Extensibility of the LSI Portal, generalizing and extending

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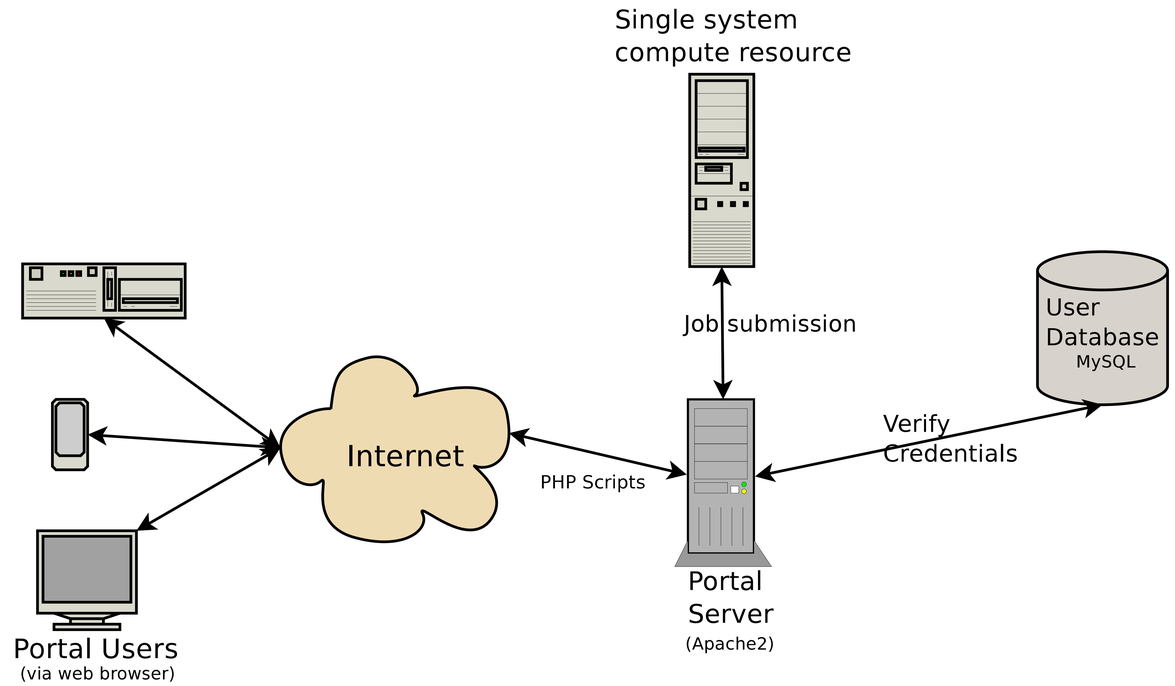
Introduction

The LSI Portal[6]: a portal project, focusing in bioinformatics, whose goal is to produce a web based front end to compute resources. The portal is implemented using the following technologies: PHP[1], Perl[2], MySQL[3], Apache2[4], and Lightweight Directory Access Protocol (LDAP)[5]. The intent is to allow non-programmers to use complex programs through an intuitive web interface. The function of the technologies listed is shown below.

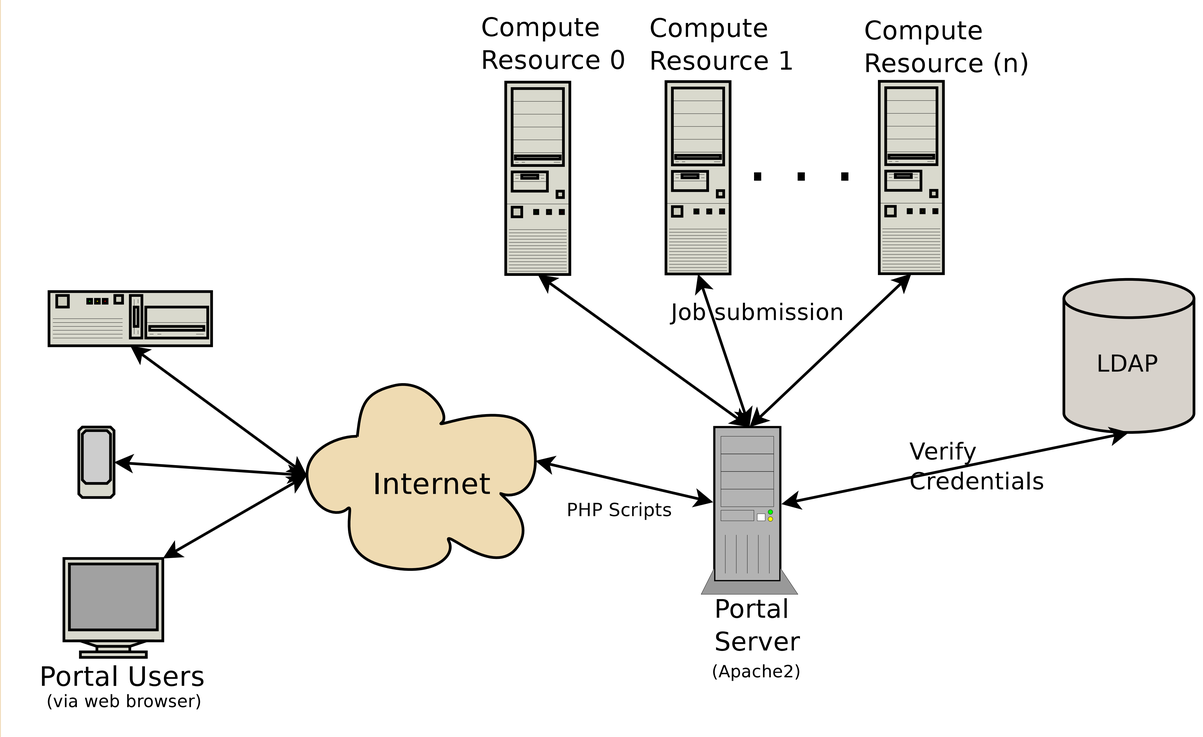
Original Layout



How it works

1. A user navigates to the portal[7] with a web browser, from virtually anywhere, on an internet capable device. Apache2 handles this as it is the web server software chosen to serve the web portal.
2. The user uses their account credentials to log on to the portal. The credentials are verified against the entries in the MySQL database. If it is a match the login succeeds, otherwise access is denied. This operation is carried about by the MySQL Apache2 module.
3. Once they are logged into the portal allows the user to submit new jobs, manage previously submitted jobs, download the output of a job locally, and re-run completed jobs. Jobs consists of a program available on the portal that can be submitted to a compute resource.
4. The portal also supports collaboration through groups and specifically allowed users. Once a user is in a group they can manage the level of access for memebers in the same group. For more granularity a user can also specify specific portal user's access level. The three levels of access are: none, read only, and read and write. The access level is defaulted to none for both groups and specific users. It must be changed explictly by the owner of the job for other portal users to have access.
5. The portal also has an administrative side. Administrators have more privilege than regular users. For instance, an admin can cancel any job that has been submitted whereas regular users can only cancel jobs they have access to. Administrators also manage the groups that regular users are in as well as the users that are on the portal.

Current Layout



How it works

While the original layout provides a good starting point it is limited to a specific compute resource. The MySQL authentication also means another username and password that will have to be remembered in order to use the portal.

The new layout reuses all the steps in the previous layout with some modification. Step 2 has been changed from MySQL to the LDAP service provided by UA. This allows the portal to unify credentials with the current UA system, meaning the same username and password that work for UA services such as Blackboard will work with the portal as well. In both instances, the portal credentials are sent over the network on an encrypted connection.

Step 3 has also been changed. The original portal only allows for job submission to specific queues on a single system compute resource. The modifications made to the portal now allow jobs to be submitted to a completely different compute resource. Compute resources have job queues. These queues are setup in a way that jobs submitted to that queue get submitted to a particular set of resources. For example one queue could be dealing with jobs that can make use of graphics processing unit (GPU) computing, where as a different queue would be setup to handle jobs that are designed for centeral processing unit (CPU) computing.

The development for these proposed changes are still underway. Once completed the portal will be general enough for use on more than bioinformatics, for example a chemistry portal.

References and Credits

1. PHP. http://php.net
2. Perl. http://perl.org
3. MySQL. http://mysql.com
4. Apache2. http://httpd.apache.org
5. LDAP. http://tools.ietf.org/html/rfc4511
6. LSI Portal Project. http://sourceforge.net/projects/portalproj/ (ComputePortalProject)
7. Life Science Informatics "Compute Portal". http://biotech.inbre.alaska.edu/ – This project was sponsored in part by UA INBRE.