BREE
Basin Resilience to Extreme Events
in the Lake Champlain Basin

Cyber Update

Patrick J. Clemins
Cyber Specialist, Vermont EPSCoR
Assoc Research Professor, Dept of Computer Science

Your Cyber Team

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- Cyber Specialist
  - Patrick Clemins
- Software Developers
  - Scott Turnbull
  - Morgan Rodgers
- Technologist
  - Steve Exler
- Collaborators
  - UVM Enterprise Technology Services (ETS)
  - CISL @ NCAR

Our Support Roles

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- **Data Collection:** Automate and support the collection and management of data from the soil and lake sensor network
- **BREE Domain Scientists:** Provide software development and data management support for building and calibrating the component models of the IAM
- **The IAM Effort:** Implementing the connectivity between the component models and managing available cyberinfrastructure to effectively run the IAM
- **Collaboration:** Video conferencing and data management / sharing

Core CI Resources - Hardware

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- Compute
  - Babbage – Dell PowerEdge compute server
    - 32/64 CPU cores, 256 GB RAM
  - Pascal – NVIDIA DXG-1 GPU compute server
    - 40/80 CPU cores, 512 GB RAM, 28672 NVIDIA CUDA cores (8x Telsa GP100)
  - Cheyenne / XSEDE (i.e. Xstream)
    - National high performance computing (HPC) resources
- Data Management
  - Aquarius – Aqaurius hydrology database server
  - Aquariusws (Leopold) – LoggerNet Admin and Aquarius workstation
- Data Storage
  - raccfs (Leibnitz) – 100TB network storage

ownCloud

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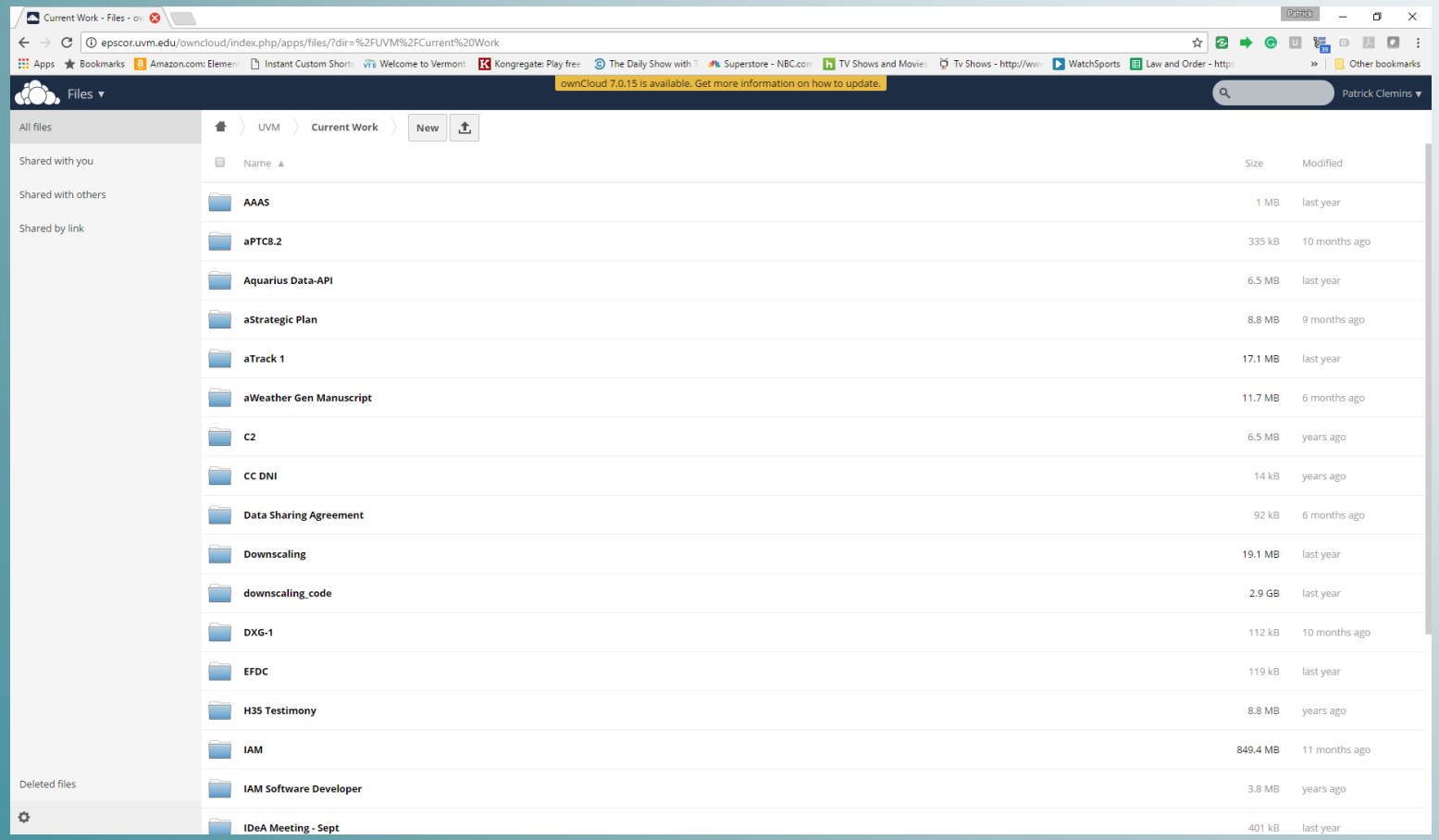
- http://epscor.uvm.edu/owncloud and desktop client
- Open-source Dropbox equivalent



LoggerNet

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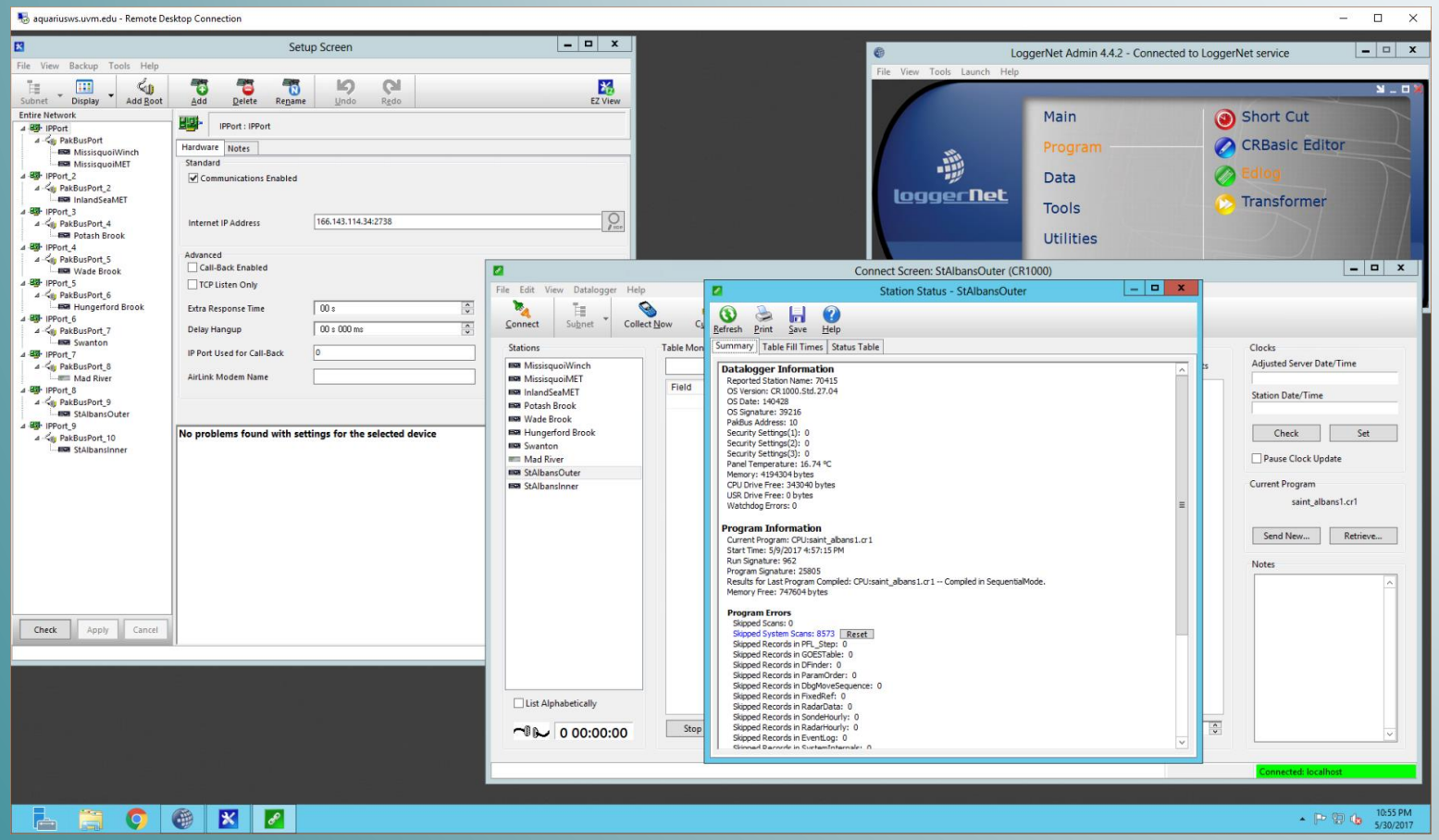
- Remote Desktop to aquariusws.uvm.edu
- Acquires data from stream and lake sensors



Aquarius

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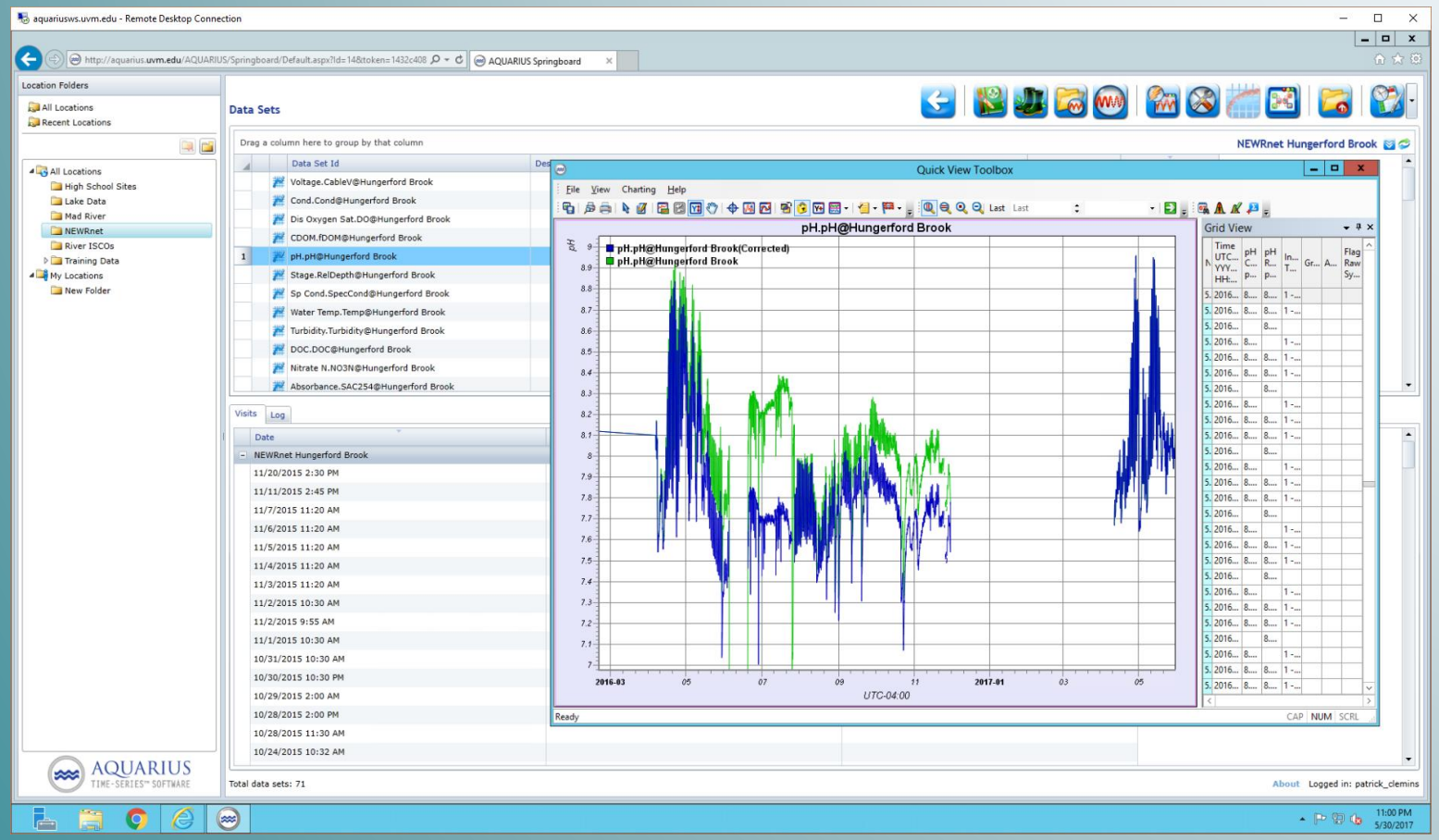
- Remote Desktop to aquariusws.uvm.edu
- Store and manage data from stream and lake sensors



Computational Workflows

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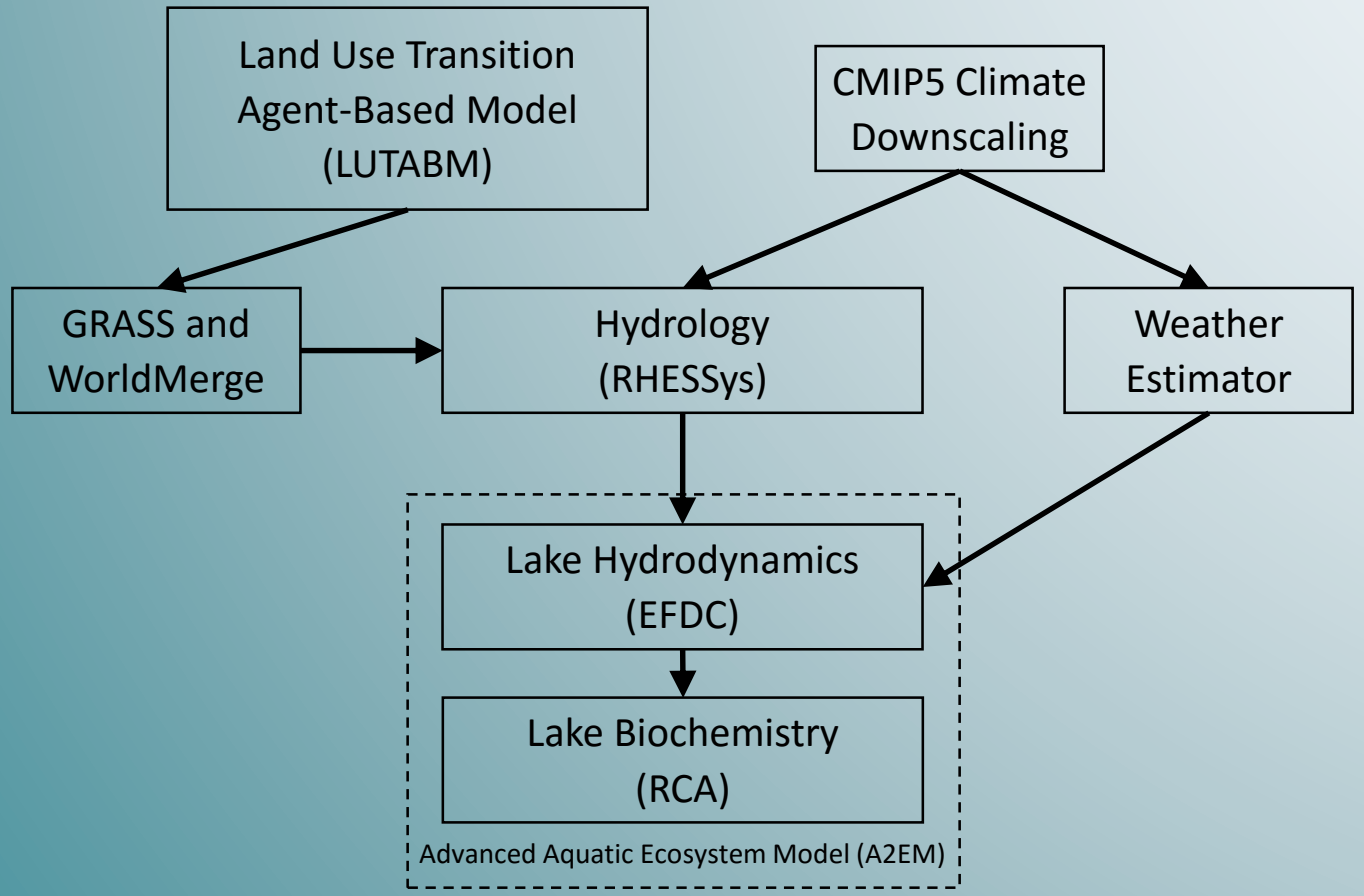
- Pegasus + HTCondor
- Build and standardize repetitive computational workflows



Delphi Survey

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- http://css2cc.org
- Adaptive intervention crowdsourcing and discussion platform

National HPC Resources

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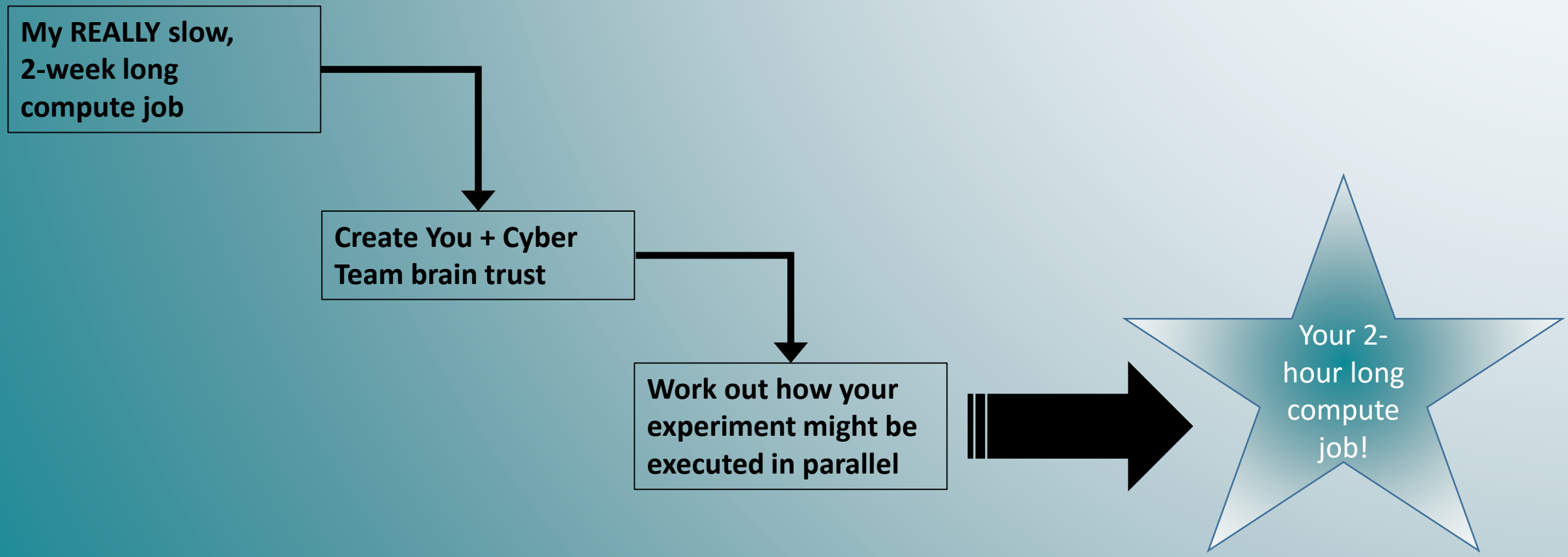
- cheyenne.ucar.edu
- 145,152 core National High-Performance Computing Resource



LimeSurvey

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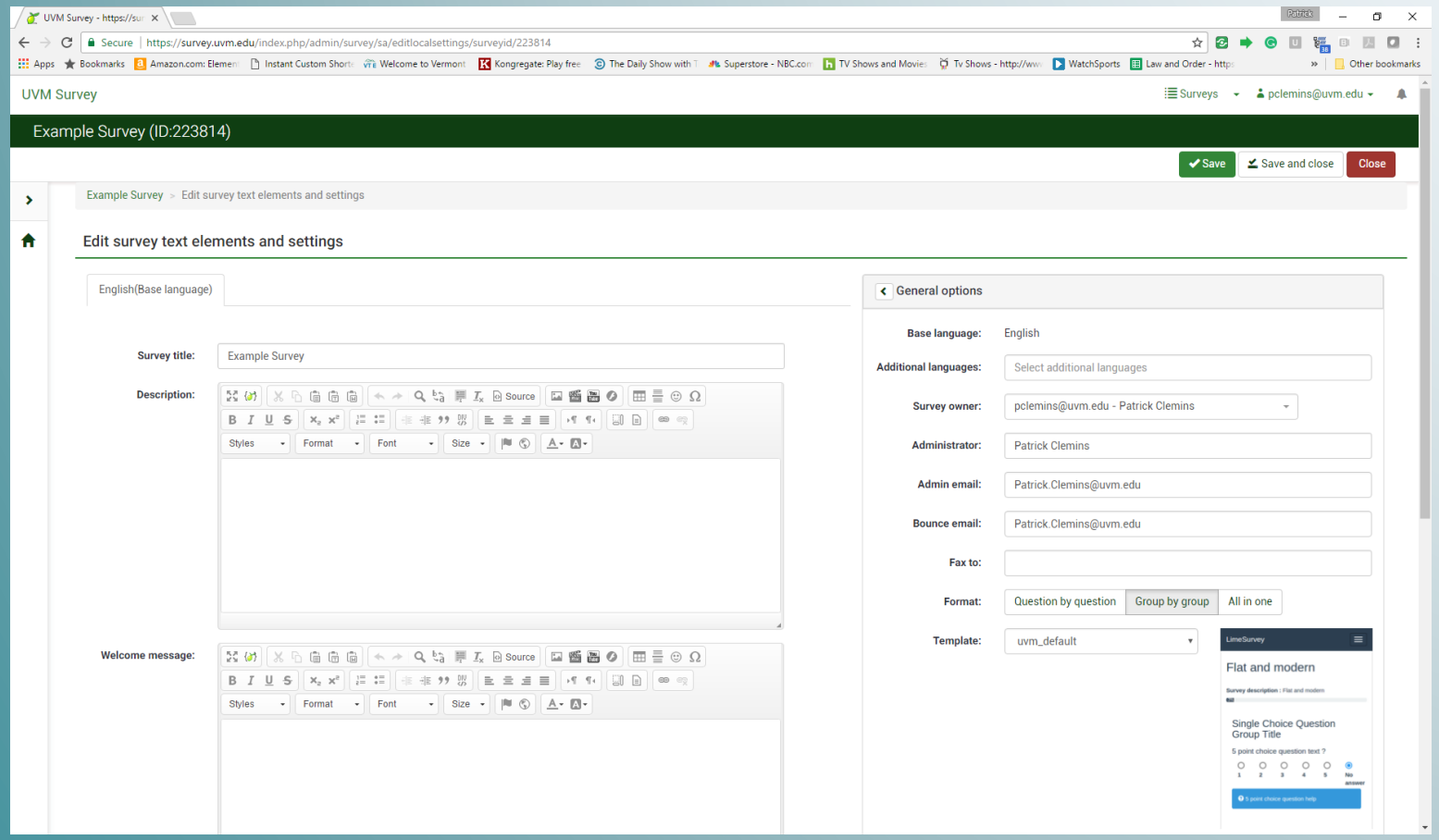
- http://survey.uvm.edu, http://survey.uvm.edu/admin to create
- Create, administer and analyze the results of your own survey



Pascal GPU-Based Processing

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- epscor-pascal.uvm.edu
- Docker containers provide deep-learning frameworks

gitlab

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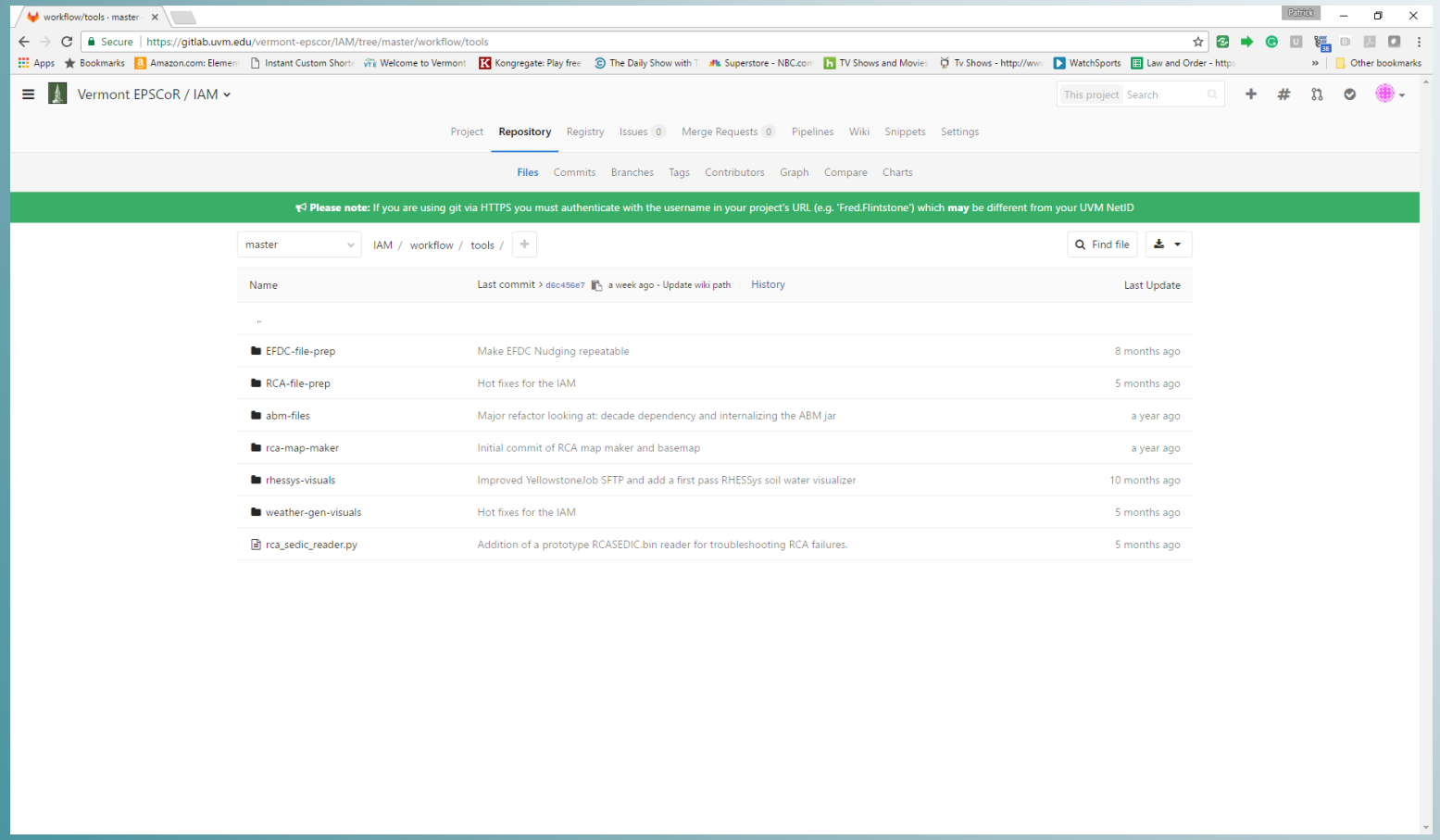
- http://gitlab.uvm.edu
- Code / Data repository, issue / task tracking, wiki



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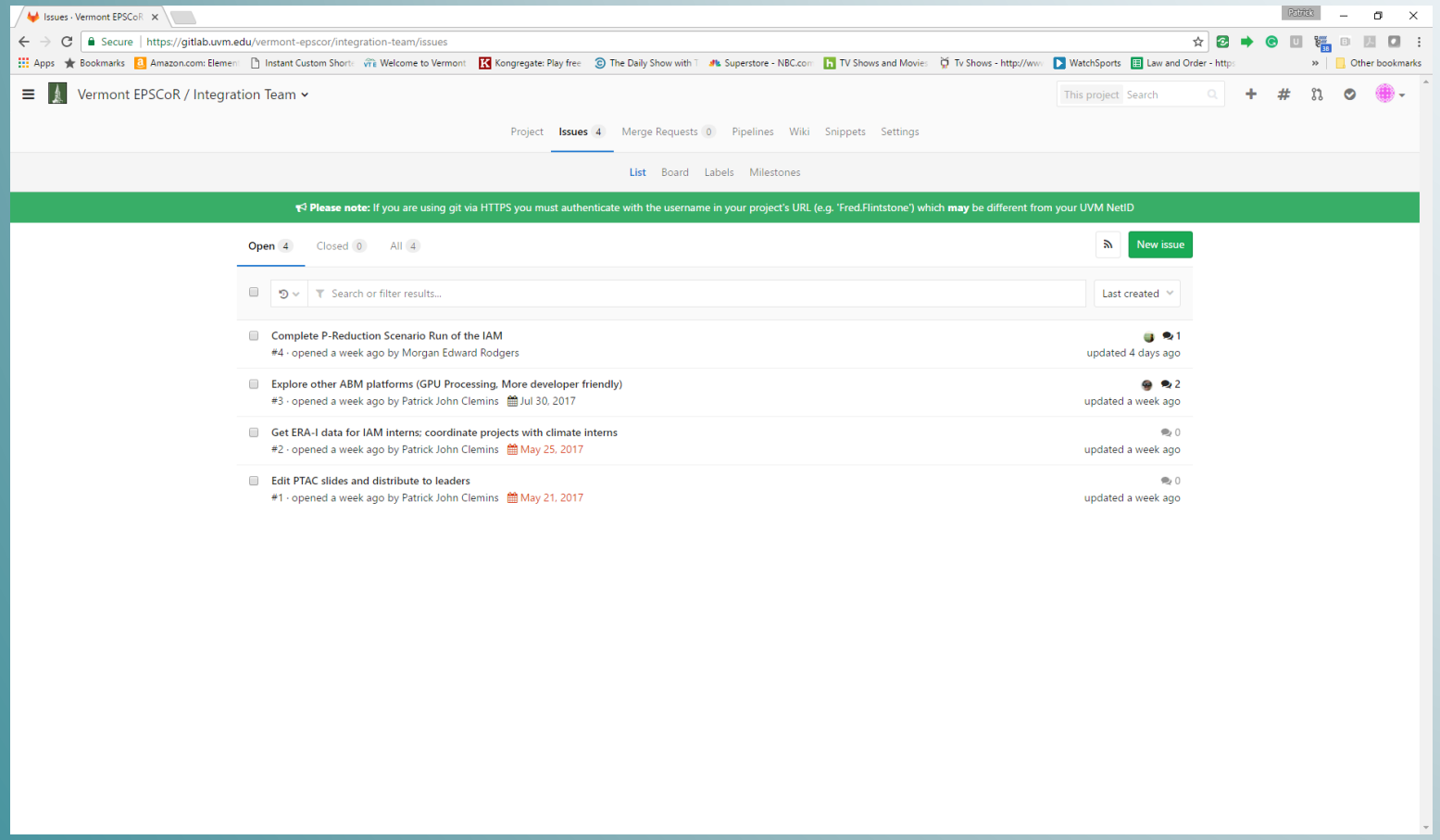

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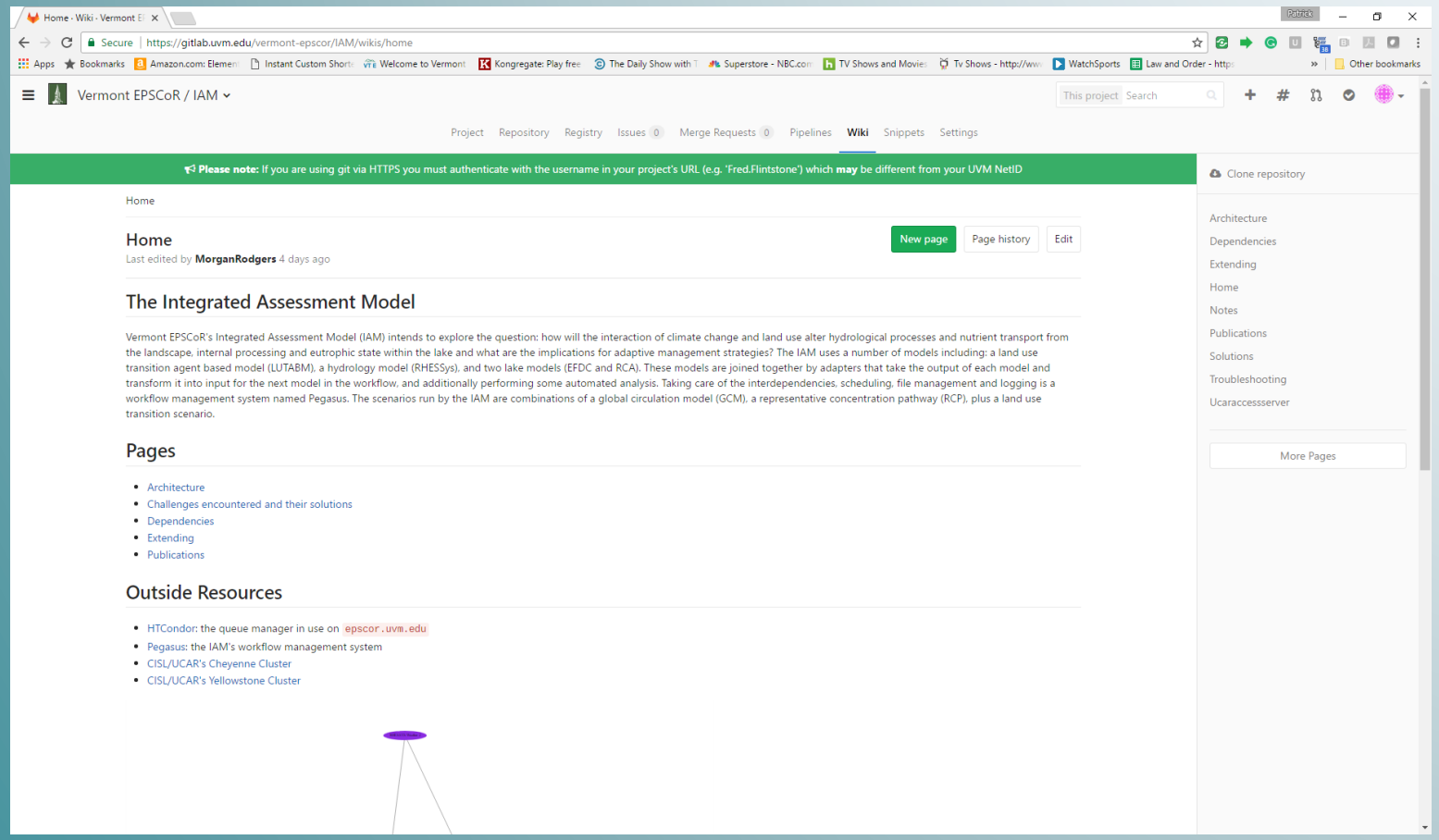

Data Sharing and Archiving

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- Data Sharing Policy reviewed annually
  - Data Sharing Agreement Template available
- CI Resources are backed up via existing ETS systems and policies
- Archiving
  - Environmental – CUAHSI
  - Social Systems – ICPSR
  - Model-Generated – UVM

BREE Strategic Plan

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- Linkages #9 – IAM Interconnections and Feedbacks
  - Collaboration with domain scientists
  - Implementation of data transfers between CI resources
- Linkages #10 – Computation
  - Expand Pegasus workflow for new domain models
  - Modify Pegasus workflow to run on UCAR's new HPC resource, Cheyenne
  - Enable GPU processing capability via Pascal and potentially, XSEDE resources if necessary

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Discussion

Cyberinfrastructure