OSS PaaS and DevOps
Whiteboard design session student guide
April 2018

Contents

OSS PaaS and DevOps whiteboard design session

student guide

Abstract and learning objectives

In this whiteboard design session, you will work with a group to build a solution for integrating and deploying complex Open Source Software (OSS) workloads into Azure PaaS. You will design a solution to migrate an existing MERN (MongoDB, Express.js, React.js, Node.js) stack application from a hosted environment into Azure PaaS services, migrate an existing MongoDB instance into Cosmos DB, enhance application functionality using serverless technologies, and fully embrace modern DevOps tools.

At the end of this whiteboard design session, you will be better able to design solutions for migrating OSS applications into Azure PaaS using modern DevOps methodologies.

Step 1: Review the customer case study

Outcome

Analyze your customer's needs.

Timeframe: 15 minutes

Directions: With all participants in the session, the facilitator/SME presents an overview of the customer case study along with technical tips.

1. Meet your table participants and trainer
2. Read all of the directions for steps 1–3 in the student guide
3. As a table team, review the following customer case study

Customer situation

Best For You Organics Company is one of the leading online health food suppliers in North America, serving customers in Canada, Mexico, and the United States. They launched their highly-successful e-commerce website, which sells subscriptions to their meal service, in 2016, and have been steadily increasing their subscriber-base since. Their service is tailored towards working professionals, who want convenient, reliable access to healthy meal choices, and pre-packaged recipes, without having to speed too much time preparing the meals. Customers can choose from a variety of meal plan options (vegetarian, vegan, gluten-free, high-protein, etc.), along with several options for portion sizes, and the number of meals per week. Meals are delivered weekly directly to the customer's home.

Their CIO, Holly Franklin, is a big proponent of Open Source Software, and development of their web application was done using the MERN stack (MongoDB, Express.js, React.JS, Node.js). Their code is hosted in a private GitHub repository. A point of pride for Best For You Organics Company has been their developers' involvement in the open source community, with most members of the team frequently contributing to React.js on GitHub. They currently have a continuous integration workflow, triggered by each code check-in/commit in GitHub, using Jenkins.

Their current meal plans include only dinner options, but Best For You Organics Company has received feedback from many customers expressing a desire that breakfast be included as part of the service offering. They would like to expand their meal service to include ongoing breakfast to meet this demand, but feel they first need to address their rising infrastructure costs and management time. They have reached a point where managing their VM and server infrastructure is becoming a real challenge, and are interested in understanding more about Platform as a Service (PaaS) solutions for OSS applications that could help them focus their expenditures and efforts on their core business, rather than infrastructure. "We're finding that with every upgrade, we're spending more time and money on infrastructure, and less on delivering the functionality and features that matter most to our customers," says Holly Franklin, "and we need to rebalance those efforts." The development team at Best For You Organics has some experience with Docker, and is interested in what options might be available for using containers to deploy their application into a cloud environment.

Another feature she is interested in learning more about is identity management. Their existing web app requires users to register, and log in before subscribing to a meal plan. Today, this is handled via a home-grown solution that stores user names and passwords in the same database used for storing application information. They have experimented with other third-party solutions in the past, but found them difficult to integrate into their application, and are curious if moving their application into a cloud PaaS platform could help them integrate a better solution.

For their migration to the cloud, they have indicated that they would like to reuse as much code and architecture as possible. "We want the migration to be non-invasive. Although the existing code has its nuances and issues, we do not want to redesign the entire solution to migrate to the cloud. We want to be as efficient as possible with time and cost." Additionally, they want to continue using MongoDB APIs for data storage, to avoid having to rewrite application data access code, but don't want to worry about managing infrastructure, consistency, replication, etc.

The development team has also expressed that they would like to continue using GitHub as their code repository, but is interested in improving upon their DevOps pipeline. They currently use Jenkins for their builds and are interested in any tools available in a cloud offering that could help with release management, or other aspects of a fully-integrated, modern DevOps pipeline. Ultimately, their goal is to automate and simplify deployments through CI/CD capabilities, and deliver updates faster and more reliably.

They have also expressed interest in gaining a better understanding of how serverless architecture could be leveraged to help their business grow. They have several processes that they are considering adding to their workflow, which they feel would be good candidates for a serverless approach, but are not sure which technologies and tools are right for the job. First, they would like to see if they can automate their daily order processing, queuing up the orders that need to go out each day, and updating their database when the orders have completed processing and been shipped. Next, they would like to put functionality in place to send customers an SMS text message when their credit card has been charged, and when their weekly meal delivery has been shipped.

Best For You Organics is optimistic about the benefits of moving to a PaaS solution, but very concerned about the time and potential changes which might be required to accommodate the transition for an OSS application.

Customer needs

1. Wants to migrate as much of their infrastructure as possible to the cloud to make it easier to take advantage of the scalability, reliability, and performance of a PaaS solution, and reduce the burden of building out and managing hardware and software.
2. Would like to reuse as much of their existing code and architecture as possible.
    - They want the migration to be non-invasive. Although the existing code has its nuances and issues, we do not want to redesign the entire solution to migrate to the cloud.
    - Would like to continue using MongoDB APIs for data storage, to avoid having to rewrite application data access code, but don't want to worry about managing infrastructure, consistency, replication, etc.
3. Want to continue to use their GitHub repository for source control, and Jenkins for their builds, but are interested in any value-added functionality available in Azure which improve their ability to rapidly build, test, and deploy application updates, through automated and simplified deployments using continuous Integration/continuous delivery (CI/CD) capabilities.
4. Want to maintain a dedication to open source technologies, and maintain those same technologies within the cloud solution, while taking advantage of integrations with the cloud environment, where possible.
5. Looking for opportunities to integrate automated, serverless processes, specifically around their order processing and SMS notifications to customers.
6. Desire a replacement solution for safeguarding and managing user identities.
7. Add search capabilities to their application, providing the ability for customers to find meals or options.

Customer objections

1. Is Azure an appropriate platform for hosting an OSS application using PaaS?
2. We're interested in using containers, but we're not sure how they work in Azure. Does Azure provide reliable ways to deploy and manage containers? What is the simplest way to move containers to Azure, based on our PaaS experience, while at the same time considering our scale and growth requirements?
3. We would like to improve our current DevOps workflow. What options are available in Azure? Can we implement a CI/CD pipeline? Can we continue to use Jenkins? Does Azure offer any value-added services which we can leverage in our existing Jenkins CI pipeline?
4. We've heard about Azure Active Directory B2C (Azure AD B2C) to manage application users, but we are not sure how that would work with our open source application.
5. Is Azure Search an appropriate solution for improving the search capabilities of our OSS app?
6. Will we be able to continue using the MongoDB API, while benefiting from the scalability and reliability of a PaaS database platform?
7. We would like to understand more about the benefits of a serverless architecture. In Azure does it mean only using Azure Functions or is there more to it?
8. We've read that Visual Studio Code is a free, open source code editor that can be used for OSS development. Can our developers continue to use their IDE, or do they need to switch over to using Visual Studio Code to write code destined for the Azure platform? Does Visual Studio Code offer any features or integration capabilities that would make it advantageous over a non-Microsoft code editor?

Infographic for common scenarios

Step 2: Design a proof of concept solution

Outcome Design a solution and prepare to present the solution to the target customer audience in a 15-minute chalk-talk format.

Timeframe: 60 minutes

Business needs

Directions: With all participants at your table, answer the following questions and list the answers on a flip chart.

1. Who should you present this solution to? Who is your target customer audience? Who are the decision makers?
2. What customer business needs do you need to address with your solution?

Design Directions: With all participants at your table, respond to the following questions on a flip chart.

High-level architecture

1. Without getting into the details, (the following sections will address the details), diagram your initial vision for handling the top-level requirements for the OSS app migration, serverless architecture integration, search integration, Azure AD B2C implementation, and DevOps pipeline. You will refine this diagram as you proceed.

PaaS Solution

1. What PaaS solution would you propose to Best For You Organics Company for moving their application into Azure? Will this solution minimize the number of application code changes required to migrate the application? How with container orchestration be handled?
2. What options does the customer have for a Docker image registry? What option you would recommend?

Database migration

1. What service would you recommend for hosting the customer's MongoDB in Azure, and ensuring they can continue to use the MongoDB API for accessing their data?
2. What application changes need to be made to accommodate using a Cosmos DB database with MongoDB API? Be specific about the impact of the change on their application code.
3. How would you handle importing their existing data into Azure Cosmos DB? What factors do you need to consider when doing the import?

Serverless architecture

1. What serverless technologies would you recommend Best For You Organics Company use for automating their order processing?
2. How would you recommend the customer handle notifying customers that their order has been processed? Are there specific Azure services that can be used?

Identity management

1. How would you recommend Best For You Organics Company implement identity management in their customer-facing application? Be specific about both the implementation and process you would use to gain Best For You Organics Company's acceptance of the proposed solution.

Search integration

1. How could Azure Search be integrated into the OSS application?

DevOps workflows

1. How can Jenkins be used to help the customer create a full CI/CD pipeline?

Prepare

Directions: With all participants at your table:

1. Identify any customer needs that are not addressed with the proposed solution
2. Identify the benefits of your solution
3. Determine how you will respond to the customer's objections

Prepare a 15-minute chalk-talk style presentation to the customer.

Step 3: Present the solution

Outcome

Present a solution to the target customer audience in a 15-minute chalk-talk format.

Timeframe: 30 minutes

Presentation

Directions:

1. Pair with another table
2. One table is the Microsoft team and the other table is the customer
3. The Microsoft team presents their proposed solution to the customer
4. The customer makes one of the objections from the list of objections
5. The Microsoft team responds to the objection
6. The customer team gives feedback to the Microsoft team
7. Tables switch roles and repeat Steps 2–6

Wrap-up

Timeframe: 15 minutes

Directions: Tables reconvene with the larger group to hear the facilitator/SME share the preferred solution for

the case study.

Additional references

Description	Links
Azure Cosmos DB API for MongoDB	**https://docs.microsoft.com/azure/cosmos-db/mongodb-introduction/**
Import MongoDB data into Cosmos DB	**https://docs.microsoft.com/en-us/azure/cosmos-db/mongodb-migrate/**
Azure Container Registry	**https://azure.microsoft.comservices/container-registry**
Azure functions	**https://docs.microsoft.com/azure/azure-functions**
Logic Apps	**https://docs.microsoft.com/azure/logic-apps/logic-apps-what-are-logic-apps**
Azure AD B2C	**https://docs.microsoft.com/azure/active-directory-b2c/active-directory-b2c-overview**
Cosmos DB	**https://docs.microsoft.com/azure/cosmos-db**
Deploy to Azure App Service using Jenkins plugin	**https://docs.microsoft.com/azure/jenkins/deploy-jenkins-app-service-plugin**
Create Jenkins server in Azure	**https://docs.microsoft.com/en-us/azure/jenkins/install-jenkins-solution-template**
Azure Search in Node.js	**https://docs.microsoft.com/azure/search/search-get-started-nodejs**
Visual Studio (VS) cCode for OSS	**https://code.visualstudio.com/docs/nodejs/reactjs-tutorial**
Web App for containers	**https://azure.microsoft.com/blog/webapp-for-containers-overview/**