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MECHANISMS FOR SYNCHRONIZING AND ENSURING THE CORRECTNESS OF USER DATA ON EDUCATIONAL PORTALS

Abstract: *Mechanisms are that allow synchronizing current data between the university student enrollment system and SPbPU educational portals. The introduction of such mechanisms has made it possible to sharply reduce the amount of administrative work required to update these data.*

Key words: *IT infrastructure of SPbPU, PHP, Moodle, Single Sign-On, Swagger, Enterprise Service Bus.*

Language: *English*

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Introduction

This article continues the series of articles [1-5] describing the work we have done to modernize the IT infrastructure of SPbPU.

As we have already noted in our series of articles, SPbPU is one of the largest universities in Russia and has a large number of Moodle courses for organizing training on various educational portals. Basic information about students is located in the Automated Management System "Dekanat" (sometimes this system is also called "Contingent"), which is constantly updated. And you need to constantly synchronize data between this system and courses on Moodle (up-to-date lists of students in groups and access to courses). Previously, Moodle administrators and teachers managing courses had to do this manually, which is quite difficult, since about 10,000 courses are created every semester on various SPbPU educational portals. We will talk about automation of this work in this article.

Description of the synchronization mechanism

All basic and current data about students, starting with the admissions committee, are located in the "Dekanat" system - information from such primary data as enrollment orders, transfer orders, expulsion orders, etc. is loaded there. This system is kept up to date by SPbPU institutes. The web interface to this system is shown in Fig.1. At the same time, the list of students in each Moodle course should be up-to-date - but there was no API for communication with the "Dekanat" system before the creation of our mechanism and there was no synchronization. Previously, the student had to log into the course in Moodle using Single Sign-On SPbPU [6], and only after that the structure of his access is updated. Accordingly, all students in the group had to log in to Moodle via Single Sign-On (SSO) so that their information would be updated. The same problem occurred with groups - until someone from the group logged into Moodle via SSO, the teacher could not add a group to the course. Groups were understood as global groups - that is, a global group in Moodle corresponded to a global group in the "Dekanat" system. Apart from this, what other problems were

there? If, for example, a student is expelled, then he will remain in the Moodle group (and this student himself will not be able to unsubscribe from the course, because he will no longer be able to log in through the SSO) - he must be deleted manually. If, for example, a student has never logged into Moodle and therefore was not enrolled in a course, then he will not receive any email notifications about course activities (he may not even know that there are any deadlines for this course, mandatory tasks, etc.). Another problem is that study groups can sometimes be renamed, merged or separated. This information is updated in the "Dekanat" system, but in Moodle everything had to be changed manually.

An API was created for the "Dekanat" system and a plugin for Moodle. In the synchronization mechanism we implemented, the following now happens: the administrator connects to the corresponding API and receives a list of groups in the "Dekanat" system and a list of groups in Moodle. Checking the compliance of groups in the "Dekanat" system and in Moodle is shown in Fig. 2. If a group has appeared in the "Dekanat" system, but is not yet in Moodle, then this group can be added to Moodle. As an example, Fig. 3 shows a list of groups that are in Moodle, but not in the "Dekanat" system. Fig. 4 shows a list of groups that are in the "Dekanat" system, but not in Moodle. The same figure shows the "Synchronize" button, with which synchronization occurs. It is worth noting that synchronization will only occur if there are more than zero students in the corresponding group according to the "Dekanat" system. Synchronization occurs using a script we wrote, part of which is shown in Fig. 5. The script creates the appropriate student accounts, where the students' last name, first name, patronymic, email, global group, etc. are entered. If there is no corresponding global group yet, then the script creates it, but if such a group already exists in Moodle, then this student is automatically subscribed to all courses to which this group is subscribed. Fig. 6 shows the JSON [7] portion that describes the account that the script creates.

When creating our synchronization mechanism we used PHP, API Moodle [7], Swagger [8], Apereo CAS [9].

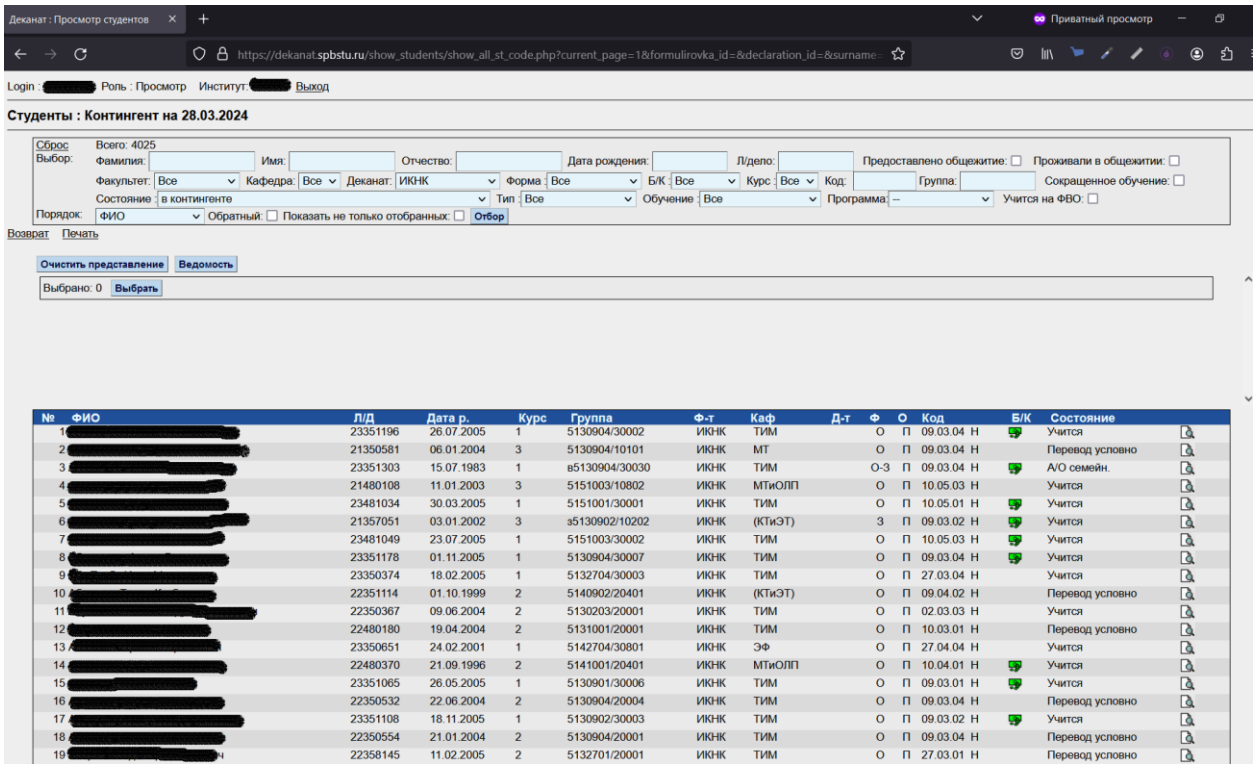

Fig 1. Web interface to the "Dekanat" system

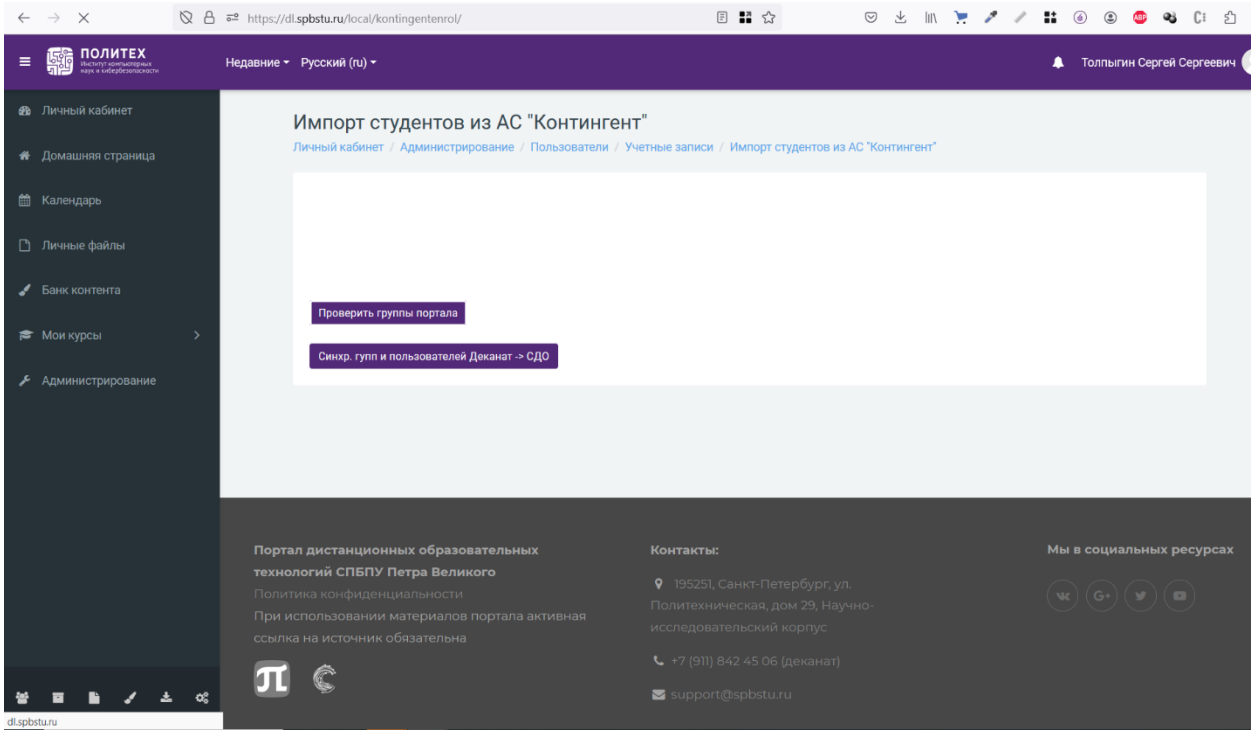

Fig 2. Checking the compliance of groups in the "Dekanat" system and in Moodle.

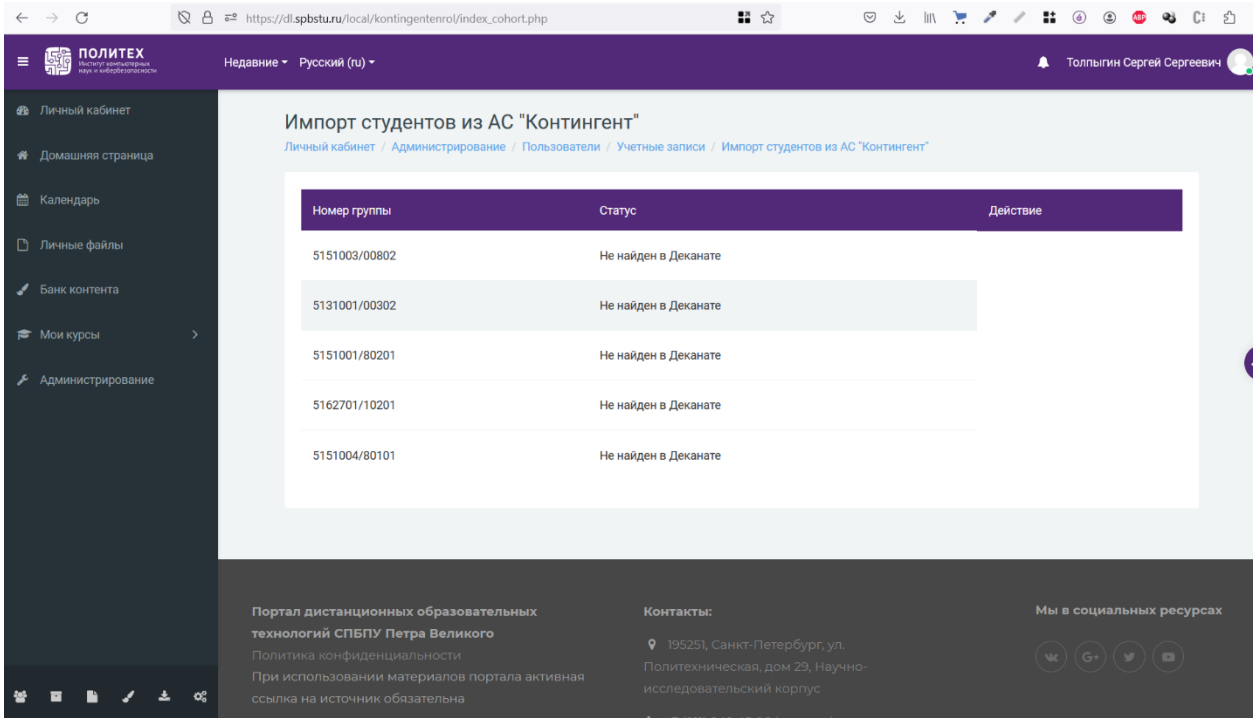

Fig 3. A list of groups that are in Moodle, but not in the "Dekanat" system.

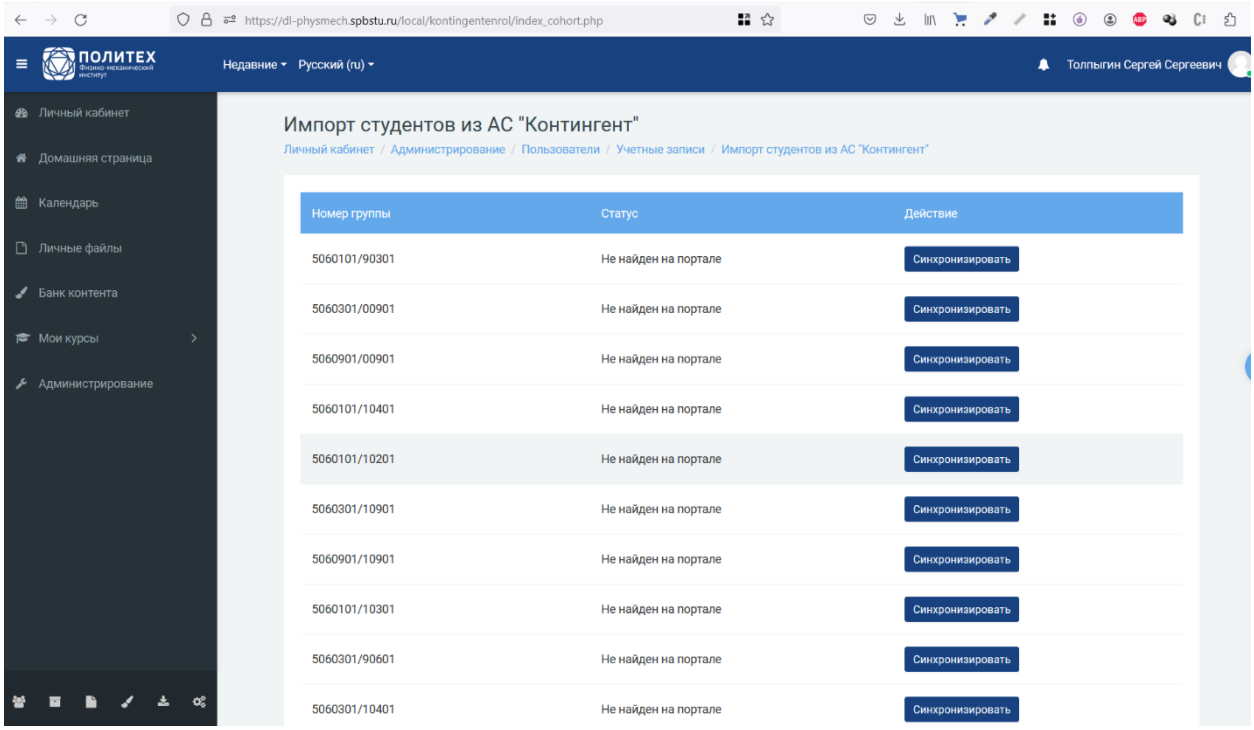

Fig 4. A list of groups that are in the "Dekanat" system, but not in Moodle.

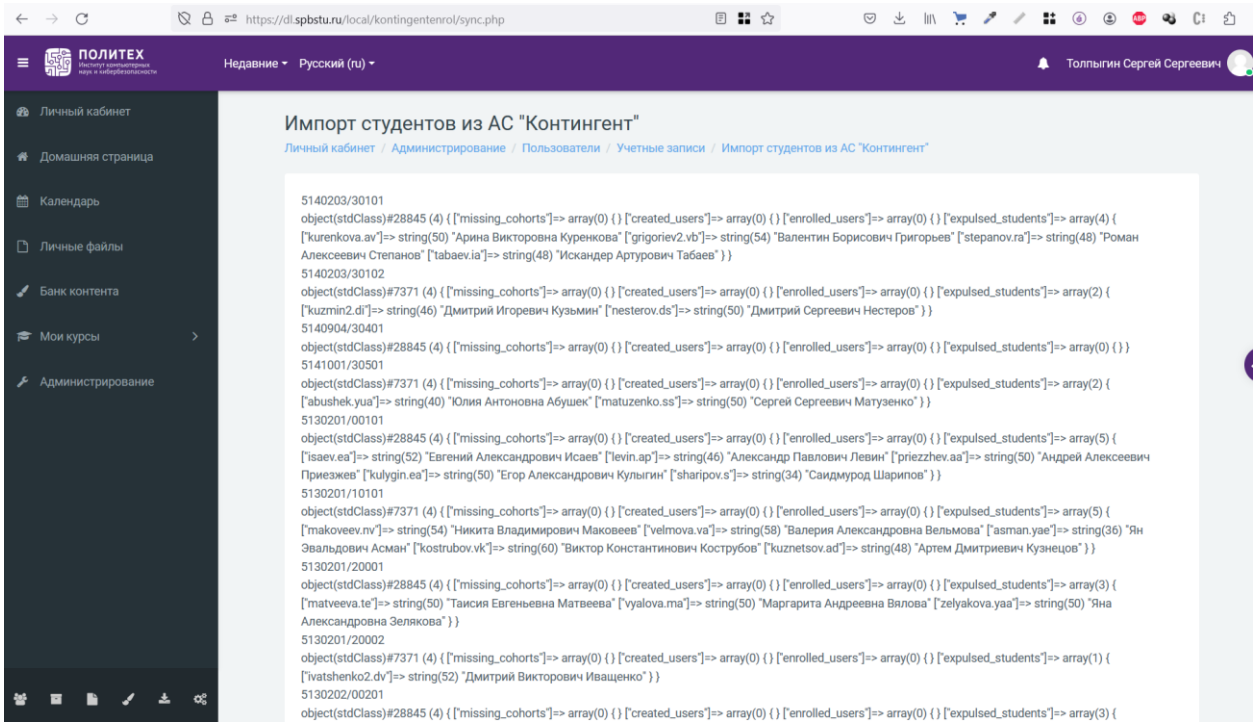

Fig 5. Synchronization script fragment.

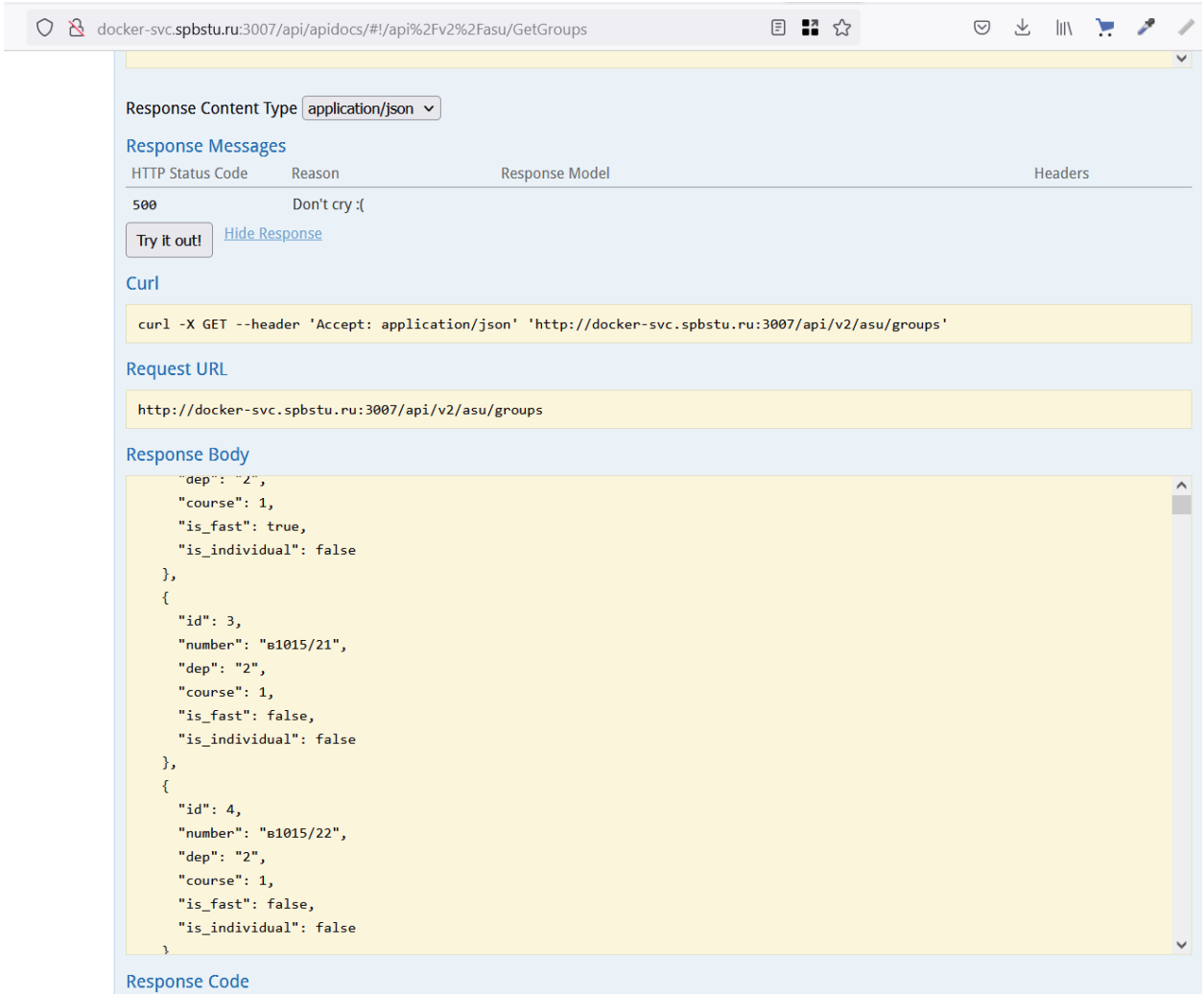

Fig 6. Part of the JSON describing the account.

Conclusion

As a result, we created mechanisms for synchronizing and ensuring the correctness of user data on educational portals, which eliminated a lot of manual work for course administrators. We are currently working to modernize this mechanism. One possible improvement is the introduction of an enterprise service bus (ESB) [10]. This will speed up data synchronization. Now synchronization occurs across all entities, while with the implementation of ESB it will be possible to synchronize only data changed over a certain period of time. Another possible improvement is the introduction of a global individual/group identifier at the level of all SPbPU information systems. The introduction of a global identifier will simplify synchronization (for example, now the identifier of a training group is its number, but the group number may be subject to change). However, the issuance of such global identifiers at the level of all SPbPU information systems is still beyond our competence.

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