

VIRTUAL EDUCATION SPACE FOR LIFELONG LEARNING

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RATIONALE

- One year ago we applied in open competition that raises some changes in our group
- We had to inventory existing software tools and rethink our research strategy
 - Especially Virtual Education Space that was supposed to be successor of DeLC
- Project application
 - Identification of existing tools suitable for the proposal
 - Identification of tools convenient for adaptation
 - Rethinking of the concepts of the Virtual education space (successor to DeLC)

DEL C LABORATORY

- Mission:
 - Developing and improving DeLC 2.0 as a real e-learning environment
 - No prototyping, no research
- Financing: deduction from collected student fees

EDUCATION IN DELC 2.0

- 2000+ bachelor students in 4 curricula:
 - Informatics
 - Software engineering
 - Business information technologies
 - Software technologies and design
- about 150 masters in 4 curricula in Software engineering
 - SE (Graphical environments and user interfaces)
 - SE (Mobile systems and applications)
 - SE (Software architectures and tools)
 - SE (AI systems)

STRUCTURE OF MSC

Basic Module

- 4 mandatory courses

Specialized Module

- 3 mandatory
- 2 elective

Practical project

- Part 1
- Part 2

Diploma thesis (or final exam)

COGNITIVE ROBOTICS

Plovdiv University



Проф. д-р Hans-Dieter Burkhard

Професор по информатика
в Хумболтовия университет, Берлин

1991-98 Председател на Законодателното събрание в Хумболтовия университет
1991-96 Председател на Берлин Интерес Груп по ИИ
1998-2008 Член на "Съвета на настоятелите" на Robocup-федерацията
2000 Съпредседател на организационния комитет на АВКО 2000 в Берлин
От 2002 Научен сътрудник към Европейски координационен комитет за ИИ
2004-2008 Вицепрезидент на Robocup-федерацията за Европа
2006 Съпредседател на Robocup 2006 в Бремен
Любим професор за 2004 г. в Humboldt Kinder Uni (Детски университет)



Burgas Free University



1997 Световен шампион в Simulation 2D League на RoboCup с отбора "AT Humboldt"
2004, 2005, 2008 Световен шампион във Four-Legged Robots League на RoboCup с отбора "German Team"

Курсът "Когнитивна роботика" е базиран на лекциите на проф. Буркхард.

Благодарим Ви, проф. Буркхард!

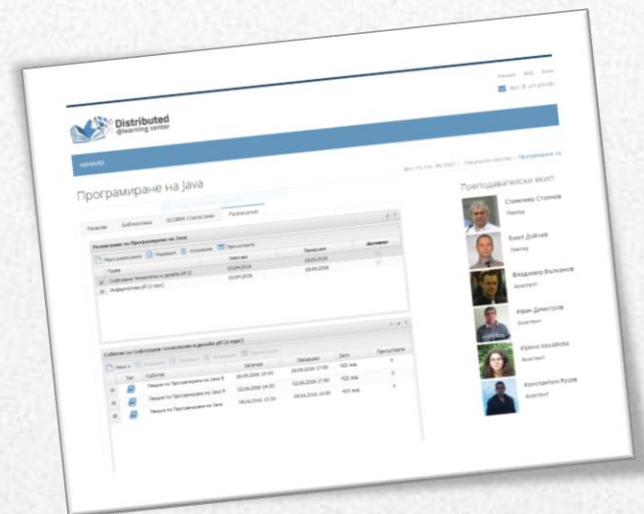
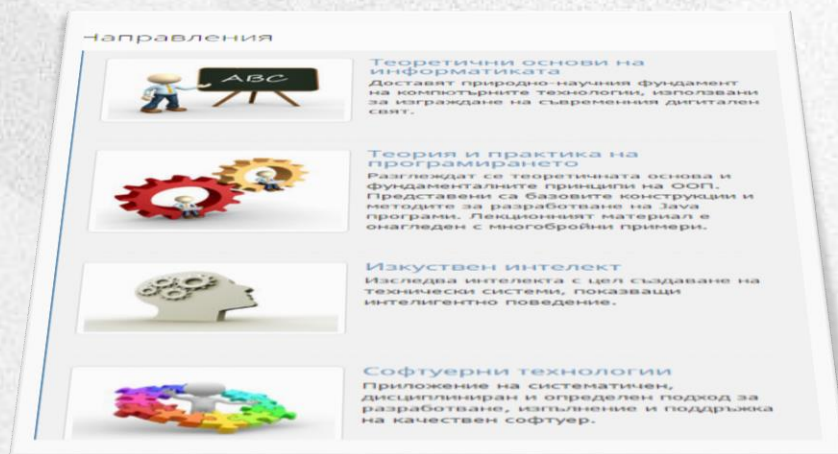
Workshop, Primosten, 2-8 September 2018

ELECTIVE COURSES (EXAMPLES)

- IoT
- IoT applications
- Machine learning
- Personal assistants
- Blockchain technologies

LEARNING WITH DELC 2.0

- Education portal supporting various forms of e-learning, incl. LLL
- Provides 40+ lecture courses for masters and bachelors at the Plovdiv University (partly BFU)
- Version for secondary school



SELF-PACED LEARNING

- SCORM 2004 support of students' self-study
- Personal reporting of learning progress

The screenshot displays a SCORM 2004 LMS interface with the following components:

- Navigation Menu:** Home, Library, SCORM statistics, Reports, User profile.
- Statistics Summary:**
 - Total Users: 1429
 - Total Started: 273
 - Total Completed: 65
- User Progress Report (Ангел Христова):**
 - Ангел Бели: 100%
 - Аполон Московски: 100%
 - Алекс: 100%
 - Александар Драво: 100%
 - Александар Раков: 41.75%
 - Александар Чолаков: 79.81%
 - Ана Димитрова: -1.94%
 - Ангел Гергиев: 68.8932%
 - Ангел Дабриес: 33.98%
 - Ангел Гергиев: 48.54%
 - Ангел Христова: -0.97%
 - Ангел Христова: -0.97%
- Course Item List:**

Item ID	Title	Attempts
113274	Прогнозиране	1
160078	Въведение	1
071339	Тест	1
159205	Въведение	1
148767	Решение от данни	1
168759	Въведение	1
162276	Графика	1
159886	Въведение	1
19501	Тест	1
179258	Зачетете диаграма	1
189776	Соблагодател диаграма	1
127485	Обща характеристика	1
183133	Стратегии на икономизация	1
171674	ГТМ	1
156247	Други модели	1
11136	Осн. концепции	1
102361	Решение от данни и усъвършенстване на данните	1
184565	Тест	1
120917	ЕКО	2
184774	Тест	2
1106808	Решение	2
160118	Simulation engineering	3
154909	Статичен модел	3
129000	Фонетичен модел	3
881832	Тест	3
131198	V. модел	4
123897	Тест	4
183256	Въведение	4
176176	Тест	4
171242	Итеративен модел	6
155427	Тест	8
171200	SCORM	9
198208	Модел на СП	10
151847	Тест	10
- Course Item List (Bottom):**

Item ID	Title	Attempts
T-979258	Sequence diagrams	48
T-156169	Валидационни тестове	12
T-763070	Динамичен модел	132
T-431728	Статичен модел	145
T-241207	Дърво на решенията	152
T-673369	Общ преглед	185
T-186866	Пример за спецификация на изискванията	127
T-130755	Use case	155
T-487185	Таблица на решенията	170
T-687593	Въведение	202
T-808281	Крайни автомати(State transition)	151
T-259305	Въведение	202
T-519927	Обща характеристика	182

BLENDED LEARNING (E-TESTING)

- QTI 2.1-like e-testing module providing a lot of functionalities

The collage displays various functionalities of the e-testing module:

- Student List:** A table with columns for 'Фигуратен номер', 'Студент', 'Статус', and 'Отбѣд'. It lists students like Кристиан Костанков, Уляна Георгиева, and others.
- Question Interface:** A question titled 'Кои от моделите на развојни софтуерни процес се линейни последователни модели?' with options 'clearroom - engineering', 'prototyping', and 'clearroom - engineering'.
- Score Display:** Shows '33 точки (от максимум 40)' and 'Оценка 5'. Below it, 'Коментари към отговорите въпроси' includes an English text snippet: 'An increasing number of Bulgarians use smartphones to connect to the Internet. In 2017, 41% of users use an equivalent computer and smartphone to connect to the Internet. 82% use the Internet to search for information, 80% for fun, 60% to solve a task, 28% upload content on the Internet, and 30% publish solutions to problems that help other users online. I think that...'
- Question Statistics:** A pie chart showing the distribution of question types: 'Смисъл (3)', 'Съдържание (7)', 'Дължина (4)', and 'Мис. дилема (5)'. A legend below the chart identifies these categories.
- Question Selection:** A screen titled 'Избиране на тип на въпрос:' with icons for different question types: 'Въпрос с един верен отговор', 'Въпрос с повече от един верен отговор', 'Свързване съдържание', 'Построително съдържание', 'Отговор въпрос', and 'Шаблон'.
- Question Editor:** A form for editing questions with fields for 'Фигуратен номер', 'Условие', 'Справка', and 'Група'.

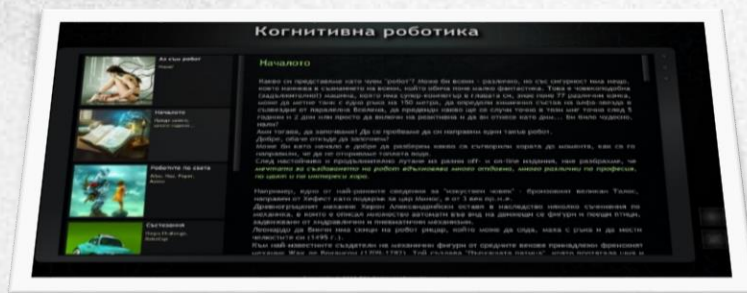
GAME-BASED LEARNING (AS LLL)

- Studying traffic rules playing (primary school)




COGNITIVE ROBOTICS (AS LLL)

- A new version of lecture course as LLL



CHH (AS LLL)

- E-content “Cultural-historical heritage”
- Semantic modeling (ontologies)




Equivalent To +

- 'female costume'
- and (hasBackApron some (brachnik or kariyanka or mesal or okrel or valnenik or weistcloth or zaveszka))
- and (hasBackApron only (brachnik or kariyanka or mesal or okrel or valnenik or weistcloth or zaveszka))
- and (hasFrontApron some 'front apron')
- and (hasFrontApron only 'front apron')
- and (hasShirt some (tunic or Barchanka))
- and (hasShirt only (tunic or Barchanka))
- 'female costume'
- and (hasBackApron some (brachnik or kariyanka or mesal or okrel or valnenik or weistcloth or zaveszka))
- and (hasBackApron only (brachnik or kariyanka or mesal or okrel or valnenik or weistcloth or zaveszka))
- and (hasFrontApron some 'front apron')
- and (hasFrontApron only 'front apron')
- and (hasShirt some (tunic or Barchanka))
- and (hasShirt only (tunic or Barchanka))
- and (hasBelt only Belt)
- and (hasCoat only ('big coat' or dolaktanka or gluhche or klashnik or kasak))

SubClass Of +

- hasShoes some navoi
- hasShoes some opink
- hasSocks some kalci
- hasSocks some kalcuni



Description 'black colored man costume from Pomorie'

Equivalent To +

SubClass Of +

- 'black colored costume'
- hasCoat only 'dolotanka from Pomorie'
- hasCoat some 'dolotanka from Pomorie'
- hasHat only 'klapak from Pomorie'
- hasHat some 'klapak from Pomorie'
- hasShirt only 'man tunic from Pomorie'
- hasShirt some 'man tunic from Pomorie'
- hasShoes only ('man 's navoi' or 'edgeless man 's shoes')
- hasShoes some ('man 's navoi' or 'edgeless man 's shoes')
- hasTrousers only 'black colored man 's trousers from Pomorie'
- hasTrousers some 'black colored man 's trousers from Pomorie'
- hasWeistband only 'man 's weistband from Pomorie'
- hasWeistband some 'man 's weistband from Pomorie'

General class axioms +

SubClass Of (Anonymous Ancestor)

- isLocatedIn some Exposition

3I LABORATORY

OPERATIONAL PROGRAMME “SCIENCE AND EDUCATION FOR SMART GROWTH”



Project: “Center of Excellence in Informatics and Information and Communication Technologies”

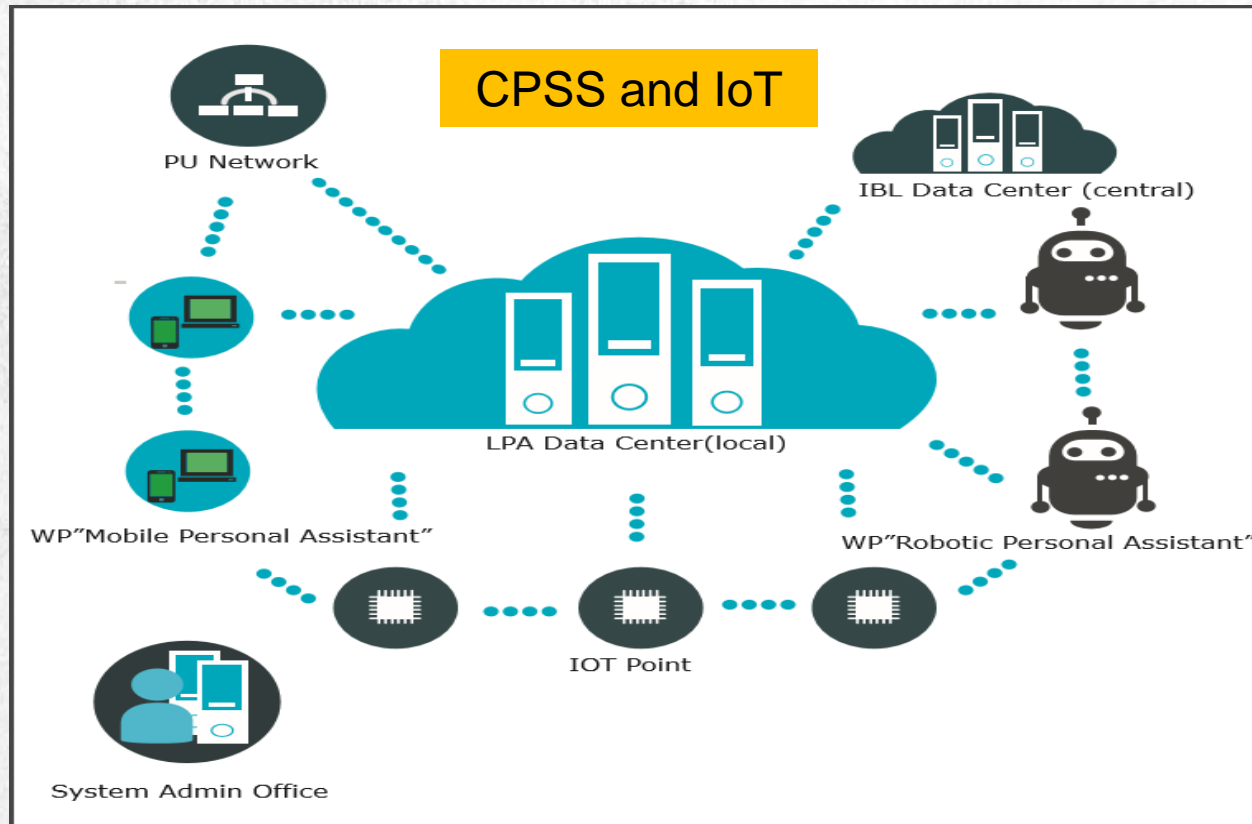
Start date: 03.08.2018

End date: 31.12.2023

3I (INTEGRATED INTELLIGENT INFRASTRUCTURE) LABORATORY

- Mission:
 - Building a research and prototyping infrastructure for CPSS and IoT ecosystems
 - Sustainability: 10 years after completion of the project
- Challenges:
 - Identifying suitable projects
 - Partners from the business
 - Building a team - not only with good theoretical knowledge but also rich practical experience

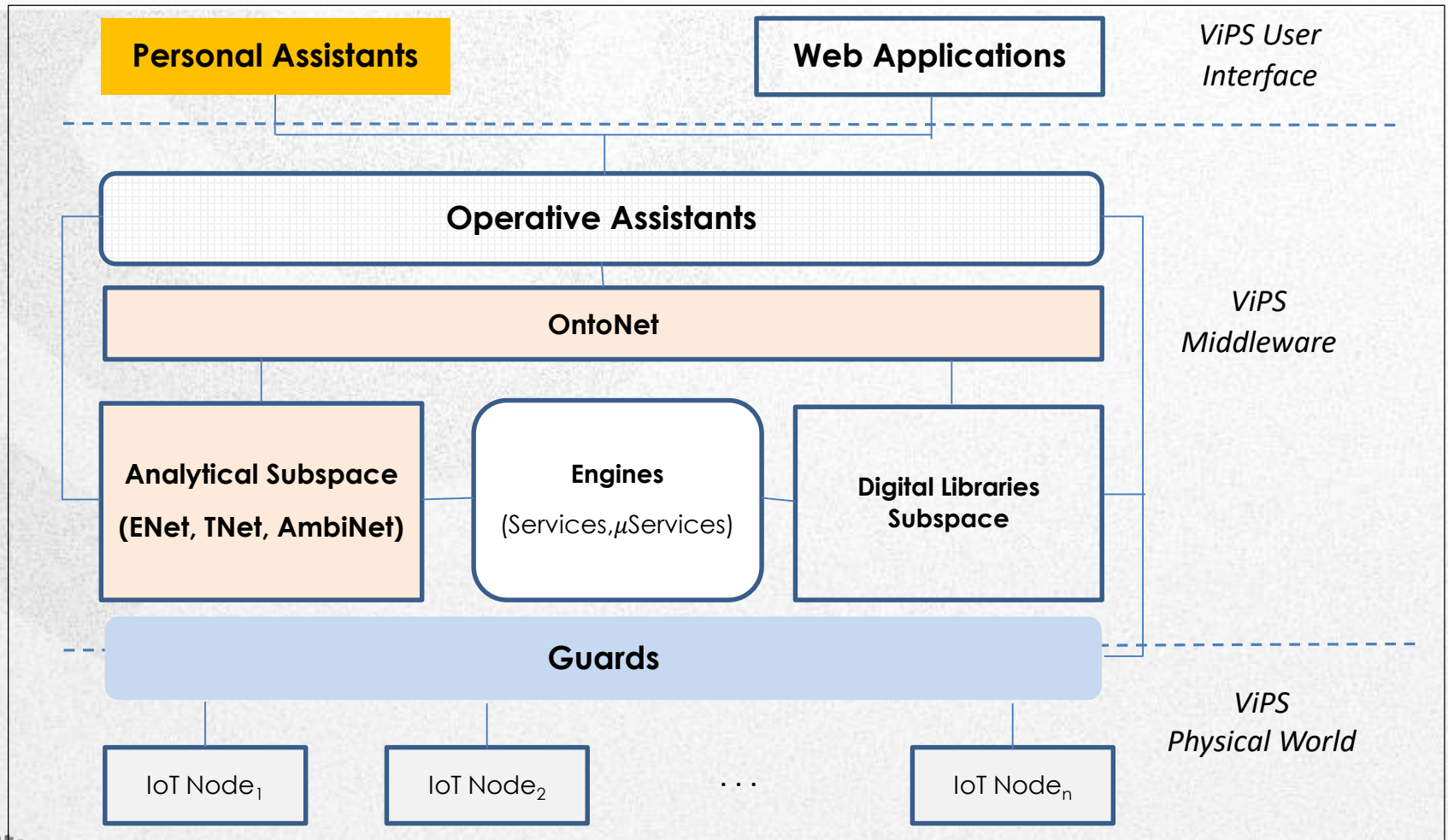
TARGET INFRASTRUCTURE



VIRTUALIZATION OF “THINGS”

- Objects with attributes
 - Attributes present the inherent characteristics of things
- Additional aspects:
 - Space
 - Time
 - Events
- Integrated formal environment
 - AmbiNet (CCA)
 - TNet (jTempura, AjTempura)
 - EventNet (EM)
 - OntoNet (OWL 2, Protege)

REFERENCE SOFTWARE ARCHITECTURE



INTENDED DOMAINS AND PROTOTYPING

- Possible domains
 - Smart Medicine
 - Smart Agriculture and Environment
 - Smart City
 - LLL, Historical-Culture Heritage, Secondary School
- Prototypes
 - TG
 - BLISS
 - GENE (Evolutionary IOT platform)

TOURISTIC GUIDE (ANCESTOR)

CCO COMMONS
CATALOGING CULTURAL OBJECTS

HOME ABOUT CCO TOOLKIT 10 KEY CONCEPTS TRAINING RESOURCES COMMUNITIES

GETTING STARTED CCO TOOLKIT

10 KEY CONCEPTS EXAMPLES

CCO FOR YOUR COMMUNITY
Museums
Libraries
Image Collections
Archives

Who Is Using CCO?

CCO practice has been adopted and implemented in a range of settings by a diverse group of cultural organizations, academic institutions, and special initiatives. Following is a select list of such projects. Please [contact us](#) if you would like to be added to this list.

- **ARTstor**, a Non-Profit Digital Image Library for Education and Scholarship
- **California Digital Library - UC Shared Images**
- **Centro de Documentacion de Bienes Patrimoniales (Chile)**. The documentation system for the state museums of Chile is based on CDWA and the manual developed for museum professionals uses CCO as its model. See article: Nagel, Lina, ed. "Manual de registro y documentaci3n de bienes culturales," Santiago de Chile: Andros Impresores, 2008.
- **Electronic Catalogue of Bulgarian Cultural Historical Heritage (Bulgaria)** See article: Trendafilova, Malina. "Development environment for building common catalogue for representation of the culture-historical heritage of Bulgaria," Bulgarian Academy of Sciences Cybernetics and Information Technologies. Volume 7. no. 1 (2007), 95-105.

CCO NEWS & EVENTS

- **Visual Resources Association Foundation appoints task force to make recommendations for CCO**
The Visual Resources Association Foundation (VRAF) has appointed a task force to research and explore options for the continued, sustained, and future development, maintenance, web presence, and administrative structure of Cataloging Cultural Objects (CCO).
- **VRAF announces the Russian translation of Cataloging Cultural Objects**
The Visual Resources Association Foundation is pleased to announce that a Russian translation of Cataloging Cultural Objects: A Guide to Describing Cultural Works and Their Images is available online. The translation is a project of the Boris Yeltsin Presidential Library, Saint-Petersburg, Russia.

TOURISTIC GUIDE

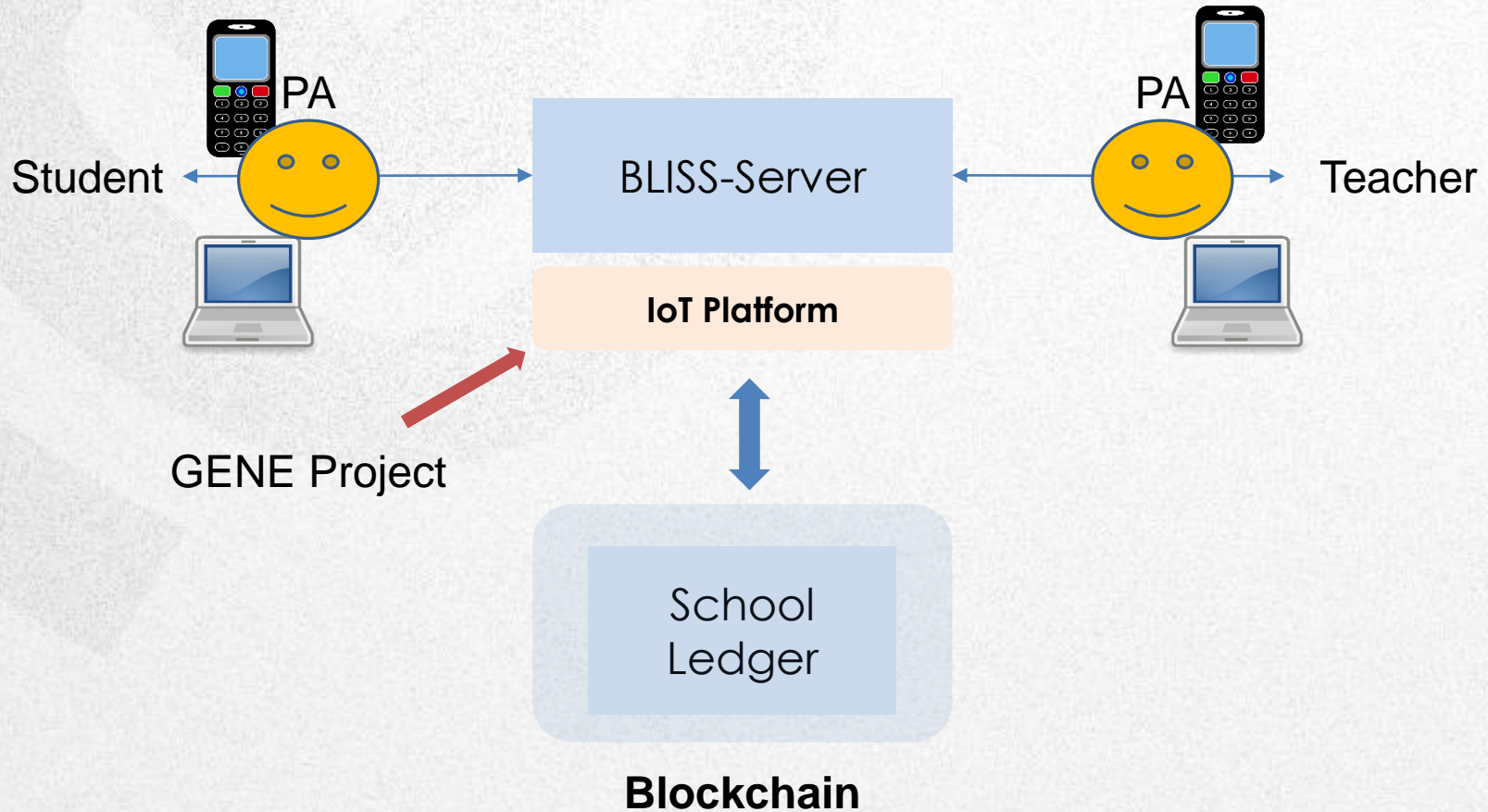
- IoT PA for tourists
 - Based on DeLC 2.0 tools and content
- Also be used as a LLL environment



BLISS PROJECT

- Project goals:
 - There is a specific problem that needs to be addressed
 - In a region, working people want to complete secondary education
 - Like part-time students
 - Personal timetable - for various reasons frequent changes are required
 - One teacher is responsible for the organization
 - 2018/19: 40+ enrolled students
 - Building a reference architecture that can be adapted to various domains

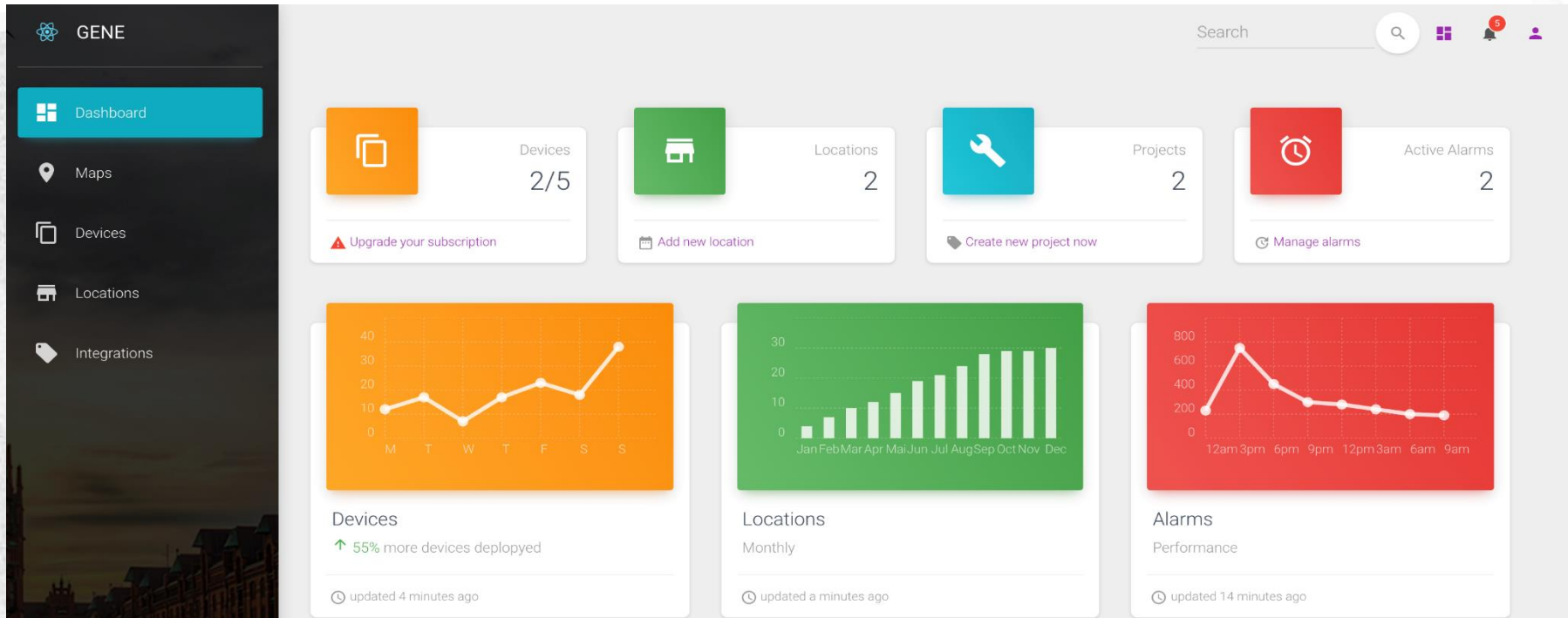
BLISS ARCHITECTURE (UP TO DATE)



EVENTS IN BLISS

The screenshot displays the BLISS application interface. On the left is a dark sidebar with navigation options: Начало, Потребители, Предмети, Класове, Групи, Изпити, Консултации, and Съобщения. The main content area is titled 'Начало' and shows a calendar for August 2018. The calendar view is currently set to 'month' and shows dates from 29th to 4th. A blue bar highlights the 21st, with a tooltip that reads 'Записване на ученици в СФО'. Below the calendar, there is a table of events for the selected day (21st), with columns for 'Тип', 'Име', and 'Описание'. The table shows several events, including 'Записване на ученици в СФО' and 'Поправка на данни'. To the left of the calendar is a form to 'Създай ново събитие' (Create new event). The form includes fields for 'Вид събитие' (Event type), 'Име' (Name), 'Описание' (Description) with a rich text editor, 'Начална дата и час' (Start date and time), 'Крайна дата и час' (End date and time), 'Клас' (Class), 'Група' (Group), 'Предмет' (Subject), and 'Студент' (Student).

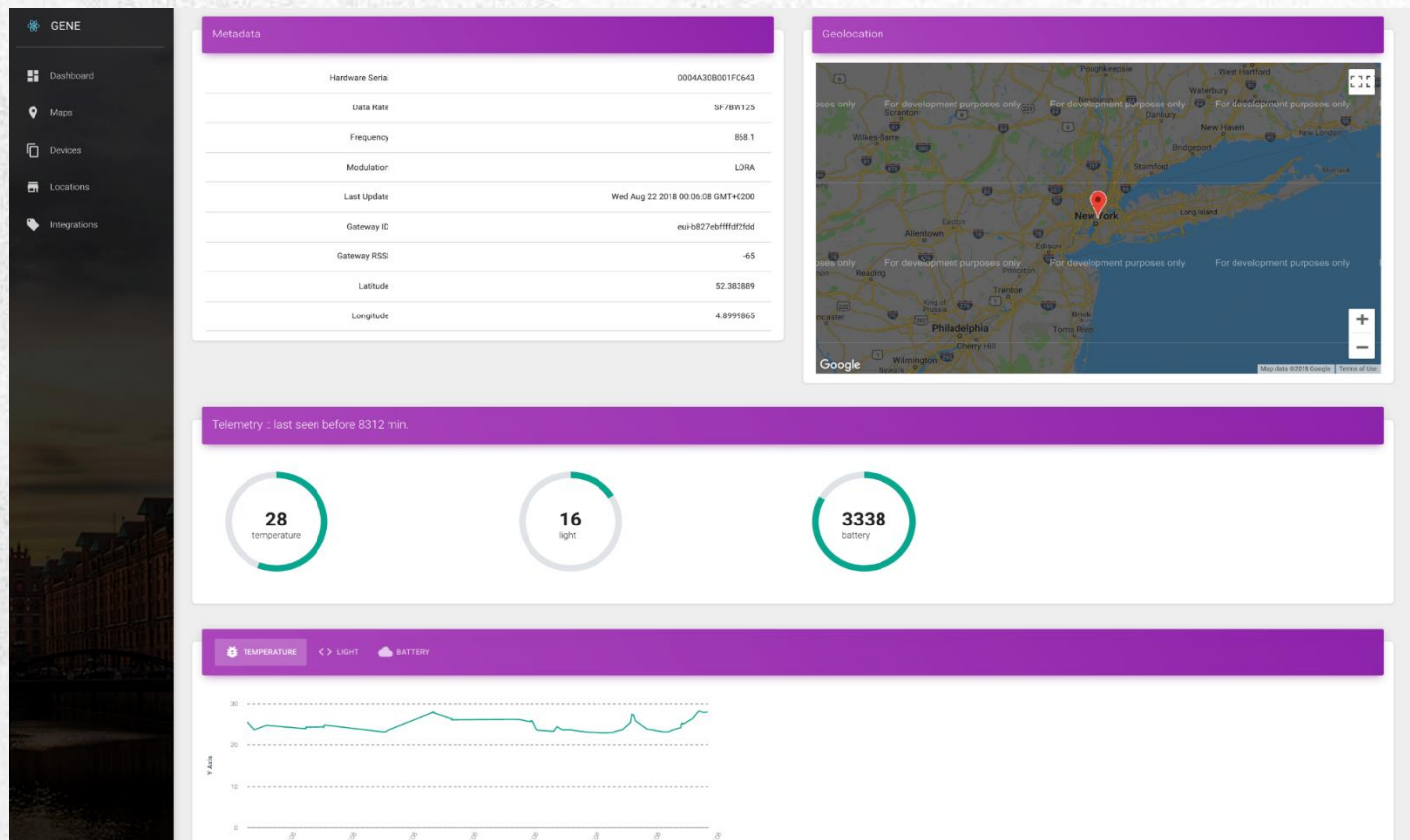
GENE PROJECT



4 channels:

- MQTT
- Block chain
- DB chain
- Real-time analysis (intelligent services)

GENE PROJECT



BLOCKCHAIN TECHNOLOGY

- Ethereum
 - Instant confirmation of transactions
 - No mining fees
 - Extremely high scalability
 - Secured through digital signatures
 - Immutability
 - Assign aliases to users instead of using base-58 addresses
 - Multiple levels of control:
 - Fully open ledger that can be joined anonymously
 - Closed loop ledger where participants must be approved by the administrator
 - A mix of the above where approved users enjoy more rights than anonymous users
- Client applications access
 - Standard REST API

THANK YOU!