SAND2017-7488D

RISE

Attracting and Developing Top Level IT and R&D CS/CE/Cyber Professionals

Pandamax

Enterprise Architecture

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Problem Statement

Upgrade Sandia's current enterprise architecture to one that provides a common deployment pattern for enterprise solutions, and makes the deployment of API services easy for Sandia to manage.

Objective

Our objective is to provide a comprehensive workflow for deploying API's on Sandia's main networks. We must provide constructs for security, high availability and scalability at little cost to development teams. We tested different WSO2 deployment patterns via benchmarking. Additionally, we focused on providing automated testing for deployed API's and reducing time to market for enterprise solutions. Figure 2 illustrates the target architecture for managing API's.

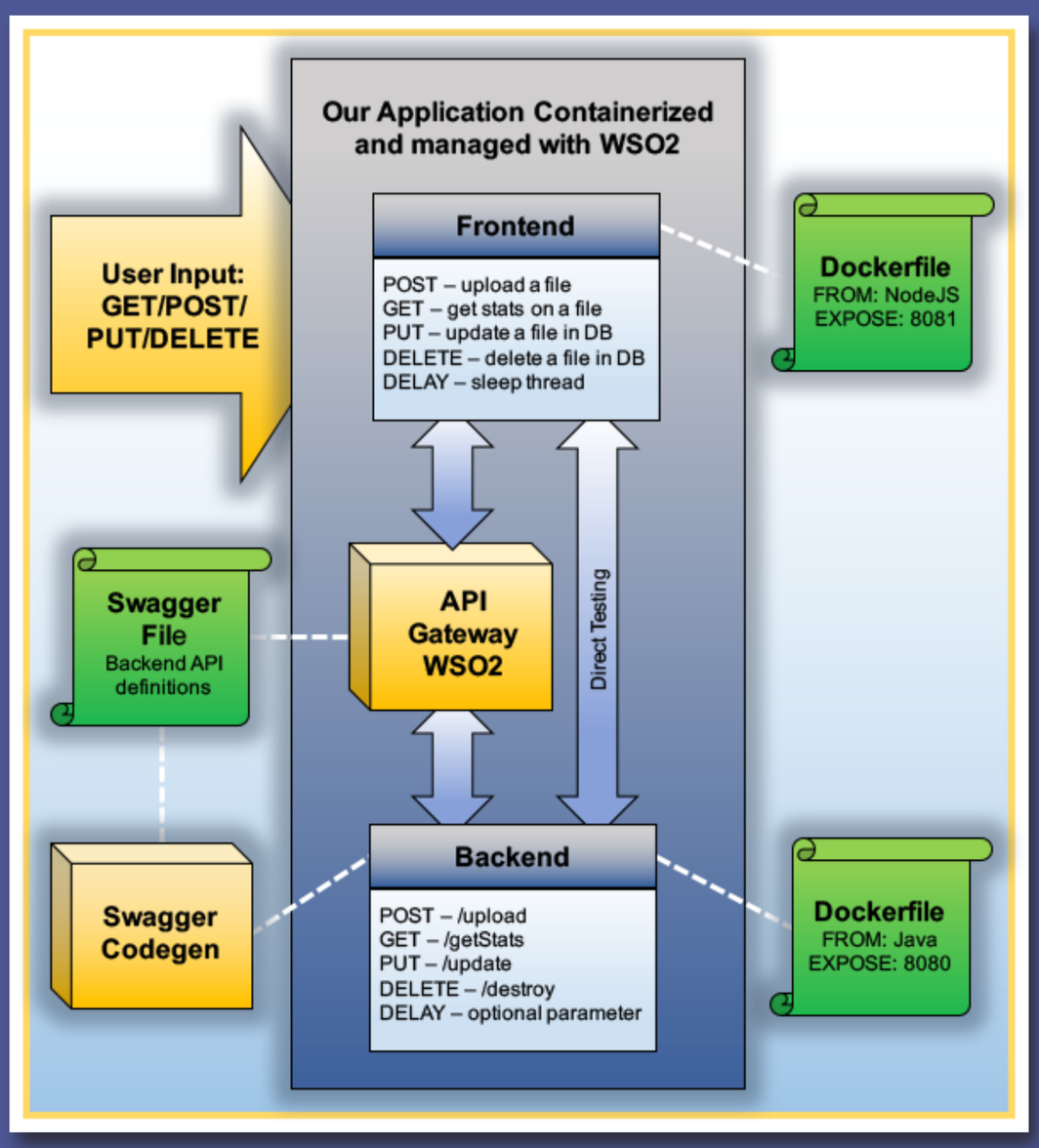

Figure 1
Demo architecture with WSO2 integration

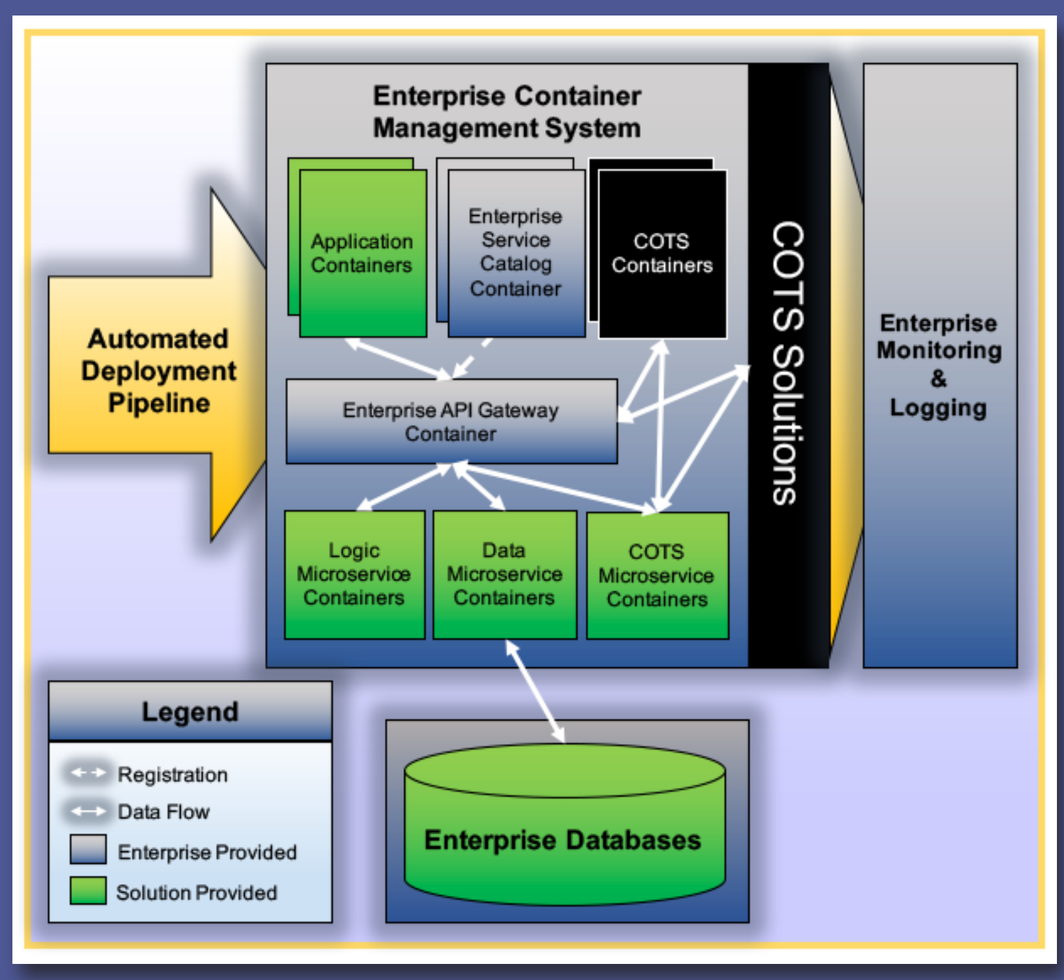

Figure 2
Target architecture

Approach

Docker is a container platform for launching lightweight virtual machines. Docker reduces onboarding time and provides services that have low coupling and high cohesion. Docker can handle any app, language, or stack, making it cross-platform and easy to ingrate within Sandia. We used Docker to containerize our API, and Docker Data Center (DDC) to create and manage a swarm of services on a cloud-based environment.

Figure 3
Some tools used for the project

Impact and Benefits

Our project proved that API solutions at Sandia can be launched and managed on the DDC, and that WSO2 may be a suitable choice as an API management tool. Sandia can now develop an operational cloud environment where Sandians deploy API solutions hosted on Sandia's main networks. This will improve Sandia's resource management and make launching and using API's simple and efficient.

Results

We utilized a Continuous Integration (GitLab CI), Continuous Deployment (Jenkins) pipeline in order to simulate a normal dev environment while creating and launching our test services. Our main focus was exploring WSO2 as a solution for managing Sandia's internal API's. In order to test the effectiveness of WSO2, we created containerized frontend (NodeJS) and backend (Java) microservices hosted on the DDC which communicated through the WSO2 gateway (Figure 1).

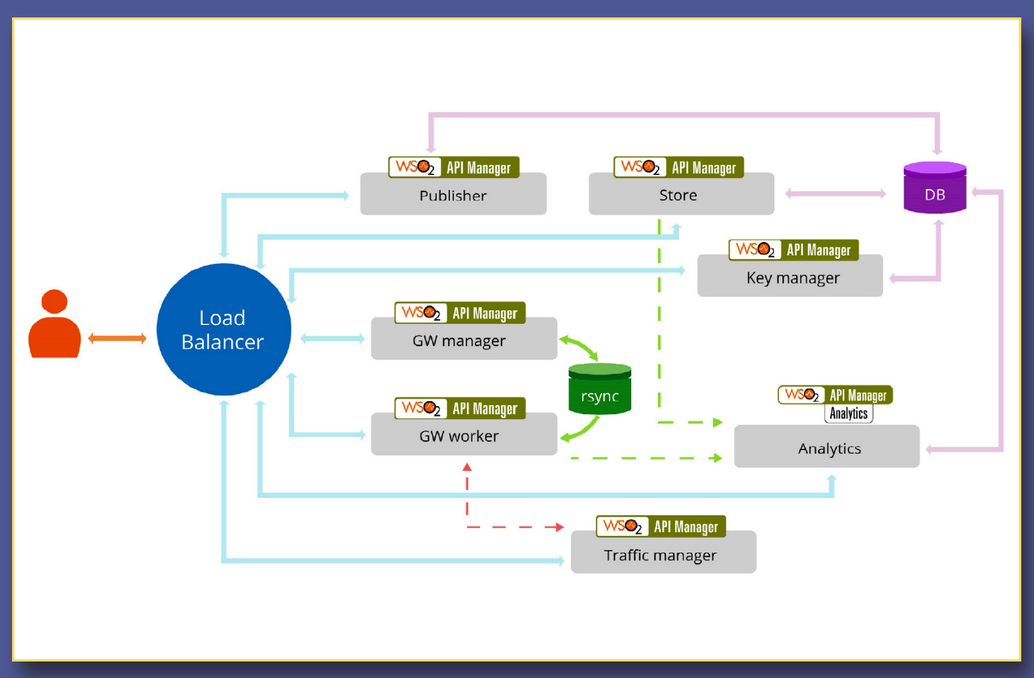

Figure 4
WSO2 distributed deployment pattern

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