Practical Course "Simulative Evaluation of Internet Protocol Functions"

Setup Instructions[1]

Working with the WebIDE

You can use our WebIDE to solve the tasks of our practical course. You will be able to use an Integrated Development Environment (IDE) inside your browser which is based on Visual Studio Code. Access to a desktop environment is made possible through VNC.

Initial Setup

1. Open `https://webide.prakinf.tu-ilmenau.de` in a browser of your choosing and log in using the credentials for your university account. Your password will not be transmitted to the WebIDE.
2. First, you need to get access to the ProtSim container. Use the so called container token found in the Moodle course to add the container. This only needs to be done once.
3. You will now see a new entry for our ProtSim container. Use the `Start`-Button on the right side and wait for a moment. After the container has started, press the `Open IDE` button to access the IDE.
4. The required files will only be stored in the read-only `/referenceCode` when you start the container for the first time. To gain write access, copy all files to your `projectCode` folder. Everything stored inside the `projectCode` folder will be stored in persistant way, so restarting the container does not delete your progress. You can use the command line to copy the folder. Open a terminal by opening the menu in the upper left corner and select `Terminal` ⇒ `New Terminal`. You will be asked for your preferred working directory. We recommend to always choose the projectCode directory. However, for the initial setup the working directory does not matter. Run the following command in the newly opened shell:
   - `cp -r /referenceCode/code/ /home/student/projectCode/protsim`
   - This command copies the `code` folder found in the `referenceCode` directory to your `projectCode` folder and renames it to `protsim`.
5. For the IDE to work correctly, you now need to compile all projects once. You can do this by running the following command in the shell:
   - `/home/student/projectCode/protsim/buildAll.sh`
   - Running this command for the first time will take a bit of time, however running this command is also only necessary for the initial setup. Errors during this process can be ignored, because some projects require changes from you before compiling completely. After the execution of the command has finished, the initial setup is complete.

[1] Version: October 12, 2023

General usage explained with project protsim01

1. Open the folder `projectCode/protsim/protsim01` in the IDE. To do this the right way, open the menu in the upper left corner and select `File` ⇒ `Open Folder`. Afterwards, navigate to the folder and press OK.
2. Now open a terminal as explained in the initial setup and run the following command:
   - `./run.sh`
3. The project will start with a graphical interface. To access it you need to use VNC. To do that, go to the container overview and press the `VNC` button. You should now see a working desktop with the running OMNeT simulation environment.
4. You can also press `F5` to start a debug session.

Additional information

1. Please stop your container after working on the tasks by using the `Stop`-Button inside the container overview. You will not be able to stop the container by using VNC.
2. The container will automatically be stopped two hours after you last requested a link to the VNC view or IDE view. To prevent this, you can reopen either the VNC or WebIDE window it using the container overview. Reopening VNC will not affect running applications inside the VNC session.
3. The container does not have access to the internet. Firefox can be used to view local html files (for example locally generated code documentation).
4. The folder containing the projects is also a local git repository. This allows you to track all your changes inside the WebIDE.
5. You can also create debug builds or builds with address sanitizer by setting the MODE environment variable accordingly before running `./build.sh` and `./run.sh`. To set the environment variable, use `export MODE=debug` or `export MODE=sanitize`.

Local installation

The following section includes a manual that explains how to install OMNeT++ and course related files locally on a linux system (preferably Debian/Ubuntu). The required files are distributed as a zip archive found in the related moodle course.

Manual

1. Unpack the zip archive to a directory of your choosing. During this manual, we assume that the main folder is called `protsim`.
2. Open a terminal and change the working directory to the root of the `protsim` folder by using `cd`.
3. Install the OMNeT++ related dependencies (You will need administrative rights on your machine to do that. In our labs everything is prepared correctly, continue with the next step):
   - Ubuntu (and similar):
     - `cd protsim/binaries`
     - `./requiredPackets.sh`
   - Other distributions: Install the packets (or equivalent):
     - `build-essential gcc g++ gdb bison flex perl python python3 qt5-default libqt5opengl5-dev tcl-dev tk-dev libxml2-dev zlib1g-dev default-jre doxygen graphviz libwebkitgtk-1.0 moreutils gnuplot wget`
4. OMNeT++ Installation
   - Move into the folder containing the OMNeT++ sources (`cd protsim/binaries`)
   - Execute the installation script `./localInstall.sh` (This will install OMNeT++ into the folder `protsim/binaries/omnetpp`)
5. Now, you can compile and simulate the tasks by moving into the respective directory `protsim/protsim??` and execute the following scripts, to...
   - `./build.sh` ...compile the task (`MODE=debug ./build.sh` for use with `gdb`), and
   - `./run.sh` ...run the simulation (or debug: `MODE=debug ./run.sh`).
6. In order to solve the practical tasks, you may use the OMNeT IDE (`protsim/binaries/omnetpp/bin/omnetpp` or desktop shortcut)
   - do *not* install `INET` when asked!
   - the projects can be imported through the menu `File` → `Import` → `General` → `Existing Projects into Workspace` (`root directory: protsim??`)

7. Or you can generate a QTCreator project with the script `./updateQtProject.sh` in the corresponding protsim directory
8. The API documentation can be build with the command `doxygen` when you are in a `protsim??/doc` folder. Afterwards, the documentation (`protsim??/doc/api/index.html`) can be viewed with any browser. Note that message classes are generated during compilation of the project. Consequently, you have to compile the project once before building the API documentation (otherwise message classes will be missing from documentation).

Hint: Maybe you will have to change the executable flag of the concerning script, by `chmod +x <scriptname.sh>`. The run scripts `run.sh` and `runCmd.sh` accept further parameters that you will learn to use in the seminar.