

The background of the slide is a solid blue rectangle. Overlaid on this background is a pattern of numerous interlocking gears. The gears are rendered in a lighter shade of blue, creating a subtle, mechanical texture. They vary in size and are arranged in a way that suggests a complex, interconnected system.

CI/CD Pipeline Introduction



Agenda

- What is CI and CD
 - What makes good CI / CD
 - How we get there
 - Business benefits of it all....
-



What is CI and CD?

- Continuous Integration
 - An approach to be continually validating the state of a codebase through automated testing.
 - Best achieved through integration with version control
 - Continuous Delivery / Deployment
 - An approach to regularly deploying artifacts that successfully pass the CI phase to ensure confidence around the deployment
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Delivery vs Deployment

Continuous integration, continuous deployment, and **continuous delivery** are like vectors that have the same direction, but different magnitude.

Their goal is the same: make our software development and release process faster and more robust.

The key difference between the three is in the scope of automation applied.



Delivery vs Deployment

- Continuous Delivery
 - Automatically prepare and track a release to production
 - The desired outcome is that anyone with sufficient privileges to deploy a new release can do so at any time in one or a few clicks. By eliminating nearly all manual tasks, developers become more productive.
 - Continuous Deployment
 - Every change in the source code is deployed to production automatically, without explicit approval from a developer.
 - As long as it passes the quality controls
-

What does good look like?



What makes for good CI?

1. Decoupled stages

- Each step in CI should do a single focused task

2. Repeatable

- Automated in a way that is consistently repeatable
- Tooling should work for local developers too – Local/Remote parity

3. Fail fast

- Fail at the first sign of trouble
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What makes for good CD?

1. Design with the system in mind

- Cover as many parts of a deployment as possible
- Application | Infrastructure | Configuration | Data

2. Pipelines

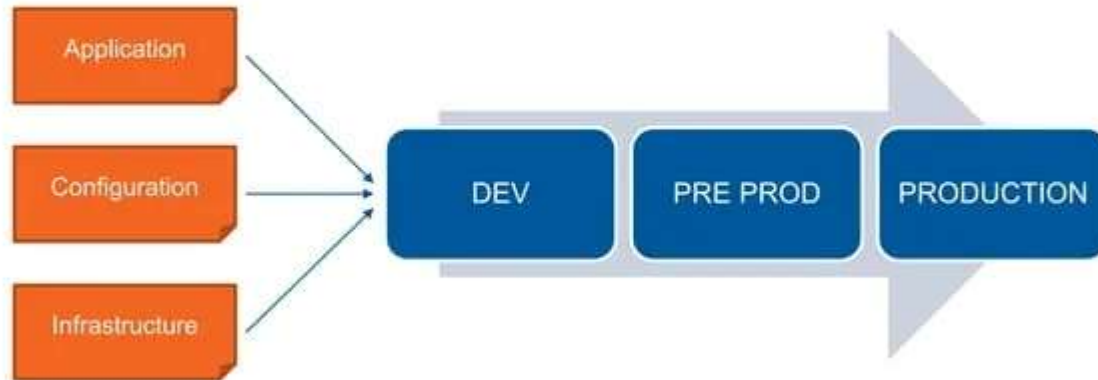
- Continually increase confidence as you move towards production

3. Globally unique versions

- Know the state of the system at any time
 - Be able to demonstrate difference between current and future state
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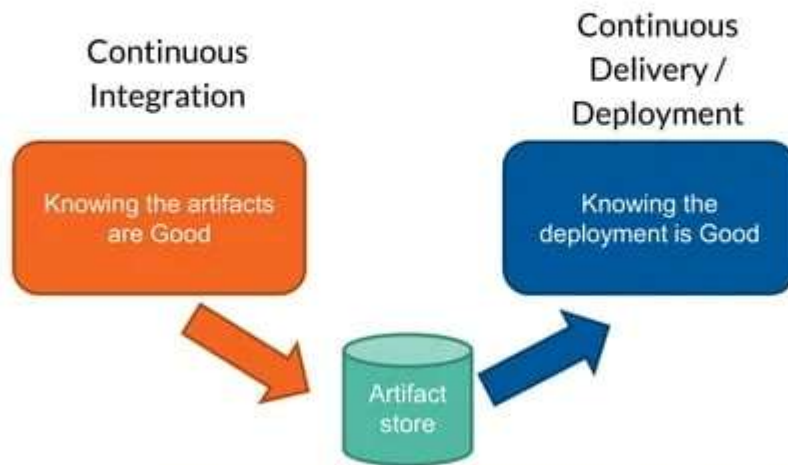


CD Pipeline flow



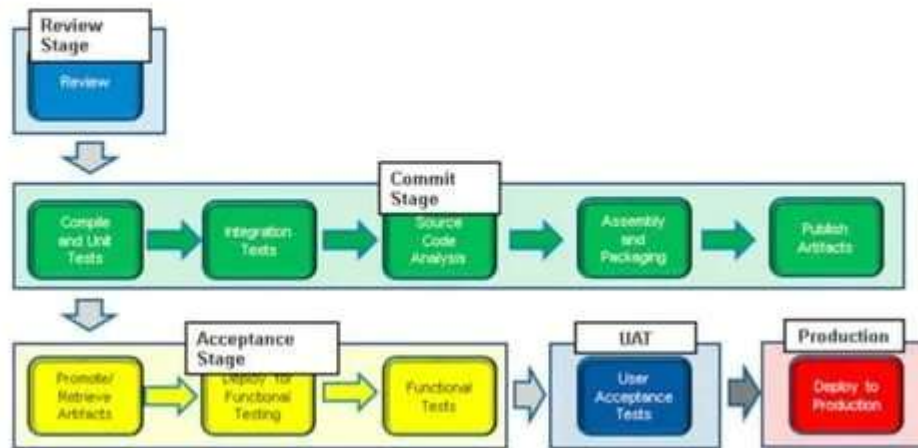


Bringing CI & CD together





Full deployment pipeline



<https://www.oreilly.com/learning/configuring-a-continuous-delivery-pipeline-in-jenkins>

Tracking Confidence

Where do we start?
How do we know we are progressing?

CI/CD PIPELINE MATURITY METRICS

CONFIDENCE MAP DD/MM/YYYY

Application	Owner or custodian	Development					Validation			Deployment				
		Pipeline as code	PR/branch builder	Full Test	Unit tests	Artifacts last-central repository	Automated functional tests	Fully resolved artifacts	Automated PVT	Infra' as code	Automated deployment	Environment configuration management	Automated data migration	Automated fallback
		⦿ ⦿ ⦿ ⦿ ⦿	⦿ ⦿ ⦿ ⦿	⦿ ⦿ ⦿ ⦿	⦿ ⦿ ⦿ ⦿	⦿ ⦿ ⦿ ⦿	⦿ ⦿ ⦿ ⦿	⦿	⦿ ⦿ ⦿ ⦿	⦿ ⦿ ⦿ ⦿	⦿ ⦿ ⦿ ⦿	⦿ ⦿ ⦿ ⦿	⦿ ⦿ ⦿ ⦿	⦿ ⦿ ⦿ ⦿
Application A	Team A	✓	✓	✓	✓	✓	⦿	✓	✗	✓	✓	✓	✓	✗
Application B	Team A	✗	✗	✗	✗	✓	?	?	✗	✓	✗	✗	⦿	✗
Service X	Team A	✗	✗	?	?	✓	✗	?	✗	✗	✗	✗	✗	✗
Service Y	Team B	✗	✗	?	?	?	✗	?	✗	✗	✗	✗	✗	✗
Service Z	Team B	✗	✗	?	?	?	✗	?	✗	✗	✗	✗	✗	✗
Application C	Team C	✗	✗	?	?	?	✗	?	✗	✗	✗	✗	✗	✗
Application D	Team C	✗	✗	?	?	?	✗	?	✗	✗	✗	✗	✗	✗

⦿ Reduces cycle time
⦿ Validates business requirements
⦿ Enables innovation

⦿ Controls costs
⦿ Controls risk
⦿ Enables rapid starts































































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		🔄 ⬆️ ⬆️ ⬆️	🔄 ⬆️ ⬆️	🔄 ⬆️ ⬆️	🔄 ⬆️ ⬆️	🔄 ⬆️ ⬆️	🔄 ⬆️ ⬆️	⬆️	🔄 ⬆️ ⬆️	🔄 ⬆️ ⬆️	⬆️ ⬆️ ⬆️	🔄 ⬆️ ⬆️	⬆️ 🔄 ⬆️ ⬆️	⬆️ ⬆️ ⬆️

1. Assess the current state
2. WSJF
3. Think globally – act locally
 - Proof of Concept and Spikes are your friends



CI/CD PIPELINE MATURITY METRICS CONFIDENCE MAP DD/MM/YYYY

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1. Assess the current state
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Unit testing and shifting left

- Make the tests easy to run
 - Run them locally
 - Invest in good quality IDE support
 - Consistent entrypoint - Abstract the complexity
 - Makefiles / Gradle
 - Pull request unit test execution
-



Failing fast

- Code inspection
 - Code linting
 - Security inspection
 - Code format
 - Code coverage
 - Track coverage changes
-



Centralised artifacts

- Managing output from a CI process
 - Only the strong survive
 - Central common location
 - Clearly understood name and version approach
 - Build them only once
 - Make them timeless – externalise configuration
-

Business benefits of CI/CD



Why do this?

- Reduction of delivery risk
 - No longer do we need to rely on humans with specific knowledge as the gate-keepers of quality
 - Reduced chance of humans not following the process
 - Reduced chance of mis-communication on executing the change
-



Why do this?

- To encode the process, we need to know the process
 - If we know all the tests pass,
 - If we know all the steps in deployment,
 - What is stopping us from releasing?
-



Why do this?

- Better visibility on change
 - As our systems and tools are version controlled
 - And we know what the current state of production is
 - And we can describe the process by which it will be changed
 - We can diff the system states with confidence
 - Opens up more avenues for review and increased audit compliance
-



Why do this?

- Increased efficiency and delivery options
 - Enables us to deliver things with reduced effort
 - This leads us to deploy change more frequently
 - Which leads to getting feedback faster
 - That enables us to experiment easier
 - This leads to smaller batch sizes
 - Which leads to an increased flow of the entire system
-



Why do this?

- Enhanced learning from failure
 - When we have an issue or failure, we write a test to cover it
 - This test gets added to our suite and executed every time
 - Decreases our risk of this issue occurring again
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