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# Indoor Positioning Systems for Intelligent Museum Visitors Support Service

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## Motivation

- Majority of museums has a limited space for visitors causing visitors traffic jam and increasing waiting time for them.
- Google Art Project allows visitors to see online interesting information of museums exhibition. It is possible to show this information for museum visitor (“Internet guide”).
- There are many research approaches and projects are focused in the area of museum guides: SMARTMUSEUM (FP7 project), HIPS, CRUMPET, KUBADJI projects, and etc.



# Task Definition

Needed:  
Indoor Positioning Systems Based  
on Communications Supported by  
Smartphones (Wi-Fi, Bluetooth, GSM)



The main goals of Intelligent Museum Visitors Support Service :

- Organize excursion plans depending of the context information in the museum and museum visitors preferences.
- Provide actual textual, graphical, video and audio information of exhibition for the museum visitor.

# Comparative Analysis of Indoor Positioning Systems (1)



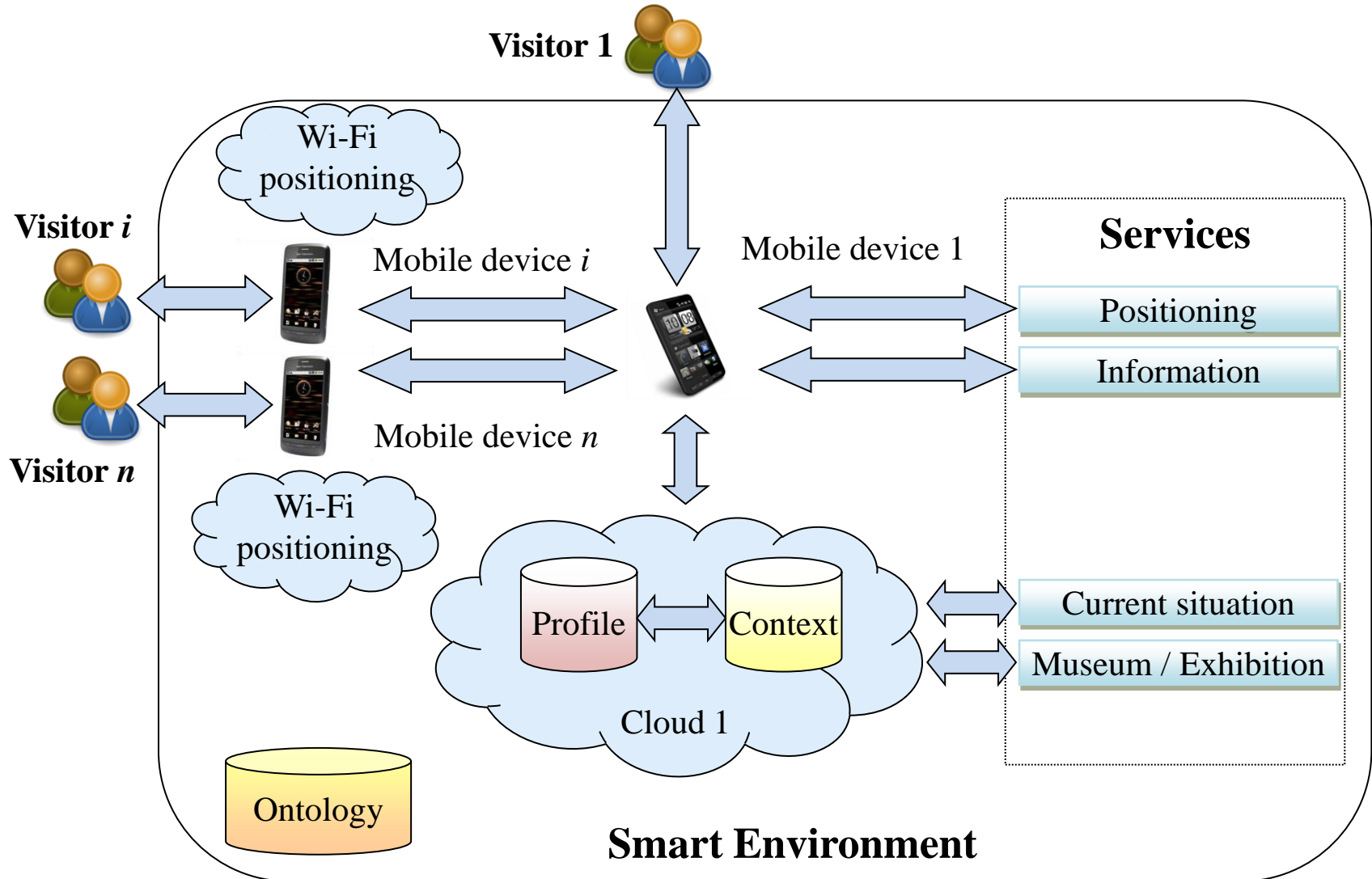
Solution	Type	Positioning technology	Declared Accuracy	Architecture	Context information	Navigation functions	3D positioning	Statistic information	Platforms	Using Maps
IWAYtours	IPS	Cell and Wi-Fi fingerprinting	1-5m	Standalone	+	-	+	-	Android	Google Maps
Wifarer in-venue navigation	IPS	Wi-Fi fingerprinting	1,3m	Client-Server	+	+	+	+	iOS, Android	Individual Maps
Walkbase	API	A-GPS	10-50m	Client-Server	+	-	+	-	Android	-
Smartmuseum	IPS	RFID	0.5m	Client-Server	+	-	+	+	Windows Mobile, Symbian	-
Google Maps (indoor module)	IPS	Cell and Wi-Fi triangulation	5-10m	Client-Server	-	+	+	-	iOS, Android, Blackberry	Google Maps
Skyhook Location	API	Cell and Wi-Fi triangulation	10m	SDK	-	-	+	+	Android, Linux, Windows, Mac OS	MapQuest
Qubulus LocLizard	API	Cell and Wi-Fi fingerprinting	1m	SDK	-	-	+	+	Android	Google Maps, Bing Maps

# Comparative Analysis of Indoor Positioning Systems (2)

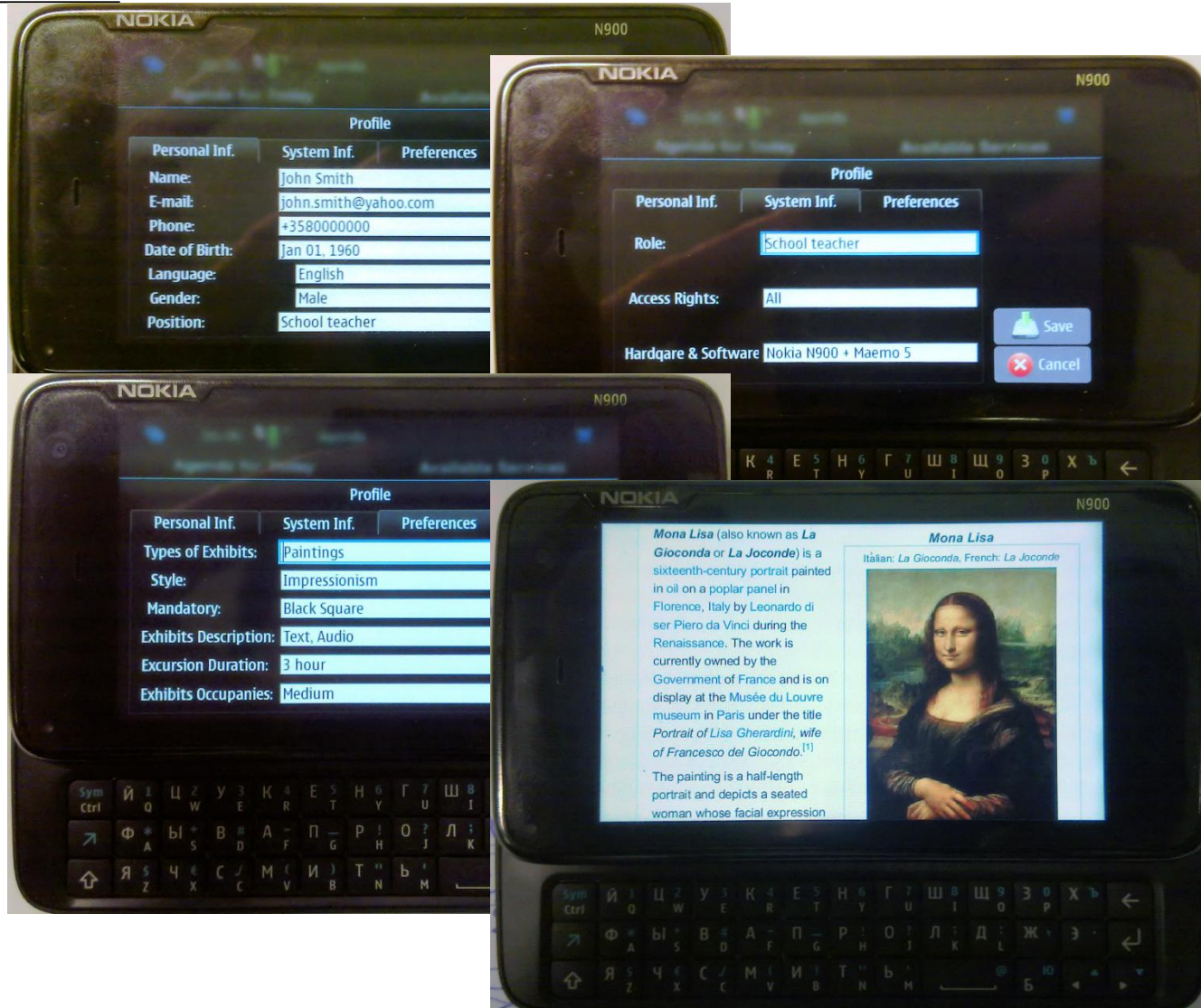


Solution	Type	Positioning technology	Declared Accuracy	Architecture	Context information	Navigation functions	3D positioning	Statistic information	Platforms	Using Maps
Nokia Indoor Navigator	IPS	Bluetooth 4.0 and Wi-Fi triangulation (HAIP)	0.3-1.0m	Client-Server	+	+	+	-	Windows Phone 7, Symbian	Navteq Destination Maps
Microsoft RADAR	IPS	Wi-Fi fingerprinting	2-3m	Client-Server	-	-	+	+	?	Bing Maps
Horus	IPS	Wi-Fi fingerprinting with location clustering	2-3m	Client-Server	+	-	+	-	Windows XP, Linux	Individual Maps
Indoor Localization Application by Eladio Martin et. al.	IPS	Cell and Wi-Fi fingerprinting	1.5	Standalone	-	-	+	-	Android	Individual Maps
Place Lab	IPS	Cell, Bluetooth, and Wi-Fi centroid, fingerprinting, particle filter	13-30m	Client-Server	+	-	+	-	?	Individual Maps

# Ontological Approach of Smart Museums Service



# Case Study



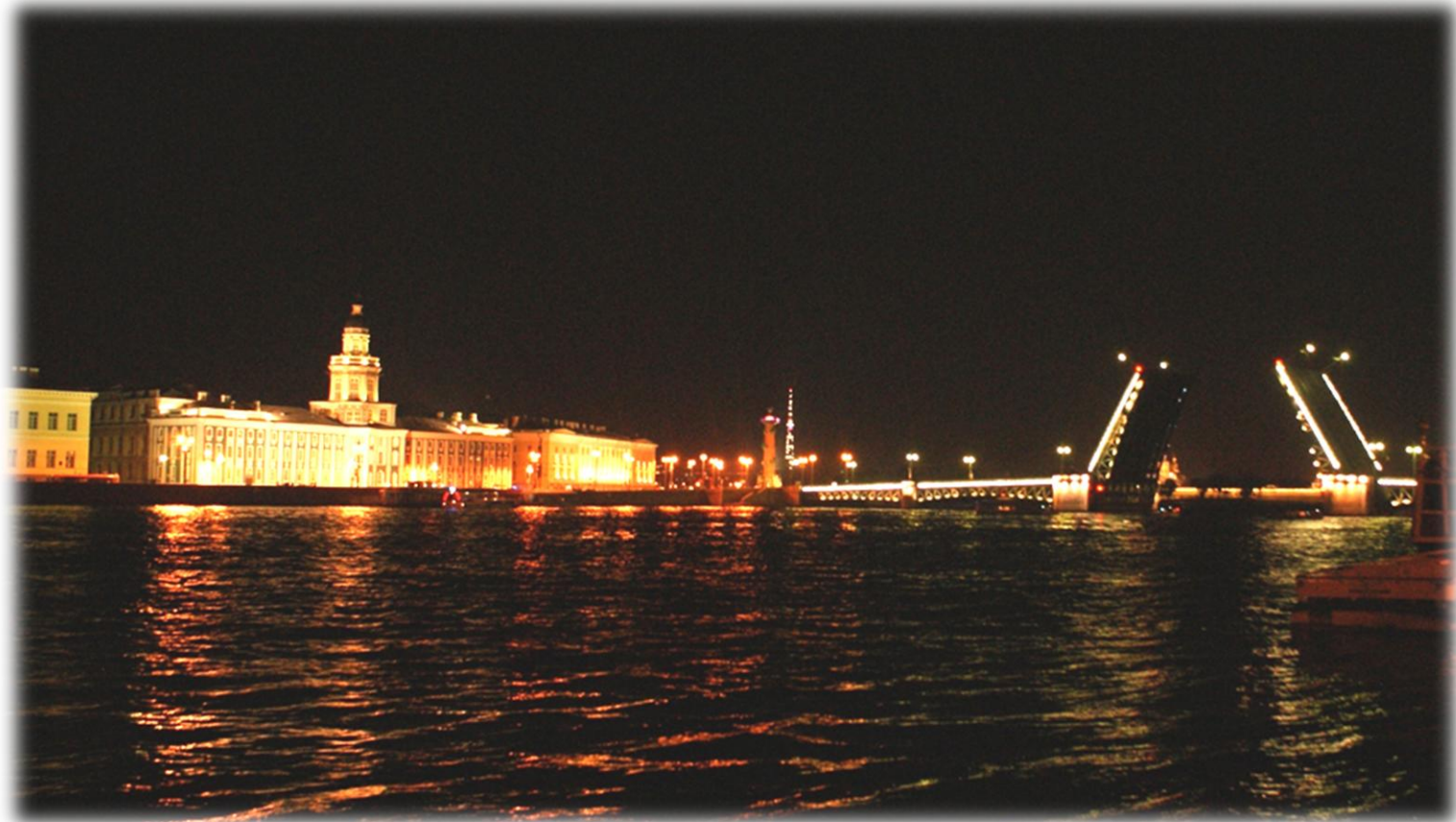




## Conclusion

- The innovative approach of smart museums service for supporting visitors has been presented.
- The approach allows different devices in the museums smart environment to interact with each other, transfer their positions for the purpose to suggest visitors a museum which is currently better to attend and propose excursion plan to the visitor in the area of museum.
- Comparative Analysis of Indoor Positioning Systems based on communications supported by modern smartphones has been presented.

**Thank you for Attention  
Questions are Welcome**



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