Nevada NSF EPSCoR
Climate Change Conference

Cyberinfrastructure Component:
Goals, Strategies, Progress and Plans

Sergiu Dascalu

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Overview

- Team
- Goal and Targets
- Strategies and Activities
- Progress: Activities & Milestones
- Plans

Nevada CI Team

Dr. Sergiu Dascalu	Dr. Frederick C. Harris, Jr.	Dr. Shahram Latifi
Eric Fritzinger (Software developer)	Mike McMahon (Database developer)	
Sohei Okamoto (RA)	Victor Ivanov (RA)	David Walker (RA)

Goal and Targets

- Goal:

    Facilitate and support interdisciplinary climate change (CC) research, policy, decision-making, outreach and education by using cyberinfrastructure (CI) to develop and make available integrated data repositories and intelligent, user-friendly software solutions

Goal and Targets

- Outputs:
  - Nevada climate change data portal
  - Intelligent interactive software tools for climate change research, outreach and education: software frameworks
  - Integration and interaction across project and among CI components within the Western Consortium of Idaho, Nevada, and New Mexico: facilitator of collaboration
- Outcomes:
  - Strengthened CI for CC research, education, outreach
  - Increased public awareness of CC science through access to data
  - State and regional collaborations on CC
  - Widespread dissemination of CC software tools
  - Nationally recognized research in CI

Strategies and Activities

- Strategies indicated in the project's 5-year strategic plan:
  - Create CC data portal
  - Design software environments & interaction solutions
  - Develop a computing and technical support structure
  - Augment technical staff support
- In addition:
  - Create and follow a CI project plan with four components (see Plans section for more details)
  - Apply a systematic, incremental and iterative software engineering process for data portal and software frameworks

Strategies and Activities

- Major activities indicated in the 5-year strategic plan:
  - Ongoing
    - Convene steering committee biannually
    - Attend 3-state collaboration annual meeting
    - Purchase computing equipment/software licenses
    - Leverage TeraGrid, CENIC, NSF initiatives
  - Year 1
    - Hire computer professionals and graduate students
    - Create tri-state control system for shared open source
    - Assess roles of National Lambda Rail and ABILENE
    - Design data portal
  - Years 2-3
    - Build, test, and run data portal
    - Research and develop software frameworks

Strategies and Activities

- Major activities indicated in the 5-year strategic plan (continued):
  - Years 4-5
    - Run data portal
    - Extend data portal for school/business use
    - Apply software frameworks for appropriate components

Progress: Major Activities

- Status of the major activities:
  - Ongoing
    - Convene steering committee biannually: DONE
    - Attend 3-state collaboration annual meeting: DONE
    - Purchase computing equipment/software licenses: DONE
    - Leverage TeraGrid, CENIC, NSF initiatives: IN PROGRESS
  - Year 1
    - Hire computer professionals and graduate students: DONE
    - Create tri-state control system for shared open source: DONE
    - Assess roles of National Lambda Rail and ABILENE: DONE
    - Design data portal: IN PROGRESS
  - Years 2-3
    - Build, test, and run data portal: IN PROGRESS
    - Research and develop software frameworks: IN PROGRESS

Progress: Milestones Completed

- ## Year 1
  - Hired graduate students: Sohei Okamoto, Victor Ivanov, David Walker
  - Purchased equipment: workstations, PCs, laptops, and accessories
  - Purchased equipment: new advanced high performance compute nodes and data stores during a sales period by Sun Systems (50% discount): 33 Sun Fire x4140 servers, 3 Sun Fire x4540 storage units (24 TB each), and gigabit network switches
  - Purchased software licenses for workstations at UNLV
  - Established communication links and held talks with all other project components
  - Initiated hiring process of software developer and DB system admin/developer
  - With Idaho and New Mexico collaborators created the CI Western Consortium of ID, NV, NM
  - With Idaho and New Mexico collaborators worked on a NSF EPSCoR CI collaborative proposal that was funded in September 2009 (a 3-year $9-million project)

Progress: Milestones Completed

- ## Year 1 [continued]

  - Completed a survey of existing environmental data portals, basis for Nevada data portal's design (student Kai Huang completed his Master degree in CS with the above topic for his professional paper)

  - RA Sohei Okamoto worked on researching existing software frameworks

  - RA Victor Ivanov worked on researching common and special features as well as usability criteria for data portals

  - RA David Walker also worked on surveying existing data portals, with emphasis on reliability aspects

  - In July 2009 CI members Harris and Okamoto attended an NSF-Senate workshop & luncheon; Nevada CI efforts mentioned in Senator Harry Reid's talk

  - Held several CI steering committee meetings and CI lead Dascalu attended all project council teleconferences

Progress: Milestones Completed

- **Year 2** (in its first 5 months)
  - Hired professional developers: Mike McMahon and Eric Friztinger
  - Provided a detailed response to NSF Reverse Visit Review Panel's Recommendation #1 (need for a data management plan / September 2009)
  - Created and revised a detailed 4-part CI Plan
  - Communicated and held meetings with all other project components
  - Identified most of the software licenses needed for data portal development
  - Specification, design, and initial implementation of the data portal has picked up speed (in collaboration with staff from the UNR Research Grid)
  - Research on software frameworks is also going strong
  - In October RA Sohei Okamoto presented two posters on his work at the NSF EPSCoR Annual Conference in Arlington, MD
  - UNR has hosted a talk on CI topic by our New Mexico collaborator Karl Benedict
  - Cyber group had a featured presentation in the project's December council meeting
  - Two conference papers and a journal article based on work so far have been started

Plans: CI Plan

NEVADA CYBERINFRASTRUCTURE MANAGEMENT AND DEVELOPMENT PLAN			
DATA PORTAL DEVELOPMENT PLAN	**DATA MANAGEMENT PLAN**	**CI EDUCATIONAL PLAN**	**COLLABORATION & INTEGRATION PLAN**
Incremental & iterative software process **User-oriented approach** **Architecture-centric** **Phases:** - **Requirements** - **Analysis** - **Design** - **Implementation and integration** - **Testing** - **Operation, support & and maintenance (evolution)**	**Focused on assuring that high quality data are produced and are available via the portal** **Key elements:** - **Data selection, processing and quality control, archiving and preservation** - **Data security** - **Data use policy** - **Metadata generation** - **Data curation model** - **Interoperability standards & models**	**Integrated in the project's overall educational plan and connects with the goals of the Education component** **Activities:** - **Online user education & support material** - **Educational game** - **Integration of data portal development experience in courses** - **CI requirements in science courseware** - **Personnel development** - **Awareness & exposure**	**Consists of several areas of collaboration and aims to leverage nationwide resources** **Levels:** - **Internal: project groups** - **Local: state of Nevada-wide** - **Tri-State: ID, NV, NM** - **Nationwide** **Resources:** **NEON, GEON, TeraGrid, CSDMS, etc.**

Plans: SE Approach
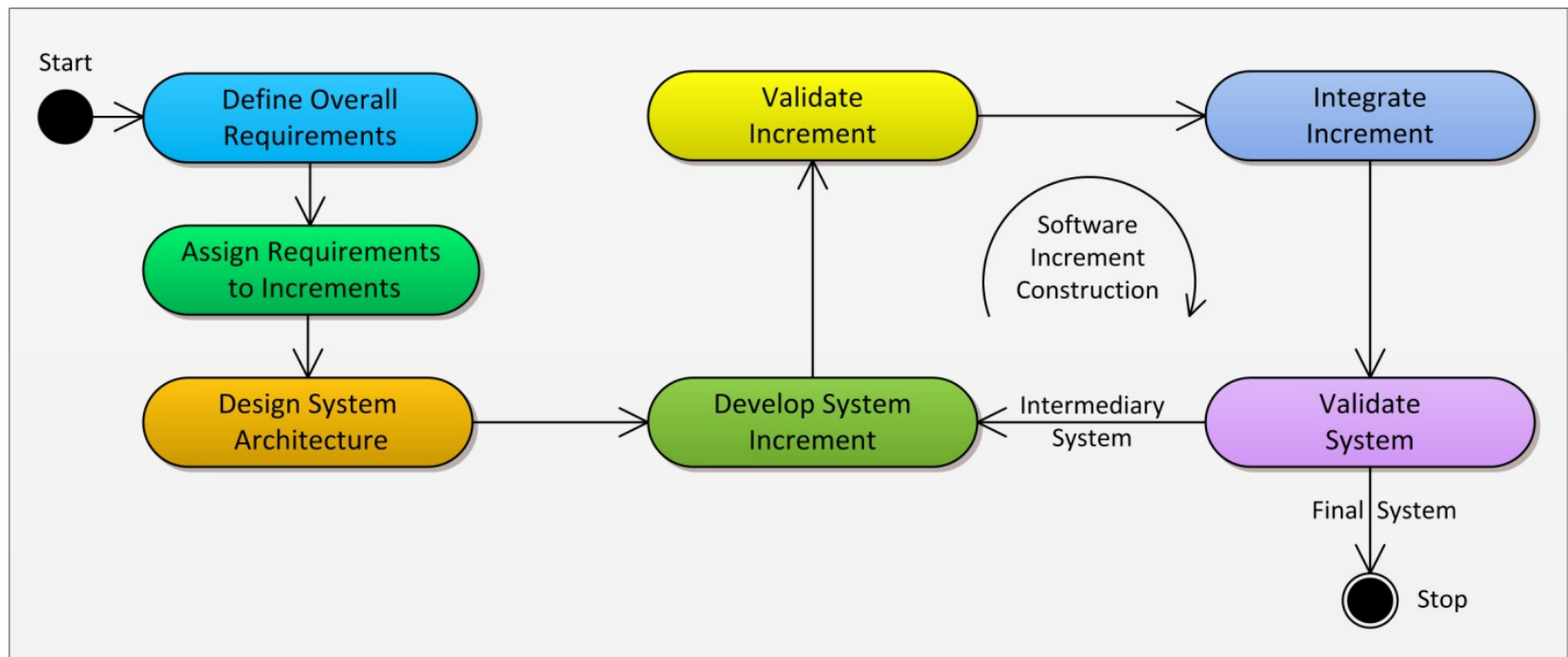
Progress: Major Upcoming Milestones

- **Data portal** (goal Year 2: *initial operational version*)
  - 2010/02: Requirements analysis & specification
  - 2010/03: Design (architecture, detailed, data, user interface)
  - 2010/06: Implementation, integration, testing
  - 2010/07: Initial operation and maintenance

- **Software frameworks** (goal Year 2: *two-model coupling*)
  - 2010/03: Research report
  - 2010/04: Requirements analysis & specification
  - 2010/05: Design (architecture, detailed, data, user interface)
  - 2010/07: Implementation 2-model coupling
  - 2010/08: Testing 2-model coupling