Application a ViPS for Lifelong Learning

Todorka Glushkova

Plovdiv University „Paisii Hilendarski", Bulgaria

Introduction

➢ Cyber-Physical Spaces (CPS) are developed in the synergy between the physical and the virtual words .

➢ Because we want in the center of the space put the social factors, the concept of Cyber-Physical-Social Spaces (CPSS) is fully justified.

➢ ViPS (Virtual Physical Space) is an ecosystem of the IoT.

➢ The reference architecture of the ViPS enables it to be applied in various fields of application - smart agriculture, tourism, smart cities, but also in education.

Motivation

➢ This report presents a ViPS -based application known as BLISS

➢ As we wish to provide security and trust between the users by providing them personalized services and learning resources, we will use Personal Assistants and Blockchain technologies.

➢ BLISS supports also and a kind of lifelong learning where people who need to be educated have dropped out of school for various reasons but wish to complete their education through individual training.

➢ Since these people have jobs, the education process is conducted on individual curriculum plans. The managing this process is a serious challenge.

BLISS

➢ BLISS is an adaptation of the ViPS reference architecture to support the secondary school learning process.

➢ It is implemented as a multi-agent system and includes two basic components:

  ➢ Personal assistants (PAs) that assist users in their work with the system.

  ➢ School diary implemented through Blockchain technologies.

BLISS architecture
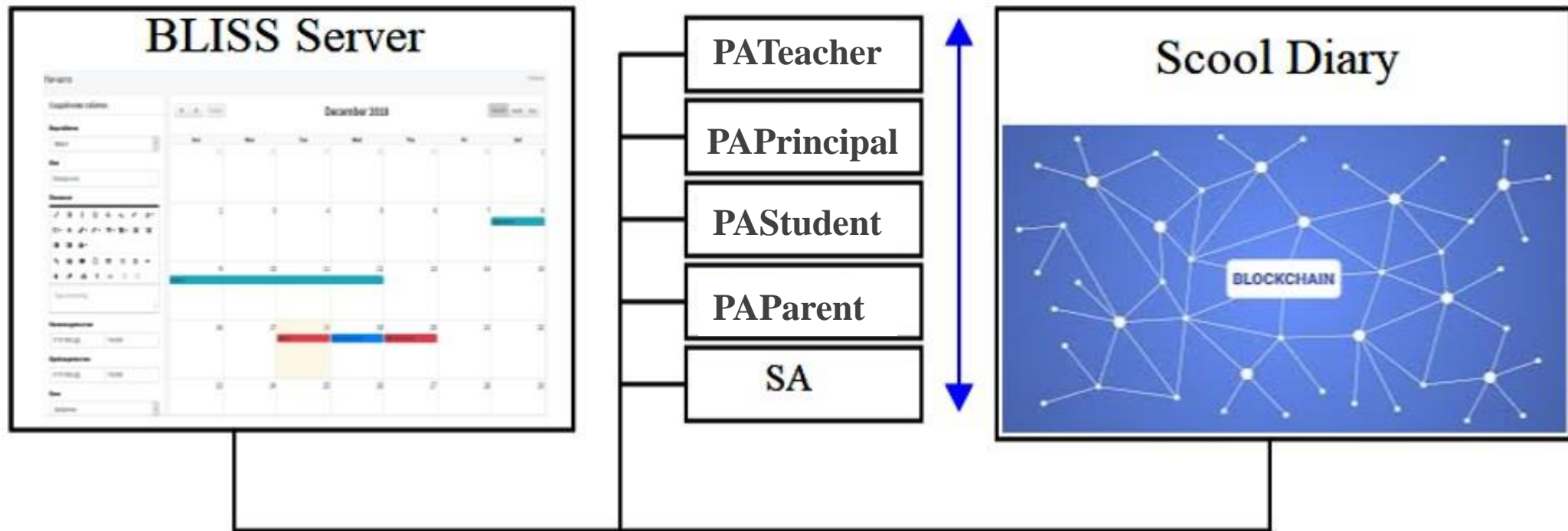
BLISS GPA

➢ Due to the nature of BLISS, users are into the center of attention

➢ Genetic Personal Assistant (GPA) aims both to create specific personal assistants for new users and to manage, storing and restoring the versions of personal assistants that are created in the past.

➢ We will briefly introduce the personal assistants involved in the work of BLISS.

PAStudent

- PAStudent assists students in their daily duties in accordance with a pre-approved curriculum.

- The PA is informed of any upcoming events as exams, lessons, training sessions, consultations, and more.

- It monitors and reminds the student to prepare before the upcoming event. For example for the exam, the agent prompts students to begin preparation.

- The PA is able to prepare analyzes of the learning results.

PAStudent

➤ Event days are marked in different colors.

➤ Different colors indicate different types of events

PATeacher

- Informs the teacher about upcoming events and necessary preparation.

- Helps teachers track and analyze their students' participation and progress in their learning, as well as their results.

- Analyzes for various aspects - e.g. correction of materials used for self-study by students.
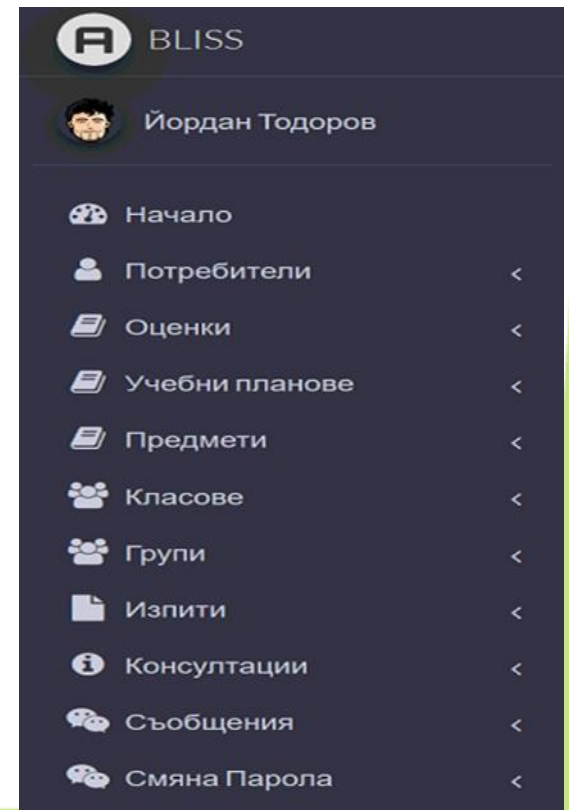
PAPrincipal

➢ The purpose of this assistant is to assist the school principal in the management and analysis of the processes.

➢ Mainly, the assistant is intended to help plan, conduct and control the learning process.

➢ This is the most difficult to implement personal assistant.

BLISS Server

> In the BLISS server, all information objects (such as schedules, lessons, exams, consultations, self-preparation, meetings) are presented as domain events.

> Authorized teachers and moderators can create, update and remove events.

> The server stores these events, controls access to them, and provides students with a PA to generate, manage, and control personalized curricula and schedules.

> Any change in the server is automatically perceived by all "interested" assistants.

BLISS

Йордан Тодоров

- Начало
- Потребители
- Оценки
- Учебни планове
- Предмети
- Класове
- Групи
- Изпити
- Консултации
- Съобщения
- Смяна Парола

School Diary

➤ In recent years, more attention has been paid to the security that the various IoT systems have to provide. In BLISS the sensitive information is personal data, students marks, diplomas, etc.

➤ BLISS School Diary is implemented by using of Blockchain technologies.

➤ In essence, the School Diary is a multi-agent system in which assistants with different rights and roles communicate and coordinate their activities.

Blockchain technology

- P2P architecture - distributed system that consists of nodes that have the same functional capability and responsibility.

- Participants (nodes) exchange information and assets with each other.

- A key role in building the blockchain is to use cryptographic and security technologies to achieve integrity.

- Distributed Registry System (ledgers) - store the entire transaction history. Each node has its own copy of the registry.

- A public-private approach to asymmetric cryptography is used to identify users, transfer ownership and protect the system.

School Diary

- For the development we use a private block chain (closed).
- The nodes in the system will be all teachers and the school principle.
- Each teacher sends a request to the principle to become a node in the system.
- Once access is granted, the system provides a public and private key to the respective teacher through which he or she can check and sign the transactions in the e-School Diary.

School Diary

- ➤ At the end of each day, one block will be validated with all transactions.
- ➤ Each teacher enters the students' grades as separate transactions by signing them with his private key. The students are not nodes in the system and the school principal will be the recipient of the transactions.
- ➤ Once transactions are signed, the algorithm checks them for formal and semantic correctness and authorization.
- ➤ Only the correct transactions are completed in a block and validated in the block chain, updating all registers in the system.

School Diary

- The School Diary contains various information. To store the sensitive content, we will use block chain, and for the rest - the data module (DM). We will use both approaches.
- For the relationship between the block chain and the DM, we will use a Specialist Assistant (SA), who is an intelligent agent and aims to respond to the changing environment of the e-School Diary.
- When a block chain change occurs, such as validating a new block of transactions, SA informs all assistants who are affected by this change and writes the information to the server DM.

Conclusion

➢ We consider that BLISS can assist and support training for both- regular and adult learners of self-training and lifelong learning.

➢ At the moment the first prototype of BLISS is being tested in a secondary school "Hristo Smirnenski" in Brezovo town.

➢ Currently, more than 40 lifelong learning students are provided with personal assistants that help them to study on individual plans in a personalized manner.

Thank you for your attention!