High Performance Computing System Administration

About AFRL DSRC:

The Air Force Research Laboratory (AFRL) has been leading USAF scientific computing since the 1970s operating early CDC and Cray supercomputers performing fluid dynamics and structural mechanics calculations advancing aircraft, space launcher and propulsion technologies.

Established in 1993 in Kihei, Hawaii on the Maui island, the Maui DOD Supercomputing Resource Center (DSRC) is one of five world class computational science facilities supporting the DoD research and development, test and evaluation, and acquisition engineering communities. The Maui DSRC provides advanced computing resources and computational solutions to US Space Force and Pacific region programs focusing on AI for Cybersecurity, AI for Space Domain Awareness, Digital Engineering, Acquisition Programs and advanced Modeling Simulation and Analysis. Located within the 15th Space Surveillance Squadron, whose mission is to track and monitor satellites in orbit, the Maui DSRC supports all research and development organizations across the DoD.

In partnership with the High Performance Computing Modernization Program (HPCMP), the AFRL (Maui) DSRC makes available powerful HPC systems, advanced software packages, high-speed secure network access, mass storage for data, and expert researchers to assist in solving the hardest problems.

RESEARCH LOCATION: Kihei, HI

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, Apptainer installation.

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

Week 3: Tackle processes, HPC storage and data ingestion, plan problem ideation and statement.

Week 4: Networking HPC networks, data transfer, and producing an initial script and testing.

Week 5: Introduces security and HPC cybersecurity, and secure script.

Week 6: Scripting, automation (Ansible) HPC automation, Apptainer Automate script with Apptainer Automated script.

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

Week 8: Introducing containers, HPC workload management (Slurm/Kubernetes), Apptainer Workload management integration, slides presentation draft.

Week 9 Centers on review: practice exams HPC user support, Apptainer, finalize script, rehearse final script.

Week 10: Exam, review HPC trends, and the final 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 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 (Linux+ or RHCSA), HPC proficiency, and a portfolio project.

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: A virtual HPC facility tour (Week 5, 2 hours) explores supercomputers and storage. An HPC support center tour (Week 7, 2 hours) showcases operations.

Skill Enhancement 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 be enrolled in a bachelor's degree program 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 CS101 (Introduction to Programming) or IT200 (Introduction to IT Systems).

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

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

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

ACADEMIC LEVEL:

Degree received within the last 60 months or currently pursuing:

- Bachelor's

DISCIPLINE NEEDED:

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