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How to Modernize AIX Applications In-place Using Red Hat OpenShift



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Enterprises are modernizing their application to bring in cloud-native capabilities that work in a Hybrid Multicloud environment. In its Total Economic Impact study, Forrester found that clients accelerated development cycles by up to 66% by modernizing (ibm.co/3fvl8d2). Quite often, these organizations are looking at multiple cloud providers to host different parts of their applications while keeping mission critical workloads in-house. According to Flexera 2020 State of the Cloud Report (bit.ly/3iYCCR4), 93% of enterprises are pursuing a multicloud strategy, which helps them from being tied to a single vendor.

To make an application more portable across multiple clouds, it must run on a unifying platform. Red Hat® OpenShift® is that platform. OpenShift extends the Kubernetes with built-in tools to enhance app lifecycle development, operations and security. With OpenShift, clients can consistently deploy workloads across multiple public or private clouds with ease.

This article will break down how my team modernized a banking application running on AIX®. We built a new User Interface and deployed it on Red Hat OpenShift running on the existing IBM Power Systems™ server, while the business logic continued to run on the AIX backend. We added new functionality that ran on three different public clouds: IBM Cloud™, Amazon Web Services and Microsoft® Azure. All these environments were managed using IBM Cloud Pak® for Multicloud Management, also running on POWER®.

Advantages of Containers in App Modernization

One of the most common approaches to modernizing legacy applications starts by containerizing them so that they can be migrated to cloud. Containers are small and lightweight, which makes them a good match for microservice architectures where applications are constructed with loosely coupled, and independently deployable, smaller services.

The combination of microservices as an architecture and containers as a platform is a common foundation for many teams that embrace DevOps as the way they build, ship and run software. Because containers can run consistently anywhere, they are an ideal environment to deploy applications across multiple public clouds and on-premises.

Paths to Modernization

There are several paths to modernization, ranging from low to high complexity¹. Some people call “lift-and-shift” as application modernization, but in reality, it is just rehosting the application on a new platform, without getting its benefits. A smarter way is to modernize the application and deploy it on a hybrid cloud that is based on open standards.

1. Refactoring
 - Factor existing code into microservices and add a new layer to support enhancements
 - Main core of the application, i.e. the business logic, remains unchanged on current platform
2. Complete rewrite
 - Replace current application with a new one that is written for the new platform
 - This is by far the most time-consuming and expensive option.

¹ Red Hat whitepaper: [Making old applications new again](#)

Our team chose refactoring because this adds new functionality without losing the benefit of the Power Systems platform.

Our Path to Modernization

Step 1

We started with a monolithic online banking application running on IBM WebSphere®, connected to a Db2® database, both running on Power®/AIX.

Step 2

We refactored the application into seven loosely coupled business processes, each converted to a microservice (Figure 1). These processes are login, get account balances, process deposit, process withdrawal, view/update customer profile, get transaction history and logoff. These microservices remained connected to the existing Db2 database. The business logic remained unchanged and continued to run on AIX.

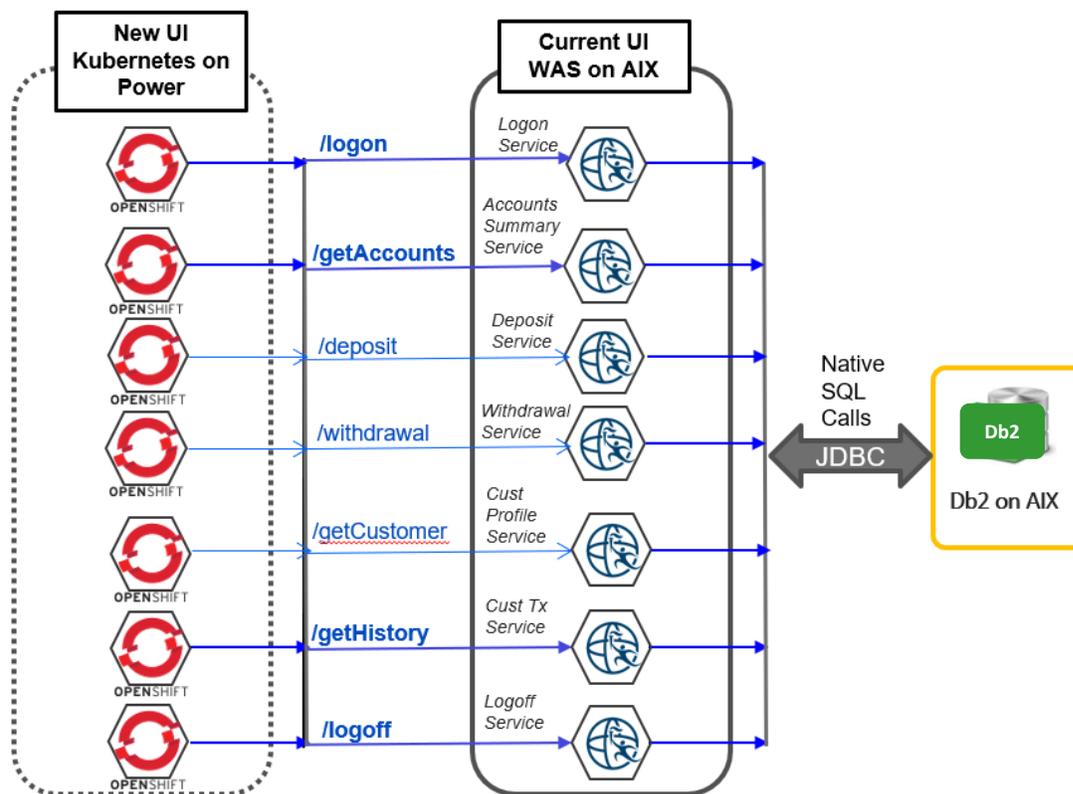


Figure 1: Refactoring the banking application into microservices

Step 3

Then we developed a new user interface (UI) that calls the respective microservice for each business process. It had no direct connection to the database. The new UI was deployed on OpenShift 3.11 on Power with two Red Hat Enterprise Linux® logical partitions (LPARs)—one for master and the other for worker node.

Step 4

Next, we added three more independent apps running on different public clouds:

- A customer service chatbot, powered by IBM Watson® on IBM Cloud
- A pandemic payment relief request app on Microsoft Azure
- A customer satisfaction survey app on AWS

Step 5

Lastly, we managed all apps (both on-prem and running on public clouds) using Cloud Pak for Multicloud Management. To manage AIX LPAR, we needed to add Cloud Automation Manager to the Cloud Pak. See Figure 2 for an example of what the modernized application deployment looked like.

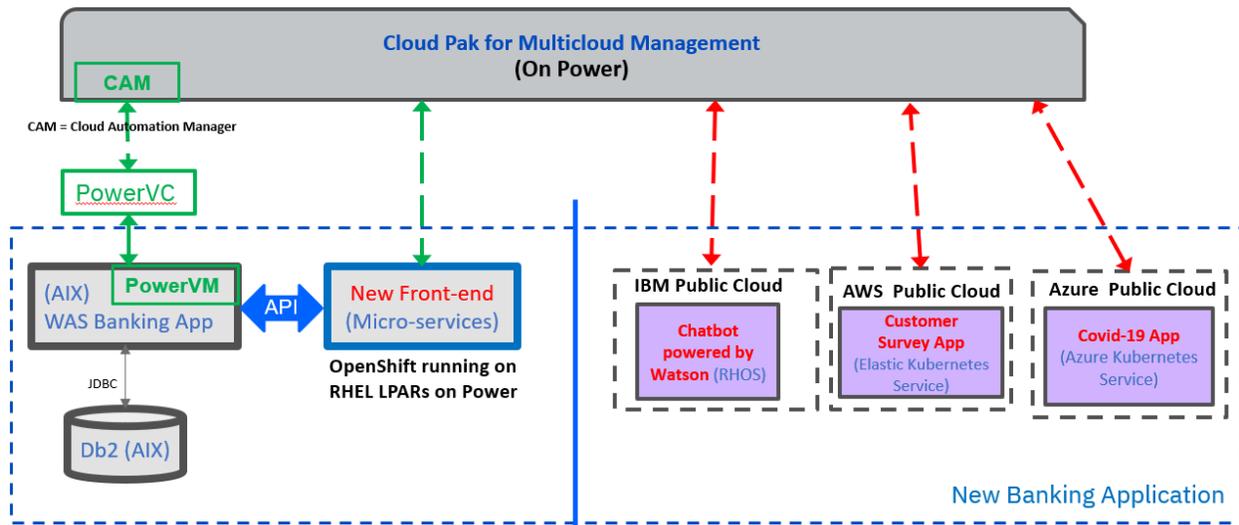


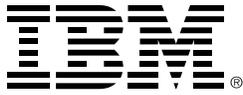
Figure 2: Modernized application managed by Cloud Pak for MCM

Unified Management on Power Systems

Through this exercise we demonstrated that AIX applications can be modernized “in-place” quite easily on the Power Systems platform. This approach gets the benefits of containerization on resilient hardware, while avoiding the risk associated with migrating to a new platform. It also reduces the risk and cost associated with rebuilding the entire application for the new platform.

Monolithic apps can be converted to microservices easily, especially if they are written using structured programming language like Java®. Once containerized, new functions can be added easily, even if they are running on non-Power or other public cloud platforms.

All these apps running on heterogeneous cloud platforms, including AIX LPARs, can be managed in a single place using Cloud Pak for Multicloud Management. This helps in managing the multicloud environments with a consistent and automated set of configuration and security policies across all applications. It improves automation by simplifying the IT and application operations and reduces costs.



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