

# Supercomputers and users – management features

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**Abstract.** *Supercomputers are getting common and are widely used in many areas. More and more people can use supercomputers for research, modeling, computing. But such complicated and expensive installations in most cases are not available for everyone. At the same time, if you have a supercomputer, you cannot use it all the time and with full load (in most cases). Because of that most supercomputers are used by different users or groups, sharing resources of one computer. Is it enough to install batch system and just to provide users with logins to make their work efficient and comfortable? What should administrator and supercomputer holder think about? Let's try to determine.*

## Keywords

Supercomputer, users, administrating.

## 1 Introduction

Most nowadays supercomputers are used by several or many user groups. If the number of groups is not too big and groups do not change often, there are no troubles for system administrator to manage them. But many supercomputer owners grant access for outer organizations and users, or just have a lot of own users. This especially typical for education and science organizations. In this case system administrator meets many small and big troubles. Let's check some of them and try to elaborate solutions.

First trouble is accounting. How many users do you have? Do all of them access your resources for legal purposes? They might have already finished real projects and now your resources are being used for... For what? Do you even know who is actually using your resources? Users can just pass their logins/passwords to each other, can you detect or prevent it? If a real user is dismissed from organization, he can still use your supercomputer – do you need it?

Yes, these cases are rather rare, but very painful. If you have ten users, you cannot meet such troubles, but later ten users become fifty, then – hundred... How do you store information about your users? Some system administrators do not store it at all. Many administrators store it in plain text or excel-files. There are cases, when this information is stored in LDAP. Last way seems to be right, but it does not allow to track history. If you delete user, you cannot retrieve information about him later. You also do not know about his quotas changes, and other things.

If you store account information in plain- or excel-files, you must use your own report generator scripts, scripts for account changes log, scripts for... many other things. It is hard to maintain such script-based accounting, and very hard to add new features or modify existing functions. It is most widely used approach, but it has no future probably.

The most modern approach is to store such data in the database, but how can it be used with LDAP or passwd file? How can it be integrated with other services and technical support? These questions are important if you try to get statistics of your supercomputer usage, if you care about your technical support quality.

At first glance it seems to be the best approach to have an integrated solution – database, web-interface, technical support, LDAP integration, report generator. But such solution have some big caveats:

- LDAP cannot be used in huge supercomputers yet, or there are too many restrictions and limitations,
- supercomputers are **very** different – different quotas, filesystems, other features,
- you may want to integrate here other tools – monitoring, program environment control, etc.

It seems to be a good approach to create a special service to get rid of such issues, providing the following functionality:

- to store information about users, organizations, and their relations,
- to store relations between users and their accounting information, quotas, special programs access,
- to have an ability to be integrated into **any** accounting system (LDAP, passwd, NIS, AD, ...),
- to have an integrated user technical support,
- to be available from anywhere – administrator must not be at console 24 hours every day,
- to be extensible with new features – no one knows about tomorrow wishes and demands.

We would also mark out some special requirements:

- support for project-oriented user collaboration – one login should be used for every user+project pair,
- support for groups – members of one project should have one unix-group,
- disk/cpu quotas support,
- ssh keys management,
- various statistics, reports,
- reregistration support - some kind of regular procedures confirming personal and project details including contact information.

At present the development of such system is in progress, but we already have support for most of required features. Our users can register and create requests for access to supercomputers. After request approval user can add ssh-key(s) and get access via ssh to the supercomputer system. All troubles are discussed via tech support mechanism. If it is needed, user can invite another user to collaborate without admin bother.

The system is built as web-service, so users and admins can access it in any point of the internet world. It has special modules to access supercomputers, so we can manage user on different clusters with different manage models (passwd, LDAP, non-standard...) The only need to add new cluster is to adopt several scripts and allow special user to execute them as superuser.

The system automates many administration steps relates to user management, it also can show us user and project statistics. In future it will be possible to get data from monitoring and batch systems to show us full information about the activity of users, organizations, projects. Adding new management modules will allow administrator to change priorities, quotas, applications access for any user.

## References

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