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DL NGL

NEXT GENERATION LABS

DL WORKSPACE

Dital work einvironment for study and experimentation in the DL NGL Laboratory

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Introduction

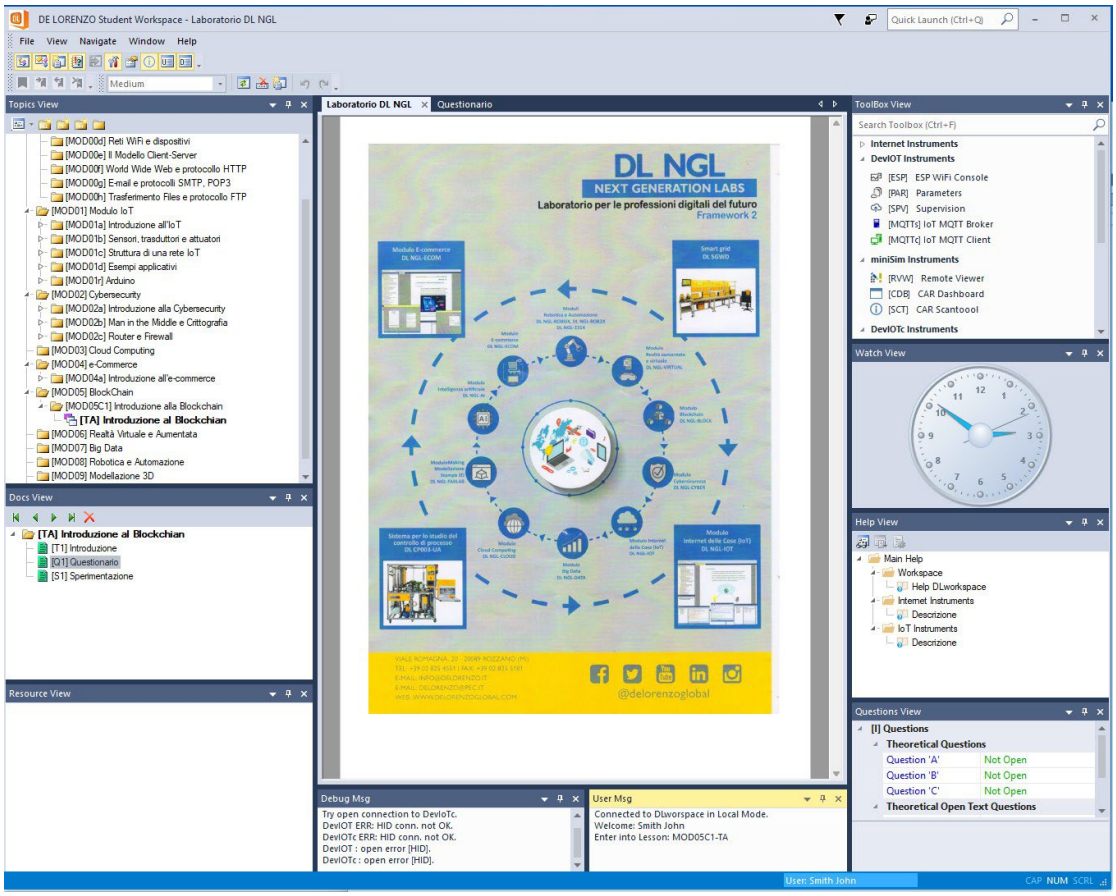
DL WORKSPACE is a Windows application that provides an integrated work environment for the "Next Generation Lab", i.e., the teaching laboratory in which male and female students can develop specific digital skills in the various advanced technological fields for their preparation for the new professions of the future.

The main characteristic of the laboratory is that of reconstructing within it, through hardware and software devices, apparatus and systems, the reality in which these new professions are developing in order to allow effective experiences to be made on apparatus, instruments and processes, as if female and male students were operating in the outside world.

DL WORKSPACE provides, for each workstation, an integrated environment in which all the software tools for study and experimentation find their place:

- browsing the teaching material in PDF or HTML format
- the management of the answers to the questions present in the lessons
- the execution of experiments with the ToolBox tools (Servers, Clients, Network Analyzers, Supervision Systems, etc.).

The environment is completely customizable by the user who can move the windows at will, let them float or anchor them to the main window, resize them, close and open them as needed.

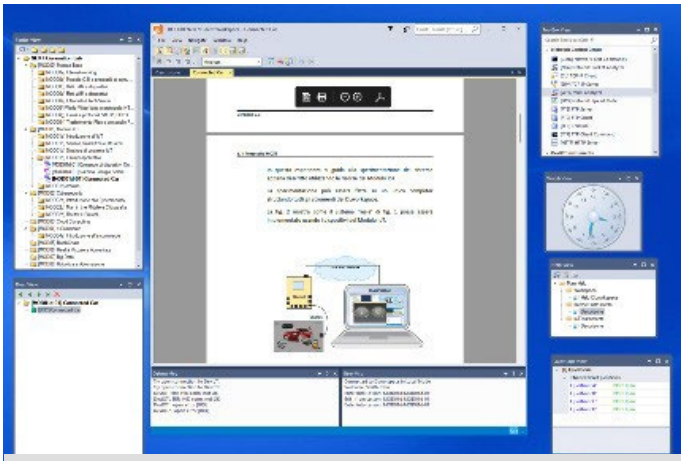


Work windows

You can see the window on the top left with the list of all the subjects of study, in which the lesson of interest is selected, and the lower left window showing all the documents of the selected lesson.

The central window allows you to view the contents of the documents.

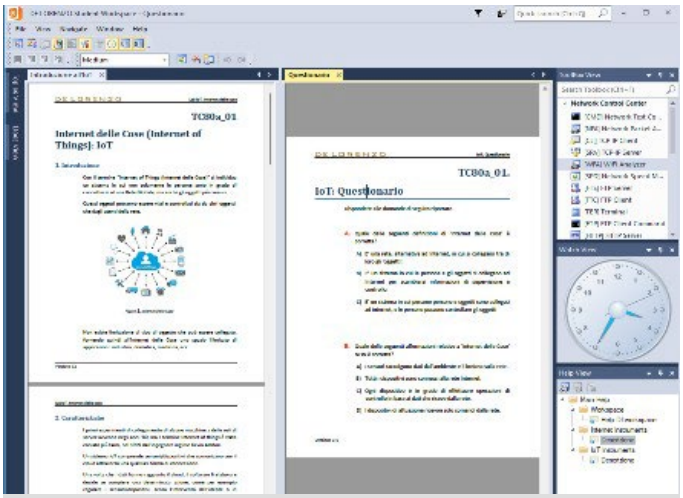
The windows below carry specific messages for the user, or service messages when external devices are connected to the computer.



The figure shows the working environment in which the side windows have been made floating and positioned as desired on the full screen, around the main window.

The windows on the right, starting from the top, are:

1. The ToolBox, which contains all the tools required for carrying out the experiments.
2. The clock window.
3. The Online Help window that allows you to select the various topics.
4. The Questions management window that allows you to view the questions asked for the active lesson, and to answer them.



The figure shows 2 windows open at the same time. In this way, the user can answer the questions (on the right) and consult the theory (on the left).

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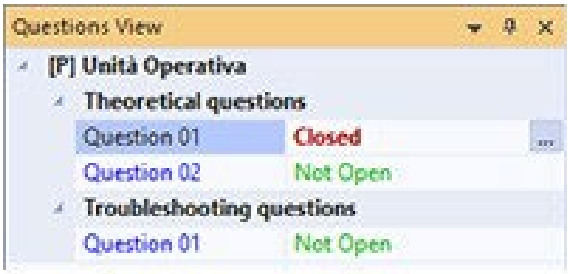
Evaluation of the learning degree

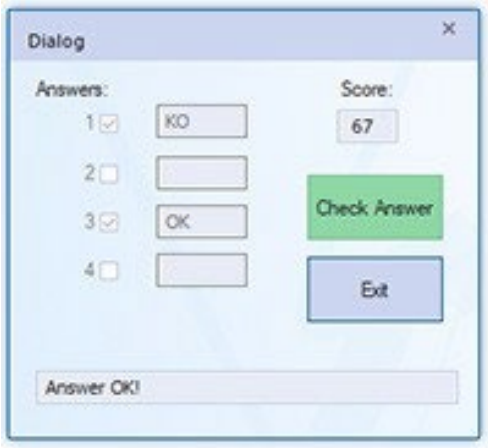
The DL NGL Laboratory uses a questionnaire model, included in the teaching material of the modules, to verify the students' learning degree.

To analyze their preparation in the most complete way, there are theoretical questions on the topics under study as well as questions relating to the exercises and the experiments.

DL WORKSPACE provides the tools for students to answer the questions and for the automatic evaluation of the score, which is then used by the teacher to verify their preparation degree.

All this information is stored in a Local Database accessible by the Teacher.





Data tables and graphs

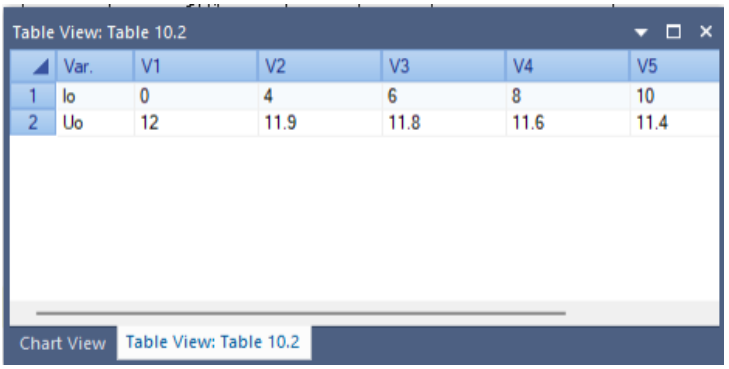
In carrying out the exercises, the student often has to collect data, enter them in tables and process them.

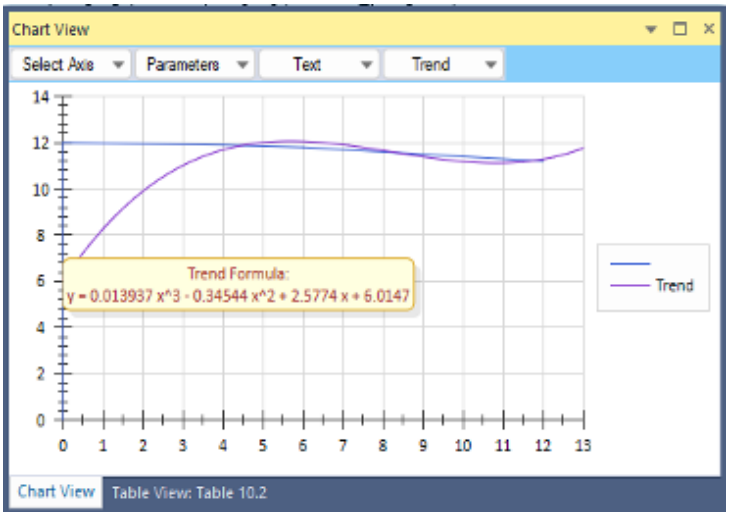
DL WORKSPACE provides the right tools for the purpose. Any data tables required by the exercise are available in the Resource View of the lesson.

Once the table has been selected, it is available for data entry in the Table View.

All data entered in the table is saved in the student database and available at any time.

The subsequent graphic elaboration is done automatically through the Chart View.





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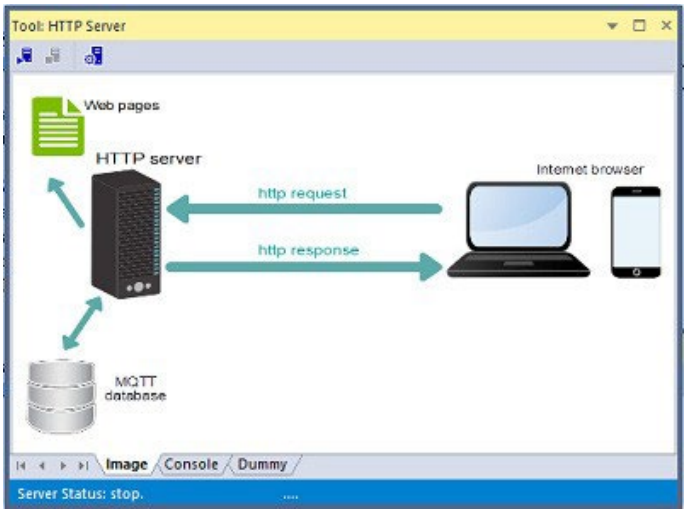
Tools integrated into the Work Environment

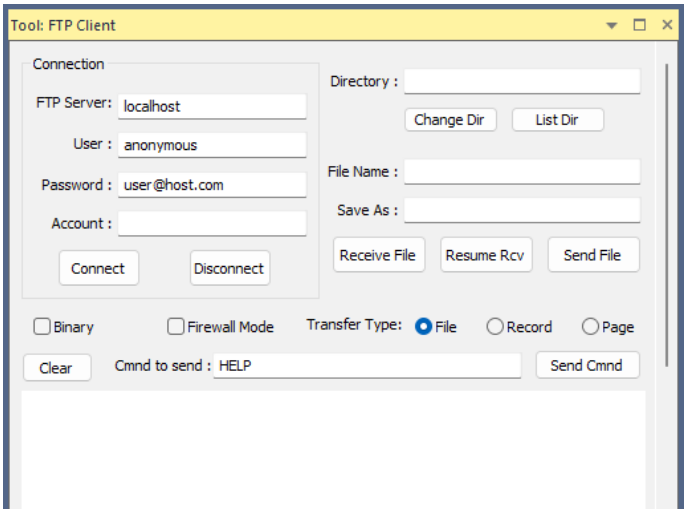
DL WORKSPACE contains a ToolBox where there is space for a complete series of important software tools for carrying out the exercises of the DL NGL Laboratory in support of the theoretical lessons.

Some of them are illustrated below.

1. HTTP Server

An HTTP Server, directly integrated in the DL WORKSPACE, allows you to experiment with the World Wide Web.
The creation of a simple HTML page for the World Wide Web is the first and basic experience that students must do, to then be ready for more complex applications such as E-Commerce.
An editor integrated in the DL WORKSPACE allows students to create simple Web pages, which can then be inserted into the Server and viewed with any Internet Browser.





2. FTP Server and Client

An FTP Server and Client allow you to perform file transfer exercises using this protocol.

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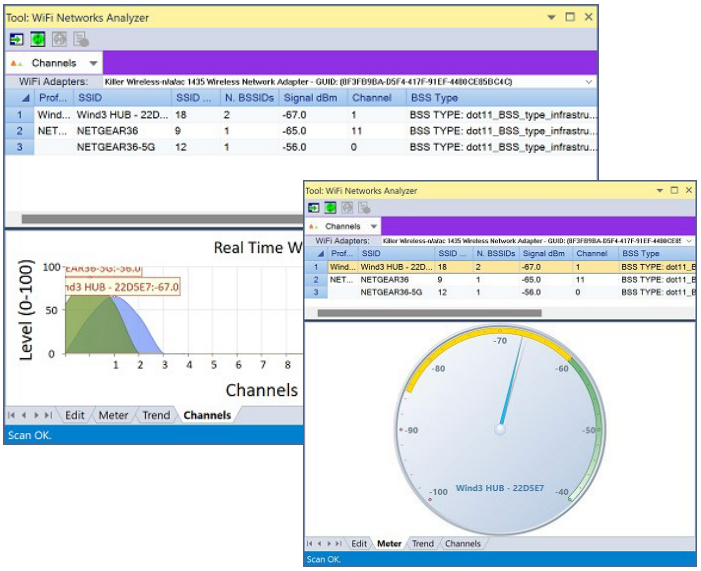
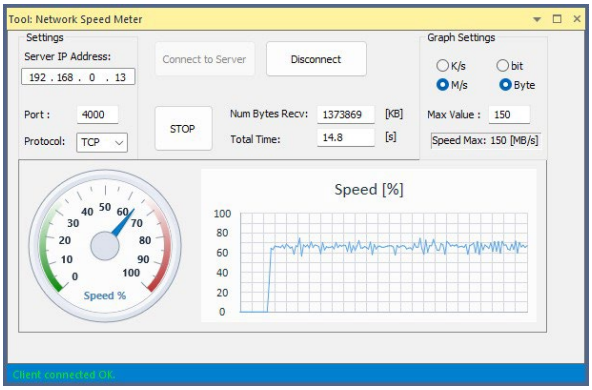
3. Wi-Fi Network Analyzer

The Wi-Fi Network Analyzer is a very important tool for studying this type of wireless network.

It allows detecting the networks present in the area of interest and checking all the parameters including the signal level, the frequencies and the channels used.





4. Network Speed Meter

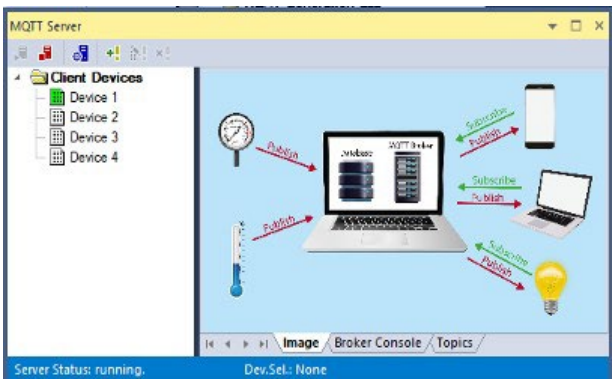
The Network Speed Meter is the essential tool for verifying the performance of a network in terms of data transfer speed.

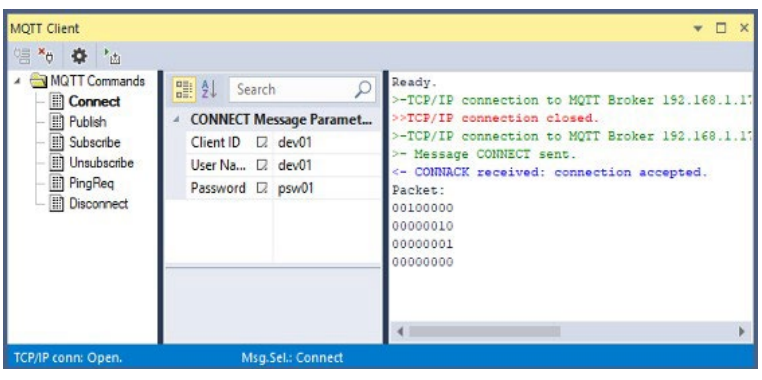
5. MQTT Broker & MQTT Client

The Internet of Things allows connecting and making devices in different places on the earth 'talk' to each other through the use of a Server called MQTT Broker. The devices appear as MQTT clients that connect to the broker.

DL WORKSPACE, for exercises related to the Internet of Things (IoT), provides an MQTT Broker and an MQTT Client that allow performing exercises using a simple PC.

In this way, the students are able to interact with all the devices of the system and see in detail how the system itself operates, in all its more in-depth aspects.





6. Blockchain

For exercises related to the Blockchain technology, DL WORKSPACE provides a proprietary platform with all the tools to analyze its operation and performance.
The figures show (taken from an exercise in the manual) the tools for creating a basic Blockchain, for inserting blocks and for analyzing the problems of block 'mining'.