HPCC

How to run R jobs on Hrothgar

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1. Introduction

R Job introduction R is a software package especially suitable for data analysis and graphical representation. Functions and results of analysis are all stored as objects, allowing easy function modification and model building. R provides the language, tool, and environment in one convenient package.

It is very flexible and highly customizable. Excellent graphical tools make R an ideal environment for EDA (Exploratory Data Analysis). Since most high level functions are written in R language itself, you can learn the language by studying the function code.

2. Setting up the environment

Hrothgar is equipped with SoftEnv to set up the environment with minimum work by users. The use of SoftEnv is not required but highly recommended by HPCC staff.

**Step 1: setting up user environment**

If the user environment is already set up, please skip this step.

At the first use, the user should copy two sample dot-files: dot-bashrc is the start up script which evokes SoftEnv; dot-soft contains a list of software whose specific environment variables will be set up for the user.

```
$ cp /lustre/work/apps/examples/dot-bashrc .bashrc
$ cp /lustre/work/apps/examples/dot-soft .soft
$ ln -s .bashrc .bash_profile
```

Log out and log in again.
Step 2: setting up R environment

The latest version of R is installed on Hrothgar. Use the following commands to add R in SoftEnv:

```
$ soft add +R
$ which R
```
3. Job Submission

3.1. Script for job submission

The following is a script file to submit a R job to hrothgar. The sample script and input files are available at the directory /lustre/work/apps/examples/R. Use the command to copy the directory:

$ cp –r /lustre/work/apps/examples/R  R
Below is the example script for ArraJob.sh

```bash
#!/bin/bash
#$ -S /bin/bash
#$ -t 1-300:1
#$ -cwd
#$ -V
#$ -q serial
#$ -P hrothgar
/lustre/work/apps/R/bin/R --vanilla < code.$SGE_TASK_ID >
code.$SGE_TASK_ID.out
```

Below is the example script for Serial_R.sh

```bash
#!/bin/sh
#$ -V
#$ -cwd
#$ -S /bin/bash
#$ -N RJOB
#$ -o $JOB_NAME.o$JOB_ID
#$ -e $JOB_NAME.e$JOB_ID
#$ -q serial
#$ -P hrothgar
/lustre/work/apps/R/bin/R --vanilla < ds_gfdl_tmax.r > out.118
```

### 3.2. Job submission

$ qsub ArrayJob.sh - To submit your R job to Hrothgar

$ qsub Serial_R.sh

$ qstat – To check the status of the job
hrothgar:/R$ qsub Serial_R.sh
Your job 112838 ("RJOB") has been submitted
hrothgar:/R$ qstat
job-ID  prior  name    user    state submit/start at  queue
slots ja-task-ID

-------------------------
112838 0.00000  RJOB    pmane  qw  12/08/2010 15:55:28

hrothgar:/R$ ls
ArrayJob.sh  RJOB.e112838  RJOB.o112838  Serial_R.sh
hrothgar:/R$
4. RMPI

4.1. Introduction
RMPI is an interface to MPI that allows R users to take advantage of MPI functionality, without having to learn C, C++ or Fortran.

4.2. Setting up RMPI environment
To run Rmpi jobs you will need a certain R profile. To use the correct R profile, use the following commands to copy the R profile to your working directory:

\$ mkdir $HOME/R

\$ cp /lustre/work/apps/examples/R/Rprofile $HOME/R/.Rprofile

Once you have copied the profile you can check if it is in the right directory by using:

\$ ls –a

4.3. Submitting RMPI Jobs
Now that the environment is set up, you can submit a test script. Copy the example files with the following commands:

\$ cp /lustre/work/apps/examples/R/RMPI_Test.R $HOME/R/RMPI_Test.R

\$ cp /lustre/work/apps/examples/R/RMPI_Job.sh $HOME/R/RMPI_Job.sh

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Below is the example for RMPI_Job.sh

```bash
#!/bin/sh
#$ -V
#$ -cwd
#$ -S /bin/bash
#$ -N R_par
#$ -o $JOB_NAME.o$JOB_ID
#$ -e $JOB_NAME.e$JOB_ID
#$ -q normal
#$ -pe fill 24
#$ -P hrothgar

mpirun -np 24 /luster/work/apps/R/bin/R --no-save --q < RMPI_Test.R > RMPI_Test.out
```
Below is the example for RMPI_Test.R

```r
mpi.remote.exec(paste(Sys.info()$c("nodename")), "checking in as", mpi.comm.rank(), "of", mpi.comm.size()))
mpi.close.Rslaves()
mpi.quit()
```

```bash
$ qsub RMPI_Job.sh - To submit RMPI job

$ qstat - To check job status
```

User Guide

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For Additional Assistance Contact: hpccsupport@ttu.edu

For Comments/Suggestions on user guide hpcc@ttu.edu

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