CS25610 / CSM5610 Worksheet 4 1999-00

Fred Long (edited by Dave Price)

March 25, 2000

1 Introduction

This worksheet is intended to provide an introduction to using the Java security mechanisms. You will need to consult your lecture notes and on-line resources linked from the course materials web site at

http://www.aber.ac.uk/~dcswww/Dept/Teaching/Courses/CS25610/

to complete this work.

In particular, you will no doubt choose to read the API description for the class SocketPermission in the Java 1.2 API platform specification.

2 Your Task

This worksheet asks you to run some Java programs, and then introduce the Java security mechanisms to first prevent the programs from running but then allow them to run with fine-grained access control.

For the purposes of this practical, start both the server and the client on the workstation at which you are sitting. It will be easier to see what is happening if you have one terminal window in which you are running the server and another in which you are running the client. Therefore, in what follows, interpret "client machine" to mean the window in which you are running the client and the phrase "server machine" to mean the window in which you are running the server.

Remember you will need to "kill" one copy of the server before you can start another one. Please make sure both the client and the server are killed before you log off.

2.1 Rerun Original Programs

Use the socket server and client developed for Worksheet 1 (if you didn't get your own client and/or server working, use Dave's example solution, now linked from the course materials web site in the "practicals" area).

Make sure that both the server and client work. This requires issuing a command like:

```
java PoemServer
```

on the server machine, and:

```
java GetPoem
```

on the client machine.

2.2 Introduce the Security Manager

NOTE: make sure you delete or rename any java policy file (named .java.policy) in your home directory so that it is not automatically used, thus spoiling the purposes of this practical.

Now try to run the server by giving the command:

```
java -Djava.security.manager PoemServer
```

on the server machine (and the same command as before on the client machine). Note what happens. Do this several times and, in particular, note the details of the permission that was denied.

2.3 Introduce a Policy File associated with the server

Produce a file, called "`accept.policy`" containing the single line:

```
grant {permission java.net.SocketPermission "<IP address>", "accept";};
```

where the <IP address> is obtained from the error message obtained in step 2. Do *not* include the port number (the number after the colon). **Why not?**

Now try to run the server by giving the command:

```
java -Djava.security.manager -Djava.security.policy=accept.policy PoemServer
```

on the server machine (and the same command as before on the client machine).

2.4 Introduce a Policy File associated with the client

Start the server as above with the security policy file, accept.policy, in use.

Now start the client also requesting that it uses a java.security.manager but do not specify a policy file. Note the errors that occur. Now create a policy file for the client, called client.policy. You should use your observation of the error messages, what you have learnt in creating accept.policy and the description of SocketPermission from the API to decide what to put in the policy file.

Rerun your client using the policy file, observe any new error messages and if necessary, further edit your policy file until the client runs successfully.

2.5 Introduce File Access

Now modify the server program "`PoemServer`" so that it reads the poems from a file or files. Run the program as in step 3 and observe the access control error that you get.

Modify the "`accept.policy`" file in order to overcome the access control error.

2.6 Java policytool

There is a software tool provided with the Java jdk to help you create and edit policy files. You might like to try to use this to create and edit your policy files.

You will need to alter your shell PATH variable to include the directory containing the policytool. The following command will do this for the bash shell.

```
PATH=/usr/local/lang/jdk/bin:$PATH
```

3 Effort Allocated to the Worksheet

You may not complete all of this worksheet in your two hour practical this week. You should expect to spend some "own time" work to complete the worksheet.

4 Assessment of this Worksheet

These worksheets for the modules CS25610 and CSM5610 are NOT assessed.

The worksheets and the demonstrated practicals are provided as part of the educational offering of the module. The examination questions for these modules may be based on material covered in practicals in addition to lecture material and background reading drawn to your attention by the lecturers or by links on the course materials web site.