High Performance Computing System Administration

About Navy DSRC

The U.S. Navy DoD Supercomputing Resource Center (DSRC), in partnership with the High Performance Computing Modernization Program (HPCMP), is a premier provider of high performance computing (HPC) services and support to Department of Defense (DoD) scientists and engineers. By leveraging the latest in HPC technology and software and our in-depth expertise in HPC systems configuration and administration, high-speed networking, data archival systems, and HPC user support, the Navy DSRC greatly improves the computational research environment for DoD researchers. The Navy DSRC provides users with in-depth computational research expertise, with support for the largest, most computationally intensive HPC applications available. Our in-house knowledge is further supplemented by the User Productivity Enhancement and Training (PET) on-site staff with expertise in the areas of Advanced Computational Environments and Climate Weather Ocean Modeling and Simulation.

The Navy DSRC also provides, on a daily basis, computational support for the creation of global, regional, and very high-resolution coastal ocean circulation and wave model oceanography products supporting worldwide Navy and DoD operations. By making state-of-the-art HPC systems including large-scale supercomputing systems, high-speed networks, and petascale data storage accessible to thousands of DoD scientists and engineers, the Navy DSRC is focused on promoting the technological supremacy of the warfighter.

RESEARCH LOCATION: Stennis Space Center, 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, plan a problem ideation and statement.

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

Week 5: Introduces security and HPC cybersecurity, with a deliverable 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 (Slurm/Kubernetes), Apptainer Workload management integration, slides 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. Linux+ or RHCSA Prep involves relevant modules (e.g., user management, scripting), VM practice with privileged access for hands-on learning, and taking a certification exam (such as 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 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 (Linux+ or RHCSA), 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.

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:

The ideal candidate should currently be pursuing 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:

- Associate's
- Bachelor's

DISCIPLINE NEEDED:

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