

# CCJ introduction

RIKEN Nishina Center

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# RIKEN CCJ – PHENIX Computing Center in Japan

- RIKEN CCJ is constructed as a principal site of computing for PHENIX simulation and data analysis
- <http://ccjsun.riken.go.jp/ccj/index.html>
- At room 258 in Main research building

## Linux CPU Farm

- 2.6GHz x 264CPUs
- 500GB memory in total
- 380TB disk

## Data storage

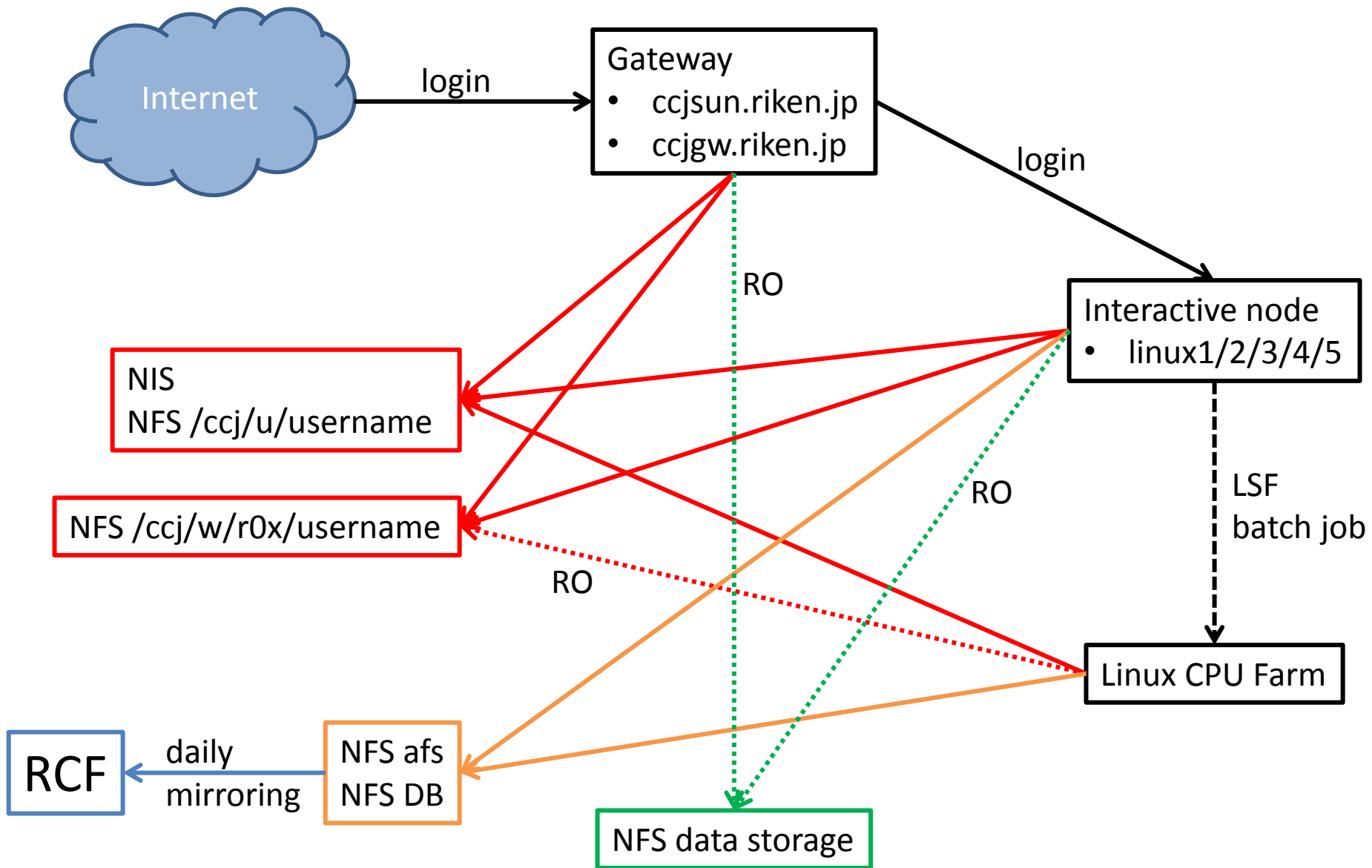
- 40TB on HDD
- 1400TB on HPSS

## Data transfer between RCF

- 200MB/sec with Grid-FTP



# Overview



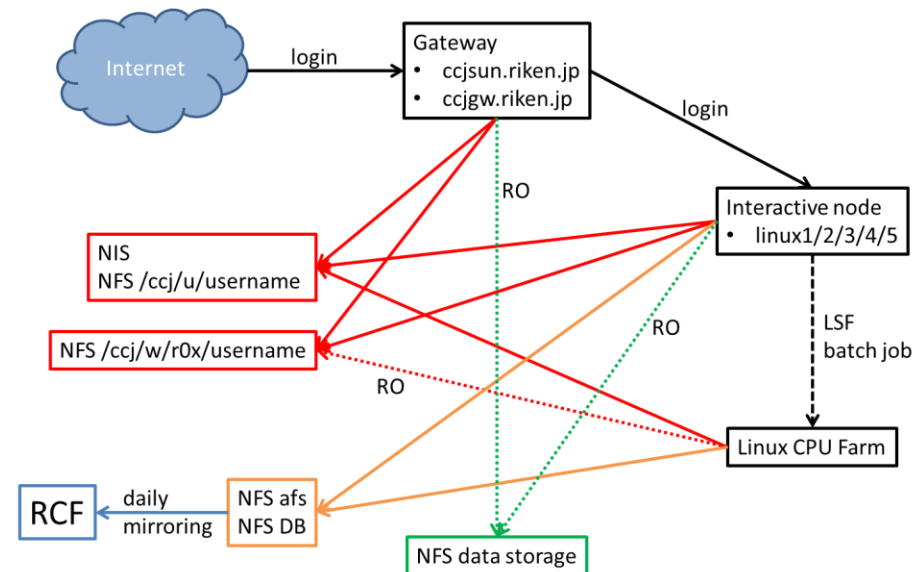
# Gateway & interactive node

- Login to ccjsun.riken.jp / ccjgw.riken.jp
- Login to interactive node
  - most users use linux4 / linux5 which have 64bit-CPU with SL5.3
  - other interactive nodes have 32bit-CPU with older SL version
- Common directories served by NFS

- /ccj/u/username
  - home directory
  - quota 4GB/5GB
  - daily backup
- /ccj/w/r0x/username
  - work directory
  - quota 40GB/50GB
  - NO daily backup

- Tips

- confirm your quota by `/usr/bin/rsh ccjnfs20 vxquota -v`



# Interactive node & Linux CPU Farm

- Setup

```
source /opt/phenix/bin/phenix_setup.csh -a
setenv ODBCINI /opt/ccj/etc/odbc.ini.ccj.analysis
setenv PGHOST ccjams002.riken.go.jp
setenv PGPORT 5432 or 5440
```

- Use “-a” option because phenix\_setup.csh remove PATH and LD\_LIBRARY\_PATH needed for LSF batch job system if “-a” is not specified
- “setenv”s are for database access at CCJ
- CCJ provides </afs/rhic.bnl.bnl.gov> and **database** which you are familiar at RCF
- But they are just daily-mirror of that at RCF
  - Actually you can commit to CVS but it would be lost next day
  - The changes at RCF are reflected next day

# Linux CPU Farm

- LSF batch job system is used at CCJ (cf. Condor at RCF)
- <http://ccjsun.riken.go.jp/ccj/doc/LSF/lsf-wrapper.html>
- Commands

`bsub -q short -o stdout.txt -e stderr.txt -s "script arguments"`

- select queue with your job length : short 2.5 hours / long 24 hours
- get log for stdout and stderr
  - the output should be under /ccj/u/username
  - could NOT specify under /ccj/w/r0x/username because the directory is mounted with read-only mode at batch node
- write script you want to run **with double quotation**

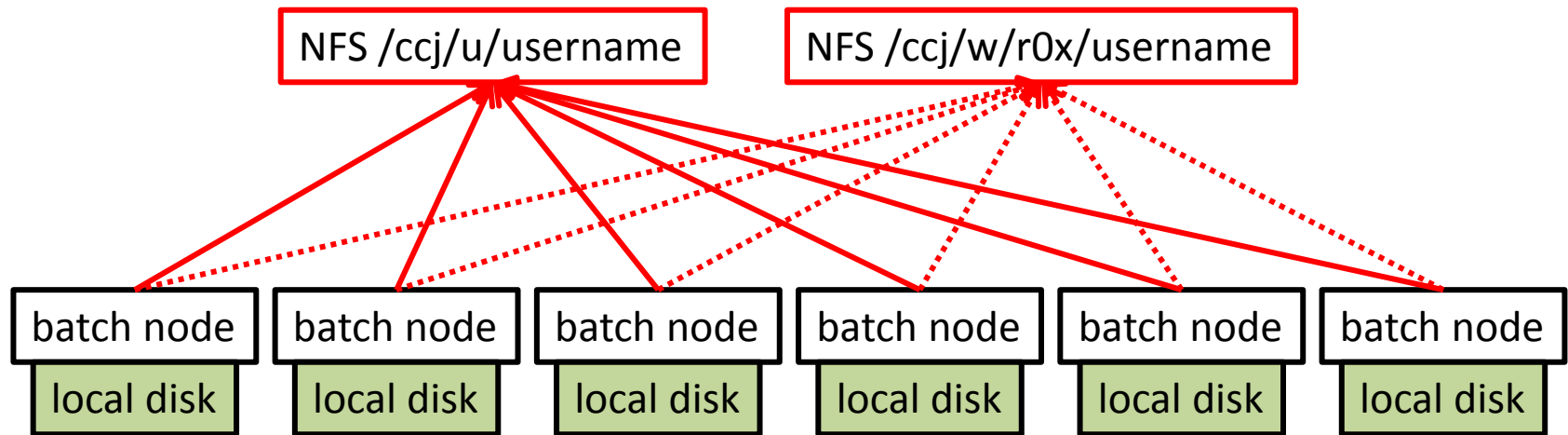
`bqueues`

- check queue status

`bjobs`

- check job status

# Linux CPU Farm – local disk



- If submitted jobs make multiple/massive access to NFS, everything gets slow
    - people on interactive node needs a few or more minutes to get “ls”
  - **Do not read from/write to /ccj/u or /ccj/w/r0x in your job**
  - To avoid this, in your job script
    - copy input files **to local disk** at batch node
    - do computing / run analysis and write output **to local disk**
    - copy output files **from local disk** to your directory
- Use dedicated command “rcpx” for file copy, not use “cp”**

# Linux CPU Farm – rcpx

- Local disk directory you can use at batch node is given by environmental variable **\$CCJ\_JOBTMP**
- /ccj/u and /ccj/w/r0x are served by NFS server **ccjnfs20**
- Example of job script

```
#!/bin/csh

# copy input files
rcpx  ccjnfs20:/ccj/w/r0x/username/run.csh  $CCJ_JOBTMP/run.csh
rcpx  ccjnfs20:/ccj/w/r0x/username/input.root  $CCJ_JOBTMP/input.root

set  input_name  =  $CCJ_JOBTMP/input.root
set  output_name =  $CCJ_JOBTMP/output.root

# run analysis
$CCJ_JOBTMP/run.csh  $input_name  $output_name

# copy output files
rcpx  $CCJ_JOBTMP/output.root  ccjnfs20:/ccj/w/r0x/username/output.root

exit
```



# Linux CPU Farm – rcpx

- rcpx command controls the number of accesses to the NFS server to avoid the panic
- Tips
  - Do not forget to put “ccjnfs20:” or the rcpx fails
  - It would be better to use wild card to reduce overhead
  - Directory you submitted job is the initial directory of the batch job
  - You don’t need to take care about libraries and database though they are served by NFS
  - Directory you used (\$CCJ\_JOBTMP) is automatically cleaned by LSF

# Linux CPU Farm – nDST

- Several types of nDSTs have been put at local disks
- <http://ccjsun.riken.go.jp/ccj/doc/phenix-data/localdisk/index.html>
- User can access these nDSTs by using “-r” option of bsub
- Command  
`bsub -q short -o stdout.txt -e stderr.txt -r 123456 -s “script arguments”`
- The location of nDSTs is given by variable `$CCJ_DATADIR`
- Available files can be obtained by `/opt/ccj/bin/filename`
  - this command lists available nDST file name
- Example to get file list in job script

```
set files = `/opt/ccj/bin/filename 123456 | grep CNT`
foreach file ( $files )
    /bin/ls $CCJ_DATADIR/$file >> filelist.txt
end
```

# Data storage & File transfer

- <http://ccjsun.riken.go.jp/ccj/doc/usersguide/ccjusersguide.html>
- HPSS
  - tape drive to archive files
- NFS
  - If you need a space to put some amount of files, please submit the application to get the space on which files can be accessed with rcpx from batch node
  - <http://ccjsun.riken.go.jp/ccj/forms/>
- scp & bbftp – transfer files from/to outside
  - scp to transfer files up to 100MB
  - bbftp to transfer files up to 50GB
- Grid-FTP
  - CCJ achieved transfer speed of 200MB/sec between RCF and CCJ
  - If you want to transfer new DSTs from RCF, please contact to CCJ guys

# Summary

- CCJ provides analysis/computing environment similar to RCF
  - libraries, CVS, database, etc.
- LSF batch job system is available at CCJ
  - User should take care not to hang up the system by reading/writing NFS directly
  - Several types of nDSTs are available on batch job
- HPSS, NFS file storage are useful to progress the analysis and simulation smoothly
- User can use scp/bbftp to transfer files from/to outside
- Grid-FTP makes it possible to transfer a large amount of files between CCJ and RCF
- Please contact to [phenix-ccj-admin at ribf.riken.jp](mailto:phenix-ccj-admin@ribf.riken.jp)