



# NRP and the CSUs: Case Studies and Lessons Learned Supporting Teaching and Learning

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# From Concept to CENIC AIR



# TIDE

Technology Infrastructure  
for Data Exploration



# VERNE (Instructional) at SDSU



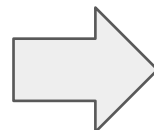
Integration with NRP



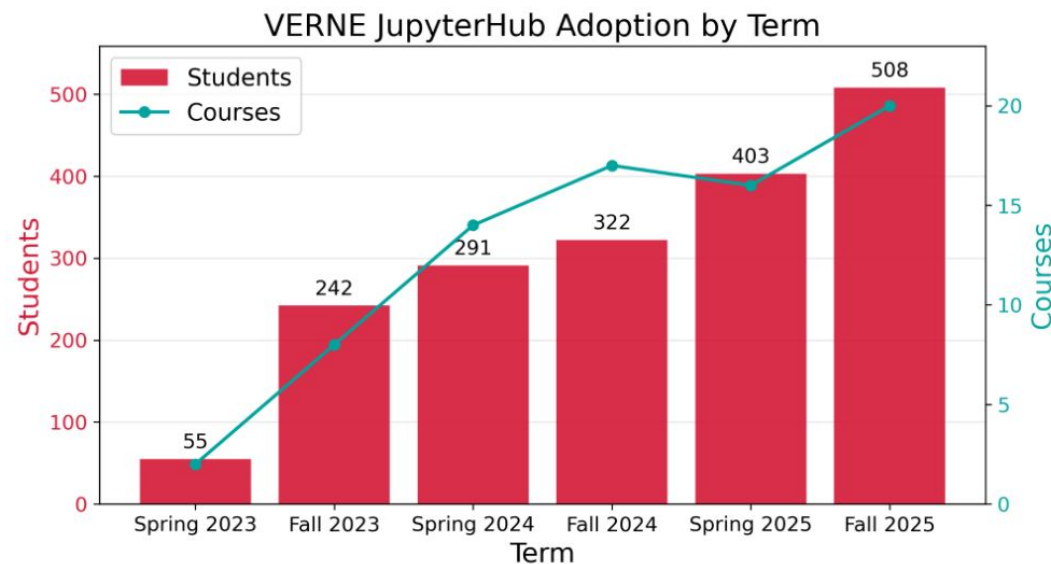
Access to the cluster using JupyterHub



Student assistant-driven container development



Continuous Increase of Course Usage



# TIDE Goals

- Create a computational core facility within the CSU
- Focus on artificial intelligence (AI) and machine learning (ML)
- Enable science drivers across the CSU
- Address the lack of equitable access to cyberinfrastructure
- Democratize GPU access, thus facilitating full participation in the AI revolution
- Address support and on-boarding by forming a support team



# Community

## **TIDE Support Team:**

- Capable of taking requests from faculty at any CSU campus using a common ticketing system
- Worked together to share knowledge (e.g., how to deploy a JupyterHub)
- Delivered workshops and hands-on tutorials

## **CSU System-wide Groups:**

- Created Research Computing Technology Alliance (RCTA)
- Existing ecosystem: Network Technology Alliance (NTA), and Cloud and Systems Technology (CAST)

## **Regional:**

- Supported the San Diego Community College District with JupyterHub deployment and authentication integration to leverage CENIC AIR
- Partnered with UC Merced's CENVAL-ARC (NSF CC\*) to expand outreach to CSU faculty in the Central Valley

# From Campus Alignment to Classroom Impact



## Internal Collaboration at CSUF

- Partnership across:
  - IT / Research Computing
  - Faculty & Colleges
  - Academic Affairs
- Department Chair and leadership engagement
- Breaking silos to enable adoption

## Faculty & Student Enablement

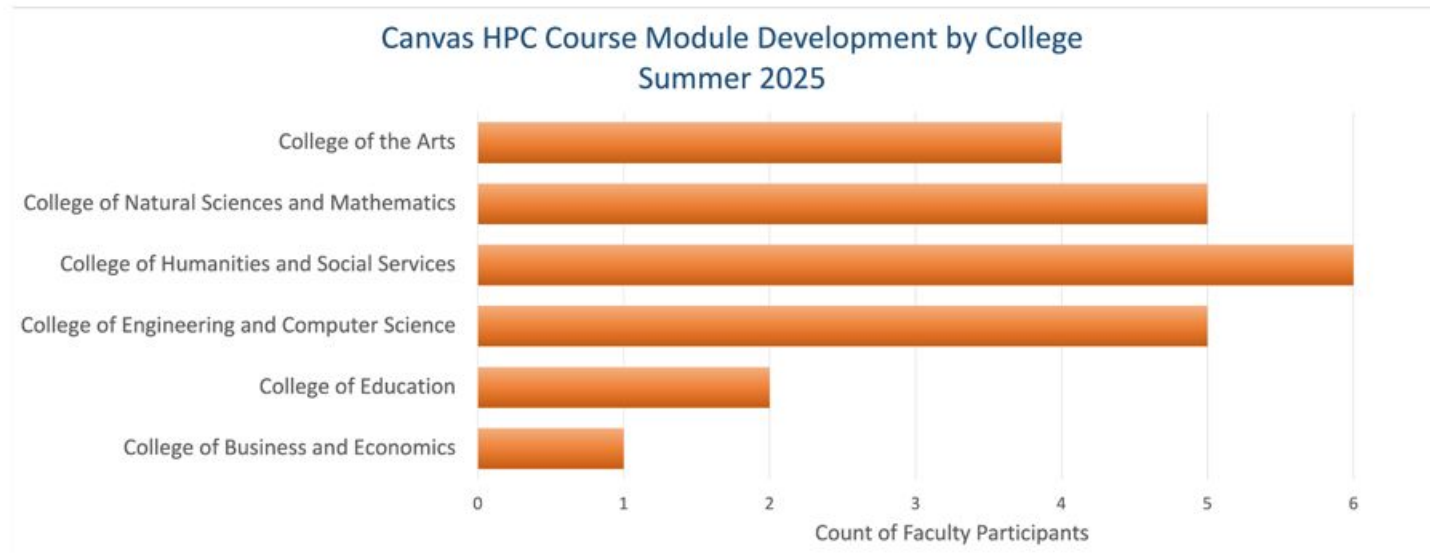
- JupyterHub onboarding for teaching and research
- Course-level integration across disciplines
- Faculty development + reusable course modules

## Teaching & Learning Impact

- Browser-based Jupyter access (no barriers to entry)
- Supports:
  - Data literacy
  - AI fluency
  - Computational skills
- Scalable from classroom → research

# Faculty Professional Development: HPC Sharable Course Module Program

- Faculty collaborated with *instructional designers* to create shareable Canvas modules that connect HPC concepts to real-world applications.
- The goal of this initiative is to help students build skills in data analysis, critical thinking, and problem-solving by integrating real-world data and computational methods into coursework across disciplines.
- The resulting modules of instructional resources are put into a repository that is available and reproducible to faculty.
- Plug-and-play design enables scalable adoption across disciplines



# Our Approach: The BOT Model

*A three-phase model designed to deliver sustainable HPC capability to partner institutions.*



1

## Build

*Deploy dedicated JupyterHub instances on the National Research Platform (NRP), pre-configured with popular research and education software stacks.*

2

## Operate

*Provide full-service operations and end-to-end user support for faculty and students throughout the academic term.*

3

## Transfer

*Share know-how and gradually hand over the system to college IT teams for long-term sustainability.*

# Collaborating Community Colleges



San Bernardino Valley College

*14,500 students*

- *Faculty actively exploring JupyterHub*
- *Interest in classroom deployment*



Crafton Hills College

*6,900 students*

- *Shared SBCCD JupyterHub access*
- *Faculty onboarding underway*



Chaffey Community College

*22,500 students*

- *AI degree program approved*
- *Curriculum development in progress*



University Partners  
**Loma Linda  
University**

*Extending the BOT model beyond  
community colleges to support faculty  
research and data-intensive coursework.*

**Faculty Research**

*Supporting computational research across disciplines*

**Data Analytics Course**

*Live classroom deployment for analytics instruction*

# Providing Full HPC Assistance

*End-to-end support that removes technical barriers so faculty can focus on teaching and research.*



## Dedicated JupyterHubs

*Deployed on NRP cluster with R-Studio, Julia, Python, and popular data science packages.*



## Curriculum Support

*Assist faculty in preparing curriculums and develop custom software stacks upon request.*



## Reliability & Stability

*Ensure resource availability and system stability throughout the academic term.*

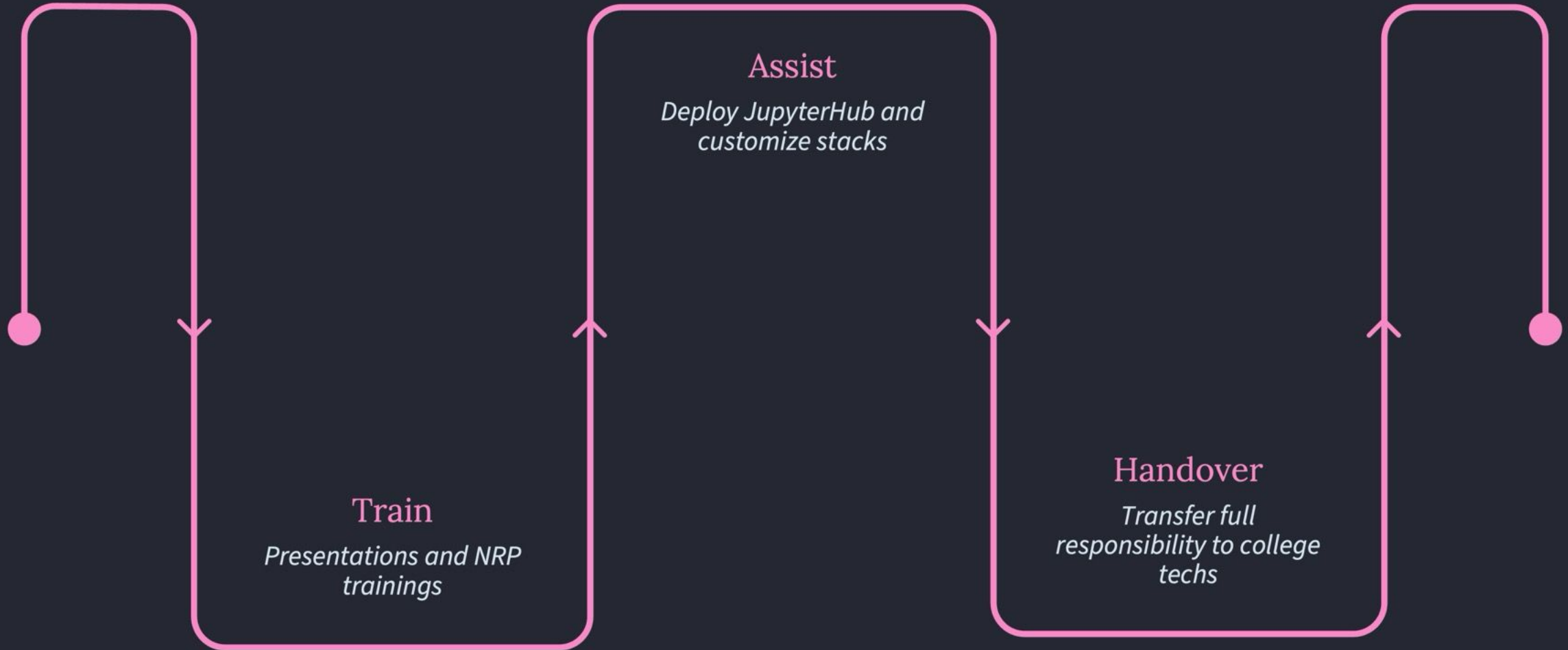


## Technical Support

*Full support so faculty complete research and students finish assignments successfully.*

# Comprehensive Know-How & Technology Transfer

*A structured handover that builds lasting internal capacity at each partner institution.*



*Each stage is designed to progressively empower college technical teams to own and operate their HPC environment independently.*

# Lessons Learned

## 1 Prepare Resources Proactively

*Stage HPC resources and software stacks ahead of demand to ensure a smooth classroom experience from day one.*

## 3 Deliver Timely, Quality Support

*Ensure satisfactory assistance with timely solutions and rapid problem solving during active terms.*

## 2 Engage Management & Faculty Early

*Proactively promote available HPC services to administrators and instructors to drive adoption.*

## 4 Scale to Meet Growing Demand

*Continuously expand HPC infrastructure as more faculty, courses, and students come online.*

**Thank you!**