An aerial photograph of a coastal region, likely a delta or estuary. The image shows a large body of water on the left, transitioning into a complex network of channels and wetlands. The land is a mix of brown and green, indicating different types of vegetation and soil. A prominent feature is a large, curved bay or inlet. The overall scene is a detailed view of a natural coastal environment.

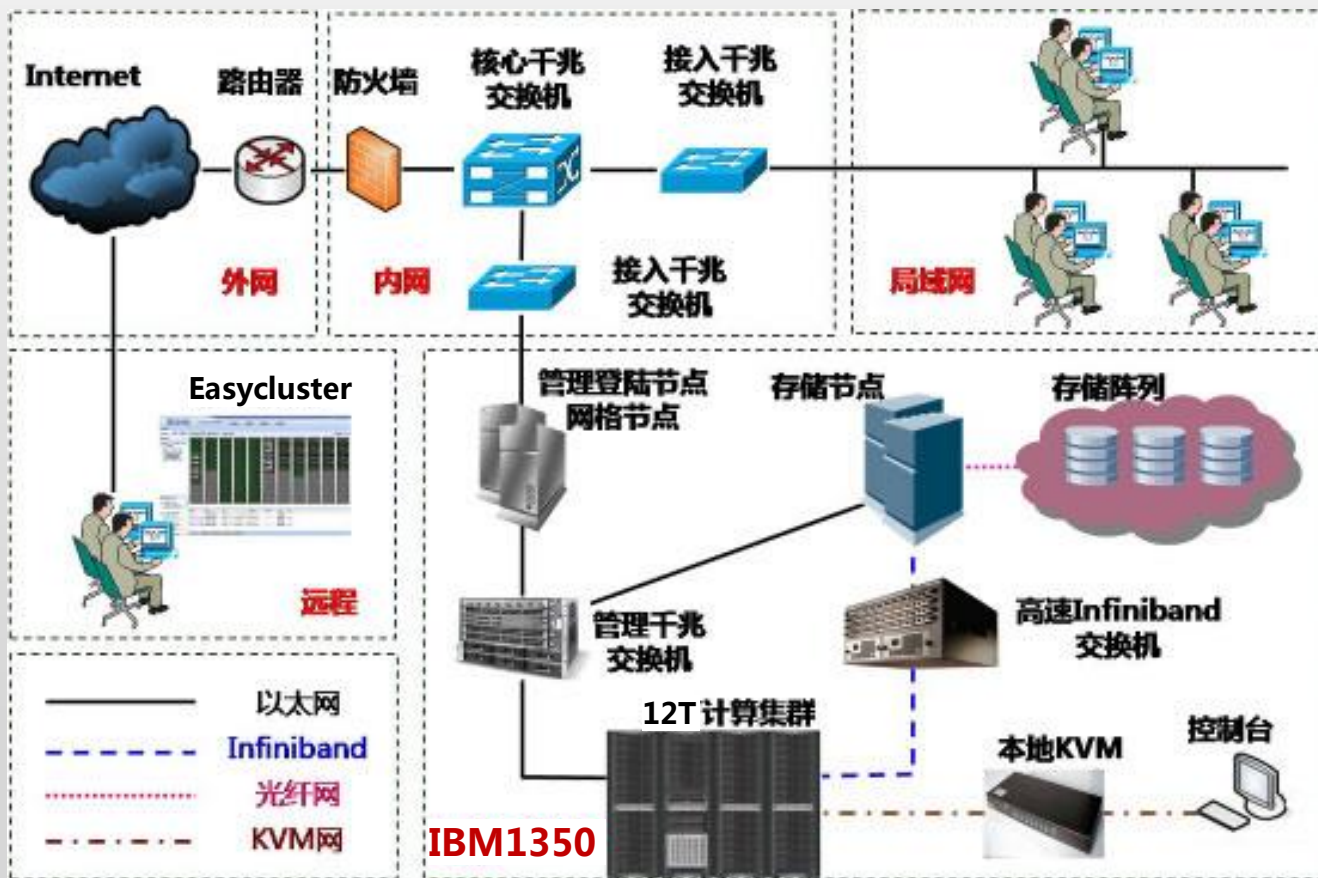
# Delft3D在高性能集群上的并行计算

2013-11

- 高性能计算集群
- Delft3D
- 并行计算实现步骤
- 算例现场演示

# (一) 高性能计算集群

集群性能: IBM 1350集群——37个节点×12个核心  
操作系统: CentOS6.2 (x86-64Edition)  
基础编译器: GNU Compiler, Intel Compiler 11.1 (non-commercial edition)  
并行编译器: mpich2-1.5, mvapich2-1.8, OpenMPI1.6.4



## (二) Delft3D



### Delft3D-Linux

源代码版本：5.00.06.1677（已编译）

源代码下载地址：

<https://svn.oss.deltares.nl/repos/delft3d/trunk>

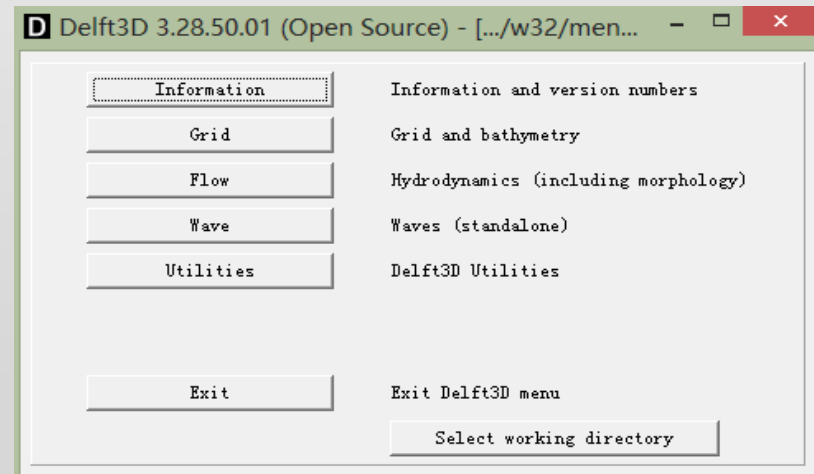
（Get it using subversion software）

### Delft3D-Windows

准备文件：

- \*.mdf ----- 项目定义文件；
- \*.grd ----- 计算网格文件；
- \*.dep ----- 水深地形文件；
- \*.bct ----- 时序列边界文件；
- \*.enc ----- 网格范围定义文件；
- \*.obs ----- 结果输出点文件；

.....



# (三) 并行计算实现步骤

## 1. 客户端—Xshell & XFTP

登陆方式SSH: Xshell

文件上传与下载SFTP/FTP: XFTP

河海大学 港口海岸与近海工程学院

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集群常用软件

发布人: 港航院 发布时间: 2013-07-11 访问次数: 69

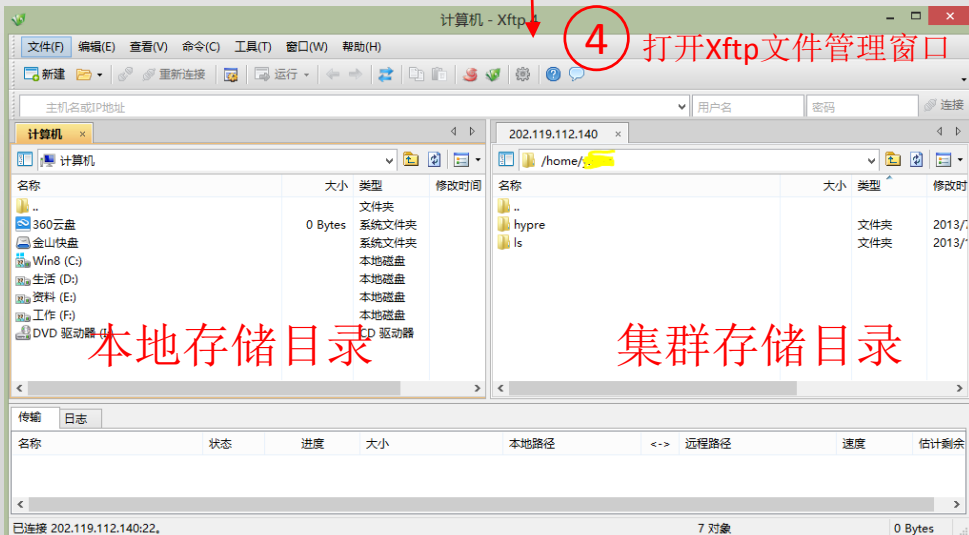
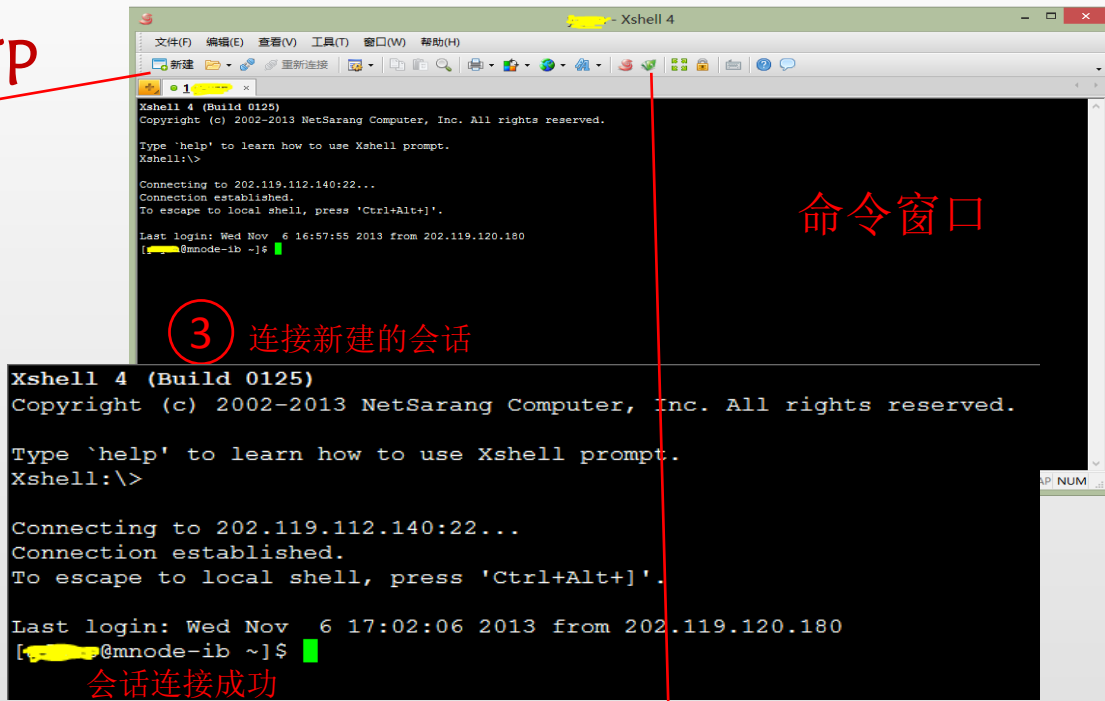
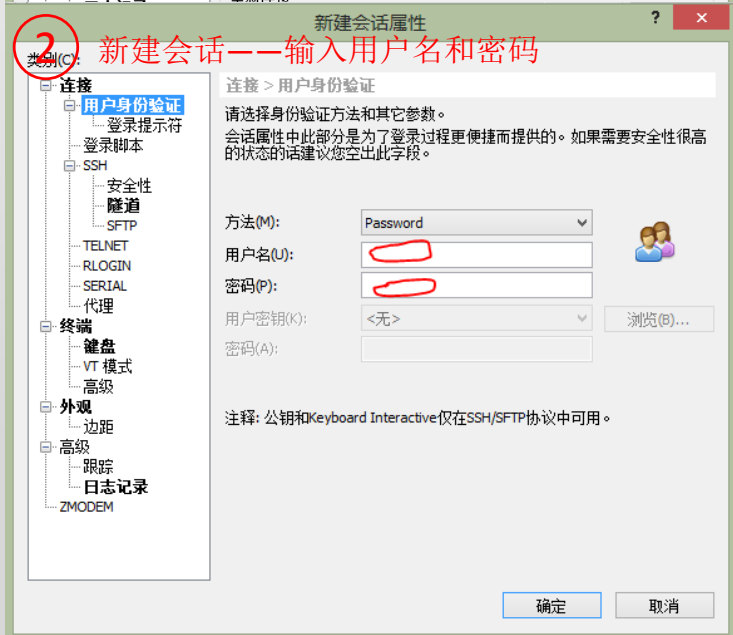
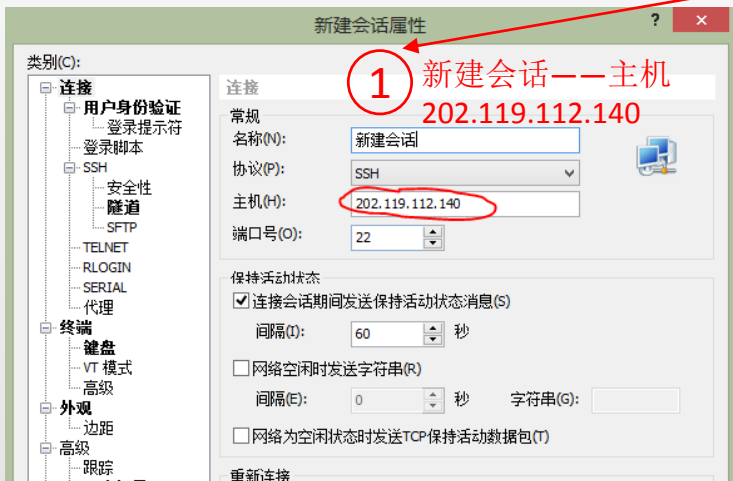
**Xshell&Xftp.zip**

港航院

关闭窗口

# (三) 并行计算实现步骤

## 1. 客户端—Xshell & XFTP

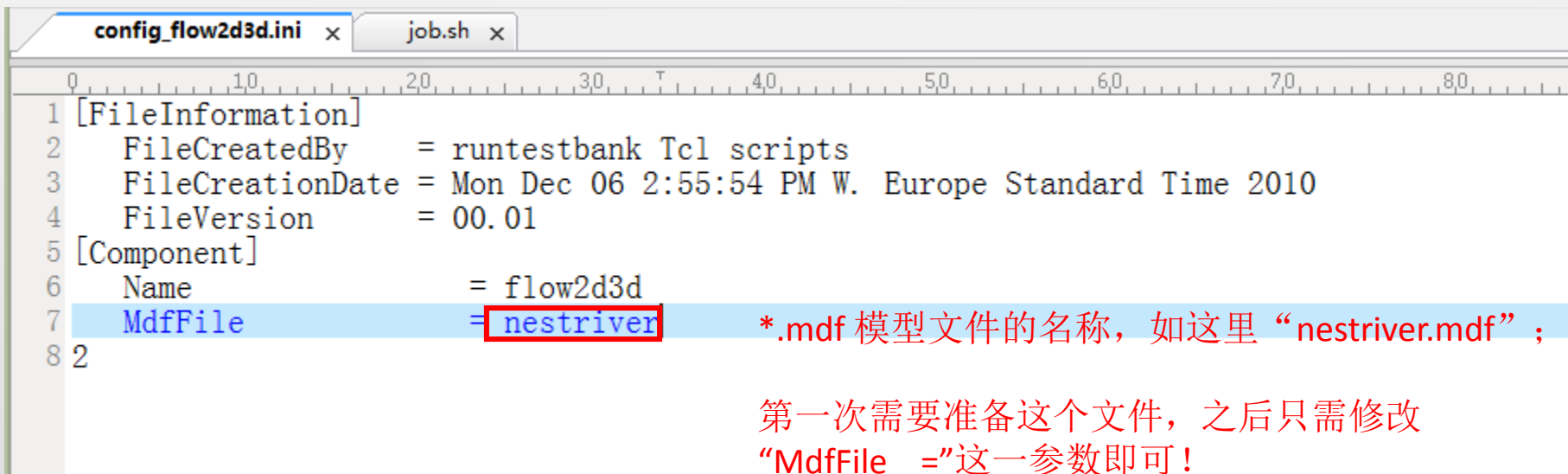


## (三) 并行计算实现步骤

### 2. 文件准备—模型配置文件

**config\_flow2d3d.ini**

这里的文件名称要求与\*.sh脚本文件中的保持一致！！



```
config_flow2d3d.ini x job.sh x
0 10 20 30 40 50 60 70 80
1 [FileInformation]
2   FileCreatedBy      = runttestbank Tcl scripts
3   FileCreationDate  = Mon Dec 06 2:55:54 PM W. Europe Standard Time 2010
4   FileVersion       = 00.01
5 [Component]
6   Name               = flow2d3d
7   MdfFile            = nestrivier
8 2
```

\*.mdf 模型文件的名称，如这里“nestrivier.mdf”；

第一次需要准备这个文件，之后只需修改“MdfFile =”这一参数即可！

# (三) 并行计算实现步骤

## 2. 文件准备—shell脚本文件

### job.sh

```
config_flow2d3d.ini x job.sh x
0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150
1 #!/bin/sh
2 # __INFO_MARK_BEGIN__
3 # Welcome to use EasyCluster V1.6 All Rights Reserved.
4 #
5 # __INFO_MARK_END__
6 #
7 ## -S /bin/sh
8 ## -N test
9 ## -j y
10 ## -o .
11 ## -e .
12 ## -cwd
13 ## -q short.q
14 ## -pe mvapi 24-24
15 source ~/.bashrc
16 hash -r
17 export path=$TMPDIR:$path
18 /usr/local/mpich2_1.5/bin/mpexec -launcher rsh -n $NSLOTS -f $TMPDIR/machines /usr/local/Delft3D.5.00.06.1677/bin/deltares_hydro.tcl config_flow2d3d.ini
19
```

任务名称

节点数

Delft3d编译得到的执行程序，一般情况下不要修改！！

模型配置文件，文件名需保持一致！！

config\_flow2d3d.ini, job.sh 尽量直接通过集群端Linux下的Vi编辑器编辑，否则格式可能会有问题！！



## (三) 并行计算实现步骤

### 3. 实现并行计算—cd, qsub, qstat

```
[redacted@mnode-ib ~]$ clear
[redacted@mnode-ib ~]$ cd ls/test
[redacted@mnode-ib test]$ qsub job.sh
Your job 1365 ("test") has been submitted
[redacted@mnode-ib test]$ qstat
```

转到文件所在目录  
上传脚本文件到计算节点  
查看集群所有提交任务情况

job-ID	prior	name	user	state	submit/start at	queue
1361	0.60500	gsJ05R18	[redacted]	r	11/06/2013 15:21:25	long.
q@node22-ib			48			
1357	0.50500	job	[redacted]	r	11/06/2013 14:33:10	seria
l.q@node32-ib			1			
1358	0.50500	job	[redacted]	r	11/06/2013 14:34:10	seria
l.q@node33-ib			1			
1359	0.50500	job	[redacted]	r	11/06/2013 14:39:25	seria
l.q@node34-ib			1			
1356	0.60500	gs07JR013	[redacted]	r	11/06/2013 10:19:25	short
.q@node16-ib			48			
1365	0.55394	test	[redacted]	r	11/07/2013 00:59:10	short
.q@node30-ib			24			
1362	0.60500	N09_R119	[redacted]	r	11/06/2013 15:23:25	short
.q@node5-ib			48			
1360	0.60500	gsJ05R010	[redacted]	r	11/06/2013 15:20:10	short
.q@node8-ib			48			

```
[redacted@mnode-ib test]$ █
```

r 正在运行, qw 排队中

## (三) 并行计算实现步骤

### 3. 实现并行计算—tail

```
1356 0.60500 gs07JR013 [redacted] r 11/06/2013 10:19:25 short
.q@node16-ib 48
1365 0.55394 test [redacted] r 11/07/2013 00:59:10 short
.q@node30-ib 24
1362 0.60500 N09_R119 [redacted] r 11/06/2013 15:23:25 short
.q@node5-ib 48
1360 0.60500 gsJ05R010 [redacted] r 11/06/2013 15:20:10 short
.q@node8-ib 48
[redacted@mnnode-ib test]$ tail test.o1365
Time to finish 2h 3m, 8.5% completed, time steps left 47364
Time to finish 2h 3m, 8.5% completed, time steps left 47363
Time to finish 2h 3m, 8.5% completed, time steps left 47362
Time to finish 2h 3m, 8.5% completed, time steps left 47361
Time to finish 2h 3m, 8.5% completed, time steps left 47360
Time to finish 2h 3m, 8.5% completed, time steps left 47359
Time to finish 2h 3m, 8.5% completed, time steps left 47358
Time to finish 2h 3m, 8.5% completed, time steps left 47357
Time to finish 2h 3m, 8.5% completed, time steps left 47356
Time to finish 2h 3m, 8.5% completed, time steps left 47355
[redacted@mnnode-ib test]$ tail test.o1367
D Hydro [1383765624.964204] <anonymous> >> d_hydro shutting down normally
D_Hydro [1383766958.700083] <anonymous> >> d_hydro shutting down normally
D Hydro [1383765624.964288] <anonymous> >> d_hydro shutting down normally
```

模型计算正常结束！！

## (三) 并行计算实现步骤

### 3. 实现并行计算—qdel

```
Time to finish 1h 53m, 15.9% completed, time steps left 43531
Time to finish 1h 53m, 15.9% completed, time steps left 43530
Time to finish 1h 53m, 15.9% completed, time steps left 43529
Time to finish 1h 53m, 15.9% completed, time steps left 43528
Time to finish 1h 53m, 15.9% completed, time steps left 43527
Time to finish 1h 53m, 15.9% completed, time steps left 43526
Time to finish 1h 53m, 15.9% completed, time steps left 43525
Time to finish 1h 53m, 15.9% completed, time steps left 43524
Time to finish 1h 53m, 15.9% completed, time steps left 43523
```

```
[user@mnnode-ib test]$ qdel 1365 删除任务1365 (job-ID) !
```

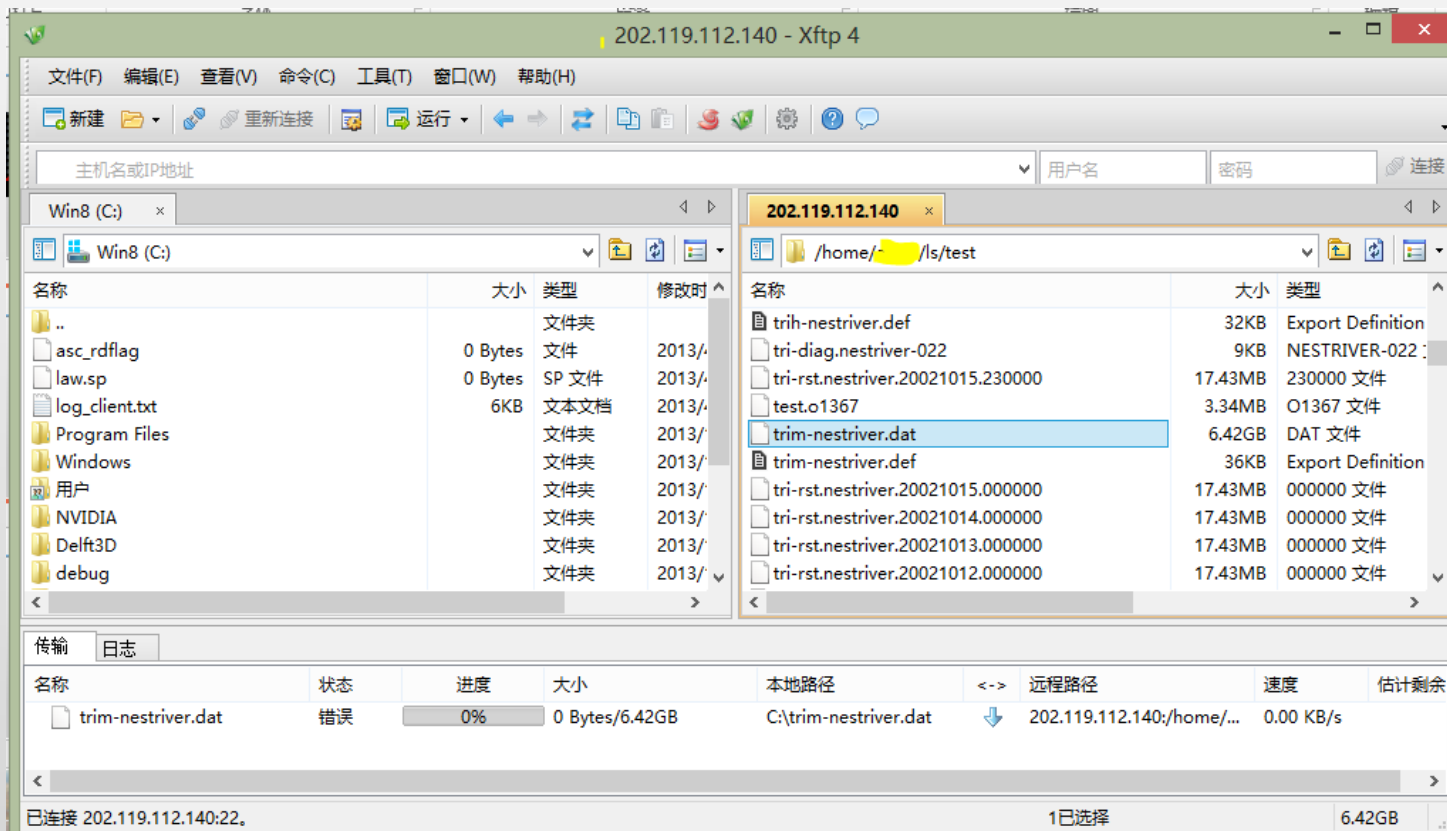
```
user has registered the job 1365 for deletion
```

```
[user@mnnode-ib test]$ █
```

# (三) 并行计算实现步骤

## 4. 结果文件

test.o1367  
trih-\*.dat  
trih-\*.def  
trim-\*.dat  
trim-\*.def  
... ..



## (四) 算例现场演示

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# 算例现场演示

An aerial photograph of a coastal wetland system. A large, winding tidal channel flows from the ocean on the left towards the right. The surrounding land is a mix of brownish mudflats, green marshes, and some agricultural fields. The text "Q & A" is overlaid in the center of the image.

# Q & A