

TILLICUM



W. INFORMATION
TECHNOLOGY

NVIDIA

DELL

[re]DESIGN



TILLCUM

Containers Tutorial

Kristen Finch
Director of Research Computing Solutions

INFORMATION TECHNOLOGY
UNIVERSITY *of* WASHINGTON

W



AGENDA

Introduction

Tillicum

- Common Workflows
- Business Model
- Storage & Data Commons

Software on Tillicum

- Policies
- Baseline Environment

Containers

- What is a container?
- Why use a container?

Tutorial

- Objectives
- Layout
- Hands-on option

W

COMPUTING TASKS

Artificial Intelligence

- Train language and vision models
- Accelerate science with AI
- Tackle complex, real-world challenges



Interactive Workloads

- Browser-based user interface
- Lowering barriers of entry to compute
- Support learning and collaboration



Supported:

- Epic Kitchens
- Fine-web EDU
- ImageNet
- Kinetics
- OlMo Mix 1124
- The Pile
- TabLib
- TCGA

GPU-Accelerated Simulations

- Speed up simulations
- Enable complex discoveries
- Scale-up to tackle bigger problems

Common Datasets

- Access shared research data
- Skip long downloads
- Work from same sources

W



BUSINESS MODEL

Pay-as-you-go

Computing unit

- GPU hour = elapsed time * N GPUs
- minimum 1 GPU requested per job
- **\$0.90/GPU hr** production jobs
- monthly billing

No charge

- **persistent** project storage (~1TB)
- temporary data storage (~2 months)
- data import, export (Globus endpoint - high speed transfers)
- data parsing, manipulation
- **user support and consulting**

Not permitted

- long term data storage

W



Supported:

- Epic Kitchens
- Fine-web EDU
- ImageNet
- Kinetics
- OlMo Mix 1124
- The Pile
- TabLib
- TCGA

DATA COMMONS

Currently supporting 8 datasets

Requirements

- the data must be open source and free to download and copy
- name a minimum of 3 research groups and 3 specific users (6 people)
- requester submits documentation page describing the dataset

Data Commons Requirements

↑ **Everything underlined is a link** 



SOFTWARE



Tillicum Software Policies

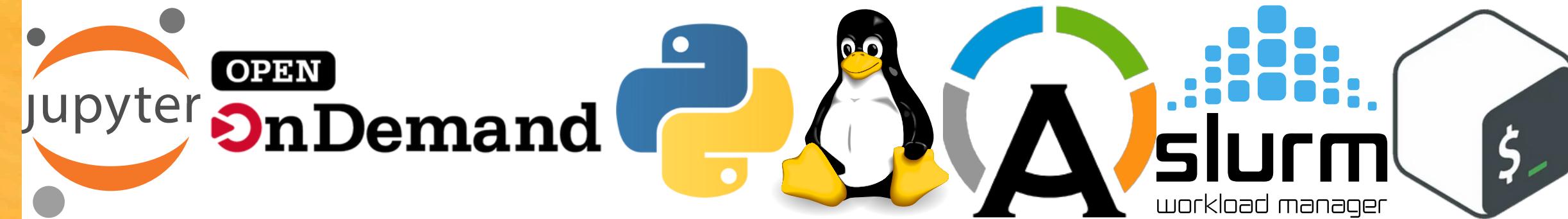
- Shared Research Environment
- Baseline Computing Environment
- No Root/Sudo Access
- Researcher Responsibility
- Tillicum Team - Support, Training, and Documentation



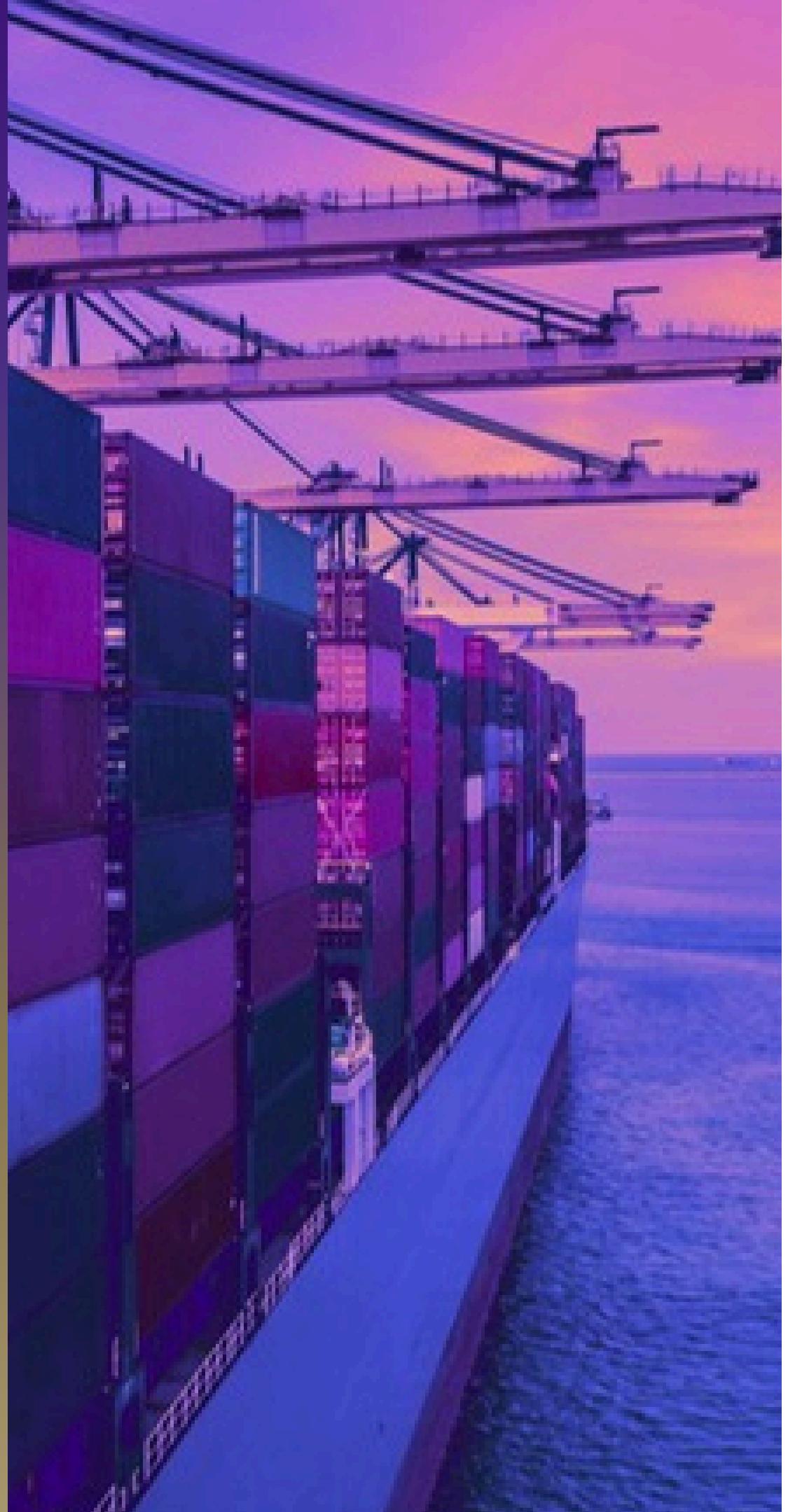
SOFTWARE

Rocky Linux + Slurm

- Open OnDemand
 - Jupyter Notebooks
- **Containerized environments (Apptainer runtime)**
- LMOD modules - maintained and contributed modules
 - hierarchy
- Python environments (conda module)



W



CONTAINERS

What is a container?

- Containers are lightweight, isolated software environments that encapsulate an application along with its dependencies and runtime settings.

What does that mean in practice?

- All require software must be installed into the container. `apptainer build`
- You must activate the container before you can use it.
 - `apptainer shell`
 - `apptainer exec`

W



CONTAINERS

Why use a software container?

- Consistent and reproducible way to package, distribute, and run software across different computing environments.
- A single file, improving storage usage for individual users and lab groups.

Are they hard to build?

- **Many ready-made containers exist** – you can start from trusted images and customize as needed.
- **Definition files make builds repeatable** – once written, they simplify future rebuilds or sharing.

W



CONTAINERS

Why wouldn't you use a container?

- **Environment changes require rebuilds –**
installing or updating packages can take longer.
- **Less flexibility for quick experimentation –**
containers favor stability over rapid iteration.

W

TUTORIAL

LEARNING OBJECTIVES

By completing this tutorial, you'll learn how to:

- Work with Apptainer containers on Tillicum, including pulling, inspecting, and running containers.
- Create sandbox environments and build customized container images.
- Access and use shared datasets from the Tillicum Data Commons.
- Run GPU-accelerated deep learning inference inside a container.
- Submit and monitor batch jobs on Tillicum using Slurm.

Training Materials Repo:

<https://github.com/UWrc/tillicum-containers.git>

Feedback Survey:



↑ **Everything underlined is a link** 

W

TUTORIAL

NEED TO KNOW'S

Tillicum training access period:

- You will be able to complete this training over the next ~3 days (**ending Monday morning 11/17**)
- User the slurm account "**traincontainer2025**"
- Tutorial is designed as introductory concepts and practice followed by a "**task**" that brings together multiple skills for a relevant GPU-accelerated workflow on Tillicum.

Training Materials Repo:

<https://github.com/UWrc/tillicum-containers.git>

Feedback Survey:



↑ **Everything underlined is a link** 

W



MORE TRAINING

Tillicum Specific Training

- [Tillicum Onboarding Training](#)
- [Tillicum Slurm Training](#)

Upcoming

- [Docker Containers - December 2, 2025 1-3pm](#)
- Scaling your NN on Tillicum - Winter 2025

[Research Computing Events](#)

[Mailing list](#)



↑ **Everything underlined is a link** 

W



GET THIS SERVICE

GPU Cluster

Intake form - [Tillicum Access Request Form](#)

Trial account - 100 GPU Hours

Service Info - [Tillicum: AI-Accelerated Research Computing Platform](#)

[Tillicum Service Catalog](#)

[Tillicum System Architecture](#)

[Tillicum User Guides](#)

↑ **Everything underlined is a link** ↗



Learn more – everything underlined is a link

UWIT - <https://it.uw.edu/>

[Research Computing Services](#)

- [Tillicum: GPU-Accelerated Research Computing Platform](#)
 - [Intake Form](#)
- [Hyak: High-Performance Supercomputing Research Cluster](#)
 - [Pricing and Eligibility](#)
 - [Documentation](#)
- [Data Storage Services](#)
 - [Kopah S3 Object Storage](#)
 - [Pricing and Eligibility \(cost calculator\)](#)
 - [Documentation](#)
 - [Lolo Data Archive](#)
 - [Pricing and Eligibility](#)
 - [Documentation](#)
- [Cloud Computing](#)
- [Computing for Restricted Access Data](#)
- [Research Computing Consulting](#)

Training and Events

- [Hyak mailing list](#)
- [Hyak Blog](#)
- [UWIT Research Computing Calendar](#)
- [Office Hours](#)
- [eScience Newsletter \(scroll for sign up\)](#)
- [eScience Data Science and AI Accelerator](#)
- [Office of Research Calendar](#)

Past Trainings

- [Research Computing Tutorials & Video Library](#)
- [eScience YouTube Channel](#)

New Hyak Users

- [Free Demonstration Account](#)
- [Hyak Basics Tutorial](#)
- [Limitations of demonstration accounts](#)
- [Using free resources \(Checkpoint\)](#)

Students

- [Research Computing Club](#)
- [Student Hyak account](#)
- [Cloud Credits](#)
- [Student Technology Fee](#)

Other Resources

- [Join the UW AI Community of Practice](#) on MS Teams to get updates from UW-IT's AI team about events and join the discussion around AI in the news, society, and culture.
- [UW Seattle Events Calendar](#)

Special thanks to

- [UW Office of Research](#)
- [eScience Institute](#)