ENV-E-CITY

ENvironmentally Viable electronic CITY

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The objective of project Env-e-City is to develop an on-line broker application for environmental information related services. The e-content domain extends over four application areas: air emission, air quality, topography and meteorology. The application framework to be developed includes meta-data structures for all application areas, export and import filters, interfaces and various e-content basic services. The user community of the platform envisaged consists of city authorities, consultants involved in environmental impact assessment studies and citizens desiring valid information on the state of the environment. An electronic market place for the e-content itself and the services will be established using an on-line pricing scheme. The overall system will be properly demonstrated and validated against "real world" applications.

City authorities are obliged to comply with EU environmental legislation like the so called "Framework Directive 96/62/EC" on ambient air quality assessment and management. This obligation is accompanied by the provision of reports to the EU via the EEA and includes specific monitoring and reporting actions to be taken from cities of size more than 250.000 inhabitants. Nevertheless, this mandate has not been followed by all EU cities, causing legal and environmental administration problems to both national and EU authorities. This "new generation" of legislative texts underline the need for an efficient environmental assessment, which can be achieved only on the basis of efficient environmental data at an urban scale. The latter, are often unavailable for the majority of EU cities, making them ideal nominates for an ENV-e-CITY like application.

Project ENV-e-CITY* aims at improving access to and use of public sector information, and more specifically environment-related information, by creating an on-line broker for environment information related services. The project objective is to create a modular

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framework for metadata definition and data collection and management, regarding a digital content application on urban environment. This framework will consist of a theoretical model, which will be based on existing standards regarding the collection and management of environmental information and related meta-information. Modularity, in addition, will be based on the need for constructing the three-layer approach of the project as follows:

- 1st layer: raw data
- 2nd layer: meta-data
- 3rd layer: basic services

This structure will support the creation and operation of added-value services, to be developed as tailored applications "over basic services", i.e., basic services as well as raw and meta-data will be provided by a non or low cost basis, while added-value services on top of this core will be granted on a commercial basis. Some added-value services can be implemented during this project, but the main task will be to design and implement interfaces which will allow the linkage of other e-content services to the ENV-e-CITY engine.

The project will make use of four pilot application areas as the *e-content domain*: Air emissions, air quality, topography data and meteorology. These areas will serve as the backbone for e-content basic services, named *tools*. The latter will consist of Air Quality Models, Environmental Impact Assessment procedures, and other electronic tools aiming at:

1. Serving the application of the EU legal framework regarding environmental monitoring, management and reporting,
2. Serving the local application of policies and strategies at the urban scale,
3. Providing information access towards citizens and
4. Providing environmental e-content for other e-content services and applications.
1. The ENV-e-CITY project will serve as a shell for hosting and organising all available emission, air quality, topographical and meteorologically related information in a multi-layer way.

Data collection and management will be based on existing tools (Examples are "Collecter" for emission data reporting and the "Data Exchange Module-DEM" for air quality reporting) and state-of-the-art tools (like air quality models) already available via the European Environment Agency, plus additional ones, which will be developed through the project.

The application framework to be developed will combine:

1. A core database of emission, air quality, topographical and meteorological information,
2. Export and import filters (including data/meta-data interchange protocols, like XML and RDF)
3. Search functions and interfaces and
4. Tools/wizards

Since the content description and information regarding data has proven error-prone and close to impossible to implement, a meta data architecture will be developed, that manages meta data about contents and sources and delegates the actual data handling of raw data to the respective data management functions. Dedicated synchronisation strategies will be developed to keep the consistency of the central information server at a sensible level of accuracy.

In addition, ENV-e-CITY aims to target commercial content providers. ENV-e-CITY is not limiting its approach to non-profit organisation in public-private ownership, but also strives to design new information services that can be sold in horizontal or vertical

markets. Weather information accompanied by content services for level of comfort, tailored to specific regional requirements in tourism, is a well cited example service. Other services will be employed by news stations, as unique selling points.

ENV-e-CITY will provide benefits for

- the citizen, ENV-e-CITY vs. current situation: the ability to have access to both data and tools that will allow the formulation of personalised queries and views regarding the state of the urban environment.
- City authorities: a platform for collection and reporting of environmental data, in line with EU legislation. More specifically, and concerning emission data, a data exchange module will be developed for the collection and management of emission information at a city level. In addition, cities will be provided with a toolbox that will allow them to calculate statistics and indicators available for sectoral analysis of environmental impact (e.g. Transport and Environment Reporting Mechanism –TERM) and other statistics linked with reporting obligations towards the Commission.
- Commercial exploitation: provide raw data to EIA companies and every other interested party, plus online, tool related services, plus expert support (e.g. suggestions for the use of Air Quality models in an EIA study, evaluation and validation of assessments performed by the user, using the e-contents data made available through our portal).
- Service engineering: exploitation of environmental data for the provision of new information services to citizens that are marketed in bundles with other information services. Based on the available data, new service portfolios can be designed.

An additional strong point of the ENV-e-CITY project is the fact that the Internet platform to be developed will be able to serve as an information portal to be used by city authorities towards the citizens. The modular structure of the application will allow for cities interested in making use of the facilities provided, to either buy or rent "information providing services". This should also include ranking/benchmarking tools to help cities (and citizens) to "position" themselves and look for possible improvements, following an "EMAS for cities" approach.

The on-line pricing scheme will be based on quantified contents pricing, which has successfully been applied in the past for environmental information. In addition, the pricing scheme on services will be based on a price list, to be developed in the second half of the project. This list will cover both remote services for individuals and organisation, plus in-situ installations and support.

The basic idea for the development of the pricing scheme will be to use:

(a) a first level of digital content (emission data, air quality, topographical and meteorological data)

(b) a second level of "digital content describing information" (meta-data) in order to create an electronic market place for the content itself (emissions, air quality, topography, meteorology) and related services (via tools), that will (i) be beneficial for the general public, (ii) assist the user in fulfilling EU directives and (iii) provide sufficient "value" to support a "business".

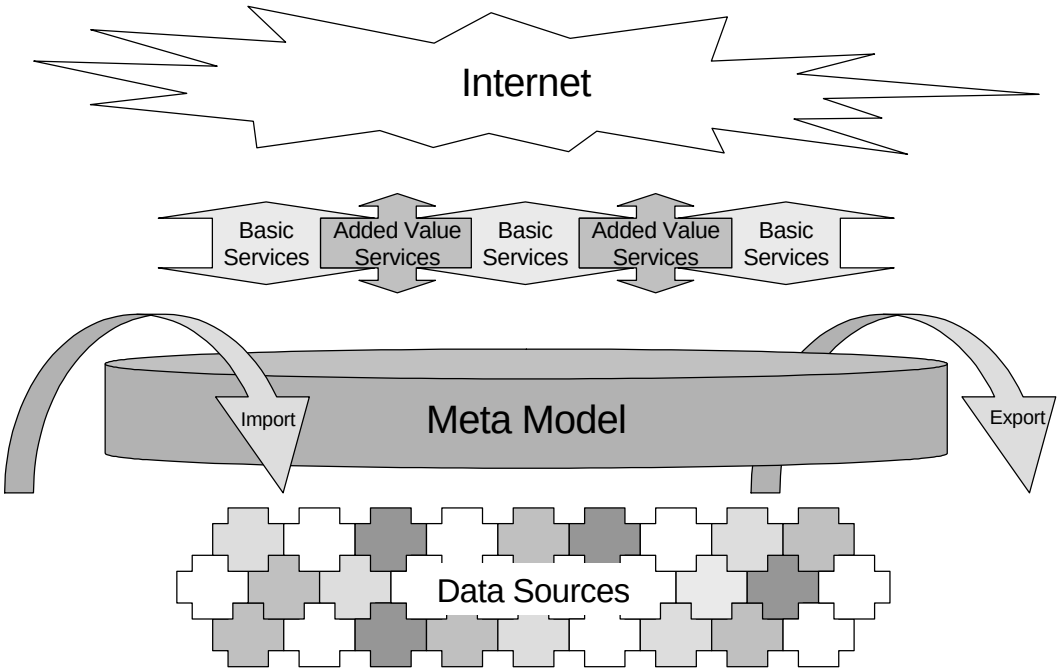
For those services that are going to be provided free of charge, there will be a pricing scheme indicating the "internal cost", and therefore proving the economic benefit of the service.

A proposed business model and possible financing models for ENV-e-CITY is the following:

- Provide (free of charge) a "table of contents" regarding services and data, which can be made available on-line via a normal subscription or a specialised query, both of which will be served via credit card payments. For those wishing to receive detailed information, an additional charge will be applied.

Another part is the public-private partnership, with the public (city) responsible for the information collection and dissemination/reporting, but also with private application service providers assisting them by creating added value/tools for the exploitation of the information.

The ENV-E-CITY broker architecture can be sketched as follows.



Core of the broker architecture represents a database holding all information about services provided by the system. This is based on a common meta model describing attributes of services to be linked together. The services itself can but must not be necessarily located on the broker system but distributed over net. This allows a local maintenance of the service providers.

Services offered by the broker system include:

- export from data sources (partly protected access)
- import to data source (protected access)
- general administration interface for overall system
- access to basic services (low cost or free access)
- access to added value services (individually prized services)

The project consortium includes major players in the air quality, emissions, topographical and meteorological data collection and management in Europe, having an official role directly linked to the operation of organisations like EEA. The cost of the Internet applications to be developed is supported by the Commission, while the operational and maintenance cost is minimal, due to the Internet technology used, and therefore is planned to be covered by the participants after the end of the EU funding of the project. The official project web site is http://www.env-e-city.org