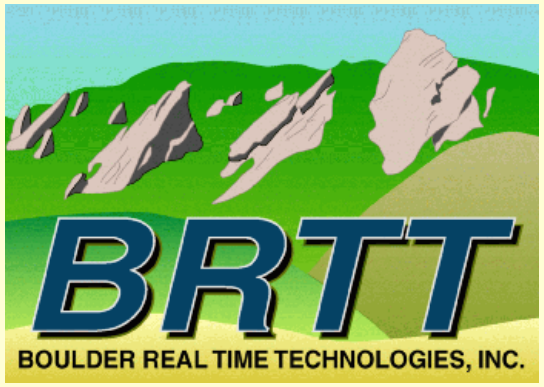
What's New in Antelope



Dr. Kent Lindquist

March, 2015

Udine, Italy AUG

Overview

- Administrative
  - Recap announcements
    - *Linux* and *Apple*—no more *Solaris*
    - *support@brtt.com*
  - Operational changes at BRTT
    - ISO Download for Customers
    - Tokenized Licenses
- Antelope 5.4 and Peregrine

BRTT

Administrative

Recap: Solaris, Apple, Linux

- Antelope 5.3 was the last release on Solaris.
  - *Solaris support is over.*
- Uncertainty of Apple hardware future
  - We still fully support Apple
  - Cannot depend on Apple for enterprise-class hardware
  - Antelope 5.4 Needs OSX Mountain Lion (10.8.5) or above
- BRTT fully supports Linux as a platform for enterprise-class systems
  - BRTT fully supports RHEL and CentOS 6.2 in the Antelope 5.4 release

Operational Changes at BRTT: Support

- Improved support responses via email and web *https://brtt.zendesk.com*
- Always get an automated reply with a ticket number
- Provides BRTT staff with coordinated support response tools
- You can go to the web site to see current and old support requests
- You can access your support requests from any web browser
- Our web site (www.brtt.com) describes this in more detail
- YOU ABSOLUTELY MUST USE

  support@brtt.com
- WE WILL NO LONGER RESPOND TO SUPPORT REQUESTS TO OUR INDIVIDUAL ADDRESSES

Operational Changes

Operational Changes at BRTT: Distribution

- New download site for paying customers
  - http://www.brtt.com/customer_download.html
  - Much more convenient than CD distribution
  - Downloads are logged by customer
  - Makes sure everyone has latest ISO
  - Eases notification upon problems
  - Allows us to make large updates when necessary

Operational Changes at BRTT: Further Licensing Improvements

- Customer ID assigned by BRTT
- Tokenized licenses
  - Human-readable
  - Enhanced *check_license* program
    - *check_license –v*
    - Looks for the first license line applicable to the machine
    - Also runs the new *licsnapshot* program
  - Single-line licenses. *Make sure it's on a single line.*
  - If you modify the license line, it will break
  - Still goes in *$ANTELOPE/data/pf/license.pf*

key=*********
product=Antelope version=5.4 custid=USA/BRTT/Evaluation
lictype=node serial=**3F82ZQ*****
a=netops count=0 expires=2016 Jun 01

Operational Changes at BRTT: Software Audit

- ***For Antelope 5.4***:
  - New naming convention
    - Deprecated: **_dep*
    - Preliminary: **_pre*
    - Experimental: **_exp*
- ***For Antelope 5.5***: Conducted audit of entire code base
  - *Will implement the audit results for Antelope 5.5 this May*
  - Removing little-used programs and libraries
    - No more *libproj*
    - No more *VOGL* graphics
    - No more *dynamic_controls*
    - Moved *autodrm, dbdoc, init_training etc.* to *contrib*
    - Will remove *dbinfer, heartbeat2db, leak_detector etc.*
  - Hard to maintain unused programs – "attractive nuisance"
  - Focusing our efforts on most-used and critical components
  - Feedback welcome of course

Antelope 5.4

BRTT

Udine, Italy
March 2015

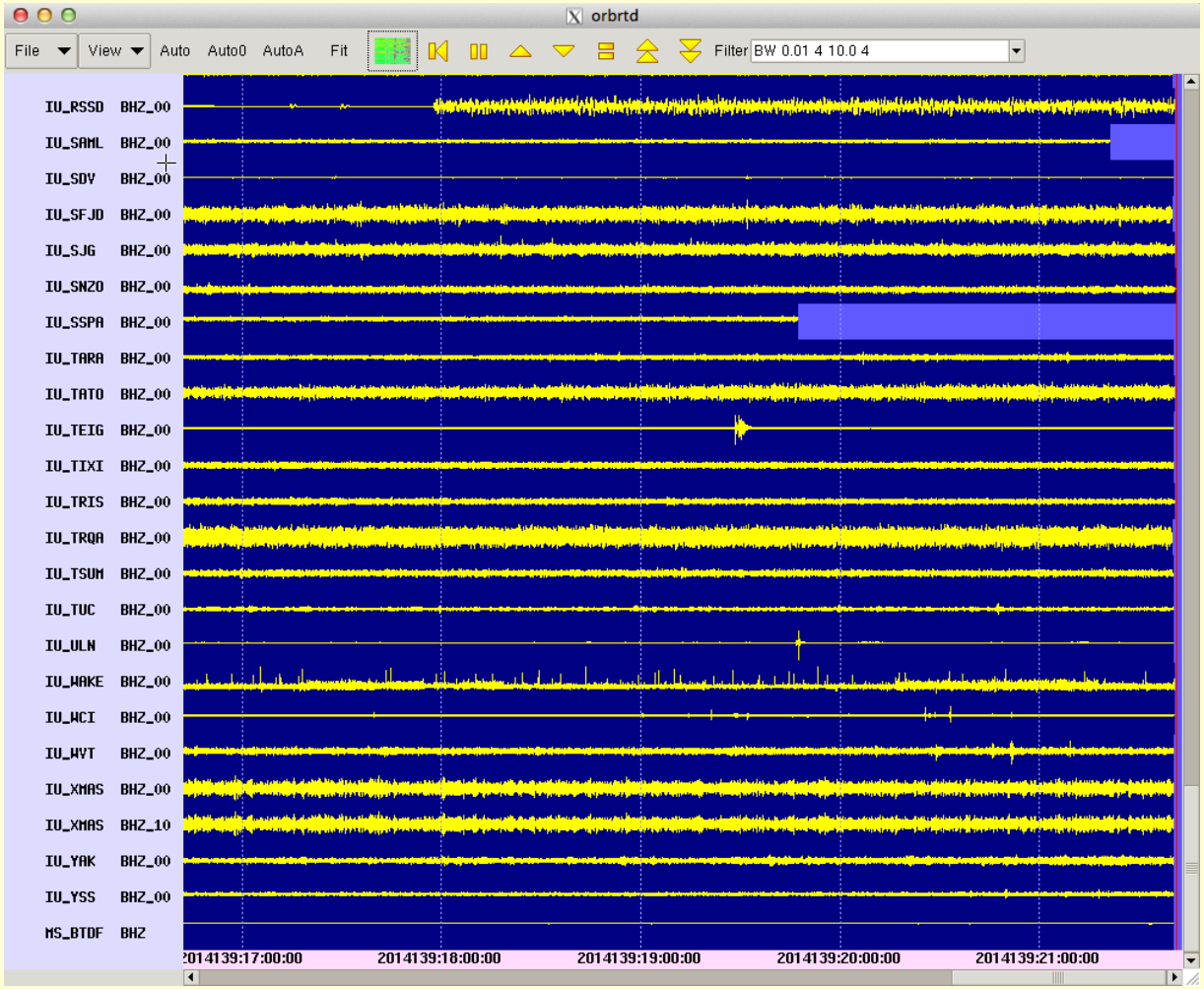
Antelope 5.4

- *orbrtd*
- Python enhancements
- Antelope Toolbox for *MATLAB*
- *USGS2orb*
- Moment Tensors
- *dbevents_pre*
- Peregrine

orbrtd

- **orbrtd** is a complete rewrite of **orbmonrtd**
- Rewrite of old TCL/Tk script as a Python script
- Adaptation of *buplot bptrace* Tk canvas item extension available in python
- Provides enhanced trace amplitude plotting options (color, log scales, etc.)
- Provides capability to plot color-contoured spectragram style time-scrolling spectra plots
- Introduces a number of new features, including dynamic automatic channel configurations
- First stage in converting **dbpick** display graphics

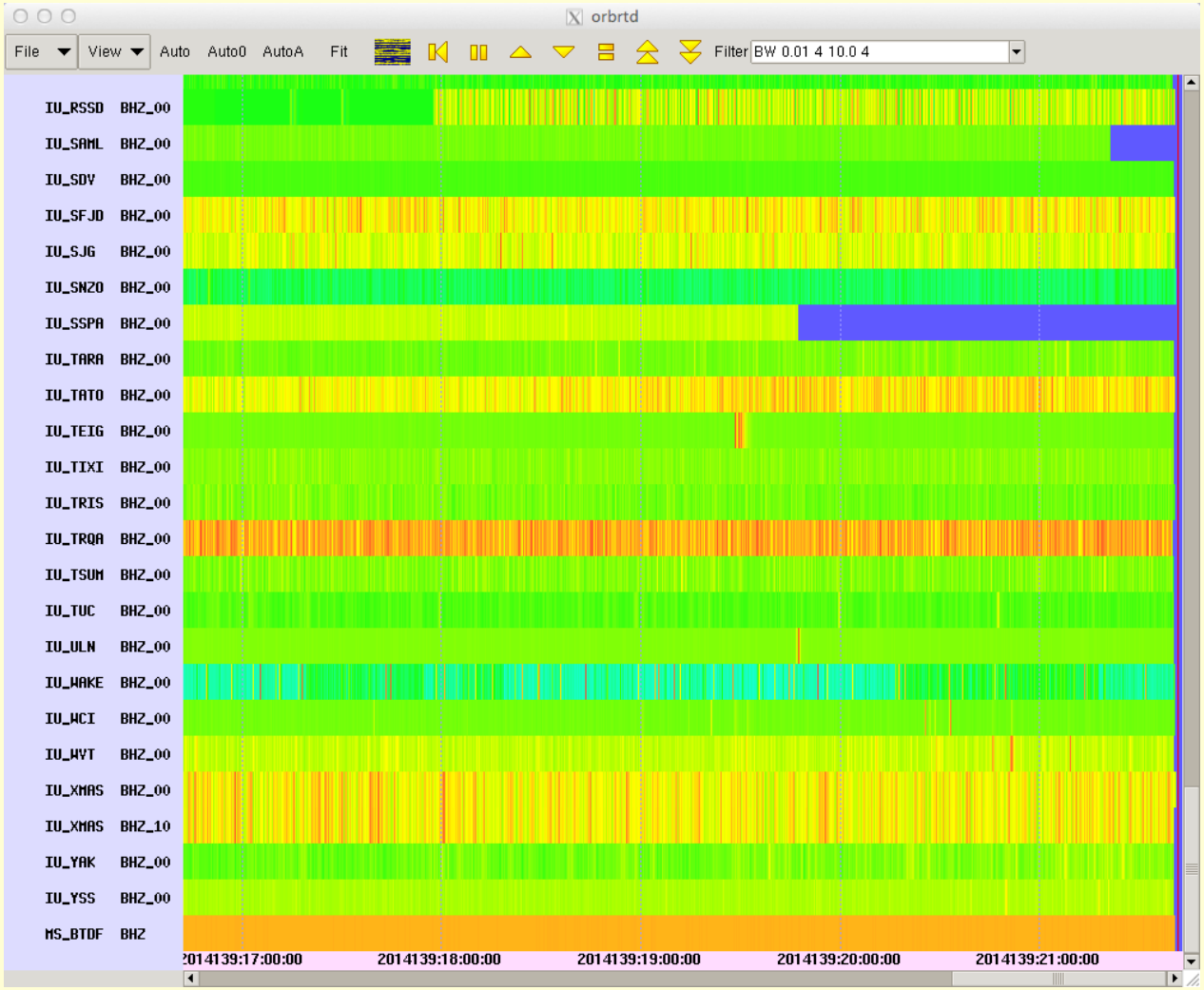
orbrtd: scrolling time-series



BRTT

Udine, Italy
March 2015

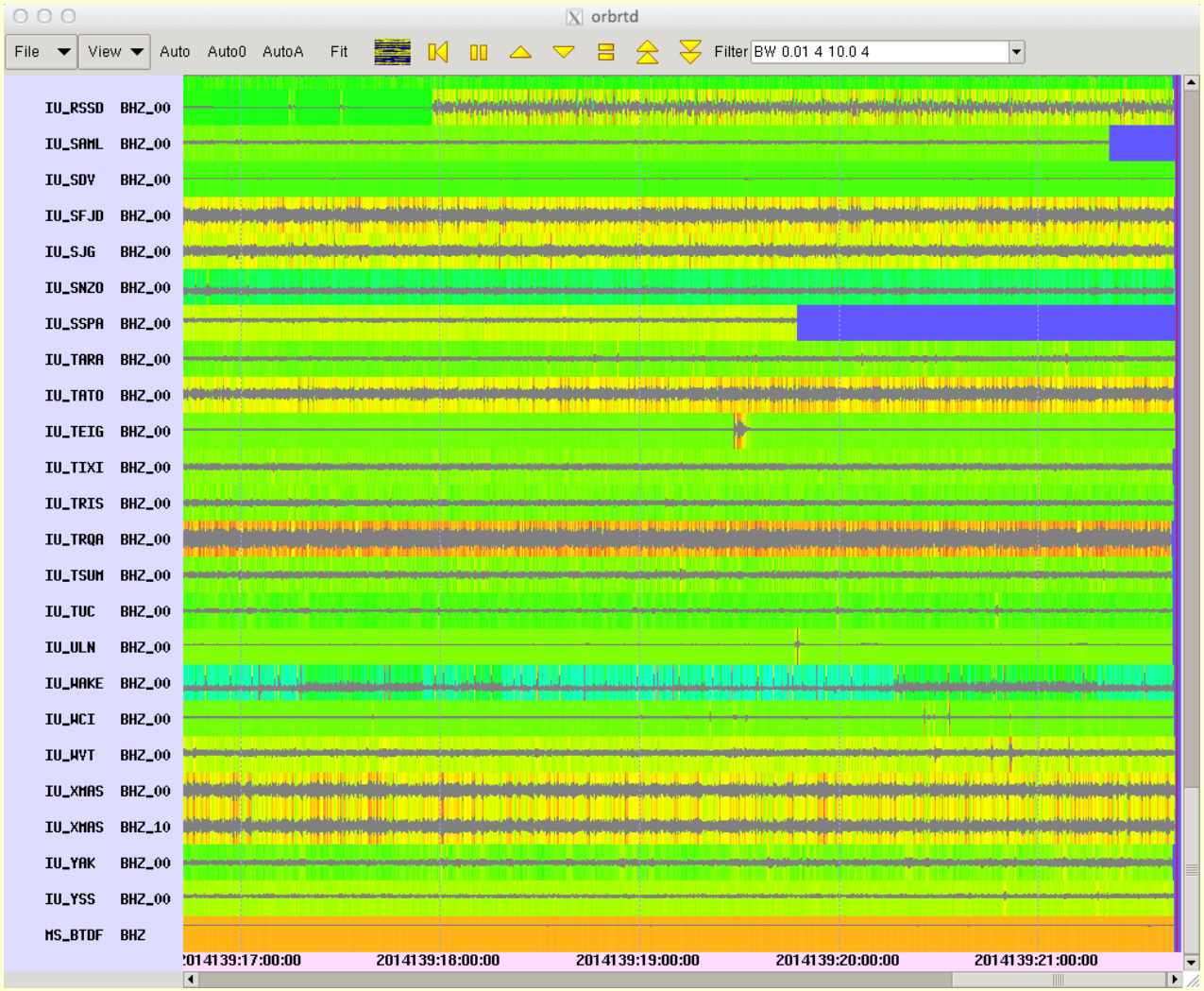
orbrtd: color contours



BRTT

Udine, Italy
March 2015

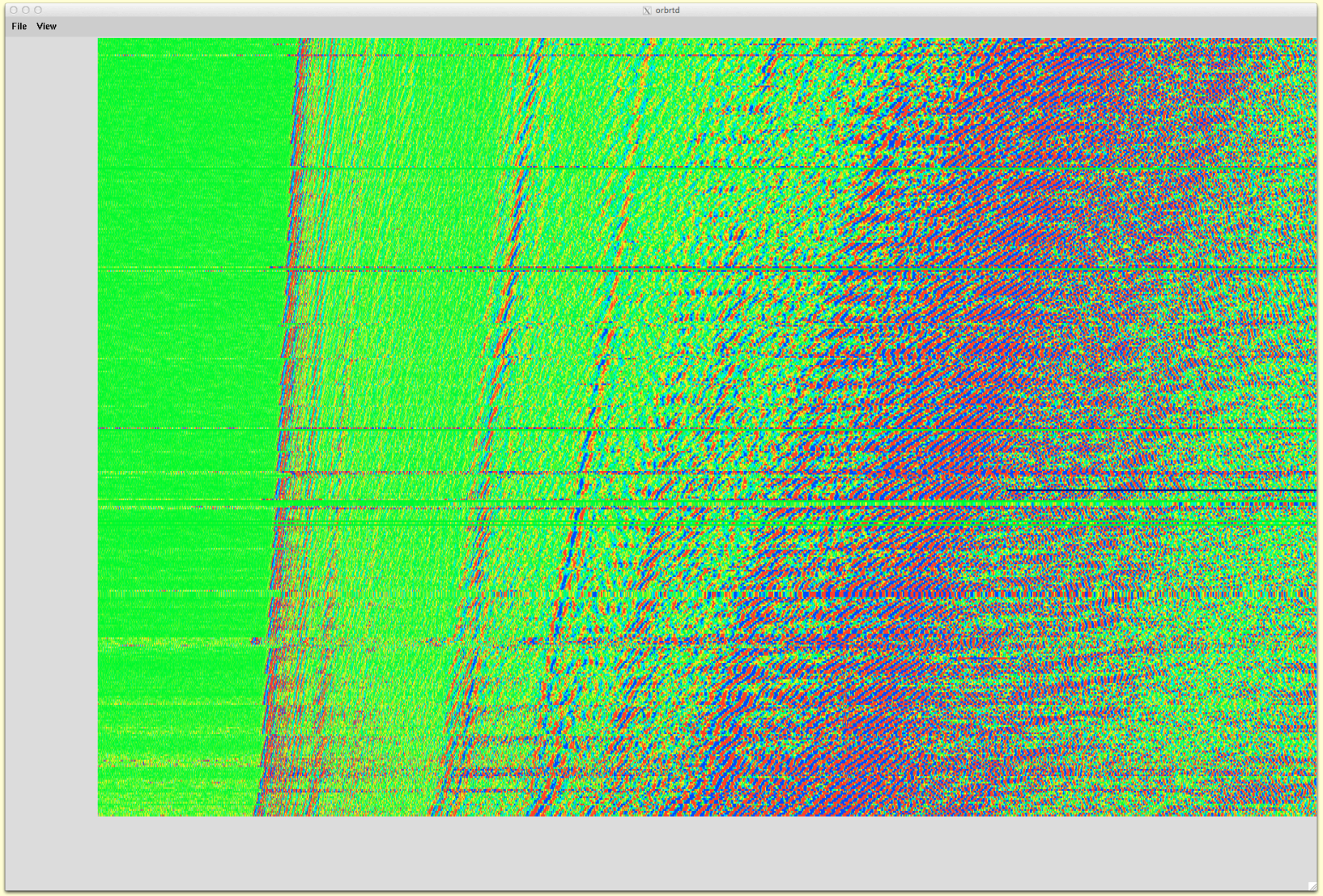
orbrtd: combined plot



BRTT

Udine, Italy
March 2015

orbrtd: colorscale, USArray

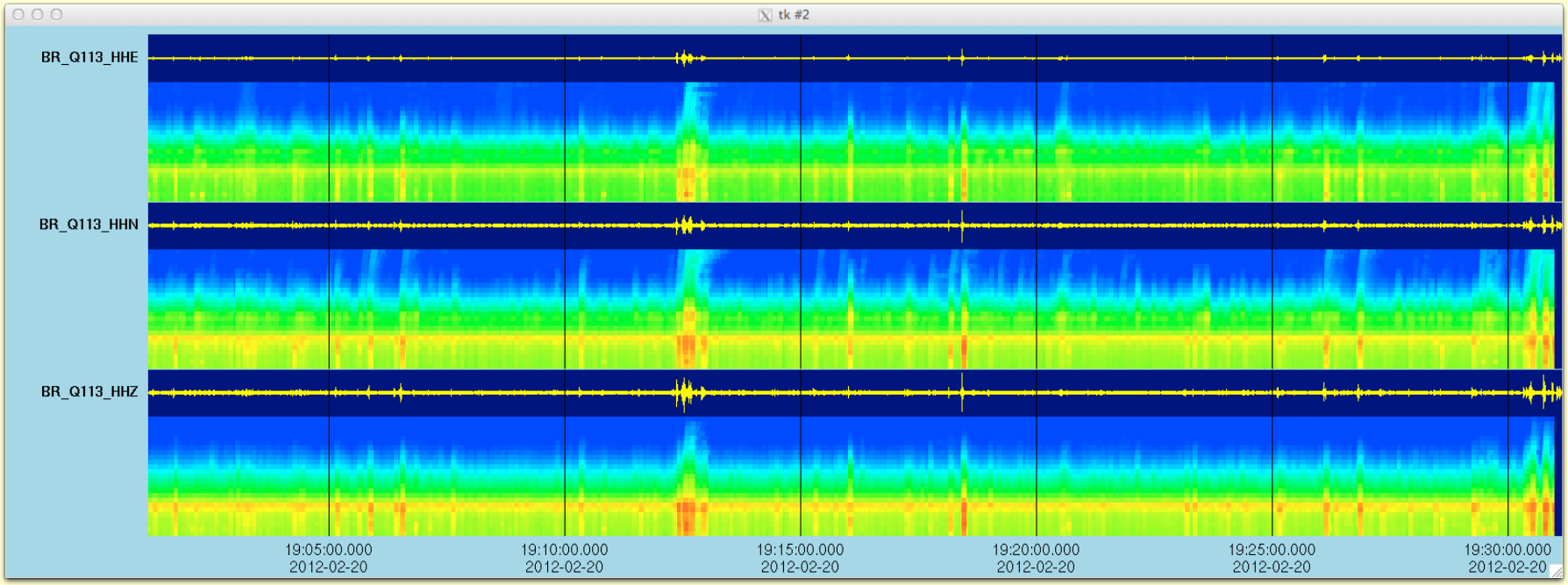


BRTT

Udine, Italy
March 2015

orbrtd spectragrams

*[with **Bighorn** structural monitoring package]*

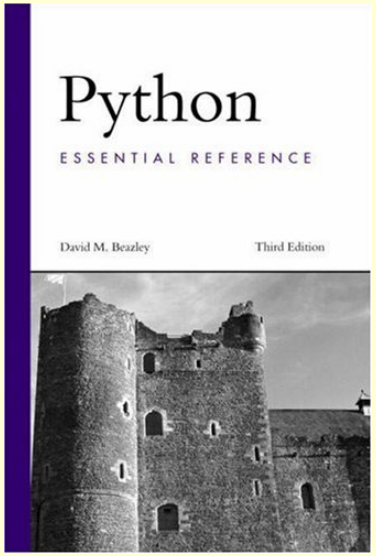


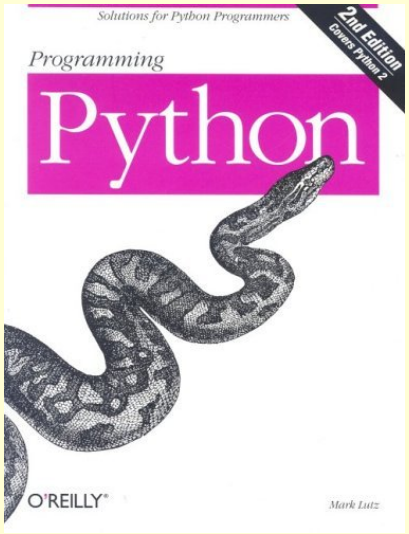
BRTT

Udine, Italy
March 2015

Python

- Python: Object-oriented scripting language
  - http://www.python.org
  - Dynamic
  - Powerful
  - Extensible
  - Fast





Python

- *Datascope* interface rewritten
  - Interface mostly backwards-compatible
  - Only one idiom – object based
  - Can still use in procedural code
- *Coords* interface rewritten
- Many changes to *buplot* BRTT plotting library
- New *ipa* program for interactive

  Antelope Python shell (*ipython* profile)

("ipython Antelope")

Python *ipa*

```
[marble:~][dev] kent% ipa
Python 2.7.6 (default, Mar  5 2014, 15:42:38)
IPython 1.1.0 -- An enhanced Interactive Python.
…
IPython profile: antelope

In [1]: from antelope import datascope

In [2]: db = datascope.dbopen( '/opt/antelope/data/db/demo/demo' )

In [3]: db = db.lookup( table = 'origin' )

In [4]: db.query( datascope.dbRECORD_COUNT )
Out[4]: 1351

In [5]:
```

BRTT

Udine, Italy
March 2015

Antelope Toolbox for MATLAB

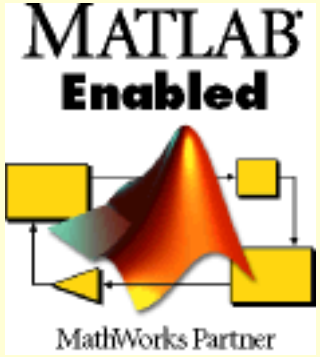
- Antelope Toolbox for MATLAB (ATM)
  - *Compiled into Antelope 5.4*
  - Still need your own copy of MATLAB
  - Use *getid* to find supported versions

```
% getid matlab
R2013b R2014a
```

  - Turnkey:

```
>> run( '/opt/antelope/5.4/setup.m' )
```

  - Starting man-page *antelope_matlab(1)*
- Part of the MATLAB Connections Program

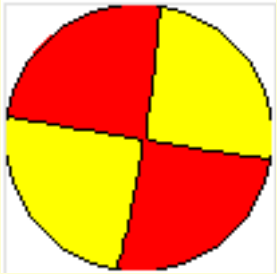


USGS2orb

- Reads Event Catalog from USGS/NEIC web-site
- Puts events in *orbserver*
- Magnitude cutoffs
  - Option to ignore all events below threshold mag
  - Option to archive all events above threshold regardless of association with locally detected events
- *Optionally imports USGS Moment Tensors*

Moment Tensor support

- New Program *USGS2orb* imports moment tensors
- New '*mt*' database table stores them
- New *buplot* capability plots beach-balls



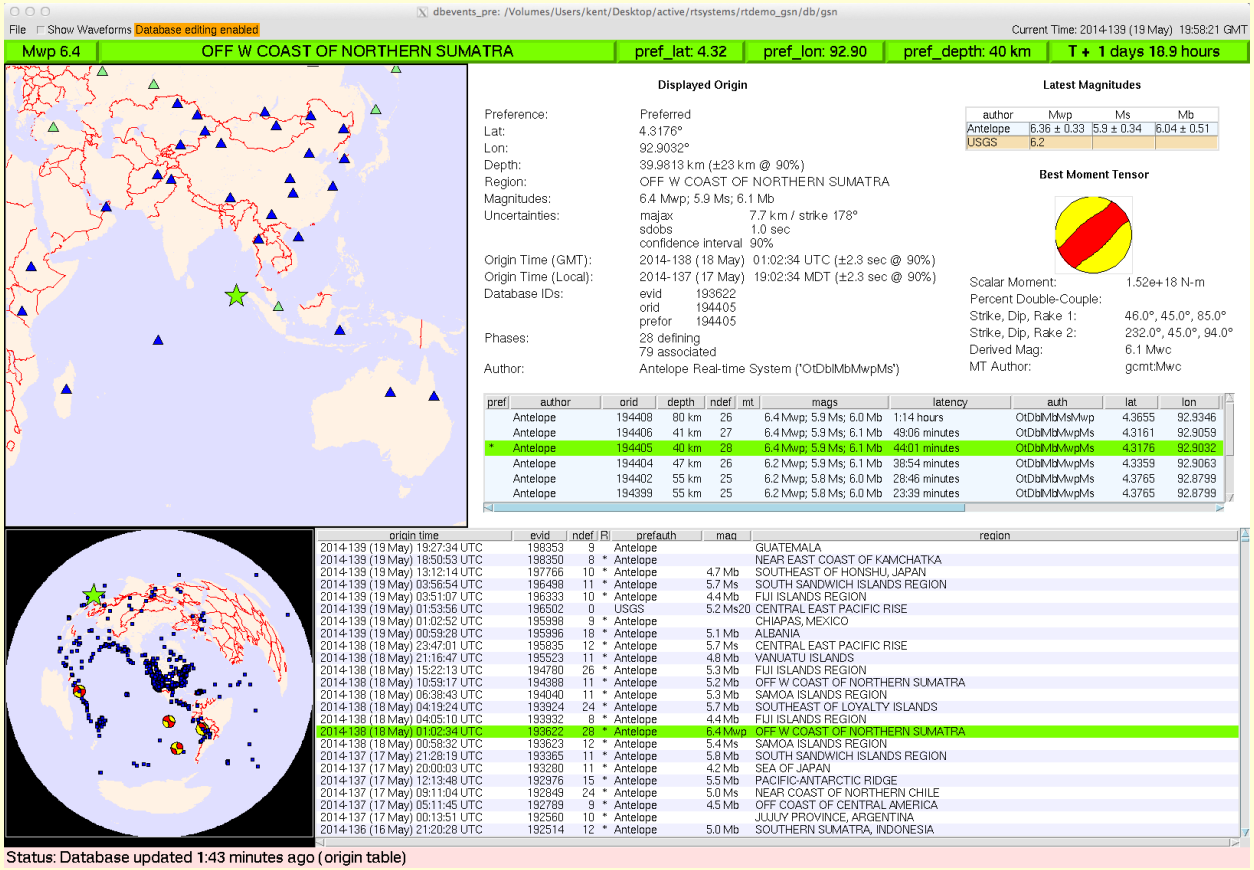
- Integrated into *dbevents_pre* event display

BRTT

dbevents_pre

- New Event Display program
- Includes Moment Tensor Support
- Top banner for heads-up situational awareness
- Magnitudes comparison table
- Configurable
- Basis for new *dbloc2*

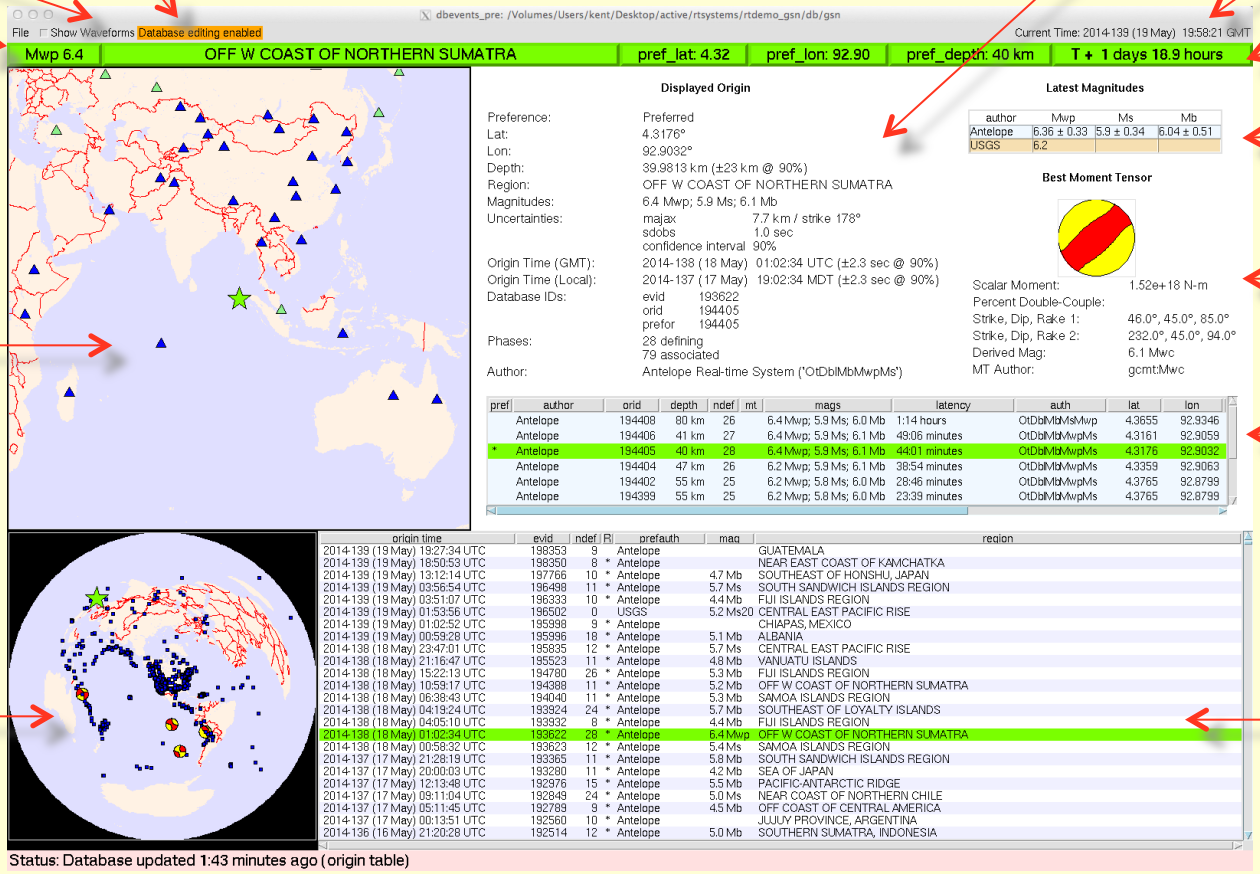
dbevents_pre: Event Display



BRTT

Udine, Italy
March 2015

dbevents_pre:
Event Display

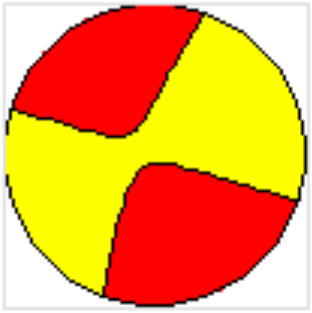


BRTT

Udine, Italy
March 2015

dbevents_pre: Moment Tensor Support

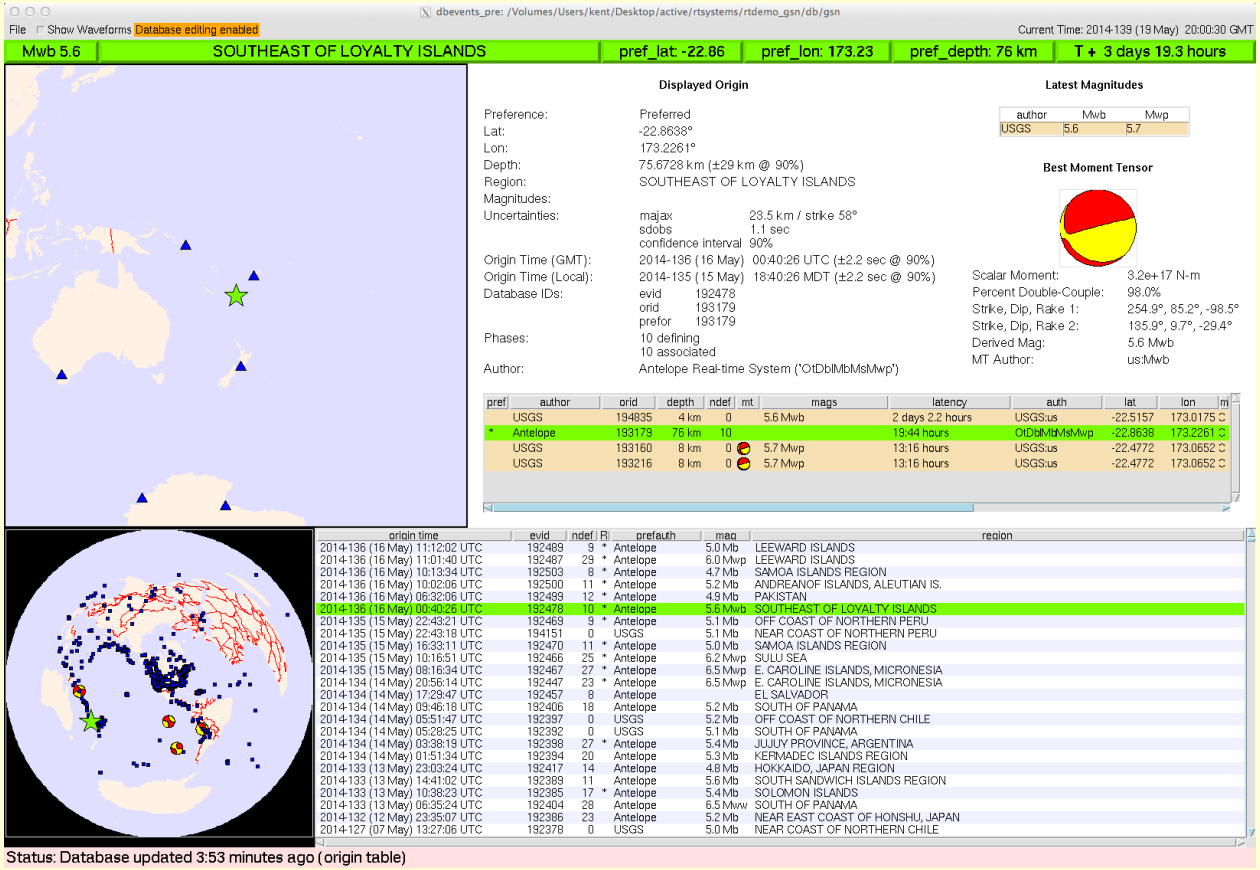
Best Moment Tensor



Scalar Moment:	1.73e+18 N-m
Percent Double-Couple:	89.0%
Strike, Dip, Rake 1:	108.8°, 89.2°, -13.3°
Strike, Dip, Rake 2:	199.0°, 76.7°, -179.2°
Derived Mag:	6.1 Mwb
MT Author:	us:Mwb

BRTT

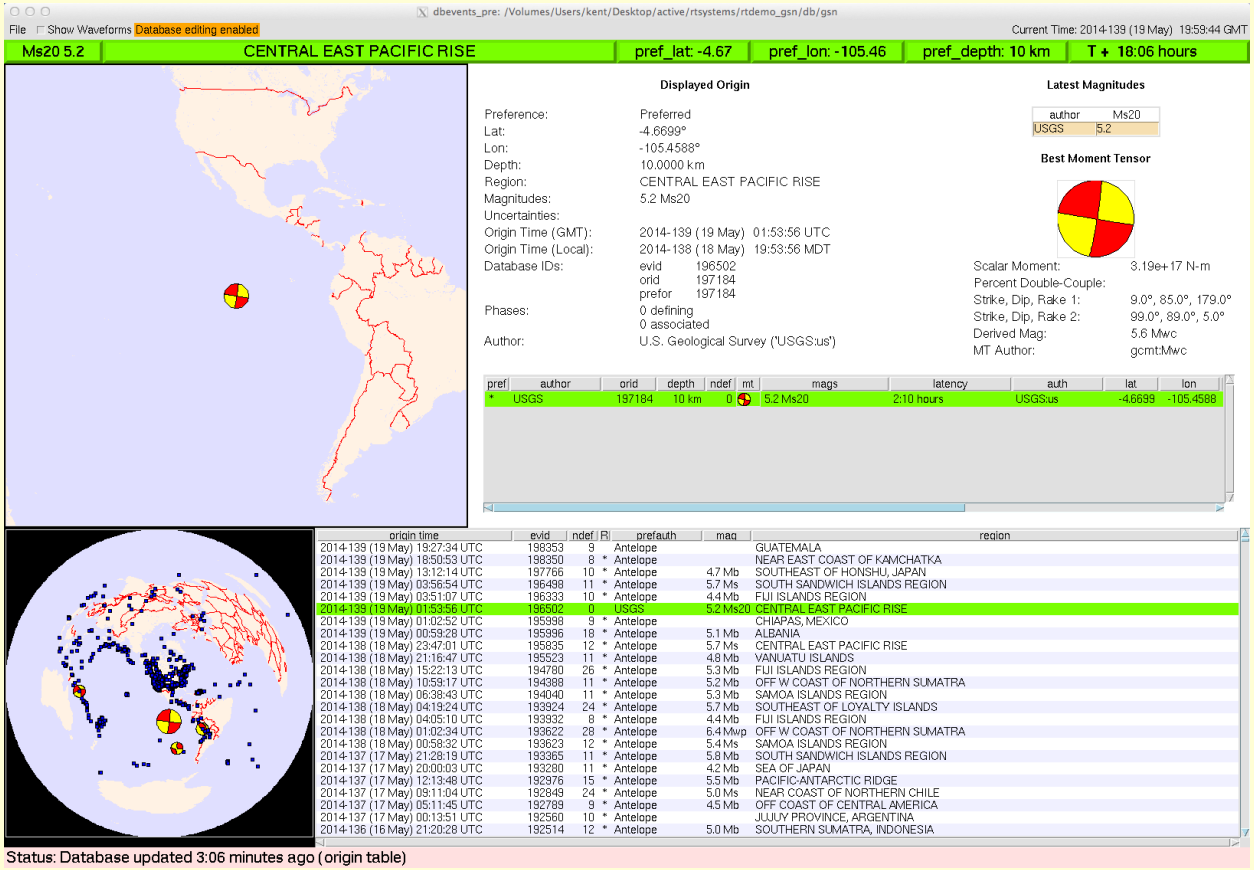
dbevents_pre: Choice of 'best' MT



BRTT

Udine, Italy
March 2015

dbevents_pre:
Map display of prefor MT, 'best' MT



BRTT

Udine, Italy
March 2015

dbevents_pre: Magnitudes Summary Table

Latest Magnitudes

author	Mwp	Ms	Mb
Antelope	6.36 ± 0.33	5.9 ± 0.34	6.04 ± 0.51
USGS	6.2		

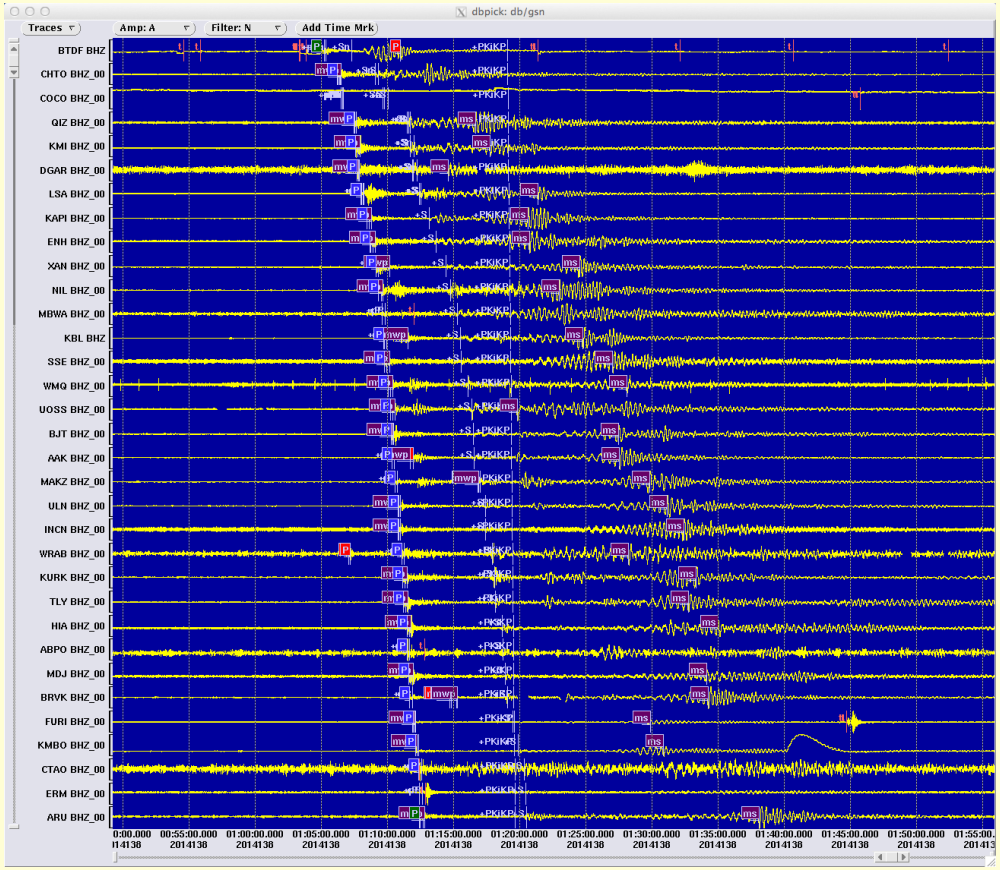
- Magnitude preference order is specifiable

dbevents_pre: Information Panel

Displayed Origin

Preference:	Preferred	
Lat:	4.3176°	
Lon:	92.9032°	
Depth:	39.9813 km (±23 km @ 90%)	
Region:	OFF W COAST OF NORTHERN SUMATRA	
Magnitudes:	6.4 Mwp; 5.9 Ms; 6.1 Mb	
Uncertainties:	majax	7.7 km / strike 178°
	sdobs	1.0 sec
	confidence interval	90%
Origin Time (GMT):	2014-138 (18 May)	01:02:34 UTC (±2.3 sec @ 90%)
Origin Time (Local):	2014-137 (17 May)	19:02:34 MDT (±2.3 sec @ 90%)
Database IDs:	evid	193622
	orid	194405
	prefor	194405
Phases:	28 defining	
	79 associated	
Author:	Antelope Real-time System ('OtDblMbMwpMs')	

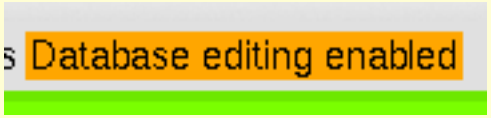
dbevents_pre: show waveforms option



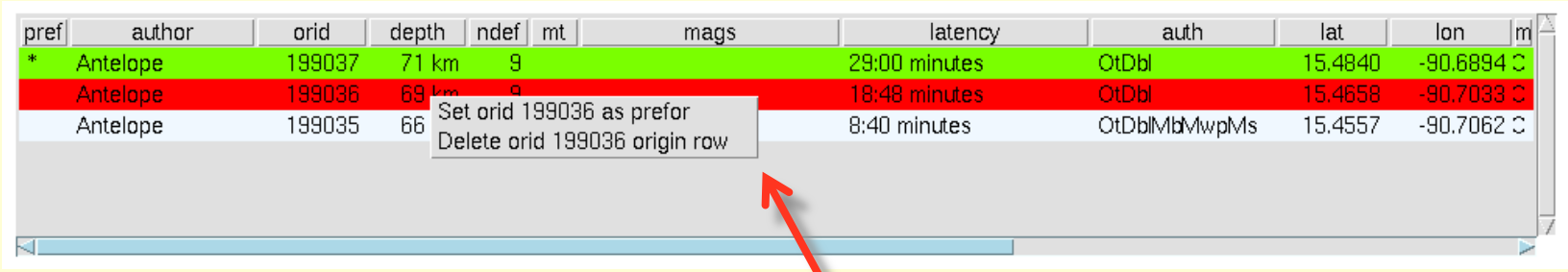
BRTT

Udine, Italy
March 2015

dbevents_pre: rudimentary editing

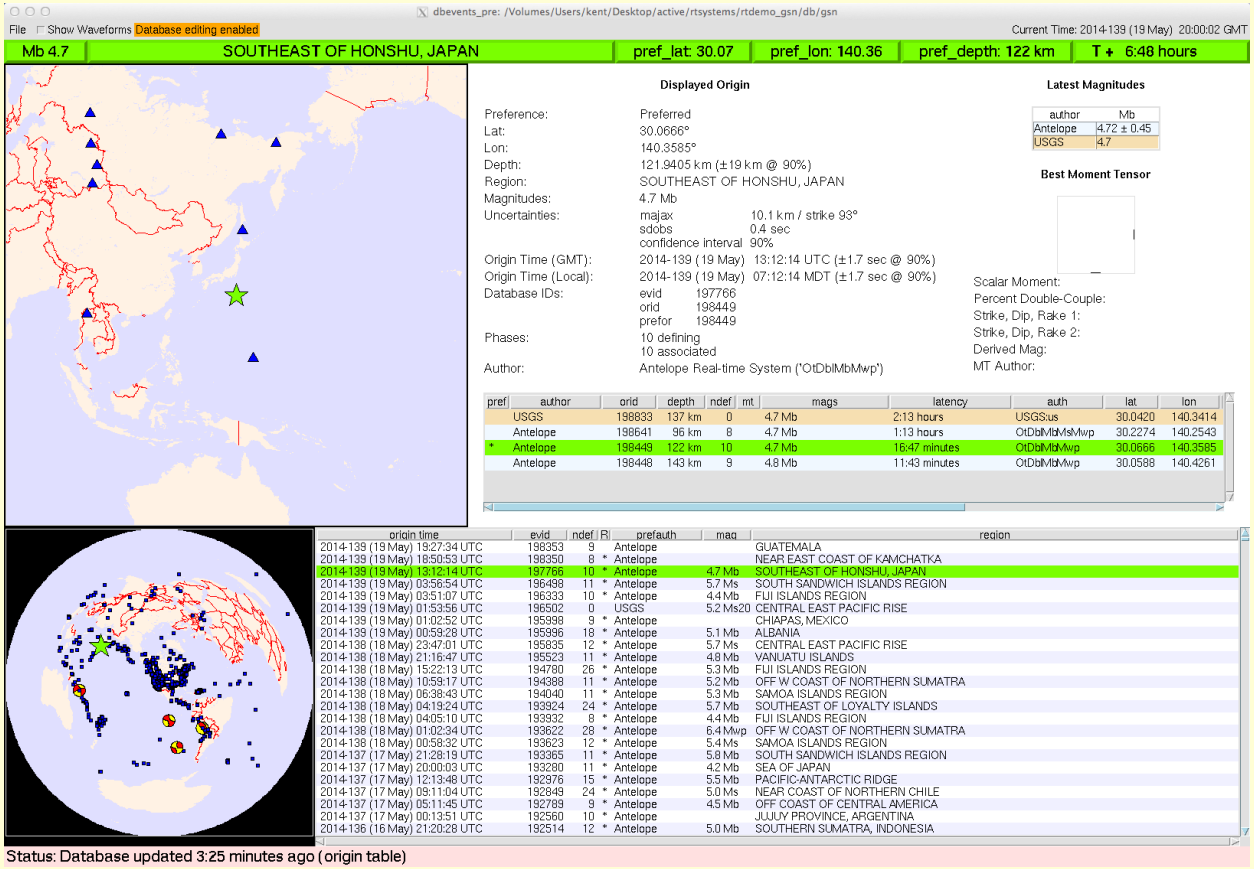


Editing has warning-label and off-switch for kiosk displays



- Set preferred origin
- Delete undesirable origin

dbevents_pre:
Color-coded Authors



BRTT

Udine, Italy
March 2015

Bighorn

Strong motion/structure monitoring version of Antelope also including web enhancements

Peregrine

Web enhanced version of Antelope

Peregrine

- Web-based Monitoring
- Web-based Information distribution
- Web-based Interaction
- Antelope Base System + Web Infrastructure
  - New program ***rtwebserver***
  - New program ***rtcache***
  - Host of supporting *Python* libraries

Peregrine Goals

- Robust Web Presence for users and operators
- Capitalize on informative power of real-time system
- Platform for revealing more about RT system to operators
- Clean integration with real-time system
- Familiar configuration patterns for operators
- Low user-maintenance cost and complexity
- Flexible and Extensible
- Self-contained
- Maintainable software base

What We Did

- Wrote our own web server
- Made it run under a real-time system (*rtexec*)
- Made it look and feel like our existing programs
- Made it connect easily to Antelope
- Wrote a caching daemon to generate products for it
- Added example web-site to GSN demo

rtwebserver

- Self-contained web-server:

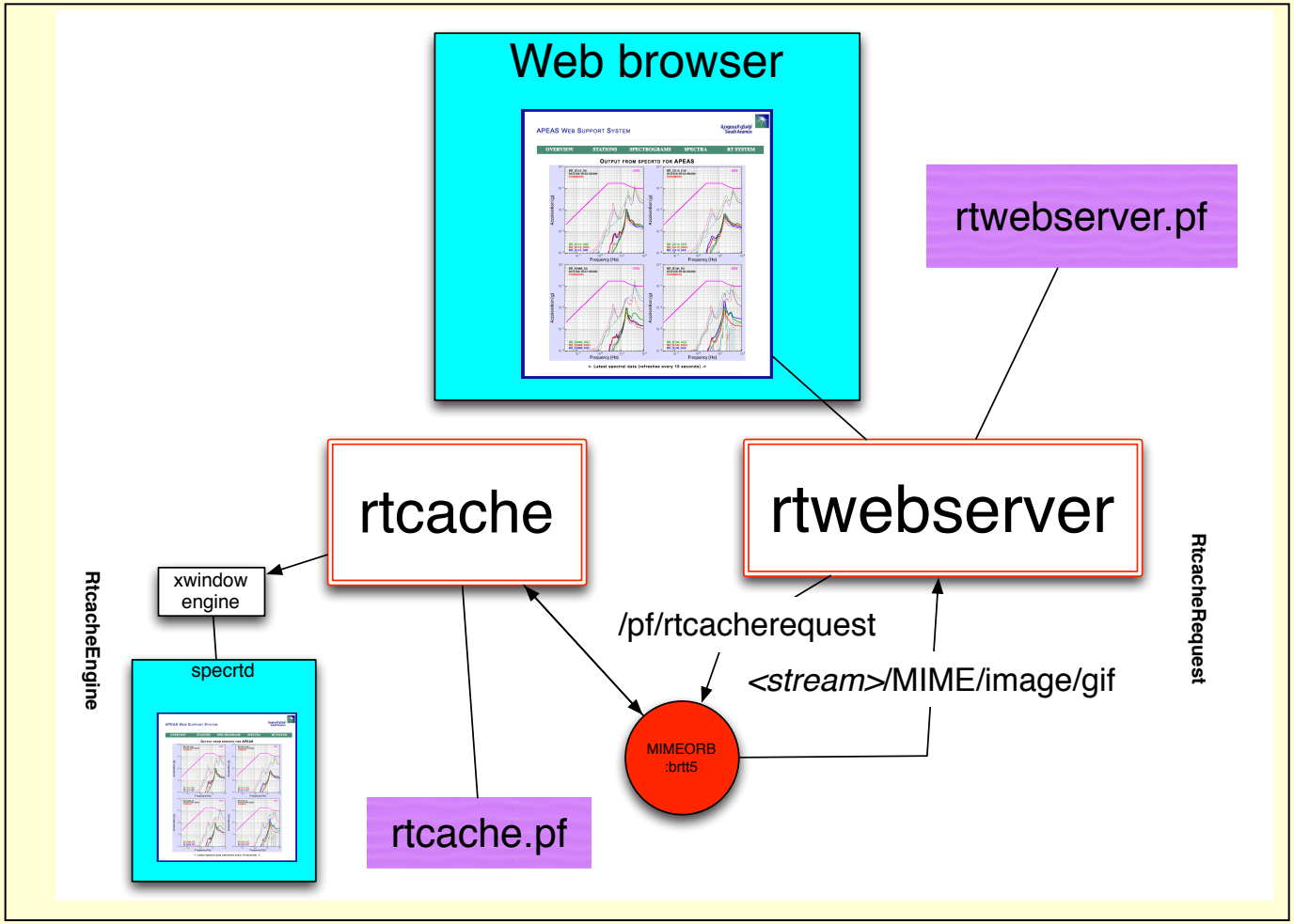
```
% rtwebserver -v -P 8000
```

- Written in *Python* and *Twisted*
  - *http://twistedmatrix.com*
- Runs under *rtexec*
- Parameter-file configures entire site
  - *rtwebserver.pf*
- Logs connections to database

rtcache

- Generalized Caching Daemon
- Pre-builds products for the web server
- For Example:
  - Dynamic X-window screen-shots
  - Strong-motion alarm reports
  - Dbevents or orbrtd output
  - Anything you can code into *Python*
- Exchanges request/response via *orbserver*
- Can show on the web any GUI you can run as X-client

Peregrine Architecture



rtwebserver.pf

```
site &Arr{
   pages &Arr{
      index             rpy:webitems/index.rpy  index
      latest            rpy:webitems/latest.rpy
      rtm               rpy:webitems/rtm.rpy
      orbmonrtd         rpy:webitems/orbmonrtd.rpy
      sources           rpy:webitems/sources.rpy
      clients           rpy:webitems/clients.rpy
      dynamic &Arr{
        ximage          rtcache:ximage
      }
      images &Arr{
        brtt_logo.gif   file:webitems/images/brtt_logo.gif
        dots.gif        file:webitems/images/dots.gif
      }
      css &Arr{
        style.css       pf:stylesheet   text/css
      }
   }
```

rtwebserver connection logging: who is connecting

rtwebtrack peers

File Edit View Options Graphics Help

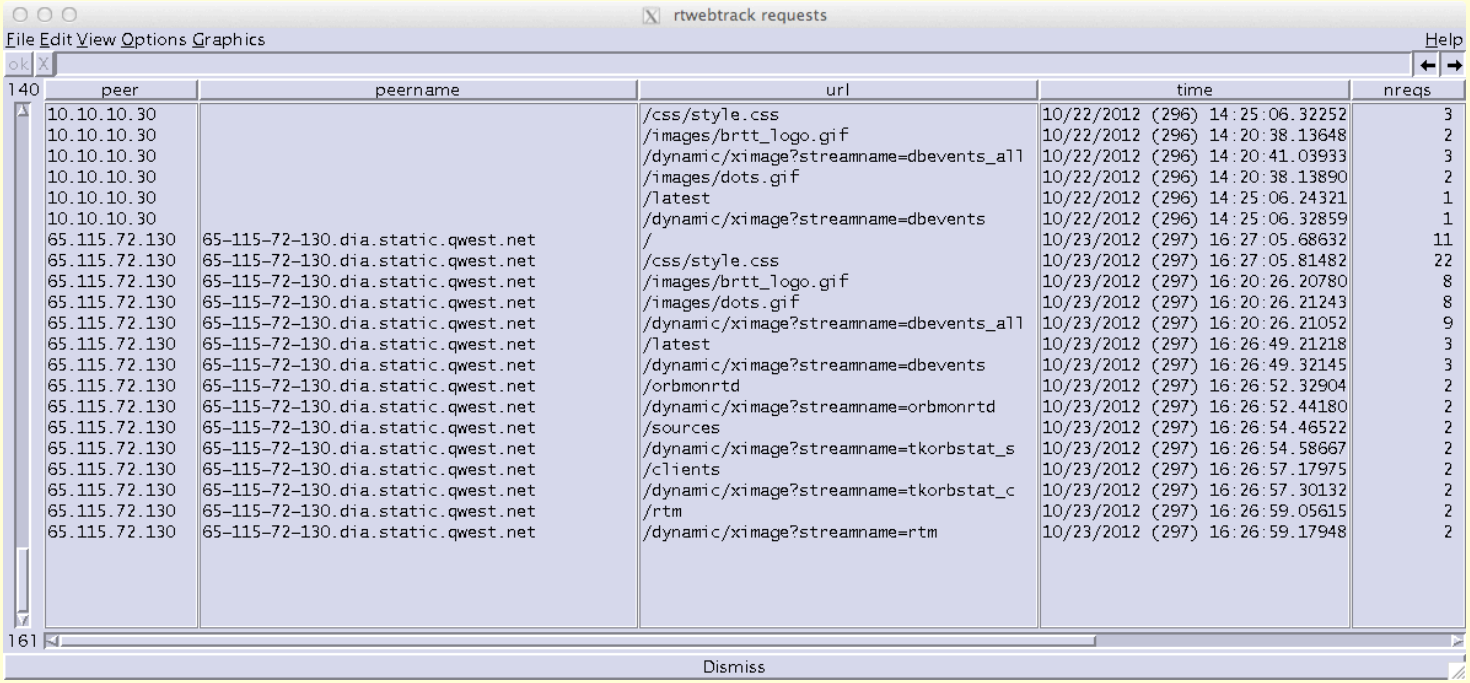
0	peer	peername	time	nreqs	lddate
	10.10.10.242	marble.brtt.com	10/23/2012 (297) 16:31:58.24450	79305	10/23/2012 (297) 16:31:58.24454
	74.92.217.131	lindquistconsulting.com	10/19/2012 (293) 5:49:04.44079	67792	10/19/2012 (293) 5:49:04.44081
	64.60.212.3	64-60-212-3.static-ip.telepacific.net	10/01/2012 (275) 23:18:54.50366	3299	10/01/2012 (275) 23:18:54.50369
	62.48.148.172	adsl-62-48-148-172.ptprime.net	10/01/2012 (275) 16:23:21.48389	31	10/01/2012 (275) 16:23:21.48392
	76.87.92.179	cpe-76-87-92-179.socal.res.rr.com	10/01/2012 (275) 18:18:05.54176	35	10/01/2012 (275) 18:18:05.54178
	213.3.26.109	109-26.3-213.fix.bluewin.ch	10/02/2012 (276) 6:44:40.37573	23	10/02/2012 (276) 6:44:40.37576
	10.10.10.16		10/02/2012 (276) 22:38:06.20054	3725	10/02/2012 (276) 22:38:06.20057
	128.138.65.126	ucb-np2-126.colorado.edu	10/03/2012 (277) 3:36:15.36067	2920	10/03/2012 (277) 3:36:15.36069
	71.165.183.106	pool-71-165-183-106.lsanca.btas.verizon.net	10/03/2012 (277) 6:30:39.88490	32	10/03/2012 (277) 6:30:39.88493
	128.138.65.141	ucb-np2-141.colorado.edu	10/03/2012 (277) 23:35:49.00407	1066	10/03/2012 (277) 23:35:49.00410
	128.138.65.150	ucb-np2-150.colorado.edu	10/16/2012 (290) 0:46:45.40951	5	10/16/2012 (290) 0:46:45.40954
	128.138.65.162	ucb-np2-162.colorado.edu	10/18/2012 (292) 0:41:22.11803	5	10/18/2012 (292) 0:41:22.11805
	128.138.65.229	ucb-np2-229.colorado.edu	10/19/2012 (293) 3:25:03.66532	5001	10/19/2012 (293) 3:25:03.66535
	10.10.10.30		10/22/2012 (296) 14:25:06.32906	14	10/22/2012 (296) 14:25:06.32909
	65.115.72.130	65-115-72-130.dia.static.qwest.net	10/23/2012 (297) 16:27:05.81495	80	10/23/2012 (297) 16:27:05.81498

15

Dismiss

BRTT

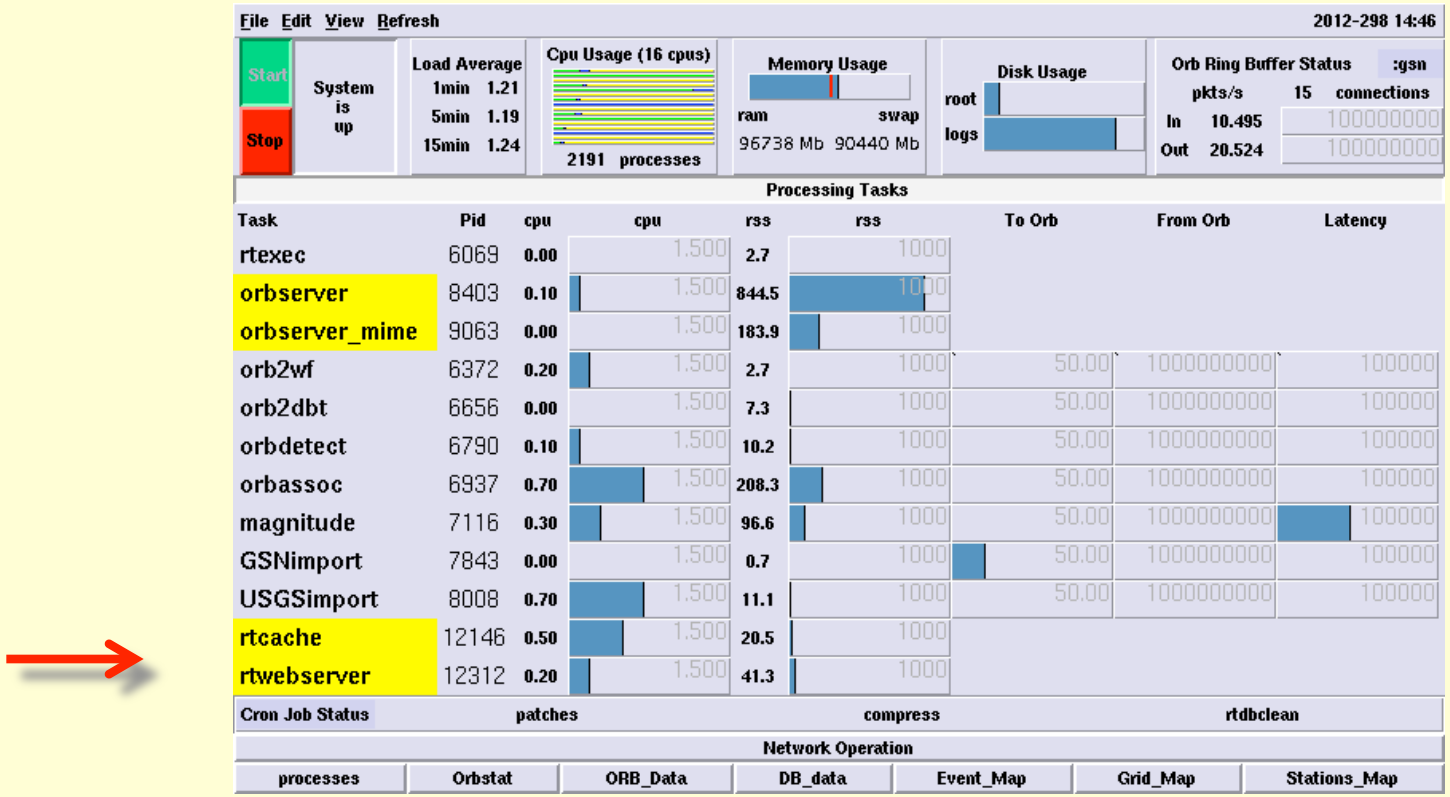
rtwebserver connection logging: what are they asking for



peer	peername	url	time	nreqs
10.10.10.30		/css/style.css	10/22/2012 (296) 14:25:06.32252	3
10.10.10.30		/images/brtt_logo.gif	10/22/2012 (296) 14:20:38.13648	2
10.10.10.30		/dynamic/ximage?streamname=dbevents_all	10/22/2012 (296) 14:20:41.03933	3
10.10.10.30		/images/dots.gif	10/22/2012 (296) 14:20:38.13890	2
10.10.10.30		/latest	10/22/2012 (296) 14:25:06.24321	1
10.10.10.30		/dynamic/ximage?streamname=dbevents	10/22/2012 (296) 14:25:06.32859	1
65.115.72.130	65-115-72-130.dia.static.qwest.net	/	10/23/2012 (297) 16:27:05.68632	11
65.115.72.130	65-115-72-130.dia.static.qwest.net	/css/style.css	10/23/2012 (297) 16:27:05.81482	22
65.115.72.130	65-115-72-130.dia.static.qwest.net	/images/brtt_logo.gif	10/23/2012 (297) 16:20:26.20780	8
65.115.72.130	65-115-72-130.dia.static.qwest.net	/images/dots.gif	10/23/2012 (297) 16:20:26.21243	8
65.115.72.130	65-115-72-130.dia.static.qwest.net	/dynamic/ximage?streamname=dbevents_all	10/23/2012 (297) 16:20:26.21052	9
65.115.72.130	65-115-72-130.dia.static.qwest.net	/latest	10/23/2012 (297) 16:26:49.21218	3
65.115.72.130	65-115-72-130.dia.static.qwest.net	/dynamic/ximage?streamname=dbevents	10/23/2012 (297) 16:26:49.32145	3
65.115.72.130	65-115-72-130.dia.static.qwest.net	/orbmonrtd	10/23/2012 (297) 16:26:52.32904	2
65.115.72.130	65-115-72-130.dia.static.qwest.net	/dynamic/ximage?streamname=orbmonrtd	10/23/2012 (297) 16:26:52.44180	2
65.115.72.130	65-115-72-130.dia.static.qwest.net	/sources	10/23/2012 (297) 16:26:54.46522	2
65.115.72.130	65-115-72-130.dia.static.qwest.net	/dynamic/ximage?streamname=tkorbstat_s	10/23/2012 (297) 16:26:54.58667	2
65.115.72.130	65-115-72-130.dia.static.qwest.net	/clients	10/23/2012 (297) 16:26:57.17975	2
65.115.72.130	65-115-72-130.dia.static.qwest.net	/dynamic/ximage?streamname=tkorbstat_c	10/23/2012 (297) 16:26:57.30132	2
65.115.72.130	65-115-72-130.dia.static.qwest.net	/rtm	10/23/2012 (297) 16:26:59.05615	2
65.115.72.130	65-115-72-130.dia.static.qwest.net	/dynamic/ximage?streamname=rtm	10/23/2012 (297) 16:26:59.17948	2

BRTT

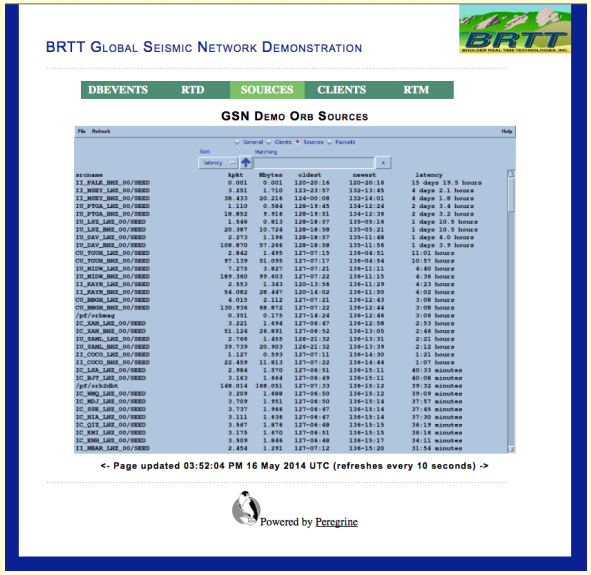
rtwebserver / rtcache in real-time system



BRTT

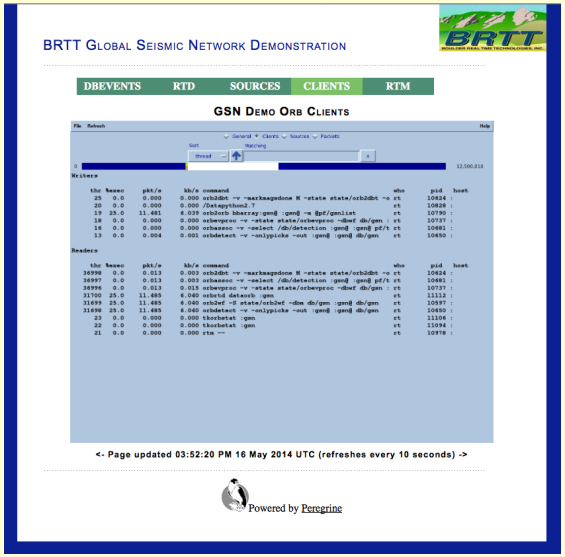
Udine, Italy
March 2015

Arbitrary X-client Display on Web



tkorbstat sources display

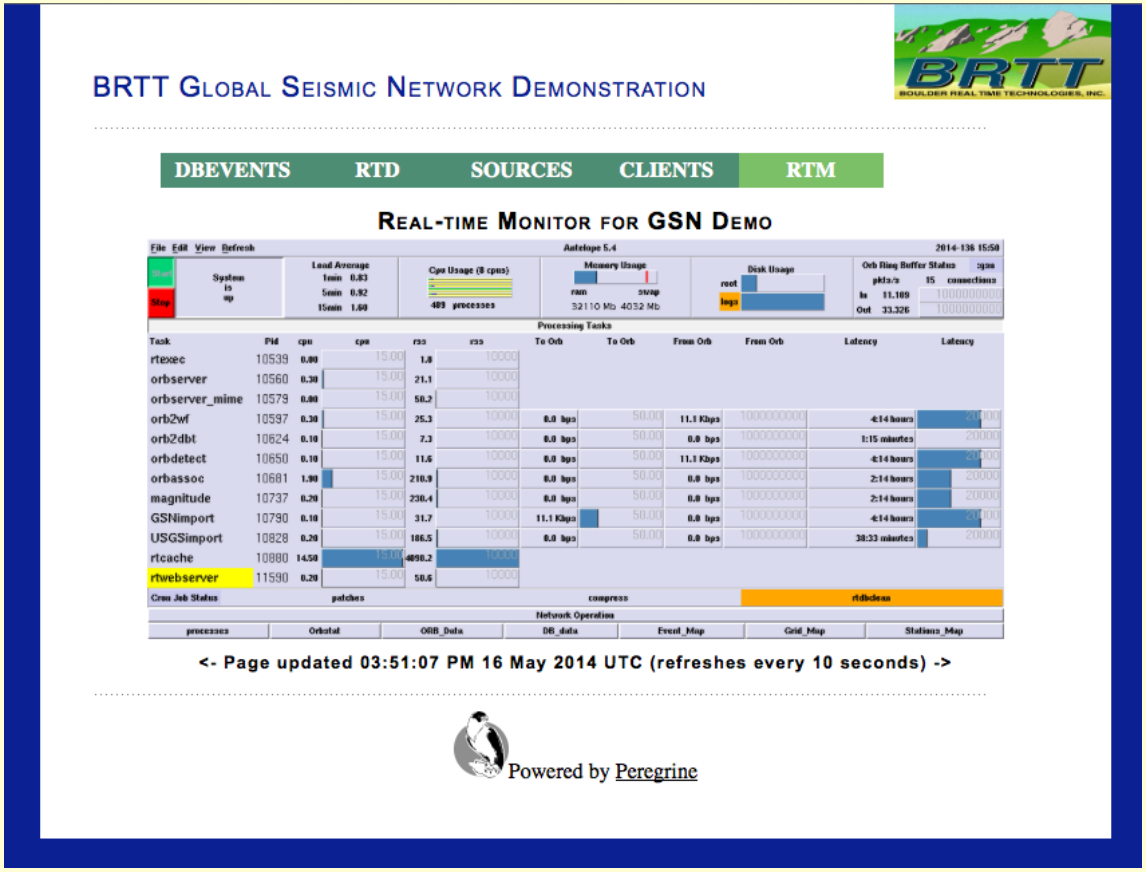
tkorbstat clients display



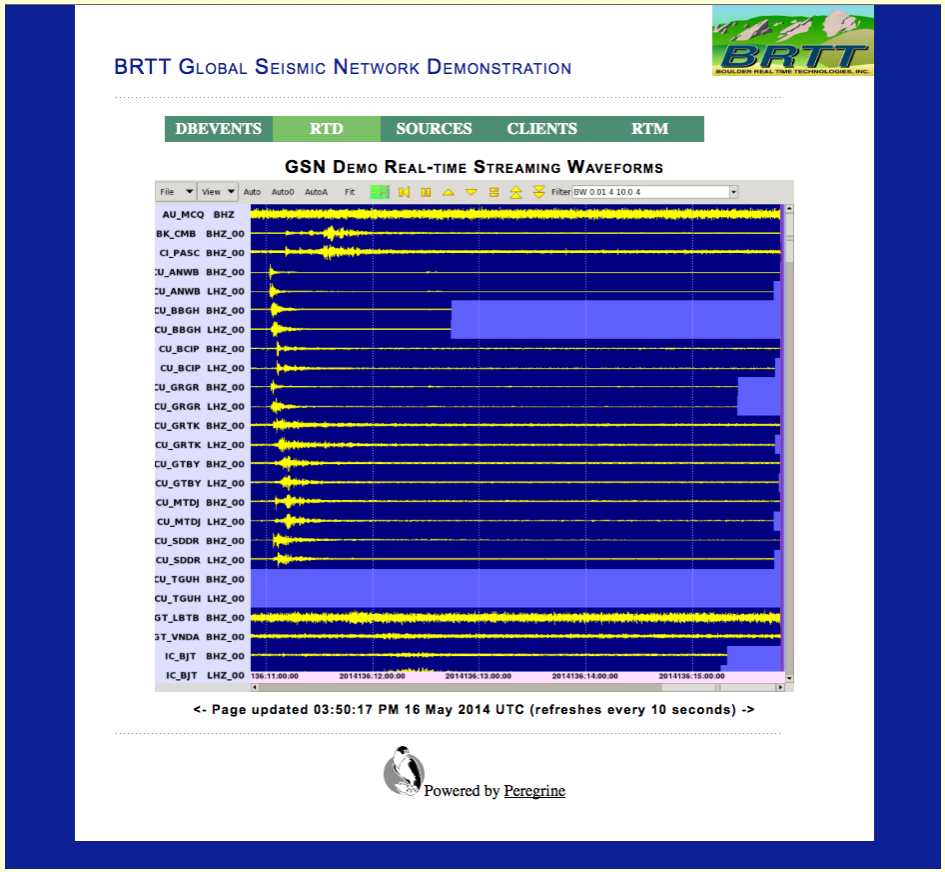
BRTT

Udine, Italy
March 2015

RTM System Status on Web



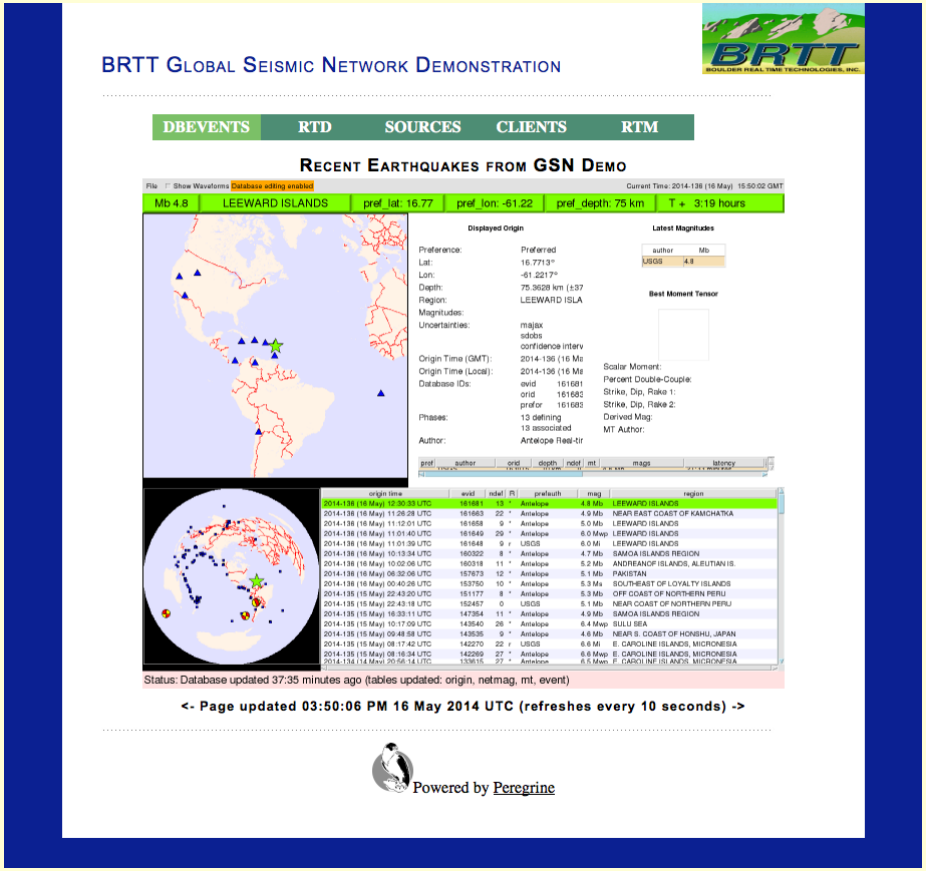
Real-time Waveform Display on Web



BRTT

Udine, Italy
March 2015

Latest Earthquakes on Web



BRTT

Udine, Italy
March 2015

Peregrine Added Cost For Antelope 5.4 Users:

$ 0.00

Setup notes

- Please read and apply setup notes when setting up new systems:
  - *man* ***notes_linux_setup****(5)*
  - *man* ***notes_mac_setup****(5)*
- Preventatives for common problems:
  - spotlight on Mac
  - case-sensitive filesystems on Mac
  - out-of-memory killer (OOM) on Linux
  - etc.

Coming in Antelope 5.5

- New Graphics
- Commercial “Qt” toolkit
  - www.digia.com/qt
  - Cross-platform application and UI-Development framework
  - C++
- Multi-year effort

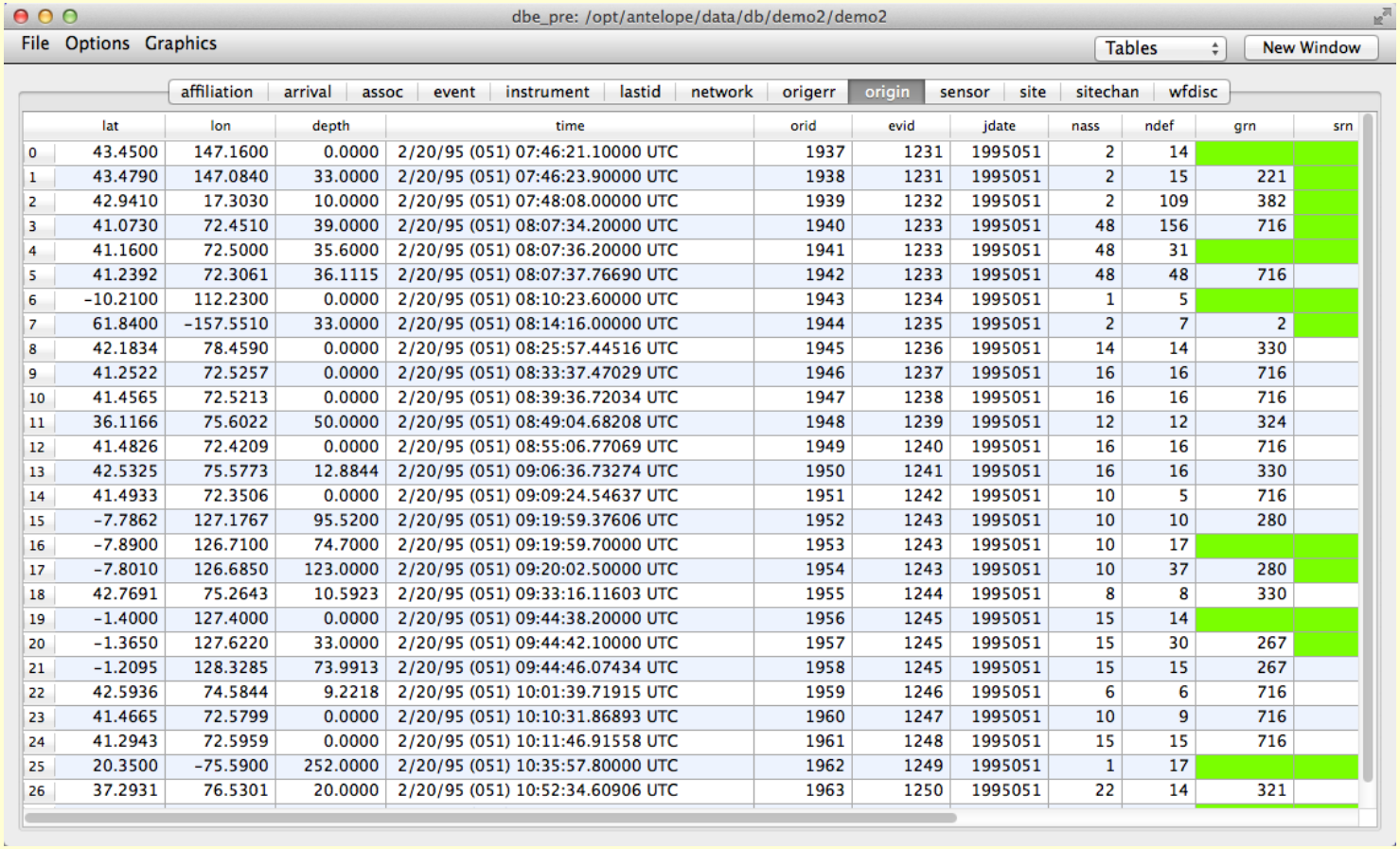
Qt Goals

- Modern “look and feel” for applications
  - Proper anti-aliasing support
  - Proper alpha-blending support
- *Improved maps*
- Get away from dying/dead TCL/Tk language
  - Hard to maintain TCL/Tk apps
  - Looks dated

dbe_pre

- Rewrite of classic dbe application
- New features:
  - Modern look and feel
  - In-cell editing
  - Fast table scrolling
  - More efficient layout
  - Sophisticated tooltips with most dbhelp info

dbe_pre



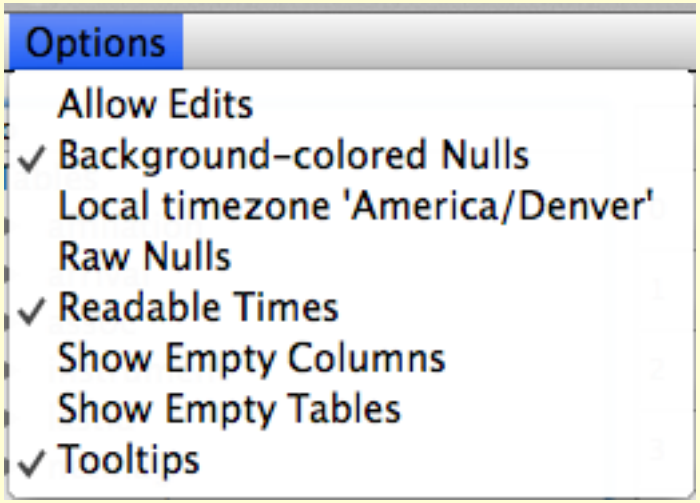
	lat	lon	depth	time	orid	evid	jdate	nass	ndef	grn	srn
0	43.4500	147.1600	0.0000	2/20/95 (051) 07:46:21.10000 UTC	1937	1231	1995051	2	14		
1	43.4790	147.0840	33.0000	2/20/95 (051) 07:46:23.90000 UTC	1938	1231	1995051	2	15	221	
2	42.9410	17.3030	10.0000	2/20/95 (051) 07:48:08.00000 UTC	1939	1232	1995051	2	109	382	
3	41.0730	72.4510	39.0000	2/20/95 (051) 08:07:34.20000 UTC	1940	1233	1995051	48	156	716	
4	41.1600	72.5000	35.6000	2/20/95 (051) 08:07:36.20000 UTC	1941	1233	1995051	48	31		
5	41.2392	72.3061	36.1115	2/20/95 (051) 08:07:37.76690 UTC	1942	1233	1995051	48	48	716	
6	-10.2100	112.2300	0.0000	2/20/95 (051) 08:10:23.60000 UTC	1943	1234	1995051	1	5		
7	61.8400	-157.5510	33.0000	2/20/95 (051) 08:14:16.00000 UTC	1944	1235	1995051	2	7	2	
8	42.1834	78.4590	0.0000	2/20/95 (051) 08:25:57.44516 UTC	1945	1236	1995051	14	14	330	
9	41.2522	72.5257	0.0000	2/20/95 (051) 08:33:37.47029 UTC	1946	1237	1995051	16	16	716	
10	41.4565	72.5213	0.0000	2/20/95 (051) 08:39:36.72034 UTC	1947	1238	1995051	16	16	716	
11	36.1166	75.6022	50.0000	2/20/95 (051) 08:49:04.68208 UTC	1948	1239	1995051	12	12	324	
12	41.4826	72.4209	0.0000	2/20/95 (051) 08:55:06.77069 UTC	1949	1240	1995051	16	16	716	
13	42.5325	75.5773	12.8844	2/20/95 (051) 09:06:36.73274 UTC	1950	1241	1995051	16	16	330	
14	41.4933	72.3506	0.0000	2/20/95 (051) 09:09:24.54637 UTC	1951	1242	1995051	10	5	716	
15	-7.7862	127.1767	95.5200	2/20/95 (051) 09:19:59.37606 UTC	1952	1243	1995051	10	10	280	
16	-7.8900	126.7100	74.7000	2/20/95 (051) 09:19:59.70000 UTC	1953	1243	1995051	10	17		
17	-7.8010	126.6850	123.0000	2/20/95 (051) 09:20:02.50000 UTC	1954	1243	1995051	10	37	280	
18	42.7691	75.2643	10.5923	2/20/95 (051) 09:33:16.11603 UTC	1955	1244	1995051	8	8	330	
19	-1.4000	127.4000	0.0000	2/20/95 (051) 09:44:38.20000 UTC	1956	1245	1995051	15	14		
20	-1.3650	127.6220	33.0000	2/20/95 (051) 09:44:42.10000 UTC	1957	1245	1995051	15	30	267	
21	-1.2095	128.3285	73.9913	2/20/95 (051) 09:44:46.07434 UTC	1958	1245	1995051	15	15	267	
22	42.5936	74.5844	9.2218	2/20/95 (051) 10:01:39.71915 UTC	1959	1246	1995051	6	6	716	
23	41.4665	72.5799	0.0000	2/20/95 (051) 10:10:31.86893 UTC	1960	1247	1995051	10	9	716	
24	41.2943	72.5959	0.0000	2/20/95 (051) 10:11:46.91558 UTC	1961	1248	1995051	15	15	716	
25	20.3500	-75.5900	252.0000	2/20/95 (051) 10:35:57.80000 UTC	1962	1249	1995051	1	17		
26	37.2931	76.5301	20.0000	2/20/95 (051) 10:52:34.60906 UTC	1963	1250	1995051	22	14	321	

BRTT

Udine, Italy
March 2015

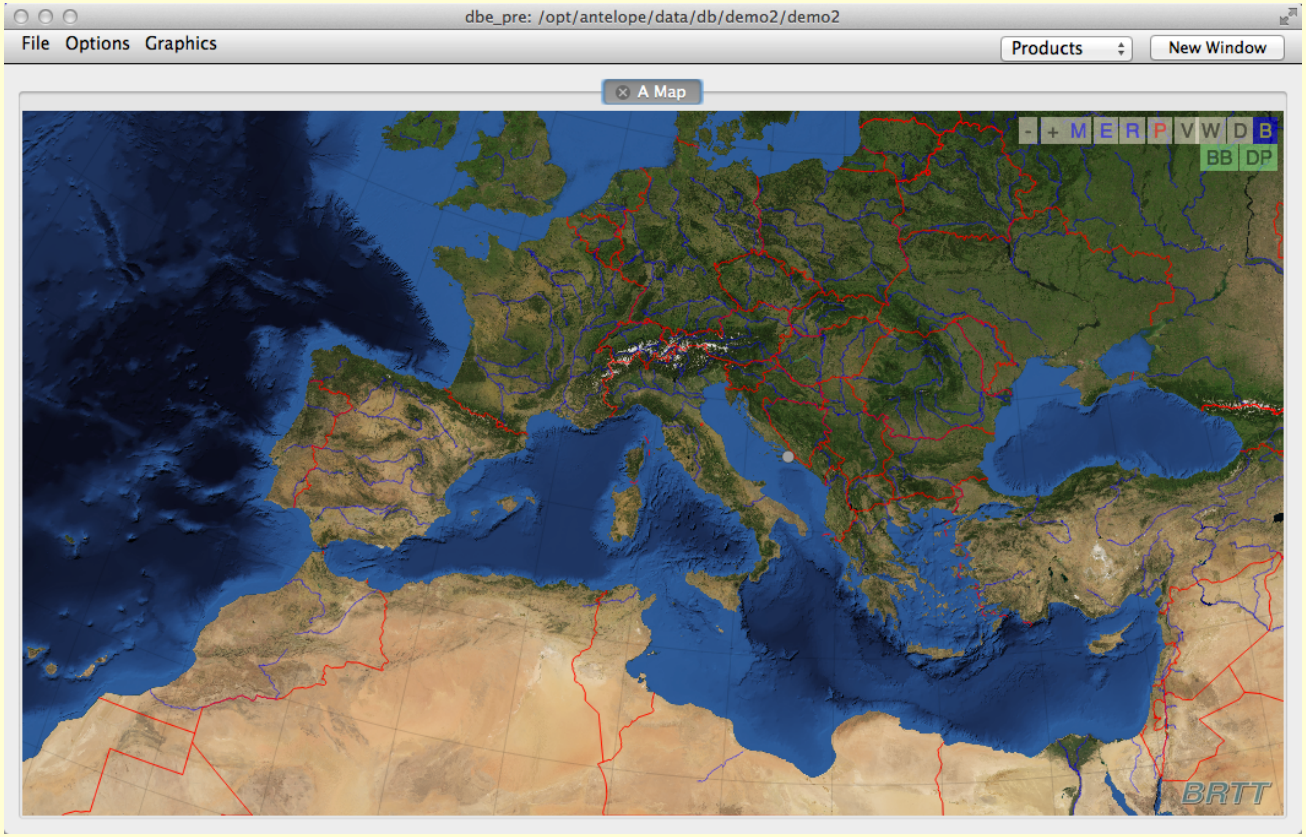
dbe_pre

- Progressively adding standard options



- Generic object-class for standard interaction over multiple applications

dbe_pre



BRTT

Udine, Italy
March 2015

Thank You



BRTT

Udine, Italy
March 2015