Future proof Application Architecture Based on Containers and Related Technologies

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58%

of developers said they are the **primary decision makers** in technology decisions.





Source: Cloud Development Survey 2017 - Evans Data Corp

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Source: The State of Enterprise Open Source: A Red Hat Report, Conducted by Red Hat via Illuminas, 2018

In the next year IT leaders plan to increase their use of containers by **67%**.

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Red Hat Developer Tools





Red Hat's Composable Cloud-native Solution



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Why customers choose Red Hat Develop, Deploy, Run across any cloud



Kubernetes powered platform eliminates cloud lock-in & provides management capabilities for containers

• Infrastructure-agnostic

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- Container/K8s optimized Application runtimes, frameworks and developer services
- Supports modern DevOps tools and automations



Emirates NBD builds cloud platform to offer innovative banking services

Open source provided flexibility and efficiency of cloud-native stack



6699

With our DevOps pipeline and Red Hat, we did a proof of concept for WhatsApp banking in 3 days.

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Previously it would have taken 6 months, maybe even a year.

Ali Rey Vice President of Cloud Platforms Emirates NBD

Challenge

Deliver the most innovative digital products and services to its growing customer-base with with zero application downtime, for mobile and online banking channels.

Solution

Sahab ("white cloud" in Arabic) is a private cloud, the first in a bank in the Middle East.

Results

- Reduced app launch and update cycles from 6-18 months to hours
- Simplified collaboration between internal teams and with partners using APIs
- Established flexible yet stable foundation for private cloud today and hybrid cloud tomorrow



Developer focused clients

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Web CLI IDE

GA on OCP 4.2



Photo by <u>Unsplash</u>



Red Hat CodeReady Workspaces

A collaborative Kubernetes-native development platform that runs in OpenShift on-premises or in the cloud.

Container Workspaces	DevOps Integrations	Protect Source Code			
Workspace replicas to end "works on my machine" and enable team collaboration.	Reference developer workspaces from any issue, failed build, or git notification.	Full access to source code without any of it landing on hard-to-secure laptops.			
Code anywhere with centrally-hosted workspaces	Plugin model for extensibility	Serverless support (coming later)			
Based on the open source Eclipse Che project					

Based on the open source Eclipse Che project

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Red Hat CodeReady Workspaces

- Browser-based web IDE and dev environment in Kube pods
- Red Hat supported Eclipse Che
- Bundled with OCP/OSD SKU
- Available on OCP and OSD
- Enabled via an operator

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• Stacks based on Red Hat Linux and Middleware







Hosted Eclipse Che On Openshift Online

A free SaaS that makes evaluating container development on OpenShift Kubernetes painless.

Great for small teams or as a place to start work, then easily transition projects to CodeReady Workspaces on-premises or private cloud.

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Eclipse Che 🛛 🗘	Workspaces 🕻 RHTE	Stopped		RUN OPEN
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o RHTE o idc		Bayes	an LSP 1.0.0	Bayesian LSP Server
 healthfirst app-test-4000-cqsi3 app-test-1-du1lx 		C# lan	guage 1.0.1	C# intellisense
		Clange	d 1.0.0	Clangd intellisense for C/C++
		Exec	1.0.1	Agent for command



OpenShift's Dev-Focused CLI: "odo"

A developer-focused command-line tool for rapid development iterations on OpenShift.

Simplifies building of microservices applications on OpenShift.

Targeting GA release with OpenShift 4.2.

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\$ odo create wildfly backend Component 'backend' was created.

\$ odo push
Pushing changes to component: backend

\$ odo create php frontend Component 'frontend' was created. To push source code to the component run 'odo push'

\$ odo push
Pushing changes to component: frontend

\$ odo url create
frontend - http://frontend-myapp.192.168.99.100.nip.io

\$ odo watch
Waiting for something to change in /dev/frontend



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CodeReady Containers

OpenShift on your Laptop

Provides a pre-built development environment based on **Red Hat Enterprise** -**Linux** and **OpenShift** for quick container-based application development. -Use with OpenShift on-premises or cloud.

\$ crc setup
Prepare your machine for running OpenShift

```
$ crc start -b
crc-hyperkit-4.2.0.crcbundle
Start with the Hyperkit 4.2 bundle
```

\$ crc status
Get the status of the cluster

- Based on OpenShift 4.x
- Linux (libvirt)
- Windows (Hyper-V)
- MacOS (Virtualbox)
- Internally available
- External beta targeted for end of August
- Replaces the 3.x experiences around:
 - Minishift
 - CDK
 - oc cluster up

Use It To: Simplify direct-to-OpenShift development on laptops.



OpenShift Pipelines



OpenShift Pipelines provides a Cloud-Native CI/CD experience based on Tekton

- Container based
- Serverless
- Designed for DevOps

Tech Preview on OCP 4.2



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An open-source project for providing a set of shared and standard components for building Kubernetes-style CI/CD systems



Governed by the Continuous Delivery Foundation Contributions from Google, Red Hat, Cloudbees, IBM, Pivotal and many more



OpenShift Pipelines

a Cloud-Native CI/CD Experience on OpenShift

Standard Kubernetes-style



pipelines

Declarative pipelines with standard Kubernetes custom resources (CRDs) based on Tekton*



Run pipelines in containers

Scale pipeline executions on-demand with containers on Kubernetes



Powerful command-line tool

Run and manage pipelines with an interactive command-line tool



Build images with Kubernetes tools

Use tools of your choice (source-to-image, buildah, kaniko, jib, etc) for building container images



Deploy to multiple platforms

Deploy applications to multiple platforms like serverless, virtual machines and Kubernetes



Integrated CI/CD experience

A CI/CD experience integrated with OpenShift Developer Console, Visual Studio Code Plugin,

Eclipse Che Plugins and more



GA since OpenShift 3

Jenkins CI/CD in OpenShift

Jenkins is still the most used CI/CD platform in enterprises and can be used from inside OpenShift.

An intuitive pipeline visualization makes it simple for users to see how builds are progressing.

The full Jenkins UI is also available.

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OpenShift Pipelines CI/CD Platform

Provides a next-gen Kubernetes CI/CD pipeline that works for containers (including serverless).

Based on the Tekton project (which was spun out of the Knative Pipelines project) started by Google, Red Hat and others.

Target Dev Preview (pre-beta) in June, 2019.

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OpenShift Developer Console

Provide developers with an application-centric UI that enables them to quickly import code, create containers, link services and build their projects.

Will leverage OpenShift Pipelines for the CI/CD, and use Istio and Kiali project to provide a graphical view of container interactions for an application.





Latest Version: 1.3

OpenShift Plugin for Microsoft Azure Devops and Team Foundation Server

This plugin offers tasks for integrating OpenShift into your build and release pipelines whether you're using Azure DevOps (cloud) or Team Foundation Server (on-premises).

Developers can deploy to any OpenShift:

- On-premises
- In the cloud
- Hosted by Red Hat
- On the Azure Red Hat OpenShift service
- etc...





Red Hat Plugins for Microsoft VS Code

Red Hat plugins for VSCode add IDE superpowers for **Java**, **Kubernetes** YAML and XML.

The **OpenShift** plugin allows developers to quickly connect and deploy to OpenShift instances locally or remotely.

Dependency Analytics adds license and CVE package alerts.

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Architectural change

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GA on OCP 4.2



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How to transform application delivery

Action plan for accelerating software delivery



- » Choose a cloud-native platform
- » Deploy your applications to your cloud
- » Automate your delivery pipeline
- » Give your delivery teams end-to-end responsibility over their code
- **» Break up** your delivery teams and code into smaller units for faster iteration and delivery



Application Development Paradigms Gradual evolution from app code to infrastructure features





Making microservices apps development more productive Replace code with configuration

Red Hat Service Mesh

A service mesh provides a **transparent** and **language-independent** dedicated network for connecting, observing, securing and controlling the connectivity between services.

- Observability and distributed tracing
- Policy-driven security
- Routing rules & chaos engineering
- Powerful visualization & monitoring
- Unified Istio, Kiali, Jaeger, Grafana and Prometheus available via OperatorHub







SERVICE MESH A dedicated network for service-to-service communications

MICROSERVICES EVOLUTION





SERVICE MESH ARCHITECTURE





FAULT TOLERANCE



CIRCUIT BREAKERS WITHOUT ISTIO



coupled to the service code



CIRCUIT BREAKERS WITH ISTIO



transparent to the services



CIRCUIT BREAKERS WITH ISTIO



improved response time with global circuit status



TIMEOUTS AND RETRIES WITH ISTIO



configure timeouts and retries, transparent to the services



RATE LIMITING WITH ISTIO



limit invocation rates, transparent to the services



SERVICE SECURITY



SECURE COMMUNICATION WITHOUT ISTIO



coupled to the service code



SECURE COMMUNICATION WITH ISTIO



mutual TLS authentication, transparent to the services



CONTROL SERVICE ACCESS WITH ISTIO



control the service access flow, transparent to the services



CHAOS ENGINEERING



CHAOS ENGINEERING WITHOUT ISTIO





CHAOS ENGINEERING WITH ISTIO



inject delays, transparent to the services



CHAOS ENGINEERING WITH ISTIO



inject protocol-specific errors, transparent to the services



DYNAMIC ROUTING



DYNAMIC ROUTING WITHOUT ISTIO



custom code to enable dynamic routing



CANARY DEPLOYMENT WITH ISTIO





A/B DEPLOYMENT WITH ISTIO





DARK LAUNCHES WITH ISTIO





DISTRIBUTED TRACING



DISTRIBUTED TRACING WITHOUT ISTIO



code to enable dynamic tracing



DISTRIBUTED TRACING WITH ISTIO & JAEGER



discovers service relationships and process times, transparent to the services





DISTRIBUTED TRACING WITH ISTIO & KIALI





OpenShift Serverless

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seferred(),c=f,_Deferred(),d;f.extend(b,th) ([Deferred:function(){var.a= cancel,a&&a.call(b,b)

OpenShift Serverless helps developers deploy and run applications that will scale up or scale to zero on-demand.

Applications are packaged as OCI compliant Linux containers that can be run anywhere.

Tech Preview on OCP 4.2











Hybrid Cloud Serverless



Key Features

- Familiar to Kubernetes users. Native.
- Scale to 0 and autoscale to N based on demand
- Applications and functions. Any container workload.
- Powerful eventing model with multiple event sources.
- Operator available via OperatorHub
- Knative v0.7.1 (v1beta1 APIs)
- No vendor lock in

Learn more

https://openshift.com/learn/topics/serverless https://redhat-developer-demos.github.io/knative-tutorial





Quarkus

Alter a list a lis

A Kubernetes Native Java stack tailored for GraalVM & OpenJDK HotSpot, crafted from the best of breed Java libraries and standards



Photo by <u>Unsplash</u>





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