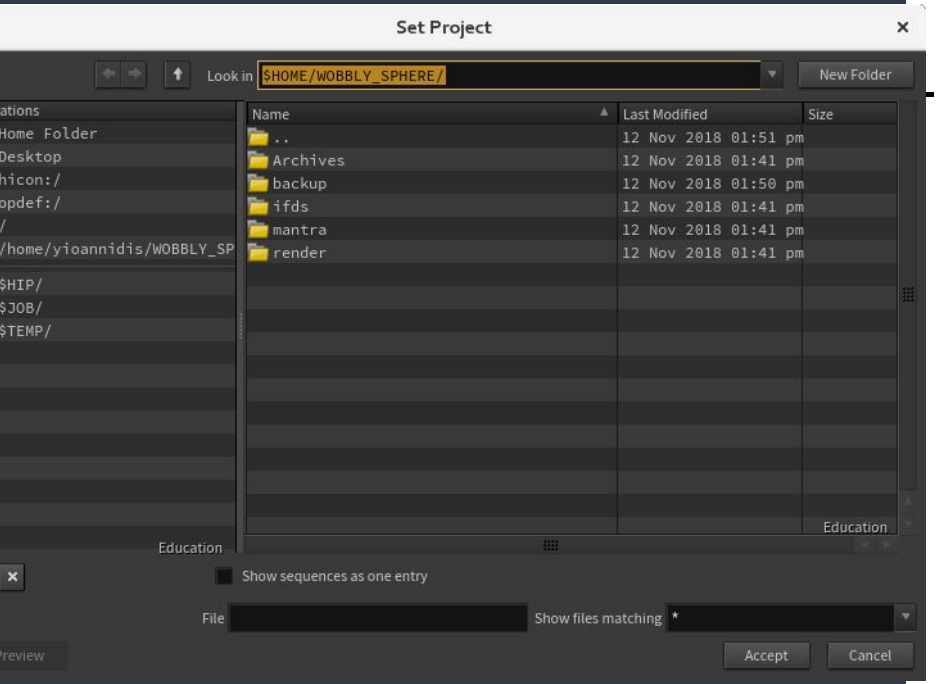
Copy my test folder to play with



Close down any Houdini scenes on your machine first !!

then..

Open a terminal and paste the following in:

1. **/public/mapublic/loannisloannidis/1819/WOBBLY_SPHERE/copyAndStart.sh**

Then

File -> Set Project → WOBBLY_SPHERE
File -> Save

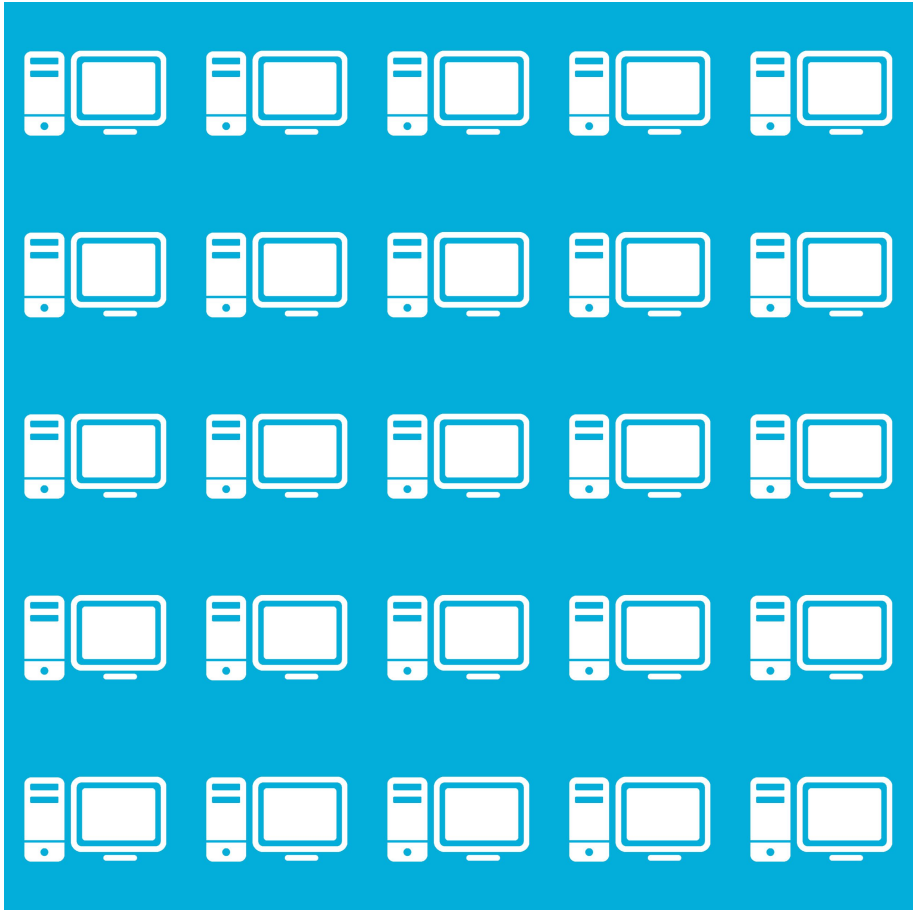
The Render farm

Helps us render faster!

Yannis Ioannidis
Demonstrator
National Centre for Computer Animation
Faculty of Media & Communication
Bournemouth University
Email: yioannidis@bournemouth.ac.uk

What is it?

A bunch of computers dedicated for rendering!

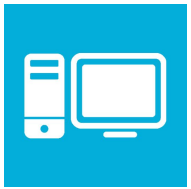


Where are these computers?

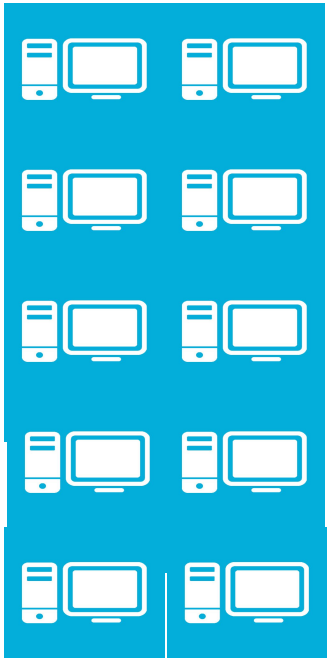
In a room somewhere in the University!

Render farm

You are here!



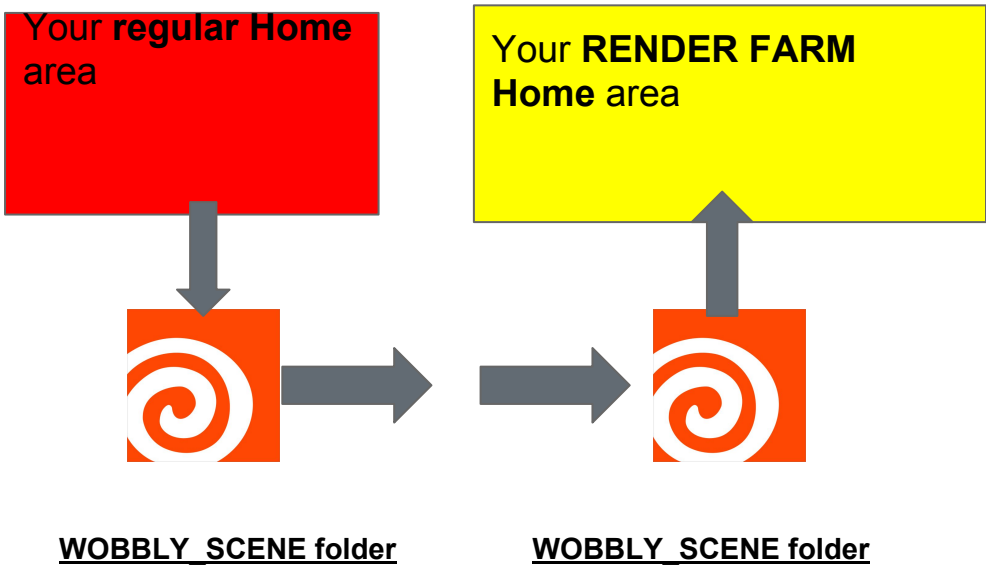
Render remotely ?

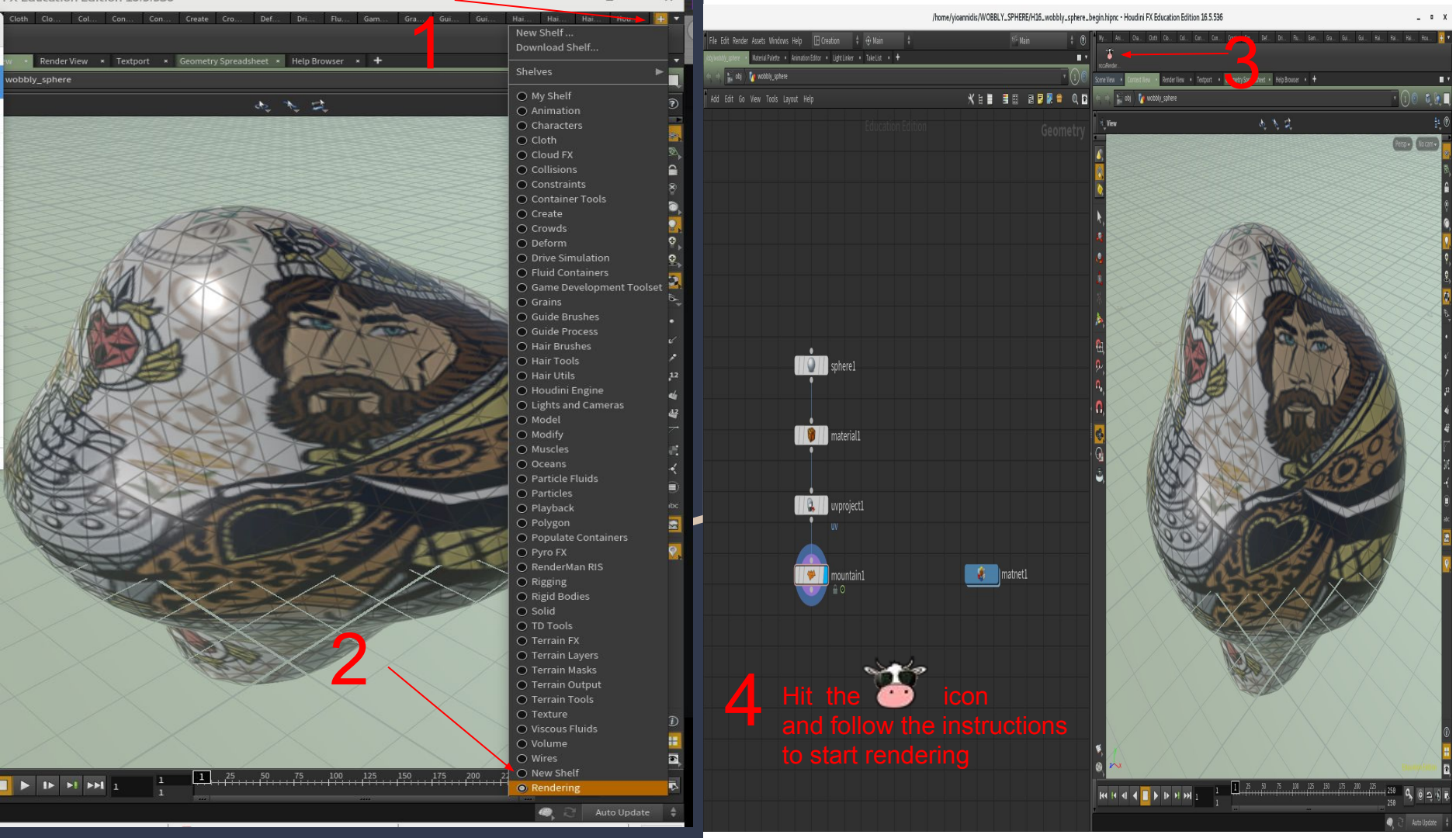


Your regular **Home** area

Your **RENDER FARM Home** area

Copy project folder to the Render farm Home area!

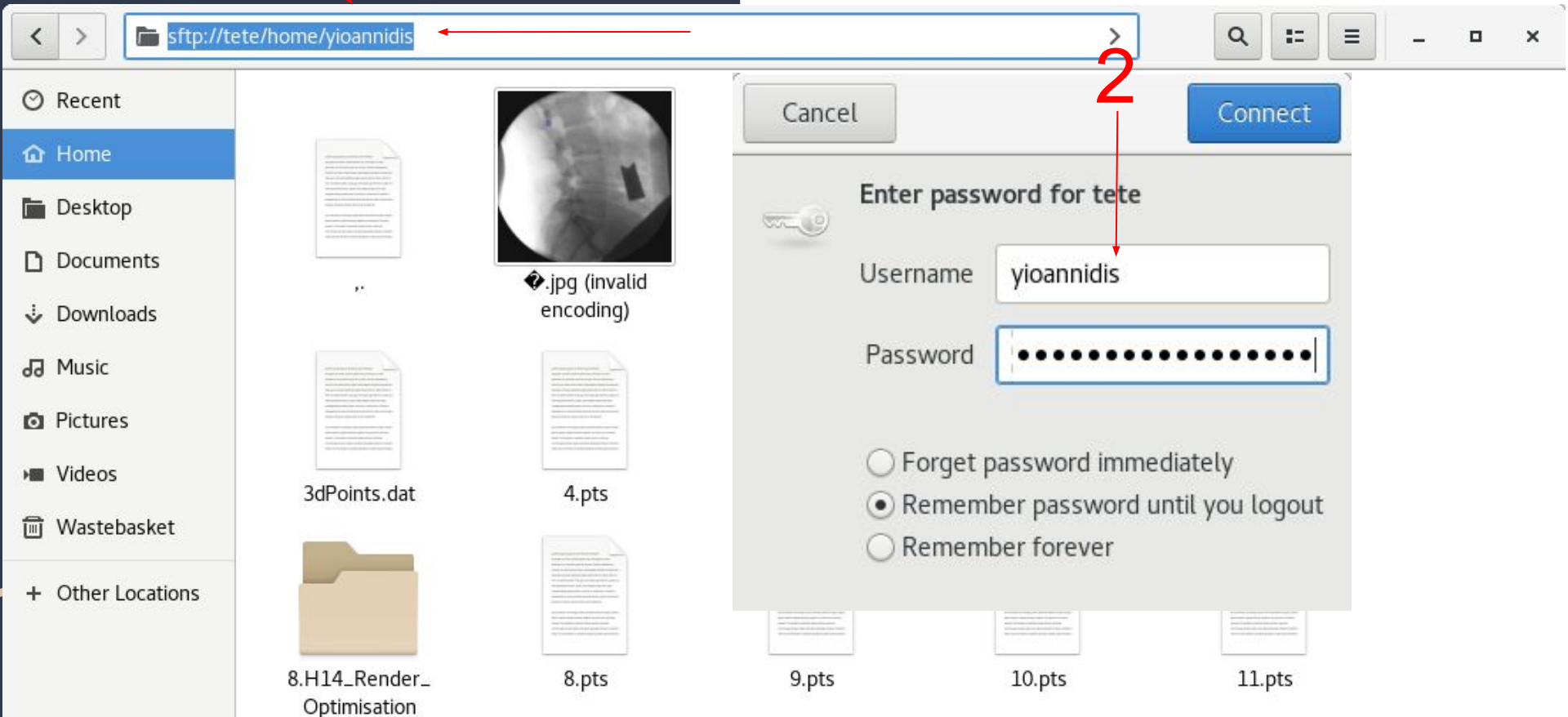



1
New Shelf ...
Download Shelf...
Shelves
My Shelf
Animation
Characters
Cloth
Cloud FX
Collisions
Constraints
Container Tools
Create
Crowds
Deform
Drive Simulation
Fluid Containers
Game Development Toolset
Grains
Guide Brushes
Guide Process
Hair Brushes
Hair Tools
Hair Utils
Houdini Engine
Lights and Cameras
Model
Modify
Muscles
Oceans
Particle Fluids
Particles
Playback
Polygon
Populate Containers
Pyro FX
RenderMan RIS
Rigging
Rigid Bodies
Solid
TD Tools
Terrain FX
Terrain Layers
Terrain Masks
Terrain Output
Terrain Tools
Texture
Viscous Fluids
Volume
Wires
New Shelf
Rendering
2
3
sphere1
material1
uvproject1
uv
mountain1
matnet1
4
Hit the icon
and follow the instructions
to start rendering

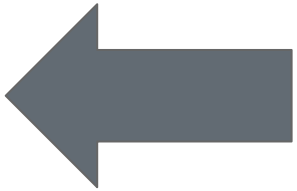
1) Go to Places → Home
2) Click anywhere in the window and hit *Ctrl + L*
3) On the editable address type: sftp://tete/home/yourusername
4) The window below should pop up, so type your credentials in and hit Connect

1

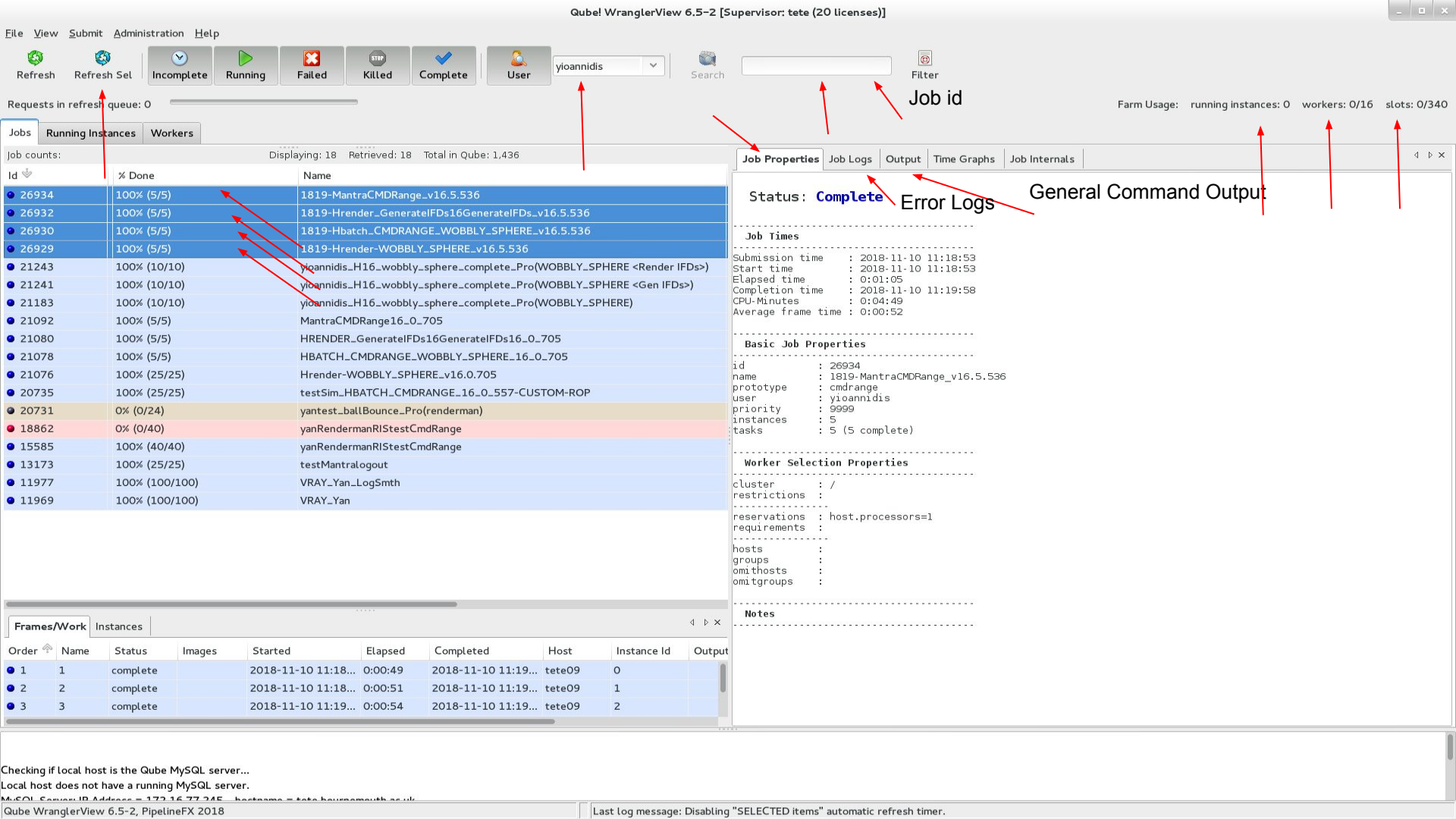
Replace yioannidis with your username



The renderfarm software



Command on the terminal: goQube &


Qube! WranglerView 6.5-2 [Supervisor: tete (20 licenses)]
File View Submit Administration Help
Refresh
Refresh Sel
Incomplete
Running
Failed
Killed
Complete
User
yioannidis
Search
Filter
Job id
Requests in refresh queue: 0
Farm Usage: running instances: 0 workers: 0/16 slots: 0/340
Jobs
Running Instances
Workers
Job counts:
Displaying: 18 Retrieved: 18 Total in Qube: 1,436
Id
% Done
Name
26934 100% (5/5) 1819-MantraCMDRange_v16.5.536
26932 100% (5/5) 1819-Hrender_GenerateIFDs16GenerateIFDs_v16.5.536
26930 100% (5/5) 1819-Hbatch_CMDRANGE_WOBBLY_SPHERE_v16.5.536
26929 100% (5/5) 1819-Hrender-WOBBLY_SPHERE_v16.5.536
21243 100% (10/10) yioannidis_H16_wobbly_sphere_complete_Pro(WOBBLY_SPHERE <Render IFDs>)
21241 100% (10/10) yioannidis_H16_wobbly_sphere_complete_Pro(WOBBLY_SPHERE <Gen IFDs>)
21183 100% (10/10) yioannidis_H16_wobbly_sphere_complete_Pro(WOBBLY_SPHERE)
21092 100% (5/5) MantraCMDRange16_0_705
21080 100% (5/5) HRENDER_GenerateIFDs16GenerateIFDs16_0_705
21078 100% (5/5) HBATCH_CMDRANGE_WOBBLY_SPHERE_16_0_705
21076 100% (25/25) Hrender-WOBBLY_SPHERE_v16.0.705
20735 100% (25/25) testSim_HBATCH_CMDRANGE_16_0_557-CUSTOM-ROP
20731 0% (0/24) yantest_ballBounce_Pro(renderman)
18862 0% (0/40) yanRendermanRIStestCmdRange
15585 100% (40/40) yanRendermanRIStestCmdRange
13173 100% (25/25) testMantralogout
11977 100% (100/100) VRAY_Yan_LogSmth
11969 100% (100/100) VRAY_Yan
Job Properties
Job Logs
Output
Time Graphs
Job Internals
Status: Complete
Error Logs
General Command Output
Job Times
Submission time : 2018-11-10 11:18:53
Start time : 2018-11-10 11:18:53
Elapsed time : 0:01:05
Completion time : 2018-11-10 11:19:58
CPU-Minutes : 0:04:49
Average frame time : 0:00:52
Basic Job Properties
id : 26934
name : 1819-MantraCMDRange_v16.5.536
prototype : cmdrange
user : yioannidis
priority : 9999
instances : 5
tasks : 5 (5 complete)
Worker Selection Properties
cluster : /
restrictions :
reservations : host.processors=1
requirements :
hosts :
groups :
omithosts :
omitgroups :
Notes
Frames/Work
Instances
Order
Name
Status
Images
Started
Elapsed
Completed
Host
Instance Id
Output
1 1 complete 2018-11-10 11:18... 0:00:49 2018-11-10 11:19... tete09 0
2 2 complete 2018-11-10 11:18... 0:00:51 2018-11-10 11:19... tete09 1
3 3 complete 2018-11-10 11:19... 0:00:54 2018-11-10 11:19... tete09 2
Checking if local host is the Qube MySQL server...
Local host does not have a running MySQL server.
Qube WranglerView 6.5-2, PipelineFX 2018
Last log message: Disabling "SELECTED items" automatic refresh timer.

Some terminology!

Nodes/Workers = Computers

Slots = Cores (frame capacity)

Job = User frame range to render

Instances = **In parallel running** number of frames

We have **16** NODES

Each NODE has **20** CORES/SLOTS

Each CORE/SLOT RENDERS **1** FRAME

So,

Each NODE/MACHINE :

RENDERS 20 FRAMES in parallel max

Hence,

15 nodes x 20 frames each node = 300

+

1 test node x 40 frames = 40

frames can be rendered in parallel on the farm **overall !!**

Render from the command line!

WHY ???

- **We need a way to instruct Houdini to start rendering**

  R E M O T E L Y!

- **No Houdini graphical user interface on the farm!**

- Qube (the renderfarm software)**understands**,
  - **only commands**
  - **not clicks (no GUI on the farm)**

- No render button to press in Houdini on the farm

- We can trigger our renders through terminal commands

3 different commands to Render

locally or on the farm

HRENDER

HBATCH

MANTRA

HRENDER

HRENDER [uses Houdini licence]
INPUT : HIP/HIPNC scene files
Renders either the Live Houdini Node Network
Can generate IFDs for later rendering with mantra

Render The Live Network LOCALLY

Pros:

- Easy
- Straightforward

Cons

- Heavy
- Not that flexible but still fine to use

hrender -e -f 1 10 -w 640 -h 480 -R -v -d mantra1 H17_wobbly_sphere_begin.hipnc

-e -f 1 10 -> Frame range start and end

-w 640 -h 480 -> Pixels Width & Height of Image

-R -> Use non-graphics license token

-v -> Run in verbose mode

-d -> Output Driver

Prepare our local houdini scene/project

to HRender on the farm?

- Rename all absolute paths in your scene nodes

  to $HIP **relative** equivalent ones!

  Replace ALL of your houdini scene nodes' absolute paths

For example..in your ROP OUT NEWORK MANTRA NODE's image path

/home/yioannidis/Downloads/WOBBLY_SPHERE/WOBBLY_SPHERE/*render/$HIPNAME.$OS.$F4.exr*

becomes..

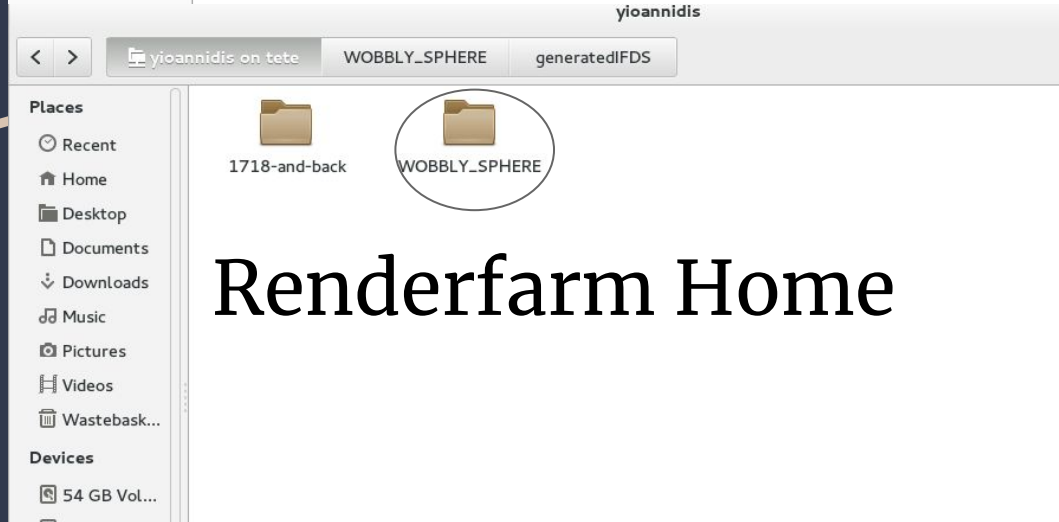
***$HIP****/render/$HIPNAME.$OS.$F4.exr*

Notice **/home/yioannidis/Downloads/WOBBLY_SPHERE/WOBBLY_SPHERE** is replaced by

$HIP

- Place all project dependencies to 1 project folder

Copy & paste the local WOBBLY_SPHERE project folder to Renderfarm Home area



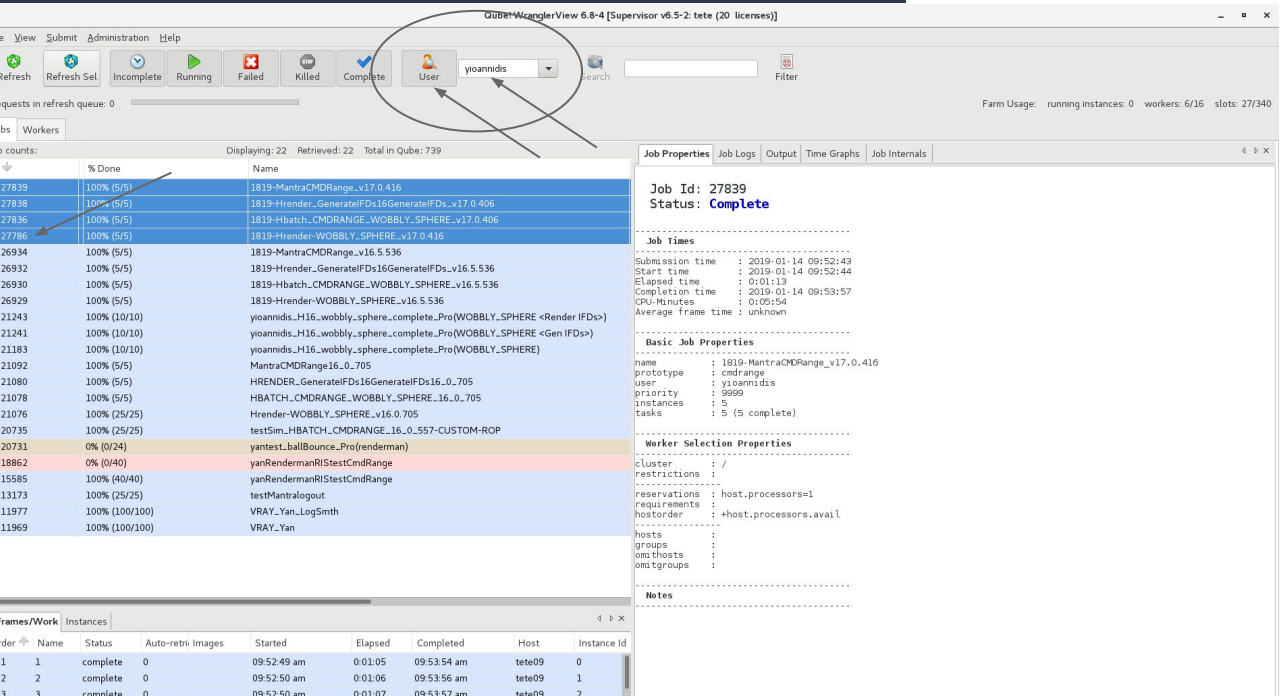
Fire up Qube and Resubmit a HRender Job

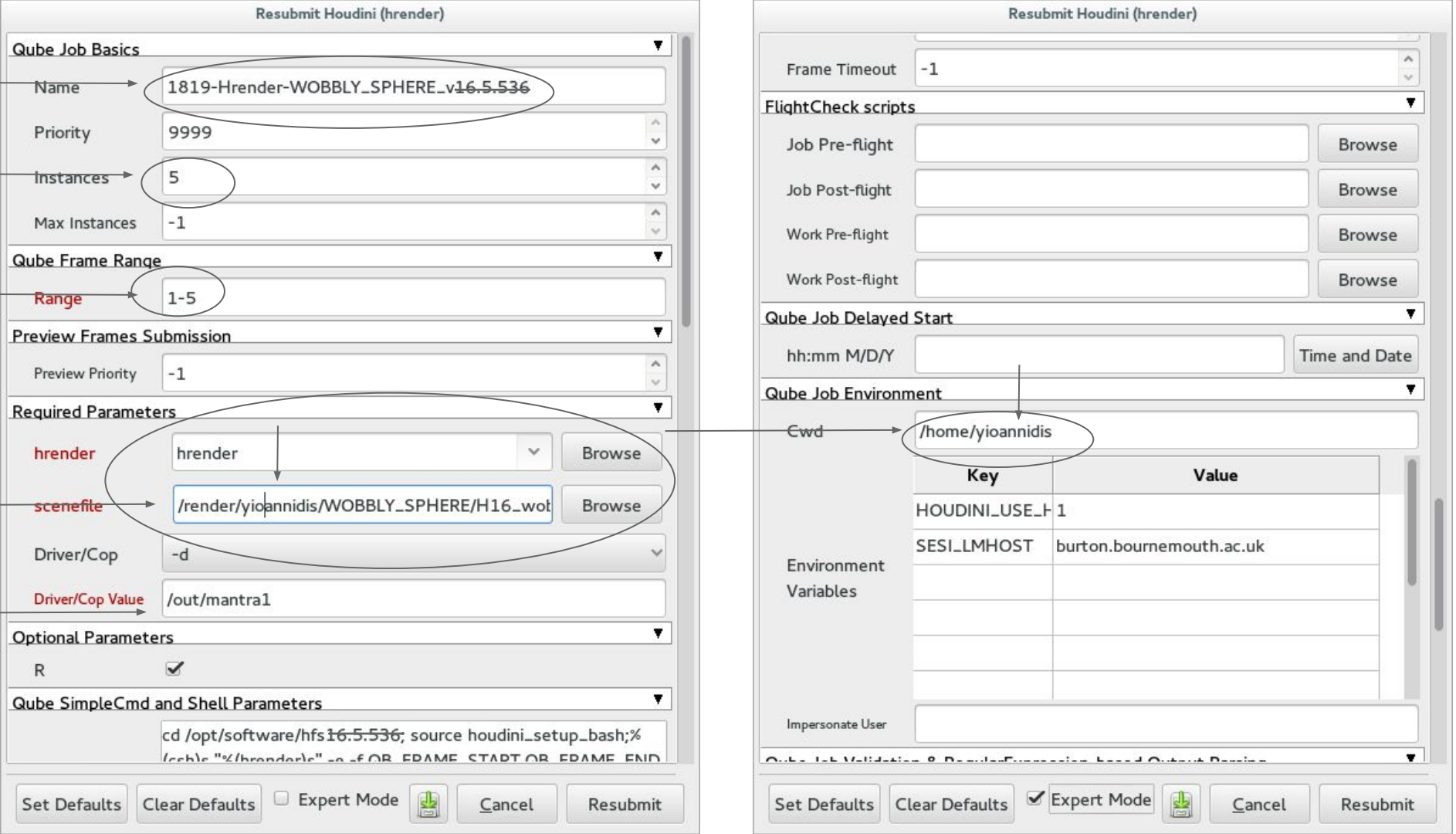
open terminal and type: goQube &

Click **User** & and in the textbox type **yioannidis + Hit Enter**

Find the Job with ID **27786**

Right click on the Job & Edit the fields & Click Resubmit :




Resubmit Houdini (hrender)
Qube Job Basics
Name
1819-Hrender-WOBBLY_SPHERE_v16.5.536
Priority
9999
Instances
5
Max Instances
-1
Qube Frame Range
Range
1-5
Preview Frames Submission
Preview Priority
-1
Required Parameters
hrender
hrender
Browse
scenefile
/render/yioannidis/WOBBLY_SPHERE/H16_wot
Browse
Driver/Cop
-d
Driver/Cop Value
/out/mantra1
Optional Parameters
R
Qube SimpleCmd and Shell Parameters
cd /opt/software/hfs16.5.536; source houdini_setup_bash;%
Set Defaults
Clear Defaults
Expert Mode
Cancel
Resubmit
Resubmit Houdini (hrender)
Frame Timeout
-1
FlightCheck scripts
Job Pre-flight
Browse
Job Post-flight
Browse
Work Pre-flight
Browse
Work Post-flight
Browse
Qube Job Delayed Start
hh:mm M/D/Y
Time and Date
Qube Job Environment
Cwd
/home/yioannidis
Key
Value
HOUDINI_USE_H
1
SESI_LMHOST
burton.bournemouth.ac.uk
Environment Variables
Impersonate User
Set Defaults
Clear Defaults
Expert Mode
Cancel
Resubmit

Resubmit a HRender job

Edit the following fields in the Qube Resubmit Dialog:

1. •**NAME**: YOURUSERNAME _Hrender
2. •**Instances**: **<=40**
3. •**Range**: 1-5
4. •**scenefile**:

Change from

*/render/**yioannidis**/WOBBLY_SPHERE/H17_wobbly_sphere_begin.hipnc*

To

*/render/**yourusername**/WOBBLY_SPHERE/H17_wobbly_sphere_begin.hipnc*

Notice how /home/…… becomes /render/……

5. •NAME**: YOURUSERNAME _Hrender**
6. •Cwd**: /home/ YOURUSERNAME**
7. •scenefile**: /render/YOURUSERNAME/scenfile.hipnc**
8. •Driver/Cop Value: **/out/mantra1**

HBATCH

INPUT : HIP/HIPNC scene files
renders either the Live Houdini Node Network
OR Generates IFDs for later rendering with mantra

Opens the scene in Hscript mode (command line mode)

Pros:

- Integrating Rendering as part of a workflow
- Command Line, flexible, customizable through HScript commands
- -R option will force a non graphical token to be used instead of a full graphical Houdini licence
- Unlimited non graphical tokens to use

Cons

- Not as easy as HRender

Example HBatch commands

http://www.sidefx.com/docs/houdini/commands/

echo $HIPNAME

echo $OS

echo $RFSTART

echo $RFEND

Open text port & test the following

/ -> ls

/ -> cd obj

/obj -> ls

/obj -> opadd geo mygeo

/obj -> opparm mygeo t 1 1 1

On the terminal locally execute the following:

hbatch H17_wobbly_sphere_begin.hipnc

render -V -I -f 1 2 mantra1

When done, hit Ctrl+D or Ctrl+C to get back to terminal mode

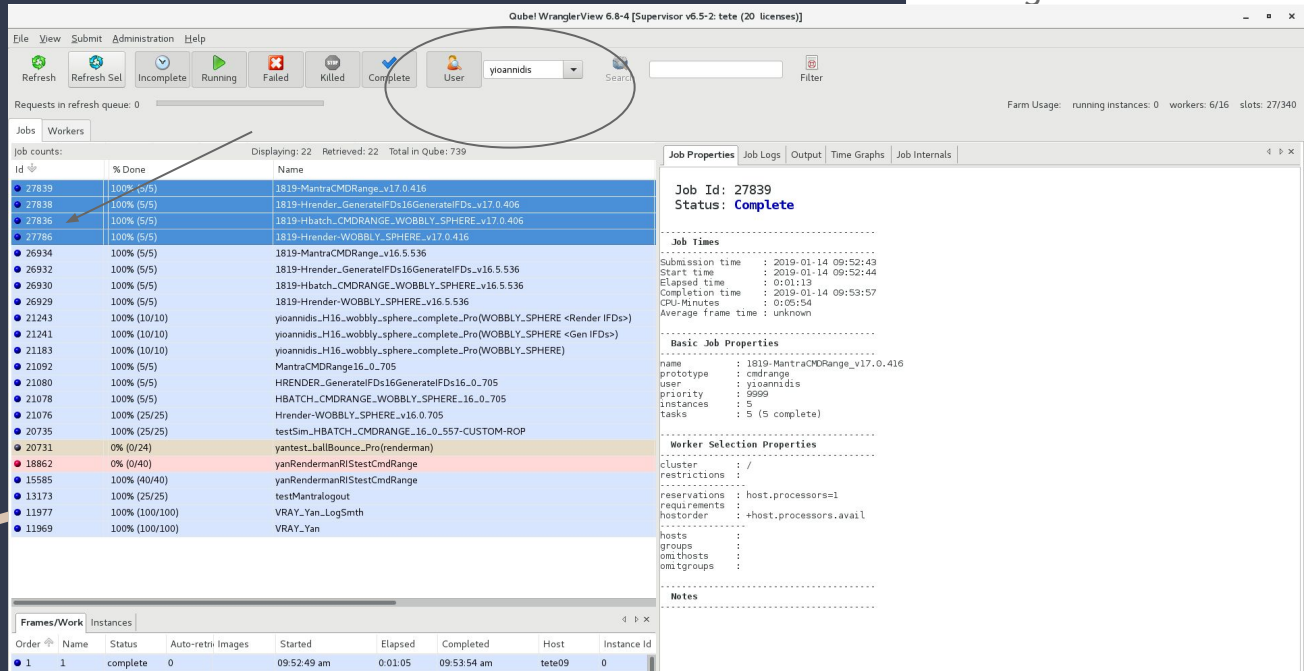
Let’s test HBatch on the Render farm

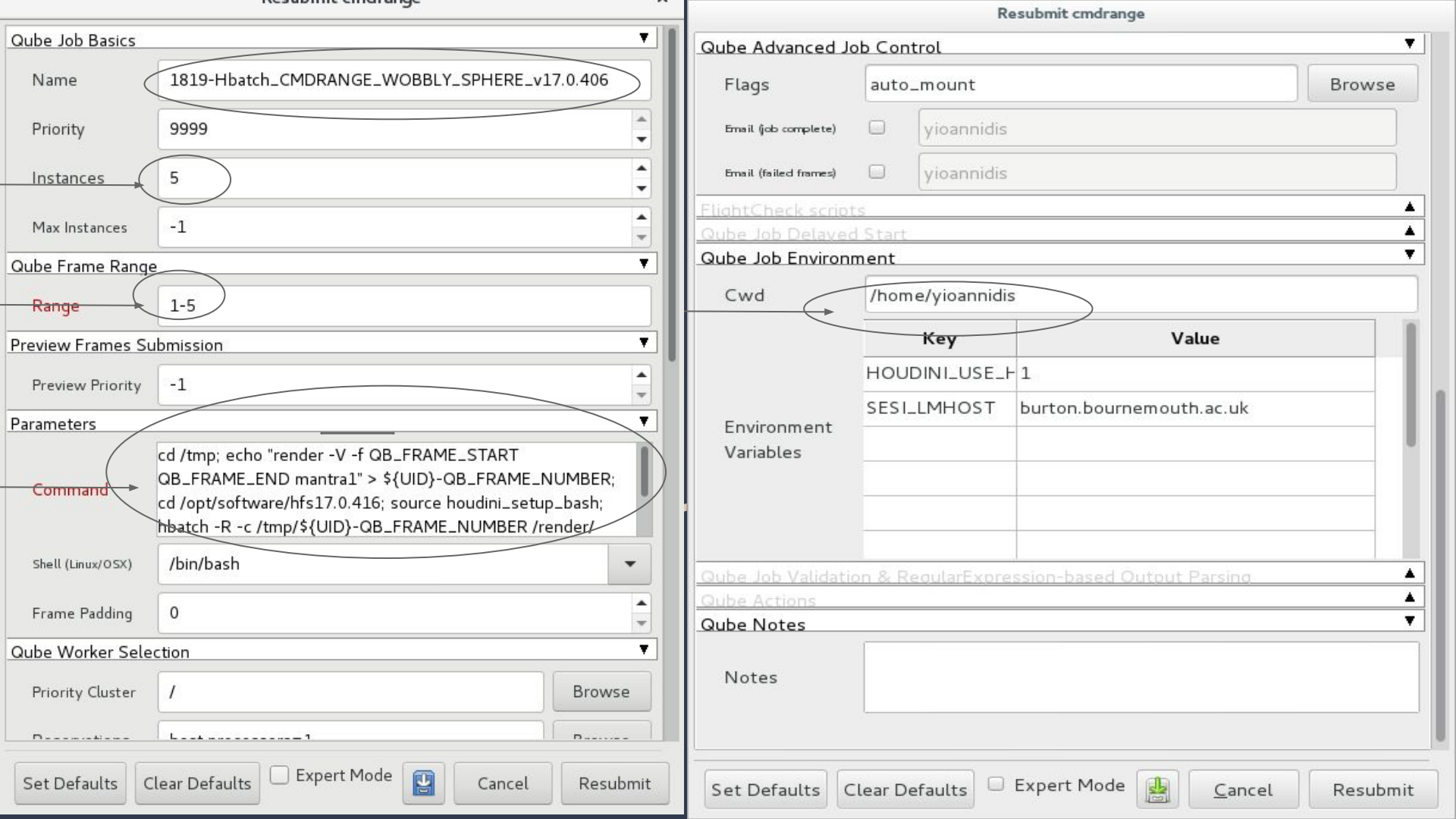
open terminal and type: goQube &

Click **User** & and in the textbox type **yioannidis + Hit Enter**

Find the Job with ID **27836**

Right click on the Job & Edit the fields & Click Resubmit :




Resubmit cmdrange
Qube Job Basics
Name
1819-Hbatch_CMDRANGE_WOBBLY_SPHERE_v17.0.406
Priority
9999
Instances
5
Max Instances
-1
Qube Frame Range
Range
1-5
Preview Frames Submission
Preview Priority
-1
Parameters
Command
cd /tmp; echo "render -V -f QB_FRAME_START QB_FRAME_END mantra1" > ${UID}-QB_FRAME_NUMBER; cd /opt/software/hfs17.0.416; source houdini_setup_bash; hbatch -R -c /tmp/${UID}-QB_FRAME_NUMBER /render/
Shell (Linux/OSX)
/bin/bash
Frame Padding
0
Qube Worker Selection
Priority Cluster
/
Browse
Set Defaults
Clear Defaults
Expert Mode
Cancel
Resubmit
Resubmit cmdrange
Qube Advanced Job Control
Flags
auto_mount
Browse
Email (job complete)
yioannidis
Email (failed frames)
yioannidis
FlightCheck scripts
Qube Job Delayed Start
Qube Job Environment
Cwd
/home/yioannidis
Key
Value
HOUDINI_USE_H
1
SESI_LMHOST
burton.bournemouth.ac.uk
Environment Variables
Qube Job Validation & RegularExpression-based Output Parsing
Qube Actions
Qube Notes
Notes
Set Defaults
Clear Defaults
Expert Mode
Cancel
Resubmit

Resubmit a HBatch job

Edit the following fields in the Qube Resubmit Dialog:

1. •**NAME**: YOURUSERNAME _HBatch
2. •**Instances**: **<=40**
3. •**Range**: 1-5
4. •**Command**:

Change from

cd /opt/software/hfs17.0.416; source houdini_setup_bash;

hbatch -R -c "render -V -f QB_FRAME_START QB_FRAME_END mantra1" /render/yioannidis/WOBBLY_SPHERE/H17_wobbly_sphere_begin.hipnc

To

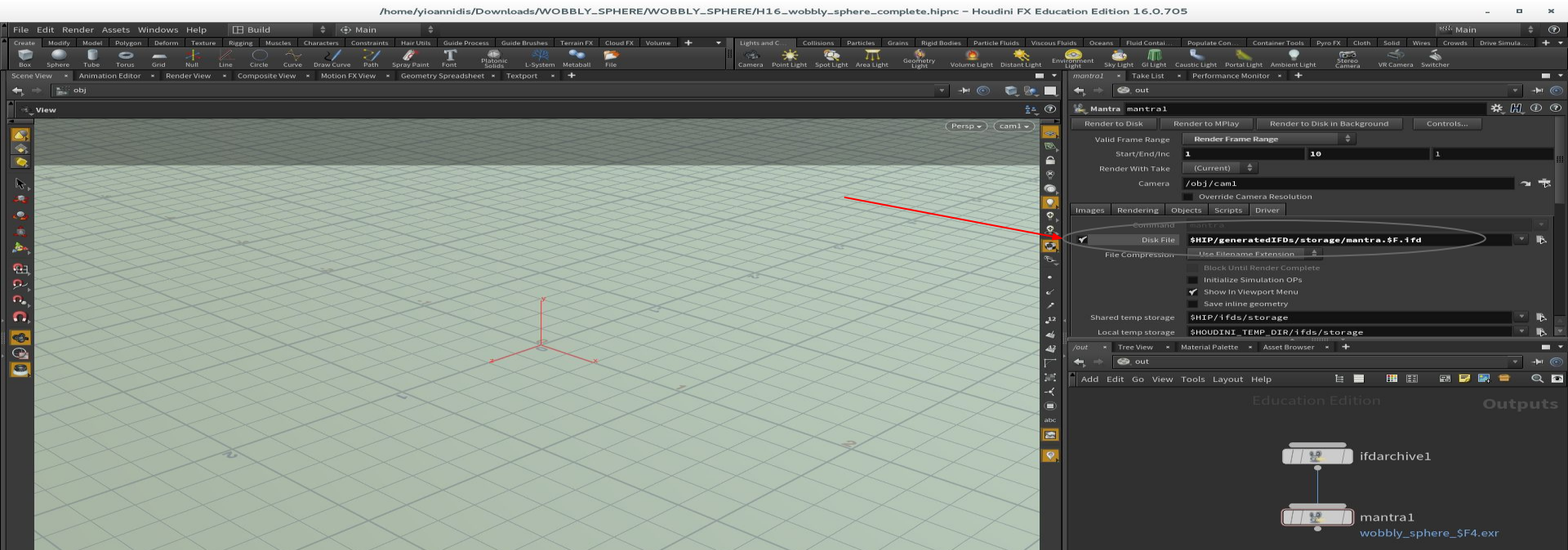
*cd /tmp; echo "render -V -f QB_FRAME_START QB_FRAME_END mantra1" > ${UID}-QB_FRAME_NUMBER; cd /opt/software/hfs17.0.416; source houdini_setup_bash; hbatch -R -c /tmp/${UID}-QB_FRAME_NUMBER /render/**yioannidis**/WOBBLY_SPHERE/H17_wobbly_sphere_begin.hipnc; rm /tmp/${UID}-QB_FRAME_NUMBER*

5. •NAME**:YOURUSERNAME_Hbatch,**
6. •Cwd**: /home/YOURUSERNAME**

Generate IFDs with Hrender
Render them with MANTRA

MANTRA INPUT : IFD files
Renders previously exported IFD scene files

- The mantra renderer program can take IFD files (Houdini's scene description format) and use them to render images
- We need to generated the IFD files first



Why IFD files?

Why IFDs matter:
http://www.sidefx.com/docs/houdini/render/ifd_workflows.html

A 2 stage process

- Help maintaining an effective pipeline
- Full commercial license of Houdini comes with unlimited Mantra tokens (use as many machines as you have access to for rendering.)
- Keep your Houdini and Engine licenses free for working and running simulations.
- Mantra will simply pick up any changes to the on-disk geometry the next time it renders the IFDs.
- Only need to update the IFD if the materials or lights change. (regardless of changes in modelling, animation, or simulation)

Generating IFDs Locally (using Hrender) & Rendering them by feeding them with Mantra

Open terminal & type

hrender -e -f 1 5 -R -v -d mantra1 H17_wobbly_sphere_IFD_GENERATION.hipnc

Now ifds have been locally generated under:

$HIP/generatedIFDS

So, we now we can render our 1st frame with mantra:

mantra -f generatedIFDS/frame1.ifd

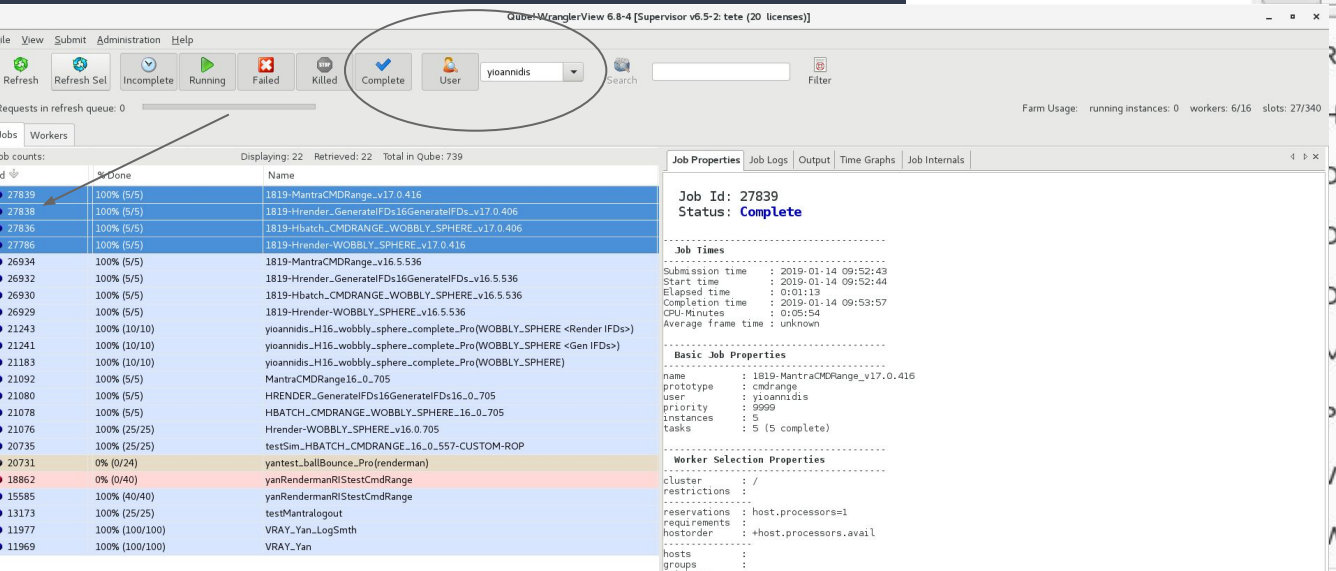
Let’s generate IFDs on the farm & render them using Mantra

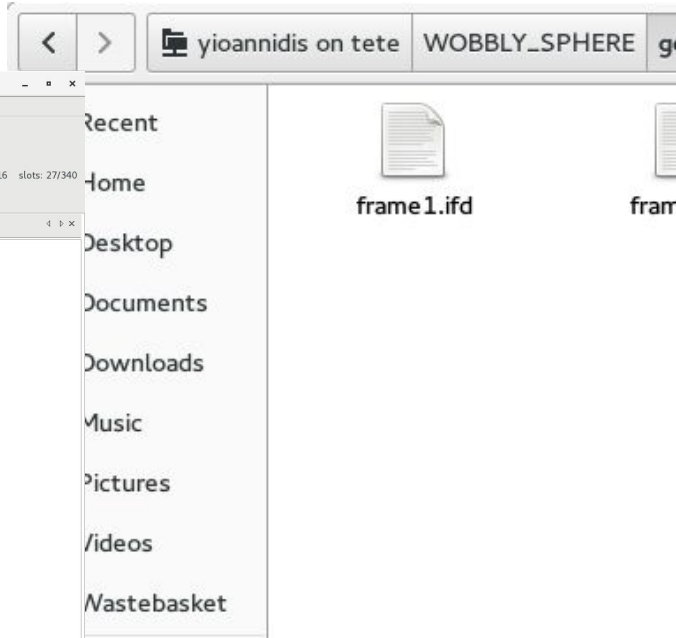
open terminal and type: goQube &

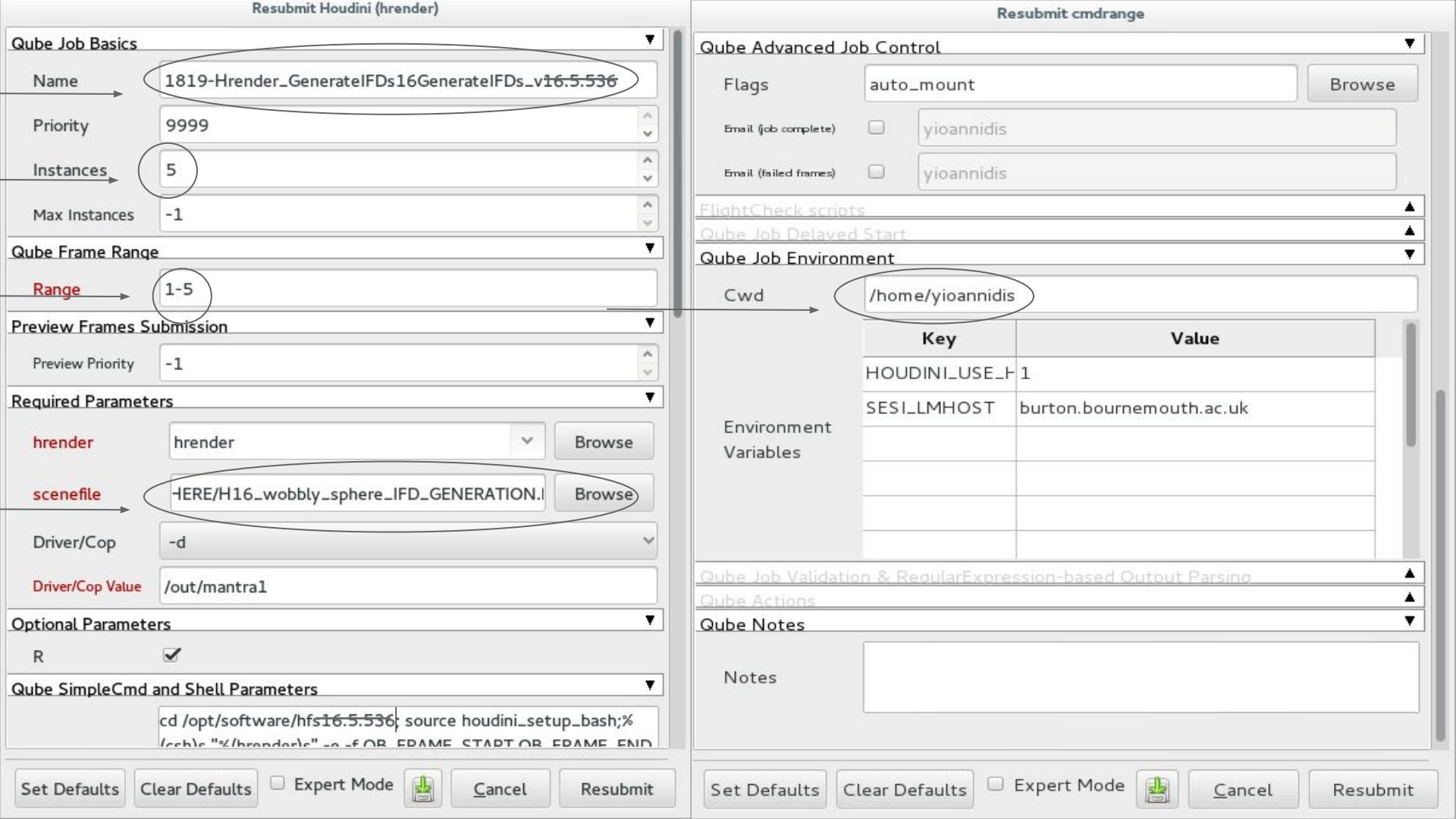
Click **User** & and in the textbox type **yioannidis + Hit Enter**

Find the Job with ID **27838**

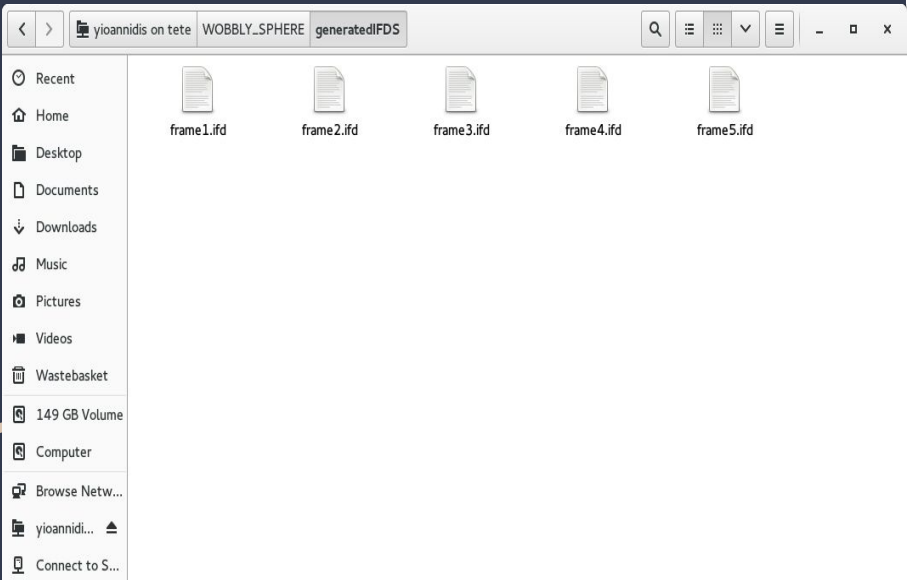
Right click on the Job & Edit the fields & Click Resubmit :






Resubmit Houdini (hrender)
Qube Job Basics
Name
1819-Hrender_GenerateIFDs16GenerateIFDs_v16.5.536
Priority
9999
Instances
5
Max Instances
-1
Qube Frame Range
Range
1-5
Preview Frames Submission
Preview Priority
-1
Required Parameters
hrender
hrender
Browse
scenefile
HERE/H16_wobbly_sphere_IFD_GENERATION.
Browse
Driver/Cop
-d
Driver/Cop Value
/out/mantra1
Optional Parameters
R
Qube SimpleCmd and Shell Parameters
cd /opt/software/hfs16.5.536; source houdini_setup_bash;%
Set Defaults
Clear Defaults
Expert Mode
Cancel
Resubmit
Resubmit cmdrange
Qube Advanced Job Control
Flags
auto_mount
Browse
Email (job complete)
yioannidis
Email (failed frames)
yioannidis
FlightCheck scripts
Qube Job Delayed Start
Qube Job Environment
Cwd
/home/yioannidis
Key
Value
HOUDINI_USE_H
1
SESI_LMHOST
burton.bournemouth.ac.uk
Environment Variables
Qube Job Validation & RegularExpression-based Output Parsing
Qube Actions
Qube Notes
Notes
Set Defaults
Clear Defaults
Expert Mode
Cancel
Resubmit

Resubmit a HRender job first (as before), to generate IFDs



Edit the following fields in the Qube Resubmit Dialog:

1. •**NAME**: YOURUSERNAME _HRender_IFD_Generation
2. •**Instances**: **<=40**
3. •**Range**: 1-5
4. •**scenefile**:

Change from

*/render/**yioannidis**/WOBBLY_SPHERE/H17_wobbly_sphere_IFD_GENERATION.hipnc*

To

*/render/**yourusername**/WOBBLY_SPHERE/H17_wobbly_sphere_IFD_GENERATION.hipnc*

Notice how /home/..... becomes /render/.....

5. •**Driver/Cop Value**: /out/mantra1
6. •**Cwd**: /home/ **YOURUSERNAME**
7. •**Click** Resubmit button

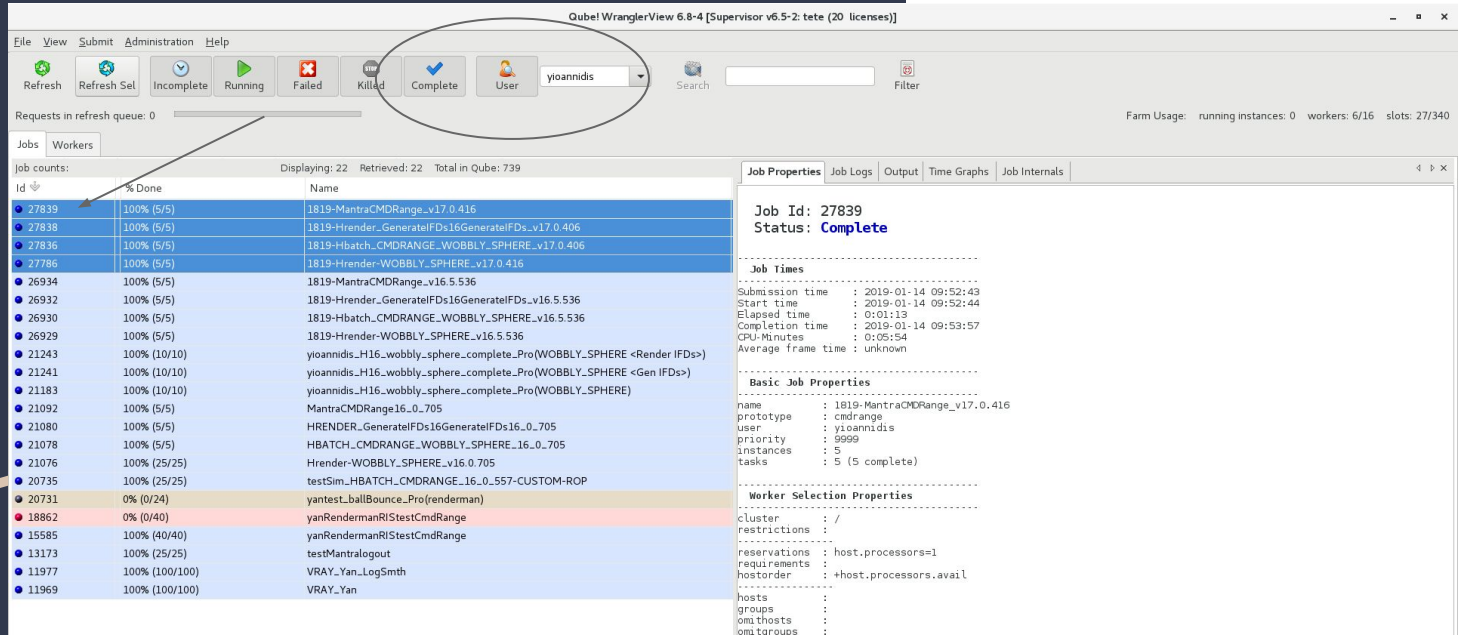
Render the IFDs generated using Mantra

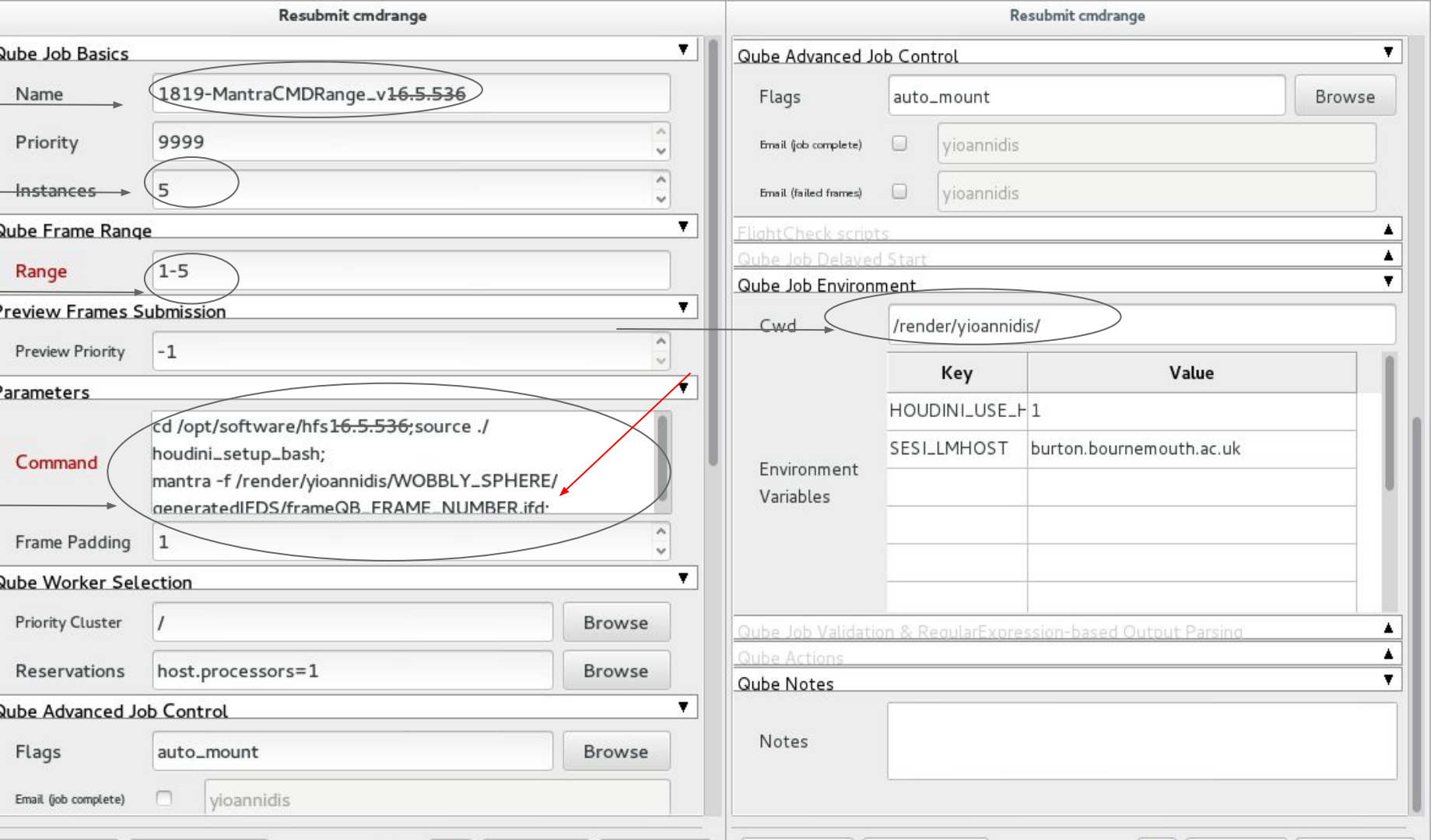
open terminal and type: goQube &

Click **User** & and in the textbox type **yioannidis**

Find the Job with ID **27839**

Right click on the Job & Click Resubmit :




Resubmit cmdrange
Qube Job Basics
Name
1819-MantraCMDRange_v16.5.536
Priority
9999
Instances
5
Qube Frame Range
Range
1-5
Preview Frames Submission
Preview Priority
-1
Parameters
Command
cd /opt/software/hfs16.5.536;source ./
houdini_setup_bash;
mantra -f /render/yioannidis/WOBBLY_SPHERE/
Frame Padding
1
Qube Worker Selection
Priority Cluster
/
Browse
Reservations
host.processors=1
Browse
Qube Advanced Job Control
Flags
auto_mount
Browse
Email (job complete)
yioannidis
Resubmit cmdrange
Qube Advanced Job Control
Flags
auto_mount
Browse
Email (job complete)
yioannidis
Email (failed frames)
yioannidis
FlightCheck scripts
Qube Job Delayed Start
Qube Job Environment
Cwd
/render/yioannidis/
Key
Value
HOUDINI_USE_H
1
SESI_LMHOST
burton.bournemouth.ac.uk
Environment Variables
Qube Job Validation & RegularExpression-based Output Parsing
Qube Actions
Qube Notes
Notes

Render the IFDs using Mantra

Edit the following fields in the Qube Resubmit Dialog:

1. •**NAME**: YOURUSERNAME _HRender_IFD_Generation
2. •**Instances**: **<=40**
3. •**Range**: 1-5
4. •**Command**:

Change from

*mantra -f /render/**yioannidis**/WOBBLY_SPHERE/generatedIFDS/frameQB_FRAME_NUMBER.ifd;*

To

*mantra -f /render/**yourusername**/WOBBLY_SPHERE/generatedIFDS/frameQB_FRAME_NUMBER.ifd;*

5. •**Cwd**: /home/ **YOURUSERNAME**
6. •**Click** Resubmit button

Houdini Qube Documentation & Renderfarm Guide

Manual Docs:

cd /public/bin/ncca_renderfarm/Documentation/Standard/for_Linux/Houdini

nautilus .&

Tool Docs:

cd /public/bin/ncca_renderfarm/Documentation

nautilus .&