OpenShift — deliver software with confidence, just in time

White paper

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we speak human and computer

TRIGO

No other factor plays a more important role in a modern, digitized economy than delivering products and services fast and reliably. Just-in-time production has become the new standard, whether clothing, lifestyle products, or even industrial components. Everyone is trying to reduce stock because managing large warehouses is simply too expensive. The same goes for software.

Because businesses are changing so quickly, IT also needs to move faster.

For example, you want to get a brand-new Internet of Things (IoT) product onto the market. But because competitors are moving so quickly, you can't really afford your development team spending time working out IT basics such as:

➔ How and where are we gonna host?

➔ How will we scale this solution?

➔ How can we monitor it?

➔ How will we integrate it into the rest of the business and tech stack?

Answering these questions from scratch will cost you a lot of time — time you might not have if you want to get onto the market fast. That's where OpenShift comes in (more on that later) — but first, let's dive into just how application development has changed over the past decade and what that means for your business.

How software development has changed over the past decade

Software development has always been a field where technologies and methodologies (databases, languages, frameworks, etc.) change quickly.

Twenty years ago, it was common to work on an application for a long time and then do a big bang release. These days, development happens in small incremental steps. Agile development teams deliver applications as a constant stream of minor releases, often directly deployed into the production system. These increments build upon each other, and the final result fulfills all the requirements.

This approach means you can not only test the software components' functionality and get feedback cycles — it's what gets your products to market early. Also known as a quicker time-to-market.

The role of containerization and CI/CD

In the past few years, containerization has been the primary driver for continuous integration and deployment in the enterprise software landscape. Of course, big players had the know-how and resources to achieve similar results using traditional VM-based infrastructure. But the investment risk was just too high for small to medium-sized businesses.

Too frequently, these attempts failed because of the massive complexity of managing all the application dependencies — a fundamental problem containers fix. The application and its runtime are a single compact deployment unit.

To get an idea for the scale of this shift, take a look at what Gartner predicted mid-2020:

"Containers have become popular because they provide a powerful tool for addressing several critical concerns of application developers, including the need for faster delivery, agility, portability, modernization, and life cycle management.

Gartner predicts that by 2022, more than 75% of global organizations will be running containerized applications in production, up from less than 30% today.

[…]

Gartner expects that up to 15% of enterprise applications will run in a container environment by 2024, up from less than 5% in 2020, hampered by application backlog, technical debt, and budget constraints."

https://www.gartner.com/en/newsroom/press-releases/2020-06-25-gartner-forecasts-strong-revenue-growth-for-global-co

Containers are here to stay, and it's not a question anymore if you need to adopt … it's when. And OpenShift just might be the containerized solution you're looking for.

Simple and efficient means of reducing cost

OpenShift provides a streamlined platform that can save a significant amount of resources by using lightweight containers instead of virtual machines to run workloads. In addition, the container technology, with reduced overhead and portability of the workloads, allows you to utilize the underlying hardware more efficiently.

Taking the numbers from the IDC Business Value White Paper, March 2021, the increase of virtual machines used by 22%.[1]

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[1] https://www.redhat.com/en/resources/The-Business-Value-of-Red-Hat-OpenShift

Kubernetes, the engine of modern application infrastructure

Shipping the application as container images, ready to run on any platform or machine, was a massive step forward, but also opened the field for another bunch of problems to be solved. In traditional IT, we have battle-tested components that give us all the basic infrastructure we need to operate large systems. Non-functional requirements like, monitoring, logging, and various other aspects that need to be considered were solved issues.
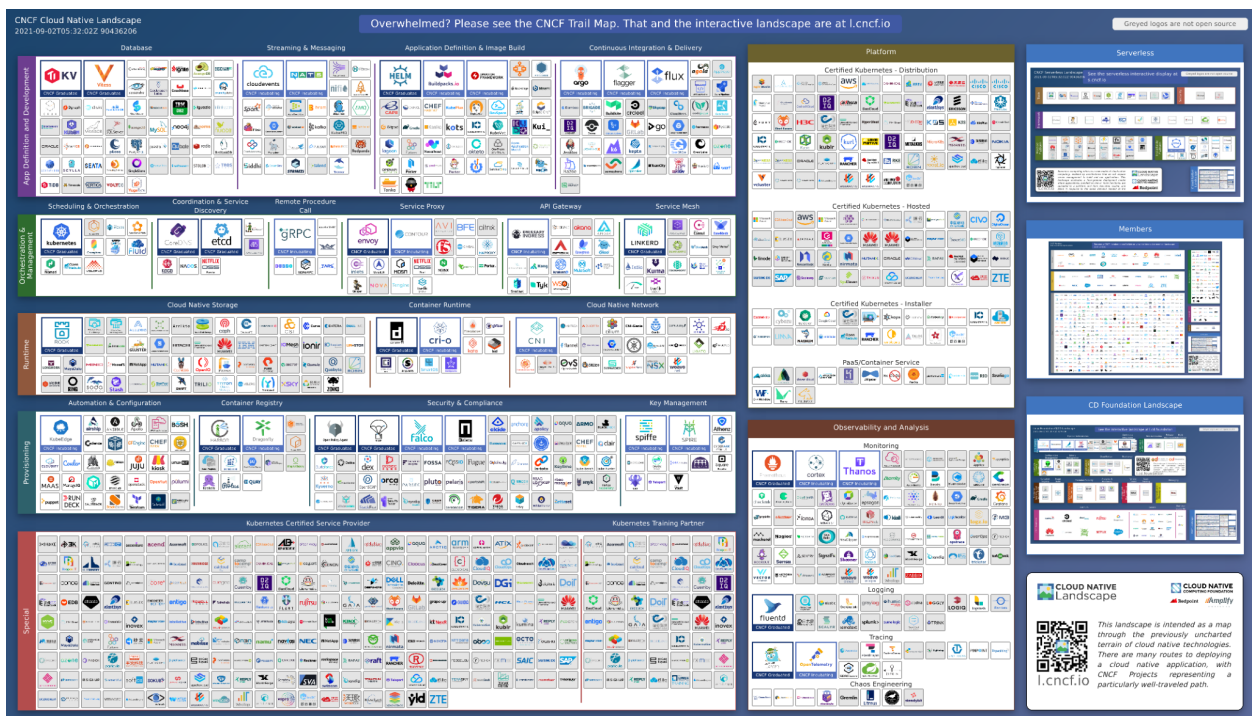
With containers, and the change in application design that came with it — from enterprise servers to microservices based 12 factor apps, the management, and orchestration of the systems became far more complex. It's a huge difference to operate a big central database and a few application servers, or dozens of decentralized data stores, queuing systems, and microservices which all need to interact with each other. And by far, the most critical factor is the capability to scale. Whereas traditional enterprise IT systems have a well-known audience, scalability is vital once you move to the public web.

Kubernetes — the open-source community-driven container orchestration platform and the various technologies around it, provide all the capabilities one needs to run a future-proof application platform.

OpenShift: an alternative to a complex ecosystem

The cloud-native computing foundation landscape is enormous. Just take a look at this almost overwhelming number of projects, technologies, platforms, and companies involved.
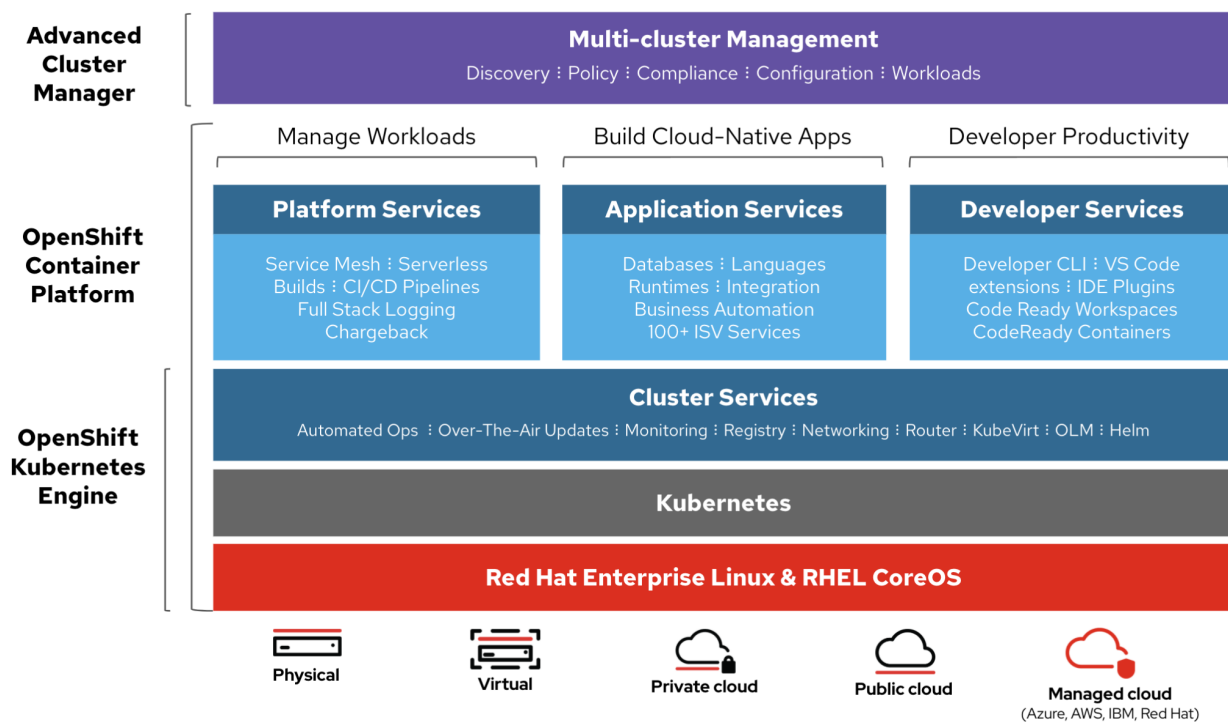

To run a stable and reliable Kubernetes platform, you need to pick, integrate, and operate the right technologies out of many possibilities.

OpenShift — far more than just another packaged Kubernetes

OpenShift provides our clients with precisely this selection and much more than that — considering the cost to set up, operate, and deploy your Kubernetes cluster with all the required subsystems. Evaluating and choosing your image registry, storage provider, management UI, authentication, etc., alone makes it almost logical to go for a pre-packaged integrated solution.

Looking at the diagram above, OpenShift is far more than Kubernetes re-packaged. Instead, it is a full-featured platform with highly integrated solutions, from infrastructure level, developer tooling up to highly sophisticated enterprise features such as compliance, or multi-cluster management.

With the OpenShift installer — capable of deploying a cluster within a few minutes on all central cloud and virtualization platforms — you gain a lot of flexibility and speed.

The same hosting infrastructure running on public cloud providers and your on-premise infrastructure allows you to quickly move the workloads between the environments.

It's a matter of a few days from the decision to a ready-to-use production environment, preconfigured according to best practices.

So, no wonder that in May 2019, Red Hat was proud to publish those numbers in their press statement:[2]

"Nearly 50% of the top Fortune 100 companies are using Red Hat OpenShift. Almost 30% of the top Fortune Global 500 companies use OpenShift, representing:

- ➔ 2 of the top 3 energy companies
- ➔ 2 of the top 3 hotel companies
- ➔ 2 of the top 3 telecommunications companies
- ➔ 3 of the top 5 aerospace companies
- ➔ 4 of the top 5 industrial companies
- ➔ 3 of the top 10 finance companies
- ➔ 4 of the top 10 retail companies
- ➔ 5 of the top 10 healthcare companies
- ➔ 5 of the top 10 transportation companies"

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[2]

https://www.redhat.com/en/about/press-releases/more-1000-enterprises-across-globe-adopt-red-hat-openshift-container-platform-power-business-applications

Minimizing maintenance — the hidden cost

While the setup is a one time task in lots of cases, maintaining such a cluster can become tedious. The new OpenShift 4 introduced operators that automatically manage the cluster down to the operating system level, which reduced those costs a lot. No more manual OS updates, handling package incompatibilities, or failing automation scripts. The OpenShift Cluster Version Operator will always provide you safe, and tested upgrade paths from one version to the next, without the need to full maintenance shutdowns.

Red Hat invests a lot of time and money into testing and verifying those updates so that, sticking to the stable upgrade channel, you can be sure everything will work as expected.

Red Hat Enterprise Linux Core OS — the zero maintenance OS

With RHEL Core OS as the underlying operating system, Red Hat created a complete self-managed platform. Although you can always access the host machines, you simply have no reason to do that in regular operation. Instead, it's all managed by OpenShift, removing one of the main reasons for failing clusters — partly and misconfigured host machines.

OpenShift can add and remove nodes dynamically when running on AWS, GCP, and some other supported platforms. This process provides the auto-scaling capabilities required for large-scale applications.

A system with security & compliance in mind

In several significant sectors such as finance, health care, or automotive, IT systems must follow compliance rules enforced by law. The last thing these businesses need is regulators finding issues, causing penalties, or forcing the company to go offline.

As an industry leader in large-scale enterprise IT, Red Hat has a strong focus on security and compliance.

The annually published Red Hat Product Risk Report[3] from 2020 provides For example, impressive numbers in that area. 31% of all critical issues have been addressed in a single day, 89% in a week and 100% within 31 days.

As one of the significant contributors to Kubernetes and various other related projects, Red Hat laid the base that allowed them to deliver an out-of-the-box secure platform.

When expanding to new markets, OpenShift compliance operators' pre-packaged profiles provide a tool to do so without setting up and validating all those rules on your own.

Private cloud: data safety and privacy at the forefront

Data safety and privacy are becoming more and more critical for customers and, consequently, for business.

Especially in Europe — with GDPR in place and numerous concerns regarding data safety and compliance with public cloud offerings — being able to operate a private cloud environment without spending months in research and development is of great value.

With Kubernetes as the base technology, OpenShift actively avoids any kind of vendor lock-in.

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[3] https://www.redhat.com/en/resources/product-security-risk-report-2020

So, nothing prevents you from implementing a hybrid cloud solution. However, hosting critical and sensitive components on-site and seamlessly integrating them with your existing applications running in the public cloud (AWS, Azure, etc.) provides you with the flexibility and scalability modern large-scale applications require.

Operators: get ready-to-run software

When talking about time-to-market, an often forgotten or underestimated factor is to have all those standard infrastructure components up and running your new product is built on.

Starting a database server by spinning up a pod in the cluster is not enough. Modern software components are often built as rather complex distributed systems where the maintenance cost can be multiple initial setups or license fees. OpenShift 4 introduced operators as a solution for that problem.

Operators allow Red Hat and 3rd party vendors to deliver their software ready to run in OpenShift. They do not just deploy, configure, and run the applications. Operators can also take care of typical 2nd-day tasks, such as backup/restore, proper deployment of updates, etc.

With the built-in Operator Hub — a marketplace for such operators — lots of standard software solutions can be installed into the cluster with a few clicks in the web console.

The open-source Operator SDK, used to build those operators, is available for your development team so that you have all possibilities to automate the operations of your applications.

Every business is becoming a software business

More and more businesses are silently transforming into software-driven organizations in a modern enterprise. For example, considering the finance, insurance, and automobile sector — big players on the market these days — run large-scale development departments with hundreds of teams that deliver critical software components, forming the actual core of the businesses.

With that in mind, a solution to run the software is not enough. We mustn't forget how much time and effort you invested in the process of building, testing, and rolling out new software.

OpenShift Pipelines — Built-in CI/CD

The DevOps movement changed a lot when building and releasing software. Instead of developers throwing their software over to the ops team to install, configure, and run, we now automate the whole process.

As nothing comes without cost, an entirely new central component entered the CI/CD Server field. By the nature of the task, building and testing software is a complex issue and current CI/CD solutions.

The complete CI/CD pipeline runs inside the cluster with OpenShift Pipelines; based on the popular Tekton project, the whole CI/CD pipeline runs inside the cluster. This is a benefit because we got rid of a fundamental component in our tech stack and in terms of security. CI/CD needs access to almost any system to do its job. Having this inside the cluster, with the built-in strict security policies applied automatically, simply removes a considerable array of possible issues. You no longer require an external system to have high-level privileges on your cluster resources.

Code ready workspaces

Taking all this to the next level, we get a complete development environment shipped, running in OpenShift. Code Ready Workspaces allow you to start developing a new application by simply popping up your browser and starting to code. Fully integrated with the platform, developing cloud-native applications has never been as accessible before.

This low barrier entry — allowing you to experiment and try out things — powers organizations to beat the competition by speeding up the innovation cycle.

> *"Red Hat OpenShift fits very well with agile development with DevOps and container-based development and with the hybrid environments. We've been able to shorten our critical applications release cycles, which used to be monthly but can now be done weekly or, in some extreme cases, daily hotfixes. That's definitely a huge business benefit."* — IDC Business Value White Paper, March 2021[4]

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[4] https://www.redhat.com/en/resources/The-Business-Value-of-Red-Hat-OpenShift

From your idea to product

All those single pieces of technology composed into a holistic platform product, serve just a single purpose — save time, get rid of all the custom infrastructure setup and maintenance and free the resources to speed up product delivery. Shorten the time to market.

In the traditional enterprise development model, it is often quite a long and complicated path from a first prototype to the finished product. Frequently starting as an ad-hoc prototyped idea, running on the developer's laptop, not only the application itself gets changed — also the runtime platform below changes over time. From laptop to test server to final production infrastructure.

Think alone of configuration and credential management for database access, networking setup, and DNS entries with final production deployment introducing more and more aspects such as compliance, audit, monitoring, and logging, to name a few.

> *"With Red Hat OpenShift, DevOps and development teams increased the number of new applications and features that they delivered to their businesses by 44% and 196%, respectively."* — IDC Business
>
> Value White Paper, March 2021[5]

Deploy with confidence

With the integrated platform OpenShift provides, the prototype can already be developed as a cluster native application, without any additional cost.

From the first line of code, using the provided tooling — with pre-configured security policies applied, deeply integrated into the environmental services — the app runs on the same platform as it will later on in production.

The development and test clusters may of course be separated from the production environment, but the system is the same — the same OS, same tooling, same policies, fences, and borders.

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[5] https://www.redhat.com/en/resources/The-Business-Value-of-Red-Hat-OpenShift

When the app works on the test cluster — you can be very sure it will too in production. As a result, you can ship much faster, compared to a traditional model.

To back this with some concrete numbers here the results gathered by interviews done with fourteen OpenShift users published in the IDC Business Value White Paper, March 2021[6]

	Before/Without Red Hat OpenShift	With Red Hat OpenShift	Difference	% Benefit
Development Volume				
Number of new applications per year	9.3	13.4	4.1	44%
Number of unique features per year	245	723	479	196%
Development Life Cycle, Weeks				
New applications	31.7	22.4	9.3	29%
New features	8.1	5.4	2.7	33%

n = 14, Source: IDC in-depth interviews, January 2021

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[6] https://www.redhat.com/en/resources/The-Business-Value-of-Red-Hat-OpenShift

Logging

Having your application shipped is by far not the end of the game. In reality, here it starts, with growing success and continuous improvements. You'll soon face the need to get profound insights into your system. Without a reliable Logging and Monitoring solution, you'd be lost when something breaks — and things do break from time to time.

OpenShift ships out of the box with a centralized logging stack, based on the battle-proven components — Elasticsearch, fluentd & Kibana.

From the node's operating system logs up to your applications, OpenShift collects all the logs and makes them centrally available for inspection. Housekeeping with customizable retention times included.

Monitoring

With a pre-packaged, deeply integrated monitoring stack built on Prometheus, Grafana, and Alertmanager, OpenShift ships everything you need to monitor your platform.

The default installation already provides detailed insights into system component performance and preconfigured alerts, keeping you aware of upcoming problems. Of course, all of this can be customized and integrated with various external solutions. Lots of them are available as per click installable operators using the Web Console UI.

Get insight and transparency to drive reliability

Providing system insight, streamlined processes, and the Kubernetes container orchestration engine's self-healing capabilities lead to a platform superior regarding application availability, resilience, and time to repair. For example, the IDC Business Value White Paper[7] showed that unplanned outages are reduced by almost 42% and the average time to resolve the issue halves.

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[7] https://www.redhat.com/en/resources/The-Business-Value-of-Red-Hat-OpenShift Table 5, p14

OpenShift: ship today, not tomorrow.

OpenShift provides all the characteristics we just talked about. Enabling even small to medium-sized businesses to host and maintain a state-of-the art on-premise infrastructure. Providing a future-proof well tested and easy-to maintain solution like — is a game changer.

From our experience, TRIGO as a developer-driven software company, our cluster provides us and our clients with a tremendous range of tools and pre-built integrations. We can reduce the time from the start of a new project to a first production-ready deployment from several days down to a few hours.

Instead of pondering CI pipelines, infrastructure needs or deployment scripting — this speed and ease allows our developers to use all their time and creativity to produce the best possible software for our clients and their end users.