Documents for trainers

How to use BIM GAME in course

BIM GAME I.O. #4

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1 Introduction

BIM Game is a set of training devices on collaboration in a BIM process. For practical reasons, BIM Game focuses on a well-defined phase of a BIM process. The ultimate goal is to be able to train on collaboration in a BIM process.

The scenario may have different stated objectives to push for the development of outputs, but the hidden goal that must be put forward at the end of the scenario is the ability to collaborate.

Therefore, beyond the scenario that could be proposed, the teacher must equip himself with means to evaluate the acquisition of learning at the level of collaboration and not at the level of job skills. Job skills must be prerequisites. This evaluation of the collaboration must also be able to be done whatever the scenario proposed.

At the end of this document, you can find several document to help a teacher:

Annex A: Example of a scenario schedule
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Annex E: Draft for 6 scenarios with map links between actors
Annex F: Table to manage experimentation
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2 Basis of a scenario

The scenarios of the BIM game are based on problems from real construction projects. In this way, the diversity and complexity of the projects to be solved on a daily basis should be brought closer to the students. In addition, the realistic tasks should increase the motivation to deal with the topic. The BIM GAME I.O. *3 "Educational scenarios"* indicates which kind of issues have to be solved in the different scenarios and how they are related to real live projects.

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Furthermore, each scenario focusses on one aspect of the BIM process. As BIM can be used from the project development till the demolition and from 3D modelling to 8D modelling, there are many possibilities in how to involve BIM in the scenarios.

3 Scenario Design

3.1 Scenario design overview

Whether designing a new scenario or preparing to adopt a BIM GAME existing scenario, you will find it helpful to begin your scenario preparation by clearly defining what you expect your students to have learned by the end of your scenario. You can then put together students in teams, or select individual roles to play, that serve the learning outcomes you have chosen.

Consider the topic and level of your scenario, and ask yourself:

- What is the most important information students should learn and remember from this scenario (facts and other kinds of core knowledge)?
- What are the most important ideas that students should understand after playing this scenario (knowledges, competences, process, theories, approaches, perspectives, and other broad themes in BIM)?
- What are the most important skills that students should develop in this course (laboratory skills, problem-solving skills, creative skills, writing skills, etc.)?

3.2 Audience overview

Some questions about your audience:

- Who are your students?
- What are their motivations for taking your scenario?
- Are they ready to work together in different teams ?
- What background knowledge and skills can you expect them to have?

The success of your scenario will be determined not only by how well it meets your personal teaching goals, but by how well you manage to match your scenario co-ntent to the goals and backgrounds of your students.
To get a general sense of your likely audience, see on bimgame.eu all the scenarios tested, contact the BIM GAME team to help you to build your scenario.

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By considering many factors, you can begin to imagine the needs and possible attitudes of your students.

☞ *Have a look on I.O. #3 "Educational scenarios"*

3.3 Translating Goals into Scenario Content

Once you have identified the most important learning outcomes for your scenario, you are ready to assemble the means that will best support your goals. In doing so, you will want to focus on three questions:

- Do you have any materials about a known situation (local project is better for students) ?
- What materials (3D model, 2D plans, requirements, technical document, lego/duplo system…) do students need access to in order to play the scenario ?
- What kind of software do students need on their computers ?
- What assignments (papers, problem sets, projects) and experiences (discussions, labs, field trips, collaborative activities) will give students the opportunity to reinforce the information and ideas of the scenario, as well as practice key skills?

3.4 Design BPMN diagram

3.4.1 What is BPMN ?

Business Process Model and Notation (BPMN) is a well-known modeling standard to use in business process modeling. It's often created to aid business process analysis, business process improvement or reengineering. BPMN visualizes business processes from the beginning to the end, showing the sequence of process activities and the information flow between the participants.

3.4.2 BPMN symbols

There are five basic categories of BPMN elements. Each of them represents a unique aspect of the business process.

Swimlane

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Swimlanes are graphical containers that represent participants of a process. There are two types of swimlanes—pools, and lanes.

Flow Elements
Flow elements are elements that connect to form business workflows. Flow elements are the primary elements that define the behavior of a process. There are three kinds of flow elements: Events, Activities, and Gateways.

Connecting Objects
Flow objects are not isolated, but rather connected to form a flow. The connectors that connect the flow objects are called connecting objects. There are four kinds of connecting objects: Sequence flows, message flows, associations and data associations.

Data
Data is mainly information needed or produced when executing a business process. There are four kinds of data: Data objects, data inputs, data outputs and data stores.

☞ *Have a look on annex B: Business Process Model and Notation*

3.4.3 BPMN for BIM GAME

A new BIM GAME scenario may required a modeled BPMN process defining:

- The different actors;
- The inputs;
- The stages of the scenario;
- The different roles in each step;
- The outputs

- A descriptive document of the scenario with the declared objectives;
- Fact sheets describing the skills and roles expected of each participant;
- Software to use to perform the different tasks;
- Software to use for collaboration;
- Access to the BIM Game collaboration platform;
- The evaluation grid of collaborative work.

Will role-playing help students understand certain topics? Also consider delegating a certain amount of content coverage to peer instruction, in which students—through careful group research and presentations— teach their classmates. Studies have

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shown that students achieve the highest level of information retention and comprehension when they have taught the material themselves. Explain to students the value of such active engagement with the course content; you may also want to devote some class time and office hours to guiding students in their explorations and preparing them for peer instruction, so that they do not perceive peer instruction as an avoidance of your own teaching duties.

3.5 Plan the scenario schedule

Finally, of course, you will plan the schedule of the scenario: is it a work with different teams ? how much time to read all the documents at the beginning ? How much time to understand the goals of the scenario ?

☞ Have a look on annex A: example of scenario schedule

3.6 Get feedback

Once you have your scenario outline, check it over carefully. Even better, have a colleague look it over and react. Is it meaty—is there enough material to challenge the students intellectually and sustain their interest? Is it flexible—if students make suggestions, do you have room to incorporate them? Is it coherent—is there a recognizable connection between the3D models, documents, and role assignments? Do the major themes of the scenario stand out? Is there a sense of intellectual movement— will students emerge with not only more information, but also new skills and capabilities?

☞ Have a look on I.O. #7: "Evaluation reports"

3.7 Deliverable

Once your scenario outline is finished, you can prepare a version of it for your students, other teachers or to upload it on the BIM GAME website. Your syllabus is both an invitation to students interested in your scenario and a contract between you and the student. For these reasons, your syllabus should contain, at a minimum:

- A descriptive document of the scenario with the declared objectives;
- Scenario prerequisites;
- A modeled BPMN process defining:
- Fact sheets describing the skills and roles expected of each participant;

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- Software to use to perform the different tasks;
- Software to use for collaboration;
- Access to the BIM Game collaboration platform;
- The evaluation grid of collaborative work.

☞ *Have a look on bimgame.eu: you can upload your scenario on bimgame.eu in the menu "Get Involved"*

4 BIM GAME Open badges

We use the open badge system for the BIM GAME competition with students. In this section, you will find all information about criteria, competences targeted, etc…

Open Badges are verifiable, portable digital badges with embedded metadata about skills and achievements. They comply with the Open Badges Specification and are shareable across the web.

Each Open Badge is associated with an image and information about the badge, its recipient, the issuer, and any supporting evidence. All this information may be packaged within a badge image file that can be displayed via online CVs and social networks. Thousands of organizations across the world issue badges in accordance with the Open Badges Specification, from non-profits to major employers to educational institutions at all levels.

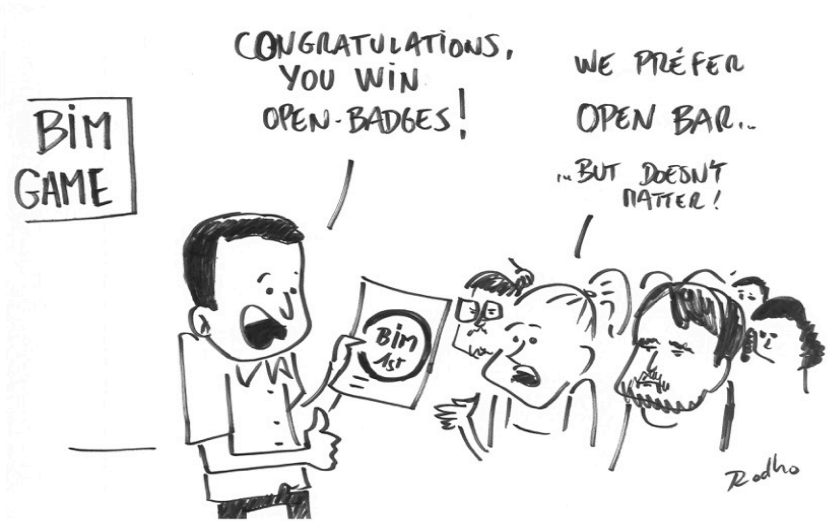

Figure 1 - Drawing by Rodho for the BIM GAME Event in Beasnçon

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4.1 Badge #1 : BIM GAME BCF Collaboration

4.1.1 Picture

4.1.2 Tags

BCF, BIM, BIMGame, building, collaboration, data

4.1.3 Description

The Open BIM Collaboration Format (BCF) is a data interface for the simplified exchange of information during the work process between different software products based on the IFC exchange format. It enables model-based communication between different users and provides information on status, location, direction of view, part, comment, user and time in the IFC data model.

4.1.4 Criteria

The beneficiary of the "BCF Collaboration" badge has validated the following criteria in a BIM Game session :

Each topic needs:

- Correct location
- Address the correct person
- Description of problem
- Proposition of solution
- Correct model view definition
- Priority

The team creates more than 5 different topics using BCF.

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Each topic needs to be replied using BCF.
For each topic send a link to the file on the platform to the supervisor.

Figure 2 - BIM GAME Competition - Besançon

4.2 Badge #2 : BIM GAME ARCHITECTURAL QUALITY

4.2.1 Picture

4.2.2 Description

The team managed to answer to the requirements by proposing an original project.

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4.2.3 Criteria

The beneficiary of the "BIM GAME Architectural Quality" badge has validated the following criteria in a BIM Game session :

Each topic needs:

- Required surfaces are checked.
- Facilities access for disabled users is optimized.
- The circulation from the outside to the different areas is smooth and easy.
- Good quality of the cardboard and 3D model.
- Originality of the project (spaces organisation).

4.3 Badge #3 : BIM COLLABORATION

4.3.1 Picture

4.3.2 Description

The team has collaborated between each stakeholders during the process of the stress test.

4.3.3 Criteria

The beneficiary of the "BIM Collaboration" badge has validated the following criteria in a BIM Game session :

Each topic needs:

- 3D model exchange format.
- Use of BCF
- Structure model
- 4D files
- Use of Rocketchat

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4.4 Badge #4 : REUSE QUALITY

4.4.1 Picture

4.4.2 Tags

circularity, flexibility, reuse

4.4.3 Description

The team has understand the circularity issues. The team members had studied the existing site and knew the possibilities to reuse some elements. If the reusing elements on existing site was not possible, the team was able to propose to reuse some other elements on a different site.

4.4.4 Criteria

The beneficiary of the "REUSE QUALITY" badge has validated the following criteria in a BIM Game session :

Each topic needs:

- use point cloud model for existing site
- modelise the existing site in BIM
- modelise the reuse element and and put necessary information (BIM properties) with it
- bonus : think at flexibility for the program

4.5 Badge #5 : BIM GAME Originality

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4.5.1 Picture

4.5.2 Tags

architecture, BIM, originality

4.5.3 Description

The beneficiary of this badge has obtained the first place in terms of architectural originality at the Brussels BIM Game on 24 April 2019
This badge was awarded following a vote by professionals from different European countries: university professors, companies, ... during the BIM Game event of April 24, 2019 in Brussels. (https://bimgame.eu/)

Figure 3 - BIM GAME Competition in Brussel

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4.6 Badge #6 : SUSTAINABLE DEVELOPMENT

4.6.1 Picture

4.6.2 Tags

architecture, BIM, sustainable

4.6.3 Description

The beneficiary of this badge has obtained the first place in terms of sustainable development at the Brussels BIM Game on 24 April 2019
This open-badge was awarded following a vote by professionals from different European countries: university professors, companies, ... during the BIM Game event of April 24, 2019 in Brussels. https://bimgame.eu/

4.7 Badge #7 : JOB SITE ORGANIZATION

4.7.1 Picture

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4.7.2 Tags

organization

4.7.3 Description

The team has fulfilled each step of planning on the project. A collaboration has been accomplished from transport to lifting choices in order to optimize the construction on site.

4.7.4 Criteria

The beneficiary of the "JOB SITE ORGANIZATION" badge has validated the following criteria in a BIM Game session :

Each topic needs:

- Choose and justify a lifting device.
- Choose and justify transport device.
- Site installation plan (NAVISWORKS)
- Gantt diagram

4.8 Badge #8 : BRICK PATTERN

4.8.1 Picture

4.8.2 Tags

architecture, BIM, bricks, lego, model

4.8.3 Description

The beneficiary of this badge has obtained the first place for the quality of its brick play model at the Brussels BIM Game on 24 April 2019

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This open-badge was awarded following a vote by professionals from different European countries: university professors, companies, ... during the BIM Game event of April 24, 2019 in Brussels. https://bimgame.eu/

4.9 Badge #9 : BIM GAME Tester

4.9.1 Picture

4.9.2 Tags

BIM, Collaboration, training, Game, tester

4.9.3 Description

The beneficiary of this badge participated in the stress test of the BIM Game project during the Tag BIM of the University of Oldenburg on February 28, 2019.

4.9.4 Criteria

The beneficiary of the "BIM GAME Tester" badge has validated the following criteria in a BIM Game session :

Each topic needs:

- was present at Oldenburg BIM Tag on February 28, 2019
- participated in the test of the scenario BIM Game of Jesus ALFARO, professor at the University of Cuenca (UCLM)
- has actively taken on a role in the test team of this scenario
- collaborated with a BIM Manager and other students
- completed a one-day architectural test project

4.10 Badge #1 : 3D MODEL QUALITY

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4.10.1 Picture

4.10.2 Tags

3D, architecture, BIM

4.10.3 Description

The beneficiary of this badge has obtained the first place in terms of the quality of his 3D model at the Brussels BIM Game on 24 April 2019
This open-badge was awarded following a vote by professionals from different European countries: university professors, companies, ... during the BIM Game event of April 24, 2019 in Brussels. https://bimgame.eu/

5 Proposition for a scenario canevas

5.1 Introduction

A pedagogical scenario or learning scenario is an instantiation of an instructional design model for a given subject and a given kind of situation. It basically defines what learners and other actors like the teacher should/can do with a given set of resources and tools. A more formal scenario can be called a learning design.

Problem Statement: explain the situation's case and the different protagonists.

- Deliverables: students know what kind of deliverable they have to do, and for when they have to finish them.
- Assessement Criteria/Weightings: available from a Web site
- Further information: this part shows some specific information which could be very important for the sudent to keep in mind.

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- Advice: this part explains to the student the way to follow, the most important skills,…
- Ressources: detail the avaible resources.
- Facilitator guide: this well-named guide help students to progress in their work. It containts:
- Schedule: It details the different tasks which have to be done, the type of the activity, (class activities, independent study, submissions), and their delivery time. This part can take the shape of a tab.
- Resources: this part lists the different resources available (Web sites, books,…)
- Background: used as an aide memoir for the tutor for the role plays. This part explains the situation, the context.
- Requirements: This is a list of all requirements: who to contact, how to contact them, which kind of data is required, who needs what,…

5.2 General guidelines

The script should be self-explaining.
Use keywords such as "each", "all", "at least" to describe participants.
Point out interdependencies among components, such as "one case description per group", which is more general and works with any number of groups.

5.3 Components

5.3.1 Resources

Resources comprise virtual or physical objects that can be allocated to learners. As opposed to more traditional instructional design models, different learners can receive different materials in order manipulate social dependencies.
Each resource that need to be prepared in advance must be specified (these are usually distributed before the script starts)
Specify whether a set of resources is composed of equal or unequal items.

5.3.2 Participants

Participants are used in synonym with users, persons or people, i.e. it is used as a general abstraction of concrete individuals
Specify the minimal amount of participants needed and the amount of participants recommended. Also specify the maximal number.
If there a different roles ("At least 2 participants (3 recommended) for each xxx")

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5.3.3 Groups

Groups form a hierarchical structure with larger groups (at least one, i.e. the class) composed of one or more smaller groups. Participants can be grouped according to various criteria defined by the design rationale.
Groups are created at start or during the script, they also can be recomposed during the script.
Different kinds of groups (e.g. expert group, case group) must be identified with a label (to be reused in the group composition definition)
If the class is also a group, specify.

5.3.4 Roles

The main function of roles in collaboration scripts is to refer to specific participants when assigning activities or allocating resources. Roles are also associated with privileges, obligations and expectancies.
There exists already a default roles, i.e. "participant" which you don't need to further specify.
"Student" and "teacher" are special roles in CSCL and are reserved for peer tutoring scenarios.
Define extra roles to define specific role parts in an activity, e.g. a "summarizer" or a "listener".
You then can further differentiate like e.g. by referring to "all experts of xxx" or "one expert from each field of study".

5.4 Activities

CSCL is more interesting in higher level learning and in particular (but not exclusively) in activities that engage learners in collaboration through some kind of scripted workflow. Specification of effective learning activities is an improvement to merely setting the conditions for collaborative learning, but doesn't guarantee adequate cognitive processing not to speak of effective learning results. Problems can be categorized in in lack of epistemic quality (appropriate strategy), elaborateness (richness and interrelation of information) and transactivity (operating on each other's reasoning).

Researchers of the Kaleidoscope project identified examples of learning activities recommended for collaboration scripts, e.g. asking thought-provoking questions, clarifying ideas and relations, comparing concepts, constructing arguments, critiquing proposals, drawing conclusions, elaborating on content, evaluating the significance of findings, explaining ideas and concepts, predicting consequences.

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Activities form a hierarchical structure in which any greater activity can be decomposed into lesser, more fine-grained activities, and any lesser activity can be subsumed by one or more greater, more low-grained activities. For instance, discussing can be decomposed into explaining, constructing arguments, question asking, etc., and asking somebody to check a report for mistakes can be generalized as help-seeking.

Kobbe suggest to start with the sequencing and the refine activities, e.g. in a sequencing description one can write "participants discuss xy" and then define precisely this activity in the activity section.

5.5 Group Formation

In most cases, group formation simple, such as forming groups by amount (e.g. dividing a class into four groups) or by size (e.g. dividing a class into groups of four). But some scripts require principled composition of groups, e.g. mix different nationalities or skill levels. Recent work have shown that adequate group formation is one of the key factors to produce adequate collaboration and leverage the results obtained by CSCL scripts (Isotani et al, 2009).

Describe how group are to be formed, giving details on group size (min/max/desired), amount of groups (min/max/desired) and their group composition (such as males & females, nations, expert/novices, etc.).
Usually, there suggestions for group size (not amount of groups), but if group formation is dependent on other variables such as resources (e.g. "case descriptions"), then try to formulate it like this: "For each xxx, form one group of ...".
The relation between roles, CL activities and learning states of students are important factors to consider during the selection of individuals to form a group.

5.6 Component Distribution

Components have been described above. In CSCL the most important components to think about are roles and role parts (associated activities). Decomposable activities can be distributed in a way that one learner engages a cognitive activity while the other learner engages in a supportive metacognitive activity. Resources also can be distributed in various ways, e.g. providing participants with only one part of the information that they need in order to foster knowledge exchange with each other.
Consider each of the available components (in particular resources and roles) and describe which components are distributed over participants or groups of the script and how they are distributed.

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You also have to consider what could happen if there are more components than participants or groups or the other way round (be flexible)
Component distribution only states how components are initially distributed. Whether or not they are redistributed later on is stated in the sequencing section.

5.7 Sequencing

Sequences specific linear sequence of activities, but also repetition of activities with minor variations. The most prominent principles underlying such repetitions are traversion, rotation and fading. A traversion describes a repetition in which all elements of one set are looped through, with only one element being in use at a time. A rotation permutates the order of elements in a given set Fading refers to features that are gradually added (faded in) or removed (faded out) from a script.
You must convey what is happening in a short hand form that gives barely enough details to understand how the script is to be conducted.
You may separate the sequencing into phases
Then for each phase, describe loops (repetitions) in your script.

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6 Annex A: Example of scenario schedule

Example of a scenario schedule (one day)
8h – 12h / 14h – 17h

	Teacher		Student	
	Tasks	To evaluate	tasks	Deliverable
8h – 9h	• Roles assignment • Distribution of scenario documents		• Knowledge of profile, rôle, scenario • Organization of the planned meetings	
9h – 10h	• Actions monitoring		• Group meetings depending the scenario schedule	Requirements _V0
10h – 11h	• Play the role of the project owner • Working instructions to progress • Evaluate the requirements (V0)	Requirements_ V0	• Meeting with the owner / teacher	
11h – 12h	• Actions monitoring		• Group meetings depending the scenario schedule	Requirements _V1
14h - 15h	• Play the role of the project owner • Working instructions to progress • Evaluate the requirements (V1)		• Meeting with the owner / teacher	
15h - 16h	• Actions monitoring	Requirements_ V1	• Group meetings depending the scenario schedule	Requirements _V2
16h - 17h	• Summary of activities, evaluation of the collaboration	Requirements_ V2	• Global meeting. Evaluation point with the teacher	

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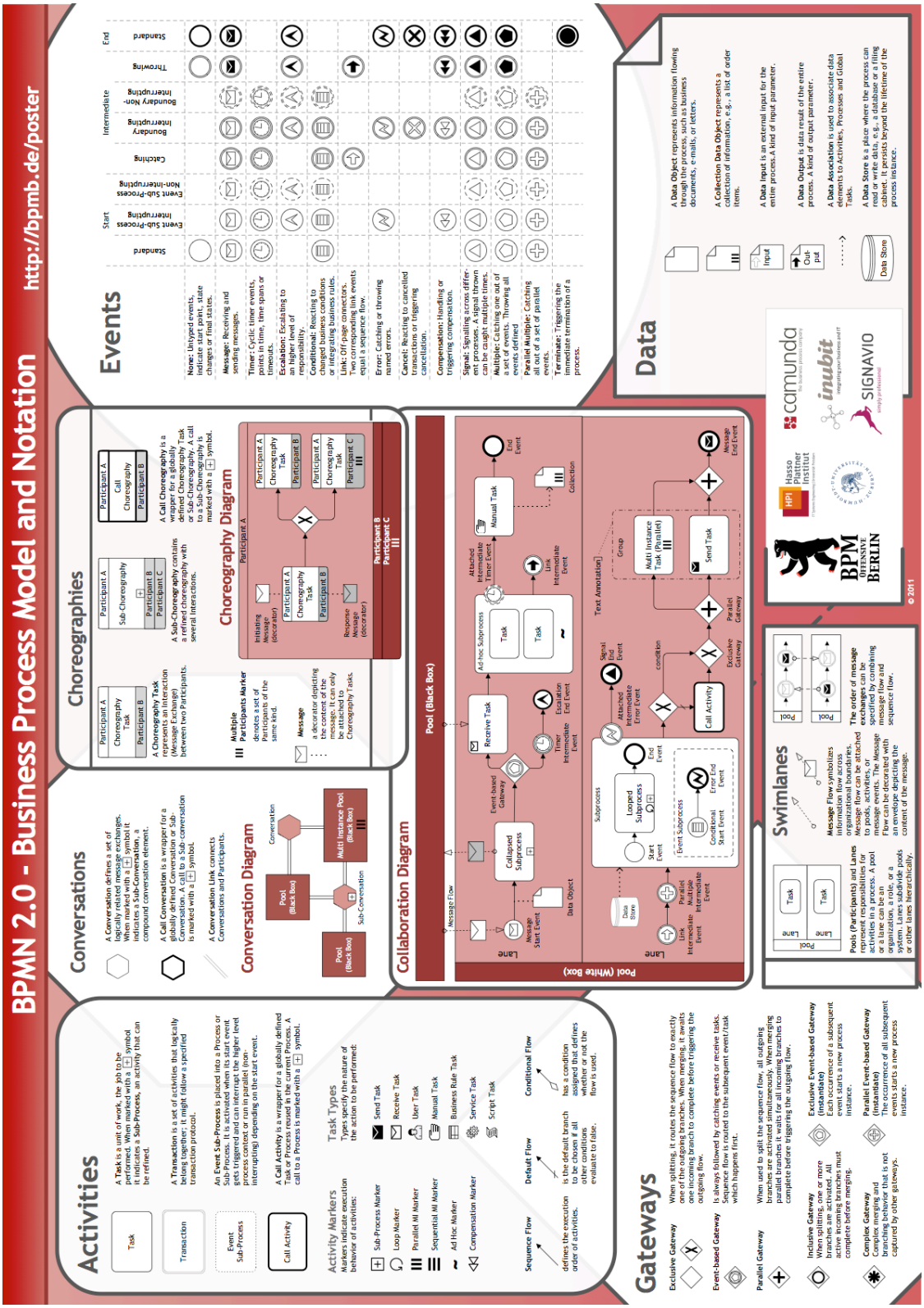
7 Annex B: Business Process Model & Notation



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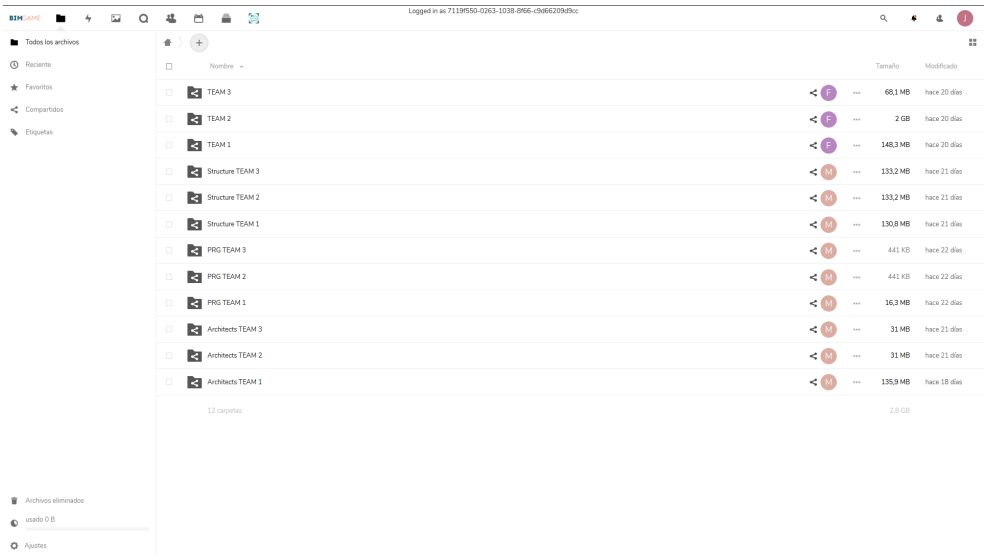
8 Annex C: The Nextcloud Interface

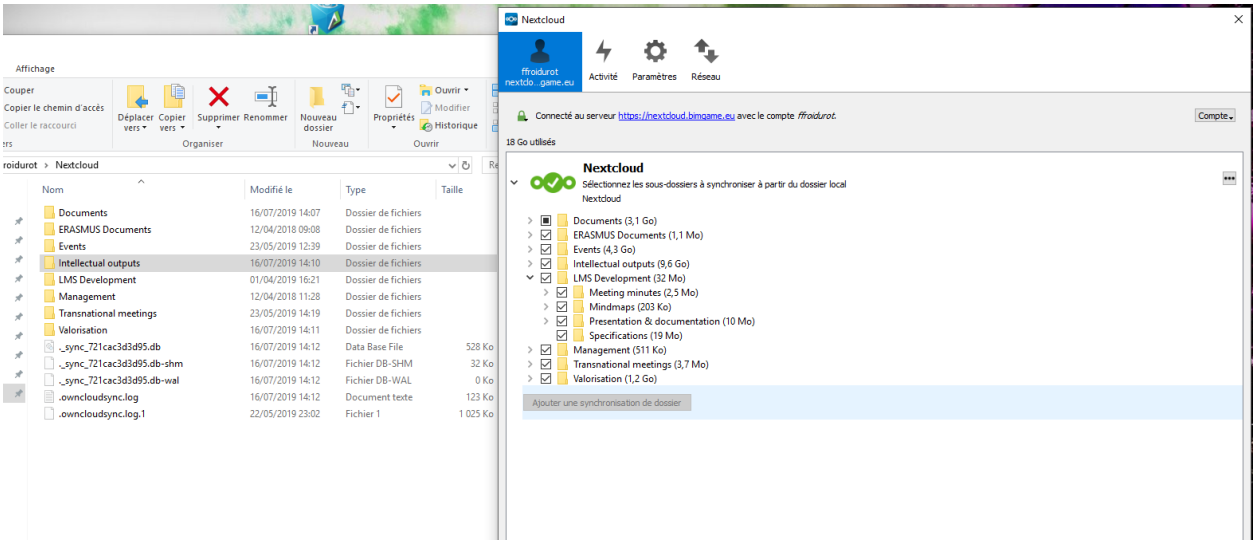
8.1 File sync and share solution

The web application offers file sharing capabilities, an integrated office suite as well as search functionalities, favorites and tags.



8.2 Desktop and mobile clients

Desktop client allow users to sync and shares files. It also shows all activity happening on the server.



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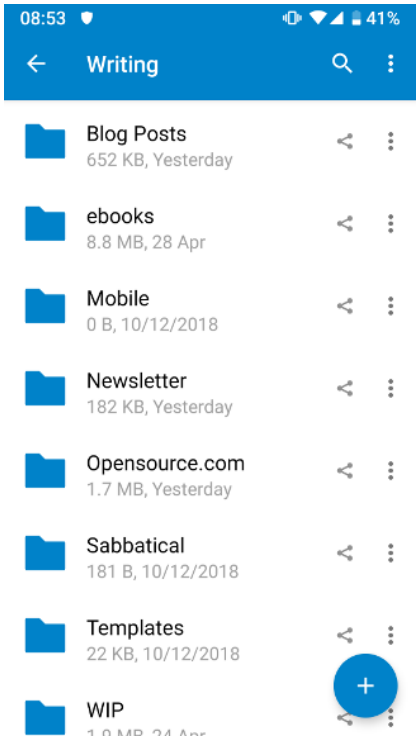
The mobile client can also notify users of new events such as the availability of new shares.



8.3 Workflow management

The deck module enables the user to create Kanban-style boards and to distribute and follow the achievements of tasks. The use of boards is also common in agile methodology.

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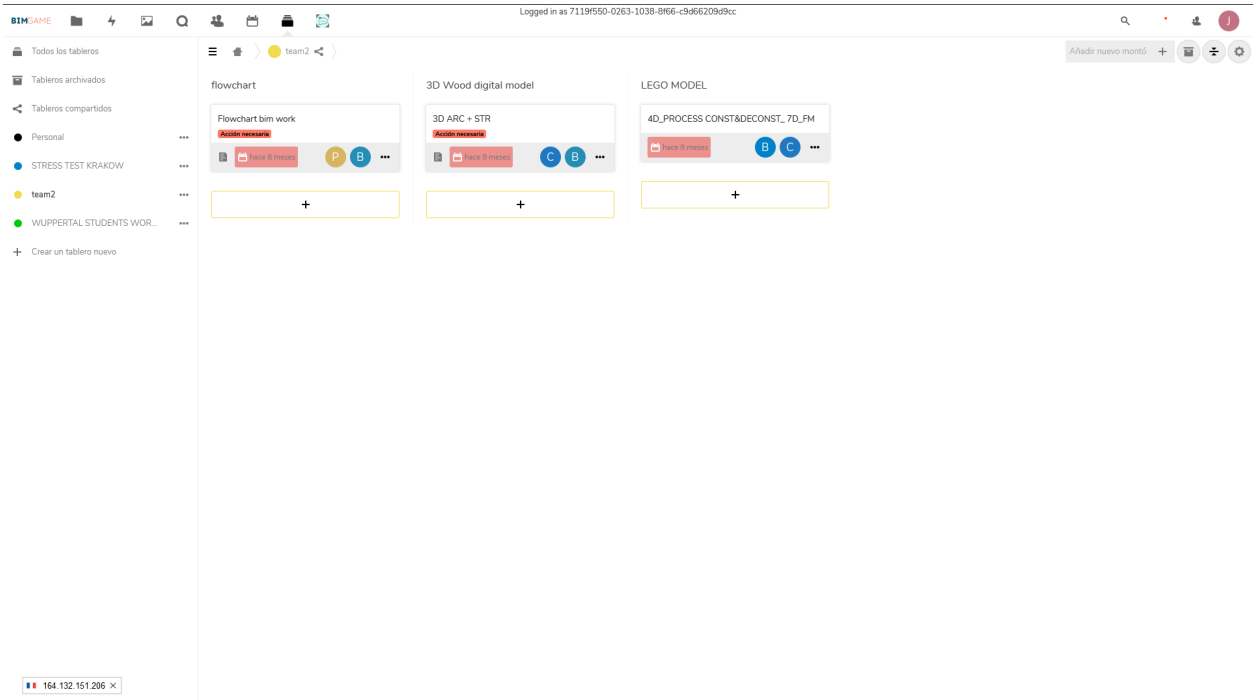
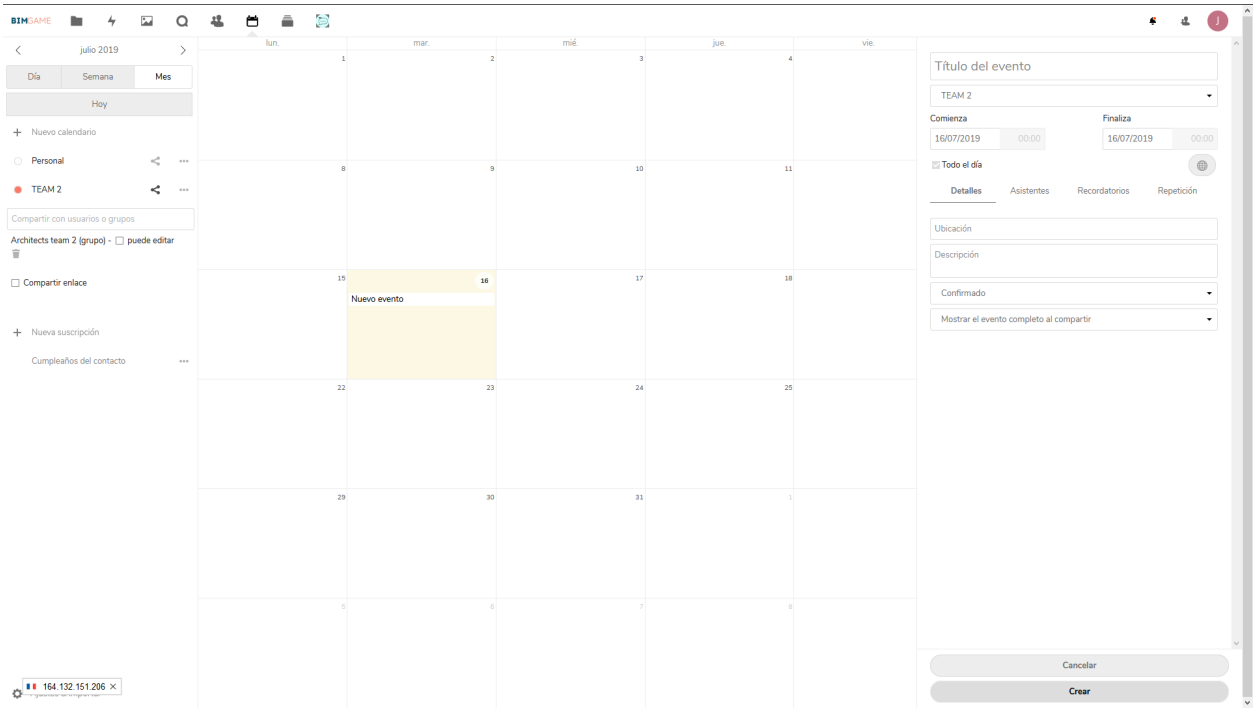


8.4 Groupware

The calendar is used to schedule work and online meetings. It is also possible to link it with popular mail client like Thunderbird or Outlook.



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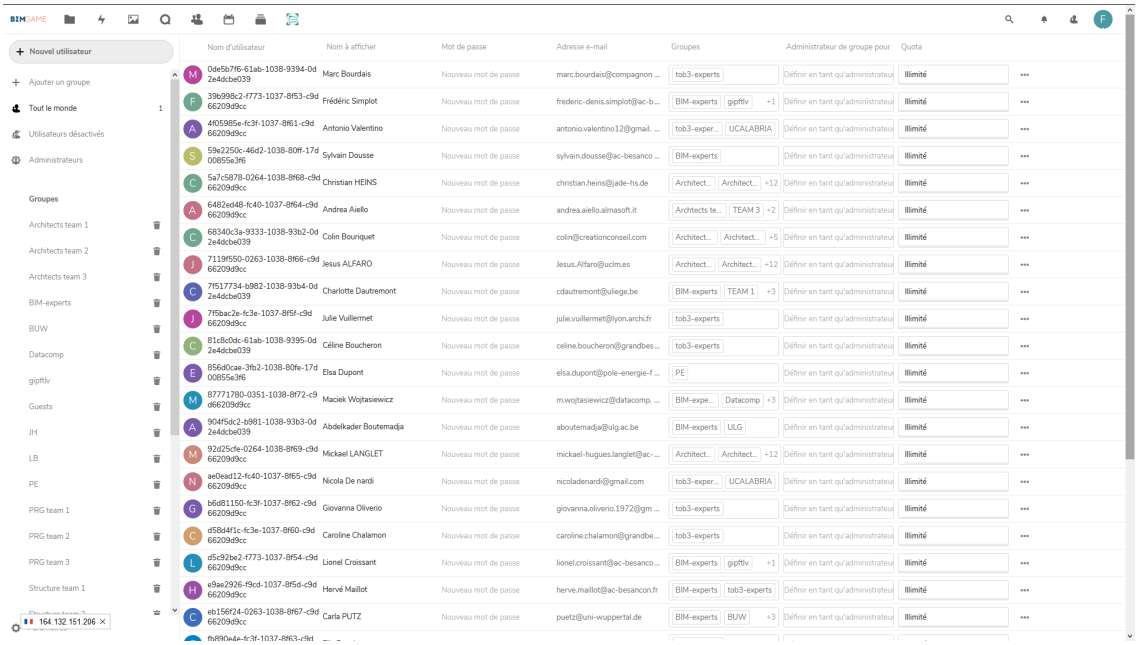
8.5 Account management

The application has a basic account management. It is also possible to use external directories.
During the experimentations, an LDAP directory was used. The interest of using such a solution is to provide a single account for every applications used in the project.



8.6 Accessibility

Nextcloud has extensive keyboard accessibility and screen reader support.

The colors used in Nextcloud meet the WCAG 2.0 AA standard for contrast and there are themes for users who need even higher support.

High Contrast theme aims for WCAG 2.0 AAA compliance, while a Dyslexia-friendly font option helps people with reading disability.

A Dark theme is also available.
https://youtu.be/S_842AQx3MQ

8.7 Notifications

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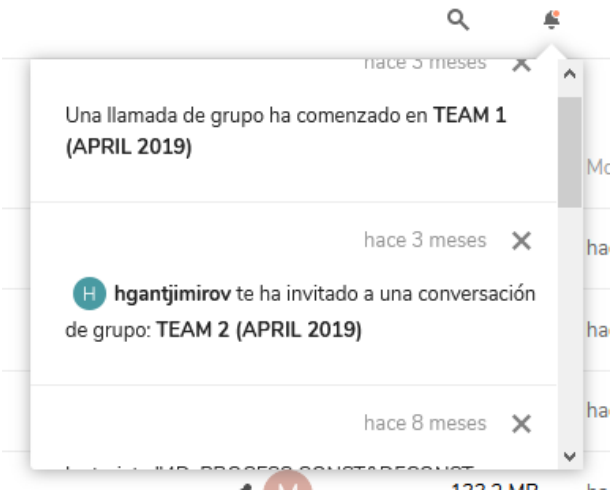
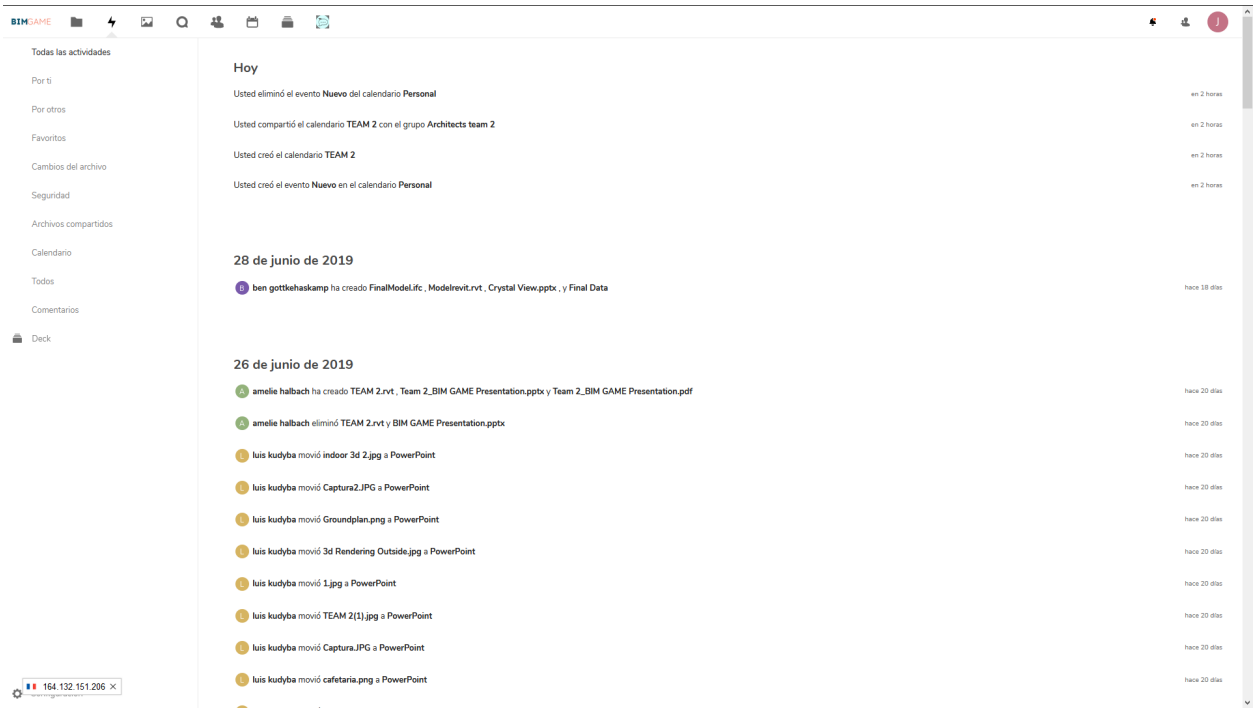
Basic principle and screen capture



8.8 Activity tracking

Basic principle and screen capture



8.9 Integration

Inside Nextcloud, it is possible to create new entries in the menu. We use this functionality to provide a direct link to our Rocketchat instance.

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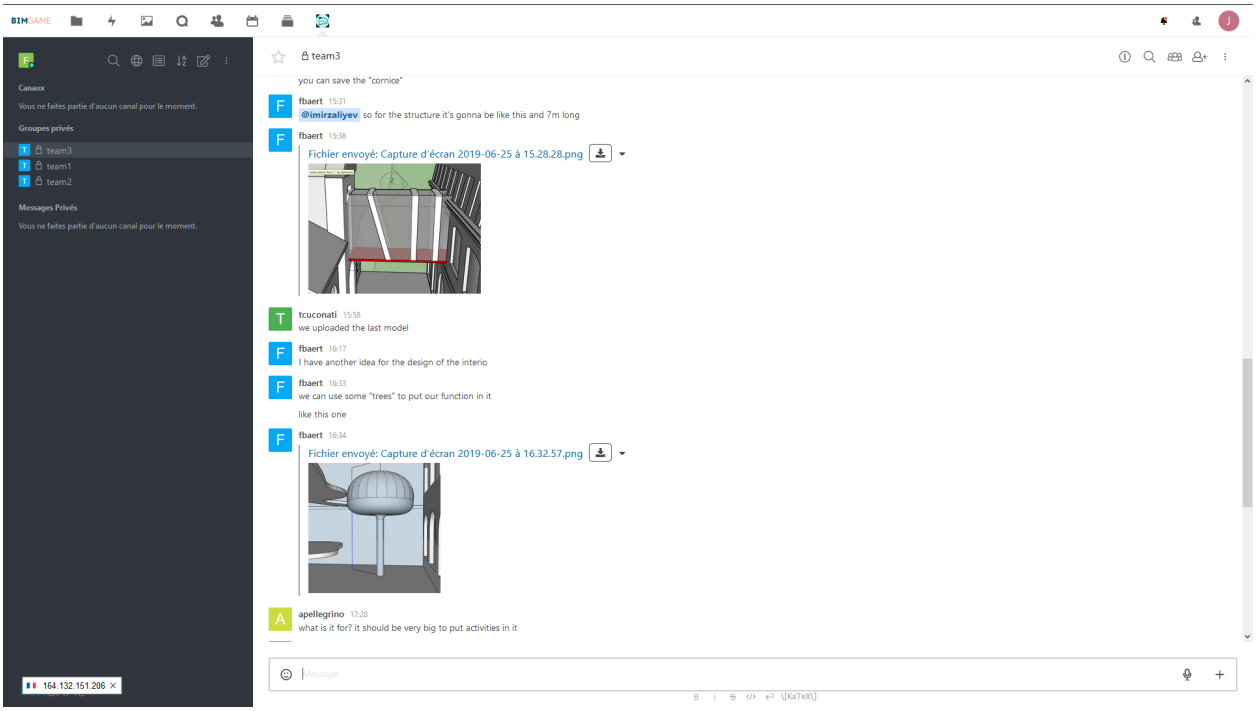
8.10 Rocketchat

8.10.1 Team chat

Rocketchat enables Communication and collaboration using team chat or public chat.



8.10.2 Video-conferencing & desktop sharing

At any moment, a user can start a video-conference and transmit the link to his partners inside Rocketchat. Desktop sharing is also possible.

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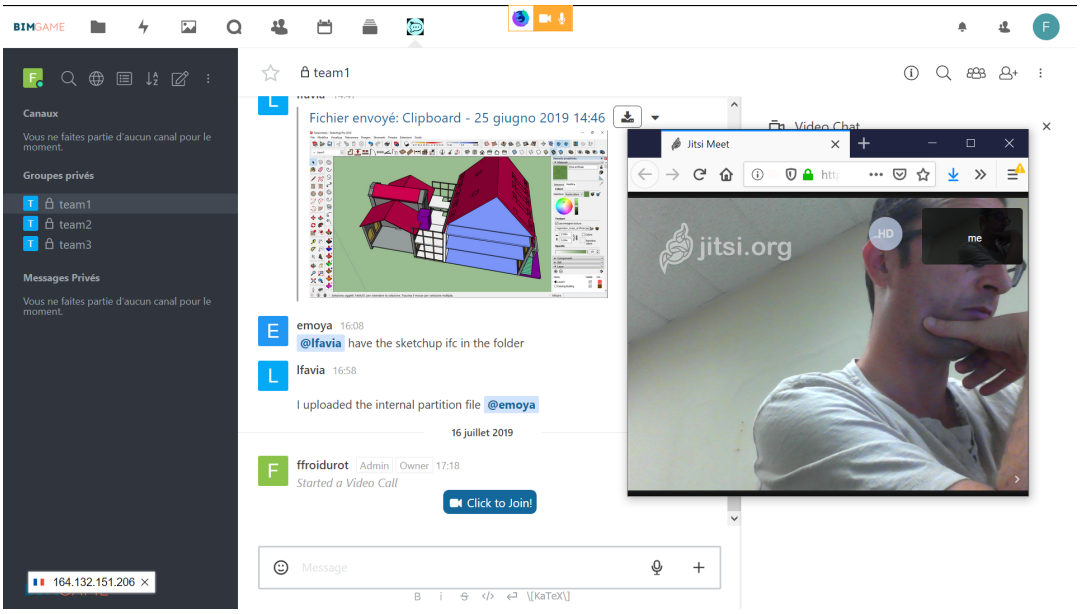

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9 Annex D: Example = Skills to acquire per roles

Roles	Skills to acquire	Pre-requisites
Architect	• find if the attribute for a construction part is wrong • Name correctly all the construction part • Check if groups are correctly created • Check if volumes are done correctly • Check the names of a room • Check the geometry • Make simple corrections • Check the diameter of construction parts • Change function parameter • Check project families (revit)	Basic 3D modeling skills : • Have an understanding of families • Know about attributes • Basic geometry knowledge • How to name building parts in Revit • Build volumes in Revit • Knowledge about function parameters
Engineer	• find if the attribute for a construction part is wrong • Name correctly all the construction part • Check if groups are correctly created • Check if volumes are done correctly • Check the names of a room • Check the geometry • Make simple corrections • Check the diameter of construction parts • Change function parameter • Check project families (revit)	Basic 3D modeling skills : • Have an understanding of families • Know about attributes • Basic geometry knowledge • How to name building parts in Revit • Build volumes in Revit • Knowledge about function parameters
BIM coordinator	• find if the attribute for a construction part is wrong • Check if groups are correctly created • Check if volumes are done correctly • Check the names of a room • Check the geometry • Check the diameter of construction parts • Change function parameter • Check project families (revit) • Combine an architecture model with an engineer model	Basic 3D modeling skills : • Have an understanding of families • Know about attributes • Basic geometry knowledge • How to name building parts in Revit • Build volumes in Revit • • Knowledge about function parameters
Client (teacher)		BPMN

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10 Annex E: Draft for 6 scenarios with map links between actors

10.1 SCENARIO 1 : The Architect

The client discuss with the architect. The architect makes the planning and gives the model to the structure engineer. He checks it and says it's ok.
Then he sends it back to the architect.
The architect gives back to the client. The client changes his mind because he hasn't got enough space in his room.
The architect change the model and send it to the construction engineer.
The engineer calculates and send back to the BC who send to Architect who changes the model.
Return the client, the client says ok.

10.2 SCENARIO 2 : The BIM Coordinator

Design is ready, structure is ok. The BIM Coordinator send to MEP.
MEP starts his work. Heating cooling system...
MEP send to the BIM coordinator, the BIM coordinator detects the clashes. And send the model to all the actors (MEP+ Construction engineer).
They send back modifications to the BIM Coordinator.
Ok all is ok.

10.3 SCENARIO 3 : The MEP

Design is ready, structure is ok.
MEP starts his work. Heating cooling system...
MEP send to the BIM coordinator, the BIM coordinator detects the clashes. And send the model to all the actors (MEP+ Construction engineer).
They send back modifications to the BIM Coordinator.
New problem : it's impossible to change the structure. The BIM C asks to find a solution.
The MEP propose to change but the project will need more money.
The Architect asks to the client if he's ok.

10.4 SCENARIO 4 : The Calculator inside the Constructor group

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The model is ok.
He has to find out information : how many materials he needs ? What the price for the project ?
He sends the price to the architect. The architect to the client : the client find the solution too expensive.
The architect propose another material and make to the calculator.
The Client says it's ok.

10.5 SCENARIO 5 : The structure engineer

The model is ok. But because of the pressure of the building (5 floors) he can't build all the building in the same material because of the load. The 5th floor must be build in wood.
Tell the modification to the architect.

10.6 SCENARIO 6 : FM

You're FM. You have to check all the heating system in the building. You need information in the model. You tell the BIM Coordinator. The BIM C is looking who was reponsable to bring information to the Construction company. To the manufacter of the heating. He asks another document. He find it. He sends it back to the CC, to the BIM C, to the FM.

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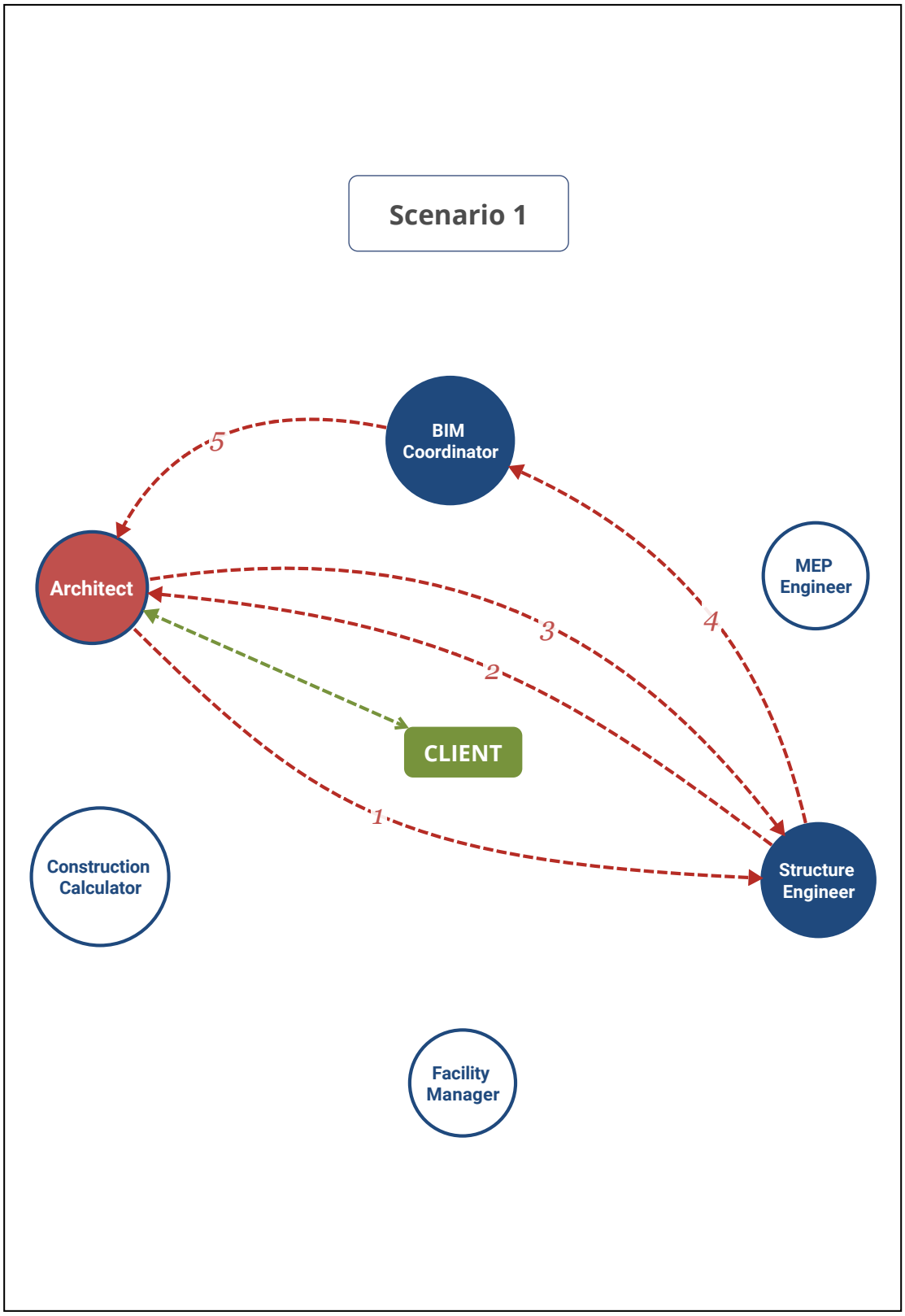

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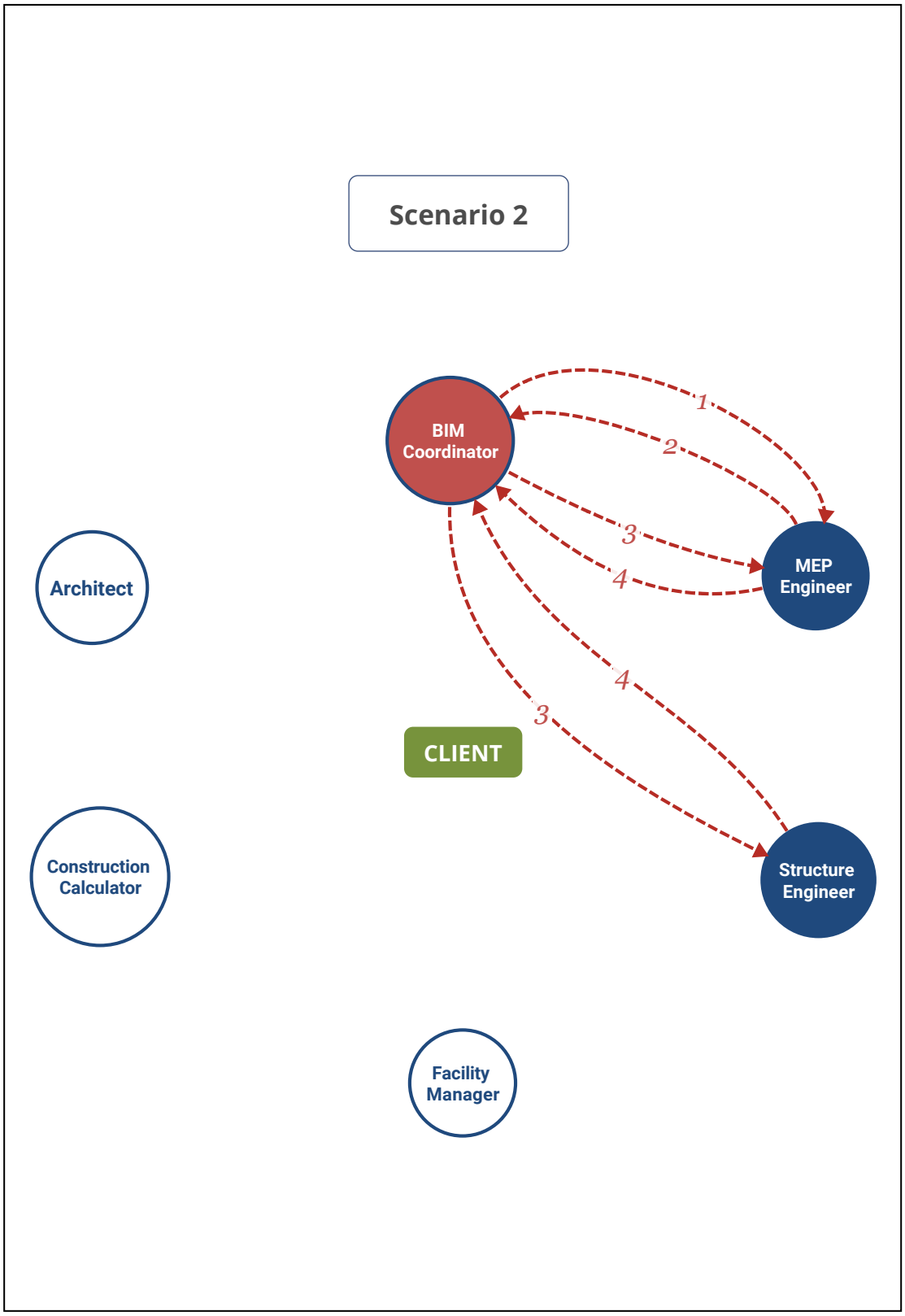

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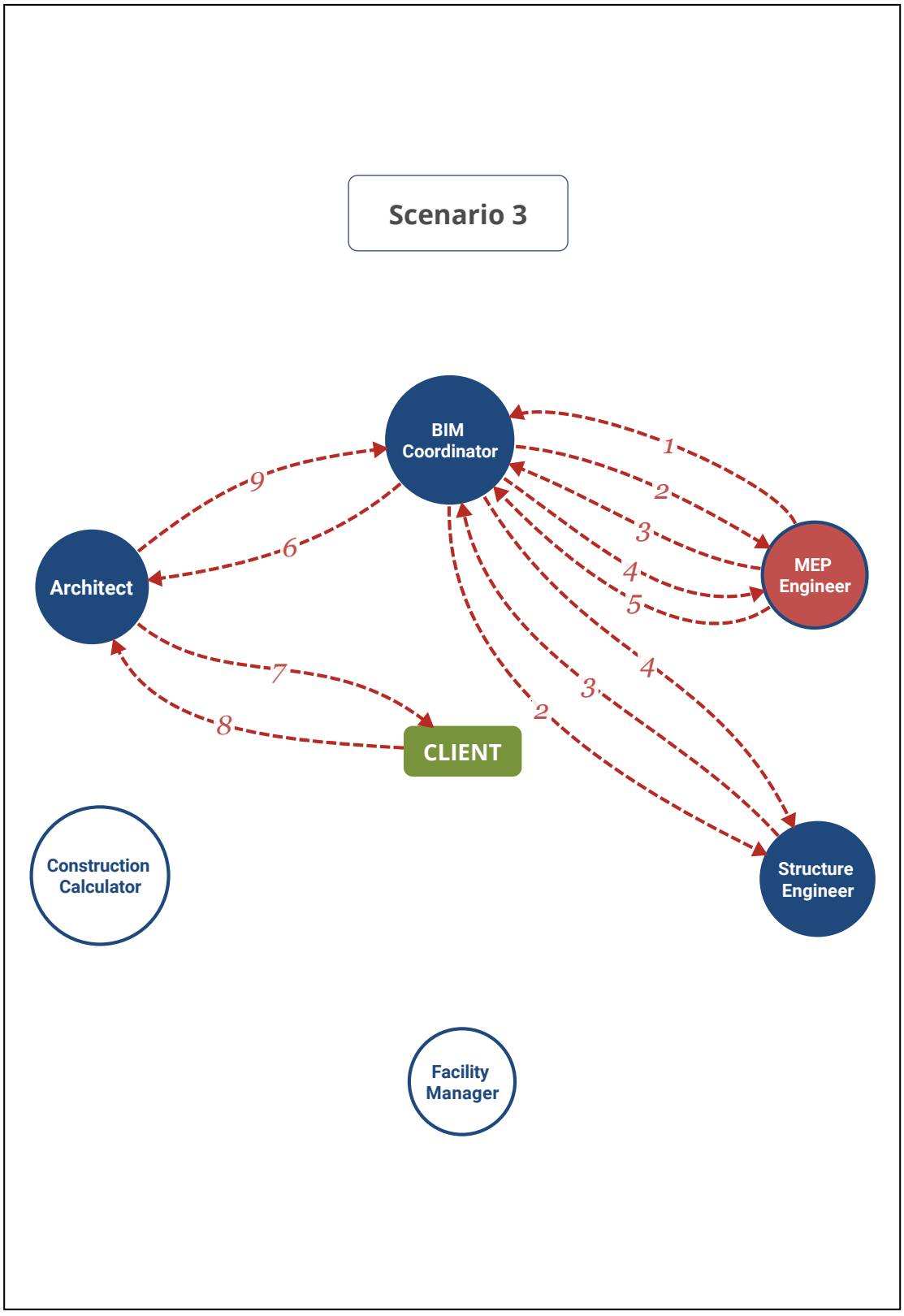

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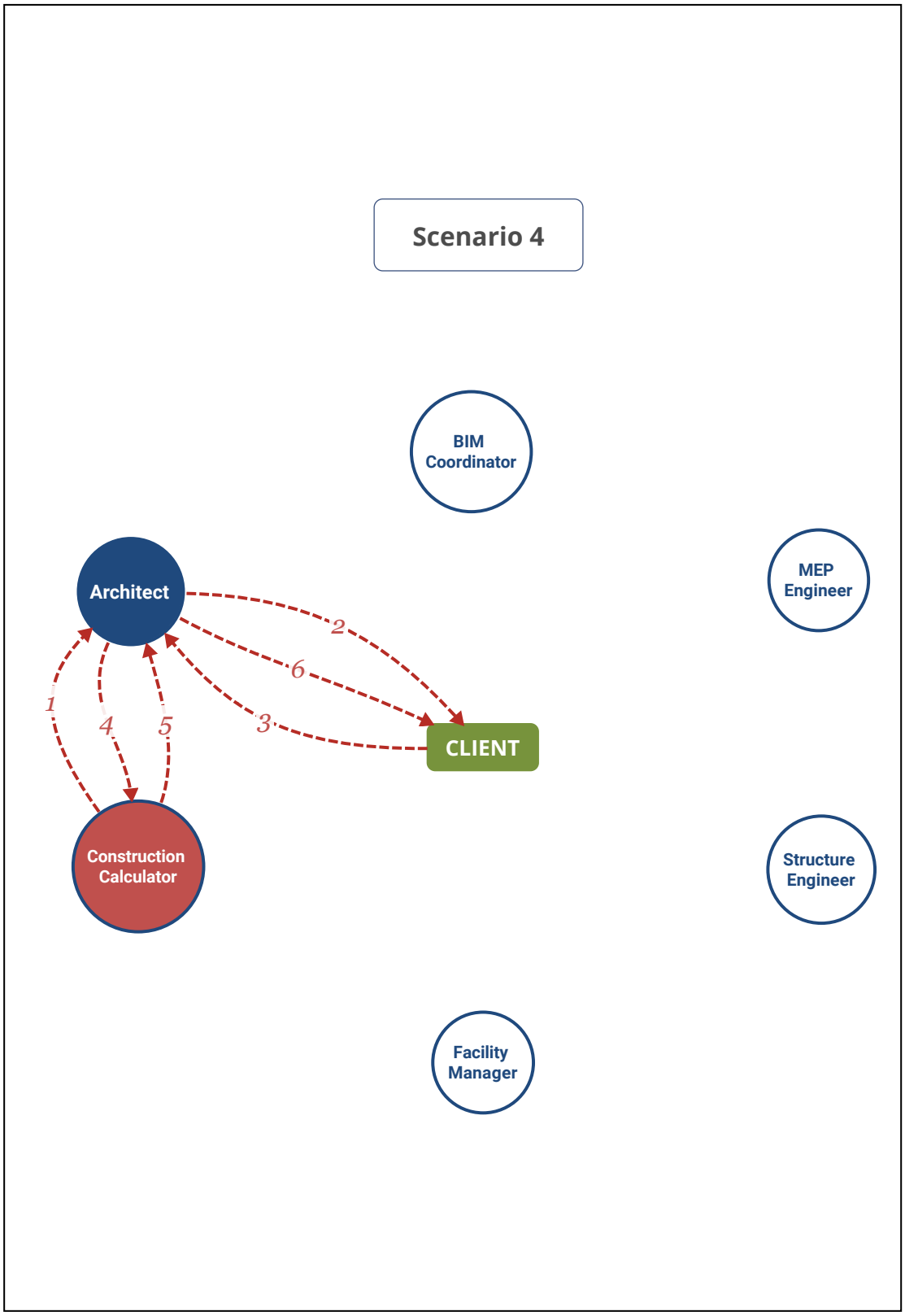

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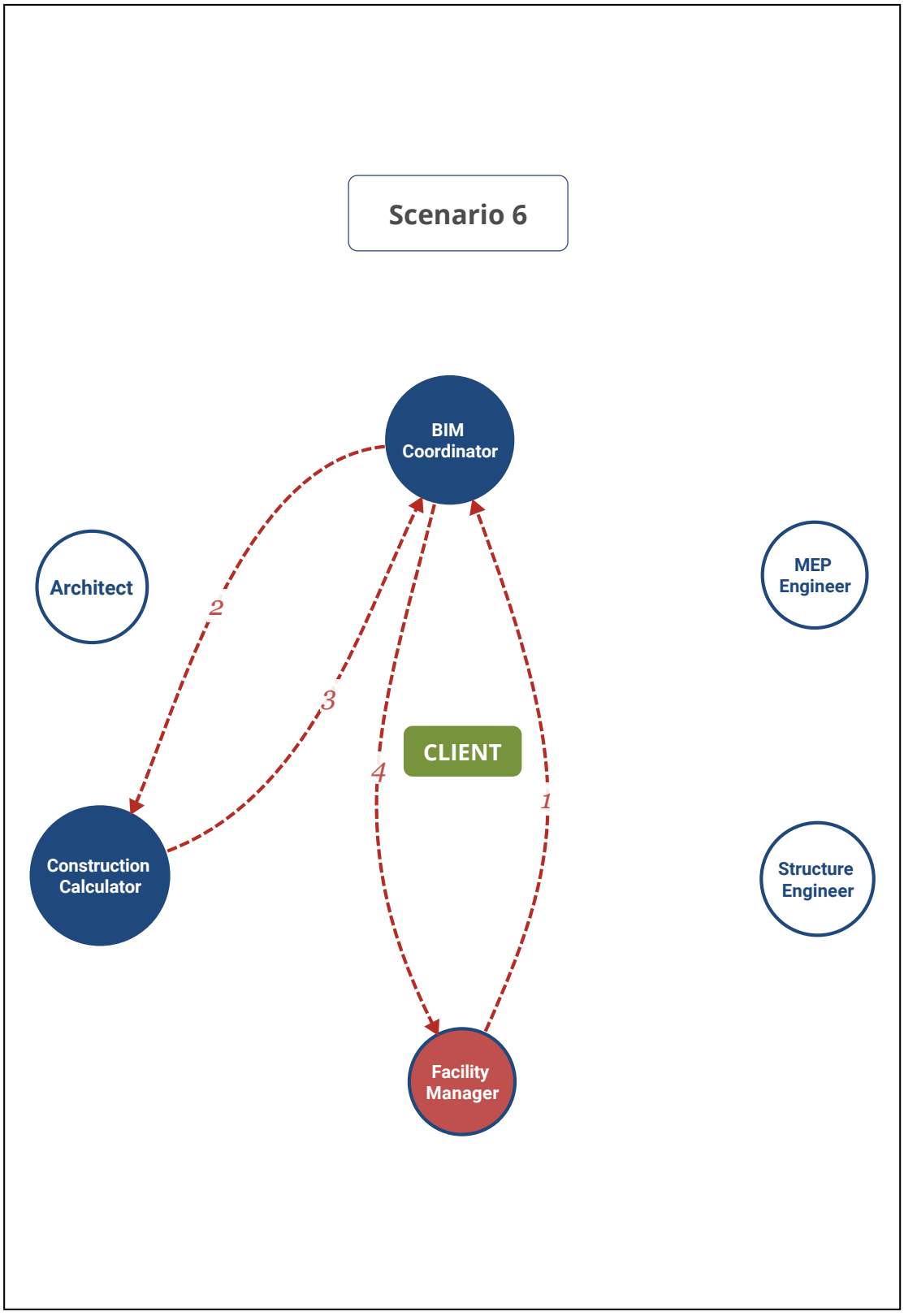

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11 Annex F: Table to manage experimentation

BIM GAME EXPERIMENTATION		
BEFORE EXPERIMENTATION	DURING EXPERIMENTATION	AFTER EXPERIMENTATION
F1 : Skills and Learners Commitment		
- Precise identification of phases in the BPMN	- Time spent by phase (information, execution, debrief)	- Link between spent time and motivation - To Criticize the choice of roles (balance of roles, interest and duration of tasks , cognitive overload for the learner, stress, ...)
- List of actions from the BPMN	- Time spent by action	
- Interview plan		- Itw storyline's catcher.
- Aiming skills identification - Pre-test for aiming skills	-To identify actions close to skills (by tracing in the LMS)	- Post-test on aiming skills - Justification of non assured skills by tracing activities (missing actions for exemple) - Detection of alternatives valids methods
- Questionnaire preparation about perception (1 to 5 scale) : appreciation of the collaborating work, differents roles excepted mine, new skills, storyline modification		- Evaluation with a questionnaire of the learner perception : credibility of the situations
F2 : Trainers Satisfaction		
		- Ergonomic (itw) : a first approach
- Educationals targets list (collaboration, skills, integration in the degree course, timing....)		- Appropriateness educational targets / storyline and trainers suggestion
-Trainers tasks list (observation, active role in evaluation) to supply		- Role of the trainer (disponibility, total number, cognitive overload, place in the storyline, credibility of the situations) (itw)
- Apprehension of the assessment grid of the deliverable	- To Add or modificate fields in the assessment grid if necessary	- To Criticize the assessment grid of the deliverable
F3 : Storyline soudness		
- To build the generation tool for the BPMN	- BPMN generating	- To compare the effectives BPMN with theoreticals models
		- Suggestion of modifications about storyline (new fields, etc...). Validation of learner's suggestions (credibility)
		- To add or modify of new roles thanks to F1/F2
F4 : Collaboration		
		- Dependence to others to continue the process of the storyline
- To identify important points of collaboration in the storyline	- To observe if those points are crossed	- To analyze and conclude the legitimacy of the collaboration - To modify the storyline to include new rewards
- Questionnaire writing		- Form for learners : collaboration, with or without, what does it change for me ? - To draw conclusions and eventually modifications of the storyline

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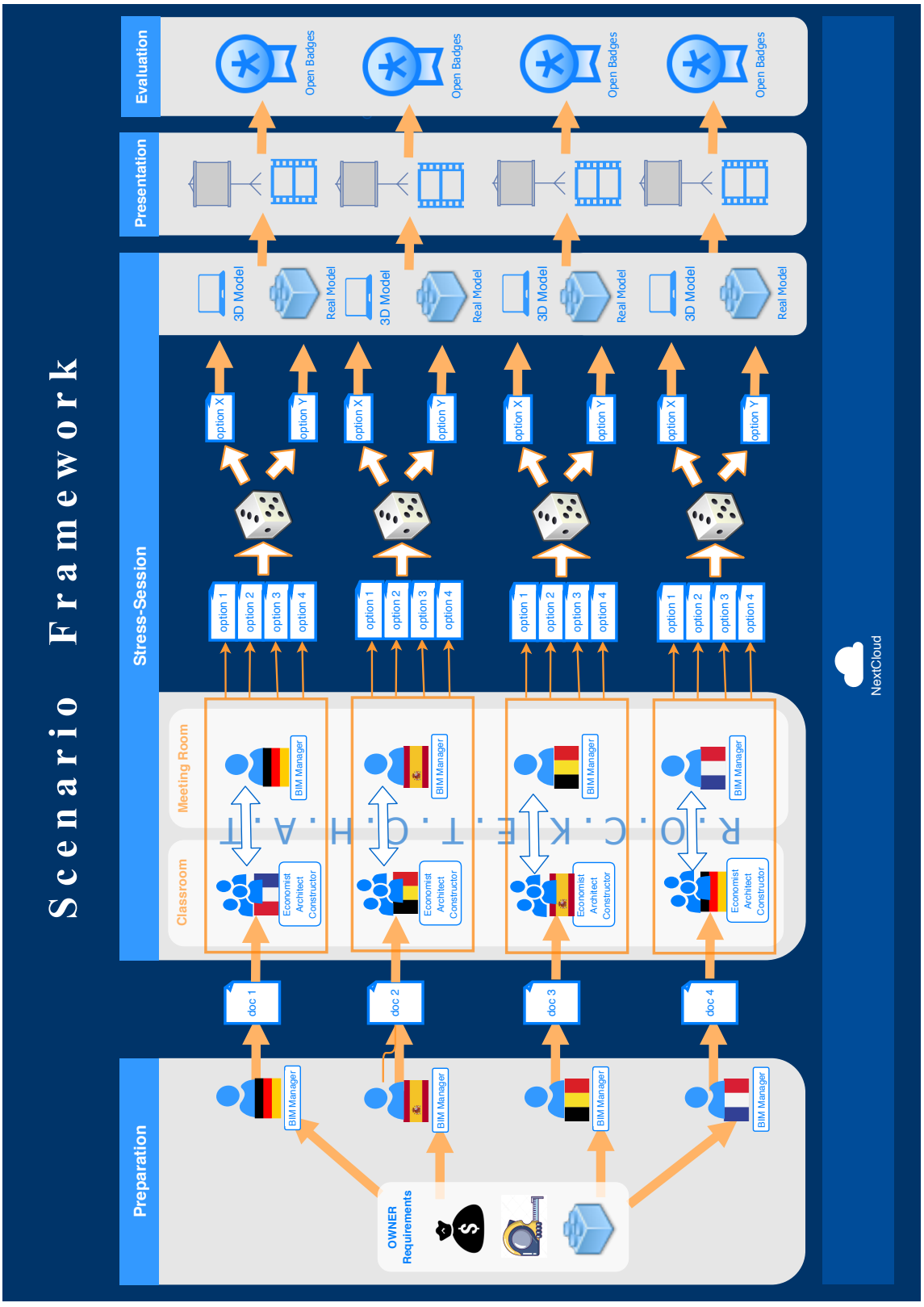
12Annex G: 2 Scenario frameworks



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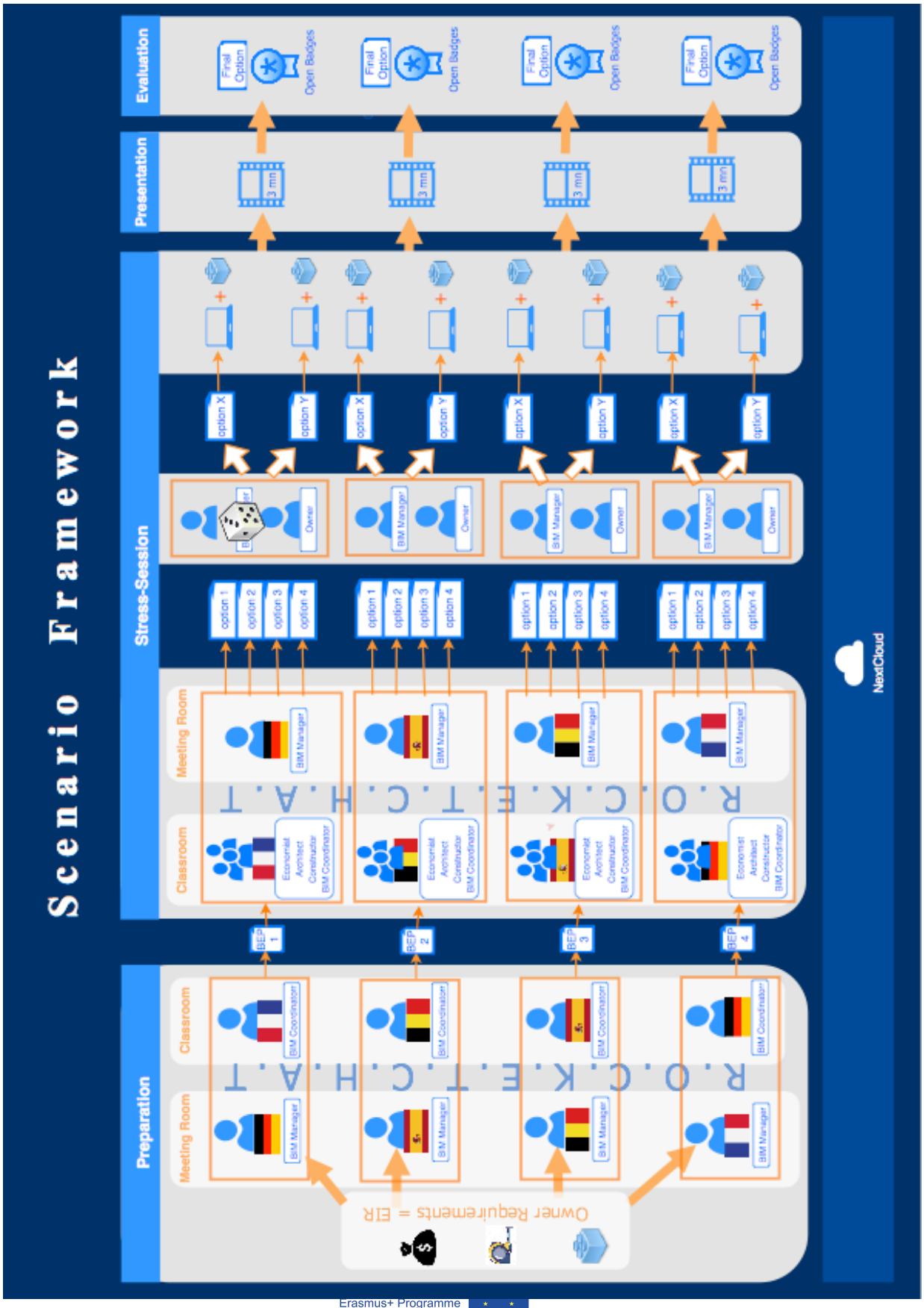

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