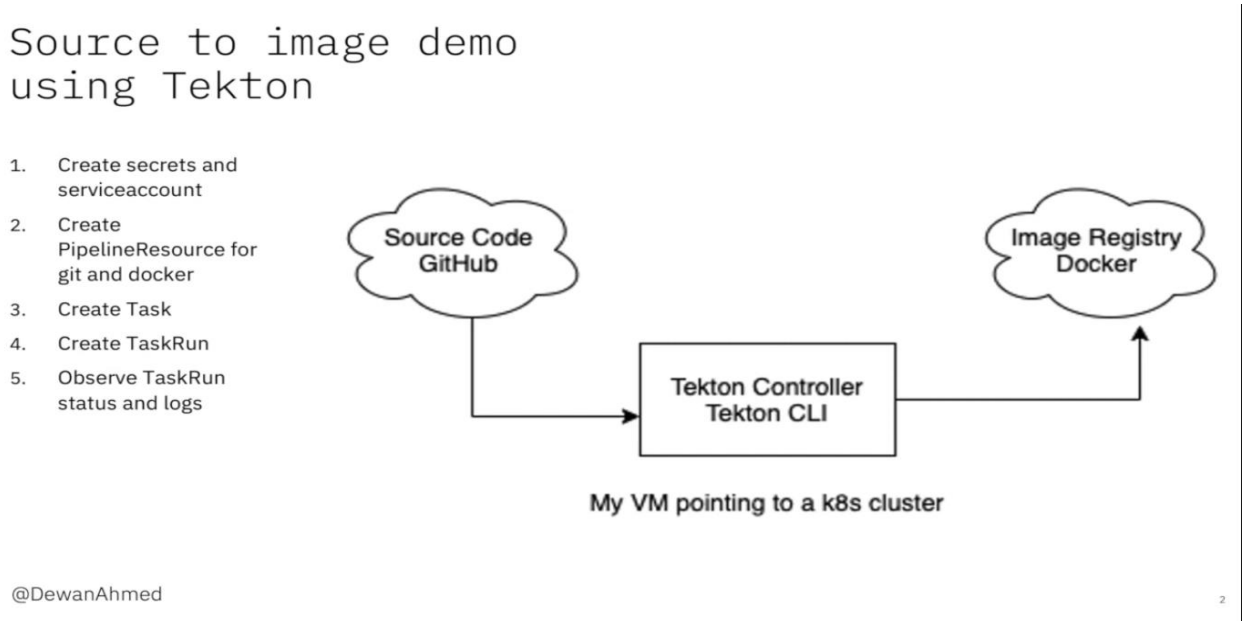
TekTon

TekTon is a powerful yet **flexible Kubernetes- native open source framework for creating Continuous Integration and Continuous Delivery (CI/CD)** system.

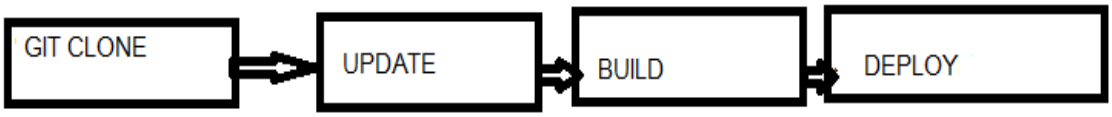
It lets you to **build, test and deploy across multiple cloud providers** (or) on-promises system by abstracting away the underlying implementation details.

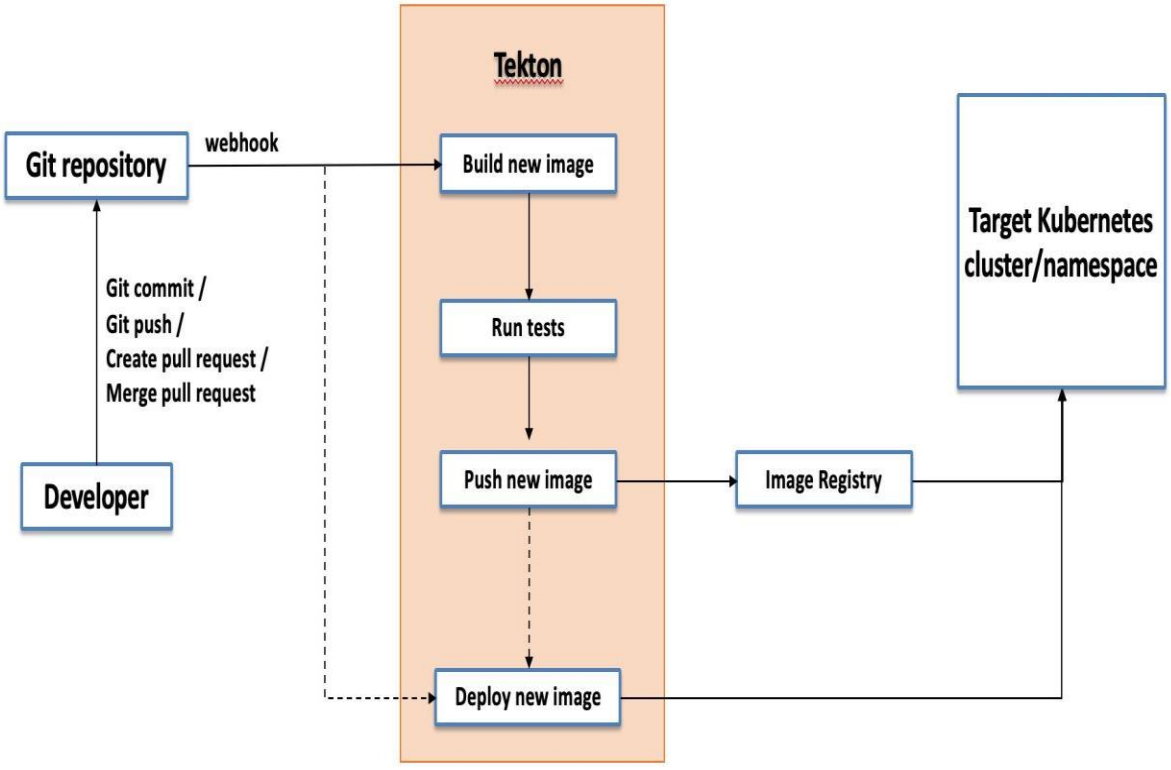


What is TekTon?

- Formerly a part of knative and was called Knative Build pipelines.
- Builds by Google but contributed by cloud Bees, Red Hat, IBM, etc.
- Kubernetes – native.
- Flexible and supports many advanced CI/CD patterns including rolling, blue/green and canary Deployments.
- Written in GO Long.
- CLI and a dashboard.

Tekton Vision





Key components:

- **Pipelines:** Basic building blocks (tasks and pipelines) of a CI/CD workflow.
- **Trigger:** Event trigger for a CI/CD workflow , like a GitHub trigger(I want to trigger a pipeline based on the git commit , Want to do a git push it basically triggers a pipeline.
- **CLI:** Command- line-interface for CI/CD workflow management, view logs, etc.
- **Dashboard:** General- purpose of this web based UI for pipeline.

Step

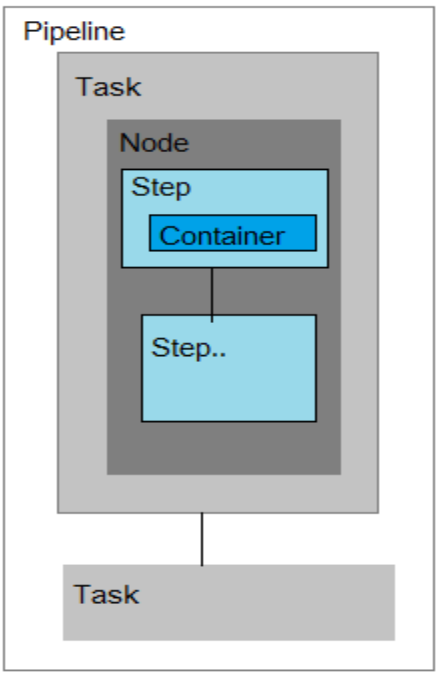
The **most basic of Tekton components are the steps**, essentially a kubernetes container spec which is an existing resource type **lets you define an image and the information you need to run it.**

Task

A **task is composed of one or more steps** (you can have a granular or fine tasks as you wish) and is a **unit of work in a pipeline that achieves a specific goal** (built jar archive, Docker image, test run etc..)

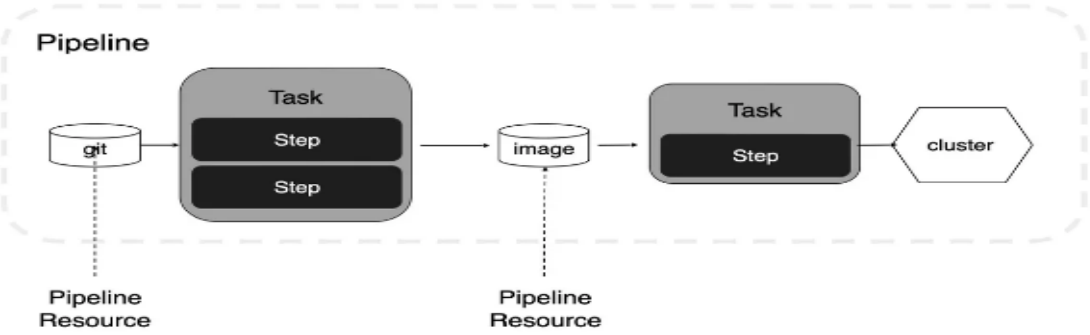
Pipeline

Pipeline is a collection of Tasks that you define and arrange in a specific order of execution as part of your continuous integration flow. Each Task in a pipeline execution as a Pod o your Kubernetes cluster. You can configure various execution conditions to fit your business needs. Pipeline can be both the workflow of part of workflow as you desire. Here's a diagrammatic representation of what a pipeline would achieve in Tekton.



Defining a Pipeline

Let's see how to define a **Continuous Delivery Pipeline** in Tekton. This **pipeline is composed of two tasks**. The first **task clones the project from GitHub**, **builds** a Java project using Maven (it could be any other build tool or even a different language), **creates a container image**, and **pushes it to a container registry**. And a second task **deploys** the services to a Kubernetes cluster.

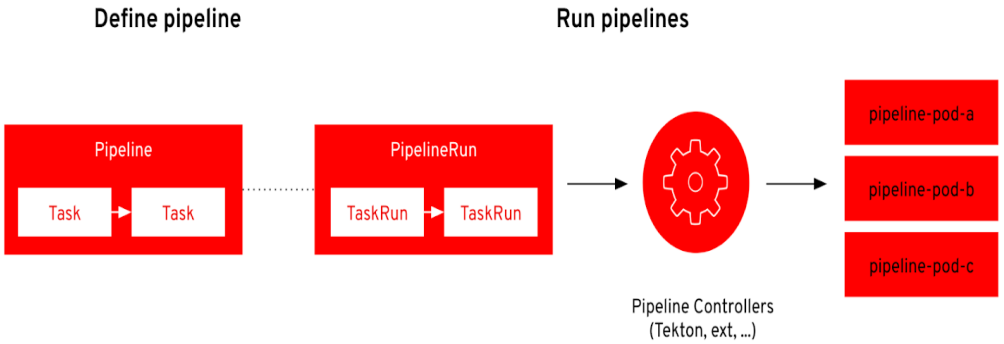


Kubernetes:

Kubernetes is a open source orchestration tool developed by Google for managing micro services or containerized application across a distributed cluster of nodes.

Kubernetes-native CI/CD concepts

By extending Kubernetes/OpenShift with Custom Resource Definitions (CRDs), OpenShift Pipelines makes CI/CD concepts such as a "**pipeline**", a "**task**", a "**step**" natively instantiable so it can use the **scalability**, **security**, **ease of deployment capabilities** of Kubernetes.

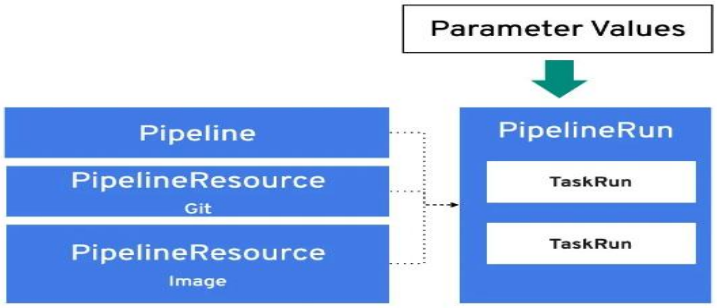


Concepts that define the pipeline

- **Pipeline**: the definition of the pipeline and the **Tasks** that it should perform
- **Task**: a reusable, loosely coupled number of steps that perform a specific task (e.g. building a container image).

Concepts that run the pipeline

- **PipelineRun:** The execution and result of running an instance of a pipeline, which includes a number of **TaskRuns**
- **TaskRun:** the execution and result of running an instance of a **Task**.



Tekton defines the following basic Kubernetes Custom Resource Definitions (CRDs) to build a pipeline:

A `PipelineResource` defines referable resources such as source code repositories or container images.
A `Task` defines a list of steps executed in sequential order. A step executes commands within a container. A task is a Kubernetes Pod containing as many containers as steps.
A `TaskRun` instantiates a `Task` for execution with concrete inputs, outputs, and parameters.
A `Pipeline` defines a list of tasks to execute in a particular order.
A `PipelineRun` instantiates a `Pipeline` for execution with concrete inputs, outputs, and parameters. It automatically creates `TaskRun` instances for each `Task`.
A `Task` may be run individually by creating a `TaskRun` object or as a part of a `Pipeline`.

OpenShift Pipelines concepts

Openshift pipeline provide a set of standard Custom Resource Definitions(CRDs) that **act as the building blocks from which you can assemble a CI/CD pipeline for your application**.

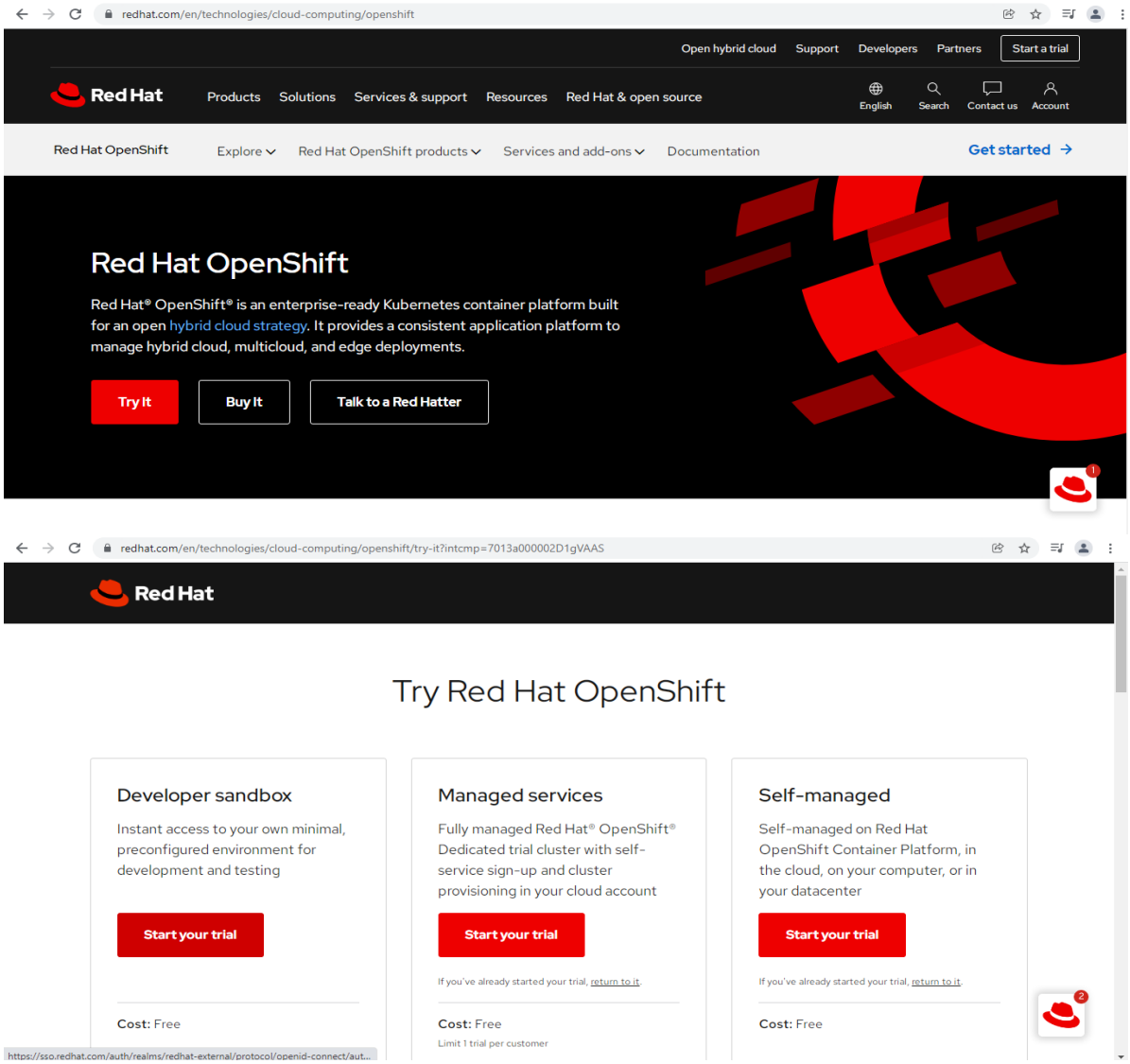
OpenShift Pipelines: Cloud-Native Continuous Integration

Tekton is the core of OpenShiftPipelines and provides a Kubernetes-native framework for creating pipelines that automate the delivery of applications and run native as pods on the cluster. Tekton is built on top of Kubernetes concepts, an operational model that significantly reduces the operational overhead of continuous integration infrastructure for organizations when combined with the serverless execution model.

OpenShift Pipelines features:

- Standard CI/CD pipeline definition based on Tekton.
- **Build images with Kubernetes tools** such as S2I, **Buildah**, Buildpacks, Kaniko, etc.
- Deploy applications to multiple platforms such as Kubernetes, serverless and VMs.
- Easy to extend and integrate with existing tools.
- Scale pipelines on-demand.
- Portable across any Kubernetes platform.
- Designed for **microservices** and **decentralized** teams.
- Integrated with the OpenShift Developer Console.

Screenshot: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Welcome to the Developer Sandbox for Red Hat OpenShift

Access Red Hat's products and technologies without setup or configuration, and start developing quicker than ever before with our new sandbox environments for Red Hat OpenShift and CodeReady Workspaces. Try your hand at the technologies with our library of activities as well.

Overview | Get started in the Sandbox | Sandbox IDE | Sandbox activities

What is the Sandbox?

The sandbox provides you with a private OpenShift environment in a shared, multi-tenant OpenShift cluster that is pre-configured with a set of developer tools. You can easily create containers from your source code or Dockerfile, build new applications using the samples and stacks provided, add services such as databases from our templates catalog, deploy Helm charts, and much more. Discover the rich capabilities of the full developer experience on OpenShift with the sandbox.

Get started in the Sandbox | Learn about our IDE

https://developers.redhat.com/developer-sandbox/get-started

developers.redhat.com/developer-sandbox/get-started

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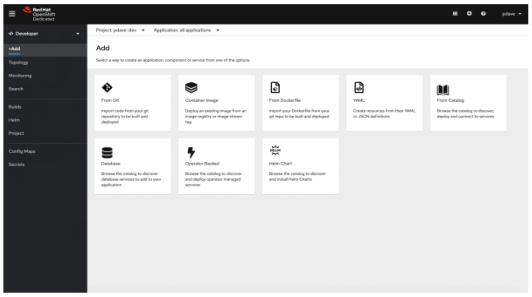
Start your OpenShift experience in four simple steps

If you're exploring how to run your code in containers, our Developer Sandbox makes it simple. Not only can you easily deploy your application from a Git repo, you can also set up a cloud IDE for your entire team. Follow these four steps to quickly get started:

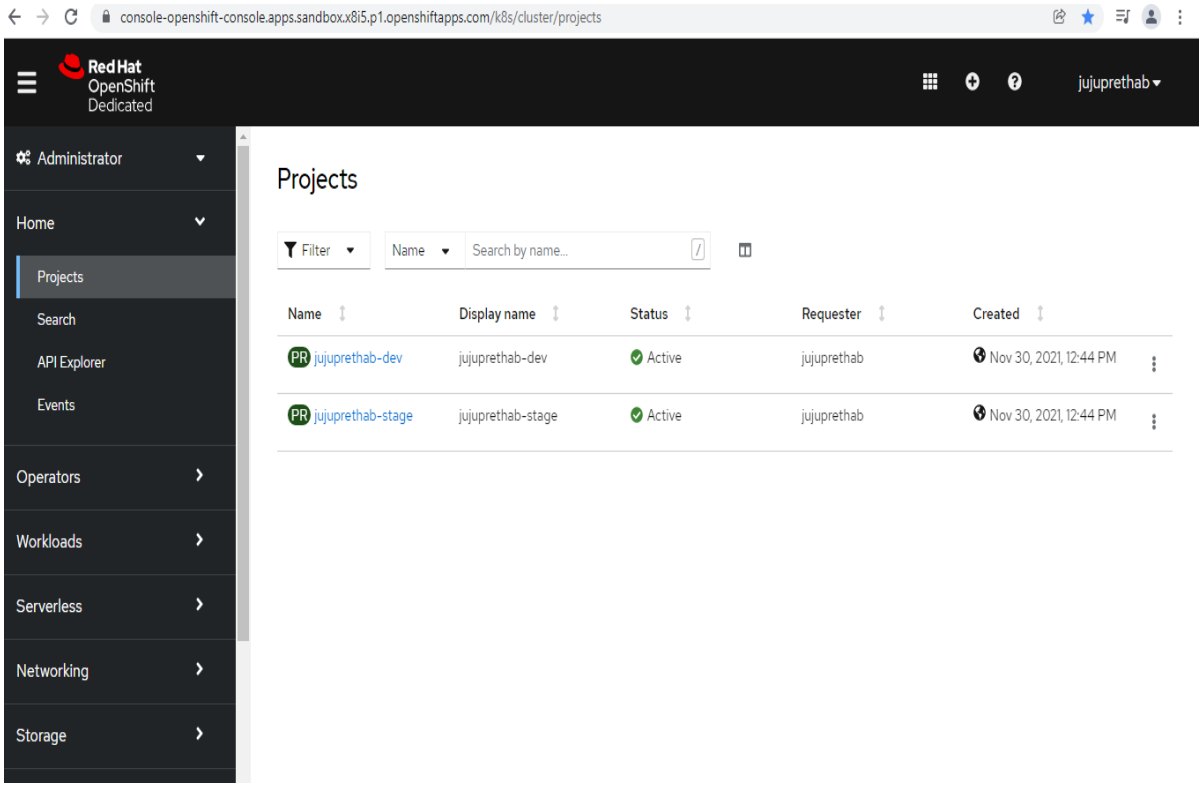


You're ready to get started!

To launch your sandbox, click the button below and select DevSandbox when prompted.

Start using your sandbox

1. Provision your free Red Hat OpenShift development cluster
2. Deploy a sample application or bring your own repo
3. Edit code from the integrated Eclipse Che–based cloud IDE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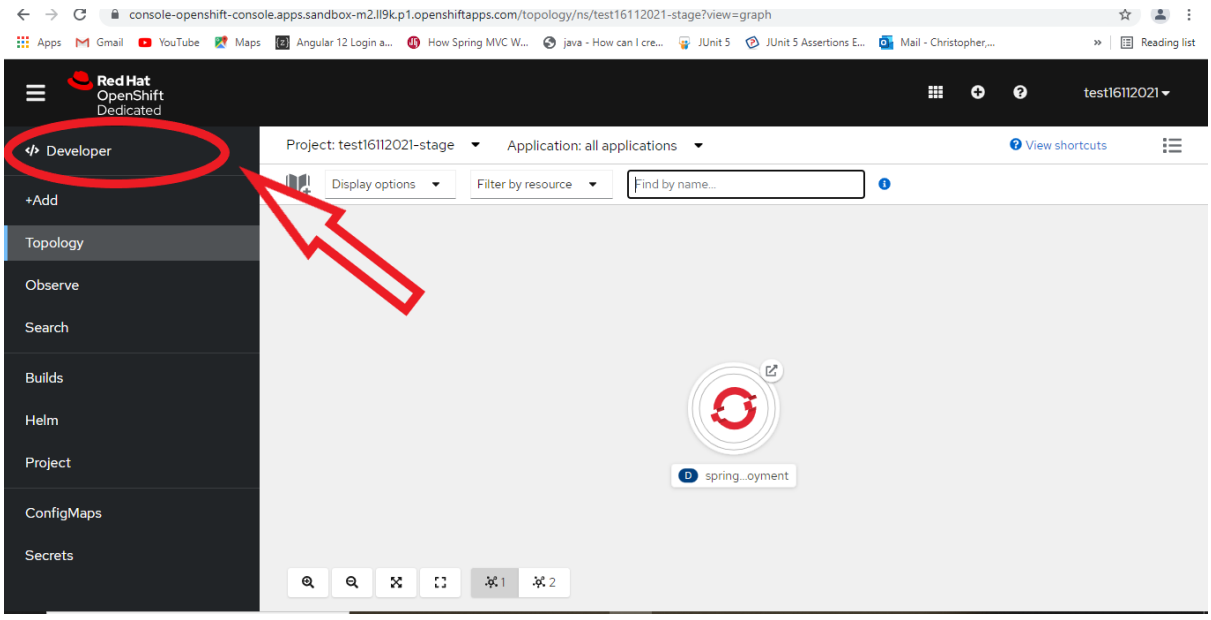
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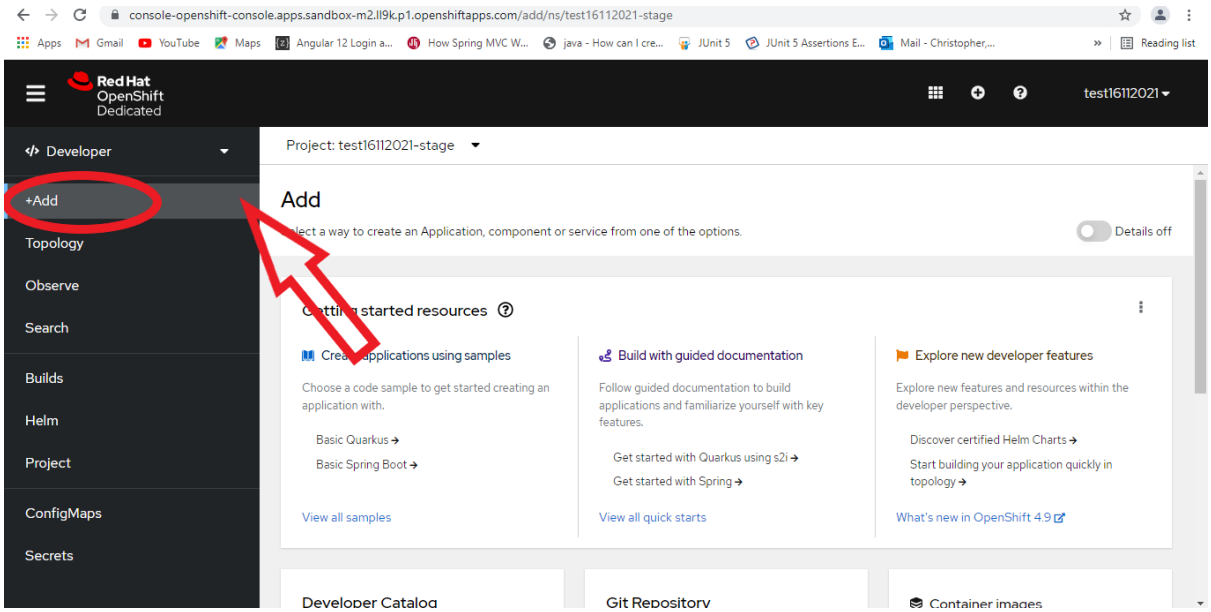
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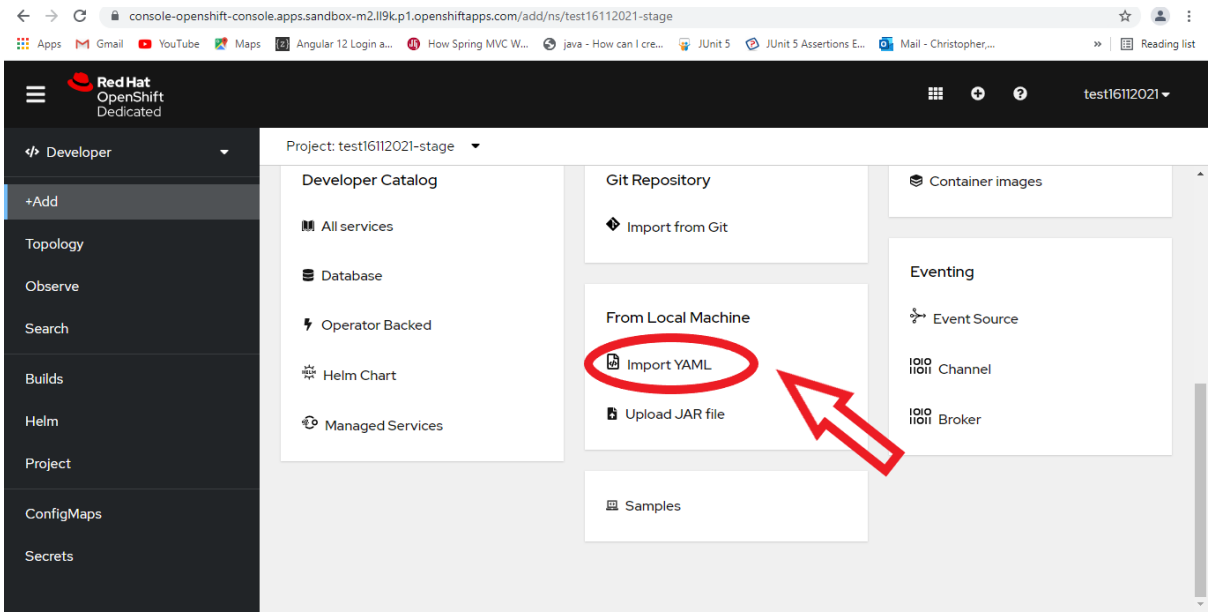
Git Repository
Container images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From Local Machine
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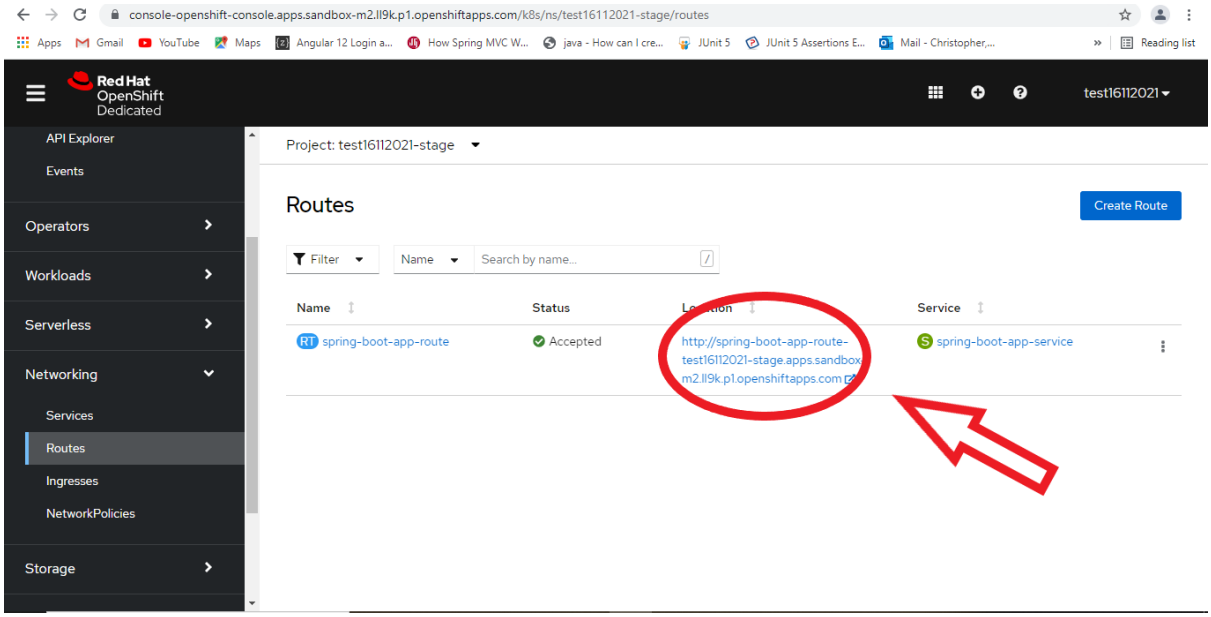
Event Source
Channel
Broker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Routes
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