

Student's Zone 2020 of the NICA Project



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The LabVIEW™ program modules Record Generator and Transmitter/Receiver for the Input Output Device Simulator project

Laboratory of High Energy Physics (LHEP) Engineering Support

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The topic of the exercise

“The LabVIEW™ program modules Record Generator and Transmitter/Receiver for the Input Output Device Simulator project of the NICA-MPD-PLATFORM”

Goal

The Engineering Support Group working in the High Energy Physics Laboratory at the Joint Institute for Nuclear Research in Dubna is involved in the construction of NICA-MPD-PLATFORM. It is a set of devices controlling and monitoring the work of the MPD (Multipurpose Detector) included in the NICA complex. Part of the data generated by these devices will have to be saved to the database. Equipment Database (EqDb) was established especially for this purpose at the Faculty of Physics of the Warsaw University of Technology. Since the devices will be built only after some time, it was decided to launch a project called Input Output Device Simulator (IODS). Its task is to create a VPN connection between JINR and WUT and automatically write to the EqDb a record that will be simulated by the IODS. On the other hand, it should also be possible to read data from the EqDb and write it to this record. As a result, a two-way communication channel will be established between the two centers and a way of saving and reading data on the fly from/to the EqDb will be developed and tested. The project is fully a software written with use of the LabVIEW™ environment. Students will be required to write a program that generates a IODS Simulated Record and sends it in both directions between two computers connected with Ethernet cable.

To do: Design, write and test a LabVIEW™ program to transfer the IODS Simulated Record between two computers connected with Ethernet cable.

Description of the exercise

1. Learning the project of the Input Output Device Simulator (IODS) from the Conceptual Design Report documentation.
2. The development of the Simulated Data Record for the IODS in LabVIEW™ environment.
3. LabVIEW™ coding of the Record Generator Module.
4. Learning Client Server Architecture.
5. Getting to know the terms such as LAN, WAN, Web Server, Web Services, REST and SOAP web services APIs, XML, JASON, UDP, TCP, IP, TCP/IP.
6. Getting familiar with popular Web Services.
7. Learning the TCP/IP implementation in LabVIEW™.
8. LabVIEW™ coding of the module which transmits and receives the Simulated Record via Ethernet applying the Finite State Machine architecture (one of the fundamental architectures in LabVIEW™).
9. Installing written software on two computers connected together with the Ethernet cable (LAN connection).
10. Testing the Simulated Record sending over the LAN in both directions.
11. Writing project documentation.
12. Preparation of the own speech at the end of the student practice and for the conference after that, and preparation the publication together with the practice supervisor based on the obtained results.

Requirements for the students

The subject is addressed to students interested in LabVIEW™ programming. Basic programming skills in the LabVIEW™ graphical language are required.

Exercise for maximum up to 3 students

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