

Accessing data from BIHO

using SWARM and CWBQuery

july 2016

About BIHO

- Currently, data from all of our stations (**with the exception of GRWE**) is being telemetered to, and stored on, the BIHO server in room 440
- **BIHO IP: 128.138.152.38**
- Computer hardware and CU Firewall configurations are maintained by CIRES IT (trouble@cires.colorado.edu).
 - Contact them for login user names etc.
 - Many data access issues have been associated with CU's firewall which they can help with
- CWB and other BIHO data servers are maintained by Dave Ketchum at USGS (ketchum@usgs.gov).

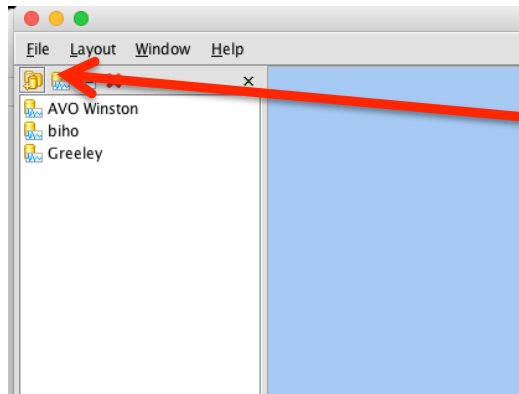
About SWARM

- A fancy helicorder and waveform viewer that makes easy work of navigating through and manipulating waveforms
- Download the latest version here:
 - <http://volcanoes.usgs.gov/software/swarm/download.php>
 - it's also installed on BIHO
- A manual comes in the package you download and you can also view it here: http://volcanoes.usgs.gov/software/doc/swarm_v2.pdf
- Pros:
 - automatic, real time data updates
 - easy filtering and switching between filters
 - sweet spectra and spectrogram view options
 - easy navigation through time and zoom features
 - easy comparisons between channels and/or stations
 - convenient screen capture features
- Cons:
 - software runs a little clunky sometimes
 - not able to pick arrivals or save filter settings
 - makes really weird .sac files (so don't use it to make .sac files if you want to actually run them in SAC)

BIHO data on SWARM

- If you read a little about SWARM you'll see that it pulls data directly off a server by it's IP address
- If you are using SWARM from your own computer **you must either be on campus or use VPN**
- BIHO runs a Winston Wave Server (WWS)
 - IP: 128.138.152.38
 - port: 2060
- GRWE can be seen in SWARM but must be accessed from an IRIS or USGS server

BIHO data on SWARM



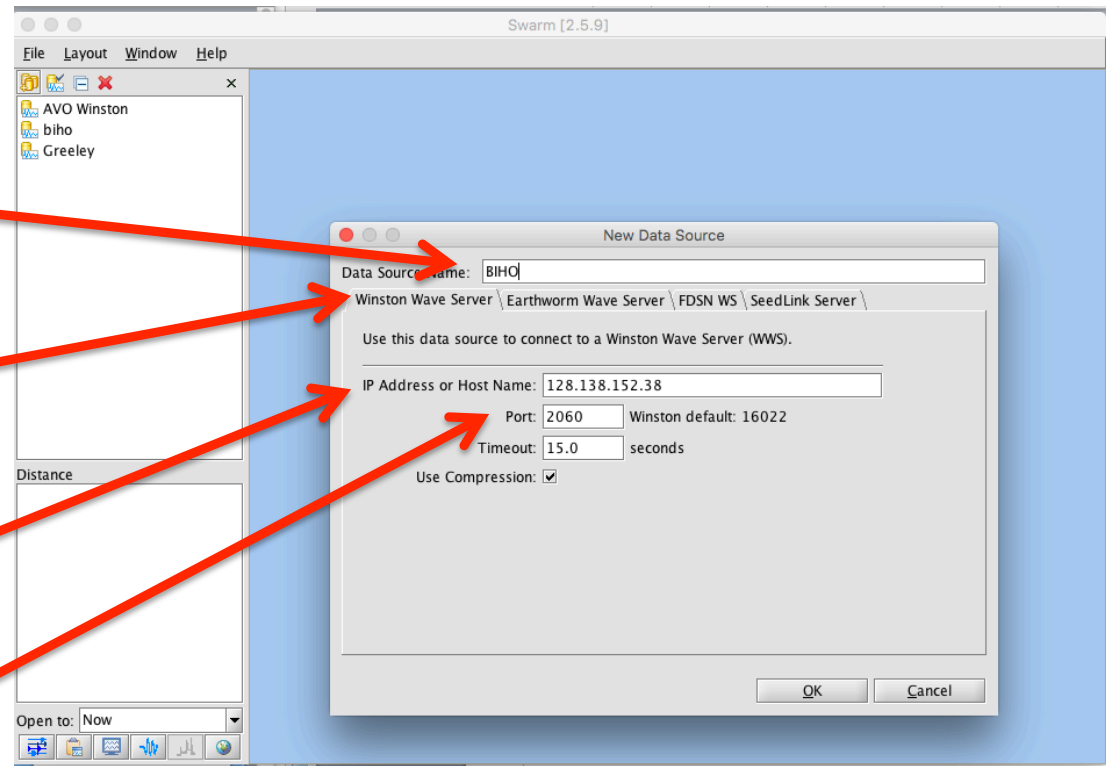
click this icon to
add new data
source

choose a name

select Winston
Wave Server tab

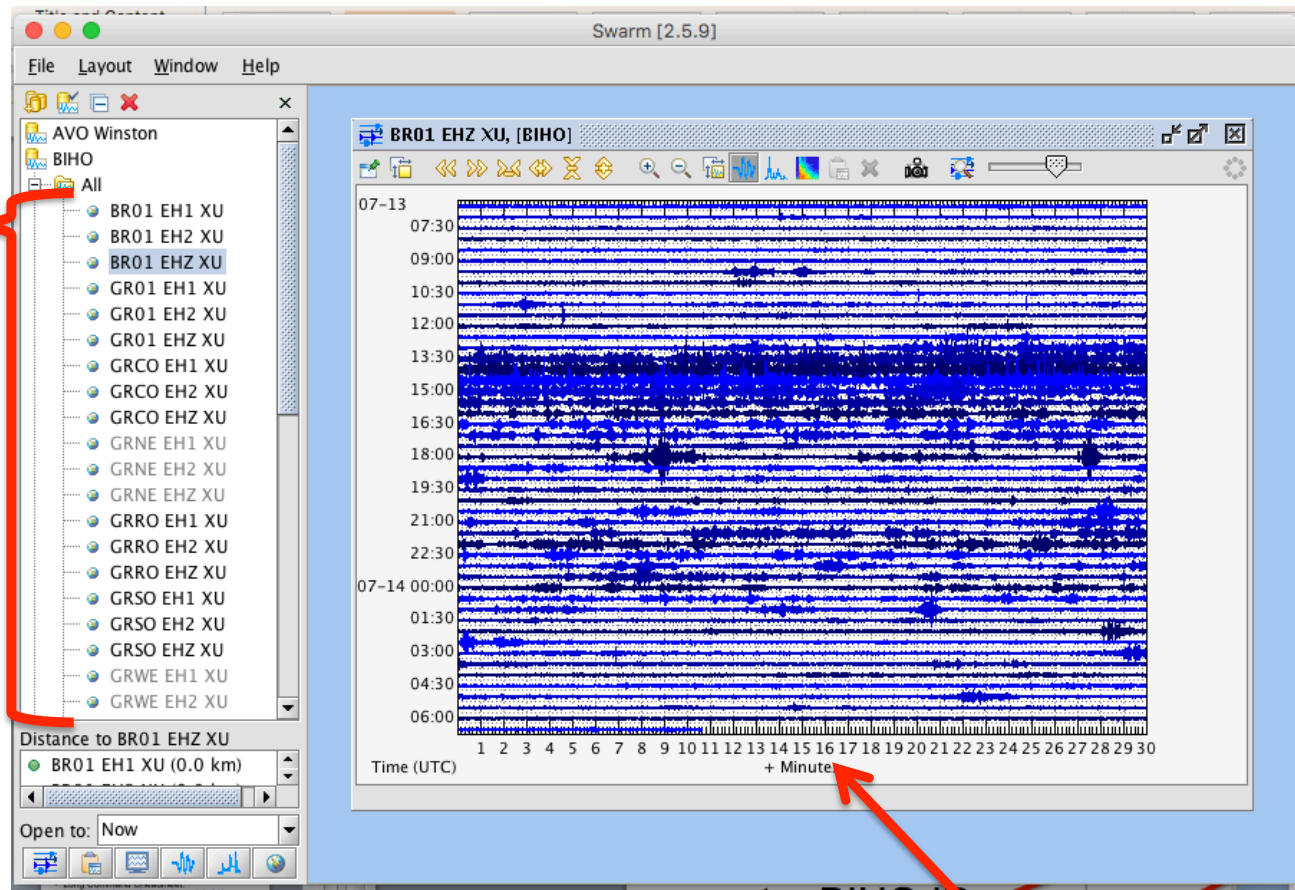
enter BIHO IP

port 2060



BIHO data on SWARM

Ta-da!
our channels.



helicorder

GRWE data on SWARM

choose a name

Choose FDSN WS tab

enter info for IRIS
server (should be
default), then click
update

pick either of
these XU
Greeley networks

(optional) GRWE in station
field. If you don't enter a
station you'll get all our
stations from IRIS

The screenshot shows the 'New Data Source' dialog box. Red arrows point to the following elements:

- 'Data Source Name' field containing 'GRWE'.
- 'FDSN WS' tab in the server selection bar.
- 'Dataset URL' field containing 'http://service.iris.edu/fdsnws/datasetselect/1/query'.
- 'Station URL' field containing 'http://service.iris.edu/fdsnws/station/1/query'.
- 'Update' button.
- 'Network' dropdown menu showing '1A,Waste Isolation Pilot Plant Noise Analysis'.
- 'Station' dropdown menu showing 'XU,Colorado BB Array - Lodore'.
- 'Channel' dropdown menu showing 'XU,USGS NEHRP Proposal 2016-2018 - Greeley, CO'.
- 'Location' dropdown menu showing 'XU,Greeley, Colorado RAMP deployment June 2014'.
- 'Station' field in the bottom right containing 'GRWE'.
- 'Channel' field in the bottom right.

The dialog box also contains the following text:

Use this data source to connect to an FDSN Web Services server.

Enter Station, Channel, Network and Location. An empty field is the same as '*'. Use -- for an empty location code. Wildcards ("?" for any single character and "*" for zero or more characters) and comma-separated lists are accepted. All Networks channels will not be displayed on the map.

GRWE data on SWARM

- Older versions of SWARM may not have have the “FDSN WS” tab
- GRWE can also be accessed on SWARM through IRIS’s SeedLink server:
 - <http://ds.iris.edu/ds/nodes/dmc/services/seedlink/>

About CWBQuery

- Quick access to telemetry/latency information on stations
- Retrieves data from BIHO in various formats (such as SAC, miniSEED, etc...)
- Runs on BIHO through command line
 - can use it from other computers by ssh-ing into BIHO
- Command Cheatsheet (short):
<https://github.com/usgs/edgecwb/wiki/CWBQuery-Cheatsheet>
- More complete documentation:
<https://github.com/usgs/edgecwb/wiki/CWBQuery>

BIHO data through CWBQuery

```
Kyren — kyren@biho-biho: /home/kyren — biho-biho — ssh -Y kyren@128.138.152.38 — 75x32
Last login: Wed Jul 13 23:03:57 on ttys001
[cy-vpn-colorado-edu-198:~ Kyren$ ssh -Y kyren@128.138.152.38
[kyren@128.138.152.38's password:
Last login: Wed Jul 13 23:04:31 2016 from cu-vpn-colorado-edu-198.11.30.182
.int.colorado.edu
[biho::kyren:~>ls
anss.prop      Downloads/    Music/       query.prop    swarm/
chandisp.prop  edgecon.prop Pictures/     ringserver/   swarm.tar
Desktop/       edge.prop    Public/      ringserver.tar Templates/
Documents/     msread.prop query        SESSION.OUT   Videos/
[biho::kyren:~>query -t sac -s XUPV -b "2016/06/26 02:06" -d 120
05:05:24 Query on XUPV01 EH1  000038 mini-seed blks 2016 178:02:05:57.4700
2016 178:02:08:01.110 ns=12365 #dups=0
05:05:24.252 StaSrv: Open new socket 137.227.224.97.2052
05:05:24 Query on XUPV01 EH2  000047 mini-seed blks 2016 178:02:05:59.5300
2016 178:02:08:01.400 ns=12188 #dups=0
05:05:24 Query on XUPV01 EHZ  000035 mini-seed blks 2016 178:02:05:57.5900
2016 178:02:08:02.710 ns=12513 #dups=0
120 Total blocks transferred in 396 ms 303 b/s 0 #dups=0
[biho::kyren:~>ls
anss.prop      edgecon.prop Public/      SESSION.OUT  XUPV01_EH1___.sac
chandisp.prop  edge.prop    query       swarm/        XUPV01_EH2___.sac
Desktop/       msread.prop query.prop   swarm.tar     XUPV01_EHZ___.sac
Documents/     Music/       ringserver/ Templates/
Downloads/     Pictures/    ringserver.tar Videos/
[biho::kyren:~>
```

SSH or open
terminal window
on BIHO

enter query
command

Ta-da!
SAC files

BIHO data through CWBQuery

select stations and channels (wild cards allowed, see additional documentation)

time duration in seconds

```
~>query -t sac -s XUPV -b "2016/06/26 02:06" -d 120
```

choose output
file type

specifies beginning date
and time

Lots and lots and lots more info!

<https://github.com/usgs/edgecwb/wiki/CWBQuery-Cheatsheet>

<https://github.com/usgs/edgecwb/wiki/CWBQuery>

rtpd_biho_training.pdf from Dave Ketchum

just type **query** into command line

A particularly handy command:

```
biho::kyren:~>query -lsc
05:22:43.870 localhost/2061 line='-lsc':
There are 39 channels
XUBR01 EH1 #days=15 16_182-16_196
XUBR01 EH2 #days=15 16_182-16_196
XUBR01 EH3 #days=15 16_182-16_196
XUGR01 EH1 #days=12 16_182-16_189 16_193-16_196
XUGR01 EH2 #days=12 16_182-16_189 16_193-16_196
XUGR01 EH3 #days=12 16_182-16_189 16_193-16_196
XUGRC0 EH1 #days=14 16_183-16_196
XUGRC0 EH2 #days=14 16_183-16_196
XUGRC0 EH3 #days=14 16_183-16_196
XUGRNE EH1 #days=1 16_182
XUGRNE EH2 #days=1 16_182
XUGRNE EH3 #days=1 16_182
XUGRR0 EH1 #days=8 16_183-16_184 16_189-16_191 16_194-16_196
XUGRR0 EH2 #days=8 16_183-16_184 16_189-16_191 16_194-16_196
XUGRR0 EH3 #days=8 16_183-16_184 16_189-16_191 16_194-16_196
XUGRS0 EH1 #days=7 16_190-16_196
XUGRS0 EH2 #days=7 16_190-16_196
XUGRS0 EH3 #days=7 16_190-16_196
XUGRWE EH1 #days=6 16_189-16_194
XUGRWE EH2 #days=6 16_189-16_194
XUGRWE EH3 #days=6 16_189-16_194
XUHU01 EH1 #days=8 16_182-16_189
XUHU01 EH2 #days=8 16_182-16_189
XUHU01 EH3 #days=8 16_182-16_189
XUKE01 EH1 #days=15 16_182-16_196
XUKE01 EH2 #days=15 16_182-16_196
XUKE01 EH3 #days=15 16_182-16_196
XUKE02 EH1 #days=15 16_182-16_196
XUKE02 EH2 #days=15 16_182-16_196
XUKE02 EH3 #days=15 16_182-16_196
XULS01 EH1 #days=15 16_182-16_196
XULS01 EH2 #days=15 16_182-16_196
XULS01 EH3 #days=15 16_182-16_196
XULS02 EH1 #days=15 16_182-16_196
XULS02 EH2 #days=15 16_182-16_196
XULS02 EH3 #days=15 16_182-16_196
XUPV01 EH1 #days=15 16_182-16_196
XUPV01 EH2 #days=15 16_182-16_196
XUPV01 EH3 #days=15 16_182-16_196

There are 39 channels ncomp=0 # stations=13 today=16_196
biho::kyren:~>
```

query -lsc

lists every active channel and it's dates of availability for the last 15 days. use **-b** and **-d** arguments to specify other start times and durations.

this can be helpful for identifying what data can be retrieved with the query command for a particular time interval

available Julian days (within last 15 days or specified range)

GRWE or GRES data through CWBQuery

GRWE data or old GRES data (GRES available until 2016:182 when station was demobilized) are accessed by pointing the query command to the CWB at the USGS (IP 137.227.224.97)

just add `-h 137.227.224.97` to the command arguments

```
biho::kyren:~>query -t sac -s XU -h 137.227.224.97 -d 120 -h 137.227.224.97
05:57:59.696 -h 137.227.224.97
05:58:10 Query on XUGRES EH100 000048 mini-seed blks 2016 178:02:05:59.3150 2016
178:02:08:02.435 ns=12313 #dups=0
05:58:10.647 StaSrv: Open new socket 137.227.224.97.2052
05:58:10 Query on XUGRES EH200 000046 mini-seed blks 2016 178:02:05:58.7450 2016
178:02:08:02.375 ns=12364 #dups=0
05:58:10 Query on XUGRES EH200 000057 mini-seed blks 2016 178:02:05:58.6330 2016
178:02:08:01.365 ns=12274 #dups=0
05:58:10 Query on XUGRWE EH100 000038 mini-seed blks 2016 178:02:05:58.3900 2016
178:02:08:01.780 ns=12340 #dups=0
05:58:10 Query on XUGRWE EH200 000036 mini-seed blks 2016 178:02:05:57.7200 2016
178:02:08:00.500 ns=12279 #dups=0
05:58:10 Query on XUGRWE EH200 000038 mini-seed blks 2016 178:02:05:59.4100 2016
178:02:08:01.090 ns=12169 #dups=0
263 Total blocks transferred in 11313 ms 23 b/s 0 #dups=0
biho::kyren:~>ls
[anss.prop      msread.prop  ringserver.tar  XUGRES_EH200.sac
chandisp.prop   Music/       SESSION.OUT     XUGRES_EH200.sac
Desktop/        Pictures/    swarm/          XUGRWE_EH100.sac
Documents/      Public/     swarm.tar       XUGRWE_EH200.sac
Downloads/      query       Templates/      XUGRWE_EH200.sac
edgecon.prop    query.prop   Videos/
edge.prop       ringserver/  XUGRES_EH100.sac
biho::kyren:~>
```

query command
with USGS IP
specified as host

all channels
on XU network
code

Ta-da!
SAC files

Quick and dirty quake finding...

- Look at helicorders for quake-like things
 - IRIS webpages
 - SWARM helicorder view
- Use SWARM to examine potential quakes
 - play with filters
 - spectrogram mode is nice for finding small signals on noisier channels
 - compare channels and stations with wave clipboard
- If a quake is found: identify date, time (start and duration) and stations
- CWBQuery to pull .sac files from BIHO
- GSAC to pick arrivals and elocate to locate