

The Nevada Research Data Center

An Overview

Presented By

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- What is the Nevada Research Data Center (NRDC)?
- Who is involved?
- What do we do at the NRDC?
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Introduction - NRDC

- The Nevada Research Data Center (NRDC) is a scientific data management facility.
- Collaborated between three major institutions
 - UNR
 - UNLV
 - DRI



Introduction - Goals

Work

Work to connect cyberinfrastructures more closely across UNR, DRI and UNLV

Provide

Provide advanced research data management services to NSHE and the Nevada scientific community

Provide

Provide research result dissemination services to projects so that those results will reach the broader scientific community.

Introduction - History

- The NRDC was born of a previous EPSCoR Track I Grant from 2008
 - Previously known as the Nevada Climate Change Portal (NCCP)
 - Part of the NevCAN Project
 - Monitor and record climate conditions in remote places of Nevada
 - 20 million dollars
 - NevCAN sites are actively maintained and collecting data today
- In 2013, Nevada was awarded a new EPSCoR Track 1 Grant
 - This allowed for a substantial expansion from NCCP to NRDC



Introduction – Current Status

- Since then, the NRDC is covering a total of 5 Projects
 - Nexus, Walker Basin Hydroclimate, NevCAN
- Connection with external organizations
 - DataOne at Tier 4 status
- Collaboration with other groups
 - Center of Resource Economics (UNR)
 - Deforestation Hydrology Study in Lassen National Forest
- NRDC – UNLV
 - Using the collected data to process new data products with UNLV's Advance High-Powered Computing Cluster



Innovative research to achieve water efficient and environmentally friendly solar power



NRDC - UNR Staff

- Eric Fritzinger
 - Main Developer and Database Administrator
- Scotty Strachan
 - Ph.D., Environmental Data and Field Network Coordinator
- Vinh Le
 - Part-time Developer and Graduate Student
- Connor Scully-Allison
 - Part-time Developer and Graduate Student
- Hannah Muñoz
 - Part-time Developer and Graduate Student

NRDC Infrastructure - UNR

- 11 Physical Servers
 - 9 from previous grant
 - 2 from the current grant
- Currently, over 180 TB of storage capacity
- Server room provides 1 Gigabit connection to UNR Network and Internet



NRDC Infrastructure - UNLV

- Head Node
 - Processor : 2X 6-Core 2.4G Hz Xeon
 - RAM : 64 GB
 - Disk : 2X 1.2 TB SAS
- Compute Nodes
 - 10 Nodes
 - Processor : 2X 4-Core 2.5G Hz Xeon
 - RAM : 32 GB
 - Disk : 4X 1.2 TB SATA & 1X 150GB SAS



Nevada Research Data Center

Acquire and Share Research Data and Results

Featured Projects

1

2

3

4

Solar Energy-Water-Environment Nexus

The mission of Nevada's proposed Track-1 project is to advance knowledge and discovery through research on solar energy generation, its environmental impacts, and associated water issues and accelerate this research by developing new capabilities in cyber-infrastructure. Benefits include diversifying Nevada's economy, building its workforce, and developing innovative approaches to STEM education.

[Featured Projects](#)[Suggest a Dataset](#)[Submit Research Results](#)[About Us](#)

Web Interface

- Navigate to the various project websites that have been developed
- Search through the geospatial data and imagery that has been collected
- View the NRDC's image gallery
- Suggest a dataset you own to begin discussing a solution

Data Search Interface

- Primary Interface to access and examine NRDC data
- Oriented around a modified google maps API
- Data organized according to location and time of collection
- And now a demonstration!

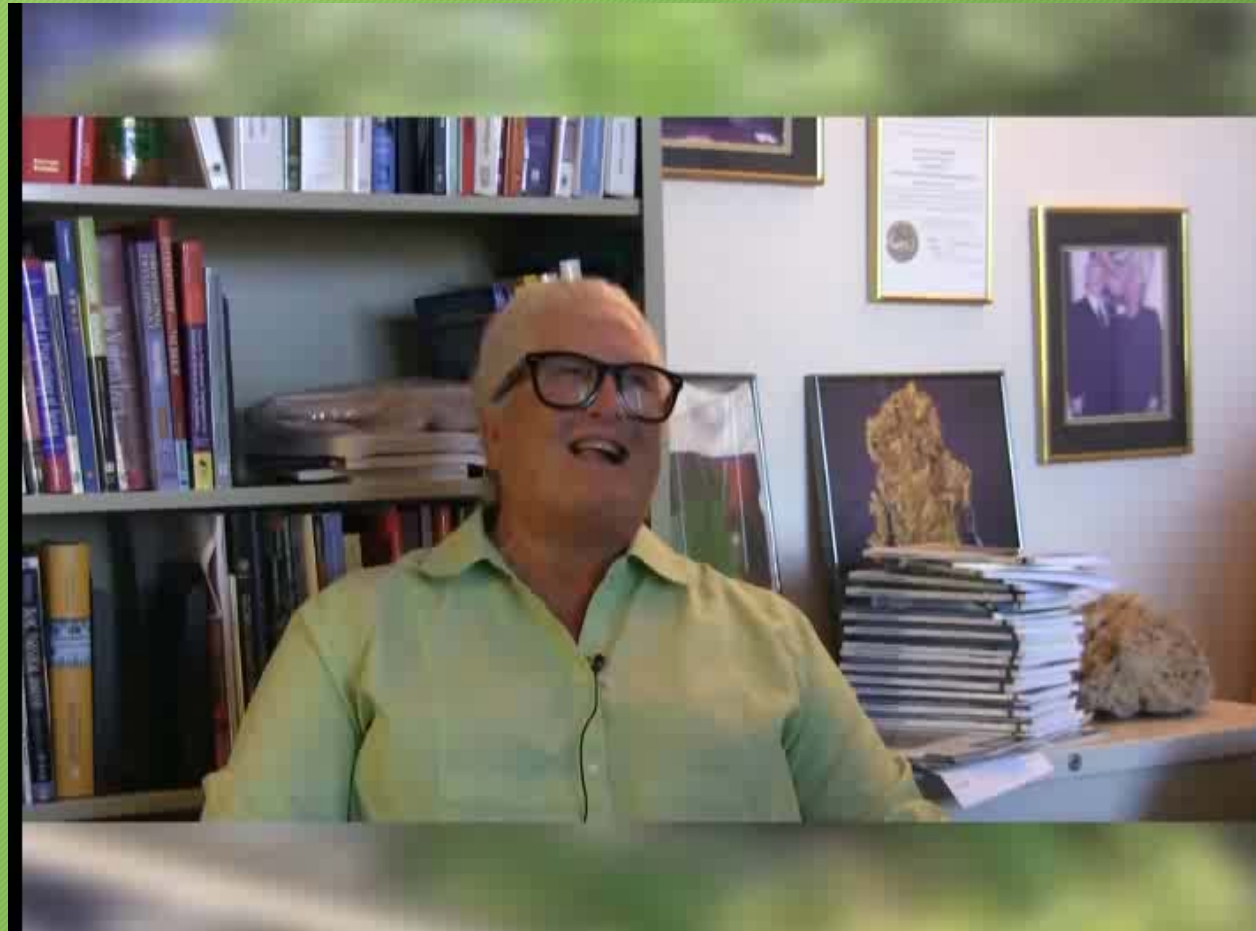
Webcam Image Archive

- Main Interface to NRDC Image Repository
- Images are extracted from each research site
 - At least 12 per site
 - Camera numbers can vary from site to site
 - Many sites are equipped with HD cameras
- And now a demonstration!

Impacts – Web Statistics

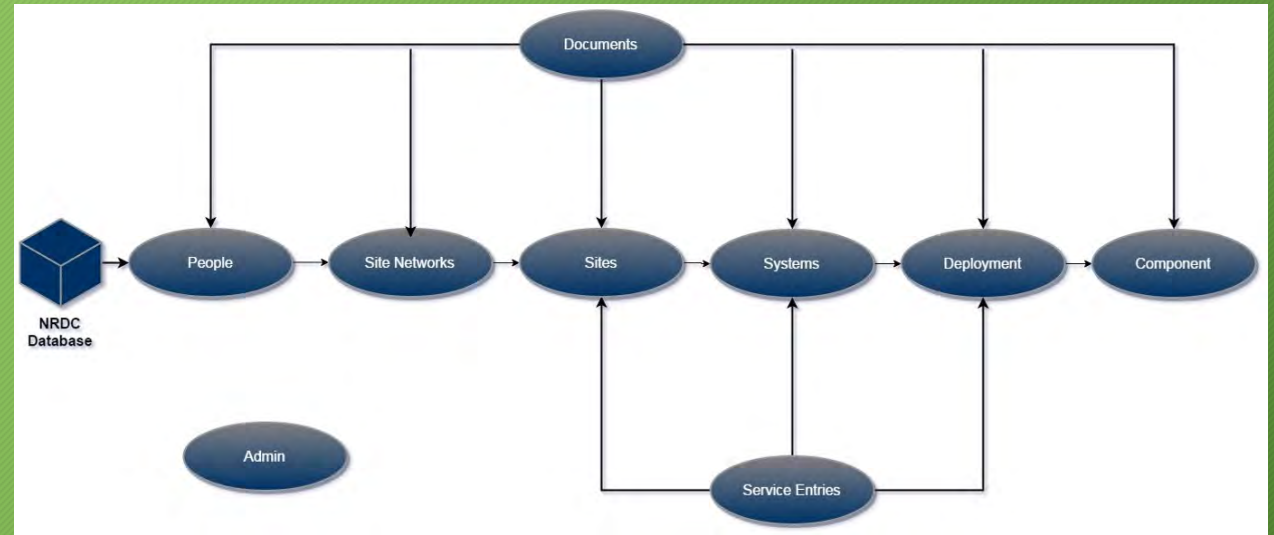
- Currently the NRDC has ~12.6 million data files containing more than 2.6 billion data points stored across its databases, and those datasets grow larger everyday
- We are currently a Tier 4 node for DataONE, meaning we replicate our data to DataONE, and they replicate other member nodes' data to our servers
- In 2016 we had more than 5000 different users visiting our websites for data and imagery
 - We maintain Google Analytics on all of our websites

Impacts – A More Personal Look



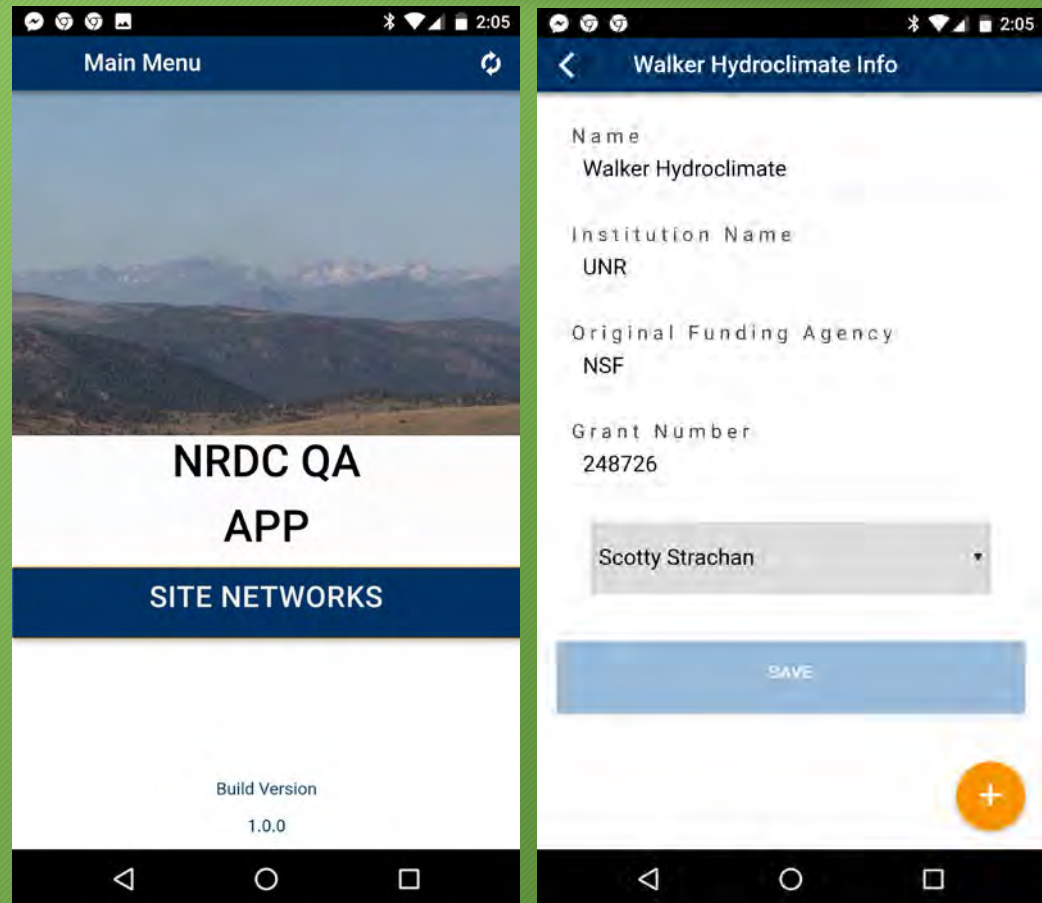
Related Projects - Microservice Architecture

- Service Oriented Design
- Enables the modular construction of software on well tested services
- Each service provides a small piece of large functionality
- Can be aggregated to create complex software packages



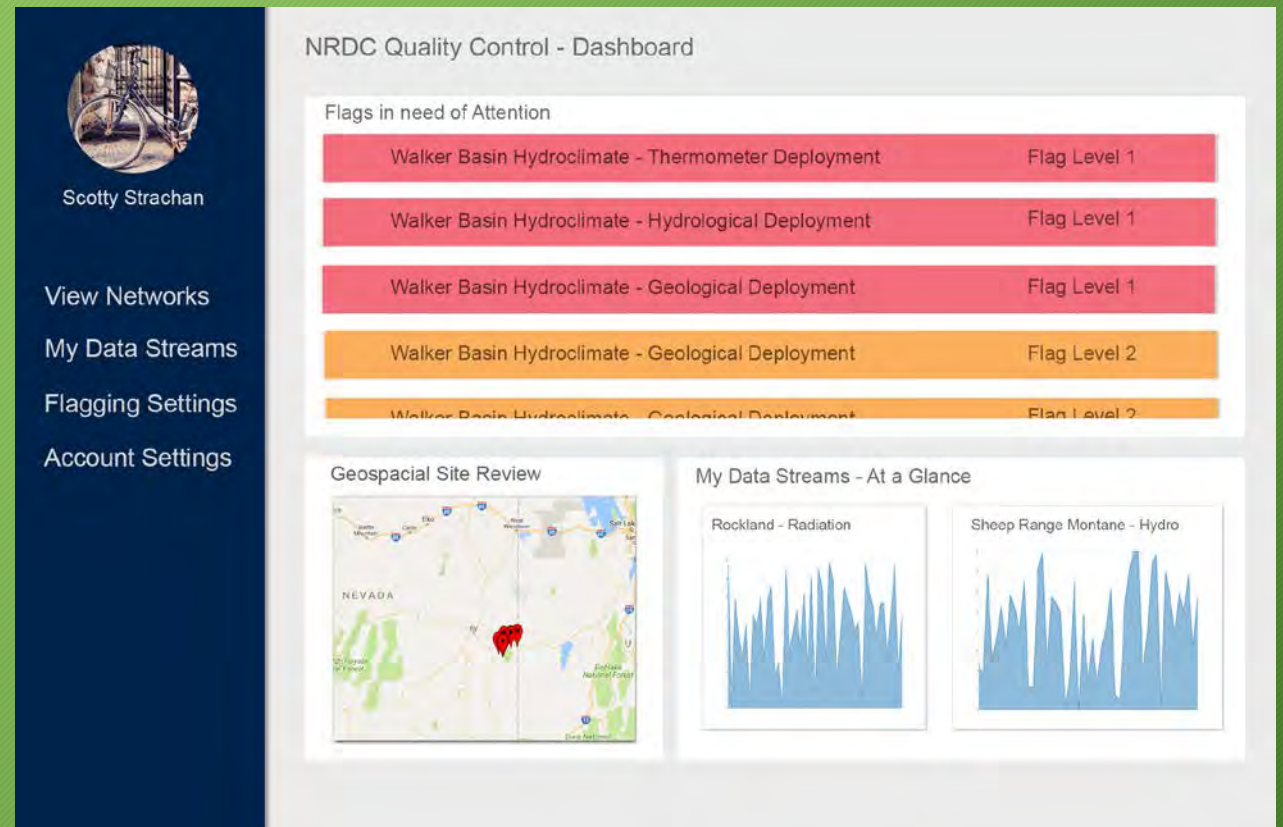
Related Projects - QA Application

- Mobile Application developed for Android and iOS
- Used by field technicians and scientists managing data collection sites
- Enables on-the-fly updates centralized databases holding metadata about these sites



Related Projects - QC Application

- Web Application currently in development
- Used by technicians, scientists, and data steward
- Provides a toolbox to ensure the integrity of collected data
- Will also provide tools for data visualization and analysis



The NRDC Process

- Once a group has defined a dataset that they wish to have managed, they contact the NRDC staff through the web interface and begin discussing their needs
- The NRDC staff will work closely with the “data owners” during this process to ensure all their needs are being met for data access and dissemination



The screenshot displays the NRDC website interface. At the top, a dark navigation bar contains links for Data, Projects, Resources, Connections, and Contact, along with a search icon. The main header area features the text "Nevada Research Data Center" and "Acquire and Share Research Data and Results". Below this is a section titled "Suggest a Dataset" with a descriptive paragraph. The form includes input fields for "Your Full Name:" and "Your Email:", followed by a large text area for "Brief Description of the Datasets:". A "Submit Suggestion" button is positioned below the text area. At the bottom of the page, a footer section contains four columns: "Featured Projects", "Suggest a Dataset", "Submit Research Results", and "About Us". The footer also includes the text "Hosted by the University of Nevada, Reno" and "Supported by NSF grant # IIA-1301726", with a "Site Map" link on the right.

Thank you!

Any questions?