Client server made easy
with the Socket Messaging library for Delphi

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Agenda

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Foreword

This presentation is available on GitHub with links, comments and samples source code. Look at https://vasur.fr/cb2023pres after the conference.

I use "VaSur" URL shortener on the slides. Full links are available on the GitHub repository.

Foreword

If you have questions during the presentation, please ask them on the chat window. I'll answer there.

After the presentation or if you see it as a replay video, please leave me a message on Developpez (FR) or Delphi Praxis (EN) forums.

What is a (network) socket ?

- A socket is a lower level API to communicate between programs over an IP network.
- It opens a port on an IP address
  - with read / write access
  - with a transport mode (TCP or UDP)
- All client/server on a local IP network or on the internet communicate thru sockets (even your browser).

Wikipedia "network sockets" page : https://vasur.fr/wikisocket

How to use a socket in Delphi ?

- We can use a lot of open source or commercial libraries and components : Internet Direct (Indy), Internet Components Suite (ICS from Overbyte), etc ...

- We can use the native multi platform socket class included in recent Delphi releases from System.Net.Socket unit.

System.Net.Socket documentation : https://vasur.fr/socketunit

Basic client/server over a TCP/IP network

- The server creates a socket on an IP:port and listen on it. It waits for new connected clients.

- The client creates a socket on the server IP:port and connect to it.

- The server receives a connection demand which creates a new socket on a different port to exchange messages with the client.

Basic client/server over a TCP/IP network

- Server and client wait on connected sockets to send/receive messages

- We need to use a thread for each socket so as not to block the operation of the program or the user.

Sample project : https://vasur.fr/cb2023socket

What is the Socket Messaging library for Delphi ?

- For the Kenney Jam 2023 I wanted to create a multi player game and needed a client/server system.
- As usual, I started from scratch and implemented it from start to finish, but it took a lot of time coding and debugging. I used shared RECORDs for the data exchanged, which had side effects compared with what I wanted to achieve.
- After the game jam, I thought about optimizing what I'd coded and simplifying the code so that I could use it elsewhere much more quickly. The result was the Socket Messaging library.

What is the Socket Messaging library for Delphi ?

- The library is an open source project available at https://vasur.fr/cb2023smlib

- It's a Delphi unit for all Delphi projects types (VCL, FMX, console, …) and it uses classes instead of RECORDs.

- I decided to use the TSocket class from Embarcadero to limit external dependencies.

Basic client/server with the library

- The client and the server exchange texts and numeric values.

- All the code has been written by hand (and it's still too much code in my opinion).

Sample project : https://vasur.fr/cb2023css

How to use the SM Code Generator ?

- Writing a message class is simple.

- Writing 2 messages classes is a copy/paste operation from the first one.

- Writing 100 messages is a stupid idea when it's practically copy/paste and not really maintainable !

How to use the SM Code Generator ?

- To write less code each time, I've written a lot of code one time.

- Now I have a code generator with a simple user interface.

- It's an open source project available on GitHub.

- Download the compiled program from https://vasur.fr/smcg

Coding a simple chat program from scratch

- Think at your user interface and your data model.

- Think at what data is needed for each program when speaking to others.

- Use SM Code Generator to define your messages.

- Export the messages unit from SM Code Generator

Coding a simple chat program from scratch

- Import the Socket Messaging library and the generated unit in your projects.

- Create an instance of the client class on each clients and the server class on the server.

- Implements the onReceiveXXX events
  (beware of synchronizing events code with your primary thread)

Coding a simple chat program from scratch

- Run your program and enjoy coding with low code !

Sample project : https://vasur.fr/cb2023chat

Coding a real time multiplayer game

You want to code a real time multiplayer game ?

It's not really different than the previous sample. Except for the user interface !

Coding a real time multiplayer game

- Define the data to exchange

- Generate your units with SM Code Generator

- Code your game client program (UI + local data cache)

- Code your server program (no UI, only the global game database, receiving actions from users, sending a user action to all others)

Sample project : https://vasur.fr/cb2023game