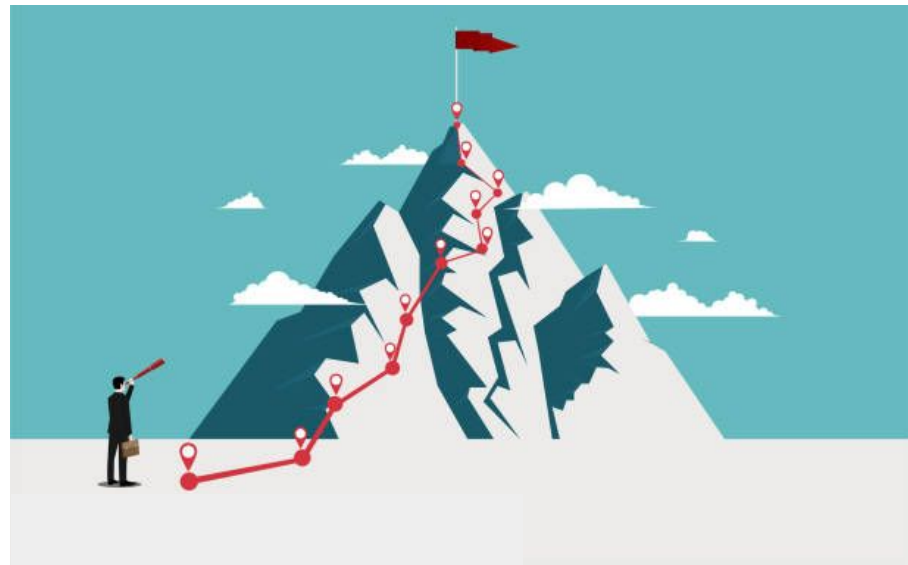


Application Modernization Lunch and Learn

Using the Migration Toolkit to Kick Start
Modernization

Richard Hofmeister
App Dev SSA





Red Hat Modernization and Migration Solutions

Modernization and Migration Tools Overview



Migration Toolkit for Virtualization

Tools and services that help customers migrate to OpenShift Virtualization



Migration Toolkit for Containers

Tools and services that help users migrate containers between OpenShift clusters



Migration Toolkit for Applications

Tools and services that help customers migrate and modernize applications with a focus on adopting OpenShift



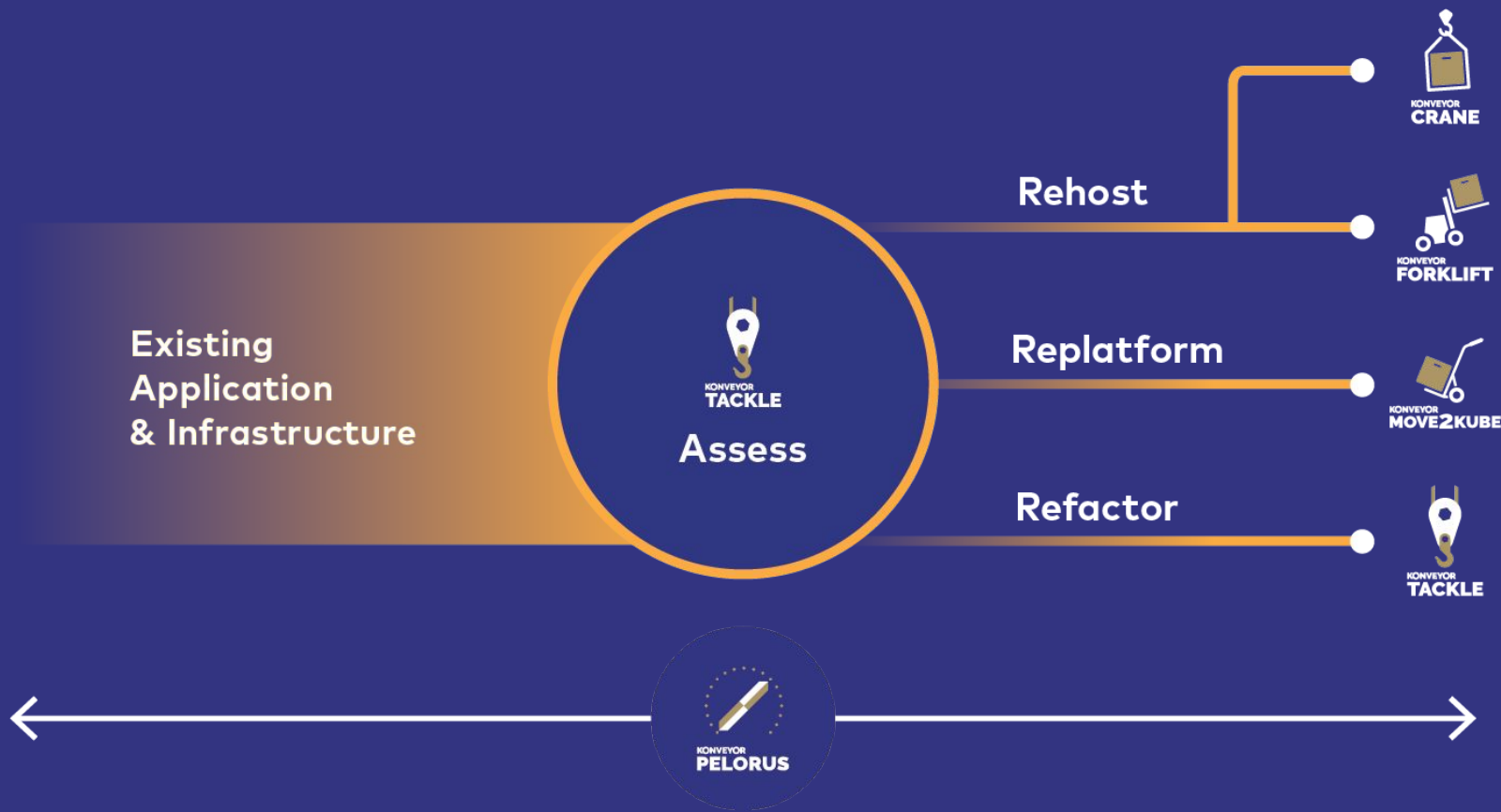
<https://konveyor.io/>

Accelerate your journey to Kubernetes with the Konveyor Community

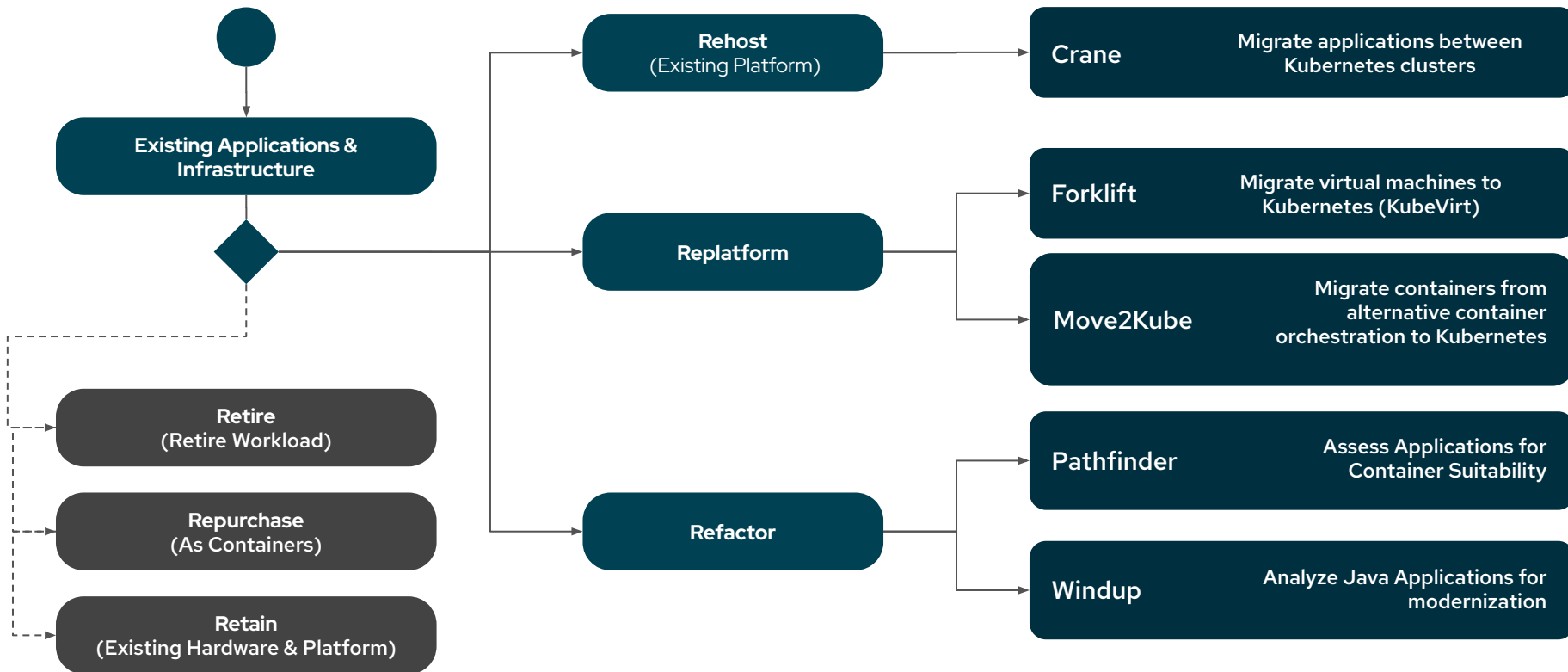
A community of people passionate about helping others modernize and migrate their applications to the hybrid cloud by **building tools to rehost, replatform, and refactor applications to run on Kubernetes & cloud-native technologies**



www.konveyor.io



Migrating to OpenShift with *Konveyor*



Migration Toolkit for Applications

Bringing Together Assessment and Analysis on OpenShift

Application Migration Toolkit

Automated Application Analysis and recommendations for J2EE applications



Pathfinder

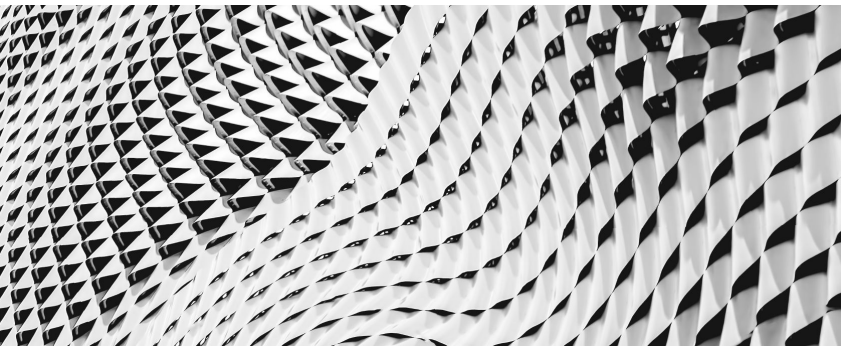
Tool to assess suitability for applications to run on OpenShift



Migration Toolkit for Applications

Assessment and analysis of applications sharing **common microservices** and delivered as an **operator** on OpenShift.

Why?



Never-Ending Modernization

Preparing for the Journey, not the destination

- ▶ Java Migration from 8 > 11 > 17 and beyond
- ▶ Preparing workloads to move to the cloud and back
- ▶ Standardizing Platforms
- ▶ Tracking applications as new versions release
- ▶ Justifying and prioritizing legacy modernization
- ▶ Sprint Planning and Resource Allocation



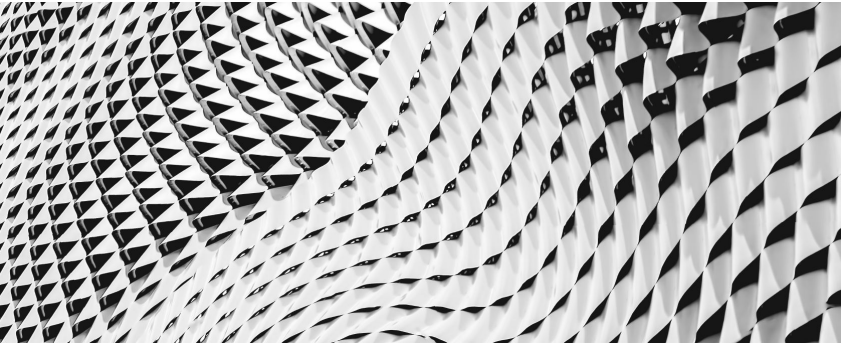
Gartner®



By 2027, 85% of the workload placements made until 2022 will no longer be optimal, highlighting the evolving need for application mobility and portability.

- *Gartner, Workload Placement in Hybrid IT — Making Great Decisions About What, Where, When and Why, Henrique Cecci, David Cappuccio, 2 May 2022

Tackle to Assess Applications





Assess, Prioritize, and Refactor Applications to Kubernetes



Streamline the modernization of your application portfolio to Kubernetes.


Through interrelated open source tools, Tackle gives you insight throughout the adoption process

Whether you're making decisions at the portfolio or application level.



Tackle Operator

Install Tackle in your Kubernetes cluster with almost no effort

**Tackle Operator**
1.2.0 provided by Konveyor

Uninstall

Latest version
1.2.0

Capability level
☒ Basic Install
☐ Seamless Upgrades
☐ Full Lifecycle
☐ Deep Insights
☐ Auto Pilot

Source
Community

Provider
Konveyor

Repository
<https://github.com/konveyor/tackle-operator>

Container image
quay.io/konveyor/tackle-operator:1.2.0-native

Installed Operator
This Operator has been installed on the cluster. [View it here.](#)

Tackle is a collection of tools that supports large-scale application modernization and migration projects to Kubernetes.

Tackle allows users to maintain their portfolio of applications with a full set of metadata and to assess their suitability for modernization leveraging a questionnaire based approach.

Tackle is a project within the [Konveyor community](#).

For more information please refer to [Tackle documentation](#).

- Can be installed in all Kubernetes distributions
- Available in operatorhub.io and OpenShift
- Requires Operator Lifecycle Manager on upstream Kubernetes distributions
- Provides a tackle CRD to provision all components
- Capability Level II



Application Inventory

Application Portfolio Management

Name	Description	Business service	Assessment	Review	Tag count
Floccard	Account Management for Credit Cards		Not started	Not started	3
ForestAndTrees	'generic, interfaces, extract and report...	Finance and HR	Not started	Not started	4
GeneralLedger	General Ledger	Finance and HR	Not started	Not started	4
Hauler-BE	Insurance service of commercial vehicles	Motor Insurance	Completed	Completed	5
Hauler-FE	User interface for commercial vehicle ins...	Motor Insurance	Completed	Completed	4
HeadChef	Allocation of orders to restaurants for fu...	Food2Go	Not started	Not started	4
Homesure	Home Insurance - buildings and contents	Home Insurance	In-progress	Not started	5
HomesureBTL	Insurance for Buy to Let properties	Home Insurance	Not started	Not started	4
InventoryManagement	Inventory management	Finance and HR	Not started	Not started	5

- Used to maintain a portfolio of applications
- It is the hub, and natural integration point for all Tackle projects in the future
- Through the use of tags extensible metadata can be added to describe and categorize the applications in multiple dimensions
- Applications can be linked to the business services that they support
- Application interdependencies can be defined and managed

Assessment Areas

Assessment questions cover the following application aspects



- Architectural Suitability
- Dependencies
- Application Resiliency
- Communication
- Compliance
- State Management
- Runtime Profile
- Observability



- Level of Ownership
- Service Discovery
- Deployment Complexity
- Application Testing
- Application Security
- Application Configuration
- Clustering
- Custom Questions



Pathfinder: application portfolio assessment

Chart Testing Assessments Applications Members 1

ASSESSMENT

Application Details

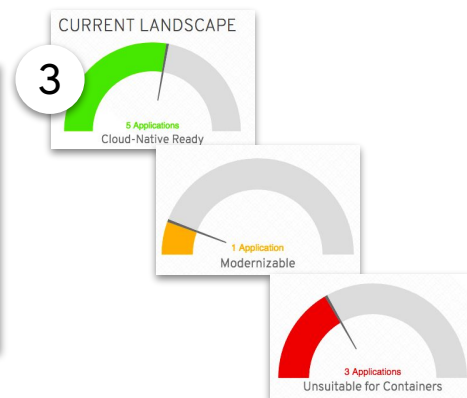
1. Does the application development team understand and actively develop the application?

- ☐ Unknown
- ☐ External 3rd party or COTS application
- ☐ In maintenance mode, no app SME knowledge, poor documentation
- ☐ Maintenance mode, SME knowledge available
- ☐ Actively developed, SME knowledge available
- ☐ New Greenfield application

2. How is the application supported in Production?

- ☐ Unknown
- ☐ Application production support outsourced to 3rd party support provider. Ticket driven escalation process, no inhouse support resources.
- ☐ Production support provided by separate internal team, little interaction with development team.
- ☐ Multiple teams support the application using an established escalation model
- ☐ SME based approach with knowledgeable and experienced operations team
- ☐ Pure DevOps model, the team that builds it is responsible for running it in Production

1. Simple questionnaire to assess applications
2. Review individual application results
3. Report aggregate view of applications
4. Identify candidates for migration



ARCHITECT REVIEW TESTAPP1 2

Application Description: No description
Assessment Notes: None

Please use this section to provide your assessment of the possible migration/modernisation plan and an effort estimation.

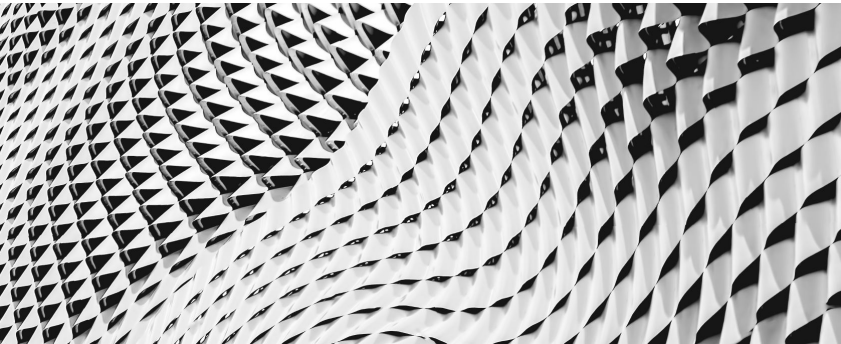
Proposed Action: Re-plate Effort Estimate: Extra La Business Criticality: 8 Work Priority: 1 Supporting Notes:

Submit Review

Question	Answer	Rating
Are 3rd party components supported in containers?	Supported but with restricted functionality/untested	AMBER
Communication	TCP/UDP encapsulated in SSL with SNI header	GREEN
Dependencies - (Incoming/Northbound)	Internal dependencies only	GREEN
Dependencies - (Outgoing/Southbound)	Application not ready until dependencies are available	AMBER
Deployment frequency	Unknown	UNKNOWN



MTA to Analyze Applications

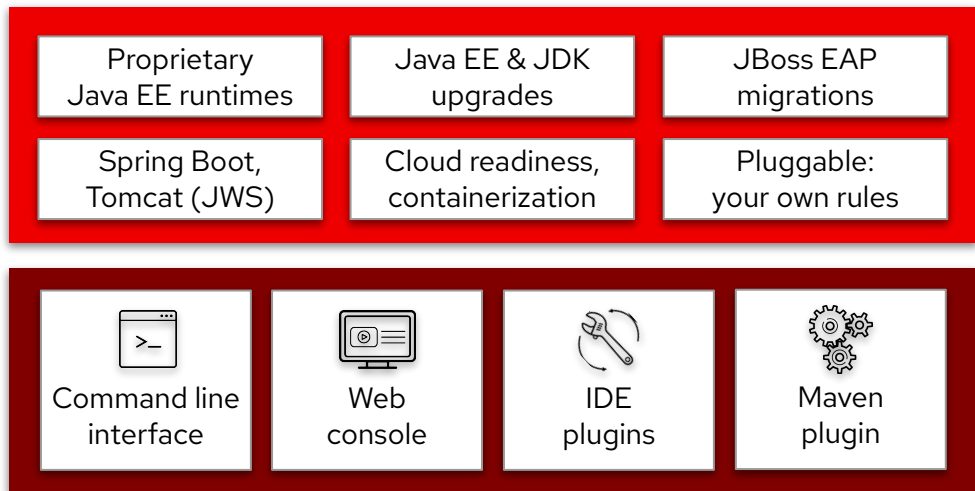




Migration Toolkit for Applications

Catalyze large scale application modernizations and migrations

- Automate application analysis
- Support effort estimation
- Accelerate code migration
- Support containerization



<https://red.ht/mta>

MTA Rules

New WebUI with Patternfly 4

The screenshot displays the 'Migration Toolkit for Applications - Web Console' interface. The left sidebar contains a navigation menu with the following items: Projects (selected), Analysis results, Applications, Analysis configuration, Global, Rules configuration, and Labels configuration. The main content area is titled 'Create project' and includes the subtitle 'Create a project for your applications.' Below this, there is a step indicator on the left with five steps: 1. Details, 2. Add applications, 3. Configure the analysis (selected), 4. Advanced, and 5. Review. Under the 'Configure the analysis' step, there are three sub-sections: 'Set transformation target' (with a link to 'Set transformation target'), 'Select packages', and 'Custom rules'. The 'Set transformation target' section is active, showing a dropdown menu with 'eap7' selected. The main area displays a grid of transformation targets, each with a red circular icon and a description. The targets are: Application server migration to (with a dropdown showing 'eap7'), Containerization, Linux, OpenJDK, Camel, Quarkus, and Spring Boot on Red Hat Runtimes. The 'OpenJDK' target is highlighted with a blue border. The bottom of the sidebar features the Red Hat logo.

Activities Google Chrome 27 de nov 10:01:43

Migration Toolkit for Applications - Web Console

Projects

Analysis results

Applications

Analysis configuration

Global

Rules configuration

Labels configuration

Create project

Create a project for your applications.

1 Details

2 Add applications

3 Configure the analysis

4 Advanced

5 Review

Set transformation target

Select packages

Custom rules

Custom labels

Options

Select transformation target

eap7

Upgrade to the latest Release of JBoss EAP or migrate your applications to JBoss EAP from competitors' Enterprise Application Server (e.g. Oracle WebLogic Server).

Application server migration to

Containerization

A comprehensive set of cloud and container readiness rules to assess applications for suitability for deployment on OpenShift Container Platform.

Linux

Ensure there are no Microsoft Windows paths hard coded into your applications.

OpenJDK

Rules to support the migration to OpenJDK from OracleJDK.

Camel

A comprehensive set of rules for migration from Apache Camel 2 to Apache Camel 3.

Quarkus

Rules to support the migration of Spring Boot applications to Quarkus.

Spring Boot on Red Hat Runtimes

A set of rules for assessing the compatibility of applications against the versions of Spring Boot

Red Hat

Migration Toolkit for Applications

Other distributions



Command line
interface



IDE
plugins



Maven
plugin

Command Line Interface

Features



- Great for larger / automated analyses
- Easy to script
- Typical Use Case
 - Create a folder structure where your artifacts are stored
 - Have a script run through all
 - Move the resulting reports to a simple Web Server for consumption

```
$ <MTA_HOME>/bin/mta-cli --input /path/to/jee-example-app-1.0.0.ear --output  
/path/to/report-output/ --source eap:5 --target eap:7 --packages com.acme  
org.apache
```

Maven Plugin

Features



- For teams who want to continuously evaluate Migration efforts with each build iteration
- Easy to add to your CI/CD or build processes
 - CLI - add a step in your pipeline
 - Maven Plugin - Integrate into your Maven build

IDE Plugins

Task list, inline hints, support for code changes



```
20 import com.rhc.booking.entities.Booking;
21 import com.rhc.booking.entities.Hotel;
22 import com.rhc.booking.entities.User;
23 import com.rhc.booking.entities.NotificationServiceLocal;
24 import com.rhc.booking.entities.ValidationException;
25 import com.rhc.booking.entities.SessionBean;
26
27 public class BookingServiceImpl implements SessionBean
28 {
29     private static final Log LOG = LogFactory.getLog(BookingServiceImpl.class);
30     private NotificationServiceLocal notificationService;
31     private EntityManager em;
32
33     @WebParam(value="insurance")
34     // Context menu options:
35     // - Create annotation 'WebParam'
36     // - Change to 'WebParam' (javax.js)
37     // - Rename in file (#2 R)
38     // - Copy to Criteria Editor
39     // - Fix project setup...
40
41     import javax.ejb.SessionBean;
42     import javax.ejb.SessionContext;
43     import javax.jsr.WebParam;
44     import javax.naming.Context;
45
46     @WebParam(value="insurance")
47     private String type;
48 }
```

```
20 import com.rhc.booking.entities.Booking;
21 import com.rhc.booking.entities.Hotel;
22 import com.rhc.booking.entities.User;
23 import com.rhc.booking.entities.NotificationServiceLocal;
24 import com.rhc.booking.entities.ValidationException;
25 import com.rhc.booking.entities.SessionBean;
26
27 public class PersistenceConfig implements SessionBean
28 {
29     private static final Log LOG = LogFactory.getLog(PersistenceConfig.class);
30     private NotificationServiceLocal notificationService;
31     private EntityManager em;
32
33     @WebParam(value="insurance")
34     // Context menu options:
35     // - Create annotation 'WebParam'
36     // - Change to 'WebParam' (javax.js)
37     // - Rename in file (#2 R)
38     // - Copy to Criteria Editor
39     // - Fix project setup...
40
41     import javax.ejb.SessionBean;
42     import javax.ejb.SessionContext;
43     import javax.jsr.WebParam;
44     import javax.naming.Context;
45
46     @WebParam(value="insurance")
47     private String type;
48 }
```

Eclipse(Che, CodeReady Studio) / VS Code / IntelliJ

Advanced Usage

Build your own rules



- For your own Frameworks
 - “If you encounter this – here is how you migrate”
- Also great for large engagements, once you have built your “cookbook”
- Provide your internal guidance and link directly to your documentation

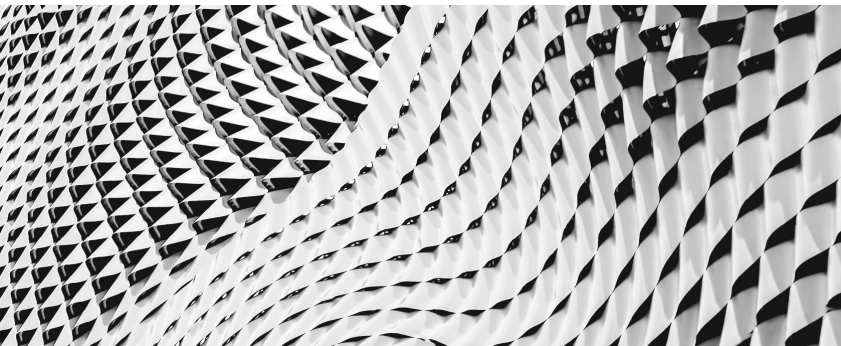
```
<rule id="cookbook-eap7-02000" xmlns="http://windup.jboss.org/schema/jboss-ruleset">
  <when>
    <javaclass references="weblogic.utils.StringUtils.{*}" />
  </when>
  <perform>
    <hint category-id="mandatory" effort="1" title="WebLogic StringUtils usage">
      <message>Replace with the 'StringUtils' class from Apache Commons.</message>
      <link href="https://commons.apache.org/proper/commons-lang/" title="Apache Commons Lang"/>
      <message>Also, check the wiki for an example in conjunction with our XYZ-SUPERFRAMEWORK</message>
      <link href="https://our.internal.wiki/migration/StringUtils/" title="StringUtils usage and"/>
      <tag>weblogic</tag>
    </hint>
  </perform>
</rule>
```

Migration paths Matrix



Source Platform	Targets							
	Migration to JBoss EAP 7	Cloud Readiness	OpenJDK 8 & 11	Jakarta EE 9	Camel 3	Spring Boot in Red Hat Runtimes	Quarkus	Open Liberty
Oracle WebLogic Server	✓	✓	✓	-	-	-	-	-
IBM WebSphere Application Server	✓	✓	✓	-	-	-	-	✓
JBoss EAP 4	✗ [1]	✓	✓	-	-	-	-	-
JBoss EAP 5	✓	✓	✓	-	-	-	-	-
JBoss EAP 6	✓	✓	✓	-	-	-	-	-
JBoss EAP 7	✓	✓	✓	-	-	-	-	-
Thorntail	✓ [2]	-	-	-	-	-	-	-
Oracle JDK	-	✓	✓	-	-	-	-	-
Camel 2	-	✓	✓	-	✓	-	-	-
Spring Boot	-	✓	✓	✓	-	✓	✓	-
Any Java application	-	✓	✓	-	-	-	-	-
Any Java EE application	-	-	-	✓	-	-	-	-

DEMO TIME



Technical? Join the Konveyor Community



Konveyor is now a CNCF
sandbox project

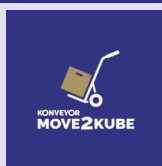
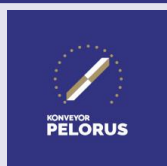
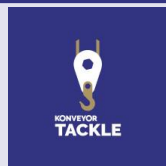


A community of **people** passionate about **helping others modernize** and migrate their **applications** to Kubernetes by **building tools and discovering patterns** of how to **break down monoliths, adopt containers, and embrace Kubernetes**.



Additional community
contributors being
recruited

Projects

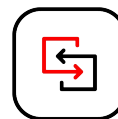


How I strangled a monolith

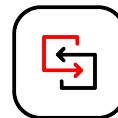
How I containerized my java app

How I created an operator

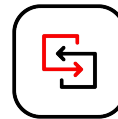
 **Red Hat** Supported Operators



Migration Toolkit
for Applications



Migration Toolkit
for Containers



Migration Toolkit
for Virtualization



Data Gravity in Modernization

Post Talk Conversation

- ▶ [Moving from Database to Data Grid](#)
- ▶ [Konveyor Solutions on Data Gravity](#)
- ▶ [Outbox Pattern with Debezium](#)

Thank you

Red Hat is the world's leading provider of enterprise open source software solutions. Award-winning support, training, and consulting services make Red Hat a trusted adviser to the Fortune 500.



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