

APPLYING TECHNOLOGY. AMPLIFYING RESULTS.

# Client

United States Citizenship and Immigration Services (USCIS)

#### At a Glance

The mission-critical National File Tracking System (NFTS) application allows centralized tracking, logging, and access for more than 100 million paper-based immigration files. The modernization of the application architecture to a loosely coupled microservices architecture using open source tools and a modern software stack would lead to cost and application efficiencies.

### TWD's Role

USCIS partnered with TWD for the highly visible NFTS migration from the DHS data center to the AWS cloud. TWD applied its experience, Agile methodologies, and certified expertise in AWS and the latest technologies. This ensured a low risk migration of the application and compatibility with NFTS's many interfacing applications.

### Impact

The successful migration of USCIS's large-scale, NFTS application delivers on the anticipated cloud-based benefits and sets the stage for future modernization.

## TWD CASE STUDY

# A Highly Visible Migration Sets the Stage for Modernization in the Cloud

### Overview

The United States Citizenship and Immigration Services (USCIS) is the Component of the Department of Homeland Security (DHS) that oversees lawful immigration into the United States. USCIS is responsible for administering and processing applications for all immigrant and non-immigrant benefits.

The USCIS Records Division stores the more than one hundred million existing paperbased immigration files – which include case data and records vital to the USCIS mission – in 150 File Control Offices (FCOs) worldwide, co-located with two other DHS Components: Customs and Border Protection (CBP) and Immigration and Customs Enforcement (ICE).

To ensure the proper handling and monitoring of these files, USCIS created the National File Tracking System (NFTS), a web-based application that allows DHS to track and log file movement in a centralized database, and that provides timely and accurate access to the physical location of each file. NFTS is mission-critical to USCIS and to millions of immigrants worldwide. More than 22,000 users rely on the application, which provides role-based access to confidential data from many different sources and systems. This access is accomplished through a series of complex, dependent interfacing applications that enable data look-ups and reporting, application status tracking, and information-sharing for users within USCIS and government-wide.

NFTS is a monolithic application built on the Microsoft .NET framework. Its tightly coupled application architecture required extended testing for new releases and updates to identify any cascading effects due to changes. In addition to maintaining a legacy application, the hosting and infrastructure management cost added to the total cost of ownership. The modernization of the application architecture to a loosely coupled microservices architecture using open source tools and a modern software stack would lead to cost and application efficiencies.





# Planning and support are integral to the success of any migration project.

USCIS partnered with TWD & Associates for the highly visible NFTS migration to the Amazon Web Services (AWS) cloud – a move that, if successful, would produce substantial cost savings and flexibility for USCIS for its mission-critical application, serve as a blueprint for future migrations, and provide a launching point for modernization.

## The Solution

The execution of a seamless transition of NFTS to AWS required unprecedented collaboration of multiple functional teams and an exceptional approach to AWS GovCloud migration. Extensive analysis was needed to determine the requirements and unique challenges of the complex NFTS legacy system, including potential compatibility issues and testing/scheduling dependencies associated with the many interfacing legacy applications.

Objectives for the completed migration included maintaining 100 percent data integrity and ensuring no significant degradation in performance. The architecture in the AWS cloud would closely mimic that of the DHS data center.

For the production build, the TWD-USCIS team followed an Agile, iterative approach for the migration in order to minimize risk and enable rapid delivery of business value. The team created six different environments in AWS to work with each development/ release phase: Development, Formal Qualification Testing (FQT), Integration, Staging, Production, and Training.

The infrastructure hosts web servers and Oracle databases on AWS Elastic Compute Cloud (EC2) servers in two different AWS

Availability Zones. Elastic load balancers route application traffic through multiple servers, resulting in efficient load handling and tolerance for server failure. The result is a highly durable available infrastructure and fault tolerant application. Testing was carried out in all phases of the project – a highly coordinated effort among the many NFTS users and stakeholders that included government as well as contractors. A variety of tests on the new AWS NFTS and the external interfaces validated security, connectivity, functionality, and performance during staging and production.

The production cutover was achieved with zero production-hour downtime. The dedicated group of project team members – which included multiple contractors and government stakeholders – worked tirelessly throughout the final 48-hour release toward project closeout to ensure that all functionality was operational on the NFTS application in the AWS cloud. Critical post-migration software testing included build verification and core functionality tests with the user community and interfacing applications.

The TWD-USCIS team continues to monitor and support the NFTS application during stabilization, and uses tools including Amazon CloudWatch and AWS CloudTrail to help identify and address issues quickly, mitigating problems before they cause disruption.

## **The Results**

The TWD-USCIS team accomplished the planning and migration of the large-scale NFTS application successfully from the DHS data center to the AWS cloud in just nine months. The team delivered on the objectives of maintaining 100 percent data integrity and end-user performance and functionality, with zero productionhour downtime. The cost savings to USCIS as a result of the migration are substantial, and AWS offers the anticipated cloudbased benefits of scalability, accessibility, flexibility, and assured 99.99 percent availability.

Now that NFTS is under direct control of USCIS in the AWS cloud, the system is well-positioned for the next phase of Agile-based modernization – an effort that would have been difficult in the highly regulated, limited physical space of the DHS data center. Since the migration, USCIS already is deriving benefits from continuous improvements of the NFTS application that include simplified processes, improved interface with other applications, and other usability enhancements. The team also conducted a constructive "lessons learned" review of the NFTS migration which will used to inform future projects.

In addition to well-earned praise from stakeholders and management, the formal recognition of the USCIS Agile Award to the NFTS Delivery Team a month after the production cutover confirmed that the TWD-USCIS team not only met the project expectations, but exceeded them, "exemplify[ing] what USCIS wants to see in Agile projects."

For more information about TWD's services, visit our website **www.twd.com** or call **(703) 341-4024**. © Copyright 2017 TWD & Associates, Inc. All rights reserved. NFTS-E0917A