Learn Continuous Delivery with Bitbucket Pipelines

In this guide, we'll see how you can use Bitbucket Pipelines to adopt a continuous delivery workflow. Read on!

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Requirements

> **Time:**
>
> 30 minutes
>
> **Audience:**
>
> You are new to continuous delivery and/or Bitbucket Pipelines
>
> **Prerequisite:**
>
> - Create a Bitbucket account
> - Follow the continuous integration tutorial
>
> Try it free

Releasing a new feature is always an exciting moment as you're about to give new capabilities to your customers. But it can also be a risky exercise requiring a lot of preparation, making your team reluctant to do often. And the more you wait, the harder it becomes to deploy to production. Changes are piling up, it's difficult to understand the scope of the change, and it will be hard to identify root causes if problems occur in production.

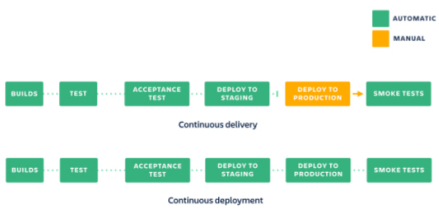
A simple way to take away the fear and the cost of deploying software is to automate it and release smaller changes more often. First of all, you'll save countless hours that are normally spent preparing the release. But you'll also reduce the risk of deploying software by having a much smaller scope for each release, making it easier to monitor environments and troubleshoot issues.

This deployment automation is something that you can do easily with Bitbucket Cloud today. For each of your repositories you can configure a pipeline that will automatically build, test, and deploy your code to your environments on every push. We'll see in this guide how you can use Bitbucket Pipelines to adopt a continuous delivery workflow.

Continuous delivery vs. continuous deployment

Continuous delivery is the practice of making sure that your code is always ready to release even if you are not deploying every change to production. It is recommended to update your production as often as possible to make sure that you keep the scope of the changes small, but ultimately you're in control the rhythm of your releases.

In continuous deployment, new changes pushed to the repository are automatically deployed to production if they pass the tests. This puts more emphasis (read: pressure) on your testing culture, but it's a great way to accelerate the feedback loop with your customers.



Adopting a continuous delivery

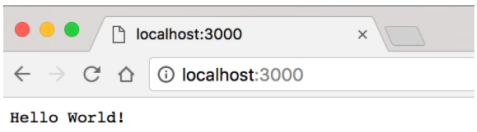
pipeline

In this example, we will build a simple continuous delivery pipeline that automatically deploys to staging when the build passes the test. We'll see two different strategies for the production deployment: one using branches and pull requests, and the other using custom pipelines and manual triggers.

In both examples, we'll use a simple Node.js application that displays a "Hello World" message in your browser. You can clone the code of the "Hello World!" application below and use it to follow this tutorial.

- Hello World application

We will deploy this application to staging and production environments hosted on Heroku using both methods.



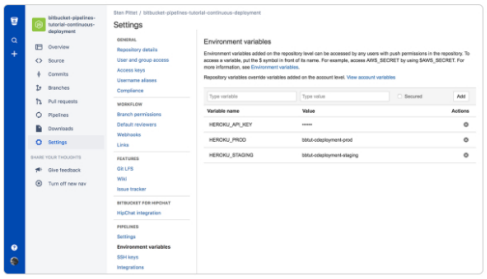
Our very basic Hello World application

Preparing the deployment to Heroku

To begin we will need to add a few environment variables to Bitbucket Pipelines so that we can deploy to Heroku:

- **HEROKU_API_KEY:** You can find your API key in your Heroku account
- **HEROKU_STAGING**: name of your staging environment
- **HEROKU_PROD**: name of your production environment

Go to Pipelines > *Environment variables* in your repository settings to add all these variables.



Setting up environment variables to deploy to Heroku

> We're using Heroku in this guide, it is certainly possible to adapt this example to other hosting services. You can find other deployment guides in the documentation.

Continuous delivery with branches as a gate to production

This configuration is suited for teams that have special release branches that can be mapped to a deployment. It also allows you to review changes in a pull-request before they are deployed to production.

In this setup we will use 2 different branches to trigger deployments:

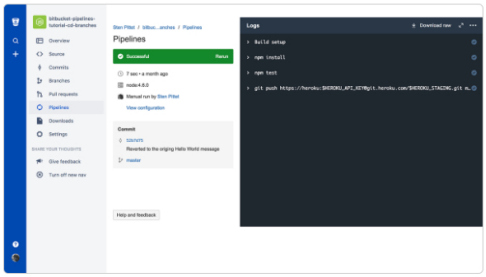
- **main:** any push to main will deploy the code to a staging environment after running the tests.
- **production**: code merged to the production branch will be automatically released to the production environment.

First, we'll configure the deployment to staging. To do that, we use the branch-specific pipelines and create a pipeline that gets executed for every push on the main branch.

bitbucket-pipelines.yml

```
  image: node:4.6.0   # Doing a full clone to be able to pu
```

We have now created a pipeline that will deploy every push to main to Heroku after building and testing our application. The *clone* section at the beginning of the configuration ensures we do a full clone (otherwise Heroku might reject the git push). Just push this configuration to Bitbucket to see your first automated deployment to staging happening.



A successfull pipeline that deploys our application to staging

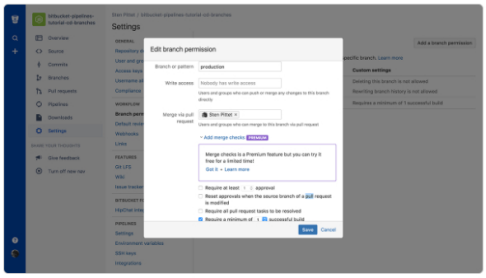
As you may have guessed, we just need to add another branch pipeline for the production branch to automatically release the production environment when changes get merged to the production branch.

bitbucket-pipelines.yml

```
image: node:4.6.0   # Doing a full clone to be able to pu
```

We run the tests again on the production branch to make sure that nothing affected the build prior to releasing the application.

Our pipelines are now configured and we can restrict the production branch to only accept merges via pull requests. Just go to *Workflow > Branch permissions* under your repository settings to restrict the production branch. This is an important step as we want to prevent people from pushing straight to production from their local machine.



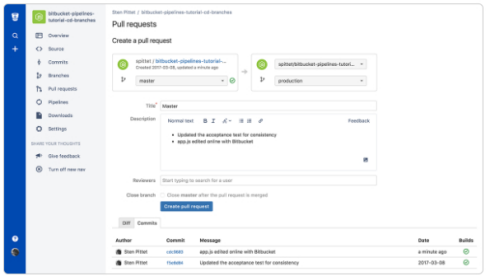
Configuring the permissions of the production branch

In the screenshot above you can see the permissions:

- Nobody has write access
- Only one developer can merge to the branch

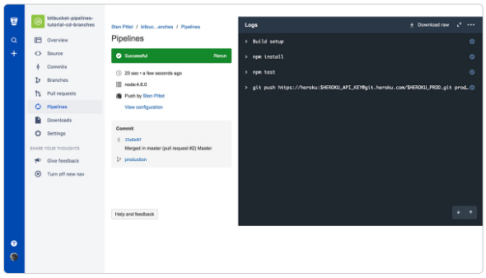
We've also added a merge check to make sure the source branch has at least one green build prior to merging the code. It will allow us to save build time and prevent developers from merging bad code to our production branch.

When that's done, you can create a pull request to merge the code from *main* to *production* and subsequently release the new changes to your production environment.

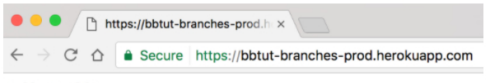


Create a pull request to merge changes to production

As soon as you merge the pull request, you'll be able to see a new pipeline being triggered for the production branch.



When it completes your new changes will have been successfully deployed to the production environment.




```
Hello World!
```

The prod environment is up-to-date!

You have now set up a continuous delivery workflow with Bitbucket Pipelines, and you can safely use pull requests to release code to your customers.

You can find the final source of this example in the repository linked below.

- Bitbucket Pipelines tutorial - continuous delivery with branches

Continuous delivery with manual trigger for the release

This configuration is great for teams that are practicing trunk-based development.

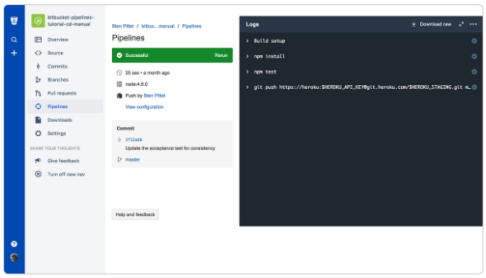
With Bitbucket Pipelines it is possible to configure custom pipelines that can be triggered manually. They can be used for various purposes: long-running tests that you do not want to run on every push, or specific actions that you want to control yourself. We will use a custom pipeline to set up a continuous delivery workflow where pushes to the main branch get automatically deployed to a staging environment, and commits can be manually deployed to production.

First, we need to configure the automatic deployment to staging. You simply need to add a branch-specific pipeline for main that will deploy the staging environment.

bitbucket-pipelines.yml

```
image: node:4.6.0   # Doing a full clone to be able to pu
```

You can push this configuration to your repository to see the first deployment to staging in action.



Our first automatic deployment to staging

Now that we have our staging deployment set up, we can simply add a custom pipeline to our *bitbucket-pipelines.yml* configuration that we will use to trigger the release to production manually.

bitbucket-pipelines.yml

```
    image: node:4.6.0   # Doing a full clone to be able to pu
```