Sharing seismic catalogs: an Antelope bulletin server and incorporation at USArray

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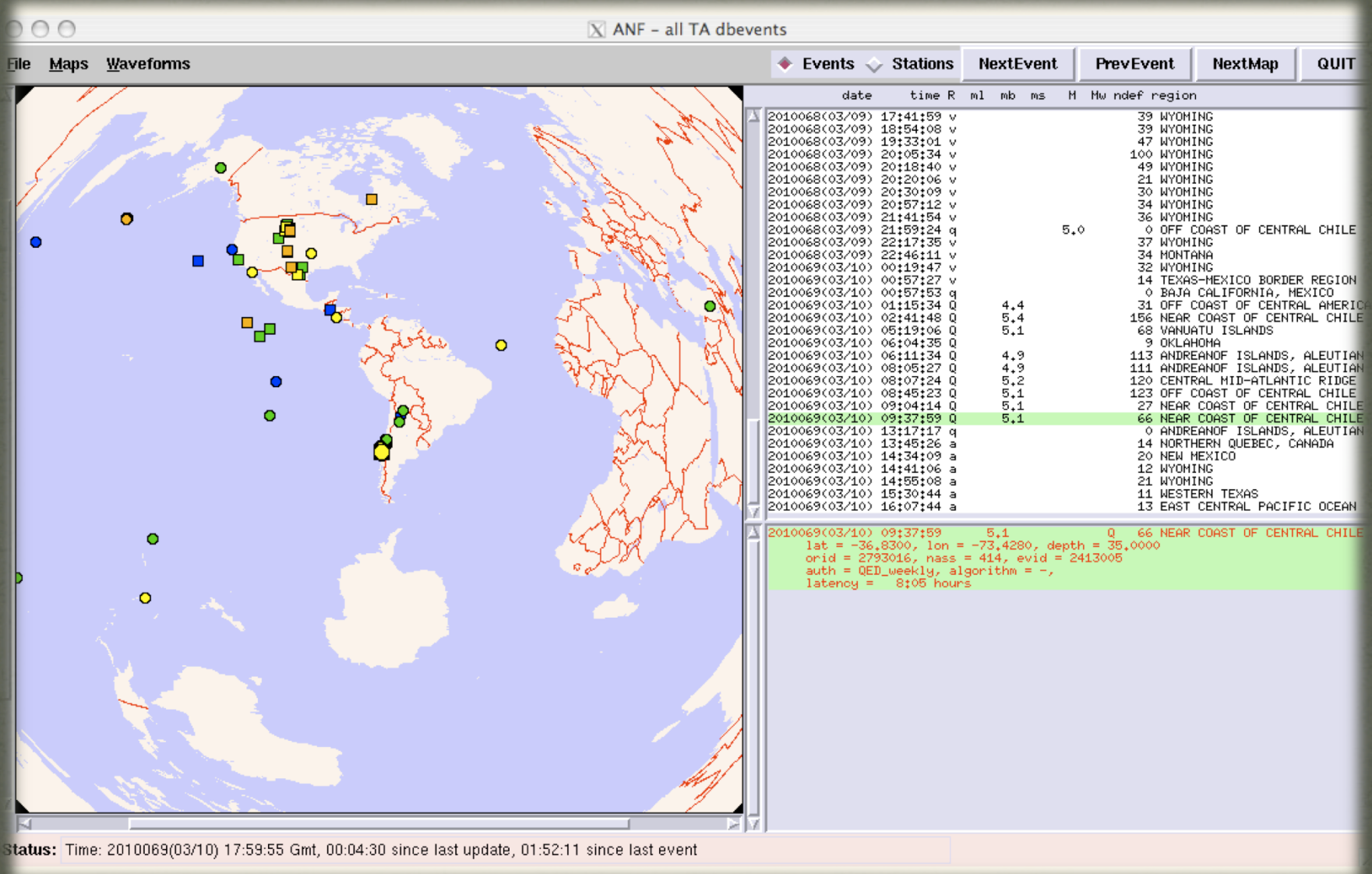
Antelope Users Group Meeting

~~Papagayo, 4-6 Nov 2013~~

Fairbanks, 17-19 Aug 2016

Why external bulletins are needed



Why USArray needed external bulletins

Authoritative Regions map from ~2009

How to get bulletins into css3.0 format?

- No one (except AEC or ANF if you ask nicely) publishes/ distributes real-time css3.0 origin information.

- Need to collect information from:
  - Screen scrapes (parsing of tagged HTML)
  - http available text files or xml files
  - ftp
  - Twitter
  - RSS (not so much any longer)
  - XML/JSON

Formats of distributed information and locations for bulletin collection can change with no warning!

Previous methods of bulletin collection in Antelope

- In-house developed scripts
- contrib script(s)
  - update_weekly_qed, scec2db, mchedr2db, etc.

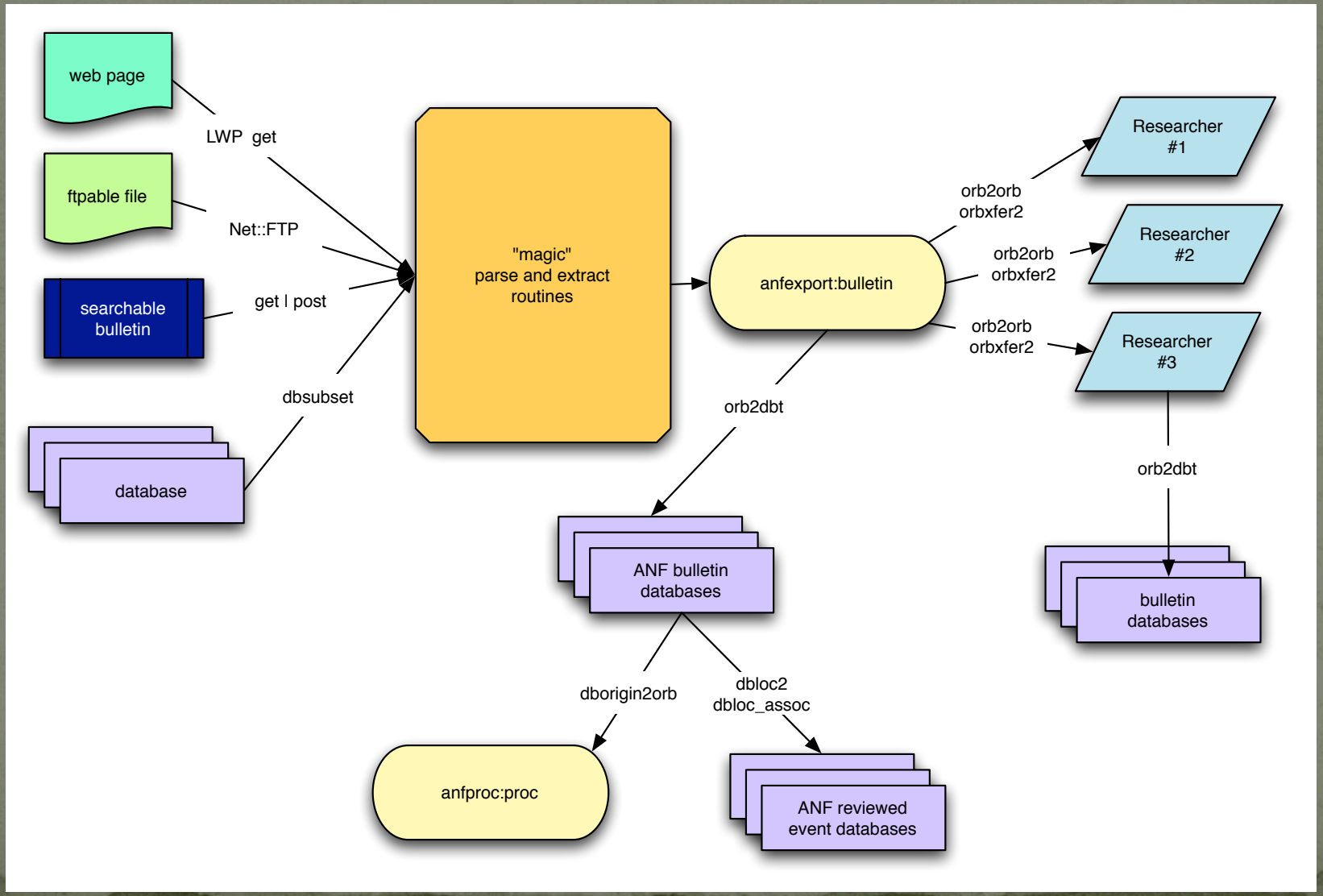
Drawbacks:

- Repetition of coding
- Lack of maintainability

What catalog hypocenters are needed?

1. Collect solutions only for events over magnitude threshold
   - Good for fully tuned network and/or group with no additional projects and no post-processing or review
2. Collect only published solutions with user specified interest criteria
   - Good for significant global events, and local/regional
3. Collect all published solutions
   - Useful for research purposes, detection tuning, analyst re-review of events, and any future reprocessing

Central bulletin server via Antelope



Central bulletin server via Antelope

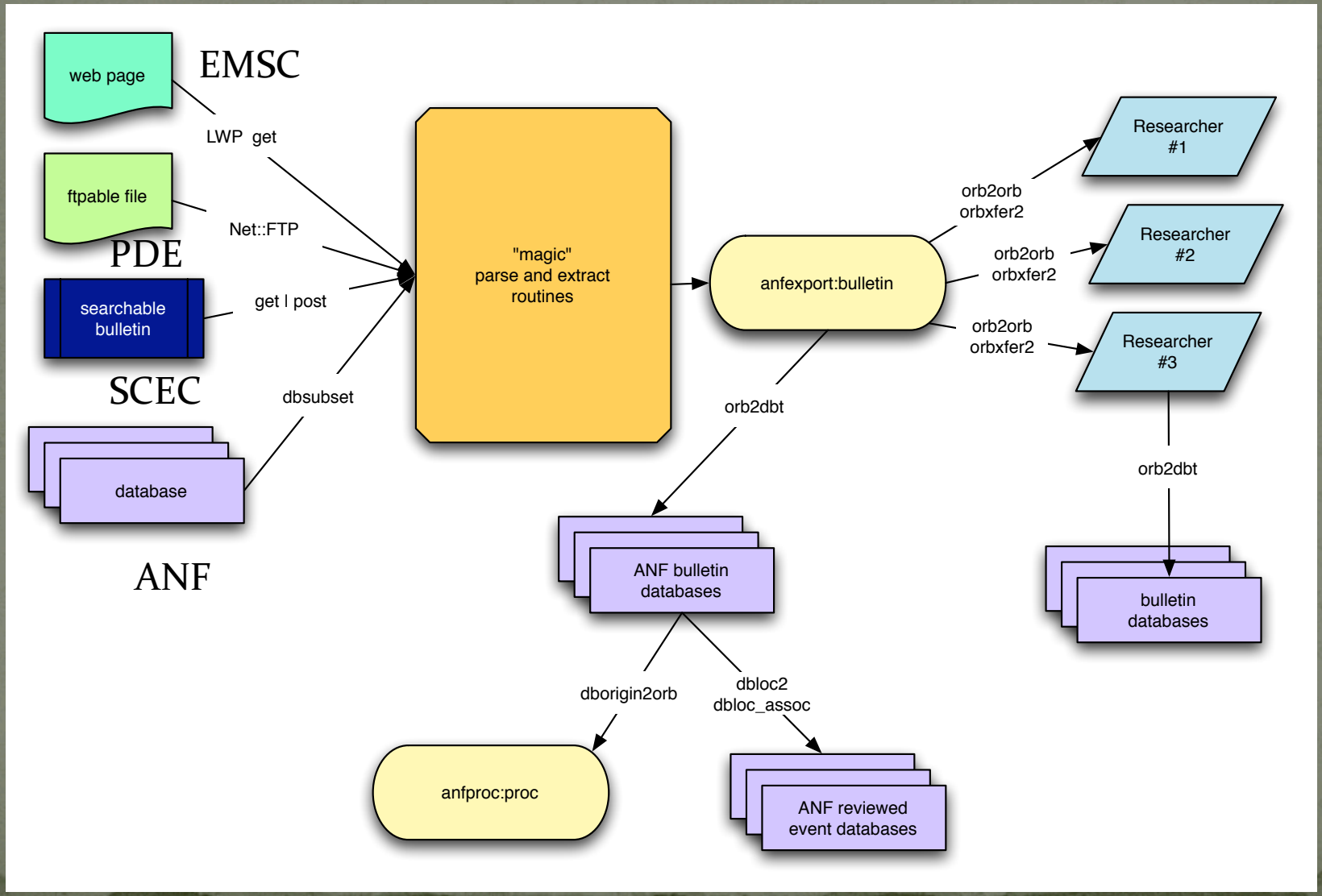
- Single institution maintains codes for parsing known bulletin distribution points
- Open access point for orb2orb connections of origin information
- Customizable on receiver side for what bulletins to collect

Drawback: Currently no available filtering based on magnitude or location – you get everything!

Bulletins supported

- USGS/NEIC (world): Comcat, CUBE, ~~QED~~, ~~QED_weekly~~, ~~mines~~, *PDE*
- ~~*EMSC (Europe)*~~
- NRCAN (Canada): PGC and GSC
- US Regional networks: NESN, ~~CERI-NMSN~~, Montana Tech-MBMG, ~~US-PNSN~~, UNR-NBE, ~~UUSS-Utah~~, ~~UUSS-Yellowstone~~, UCSD-Anza, Berkeley-NCSN, Caltech-SCSN, *UAF-AEIC*
- ANF (US)

Central bulletin server via Antelope



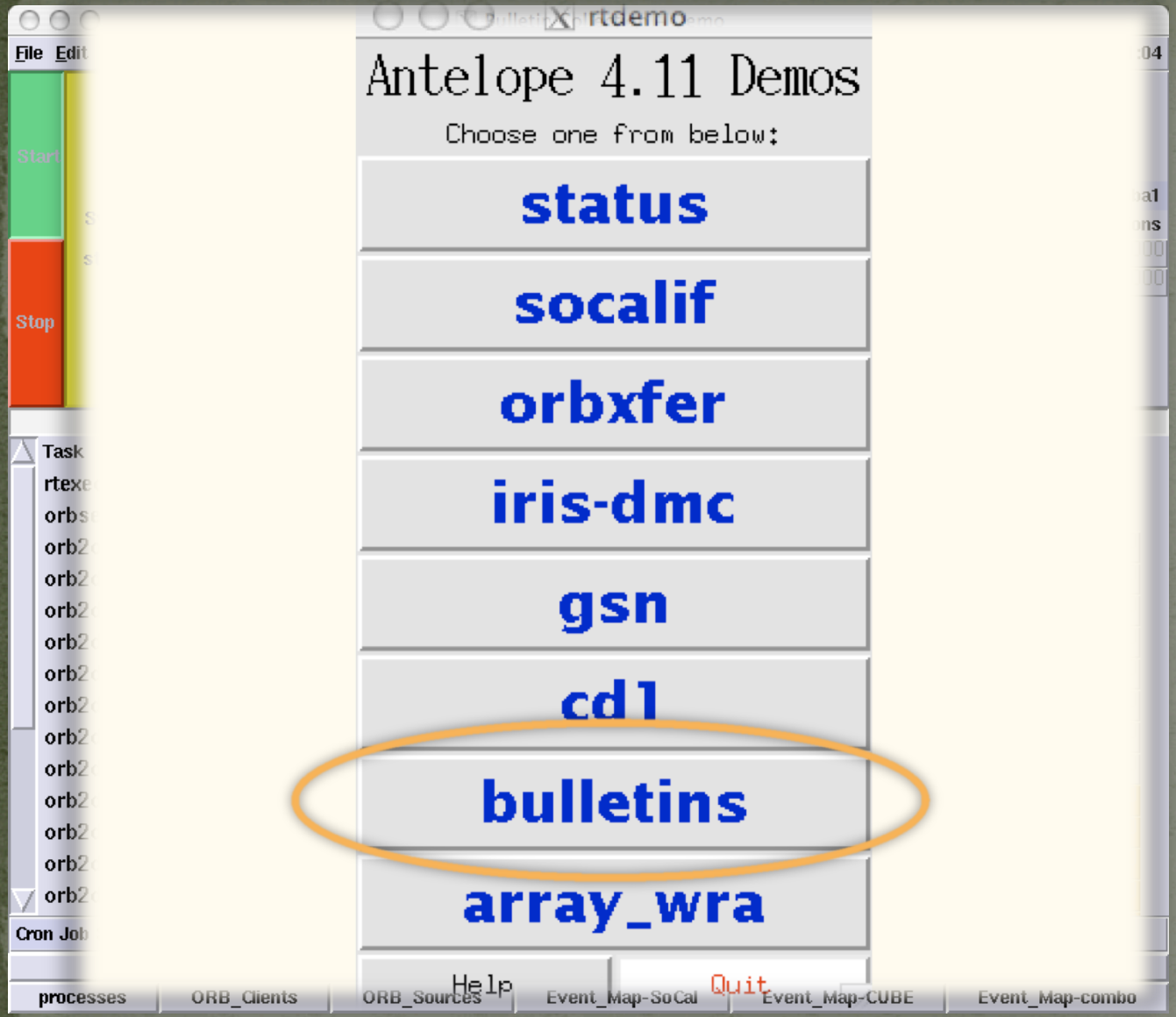
Contents of taexport.ucsd.edu:bulletin

rt@taexport:~ — ssh — 149×37

```
taexport.ucsd.edu{rt}94% orbstat -s :bulletin
orbserver  8/17/2016 (230) 17:04:20.158
        Version 'Release 5.6 Linux 2.6.32-220.el6.x86_64 2016-04-29 '
        Pid 2827 @ taexport.ucsd.edu:/export/home/rt/rtsystems/exchange (169.228.44.56), port #6707
        Started Tue 2016-222 Aug 09 20:17:55 by rt, running  7 days 20.7 hours
        ring buffer last initialized Fri 2016-134 May 13 13:52:28
        Maximum   1000.0 Mbytes packet data
        Maximum  3333343 packets
        Maximum      100 sources
         13 clients
         10 sources
        106665 opens 106652 closes 0 errors 0 rejections
        utilization =  0.00
        packets  input =      0.000  output =      0.000 (kpkts/sec)
        bytes    input =      0.000  output =      0.000 (Mbytes/sec)
        stash    input =          0  output =          0 (packets/sec)
        maximum lag =  1.00  delay =  18.735 seconds
        Throttling not enabled

Sources
                                                    Oldest                Latest                Average
  Srcname                          Thread      #pkts     Mbytes    pktid    time          pktid    time            kbps      latency
/pf/LCSN/orb2dbt                   106602       4404      1.869  1397085  224 16:17:39    99272  230 16:56:37          0.0    7:43 minutes
/pf/MTECH/A/orb2dbt                106602     464292    197.092  1376599  224 15:56:48   101978  230 16:56:49          3.0    7:31 minutes
/pf/MTECH/R/orb2dbt                106602      59168     25.117  1378165  224 15:56:59   102322  230 16:56:59          0.4    7:20 minutes
/pf/NBE/orb2dbt                    106602     228252     96.893  1394669  224 16:16:01    98227  230 16:56:02          1.5    8:18 minutes
/pf/NCSN/orb2dbt                   106086      89238     37.882  1384726  224 16:02:18    79878  230 16:02:24          0.6    1:02 hours
/pf/NEIC                            92779    1002781    551.530  1378665  224 16:00:11   102466  230 17:00:09          8.5    4:10 minutes
/pf/NEIC/CUBE/orb2dbt              106602      26540     11.266  1378509  224 15:57:09   102464  230 16:57:10          0.2    7:10 minutes
/pf/NESN/orb2dbt                   103963        282      0.135  1441129  224 18:13:02  3318340  230 12:13:02          0.0    4:51 hours
/pf/NRCAN/GSC/orb2dbt              106602     184016     78.115  1395961  224 16:17:28    99244  230 16:56:26          1.2    7:53 minutes
/pf/SCSN/orb2dbt                   106086        238      0.101  1394644  224 16:05:03    79898  230 16:05:03          0.0   59:17 minutes
ringbuffer has  6 days 1.0 hours     of data
  1000.000 Mbytes data in 2059211 packets
  average packet size = 486 bytes
taexport.ucsd.edu{rt}95%
```

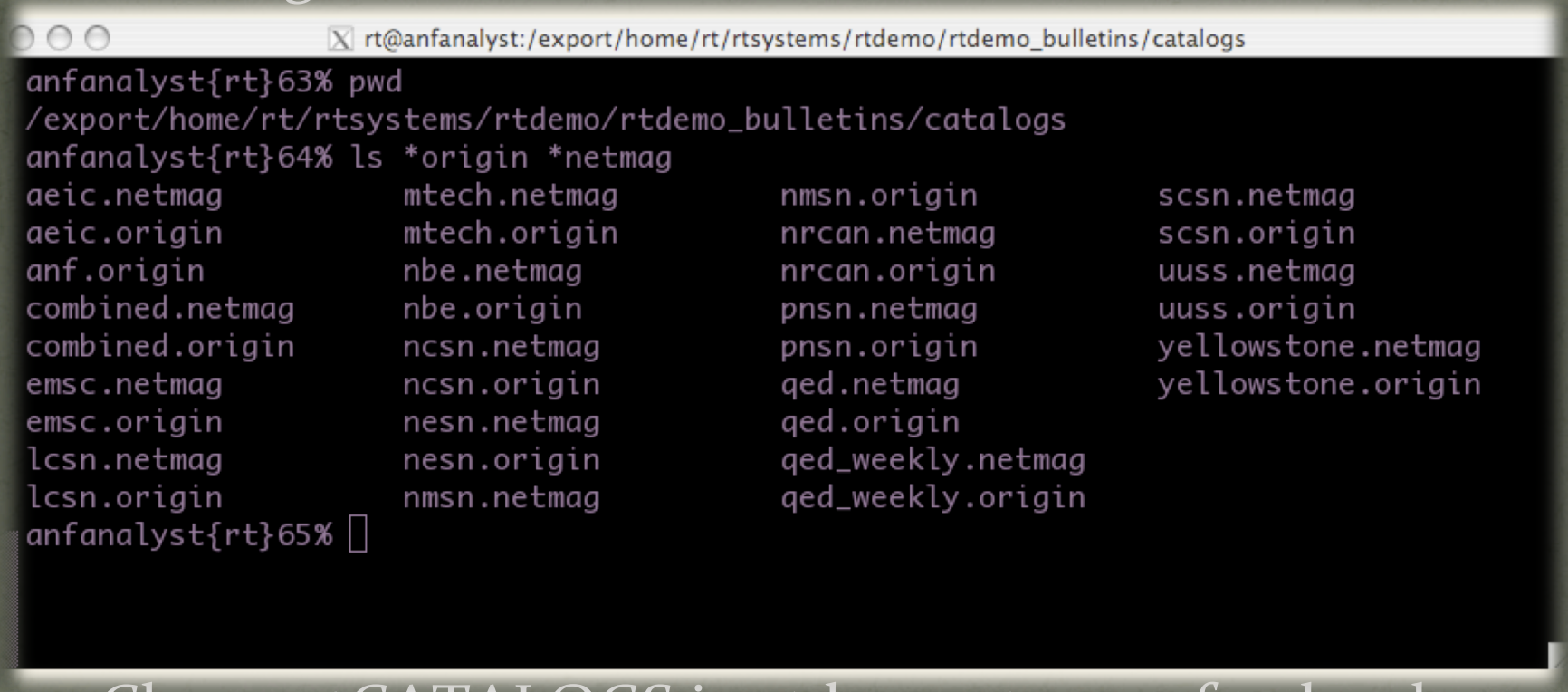
How to collect css3.0 bulletin from orb?



rtdemo example available in Antelope

Collected bulletins

- Using rtdemo, bulletins will be collected to "catalogs/"



- Change $CATALOGS in rtdemo rtexec.pf to local save location

USGS2orb replaces USGScube2orb

NAME

USGS2orb - read event catalogs from USGS/NEIC web site and put them in an orb

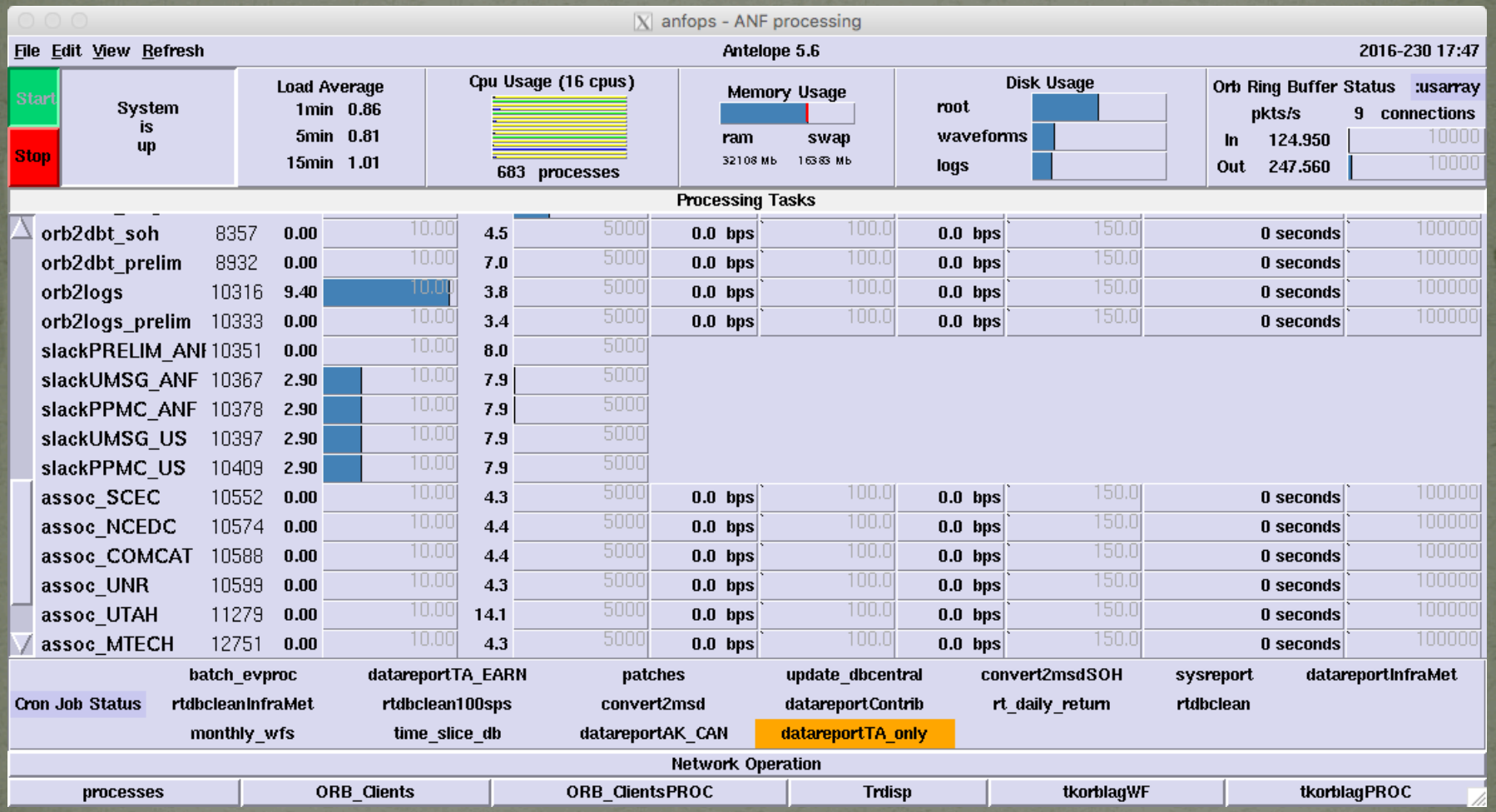
SYNOPSIS

USGS2orb [-v] [-vv] [-vvv] [-start start_time] [-mag_cutoff_process mag_cutoff_process] [-mag_cutoff_archive mag_cutoff_archive] [-replay_interval replay_hours] orbname

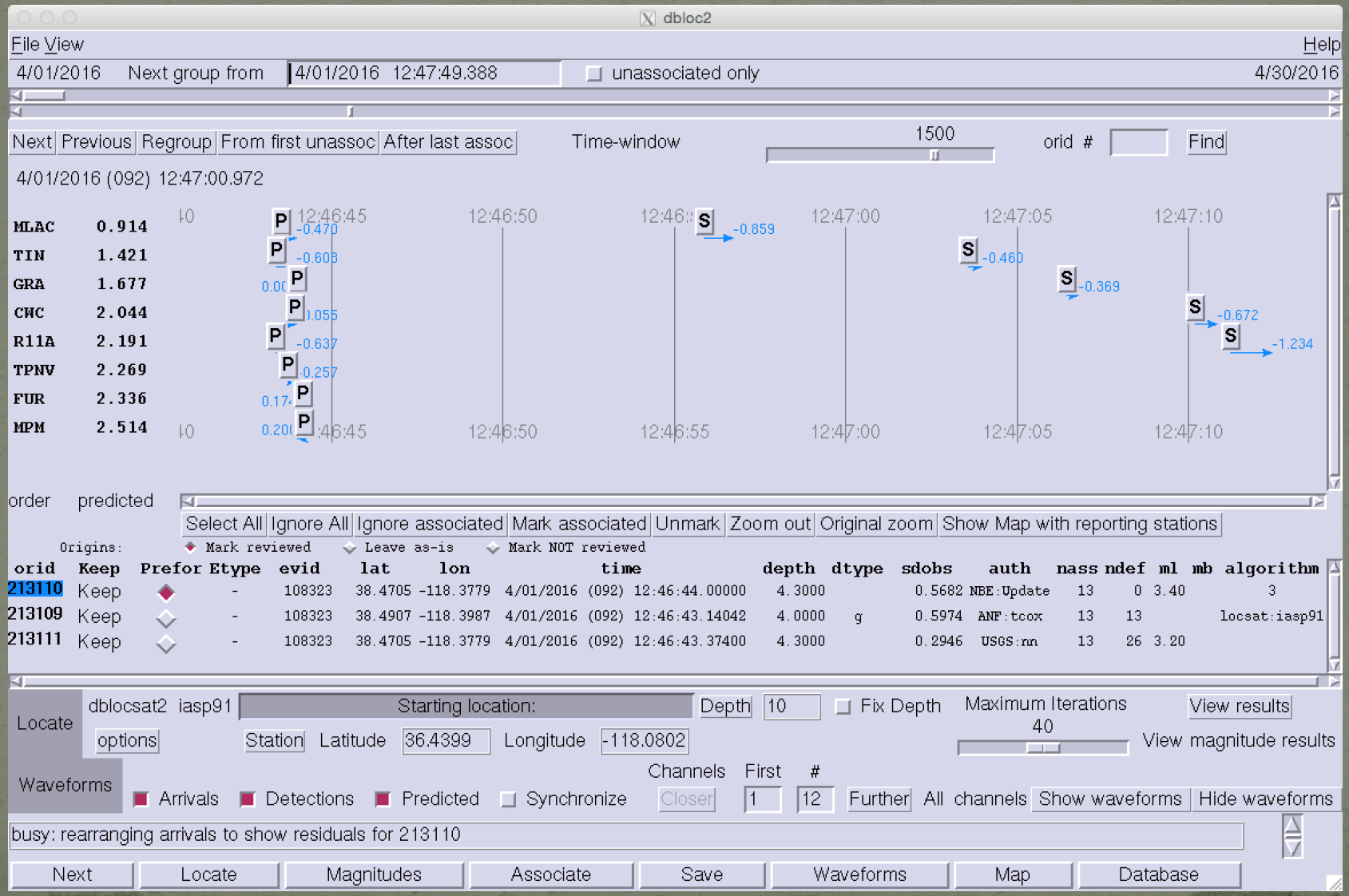
DESCRIPTION

USGS2orb is a script that polls a set of web URLs hosted by the USGS/NEIC, reads earthquake event locations from these URLs and writes these events, as they appear, into an output ORB as special parameter file packets that can be processed by orb2dbt(1) in its "association" processing mode. This script can be used to automatically associate events from USGS/NEIC with event associated picks from a seismic network.

View of operations at ANF/USArray



Analyst use of bulletins at ANF/USArray



Future directions

- Uncertain… fewer bulletins are openly available with precision we would prefer. Switch from regional networks to only COMCAT?
- Additional parsers (unlikely)
- Resend “old” bulletins previously collected at ANF
- Client-side customization examples – criteria based subset/removal of events that are not of interest?

Try it -
Collect from taexport.ucsd.edu:bulletin