



boxboat
technologies



kubernetes



Azure

APPLICATION INNOVATION WITH AKS/ AZURE ARC

PRESENTED BY: BOXBOAT TECHNOLOGIES, LLC

BETHESDA, MD

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INTRODUCTION

THE SERVICE

The Application Innovation Accelerator with AKS/Azure Arc ("Service") is a professional services package comprised of:

1. The guided setup of a single functional Azure Kubernetes Service (AKS) or Azure Arc enabled cluster for hybrid or multi-cloud configuration
2. Assistance with containerizing a traditional Windows or Linux application and deploying it to the Kubernetes cluster
3. Integration with GitHub Actions or any other CI/CD tools being used in Customer's Environment and
4. Follow up weekly check-in calls.

The Service does Not include:

1. Disaster recovery configuration
2. Performance and load testing

BoxBoat provides expert implementation services for the container ecosystem. Our Certified Kubernetes Administrators, open source contributors, and Docker Captains are skilled at developing scalable microservices using best practice containerization and CI/CD. We have extensive enterprise experience with Kubernetes, Terraform, GitLab, Ansible, and many other solutions needed to drive a cloud-native architecture.



1 BOXBOAT APPLICATION INNOVATION SERVICES

1.1 READINESS PHASE

During the Readiness Phase, BoxBoat will review infrastructure in which the cluster will be deployed, candidate Applications, and will provide Customer with basic product knowledge on AKS or Azure Arc.

A. Applications. BoxBoat will work with Customer to review Applications as candidates for migration. Customer shall select three Applications, ranked by preference. BoxBoat will assist Customer in the migration of a single Application during the Application Modernization Phase, however the remaining Applications shall serve as ‘fallbacks’ should BoxBoat and Customer run into unforeseen difficulties in the migration. An Application may contain no more than five (5) Application Components.

B. Product Knowledge Transfer. Prior to installation and configuration, a BoxBoat solution architect will discuss cloud and Kubernetes fundamentals with Customer. The topics will include the Azure fundamentals, AKS platform details, Azure Arc for Kubernetes, Container Registries, and CI/CD overview.

1.2 PLATFORM INSTALLATION PHASE:

The Platform Installation Phase provides the design and full installation of the Kubernetes cluster including the Azure configuration, container registry setup, and the cluster provisioning. The services associated with this phase does not include support for any unit of software (such as engines, registries, etc.). This phase includes the following:

A. Azure Configuration. BoxBoat will guide Customer’s installation and configuration of the Azure subscription and resources in the target Environment which includes configuration of Azure Active Directory, Virtual Networks, Azure DNS, Log Analytics workspace, and other resources as required by Azure Kubernetes Service or Azure Arc for Kubernetes.

B. Kubernetes Cluster Provisioning. BoxBoat will provide design assistance for a Kubernetes cluster managed through Azure cloud control plane:

- I. BoxBoat will provide live installation and configuration assistance for the AKS cluster. AKS cluster provisioning includes: 1) Azure AD Configuration, 2) VNet configuration, 3) Logging Analytics Workspace, 4) TLS termination setup, and 5) NGINX Ingress Controller installation.
- II. Alternatively, BoxBoat will provide installation and configuration assistance for a Kubernetes cluster in on-premises or a secondary cloud environment integrated with Azure Arc for Kubernetes. This configuration will specifically include, 1) Cluster provisioning in customer environment, 2) Integration with Azure Monitor and Log Analytics workspace, 3) NGINX Ingress controller, 4) TLS termination through ingress-controller, 5) Basic governance configuration through Azure Policies.

C. ACR Provisioning. BoxBoat will provide design assistance for Azure Container Registry provisioning. BoxBoat will provide live installation and configuration assistance for ACR. ACR configuration includes: 1) ACR provisioning, 2) Kubernetes Integration, 3) CI/CD Integration, 4) automated house-keeping.

1.3 APPLICATION MODERNIZATION PHASE:

The Application Modernization Phase provides the identification and migration of a traditional Windows or Linux application to the Environment established during the Platform Installation Phase. BoxBoat will work with Customer to identify a suitable Application for containerization, then guide Customer through the migration. Up to three (3) Applications will be identified as appropriate for the Application Migration Phase. One of the Applications will be containerized and migrated with the remaining two to be used if, upon further investigation, the selected application is not appropriate.

A. Containerize Application Components. BoxBoat will assist Customer to 1) create a Docker image for each Application Component, 2) validate that the Application Component runs on a single node, then externalize Environment-specific configurations as runtime environment variables and secrets (e.g. connection strings, API keys, etc.)

B. Compose Application Components. BoxBoat will help Customer 1) assemble Application Components into a full Application Stack, 2) centralize logging, 3) create Docker Compose file for the Environment (e.g. development/UAT environments may include database tier, while staging/production environments may not), and 4) validate that the Application Stack runs on a single node.

C. Deploy Application Components. BoxBoat will guide Customer through 1) pushing the Application Component images to ACR, and 2) deploying composed Application to the Kubernetes cluster.

D. Application Validation and Testing. BoxBoat will assist Customer to 1) run a functional test plan, and 2) validate end-to-end deployment process.

E. Knowledge Transfer. Prior to completion of this phase, BoxBoat will review configurations, assets (e.g., Dockerfile, docker-compose, manifests, bootstrap scripts), commands, and general information on how to deploy the application onto the Kubernetes cluster.

1.4 PIPELINE INTEGRATION PHASE:

The Pipeline Integration Phase provides for either the integration of an existing CI/CD solution with the Environment established during the Platform Installation Phase or setting up new CI/CD solutions using GitHub Actions.

A. CI/CD Integration Service account(s) are created in Kubernetes for use by the CI/CD tools. Users, Roles & Service Accounts are configured to enable authentication and authorization of the toolset to perform development pipeline functions (e.g. docker build/tag/push and kubernetes deployment commands).

B. Build Pipeline Configuration Creation and testing of build pipeline scripts to facilitate pulling code from a repository and subsequently building app artifacts for containerization. Tag & push docker image to ACR repository. Use kubernetes deployment manifests or templated charts to deploy application stack.

C. Build Promotion Integrate build pipeline to code repository using post-commit hooks to initiate execution of pipeline scripts based on app code commits. Configure pipeline to deploy the app stack to relevant Kubernetes cluster based on build stage (e.g. dev, qa, prod).

1.5 CLOSEOUT PHASE

The Closeout Phase provides Customer a number of checkpoints after the Application Modernization Phase.

Knowledge Transfer. BoxBoat will host a final knowledge session up to two (2) hours in duration to transfer any additional verbal description of customer environment, to discuss Customer's status, and to provide any additional best practice guidance around the use of the cloud native platform.

Project Completion Project completion is defined as the successful realization of all phases outlined in this document (Readiness Phase through Closeout Phase). Upon completion of the Closeout Phase, BoxBoat will provide a Project Summary package which includes the following documents:

- Architectural Diagram of the Azure/Kubernetes Platform as configured for the Customer's environment
 - Nodes (host names, IP addresses, roles)
 - Load balancers (IP addresses, DNS, TLS)
 - Networking (firewalls, proxy servers, DNS, TLS)
- Summary of work completed
 - AKS or Azure Arc for Kubernetes configuration (AAD, RBAC, namespaces, NGINX Ingress)
 - ACR configuration (replication, housekeeping, permissions)
 - CI/CD pipeline integration (build scripts, code repository web hooks, service accounts)
 - Application containerization (Dockerfiles, compose files, gMSA, kubernetes manifests, external dependencies)

1.6 DEFINITIONS

- A.** “Application” means a container-compatible, custom server-side application based on Java or .NET frameworks, more specifically, the selected application should conform to the following:
- a. Simple 2-tier application using the following middleware and frameworks:
 - b. .NET Framework 4 (or higher), capable of running on Windows Server 2016 or higher
 - c. Java 1.6 or 6 (or higher)
 - d. Internet Information Services (IIS) or Tomcat
 - e. Limited or no security requirements
 - f. Limited or no performance requirements
 - g. Limited or no High Availability requirements
 - h. No existing testing or deployment automation
 - i. Full access to application source code, documentation and the application’s development team
 - j. No need for application refactoring for components to functionally operate within a container
- B.** “Application Component” means an application tier or part of application with an independent runtime requiring an independent container
- C.** “Application Stack” means a composition of containerized Application Components to make up a complete Application, not including databases.
- D.** “Azure Kubernetes Service” or “AKS” means Azure’s managed kubernetes offering
- E.** “Azure Container Registry” or “ACR” means Azure’s container registry
- F.** “Environment” means the deployment destination through each step of the Application lifecycle (e.g. development, testing, staging, production).
- G.** “CI/CD” means Continuous Integration and Continuous Deployment of software throughout the build environment(s).

2 ESTIMATED SCHEDULE AND LEVEL OF EFFORT

The Service is provided for a fee of \$45,000 USD (excluding travel and related expenses) which include a maximum of 180 hours of professional services resource usage.

BoxBoat will use commercially reasonable efforts to complete the Service within the timeline provided above. However, in the event Customer selects an application that requires more than 64 hours of effort by BoxBoat during the Application Modernization Phase or 48 hours during the Pipeline Integration Phase, then a Project Change Request (PCR) may be executed in order to provide additional professional services hours.

The Service is delivered both remotely through web and video conference and onsite as set forth below:

Phase	Location
1. Readiness Phase	Remote
2. Platform Installation Phase	Remote
3. Application Modernization Phase	Remote or Onsite
4. Pipeline Integration Phase	Remote or Onsite
5. Closeout Phase	Remote

3 ESTIMATED CHARGES

BoxBoat proposes to perform this effort on a time and materials basis as described in the table below:

Description	Hours	Price
BoxBoat Docker Services	Up to 180 hours of professional services	\$45,000.00
Total		\$45,000.00

* Travel and living expenses additional