Towards a Dynamic and Extensible Middleware for Enhancing Exhibits

Walter Rudametkin\textsuperscript{1,2}, Kiev Gama\textsuperscript{1}, Lionel Touseau\textsuperscript{1}, Didier Donsez\textsuperscript{1}

1: Université Grenoble 1, LIG Laboratory, ADELE Team, France
2: Bull SAS, JOnAS Team, France

Firstname.Lastname@imag.fr
Outline

• Context: Interactive exhibits
• Motivations
  – functional and non-functional
• Proposition
• Architecture
• Conclusion
Interactive exhibits

• State of the Art
  – Audio Guide
  – Passive RFID badge +/- ZigBee sensors
• During the visit & Afterwards

• But
  – Device ownership cost
    • loan, maintenance, theft, …
  – Lack of personalization
  – Lack of feedback to the scenographer
  – Dedicated software
New handhelds

- Consumer Electronic industry sell billions of personal interactive devices
  - iPhone, Android smartphones (Google’ Nexus 1), ...

- Near-Field Communication (NFC)
  - Over 50% of Japanese phones can read RFID tags
Motivations

Functional requirements

• Visitor: Enhance his experience
  – Use his personal handset
    • No ownership cost for the museum
  – Collect and exchange bookmarks on museum’s pieces of art
  – Annotate the pieces of art (blog, twit, …)
  – Personalization of the scenography according to his profile and to the context
NFC-enabled phone

NFC marker
Motivations (continued)

Functional requirements

• Exhibit Designer/Scenographer
  – Get feedback from the visitor ASAP and analyze it ASAP
    • Data mining on the visitors paths, visitors answers, ...
  – Adapt the exhibit if necessary
Motivations (continued)

Non functional requirements

• Reuse general-purpose SW design patterns
  – Touch-and-collect, Event Condition Action, …

• Reuse (robust) generic middlewares
  instead of *dedicated* softwares
  – Time-to-Market
  – Software quality

• Enable dynamic changes
  – Add new actuators in a scene
Our proposition

• Provides a generic and flexible middleware for enhanced exhibit (SW) development

• Implementation relying on well-known specifications
  – EPC Global specifications (ALE, EPCIS)
  – NFC Forum specifications (NDEF RTD)
  – OSGi and JavaEE platforms
Global Architecture

La vénus de Milo
The Aphrodite of Milos, better known as the Venus de Milo, is an ancient Greek statue and one of the most famous works of ancient Greek sculpture. It is a marble statue that was discovered on the island of Milos in Greece in 1820. The statue depicts a woman with a slender body, large breasts, and a Sensual face. It is one of the most representative sculptures of ancient Greece and is considered to be a masterpiece of ancient sculpture. It is displayed in the Louvre Museum in Paris, France.
Detailed Architecture
Markers

• NFC Tags
  – ISO 14443 A/B
  – NFC Forum NDEF RTD
    • for Smart Poster (Text+URL)
    • for Bluetooth/WiFi pairing
    • for Geolocation
• Datamatrix (the backup solution)
  – URL
Conclusion & Perspectives

• Shorten development time
  – Experiment on a basic exhibit
    • 2 profiles and 2 langues
  – Some new SW patterns were found

• Invivo validation
  – exhibit in Grenoble (2010Q4)
  – Study reporting

• Part of the open-source OW2 Aspire project
  – Funded by EU
Q&R
[Gracia|Obrigado|Thanks|Merci]
Bonus Track