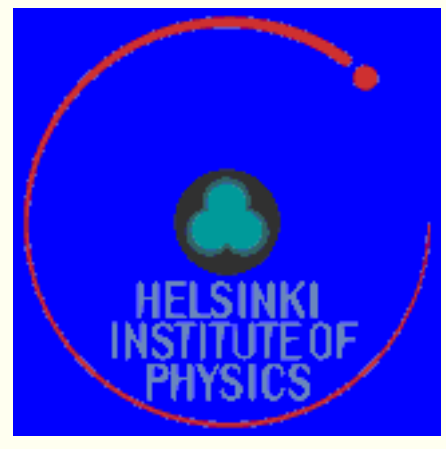


# Mobile Analyzer - New Concept for Next Generation of Distributed Computing



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Juho Karppinen, Tapio Niemi and Marko Niinimäki

<http://wikihp.cern.ch>

The Mobile Analyzer is a distributed computing platform for heterogeneous computer clusters. It can be used when there is a need to analyze vast amounts of data that is stored in a distributed fashion. The user provides Mobile Analyzer with Java classes that are executed remotely in servers, avoiding the need to transfer large amounts of data. Only the results and status information are sent back to client. Grid Security Infrastructure (GSI) is used for secure authentication and communication.

A problem with current Grid implementations is that they are difficult to install and maintain. This is mostly due to their large scope and generality, which implies complexity. Therefore, using the Grid is still far away from 'surfing' on the Web. Our partial solution is the Mobile Analyzer platform, which could be described as 'a light version of the Grid'. The installation of Mobile Analyzer does not need any special privileges and an ordinary user can install it in his/her own home directory. The Mobile Analyzer server needs to access only one TCP port.

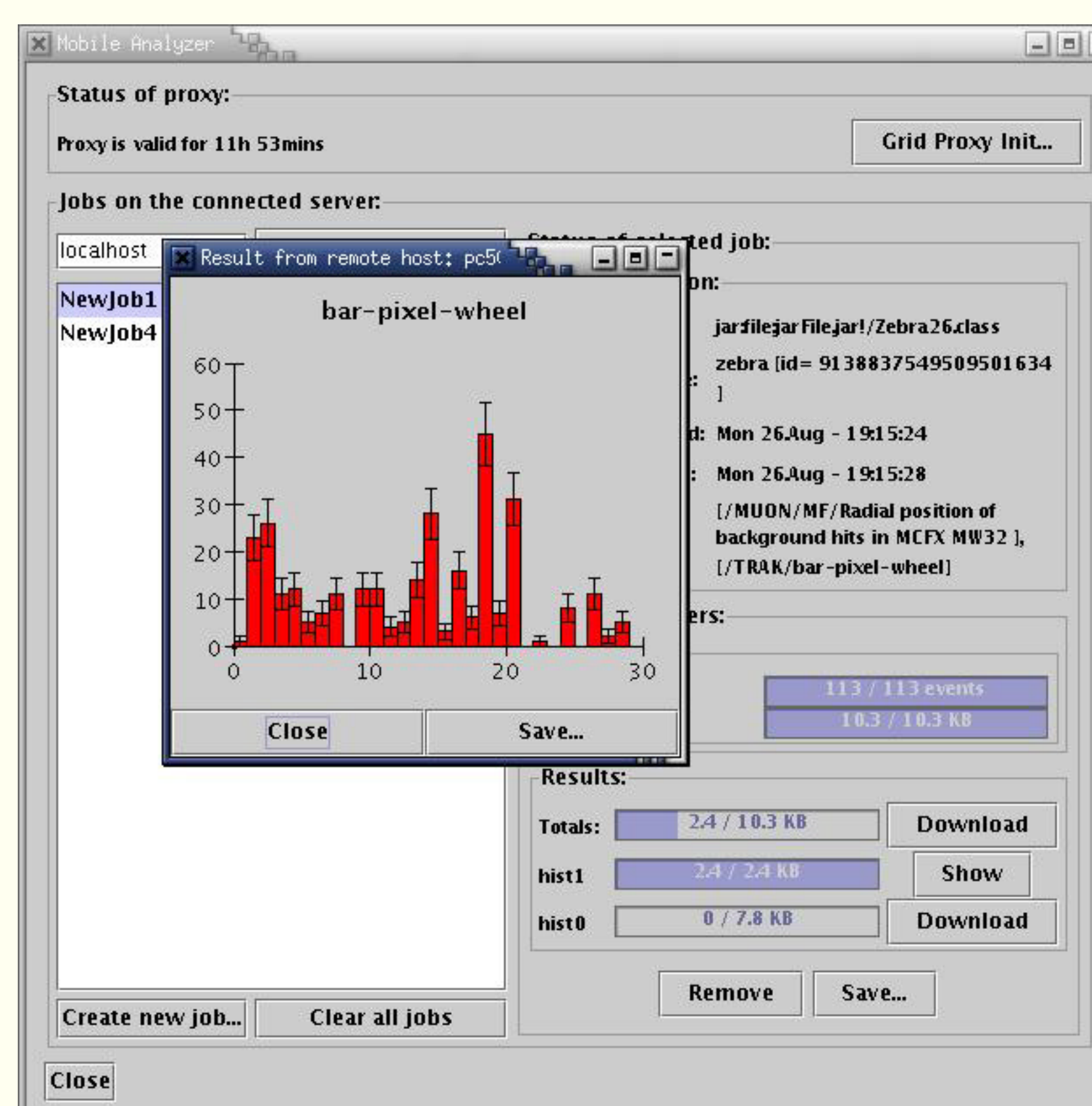
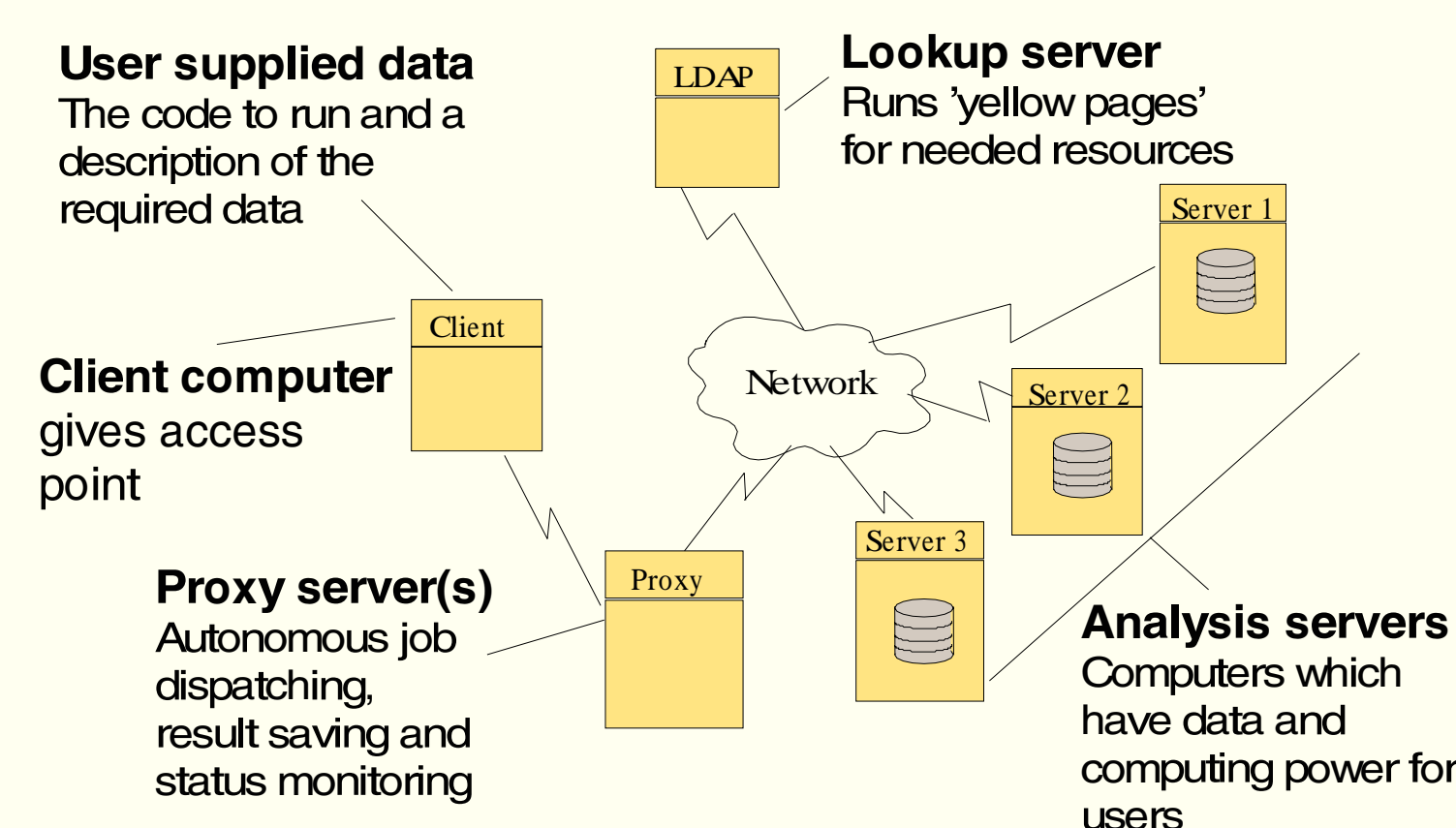
The most important advantages of Mobile Analyzer are the following:

- Being purely Java-based, it supports truly heterogeneous environments.
- Using GSI in user authentication increases security and enables intercommunication with other certificate based systems.
- Gains in computing power by distributing the jobs to multiple computers.
- Saves bandwidth because of no need to transfer large amounts of data.
- Enables easy and user friendly access to Grid services.

Mobile Analyzer is a centralized platform. The Proxy server serves the requests of clients and dispatches jobs to proper analysis servers using the information stored inside the lookup server. Analysis servers are just computing power and data storage for the jobs and they be easily multiplied. The client computer is an access point to the Mobile Analyzer network and does not perform any computation intensive tasks. This architecture allows usage of web clients and other thin clients such as PDA's and mobile phones.

## Example Execution Process

1. The client sends a job request to the proxy server with a Java Archive (JAR) package of all analysis code. The client can disconnect right after that, or stay connected and receive progress reports from the proxy server.
2. The proxy server contacts a lookup server, locates the data, and dispatches the job to the target computer(s).
3. The job is executed on the remote locations, and status messages are regularly sent to the proxy server. When the analysis is completed, the results are sent back to the proxy server where they are combined and stored.
4. The client can fetch the results from the proxy server at any time.



## Technical Overview

The GSI is implemented by using Java CoG Kit. Alternatively, SSL authentication and plain sockets can be used too. An XML based data format is used for communication through sockets. Further, Mobile Analyzer supports analysis tools offered by the Java Analysis Studio (JAS). The analysis code implements the JAS-style job interface. Therefore, existing JAS classes can be easily converted for distributed analysis. Finally, Mobile Analyzer uses a LDAP server to find the data locations and information on how to connect to the datasources.

The Mobile Analyzer server is basically a remote procedure call (RPC) framework with an ability to attach a mobile code inside it. When the server receives a job request, it loads the job class included in the JAR package and executes it. Afterwards the control is given to the code provided by the user and the actual analysis can begin. The user code can access many kinds of resources including processor power, files, and both local and remote databases. The code is run in a

'sandbox' offered by the Java Security Manager which controls the policies and resources available for users. All messages through the network are sent using XML messages processed by Sun's JAXP package.

**Mobile Analyzer is a new concept for distributed Grid computing based on the idea of mobile code. It has a simple and efficient Java implementation, which makes it easy both to install and use.**

**Our future plans include making two versions of the software. A single-user version can be installed in the user's home directory in a cluster environment. Instead, the server version is executed as a Tomcat servlet and it supports multiple simultaneous users.**