Container Driven Continuous Delivery

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Agenda

- Immutable infrastructure
- MVP CD in openshift
- CD best practices
Immutable infrastructure

A contract between the application and the infrastructure necessary to run it
High-level MVP deployment process

Moving through the SLDC environments
CI/CD considerations

Questions to answer before we start

Organizational:

1. Who owns the pipeline process
2. Point&Click deploy vs true pipeline

Technical:

1. How do we promote images
2. How do we promote API objects
3. How to we manage environment dependent properties
4. How do we manage secrets
5. How to we execute the release
Image Promotion Tooling

Tools to Facilitate Image Promotion

**Docker Engine**
- Utilizes Docker Client
- Command line interface

**Skopeo**
- Project Atomic tool
- Command line interface to perform Docker operations
- Communicates with Docker REST API
Image promotion recommended approach
Openshift API object promotion recommended approach

```
oc process <template> -v ... | oc apply -f -
```
# Environment Dependant Configuration Approaches

<table>
<thead>
<tr>
<th>Environment Variables</th>
<th>Configuration Profiles</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environment dependent properties are passed as environment variables to the container process.</td>
<td>All properties for all environments are stored in the image. Container process picks the right one based on an environment variable.</td>
</tr>
<tr>
<td><strong>Does not scale with the number of variables</strong></td>
<td><strong>Does not work well with ephemeral environments</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ConfigMap</th>
</tr>
</thead>
<tbody>
<tr>
<td>OpenShift ConfigMaps are used to store environment dependent properties.</td>
</tr>
<tr>
<td><strong>Additional API object to manage</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Config Store</th>
</tr>
</thead>
<tbody>
<tr>
<td>Properties are retrieved from a Config Store service at application boot.</td>
</tr>
<tr>
<td><strong>Container may not be able to start if store service is down.</strong></td>
</tr>
</tbody>
</table>
## Credential management approaches

<table>
<thead>
<tr>
<th>OpenShift Secrets</th>
<th>Secret Store</th>
</tr>
</thead>
<tbody>
<tr>
<td>OpenShift secrets is the recommended approach.</td>
<td></td>
</tr>
<tr>
<td>OpenShift secrets have some limitations with regard to security, if this is a concern, consider a user space solution.</td>
<td>Build an integration with a secret store</td>
</tr>
<tr>
<td></td>
<td>● Hashicorp Vault</td>
</tr>
<tr>
<td></td>
<td>● CyberArk</td>
</tr>
<tr>
<td></td>
<td>● ...</td>
</tr>
</tbody>
</table>
Rollout options

**DeploymentConfig-based options:**
1. Recreate
2. Rolling deployment
3. Custom deployment

**Routing policy-based options:**
1. Blue-Green deployments
2. A/B deployments
References

Cross cluster image promotion techniques.
Environment dependent configuration management strategies.
Rollout reference architecture.
OpenShift-Vault Integration.
THANK YOU

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## CI/CD 1/2

<table>
<thead>
<tr>
<th>CI</th>
<th>Why / objective</th>
<th>How</th>
<th>The effect</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>To make the quality of software observable at any point in time</td>
<td>Static analysis, unit tests, Integration tests And A DASHBOARD</td>
<td>Quality will tend to go up to the point where software is always in a releasable state.</td>
</tr>
<tr>
<td>CD</td>
<td>To reduce the cost of a release</td>
<td>By automating all the steps</td>
<td>Confidence in the release process goes up. Releases can be done any time code is ready to be released.</td>
</tr>
</tbody>
</table>
CI/CD 2/2

- Code is always releasable.
- Releasing is relatively inexpensive.
- It is possible to release more frequently therefore reducing the risk.
- Releasing becomes a non-event for IT, done during normal business hours.
- Releasing becomes a business decision, not an IT decision.
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