App Modernization – Migration approaches

WW Developer Advocacy Team

IBM **Developer**

Moving apps to **modern architectures** starts with **planning**

Assessment for each legacy app

i. **Business value**

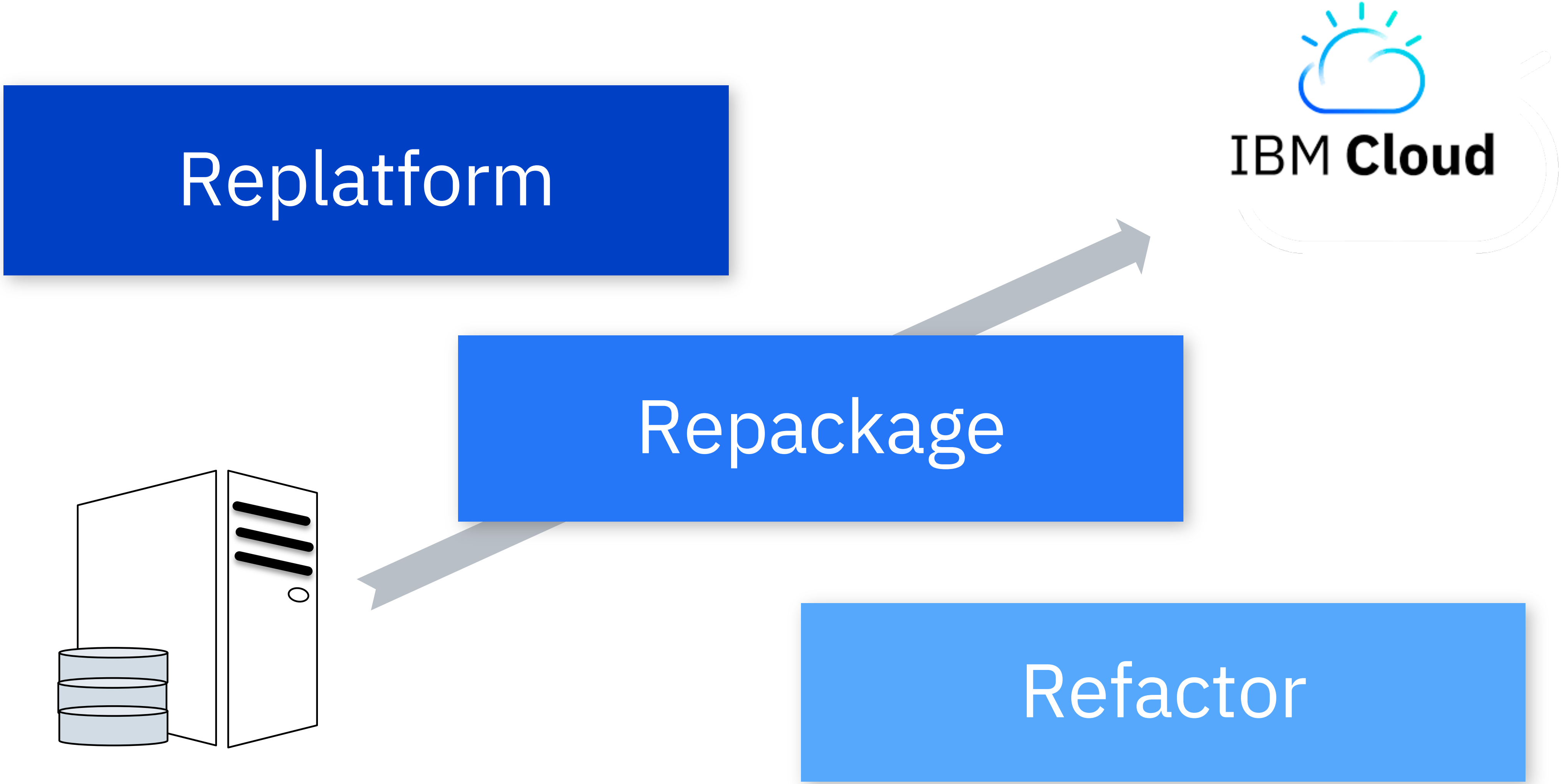
- ➢ Measure cost of migration vs benefits gained by migrating
  - ▪ Good value usually found in apps that have
    - Multiple upgrades per year
    - ✓ Lots of business rules requiring complex regression testing and extended service outages to implement
    - ✓ Large, stable (or growing) user base

ii. **Technical effort**

- ➢ This is where Transformer Advisor helps

Best candidates are those with relatively high business value and relatively small technical effort

The three ways to migrate…

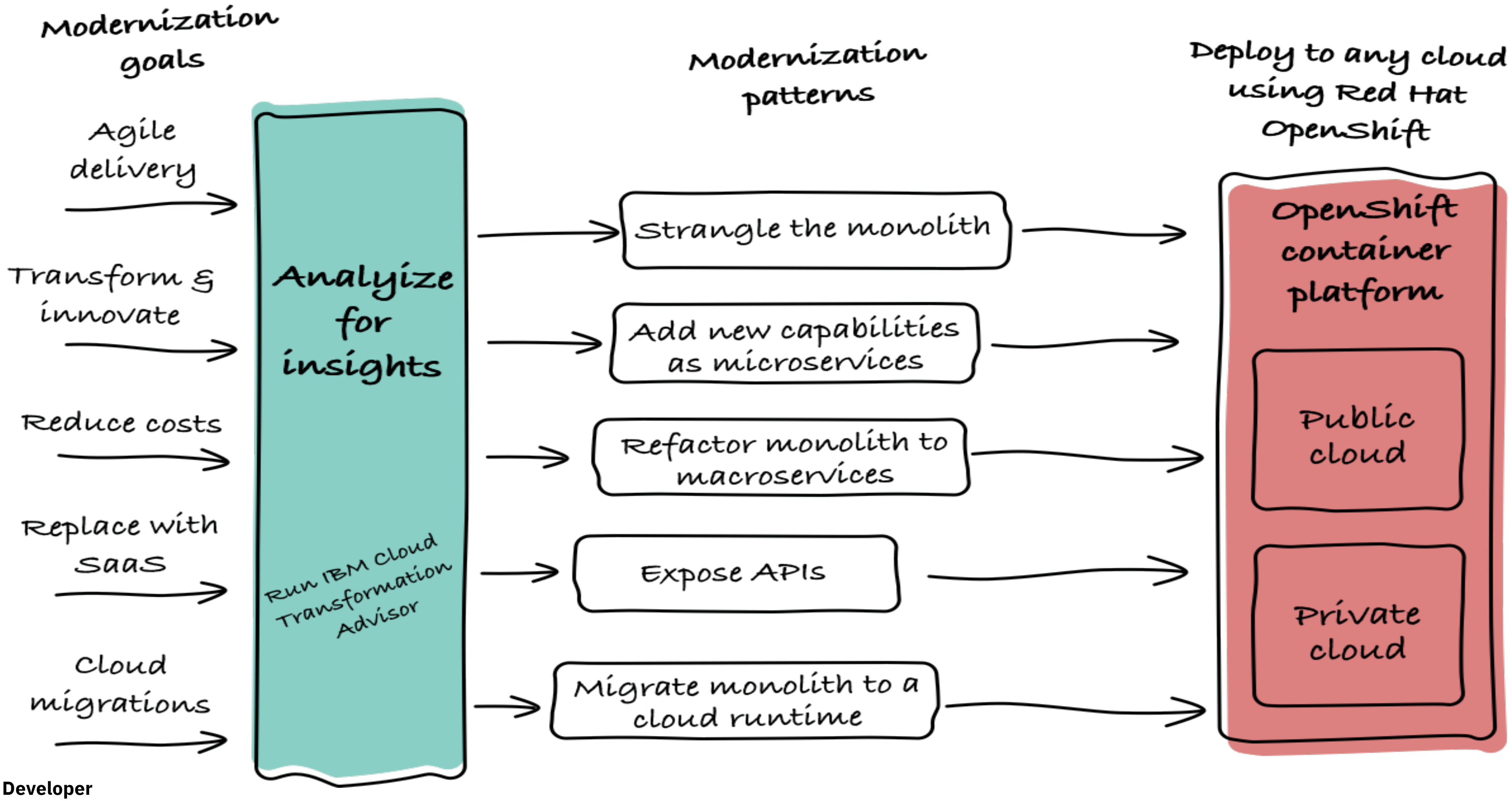


Replatform

Repackage

Refactor

A few ways to migrate…



Modernization goals

Agile delivery

Transform & innovate

Reduce costs

Replace with SaaS

Cloud migrations

Analyze for insights

Run IBM Cloud Transformation Advisor

Modernization patterns

Strangle the monolith

Add new capabilities as microservices

Refactor monolith to macroservices

Expose APIs

Migrate monolith to a cloud runtime

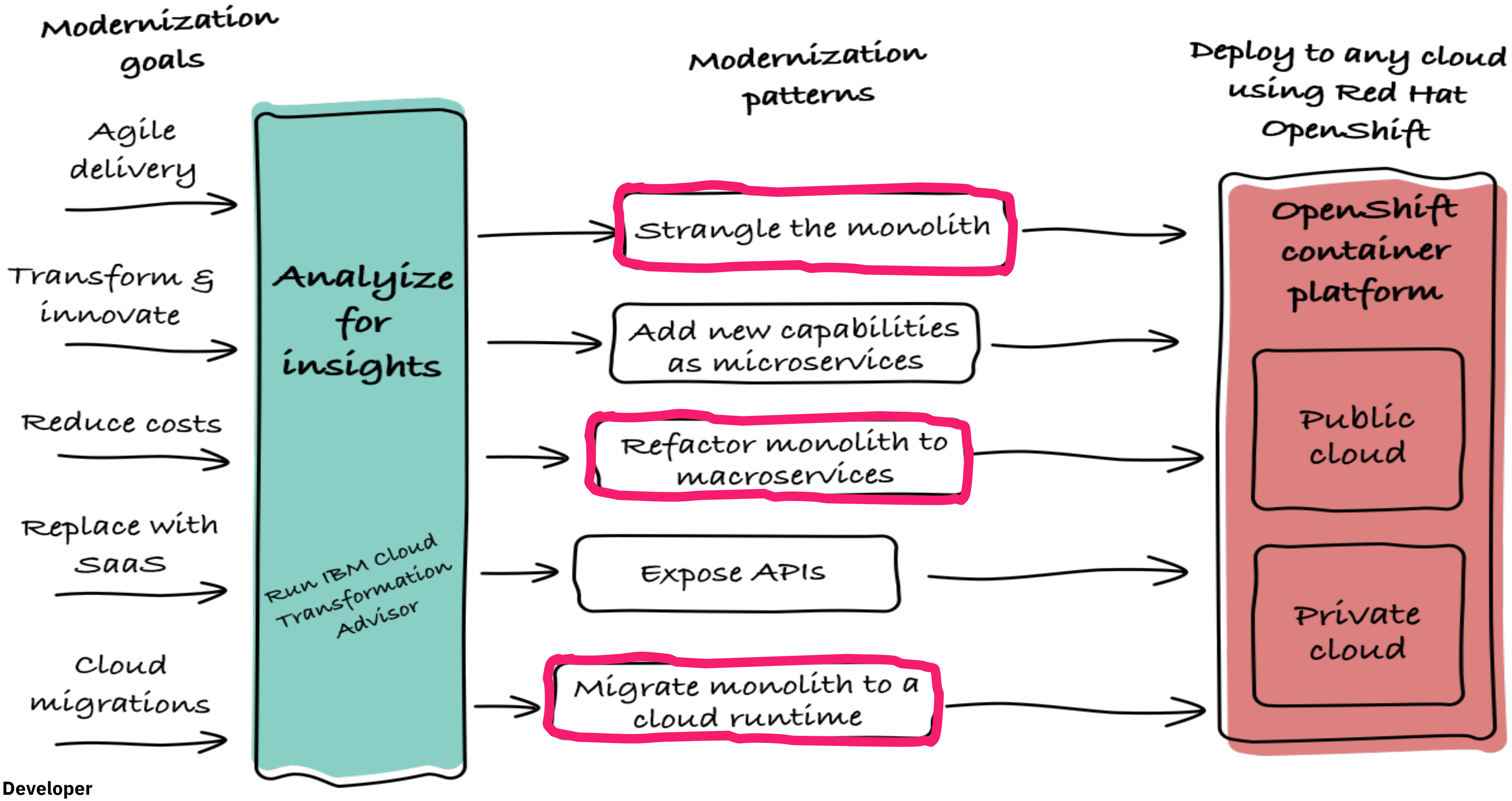
Deploy to any cloud using Red Hat OpenShift

OpenShift container platform

Public cloud

Private cloud

Three ways to migrate…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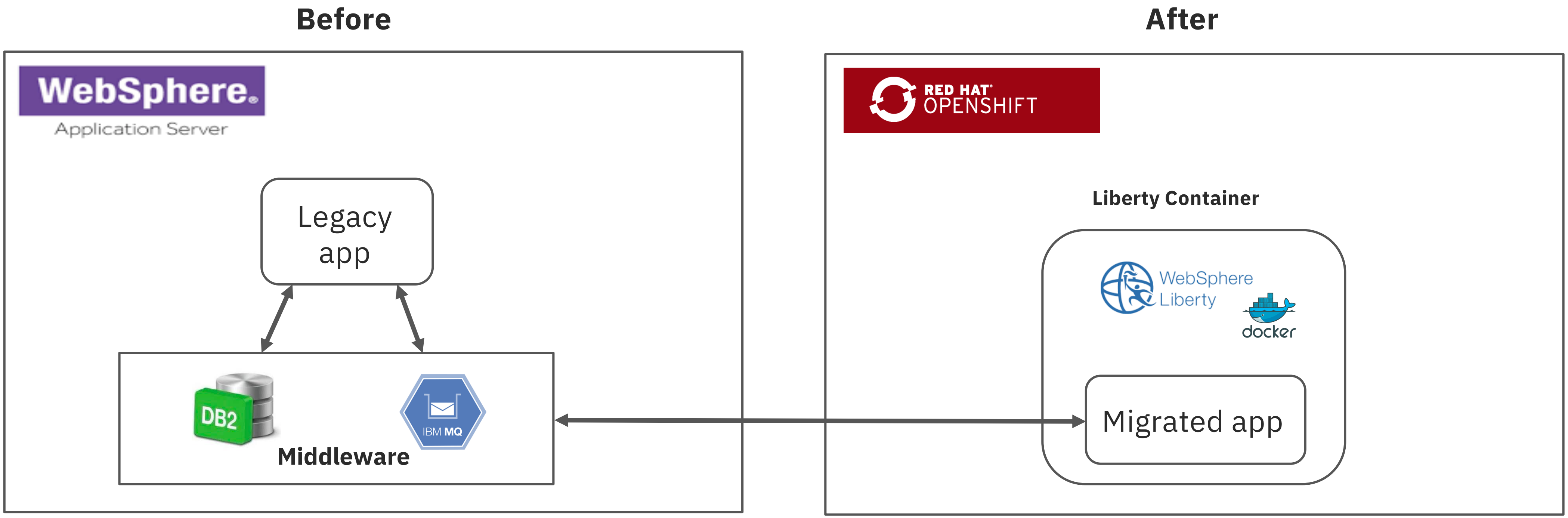
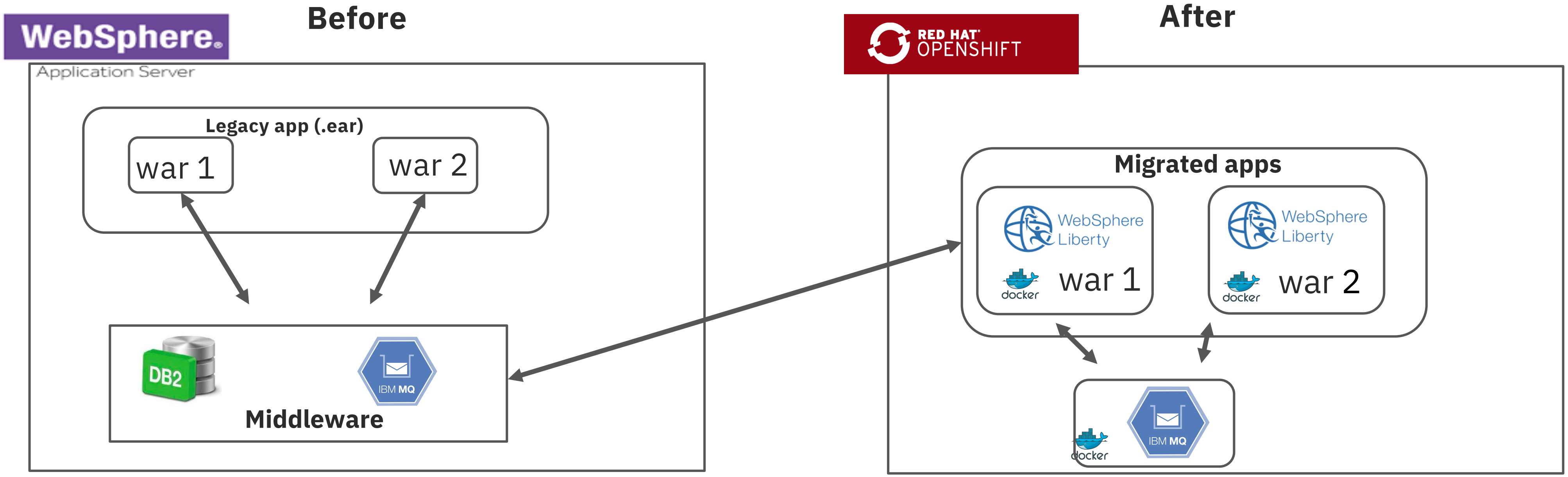
Replatform example

- Legacy app migrated in full from WebSphere Application Server to WebSphere Liberty running in a Kubernetes cluster
- Transformation Advisor provides guidance with equivalent Liberty config for migrated app
- Associated middleware is left in place and still used by migrated app



Repackage to “macroservices”

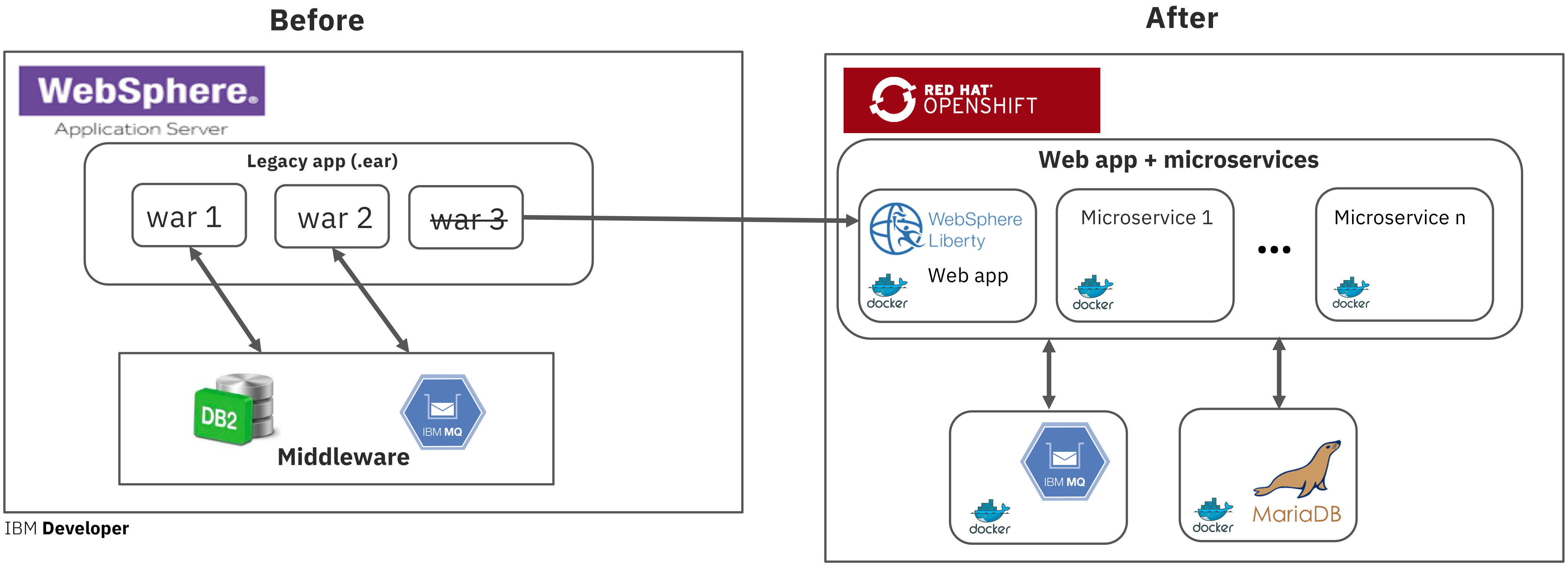
- ❑ Components (.war files) of legacy app (.ear) migrated to separate Liberty containers
- ❑ DB2 is left in place and still used by migrated app
- ❑ IBM MQ is partitioned
  - Container version handles communications between migrated modules
  - Legacy version handles communications between migrated modules and other legacy apps



Refactor using the Strangler Pattern

- Component (war 3) of legacy app is rebuilt as a web app and a set of microservices
- New microservices and app use their own containerized data and messaging middleware
- Legacy app proxies all requests for war 3 to new implementation and handles everything else

  Over time more of the legacy app is rebuilt and eventually it will be no longer be needed



IBM **Developer**

IBM Transformation Advisor

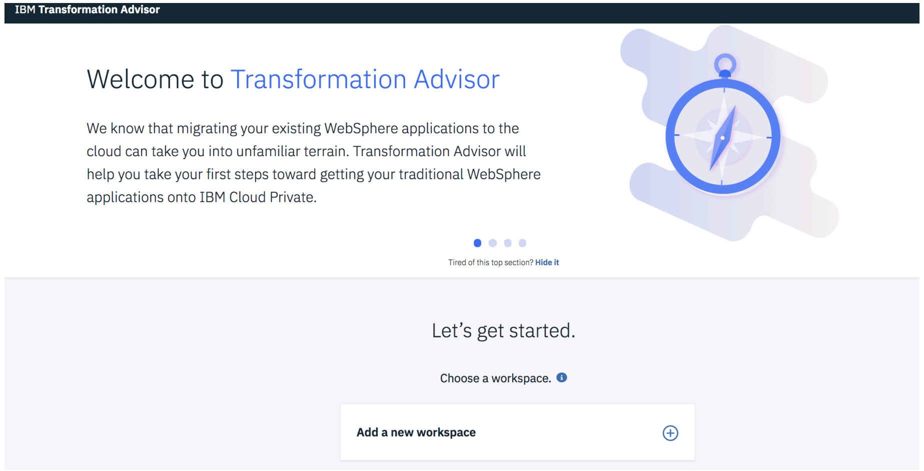
Collects information about your existing WebSphere/JBoss Environment and Applications,
combines that with rules and insights gained from years of working with JavaEE applications, and provides recommendations for your cloud journey

CHALLENGES ADDRESSED

- Leveraging existing application logic
- Need to accelerate application development and maintenance
- Monolithic applications that are complex and tightly coupled

BENEFITS

- Included and deployed with IBM Cloud Pak for Applications
- Introspects existing WebSphere/JBoss Deployments
- Provides recommendations, guidance and artifacts for deployment in Liberty containers and Kubernetes clouds


IBM Transformation Advisor

Welcome to Transformation Advisor

We know that migrating your existing WebSphere applications to the cloud can take you into unfamiliar terrain. Transformation Advisor will help you take your first steps toward getting your traditional WebSphere applications onto IBM Cloud Private.

Tired of this top section? Hide it

Let's get started.

Choose a workspace.

Add a new workspace

https://developer.ibm.com/app-modernization/

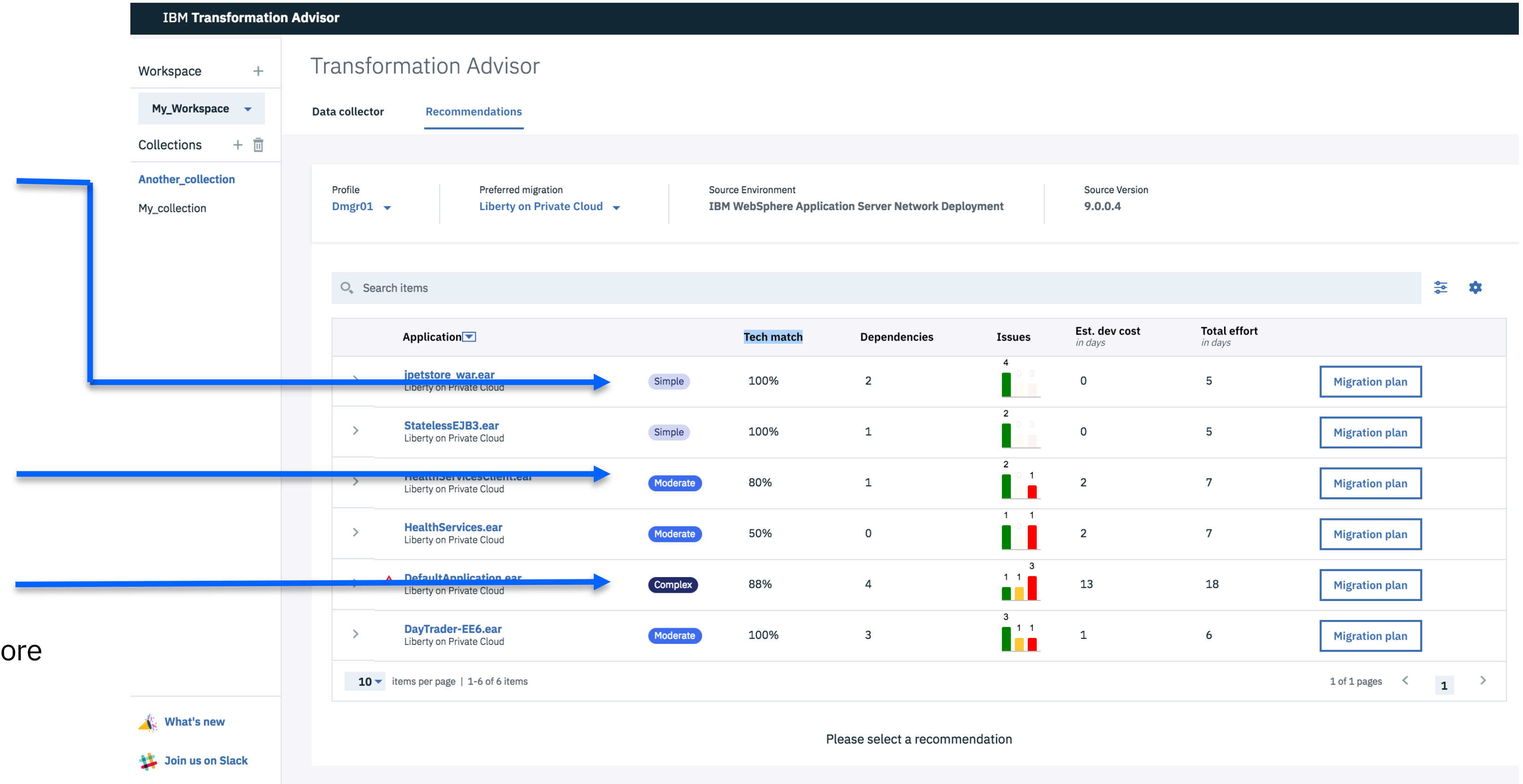
IBM Transformation Advisor

Creates application inventory assesses modernization effort and provides insights and guidance …

Simple:
No code changes

Moderate:
Some refactoring
needed

Complex:
May decide to run
in WAS/JBoss in VMs before
re-engineering



Transformation Advisor

Data collector | Recommendations

Profile	Preferred migration	Source Environment	Source Version
Dmgr01	Liberty on Private Cloud	IBM WebSphere Application Server Network Deployment	9.0.0.4

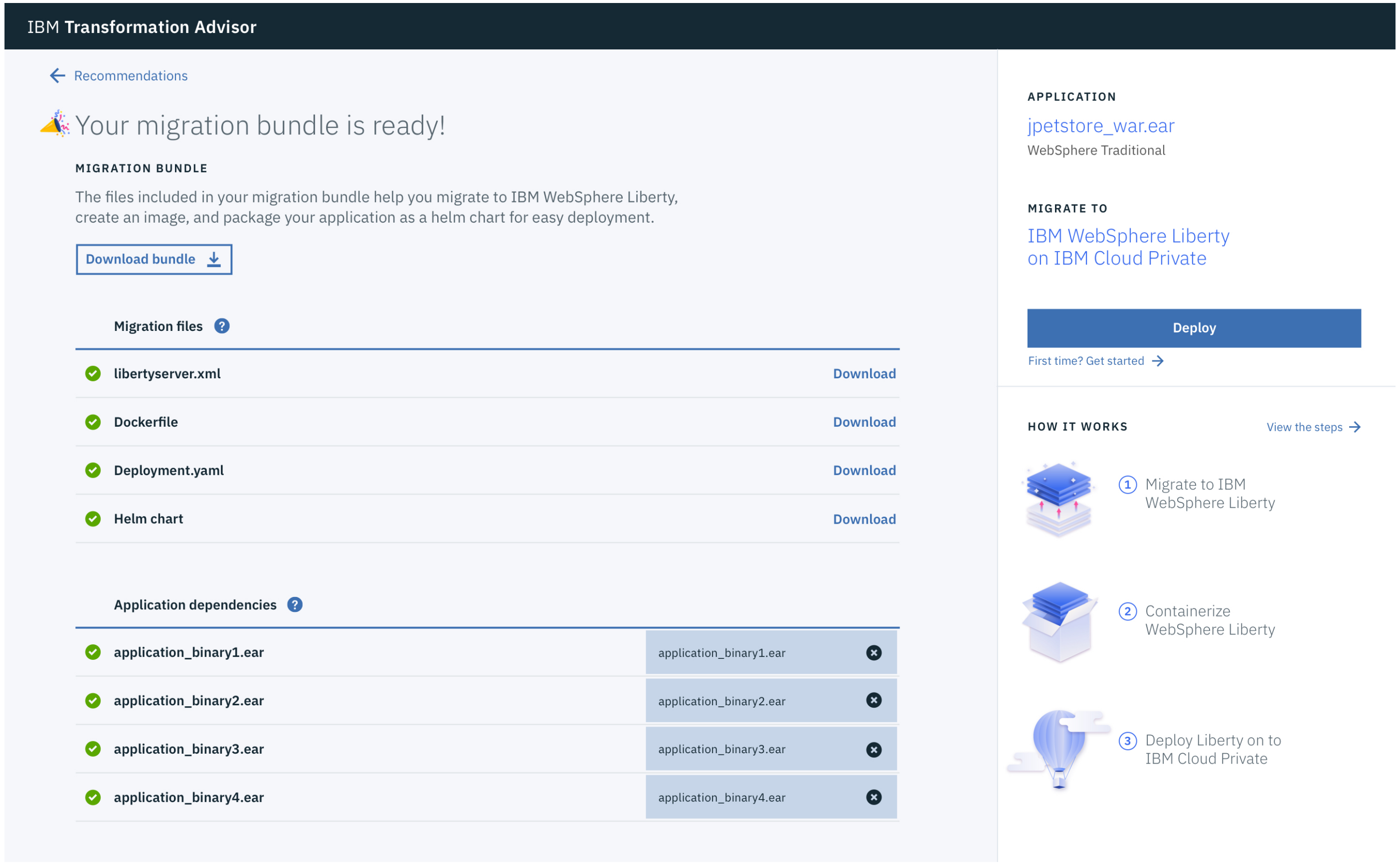
Search items

Application		Tech match	Dependencies	Issues	Est. dev cost *in days*	Total effort *in days*	
jpetstore_war.ear Liberty on Private Cloud	Simple	100%	2	4 0 0	0	5	Migration plan
StatelessEJB3.ear Liberty on Private Cloud	Simple	100%	1	2 0 0	0	5	Migration plan
HealthServicesClient.ear Liberty on Private Cloud	Moderate	80%	1	2 0 1	2	7	Migration plan
HealthServices.ear Liberty on Private Cloud	Moderate	50%	0	1 0 1	2	7	Migration plan
DefaultApplication.ear Liberty on Private Cloud	Complex	88%	4	1 1 3	13	18	Migration plan
DayTrader-EE6.ear Liberty on Private Cloud	Moderate	100%	3	3 1 1	1	6	Migration plan

10 items per page | 1-6 of 6 items   1 of 1 pages 1

Please select a recommendation

Transformation Advisor automates simple migrations



IBM **Transformation Advisor**

← Recommendations

Your migration bundle is ready!

MIGRATION BUNDLE

The files included in your migration bundle help you migrate to IBM WebSphere Liberty, create an image, and package your application as a helm chart for easy deployment.

Download bundle

Migration files ?	
✓ libertyserver.xml	Download
✓ Dockerfile	Download
✓ Deployment.yaml	Download
✓ Helm chart	Download

Application dependencies ?	
✓ application_binary1.ear	application_binary1.ear
✓ application_binary2.ear	application_binary2.ear
✓ application_binary3.ear	application_binary3.ear
✓ application_binary4.ear	application_binary4.ear

APPLICATION

jpetstore_war.ear

WebSphere Traditional

MIGRATE TO

IBM WebSphere Liberty on IBM Cloud Private

Deploy

First time? Get started →

HOW IT WORKS

View the steps →

1. Migrate to IBM WebSphere Liberty
2. Containerize WebSphere Liberty
3. Deploy Liberty on to IBM Cloud Private

"Easy button" to enable simple migrations into IBM Cloud Private

Steps that occur behind the scenes to move the app over to Cloud Pak for Apps

References

- Newman, Sam. *Building Microservices: Designing Fine-grained Systems*. S.l.: O'Reilly Media, Inc, USA, 2018.
  - *Chapter 5 – Splitting the Monolith* specifically covers rebuilding a legacy app as a set of microservices
- Evans, Eric. *Domain-driven Design: Tackling Complexity in the Heart of Software*. Boston, MA: Addison-Wesley, 2014.
  - *Chapter 14 – Maintaining Model Integrity* defines a *bounded context*. Identifying bounded contexts is the first step in splitting a monolithic application.
- BoundedContext – *Martin Fowler*
  - https://martinfowler.com/bliki/BoundedContext.html
- Feathers, Michael C. *Working Effectively with Legacy Code*. Upper Saddle River, N.J: Prentice Hall PTR, 2013.
  - *Chapter 4 – The Seam Model* defines a *seam*. Identifying seams with the appropriate level of granularity is an important step in defining microservice boundaries
- Apply the Strangler Application pattern to microservices applications – *Kyle Brown IBM Fellow*
  - https://www.ibm.com/developerworks/cloud/library/cl-strangler-application-pattern-microservices-apps-trs/index.html?ca=drs-
- Transformation Advisor
  - https://developer.ibm.com/recipes/tutorials/using-the-transformation-advisor-on-ibm-cloud-private/
- Introduction to IBM's app modernization approach
  - https://www.ibm.com/cloud/garage/content/culture/app-modernization-field-guide/

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