

Managing Metadata with Antelope – *Keeping up with the 2000+ station EarthScope USArray Transportable Array experiment*

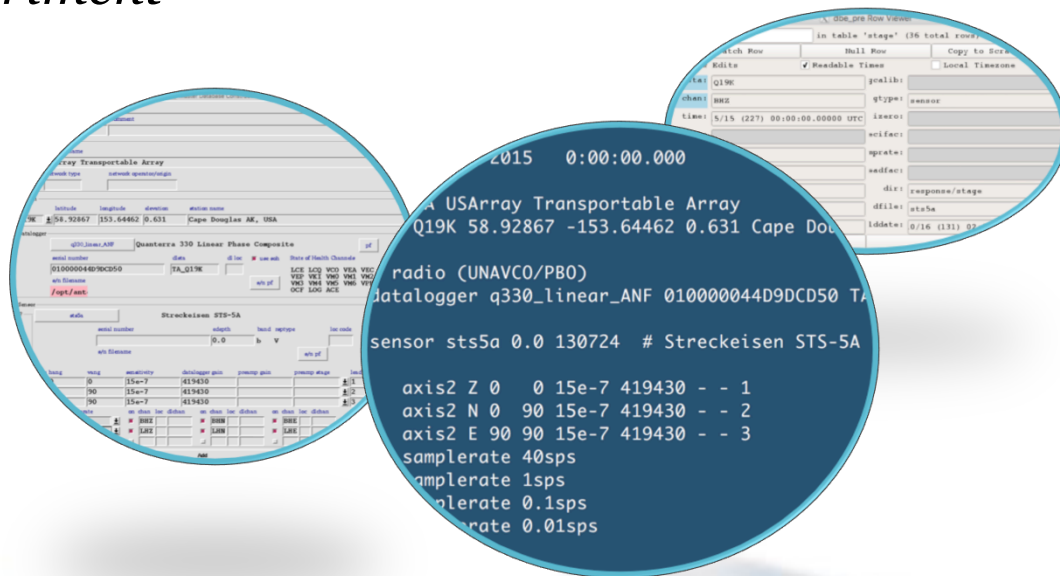
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~~AUG – Rome~~

~~May, 2016~~

AUG – Fairbanks, AK

17-19 August, 2016



Available tools

- dbbuild
 - Batch mode
 - GUI
- seed2db
- dbe

```
#
time 08/15/2015 0:00:00.000

net TA USArray Transportable Array
sta Q19K 58.92867 -153.64462 0.631 Cape Douglas

# radio (UNAVCO/PBO)
datalogger q330_linear_ANF 010000044D9DCD50 TA
sensor sts5a 0.0 130724 # Streckeisen STS-5A

axis2 Z 0 0 15e-7 419430 - - 1
axis2 N 0 90 15e-7 419430 - - 2
axis2 E 90 90 15e-7 419430 - - 3

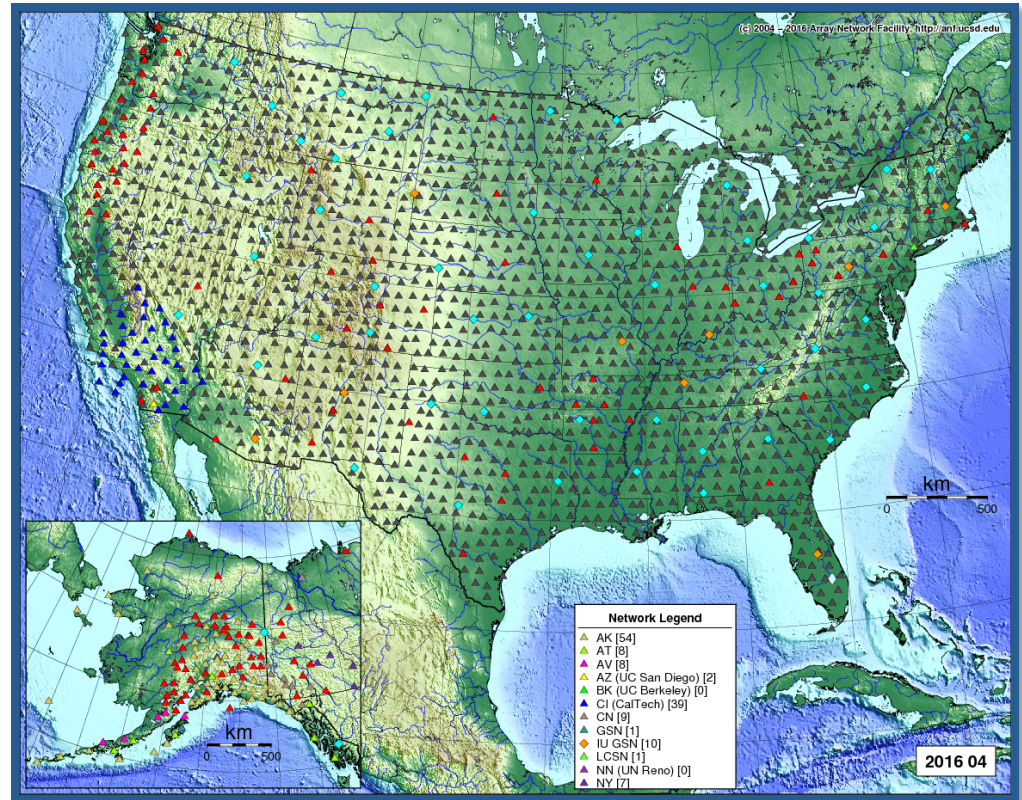
sample_rate 40sps
```

The screenshot shows the dbe GUI with the following configuration:

- Configuration time:** 8/15/2015
- Network:** TA USArray Transportable Array
- Station:** Q19K, latitude 58.92867, longitude 153.64462, elevation 0.631, station name Cape Douglas
- Datalogger:** q330_linear_ANF, Quanterra 330 Linear Phase, serial number 010000044D9DCD50, di sta TA_Q19K
- Sensor:** sts5a, Streckeisen STS-5A, serial number 130724, depth 0.0
- Axis 2:** Z 0 0 15e-7 419430, N 0 90 15e-7 419430, E 90 90 15e-7 419430
- Sample Rate:** 40sps
- Units:** nm/s
- Time:** 5/15 (227) 00:00:00.00000 UTC
- Ageid:** 1
- Ident:** 1212
- gnom:** 1.5e-06
- dir:** response/stage
- dfile:** sts5a
- lddate:** 0/16 (131) 02:57:47.55206 UTC

Overview of metadata

- Rolling deployment since 2004
- Currently:
 - **344** stations (154 TA)
 - Field season April-Oct. ~35 installed this season
- At the peak:
 - **5-20** station services, installs, removals per week leading to interrupts 2x/wk
- Overall:
 - **2059** total stations (1792)





Why not use your dbmaster/ for updates?

Removing database rows for active programs == **problems!**

Could result in longer delays if you shutdown rtsystem:

- Possible errors in batch file
- Incoming dataless SEED may not be correct
- Wrong stations/channels chosen to add/update

Directory structure for dbmaster preparation

- Need working area that is not in-use rtsystem/dbmaster
- Create a pre-dbmaster area
- ta_dbuild area
 - active
 - closed
- Individual network area
- Staged merging zones:
 - CONTRIB...merge
 - all_merge

```
taops.ucsd.edu{rt}522% pwd
/anf/TA/dbs/pre-dbmaster
taops.ucsd.edu{rt}523% ls
CONTRIB_NETWORKS_merge/   iu_only/
ak_only/                   ld_only/
all_merge/                 n4@
at_only/                   nn_only/
av_only/                   ny_only/
az_only/                   po_only/
bk_only/                   ta_dbbuild/
ci_only/                   usnsn_only/
cn_only/                   uu_only/
err.merge                  wu_only/
ii_only/
taops.ucsd.edu{rt}524% █
```

External stations – using seed2db on dataless SEED

- Develop way to check for and download updated dataless files
- Use chansift.pf
 - Subset sta/chan

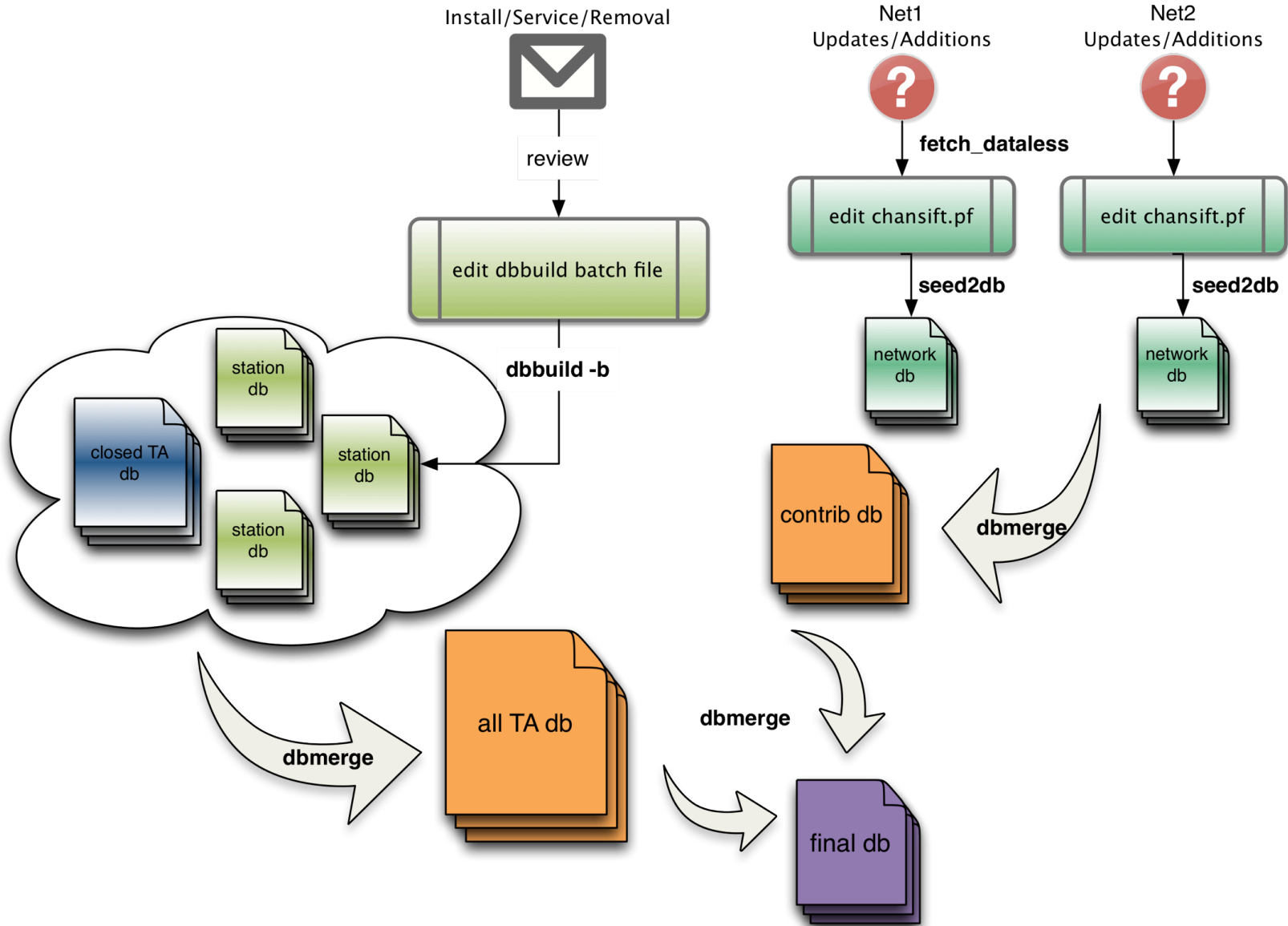
```
taops.ucsd.edu{rt}524% ls cn_only
2015-238/          cn_tmp.sensor
2016-015/          cn_tmp.site
CN.dataless*      cn_tmp.sitechan
chansift.pf        cn_tmp.snetsta
cn_tmp.calibration cn_tmp.stage
cn_tmp.instrument fetch_dataless*
cn_tmp.lastid     foo
cn_tmp.network    response/
cn_tmp.schanloc
```

- Command line:

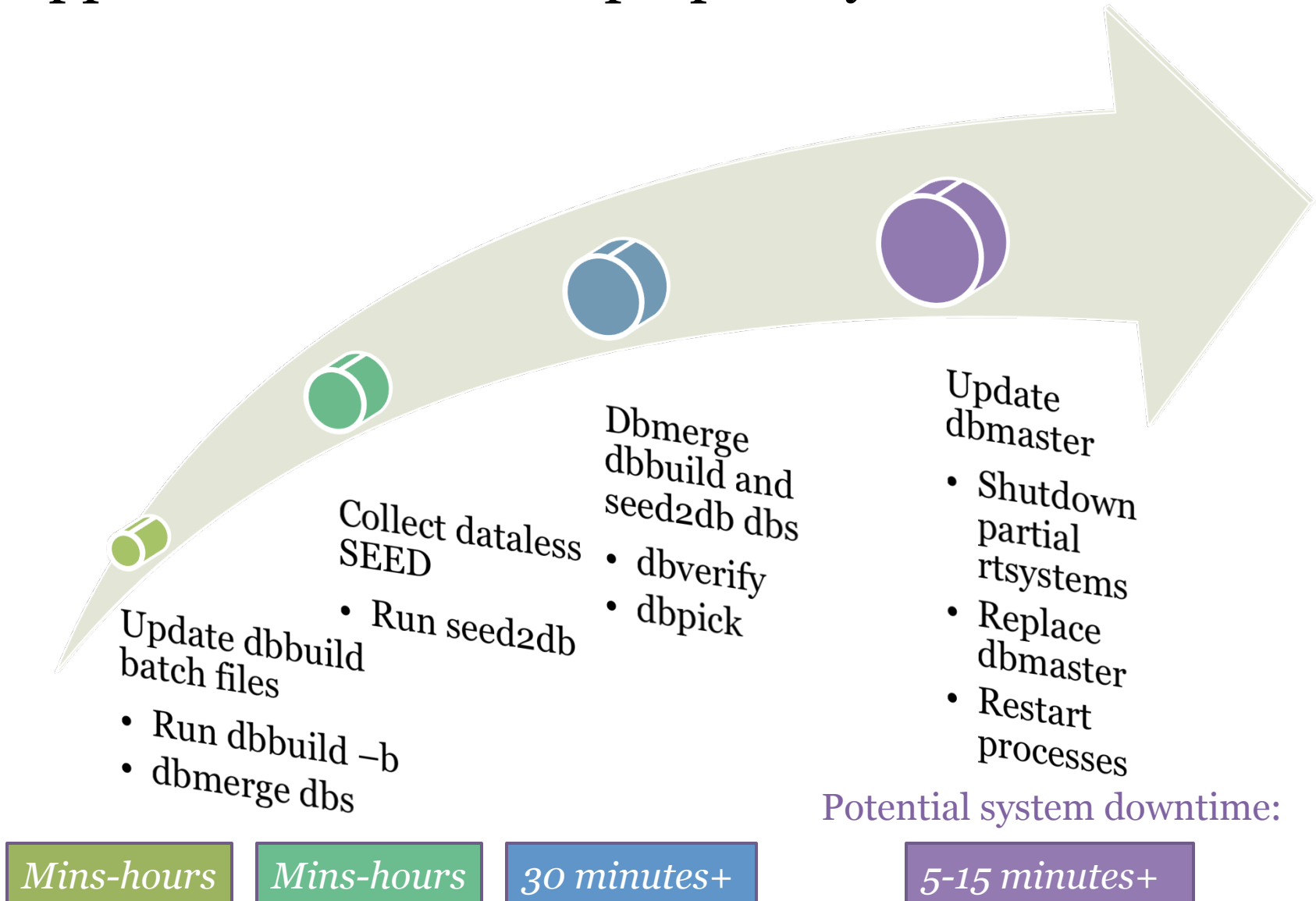
```
seed2db -resmdir response -stagedir response/stage_CN -  
chansift chansift.pf CN.dataless cn_tmp
```

- Clean up duplicated response and stage files with “**clean_dup_responses**”

Flowchart of build process



Approximate times for prep vs. system downtime



Partial Shutdown – no rtexec -k

- acq host (q3302orb)

```
# turn these off during dbmaster updates
#
q3302orb_prelim yes
q3302orb_prelimBGANb yes
#
q3302orb_AKCAN yes
q3302orb_BGAN yes
q3302orb_Low48 yes
q3302orb_Strays yes
q3302orb_EARN yes
q3302orb_TPF0 yes
q3302orb_CASC yes
q3302orb_DIP yes
q3302orb_NoEP yes

# collect datalogger logs
q330logs2db yes
q330logs2db_CASC yes
```

- ops host (db and wf writes)

```
turn off for dbmaster updates
orbdetect yes
orbassoc yes
orbevproc yes

orb2dbSeismic yes
orb2dbInfraMet yes
orb2db100 yes
orb2wf_reg yes
orb2wf_AKinframet yes
orb2wf_AKSOH yes
orb2db_prelim yes
orb2db_soh yes

orb2dbt yes
orb2dbt_orig yes

orb2dbt_soh yes
orb2dbt_prelim yes

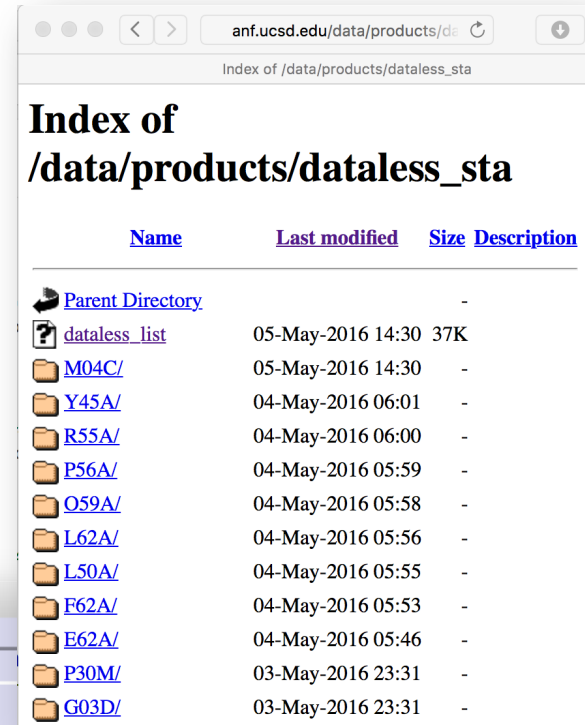
orb2logs yes
orb2logs_prelim yes

assoc_SCEC yes
```

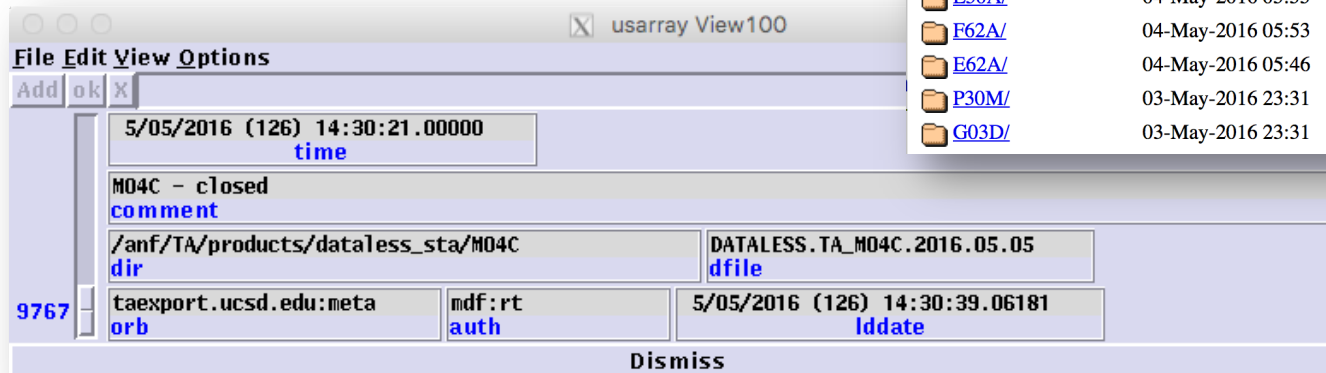
```
q3302orb_AKCAN q3302orb -v -noipresolv -S state/q3302orb_AKCAN -pf q3302orb_AKCAN
-calib_db $DBOPS/usarray tadata_AKCAN wforb $ORB dataorb $ORB cmdorb $CMDORB poco
rb $POCORB statusorb $STATUSORB
```

Exporting metadata

- mk_dataless_seed
 - Distribute via email, ftp, or orbxfer
 - Keep track of distribution with dmcfiles



Name	Last modified	Size	Description
Parent Directory		-	
dataless_list	05-May-2016 14:30	37K	
M04C/	05-May-2016 14:30	-	
Y45A/	04-May-2016 06:01	-	
R55A/	04-May-2016 06:00	-	
P56A/	04-May-2016 05:59	-	
O59A/	04-May-2016 05:58	-	
L62A/	04-May-2016 05:56	-	
L50A/	04-May-2016 05:55	-	
F62A/	04-May-2016 05:53	-	
E62A/	04-May-2016 05:46	-	
P30M/	03-May-2016 23:31	-	
G03D/	03-May-2016 23:31	-	



usarray View100

File Edit View Options

Add ok X

5/05/2016 (126) 14:30:21.00000
time

M04C - closed
comment

/anf/TA/products/dataless_sta/M04C
dir

DATALESS.TA_M04C.2016.05.05
dfile

9767 taexport.ucsd.edu:meta
orb

mdf:rt
auth

5/05/2016 (126) 14:30:39.06181
lddate

Dismiss

- db2stationxml



Summary

- Antelope provides a top to bottom solution for metadata creation
- Antelope tools available for metadata import/build: *dbbuild* & *seed2db*
- Limit processing and possible acquisition downtime by creating a “pre-dbmaster” area

Extra – dbverify output, what can I ignore?

To be fixed:

- chanid
- calib/calper
- hang/vang
- arid/orid/evid/wfid/magid
- duplicate arrival/origins
- hang/vang

To ignore:

- hang/vang
- site lat/long matches

dbverify – things to ignore after dbmaster update

- Some hang/vang errors

```
dbopen sitechan
  dbsubset hang!=NULL
  dbsubset chan=~/. *Z/
  dbverify abs(hang)<5 sta ch
Record #857 : chanid = 6624
false E12A BHZ 180.0
Record #858 : chanid = 6627
false E12A LHZ 180.0
Record #859 : chanid = 6630
false E12A VHZ 180.0
Record #860 : chanid = 6633
false E12A UHZ 180.0
4 failures of 'abs(hang)<5'.
```

```
false P25A BDE 0.0
Record #8802 : chanid = 69340
false P25A LDE 0.0
Record #8803 : chanid = 69341
false P25A VDE 0.0
Record #8804 : chanid = 69342
false P25A UDE 0.0
Record #9560 : chanid = 76208
false Y22D BDE 0.0
Record #9561 : chanid = 76209
false Y22D LDE 0.0
Record #9562 : chanid = 76210
false Y22D VDE 0.0
Record #9563 : chanid = 76211
false Y22D UDE 0.0
408 failures of 'abs(hang-90)<5||abs(hang-270)<5'.
```

- site lat/long matches

```
dbopen site
  dbsort lat lon sta
  dbgroup lat lon sta
  dbfind_dups lat .0001 lon .0001
```

```
Records #391 and #392 match:
lat      : 34.945500 34.945500 0.000000 0.000100
lon      : -106.460000 -106.460000 0.000000 0.000100
Records # : 391 # 392
lat      : 34.9455 34.9455
lon      : -106.4600 -106.4600
sta      : ASM TASN
bundle   :
bundletype : 1 1
```

dbverify – beyond dbmaster: id issues, calib/calper

- Chanid

```
dbfixchanids dbname
```

```
dbopen wfdisc
dbjoin sensor
comment check that chanids are set more or less correctly
dbverify wfdisc.chanid==sensor.chanid wfdisc.chanid sensor.chanid
```

```
Record #129767 : sta = G03D
endtime = 4/26/2016 (117)
false 75906 75921
Record #129769 : sta = G03D
endtime = 4/26/2016 (117)
false 75907 75922
```

```
dbopen wfdisc
dbjoin calibration
comment check that wfdisc calib's are set (properly)
dbverify wfdisc.calib==calibration.calib wfdisc.calib calibration.calib
Record #171686 : sta = P19K chan = BHZ time = 5/18/2016 (139) 10:24:04.525
endtime = 5/18/2016 (139) 10:42:29.500
false 1 1.5895
Record #171687 : sta = P19K chan = BHN time = 5/18/2016 (139) 10:24:04.525
endtime = 5/18/2016 (139) 10:42:29.500
false 1 1.5895
```

- Calib/calper

```
dbjoin $db.wfdisc calibration | dbselect -s -
"wfdisc.calib:=calibration.calib" > /dev/null
```

dbverify – beyond dbmaster: del phases, arrival/origin matches

- del phases

```
dbsubset -v dbname.arrival "iphase=='del'" |
```

```
dbdelete -sv -
```

- arrival/assoc

```
dbopen assoc
  dbjoin arrival
  dbjoin origin
  dbjoin site
  comment verify that assoc station matches arrival station
  dbverify assoc.sta==arrival.sta arid orid assoc.sta arrival.sta
  comment check that assoc.delta corresponds to the computed distance
  dbverify abs(delta-distance(origin.lat,origin.lon,site.lat,site.lon))<.001 del
ta distance(origin.lat,origin.lon,site.lat,site.lon)
  comment check that the arrival follows the event
  dbverify arrival.time-origin.time>0 origin.time arrival.time
  comment check that computed arrivals are close to actual arrivals
  dbverify phase!~/P.*//!(abs(parrival()-arrival.time)<10) phase parrival()-arri
val.time
Record #3513 : arid = 2882922 orid = 3877500 sta = LRL time = 4/04/2016 (095)
11:48:58.656 lat = 30.2995 lon = -113.6842 depth = 0.0000 ndef = 19 nass
= 19 ondate = 1992211 offdate = -1
false Pb -16.576
Record #4912 : arid = 2883665 orid = 3960316 sta = AGMN time = 4/03/2016 (094)
8:37:56.954 lat = -14.3519 lon = 166.8205 depth = 35.0000 ndef = 0 nass
= 245 ondate = 2006232 offdate = 2599365
false Pdiff 255.94
```

- origin matches