High Performance Computing Linux Training Grounds

About ERDC-ITL DSRC

The U.S. Army Engineer Research and Development Center (ERDC) in Vicksburg, Mississippi, is the premier research and development laboratory complex for the Corps of Engineers. ERDC discovers, develops, and delivers innovative solutions to the nation's toughest challenges in military engineering, installations and operational environments, civil works, geospatial research and engineering, and engineered resilient systems. Located in the Information Technology Laboratory (ITL) at ERDC, the ERDC DoD Supercomputing Resource Center (DSRC) serves the high-performance computing (HPC) needs of engineers and scientists throughout the DoD, providing a complete HPC environment, including hardware, software, data storage, archiving, visualization, training, and expertise in various computational technology areas.

RESEARCH LOCATION: Vicksburg, MS

PROJECT DESCRIPTION:

The HPCMP has authorized DSRCs to self-administer systems starting with TI-24 and extended HPC life from five to seven years. These systems require more future HPC Linux system administrators. In this project, the intern will receive structured training in Linux, scripting, and system administration. This internship process, which uses a Virtual Range for practice without privileged access, will teach the intern essential Linux skills while giving them crucial exposure to the HPC environment. The project will be completed within a 10-week period.

Week 1: Covering fundamentals: Linux basics, VM setup, an HPC overview, and Apptainer installation.

Week 2: Add user management, software packages, HPC hardware, and data workflows.

Week 3: Tackle processes, HPC storage, and data ingestion, while drafting a problem statement and project plan.

Week 4: Shifts to HPC networking, data transfer, and producing an initial script.

Week 5: Introduces security and HPC cybersecurity, with completion of a hardened script.

Week 6: Emphasizes automation through scripting, Ansible, and Apptainer—while exploring how AI large language models (LLMs) can assist in automating routine tasks—resulting in an automated script.

Week 7: Focuses on troubleshooting on HPC systems, Apptainer test/debug script for results.

Week 8: Introduces containers, workload management, and culminates in a presentation draft.

Week 9: Centers on review: practice exams, HPC user support, and script finalization.

Week 10: Linux exam, a review of HPC trends, and the final project presentation.

Interns will engage in a 40-hour week program: 25 hours on Linux+ or RHCSA prep using resources like CompTIA Linux Pro or Red Hat training materials, 10–15 hours on DoD HPC systems via the Virtual Range, and 5 hours (Weeks 3–10) on a project optimizing data ingestion to HPC storage. Certificate prep involves relevant modules, VM practice with privileged access for hands-on learning, and taking a certification exam (Linux+ or RHCSA) in Week 10. Virtual machines will be created in which the interns will have the privileged access they need to learn and to practice. HPC Training covers DoD HPC documentation, Apptainer, and storage workflows with VM practice. Project Work develops a Bash script with resync and Apptainer, tested and presented to mentors. Outcomes include a certification test, HPC proficiency, and a portfolio project. Interns join bi-weekly virtual mentor meetings (Weeks 2, 4, 6, 8, 2 hours) to discuss HPC applications, an HPCMP forum (1 hour/week, Weeks 3–10), and a virtual HPC Career Panel (Week 9, 2 hours).

Training Opportunities: Interns complete Linux Foundation HPC modules (edX, 5 hours, Weeks 1–2), TryHackMe Linux/security labs (4 hours/week, Weeks 3–9), and Apptainer training (3 hours/week, Weeks 3–8). Mentor and intern feedback sessions daily for mentorship and enhance skills.

Laboratory/Center Tours: HPC facility tour (Week 5, 2 hours) explores supercomputers and storage, and support functions. An HPC support center tour (Week 7, 2 hours) showcases operations.

Skill and Career Benefits: Builds Linux administration, HPC expertise, and presentation skills. Certification (Linux+ or RHCSA) and the project's Git artifact boost DoD employability. Networking opens HPC and AI/ML career paths. The mentor will stand up a Virtual Range to allow intern access to a customized development environment.

ANTICIPATED START DATE:

May/June 2026 – Exact start dates will be determined at the time of selection and in coordination with the selected candidate.

QUALIFICATIONS:

 A successful candidate will be pursuing or received a degree in computer science, electrical engineering, information science, information technology, or a related field (e.g., computer engineering, cybersecurity) and complete at least one year of undergraduate study, including courses like Introduction to Programming or Introduction to IT Systems.

Familiarity with operating system concepts (e.g., file systems, processes, user management), preferably from coursework or self-study.

Basic experience with command-line interfaces (e.g., Windows CMD, PowerShell, or Linux terminal basics like ls, cd) is recommended but not required.

No HPC experience required but interest in HPC or related fields (e.g., AI/ML, simulations) is beneficial.

U.S. citizenship and ability to pass a background check (e.g., for access to DSRC facilities or HPC Portal).

ACADEMIC LEVEL:

Degree received within the last 60 months or currently pursuing:

- Bachelor's
- Master's
- Doctoral

DISCIPLINE NEEDED:

- Computer, Information, and Data Science
- Engineering
- Science & Engineering-related