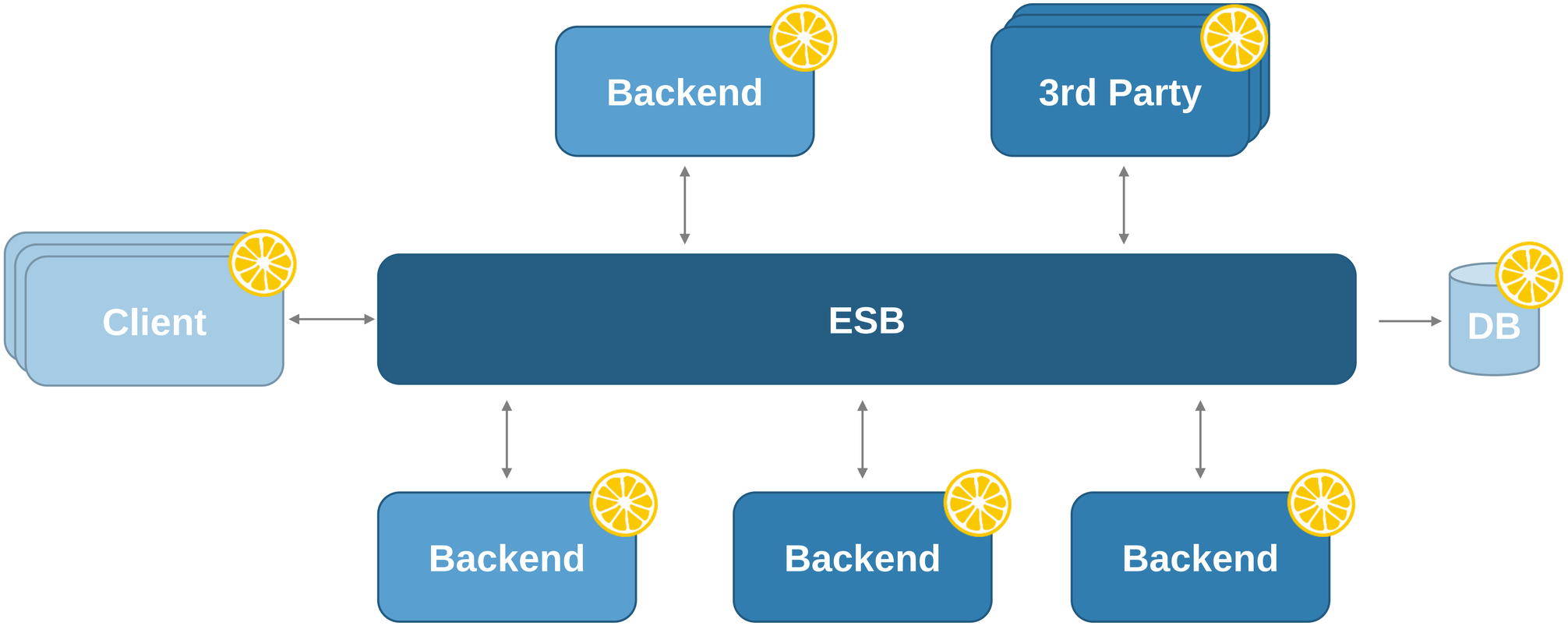

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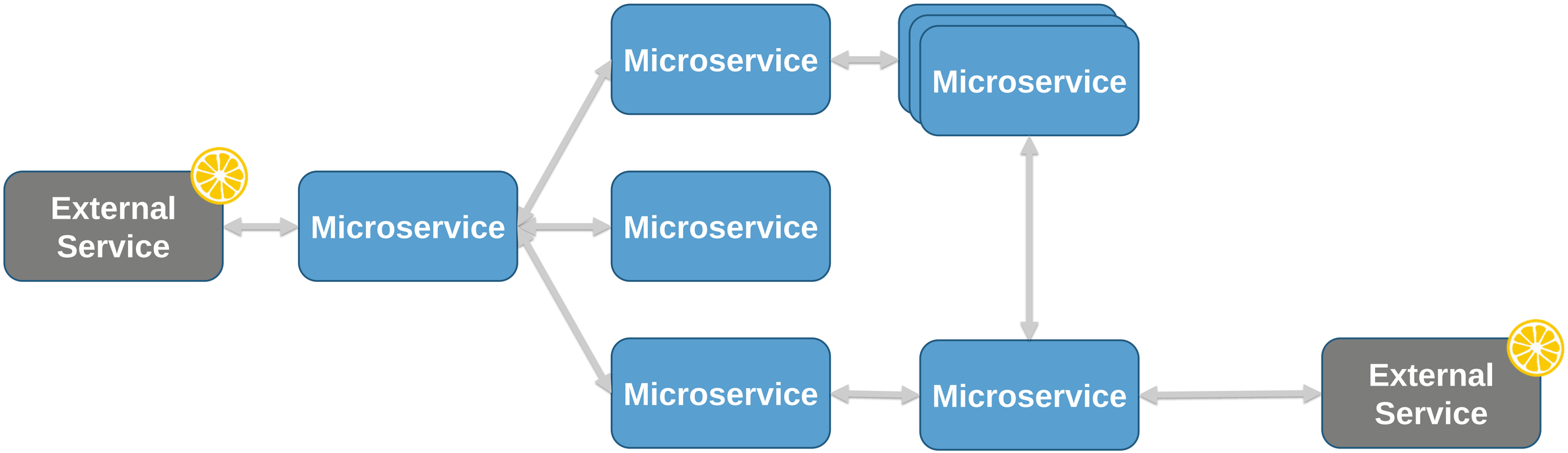

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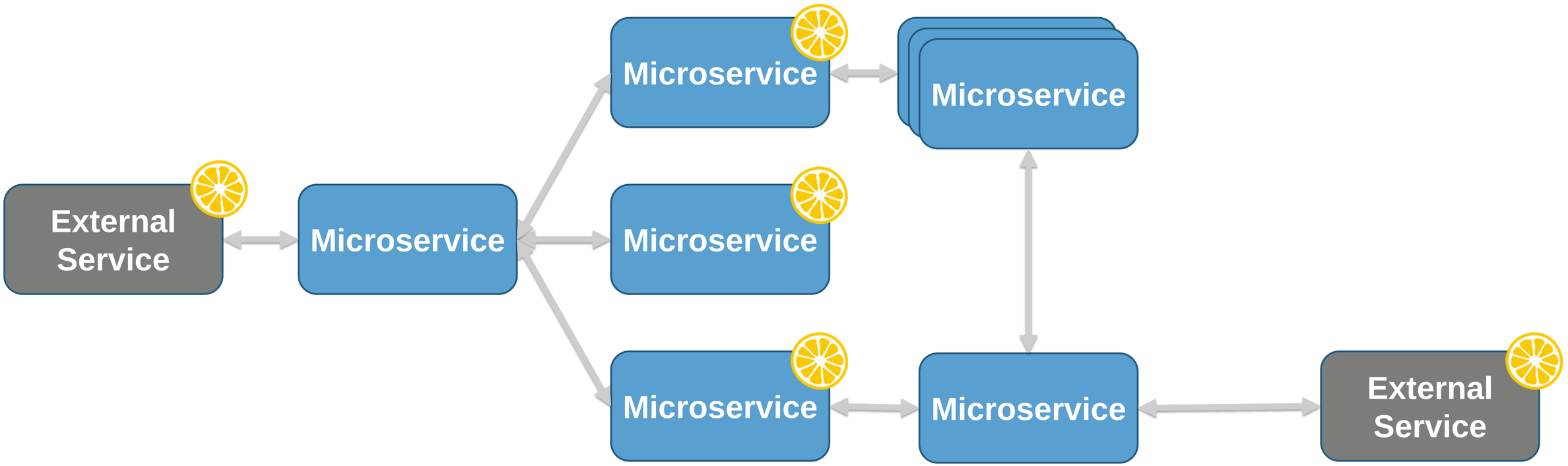
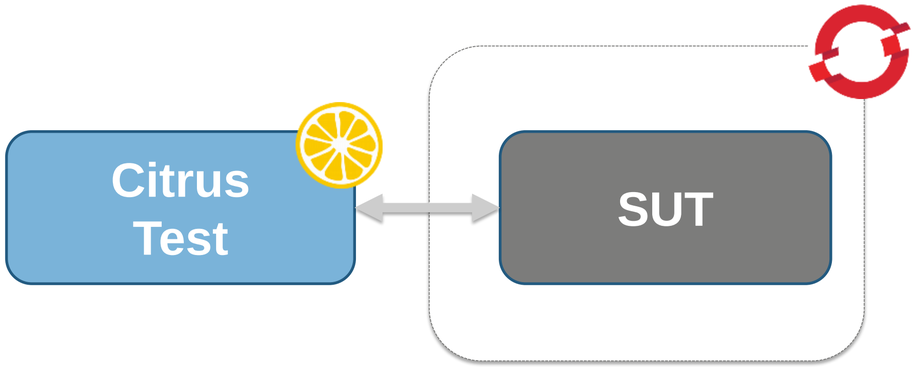


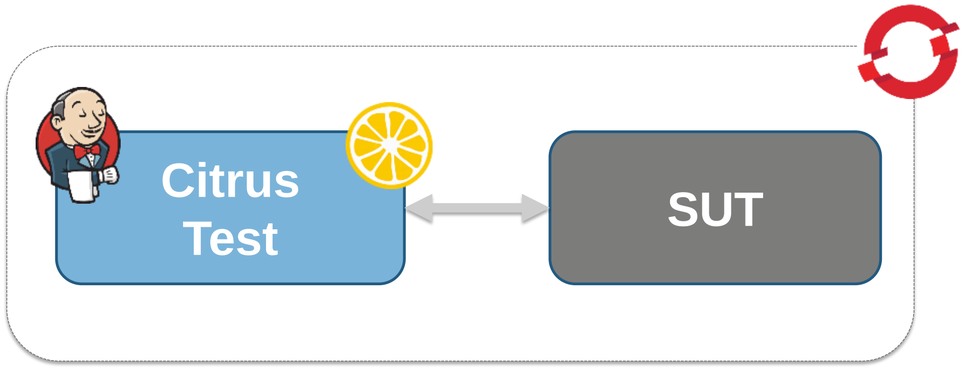
Integration testing with CITRUS

Direct test execution



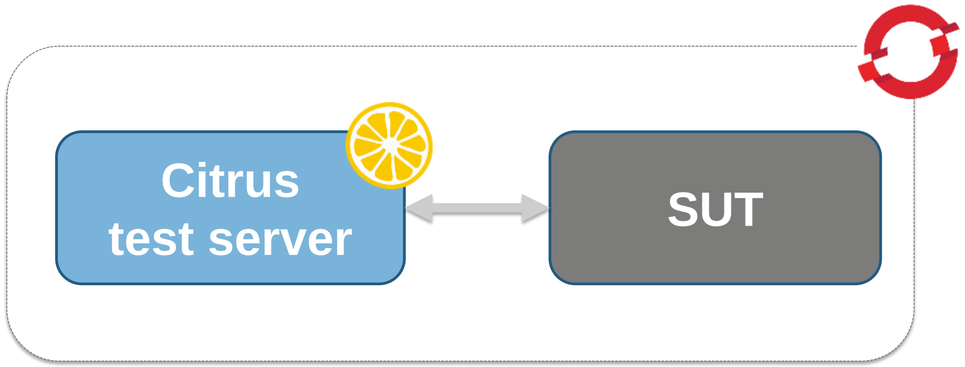
Integration testing with CITRUS

From a Jenkins slave



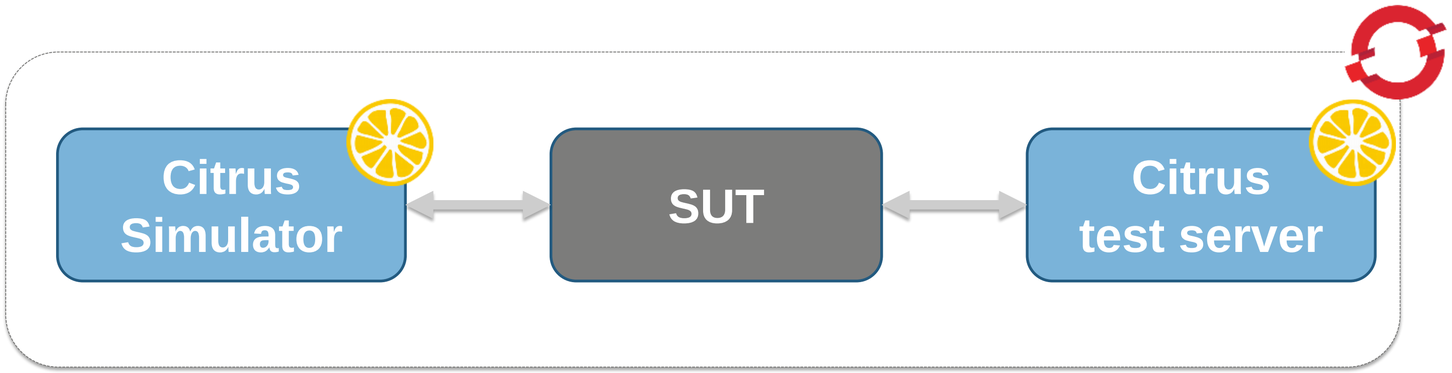
Integration testing with CITRUS

From a dedicated test container



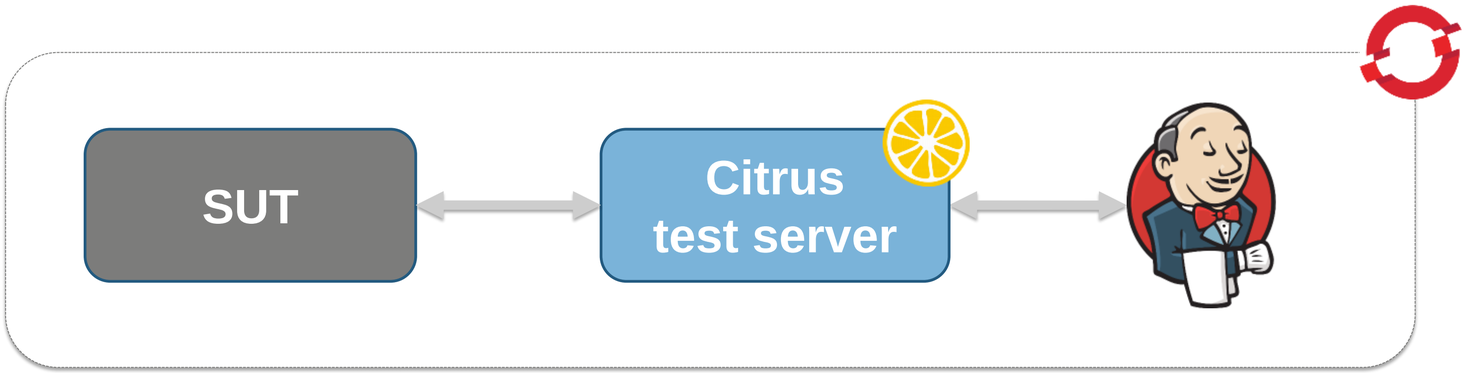
Integration testing with CITRUS

In combination with a standalone Simulator



Integration testing with CITRUS

With Jenkins controlling your test container



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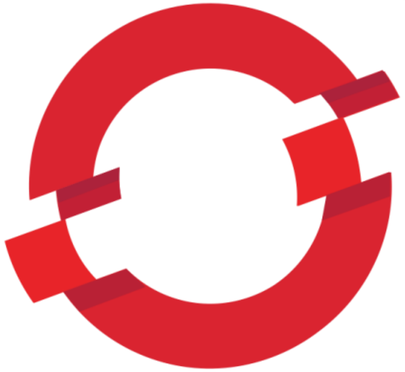
Summary

- Testing of microservices is different
- Modern container platforms can support you
  - Simplifies CI/CD
  - Simplifies testing
- Citrus for integration testing
  - Supports a vast amount of technologies
  - Flexible test execution
  - Transports combinable in a single test case



Questions?

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Thank you!