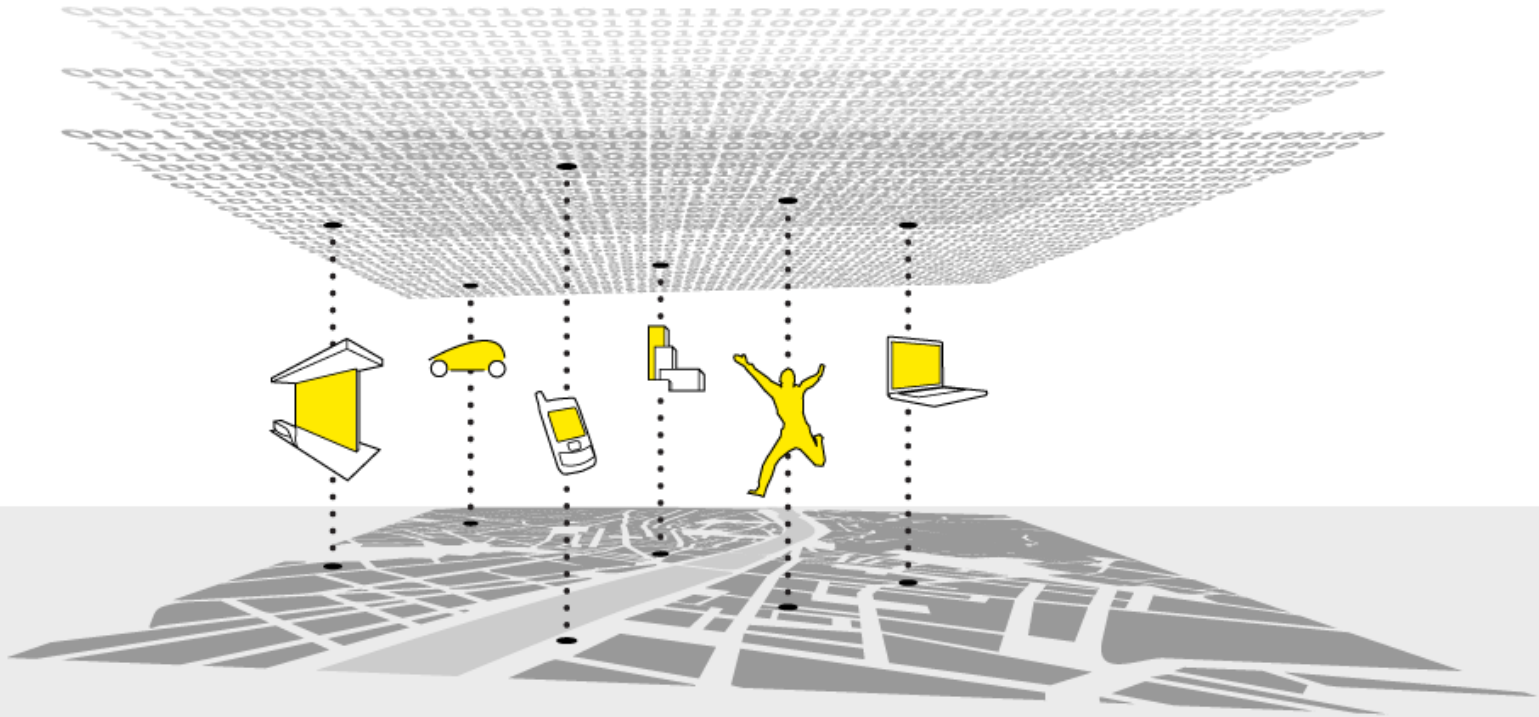
wikicity [*]

senseable city lab:.::

HOW CAN A CITY
PERFORM AS AN
OPEN-SOURCE
REAL-TIME SYSTEM



Fabien Girardin

4th International Symposium on LBS
and Telecartography
Hong-Kong, China
November 9, 2007

team

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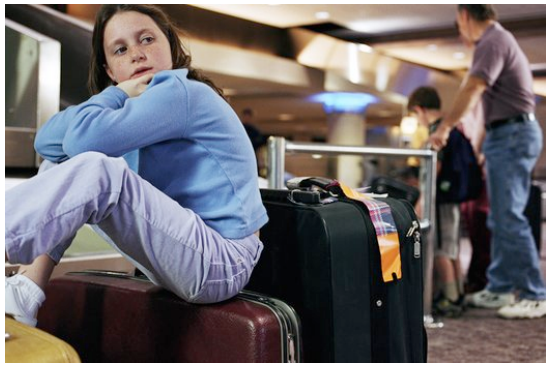
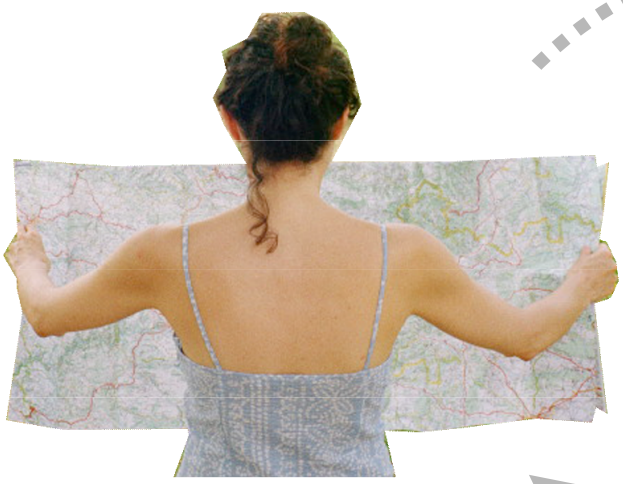
1/7 introduction

People moving and acting in a city base their decisions on information that is in most cases not synchronized with the time and place they find themselves in when taking that decision.

How often have you arrived at the airport just to find out that your flight has been delayed, been surprised by a traffic jam, found that a product is out of stock or a service operator busy at the moment you needed it.





The WikiCity project is concerned with the real-time mapping of city dynamics. This mapping however is not limited to representing the city but instead becomes instantly an instrument for city inhabitants to base their actions and decisions upon in a better informed manner.

This with the ultimate aim of leading to an overall increased efficiency and sustainability in making use of the city environment.

Towards the above goal, the WikiCity project can be thought of as adding further, interaction-oriented layers to a real-time map of the city and making location and time-sensitive information accessible to users, allowing them full control on the database, onto which they can upload and download data.

In this way, these tools enable people to become distributed intelligent actuators and thus became prime actors themselves in improving the efficiency of urban systems.

context

WikiCity refers to a number of active threads of research and business in different fields on topics such as

2.1 Sensing
2.2 Interactive Maps
2.3 Wikipedia
2.4 Real time information
2.5 Intelligent transportation systems
2.6 E-business
2.7 Semantic Web
2.8 Web 2.0
2.9 Service Oriented Architecture
2.10 Location & time-sensitive data

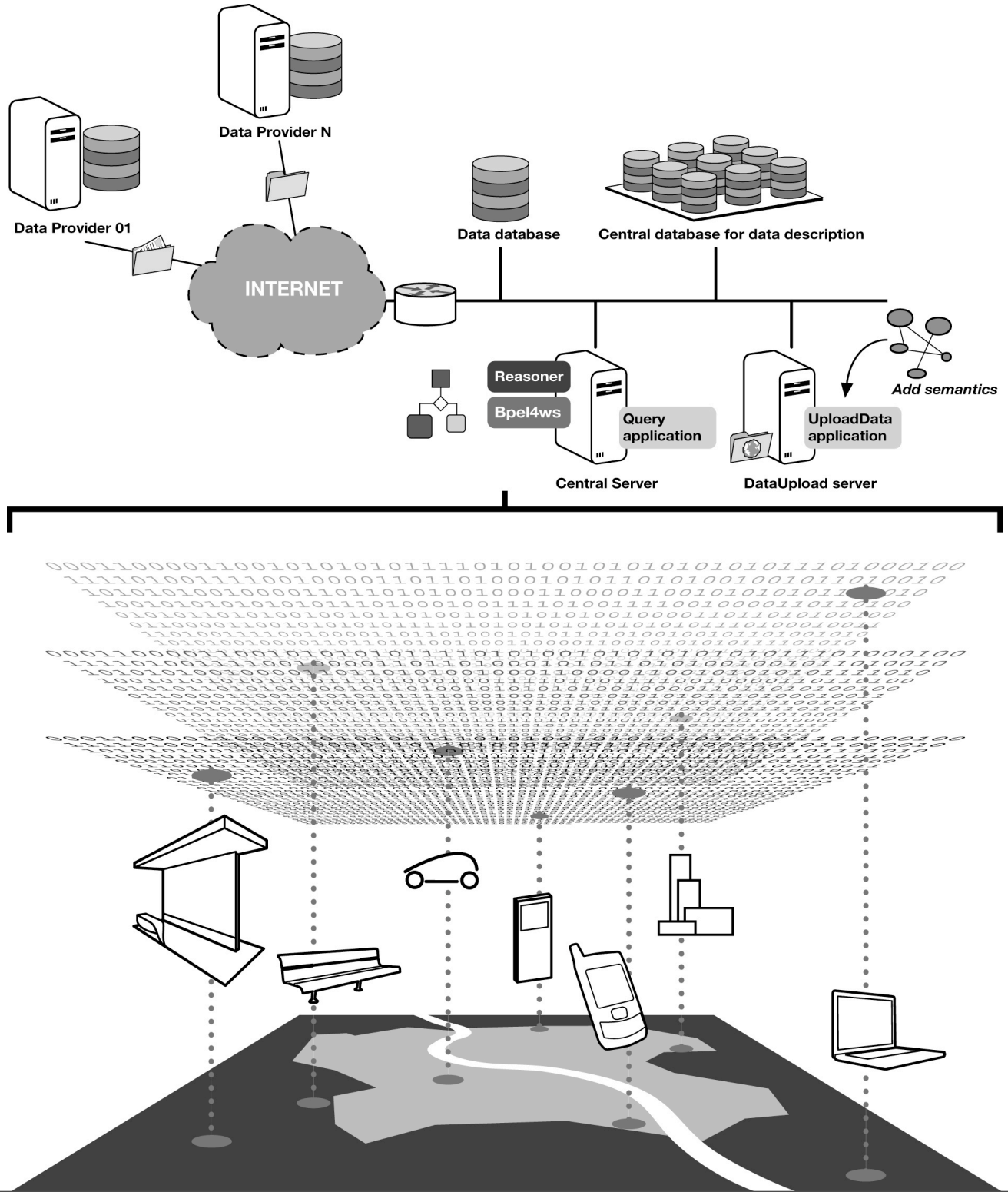
wikicity

The WikiCity project aims at combining the benefits of the previously described projects on the basis of creating a common format for interchange of real-time location-based data and a distributed platform able to collect, manage and provide such data in real time.

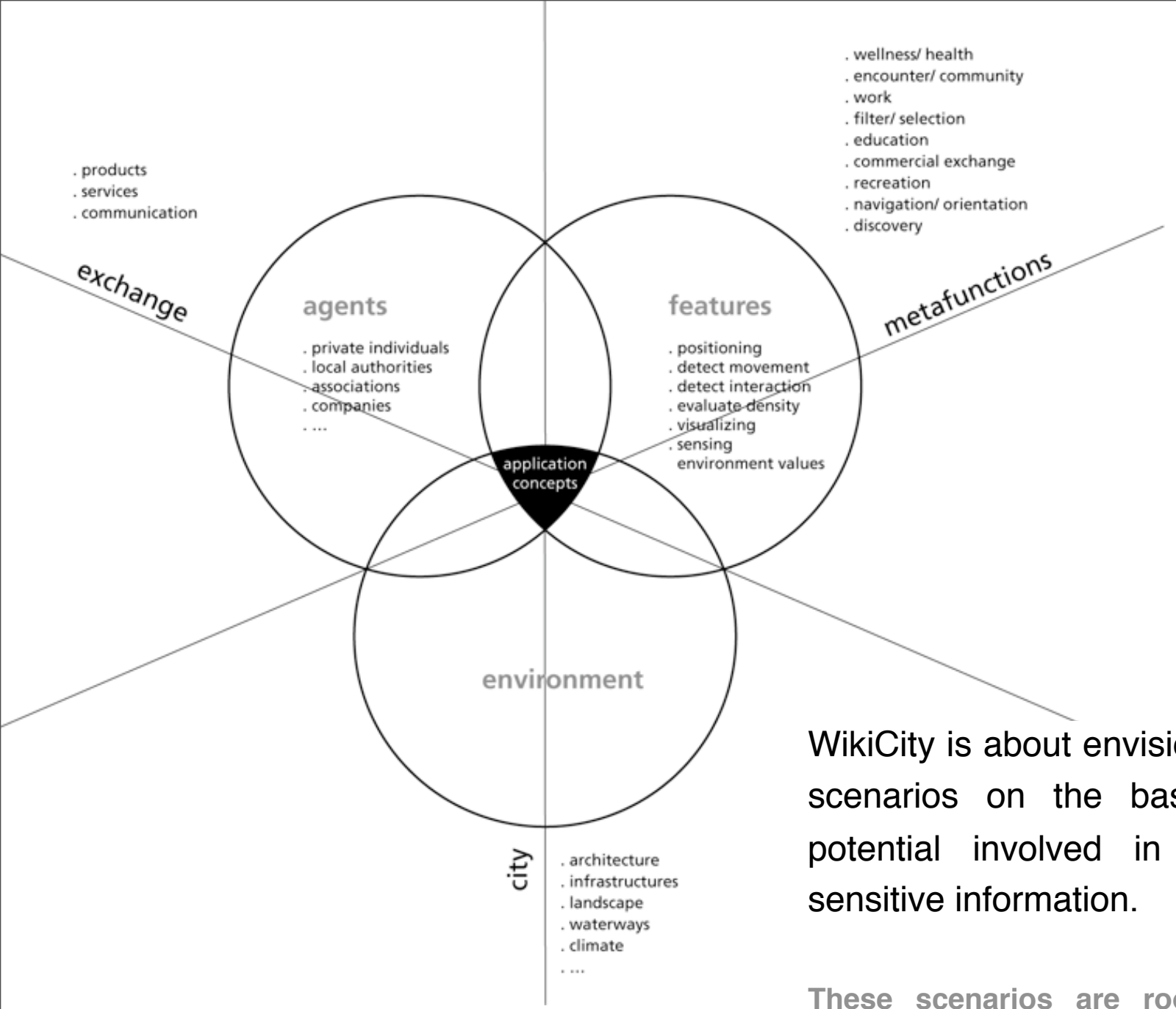
In this way the city's most informative real-time map can be created, letting users broadcast their location and have site-specific information pushed on them per request.

We aim to acquire data from:

1. **telecom operators**
such as aggregate mobile phones location data and further users information;
2. **public transport** (bus, subway, train)
such as vehicles' locations, paths and time schedules;
3. **companies**
which have real-time location information of a number of vehicles
4. **businesses**
which want to provide services/products that are location-time sensitive;
5. **local authorities**
that can add information about events, activities or environmental conditions.
6. **any private individual**
that can upload information on general interest, events, requests or offerings.


Data Provider N
Data Provider 01
INTERNET
Data database
Central database for data description
Reasoner
Bpel4ws
Query application
Central Server
UploadData application
DataUpload server
Add semantics

4/7 design concept and scenarios

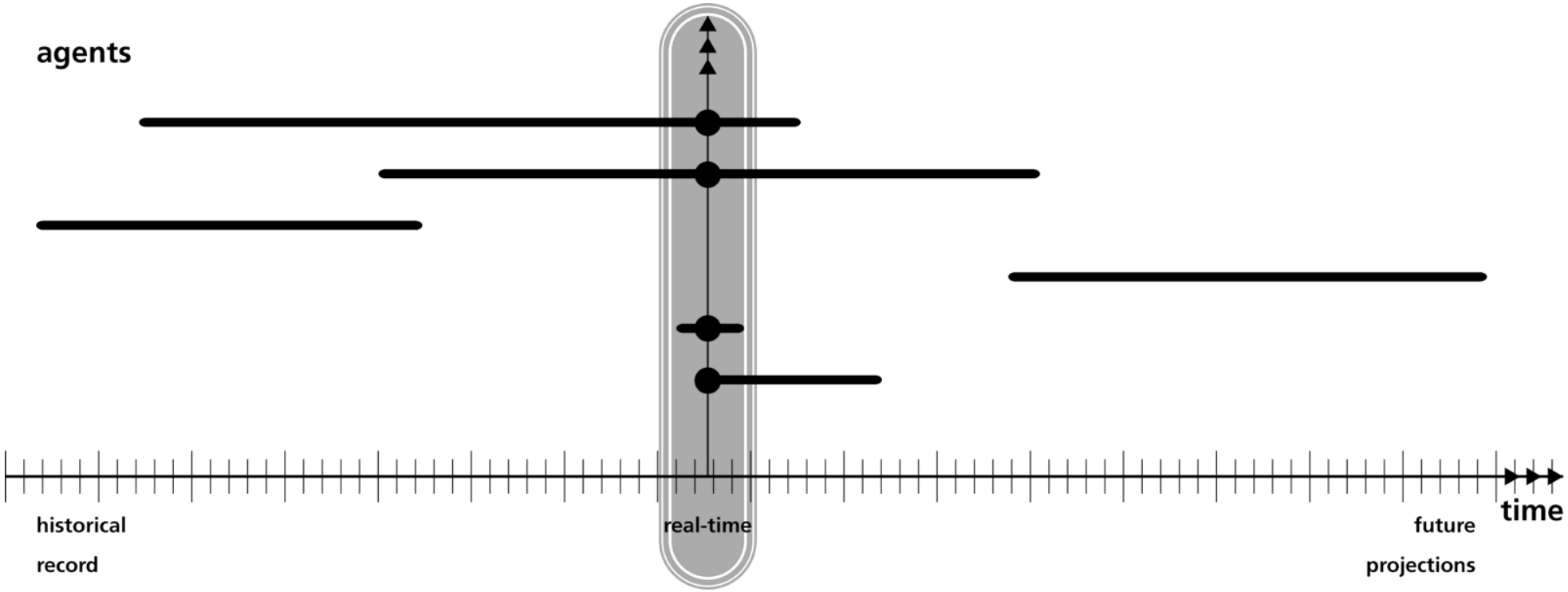


WikiCity is about envisioning new application scenarios on the basis of a technology potential involved in location and time-sensitive information.

These scenarios are rooted within the social context of a city for which we have identified three main element groups involved which are Agents, Environment and Technology features.

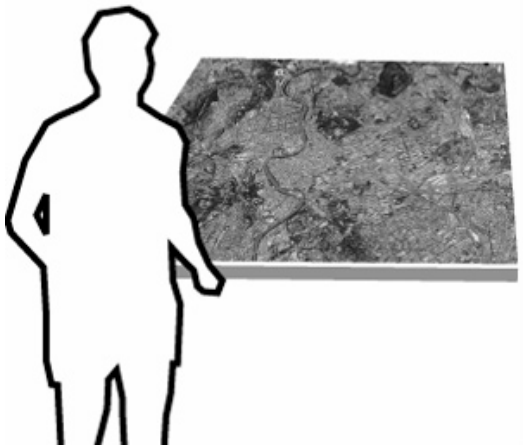
Time value

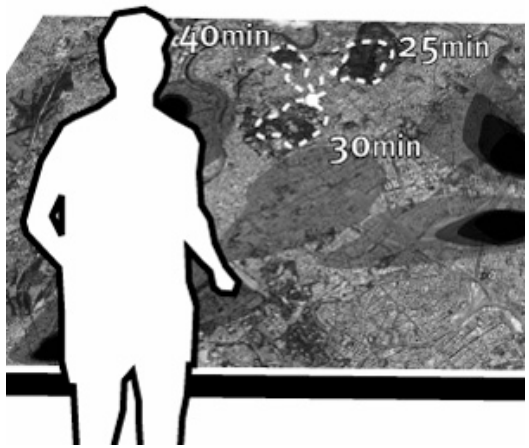
A key characteristic of WikiCity being the circulation of information on a real-time basis, we can identify different “time zones” in which the data can be useful and supportive to different agents and different operations. These determine the way data shall be made accessible.

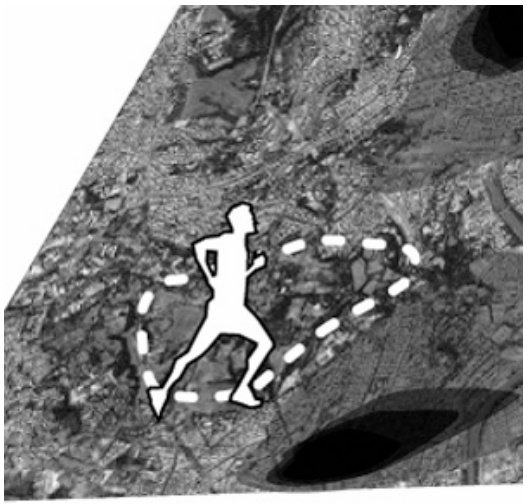


Storyboards

As a last step in concept and scenario elaboration the technique of storyboards is used to visualize dynamic situations enabled by the use of the WikiCity project in a modelled real-world situation. The technical potential of location and time sensitive services becomes tangible through the application to a coherent application scenario.



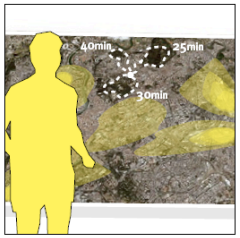




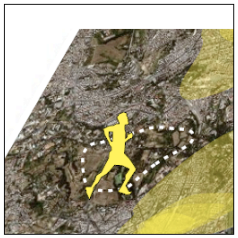
Scenario 01 | Jogging Path

Tom is an occasional jogger, health conscious and trying to find routes for his activity that provide him with traffic calm paths, little air pollution and that correspond to his level of physical condition.

wanting to go jogging tom looks at the WIki-City map to get suggestions on routes considering air quality, traffic calm paths and his physical condition.



the wiki-city map suggests three jogging routes considering air quality, traffic density and tom's physical condition indicating an approximate time and starting from tom's current position.

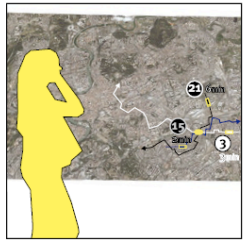


tom choses his prefered route for the day and sets of for a run. by chosing one route, he can decide whether to record his choice for later and leave suggestions for others.

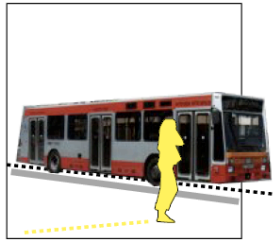
Scenario 02 | Bus hop

Susan knows the public transport lines of her city quite well and she wants to take any line that takes her to the center. Looking up the wiki-city che sees all public transport lines that are approaching the station close to her in real-time indicated by the number of the line and the time left until her station. In this very intuitive way she sees immediately when to walk down to the bus stop and be sure not waiting for long.

susan thinks of going to the city center and wants to catch the first bus or tram passing by her stop downstairs.



looking into wiki-city she sees the real-time position of public transport means approaching her stop, which lines they are, where they are going and in how many minutes they will arriv.

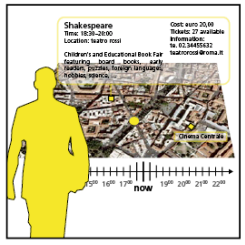


in this way she continues her work just until her bus arrives catching it on the fly without having to wait for long outside.

Scenario 03 | Event spotter

Jonathan wants to find out what events are going on close to where he finds himself in town. The wiki-city knows about his position and the events calendar indicating him places and titles of events happening in the next 30 minutes. Quickly he sees that a theatre show is about to start at a place around the corner and manages to get tickets in time.
While waiting for the play to start he uses the time-shift function to see on wiki-city what will be going on the next day in that same area.

jonathan is wondering around the city without any particular plan. he wonders whether in this area some event is taking place that might interest him.

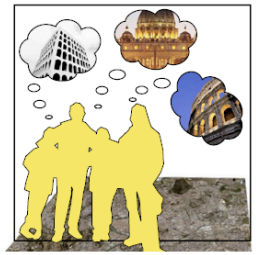


in the wiki city events part he easily identifies the events taking place near him at this moment. or sliding the time shifter he can get information on events in that area at different times.

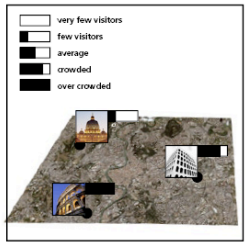
having located a theatre a few streets from his location starting in 20 minutes with places available he decides to get tickets on the fly and follow the play.

Scenario 04 | Sights density

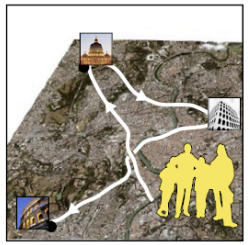
Giuseppe and his family have come as tourists to this city and want to do sightseeing. However they want to avoid being at the various sights when these are crowded. Wiki City reveals the amount of people at the different locations and Giuseppe can arrange his visiting tour according to this information, always going to those sights where less people happen to be at that moment.



Giuseppe and his family are making up their mind as to what sights in Rome to visit during the day.

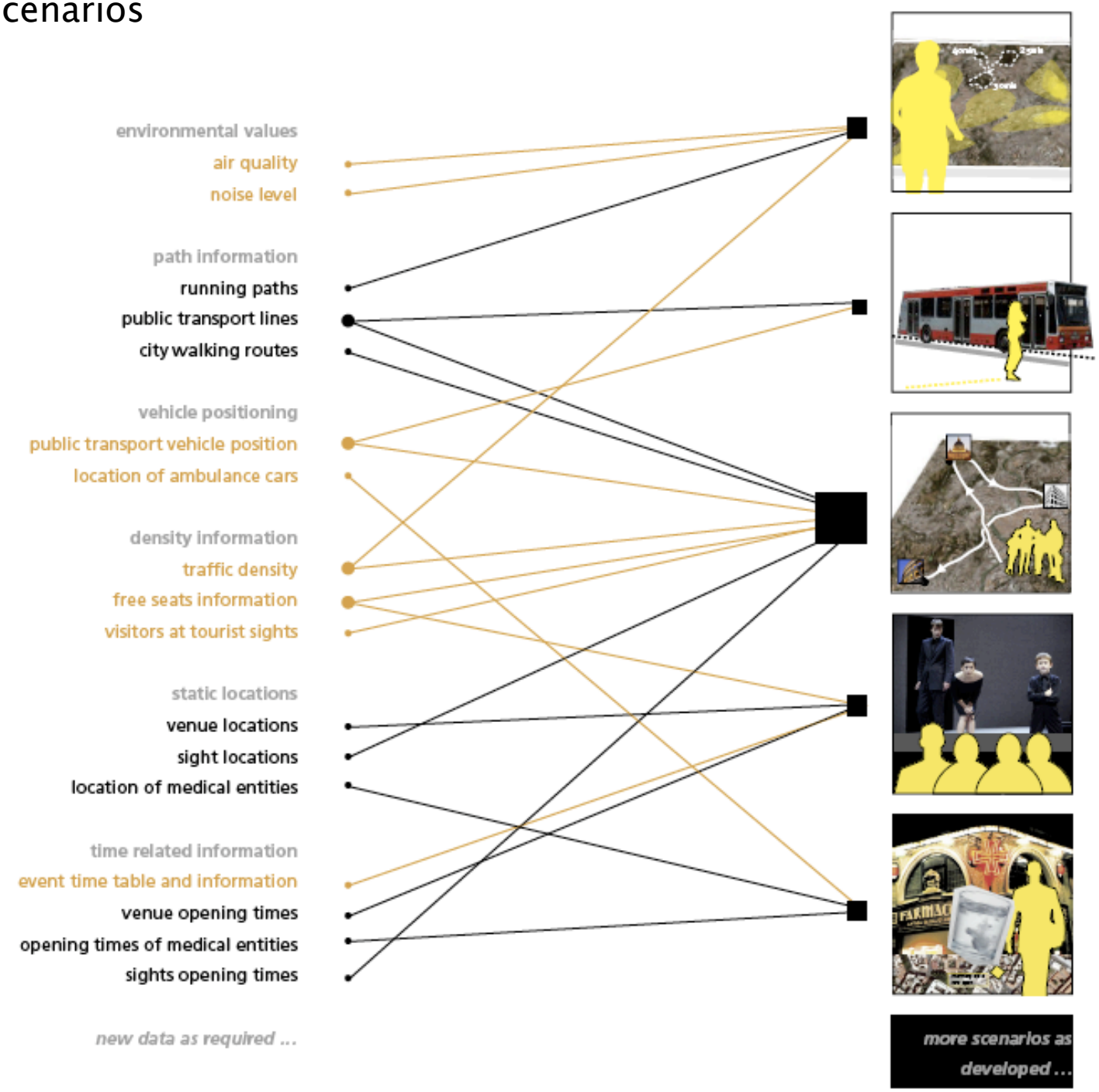


In the wiki city the see in a glimpse what the density of visitors at those different sights is like and so they understand where long waiting lines could happen.



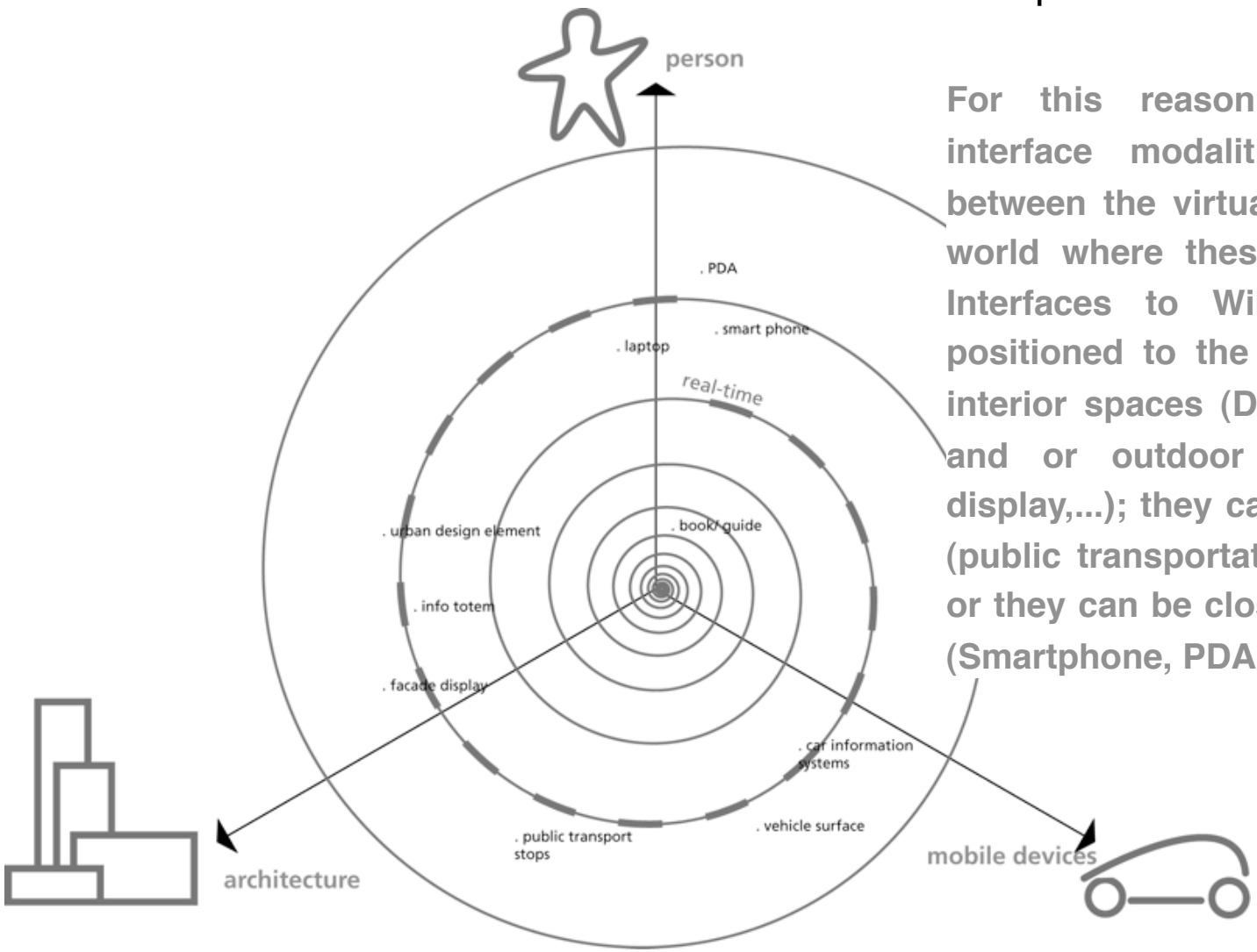
on the basis on the information from wiki city's sights density they decide upon the sequence of sights starting from the least visited ones in that moment, updating their tour according to changes in density.

Map data type for scenarios



5/7 access modality and interfaces

Just as important as the information that can be presented in various circumstances in relation to a city map, the very way the information is made accessible determines the effective outcome and relevant acceptance of the project as such.



For this reason WikiCity explores different interface modalities that create connections between the virtual data and the actual physical world where these data is accessed by users. Interfaces to WikiCity can be more closely positioned to the built environment in terms of interior spaces (Desktop PC, Wall projections,...) and or outdoor spaces (info totem, facade display,...); they can be linked to moving vehicles (public transportation, car infotainment centre,...) or they can be closely located to the user himself (Smartphone, PDA, PC Laptop,...).


person
. PDA
. smart phone
. laptop
real-time
. book/ guide
. urban design element
. info totem
. facade display
. car information systems
. vehicle surface
. public transport stops
architecture
mobility vehicle
time
PagineGialle.it
search
Jogging paths
now
Emergency
Healthcare / Medical
Environmental Values
Local authority
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Events
Eating & Drinking
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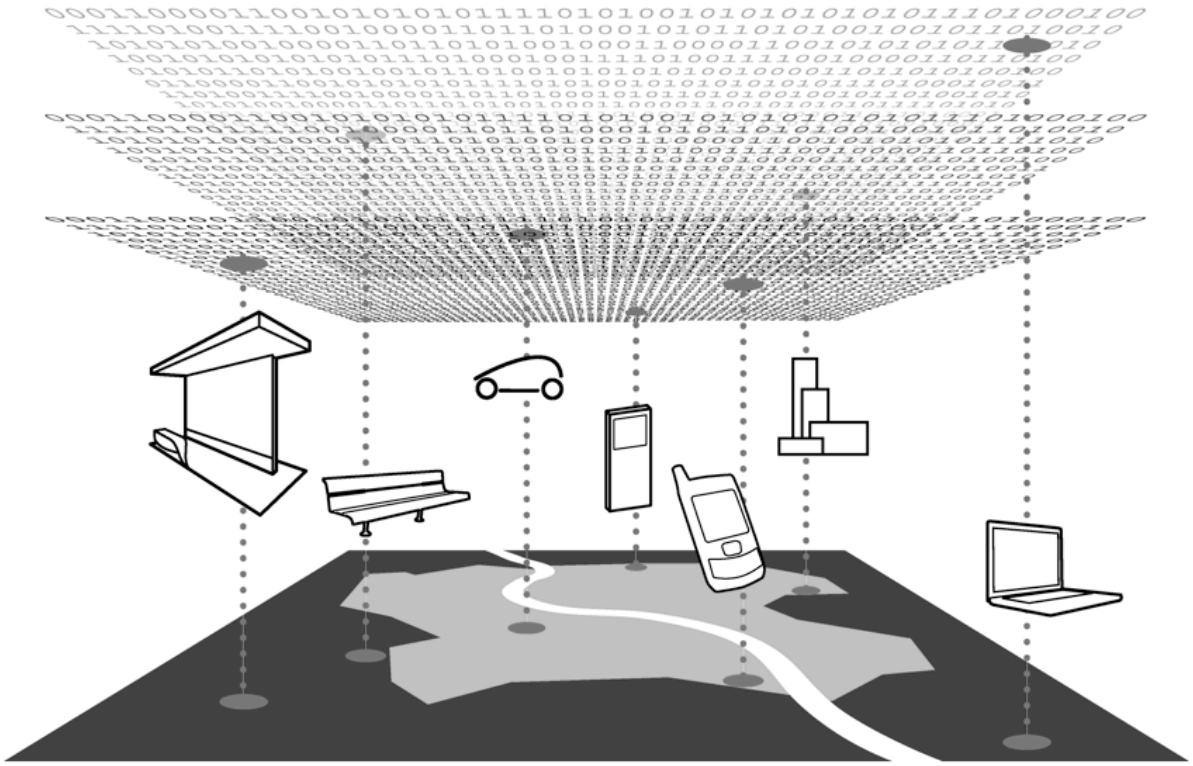
4,3km
iPAQ
Pocket PC



Multimodal interfaces

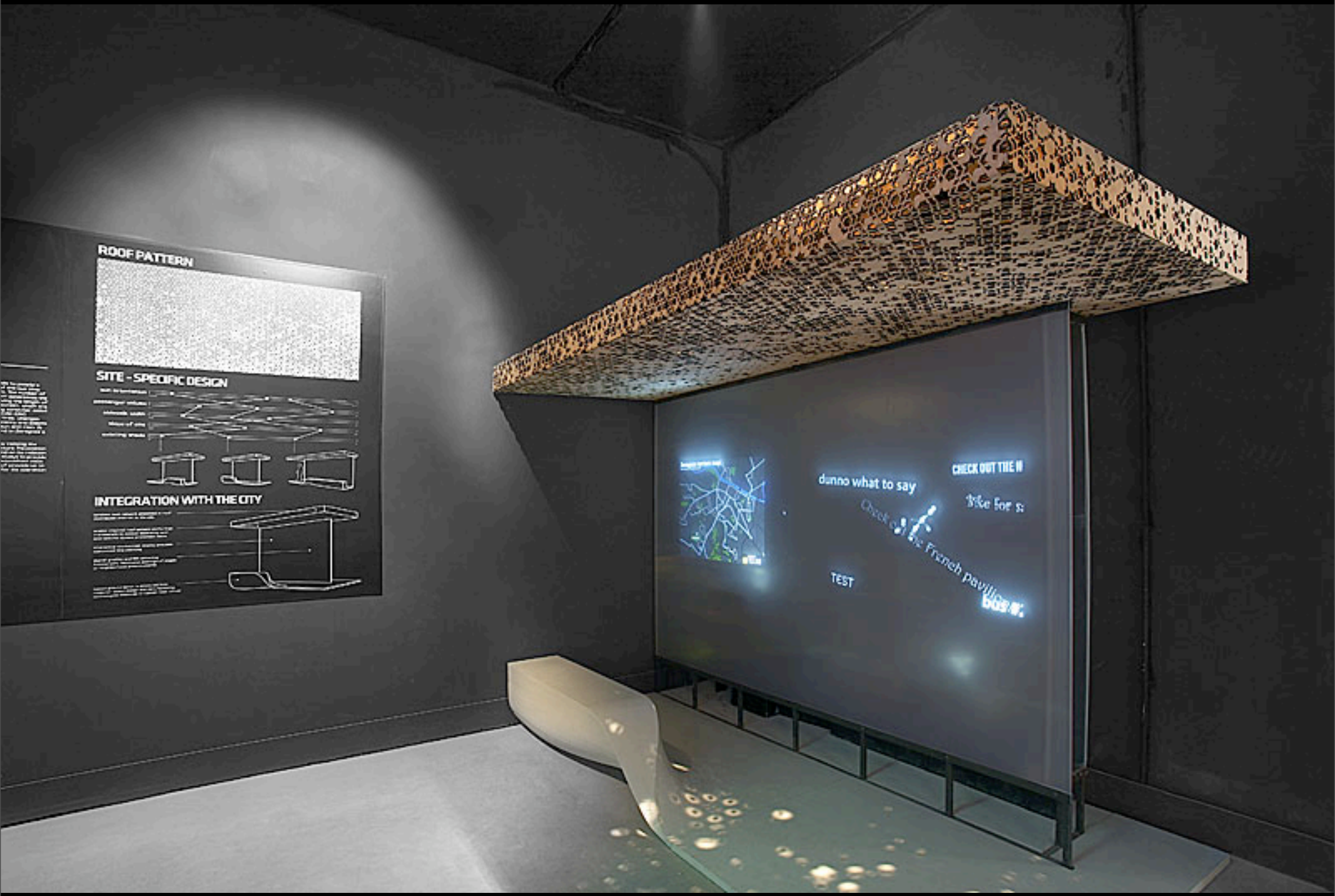
Looking for connections between the data realm and the user within the urban space, the second focus for WikiCity interfaces shall be put upon built structures. Throughout the urban environment inhabitants are permanently surrounded by structures that can be attributed to urban furniture or built infrastructures, many of which already carry various types of information if also mainly in a static way.

Information data from the virtual realm of WikiCity shall also be accessed through interaction with these structures and three approaches can be clearly distinguished:

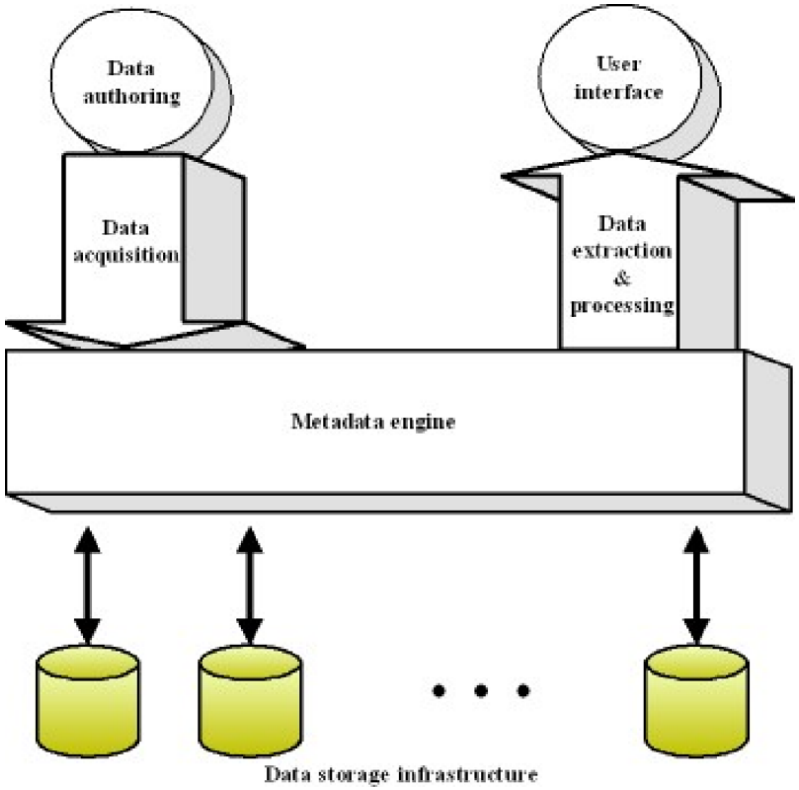
1. Embedded access in existing structures

2. Embedded access in existing structural typologies

3. New structural typologies in function of access to WikiCity.


ROOF PATTERN
SITE - SPECIFIC DESIGN
INTEGRATION WITH THE CITY
dunno what to say
CHECK OUT THE N
TEST

6/7 software implementation



The WikiCity infrastructure is based on standards and on a distributed architecture. The identified architecture is composed of the following components:

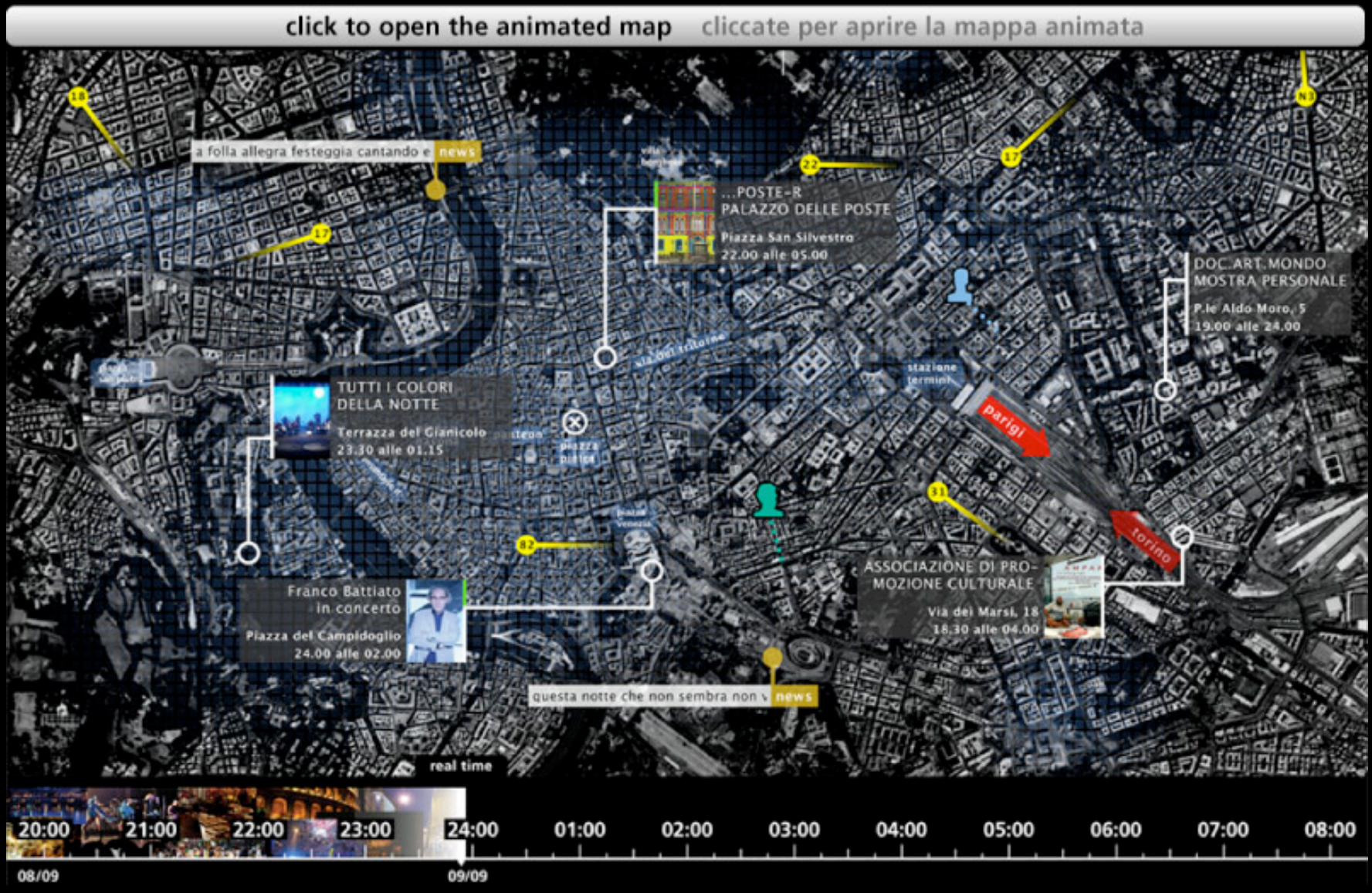
1. Data authoring (ontology);
2. Data acquisition (web services);
3. Data storage infrastructure (hybrid central & dist);
4. Metadata engine;
5. Data Extraction and Processing;
6. User interface.

To be presented at PerCom 2008 in March, in Hong-Kong.

wikicity [Rome]

Notte Bianca | 8. September 2007

WikiCity Rome
Notte Bianca I 8. September 2007



founding partners

technical partners

WikiCity Rome

Notte Bianca l 8. September 2007

WikiCity Rome
Notte Bianca l 8. September 2007

WikiCity Rome
Notte Bianca | 8. September 2007

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real time
30min preview
fast forward loop
Wikicity [Rome]
Poste di Piazza prende vita grazie
news
tto il sindaco di Roma in visita al
news
Il concerto, seguito da circa un mi
news
Complesso
Roma, Via San Michele, 17/22
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realtime
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09/09

7/7 Take aways

real-time mapping of city dynamics

people become distributed intelligent **actuators** and prime **actors**

common format for **interchange** of real-time location-based data

scenarios based on **Agents**, **Environment** and **Technology features**

multimodal interfaces (mobile, infrastructure, vehicles)

wikicity [*]

senseable city lab:.::

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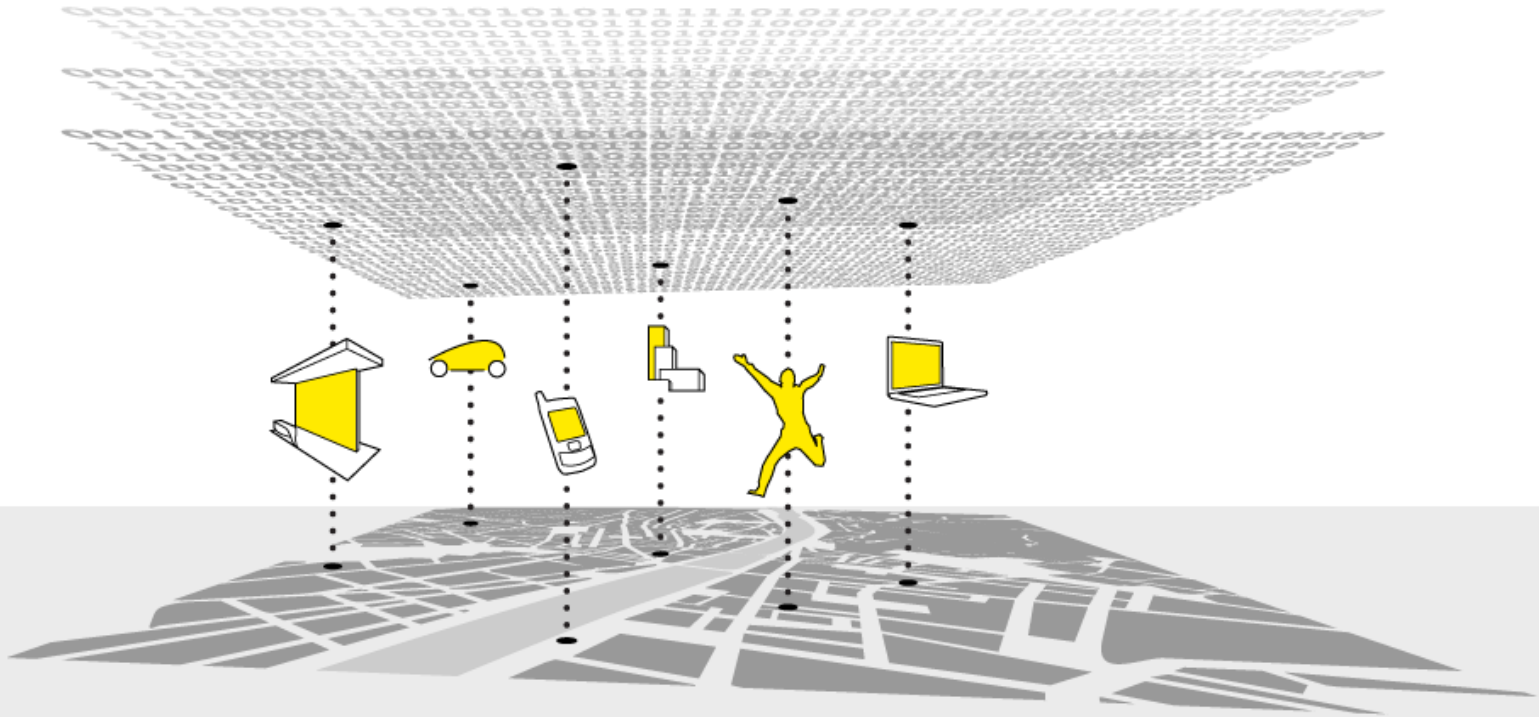
REAL-TIME SYSTEM



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