2023 INTERNET2
TECHNOLOGY
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How to Support and Run a Customized ERP in AWS

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Agenda

- What is the ERP?

- Who supports the ERP?

- What does the Agile process look like?

- What is the technology stack to build the ERP?

- What is the technology stack to host the ERP?

What is the ERP

- Kuali Financials System (KFS)
  - https://www.kuali.co/
  - Vendor releases patches weekly
  - J2EE Web Application
    - Java Servlets
    - JSPs and Tag front end
- Cornell customization of KFS as Maven overlay
- Relational Database
 - Oracle

Who Supports the ERP

Core Team

- IT Staff
  - 1 Tech Team manager
  - 4.5 Software Developers
  - 2.5 Devops Engineers
  - 1 Authorization / Configuration Analyst
- Functional Staff
  - 3 Functional Leads

Other Interested Parties

- Cornell Finance Module Leads
- Cornell DBAs
- Cornell IT Leadership
- Cornell Finance Leadership
- KualiCo
- Amazon Web Services Support
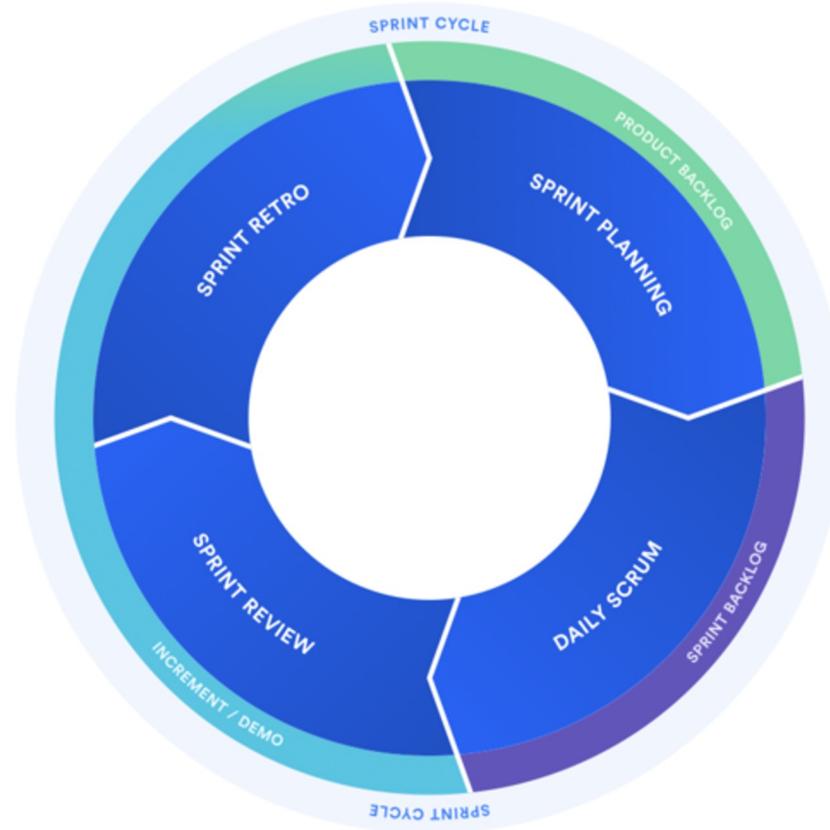 - Shared responsibility model

AWS Shared Responsibility Model
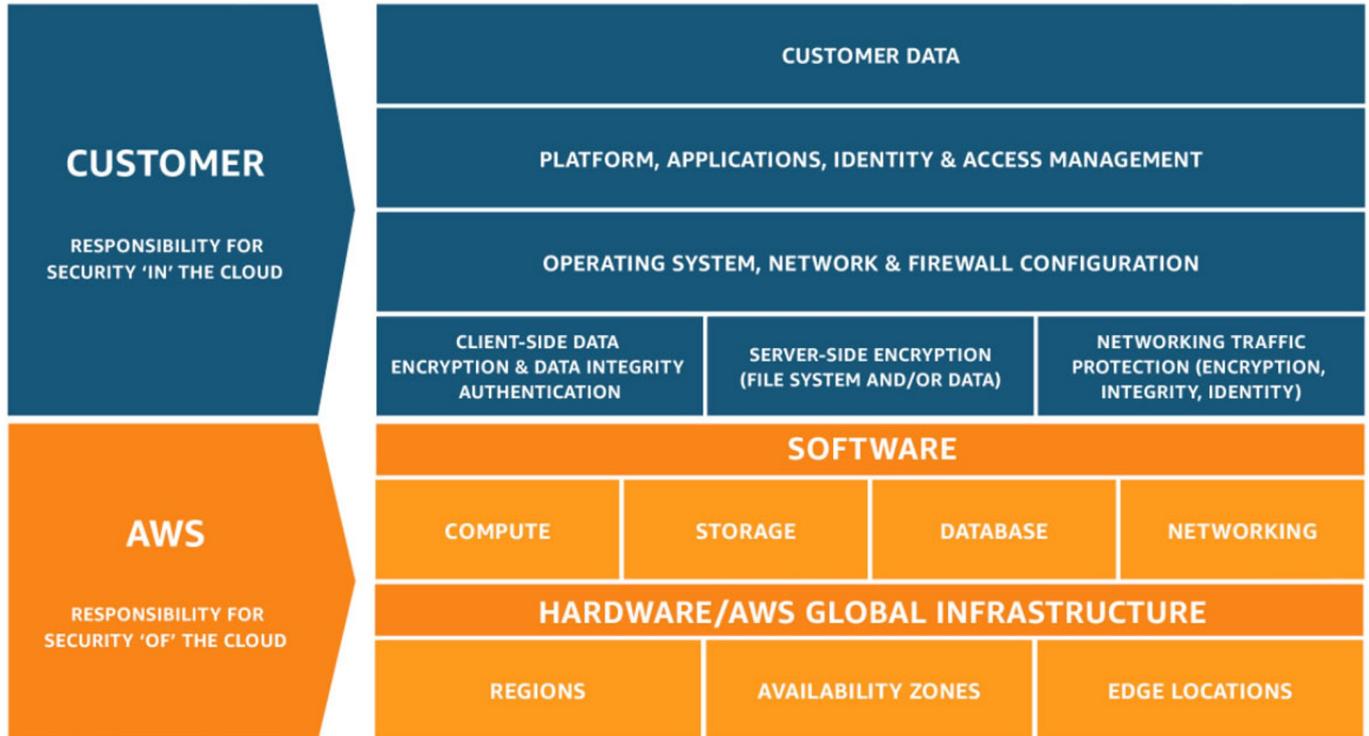
Agile Process

Agile Overview

Agile Process

- General backlog of change requests - Jira
- Weekly review of backlog
  - Verify tickets have enough details for it to be implemented
  - Prioritize tickets into upcoming sprints
- Two week Sprint
  - Sprint planning to start
    - Core team agrees a sprint is ready to begin
    - Add granular sub tasks to tickets to support Agile process
  - Daily standups
    - 20 minute review of all tickets in progress
  - Sprint retro to close out a sprint
    - Lessons learned review
  - Release to production the following Sunday morning
    - Developer, Devops, and a DBA participate in the process

Agile Process - What goes into a Sprint

- Update CU Overlay to new version of vendor base code
    - We aim to be 1 month behind the most recent release from the vendor
    - We typically try to bring in two vendor patches per sprint
- Backport of singles updates from vendor
    - Critical bug fixes
    - Add needed functionality
- Bug fixes to Cornell and Vendor Code
- Create or enhance customizations
- Create or enhance integrations
- Critical production support issues
- Infrastructure enhancements and adjustments
- Infrastructure patching
- Source code library patching
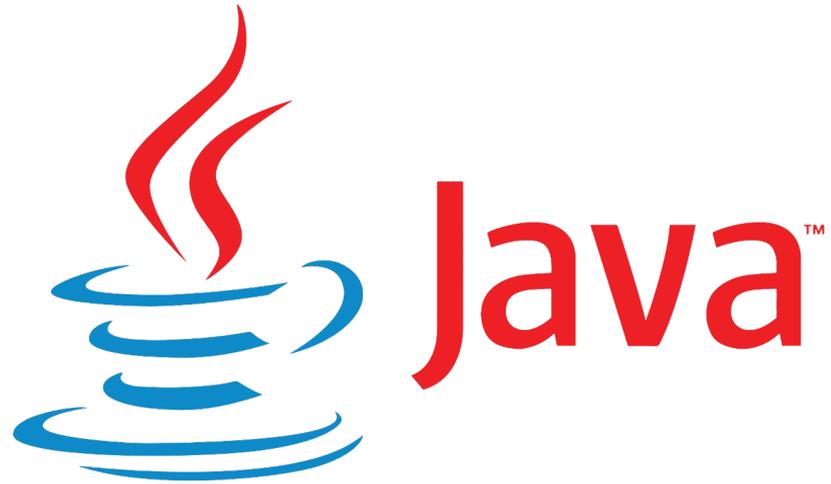
Build Process
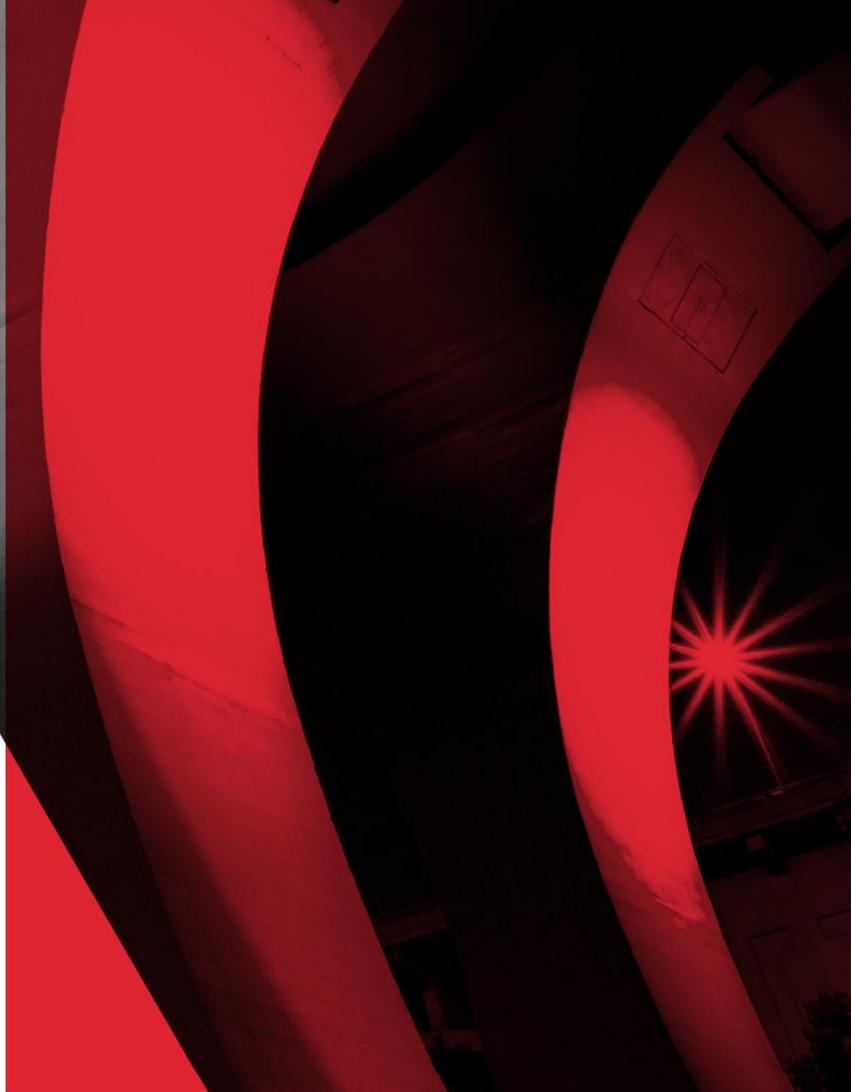
Build process - High Level

- Jenkins as build servers
- Run unit tests against a pull request
- Compile Java code to a WAR
- Build Docker images
 - Apache
  - Tomcat
  - ClamAV
  - Datadog
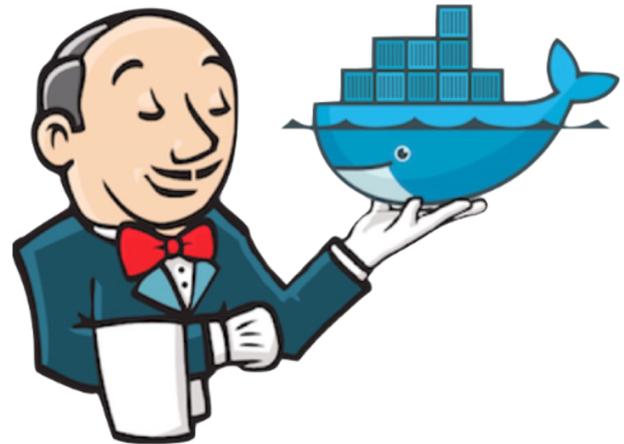
Build Process - Java

- Run unit tests against Github pull requests
- Compile Java WAR from the source code

Build Process - Docker
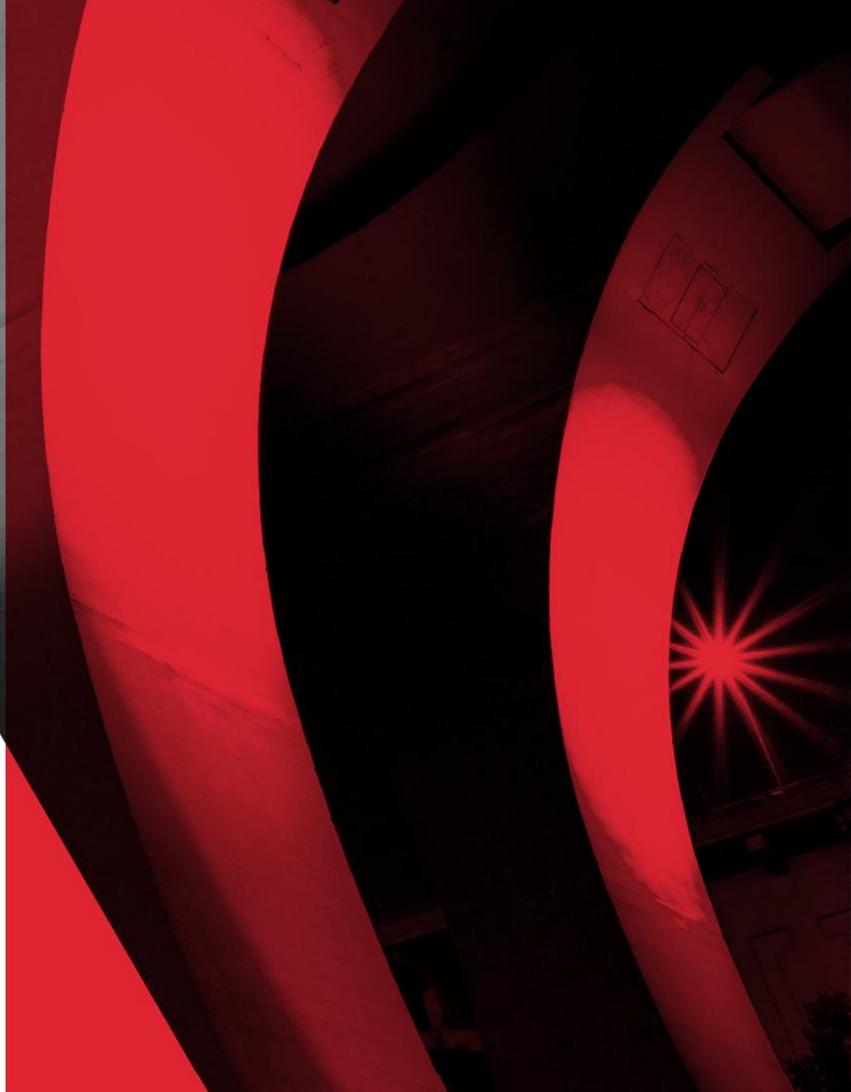
- Apache
  - Base Apache
  - Configuration files and Shiboleth certs from Puppet
- Tomcat
  - Base tomcat
  - Add WAR file
  - configuration files from Puppet
  - Passwords from AWS Secrets Manager
- ClamAV (Antivirus)
  - Base ClamAV
  - Localization configuration
  - Point to our S3 mirror for virus definitions
- Datadog (Log aggregation)
  - Base Datadog
  - Local configuration
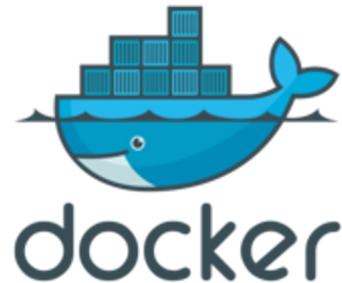
Hosting

Application hosting

- Application load balancer
- Target Group
- Auto Scaling Group
- Launch templates
  - Defines type of EC2 instances allowed based on CPU and RAM
  - Mount EFS folders
  - Install software
  - Run docker compose script
- EFS
  - Each EC2 instance needs access to the same shared application working directory
- EC2 Instances

Infrastructure data flow

- Cornell DNS
- Route 53
- Application load balancer
- Target group
- Single EC2 instance running application

Database hosting in RDS

- Oracle Bring your own license
  - 19.0.0.0.ru-2023-01.rur-2023-01.r2
- Instance class db.m5.2xlarge
- Multi-AZ
- 30 Days of Roll back
- Database snapshots
  - Automated nightly snapshots
  - Manual snapshots can be created ad hoc
  - Process to regularly remove old automated snapshots

Other AWS services

- S3
  - Main point for other entities to send files to be processed by KFS
- Lambda Functions
  - Manage incoming and outgoing files
- Dynamo DB
  - Configuration store "manage files Lambda"
- Secrets Manager
- Elastic Container Registry
- Elastic Container Service
  - Forwards requests from an external scheduling tool
- AWS Cost Explorer

Other Services

- OpsGenie
    - On call management
- Pingdom
    - Service outage alerts
- Tidal
    - Batch scheduling
- Github

Issues to consider in AWS hosting

- Keeping track of spend is something that needs monitored regularly
  - Cost saving options can include using smaller instances for non-prod and turning off non prod during non-business hours
- Fine tuning Auto Scaling Groups to scale up or down to meet load
- Fine tuning Target Group health checks
- AWS Trusted Advisor recommendations and security concerns
- Understand how a system responds to AWS automation
  - Multi-AZ failover
  - Service latency
  - Load scaling

Questions

- **Any Questions?**
- Questions after the presentation,,,
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