Cyberinfrastructure Development for the Western Consortium of Idaho, Nevada, and New Mexico

Project Goal

- Promote knowledge transfer to scientists, educators, students and citizens by enhancing state CI
- Enable the community science that is required to address regional to global scientific and societal challenges related to climate change

Objectives

- Increase connectivity and bandwidth
- Enhance data and model interoperability
- Utilize CI to integrate research and education

Outcomes

- Increased collaboration
- Improved research outcomes
- Improved learning

Impact

- Enhanced ability to address 21st century grand challenges related to climate change through increased competitiveness for research funding and sustained partnerships among Idaho, Nevada, and New Mexico

Connectivity

Activity	Short-term Outcomes	Medium-term Outcomes	Short and Medium-term Metrics
Idaho 1. Upgrade connectivity to key labs and desktops 2. Add IRON POP in S. Idaho	**Idaho** 1. Upgraded Connectivity: 1 - 10 Gbps service 2. Aggregation switch (POP) added to IRON to include sites in Hagerman and Kimberly	**Idaho** 1. Increased capability & utilization 2. Increased connectivity to IRON	**Idaho** 1. # of connections at improved speeds; increased utilization 2. # connections (sites/machines/people); Increased IRON usage
Nevada 1. Increase connectivity into the state 2. Increase connectivity within the state	**Nevada** 1. Upgraded connectivity NVnet to CENIC & NVnet to Elko; monitoring & security SW & HW in place 2. Upgraded video conf. hardware in north and south	**Nevada** 1. Increased capability & utilization 2. Increased capability & utilization	**Nevada** 1. Increased utilization 2. Increased utilization
New Mexico 1. Establish portals at college campuses (44 planned) 2. Increase portal connectivity	**New Mexico** 1. Gateways installed & connected to 6 HSU & Native Am. Campuses 2. User friendly gateway system & data compression software to min. bandwidth needed	**New Mexico** 1. Increased access to HPC, visualization, & other research tools 2. Increased capability and utilization	**New Mexico** 1. # of portals installed 2. Increased utilization

Long-term outcomes	Long-term metrics
• Sustained connectivity and bandwidth • Increased communication and collaboration between researchers, educators, business owners, and policymakers • Improved research competitiveness, STEM education, and economic development	Impacts survey and interviews to measure how increased connectivity has increased communication and collaboration between researchers, educators, business owners, and policymakers and improved research competitiveness, STEM education, and economic development

Interoperability

Activity	Short-term Outcomes	Medium term Outcomes	Metrics
Data/Model Interoperability • Identify models/frameworks • Develop machine interfaces to identify models & frameworks • Develop user interfaces for chaining machine interfaces into workflows	Interoperable data archives and frameworks Desktop and web-based model	Simplified model execution framework supporting user linkage of components	Data portal use survey to measure usage of framework
Interoperable Data Archive • ID core interoperability standards • Develop create/read/update/delete interfaces for archive nodes (web) • Establish interoperable services for product delivery into multiple clients • Create replicated data archives across ID, NV, NM	Desktop and web-based archive interfaces Best practice documents for researchers for effective contribution and use	Easily discovered data and information services	Data portal use survey to measure use of data products
Interact and Integrate with National Networks	Integration with National Networks	Value added through leveraging with National Networks	Level of integration

Long-term outcomes	Long-term metrics
• Develop and sustain a model and data interoperability framework • Build and sustain an interoperability data archive • Integrate with national networks • Increase data intensive research • Increase research capabilities • Increase the number and quality of research outcomes • Increase data sharing • Improve research competitiveness	Impacts survey and interviews to measure how increased data interoperability framework and archive enables participants to integrate with national networks, increase data intensive research, data sharing, and research competitiveness

Cyberlearning

Activity	Short-term Outcomes	Medium-term Outcomes	Short and medium-term Metrics
Offer & support CI training in computation & climate change	New CI skills for grad stds., post docs & faculty & K-12 teachers; New delivery methods	Increased human resource capacity	1. # trainees disaggregated by demographics & degree program 2. # of trainings disaggregated by type
Develop & disseminate educational materials for MS/HS	New CI-enabled classroom learning materials (e.g., traditional, Web)	Increased awareness, skills, and knowledge of CI and STEM content	1. # of materials developed by category 2. # of entities to which materials are disseminated 3. # of downloads of materials from portal
Develop & support extracurricular CI activities	New CI-enabled extracurricular learning materials	Support the STEM pipeline	1. # of new schools, students and teachers (e.g., GUTS and Super Computing Challenge) 2. # of new content modules 3. # of programs to which CI information is disseminated
Develop & deliver Industry CI Days	Outreach to business & industry	Increased knowledge and skills necessary to use cyberinfrastructure	1. # of participants disaggregated by demographics

Long-term outcomes	Long-term metrics
• Use CI to integrate research with informal and formal education • Build human capacity • Support students in the STEM pipeline • Improve STEM curriculum and instructional strategies • Increase student learning • Improve ability to make knowledge based decisions • Improve ability to address societal issues related to scientific causes • Improve economic development	Impacts survey and interviews to measure how participation in cyberlearning activities has increased participants' knowledge , their ability to transfer knowledge to students and their ability to make informed, knowledge based decisions.