Managing Affective-learning THrough Intelligent atoms and Smart InteractionS

D7.2 MaTHiSiS platform, 1st release

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Abstract:	The document presents the result of one full year of concept definitions, reflexions, implementations and integrations with the first release of the MaTHiSiS platform. This early version integrates all working components and it will be used for the first pilot phase.
Keywords:	MaTHiSiS platform, release, front-end, back-end, platform agents, integration
Related Deliverable(s)	*D2.3 - Full system architecture (M6)*
	D3.1 - The MaTHiSiS Smart Learning Atoms (M12)
	D3.3 - The MaTHiSiS Learning Graphs (M12)
	D3.5 - Experience Engine (M12)
	D3.7 - Learner's Profile Repository (M12)
	D4.1 - MaTHiSiS sensorial component (M12)
	D5.1 - Description of the robotic layer (M12)
	D5.4 - Description of the mobile layer (M12)
	D5.7 - Description of the interactive whiteboards layer (M12)
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Document History

Version	Date	Change editors	Changes
0.1	07/12/2016	Clément RODRIGUES-VIGUIER (DXT)	Initial version for the TOC.
0.2	19/12/2016	Clément RODRIGUES-VIGUIER (DXT), Norbert BARICHARD (DXT), Thomas TECHENE (DXT), Alejandra BARRAGAN (DXT)	Sections 1, 2, 2.3 and 4 Integration of the contributions of ATOS, CERTH and UM
0.3	20/12/2016	Clément RODRIGUES-VIGUIER (DXT)	Integration of the contributions of ATOS and OTE Update of the layout to better fit the D2.3 Added missing components
0.4	20/12/2016	Clément RODRIGUES-VIGUIER (DXT)	Integration of the answers made by CERTH, UM
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0.7	22/12/2016	Clément RODRIGUES-VIGUIER (DXT)	Consistency pass
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0.13	13/01/2017	Clément RODRIGUES-VIGUIER (DXT), Nadia POLITOU (ATOS)	Finalization pass Added a web-based LM (YouTube player)
1.0	13/01/2017	Clément RODRIGUES-VIGUIER (DXT), Carmen PADRON (ATOS)	Final version

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List of Acronyms

Abbreviation / acronym	Description
AIR	Affect and Intent Recognition
CI	Continuous Integration
CRUD	Create Read Update Delete
DAT	Data Acquisition Tool
DoA	Description of Action
GUI	Graphical User Interface
IaaS	Infrastructure-as-a-Service
KPI	Key Performance Indicator
LA	Learning Action
LAM	Learning Action Materialization
LG	Learning Graph
LM	Learning Material
MaTHiSiS	Managing Affect-learning THrough Intelligent atoms and Smart InteractionS
PA	Platform Agent
SC	Sensorial Component
SLA	Smart Learning Atom
SSL	Secure Sockets Layer
UX	User Experience
VM	Virtual Machine
VPC	Virtual Private Cloud
WP	Work Package

Table 1: Definitions, Acronyms and Abbreviations

Project Description

The MaTHiSiS learning vision is to provide a novel advanced digital ecosystem for vocational training, special needs and mainstream education for both individuals with an intellectual disability (ID) and neuro-typical learners. This ecosystem consists of an integrated platform, along with a set of re-usable learning components with capabilities for: i) adaptive learning, ii) automatic feedback, iii) automatic assessment of learners' progress and behavioural state, iv) affective learning, and v) game-based learning.

In addition to a learning ecosystem capable of responding to a learner's affective state, the MaTHiSiS project will introduce a novel approach of structuring learning goals for each learner. Learning graphs act as a novel educational structural tool. The building materials of these graphs are drawn from a set of Smart Learning Atoms (SLAs) and a set of specific learning goals which will constitute the vertices of these graphs, while relations between SLAs and learning goals constitute the graph's edges. SLAs are atomic and complete pieces of knowledge which can be learned and assessed in a single, short-term iteration, targeting certain problems. More than one SLA, working together on the same graph, will enable individuals to reach their learning and training goals. Learning goals and SLAs will be scoped in collaboration with learners themselves, teachers and trainers in formal and non-formal educational contexts (general education, vocational training, lifelong training and specific skills learning).

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Executive Summary

The current document presents the first release of the MaTHiSiS platform, layer by layer, component by component, as described in **D2.3 - *Full system architecture M6*** [2].

Firstly, in Section 2.1, a description of the early front-end layer needed for the Driver pilots phase is provided. It's mainly useful to have this initial implementation to set up and to test back-end Open APIs and have the ability to test the work flow.

Secondly, in Section 2.2, a description of the back-end layer is provided. It contains all Open APIs and related libraries, mainly to manage the data used by the MaTHiSiS system. Core components, i.e. the Decision Support System, the Learning Graph Engine and the Experience Engine are also included.

Thirdly, in Section 2.3, a description of the platform agent layer is provided. It consists of the implementation of the common architecture on each concrete kind of Platform Agent, as well as the description of the initial set of Learning Materials available at M12.

Finally, the current progression status of the User Stories is given in Section 3.1, as a reference on the progression on the whole MaTHiSiS system. An update on the initial release planning included in the **D7.1 - *Integration Strategy and planning*** [11] is also provided in Section 3.2.

1. Introduction

This section provides detailed information about the purpose and the structure of the document.

1.1 Purpose of the document

The current document is the deliverable **D7.2 - MaTHiSiS platform, 1st release** and describes the outcomes of work package **WP7 - System Integration** and more specifically **T7.2 - Setup, integration and validation of the first platform**.

It is a public document. It serves as the reference document describing the milestone **MS2 - All independent components functioning and integrated in a common platform. Early learning material integrated**. It also provides a status on the development of the MaTHiSiS components.

DXT was the leader of the T7.2 that has finished in M12 and as such, was the leader of weekly project-wise Scrum meetings until the end of the first year. ATOS, as the leader of the T7.3 starting in M13, will now take the lead of these meetings and be responsible for the next versions of the MaTHiSiS platform due in the second year.

1.2 Structure of the document

This document contains the key sections detailed below:

- **Section 1: Introduction**

  This section clarifies the purpose and the structure of this deliverable and the context to which it belongs to.

- **Section 2: Setup**

  This section lists the components in development and that are being integrated in the first release of the MaTHiSiS platform, the pre-alpha version, layer by layer: front-end, back-end and platform agent layers. A link to each component on the GitLab used by technical partners is also provided when relevant.

- **Section** 3**: Backlog status and future release planning**

  This section provides the current status of the MaTHiSiS project Backlog, regarding its initial version delivered with the **D7.1 - Integration Strategy and planning** [11]. We also provide an outline on the future release planning, taking into account M7-M12 events.

- **Section 4: Conclusion**

  This section presents the conclusions of the document.

1.3 Access to GitLab

This document is public but the access to the code of each component using GitLab remains private. Specific credentials have been created for the Project Officer and the reviewers during the project, and sent directly to them.

2. Setup

In this section, all components in development and that are being integrated in the first release of the MaTHiSiS platform are listed and described layer by layer as defined in the **D2.3 - Full system architecture M6** [2]. This first version is the pre-alpha version of the platform to be used during the first Driver pilot phase.

2.1 MaTHiSiS Front-end

The first release of the MaTHiSiS Front-End will include all the components for delivering the Human-Computer-Interaction User Interfaces of the MaTHiSiS ecosystem. The main objective of the Front-End is to provide high quality User Experience (UX) interfaces for every single role within the platform.

The details of the Early Components are provided in the following section.

More details about the front-end can be found in these deliverable:

- **D3.1 - The MaTHiSiS Smart Learning Atoms M12** [3]
- **D3.3 - The MaTHiSiS Learning Graphs M12** [4]
- **D3.5 - Experience Engine M12** [5]

2.1.1 Early components

Name	MaTHiSiS Main Platform	Responsible partner	ATOS, DXT
Description	Contains the main web frontend of the MaTHiSiS platform. Mainly includes the login, the Learning Experience Supervisor, the general management of user, learner profiles, classrooms as well as the platform management such as venues and platform agents.		
Prototype	http://81.171.11.179:9000/app/ (access protected by login/password, provided by ATOS)		
Link	https://gitlab.atosresearch.eu/ari/mathisis/tree/master/Front-end/MaTHiSiS%20Main%20Platform		

Table 2: Front-end - MaTHiSiS Main Platform

Name	Learning Content Editor	Responsible partner	DXT
Description	Contains the main desktop application (Windows only) dedicated to the creation of the learning content used by the MaTHiSiS platform. It allows the creation of Learning Graphs, Smart Learning Atoms, Learning Actions and Learning Actions Materialization. Uses Open APIs to retrieve/store information from/to the cloud.		
Link	https://gitlab.atosresearch.eu/ari/mathisis/tree/master/Front-end/LCE		

Table 3: Front-end - Learning Content Editor

2.2 MaTHiSiS Back-end

This layer contains the components that will reside in the back-end. All components that will be described in Section 2.2.2 will reference the deliverable in which more information is available or will be available. In the later case, a link to the documentation of the early implementation is provided.

2.2.1 Cloud infrastructure

The MaTHiSiS cloud infrastructure has been deployed over an *Apache CloudStack* infrastructure.

Apache CloudStack is open source software for deploying public and private Infrastructure-as-a-Service (IaaS) clouds. It provides an open and flexible cloud orchestration platform to deliver reliable and scalable private and public clouds[1].
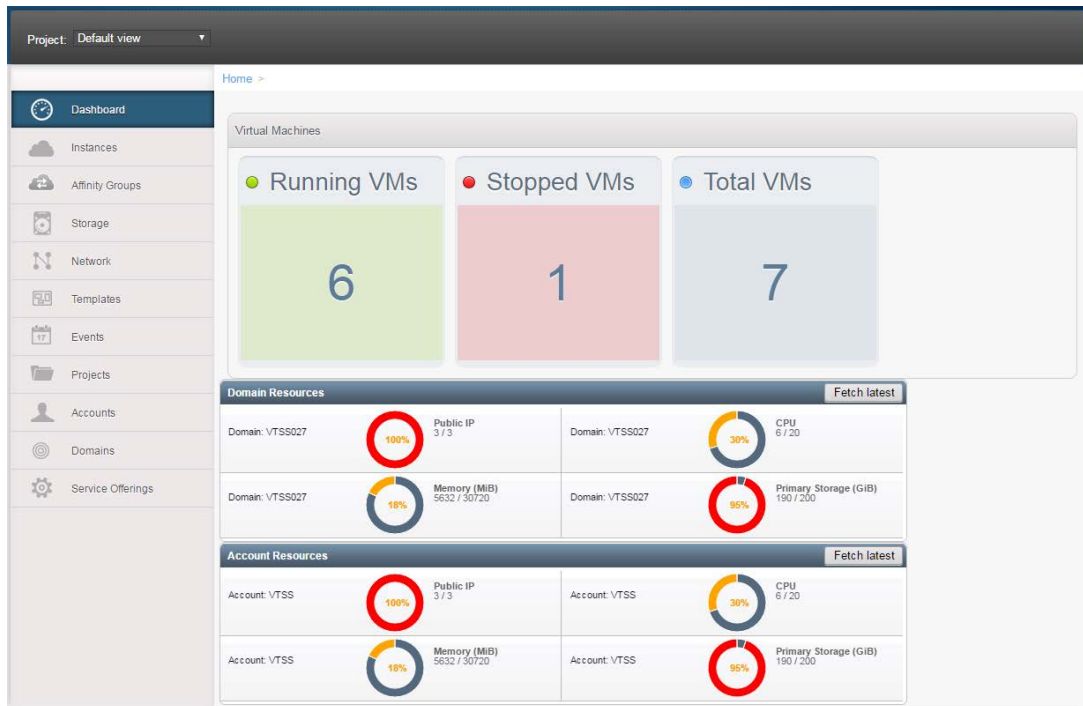
Figure 1: The OpenStack Dashboard

In this MaTHiSiS private cloud are deployed two environments/topologies, one used for the staging environment, i.e. used for development and testing purposes, and the other one that will be used later as the production environment. Both environments are continuously maintained and updated according the project needs.

2.2.1.1 Staging environment network topology

As the security requirements for the staging environment are not so strict due to the fact that it is used for development purposes, i.e. without real personal information, the entire staging cloud infrastructure has been deployed into the same Isolated Network.

A *CloudStack* network enables the management and configuration of a Firewall, a Load Balancer and port forwarding as part of the main characteristics of the network.

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[1] https://cloudstack.apache.org/about.html
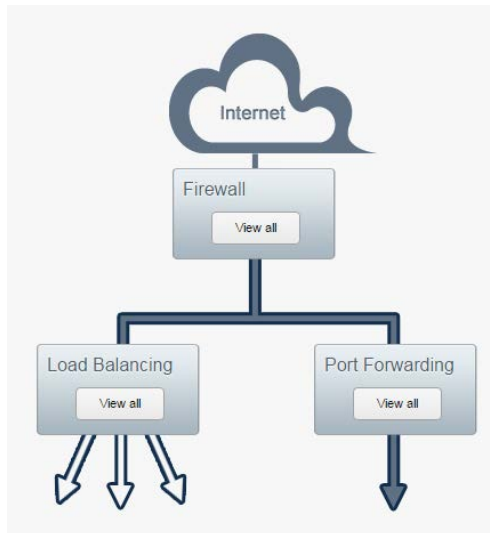
Figure 2: Firewall, Load balancing and Port Forwarding maintenance

The Firewall enables to manage the ports needed, and the Port Forwarding allows redirecting traffic to the desired virtual machine.

The Figure 3 depicts how the staging network is configured; the lists of open ports and virtual machines that appear in the image are dynamic and will be updated according the needs of the project.
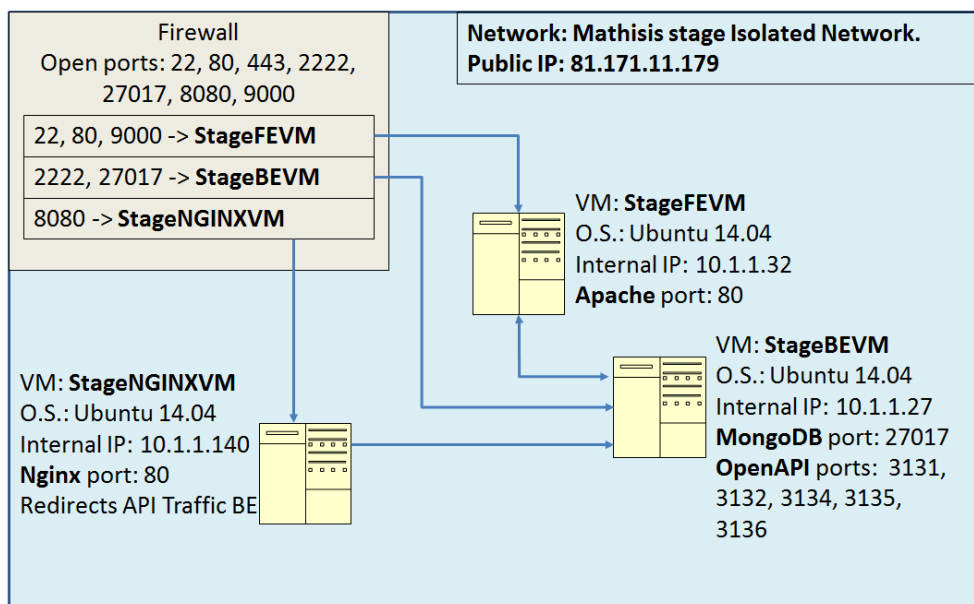
Figure 3: The MaTHiSiS Staging network topology

There are three Virtual Machines (VM) in the staging isolated network:

- **StageNGINXVM**: This VM has *nginx* installed, which is used to redirect traffic to the back-end VM that has the Open APIs running using the different ports. Through this VM, together with the Firewall redirection rules, it is possible to provide a unique end point (same port) for the different backend APIs.
- **StageFEVM**: This VM is the container of the deployed component that belongs to the front-end layer.
- **StageBEVM**: This VM is the container of the deployed components that belongs to the back-end layer.

2.2.1.2 Production environment network topology

According the MaTHiSiS high-level architecture described in **D2.3 - Full system architecture M6** [2] Section 3.2, the production environment has been created with different networks, one for the front-end layer and other for the back-end layer. This differentiation has been decided in order to provide more security between the Virtual Machine (VM) interconnections. In order to achieve the above, the production environment has been created over a Virtual Private Cloud (VPC) network. The *CloudStack* VPC is a private, isolated part of *CloudStack*. A VPC can have its own virtual network topology that resembles a traditional physical network.[2]
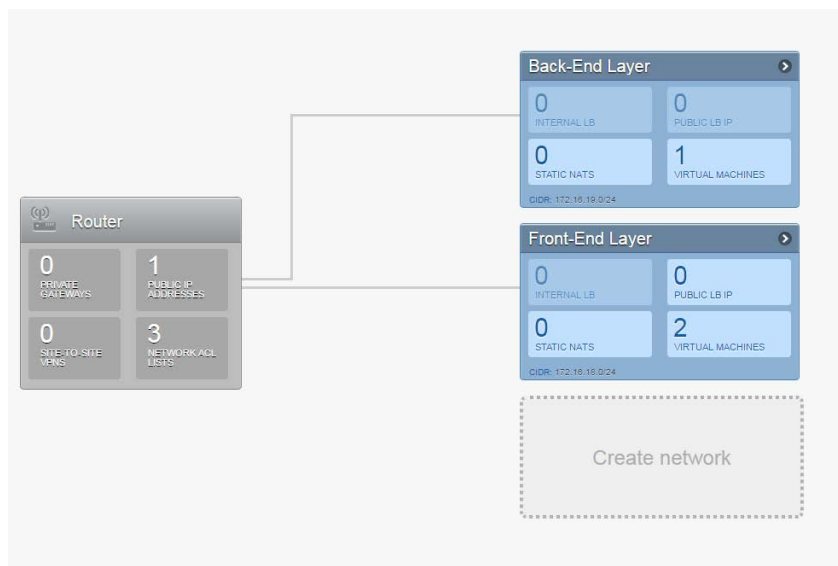
Figure 4: Virtual Private Cloud configuration

Similarly to the staging network, the management of ports and incoming traffic is also managed in the production environment. The VMs that need to contain the back-end of the MaTHiSiS platform are deployed in the Back-End Layer while the VMs that need to contain the front-end of the MaTHiSiS platform are deployed in the Front-End Layer, as shown in Figure 4.

The Figure 5 depicts how this production network topology is configured; similarly to the staging network, the lists of open ports (e.g. 2222, 2223, 27017) and the VMs that appear in the image are dynamic. They will be updated according the needs of the project.

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[2] https://svn.apache.org/repos/asf/cloudstack/docsite/html/docs/en-US/Apache_CloudStack/4.1.0/html/Admin_Guide/configure-vpc.html
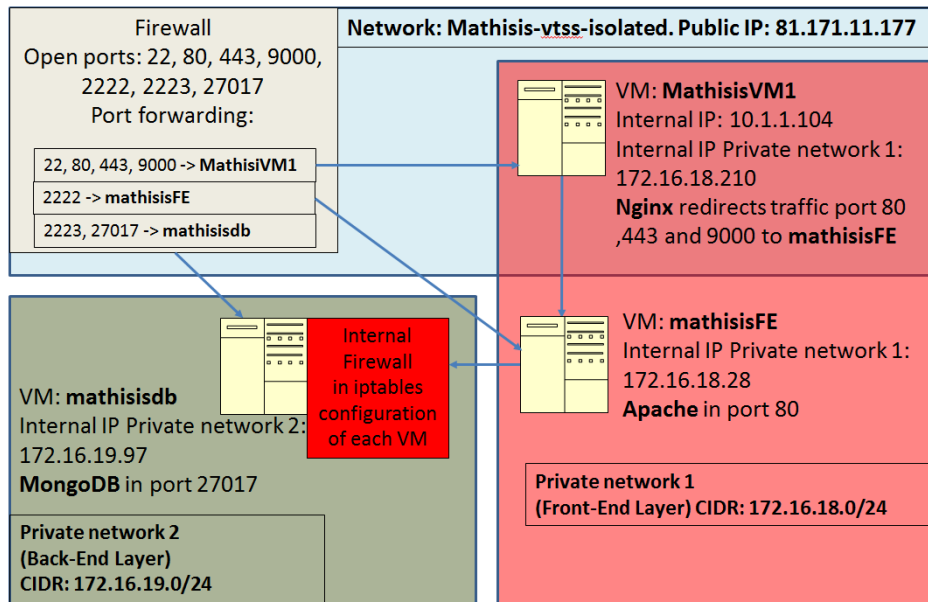
Figure 5: The MaTHiSiS Production network topology

As in the staging environment, there are three Virtual Machines in this network:

- *MathisisVM1*: This VM has installed *nginx* which is used to redirect the traffic to the rest of VMs.
- *mathisisFE*: This VM is the container of the deployments that belongs to the front-end layer.
- *mathisisdb*: This VM is the container of the deployments that belongs to the back-end layer.

2.2.2 Components

2.2.2.1 Open API Space

Name	Common API		Responsible partner	ATOS, DXT
Description	Contains all common functionality used in by different components of the MaTHiSiS platform. Currently it includes CRUD[3] functionality for the management of classrooms, venues, platform agents and learning sessions.			
Documentation	See Annex 1 in Section 6.1			
Link	https://gitlab.atosresearch.eu/ari/mathisis/tree/master/Back-end/OpenAPI/common			

Table 4: Back-end - Open API - Common

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[3] CRUD: **C**reate **R**ead **U**pdate **D**elete

Name	Learners' Profile Repository API	Responsible partner	ATOS
Description	Contains all CRUD functionality for the management of the learner profiles of MaTHiSiS.		
Deliverable	*D3.7 - Learner's Profile Repository M12* [6]		
Link	https://gitlab.atosresearch.eu/ari/mathisis/tree/master/Back-end/OpenAPI/lpr		

Table 5: Back-end - Open API - Learners' Profile Repository

Name	User Repository API	Responsible partner	ATOS
Description	Performs the general user management of the platform, roles management as well as provides the authentication mechanisms for the MaTHiSiS platform.		
Deliverable	*D3.7 - Learner's Profile Repository M12* [6]		
Link	https://gitlab.atosresearch.eu/ari/mathisis/tree/master/Back-end/OpenAPI/user		

Table 6: Back-end - Open API - User Repository

Name	LG lib API	Responsible partner	CERTH
Description	Provides the communication interface to main functions of the LG Library, via web services.		
Deliverable	*D3.3 - The MaTHiSiS Learning Graphs M12* [4]		
Link	https://gitlab.atosresearch.eu/ari/mathisis/tree/master/Back-end/OpenAPI/sla-lg		

Table 7: Back-end - Open API - Learning Graph

Name	SLA lib API	Responsible partner	CERTH
Description	Provides the communication interface to main functions of the SLA Library, via web services.		
Deliverable	*D3.1 - The MaTHiSiS Smart Learning Atoms M12* [3]		
Link	https://gitlab.atosresearch.eu/ari/mathisis/tree/master/Back-end/OpenAPI/sla-lg		

Table 8: Back-end - Open API - Smart Learning Atom

Name	LA lib API	Responsible partner	DXT
Description	Provides the communication interface to main functions of the LA Library, via web services.		
Deliverable	*D3.5 - Experience Engine M12* [5]		
Link	https://gitlab.atosresearch.eu/ari/mathisis/tree/master/Back-end/OpenAPI/LearningAction		

Table 9: Back-end - Open API - Learning Action

Name	LM lib API	Responsible partner	DXT
Description	Provides the communication interface to main functions of the LM Library, via web services.		
Deliverable	**D3.5 - *Experience Engine M12*** [5]		
Link	https://gitlab.atosresearch.eu/ari/mathisis/tree/master/Back-end/OpenAPI/LearningMaterial		

Table 10: Back-end - Open API - Learning Material

Name	AIR lib API	Responsible partner	UM
Description	Provides the communication interface to send data from the Sensorial Components and IPA component to the DSS lib for multimodal fusion.		
Deliverable	**D4.3 - *Affect understanding in MaTHiSiS M21***		
Documentation	https://gitlab.atosresearch.eu/ari/mathisis/tree/master/Back-end/OpenAPI/air/Documentation		
Link	https://gitlab.atosresearch.eu/ari/mathisis/tree/master/Back-end/OpenAPI/air		

Table 11: Back-end - Open API - Affect and Intent Recognition

2.2.2.2 User Space

Name	Classroom Library	Responsible partner	ATOS
Related API	**Common API**		
Description	This library delivers all necessary functions for managing both the structure and the access to Classrooms within MaTHiSiS platform. The library is embedded in the related Open API thanks to the technology used.		
Documentation	See Annex 1 in Section 6.1		
Link	https://gitlab.atosresearch.eu/ari/mathisis/tree/master/Back-end/OpenAPI/common/controllers		

Table 12: Back-end - User Space - Classroom

Name	Venue Library	Responsible partner	ATOS
Related API	**Common API**		
Description	This library delivers all necessary functions for managing both the structure and the access to Venues within MaTHiSiS platform. The library is embedded in the related Open API thanks to the technology used.		
Documentation	See Annex 1 in Section 6.1		
Link	https://gitlab.atosresearch.eu/ari/mathisis/tree/master/Back-end/OpenAPI/common/controllers		

Table 13: Back-end - User Space - Venue

Name	Platform Agent Library	Responsible partner	DXT
Related API	Common API		
Description	This library delivers all necessary functions for managing both the structure and the access to Platform Agents representation within MaTHiSiS platform. The library is embedded in the related Open API thanks to the technology used.		
Documentation	See Annex 1 in Section 6.1		
Link	https://gitlab.atosresearch.eu/ari/mathisis/tree/master/Back-end/OpenAPI/common/controllers		

Table 14: Back-end - User Space - Platform Agent

A difference with the *D2.3 - Full system architecture M6* [2] is the *CLS I/O lib Open API*. It has been divided in many smaller Open APIs for a better separation and to allow faster development by sharing the work among partners. The *CLS I/O lib Open API* is made of:

- the Common API;
- the Learners' Profile Repository API;
- the User Repository API;
- the AIR lib API.

2.2.2.3 Learning Content Space

Name	LG Library	Responsible partner	CERTH
Related API	LG lib API		
Description	This library delivers all necessary functions for managing both the structure and the access to Learning Graphs within MaTHiSiS platform. The library handles both personalized and unpersonalized Learning Graphs.		
Deliverable	*D3.3 - The MaTHiSiS Learning Graphs M12* [4]		
Link	https://gitlab.atosresearch.eu/ari/mathisis/tree/master/Back-end/LGlib		

Table 15: Back-end - Learning Content Space - Learning Graph

Name	SLA Library	Responsible partner	CERTH
Related API	SLA lib API		
Description	This library delivers all necessary functions for managing both the structure and the access to Smart Learning Atoms within MaTHiSiS platform. The library handles both personalized and unpersonalized Smart Learning Atoms.		
Deliverable	*D3.1 - The MaTHiSiS Smart Learning Atoms M12* [3]		
Link	https://gitlab.atosresearch.eu/ari/mathisis/tree/master/Back-end/SLAlib		

Table 16: Back-end - Learning Content Space - Smart Learning Atom

Name	LA Library	Responsible partner	DXT
Related API	LA lib API		
Description	This library delivers all necessary functions for managing both the structure and the access to Learning Actions and their materialization within MaTHiSiS platform. The library is embedded in the related Open API thanks to the technology used.		
Deliverable	*D3.5 - Experience Engine M12* [5]		
Link	https://gitlab.atosresearch.eu/ari/mathisis/tree/master/Back-end/OpenAPI/LearningAction/controllers		

Table 17: Back-end - Learning Content Space - Learning Action

Name	LM Library	Responsible partner	DXT
Related API	LM lib API		
Description	This library delivers all necessary functions for managing both the structure and the access to Learning Materials within MaTHiSiS platform. The library is embedded in the related Open API thanks to the technology used.		
Deliverable	*D3.5 - Experience Engine M12* [5]		
Link	https://gitlab.atosresearch.eu/ari/mathisis/tree/master/Back-end/OpenAPI/LearningMaterial/controllers		

Table 18: Back-end - Learning Content Space - Learning Material

2.2.2.4   Cloud Learner Space

Name	Learning Session Library	Responsible partner	DXT
Related API	Common API		
Description	This library delivers all necessary functions for managing both the structure and the access to Learning Sessions within MaTHiSiS platform. The library is embedded in the related Open API thanks to the technology used.		
Documentation	See Annex 1 in Section 6.1		
Link	https://gitlab.atosresearch.eu/ari/mathisis/tree/master/Back-end/OpenAPI/common/controllers		

Table 19: Back-end - Cloud Learner Space - Learning Session library

Name	AIR Library	Responsible partner	UM
Related API	AIR lib API		
Description	This library delivers all necessary functions to perform multimodal (late) fusion.		
Deliverable	*D4.3 - Affect understanding in MaTHiSiS M21*		
Documentation	https://gitlab.atosresearch.eu/ari/mathisis/tree/master/Back-end/OpenAPI/air/Documentation		
Link	https://gitlab.atosresearch.eu/ari/mathisis/tree/master/Back-end/OpenAPI/air		

Table 20: Back-end - Cloud Learner Space - Affect and Intent Recognition library

Name	Decision Support System	Responsible partner	UM
Description	This component delivers all necessary functions to implement personalization and adaptation of SLA weights for a user.		
Deliverable	*D4.3 - Affect understanding in MaTHiSiS M21* *D6.2 – The MaTHiSiS Learning Graph Engine*		
Documentation	https://gitlab.atosresearch.eu/ari/mathisis/blob/master/Back-end/DSSlib/README.md		
Link	https://gitlab.atosresearch.eu/ari/mathisis/tree/master/Back-end/DSSlib		

Table 21: Back-end - Cloud Learner Space - Decision Support System

Name	Learning Graph Engine	Responsible partner	CERTH
Description	This component delivers all necessary functions to implement personalization and adaptation of the LGs for a user, by taking into account the personalized/adapted SLA weight change from the DSS, the subsequent learning goals weight change and the importance of SLAs to given learning goals (i.e. edge weights), and thus (re-)adapting the vertex weights of the whole LG.		
Deliverable	*D6.2 – The MaTHiSiS Learning Graph Engine M24*		
Documentation	https://gitlab.atosresearch.eu/ari/mathisis/wikis/lge-methodology		
Link	https://gitlab.atosresearch.eu/ari/mathisis/tree/master/Back-end/LGE		

Table 22: Back-end - Cloud Learner Space - Learning Graph Engine

Name	Experience Engine	Responsible partner	DXT
Description	The Experience Engine is responsible for the materialization of the personalized and adapted Learning Graphs. It main goals is to find the right materialization regarding the learning context, i.e. the learner's profile, the Platform Agent used and the learning environment. The first version also takes into consideration a difficulty level..		
Deliverable	*D3.5 - Experience Engine M12* [5]		
Link	https://gitlab.atosresearch.eu/ari/mathisis/tree/master/Back-end/EE		

Table 23: Back-end - Cloud Learner Space - Experience Engine

2.2.3 The MaTHiSiS Database

The core repository of the MaTHiSiS platform lies within the MaTHiSiS cloud, in the MongoDB. MongoDB is a free, open source, cross-platform, document oriented NoSQL database that uses JSON documents with schemas[4]. MongoDB has been selected due to its scalability and superior performance by supporting large volumes of rapidly changing data (structured, semi-structured or unstructured), agile sprints with quick schema iterations, among other benefits it provides compared to traditional relational databases[5].

The database schema for MaTHiSiS has been initially presented in *D2.3 - Full system architecture M6* [2] Section 7. The updated version of the schema will be included in the new version of the MaTHiSiS Architecture, in the deliverable *D2.4 - Full system architecture M15* due for M15.

2.3 MaTHiSiS Platform Agents

This layer contains the components that will reside on the Platform Agents as well as the specific Learning Materials implemented for the first pilot phase. They are all well documented in the specific deliverable for each kind of PA:

- *D5.1 - Description of the robotic layer M12* [8];
- *D5.4 - Description of the mobile layer M12* [9];
- *D5.7 - Description of the interactive whiteboards layer M12* [10].

2.3.1 Components

2.3.1.1 Sensorial Component

Name	Sensorial Component	Responsible partner	CERTH
Description	This component is responsible for capturing sensorial data from the different sensors of the MaTHiSiS PAs and interpreting them to affective state cues. A specific implementation is provided per kind of PA to better fit the device capabilities and set of sensors.		
Deliverable	*D5.1 - Description of the robotic layer M12* [8]		
	D5.4 - Description of the mobile layer M12 [9]		

Table 24: Platform Agents - Sensorial Component

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[4] https://en.wikipedia.org/wiki/MongoDB
[5] https://www.mongodb.com/nosql-explained

2.3.1.2 Interactions with Platform Agent component

Name	Interactions with Platform Agent	Responsible partner	UM
Description	This component is responsible for the learners' affect understanding through interactions with LMs. To that purpose it receives from the LMs the xAPI statements representing the relevant interactions of the learner. The IPA component has then two main parts: • xAPI statements transformation and storage; • Affect-related features extraction. No specific feature was relevant per kind of PA, that's why this component is now residing in the cloud.		
Deliverable	*D5.1 - Description of the robotic layer M12* [8]		

Table 25: Platform Agents - Interactions with Platform Agent component

2.3.1.3 NAO Robot specific

Name	NAO Experiencing Service	Responsible partner	CERTH
Description	This component contains: • The initial version of the Sensorial Component, supporting facial expression analysis, gaze estimation, speech recognition and skeleton motion analysis. Each modality collects raw data and transmits the affective state per modality to the MaTHiSiS cloud. • The initial version of the Learning Material Launcher.		
Deliverable	*D5.1 - Description of the robotic layer M12* [8]		
Link	https://gitlab.atosresearch.eu/ari/mathisis/tree/master/Platform%20Agents/NAO/Experiencing%20Service		

Table 26: Platform Agents - NAO - Experiencing Service

2.3.1.4 TurtleBot specific

Name	TurtleBot Experiencing Service	Responsible partner	UM
Description	This component contains: • The initial version of the Sensorial Component, supporting face emotion features extraction. Due to the nature of the learning scenarios available, affect recognition based on SC data is not available. • The initial version of the Learning Material Launcher.		
Deliverable	*D5.1 - Description of the robotic layer M12* [8]		
Link	https://gitlab.atosresearch.eu/ari/mathisis/tree/master/Platform%20Agents/TurtleBot/Experiencing%20Service		

Table 27: Platform Agents - TurtleBot - Experiencing Service

2.3.1.5 Mobile specific

Name	Mobile Experiencing Service	Responsible partner	OTE
Description	Contains the initial version of the Sensorial Component and the Learning Material Launcher for mobile devices with Android as operating system.		
Deliverable	*D5.4 - Description of the mobile layer M12* [9]		
Link	https://gitlab.atosresearch.eu/ari/mathisis/tree/master/Platform%20Agents/mobile_es		

Table 28: Platform Agents - Mobile - Experiencing Service

Name	Mobile Devices Experiencing Service For DAT	Responsible partner	OTE
Description	Contains an initial version of the Sensorial Component and the Learning Material Launcher for the Mobile Devices integrated with the Data Acquisition tool.		
Deliverable	*D5.4 - Description of the mobile layer M12* [10]		
Link	https://gitlab.atosresearch.eu/ari/mathisis/tree/master/Platform%20Agents/mobile_es_for_dat		

Table 29: Platform Agents - Mobile - Experiencing Service for DAT

2.3.1.6 Interactive Whiteboard specific

Name	IWB Experiencing Service	Responsible partner	DXT, ATOS
Description	Contains an initial version of the Sensorial Component and the Learning Material Launcher for the Interactive Whiteboard Platform Agent.		
Deliverable	*D5.7 - Description of the interactive whiteboards layer M12* [10]		
Link	https://gitlab.atosresearch.eu/ari/mathisis/tree/master/Platform%20Agents/IWB/Experiencing%20Service		

Table 30: Platform Agents - IWB - Experiencing Service

2.3.2 Learning Materials

2.3.2.1 NAO specific Learning Materials

Name	Count the Sounds	Responsible partner	CERTH
Description	NaO plays a set of predefined sounds containing whistles (and/or other kinds of sounds) and asks the learner to identify the number of whistles played. NaO uses its speakers and microphones, to playback the sounds and recognize the learner's answer.		
Deliverable	*D5.1 - Description of the robotic layer M12* [8]		
Link	https://gitlab.atosresearch.eu/ari/mathisis/tree/master/Platform%20Agents/NAO/Learning%20Materials		

Table 31: Learning Material - NAO - Count the Sounds

Name	Bring the Objects	Responsible partner	CERTH
Description	NaO asks the learner to bring a number of specific objects and then checks if s/he brought the right number of objects. NAO recognizes the number of objects that were placed in front of it, through appropriate computer vision algorithms and provides feedback on whether the number of objects is right or wrong.		
Deliverable	*D5.1 - Description of the robotic layer M12* [8]		
Link	https://gitlab.atosresearch.eu/ari/mathisis/tree/master/Platform%20Agents/NAO/Learning%20Materials		

Table 32: Learning Material - NAO - Bring the Objects

Name	Sort the Numbers	Responsible partner	CERTH
Description	NaO says some numbers to the learner and asks her/him to sort them in descending or ascending order. NAO recognizes whether the learner repeated the number in the correct sequence or not.		
Deliverable	*D5.1 - Description of the robotic layer M12* [8]		
Link	https://gitlab.atosresearch.eu/ari/mathisis/tree/master/Platform%20Agents/NAO/Learning%20Materials		

Table 33: Learning Material - NAO - Sort the Numbers

Name	Greater or Less	Responsible partner	CERTH
Description	NaO says two random numbers and asks the learner to pick which one is greater or less. NaO uses its speakers and microphones to interact with the learner and identify the learner's answer.		
Deliverable	*D5.1 - Description of the robotic layer M12* [8]		
Link	https://gitlab.atosresearch.eu/ari/mathisis/tree/master/Platform%20Agents/NAO/Learning%20Materials		

Table 34: Learning Material - NAO - Greater or Less

2.3.2.2 TurtleBot specific Learning Materials

Name	Associating number to an amount	Responsible partner	UM
Description	TurtleBot implements an application to associate a given number (using written numbers or sounds) with the appropriate amount of objects.		
Deliverable	*D5.1 - Description of the robotic layer M12* [8]		
Link	https://gitlab.atosresearch.eu/ari/mathisis/tree/master/Platform%20Agents/TurtleBot/Learning%20Materials		

Table 35: Learning Material - TurtleBot - Associating number to an amount

Name	Biggest and smallest	Responsible partner	UM
Description	TurtleBot allows, using the recognition of colors/cards, the development of learning activities related to the identification of the biggest and smallest number between two given ones.		
Deliverable	*D5.1 - Description of the robotic layer M12* [8]		
Link	https://gitlab.atosresearch.eu/ari/mathisis/tree/master/Platform%20Agents/TurtleBot/Learning%20Materials		

Table 36: Learning Material - TurtleBot - Biggest and smallest

2.3.2.3 Mobile specific Learning Materials

Name	Object Identification	Responsible partner	NG
Description	A native mobile/tablet application where the user supposed to name the object displayed on the screen either by voice or by typing in the information. The learner has to answer within a certain time. If nothing changes, after several prompts the image changes		
Deliverable	*D5.4 - Description of the mobile layer M12* [10]		
Link	https://gitlab.atosresearch.eu/ari/mathisis/tree/master/Front-end/NativeMobile		

Table 37: Learning Material - Mobile - Object Identification

Name	Quantity correspondence	Responsible partner	NG
Description	A native mobile/tablet application prompting the learner to count the dots shown on the screen, offering three alternatives with the result if no reply follows		
Deliverable	*D5.4 - Description of the mobile layer M12* [10]		
Link	https://gitlab.atosresearch.eu/ari/mathisis/tree/master/Front-end/NativeMobile		

Table 38: Learning Material - Mobile - Quantity correspondance

Name	Sequence reproduction	Responsible partner	NG
Description	A native mobile/tablet game prompting to reproduce a sequence of pictures. A number of images are shown on the screen highlighting two of them in a sequence. The learner has to tap on the images reproducing the same sequence. The number of highlighted images in a sequence shall rise/diminish depending on the response of the learner		
Deliverable	*D5.4 - Description of the mobile layer M12* [10]		
Link	https://gitlab.atosresearch.eu/ari/mathisis/tree/master/Front-end/NativeMobile		

Table 39: Learning Material - Mobile - Sequence reproduction

Name	Count the objects	Responsible partner	NG
Description	A native mobile/tablet game prompting to the learner to count the objects appearing on the screen on the first sight		
Deliverable	*D5.4 - Description of the mobile layer M12* [10]		
Link	https://gitlab.atosresearch.eu/ari/mathisis/tree/master/Front-end/NativeMobile		

Table 40: Learning Material - Mobile - Count the objects

2.3.2.4 Web-based Learning Materials

Name	Quiz	Responsible partner	OTE
Description	A web-based learning game that displays a list of questions with some potential answers for each one. The game asks the pupil to indicate which of the answers is the correct. The pupil needs to tap or click the correct answer.		
Deliverable	*D5.4 - Description of the mobile layer M12* [10]		
Link	https://gitlab.atosresearch.eu/ari/mathisis/tree/master/Front-end/Learning%20Materials/WebBased/LM%20Quiz%20Game		

Table 41: Learning Material - Web-based - Quiz

Name	Ordering random numbers	Responsible partner	ATOS
Description	A web-based learning game that displays two different numbers and asks the pupil to indicate which is the biggest/smallest. The pupil needs to tap on the correct number.		
Deliverable	*D5.7 - Description of the interactive whiteboards layer M12* [10]		
Link	https://gitlab.atosresearch.eu/ari/mathisis/tree/master/Front-end/Learning%20Materials/WebBased/LM%20Ordering%20random%20numbers		

Table 42: Learning Material - Web-based - Ordering random numbers

Name	**Which one is the biggest number**	**Responsible partner**	**ATOS**
Description	A web-based learning game where the pupil needs to order random numbers into the correct order.		
Deliverable	***D5.7 - Description of the interactive whiteboards layer M12*** [10]		
Link	https://gitlab.atosresearch.eu/ari/mathisis/tree/master/Front-end/Learning%20Materials/WebBased/LM%20which%20one%20is%20the%20biggest%20number		

Table 43: Learning Material - Web-based - Which one is the biggest number

Name	**YouTube Video tracker**	**Responsible partner**	**ATOS**
Description	A web-based YouTube video player that tracks user interactions.		
Link	https://gitlab.atosresearch.eu/ari/mathisis/tree/master/Front-end/Learning%20Materials/WebBased/LM%20YouTube%20Video%20Tracker		

Table 44: Learning Material - Web-based tracker- YouTube Video Tracker

3. Backlog status and future release planning

3.1 User stories implementation status in Pre-Alpha version (M12)

In **D7.1 - Integration Strategy and planning** [11] Section 3.1, a list of user stories were selected reflecting the functionalities planned to be included for the first release, the pre-alpha version for M12 of the project. This list is included hereby with the updated status of implementation up to M12.

Pre-Alpha version (M12)		Status	Comments
LCE02	As a Tutor, I want to create a complete (Learning Graph and associated SLAs) new LG in order to use them in the classroom or let other users to use them.	Partially done	The Learning Content Editor allows creating a complete new LG. Use the initial version of the LM data model.
LCE03	As a Tutor, I want to have the choice between editing an existing LG or editing a newly created LG in order to have the possibility to create new learning scenario or change an existing one.	Partially done	The Learning Content Editor can be launched for editing an existing LG, but still needs to connect to the MaTHiSiS main platform to launch the LCE.
LCE04	As a Tutor, I want to be guided in the process of creating a learning scenario using the MaTHiSiS platform in order to achieve properly my teaching objectives.	Not done	Documents explaining how to create a learning scenario are available, but nothing embedded in the front-end right now.
LCE05	As a Tutor, I want to be able to browse the MaTHiSiS repository where I am presented with a list of Learning Graphs that other MaTHiSiS contributors have made available publicly, along with some example graphs that the MaTHiSiS platform provides in order to take ideas when creating my own Learning Graph.	Not done	The Browser is in place as a mock-up in the front-end but still needs to be implemented. No example graphs provided right now.
LCE06	As a Tutor, I want to attach Learning Actions to the SLAs of a newly created or edited LG that I am going to use in order to make the SLAs MaTHiSiS-ready	Done	Available in the SLA editor in the LCE.
LCE07	As a Tutor, I want to create identifiers for the physical materials that I am going to use in order to make them identifiable by PAs.	Not done	Has been scheduled for the next release.
LCE08	As a Tutor, I want to manage the Learning Materials I have available in order to be able to use them through the MaTHiSiS-enabled learning experience	Partially done	Initial version of the LM Configurator is available in the front-end.
LCE09	As a Tutor, I want to create materializations for LAs of the LGs' SLAs that I am going to use in order to make them available during Learning Sessions.	Done	Available in the LAM editor in the LCE.
PC02	As a Tutor, I want to be able to define my PAs in order to have them ready for learning experiences / sessions.	Partially done	Initial version of the PA Configurator is available in the front-end.
PC03	As a Tutor, I want to be able to define my already known learning environments with their PAs in order to have them ready for learning experiences / sessions.	Not done	Still missing the front-end to edit the association between learning environments and PAs. The back-end is in place.

PC05	As an Administrator, I want to set up the MaTHiSiS platform in order to allow it to work on my local network.	Not done	Has been scheduled for the next release.
PC06	As an Administrator, I want to be able to install the MaTHiSiS platform on my private network, without connection with Internet.	Not done	Has been scheduled for the next release.
LES01	As a Tutor, I want to be able to set up a new Learning Session in order to make supervised learners work on their learning scenario.	Not done	Initial mock-up of the Learning Experience Controller is available in the front-end. Still missing some components in the back-end.
LES02	As a Tutor, I want to follow learning experiences of learners under my responsibility in order to check their progress.	Not done	Mock-ups are in place in the front-end, but implementation is still not done. Has been scheduled for the next release.
LES03	As a Tutor, I want to define the learning context before the beginning of a Learning Session in order to define which learner will use which PA and select the current learning environment.	Not done	Initial mock-up of the Learning Experience Controller is available in the front-end. Still missing some components in the back-end.
LES04	As a Tutor, I want to validate and change if needed the choices made by MaTHiSiS during a Learning Session in order to provide my knowledge and my understanding of the situation.	Not done	Mockups are in place and reflections around this functionality have been done, but still need to be implemented. Has been scheduled for the next release.
LES05	As a Tutor, I want to stop / pause / resume a running Learning Session in order to manage external events.	Partially done	Only working on the stop action right now. Others have been scheduled for the next release.
LES06	As a Tutor, I want to have a very simple Learning Session initialization phase in order to avoid workload for my supervised learners that could be persons with special needs.	Partially done	Initial process in place.
LES10	As a Tutor, I want to be able to start a Learning Sessions in hard learning contexts (e.g. noisy, over illuminated, without network connection, etc.) in order to match my specific learning environments (e.g. factories, classrooms, etc.)	Not done	Has been scheduled for the next release.
LES12	As a Learner I will interact with my preferred PA in order to improve my skills and it will gather all information about my current affective status and progress in order to trigger real-time Learning Graph adaptation.	Partially done	No preferred PA for now. Some Sensorial Components are available (cf. Sections 2.3.1.3, 2.3.1.4, 2.3.1.5 and 2.3.1.6 for more information).
LES13	As a Learner, I may be prompted to change certain parameters of the learning experience settings (e.g. switch to another challenge or difficulty level in order to raise engagement when the system has detected I am bored.	Not done	Automatically managed by the LA materializations.

LES15	As a Learner, I want to be able to intervene to my learning experience in order to better match my needs.	Not done	Has been scheduled for the next release.
LES17	As a Learner, I want to be able to enjoy a learning experience, without providing affect state data.	Not done	Has been scheduled for the next release.
LES18	As a Learner, I want to practice using touch screens or waving in front of the robot in order to interact with these PAs.	Done	First Learning Materials demonstrate it.
LPR02	As a Tutor, I want to be able to fill in some parts of supervised learners' profile I am in charge of in order to let the MaTHiSiS platform takes this information into account.	Partially done	An initial version is in place. The tutor is able to manage learner´s profiles through the platform´s web frontend.
LPR03	As a Tutor, I want to be able to give some rights to parents/caregivers in order to let them change the learning experience of their child (supervised learner).	Not done	Roles management has not been done in the current version.
LPR04	As a Tutor, I want to be able to prevent parents/caregivers to modify the learning experience of their child (supervised learner) in order to ensure his performance information is consistent with his activities.	Not done	Roles management has not been done in the current version.
LPR05	As a Tutor, I want to be able to give rights to my independent learners in order to let them manage their learning experiences.	Not done	Roles management has not been done in the current version.
LPR06	As a Parent/Caregiver I want to browse the Learning Graphs on the cloud and identify the graph used at the child's school in order to continue my child's schoolwork at home from right where the child left it.	Not done	Has been scheduled for the next release.
LPR07	As a Parent/Caregiver I want to be able to access the Learning Profile Repository using my child's Learner ID in order to access and update my child's information and to ensure that it is up-to-date.	Partially done	An initial version is in place. The Parent/Caregiver is able to manage learner´s profiles through the platform´s web frontend.
LPR08	As a Parent/Caregiver I want to be able to visualize my child´s performance using my child's Learner ID.	Not done	Mockups are in place, but implementation is still not done.
LPR10	As a Learner I want to be able to create my user profile and define my own learner preferences/competences in order to adapt learning directives based on my needs, competencies and requirements.	Partially done	An initial version is in place. It is possible to create a learner´s profile, although the platform yet is not able to adapt learning directive based on it.
LPR12	As a tutor I want to manage/create/delete student accounts in order to organize my data.	Partially done	An initial version is in place.

3.2 Future MaTHiSiS release planning

The technical partners will continue following the plan as set by *D7.1 - Integration Strategy and planning* [11] and Section 3.1 above. The first step will be to finalize the integration of the pre-alpha version with the initial version of all components. This work will be done in M13 to be ready for the first demonstration of the platform and for the Driver pilot phase.

Afterwards, the second year of the project includes a major release in M24, the beta version, but with an intermediate internal release, the alpha version, scheduled for M18, which should be ready for the Assisted pilots. Most of the functionalities will be included in the alpha version, whereas the beta version will include the final set with all functionalities that will be included in the MaTHiSiS platform.

D2.2 - Full Scenarios for all Use Cases [1] in Section 6, generated a detailed list of user stories, extracted from the requirements from the pilots. This list will be taken into account in the first Sprints of the second year and will be planned among the Sprints up to M24 according to the MoSCoW classification as well as the feasibility of their implementation.

As always, all project technical partners will continue using the issue tracker tool of the project, GitLab, in order to manage tasks and keep track on the development work in the project.

4. Conclusion

The current deliverable describes the first version of all components that are being integrated in the first release of the MaTHiSiS platform, the pre-alpha version. It will be finalized during M13.

This version consists of an early front-end allowing partners to check the workflow that will be proposed to and used by the end users during the first Driver pilot phase. During M13 and M14, new iterations on the front-end will be achieved and the first feedback received from partners representing end users will be taken into account.

In the back-end, all components are being integrated in their first versions and are able to provide a working framework for future updates, thus validating the architecture. Nevertheless, this is only the first step and there are still consolidations and new algorithms to integrate during next months, at least for tasks that will start in M15, but this suggests very encouraging possibilities.

On platform agents, the architecture is well defined but components still need to be upgraded in order to manage existing Learning Materials, thanks to the Learning Material Framework. The Sensorial Component will also be split in two parts, allowing the use of more computational expensive algorithms in the future on the cloud, and no longer on possibly cheap devices.

Between M18 and M24, Assisted pilots will occur and to that purpose, an alpha version will be setup. But the next deliverable *D7.3 - MaTHiSiS platform, 2nd release* will describe the beta version of the integration of all components due in M24, an update of the alpha version, with the report on its validation through the *D7.4 - Platform validation reports M24*.

5. References

[1] Nottingham Trent University (ed.): D.2.2 *Full Scenarios for all Use Cases*. Deliverable of the MATHISIS project, 2016.

[2] DIGINEXT (ed.): D2.3 *Full system architecture*. Deliverable of the MATHISIS project, 2016.

[3] DIGINEXT (ed.): D3.1 *The MaTHiSiS Smart Learning Atoms M12*. Deliverable of the MaTHiSiS project, 2017.

[4] Centre For Research and Technology Hellas (ed.): D3.3 *The MaTHiSiS Learning Graphs M12*. Deliverable of the MaTHiSiS project, 2017.

[5] DIGINEXT (ed.): D3.5 *Experience Engine M12*. Deliverable of the MaTHiSiS project, 2017.

[6] ATOS (ed.): D3.7 *Learner's Profile Repository M12*. Deliverable of the MaTHiSiS project, 2017.

[7] Centre For Research and Technology Hellas (ed.): D4.1 *MaTHiSiS sensorial component M12*. Deliverable of the MaTHiSiS project, 2017.

[8] University of Maastricht (ed.): D5.1 *Description of the robotic layer M12*. Deliverable of the MaTHiSiS project, 2017.

[9] OTEAcademy (ed.): D5.4 *Description of the mobile layer M12*. Deliverable of the MaTHiSiS project, 2017.

[10]ATOS (ed.): D5.7 *Description of the interactive whiteboards layer M12*. Deliverable of the MaTHiSiS project, 2017.

[11]ATOS (ed.): D7.1 *Integration Strategy and planning*. Deliverable of the MATHISIS project, 2016.

[12]DIGINEXT (ed.): D7.2 *MaTHiSiS platform, 1st release*. Deliverable of the MATHISIS project, 2017.

[13]MaTHiSiS Description of Action, 2016.

6. Annexes

6.1 Common API

Users that will consume the Common API will be able to get and publish data from the appropriate URLs, this are detailed in this document:

The Common Open API will be subject to an authentication mechanism, which is described in the Deliverable **D7.2 - MaTHiSiS platform, 1st release.**

You will find here a description of requests available for each route. Response data models are present in the documentation below.

/classrooms

Method	GET		
Description	Return the list of classrooms		
Responses	If Success return classrooms data model		
	If Error return ErrorResponse data model		
Parameters	Name	Location	Data Type
	X-User-Path	header	string
	X-User-Token	header	string
	userid	query	string
	venueid	query	string
	search	query	string
	sort	query	string

Method	POST		
Description	Add a classroom to the list of classrooms		
Responses	If Success return GeneralResponse data model		
	If Error return ErrorResponse data model		
Parameters	Name	Location	Data Type
	X-User-Path	header	string
	X-User-Token	header	string
	classroom_properties	body	schema: classroom{}

/classrooms/{id_classroom}

Method	GET		
Description	Return a classroom by its identifier		
Responses	If Success return classroom data model		
	If Error return ErrorResponse data model		
Parameters	**Name**	**Location**	**Data Type**
	X-User-Path	header	string
	X-User-Token	header	string
	id_learning_material	path	string

Method	PUT		
Description	Update a classroom by its identifier		
Responses	If Success return GeneralResponse data model		
	If Error return ErrorResponse data model		
Parameters	**Name**	**Location**	**Data Type**
	X-User-Path	header	string
	X-User-Token	header	string
	id_classroom	path	string
	learning_material_properties	body	Schema: classroom{}

Method	DELETE		
Description	Remove a classroom by its identifier		
Responses	If Success return GeneralResponse data model		
	If Error return ErrorResponse data model		
Parameters	**Name**	**Location**	**Schema**
	X-User-Path	header	string
	X-User-Token	header	string
	id_classroom	path	string

/venues

Method	GET		
Description	Return the list of venues		
Responses	If Success return venues data model		
	If Error return ErrorResponse data model		
Parameters	**Name**	**Location**	**Data Type**
	X-User-Path	header	string
	X-User-Token	header	string
	search	query	string
	sort	query	string

Method	POST		
Description	Add a venue to the list of venues		
Responses	If Success return GeneralResponse data model		
	If Error return ErrorResponse data model		
Parameters	**Name**	**Location**	**Data Type**
	X-User-Path	header	string
	X-User-Token	header	string
	venue_properties	body	schema: venue{}

/venues/{id_venue}

Method	GET		
Description	Return a venue by its identifier		
Responses	If Success return venue data model		
	If Error return ErrorResponse data model		
Parameters	**Name**	**Location**	**Data Type**
	X-User-Path	header	string
	X-User-Token	header	string
	id_venue	path	string

Method	PUT		
Description	Update a venue by its identifier		
Responses	If Success return GeneralResponse data model		
	If Error return ErrorResponse data model		
Parameters	**Name**	**Location**	**Data Type**
	X-User-Path	header	string
	X-User-Token	header	string
	id_venue	Path	string
	venue_properties	body	schema: venue{}

Method	DELETE		
Description	Remove a venue by its identifier		
Responses	If Success return GeneralResponse data model		
	If Error return ErrorResponse data model		
Parameters	**Name**	**Location**	**Schema**
	X-User-Path	header	string
	X-User-Token	header	string
	id_venue	Path	string

/platformagents

Method	GET		
Description	Return the list of platform agents		
Responses	If Success return platform agents data model		
	If Error return ErrorResponse data model		
Parameters	**Name**	**Location**	**Data Type**
	X-User-Path	header	string
	X-User-Token	header	string
	search	query	string
	sort	query	string

Method	POST		
Description	Add a platform agent to the list of platform agents		
Responses	If Success return GeneralResponse data model		
	If Error return ErrorResponse data model		
Parameters	**Name**	**Location**	**Data Type**
	X-User-Path	header	string
	X-User-Token	header	string
	platformAgent_properties	body	schema: platformAgents{}

/ platformagents /{id_platformAgent}

Method	GET		
Description	Return a platform agent by its identifier		
Responses	If Success return platform agent data model		
	If Error return ErrorResponse data model		
Parameters	**Name**	**Location**	**Data Type**
	X-User-Path	header	string
	X-User-Token	header	string
	id_platformAgent	path	string

Method	PUT		
Description	Update a platform agent by its identifier		
Responses	If Success return GeneralResponse data model		
	If Error return ErrorResponse data model		
Parameters	**Name**	**Location**	**Data Type**
	X-User-Path	header	string
	X-User-Token	header	string
	id_platformAgent	Path	string
	platformAgent_properties	body	schema: platformAgents{}

Method	DELETE		
Description	Remove a platform agent by its identifier		
Responses	If Success return GeneralResponse data model		
	If Error return ErrorResponse data model		
Parameters	**Name**	**Location**	**Schema**
	X-User-Path	header	string
	X-User-Token	header	string
	id_ platformAgent	path	string

/ learningSessions

Method	GET		
Description	Return the list of learning sessions		
Responses	If Success return an array of LearningSession data model		
	If Error return ErrorResponse data model		
Parameters	**Name**	**Location**	**Data Type**
	search	query	string
	sort	query	string

Method	POST		
Description	Add a platform agent to the list of platform agents		
Responses	If Success return GeneralResponse data model		
	If Error return ErrorResponse data model		
Parameters	**Name**	**Location**	**Data Type**
	learning_sessions_properties	body	schema: LearningSession{}

Method	DELETE		
Description	Delete al Learning sessions from the list		
Responses	If Success return GeneralResponse data model		
	If Error return ErrorResponse data model		

/ learningSessions /{id_learning_session}

Method	GET		
Description	Return a learning sessions by its identifier		
Responses	If Success return LearningSession data model		
	If Error return ErrorResponse data model		
Parameters	**Name**	**Location**	**Data Type**
	search	query	string
	sort	query	string

Method	PUT		
Description	Update a learning session by its identifier		
Responses	If Success return GeneralResponse data model		
	If Error return ErrorResponse data model		
Parameters	**Name**	**Location**	**Data Type**
	id_learning_session	path	string
	learning_sessions_properties	body	schema: LearningSessionPost{}

Method	DELETE		
Description	Delete a learning session by its identifier		
Responses	If Success return GeneralResponse data model		
	If Error return ErrorResponse data model		
Parameters	**Name**	**Location**	**Data Type**
	id_learning_session	path	string

Responses data models

GeneralResponse	
Success	Number
Description	string

ErrorResponse	
access	Boolean (true,false)
message	string

classroom	
Name	string
description	string

venue	
name	string
description	string
classrooms	classroom{}
lao_categories	Array of strings
platform_agents	Array of platform agent ids

platformAgents	
name	string
addr	string
laoCategories	Array of strings

LearningSession	
learning_graph	string
start_date	Date
states	Array of states
status	string
learner	string
tutor	string
venue	string
associated_platform_agent	string
learning_graph	string
learning_graph_personalized	string
current_learning_action	string
current_learning_material	string

affective_status	Array of strings
performance_status	string

LearningSessionPost	
status	string
tutor	string
venue	string
learning_graph_personalized	string
current_learning_action	string
current_learning_material	string

Updated information in: https://gitlab.atosresearch.eu/ari/mathisis/wikis/common-api