

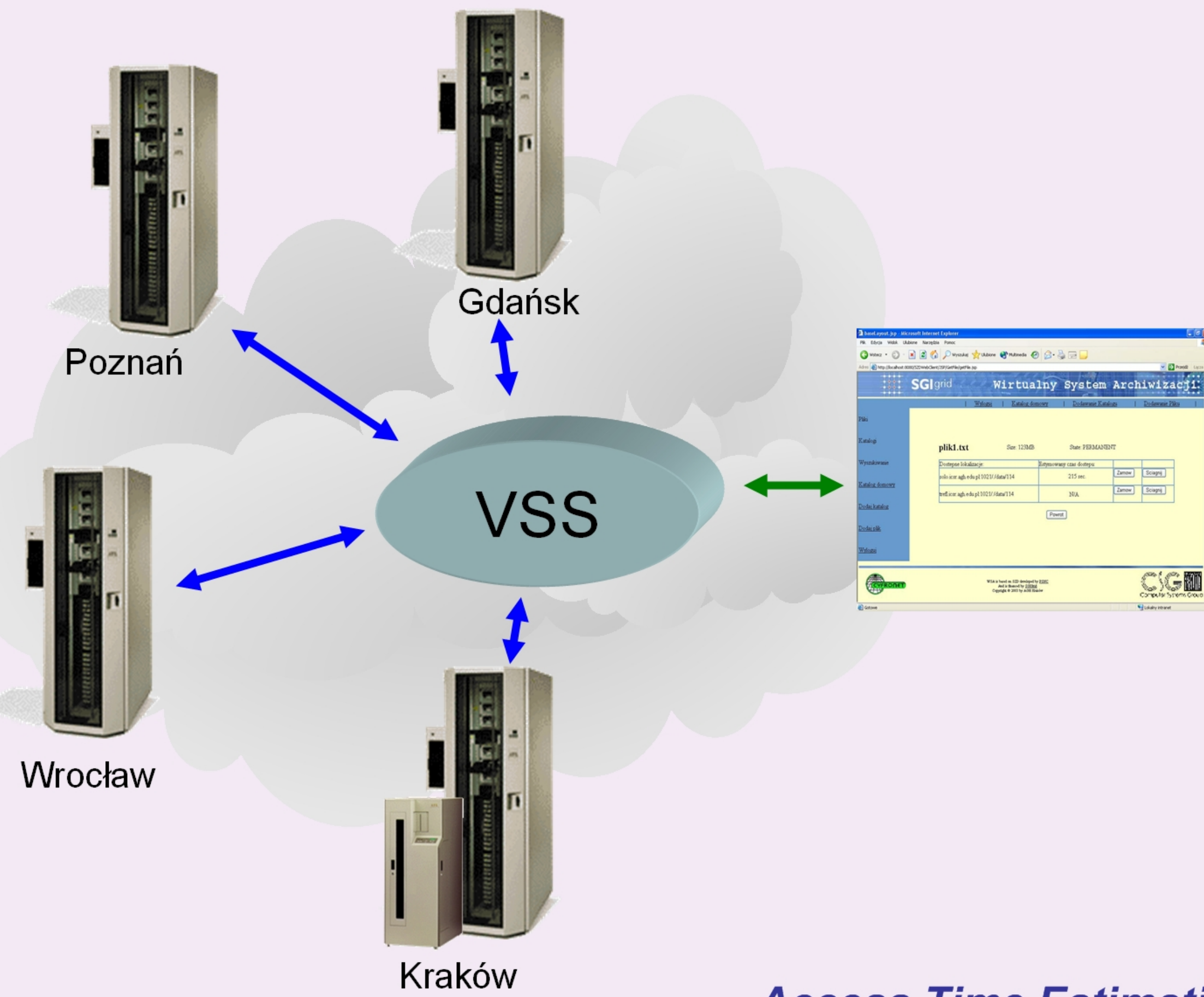
Data archivization aspects in SGI grid project [1] are addressed by Virtual Storage System (VSS) [2]. *Its main goal is to integrate storage resources distributed among computational centers into common system and to provide storage service for all SGI Grid applications.* VSS is based on DMS [3].

Extended functionalities of Virtual Storage System for grid

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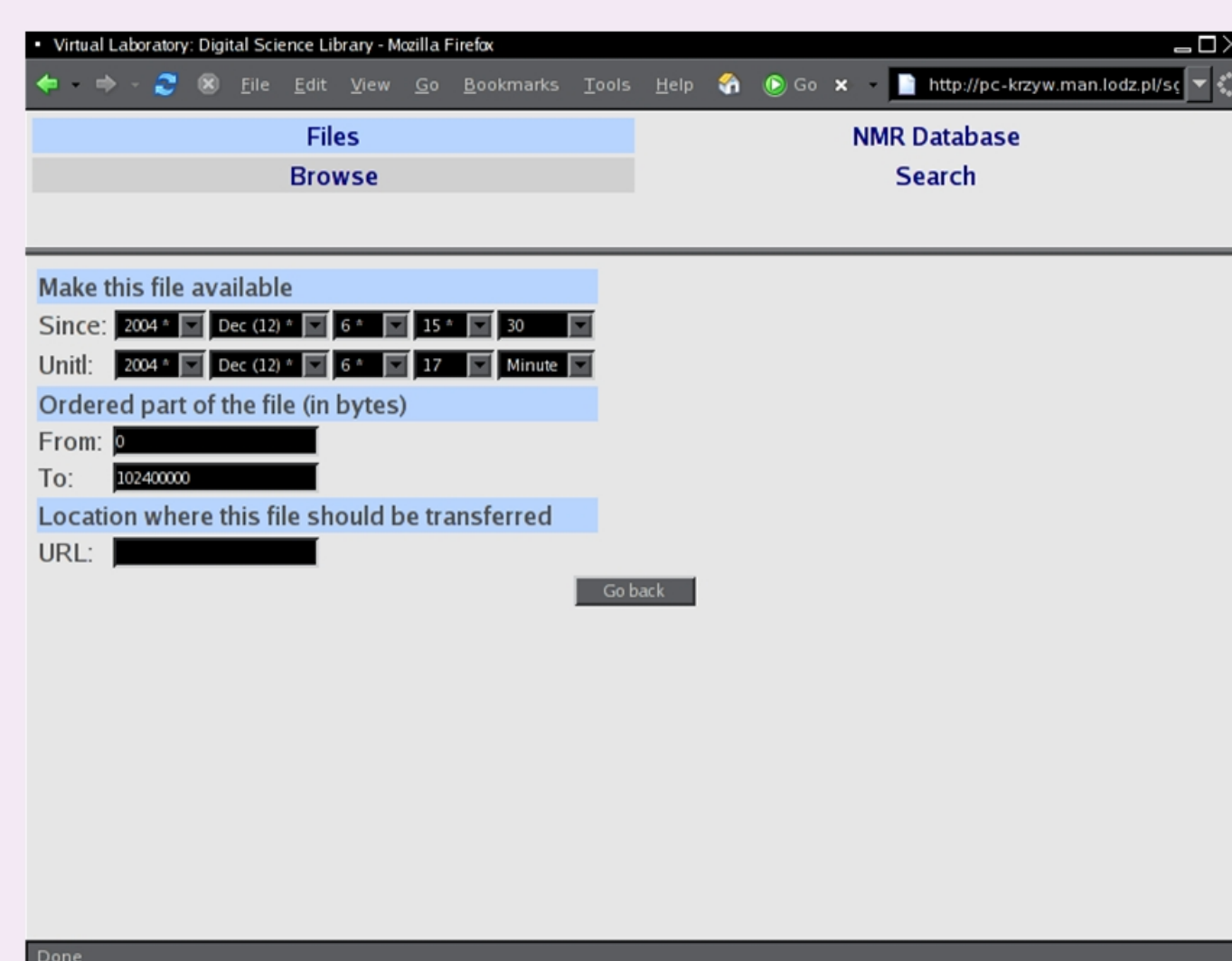


Archivization specific functionalities of VSS

- Access time estimation** Access time depends on storage resource type and state. VSS offers Access Time Estimation for HSM systems, which provide approximate access time to given file.
- File fragment access** User can have access to file fragments.
- File ordering** User can order file or file fragment, which means to inform VSS, when he will need to access the file. If file resides on tapes or other slow media, the system will copy it to cache, what will minimize access time to the file.
- Fast access to files**
 - By segmentation** Access to large files residing on tapes is accelerated by incorporating file fragmentation.
 - By automatic replication** Automatic replication has been implemented as a method of data access optimization.

Access Time Estimation for HSM systems

The access time estimation functionality is not available for direct running by an user. It is called when needed internally by the other modules. The administrator can call this functionality mainly for diagnostic purposes.



File Fragment Access

With this functionality user can access file fragments. It can be used when only part of the file is interesting for the user at the moment, so she can transfer it. Additionally less space will be needed at the user's workstation. This functionality is available for the user through all the user interfaces.

File Ordering

With this functionality the user can schedule a file or fragment to be ready for transfer. This functionality is available for the user through all the user interfaces.

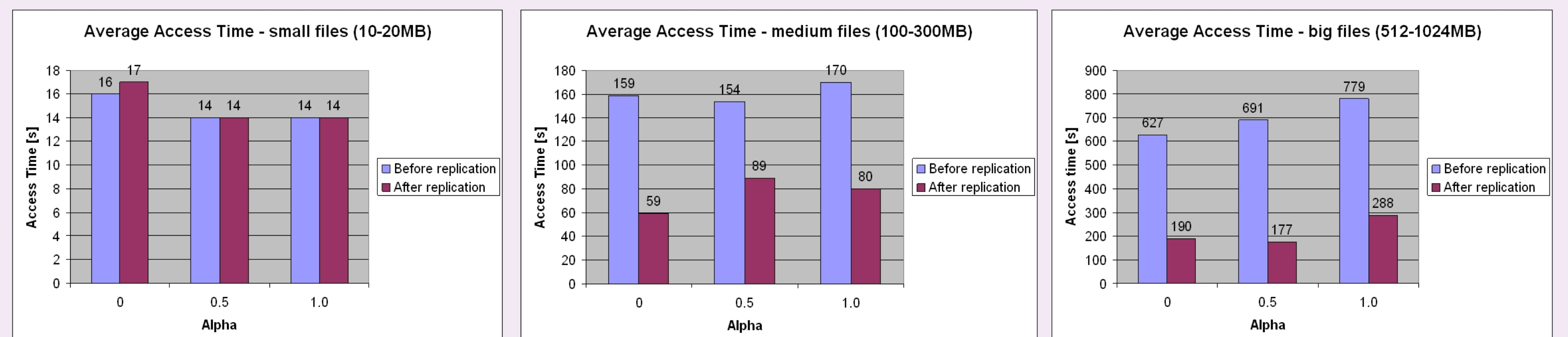
```

7) Get file's location for downloading
8) Delete file
9) Remove location
10) Get file info
11) Update file
12) Get file's containers
13) Remove file from container
14) Get file's locations w/ eta
15) Add file order
16) Update file order
17) Remove file order
18) Set Archived Attribute
19) Get Archived Attribute
20) Set Immediate Attribute
21) Get Immediate Attribute
22) Clear Archived/Immediate Attribute
0. quit, exit, bye - say goodbye to console

Enter command 14
Enter file
or to exit
Type exit
Resolved locations
1 - http://sguser:sggrid@5barka.wcss.wroc.pl:214603462895832172345_640 ETR: 0.0
2 - http://sguser:sggrid@4b-agnus.wcss.wroc.pl:214603462895832172345_640 ETR: 218.362
3 - http://octane_p_1ods.pl:214603462895832172345_640 ETR: 1.0
    
```

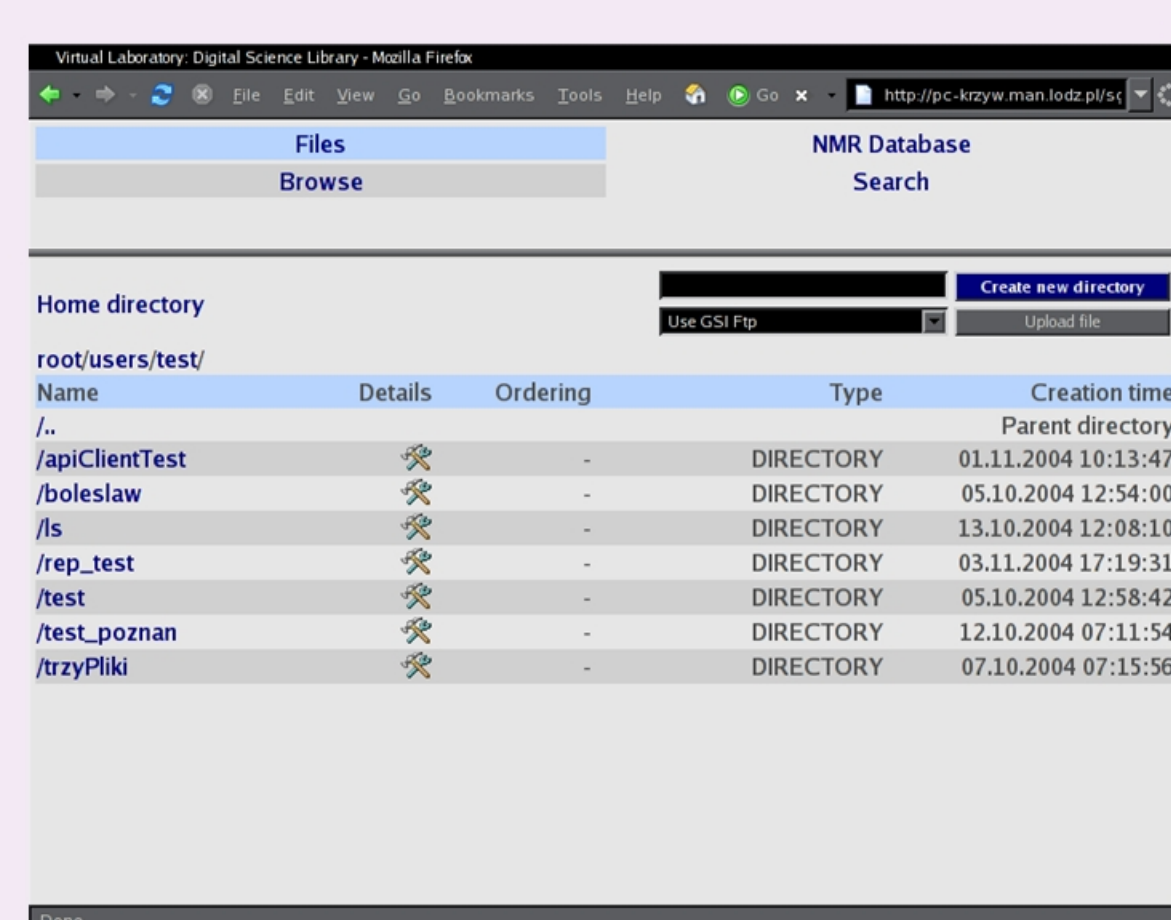
Fast Access to files

Segmentation and automatic replication are running in the background all the time and are not visible for the user. The user can realize that the segmentation and replication are working only indirectly by having smaller access times especially for large files.



User Interfaces of VSS

Web Portal



Web portal is VSS interface, which hides all system details and provide easy way of using VSS via web browser.

Text Console

```

ls
ls NAME TYPE OWNER DATE STATE SIZE
ls /apiClientTest DIRECTORY 2002 05.10.2004 02:58:42
ls /boleslaw DIRECTORY 2002 05.10.2004 12:54:00
ls /ib DIRECTORY 2002 03.11.2004 17:19:31
ls /rep_test DIRECTORY 2002 05.10.2004 12:58:42
ls /test DIRECTORY 2002 05.10.2004 07:11:54
ls /wyspk DIRECTORY 2002 07.01.2004 07:15:56
    
```

Text console is an interface for VSS developers, it provides more details then others interfaces. Text console is not intended to be used by end-users.

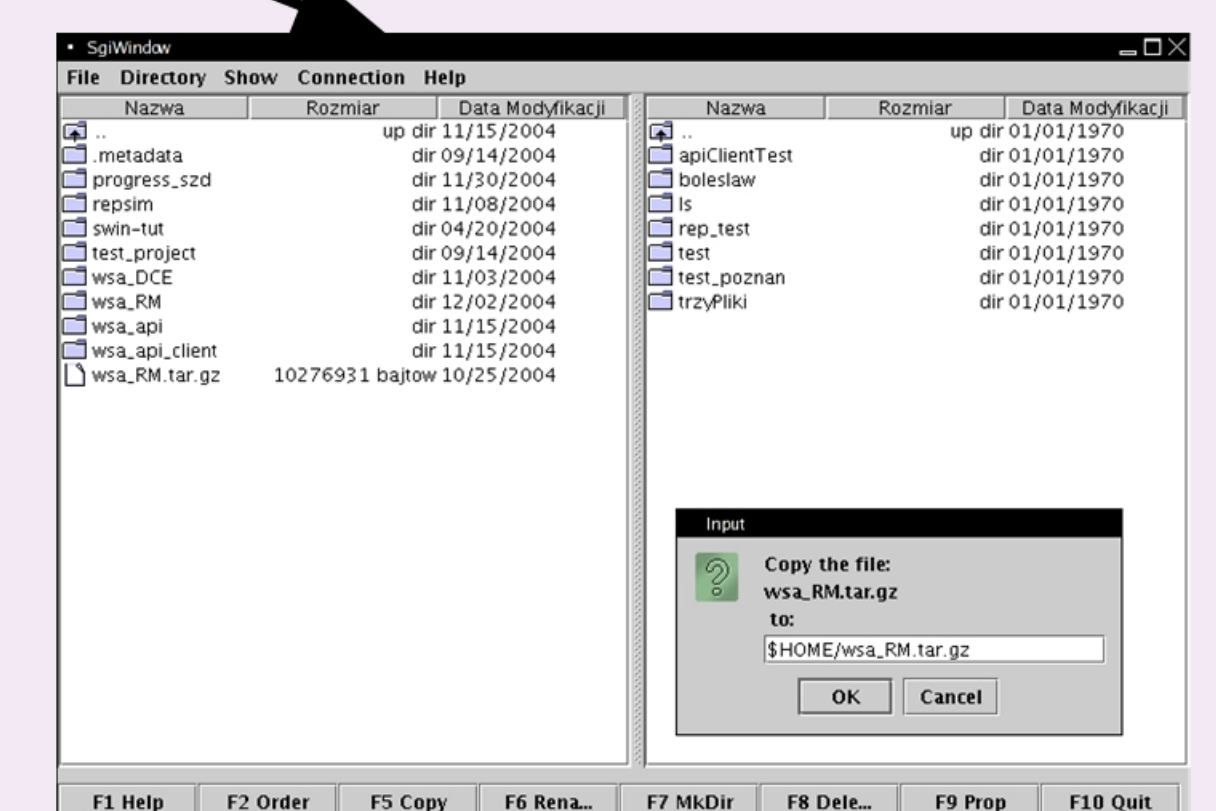
Java API

```

public void browseDirectory(Final RemoteFileElement e){
    VSSFile[] files=null;
    try{
        files=e.listFiles();
    }catch(Exception e){
        e.printStackTrace();
    }
    if(files==null) return;
    RemoteFileElement[] elements=new RemoteFileElement(files.length);
    for(int i=0;i<files.length;i++){
        elements[i]=new RemoteFileElement(files[i]);
    }
}
    
```

Java API is programmers interface, which allows easy VSS client applications development.

VSSCommander



VSSCommander is a Java application written using VSS Java API. VSSCommander offers access to VSS for advanced end-users

Bibliography

- [1] SGIgrid: Large-scale computing and visualization for virtual laboratory using SGI cluster (in Polish), KBN Project, <http://www.wcss.wroc.pl/pb/sgigrd/>.
- [2] Nikolow, D., Słota, R., Kitowski, J., Skitał, Ł., "Virtual Storage System for the Grid Environment", 4th Int. Conf. on Computational Science, Kraków, June 6-9, 2004, LNCS vol.3036, pp. 458-461, <http://www.cyfronet.krakow.pl/iccs2004/>
- [3] PROGRESS, <http://progress.man.poznan.pl>.