April User Conference Call
VNC & Nice DCV

Benjamin Hernandez (OLCF),

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- TurboVNC and NiceDCV
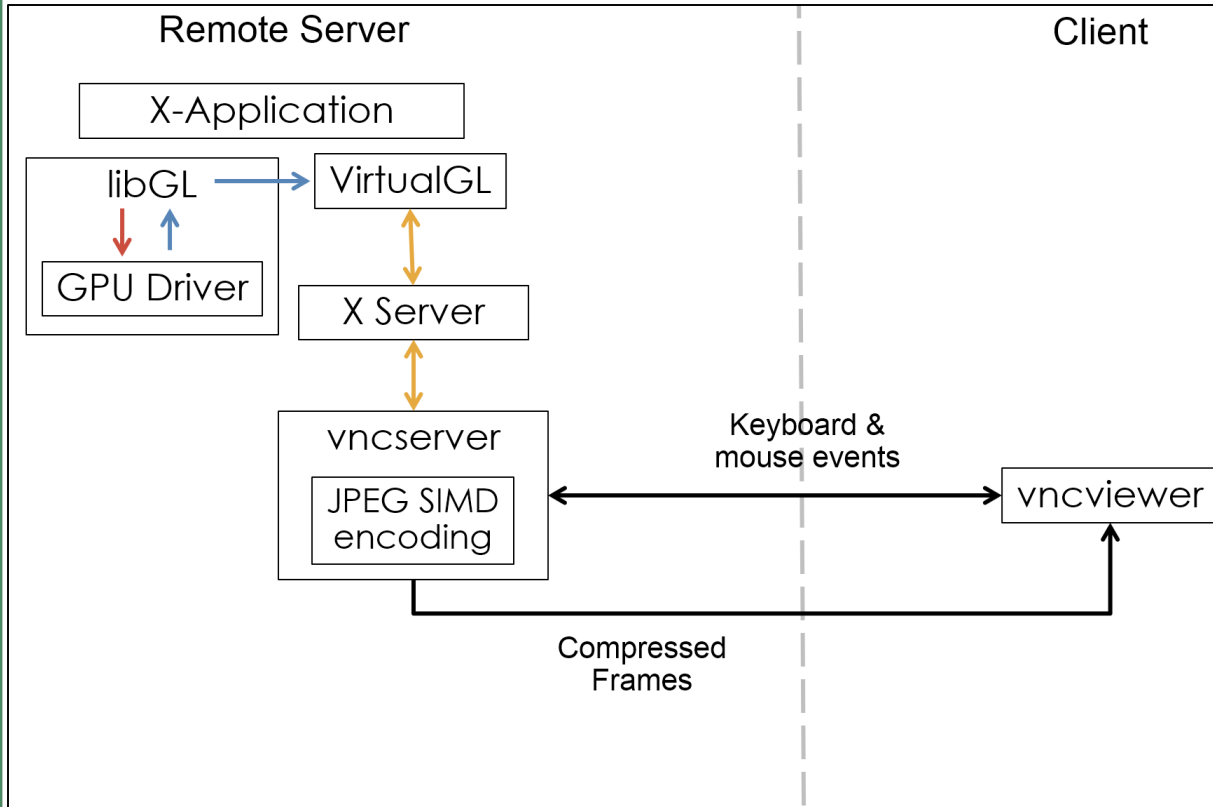
- When to use them

- How to use them

TurboVNC and NiceDCV

- Users can see and control a remote desktop running on Rhea

- TurboVNC and NiceDCV use
  - RFB (remote frame buffer protocol) for optimal keyboard and mouse event and frame buffer delivery.

- The desktop's frame buffer is encoded using
  - JPEG using the CPU when TurboVNC is used
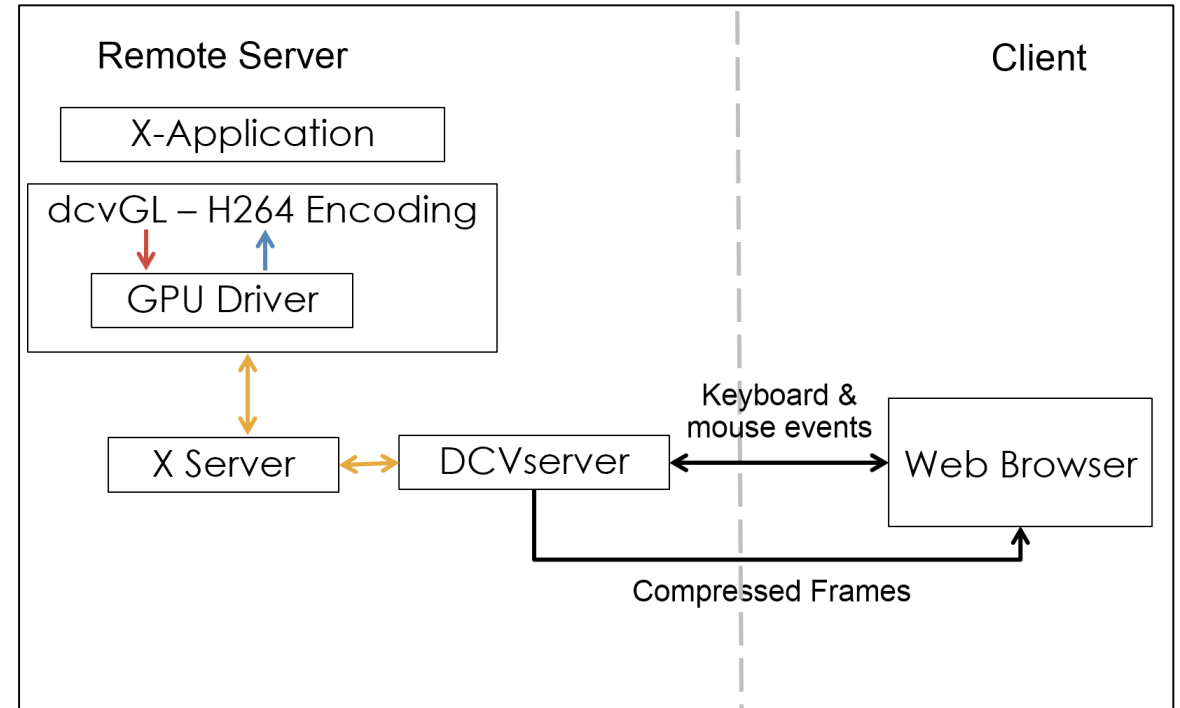 - H264 using the GPU when NiceDCV is used

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When to use… ?

	TurboVNC	TurboVNC / VirtualGL	NiceDCV
Open source	Yes	Yes	No
Availability	Regular nodes	GPU nodes	GPU Nodes (5 seats)
Use case	Non graphics intensive apps, e.g. 2D graphics, any user interface (matlab, performance tools, editors, etc.)	GPU accelerated 3D graphics, apps with no client/ server architecture e.g. VMD, yt's 3D visualization, USC Chimera, custom viz. tools CUDA+OpenGL If NiceDCV's 5 seats are being used	GPU accelerated 3D graphics, apps with no client/ server architecture e.g. VMD, yt's 3D visualization, USC Chimera, custom viz. tools CUDA+OpenGL If TurboVNC/VirtualGL provide laggy response
Compression	TurboJPEG (SIMD) • Configurable Quality / Compression settings	TurboJPEG (SIMD) • Configurable Quality / Compression settings	H264 (NVENC) • Configurable Quality / Compression settings
Client	vncviewer	vncviewer	Web browser

TurboVNC vs NiceDCV

TurboVNC

NiceDCV

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Using TurboVNC on regular nodes

Pre-requisite

Get vncviewer and install it in your machine
https://sourceforge.net/projects/turbovnc/files/

After installation vncviewer will be available under

`/opt/TurboVNC/bin`

Using TurboVNC on regular nodes

1. Login into Rhea and launch an interactive job

```
qsub -I -A abc123 -lnodes=1,walltime=02:00:00
```

2. Launch TurboVNC server

```
/opt/TurboVNC/bin/vncserver :1 -geometry 1920x1080 -depth 24
```

            display   desktop resolution   color depth

```
Starting applications specified in
/ccs/home/user/.vnc/xstartup.turbovnc
Log file is /ccs/home/user/.vnc/rhea201:1.log
```

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Using TurboVNC on regular nodes

2a. If using vncviewer 2.2.1 or lower on Mac and Java 7 or later use


```
/opt/TurboVNC/bin/vncserver :1 -geometry 1920x1080 -depth 24
-securitytypes none
```

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Using TurboVNC on regular nodes

- vncserver uses ports 59xx for communication between the client
  - For this case, vncserver is running in node rhea201 display **:1**

3. In a new terminal, open a tunneling connection between your machine and node rhea201using port 590**1**

```
ssh user@rhea.ccs.ornl.gov -L 5901:rhea201:5901
```
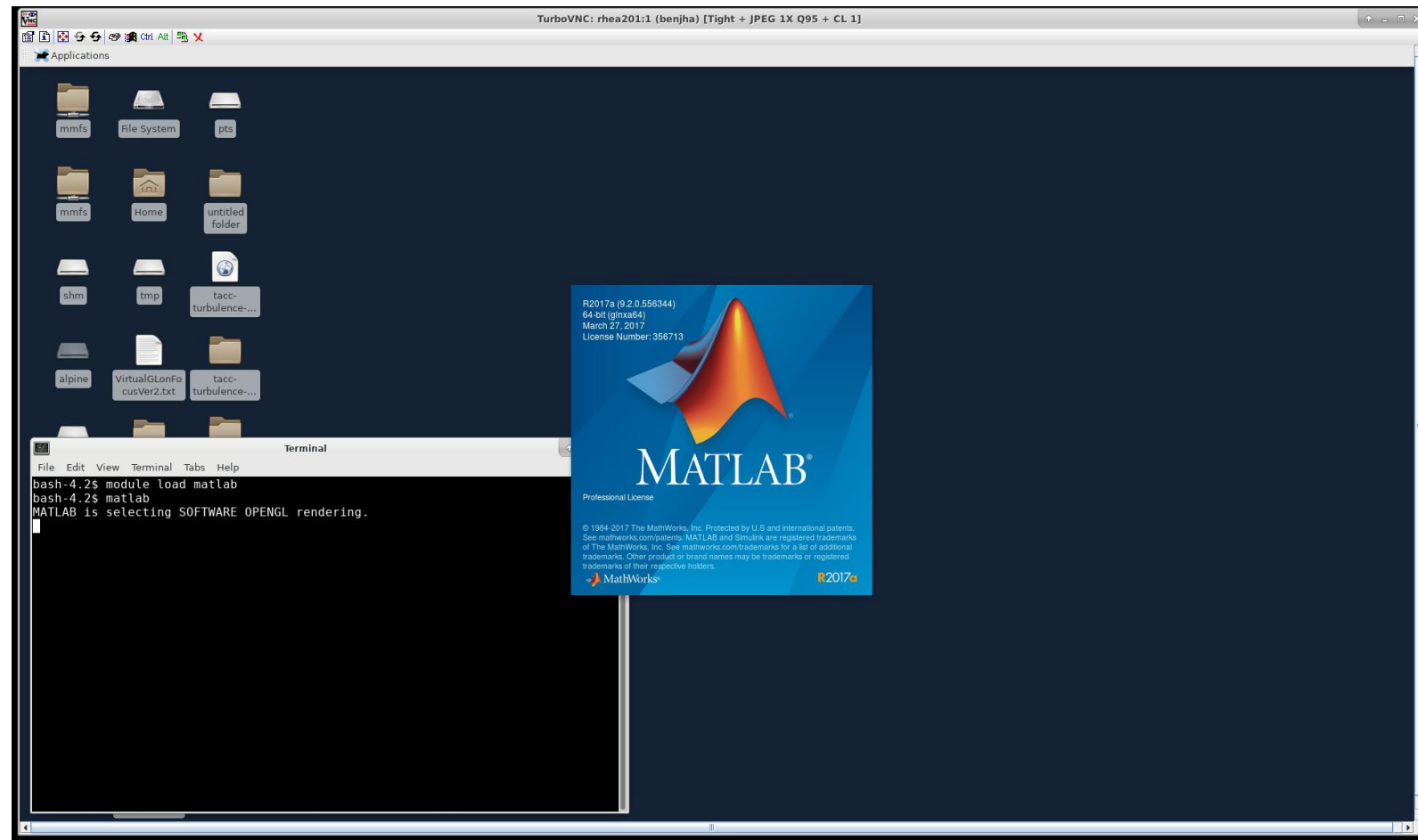
Using TurboVNC on regular nodes

4. In a new terminal, launch vncviewer

/opt/TurboVNC/bin/vncviewer localhost:5901

When running vncviewer for the first time, it will ask for a password. Set the password and reuse it for future sessions

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Using TurboVNC on regular nodes

Launch your app

Using TurboVNC on regular nodes

5. After finishing, shut down the vncserver

```
/opt/TurboVNC/bin/vncserver -kill :1
```

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Using TurboVNC on GPU nodes

```
                              Terminal
qsub -I -X -A abc123 -lnodes=1,walltime=02:00:00,partition=gpu

#initialization
$xinit &
$/opt/TurboVNC/bin/vncserver :1 -geometry 1920x1080 -depth 24
$hostname

#closing
/opt/TurboVNC/bin/vncserver -kill :1
$kill %1
```

```
                              Terminal
#tunneling
ssh user@rhea.ccs.ornl.gov –L 5901:rhea-gpuN:5901
```

```
                              Terminal
#launch vncviewer
/opt/TurboVNC/bin/vncviewer localhost:5901
```

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Using NiceDCV on GPU nodes

1. Launch an interactive job in the gpu partition using dcv as feature

```
qsub -I -X -A abc123 -lnodes=1,walltime=02:00:00,partition=gpu,feature=dcv
```

1a. Check the name of the node using **hostname**

2. Launch the X-server in the background and create a dcv session

```
xinit &
dcv create-session --gl-display :0 session1
```
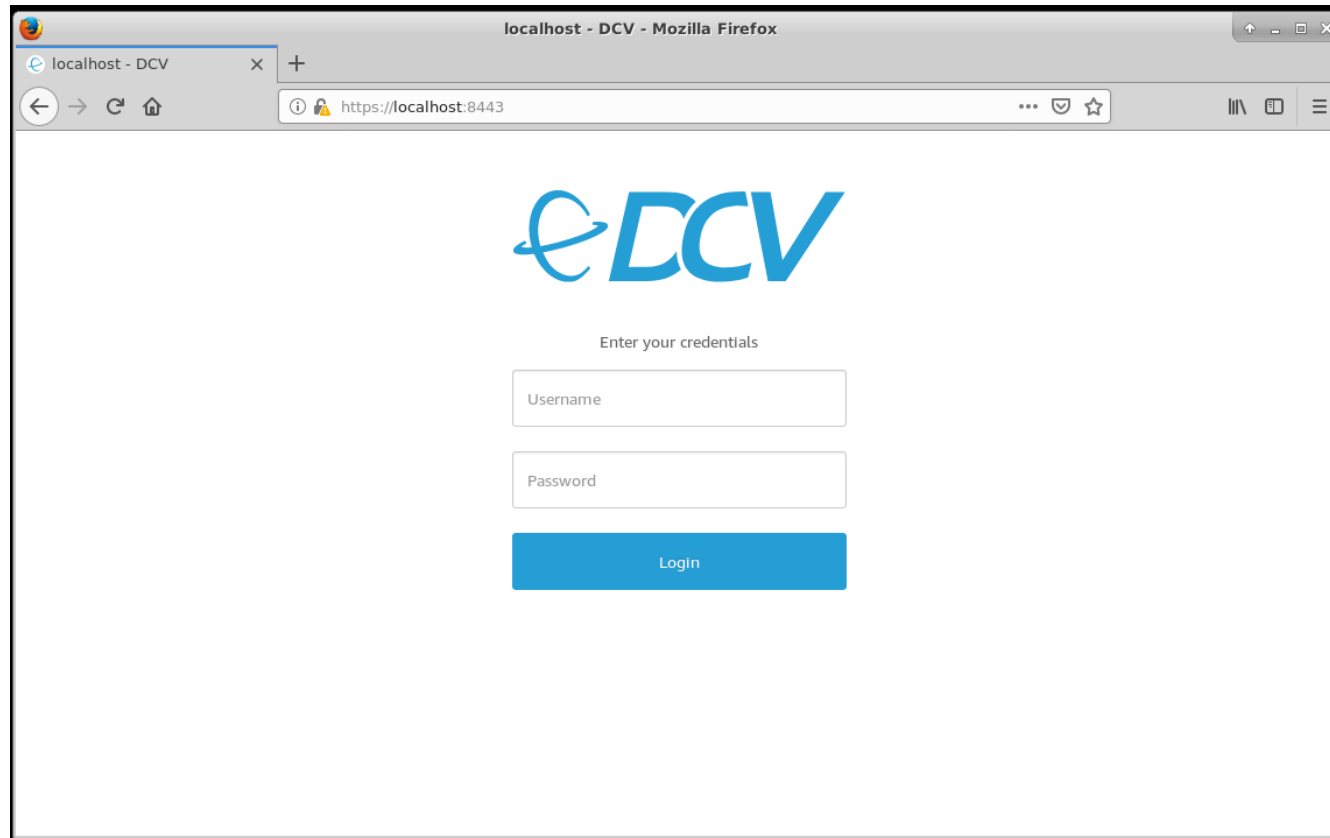
Using NiceDCV on GPU nodes

3. In a new terminal, open a tunnel to the node given by **hostname** command using port 8443

```
ssh user@rhea.ccs.ornl.gov –L 8443:rhea-gpuN:8443
```

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Using NiceDCV on GPU nodes

4. Open https://localhost:8443 in your web browser, use your OLCF user name and PIN+Token to login

Using TurboVNC on regular nodes

5. After finishing, shut down your dcv session and X-server

```
$dcv close-session session1
$kill %1
```

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SUMMARY

TurboVNC Regular nodes

Terminal
```
qsub -I -X -A abc123
-lnodes=1,walltime=02:00:00

#initialization
$/opt/TurboVNC/bin/vncserver :1 -geometry
1920x1080 -depth 24
$hostname

#closing
$/opt/TurboVNC/bin/vncserver -kill :1
$kill %1
```

Terminal
```
#tunneling
ssh user@rhea.ccs.ornl.gov
–L 5901:rheaN:5901
```

Terminal
```
#launch vncviewer
/opt/TurboVNC/bin/vncviewer localhost:5901
```

TurboVNC GPU nodes

Terminal
```
qsub -I -X -A abc123
-lnodes=1,walltime=02:00:00,partition=gpu

#initialization
$xinit &
$/opt/TurboVNC/bin/vncserver :1 -geometry
1920x1080 -depth 24
$hostname

#closing
/opt/TurboVNC/bin/vncserver -kill :1
$kill %1
```

Terminal
```
#tunneling
ssh user@rhea.ccs.ornl.gov
–L 5901:rhea-gpuN:5901
```

Terminal
```
#launch vncviewer
/opt/TurboVNC/bin/vncviewer localhost:5901
```

NiceDCV GPU nodes

Terminal
```
qsub -I -X -A abc123
-lnodes=1,walltime=02:00:00,partition=gpu,
feature=dcv

#initialization
$xinit &
$dcv create-session --gl-display :0 session1
$hostname

#closing
$dcv close-session session1
$kill %1
```

Terminal
```
#tunneling
ssh user@rhea.ccs.ornl.gov
–L 8443:rheaN:8443
```

https://localhost:8443

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Thanks !

Any problems ?

help@olcf.ornl.gov

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X-forwarding

```
$ssh –X user@rhea.ccs.ornl.gov
$qsub -I -X -A abc123 -l nodes=1 -l walltime=02:00:00
qsub: waiting …
qsub: … ready

$module load matlab
$matlab
…
```
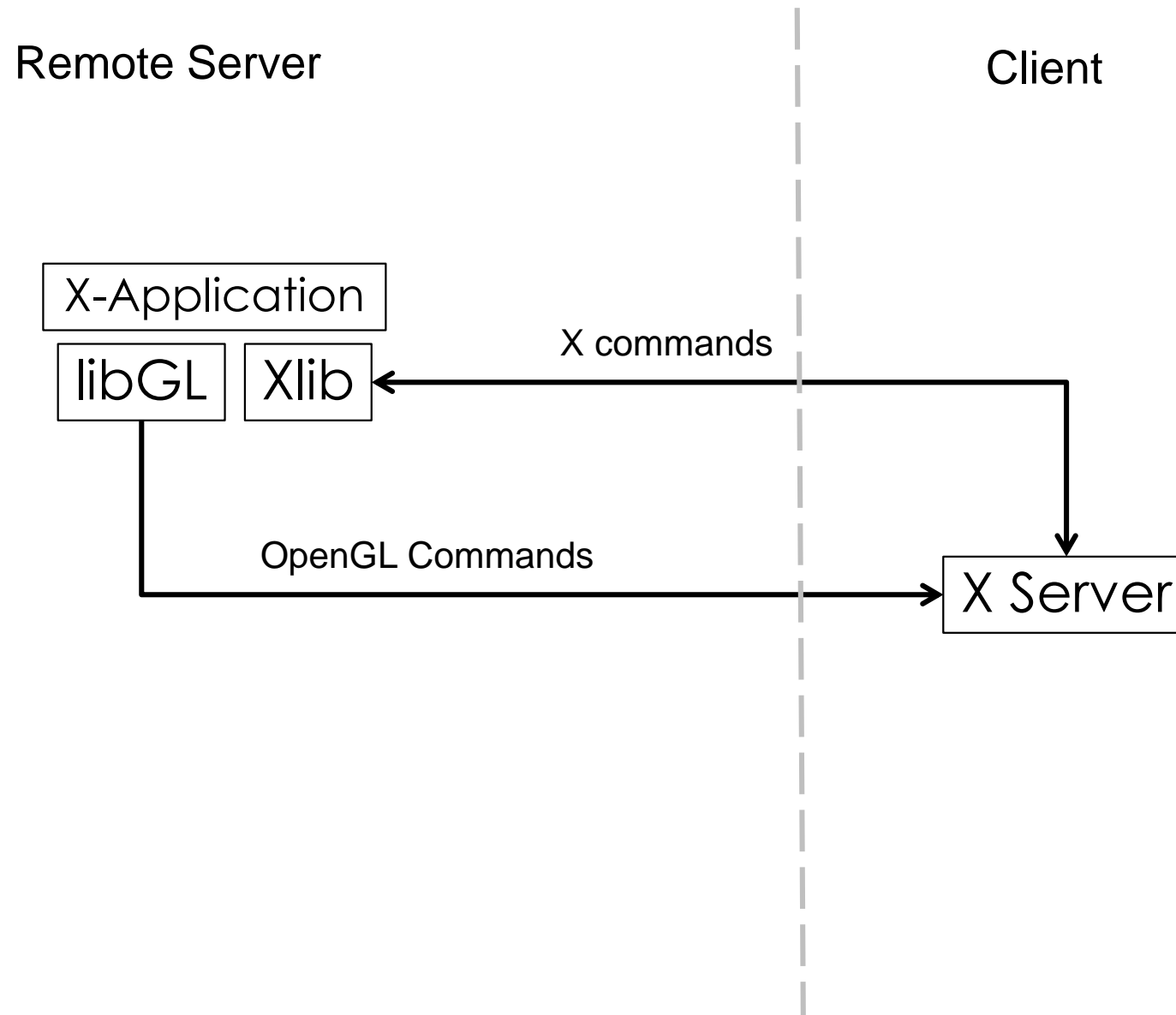
X-forwarding

Remote Server

Client

X-Application

libGL   Xlib

X commands

OpenGL Commands

X Server

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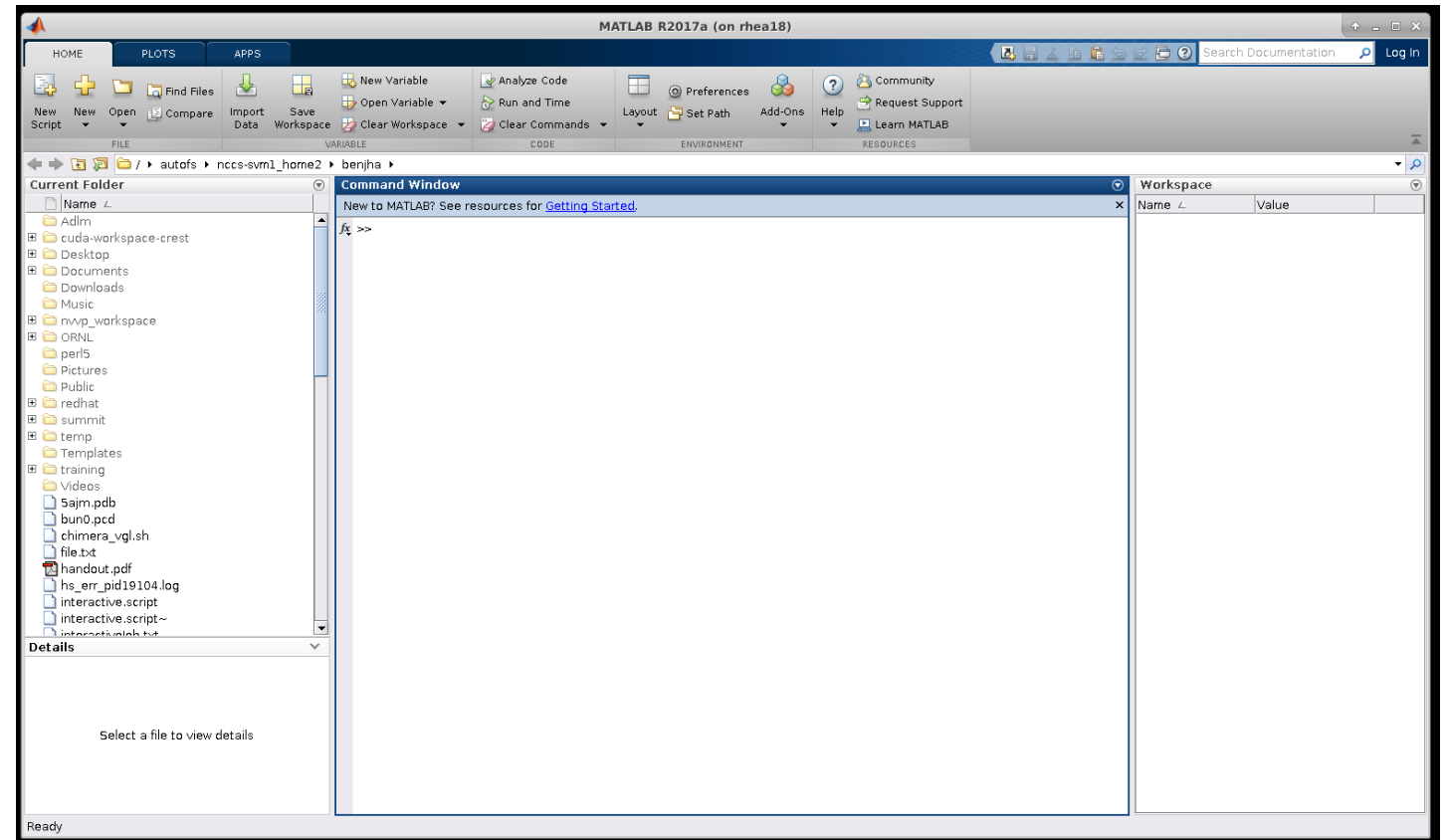
TurboVNC – Rhea's regular nodes

Remote Server

Client

X-Application

X server

vncserver

JPEG SIMD encoding

Keyboard & mouse events

Compressed Frames

vncviewer

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NiceDCV – Rhea's GPU nodes

Remote Server

Client

X-Application

dcvGL – H264 Encoding

GPU Driver

X Server

DCVserver

Keyboard & mouse events

Web Browser

Compressed Frames

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