



Remote Visualisation Services

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1 Introduction

Visualisation and rendering of scientific data play key roles in the understanding and the interpretation of simulated natural phenomena or numerical simulation. HPC facilities allow huge amounts of data to be processed in a short time, but usually they can also generate large amounts of output data. The transfer of the data to a local workstation for visualisation can be time consuming and the graphics processing required may be beyond the capabilities of the user's personal computer.

To address these issues, DEISA provides a remote visualisation service which facilitates the graphical rendering of simulation output created on the DEISA infrastructure, thus avoiding downloading large quantities of data to local facilities.

The Remote Visualisation Service (RVS) of DEISA is provided by LRZ and is based on a server connected to the DEISA infrastructure and equipped with four Nvidia QuadroFX5500 graphics cards, each with 1GB of RAM. The software implementation is based upon the *Virtual Network Computing (VNC)*. For more detailed information about the RVS at LRZ please consult the LRZ Remote visualisation guide[1].

1.1 Before Starting

The first step is to install on your personal workstation VNC-compatible graphical software for the visualisation of your data (*this is known as the client*). Among the freely available programs on the market we strongly recommend **GSISsh-Term**, a gsissh client provided by DEISA and LRZ for accessing the DEISA network.

This can be installed on the user's workstation or launched directly from the browser as described in the Interactive Access user documentation.[2]

NB only this DEISA-specific version of GSISsh-Term provides the VNC plugin required for the graphics visualisation - please consult the DEISA User Documentation: Interactive Access, for information on how to configure correctly the client.

1.2 Accessing the service

There are various ways of accessing the RVS but we will only describe that recommended for DEISA users. A typical session consists of the following steps:

- Connect to the service at LRZ.
- Request a reservation for the graphics device.

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1. http://www.grid.lrz-muenchen.de/de/mware/globus/client/gsissh_term_visualisation.html
 2. <http://www.deisa.eu/usersupport/user-documentation/interactive-access/accessing-deisa-door-nodes-using-gsissh#doc-2>

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- Once the reservation has been granted, open a VNC session to provide a virtual desktop.
- Run the graphics application.
- When finished with the application, release the reservation and close the connection with LRZ.

We will now describe these steps in detail.

2 Connecting to the service at LRZ

The service is protected by a firewall so you cannot connect to it directly from your workstation (unless authenticated by LRZ, see below). However, it is possible to “tunnel” into the service via the DEISA network. For DEISA users, this can be achieved quite simply by connecting to any one of the four DEISA Door Nodes, i.e. SARA, LRZ, RZG or CINECA, using the appropriate gsissh address as described in the DEISA User Documentation: Interactive Access[1].

For example, the gsissh address for the CINECA door node is *grid.sp6.cineca.it* so in order to connect to the service launch GSISsh-Term and select

```
File->New Connection
```

and insert *grid.sp6.cineca.it* in the box *Host to Connect to*.

GSISsh-Term will then ask you for the location of your Certificate and log you on to the Door Node.

As an alternative, it is also possible to send the static IP address of your workstation to the administrators at LRZ via the DEISA Helpdesk and then connect directly to the RVS without first logging onto a DEISA Door Node. In this case you would enter the following address in GSISsh-Term:

```
rvs1.hlr2.lrz-muenchen.de
```

Note, however, that for DEISA users, the tunnelling method is not only more convenient, but also faster because it exploits DEISA’s fast internal network.

1. <http://www.deisa.eu/usersupport/user-documentation/interactive-access/accessing-deisa-door-nodes-using-gsissh#doc-2>

3 Requesting a reservation for the graphics service

It is now necessary to request a reservation for use of the service and, if necessary, set a VNC password. This can be done by logging onto the computer at LRZ (if you already have a reservation from a previous session then you don't need to do this)

```
module load deisa globus  
  
gsissh `deisa_service -i -s lrz-rvs`
```

First time users need to set a VNC password with the command:

```
vncpasswd
```

Note that this only needs to be done once.

A reservation is requested with the command:

```
rvnc
```

Your request will be queued with others on the system but normally you will be allocated the resources within a minute. By default you will be given an allocation of one hour on the graphics facilities but it is possible to request more time with the *rvrun* command (see the LRZ user guide^[1] for more details). When the allocation is ready you will be told what host and display has been allocated for your request. For example,

```
rvs1.hlr2.lrz-muenchen.de:53
```

In this example the host is *rvs1.hlr2.lrz-muenchen.de* and the display is 53.

You will need this information for the next step. You will also be given the command you need to use in order to close the reservation (step 6). Another useful command is

```
rvstat
```

which lists the reservations of all users currently using the system.

1. http://www.grid.lrz-muenchen.de/de/mware/globus/client/gsissh_term_visualisation.html

4 Graphics applications

4.1 Open a VNC session

Once you have a reservation you can start a VNC graphical session. Within the GSISSH-Term client click on

Tools ->VNC Session

In the window enter the host and display information you obtained from the previous step. Click OK and another window will open up asking for the VNC password. After entering this and clicking OK the remote desktop should appear.

4.2 Using graphics applications

To test that everything is working correctly click on the xterm terminal you should find in the desktop and type:

```
glxgears
```

This should open a small window with an animation of three interlocking gears, and additionally print how many frames are being generated every second. It is important to emphasise that the rendering is being done *server-side* and that your personal computer is merely displaying the already rendered images which are sent across the network by the RVS. Thus the user's personal workstation requires only modest graphics facilities since effectively it only has to display images.

A number of graphical applications, such as Visit, VMD, etc have been installed on the system and you will find their icons on the Desktop; for a full list and further documentation see the LRZ Visualisation Applications Guide[1]. It is also possible to launch your own graphics application from the xterm window (which is OpenGL enabled).

The easiest way to transfer your data to the RVS is via the DEISA filesystems which are also available here. Thus, if you are running calculations at SARA, for example, just copy your data files into the *\$DEISA_HOME* or *\$DEISA_DATA* directories and they will automatically be available for use with the RVS at LRZ.

4.3 Finishing a session

1. http://www.lrz.de/services/compute/visualisation/visualisation_5/index.html

Graphics applications

When you have finished your graphics session you can exit the remote desktop and, in order to release the resources for other users, you should close the reservation with the *rvdel* command and the reservation number. For example, *rvdel cne0cinj1300890754493*.