INDUSTRIAL PRINTERS ARE FAST AND VAST

- HP manufactures industrial printers capable of printing 3,475 square feet per minute.
- For the software on these printers to keep up with this speed, up to 23 servers are built into the printers themselves.
- Each server runs a microservice to assist in the translation from PDF to printed page.
- Only one instance of a microservice can be running on a server at a given time, due to communication contamination.
- In order to update a microservice, all the servers must be taken down as to not interrupt the system.

DOCKER AND KUBERNETES ADVANTAGES

- Allows services to be easily restarted or reset to their original state
- Kubernetes allows more than one instance to run on the same machine without there being communication errors between instances
- Individual programs in containers are hardware and environment independent and can be updated while the machine is running
- Previously built versions of the container are always available to use in case a newer version has issues, improving recovery options in case of failure
- There is an installation process benefit to using containers

Oregon State University

DOCKER CONTAINERIZATION TECHNOLOGY

Using Docker and Kubernetes to reduce resource usage

docker

Docker creates efficiency

- Docker is a technology that allows a minimal operating system to run on top of an existing operating system. These are called Containers.
- Applications and services can be set up to run inside of these Containers with only the minimal system resources necessary to run them
- This was the critical technology for our project. Docker allowed us to reduce the overhead of the Workers which in turn allowed us to reduce the resources needed and allow more to run on a single physical server.

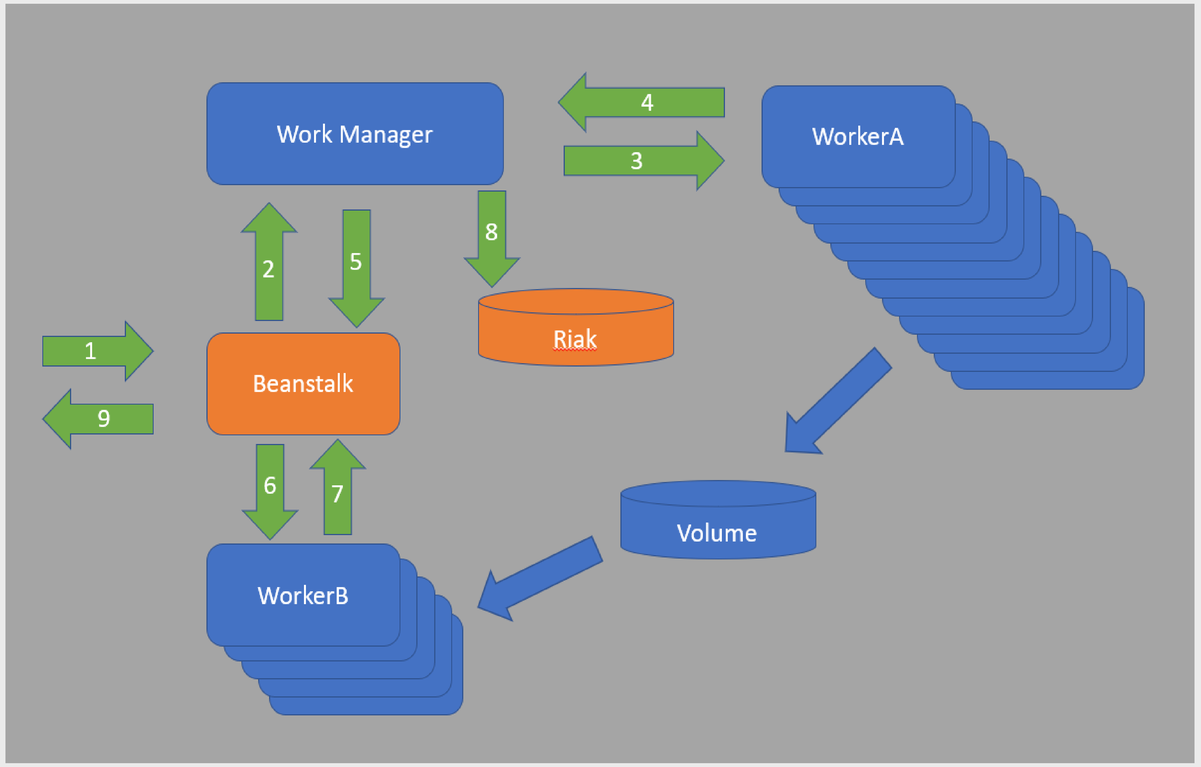

Figure 1: Each Kubernetes Pod requires the resources to run all of the services needed to construct the PDF to print

WHAT WE DID

- Created prototype of existing system using Groovy
- Used Docker to containerize these services and set up communication between them
- Used Jenkins for continuous integration
- Moved containers to Kubernetes to manage deployments

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