Front Matter: Next Era Front End Deployments on OpenShift 4

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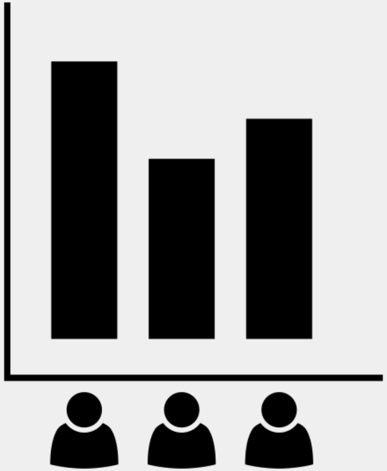
"Always code as if the guy who ends up maintaining your code will be a violent psychopath who knows where you live."

A Quick Poll

- Do you deploy apps on Openshift today?
- Do you write Node.js apps?
- Do you write Single Page Applications?
- Anyone here “full stack”?
- DevOps People?



Created by Bakunetsu Kaito
from Noun Project

Did You Know?

Number one deployment runtime on Openshift Online is Node.js

- But they’re not all actually Node.js Applications
- Many deployments are Single Page Applications
- How are these applications being deployed?
- What tools can I use in my workflow?

Let’s Build a Web App!

Create a React Application

```
$ npx create-react-app mywebapp

$ cd mywebapp

$ npm start

# Edit App.js and watch it reload
```

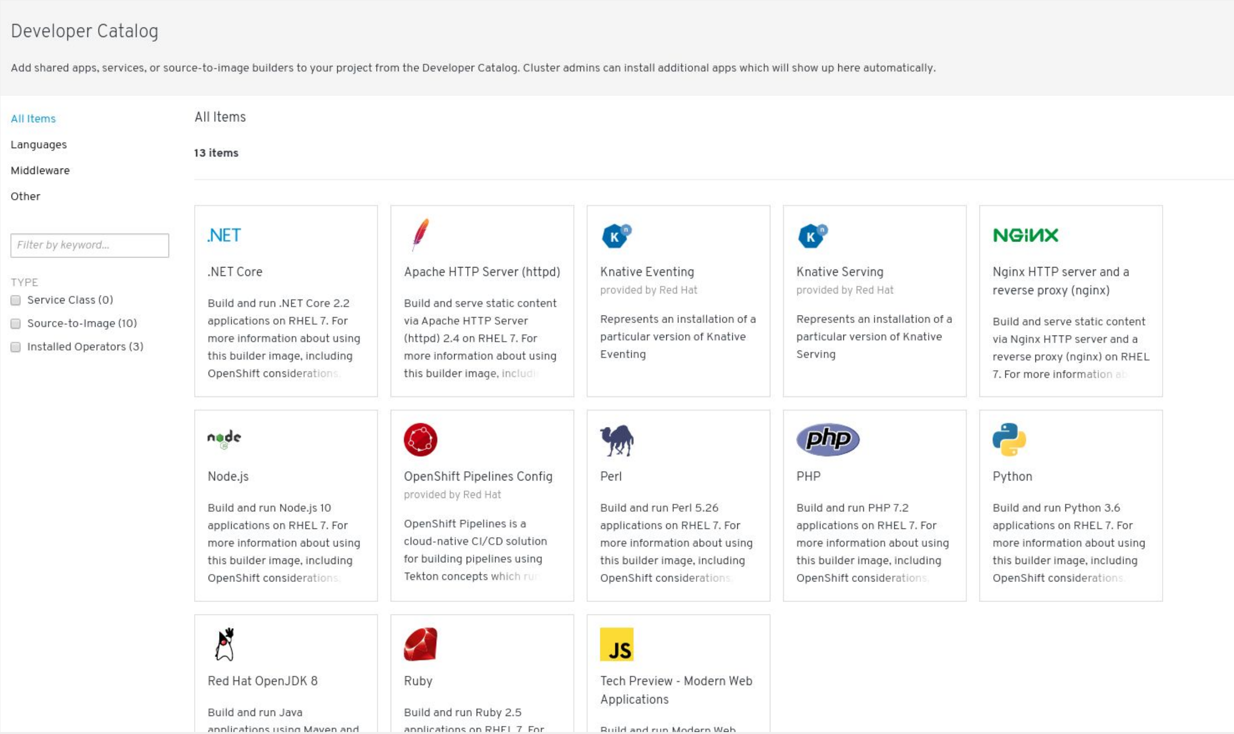
OK - Let’s Deploy It!

But How?

OpenShift NGINX

Template via the Catalog

Use the Developer Catalog



Developer Catalog

Add shared apps, services, or source-to-image builders to your project from the Developer Catalog. Cluster admins can install additional apps which will show up here automatically.

TYPE

□ Service Class (0)
□ Source-to-Image (10)
□ Installed Operators (3)

All Items

13 items

.NET Core

Build and run .NET Core 2.2 applications on RHEL 7. For more information about using this builder image, including OpenShift considerations.

Apache HTTP Server (httpd)

Build and serve static content via Apache HTTP Server (httpd) 2.4 on RHEL 7. For more information about using this builder image, includi

Knative Eventing
provided by Red Hat

Represents an installation of a particular version of Knative Eventing

Knative Serving
provided by Red Hat

Represents an installation of a particular version of Knative Serving

Nginx HTTP server and a reverse proxy (nginx)

Build and serve static content via Nginx HTTP server and a reverse proxy (nginx) on RHEL 7. For more information a

Node.js

Build and run Node.js 10 applications on RHEL 7. For more information about using this builder image, including OpenShift considerations.

OpenShift Pipelines Config
provided by Red Hat

OpenShift Pipelines is a cloud-native CI/CD solution for building pipelines using Tekton concepts which ru

Perl

Build and run Perl 5.26 applications on RHEL 7. For more information about using this builder image, including OpenShift considerations.

PHP

Build and run PHP 7.2 applications on RHEL 7. For more information about using this builder image, including OpenShift considerations.

Python

Build and run Python 3.6 applications on RHEL 7. For more information about using this builder image, including OpenShift considerations.

Red Hat OpenJDK 8

Build and run Java applications using Maven and

Ruby

Build and run Ruby 2.5 applications on RHEL 7. For

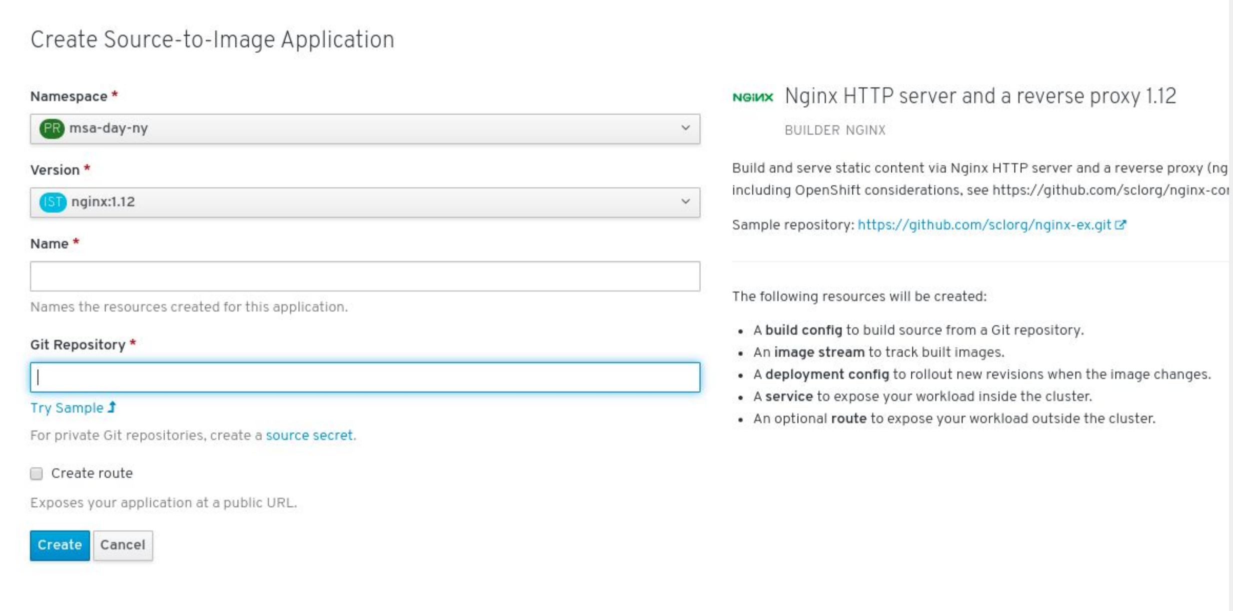
Tech Preview - Modern Web Applications

Build and run Modern Web

OpenShift Template

OpenShift Template

Use the Developer Catalog
https://github.com/sclorg/nginx-ex/blob/master/openshift/templates/nginx.json



Create Source-to-Image Application

Namespace *

PR msa-day-ny

Version *

IST nginx:1.12

Name *

Names the resources created for this application.

Git Repository *

For private Git repositories, create a source secret.

☐ Create route

Exposes your application at a public URL.

NGINX Nginx HTTP server and a reverse proxy 1.12

BUILDER NGINX

Build and serve static content via Nginx HTTP server and a reverse proxy (ng
including OpenShift considerations, see https://github.com/sclorg/nginx-co

Sample repository: https://github.com/sclorg/nginx-ex.git

The following resources will be created:

- A **build config** to build source from a Git repository.
- An **image stream** to track built images.
- A **deployment config** to rollout new revisions when the image changes.
- A **service** to expose your workload inside the cluster.
- An optional **route** to expose your workload outside the cluster.

But Wait!

This doesn't seem right

for a developer's

workflow

Two Thorns and a Rose

Created by Chris Terrill
from Noun Project

OpenShift builds pull from Git repo

Not ideal for iterative development

Created by Chris Terrill
from Noun Project

Must maintain compiled artifacts in Git repo

The “build” for a web server image expects static content

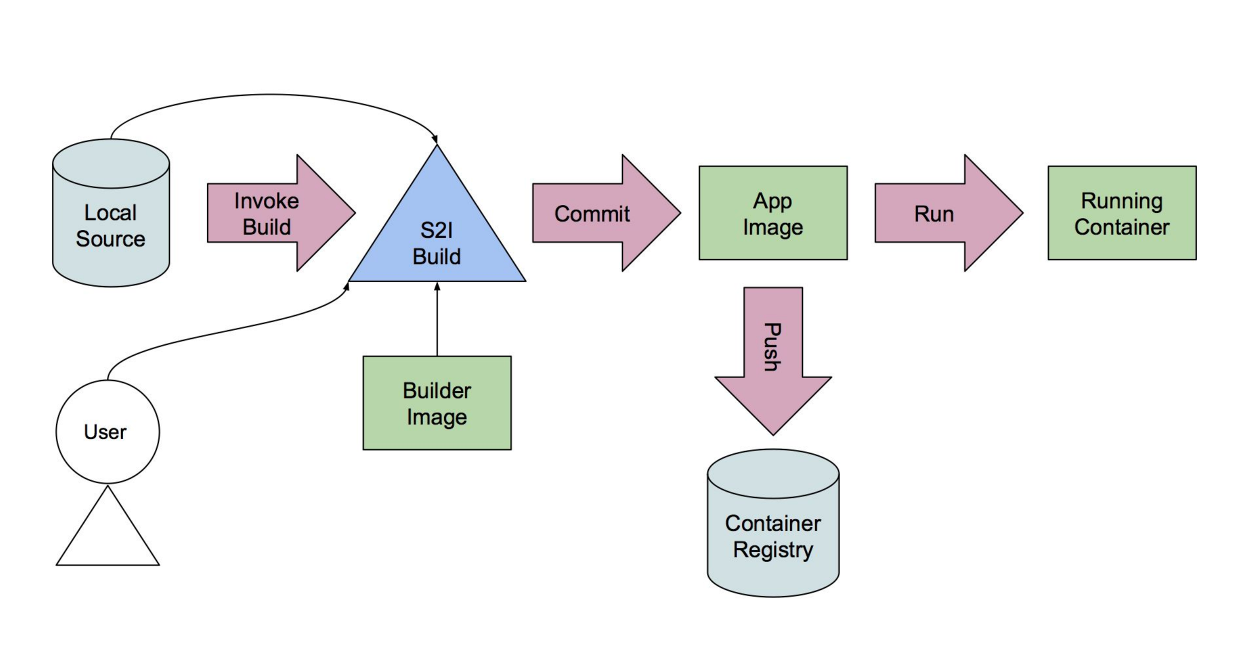
Created by mynamepong
from Noun Project

Served by a real HTTP server

We can use Apache or NGINX and don’t depend on a React Node.js server

Source to Image a.k.a. S2I

Source to Image Workflow



Source to Image

Nodeshift

So What’s Nodeshift?

An npm module for deploying Node apps on OpenShift

Creates, builds, routes and deploys your app in one command

Great for local development environments

Deploys directly from the file system

Layered application images via s2i

Overlays application on a base image, creating a new application image

Node.js REST Server via Express

```
$ npx express-generator nodejs-example

$ npx nodeshift --expose --deploy.port=3000
```

But that’s a Node.js app, not a React SPA

Web Application S2I Image Builder

Deploy and Run With Development Server

```
$ npx nodeshift
    --dockerImage=nodeshift/centos7-s2i-web-app
    --imageTag=10.x
    --expose
    --deploy.port=3000
    --deploy.env NPM_RUN=”npm start”
```

Synchronize Development Changes in Real Time

Synchronize Changes in Development

```
$ oc rsync --no-perms=true \
    --watch src/ <POD_NAME>:src/
```

Looking a little better now

Two Roses and a Thorn

Created by mynamepong
from Noun Project

Single command deployment & live updates

Easy to integrate into a development workflow

Created by mynamepong
from Noun Project

Deploys from the local filesystem

No need to push small changes in development to Github

Created by Chris Terrill
from Noun Project

Serves content using the React server

Not designed for production use

Production Deployments

Also known as Tekton

OpenShift Pipelines

Pipelines

Specifying a workflow

Pipeline

```yaml
apiVersion: tekton.dev/v1alpha1
kind: Pipeline
metadata:
 name: webapp-deployment-pipeline
spec:
 resources:
 - name: build-image
   type: image
 - name: runtime-image
   type: image
```

Pipeline (cont)

```yaml
spec:
 tasks:
 - name: build-runtime
   taskRef:
     name: webapp-build-runtime
   resources:
     inputs:
     - name: image
       resource: build-image
     outputs:
     - name: image
       resource: runtime-image
```

PipelineResource

Workflow inputs and outputs

PipelineResource

```yaml
apiVersion: tekton.dev/v1alpha1
kind: PipelineResource
metadata:
 name: webapp-build-image
spec:
 type: image
 params:
 - name: url
   value:
image-registry.openshift-image-registry.svc:5000/msa-day-ny/
mywebapp
```

PipelineResource

```
apiVersion: tekton.dev/v1alpha1
kind: PipelineResource
metadata:
 name: webapp-prod-image
spec:
 type: image
 params:
 - name: url
   value:
image-registry.openshift-image-registry.svc:5000/msa-day-ny
/webapp-runtime
```

Task

Specifying a single job within a Pipeline

Task

```yaml
apiVersion: tekton.dev/v1alpha1
kind: Task
metadata:
 name: webapp-build-runtime
spec:
 inputs:
   resources:
   - name: image
     type: image
   params:
   - name: SOURCE_PATH
     description: The location of the webapp source
     default: /opt/app-root/output
```

Task (cont)

```
  outputs:
    resources:
    - name: image
      type: image
  steps:
  - name: copy-source
    image: ${inputs.resources.image.url}
    workingdir: ${inputs.params.SOURCE_PATH}
    command: ['cp', '-Rvp', '${inputs.params.SOURCE_PATH}',
 '/gen-source/build']
    volumeMounts:
    - name: gen-source
      mountPath: /gen-source
```

TaskRun

Tasks can be run independently of a Pipeline

TaskRun

```yaml
apiVersion: tekton.dev/v1alpha1
kind: TaskRun
metadata:
 name: webapp-prod-build-taskrun
spec:
 # Use service account with git and image repo credentials
 serviceAccount: pipeline
 taskRef:
   name: s2i
```

TaskRun (cont)

```yaml
apiVersion: tekton.dev/v1alpha1
kind: TaskRun
metadata:
 name: webapp-prod-build-taskrun

spec:
 inputs:
   params:
   - name: BUILDER_IMAGE
     value: docker.io/nodeshift/centos7-s2i-web-app
   - name: PATH_CONTEXT
     value: src
```

TaskRun (cont)

```
spec:
 inputs:
   resources:
   - name: source
     resourceSpec:
       type: git
       params:
       - name: url
         value:
https://github.com/lance/pipeline-webapp-example
```

TaskRun (cont)

```yaml
spec:
 outputs:
   resources:
   - name: image
     resourceSpec:
       type: image
       params:
       - name: url
         value:
image-registry.openshift-image-registry.svc:5000/nyc-webapp
/webapp-prod
```

PipelineRun

Runs all of the Tasks defined in your pipeline, with parameterized resources

PipelineRun

```yaml
apiVersion: tekton.dev/v1alpha1
kind: PipelineRun
metadata:
 name: webapp-prod-pipelinerun

spec:
 pipelineRef:
   name: webapp-deployment-pipeline
 trigger:
   type: manual
 serviceAccount: pipeline
```

PipelineRun (cont)

```
resources:
- name: build-image
  resourceRef:
    name: webapp-build-image
- name: runtime-image
  resourceRef:
    name: webapp-prod-image
```

Three Roses!

Created by mynamepong
from Noun Project

Single command deployment with local code

Easy to integrate into a development workflow

Created by mynamepong
from Noun Project

Deploy and update from the local filesystem

No need to push small changes in development to Github

Created by mynamepong
from Noun Project

Production runtime served by a real HTTP server

We can use Apache or NGINX and don’t depend on a React Node.js server

One Last Thing

Knative Service

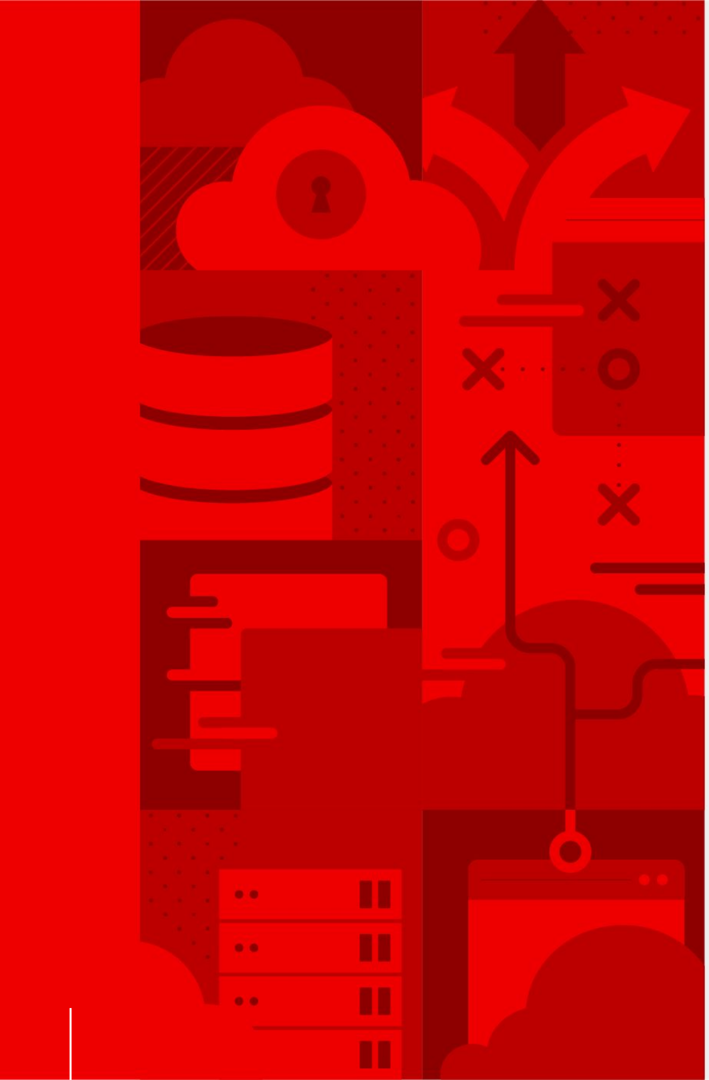
Exposing the runtime image

Service

```
apiVersion: serving.knative.dev/v1alpha1
kind: Service
metadata:
 name: production-webapp
 namespace: msa-day-ny
spec:
 template:
   metadata:
     labels:
       app: webapp
       tier: frontend
```

Service (cont)

```
spec:
   spec:
     containers:
       - image:
image-registry.openshift-image-registry.svc:5000/msa-day-ny/
webapp-runtime
         ports:
           - containerPort: 8080
```



Thank You

https://docs.openshift.com/container-platform/4.1/welcome/

https://tekton.dev

https://knative.dev

https://github.com/lance/pipeline-webapp-example

linkedin.com/company/red-hat

facebook.com/redhatinc

youtube.com/user/RedHatVideos

twitter.com/RedHat

Red Hat