

Juni Mukherjee

(@JuniTweets @CloudBees)



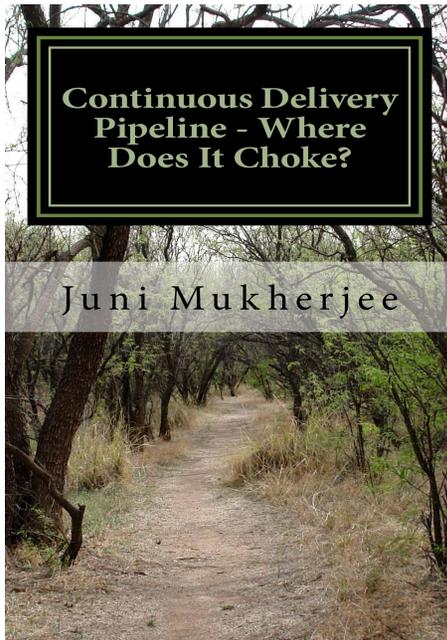
The Twelve-Factor Pipeline

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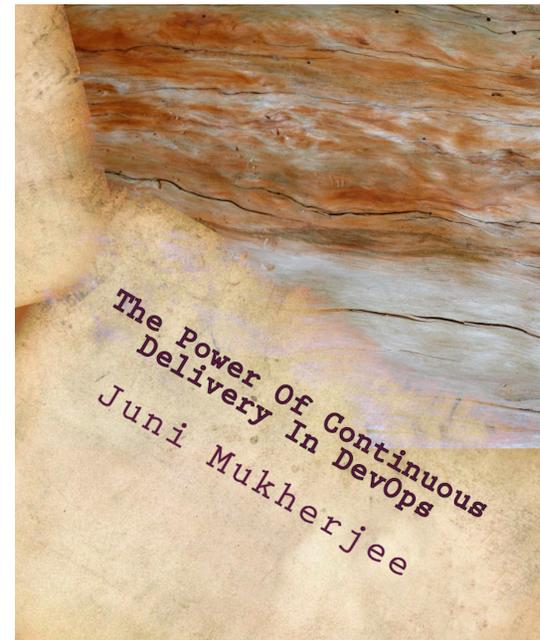


<https://continuity.world>

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<https://continuity.world/2015-book>



<https://continuity.world/2017-book>



CloudBees

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Every business is a software business, and under pressure to innovate constantly. This increased velocity introduces new business risks.

CloudBees is building the world's first end-to-end automated software delivery system, enabling companies to balance governance and developer freedom.

<https://www.cloudbees.com>

CloudBees

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#	Class/category	Solution (Not meant to be exhaustive...)
1	Orchestrator	Jenkins, GitLab, GoCD, TeamCity, TravisCI, CodeShip, CodePipeline ..
2	Source code repo	GitHub, Bitbucket, CodeCommit, SVN, ..
3	Artifact repo	Artifactory, Nexus, S3, HockeyApp, ..
4	Dashboard	SumoLogic, ..
5	IaaS	AWS, Azure, ..
6	PaaS	CloudFoundry, Heroku, ..
7	Analytics	DevOptics, CloudWatch, New Relic, Dynatrace, Crashlytics, ..
8	Container ecosystem	Docker, CoreOS, Rocket, Swarm, Kubernetes, Mesos, ECS, ..
9	Audit trail	CloudTrail, .. (never turn it off!)
10	SAST	Coverity, ...
11	DAST	OWASP ZAP, ..
12	Code coverage	Cobertura, JaCoCo, ..

CloudBees

Continuous Everything ...
integration | testing | delivery | deployment | everyone | ..

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#	Class/category	Solution (Not meant to be exhaustive...)
13	Static code analysis	Sonar, ESLint, Taylor, Lint, ..
14	Functional test	TestNG, Webdriver/Selenium, SauceLabs (Selenium on the cloud), Protractor (Node.js), Appium (Mobile), ..
15	Performance test	JMeter, BlazeMeter (JMeter on the cloud), ..
16	Unit test	JUnit (Java), Jasmine (Node.js), ..
17	Feature Flagging	LaunchDarkly, ..
18	A/B tests	Optimizely, ..
19	Build	Npm (Node.js), Maven(Java), Gradle(Java, Android), ..
20	Database	Liquibase/Datical, Flyway, ..
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Agenda

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- Introduction to pipelines
- 12 factors applied to pipelines
- Pipeline analytics and insights
- Jenkins X (what happened to Jenkins?)

DevOps World



Jenkins World

The Event for Everything Jenkins & DevOps

September 16-19, 2018
San Francisco, CA

October 23-25, 2018
Nice, France

Presented by
cloud
bees

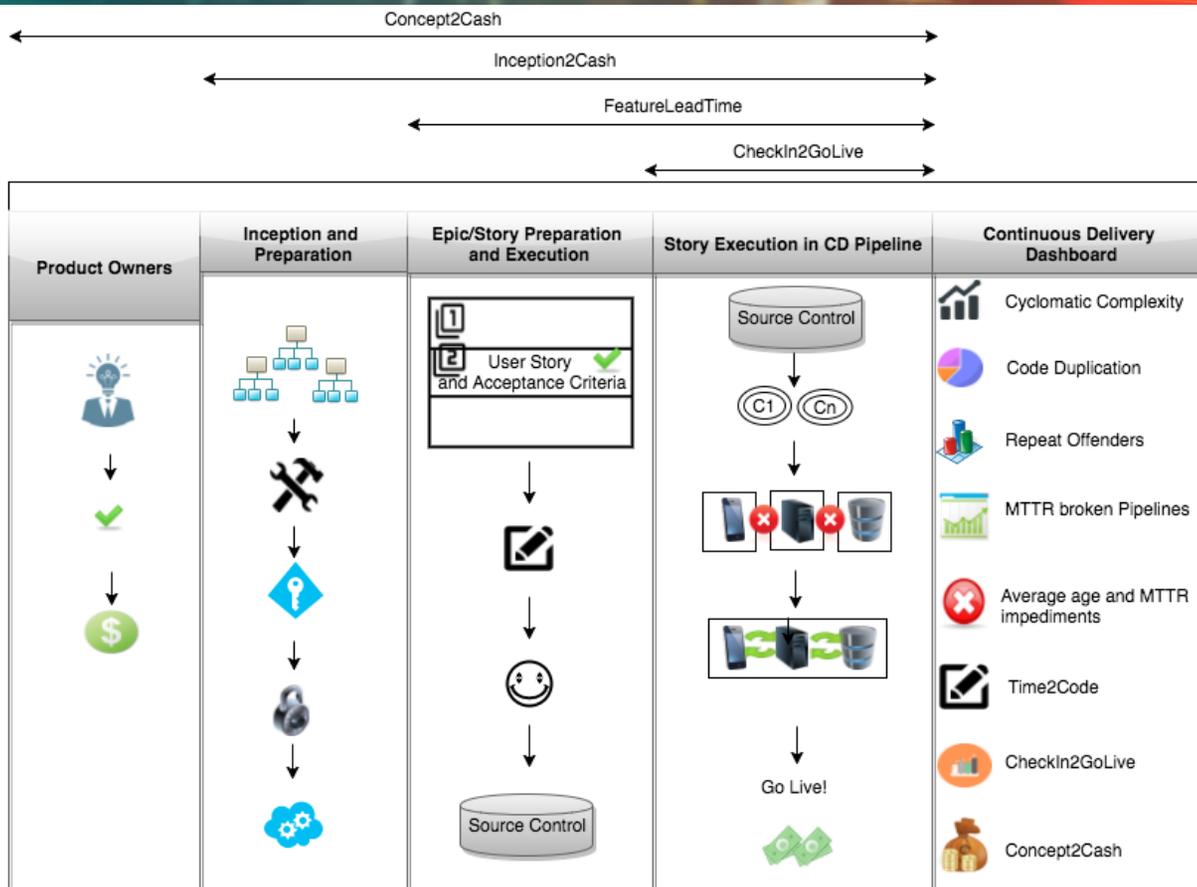
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- **Introduction to pipelines**
- 12 factors applied to pipelines
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- Jenkins X (what happened to Jenkins?)

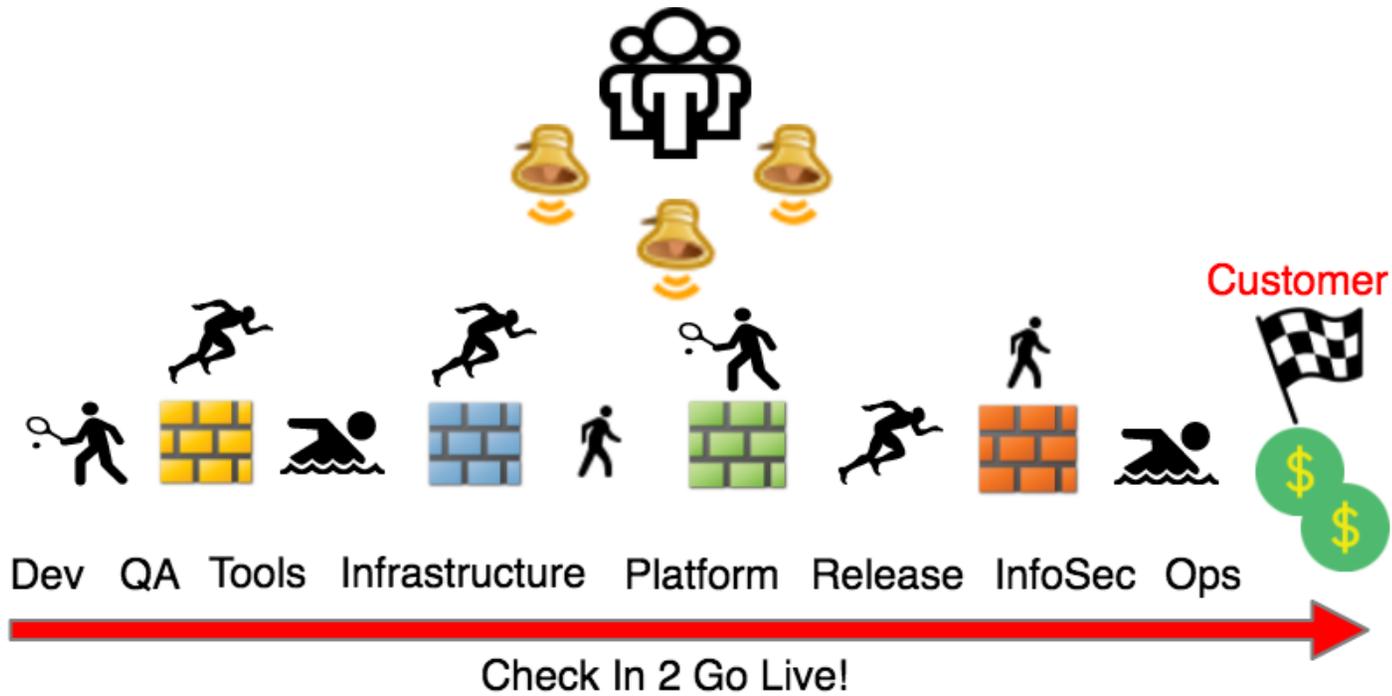
Concept to Cash

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Software Development, Testing and Delivery

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Continuous Everything

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Segregation of Duties (SoD)

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US Government



Judicial

Executive

Legislative

Agenda

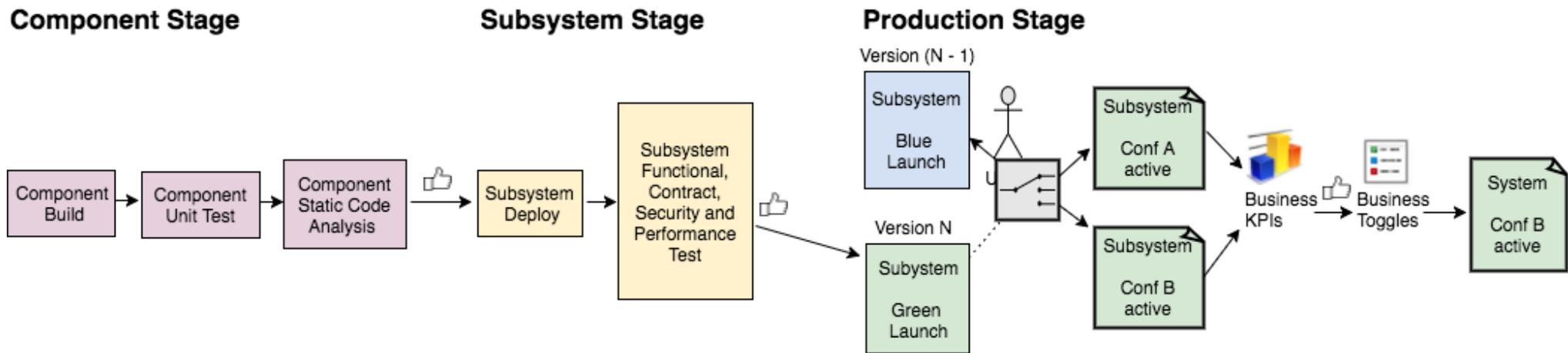
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- Introduction to pipelines
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Factor I: Codebase

One codebase tracked in revision control,
many deploys

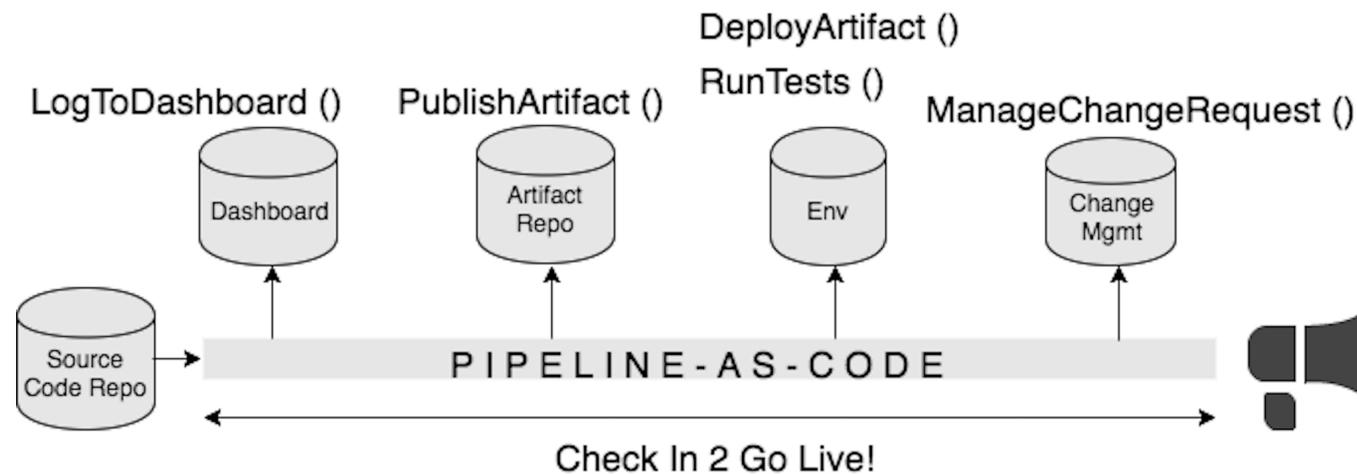
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Factor II: Dependencies

Explicitly declare and isolate dependencies

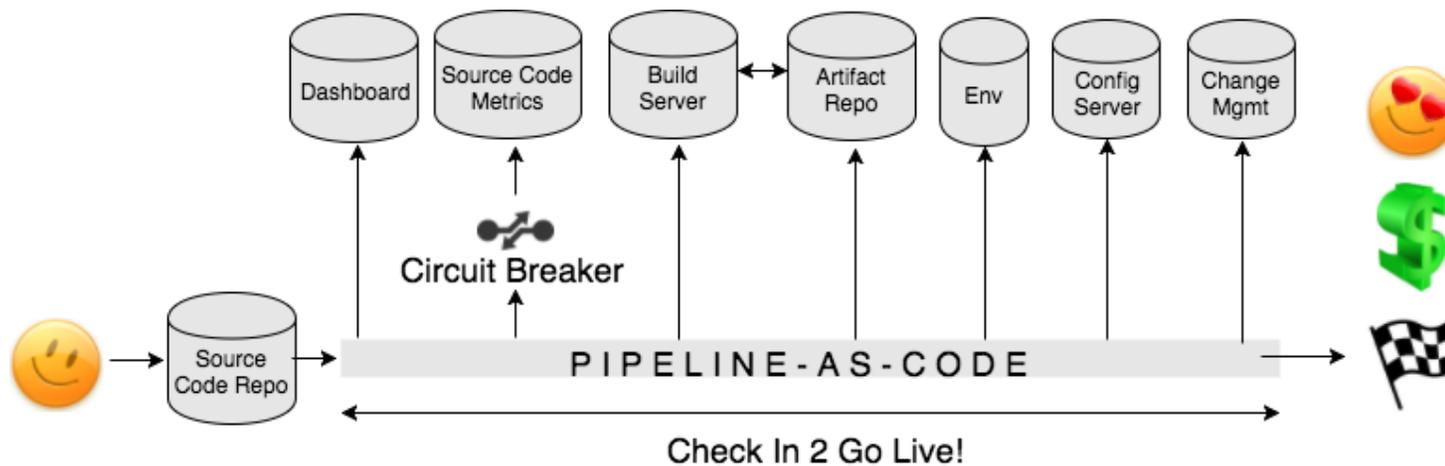
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Factor III: Config

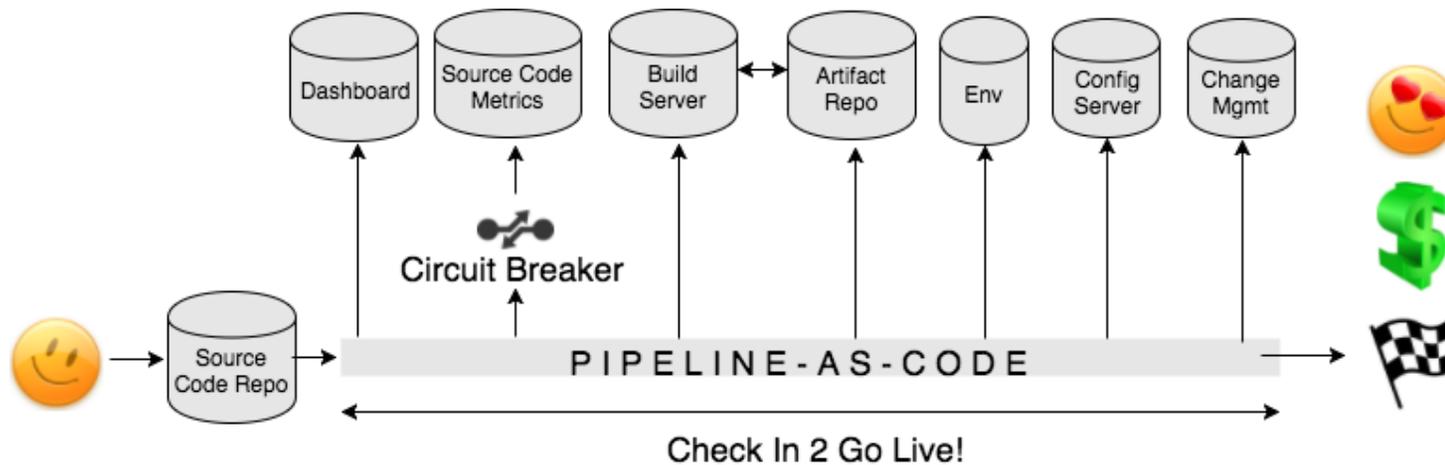
Store config in the environment

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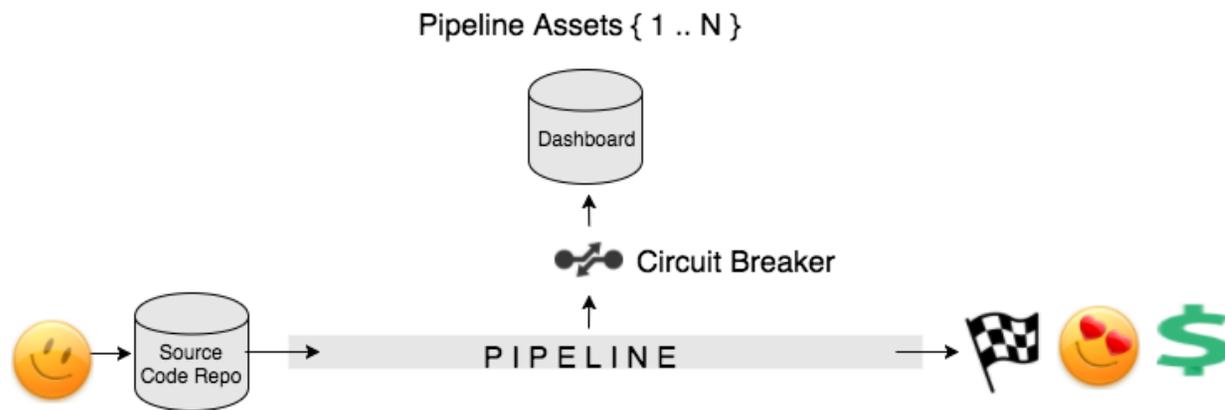
Factor IV: Backing services Treat backing services as attached resources

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Factor IV (continued): Backing services Treat backing services as attached resources

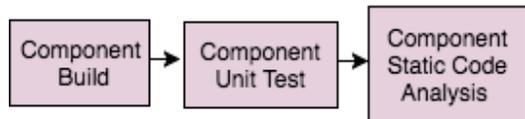
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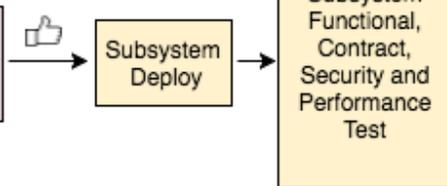
Factor V: Build, release, run Strictly separate build, release and run stages

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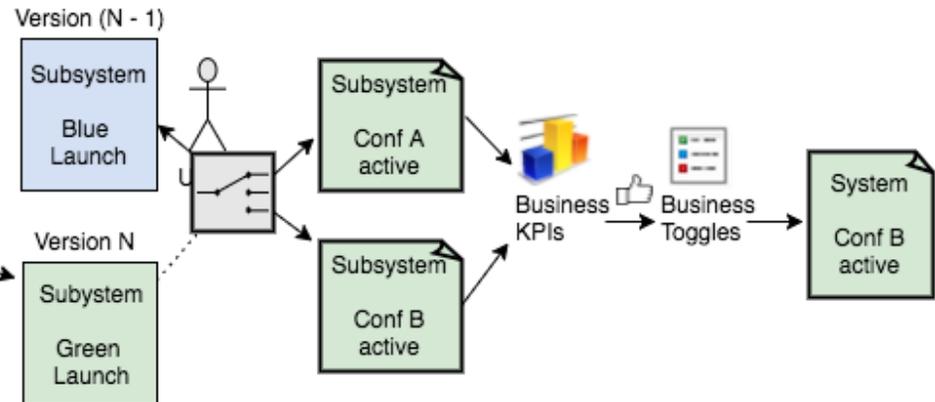
Component Stage



Subsystem Stage



Production Stage



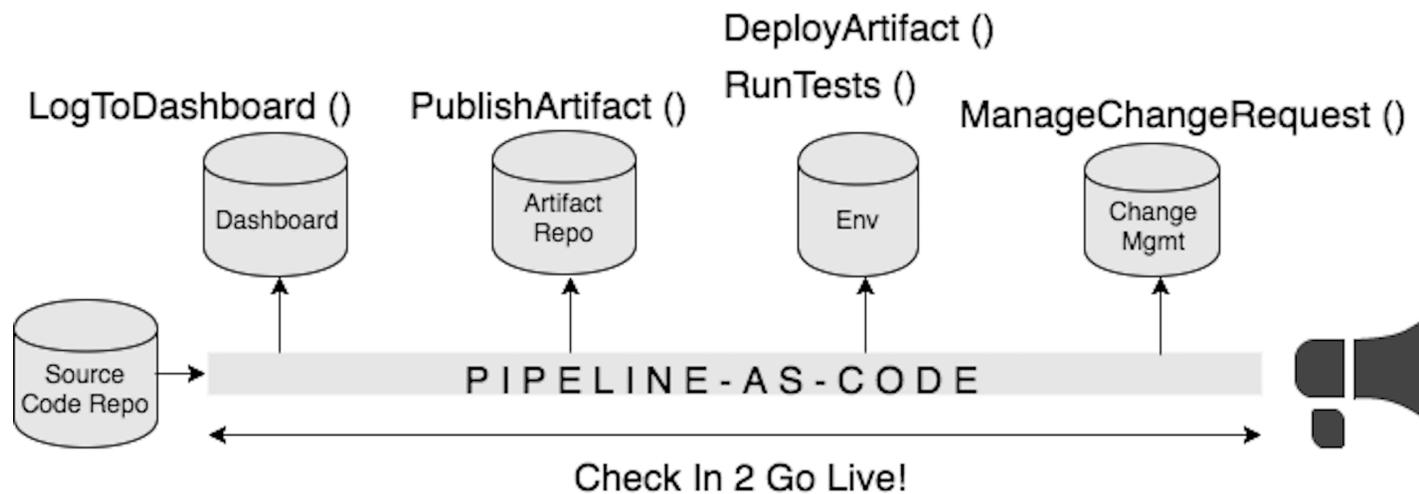
Factor VI: Processes

Execute the app as one or more stateless processes

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Factor VII: Port binding
Export services via port binding

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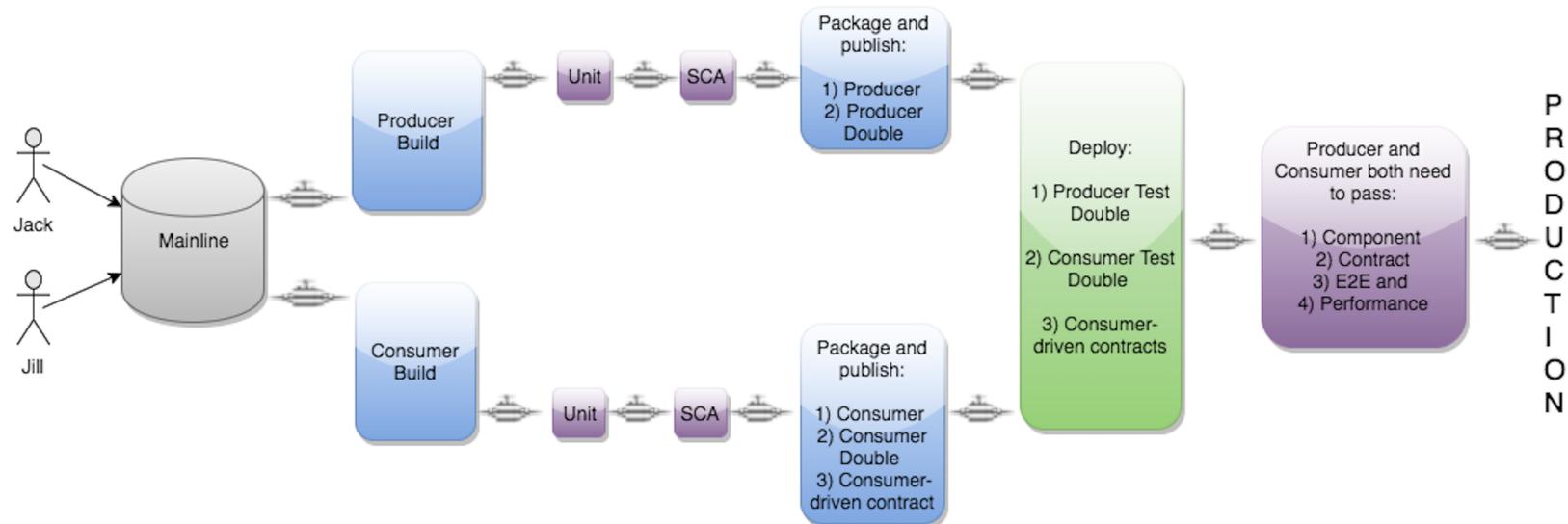
- The 12-factor app is completely self-contained
- One app can become the backing service for another app

Factor VIII: Concurrency Scale out via the process model

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Customer Supplier Pattern with consumer-driven contract

Intranet Model - Producer is aware of all Consumers



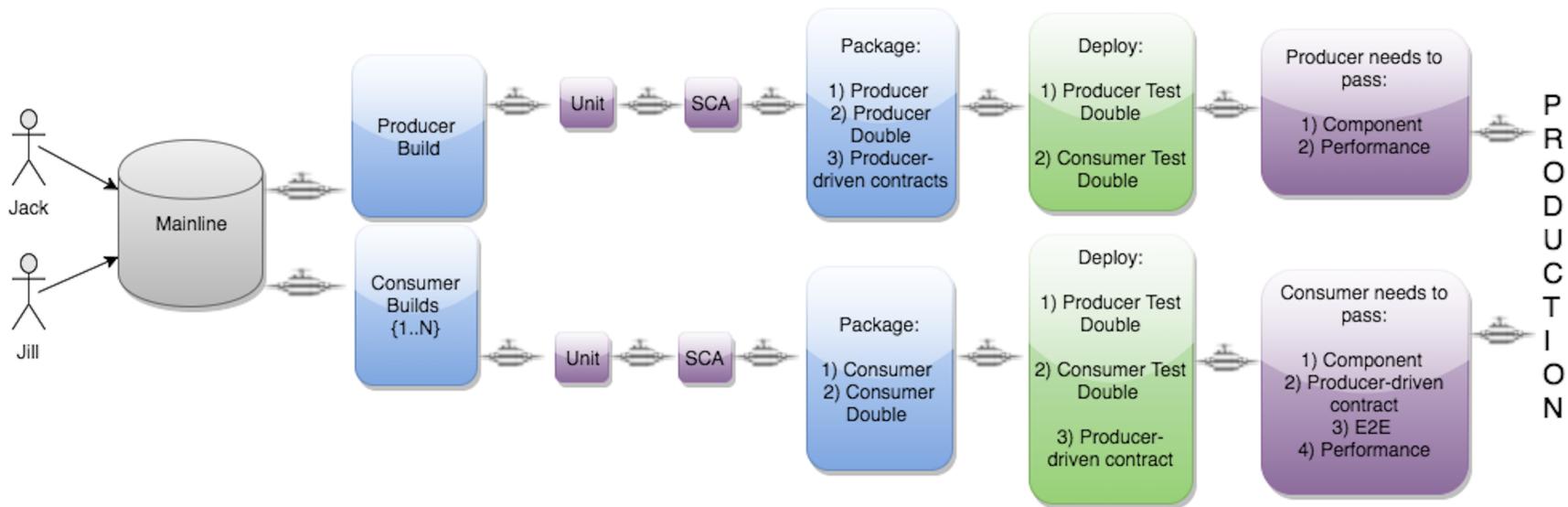
Factor IX: Disposability

Maximize robustness with fast startup and graceful shutdown

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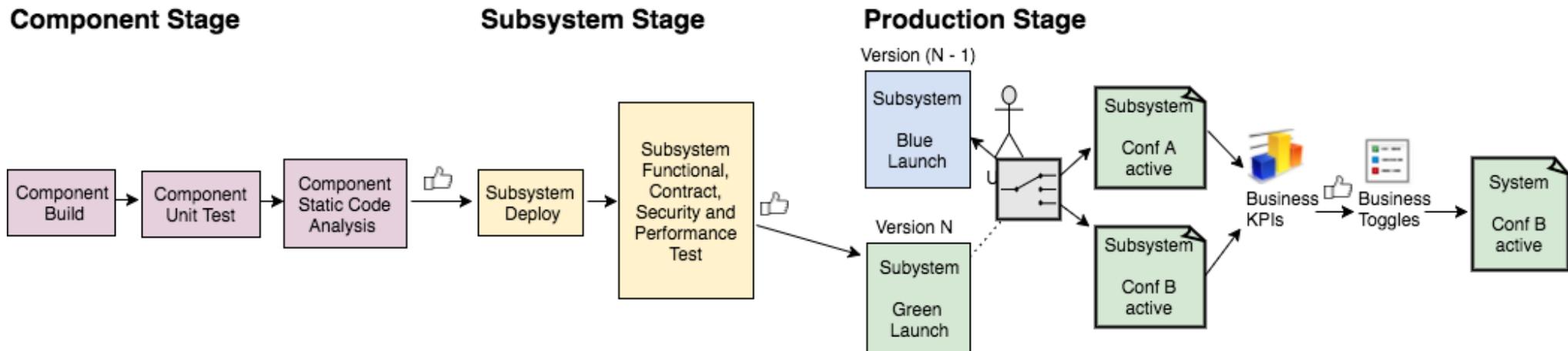
Conformist Pattern with producer-driven contract

Internet Model - Producer is not aware of all consumers



Factor X: Dev/prod parity Keep dev/test, staging, and prod similar

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- ☑ Time
- ☑ Personnel
- ☑ Tools

Factor XI: Logs

Treat logs as event streams

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The screenshot shows a Jenkins pipeline view for 'junibutler / gojenv 5'. The pipeline is currently on the 'Promote to Environments' step, which is marked as successful with a green checkmark. The pipeline consists of four steps: 'Start', 'CI Build and push snapshot', 'Build Release', and 'Promote to Environments'. The 'Build Release' and 'Promote to Environments' steps are also marked as successful. The 'Promote to Environments' step is expanded to show its logs, which include four shell script commands: 'jx step changelog', 'make release', 'jx promote -b --all-auto --timeout 1h', and 'Delete workspace when build is done'. The logs show the execution time for each command: 4s, 7s, 5m 47s, and <1s respectively. The Jenkins interface also shows the branch 'master' and commit 'd90aa06', and indicates that the pipeline was changed by 'juni' and replayed #4.

jenkins.jx.35.197.2.40.nip.io/blue/organizations/jenkins/junibutler%2Fgojenv/detail/master/5/pipeline

✓ junibutler / gojenv 5

Branch: master 12m 7s Changes by juni

Commit: d90aa06 18 days ago Replayed #4

Start CI Build and push snapshot Build Release Promote to Environments End

Promote to Environments - 5m 58s

✓	> jx step changelog --version v\$(cat ../VERSION) — Shell Script	4s
✓	> make release — Shell Script	7s
✓	> jx promote -b --all-auto --timeout 1h --version \$(cat ../VERSION) — Shell Script	5m 47s
✓	> Delete workspace when build is done	<1s

Factor XII: Admin processes

Run admin/management tasks as one-off processes

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The screenshot shows the Jenkins web interface in a Chrome browser. The page title is 'Jenkins' and the breadcrumb is 'junibutler / gojenv'. The 'Administration' tab is selected. Below the navigation bar, there is a table of build activities. The table has columns for STATUS, RUN, COMMIT, BRANCH, MESSAGE, DURATION, and COMPLETED. There are five rows of data, with the first three rows having a refresh icon in the 'COMPLETED' column.

STATUS	RUN	COMMIT	BRANCH	MESSAGE	DURATION	COMPLETED
✓	5	d90aa06	master	Replayed #4	12m 7s	18 days ago
✓	4	d90aa06	master	Updated print	12m 41s	19 days ago
✗	3	c495509	master	Started by user admin	7m 12s	19 days ago
✗	2	c495509	master	Updated print	11m 27s	20 days ago
✓	1	6c51c58	master	Branch indexing	12m 25s	20 days ago

1.4.2 · Core 2.111 · e5955c2 · 16th February 2018 01:54 PM

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Factor XII (continued): Admin processes

Run admin/management tasks as one-off processes

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Pipeline deploys on Dev
Pipeline deploys on Stage
Pipeline deploys in Production



Pipeline failures due to Unit Tests
Pipeline failures due to Functional Tests
Pipeline failures due to Performance Tests
Pipeline failures due to Security Vulnerabilities
.....
.....

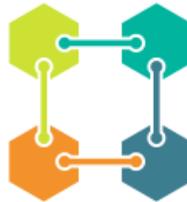


Pipeline failures in Dev
Pipeline failures in Stage
Pipeline failures in Production
of Escaped Defects



Business Value Per Sprint

Not # of releases
Not # of tests executed



Stability Index =
Fn (CheckIn2GoLive,
of Escaped Defects,
Customer Delight,
...)



Code Quality = Fn (
Cyclomatic Complexity,
Code Duplication,
Unit Test Coverage)



CheckIn2Dev
CheckIn2Stage
CheckIn2GoLive!

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Jenkins X = CD + Kubernetes

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Business value that Jenkins X brings to organizations

<https://www.cloudbees.com/blog/> | @cloudbees

Jenkins X = CD + Kubernetes

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Under the hood of Jenkins X

<https://www.cloudbees.com/blog/> | @cloudbees

DevOps World



Jenkins World

The Event for Everything Jenkins & DevOps

September 16-19, 2018
San Francisco, CA

October 23-25, 2018
Nice, France

Presented by
cloud
bees

Juni Mukherjee

(@JuniTweets @CloudBees)



Thank you!

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