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How to Obtain USGS Earthquake Catalog with Antelope

Installing USGScube2orb

Application Note #69

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TABLE OF CONTENTS

1. INTRODUCTION.....	3
2. PREREQUISITES AND CUSTOMIZATIONS.....	3
3. INSTALLING USGScube2orb	3
4. USGScube2orb Options.....	5

INTRODUCTION

For many years, Kinematics has suggested that clients who want to merge the global QED earthquake catalog produced by the United States Geological Survey into their real-time earthquake database should use the programs `qedd` or `neicd` included with the Antelope distribution or ASPEN installation.

However, recent changes to the USGS website have rendered these programs non-functional. To restore functionality of the original processes, Kinematics now recommends using the program included with the GSN real-time demo called `USGScube2orb`. While the mechanism and configuration of this program is slightly different than that of `qedd` or `neicd`, the end result should be transparent to the user.

PREREQUISITES AND CUSTOMIZATIONS

To install `USGScube2orb`, the user should follow the directions found in Section 3. Please note the following convention used for these instructions:

- The current user is called `rt`, and that this user has write permissions on the real-time system.
- The real-time system is installed in the directory `~/rtssystem` (this is most likely a link to the actual `rtssystem` directory on another partition of your system)
- A subdirectory `catalogs` under `rtssystem`

If your system differs from this configuration, please make the associated changes as necessary, or contact Kinematics for additional support.

INSTALLING USGScube2orb

Installing and configuring the real-time system to use `USGScube2orb` is a multi-step process that generally does the following:

1. Creates a new ORB to store the incoming origin packets from `USGScube2orb`
2. Writes these packets out to a database called `catalogs/qed`
3. Reads in the database origins into the main ORB where they are associated with origins in the production database

To install and configure the program, follow the proceeding steps:

- Copy the program `USGScube2orb` to the bin directory of the real-time system :
> `cp $antelope/demo/gsn/bin/USGScube2orb ~/rtssystem/bin`
- Create a new ORB specifically for the USGS data. This step is necessary in order to ensure that the new origin packets, that have the source name `/pf/orb2dbt, a)` do not mix with the real-time system, and `b)` are properly written to an external catalog. The best way to do this is to copy the default `orbserver.pf` parameter file into the real-time parameter file directory:
> `cp $antelope/data/pf/orbserver.pf ~/rtssystem/pf/orbserver_qed.pf`

- Edit the new orbserver_qed.pf parameter file using your preferred text editor. Most of the parameter file can remain the same, but the following lines should be changed:
 - > ringsize 1G changed to ringsize 50M
 - > prefix orb/ changed to prefix orb/qed_
- Create a backup of the rtexec.pf file, located in the ~/rtsystem directory:
 - > cp rtexec.pf rtexec.pf.bak
- Modify the rtexec.pf file, located in the ~/rtsystem directory. Note that, after saving, the system may briefly go down in order to restart. Add the following lines under the Processes table:
 - > orbserverQED orbserver -p \$ORBQED orbserver_qed
 - > USGS2orb bin/USGScube2orb -mag_cutoff 4.5 -wait 1.0 -backup 24.0 \$ORBQED
 - > USBS2db orb2dbt -state state/USGS2db -overwrite \$ORBQED catalogs/qed
- If a line similar to the following does not exist in the Processes table (if you are a previous user of neicd or qedd, then this line likely exists), add it:
 - > dbQED2orb dborigin2orb catalogs/qed \$ORB
- Continuing editing the rtexec.pf file, add the following lines under the Run array:
 - > orbserverQED yes
 - > USGS2orb yes
 - > USGS2db yes
- Under the Defines array, add the line (note that the value indicates the ORB port number; this number can be any value between 10000 and 65535 as long as it is not being currently used by the system):
 - > ORBQED :14000
- Under the Processes array, remove the line containing the neicd or qedd program call
- Under the Run array, remove the line containing the neicd or qedd program call
- Save and close the rtexec.pf file

NOTE: Changes to the Defines array will induce a complete restart of the real-time system

USGScube2orb Options

The program USGScube2orb reads earthquake information from the URL:

http://earthquake.usgs.gov/eqcenter/catalogs/merged_catalog.cube

and puts them as packets with the source name /pf/orb2dbt in an ORB. The synopsis of the command is:

```
USGScube2orb [-mag_cutoff mag_cutoff] [-wait wait_hours] [-backup backup_hours] orbname
```

Where:

- mag_cutoff is the minimum magnitude of an event to be associated with the real-time catalog
- wait_hours is the number of hours (after present) to wait before adding an origin to the catalog
- backup_hours is the number of hours (before present) to look back into the USGS cube catalog for origins
- orbname is the ORB to add new origin packets to