System IT Board Report

September, 2021

Application Containerization

System Information Technology currently supports over 650 virtual servers as a part of our enterprise systems. In order to reduce the workload on the infrastructure and staff, System IT has started to implement a containerization strategy. Containerization is the packaging together of software code with all its necessary components, like libraries, frameworks, and other dependencies so that they are isolated in their own "container." This is so that the software or application within the container can be moved and run consistently in any environment and on any infrastructure, independent of that environment or infrastructure's operating system. The container acts as a kind of bubble or a computing environment surrounding the application and keeping it independent of its surroundings. It's basically a fully functional and portable computing environment.

The benefits of containerization are portability, lightweight, scalability, rapid deployment and security.

- Containers are portable by design. They follow a common design specification that allows the container to be deployed across a variety of environments, from self-hosted to cloud based. CCCS software running within containers will help enable easier transition between our existing on-site hosting to cloud-based solutions such as Amazon AWS or Google.

- The lightweight characteristic of containers, by sharing operating system resources, allows for a reduced workload, driving higher server efficiencies and reducing costs.

- Containers scale up and down as workloads increase or decrease. Allowing for a minimal footprint when demand is low. Helping to keep cost down for both on-site and cloud hosting while providing a responsive user experience.

- Containers speed up the software development process by allowing rapid and easy deployment of software builds to the container platform. Automatic triggers and build pipelines reduce administration overhead of the build process and provide developers with an easy path to test new or updated code.

- Containers increase application security by using hardened base images and following the principle of minimal installation. Container images are also stored in an image repository where they are regularly scanned for security vulnerabilities and issues.

Disaster Recovery and Business Continuity is a core consideration for any System IT project. Our container cluster will span both CCCS datacenters with the new virtualization hardware, allowing us to dynamically create new containers at either datacenter as needed. Workloads

can be seamlessly migrated ahead of planned downtimes or quickly spun up at the other datacenter in cases of unexpected datacenter outages. Fully automated integration with system load balancers directs users to available applications as the underlying infrastructure changes.

System IT has containerized a significant portion of the Banner ERP application in the development environment and is currently working on containerizing the Degreeworks application. System IT has deployed 115 unique containers to support these applications. This containerization strategy has already provided several benefits including reducing the number of virtual servers needed for the development environment by 30%, reducing staff time needed for patching and server maintenance, and will increase developer efficiency for the upcoming Banner 9 Self-service project.