CSC5002 - Middleware and software architecture for distributed applications

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Presentation of CSC5002

1. Administrative information
2. Objectives
3. Prerequisites
4. Questions

Administrative Information

- TU Coordinator: Sophie Chabridon
- TU teachers:   
  - Sophie Chabridon `mailto:sophie.chabridon@telecom-sudparis.eu`
  - Denis Conan `mailto:denis.conan@telecom-sudparis.eu`
  - Chantal Taconet `mailto:chantal.taconet@telecom-sudparis.eu`
- TU resources:
  - Main site: `https://www-inf.telecom-sudparis.eu/COURS/CSC5002/`
  - `https://moodle.imtbs-tsp.eu/`

Objectives of this teaching unit

- Be aware of different software technologies for designing distributed applications: synchronous requests, asynchronous messages, services, components
- Master technologies for producing enterprise distributed applications: Web Services, REST, JMS, JavaEE, DEBS
- Experiment distributed applications and middleware frameworks through a micro-project

Prerequisites for this Teaching Unit

- Labs on Unix OS
- Object oriented programming and modeling (with UML diagrams)
- Implementation in the Java language
- Integrated development environment such as Eclipse IDE
- Relational databases

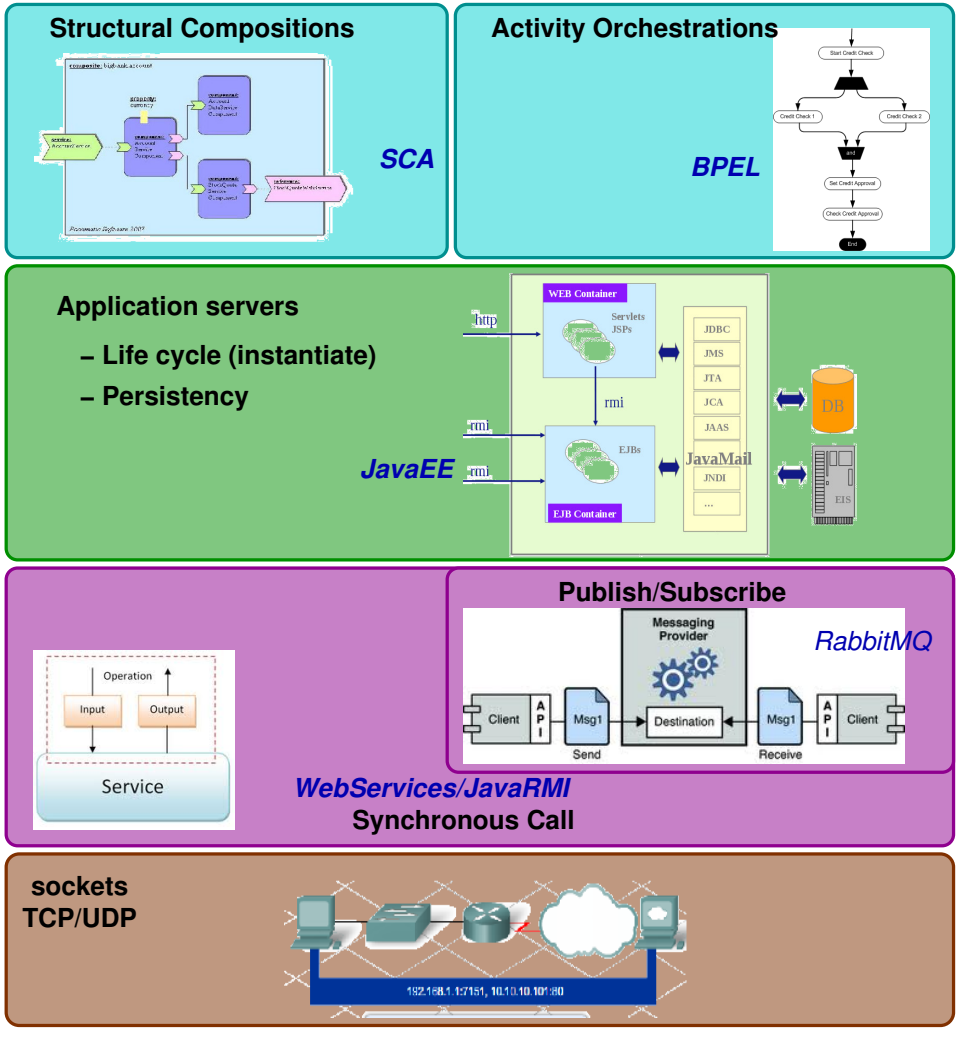
Organisation of this teaching unit I

1. Fundamentals of software architecture
   - Notion of quality attributes
   - Methodology for Attribute-driven design - ADD
2. Fundamentals of middleware
   - Well-known patterns to build distributed middleware and applications
3. Component-based middleware with JavaEE
   - Main concepts of component-oriented middleware (containers, separation of concerns, extra-functional properties)
   - EJB components
   - Synchronous and asynchronous communications with EJBs

Organisation of this teaching unit II

4. Synchronous communications with Web Services (JAX-WS and JAX-RS)
5. Asynchronous communications with DEBS (Distributed Event-Based Systems)
   - Introduction to autonomic computing and context data distribution
   - Publish-subscribe communication pattern
6. Introduction to microservices

Big Picture


Structural Compositions
SCA
Activity Orchestrations
BPEL
Application servers
– Life cycle (instantiate)
– Persistency
JavaEE
WEB Container
Servlets
JSPs
http
rmi
EJBs
EJB Container
JDBC
JMS
JTA
JCA
JAAS
JavaMail
JNDI
DB
EIS
Publish/Subscribe
RabbitMQ
Messaging Provider
Client
API
Msg1
Send
Destination
Receive
Operation
Input
Output
Service
WebServices/JavaRMI
Synchronous Call
sockets
TCP/UDP

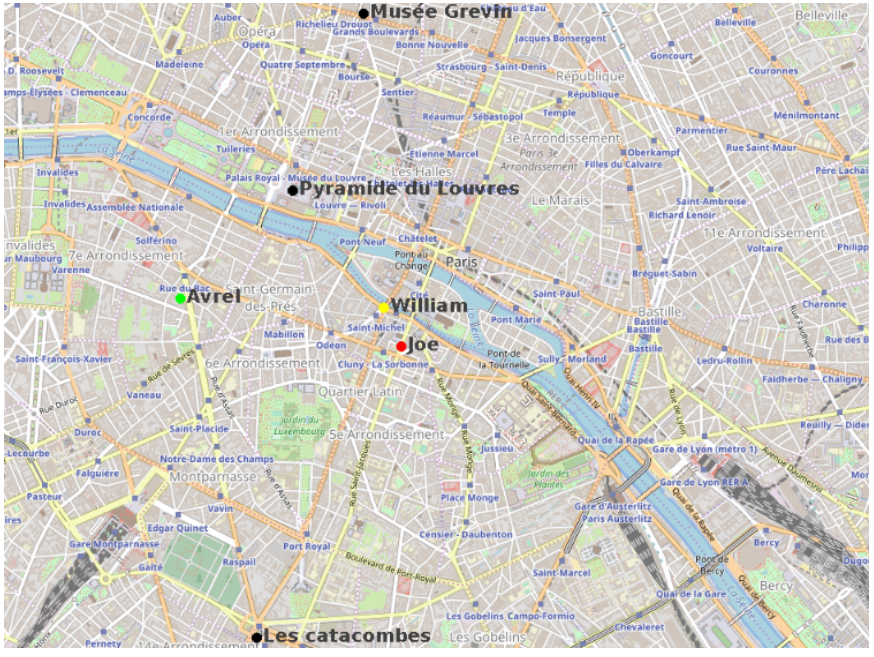
Conferences

- Friday 27th September am (in a Palaiseau room and online)
  - Anne-Cécile Orgerie (Researcher, IRISA)
  - Green computing
  - More info: `https://www.acm.org/articles/people-of-acm-europe/2019/a-c-orgerie`
- Tuesday 8th October pm
  - Charles Caporali (ASR 2018), Red Hat
- Friday 11th October pm
  - Nenad Bogojević, Expert Online & Front Office Architecture, Amadeus
  - IT solutions for the global tourism and travel industry

Evaluation

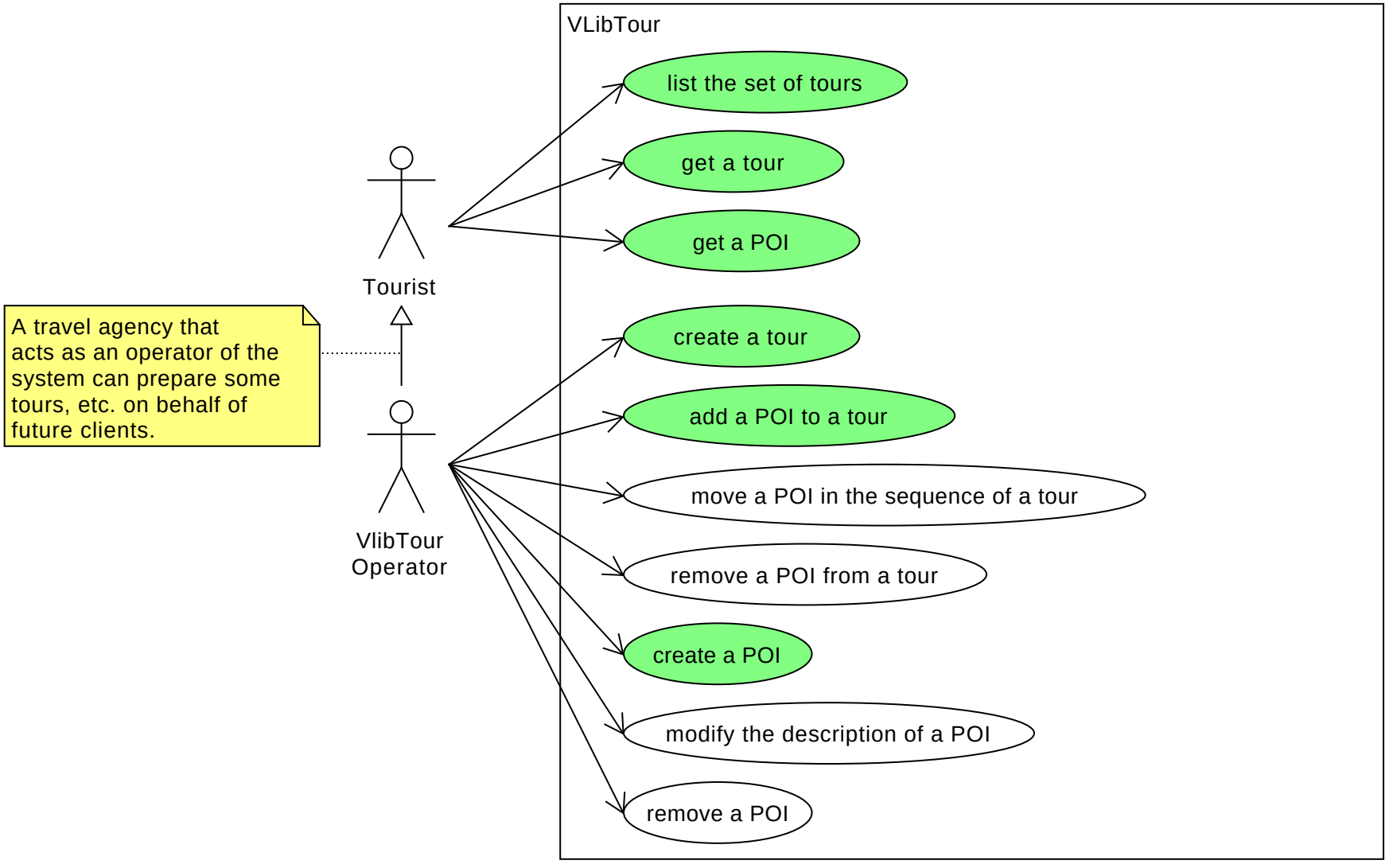
- Labs (20%)
  - Return the work done during the labs
- Micro Project (80%)
  - Subject: VLibTour management
  - Results:
    - Personalized demonstration, Report, Oral defense

Micro Project

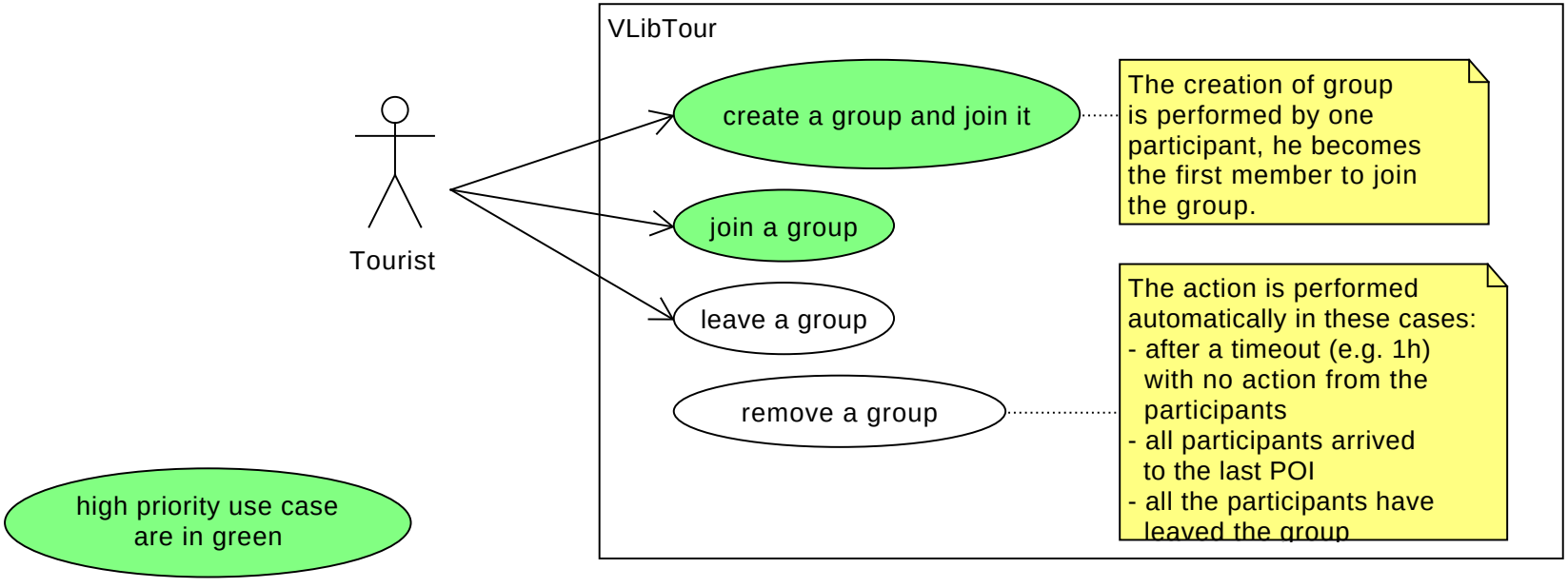


- Subject: Develop a bike tourism application for the city of Paris (for instance for Paris 2024 Olympics and Paralympics)
  - Administrators define typical bike tours in Paris (e.g. From *Musée Grévin* to *Les Catacombes*)
  - Groups of tourists select a tour among the available ones
  - The tourists of a group exchange their positions
  - The system verifies bike availabilities all along the tour

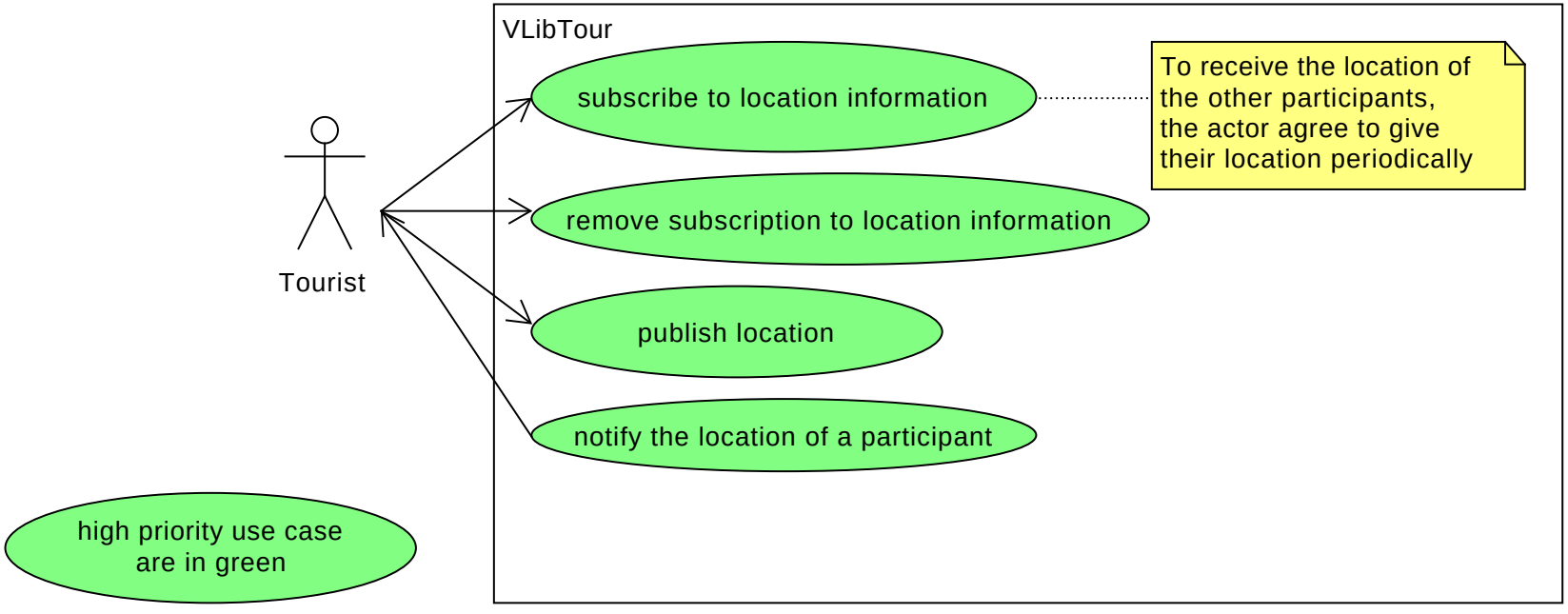
Use Case Diagram — management of tours and POIs



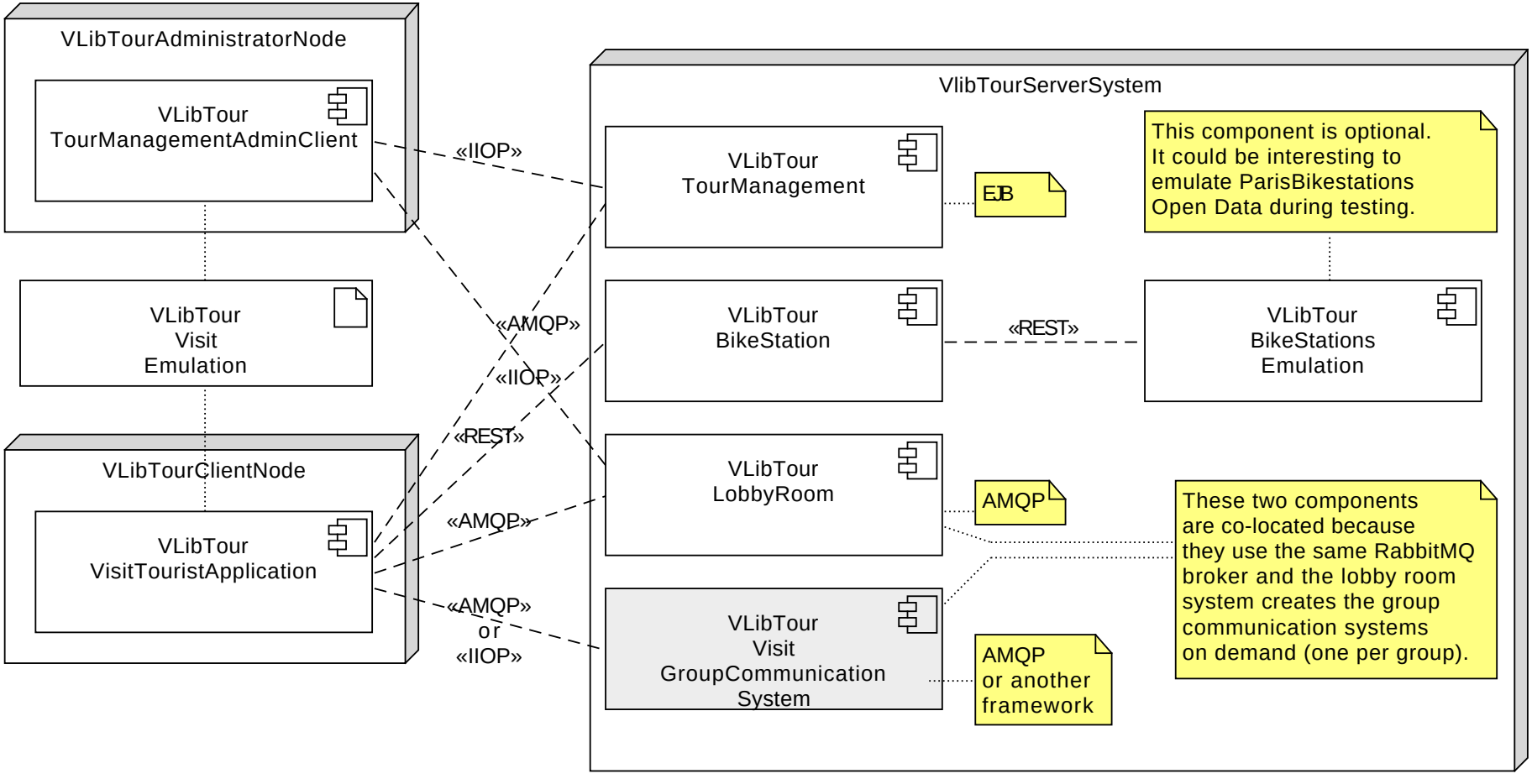
Use Case Diagram — management of group of participants



Use Case Diagram — management of locations



Software Architecture of the system



Micro Project modalities

Important dates

- Subject of the project: today
- Implement parts of the microproject during the labs
- Project defense: Fri. November 8th

Results

- Original implementation
- Report (6-10 pages)
- Defense: slides and demo (1/2 hour)

Questions

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