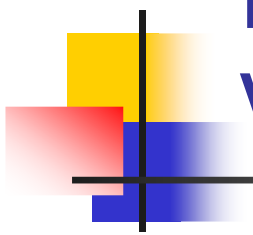

Distributed Programming – xmlrpc Virtual Identity

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  - Resources:
    - www.xmlrpc.com
    - Blackboard

Example for Passing Parameters Server

Two Parameters:
who and what

```
import org.apache.xmlrpc.*;

public class ChatServer {
 public String message(String who, String what) {
  System.out.println(who+" says: "+what);
  return "OK";
  }

 public static void main (String [] args) {
  try {
   WebServer server = new WebServer(80);
   server.addHandler("chat", new ChatServer());
   server.start();
  } catch (Exception exception) {
   System.err.println("JavaServer: " + exception);
   }
  }
 }
```

Passing Parameters - Client

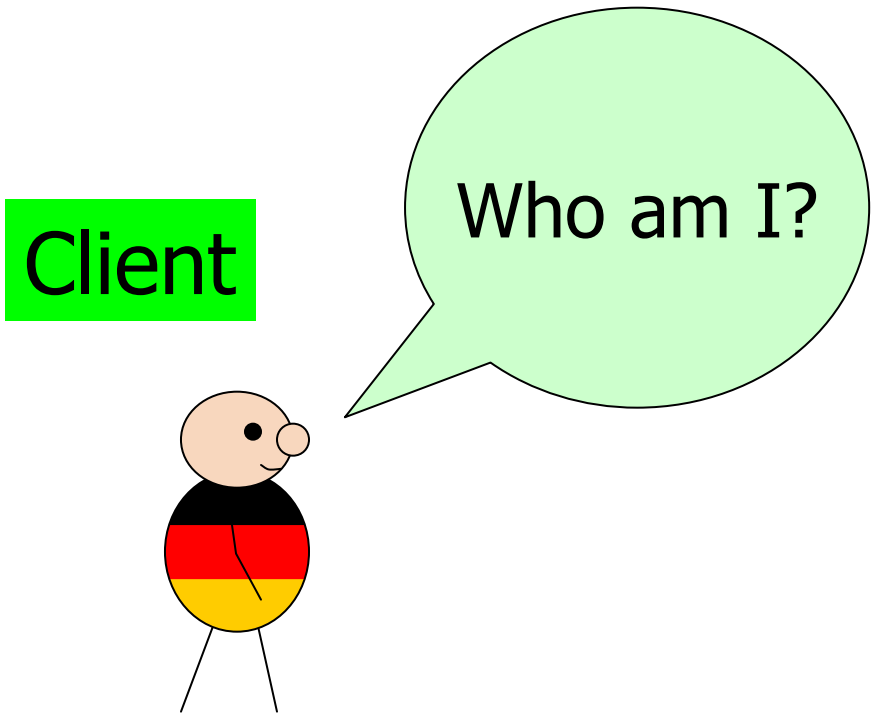
```
import java.util.*;
import org.apache.xmlrpc.*;

public class ChatClient {
 public static void main (String [] args) {
  try {
   XmlRpcClient server =
     new XmlRpcClient("http://localhost/RPC2");
   String msg = "Hello, how are you?";
   String who = "Marc";
   Vector params = new Vector();
   params.add(who);
   params.add(msg);
   Object result =
       server.execute("chat.message", params );
  } catch (Exception exception) {
   System.err.println("ChatClient: " + exception);
   }
 }
}
```

Two parameters:

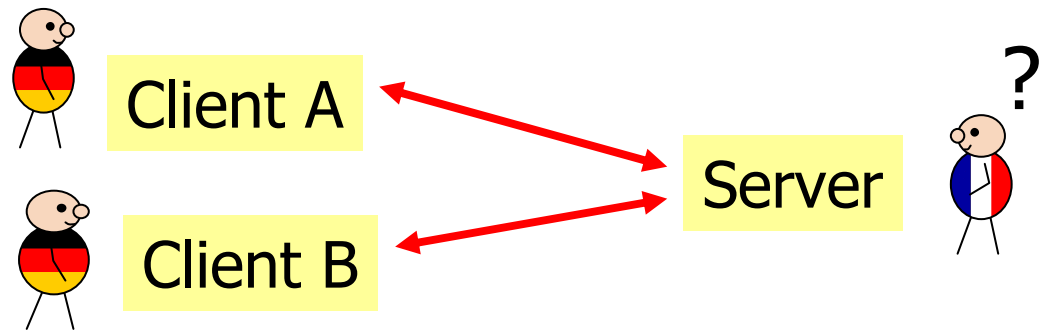
who and msg

Virtual Identity



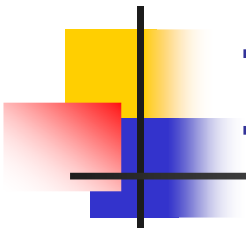
- Possible Answers:
  - Marc Conrad
  - The person you have met before
  - The person you want to listen to
  - 127.32.21.1
  - My DNA or thumb prints

Identity Problems, Identity Theft



- Problem 1:
  - *How can the Server distinguish messages from A and B?*
- Problem 2:
  - *How can the Server distinguish messages from A and B if client B maliciously wants to pretend A?*

Why we need "Virtual Identity"

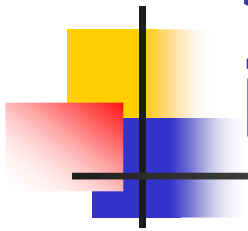


- The problem of assigning identity to clients is crucial in E-commerce applications, imagine:
  - An on-line banking server where every user could access any other user's data.
  - A virtual shopping basket where two users add items into the same basket.
- Also related: Adding state to a stateless RPC protocol.

Issues to consider when assigning virtual identity

- *Consider the following scenarios:*
  - *A* and *B* are using the same Computer to access a Web Service.
  - *A* uses different Computers (home/work) for their transactions.
  - One physical person wants to assume two roles, A and B (e.g. private/corporate), when doing transactions.
  - Usability! A or B do not want to type in the password every two minutes.

Strategies to approach the identity problem

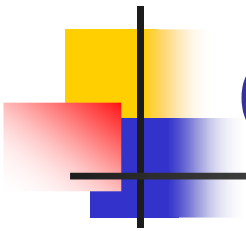


- A password that is transmitted by the client
- Cookies, that means small pieces of code stored at the client machine
- Use of the IP number of the client machine as identification
- Use of Transaction Numbers

Virtual Identity – Passwords

- A **Password** is a short sequence of characters that is matched against a data base on the Server. If the password is correct the user is identified.
- *Possible problems:*
  - Security and reliability depends on correct user behaviour
  - Usability issues: *Think for instance of a Service that provides an image of a Web Cam every couple of seconds. Here it is not feasible to enter a password manually every time.*

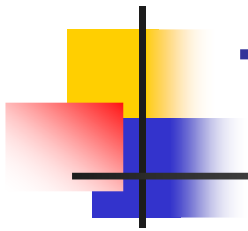
Virtual identity – Cookies



- **Cookies** are small pieces of text that are stored on the client's file system. Even when the Client is restarted the Server can identify the request as being related to previous requests.
- Session cookies are cookies that are not stored on the file system and expire when the client terminates.
- *Possible problems:*
  - Changes the file system on the client side.
  - Cookies can be hijacked.
  - Pointless if user uses different machines.

Virtual Identity – IP-Number

- The **IP-Number** can be used as a means to identify the Client machine.
- *Possible problems:*
  - The IP number can change, for instance when the client uses a dial-up connection with an Internet provider, the provider usually assigns a different IP number at very session.
  - It is also useless when the user uses different machines to connect to the Server.
  - Proxys can be used to hide the IP address.



Transaction Numbers

- A **Transaction Number** is a "use once, then throw away" password. The Service provider issues a list of numbers to the user (for instance on a piece of paper), that are used when the service is requested. If a number has been used once it must crossed out from the list and cannot be used any more.
- *Possible problems:*
  - In terms of usability transaction numbers are a nightmare.
  - Similarly to passwords the user has a responsibility to keep the numbers secret.