Reduce Application Maintenance Downtime

With PAS for OpenEdge

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Agenda

- Online deployment of web applications

- Application updates through dynamic PROPATH

- Containers and Kubernetes

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Online Deployment of Web Applications

11.7 √

12.0 √

12.1 √

Deployment Use Cases

Microservice Architecture

Each web application contains a single service/API and completely independent of each other

Customer Provisioning

A single ABL application that is provisioned among multiple customers through different web applications with different security settings

What are Microservices?

- Loosely coupled

- Independently deployable

- Highly maintainable and testable

- Organized around business capabilities

*** http://microservices.io
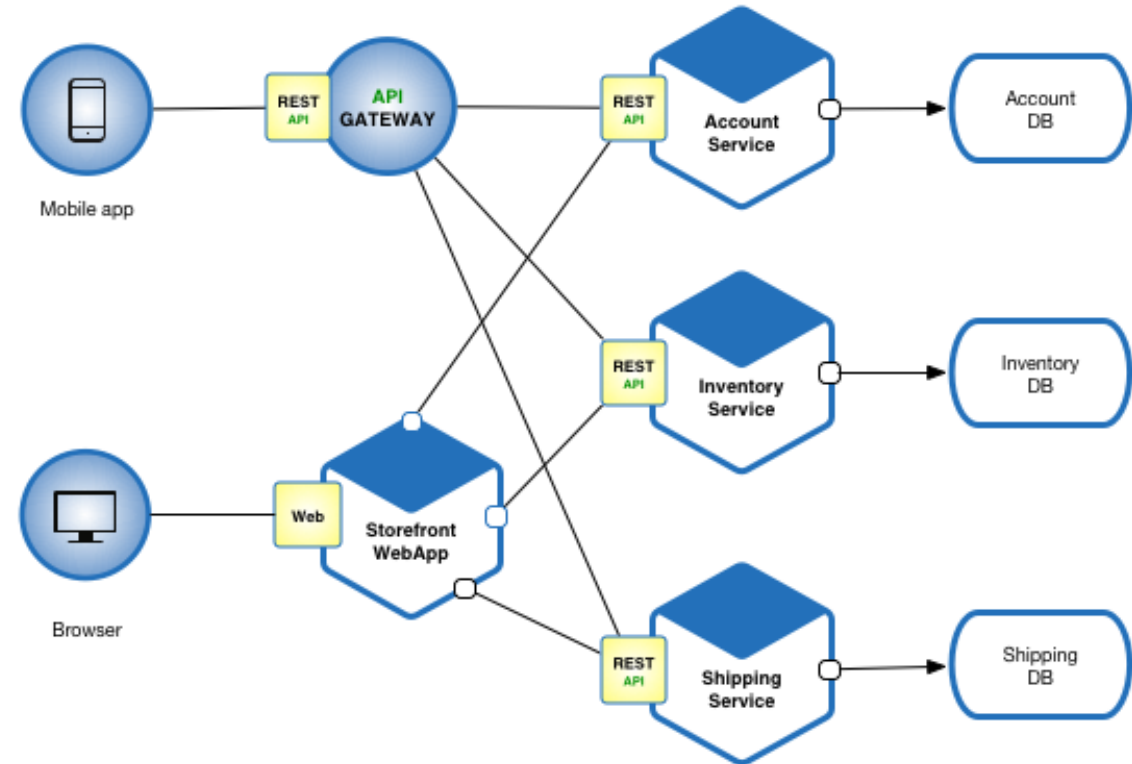
PASOE Support for Microservices

- Each PASOE instance supports 1 or more ABL Applications

- An ABL Application supports 1 or more Web Applications

- Each ABL Application is independent of each other

  - Session manager and pool of agents

  - Configuration and database connections
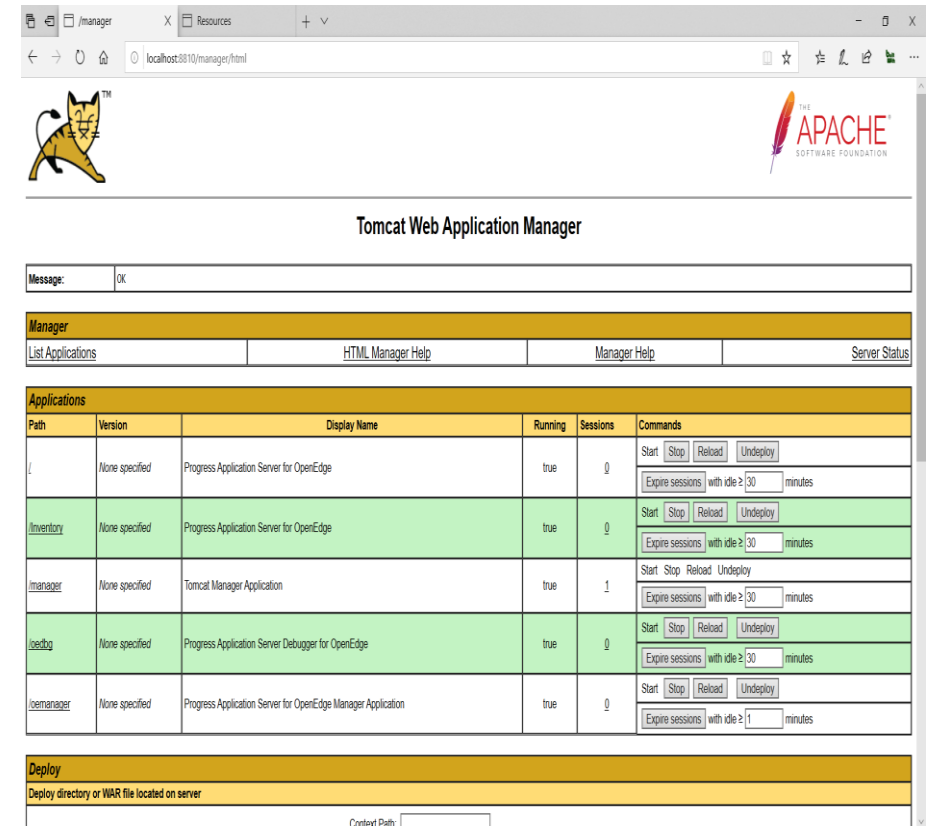

Accounts

Inventory

Shipping
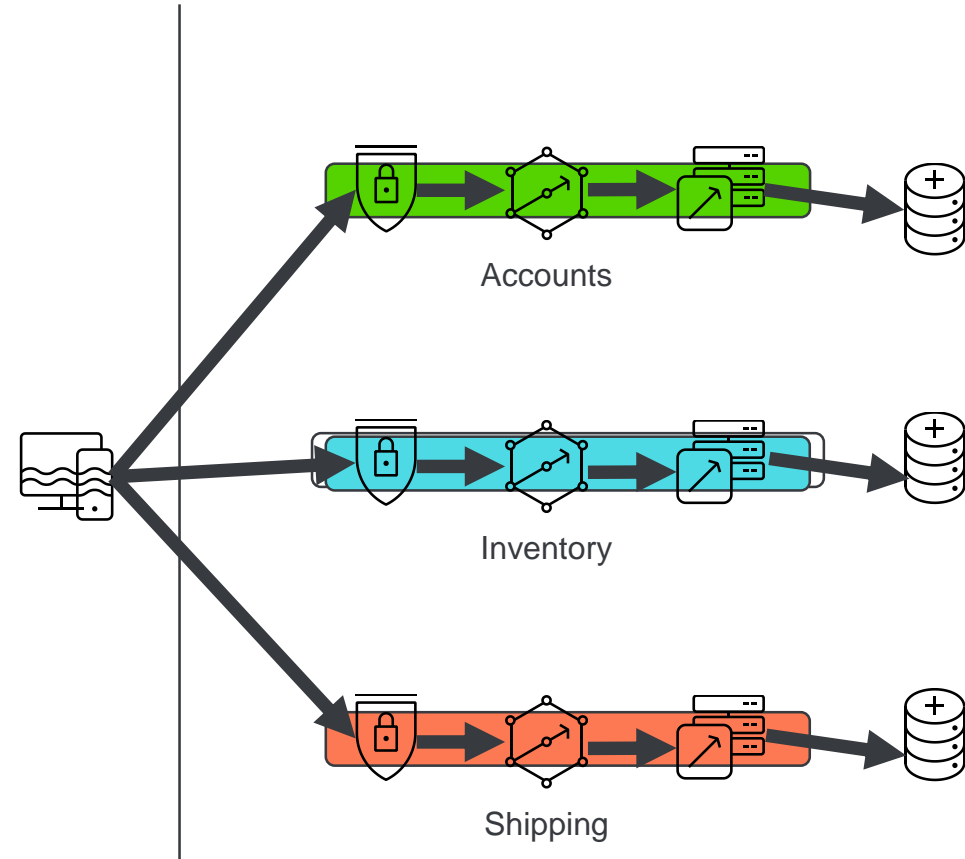
Provisioning Customers through Web Applications

- PASOE instance contains a single ABL Application

- Each Web Application contains a unique security configuration per customer

- Multi-Tenant Database used to protect data leakage

- Alternative – Multiple ABL Applications can be used with customer specific databases

Acme

Blowfeld

Cyberdyne
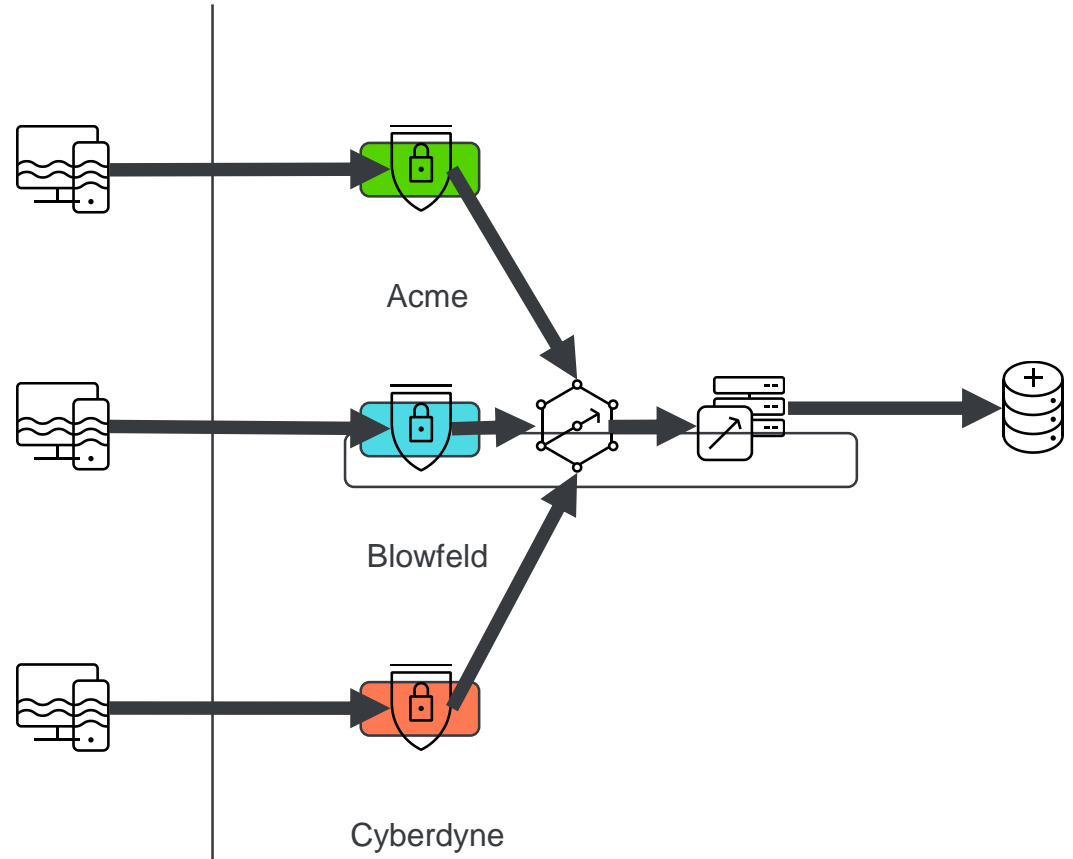
Tomcat Manager Required

- Tomcat Manager provides support for starting and stopping Web Applications (contexts)

- Tomcat Manager needs to be secured

  - Container Security – Do not use default password

  - IP Address or Host Filter to restrict access

- Use IP Filter to limit access only to localhost

PASOE Security Features

- RemoteHostValve

  - Restricts access to only hosts specified in a list

- RemoteAddrValve

  - Restricts access to only addresses specified in a list

  - Add localhost for script access

- Both are enabled by default, but not configured (tcman feature)

- Configured via WEBAPP/META-INF/context.xml

Configuring the RemoteAddrValve

context.xml

```
<!--

    Remove the comment markers from around the Valve below to limit access to

    the manager application to clients connecting from localhost

-->

<!--

<Valve className="org.apache.catalina.valves.RemoteAddrValve"

    allow="127\.\d+\.\d+\.\d+|::1|0:0:0:0:0:0:0:1" />

-->
```

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Starting the Web Application Context

- Automatic startup

  - Added –l (lowercase L) switch to deploy command

  - Created for PDSOE, but useful in production

  - Deploys, tailors, and starts web application

- Manual startup

  - tcman enable – starts web application

  - tcman disable – stops web application

  - Browser via Tomcat Manager web application

- All require Tomcat Manager installed

Demo

- Automatic deployment of web application

- Manual deployment of web application

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Application Updates through Dynamic PROPATH

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12.0 √

12.1 √

Application Update Use Cases

Application Update Pipeline

You have a CI/CD pipeline and roll out validated application updates as they are ready

Application Hotfixes

Hotfix an application without application downtime

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Online Propath Update

- Deploy new application r-code to a running server instance

- When runtimeUpdates are enabled:
  - The openedge.properties file is monitored for changes
  - When PROPATH is changed
    - Sessions in Free pool are shutdown, with appropriate event procedures run
    - Existing requests allowed to finish
    - New sessions spun up to minSessions value

```
Monitor Openedge.properties
changes
        |
        v
Did PROPATH Change
        |
        v
Terminate Free Sessions
(sessionShutdownProc)
        |
        v
Are there outstanding requests
        |
        v
Terminate Session
On completion
(sessionShutdownProc)

Start new Sessions
To minABLSessions
(sessionStartupProc)
```
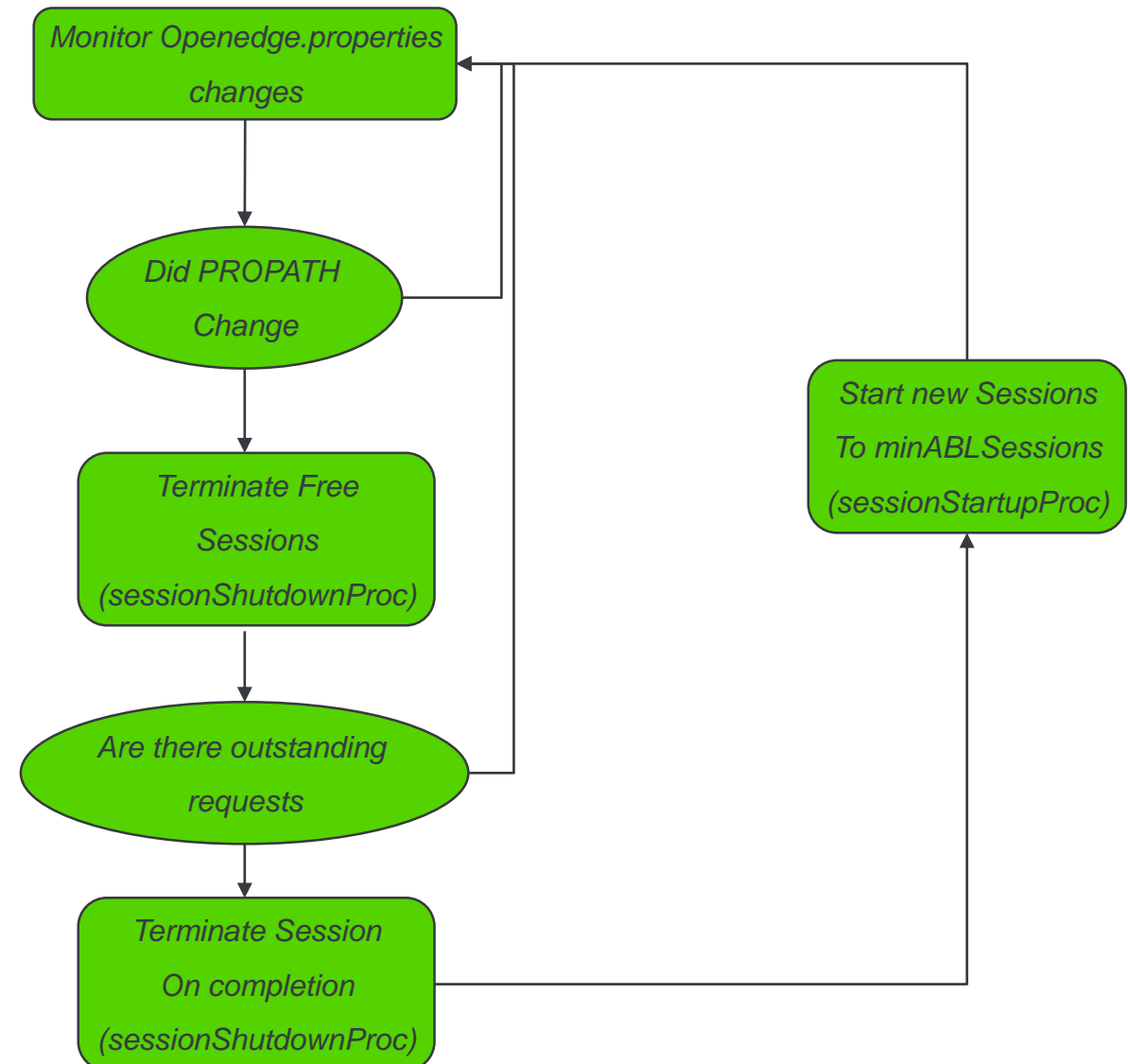
Enabling Online PROPATH Update

- Enable runtime updates

  - AppServer.allowRuntimeUpdates = 1

  - Also enables online logging updates

    - logLevel

    - LogEntryTypes

Requires some thought in R-Code layout

- PROPATH needs to change to trigger

- Use versioned directories or PL files

  - $CATALINA_BASE/openedge/Module/Version/Module.pl

    – /Payroll/1.0/Payroll.pl

    – /Payroll/1.1/Payroll.pl

  - $CATALINA_BASE/openedge/Module-vers.pl

    – /Payroll-1.0.pl

    – /Payroll-1.1.pl

- Hotfix by putting patches in front of PROPATH

Demo

- Register v1 instance

- While running, update to V1.1 code

- Update openedge.properties and confirm new code

- Hotfix update by patching single r-code file

- Roll back to V1 because things aren't going well

Application Updates with Containers and Kubernetes

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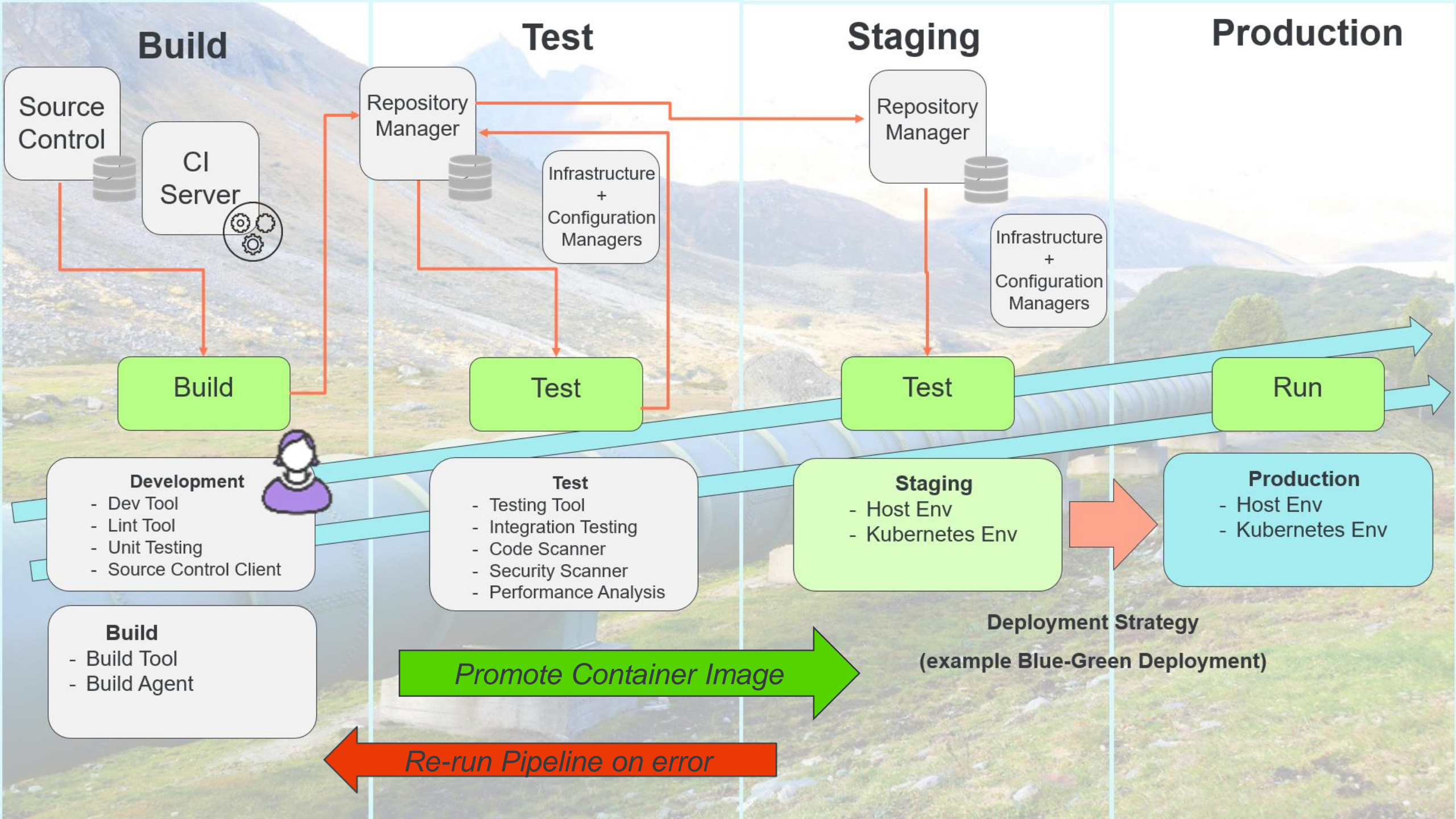
Docker vs Virtual Machine

Host Machine

Docker

PASOE

PDS

Web UI

PDS (Progress Data Service)

using REST/WebHandler

ABL code

Web Server Machine

Web UI

App Server Machine

PASOE

PDS

DB Server Machine

Swift, Java, TS, NodeJS

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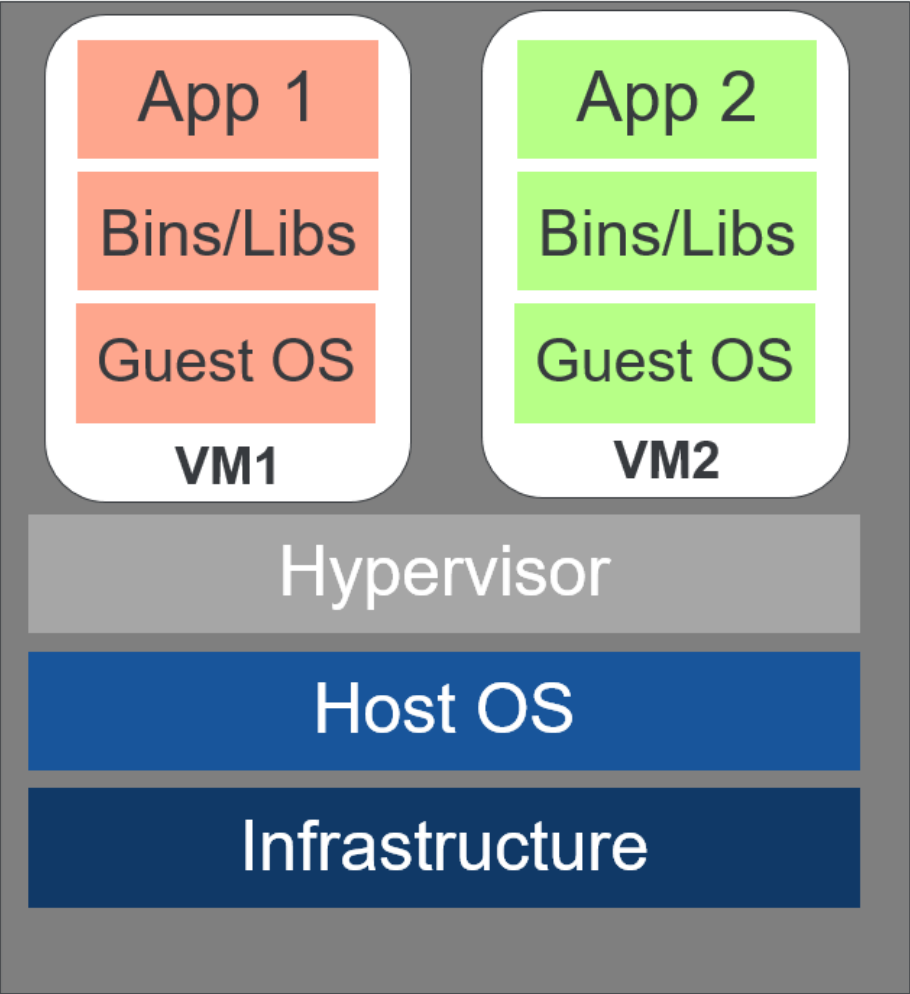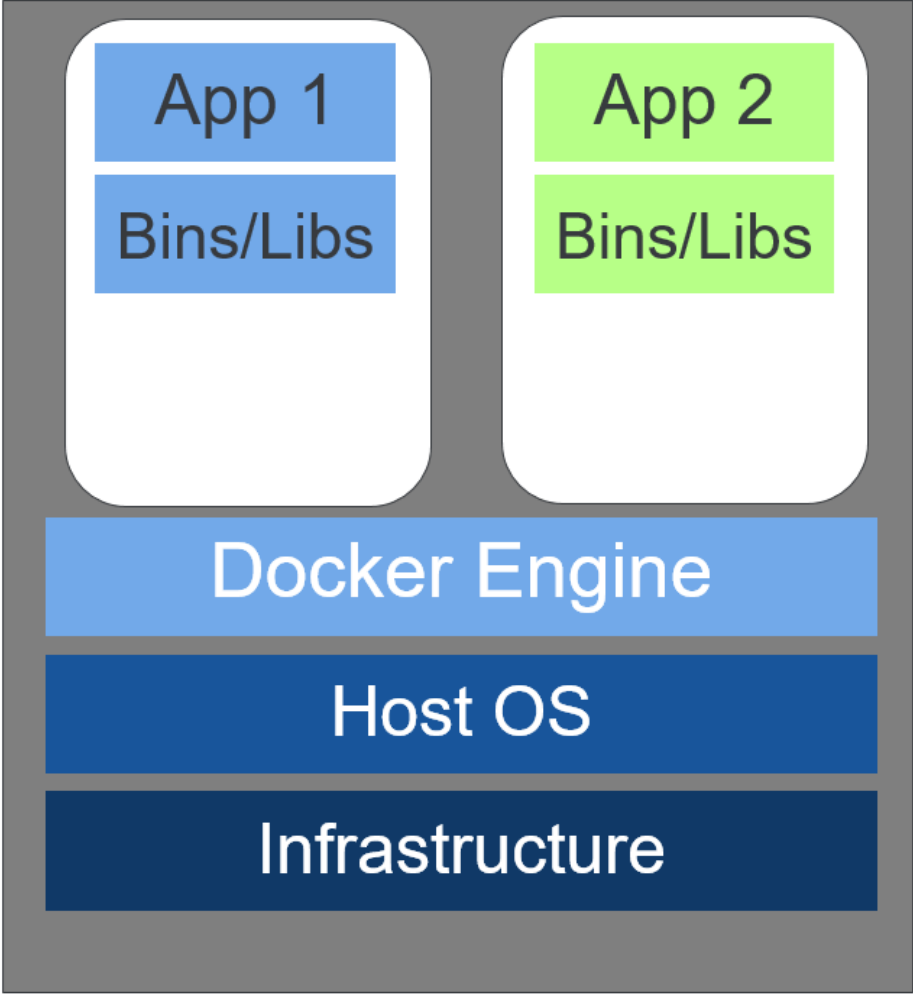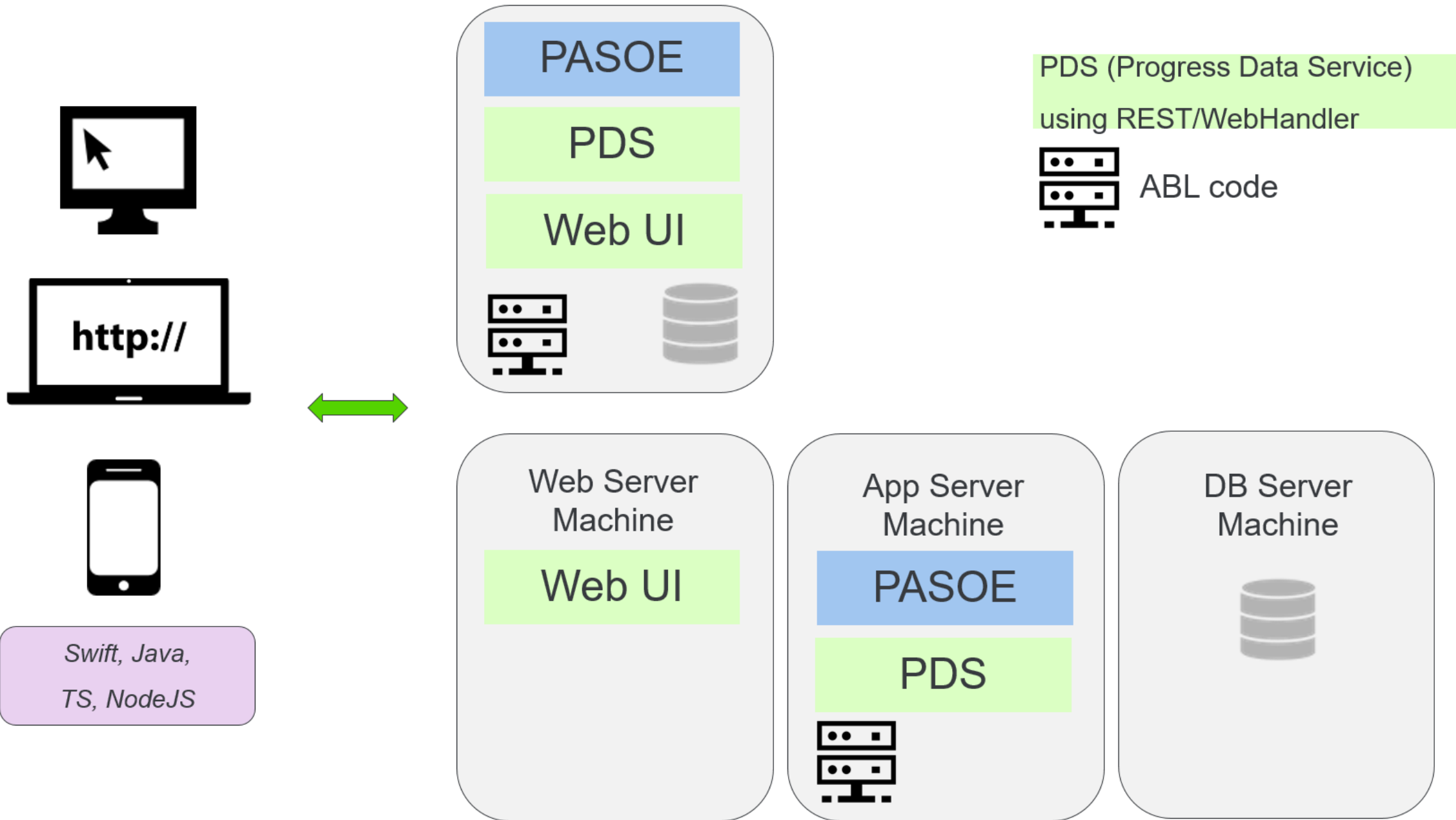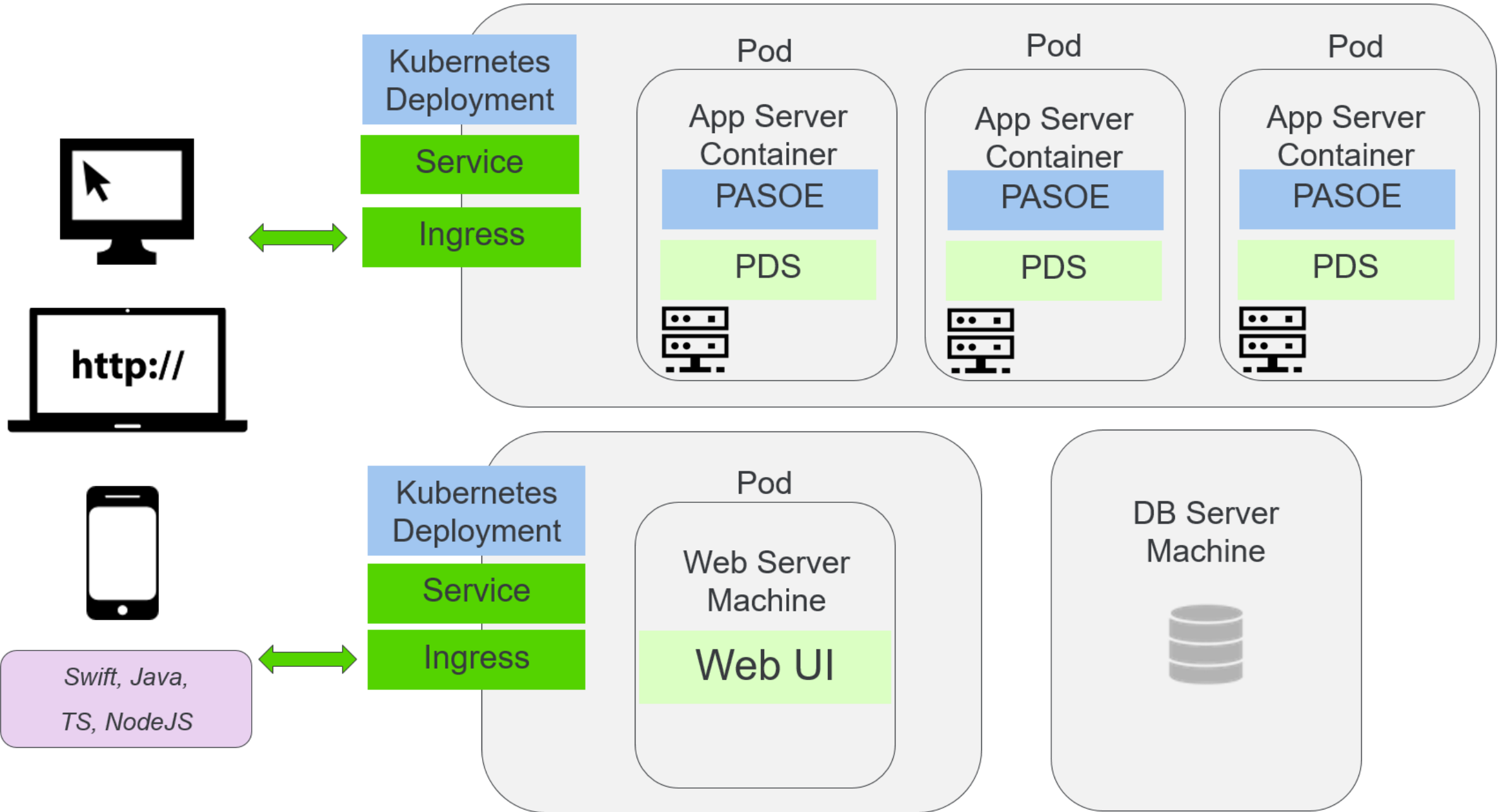
Deployment Scripts

```
vagrant@localhost:~/pasoe-basic/deploy                              —    □    ×

[vagrant@localhost deploy]$ cat config.properties
# Deployment mode can be one of: docker/docker-compose/minikube
DEPLOYMENT.MODE=minikube

# Name and tag with which app container image will be built
# Same name will be used as APP_NAME for fluentbit logging
APP.DOCKER.IMAGE.NAME=pasoe-basic_sports
APP.DOCKER.IMAGE.TAG=2.0.0

# Container image which contains JDK(compatible) in it
JDK.DOCKER.IMAGE.NAME=adoptopenjdk/openjdk8
JDK.DOCKER.IMAGE.TAG=latest
# Location/Path to JDK inside container
JDK.DOCKER.IMAGE.JAVA.LOCATION=/opt/java/openjdk

PAS.INSTANCE.NAME=oepas1
PASOE.DOCKER.IMAGE.NAME=store/progresssoftware/pasoe
PASOE.DOCKER.IMAGE.TAG=12.1.0
# In case of kubernetes provide port should be in the default nodePort range: 30000-32767
PASOE.HTTPS.PORT=30000

# Flag to enable fluent-bit logging, defaults to 'true'
FLUENTBIT.LOGGING=false
[vagrant@localhost deploy]$ █
```

Kubernetes Deployment

```
vagrant@localhost:~/pasoe-basic/deploy/scripts/minikube                          –    □    ×

apiVersion: apps/v1
kind: Deployment
metadata:
  name: oepas1
  labels:
    app: oepas1
    version: v1
spec:
  replicas: 2
  strategy:
    rollingUpdate:
      maxSurge: 1
      maxUnavailable: 1
    type: RollingUpdate
  selector:
    matchLabels:
      app: oepas1
      version: v1
  template:
    metadata:
      labels:
        app: oepas1
        version: v1
    spec:
      volumes:
        - name: deploy-artifacts-dir
          emptyDir: {}
        - name: java-dir
          emptyDir: {}
        - name: license-dir
          secret:
            secretName: progress-121-license
        - name: runtime-config-oepas1
          configMap:
            name: runtime-config-oepas1
"deployment.yml" 95L, 2878C
```

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Deploy Application Image using Kubernetes (v1)

- Build:

  - `ant package`

- Deploy

  - `ant deploy`

```
deploy:

BUILD SUCCESSFUL
Total time: 7 seconds
++ kubectl get deploy
NAME                            READY   UP-TO-DATE   AVAILABLE   AGE
nginx-ingress-controller        1/1     1            1           56m
nginx-ingress-default-backend   1/1     1            1           56m
oepas1                          0/2     2            0           0s
web-deployment                  1/1     1            1           55m
++ kubectl get pod --watch
NAME                                        READY   STATUS            RESTARTS   AGE
nginx-ingress-controller-68f69c65b8-kktc6   1/1     Running           0          56m
nginx-ingress-default-backend-576b86996d-2b8sz  1/1  Running          0          56m
oepas1-78dcb8b88b-6nffp                     0/1     Init:0/2          0          1s
oepas1-78dcb8b88b-j6fn4                     0/1     Init:0/2          0          1s
oepas1-7b8fbbd79c-ctvrh                     1/1     Terminating       0          34m
oepas1-7b8fbbd79c-d58k8                     1/1     Terminating       0          34m
web-deployment-8759db759-1h654              1/1     Running           0          55m
oepas1-78dcb8b88b-j6fn4                     0/1     Init:1/2          0          2s
oepas1-78dcb8b88b-6nffp                     0/1     Init:1/2          0          2s
oepas1-78dcb8b88b-j6fn4                     0/1     Init:1/2          0          3s
oepas1-78dcb8b88b-6nffp                     0/1     Init:1/2          0          3s
oepas1-78dcb8b88b-6nffp                     0/1     PodInitializing   0          4s
oepas1-78dcb8b88b-j6fn4                     0/1     PodInitializing   0          4s
oepas1-78dcb8b88b-j6fn4                     0/1     Running           0          5s
oepas1-78dcb8b88b-6nffp                     0/1     Running           0          6s
^C++ kubectl get svc,ingress
NAME                             TYPE           CLUSTER-IP       EXTERNAL-IP       PORT(S)
      AGE
service/kubernetes               ClusterIP      10.96.0.1        <none>            443/TCP
      58m
service/nginx-ingress-controller LoadBalancer   10.101.235.223   192.168.56.222    80:31671/TCP,443:30012/
TCP    57m
service/nginx-ingress-default-backend  ClusterIP  10.102.27.211   <none>           80/TCP
      57m
```

+ Add new record

Drag a column header and drop it here to group by that column

Cust Num	Name	State	Country		
1	LIFT TOURS	MA	USA	✏ Edit	✕ Delete
2	URPON FRISBEE	Uusima	Finland	✏ Edit	✕ Delete
3	HOOPS	GA	USA	✏ Edit	✕ Delete
4	GO FISHING LTD	Middlesex	United Kingdom	✏ Edit	✕ Delete
5	MATCH POINT TENNIS	MA	USA	✏ Edit	✕ Delete
6	FANATICAL ATHLETES	AL	United Kingdom	✏ Edit	✕ Delete
7	AEROBICS VALINE KY	Uusimaa	Finland	✏ Edit	✕ Delete
8	GAME SET MATCH	AL	USA	✏ Edit	✕ Delete

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Deploy Application Image using Rolling Updates (v2)

- Build:

  - `ant package`

- Deploy

  - `kubectl replace -f ~/pasoe-basic/v2/deployment.yml`
  - `kubectl rollout status -w deployment.v1.apps/oepas1`

```
        [exec] Successfully built f3f3acdf8ed1
        [exec] Successfully tagged pasoe-basic_sports:2.0.0

BUILD SUCCESSFUL
Total time: 5 seconds
++ docker images pasoe-basic_sports
REPOSITORY              TAG             IMAGE ID            CREATED                 SIZE
pasoe-basic_sports      2.0.0           f3f3acdf8ed1        Less than a second ago  4.89MB
pasoe-basic_sports      1.0.0           50509f361bf7        58 minutes ago          4.89MB
[vagrant@localhost pasoe_k8s_scripts]$ ./17-deploy-rolling-updates.sh
++ kubectl replace -f /home/vagrant/pasoe-basic/v2/deployment.yml
deployment.apps/oepas1 replaced
++ kubectl get pod
NAME                                            READY   STATUS    RESTARTS    AGE
nginx-ingress-controller-68f69c65b8-kktc6       1/1     Running   0           63m
nginx-ingress-default-backend-576b86996d-2b8sz  1/1     Running   0           63m
oepas1-78dcb8b88b-6nffp                         1/1     Running   0           6m23s
oepas1-78dcb8b88b-j6fn4                         1/1     Running   0           6m23s
web-deployment-8759db759-lh654                  1/1     Running   0           61m
++ kubectl rollout status -w deployment.v1.apps/oepas1
deployment "oepas1" successfully rolled out
++ kubectl get pod
NAME                                            READY   STATUS    RESTARTS    AGE
nginx-ingress-controller-68f69c65b8-kktc6       1/1     Running   0           63m
nginx-ingress-default-backend-576b86996d-2b8sz  1/1     Running   0           63m
oepas1-78dcb8b88b-6nffp                         1/1     Running   0           6m24s
oepas1-78dcb8b88b-j6fn4                         1/1     Running   0           6m24s
web-deployment-8759db759-lh654                  1/1     Running   0           61m
++ kubectl describe deployment
++ fgrep Image
    Image:          quay.io/kubernetes-ingress-controller/nginx-ingress-controller:0.26.1
    Image:          k8s.gcr.io/defaultbackend-amd64:1.5
    Image:          pasoe-basic_sports:2.0.0
    Image:          adoptopenjdk/openjdk8:latest
    Image:          store/progresssoftware/pasoe:12.1.0
    Image:          nginx
[vagrant@localhost pasoe_k8s_scripts]$
```

+ Add new record

Drag a column header and drop it here to group by that column

Cust Num	Name	State	Country		
1	Lift Tours	MA	USA	✎ Edit	✕ Delete
2	Urpon Frisbee	Uusima	Finland	✎ Edit	✕ Delete
3	Hoops	GA	USA	✎ Edit	✕ Delete
4	Go Fishing Ltd	Middlesex	United Kingdom	✎ Edit	✕ Delete
5	Match Point Tennis	MA	USA	✎ Edit	✕ Delete
6	Fanatical Athletes	AL	United Kingdom	✎ Edit	✕ Delete
7	Aerobics valine Ky	Uusimaa	Finland	✎ Edit	✕ Delete
8	Game Set Match	AL	USA	✎ Edit	✕ Delete

|◄ ◄ **1** 2 3 4 5 ... ► ►| 10 ▼   items per page

1 - 10 of 1117 items

Demo

- Build container PASOE Application (v1)

- Deploy PASOE Application

- Build container v2

- Deploy using Rolling Updates

Thank You.

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