

Kubernetes Workshop: Utilizing the NRP Nautilus Super Cluster

MORENet Technical Summit

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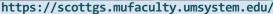
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Presenters

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Topic Introduction

- Kubernetes is a powerful tool to enable the efficient scaling and orchestration of containers
- Containers are virtualized environments that be reproduced on any machine with the container runtime
- ► The National Research Platform has a compute cluster called Nautilus that is managed with Kubernetes



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What to Expect

- ▶ In this workshop, you will learn:
 - ► How this technology can be leveraged for hands-on STEM education
 - ▶ What Jupyter is, how to use it, and what it offers STEM educators
 - ▶ What the Nautilus Hyper Cluster is, and what kinds of resources it offers
 - ► How scientific computing can be scaled on the Nautilus cluster
- ▶ The technical topics covered in this workshop are:
 - What a container is and how to build one
 - ► How to share containers with others using a container image registry
 - What Kubernetes is and its key concepts
 - ► How to deploy a container on a Kubernetes cluster
 - ► How to deploy a Jupyter Hub application using Helm to a Kubernetes cluster



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Agenda

- ▶ Introduction to Nautilus
 - ► Nautilus for Statistics Education with Jupyter
 - ► Background on the Nautilus Cluster
 - Use Case: University of Missouri Columbia
- ► Questions & Break
- Kubernetes Technical Breakdown
 - Docker & Kubernetes
 - ► Jupyter UI Walkthrough
 - Creating JupyterHub Environment in Kubernetes
- Questions & Break
- Kubernetes for Scientific Computation
 - ► Case Study: Object Detection and Localization in Remote Sensing Imagery
 - Case Study: Wildfire Burn Area Mapping

