



Architecture Prototype

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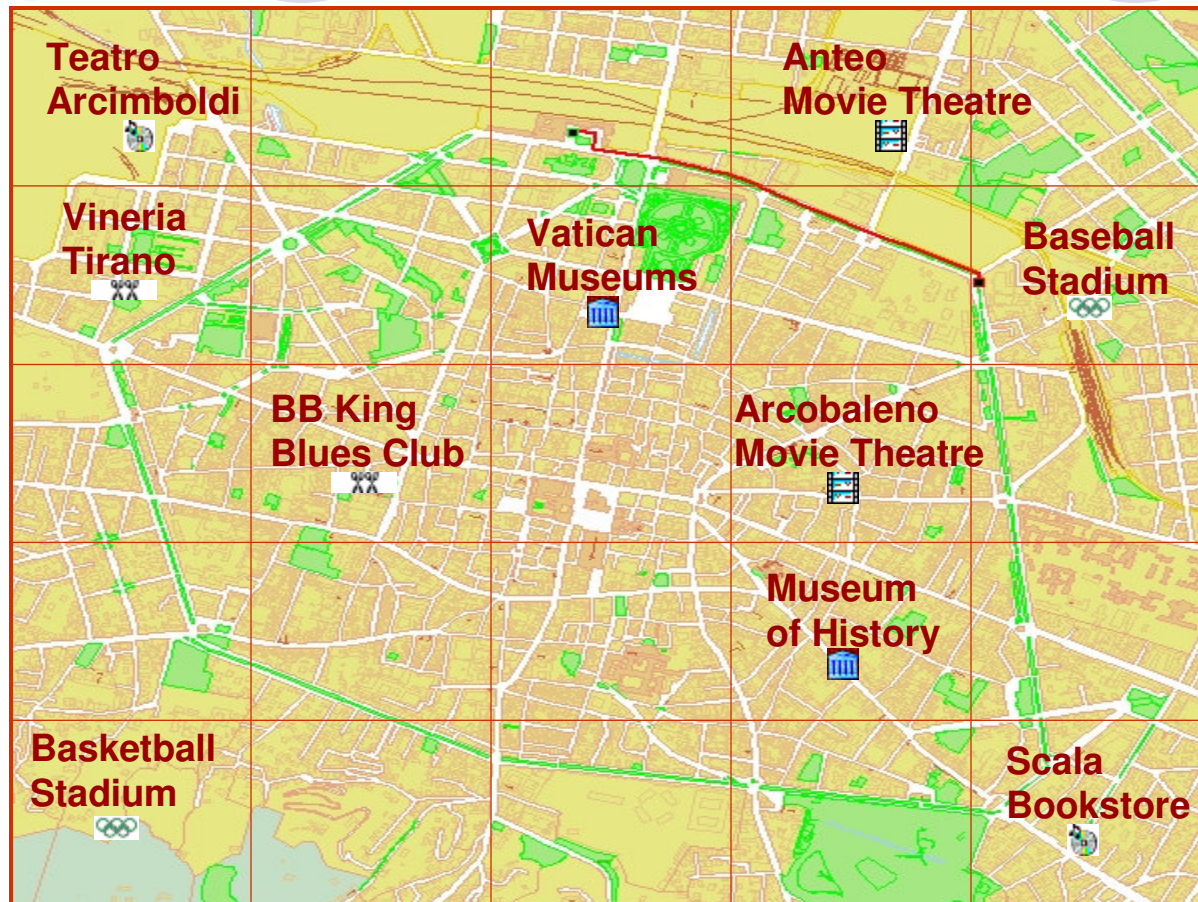
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Scenario



- The prototype web application is a micro-portal addressed to tourists visiting the fictitious ProtoTown
- The portal shows an ordered list of *Point Of Interests* (POIs), i.e. hyperlinks that point to a web page providing multimedia information over a physical place (e.g., museum, restaurant)
- POIs are sorted according to the user's interests and his distance from the POI
- The multimedia content to be delivered is chosen by taking into account profile data such as the user device capabilities and the network conditions
- Use cases:
 - A business man
 - A student

Points of Interest



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Scala di visualizzazione 1:20000

Use Case 1 – Businessman

- A businessman using a PDA (DeviceType) in a WiFi hot-spot
- Attributes values:
 - InterestCategories: Music, Sports (UPM); Architecture (SPPM)
 - Available Bandwidth: 2000 kbps (OPM)
 - BatteryChargeStatus: 90% (UPM)
 - Coordinates: [3:1] (UPM); [2:1] (OPM)
- Rules fired:
 - UPM_rule1 : ***IF DeviceType = "Pda" THEN MediaQuality = "High"***
 - SPPM_rule1 : ***IF DeviceType = "Pda" THEN TextLength = "Short"***
- Following the directives, the list of interests is ordered by considering the interests declared by the user followed by the ones induced by the service provider; the coordinates are the ones provided by the user
- Intra-category POIs are ordered by their proximity to the user
- The multimedia content is delivered in high-resolution mode (MediaQuality="High"); the text length is short (TextLength="Short")

Use Case 1: Local Proxy

User ID:

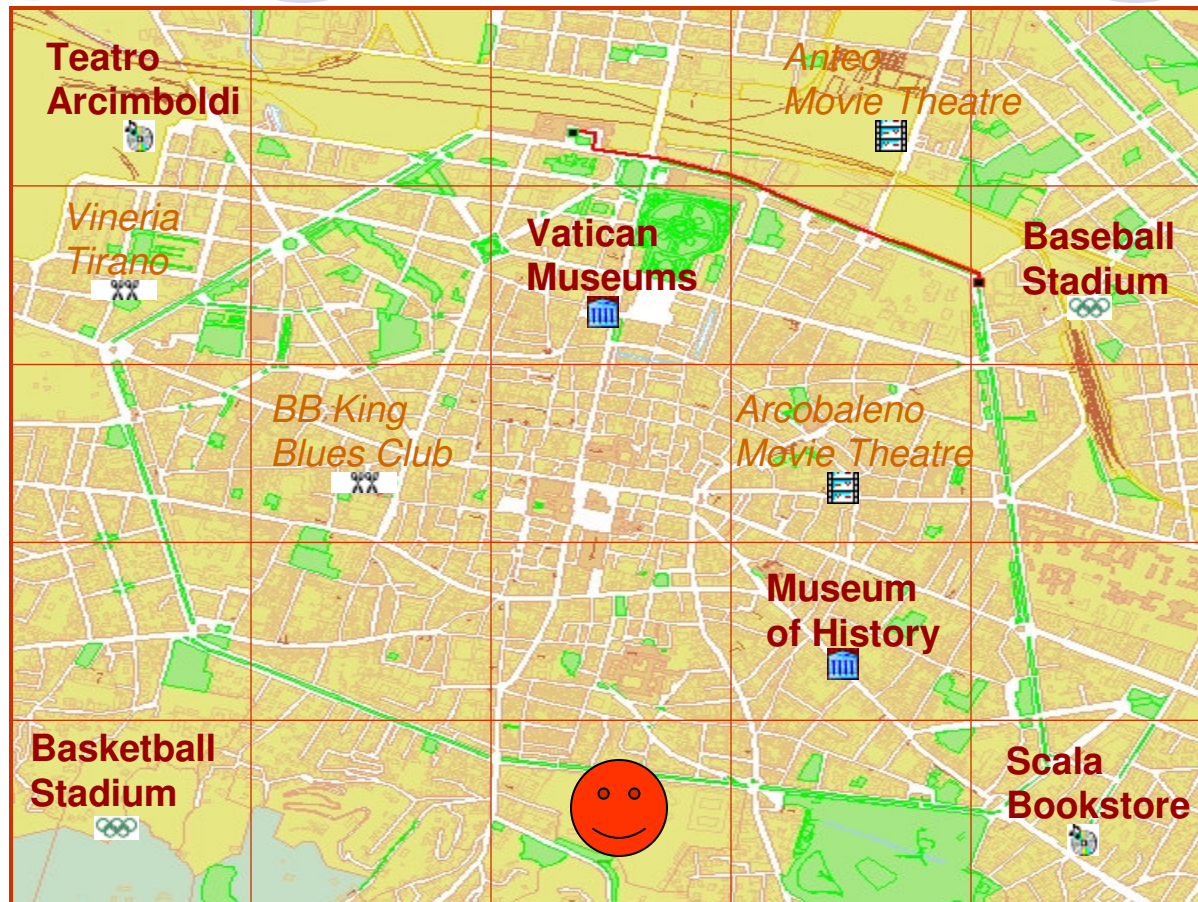
- User ID for UPM, OPM e SPPM

UPM, OPM url:

- Are provided to the SPPM by the HTTP request headers



Use Case 1: Businessman



Use Case 1 – Interest Categories

Interest Categories:

1. Music (UPM)
2. Sports (UPM)
3. Architecture (SPPM)



Use Case 1 – Presentation Directives

TextLength:

- Short

MediaQuality:

- High



Use Case 1 – Multimedia Content

MediaQuality:

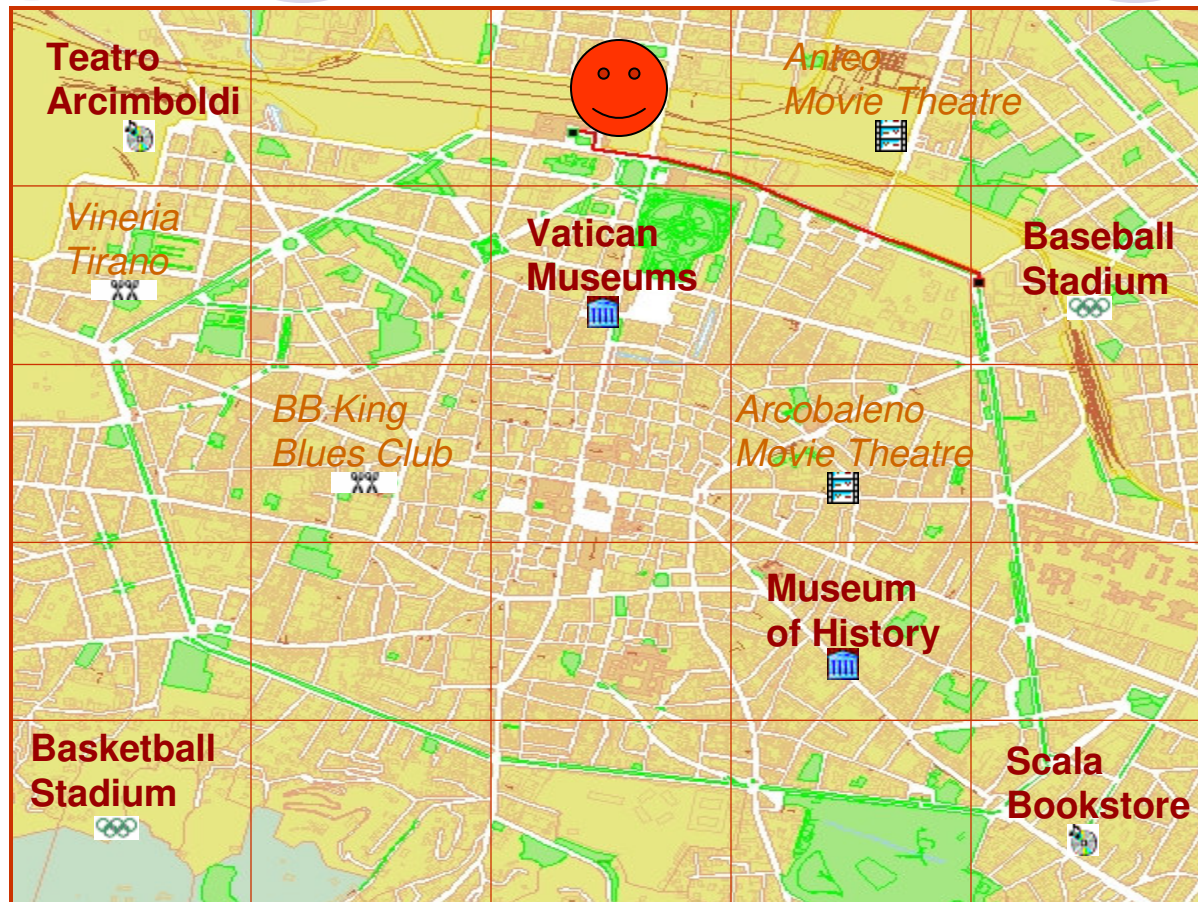
○ High



Use Case 2

- A businessman using a PDA (DeviceType) with a GPRS network connection
- Attribute values:
 - InterestCategories: Music, Sports (UPM); Architecture (SPPM)
 - Available Bandwidth: 30 kbps (OPM)
 - BatteryChargeStatus: 90% (UPM)
 - Coordinates: [3:5] (UPM); [3:4] (OPM)
- Fired rules:
 - UPM_rule1 : ***IF DeviceType = "Pda" THEN MediaQuality = "High"***
 - SPPM_rule1 : ***IF DeviceType = "Pda" THEN TextLength = "Short"***
 - SPPM_rule2 : ***IF AvailableBandwidth = "Low" THEN MediaQuality = "Low"***
- Following the directives, the list of interests is ordered by considering the interests declared by the user followed by the ones induced by the service provider; the coordinates are the ones provided by the user
- The rules UPM_rule1 and SPPM_rule2 are conflicting; the IE gives higher priority to the SPPM, considering the same profile resolution directive used by the Merge module
- The multimedia content is delivered in low-resolution mode (MediaQuality="Low"); the text length is short (TextLength="Short")

Use Case 2: Businessman



Use Case 2 – Interest Categories

Interest Categories:

1. Music (UPM)
2. Sports (UPM)
3. Architecture (SPPM)



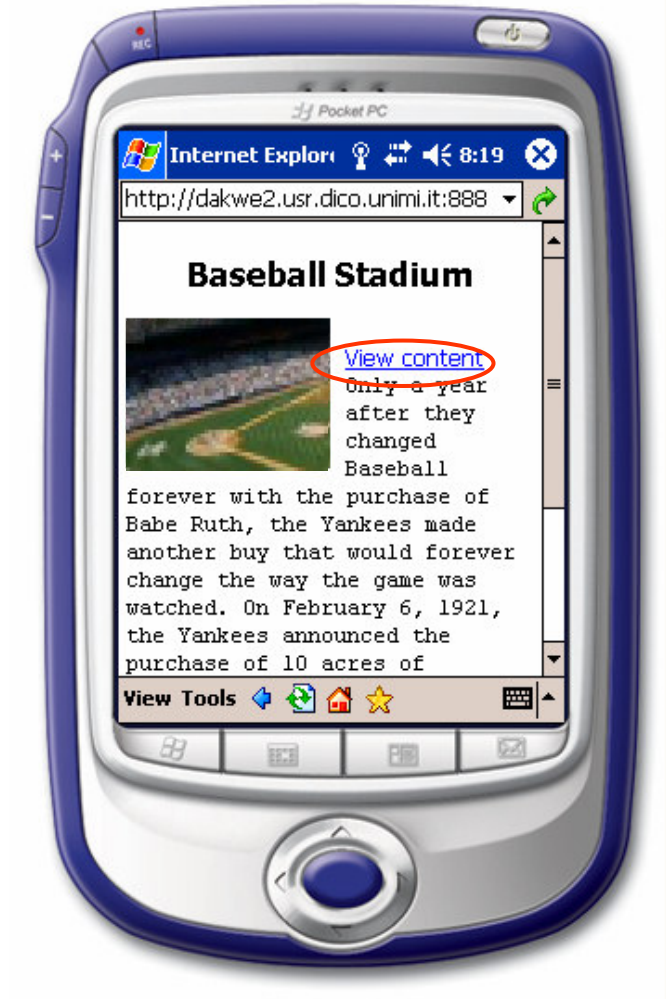
Use Case 2 – Presentation Directives

TextLength:

- Short

MediaQuality:

- ~~High~~ Low



Use Case 2 – Multimedia Content

MediaQuality:

~~High~~ Low

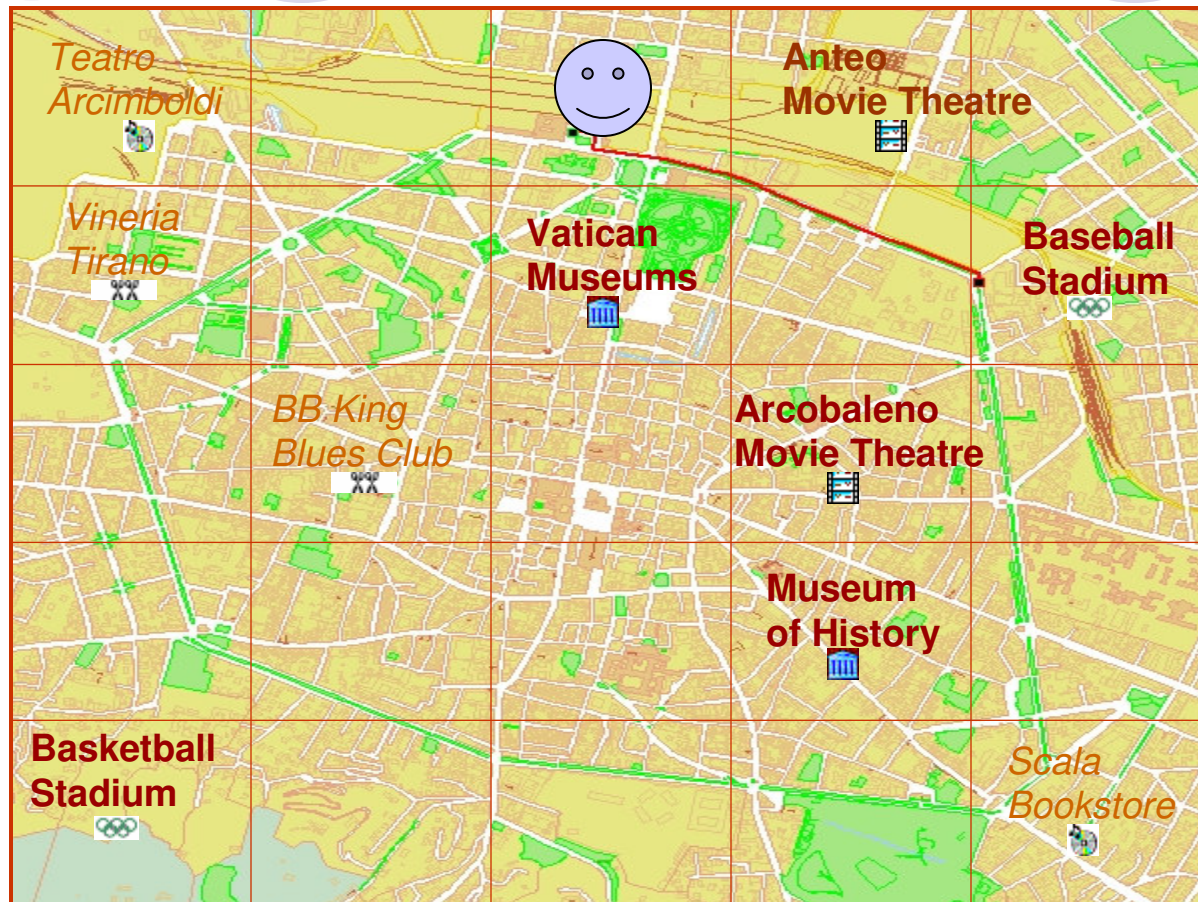


Use Case 3



- A student, using a PDA (DeviceType), in a WiFi hot-spot
- Attribute values:
 - InterestCategories: Sports, Movies (UPM); Architecture (SPPM)
 - BatteryChargeStatus: 90% (UPM)
 - Available Bandwidth: 2000 kbps (OPM)
 - Coordinates: [3:5] (UPM); [3:4] (OPM)
- Fired rules:
 - UPM_rule1 : ***IF DeviceType = "Pda" THEN MediaQuality = "High"***
 - SPPM_rule1 : ***IF DeviceType = "Pda" THEN TextLength = "Short"***

Use Case 3: Student



Use Case 3 – Interest Categories

Interest Categories:

1. Sport (UPM)
2. Movies (UPM)
3. Architecture (SPPM)



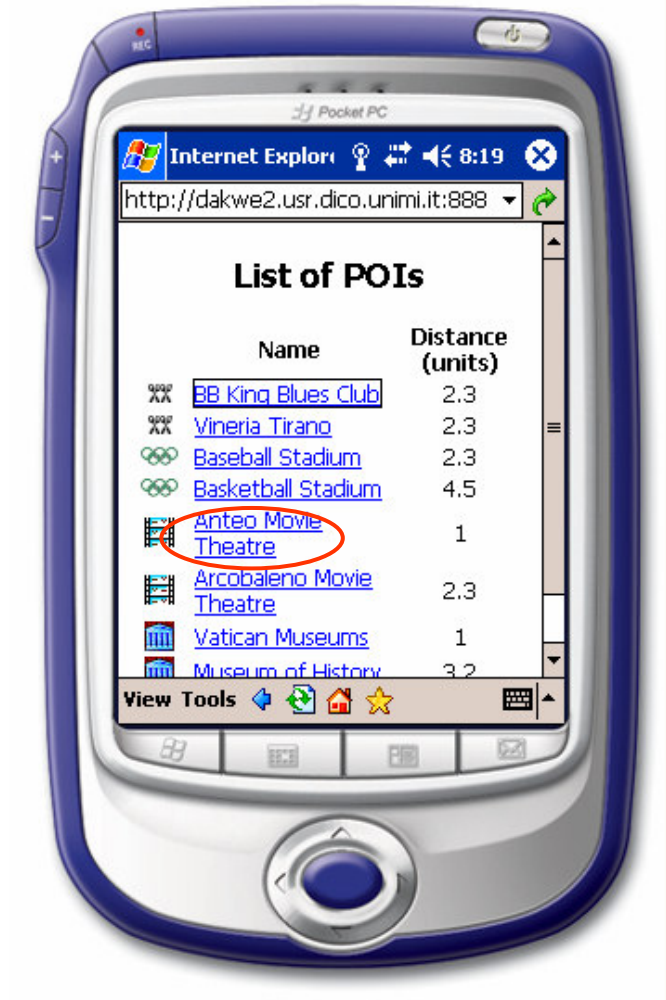
Use Case 4

- A student using a PDA (DeviceType) in a WiFi hot-spot
- Attribute values:
 - InterestCategories: Sports, Movies (UPM); Architecture (SPPM)
 - BatteryChargeStatus: 10% (UPM)
 - Available Bandwidth: 2000 kbps (OPM)
 - Coordinates: [3:5] (UPM); [3:4] (OPM)
- Fired rules:
 - UPM_rule1 : ***IF DeviceType = "Pda" THEN MediaQuality = "High"***
 - SPPM_rule1 : ***IF DeviceType = "Pda" THEN TextLength = "Short"***
 - SPPM_rule2 : ***IF BatteryChargeStatus < 40 THEN MediaQuality = "Low"***
 - SPPM_rule3 : ***IF CurrentTime > 11 AND CurrentTime < 14 THEN Phase="Noon"***
- The "Phase" attribute fires a business logic rule that brings the "Restaurants" category on top of the interest categories
- The BatteryLevel attribute determines a change in the delivered multimedia quality

Use Case 4 – Interest Categories

Interest Categories:

1. Restaurants (App. Logic)
2. Sport (UPM)
3. Movies (UPM)
4. Architecture (SPPM)



Use Case 4 – Multimedia Content

MediaQuality:

○ Low



Architecture Implementation

- User device:
 - Local Proxy for the communication of userID and profile references to the Service Provider (SP)
 - Web-based console for modifying user profile and preferences over the UPM and OPM
- Application logic:
 - Cocoon for business logic and delivery of POIs and multimedia content
 - SOAP client for the communication with the SPPM
- SPPM:
 - SOAP server AXIS;
 - Castor for profile marshalling in XML;
 - EJB su JBoss for profile retrieval and integration, consisting in:
 - Merge module (custom Java package and Jena RDQL for queryinf the profiles)
 - Mandarax for the Inference Engine
 - RDF e RuleML repositories for profiles and rules respectively
- UPM/OPM host local RDF and RuleML repositories

Architecture Implementation - Schema

