

# Migrating Mission Critical Applications To The Cloud

## BACKGROUND

The General Services Administration (GSA), comprised of more than 10,000 federal civilian employees and an operating budget of more than \$25 billion, manages procurement and acquisitions for the federal government, supplying products and office space to federal employees and developing cost minimizing processes that are used across the federal government. Within GSA, Public Building Services (PBS) manages a real estate portfolio comprised of more than 370 million square feet of space. PBS is responsible for design, construction, maintenance and renovation of more than 9,500 assets that support more than 1.1 million federal employees across the United States and US territories.

PBS implemented an enterprise-wide, commercial off the shelf (COTS) suite of tools, called Electronic Project Management (ePM), to manage both large capital projects (budget in excess of \$2.7M) and small projects (budget lower than \$2.7M) to meet the management, reporting and oversight requirements that accompanied ARRA funding. ePM was deployed into a government-owned, contractor-operated (GOCO) datacenter in 2010. At that time, ePM supported 1,800 users managing over 575 projects. Over the following four years, ePM was extended to include custom-developed features integrated with the COTS suite of tools and grew to support more than 3,000 users managing more than 20,000 projects.

## ABOUT RED RIVER

Red River brings together the ideal combination of talent, partners and products to disrupt the status quo in technology and drive success for business and government in ways previously unattainable. Red River serves organizations well beyond traditional technology integration, bringing more than 20 years of experience and mission-critical expertise in security, networking, analytics, collaboration, mobility and cloud solutions.

Learn more at [redriver.com](http://redriver.com).

## CHALLENGE

ePM grew in size and scope and quickly became the largest-scale implementation of an underlying COTS software suite. Custom features that were previously developed with proprietary software tools did not support interoperability with newer technology platforms and caused system instability. The growth of the project databases further contributed to system instability and performance degradation, which was also accompanied by security issues and end of life for Windows Server 2003.

Additionally, resolving the technical and security issues in the GOCO required significant expenses for both a hardware and software refresh, including transitioning from 32 to 64-bit servers, migrating off the dated Windows Server 2003 and setting the stage for integration requirements with newer technologies and security features.

## SOLUTION

Red River was awarded a five-year contract in 2013 to migrate ePM to a new hosting environment, provide operations and maintenance and develop new features. Red River's team includes software engineers with extensive expertise in the underlying COTS software suite, experienced infrastructure engineers and certified information security professionals.

The team pursued an aggressive schedule to stabilize the core ePM application to the extent possible in the GOCO environment, parallel to designing and implementing a secure architecture hosting development, testing, training and production environments in the



Amazon Web Services (AWS) GovCloud (US). AWS GovCloud was chosen by Red River for both its existing FedRAMP agency authorization, which could be leveraged to speed the security assessment process, and for offering the most mature and scalable cloud infrastructure available at a competitive price point. The ePM environments were architected to maximize system performance and maintain integrity across both production and non-production environments.

Engineering includes a layered security implementation, properly tuned Elastic Cloud Compute (EC2) instance sizes to improve performance and promote vertical scalability while controlling cost, Elastic Block Storage (EBS) volumes to provide large-scale storage capacity and Simple Storage Solution (S3) for internal logging and event files. The solution was engineered using Elastic Load Balancing (ELB) to automatically route traffic across virtual machines and improve horizontal scalability. Simple Email Service (SES) was leveraged to provide high quality deliverability and monitoring for application and system emails. CloudWatch metrics combined with Simple Notification Service (SNS) were used to help monitor the health of the infrastructure, and CloudFormation templates were developed to help initially provision the downstream application environments.

During the User Acceptance Test (UAT) process, the team established virtual desktop environments using AWS Workspaces. This allowed testers to replicate the standard GSA environment (Windows 7, Office 2010, etc.) without being issued government furnished equipment. Workspaces offered a low cost solution to procuring dedicated machines and provided an environment to seamlessly and securely test ePM performance in a simulated GSA desktop environment.

Red River migrated more than 2 terabytes in datasets from the GOCO environment to a staging server in AWS GovCloud via a secure Virtual Private Network (VPN) connection established in collaboration with the GSA Network Operations Team. Automated data integrity and validation methods were developed and used to verify and validate data, databases and files for the 19,000 projects transferred in the initial synchronization. Incremental data synchs were used to update the data in AWS GovCloud — significantly reducing service downtime during the final migration cutover. After the data migration, the persistent VPN connection maintained a valuable access pathway for other GSA systems to connect to for Business Intelligence reporting.

## RESULTS

ePM has maintained 99.9987% service uptime and availability since production launch in February of 2017. Users have reported that the system has been more stable and responsive since migrating onto GovCloud. Caching and reporting speeds have improved, and overall user satisfaction has been positive. Migrating out of the legacy data center has reduced the overall infrastructure hosting costs. The government avoided a sizeable investment to procure new hardware and software to upgrade the legacy production environment to support an ePM platform update. These savings have been reinvested into enhancements to improve the user interface and deliver a better ePM user experience.

Additionally, the overall security posture has been improved following a comprehensive assessment and authorization at the FISMA Moderate level. Because the platform is no longer bound to the legacy physical infrastructure, Red River can automate and streamline the patching and updating process to reduce the overall labor footprint while ensuring compliance with FedRAMP and other government information security policies.

Moving onto GovCloud has also enabled the government to begin the transition to an SLA based contracting model. The legacy production environment was unable to provide meaningful metrics to manage system performance. Red River is currently moving towards an Agile approach to promote more rapid deployment of new functionality. The team has improved and standardized the release management process, so fixes are deployed in a seamless and repeatable manner.

