Configuring and Customizing the HUBzero Experience

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Abstract

HUBzero is an open source software package used to construct websites for scientific research and educational activities. HUBzero was originally created by researchers at Purdue University in conjunction with the National Science Foundation (NSF) who sponsored the Network for Computational Nanotechnology to support nanoHUB.org. The HUBzero platform currently supports over 40 hubs across a variety of disciplines, including cancer research, biofuels, climate modeling, water quality, education, and more.

The team investigated how HUBzero features are utilized for research, education, and scientific collaboration. The project involved configuring and customizing the user experience on a new hub. The team also learned how to work with simulation workspaces, plus the process of allowing groups to collaborate. Finally, the team learned how to publish the hub so that it could be viewed publicly and how to use the new database component.

To accomplish this, the HUBzero team members used data collected by the 2013 Research Experience for Undergraduates Pasquotank River Watershed Team who completed tests of five tributaries and the river itself. Streams tested were Newbegun Creek, Knobbs Creek, Areneuse Creek, Mill Dam Creek, and Sawyers Creek. The team uploaded test data to a database to determine how HUBzero handles databases.

What is HUBzero?

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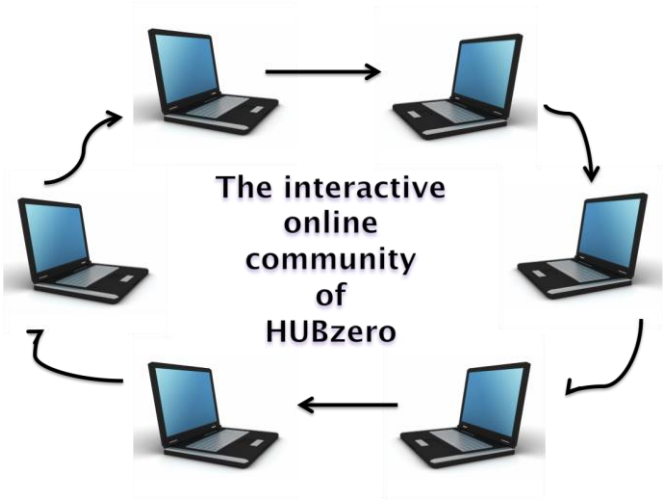
- Originally created by researchers at Purdue University in conjunction with the National Science Foundation (NSF) who sponsored the Network for Computational Nanotechnology to support nanoHUB.org.
- HUBzero is comprised of:
  - Workspaces
  - Tools
  - Various components
  - Projects
  - Groups/Users
- Created with the aim of:
  - Connecting the science community through public online interactivity
  - Supporting collaborative development



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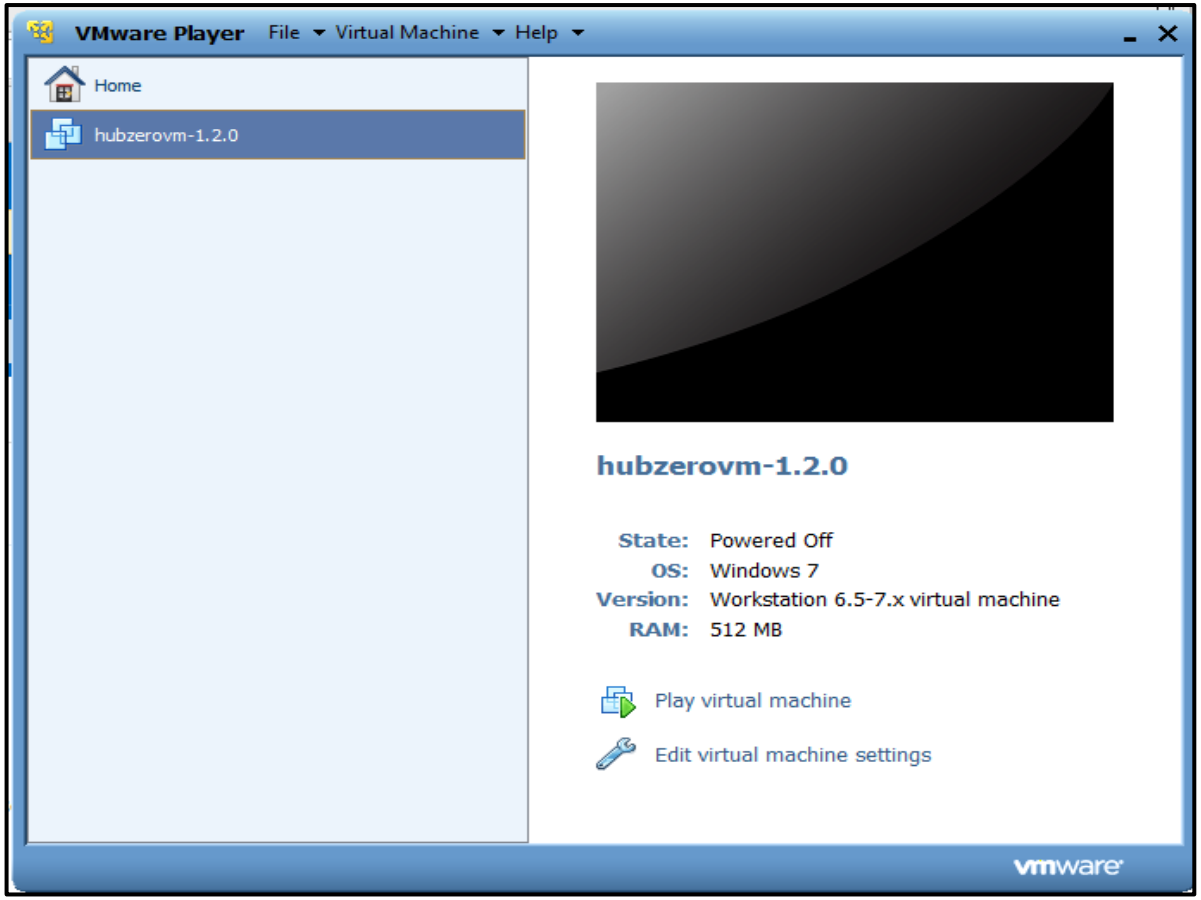
Purpose

- Acquire knowledge of HUBzero
- Investigate how HUBzero features are utilized for research, education, and scientific collaboration
- Create an interactive database for research data
- Install the hub on a computer server so that it can be viewed publicly

Downloading and Installing Software

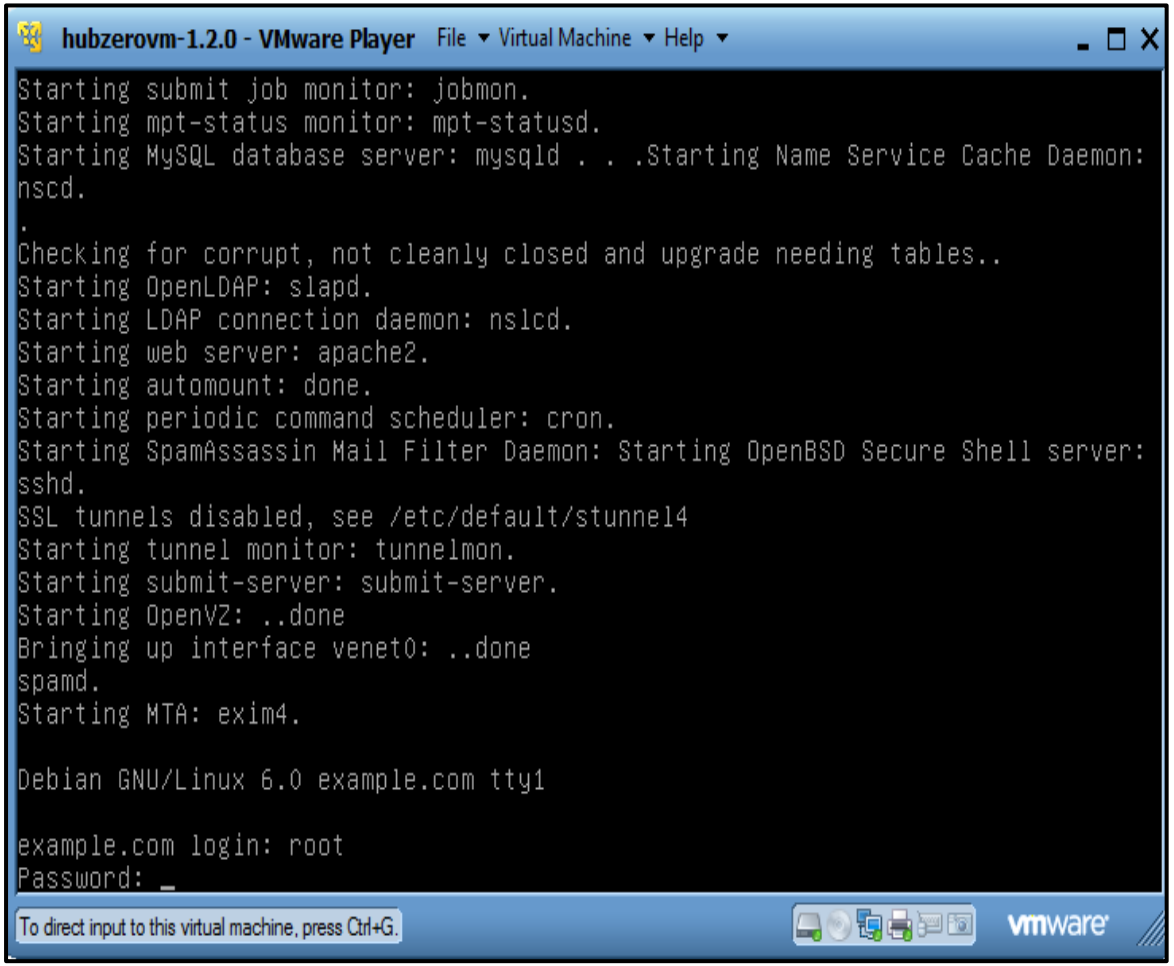


Items Downloaded:

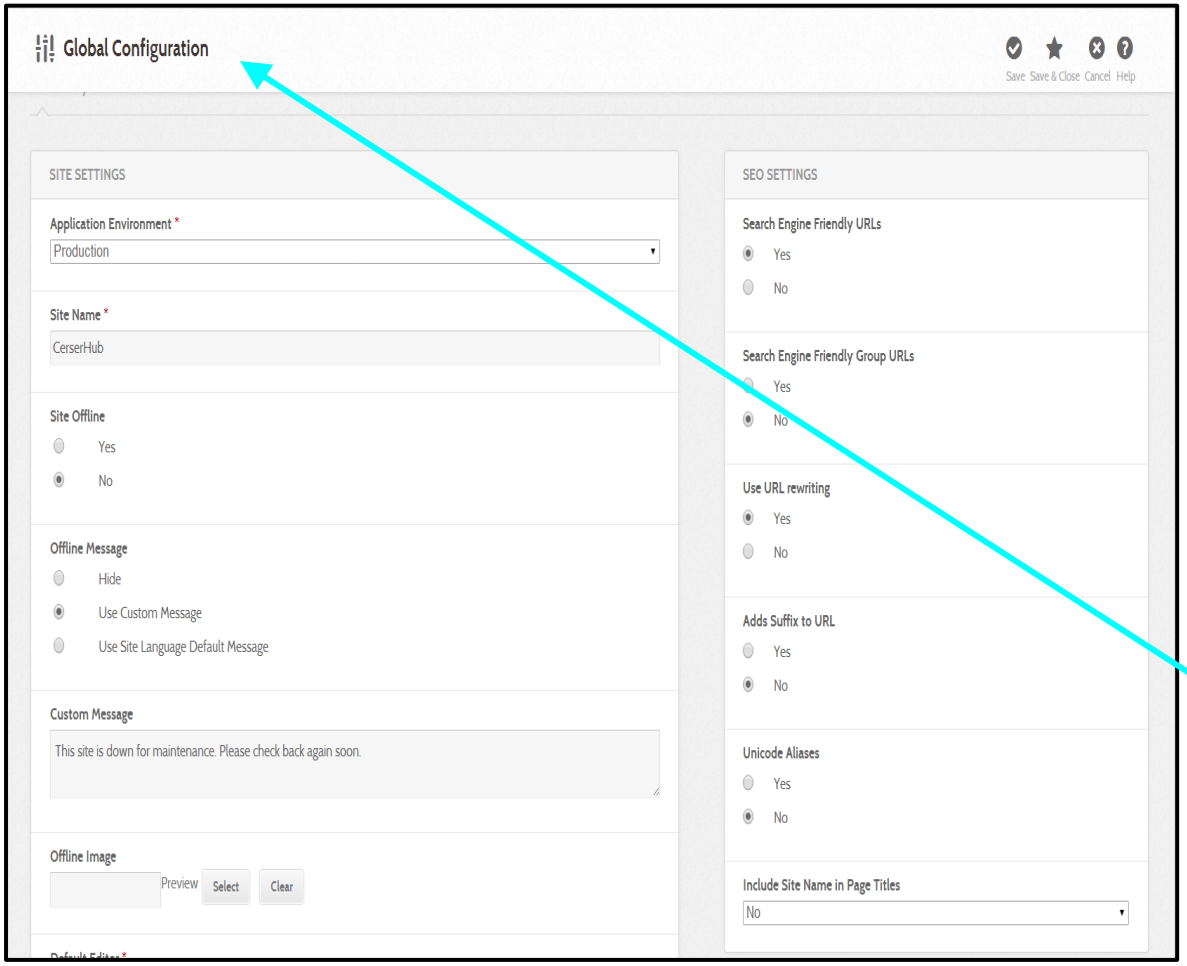
- ❑ 64-bit VM zip file
- ❑ VMplayer version 5.5
- ❑ VMware ESXi (server)

VMware Player

- VMware Player is a **virtual machine** that simulates the process of virtualization.
- Virtualization is the process in which a virtual machine acts and functions as a computer within a computer.
- VMware player is where the IP address was established.



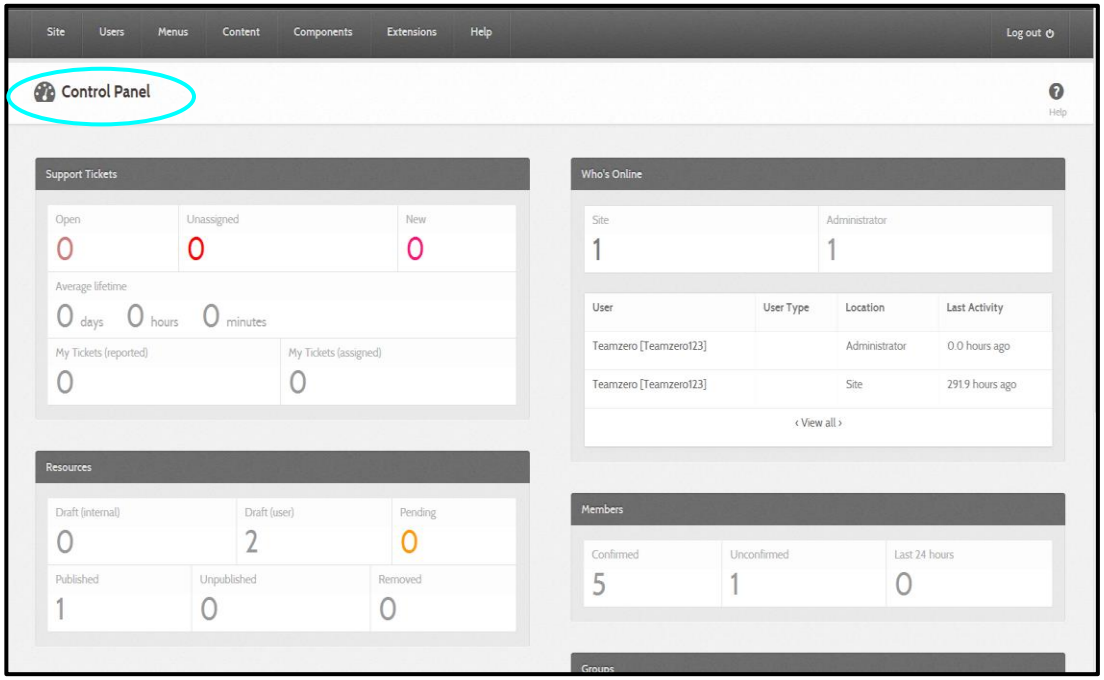
Establishing the Hub



- The team established the admin side of the hub
- The team verified given IP addresses and user/admin login information
- Using **Global Configuration** the team changed the name to CERSERhub

Further changes are made here to the interface of the website in the a**ssortment templates slate**

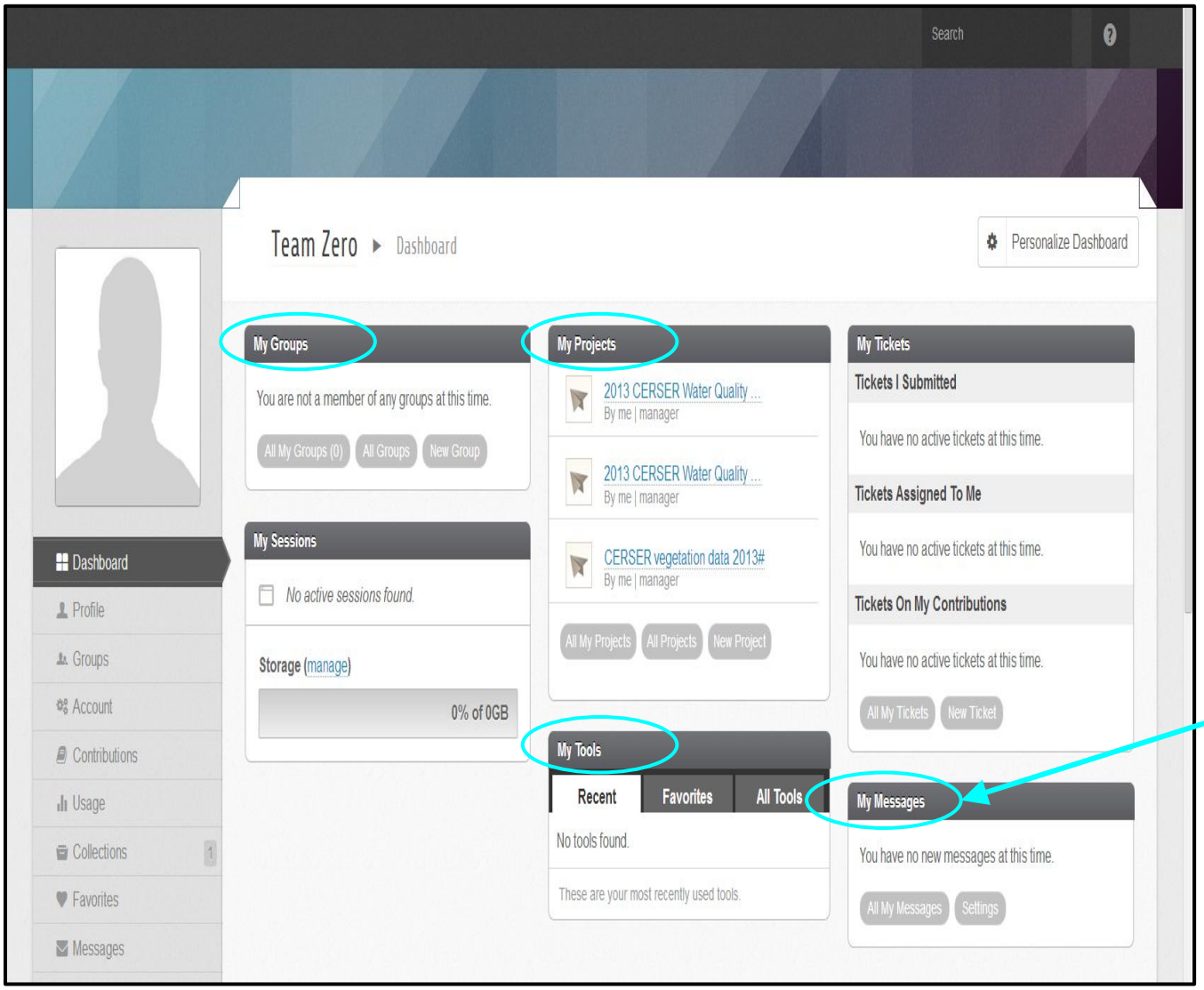
Administrative Side of the Hub



A view of the control panel from the admin side of the CERSERhub

- The **administrative "admin" side** of the hub functions as the **control center**
- The admin is also where maintenance on the hub can be performed (i.e. includes hub back-up, updates for the hub, and shut down for routine updates)
- The admin can remove and add users as well

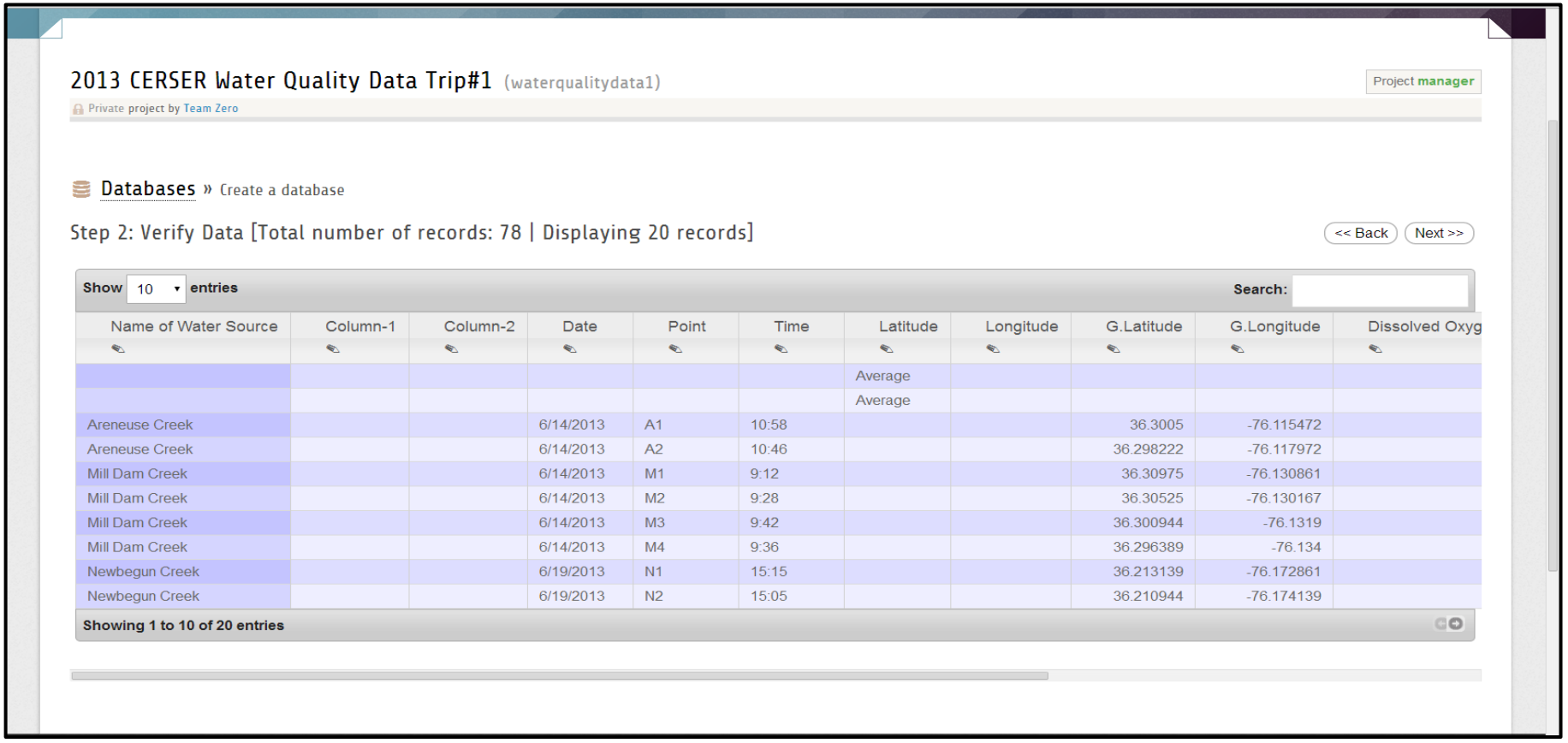
Dashboard



- Here lies the location where everything circulating the team's hub can be viewed, including: **projects**, **tools**, **groups**, files, and databases

- Profiles **messages** and account settings can be accessed as well

Database

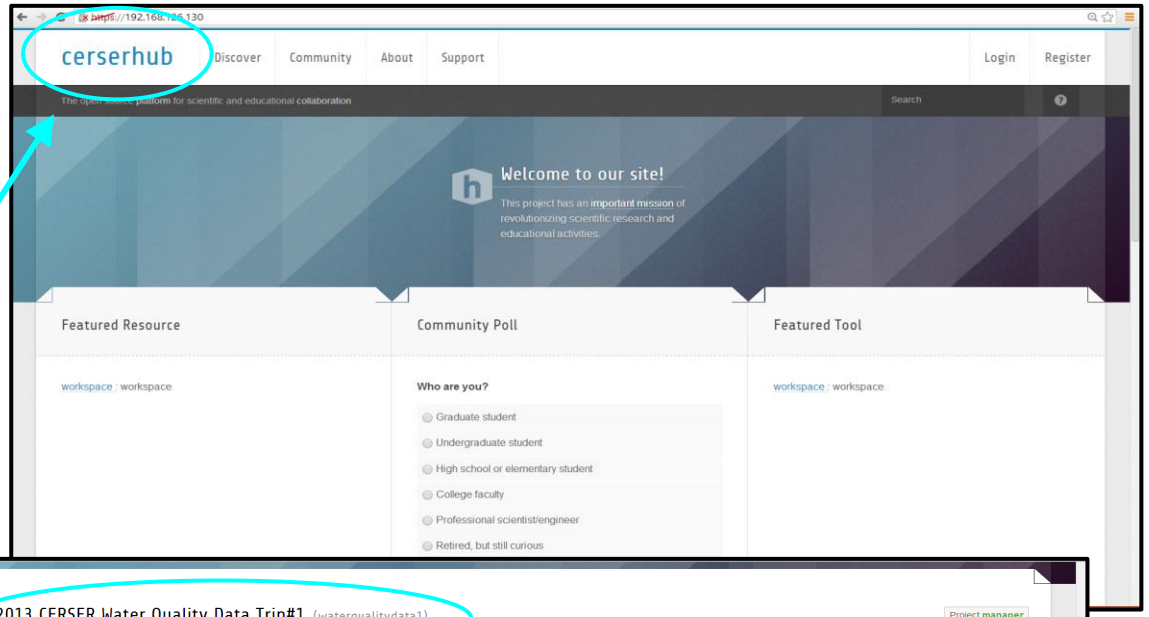


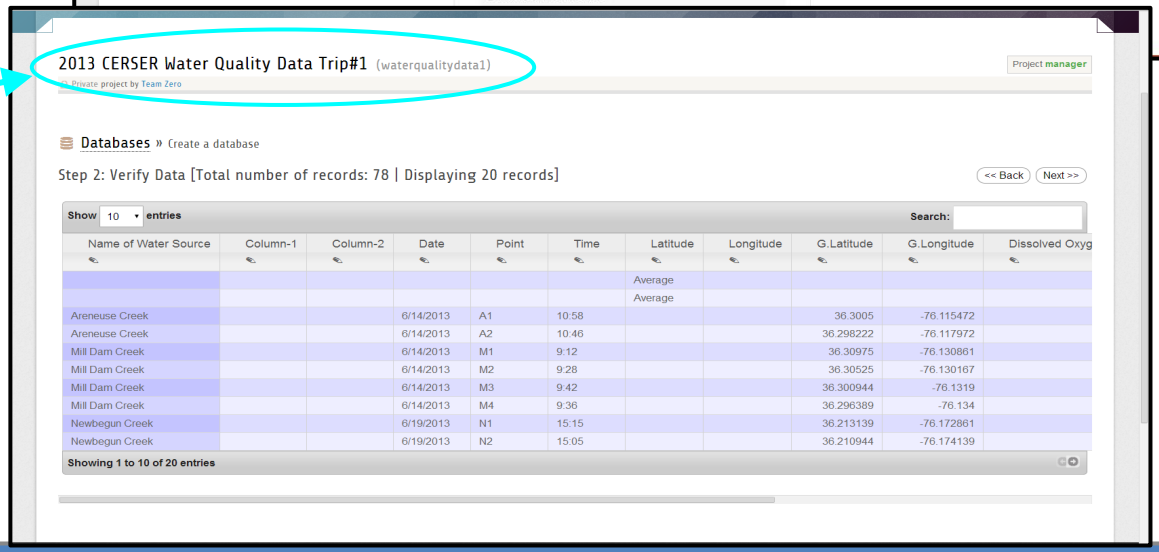
- Created project called: 2013 CERSER **Water Quality Data Trip #1**
  - Uploaded CSV spreadsheet into Files component
  - Converted uploaded file into Database component

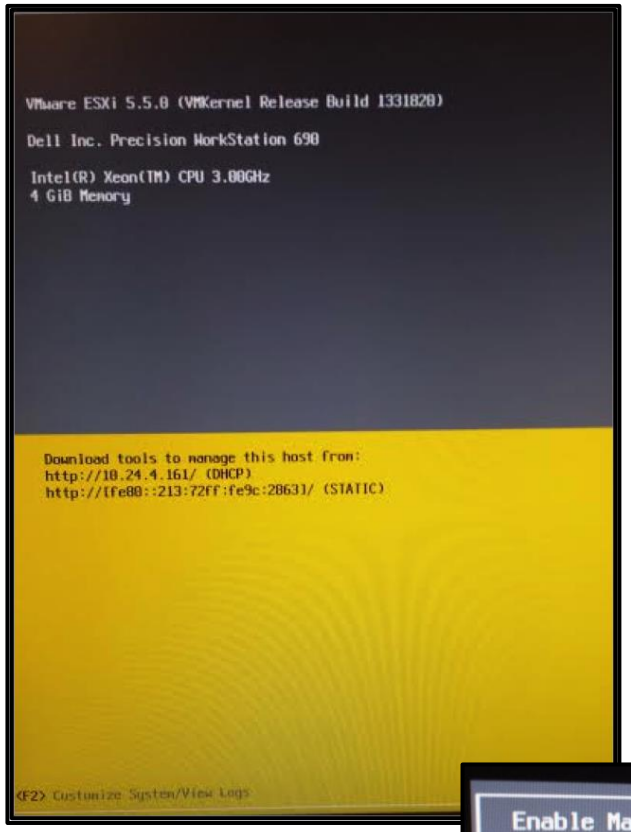
Results

Successes

- The team acquired and comprehended knowledge of HUBzero
- Created:
  - Hub and named it **CERSERhub**
  - Group, administrator, and user account logins
- Uploaded the Water Quality database into the CERSERhub







Step 2: Verify Data [Total number of records: 78 | Displaying 20 records]

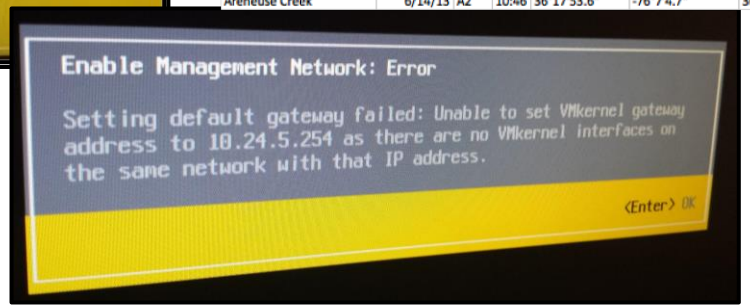
<< Back | Next >>

Show 10 entries | Search:

Name of Water Source	Column-1	Column-2	Date	Point	Time	Latitude	Longitude	G.Latitude	G.Longitude	Dissolved Oxyg
						Average				
						Average				
Areneuse Creek			6/14/2013	A1	10:58			36.3005	-76.115472	
Areneuse Creek			6/14/2013	A2	10:46			36.298222	-76.117972	
Mill Dam Creek			6/14/2013	M1	9:12			36.30975	-76.130861	
Mill Dam Creek			6/14/2013	M2	9:28			36.30525	-76.130167	
Mill Dam Creek			6/14/2013	M3	9:42			36.300944	-76.1319	
Mill Dam Creek			6/14/2013	M4	9:36			36.296389	-76.134	
Newbegun Creek			6/19/2013	N1	15:15			36.213139	-76.172861	
Newbegun Creek			6/19/2013	N2	15:05			36.210944	-76.174139	

Showing 1 to 10 of 20 entries

Name of Water Source	Date	Point	Time	Latitude	Longitude	G.Latitude	G.Longitude	Dissolved Oxygen (mg/L)	Corrected DO	pH	H2O Temp (C°)	Air Temperature
Newbegun Creek	6/19/13	N1	15:15	36°12'47.31"	-76°10'22.32"	36.21314	-76.172861	-1.5	0	7.4	25	24.9
Newbegun Creek	6/19/13	N2	15:05	36°12'39.47"	-76°10'26.87"	36.21094	-76.174139	-1.4	0.1	7.3	26	27
Newbegun Creek	6/19/13	N3	14:54	36°12'31.85"	-76°10'23.76"	36.20887	-76.173278	-1.2	0.3	6.8	27	28.2
Newbegun Creek	6/19/13	N4	14:42	36°12'24.23"	-76°10'6.39"	36.20673	-76.168442	3.5	5	7.2	28	27.5
Newbegun Creek	6/19/13	N5	14:26	36°12'36.37"	-76°9'52.63"	36.2101	-76.164619	5.1	6.6	7.2	29	27.4
Newbegun Creek	6/19/13	N6	13:24	36°12'33.41"	-76°32.34"	36.20928	-76.158972	2.1	3.6	7.2	27	29
Newbegun Creek	6/19/13	N7	13:12	36°12'44.3"	-76°9'32.4"	36.21231	-76.159	4.3	5.8	7.3	27	25
Newbegun Creek	6/19/13	N8	12:57	36°13'14.5"	-76°7'51.40"	36.22069	-76.130944	4.2	5.7	7.5	24	26
Newbegun Creek	6/19/13	N9	12:44	36°13'12.61"	-76°8'51.61"	36.22017	-76.147669	5.9	7.4	7.6	26	25
Newbegun Creek	6/19/13	N9a	12:26	36°13'18.4"	-76°8'18.6"	36.22178	-76.1385	5.8	7.3	8.1	26	26
Newbegun Creek	6/19/13	N10	12:13	36°12'52"	-76°8'58.1"	36.21444	-76.149472	6.3	7.8	8.3	26	25
Newbegun Creek	6/19/13	N11	11:59	36°13'	-76°7'21"	36.21667	-76.1225	6.7	8.2	8	25	23
				Average				**3**	**5**	**7**	**26**	**26**
Mill Dam Creek	6/14/13	M1	9:12	36°18'35.1"	-76°07'51.1"	36.30975	-76.130861	-2.1	0	6.7	25	23.5
Mill Dam Creek	6/14/13	M2	9:28	36°17'53.6"	-76°07'48.6"	36.30525	-76.130167	-1.2	0.9	6.6	26	23.8
Mill Dam Creek	6/14/13	M3	9:42	36°17'44.9"	-76°07'54.9"	36.30094	-76.1319	-0.3	1.8	7.2	25	24.4
Mill Dam Creek	6/14/13	M4	9:36	36°17'47.0"	-76°08'02.4"	36.29639	-76.134	1.8	3.9	7.1	25	22.2
				Average				**0**	**2**	**7**	**25**	**23**
Areneuse Creek	6/14/13	A1	10:58	36°18'1.8"	-76°6'55.7"	36.3005	-76.115472	-1.6	0.4	8.5	24	25.4
Areneuse Creek	6/14/13	A2	10:46	36°17'53.6"	-76°7'4.7"	36.29822	-76.117972	-2	0	7.2	27	24.1



Challenges

- The CERSERhub was not able to be completely installed on to the computer server
- The team ran into the **Default Gateway** because IP conflicts
- Data tool component of the CERSERhub manipulated the Water Quality data following upload process (i.e. omitted special characters, rearranged cells etc.)
- Data tool component of the hub would not install the full Water Quality spreadsheet so that all data could be viewed

Future Work

- Completely and successfully install CERSERhub on server
- Make database component of CERSERhub interactive
- Customize and make CERSERhub more user friendly

References

- Hands-on Tutorial: Start, Configure, and Explore a New Hub, http://hubzero.org/wiki/shortcourse2013, retrieved from the World Wide Web on January 28, 2014
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- A. G. Neeman, S. M. Gallo, E. Efstathidis Collaborative Research in a Regional Grid: Using HUBzero to Facilitate Collaboration

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Questions?