

TySSA – a Set of Means for Building of Distributed Software Systems for the Automation of Experiments by the User.

Part 1. Build Tools and Control Program

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Modification of software systems for experiment automation requires time comparable to its development due to their uniqueness. So relevant methods and tools that reduce these periods. The paper presents a set of tools that ensures the continuity of the components of such systems at the level of the executable format (.exe) and the integration of components into a distributed system. The development of drivers for individual devices that make up the experimental setup is performed by specialists with the necessary qualifications, and they are presented in an executable format (.exe). The development time for one driver is from several days to a month. If the necessary drivers are available, their integration into the experiment automation system, which corresponds to the planned experiment methodology, is performed by the experimenter and requires 10–20 minutes.

Composition, purpose and properties of the components of the TySSA complex:

1. PSJsupport.db database. Used by driver developers to document driver characteristics.

2. The PSJ program is designed to prepare an experiment task in JSON format, used by the experimenter. PSJ allows, in accordance with the planned experiment methodology, to select the necessary drivers in PSJsupport.db, set the sequence and values of the parameters at their launch, and other data. This information is represented by the PSJ program as JSON text and is an experiment program. The process of composing the task and the results of the program PSJ enters into the database JOBSlist.db.

3. The TySSA program performs an experiment task, composed using PSJ. The search for drivers in the network and the control dialog is carried out according to the protocols implemented in SLP and a specially developed DiCME module. The TySSA program is equipped with means to protect against information loss in case of power failures and experimental equipment failures.

4. Library of device drivers that are part of various spectrometers and more general purpose services. Drivers are used by the TySSA program. Drivers are represented in the .exe format, can be used without change in any experiment whose software is prepared in this technology, can be run (in the local network) on any computer to which the equipment they use is connected.