

Extreme Computing Studio (XCS) Portal

Interactive & graphical sessions

Valentin Plugaru

UL HPC Management Team,
Parallel Computing and Optimization Group (PCOG),
University of Luxembourg (UL), Luxembourg



Summary

1 Graphical sessions on UL HPC

- Two connection methods
- X11 forwarding

2 The XCS Portal

- Overview
- Prerequisites
- Applications integrated in XCS
- A look at XCS



Summary

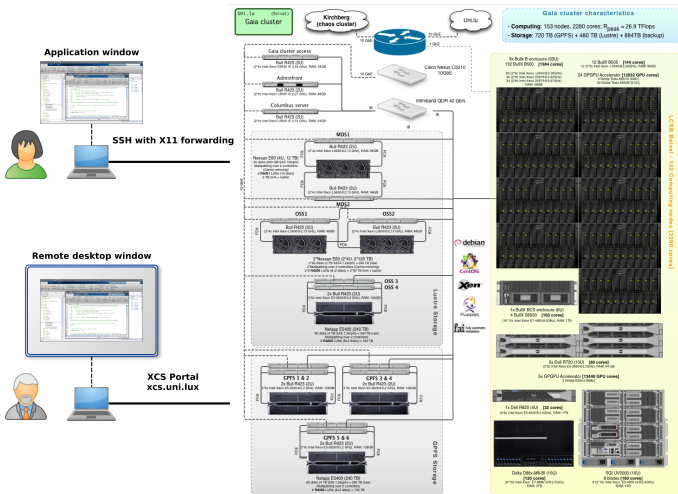
1 Graphical sessions on UL HPC

- Two connection methods
- X11 forwarding

2 The XCS Portal

- Overview
- Prerequisites
- Applications integrated in XCS
- A look at XCS

Using graphical interfaces on UL HPC





X11 forwarding

- On Windows

- ↪ **Putty**: Category → Connection → SSH → X11 → Enable X11 forwarding (*check*)

- ↪ **VcXsrv**: Windows X-server, to render locally the remote application



X11 forwarding

- On Windows
 - ↪ **Putty**: Category → Connection → SSH → X11 → Enable X11 forwarding (*check*)
 - ↪ **VcXsrv**: Windows X-server, to render locally the remote application
- On OS X
 - ↪ **ssh** (in Terminal): use `ssh -X ...`
 - ↪ **XQuartz**: X Window System libraries and applications, required on some OS X versions



X11 forwarding

- On Windows
 - ↪ **Putty**: Category → Connection → SSH → X11 → Enable X11 forwarding (*check*)
 - ↪ **VcXsrv**: Windows X-server, to render locally the remote application
- On OS X
 - ↪ **ssh** (in Terminal): use `ssh -X ...`
 - ↪ **XQuartz**: X Window System libraries and applications, required on some OS X versions
- On Linux
 - ↪ **ssh** (in a console): simply use `ssh -X ...`

X11 forwarding

- On Windows
 - ↪ **Putty**: Category → Connection → SSH → X11 → Enable X11 forwarding (*check*)
 - ↪ **VcXsrv**: Windows X-server, to render locally the remote application
- On OS X
 - ↪ **ssh** (in Terminal): use `ssh -X ...`
 - ↪ **XQuartz**: X Window System libraries and applications, required on some OS X versions
- On Linux
 - ↪ **ssh** (in a console): simply use `ssh -X ...`

Downsides

- Network connection interrupted → session crashes
- Rendering **slow** (no 3D acceleration) and **network intensive**



Summary

1 Graphical sessions on UL HPC

Two connection methods
X11 forwarding

2 The XCS Portal

Overview
Prerequisites
Applications integrated in XCS
A look at XCS



Overview

- Web portal dedicated for visualisation sessions: xcs.uni.lux
 - ↪ available from inside the UL network and externally through UL VPN
- Portal features:
 - ↪ (limited) **data management** capabilities (browse/upload/download)
 - ↪ **submission of visualisation sessions** for pre-configured applications
 - ↪ **accessing & suspending** visualisation sessions
 - ↪ **sharing sessions** with other users



Overview

- Web portal dedicated for visualisation sessions: xcs.uni.lux
 - ↪ available from inside the UL network and externally through UL VPN
- Portal features:
 - ↪ (limited) **data management** capabilities (browse/upload/download)
 - ↪ **submission of visualisation sessions** for pre-configured applications
 - ↪ **accessing & suspending** visualisation sessions
 - ↪ **sharing sessions** with other users

Advantages

- Network connection interrupted → session survives
- Rendering on GPU nodes – **fast** (with 3D acceleration)
- Fluid on slow networks (intelligent compression)



Prerequisites

- 1 UL HPC account, you need your **password** to login on xcs.uni.lux
- 2 your account to be in the XCS group (for now, added on request)
- 3 **TurboVNC**: Virtual Network Computing application tuned for maximum performance and compression with 3D applications
- 4 to use a specific application through XCS, its profile needs to be defined by the HPC team



Current applications integrated in XCS

- **MATLAB**

↪ High-level technical computing language and interactive environment for algorithm development, data visualization, data analysis, and numerical computation.

- **RStudio**

↪ IDE for R, a programming language for statistical computing and graphics.



Current applications integrated in XCS

- SAS (Statistical Analysis System)

↳ Advanced analytics, business intelligence, data management, and predictive analytics software.

- STATA

↳ Complete, integrated statistical software package for data analysis, data management, and graphics.



Current applications integrated in XCS

- ABAQUS

↳ Finite Element Analysis software for modeling, visualization and best-in-class implicit and explicit dynamics FEA.



Current applications integrated in XCS

- VMD
 - ↪ Molecular visualization program for displaying, animating, and analyzing large biomolecular systems using 3-D graphics and built-in scripting.
- ParaView
 - ↪ Data analysis and visualization application.



Current applications integrated in XCS

- **MATLAB**

- ↪ High-level technical computing language and interactive environment for algorithm development, data visualization, data analysis, and numerical computation.

- **RStudio**

- ↪ IDE for R, a programming language for statistical computing and graphics.

- **SAS (Statistical Analysis System)**

- ↪ Advanced analytics, business intelligence, data management, and predictive analytics software.

- **STATA**

- ↪ Complete, integrated statistical software package for data analysis, data management, and graphics.

- **ABAQUS**

- ↪ Finite Element Analysis software for modeling, visualization and best-in-class implicit and explicit dynamics FEA.

- **VMD**


- ↪ Molecular visualization program for displaying, animating, and analyzing large biomolecular systems using 3-D graphics and built-in scripting.

- **ParaView**

- ↪ Data analysis and visualization application.









XCS Intro page

 English (United States) ▾ Welcome Valentin Plugaru! [sign out](#) [edit profile](#)

[QUICK START](#) [ACCOUNTING ▾](#) [JOBS](#) [PROJECTS](#) [DATA](#) [VISUALIZATION SESSIONS](#)

Applications shortcuts

 MATLAB	 Abaqus	 VMD	 RStudio	 STATA	>
---	---	--	--	---	----------------------

 Upload input data You can add your private data which you can store on HPC Clusters.	 Submit job You can submit a new job.	 Monitor jobs You can monitor execution of your jobs.	 Check results You can check your job results.
 New visualization session You can create new visualization session.	 Monitor visualization sessions You can monitor your visualization sessions.		



Launching a graphical session


The screenshot shows the XCS Portal interface. At the top, there is a navigation bar with the following items: "English (United States)" (with a dropdown arrow), "Welcome Valentin Plugaru!" (with "sign out" and "edit profile" links), and a menu with "QUICK START", "ACCOUNTING", "JOBS", "PROJECTS", "DATA", and "VISUALIZATION SESSIONS" (which is highlighted with a white arrow). Below the navigation bar, the "Available applications" sidebar is visible, listing: Abaqus, MATLAB, ParaView, RStudio, SAS, STATA, and VMD. The main content area is titled "Select base settings" and contains the following sections:

- Select base settings**
 - Available projects: A dropdown menu with "xcs" selected.
 - The name of your job (optional): An empty text input field.
- Fill in the job submission form**
 - Version: A dropdown menu with "0.98.1102-R-3.0.2-ictce-5.3.0" selected.
 - Number of cores: A dropdown menu with "2" selected.
 - Walltime in hhh:mm:ss format, e.g. 2:00:00 for 2 hours job: A text input field containing "1:0:0".
- Save parameters as default**
 - Save input parameters as default for this project

At the bottom of the form, there are "Cancel" and "Submit" buttons.



Checking job status

English (United States) ▼ Welcome Valentin Plugaru! [sign out](#) [edit profile](#)

[QUICK START](#) [ACCOUNTING ▼](#) [JOBS](#) [PROJECTS](#) [DATA](#) [VISUALIZATION SESSIONS](#)

List of visualization sessions

Actions Refresh

Filter applied (adjust) - Owner: vplugaru Adjust columns

Showing 1 .. 20 of 86 (20 rows per page) << 1 2 3 4 5 >>

ID ▼	Name ▼	Application ▼	Owner ▼	Status ▼	Created ▼	Updated ▼	Start date ▼	
3404860	Job150622122028	VMD	vplugaru	Active	2015-06-22 12:20:28	2015-06-22 12:41:50	2015-06-22 12:20:59	⚙
3275288	Job150520074631	STATA	vplugaru	Done	2015-05-20 07:46:32	2015-05-20 07:46:31	2015-05-20 07:46:39	⚙
3274401	StataTest	STATA	vplugaru	Done	2015-05-18 14:23:50	2015-05-18 14:23:53	2015-05-18 14:24:05	⚙
3270930	Job150513150758	MATLAB	vplugaru	Done	2015-05-13 15:07:59	2015-05-13 15:07:58	2015-05-13 15:08:21	⚙
3198477	stata13test	STATA	vplugaru	Done	2015-03-25 16:35:21	2015-03-25 16:35:22	2015-03-25 18:11:13	⚙
3198166	stata13test	STATA	vplugaru	Done	2015-03-25 09:13:13	2015-03-25 09:13:14	2015-03-25 12:14:36	⚙
3196739	Job150324151600	STATA	vplugaru	Done	2015-03-24 15:16:01	2015-03-24 15:16:01	2015-03-24 18:51:45	⚙
3196738	Job150324151437	STATA	vplugaru	Terminated	2015-03-24 15:14:38	2015-03-24 15:15:45	N/A	⚙



Connecting to a running session

English (United States) Welcome Valentin Plugaru! [sign out](#) [edit profile](#)

QUICK START ACCOUNTING ▾ JOBS PROJECTS DATA **VISUALIZATION SESSIONS**

List of visualization sessions

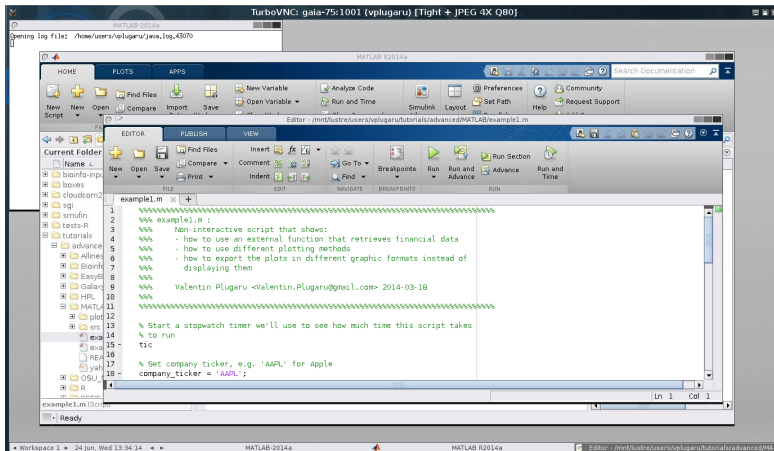
Actions Refresh

Filter applied (adjust) Owner: vplugaru Adjust columns

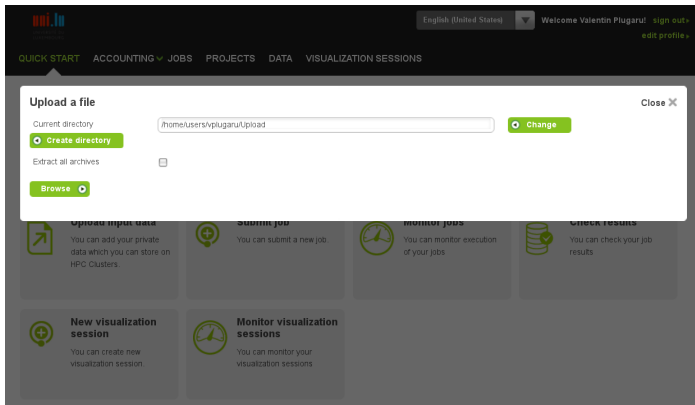
Showing 1 .. 20 of 86 (20 rows per page) << < 1 2 3 4 5 > >>

ID ▾	Name ▾	Application ▾	Owner ▾	Status ▾	Created ▾	Updated ▾	Start date ▾	
3404860	Job150622122028	VMD	vplugaru	Active	2015-06-22 12:20:28	2015-06-22	2015-06-22	Open in new window View in TurboVNC viewer Resubmit Kill session Share View details
3275288	Job150520074631	STATA	vplugaru	Done	2015-05-20 07:46:32			
3274401	StataTest	STATA	vplugaru	Done	2015-05-18 14:23:50			
3270930	Job150513150758	MATLAB	vplugaru	Done	2015-05-13 15:07:59			
3198477	stata13test	STATA	vplugaru	Done	2015-03-25 16:35:21	2015-03-25 16:35:22	2015-03-25 18:11:13	
3198166	stata13test	STATA	vplugaru	Done	2015-03-25 09:13:13	2015-03-25 09:13:14	2015-03-25 12:14:36	
3196739	Job150324151600	STATA	vplugaru	Done	2015-03-24 15:16:01	2015-03-24 15:16:01	2015-03-24 18:51:45	
3196738	Job150324151437	STATA	vplugaru	Terminated	2015-03-24 15:14:38	2015-03-24 15:15:45	N/A	

An active remote desktop session



Uploading data



The screenshot shows the XCS Portal interface. At the top right, it displays the language 'English (United States)' and a welcome message for 'Valentin Plugaru' with links for 'sign out' and 'edit profile'. A navigation bar includes 'QUICK START', 'ACCOUNTING', 'JOBS', 'PROJECTS', 'DATA', and 'VISUALIZATION SESSIONS'. The main content area is partially obscured by a white 'Upload a file' dialog box. This dialog box has a title bar with 'Close X' and contains the following elements:

- Current directory:** A text input field containing '/home/users/vplugaru/Upload' and a green 'Change' button.
- Create directory:** A green button with a plus icon and the text 'Create directory'.
- Extract all archives:** A checkbox that is currently unchecked.
- Browse:** A green button with a magnifying glass icon and the text 'Browse'.

 Below the dialog box, several cards are visible, including 'Upload input data', 'Submit job', 'Monitor jobs', 'Check results', 'New visualization session', and 'Monitor visualization sessions', each with a green plus icon and a brief description of the action.



Thank you for your attention...

Questions?

Valentin Plugaru

Mail: valentin.plugaru@uni.lu
Office E-005
Campus Kirchberg
6, rue Coudenhove-Kalergi
L-1359 Luxembourg

UL HPC Management Team

mail: hpc-sysadmins@uni.lu



1 Graphical sessions on UL HPC

Two connection methods
X11 forwarding

2 The XCS Portal

Overview
Prerequisites
Applications integrated in XCS
A look at XCS