Presentation of the teaching unit Middleware and software architecture for distributed applications

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1 Administrative Information

- Teaching Unit Coordinator: Sophie Chabridon
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  - Chantal Taconet mailto:Chantal.Taconet@telecom-sudparis.eu
- TU resources:
  - moodle access (http://moodle.tem-tsp.eu/)
  - public access (http://www-inf.telecom-sudparis.eu/COURS/CSC5002)
2 Objectives of this teaching unit

- Be aware of different software techniques 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
3 Organisation of this teaching unit

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

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 Micro-services**
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4 Big Picture

**Structural Compositions**

- SCA

**Activity Orchestrations**

- BPEL

**Application servers**

- Life cycle (instantiate)
- Persistency

**JavaEE**

**Publish/Subscribe**

- RabbitMQ

**WebServices/JavaRMI**

Synchronous Call

- TCP/UDP sockets
5 Evaluation

- Labs (20%)
  - Return the work done during the labs
- Micro Project (80%)
  - Subject: VLibTour management
  - Results:
    - Original demonstration, Report, Oral defense
Subject: Develop a bike tourism application for the city of Paris
(in preparation of the Olympics 2024)
♦ Administrators define typical bike tours in Paris (e.g. From *Musée Grévin* to *Les Catacombes*)
♦ Group of tourists select a tour among the available ones
♦ Group of tourists exchange their positions
♦ The system verifies bike availabilities around the tour
Any questions?

Good Work!