# Migrating a U.S. Army application to the cloud

"The Army stands to gain from a leaner infrastructure, fewer systems and greater economies of scale.

… Cloud migration can present numerous challenges. Investing in phase-driven migration enabled us to see real value in the TAMIS proof-of-concept."

–Bob Torche, U.S. Army G-3/5/7

**HPE contacts**

**Bill Link, PMP®**
Principal, Application Practice, HPE

**Ryan Hancock, CSM**
Technical lead, Application Practice, HPE

## Aligning with DoD's cloud strategy

The Department of Defense (DoD) is making a strategic move of its mission support applications (apps) to the cloud. Cloud service providers (CSPs) include internal DoD providers such as the Defense Information Systems Agency's (DISA's) milCloud, and certified commercial providers, including Amazon Web Services (AWS) GovCloud. In working with the U.S. Army on a pilot program, Hewlett Packard Enterprise (HPE) showcased a successful application migration process and demonstrated the resiliency of apps in the AWS GovCloud.

## Building on a long partnership

In August 2014, DISA granted AWS provisional authority to operate its GovCloud under DoD Cloud Security Reference Guide (SRG) at Impact Levels 4/5, which supports handling "controlled unclassified information." The AWS GovCloud, an isolated region specifically for U.S. government customers, became the first commercial cloud provider authorized to achieve this certification.

With this certification process in place, and commercial CSPs becoming certified, the Army will migrate many of its key applications into the cloud. To do this, the Army turned to HPE for assistance with a pilot application move to the AWS GovCloud. Hewlett Packard Enterprise and the Army have collaborated for more than 25 years, delivering IT innovation and advanced capabilities to ensure the Army achieves its mission. One of the key applications HPE supports is the Total Ammunition Management Information System (TAMIS). TAMIS is a mission-critical, web-enabled application that manages the U.S. Army Ammunition Requirements process. Soldiers use it to forecast their ammunition requirements for training and testing operations, and to request and receive wartime ammunition worldwide.

TAMIS was selected as a pilot application to move to the AWS GovCloud and enlisted Hewlett Packard Enterprise to migrate the TAMIS training environment as a proof-of-concept. HPE was tasked with showing that an army application can move successfully to the GovCloud. Through this proof-of-concept, the Army also wanted to develop a repeatable deployment pattern for future app movements to the cloud.

## Executing the migration process

The training environment migration had a six-month deadline to perform the work. Executing the HPE Application Transformation to Cloud (AT2C) process involved three steps:

- Assessment of applications for cloud suitability

- A target architecture and migration plan/roadmap

- Transformation of the app to the cloud

**Assessment**
To get this done, Hewlett Packard Enterprise performed an Application Suitability Mapping to the Cloud Assessment, analyzing multiple mission and technical characteristics of the TAMIS application, and confirming it was suitable to migrate to the AWS GovCloud. The assessment identified technical concerns that needed to be addressed to take full advantage of cloud technologies.

## Migration plan

Following the assessment, HPE developed a migration plan and established a roadmap to minimize risk and get TAMIS operational as soon as possible. The plan included two major phases:

- The forklift phase migrated the TAMIS training environment from its legacy environment to AWS to prove it could run in the AWS GovCloud; use basic cloud services—virtual private cloud, elastic cloud compute , elastic block storage, and simple storage service ; and provide an opportunity to turn off the legacy TAMIS training environment.

- The optimization phase resolved concerns identified in the assessment and improved the applications ability to take advantage of cloud capabilities and the AWS pricing model.

## Transformation

Configuring the target environment began in October 2014, with the goal of migrating the TAMIS application as-is—minimizing additional rework, and replicating the current shared infrastructure of firewalls and the network. After configuring the new environment, building out servers, and conducting rigorous testing, Hewlett Packard Enterprise successfully moved the TAMIS training environment on November 14, 2014.

Having successfully migrated it to the AWS GovCloud, HPE refactored/rearchitected the application by completing the following optimizations.

- Database tier optimization included building out a high-availability SQL server configuration. This supports high availability, continuity of operations, and disaster recovery requirements, and provides a fully synchronized read replica for reporting.

- Application tier optimization included moving user sessions from application servers to the AWS regional service Dynamo database for session management, automation for starting servers, and auto scaling groups to add or remove servers based on use.

- The configuration uses elastic load balancing to manage traffic and workloads across multiple availability zones to support high availability and disaster recovery requirements.

- Optimization at the architecture's application and data tiers supports efficient use of compute and storage capacity to take advantage of the AWS "pay-as-you go" consumption pricing model.

- The design, documentation, and testing of the TAMIS training environment supports implementation, testing, certification, and accreditation of the TAMIS production environment at DoD SRG Impact Level 5.

## The DevOps method

Due to frequent DoD command stakeholders' requirements changes, the team implemented a new approach to improve the development/test cycles and improve release time to production, including:

- End to-end automation of the DevOps life cycle using the Microsoft® stack including Team Foundation Server

- Two-week sprints using Agile Scrum

- Continuous delivery best practices

- Automated testing using HPE Unified Functional Test, HPE Load Runner, and Microsoft Test Manager

- Capture and reporting of Agile Scrum metrics

## Setting the stage for future success

The Army and Hewlett Packard Enterprise successfully migrated the TAMIS training environment to the AWS GovCloud, and in the process, learned some key lessons for future migrations. Defense agencies moving apps to AWS can balance cost versus performance by taking advantage of the elastic features of the cloud environment. For example, the base infrastructure should be deployed on "reserved" resources, and the flexible infrastructure deployed as "on-demand," paying for higher-priced, on-demand resources only when used. In addition, AWS provides the capability to implement a hardened infrastructure, but the deployment must follow the correct procedures for dedicated resources, network and security configurations, and privileged user access to actually implement it in a manner compatible with the SRG requirements.

Learn more at
**hpe.com/gov/transformation**

**Hewlett Packard Enterprise**