

Getting started with 3GEP project

This document is intended to give you a quick, step-by-step introduction to the project development and emulation environment. It covers three main steps:

- i) Downloading the template and starting the development environment.
- ii) Compiling the code.
- iii) Running the programs.

Downloading the template and starting the development environment

1. Navigate to the course homepage.
2. Click on the link *Project Code Template*. This will initiate a download of an archive file called *student-sms-tftp-code.zip*.
3. Unpack the file you have downloaded, rename the unpacked folder according to your group name e.g., *3gep_grX*, and move it to your working directory. Further in this quick reference we will assume that by now you have the project files placed in *\my_working_folder\3gep_grX*. Note that NO part of the path to the project files may contain spaces. Thus it is, for example, NOT POSSIBLE to have the project folder on the desktop!
4. Under your project folder *3gep_grX* you will find two subfolders, namely *html* and *UE*. Open the *UE* subfolder.
5. Under the *UE* subfolder you will find a file called *3gstack*. Open this file by double-clicking on it.
6. This will open the SDL development environment called *SDT*, and load the program template into it. The *SDT* project *Organizer* window will be shown.
7. In the *Organizer* window double-click on an octagon symbol with the tag *RRC process*. This will bring you to the template of the code that you will be working with in the course of the project. You should recognize that this is the same code as the one included in the *Emulation Environment* file from the project documentation. The code is shown now in the editor window.
8. The code in the project template files can be compiled and run in the form as it is now. It performs the basic communication functions, such as receiving and processing paging and establishing connection with UTRAN. It does not, however, include implementation of any service, e.g., SMS. This is where you will contribute!

Compiling

9. In order to compile the project, shift to the *Organizer* window of *SDT* and select the box named *threegstack* by clicking on it once.
10. In the menu select *Generate* → *Targeting Expert*.
11. Close the “Welcome” information window if it appears.
12. Press *Full Make* button at the bottom of the *Targeting Expert* window.
13. Ignore the possible warnings in the output pane of the *Targeting Expert* window.
14. Wait until you see the message “*Compile and link completed*” in the output pane of the *Targeting Expert* window.
15. By now the 3gep SDL template code has been compiled and saved as an executable file *component_apc.exe*, which is located in

`\my_working_folder\3gep_grX\UE\Target\threestack._0\Application_CA\`.
This file represents the protocol stack on UE.

16. Now you are ready to run and test the compiled code.

Running

17. In order to emulate all the 3g network, you will need to start three other programs apart from the UE code that you have compiled. You will find these programs under `C:\Program Files\3gep\`.
18. Start base station program by double-clicking on file `C:\Program Files\3gep\basestation\BaseStation1.exe`. Answer OK to possible warning messages. Window of this program can be minimized since we will not need to interact with it. However, it has to be running while testing.
19. Start UE client program by double-clicking on file `C:\Program Files\3gep\client\ClientApplication.exe`.
20. Start UTRAN program by double-clicking on file `C:\Program Files\3gep\utran\utran.exe`.
21. Start your compiled code (implementing UE protocol stack) by double-clicking on file `component_apc.exe`. See item 15 above for the location of the file.
22. You should now see the information about *Paging* messages in the *utran* and *component_apc* console windows.
23. In the UE client window press *YES* button on the picture of the mobile phone to turn on the power.
24. You will see in the *utran* and *component_apc* console windows that the connection establishment messages are exchanged. At the end of the establishment procedure, a message "*RRC Connection Established*" will appear both in *component_apc* console window, and in client UE window. This message indicates that the initial channels between UTRAN and UE have been established, and the system is now ready for further communication.
25. After you have implemented the SMS service at the end of this project you will be able to test it by clicking on *SMS* button in the client UE window. However, at this point no services are implemented so the only thing you can do is to turn off the phone by clicking on the *NO* button in the picture of the mobile phone in the client UE window.
26. In the pop-up window, answer *YES* to the "*Shut down power?*" question.
27. Looking at the *utran* and *component_apc* console windows you will see that the initial channels that have been established on UTRAN and UE are now released. At the end of this process the system is back to the paging stage. So we are essentially back to the point where we were when first entered item 22 of this list.