# Plan your application modernization journey

A practical guide for success

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# Ongoing change requires continuous adaptation

## Change and uncertainty are constants for today's businesses.

Your success depends on your organization's ability to continuously adapt, innovate, and deliver new, high-value products and services to customers. Your core business applications and IT infrastructure play critical roles in achieving these goals and can become key competitive differentiators.

At the same time, you need to maximize the value of time, budget, and training investments in your existing infrastructure. But maintaining these systems often consumes resources that could be used for innovation. In fact, studies show that, on average, IT organizations spend 64% of their budgets on running their current infrastructure and applications, and only 36% on innovation and growth initiatives.[1]

## Application modernization can free resources for innovation.

Traditional and legacy applications typically require significant time, effort, and money to support and maintain. Because of their architecture, these applications are not easily or quickly adaptable to meet changing business and customer requirements. And most cannot fully integrate with third-party systems, limiting your ability to add new services through partnerships.

Modernizing your traditional applications can help you get more from your existing investments and free time and budget for strategic projects, feature improvements, and new applications that support business initiatives. Cloud-native and microservice architectures and approaches provide the efficiency, flexibility, and scalability needed to boost application agility and innovation today and adapt more readily over time.

Even so, adopting these technologies can be a daunting task and requires detailed planning, time, and resources. As a result, application modernization is an ongoing journey—rather than a single act—for most organizations.

This e-book discusses the benefits of modernizing your application portfolio and provides guidance for planning and implementing your modernization journey.

### Innovate with modern hybrid cloud platforms

Organizations that adopt hybrid cloud platforms to support application modernization and innovation experience:

## 20%
higher development and DevOps team productivity.[2]

## 21%
more efficient IT infrastructure teams.[2]

## 636%
five-year return on investment (ROI).[2]

## $21.6M
in higher annual revenue.[2]

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1  Flexera. "2021 Flexera state of tech spend report," January 2021.

2  IDC White Paper, sponsored by Red Hat. "The Business Value of Red Hat OpenShift." Document #US47539121, March 2021.

# Benefits of application modernization

### Agility

**Adapt efficiently and more readily to changing market conditions and customer demands.**

- ▶ Create engaging, responsive, high-value customer experiences to stay competitive.
- ▶ Take advantage of new revenue opportunities.

### Speed

**Deliver innovative new applications, services, and features in less time.**

- ▶ Reduce change lead times and increase deployment frequency for applications and services.
- ▶ Improve developer productivity and focus on providing business value.

### Cost

**Reduce operations, development, and infrastructure costs and technical debt.**

- ▶ Scale applications—and their individual services—quickly, effectively, and cost-efficiently.
- ▶ Optimize IT resources to reduce complexity and cost.

### Security

**Improve IT and application security and protect sensitive data.**

- ▶ Assess and realign your security posture with new technologies, integrations, and approaches.
- ▶ Apply automation to ensure continuous compliance with security policies.

### Reliability

**Boost application resiliency and infrastructure reliability.**

- ▶ Reduce mean time to recovery (MTTR) for failed applications and services.
- ▶ Increase the success rate of application changes to improve stability.

# What you need to modernize successfully

Application modernization requires more than just new technology. To gain the most benefit from your modernization efforts, you need a holistic approach that combines technology and platforms with operational processes and organizational culture.

## Culture

**Empower staff to share ideas freely and solve problems together.**

People are at the core of all large IT and business initiatives. All teams—including line of business, network, security, operations, development, and infrastructure groups—must participate and collaborate openly in your modernization efforts.

## Process

**Inspire innovation with processes that foster collaboration and community.**

Processes move projects within your organization from start to finish. Clear, agreed-upon processes and best practices for creating, deploying, managing, and adapting applications are essential for modernization initiatives.

## Technology

**Build an open hybrid cloud foundation that offers scale, speed, and flexibility.**

Your underlying IT platforms provide capabilities for building, running, and managing applications. An integrated hybrid cloud platform that supports multiple generations of applications will give you the flexibility and scalability needed to modernize at your own pace.

# Key concepts and technologies for modernization

Application modernization incorporates several key technologies and approaches. Some are essential for all modernization journeys, while others are needed only for certain scenarios.

## Cloud-native approaches

**Cloud-native technologies** allow organizations to develop and run scalable applications across modern, dynamic cloud environments, including private, public, and hybrid clouds. By applying cloud-native approaches across your organization, you can more rapidly develop, deploy, improve, and scale your applications and services in response to changing business and market conditions.
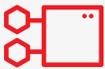
## Microservices

**Microservices architectures** break applications down into sets of functional capabilities. These functional microservices are separate from each other but work together to accomplish the same tasks as the original monolithic application. They are typically lightweight, independently scalable, and shareable across multiple applications. Microservices architectures align well with cloud-native approaches and are often adopted during application modernization initiatives.

## DevSecOps

**DevSecOps**, or just **DevOps**, is an approach to culture, automation, and platform design that speeds the delivery of high-quality applications to increase business value and agility. It focuses on collaboration across teams, dynamic operations, and standardized environments to accelerate development and deployment processes. With DevSecOps, staff from security, development, and operations teams work together, sharing visibility, feedback, best practices, and insights.

## Event-driven architecture

**Event-driven architecture** is a model for application design that is structured around the capture, communication, processing, and persistence of events, rather than requests. Event-driven applications require minimal coupling, so they work well in modern, distributed environments and architectures. Developers can create event-driven applications in any reactive programming language, giving them more flexibility and choice.

## Hybrid cloud application platforms

A **hybrid cloud platform** provides a unified software foundation for developing, deploying, and managing tools, applications, and models consistently across datacenter, edge, and cloud environments. Key features include:

- ▶ Support for traditionally virtualized, cloud-native, and containerized applications.

- ▶ IT-controlled self-service resource delivery.

- ▶ Application and workload portability across different types of cloud environments.

- ▶ Integrated DevOps and operations management capabilities.

- ▶ Application development tools.

- ▶ Integrations from third-party technology vendors and open source communities.

A comprehensive, adaptable hybrid cloud platform is essential for most application modernization journeys and can help you transform more readily at your own pace.

## Modern development frameworks

Development frameworks provide pluggable and extensible patterns of code flow for developers creating applications using programming languages like **Java™**. Developers can use these repeatable frameworks as a base for programming applications, reducing development time and increasing consistency. For example, modern, Kubernetes-native Java development frameworks like **Quarkus** and Spring let you incorporate new infrastructure technologies like **containers**, **microservices**, and **serverless**.

## Service meshes

**Service meshes** provide communication between microservices and add capabilities like resiliency, security, observability, routing control, and insights. They control how different parts of an application share data with one another. As a transparent, dedicated, and scalable infrastructure layer that resides outside of applications, service meshes allow developers to concentrate on creating valuable applications and features rather than rebuilding or connecting standard underlying services.

## Serverless models

**Serverless** is a cloud-native development model that allows developers to build and run applications without managing the underlying infrastructure. A cloud provider or IT operations team handles the routine work of provisioning, maintaining, and scaling servers, so developers can focus on coding. Once deployed, serverless applications automatically scale up, down, or even to zero according to demand or event triggers, freeing up valuable infrastructure resources when not in use.

## CI/CD pipelines

**Continuous integration/continuous delivery (CI/CD) pipelines** improve software delivery using DevOps or site reliability engineering (SRE) approaches. These pipelines apply automation to optimize application life cycle management processes like compiling code, unit testing, and code analysis. When moving to cloud-native and containerized environments, many organizations extend their CI/CD pipelines with **GitOps** workflows that automate delivery across hybrid cloud infrastructure.

# Plan your application modernization journey

## Choose the right path for your application needs

There are three main paths to application modernization. While each path has distinct technology, process, culture, and time requirements and delivers different benefits, all will help your organization operate more effectively in a digital world.

All of your applications need not follow the same modernization path. You can choose the path that best fits the characteristics of each application, as well as your organization's current—and expected—needs. You can also opt to make minimal changes to an application now and further modernize it as your requirements evolve.

**1** **Path 1: Rehost**

Deploy your application in a virtual machine on a hybrid cloud platform.

**2** **Path 2: Replatform**

Deploy your application in a container running on a Kubernetes-based hybrid cloud platform.

**3** **Path 3: Refactor**

Rebuild your application using cloud-native microservices, integrate new technologies, and deploy on a hybrid cloud platform.



Hybrid cloud platform

Rehost → Virtual machine

Monolithic application

Replatform → Container

Refactor → Microservices
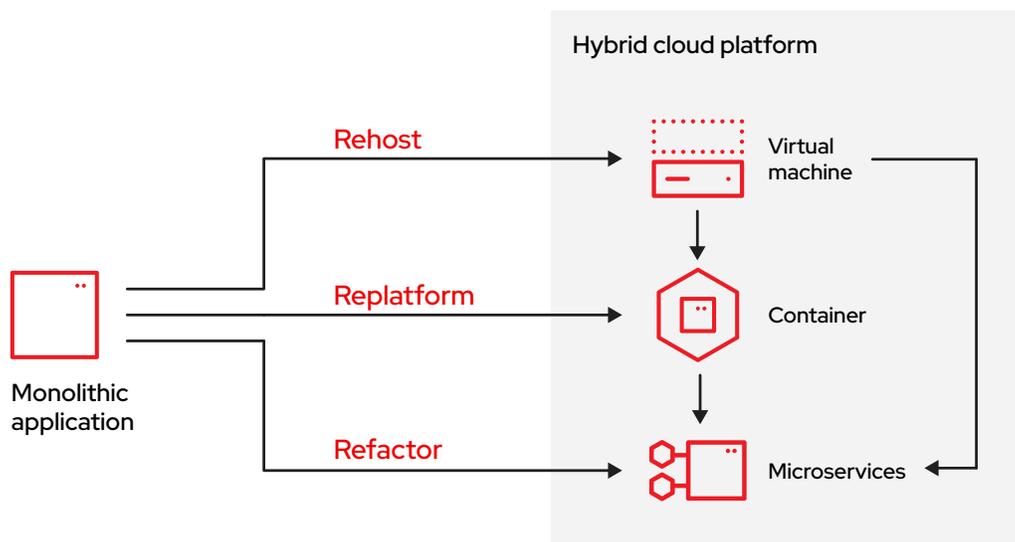
# Path 1: Rehost

## Deploy your existing application as-is within a virtual machine running on a hybrid cloud platform.

The rehost modernization path involves lifting and shifting applications running on traditional application servers into virtual machines running on a hybrid cloud platform. Monolithic applications remain unchanged on your application server and retain all existing integrations and dependencies. External data and integrations can be kept on your legacy platforms.

Rehosting generally takes a short amount of time and results in low migration costs, but delivers fewer benefits than the other modernization paths. Even so, rehosting can help you unify virtualized, containerized, and cloud-native applications onto a single, consistent platform and prepares you for future cloud-native operations.

An example of a rehosted monolithic Java application is shown below.
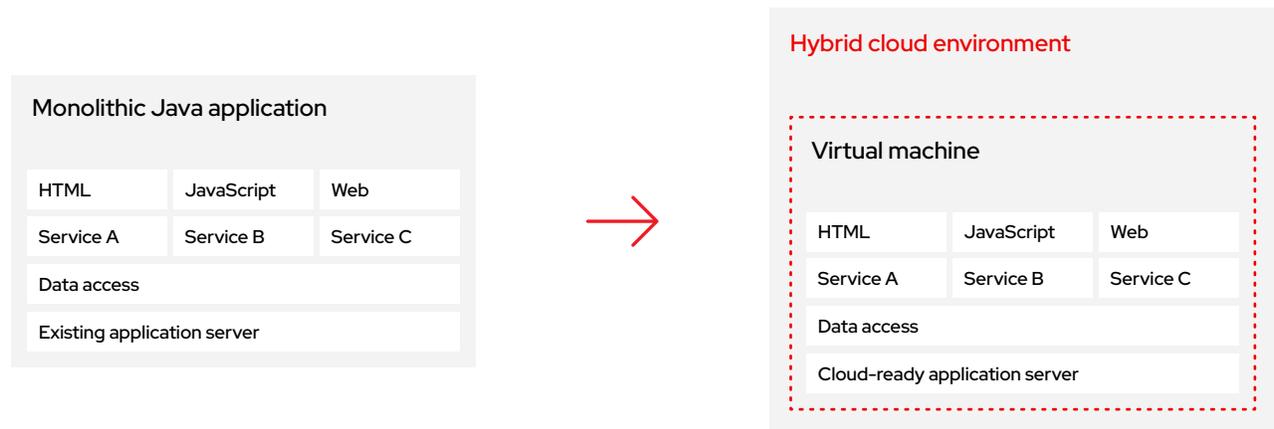
Companies intend to rehost

# 20%

of their custom legacy applications as part of modernization initiatives.[3]

### Monolithic Java application

| HTML | JavaScript | Web |
|------|------------|-----|
| Service A | Service B | Service C |
| Data access | | |
| Existing application server | | |

→

### Hybrid cloud environment

#### Virtual machine

| HTML | JavaScript | Web |
|------|------------|-----|
| Service A | Service B | Service C |
| Data access | | |
| Cloud-ready application server | | |

**⚠ TIP:**

Some traditional application servers may not work in a virtual machine, requiring you to redeploy your applications in a modern runtime environment before moving them to a virtual machine. If you need to change runtime environments, consider replatforming your applications and deploying them in containers (path 2) to optimize your modernization efforts.

3  Konveyor. "State of application modernization report 2022," 2022.

# Path 2: Replatform

**Redeploy your application in a modern runtime environment running in a container on a hybrid cloud platform.**

The replatform path involves lifting, modifying, and shifting applications to modern runtime environments running in containers on a hybrid cloud platform. Some applications require more changes than others to replatform. For example, basic Java applications require few changes to benefit from a containerized Java runtime like OpenJDK. However, enterprise applications should be migrated to modern runtime environments—like Red Hat® JBoss® Enterprise Application Platform, IBM WebSphere Liberty, or Red Hat JBoss Web Server—prior to deploying them in containers.

This path usually takes longer than rehosting, but delivers more benefits. Unifying your applications on a single hybrid cloud platform streamlines operations and allows you to deliver self-service capabilities. Your replatformed applications can also take advantage of all of the native capabilities of your hybrid cloud platform.
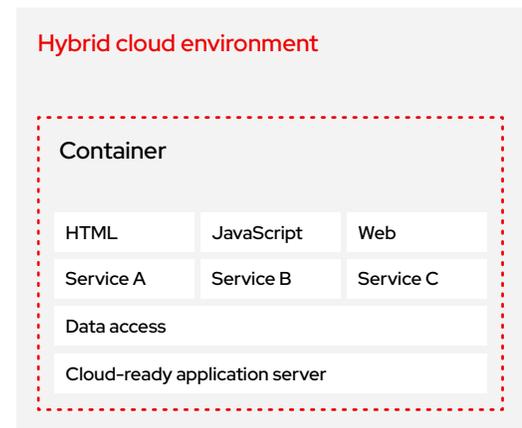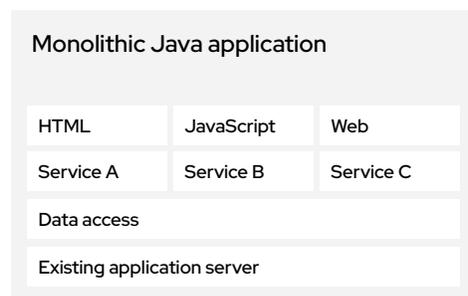
An example of a replatformed monolithic Java application is shown below.

Companies intend to replatform

# 18%

of their custom legacy applications as part of modernization initiatives.[4]

**Monolithic Java application**

| HTML | JavaScript | Web |
|---|---|---|
| Service A | Service B | Service C |
| Data access | | |
| Existing application server | | |

**Hybrid cloud environment**

**Container**

| HTML | JavaScript | Web |
|---|---|---|
| Service A | Service B | Service C |
| Data access | | |
| Cloud-ready application server | | |

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4  Konveyor. "State of application modernization report 2022," 2022.

# Path 3: Refactor

## Rebuild your application as microservices deployed within a service mesh on a hybrid cloud platform.

The refactor path involves redeveloping application services as microservices deployed within a service mesh on a hybrid cloud platform. Services can be rebuilt over time to gradually move functionality from your old application architecture to your new one. During the redevelopment process, you can also upgrade underlying technologies and add in new cloud-native capabilities like artificial intelligence and machine learning (AI/ML), analytics, autoscaling, serverless functions, and event-driven architecture.

The refactor path takes the most time, but also delivers the greatest advantage. Refactoring delivers all of the benefits of rehosting and replatforming while allowing you to embrace innovative new technologies to increase business agility and value.
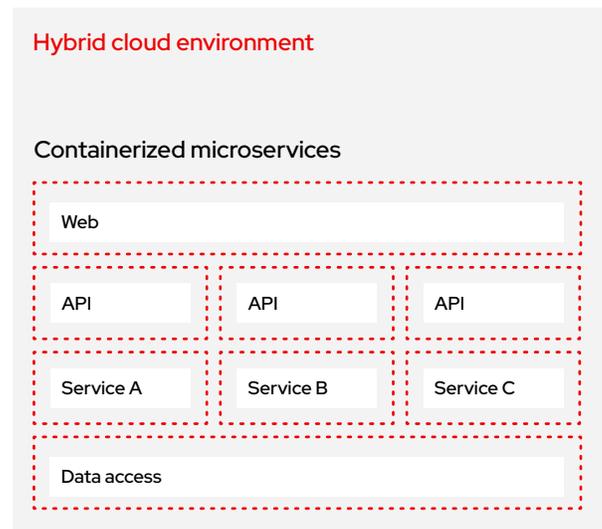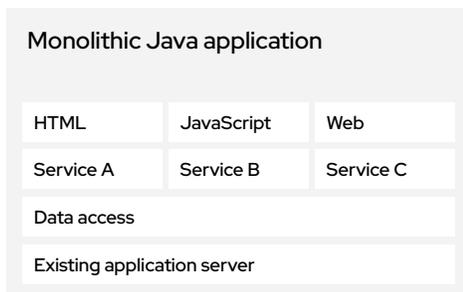
An example of a refactored monolithic Java application is shown below.
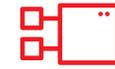
Companies intend to refactor

# 17%

of their custom legacy applications as part of modernization initiatives.[5]

**Monolithic Java application**

| HTML | JavaScript | Web |
| --- | --- | --- |
| Service A | Service B | Service C |
| Data access | | |
| Existing application server | | |

→

**Hybrid cloud environment**

**Containerized microservices**

| Web | | |
| --- | --- | --- |
| API | API | API |
| Service A | Service B | Service C |
| Data access | | |

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5  Konveyor. "**State of application modernization report 2022**," 2022.

# Start planning your journey

**Assess your complete application portfolio to determine the best path for each application.**

## 1  Identify

Determine the technical and operational risks associated with migrating each application from its current platform to your new hybrid cloud platform. Be sure to understand the differences between the two platforms and how these characteristics will impact your application. Document the changes needed for your application to run on the new platform.

## 2  Evaluate

Evaluate the costs, benefits, and concerns associated with each potential modernization path.

| Costs include: | Benefits include: | Other factors to consider include: |
|---|---|---|
| ▸ Development time and effort. | ▸ Operational efficiency. | ▸ Application life expectancy. |
| ▸ Ongoing operating costs. | ▸ Innovation potential. | ▸ New capability requirements. |
| ▸ Platform licensing and infrastructure costs. | ▸ Higher development productivity. | ▸ Technology skills and code reuse. |
| ▸ Losses in business potential. | ▸ New business and revenue opportunities. | ▸ Platform licensing renewal timeframes. |

## 3  Choose

Select the modernization path that aligns best with your goals, budget, and time constraints for your application.

## 4  Validate

After each migration, validate that your application correctly delivers the required business logic.

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### Is a microservices architecture right for your application?

Many organizations plan to deploy microservices architectures for some or all of their applications. Assess each application to ensure that rearchitecting it makes sense and will deliver value to your organization. For example, the cost of rearchitecting applications with a small number of users or limited need to scale may actually be more than the benefits. The ultimate goal is to choose the architecture and environment that delivers the best return on investment for each application.

# Modernize with the open source experts

As an expert in open source software, cloud-native technologies, and Kubernetes, Red Hat can help you modernize your applications and build an agile, cloud-native IT environment to support evolving business demands. We offer a complete, unified, open hybrid cloud foundation for your application modernization journey. Our solutions let you:

▸ Start where you are today and modernize applications as much or as little as needed, at the right time and pace for your organization.

▸ Increase operational efficiency, resiliency, and adaptability with platforms and products that support both traditional and modernized applications.

▸ Manage all applications via the same processes while continuing to use your preferred runtimes, languages, and development tools.

▸ Deliver a consistent, streamlined developer experience with standardized workflows, continuous integration, and support for multiple environments.

No matter where you are in your modernization journey, Red Hat can help you get the most benefit from your efforts.

## Simplify your application modernization journey

**Red Hat Consulting** experts can work with you to evaluate and implement application modernization solutions that help you reduce costs, improve efficiency, and speed development. Our experts can also help you, your team, and your organization develop the practices, tools, and culture needed to rapidly build and evolve applications across your organization.

## Get the skills you need for cloud-native success

Red Hat offers a comprehensive curriculum of training courses to help your organization fill skills gaps and address business challenges. Available in multiple tiers, a Red Hat Learning Subscription gives you unlimited access to Red Hat Training courses, including online self-paced and instructor-led courses, cloud-based labs, and certification testing.

# Deploy a consistent foundation for modernization

Red Hat platforms give you the flexibility, interoperability, and consistency needed for application modernization.

**Red Hat OpenShift**

Red Hat OpenShift® is a security-focused hybrid cloud platform that lets you confi-dently develop, deploy, and manage your applications across environments. Support for virtualized, cloud-native, and containerized workloads lets you modernize and move workloads at your own pace while unifying and streamlining life cycle manage-ment of all applications. This enterprise-grade platform includes key components—including development frameworks, CI/CD pipelines, serverless development models, and service meshes—for modernizing monolithic legacy applications.

Red Hat OpenShift is optimized to improve developer productivity and promote innovation. Integrated automation lets you build efficient, reusable pipelines to speed application development, testing, and deployment. Self-service capabilities allow developers to access preapproved resources faster, without manual intervention from IT teams. Built-in tools, frameworks, and runtimes let developers get started quickly and continue using the languages and workflows they prefer.

Red Hat's large **certified partner ecosystem** lets you take advantage of third-party products and services to customize your environment. Many of these vendors also deliver certified Red Hat OpenShift **operators** that automate and simplify installation and management of their products.

You can also extend the value of your Red Hat OpenShift deployment with additional security and management components. **Red Hat Advanced Cluster Security for Kubernetes** provides insights into critical vulnerabilities and threat vectors for your Red Hat OpenShift environment. It integrates with DevOps and security tools to help you mitigate threats and enforce security policies that minimize operational risk to your applications. **Red Hat Advanced Cluster Management for Kubernetes** delivers increased visibility and control for your Red Hat OpenShift clusters. It unifies multi-cluster management, provides policy-based governance, and extends application life cycle management.

**Gain business value with Red Hat OpenShift**

Organizations that use Red Hat OpenShift experience:

**20%**

higher development and DevOps team productivity.[6]

**29%**

faster application development life cycles.[6]

**21%**

more efficient IT infrastructure teams.[6]

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6  IDC White Paper, sponsored by Red Hat. "The Business Value of Red Hat OpenShift." Document #US47539121, March 2021.

**Quarkus** is a Kubernetes-native Java frame-work for building lightweight microservices and serverless applications. The **Red Hat build of Quarkus** is integrated with Red Hat OpenShift and features low memory use, fast startup times, support for popular Java stan-dards, and an enhanced developer experience.

Based on the open source **Knative** project, **Red Hat OpenShift Serverless** abstracts application development from underlying infrastructure. It lets you build, deploy, and run event-driven applications that start when triggered, scale dynamically according to demand, and scale to zero after use.

**Red Hat OpenShift Pipelines** is a cloud-native CI/CD solution based on the Tekton open source project. Through tight integration with Red Hat developer tools, it allows you to rapidly create independently scalable pipelines from simple, repeatable steps.

**Red Hat OpenShift Service Mesh** provides a uniform way to connect, manage, and observe microservices-based applications. It consists of a set of open source projects for integrated, managing, tracing, monitoring, and analyzing traffic between microservices.
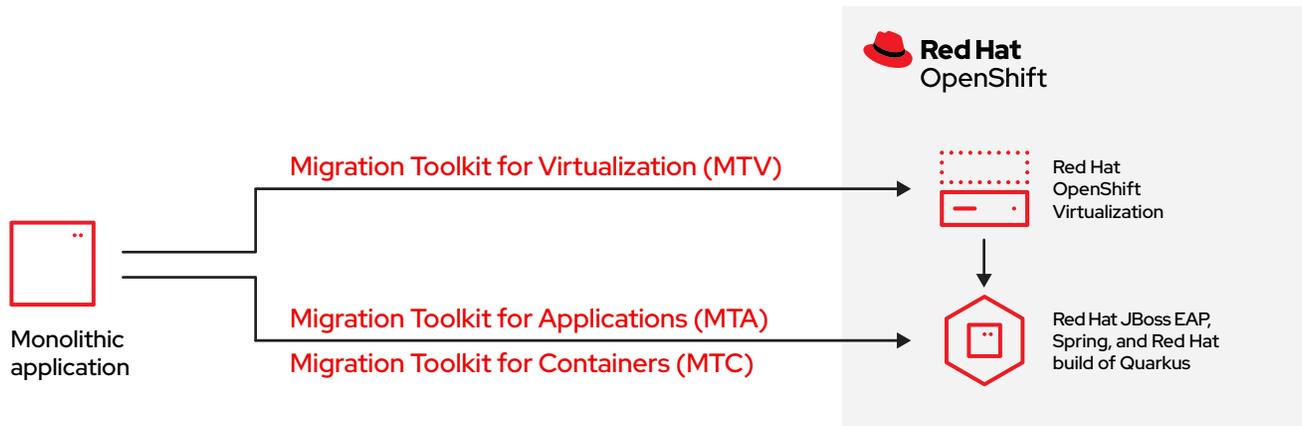
## Red Hat
# Application Foundations

**Red Hat Application Foundations** provides a comprehensive set of com-ponents for developing and modernizing software. These technologies help you build, deploy, and operate applications with security in mind and at scale across the hybrid cloud.

Some key components for modernizing applications include:

- ▸ Red Hat build of Quarkus
- ▸ Red Hat Single Sign-On
- ▸ Red Hat build of OpenJDK
- ▸ Red Hat JBoss Web Server

- ▸ Red Hat JBoss Enterprise Application Platform
- ▸ Red Hat Integration
- ▸ Migration Toolkit for Applications

# Migrate with confidence

Red Hat offers several **migration tools** to help you plan your modernization journey and move your applications to Red Hat OpenShift.



## Migration Toolkit for Virtualization

**Migrate virtual machines to Red Hat OpenShift at scale.**

**Migration Toolkit for Virtualization (MTV)** helps you migrate virtual machines from VMware vSphere or Red Hat Virtualization to **Red Hat OpenShift Virtualization**. Included with Red Hat OpenShift, Red Hat OpenShift Virtualization lets you manage virtual machines alongside containers and cloud-native workloads. MTV provides a straightforward process for migrations at scale. It also includes on-site analytics to help you find and resolve potential migration issues before starting.

You can use MTV to migrate virtual machines when rehosting your applications onto Red Hat OpenShift.

## Migration Toolkit for Applications

**Modernize and migrate applications to cloud-ready environments.**

**Migration Toolkit for Applications (MTA)** is a set of tools—based on years of experience—that supports large-scale application modernization and migration projects. It speeds code analysis and migration, provides effort estimates, and helps you move applications to cloud and container environments.

You can use MTA to assess and analyze your applications when replatforming or refactoring. MTA helps you upgrade application platforms, and migrate to cloud-native runtime environments like **Red Hat JBoss Enterprise Application Platform**, Spring, or the Red Hat build of **Quarkus**.

## Migration Toolkit for Containers

**Migrate applications between Red Hat OpenShift clusters.**

**Migration Toolkit for Containers (MTC)** helps you move stateful and stateless applications from a variety of Kubernetes platforms to Red Hat OpenShift 4 clusters. MTC migrates Kubernetes resources, persistent volume data, and internal container images from:
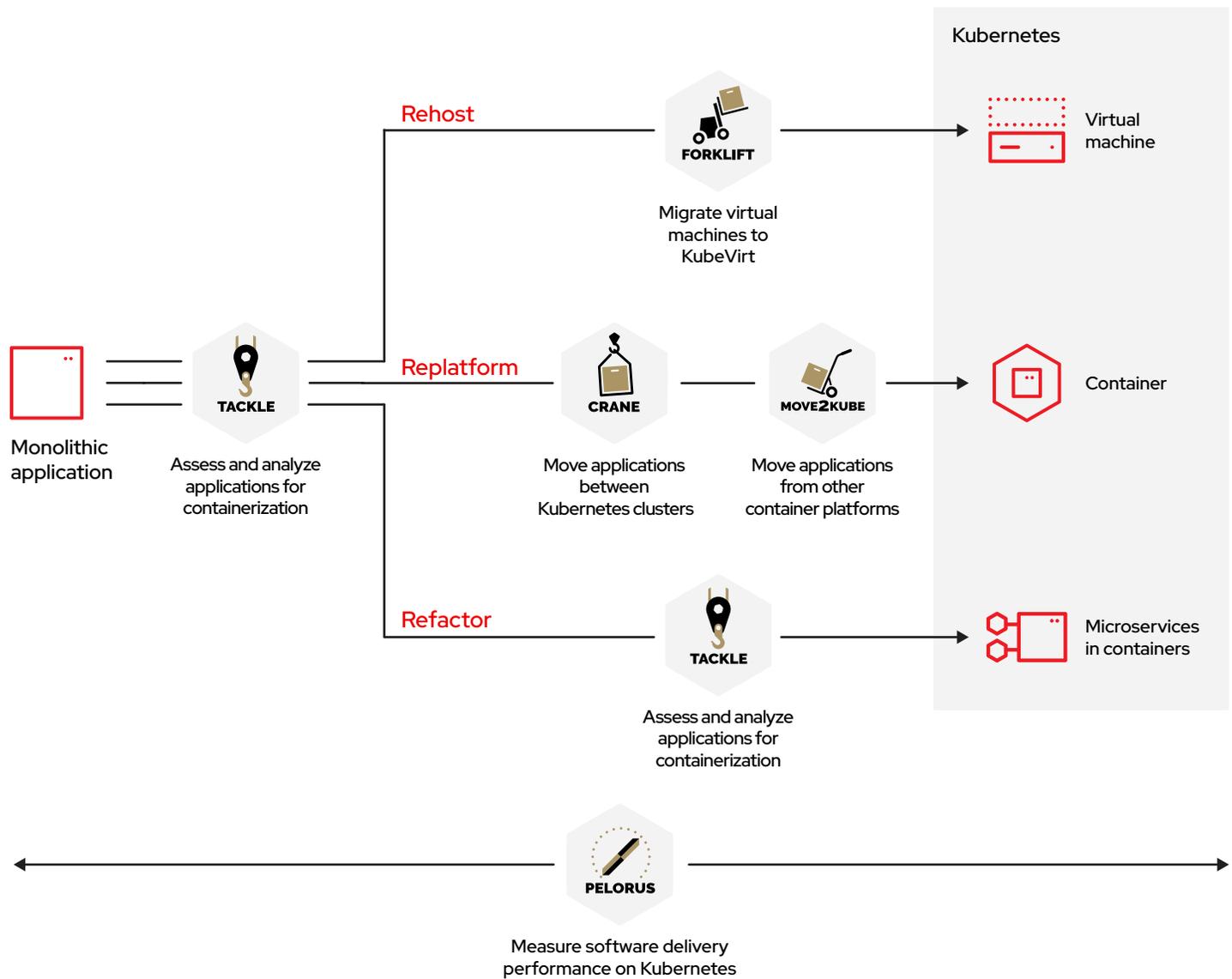
▶ Red Hat OpenShift 3 clusters.

▶ Non-Red Hat Kubernetes platforms.

▶ Other Red Hat OpenShift 4 clusters.

You can use MTC to move containerized applications between clusters when replatforming or refactoring.

# Engage with the Konveyor community

Red Hat and IBM created the Konveyor community to help organizations move more easily to Kubernetes-based application platforms. **Konveyor** is a community that helps others modernize their applications using open source tools for rehosting, replatforming, and refactoring applications to Kubernetes and cloud-native technologies.

Based on Red Hat and IBM migration technologies like MTV, MTC, and MTA, Konveyor offers several community-developed projects to simplify and ease migrations to Kubernetes. The Konveyor community also hosts regular Meetups where community members discuss and demonstrate things they have learned.



**Rehost**

**FORKLIFT**

Migrate virtual machines to KubeVirt

**Replatform**

**CRANE**

Move applications between Kubernetes clusters

**MOVE2KUBE**

Move applications from other container platforms

**Refactor**

**TACKLE**

Assess and analyze applications for containerization

**Monolithic application**

**TACKLE**

Assess and analyze applications for containerization

Kubernetes

Virtual machine

Container

Microservices in containers

**PELORUS**

Measure software delivery performance on Kubernetes

# See success in action

DAB Pumps, a leader in water handling and management technologies, wanted to modernize its IT infrastructure with open hybrid cloud technologies to support business expansion, speed up processes and services delivery, and improve customer experiences. A key part of this effort was updating its integration architecture to improve communication between the company's various enterprise applications.

Using Red Hat OpenShift, DAB Pumps is moving from a monolithic environment to a microservices architecture. The manufacturer has started migrating its existing middleware to Red Hat OpenShift as well as developing cloud-native applications on the platform. DAB Pumps also uses **Red Hat Integration** technologies to integrate and accelerate data access for critical systems like product life cycle management (PLM), customer relationship management (CRM), and business intelligence (BI).

With Red Hat technologies, DAB Pumps has been able to integrate its disparate systems, roll out applications 60% faster, and prepare to move to a cloud environment.

Centralized management across its infrastructure

Reduced time to market for new applications by 60%

Set up real-time, cross-enterprise data availability

"As a result of our collaboration with Red Hat we can get new services and updates to market more than twice as quickly than before, in a more secure way and based on well-defined standards."

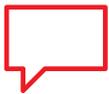**Stefano Dalla Grana**
Head of IT, DAB Pumps

The **Asiakastieto Group** is a leading provider of innovative digital business and consumer information services in the Nordic region. To support a shift to open banking, comply with new data privacy and security requirements, and help solve high levels of debt in the Nordics, the company decided to create a data-based credit assessment solution. Using Red Hat OpenShift, Red Hat Integration, and Quarkus, Asiakastieto developed their Account Insight application to reduce personal debt and payment defaulting through more accurate assessment of an individual's repayment ability.

An IT service provider for several large Danish banks, **Bankdata** must create, implement, and run high-quality IT solutions. With help from **Miracle**, the company adopted Red Hat OpenShift and built a CI/CD platform. To further maximize resource efficiency and speed rollbacks, the Miracle and Bankdata team set up an experiment to compare the performance and efficiency of their current Spring Boot Java framework against Quarkus. The results showed that a Quarkus-native version of the test application provided faster boot-up times, lower memory use per call processed, and lower CPU use.

Lufthansa Technik runs a digital platform, called AVIATAR, that helps airlines avoid delays and cancellations by using data to better organize and schedule maintenance. To address fast growth and increasing demand from customers, the company decided to move to a microservices architecture based on Red Hat OpenShift on Microsoft Azure. The AVIATAR team also deployed Quarkus to help reduce cloud resource consumption. Now, the team develops new microservices using Quarkus and is migrating existing Spring Boot microservices to enhance performance and optimize resource use.

## Less than
# 1 second
boot-up time for Quarkus-native application version

# 57%
less memory use per call at load for Quarkus-native application version

"Open source gives us more speed and scope to innovate, and Red Hat provides us with greater security and valued support."[8]

**Reetta Sinelampi**
Development Director, Asiakastieto

"With Quarkus, [the team] could run 3 times denser deployments without sacrificing availability and response times of services."

**Thorsten Pohl**
Product Owner Automation & Platform Architect,
Digital Product Division AVIATAR, Lufthansa Technik

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8　Red Hat press release. "**Asiakastieto unlocks open banking innovation with Red Hat**," 27 May 2020.

# Get started

Modernizing your application portfolio can help you innovate with speed and compete more effectively in a digital world. Red Hat offers the products, expertise, and services to make your journey successful. Modernize at your own pace while increasing efficiency, resiliency, and flexibility with a complete, unified foundation for all of your applications.

▸ **Try Red Hat OpenShift**, no-cost    ▸ **Learn more** about Red Hat OpenShift

## Take the modernization readiness self-assessment.

Find out how well your organization is positioned for application modernization, and what you can do to speed your journey, with our no-cost online self-assessment

Take your modernization journey further with Red Hat Consulting.

Red Hat experts can help you develop the practices, tools, and culture needed to modernize.

▸ **Learn more** about Red Hat Consulting