Access and Login to the Linux-Cluster

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Validation for Access

Scientists and students from Munich Universities as well as Bavarian Universities can obtain access to the LRZ Cluster Systems. The following steps need to be performed before attempting the first login to the systems:

- A valid LRZ account is required, which can e.g. be obtained by contacting the responsible master user located at your institution.
- Your master user will need to fill in a project proposal, providing details about your intentions and needed resources. He may well ask you for text describing these details.

If your project is approved, you will receive access information after at most a few working days.

Login and Security

Only the login nodes can be accessed interactively from the outside world. Two mechanisms are provided for logging in to the system; both incorporate security features to prevent appropriation of sensitive information by a third party.

1. Access via Secure Shell

Details on how to configure ssh for usage with the LRZ clusters are available in the document ssh - Secure Shell on LRZ HPC Systems.

From the UNIX command line on the own workstation the login to an LRZ account xyyyyzz is performed via one of the commands given in the following table.

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ssh -Y lxlogin5.lrz.de -l xyyyyzz</td>
<td>Haswell (CoolMUC-2) login node</td>
</tr>
<tr>
<td>ssh -Y lxlogin6.lrz.de -l xyyyyzz</td>
<td>Haswell (CoolMUC-2) login node</td>
</tr>
<tr>
<td>ssh -Y lxlogin7.lrz.de -l xyyyyzz</td>
<td>Haswell (CoolMUC-2) login node</td>
</tr>
<tr>
<td>ssh -Y lxlogin8.lrz.de -l xyyyyzz</td>
<td>KNL Segment (CooMUC-3) login node</td>
</tr>
<tr>
<td>ssh -Y lxlogin10.lrz.de -l xyyyyzz</td>
<td>Ivy Bridge (IvyMUC) login node</td>
</tr>
<tr>
<td>gsssh -Y lxgt2.lrz.de</td>
<td>login node for GSI-SSH</td>
</tr>
</tbody>
</table>

The login nodes are meant for preparing your jobs, developing your programs, and as a gateway for copying data from your own computer to the cluster and back again. Since this resource is shared among many users, LRZ requires that you do not start any long-running or memory-hogging programs on these nodes; production runs should use batch jobs that are submitted to the SLURM scheduler. Our SLURM configuration also supports semi-interactive testing. Violation of the usage restrictions on the login nodes may lead to your account being blocked from further access to the cluster, apart from your processes being forcibly removed by LRZ administrative staff!

Notes:

- The -Y option of ssh is responsible for tunneling of the X11 protocol, it may be omitted if no X11 clients are required, or if you already have otherwise configured X11 tunneling in your ssh client.
- The HOME directory on the Linux Cluster is an NFS mounted volume, which is uniformly mounted on all cluster nodes.
- The login node lxlogin8.lrz.de for the KNL cluster is itself not a KNL system; you can develop and compile your software there, but if you optimized for KNL, you may not be able to execute the program on the login node itself, but must use an interactive or scripted SLURM job.

Secure Shell Public Keys

The Secure Shell ECDSA public keys for the interactive nodes are supplied through the following link (please add these to ~/.ssh/known_hosts on your own workstation before logging in for the first time):

SSH Public Keys

2. Login via Grid Services using GSI-SSH

An alternative way of accessing the cluster is to use GSI-SSH, which is a component of the Globus toolkit and provides

- terminal access to your account
- a single sign-on environment (no password required to access other machines)
- easy access to a number of additional functionalities, including secure and parallel file transfer
The prerequisites for using it are

- a Grid certificate installed on your machine and acknowledged by LRZ, as described on the [LRZ Grid Portal](http://www.lrz.de). Please note that TUM, LMU, and LRZ members can use the new and easy short lived credential service (SLCS) of the DFN as an alternative: it allows you to immediately obtain a certificate for Grid usage
- an installation of a GSI-SSH client on your own workstation, either the command line tool `gsissh` or the multi platform Java tool Gsissh-Term, as described on the [LRZ Grid Portal](http://www.lrz.de).

### Changing of Password and Shell

Please always use the web interface on the LRZ server to change your login password or your login shell for the cluster systems. Cluster-local commands cannot be used for this purpose.

Passwords must be changed at least once in 6 months. We are aware that this measure imposes some overhead on users, but believe that it is necessary on security reasons, having implemented it based on guidelines of BSI (federal agency for information security) and the IT security standard ISO/IEC 27001. You are able to determine the actual invalidation date for your password by logging into the above-linked web interface and selecting the menu item "Person -> view" or "Account -> view authorizations". In order to prevent being surprised by a password becoming invalid, you will be notified of the need to change your password via e-mail. Even if you miss the deadline for the password update, this only implies a temporary suspension of your account - you will still be able to log in to the ID portal and make the password change.

- **Complete German text** of the authentication regulations (PDF)
- **Complete English text** of the authentication regulations (PDF)

Changing the password is also necessary after it has been newly issued, or reset to a starting value by a master user or LRZ staff. This assures that actual authentication is done with a password known only to the account owner.

### Support via Service Desk

Questions concerning the usage of the Linux Cluster should always be directed to the LRZ Service Desk. A member of the LRZ HPC support team will then attend to your needs.

### Documentation for Application Software and Packages

Please start from the Software for HPC entries on the LRZ web server.

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**LRZ-specific configuration and policies on the clusters**

### Moving data from/to the cluster

ftp access to the cluster from outside (and also within the clusters) is disabled for security reasons. Please use `scp` (Secure Copy) or `grid-ftp` to move data between platforms.

### User accounts are personalized

User accounts are always assigned to a particular person. For a number of reasons, sharing of user accounts between different persons is **not permitted**; if noticed, it will lead to the account being deactivated by LRZ. All involved parties (including the Master User of the account’s project) will be notified with information on the measures needed to rectify the situation.

### Firewall, networking

The cluster is protected from certain types of external attacks by a firewall, the configuration of which may impact the functionality of certain applications as described in the following.

**X11 Protocol**

Direct X11 connections (via `xhost` or `xauth`) are prohibited, only `ssh tunneling` is supported.

**Routing**

None of the batch nodes in the cluster are by default routed to the outside world. Please contact LRZ HPC support if you require a particular system to be routed to the batch nodes.

**Electronic mail**

We recommend against using the Linux Cluster for mail purposes (apart from having the batch scheduler send mails to you, occasionally). Please consult the LRZ documentation on how to use eMail on how to properly use this facility.
Environment

Environment settings are controlled via the LRZ module system. Such settings are needed to access specific application program packages, or to properly establish a development environment.

Using the cron or at commands

This is not allowed on the LRZ cluster. Please submit SLURM batch jobs for performing computations.

General Linux System Documentation

Typical for Linux systems there are (at least) two formats for the system documentation:

- man pages
- info pages