IRODS
in an Neutrino Experiment

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for
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T2K

- Looked at setting up iRODS system on Tokai to Kamioka (T2K) experiment
  - Located in Japan
  - Neutrino experiment
  - Collaborators in USA, Europe, Asia
- Ideal environment for grids and clouds

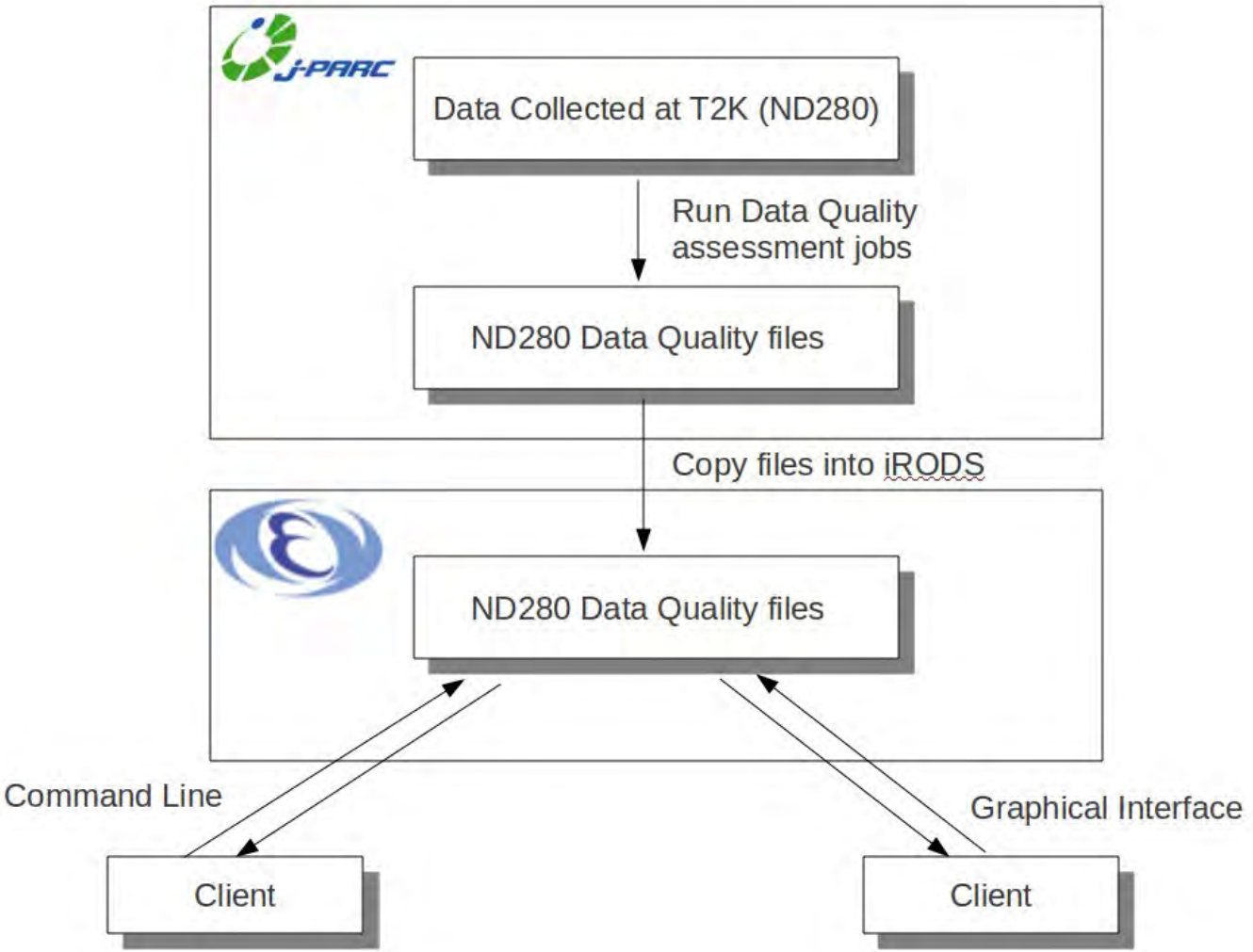
Problem

- T2K needs to assess quality of data produced
  - Identify problems in the detectors
  - Allow researchers to select ideal data sample for their analyses
- T2K data quality needs to be determined ASAP
- T2K experts distributed globally
- Access to data at JPARC restricted

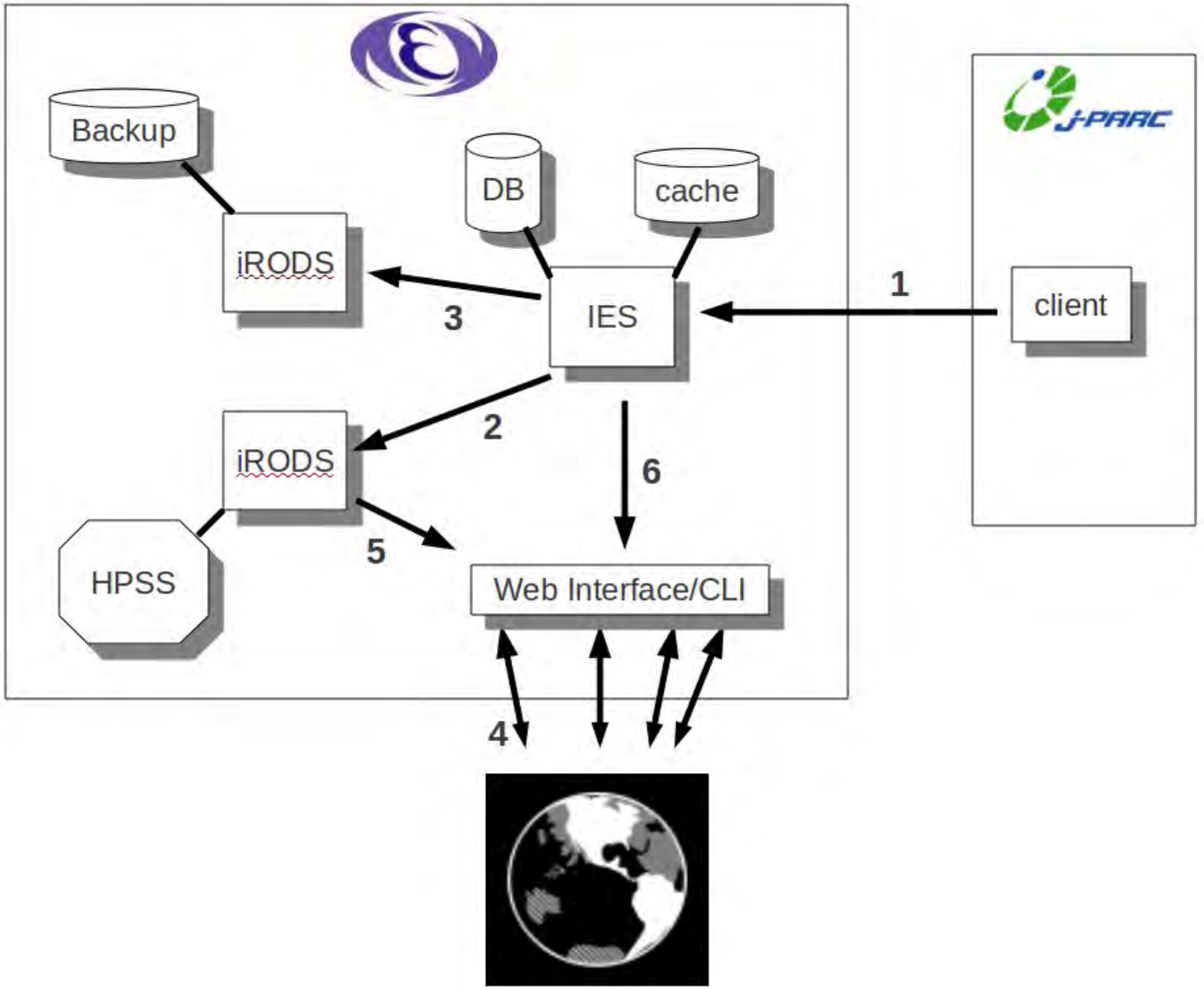
Problem details

- File sizes range from KB to MB.
- Ascii files, ROOT files.
- Currently 360GB of data produced.
- Files stored in HPSS at KEK.
  - Must be at least 1GB in size.
- Require read-only access for download with minimal overhead

Data Quality Workflow



IRODS System



IRODS System

- HPSS efficient with files >= 1GB in size.
- Created rules to bundle ingested files into 1GB units.
- Rules to also purge the cache and backup resources when files in HPSS.
- Also rule to prevent 'read-only' account users from changing account password.

IRODS Rules

Rule to prevent users changing the read-only password:

```
acPreProcForModifyUser(*UserName,*Option,*NewValue)||
    ifExec(*UserName == rods,
            ifExec(*Option == password,
                    msiWriteRodsLog("Alert: attempt to change password for *UserName", status)##
            fail,
            nop##nop,
            nop,
            nop),
    nop,
    nop,
    Nop)
|nop
```

IRODS Rules

Rule to create a bundle if the file is > 1GB:

```
acKEKBundle(*collPath, *bundlePath, *cacheRes, *compRes, *archive, *threshold)||
        msiCheckCollSize(*collPath, *cacheRes, *threshold, *aboveThreshold, *status)##
        ifExec(*aboveThreshold == 1,
                msiWriteRodsLog("Creating bundle", *status)##
                msiPhyBundleColl(*collPath, *compRes,*status)##
                msiWriteRodsLog("Finished bundling, starting to replicate", *status)##
                msiCollRepl(*bundlePath, verifyChksum++++backupRescName=*archive,
                                *status)##
                msiWriteRodsLog("Finished replicating bundle", *status),
                nop##nop##nop##nop##nop,
                nop,
                nop
        )
|nop##nop
```

IRODS Rules

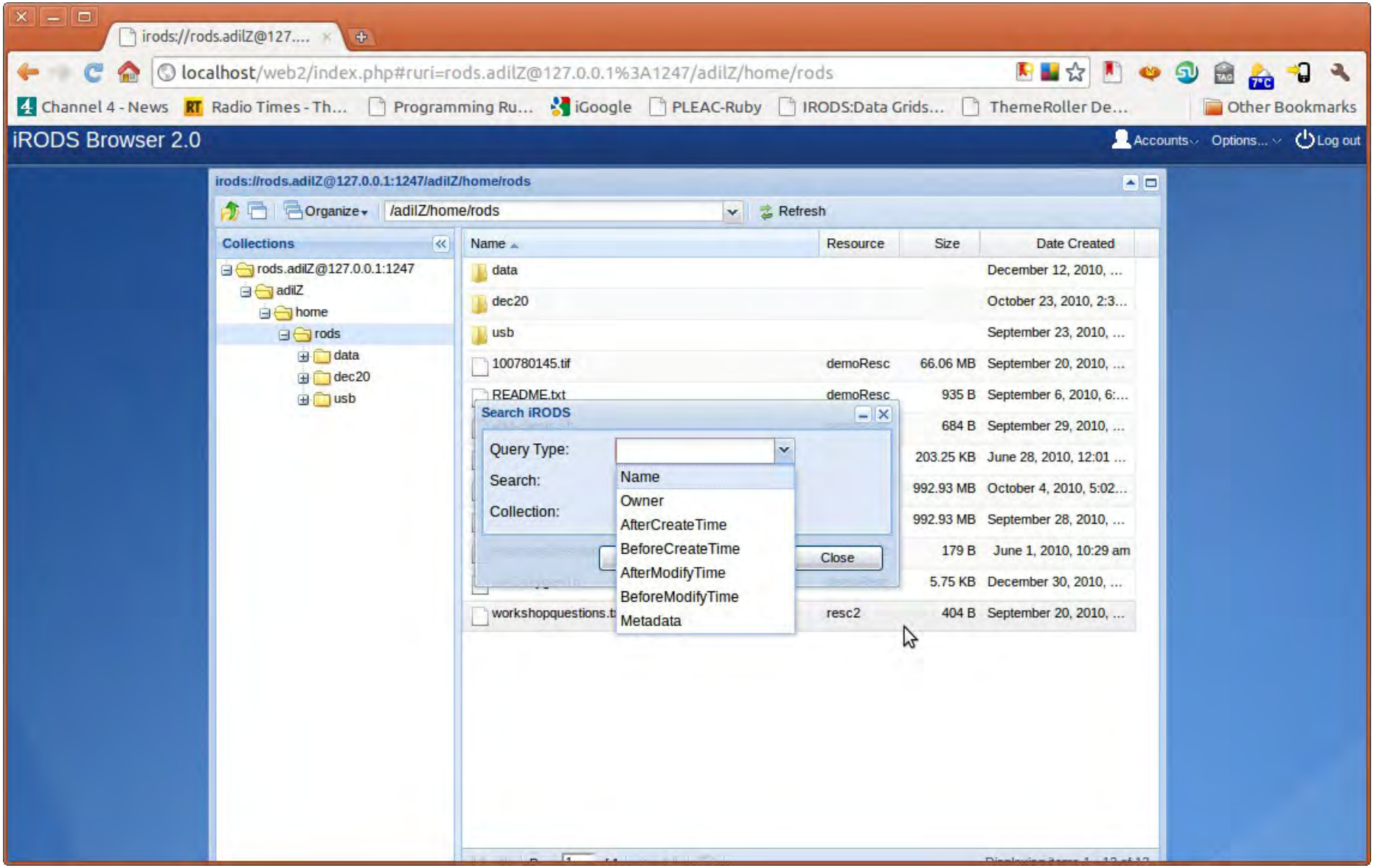
```
acKEKReplicate(*collPath, *cacheRes, *archive, *threshold)||
    msiCheckCollSize(*collPath, *cacheRes, *threshold, *aboveThreshold, *status)##
    ifExec(*aboveThreshold == 1,
            nop,
            nop,
            msiWriteRodsLog("Starting to backup files", *status)##
            acGetIcatResults(list, COLL_NAME LIKE '*collPath', *List)##
            forEachExec(*List,
                        msiGetValByKey(*List, DATA_NAME, *Data)##
                        msiGetValByKey(*List, COLL_NAME, *Coll)##
                        msiGetValByKey(*List, DATA_RESC_NAME, *dataRes)##
                        ifExec(*dataRes == *cacheRes,
                                msiWriteRodsLog("Replicating file *Coll/*Data", *status)##
                                msiDataObjRepl(*Coll/*Data,
                                                verifyChksum++++
                                                backupRescName=*archive,
                                                *status)##
                                msiWriteRodsLog("Completed replicating file *Coll/*Data",
                                                *status),
                                nop##nop##nop,
                                nop,
                                nop), nop##nop##nop),
                        nop##nop##nop)|nop##nop
```

IRODS Rules

```
acKEKTrimData(*collPath, *cacheRes)||
    acGetIcatResults(list, COLL_NAME LIKE '*collPath', *List)##
    forEachExec(*List,
        msiGetValByKey(*List, DATA_NAME, *Data)##
        msiGetValByKey(*List, COLL_NAME, *Coll)##
        msiGetValByKey(*List, DATA_RESC_NAME, *DataResc)##
        msiGetValByKey(*List, DATA_REPL_NUM, *DataRepl)##
        ifExec(*DataResc == *cacheRes,
            msiWriteRodsLog("About to trim file *Coll/*Data", *status)##
            msiDataObjTrim(*Coll/*Data, *cacheRes, *DataRepl, 1,
                                IRODS_ADMIN_KW=irodsAdmin, *status)##
            msiWriteRodsLog("Completed trimming replicas of *Coll/*Data", *status),
            nop##nop##nop,
            nop,
            nop),
        nop##nop##nop##nop##nop)
|nop##nop
```

IRODS System

- Users want to be able to access content through browser.
- Want to restrict users from modifying/deleting content.
- Users also want to search content.
- Modified web2 php browser:
  - Read-only browser
  - Search fields (allows search on metadata).


irods://rods.adilZ@127....
localhost/web2/index.php#ruri=rods.adilZ@127.0.0.1%3A1247/adilZ/home/rods
Channel 4 - News
Radio Times - Th...
Programming Ru...
iGoogle
PLEAC-Ruby
IRODS:Data Grids...
ThemeRoller De...
Other Bookmarks
iRODS Browser 2.0
Accounts
Options...
Log out
irods://rods.adilZ@127.0.0.1:1247/adilZ/home/rods
Organize
/adilZ/home/rods
Refresh
Collections
rods.adilZ@127.0.0.1:1247
adilZ
home
rods
data
dec20
usb
Name
Resource
Size
Date Created
data
December 12, 2010, ...
dec20
October 23, 2010, 2:3...
usb
September 23, 2010, ...
100780145.tif
demoResc
66.06 MB
September 20, 2010, ...
README.txt
demoResc
935 B
September 6, 2010, 6:...
684 B
September 29, 2010, ...
203.25 KB
June 28, 2010, 12:01 ...
992.93 MB
October 4, 2010, 5:02...
992.93 MB
September 28, 2010, ...
179 B
June 1, 2010, 10:29 am
5.75 KB
December 30, 2010, ...
workshopquestions.t
resc2
404 B
September 20, 2010, ...
Search iRODS
Query Type:
Search:
Collection:
Name
Owner
AfterCreateTime
BeforeCreateTime
AfterModifyTime
BeforeModifyTime
Metadata
Close

Future Work

- Need to investigate why iget is twice as slow as iput (do others see this)?
- More data is being stored in iRODS which may require investigating federation.

Summary

- Have setup an iRODS system for T2K.
- Provides remote access to content.
- Have implemented read-only accounts and browser for casual T2K user access.
- Have created rules to manage HPSS in predominantly small file environment.
- System is in production and are getting positive feedback.
- Thanks to iRODS people and Jean-Yves Nief.