

Server Side

Készítsünk egy csoportos Chat vastag kliens alkalmazást. Alkalmazzuk a Java-RMI technológiát. Hozzunk létre két projektet az eclipse-ben a kliens és a szerver számára. Az alábbi interakciós diagramm bemutatja az elvi működést.

```
sequenceDiagram
    participant U as User
    participant UI as ChatUI
    participant CC as ChatClient
    participant CS as ChatServer
    participant IC as IChatClient
    participant IS as IChatServer
    U->>UI: Starts Application
    UI->>CC: Creates ChatClient
    CC->>IS: Tries to connect
    IS->>CS: Login request
    CS->>IC: Checks if client can connect
    IC->>CC: Connection successful
    CC->>UI: Update UI (Connected)
    UI->>U: Show connected status
    U->>UI: Enter message
    UI->>CC: Send message
    CC->>IS: Publish message
    IS->>CS: Publish message to all clients
    CS->>IC: Iterate over clients
    IC->>CC: Display message
    CC->>UI: Update UI with new message
    UI->>U: Show new message
    U->>UI: Disconnect
    UI->>CC: Disconnect from server
    CC->>IS: Logout request
    IS->>CS: Remove client from list
    CS->>IC: Update client list
    IC->>CC: Acknowledge disconnect
    CC->>UI: Update UI (Disconnected)
    UI->>U: Show disconnected status
```

Készíthetünk egy másik diagrammot is a működés bemutatására:

- **ChatUI** a felhasználói interfész, amely közvetlenül kommunikál a ChatClient-tel.
- **ChatClient** a kliens oldali logika, amely megvalósítja az IChatClient interfészt.
- **Java RMI Registry** a szolgáltatások nevének feloldására szolgál, amit a ChatClient használ a IChatServer interfész elérésére.
- **IChatServer** az interfész, amelyen keresztül a ChatClient kommunikál a ChatServer-rel.
- **ChatServer** a szerver oldali logika, amely megvalósítja az IChatServer interfészt.
- **Client List** a csatlakoztatott kliensek listája a szerveren.
- **User Interface** ábrázolja a felhasználói felület komponenseit, amelyek interakcióban állnak a felhasználóval.

E z a diagram bemutatja a rendszer összetevőinek kapcsolódási és kommunikációs struktúráját, beleértve a kliens és szerver közötti interakciókat.

```
graph TD
    A[ChatUI] --> B[ChatClient]
    B --> C[Java RMI Registry]
    B -->|lookup| D[IChatServer]
    D --> E[ChatServer]
    E --> F[IChatClient]
    F --> B
    D -. -> G[Client List]
    E --> G
    A -. -> H[User Interface]
    H --> A
    C -. ->|registers| E
    style A fill:#f9f,stroke:#333,stroke-width:4px
    style B fill:#bbf,stroke:#f66,stroke-width:2px,stroke-dasharray: 5, 5
    style C fill:#fea,stroke:#333,stroke-width:2px
    style D fill:#bbf,stroke:#f66,stroke-width:2px,stroke-dasharray: 5, 5
    style E fill:#f99,stroke:#333,stroke-width:4px
    style F fill:#bbf,stroke:#f66,stroke-width:2px,stroke-dasharray: 5, 5
    style G fill:#dff,stroke:#333,stroke-width:2px
    style H fill:#fff,stroke:#333,stroke-width:2px
```

Project 1: ChatServer

1.) IChatClient

```
import java.rmi.Remote;
import java.rmi.RemoteException;
public interface IChatClient extends Remote {
    public void tell(String name) throws RemoteException;
```

```
    public String getName() throws RemoteException;
}
```

2.) IChatServer

```
import java.rmi.Remote;
import java.rmi.RemoteException;
import java.util.ArrayList;
public interface IChatServer extends Remote {
    public boolean login(IChatClient client) throws RemoteException;
    public void publish(String s) throws RemoteException;
    public ArrayList<IChatClient> getConnected() throws RemoteException;
}
```

3.) ChatServer

```
import java.rmi.RemoteException;
import java.rmi.server.UnicastRemoteObject;
import java.util.ArrayList;
public class ChatServer extends UnicastRemoteObject implements IChatServer
{
    private static final long serialVersionUID = 4705993250126188735L;
    private ArrayList<IChatClient> v = new ArrayList<IChatClient>();
    public ChatServer() throws RemoteException {
    }
    public boolean login(IChatClient client) throws RemoteException {
        System.out.println(client.getName() + " got connected....");
        client.tell("client connected");
        publish(client.getName() + " connected.");
        v.add(client);
        return true;
    }
    public void publish(String s) throws RemoteException {
        System.out.println(s);
        for (int i = 0; i < v.size(); i++) {
            try {
                IChatClient tmp = (IChatClient) v.get(i);
                tmp.tell(s);
            } catch (Exception e) {
                e.printStackTrace();
            }
        }
    }
    public ArrayList<IChatClient> getConnected() throws RemoteException {
        return v;
    }
}
```

4.) StartServer

```
import java.rmi.Naming;
public class StartServer {
    public static void main(String[] args) {
        try {
            // System.setSecurityManager(new RMISecurityManager());
            java.rmi.registry.LocateRegistry.createRegistry(1099);
            IChatServer server = new ChatServer();
            Naming.rebind("rmi://localhost:1099/chatserver", server);
            System.out.println("server ready.");
        } catch (Exception e) {
            e.printStackTrace();
        }
    }
}
```

Client Side

Project 2: ChatClient

1.) ChatClient

```
import java.rmi.RemoteException;
import java.rmi.server.UnicastRemoteObject;
public class ChatClient extends UnicastRemoteObject implements IChatClient
{
    private String name;
    private ChatUI ui;
    public ChatClient(String n) throws RemoteException {
        name = n;
    }
    public void tell(String st) throws RemoteException {
        System.out.println(st);
        ui.writeMsg(st);
    }
    public String getName() throws RemoteException {
        return name;
    }
    public void setGUI(ChatUI t) {
        ui = t;
    }
}
```

2.) ChatUI

```
import java.awt.BorderLayout;
import java.awt.GridLayout;
import java.awt.event.ActionEvent;
import java.awt.event.ActionListener;
import java.rmi.Naming;
import java.util.ArrayList;
import javax.swing.DefaultListModel;
import javax.swing.JButton;
import javax.swing.JFrame;
import javax.swing.JLabel;
import javax.swing.JList;
import javax.swing.JOptionPane;
import javax.swing.JPanel;
import javax.swing.JScrollPane;
import javax.swing.JTextArea;
import javax.swing.JTextField;
import javax.swing.border.EmptyBorder;
public class ChatUI {
    private ChatClient client;
    private IChatServer server;
    public void doConnect() {
        if (connect.getText().equals("Connect")) {
            if (name.getText().length() < 2) {
                JOptionPane
                    .showMessageDialog(frame, "You need to type a
name.");
                return;
            }
            if (ip.getText().length() < 2) {
                JOptionPane.showMessageDialog(frame, "You need to type an
IP.");
                return;
            }
            try {
                client = new ChatClient(name.getText());
                client.setGUI(this);
                server = (IChatServer)
Naming.lookup("rmi://localhost/chatserver");
                server.login(client);
                updateUserList(server.getConnectionList());
                connect.setText("Disconnect");
            } catch (Exception e) {
                e.printStackTrace();
                JOptionPane.showMessageDialog(frame,
                    "ERROR, we wouldn't connect....");
            }
        } else {
            updateUserList(null);
            connect.setText("Connect");
        }
    }
}
```

```
    }
    public void sendText() {
        if (connect.getText().equals("Connect")) {
            JOptionPane.showMessageDialog(frame, "You need to connect
first.");
            return;
        }
        String st = tf.getText();
        st = "[" + name.getText() + "] " + st;
        tf.setText("");
        // Remove if you are going to implement for remote invocation
        try {
            server.publish(st);
        } catch (Exception e) {
            e.printStackTrace();
        }
    }
    public void writeMsg(String st) {
        tx.setText(tx.getText() + "\n" + st);
    }
    public void updateUserList(ArrayList<IChatClient> users) {
        DefaultListModel<String> listModel = new
DefaultListModel<String>();
        if (users != null)
            for (int i = 0; i < users.size(); i++) {
                try {
                    String tmp = ((IChatClient) users.get(i)).getName();
                    listModel.addElement(tmp);
                } catch (Exception e) {
                    e.printStackTrace();
                }
            }
        list.setModel(listModel);
    }
    public static void main(String[] args) {
        System.out.println("Hello World !");
        ChatUI c = new ChatUI();
    }
    // User Interface code.
    public ChatUI() {
        frame = new JFrame("Group Chat");
        JPanel main = new JPanel();
        JPanel top = new JPanel();
        JPanel cn = new JPanel();
        JPanel bottom = new JPanel();
        ip = new JTextField();
        tf = new JTextField();
        name = new JTextField();
        tx = new JTextArea();
        connect = new JButton("Connect");
        JButton bt = new JButton("Send");
    }
}
```

```
list = new JList();
main.setLayout(new BorderLayout(5, 5));
top.setLayout(new GridLayout(1, 0, 5, 5));
cn.setLayout(new BorderLayout(5, 5));
bottom.setLayout(new BorderLayout(5, 5));
top.add(new JLabel("Your name: "));
top.add(name);
top.add(new JLabel("Server Address: "));
top.add(ip);
top.add(connect);
cn.add(new JScrollPane(tx), BorderLayout.CENTER);
cn.add(list, BorderLayout.EAST);
bottom.add(tf, BorderLayout.CENTER);
bottom.add(bt, BorderLayout.EAST);
main.add(top, BorderLayout.NORTH);
main.add(cn, BorderLayout.CENTER);
main.add(bottom, BorderLayout.SOUTH);
main.setBorder(new EmptyBorder(10, 10, 10, 10));
// Events
connect.addActionListener(new ActionListener() {
    public void actionPerformed(ActionEvent e) {
        doConnect();
    }
});
bt.addActionListener(new ActionListener() {
    public void actionPerformed(ActionEvent e) {
        sendText();
    }
});
tf.addActionListener(new ActionListener() {
    public void actionPerformed(ActionEvent e) {
        sendText();
    }
});
frame.setContentPane(main);
frame.setSize(600, 600);
frame.setVisible(true);
}
JTextArea tx;
JTextField tf, ip, name;
JButton connect;
JList list;
JFrame frame;
}
```

Feladat 1.: implementáljuk, hogy új kliensek belépése esetén, a régiek megkapják a teljes felhasználó listát.

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