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Plan4all

Deployment of Platforms on Local, Regional and National Levels

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¹ OJ L 79, 24.3.2005, p. 1.

Content

1. Introduction
 - 1.1. Objectives_of Task 6.1
 - 1.2. Requirements for the Plan4all Networking architecture
 - 1.3. Recommendation for platform implementation
 - 1.4. Software facilities of the Pilot Partners
2. Regional implementations
 - 2.1. Time Plan for the Implementation
 - 2.2. Recommendations on Platforms for the Implementation of Basic Services
 - 2.3. Summary of partners CSW, WMS and WFS implementations
3. Conclusions & Next Steps

Annex:

1. Case study Olomouc (Czech Republic)
2. Case study TDF (Latvia)
3. Case study HSRS (Czech Republic)
4. Case study LGV Hamburg (Germany)
5. Case study ZPR (Latvia)
6. Case study GEORAMA (Greece)
7. Case study NASURSA (Spain)
8. Case study PROVROMA/Hyperborea (Italy)
9. Case study GIJON (Spain)
10. Case study MAC (Ireland)
11. Case study CEIT ALANOVA (Austria)
12. Case study AVINET (Norway)
13. Case study DIPSU (Italy)
14. Case study EPF (Bulgaria)
15. Case study ADR Nord Vest (Romania)
16. Case study Lazio (Italy)
17. Case study HF (Czech Republic)
18. Case study MEDDTL (France)
19. Case study FTZ (Malta)

1.Introduction

1.1.Objectives of Task 6.1

The objective of Task 6.1 is to support pilot deployment of SDI infrastructure, which will support future integration with global Plan4all platform and also will support data and metadata harmonisation. The regional deployments were in first stage focused on metadata and data, as they are. Using deployed platforms and implemented Plan4all tools data and metadata will be published in Plan4all profiles. Deployed regional pilot platforms will be part of global **Plan4all** Networking services. Currently already all partners deployed basic infrastructure. Advantage is, that different technological solution are used and this guarantee interoperability testing. Important part of future deployment will be implementation of transformation services, which will support transformation of data in existing models into data following the designed conceptual models:

The objectives of Task are:

- Deploying systems for the publishing of Metadata and catalogue services based on CSW 2.0.2;
- Deploying systems for the publishing of WMS and WFS;
- Testing of partners CSW, WMS and WFS against Plan4all portal.

Partners involved in the task 6.1. have worked in order to deploy the above mentioned services and tested them against Plan4all. The steps and technologies used in each Pilot region are described in the case-studies (see Annex).

This document summarises:

- Methodology - steps taken to achieve the goal of the task;
- Summary - wrap up of all partners activities;
- Conclusion, next steps;
- Annexes - detailed descriptions of partners' implementations.

In addition to the case studies, these reports overviews for the individual countries are also available on the wiki project-site and

<http://www.plan4all.eu/simplecms/?menuID=31&action=article&presenter=Article> And description of deployments of single regions are also publicly available on Plan4all portal (<http://www.plan4all.eu/simplecms/?menuID=31&action=article&presenter=Article>)

1.2.Requirements for the Plan4all Networking architecture

The focus of **Plan4all** architecture is to support spatial planning data sharing among regions and among countries in standardised from from distributed regional servers The goal is to demonstrate best practices solution, which will support future:

- Implementation of INSPIRE
- Building European data pool for exchange relevant information about spatial planning.
The main focus of this pool will be on the tasks related to risk management and

international investment, environment protection and planning, but we will support also other needs for sharing spatial planning information.

To support implementation of such platforms analysis of existing technologies and also INSPIRE recommendations were provided in WP2 and design of Plan4all architecture in WP5. The result of these analyses is a set of services required for **Plan4all** implementation. For the **Plan4all** architecture the following principles are considered to set up a commonly designed infrastructure. It will include:

- Accessibility
- Multilingualism
- Security
- Privacy
- Subsidiary
- Use of Open Standards
- Use of Multilateral Solutions

The design and implementation of the **Plan4all** networking demonstration platform uses a basic set of INSPIRE services.

Discovery Services make possible to search for spatial data sets and services on the basis of the content of the corresponding metadata and to display the content of the metadata. The goal of discovery is to support discovery, evaluation and use of spatial data and services through their metadata properties. The important aspects are:

- Nature of the Metadata
- Availability of the Metadata

View Services make possible, as a minimum, to display, navigate, zoom in and out, pan or overlay viewable spatial data sets and to display legend information and any relevant content of metadata. The implementation rules for the directive highlight the following aspects of a view service:

- Multiple datasets View Geometry (supported spatial reference systems)
- Multiple datasets View Output Format (supported formats and their possible integration)
- Temporal data dimension
- Legend availability and handling
- Restriction of access and e-commerce
- Multilingualism
- Relationship with client applications

Download Services enable copies of spatial data sets, or parts of such sets, to be downloaded and, where practicable, accessed directly. A download service support download of a complete dataset or datasets, or a part of a dataset or datasets, and where, practicable, provide direct access to complete datasets or parts of datasets. Gazetteer like services is also covered by a type of download service.

In future stage will be implemented **Transformation Services**, which will enable spatial data sets to be transformed with a view to achieving interoperability, it will include coordinate transformation service, but also generalisation services.

Invoke Spatial Data Services service will support usage of individual (spatial) services as well as combinations of individual (spatial) services both synchronous and asynchronous through a (web) service orchestration or “workflow engine”. For spatial data services available on the Internet, the service will enable a user or client application to run them without requiring the availability of a GIS.

The **Plan4all** Services are part of European standardisation effort given by INSPIRE directive and implementation rules, worldwide standardisation effort of Open Geospatial Consortium and W3C consortium, and on the results of European and National research activities and are extension of European best practices in the area of European and national research and innovative projects into the solution, which will on one side guarantee feasibility of implementation **Plan4all** platform on all levels of public sector. The **Plan4all** project gives standards and combines these standards with the needs of spatial planning. The focus is also on an optimal combination of commercial and open source platform to reuse existing solutions.

Plan4all functionality is based as much as possible on standards defined in INSPIRE implementation rules to ensure maximum interoperability and extensibility around Europe. This list of standards was given by deliverable D2.2 and also needs was analysed in D5.1. There are mainly standards from ISO 19100 series and Open Geospatial Consortium (OGC) standards. The shared system is built on service oriented architecture (SOA).

In the INSPIRE Implementing Rules are used as background but this rules are extended by Plan4all specifications coming from WP3, 4 and 5.

For the INSPIRE metadata Plan4all profile is defined. The connectivity to central Plan4all portal is through CSW.

A Web Map Service (WMS) are used to produce map compositions of georeferenced data. WMS doesn't provide data itself but produces map images. It is used as a portrayal service in the Plan4all architecture. Maps may be rendered in several reference systems depending on WMS implementation. Implementation of optional functions is expected:

- querying map features
- legend, metadata URL,
- user defined styles support and filtering (Symbology Encoding, Styled Layer Descriptor and OGC Filter Encoding specs.)

Web feature service (WFS) is intended for use on spatial vector data transfer in GML format based on OGC Simple Feature Model. Basic WFS only enables reading data from server. The client may query data using OGC Filter Encoding expressions. Transactional WFS (WFS-T) enables also inserting and updating data on server with transactions.

Web coverage service (WCS) is intended for use on coverage data transfer, typically raster data (eg. Satellite and airborne images, DEM etc.). Output format is georeferenced raster, eg. geoTIFF etc. Data may be retrieved in different coordinate reference systems. Multiband data may be also retrieved. Former standard version was 1.0. Current standard version 1.1.2. It includes transaction support.

Gazetteer profile it is planned to extend WFS providing elements mapping parent / children / relative relationship enabling client to transverse the tree similar to thesauri implementation. The implementation will enable sophisticated searching of places and objects. For the portal simple WFS may be used in the first phase.

1.3.Recomendation for Platform Implementation

from D 2.2 Analysis of Innovative Challenges and D5.2 networking architecture

An important part of the state of the art analysis is to identify relevant GIS technologies and services. To make them more structured, we described a framework to classify software products, which was tested by classifying a couple of existing products. The framework includes minimum requirements for software and services in SDI and several classifications (classification by technology, by interactivity, by approach). First of all we need this framework to test it and to see if it is useful in SDI context (or will be within the project time). Second, we need detailed software description to decide which software could be used for the development of Plan4all prototype.

The following table briefly describes the stakeholders involved with their respective activities into the Plan4all Networking Architecture.

Stakeholder	Description	Activities
End User (application, human)	Stakeholder who uses Portal without registration on the Portal.	<ul style="list-style-type: none"> – Uses services without registration; – searches through metadata; – analyses metadata view and downloads free data; – joins free services.
Expert User	Stakeholder registered on the Portal, who connects to data/services according to his rights, but he does not publish his own data.	<ul style="list-style-type: none"> – Searches through metadata; – analyses metadata; – views and downloads data and joins services according to his rights; – creates and publishes composition from external sources – defines policies for this publication.
Content Provider	Stakeholder registered on the Portal, who provides his own data or services; he accesses data/services according to his rights.	<ul style="list-style-type: none"> – Searches through metadata. – analyses metadata; – update metadata; – views data, downloads data and joins services according to his rights; – creates and publishes composition from external sources – defines policies for this publication; – provides data on the web; – produces metadata; – assures quality of data and metadata; – defines policies and license agreements.

Policy maker	Stakeholder not directly registered on the Portal, but having a secondary influence on access to the data/service (politician, not registered data owner, ...)	Influences data access policies.
Administrator	System administrator with full access to the Portal.	Technically manages the System.

Stakeholders' activities.

WP2 defined several groups of users and captured requirements from them. The next table shows these user groups in relation to the actors of the proposed system.

User group/stakeholder	Content provider	Expert user	End user	Policy maker
Spatial planning authorities				
Other civil service authorities				
Owners of transport and technical infrastructure				
Planning engineers, city planners				
Firms				
NGO				
Investors, real estate owners				
Real estate agents				
Research institutes, students				
Public				

The Plan4all Networking Architecture defined in terms of the use of the system made by the stakeholders.

List of use cases:

- user administration and security:
 - o stakeholder registration;
 - o user deregistration;
 - o user login;
 - o setting user roles;
- search and discovery:
 - o search metadata;
 - o browse metadata;
 - o join a new catalogue;
- data management:
 - o import data;
 - o compose data/service;
 - o publish data/service;
 - o view data;
 - o download data;

- metadata management:
 - o produce metadata;
 - o import metadata;
 - o edit/update metadata and service.
- policies:
 - o DRM specification;
 - o access to data with DRM;
- monitoring and control service:
 - o monitor registration process;
 - o monitor requests for access with DRM;
 - o web analytics tool.

The survey among the Plan4all consortium offered an overview on which programmes are in use by the partners, and which ones can be used for implementing the Plan4all Network Architecture. The current platforms was recommended by Plan4all D5.2 Networking architecture

Alov Map

ALOV Map/TMJava is a free, portable Java® application for publication of vector and raster maps to the Internet and interactive viewing on web browsers. It supports the complex rendering architecture, the unlimited navigation and allows working with multiple layers, thematic maps, hyperlinked features and attribute data.

Approach: Graphic Display, Web Mapping, Web Mapping (Globe), Web Cartography, Web GIS, Location-based services.

CartoWeb

CartoWeb is a comprehensive and ready-to-use Web-GIS as well as a convenient framework for building advanced and customised applications; it is written using PHP5. Functions: searching, browsing, querying, outlining, re-centring, layer management, tab browsing and PDF printing, routing, data editing and layout customisation.

Approach: Web GIS, Routing, Can be associated to PostgreSQL/PostGIS.

Chameleon

Chameleon is an Open Source, distributed, highly configurable environment for developing Web Mapping applications. It is built on UMN MapServer as the core mapping engine and works with all MapServer-supported data formats. It also works well with the OpenGIS Consortium standards for Web Map Services WMS and Web Map Context Documents (WMC) through MapServer's support for these standards. Chameleon was originally developed in 2002 by DM Solutions Group under contract to NRCan, in support of Canada's GeoConnections programme, contributing to the Canadian Geospatial Data Infrastructure (CGDI). Chameleon is written in the PHP scripting language with snippets of Javascript code to handle browser functionality.

Approach: Graphic Display, Web Mapping.

DataMan

DataMan is an application for the management of spatial data. It supports management of data in databases or files. It supports export and import of this data and also publishing and updating of related metadata. In the database, it is possible to store both vector and raster data, including their attributes. Also for file oriented storage, it supports both vector and raster data. From raster formats, it currently supports IFF/GeoTIFF, JPEG,GIF, PNG, BMP, ECW, from vector formats ESRI Shapefile, DGN, DWG, GML.

Approach: Web Application.

Deegree

Deegree is a Java Framework offering the main building blocks for Spatial Data Infrastructures. Its entire architecture is developed using standards of the Open Geospatial Consortium (OGC) and ISO/TC 211 (ISO Technical Committee 211 – Geographic Information/Geomatics).

Approach: Graphic Display, Web Mapping, Web GIS, building of spatial data infrastructures.

DivaGIS

Free GIS for mapping and geographic data analysis (of distribution); vector and raster.

<http://www.diva-gis.org>

Approach: Desktop GIS, Connect to local databases.

GDAL/OGR

GDAL is a translator library for raster geospatial data formats that is released under an X/MIT style Open Source license by the Open Source Geospatial Foundation. As a library, it presents a single abstract data model to the calling application for all supported formats. It also comes with a variety of useful command line utilities for data translation and processing. The NEWS page describes the August 2009 GDAL/OGR 1.6.2 release. The related OGR library (which lives within the GDAL source tree) provides a similar capability for simple features vector data.

<http://www.gdal.org/>

Approach: Data transformation library.

GeoDjango

GeoDjango is an add-on for Python language based Django web framework that includes support for geometry fields and extends the ORM to allow spatial queries. GeoDjango is based on various Open Source libraries Python binding usage like GDAL/OGR, proj4 and geos to provide this library functionality in web framework. As default front-end, OpenLayers JavaScript library is used.

Approach: Web GIS, Location-based services.

GeoNetwork

GeoNetwork Open Source is a standards based, free and Open Source catalogue application to manage spatially referenced resources through the web. It provides powerful metadata editing and search functions as well as an embedded interactive web map viewer. It implements both the Portal component and the Catalogue database of a Spatial Data Infrastructure (SDI) defined in the OGC Reference Architecture.

Approach: SDI, Portal service: Interactive web map viewer, Catalogue service: database of the SDI (managing and publishing metadata).

GeoPista

GeoPista is a Territorial Information System for City Councils (Open Source) that on the basis of a mapping geositions both municipal information and Management, providing thus online services based on Geographical Information Systems.

Approach: Graphic Display, Web Mapping, Web Cartography, Web GIS, Geodatabase, Location-based services.

GeoServer

GeoServer is a Java-based software server that allows users to view and edit geospatial data. Using open standards set forth by the Open Geospatial Consortium (OGC), GeoServer allows for great flexibility in map creation and data sharing.

Approach: Web GIS.

GRASS GIS

GRASS GIS is used for data management, image processing, graphic production, spatial modelling, spatial analysis, creating, managing and storing of spatial data (raster/vector format) and visualisation. GRASS can interface with commercial printers, plotters, digitisers and databases to develop new data as well as manage existing data. 3D (raster and vector) capabilities (analyse, display). No 3D vector topology is build.

Approach: Desktop GIS, allows integration with WebGIS applications, Geodatabase. GRASS can be linked to one or many database management systems (e.g. PostgreSQL, MySQL, SQLite, ODBC, etc.; PostgreSQL is preferred). Routing – network analysis, Visualisation, Analysis, Processing, Remote sensing data analysis, Spread modelling.

gvSIG

It is a desktop GIS oriented to manage geographic information, and characterised by a user-friendly interface. It can handle both vector and raster data. It features basic and advanced editing tools for the creation and maintenance of vector or raster spatial data on a variety of file formats, including remote data sources. Application interface is in Spanish, Valencian, English, Basque, Gallego, Czech, Chinese, French, German, Italian, Romanian, Polish and Portuguese. In some cases the application is able to use JUMP (Java Unified Mapping Platform) plugins. On the gvSIG base, also a mobile application (gvSIG Mobile) version, for use in mobile devices, has been developed.

Approach: Graphic Display, Web Mapping, Geodatabase, Modelling and Analysis (e.g. network analysis), Simple data processing (union, clip, dissolve etc.).

HALE - HUMBOLDT Alignment Editor

It is an RCP application that allows users to interactively design transformations on a conceptual schema level. It supports import of schemas from different sources, such as Eclipse ecore, WFS and GML Application Schemas. The defined transformations are stored either locally or in the HUMBOLDT Model Repository and used by the Conceptual Schema Transformer to perform Schema Transformation on actual geodata. HALE is a tool for geodomain application experts and GI experts, especially data custodians. It provides a means to create automatically executable horizontal mappings on the conceptual schema level and in addition in some aspects on the logical schema level. It provides the means to ensure the validity of a mapping on the base of the source and target schema as well as on the base of the source and a reference data set. It uses schemas created in the HUMBOLDT Editor. It does not execute those mappings. There are very few Conceptual Schema Alignment tools for the geodomain, and available alignment tools like FME focus strongly on the physical and logical level, whereas tools like Protégé PROMPT and COMA++ do not make use of the specifications of geoinformation.

Approach: Graphic Display, Mapping, Geodatabase.

HSLayers

HSLayers is an Open Source extension of popular Open Layers. It includes:

- dynamic adding of OGC (Open Geospatial Consortium) services into map - clients for WMS and WFS;
- portrayal of independent data sources on the client side. Map composition is composed on the basis of requests to various servers. It is thus not necessary to install a map server;
- saving of map composition according to WMC (Web Map Context) OGC specification on user computer for repeated future use or for sharing among users;
- extension of compute functions based on WPS (Web Processing Service) OGC service, according to user needs;
- multilingual environment;
- map requests to various types of data stored on various servers, with automatic processing of results;
- work with micro-formats;
- search on the map;
- on-the-fly projection on client side including S-JTSK coordinate system (direct portrayal of e.g. GPS data is therefore possible);
- connection of the application with catalogue client (OGC CSW) in the geoportal, which enables a display of the searched service from catalogue directly on the map;
- edit function - snapping to chosen layers;
- possibilities for advanced configuration of user requests;
- advanced measuring of length and surfaces;
- print of map compositions - possibility of large print outs (up to A0 format), user configuration of print settings.

Display of description information of cadastre directly from COSMC web site.

Approach: Graphic Display, Web Mapping.

ILWIS

ILWIS (Integrated Land and Water Information System) is a GIS/Remote sensing software for both vector and raster processing. ILWIS features include digitising, editing, analysis and display of data as well as production of quality maps. ILWIS has some very powerful raster analysis modules, a high-precision and flexible vector and point digitising module, a variety of very practical tools, as well as a great variety of user guides and training modules all available for downloading. The current version is ILWIS 3.5 Open. Similar to the GRASS GIS in many respects - but more user-friendly -, ILWIS is currently available natively only on Microsoft Windows.

Approach: Desktop GIS.

JOSM

JOSM is an editor for OpenStreetMap (OSM) written in Java 1.5. Currently it supports loading stand alone GPX tracks and GPX track data from the OSM database as well as loading and editing existing nodes, ways, metadata tags and relations from the OSM database.

Approach: Web Cartography (it acts as a front-end editor for OpenStreetMap).

JUMP

The Unified Mapping Platform (JUMP) is a GUI-based application for viewing and processing spatial data. It includes many common spatial and GIS functions. It is also designed to be a highly extensible framework for developing and running custom spatial data processing applications. JUMP has the following features:

- provides an interactive Workbench for viewing, editing, and processing spatial datasets;

- provides an API giving full programmatic access to all functions, including I/O, feature-based datasets, visualisation, and all spatial operations;
- is highly modular and extensible;
- supports important industry standards such as GML and the OpenGIS Consortium spatial object model;
- it is written in 100% pure Java™.

JUMP uses the JTS Topology Suite to provide an OGC-compliant spatial object model and the fundamental geometric operations.

Approach: Graphic Display, Web Mapping, Geodatabase, Modelling and Analysis (e.g. network analysis), Simple data processing (union, clip, dissolve etc.).

ka-Map!

ka-Map! (“ka” as in ka-boom!) is an Open Source project that is aimed at providing a javascript API for developing highly interactive web-mapping interfaces using features available in modern web browsers. ka-Map! official web site is ka-Map.MapTools.org

ka-Map! was originally developed by, and most of it is Copyright (c) 2005, DM Solutions Group Inc.

Approach: Graphic Display, Web Mapping.

KOSMO GIS

Desktop GIS oriented to manage geographic information, characterised by a user-friendly interface. Application is based on JUMP (Java Unified Mapping Platform) and is able to use JUMP and Open Jump plugins.

Approach: Graphic Display, Web Mapping, Geodatabase, Modelling and Analysis (e.g. network analysis), Simple data processing (union,clip,dissolve etc.).

Map Window Gis

The MapWindow application is a free, extensible, geographic information system (GIS) that can be used:

- as an alternative desktop GIS;
- to distribute data to others;
- to develop and distribute custom spatial data analyses MapWinGIS ActiveX Control.

At the core of the MapWindow application is the MapWinGIS ActiveX control. Using this control, you can programme custom mapping functionalities directly into your own software.

Approach: Graphic Display, Web Mapping, Web Cartography, Web GIS, Geodatabase, Location-based services.

Mapbender

Mapbender is the software and portal site for geodata management of OGC OWS architectures. The software provides web technology for managing spatial data services implemented in PHP, JavaScript and XML and licensed under the GNU GPL. It provides a data model and interfaces for displaying, navigating and querying OGC-compliant map services. The Mapbender framework furthermore provides authentication and authorisation services, OWS proxy functionality, management interfaces for user, group and service administration in WebGIS projects.

Approach: Web Mapping.

MapGuide

Autodesk MapGuide Enterprise/OS is a client server oriented technology. It offers a open and flexible platform for web development and supports a huge variety of data formats, filebase formats like SHP, SDF, DXF, ...; many standard database formats like Oracle, SQLServer, MySQL, PostGIS, ODBC, ...; a huge variety of raster formats as well as Webservices like WMS, WFS, ... The data is accessed through the data access technology FDO. FDO lets you work with data natively from a variety of data formats and coordinate systems seamlessly in one application. This is enabled using FDO Data Access Technology. By using third-party and Open Source FDO data providers, you can extend the data access capabilities of the core application by yourself.

Approach: Web Mapping, WebGIS.

MapMan

The Map Project Manager (MapMan) is a web tool for users who want to publish or create new map projects and compositions. It supports publication of spatial composition from locally stored data (fields or database-stored in DataMan), with external WMS, WFS data services. MapMan provides visualisation in web browser using clients like OpenLayers, GoogleMaps, DHTML client, Desktop viewer GoogleEarth, DIS Janitor or publish data as OGC WebMapService (WMS), OGC WebFeatureService (WFS). All published data are also connected with metadata stored in Micka.

Approach: Web Mapping, Spatial data publication on the web.

MapServer

Multi-purpose web map portal. It is a platform for publishing spatial data and interactive mapping applications to the web. It supports numerous data formats:

- Commercial (ESRI shapefile/ArcSDE, Oracle Spatial);
- TIFF/GeoTIFF;
- ESRI shapfiles;
- PostGIS;
- ESRI ArcSDE;
- Oracle Spatial;
- MySQL.

Approach: Graphic Display, Web Mapping, Web Cartography, Web GIS, Location-based services.

MonoGis

MonoGis as a map server Open Source project. It includes a benchmarking among other Open Source map servers. Mono is multi-platform, multi-language and multi-technology. The term multi-technology means that you may couple a variety a different programming platforms within the same application.

Approach: Graphic Display, Web Mapping, Web Cartography, Web GIS, Geodatabase, Location-based services.

OpenLayers

OpenLayers is an Open Source map viewing library, written in pure JavaScript. The OpenLayers library provides a JavaScript API which makes it easy to incorporate maps from a variety of sources into your webpage or application. OpenLayers currently has support for OGC WMS layers, navigation, icons, markers, and layer selection.

Approach: Graphic Display, Web Mapping.

p.mapper - MapServer PHP/MapScript Framework

The p.mapper framework is intended to offer broad functionality and multiple configurations in order to facilitate the setup of a MapServer application based on PHP/MapScript. Functions included are:

- DHTML (DOM) zoom/pan interface (no use of frames);
- zoom/pan also via keyboard keys, mouse wheel, reference map, slider;
- easy configuration of layout and behaviour with XML config file;
- query functions (identify, select, search);
- fully featured attribute search, including suggest, select boxes, etc.;
- flexible layout of query results via JavaScript templates;
- query results display with database joins and hyperlinks;
- multilingual user interface - pre-defined: EN, DE, IT, FR, NL, SK, ES, RU, BR, HR, HU, ZH, JA, BG, CZ, EL, HE;
- fully XHTML 1.0 Strict compliant;
- HTML legends and various display styles of legend and layers/TOC;
- print functions: HTML and PDF;
- DHTML pop-up windows and dialogues;
- pop-up identify when moving with mouse over map;
- support for point layers with data in a database supported by PEAR framework;
- distance and area measurement function;
- adding points of interest with labels on map;
- start map with pre-defined zoom extent: via explicit extent or layer feature;
- plugin API to add custom functionality;
- various plugins: layer transparency, query result export, and more.

Approach: Graphic Display, WEB Mapping.

pgRouting

This project's main objective is to provide routing functionality to PostGIS / PostgreSQL. pgRouting is part of PostLBS, which provides core tools for Location Based Services (LBS) as Open Source Software (OSS). Its tools are similar to those to be found on proprietary software.
<http://pgrouting.postlbs.org/>

Approach: Geodatabase, Location-based services, Routing.

PHPmyWMS

A SVG-oriented Framework for extended Web Map Services.

Approach: Web Mapping.

PostGIS

PostGIS provides support for geographic objects to the PostgreSQL DBMS. PostGIS follows the OpenGIS “Simple Features Specification for SQL” and has been certified as compliant with the “Types and Functions” profile. PostGIS has been developed as a project in Open Source spatial database technology and is released under the GNU General Public License.

Approach: GIS.

PROJ.4

Cartographic projection library.

Proj4 is a library and as such can be embedded in server side applications. Command line tools are available for desktop use.

Approach: Projection library used by several software.

PyWPS

PyWPS is project developed since 2006, and tries to implement OGC WPS standard in its 1.0.0 version. It is written in Python programming language. PyWPS can be understood as a kind of proxy, which translates requests complain to WPS standard, overhands them to local scripts (processes), which can be build using Python bindings to popular geo-packages (GDAL/OGR, Proj4, R, ...) or command line commands (GRASS GIS), monitors the calculation progress and informs the user and after the calculation is completed, it returns back its results – WPS Response.

Approach: OGC Web Service WPS.

QGIS

QGIS is an Open Source GIS, providing common GIS functions and features. QGIS supports a number of raster and vector data formats, with new format support easily added using the plugin architecture. QGIS is released under the GNU General Public License (GPL).

www.qgis.org

Approach: Graphic Display.

Quantum GIS

Quantum GIS (often abbreviated to QGIS) is a GIS-application that provides data viewing, editing, and analysis capabilities. Quantum GIS can also be used as a graphical user interface to GRASS. Quantum GIS has a small file size compared to commercial GISs and requires less RAM and processing power; hence it can be used on older hardware or running simultaneously with other applications where CPU power may be limited.

Approach: Desktop GIS.

SAGA GIS

SAGA GIS (System for Automated Geoscientific Analysis) is a hybrid GIS software. SAGA has a unique Application Programming Interface (API) and a fast growing set of geo-scientific methods, bundled in exchangeable Module Libraries.

Approach: Desktop GIS.

Teredit System

Teredit system is a special solution for data transfer from mobile unit to server and back. This solution is realised via form of transactional component system when one part of the system is installed on server (Broker). Broker enables preparation of the project, project sharing with other users and data checking before saving into target database. The second part of system is installed on mobile device (PDA) and provides communication between server and PDA. The own collection or editing can be enabled by any applications in common use (tested for geographical data ArcPad, Topol CE, SiteMate, FieldCheck or for non- geographical data the own database editor.

Approach: Data Collection in the field.

uDig

uDig is an Open Source (LGPL) GIS desktop application framework, built with Eclipse Rich Client (RCP) technology. uDig is a complete Java solution for desktop GIS data access, editing, and viewing. uDig aims to be:

- user friendly, providing a familiar graphical environment for GIS users;
- desktop located, running as a thick client, natively on Windows, Mac OS/X and Linux;
- Internet oriented, consuming standard (WMS, WFS, WCS) and de facto (GeoRSS, KML, tiles) geospatial web services;
- GIS ready, providing the framework on which complex analytical capabilities can be built, and gradually subsuming those capabilities into the main application.

<http://udig.refractions.net>

Approach: Graphic Display, Web Mapping, Web GIS, Geodatabase.

In this part of the report, the major commercial GIS software platforms and tools for implementing the Plan4all Networking Architecture are listed and briefly described. The commercial GIS packages are not free and usually are available after purchase license from the vendor. The software platforms are listed under two major groups – Desktop GIS software and Web-mapping and GIS server platforms.

Desktop commercial GIS software

ArcGIS ESRI Inc, Redlands, CA, USA, <http://www.esri.com/>

ArcGIS is the most selling and popular GIS platform. It is in form of integrated collection of GIS software products. It provides a standard-based platform for spatial analysis, data management, and mapping. ArcGIS products can be used throughout the enterprise on the desktop and via servers and mobile devices. They can also be used to access online services. ArcGIS gives the developers tools for building their own applications. The major GIS database and GIS data formats are: shapefile (*.shp), coverage (*.cov), ESRI GRID (*.grd), personal database (*.mdb), file geodatabase (*.gdb), SDE etc.

*Bentley Microstation Geograph , Bentley Systems Inc, USA,
<http://www.bentley.com/en-US/Products/MicroStation/>*

GIS and CAD platform for the design, construction and operation of the major infrastructure projects. A substantial range of products aimed at Civil engineering applications, especially core infrastructure utilities: telecommunications, gas, water, electricity etc.

Manifold, Manifold Inc, Carson City, NV, USA, <http://www.manifold.net/>

Manifold 8 delivers a powerful GIS package at fairly low price. It handles both vector and raster data, includes spatial SQL, a built-in Internet Map Server (IMS), and other general GIS features. Manifold System has an active user community with a mailing list and online forums.

MapInfo, Mapinfo Inc, troy, NY, USA, <http://www.mapinfo.com/>

MapInfo Professional is a powerful Windows-based mapping and geographic analysis application. It is designed to easily visualise the relationships between data and geography. MapInfo Professional helps business analysts, planners, GIS professionals – even non-GIS users – in gaining new insights into their markets, share information-rich maps and graphs and improve decision-making.

*Geomedia, Intergraph Inc, Huntsville, AL, USA,
<http://www.intergraph.com/cgi/default.aspx>*

The GeoMedia product suite is a set of well-integrated applications that provides the user with the full breadth of geospatial processing capabilities needed by industries, such as governments and transportation agencies for map production, infrastructure management, and land management. Utility and telecommunications companies, as well as defence and intelligence organisations, also rely on this product suite for data analysis, data sharing, and map production.

Maptitude, Caliper Corp., Newton, MA, USA, <http://www.maptitude.com>

Maptitude Geographic Information System (GIS) software is a mapping solution for business, government, and education. Maptitude is a powerful combination of software and geographic data that provides everything you need to realise the benefits of desktop mapping and spatial analysis with a single, easy-to-use package.

*MapView, Golden Software Inc., Golden, CO, USA,
<http://www.goldensoftware.com/products/mapviewer/mapviewer.shtml>*

MapView is an affordable mapping and spatial analysis tool that allows the user to produce publication-quality thematic maps easily. Small businesses, large corporations, independent consultants, scientists, GIS analysts, and numerous government agencies are discovering important trends in their data with MapViewer.

*Smallworld, GE Energy, USA,
http://www.gepower.com/prod_serv/products/gis_software/en/index.htm*

It is a Geospatial-based solutions for efficiently designing and modelling the complex network infrastructure and supporting asset management lifecycle processes.

- MapFrame Mobile Solutions: a map-centric approach to integrating operational data and automating field- based processes;
- Field Force Automation; integrated solution for effective scheduling and dispatch of the network workforce.

*Idrisi (current product TAIGA) Clark Labs, Clark University, Worcester, MA,
USA , <http://www.clarklabs.org/>*

IDRISI Taiga, an integrated GIS and Image Processing software solution, provides nearly 300 modules for the analysis and display of digital spatial information. The Land Change Modeller is a revolutionary land cover change analysis and prediction software with tools to analyse, measure and project the impacts of such change on habitat and biodiversity.

GenaMap, Genasys, Madrid, Spain , <http://www.genasys.com/>

Mapping tools and location based services (LBS) software, for mobile operators and other sectors.

Geomatica, PCI Geomatics Group, Ontario, Canada, <http://www.pci.on.ca/>

Image-centric GIS package with particular emphasis on Automated Orthorectification, Mosaicking, DEM Extraction, Feature Extraction and Change Detection. Spatial analysis tools include: buffer, dissolve, overlay, proximity analysis, topographic analysis, spatial interpolation and watershed analysis.

TopoL xT, TopoL Software, <http://www.topol.cz>

TopoL is a desktop product of TopoL Software company based on TopoL NT technology. This technology has got open modular architecture based on OLE/COM/ActiveX standards for Win32. TopoL NT technology is a set of components, which enable to create any application from simple viewer to map Internet server. The most important feature of the system is the freedom it offers to users and independent developers. It enables to change the user interface, to implement new special functions or entirely new applications.

Web mapping and GIS servers commercial products

ArcIMS

Website: www.esri.com

Current version: ArcIMS 9.2

Platform: Windows, Linux, Unix

ArcIMS is a web map server that is designed to deliver dynamic maps and GIS data and services via the Web. It provides a highly scalable framework for GIS Web publishing. The core of ArcIMS is a spatial server where most of the map related services are processed. On the server side, ArcIMS connector sits on top of web server and ArcIMS component and Application server works behind the scene. On the client side, the viewers can be thin client, custom clients or ESRI desktop application like ArcMap, ArcExplorer, or ArcPad.

Note: ESRI's development of ArcIMS is now limited. Their server GIS development efforts are devoted primarily to ArcGIS Server.

ArcGIS Server

Website: www.esri.com

Current version: ArcGIS Server 10

Platform: Windows, Linux ArcGIS

Server is a complete and integrated GIS server made by ESRI that supports desktop, Web-based, and mobile workflows. It helps protect and manage mapping information, and it provides a scalable platform that satisfies everything from the simplest to the most complex Web mapping requirements. ArcGIS Server services can be consumed by web browsers, mobile devices and desktop systems. For web application development, ArcGIS Server provides several additional SDK such as: JavaScript, Flex, Silverlight, .NET based and Java based applications.

Autodesk MapGuide Enterprise

Website: www.autodesk.com

Current version: Autodesk MapGuide Enterprise 2010

Platform: Windows, Linux

MapGuide Enterprise offers a powerful platform for distributing map information quickly, easily, and cost-effectively. Based on MapGuide Open Source and using Autodesk MapGuide Studio software as its authoring tool, Autodesk MapGuide Enterprise geospatial software offers simple deployment and flexible development options.

Bentley Geo Web Solutions

Website: www.bentley.com

Current version: Bentley Geo Web Solutions V8i

Platform: Windows

Bentley Geo Web Solutions is a web services framework that can be used to integrate interactive maps in a website, or to integrate geospatial information in organisational workflows. It allows for the sharing and publishing of geospatial data on multiple platforms. It integrates geospatial information in an organisation's workflow using industry standards. Geospatial specialists are empowered to prepare geo-services for webmasters, allowing them to easily add geospatial content to a website. Bentley Geo Web Solutions supports mashups using popular mapping platforms like Google Earth, Google Maps, Microsoft Virtual Earth and Open Layers.

Manifold System (Professional & Enterprise Edition)

Website: www.manifold.net

Platform: Windows

Manifold System is a single, integrated product that provides three major classes of GIS functionality in a single package: as a desktop application, as an objects library for programmers and as an Internet Map Server for web applications (all versions except Personal Edition include IMS). Different Manifold System editions make it possible to deliver advanced features to organisations while still providing tremendous capabilities at very low cost for individuals.

Cadcorp GeognoSIS

Website: www.cadcorp.com

Platform: Windows

GeognoSIS is Cadcorp's web mapping product. It makes the wide-ranging functionality of the Cadcorp SIS – Spatial Information System available over the web for interactive mapping applications, or a corporate intranet for the enterprise-wide deployment of GIS applications and data. GeognoSIS based applications can be delivered as an ultra-thin client, immediately accessible in any HTML browser, without downloading special browser “plug-ins” to run an application. JAVA or .NET based “wrappers” can further enhance web-based solutions with client-side functionality.

AspMap

Website: www.vdstech.com

Current version: AspMap 4.3

Platform: Windows

AspMap is a set of high-performance, Web mapping components and controls for embedding maps in ASP.NET and ASP.NET AJAX applications. AspMap gives the user the ability to generate maps, drill-down capability, thematic mapping, routing, vehicle tracking and other features that – generated on the server – will make the maps fully interactive on the client-side.

TopoL Internet Server, TopoL Software

Website: www.topol.cz

Platform: Windows - PHP, ASP

A system for spatial data publication in the Internet/Intranet is based on TopoL NT technology. It works with all common raster and vector data formats and also with databases where the data are stored according to OGC specification. The System supports SQL requests to the internal and external databases and also searching for vector objects.

Metadata Catalogue Systems

MicKa

Website: <http://bnhelp.cz/produkty/metaddata>

Platform: Any

MicKa is a complex system for metadata management used for building Spatial Data Infrastructure (SDI) and geoportal solutions. It contains tools for editing and management of metadata for spatial information, web services and other sources (documents, web sites, etc.). It includes online metadata search engine, portrayal of spatial information and download of spatial data to local computer.

MicKA is compatible with obligatory standards for European SDI building (INSPIRE). Therefore it is ready to be connected with other nodes of prepared network of metadata catalogues (its compatibility with pilot European geoportal is continuously tested). It is planned that soon Micka will be published as Open Source.

Conclusion

During the last decade most of the commercial GIS providers have focused their technology development on the creation of solutions that contribute to building and positioning the world's geospatial information resources for responsible and effective use. Automated mapping, geographic information systems (GIS), and spatial data communication technologies developed by the major companies have been implementing throughout the world, contributing significantly to the today status of geospatial information, which became one of the fastest growing fields in IT. On the other hand, the developed Plan4all Networking Architecture requires basic set of networking services in compliance with INSPIRE directive for the sharing of spatial planning data between public sector and other stakeholders. These services could be provided by the majority of the commercial software platforms, but the most appropriate (as balance among interface, functionality and productivity) are ESRI's Arc GIS platform, as well as Intergraph, Autodesk and Mapinfo integrated products.

1.4. Software facilities of the Pilot Partners

One of the important objectives in the Plan4all project is the WP6 Large scale testbed. The State of SW facility of project partners and content providers is an indispensable foundation for proviing tests in WP6. It gives a basic overview of technology problems with data provision to be solved when WP6 will start.

Table3: Overview of SW used by project partners – content providers

Partner	SW used
Olomouc	MicroStation, ArcGIS – ArcView 9.3, Janitor
PROVROMA	MapInfo 9.5, ArcView 9.2, ERDAS Imagine,ERMAPPER 7.1, ENVI 4.5, IDRISI 16.1
Lazio	ArcGIS – ArcView, ArcInfo 9.3; ArcIMS 4.0, PLANETEK (Image Web server), Cart@net, AutoCAD Map 2009
EPF	ESRI, Autodesk, Map Info
ADR Nord Vest	AutoCAD 2006, eTerra, Generate CP, GPS Spider, ArcGIS, SivGIS, MicroStation, LpisWeb

LGW Hamburg	ArcGis 9.3, AutoCAD Map 2009, MicroStation, ArcIMS 9.2/9.3, Autodesk MapGuide
MAC	MapGuide, GeoMedia, ESRI products
ZPR	ArcGIS 9.3, AutoCAD Map 2009, MicroStation, MS SQL 2008, Geoportal (including Micka, MapMan, Dataman, Metadata extractor, Catalogue Services)
TDF	Geoportal (including Micka, MapMan, Dataman, Metadata extractor, Catalogue Services)
FTZ	Type of gis server used by MEPA not specified in case study
GEORAMA	ArcGIS – ArcView, ArcInfo, AutoCAD, MicroStation, ADAPT – AutoFine Rel. 14, CorelDraw, Photoshop
NASURSA	ArcGIS Desktop, ArcGIS Server, Geoportal Toolkit Extension.
GIJON	MicroStation, ArcGIS, Bentley Geographics, Geo Web Publisher, ArcReader
MEEDDAT	MapInfo, CARTELIE
AVINET	GIS/LINE (Norkart), WINMAP SQL (Norconsult), AutoCAD Map (Autodesk), ArcGIS (ArcView) (ESRI), Fysak (Statens Kartverk)
DIPSU	GIS: ArcView/ArcGIS, GeoMedia, Auto CAD Map. GIS Open Source: QGis/GRASS. Spatial DB: PostgreSQL/PostGIS. Metadata editor and publishing: GeoNetwork. Cartographic engine: MapServer.

1. Technological process

Evaluators of the case studies were asked to describe technological process of data gathering, maintenance, updating and publishing. Partners have different attitudes to answer this question, so it's quite difficult to compare the informations from the case studies in depth. So a "light overview" of processes held by content provider partners is drawn-out in the next table.

Table 2: Technological processes on planning data

Partner	Technological process:	plans available in digital form:	remarks	experiences on data interoperability on international level
Olomouc	Data gathering and updating – ArcView, Microstation;	partly	remote access documentation to look same as analogue	no experiences
PROVROMA	gathering and updating data in MapInfo, Oracle	data available after registration, for intranet, download and editing some data possible	WMS and WFS services in progress	not mentioned
Lazio	data gathering by external companies.	Available for viewing, downloading in progress;		involved in several projects on data interoperability between regions

EPF	CAD products often used, big municipalities use GIS technology	only some municipalities publish plans on web	problems with conversion of data formats used for cadastral data	
ADR Nord Vest		partly	digital data accessible for bigger institutions.	Some institutions took part in EC data interchange projects
LGW Hamburg		all data accessible using WMS OGC services		experiences with harmonization in regional level
MAC	GIS officers in local authorities manage the process of data gathering, maintenance...	SDI is being developed		experiences on national level
ZPR	Municipalities submit data both analogue and digital form	only as a picture (JPEG or PDF format) Currently are data stored in MSSQL 2008, of PostgreSQL, first municipality published as WMS, WFS, Jekabpils, available ISO metadata and CSW	Currently run integration between MSSQL and GeoPortal	Experiences from GRISI+ project and Norwegian grant project
FTZ		Available to public at MEPA GIS server		
GEORAMA		Mostly in paper form, occasionally provided for viewing	Patras – Georama partner provides for viewing at web servers	Only on national level
NASURSA	Scanning, georeferencing, edition and publishing of data.	WMS services published through document management system (SIUN).	Municipal planning	Trials with interoperability on national level
	Transformation of vector data, metadata gathering and	CSW, WMS, WFS services published through SDI (IDENA).	Regional planning/ POT (5 subregions)	

	publishing.			
GIJON	Internal GIS		digital data accessible for institutions.	Not described
MEEDDAT	The objective of the system is to enable each target user to use the spatial data in digital form mainly through web services.	WMS services		Experiences with data harmonization in France
AVINET	data gathering and updating mostly external parties	OGC WMS services, some institutions WFS services	publishing focused on visual representation	no massive projects on cross border data harmonization, but some small trials
DIPSU	Data collection from public authorities. Georeferencing, editing and publishing of data. Also, creation of new data (spatial planning process). Creation and publishing of metadata.	Some plans are made available through WebGIS.		No.

2. Regional implementations

2.1. Time Plan for the Implementation

The first discussion about the task and the questions facing took place 29.-30.10.2009:Project Meeting, Malta.

Decisions on working plan was done in Rome WP5&6 meeting 18.-19.02.2010, Roma (Italy). The Piloting partners Presented current infrastructure and discussion was carried out with every partner, how should be their component extended.

The following time plan was defined:

- End of April 2010 Pilot partners will deploy system for publishing of Metadata (non harmonised) and catalogue services based on CSW 2.0.2
- End of June 2010 Pilot partners will deploy system for publishing of WMS and WFS
- September 2010 end of testing of partners CSW, WMS and WFS against Plan4all portal.
Start of implementation of first harmonisation tools

In the case, that in the country, region municipality is not directly involved public sector, the partner will play the role of mediator, who will deploy some limited amount of data, which will be later tested for harmonisation.

Project Meeting No.3 17th May, 2010 Vienna (Austria) short demonstration on deployed system for Meta data publishing and catalogue services based on CSW 2.0.2.by each partner took place.

During Project Meeting No.4 14-15th October Roma (Italy) was discussion on Metadata. CSW 2,0 Publishing of WMs and WFS - Testing against Plan4all Portal.

The individual consultations and discussion were created on the project Internal webpage: the questions raised and answers were presented for every pilot partner in order to support the indivial approach to the specific cases.

2.2. Recomendations on Paltforms for the Implementation of Basic Services

For the support deployment of the basic infrastructure for the project implementation, the technical team from WP5 prepared on the base of WP2 analysis list of potential technologies (VOpen Source and Commercial), which are able currently support required functionality. The selection of concrete platform and covering the costs for this deployment will be covered by pilot partners.

Table 3. Recomendated platforms for implementation of basic services for pilot partners

Type	Discovery Services = Catalogue	View and downloading services = WMS & WFS
Open Source	Geonetwork	UMN Mapserver, GeoServer, GeoHosting (extension of Mapserver), deegree
Commercial solution	Micka, terracataloge, Geoportal Extension (ESRI)	ArcSDE, ArcGIS Server / ArcIMS, GeoMediaWebMap

2.3. Summary of partners CSW, WMS and WFS implementations

Partner	Catalogue	WMS and WFS implementations
Olomouc	LemonTree-Metadata (LT-M) http://metammo.smartgis.cz/	<p>GeoHosting–DataMan and MapMan applications</p> <p>Planning Studies Coverage WMS http://vm-glog.wirelessinfo.cz/glog/glog/entry.php?class=Mapman.MapmanWms&mapProject=mapproject85&instance=&SERVICE=WMS&REQUEST=GetCapabilities</p> <p>Planning Studies Coverage WFS http://vm-glog.wirelessinfo.cz/glog/glog/entry.php?class=Mapman.MapmanWfs&VERSION=1.0.0&mapProject=mapproject85&instance=&SERVICE=WFS&REQUEST=GetCapabilities</p> <p>Local Plan Draft - functional areas WMS - http://vm-glog.wirelessinfo.cz/glog/glog/entry.php?class=Mapman.MapmanWms&mapProject=mapproject94&instance=&SERVICE=WMS&REQUEST=GetCapabilities</p> <p>Local Plan Draft - functional areas WFS - http://vm-glog.wirelessinfo.cz/glog/glog/entry.php?class=Mapman.MapmanWfs&VERSION=1.0.0&mapProject=mapproject94&instance=&SERVICE=WFS&REQUEST=GetCapabilities</p>
TDF	Micka http:// geoportal.tdf.lv/catalogue/	<p>GeoHosting–DataMan and MapMan applications</p> <p>CLC 2000 for Baltic countries WMS - http://geoportal.tdf.lv/glog/Glog/entry.php?class=Mapman.MapmanWms&mapProject=mapproject20&instance=&SERVICE=WMS&REQUEST=GetCapabilities</p>

		<p>CLC 2000 for Baltic countries WFS - http://geoportal.tdf.lv/glog/Glog/entry.php?class=Mapman.MapmanWfs&VERSION=1.0.0&mapProject=mapproject20&instance=&SERVICE=WFS&REQUEST=GetCapabilities</p> <p>Natura 2000 in Latvia WMS - http://geoportal.tdf.lv/glog/Glog/entry.php?class=Mapman.MapmanWms&mapProject=mapproject19&instance=&SERVICE=WMS&REQUEST=GetCapabilities</p>
HSRS	<p>Micka http://portal.plan4all.eu/metadata/?lang=eng) also used for One Geology Europe project (http://one.geology.cz/metadata), Czech national metadata portal (http://mis.cenia.cz) etc...</p>	<p>Gehosting -UMN Mapserver, Geoserver</p>
LGV Hamburg	<p>InGrid http://www.kst.portalu.de/ingrid/index.html only in German) InGrid is also used in eContentplus project "Assessment and strategic development of INSPIRE compliant Geodata-Services for European Soil Data (GS Soil: http://www.gssoil.eu/) CSW service: http://gateway.hamburg.de/OGCFassade/HH_CSW.aspx?REQUEST=GetCapabilities&version=2.0.2&service=CSWurl</p>	<p>WMS / WFS services: deegree framework (http://www.deegree.de/) / geoserver framework / ArcIMS (starting in may: ArcGIS Server) SDI-MRH web map portal: http://geoportal.metropolregion.hamburg.de/mapbender/</p> <p>WMS services:</p> <p>Preparatory land-use plan: http://gateway.hamburg.de/OGCFassade/BSU_WMS_FNP.aspx?SERVICE=WMS&REQUEST=GetCapabilities</p> <p>Landscape programme: http://gateway.hamburg.de/OGCFassade/BSU_WMS_LAPRO.aspx?SERVICE=WMS&REQUEST=GetCapabilities</p> <p>Wildlife conservation programme: http://gateway.hamburg.de/OGCFassade/BSU_WMS_APRO.aspx?SERVICE=WMS&REQUEST=GetCapabilities</p>

		<p>Local land use plans raster maps: http://gateway.hamburg.de/OGCFassade/HH_WMS_Bebauungsplan.aspx?SERVICE=WMS&REQUEST=GetCapabilities e.g. local land use plans in neighborhood of "St. Pauli Landungsbrücken": http://gateway.hamburg.de/OGCFassade/HH_WMS_Bebauungsplan.aspx?VERSION=1.1.1&REQUEST=GetMap&SERVICE=WMS&LAYERS=1,0&STYLES=,&SRS=EPSG:31467&BBOX=3563695.5475475476,5935323.5995996,3564600.4524524524,5936124.4004004&WIDTH=565&HEIGHT=500&FORMAT=image/png&BGCOLOR=0xffffffff&TRANSPARENT=TRUE&EXCEPTIONS=application/vnd.ogc.se_inimage</p> <p>Protected sites: http://gateway.hamburg.de/OGCFassade/BSU_GDI.aspx?SERVICE=WMS&VERSION=1.1.1&REQUEST=GetCapabilities</p> <p>CSW service: http://gateway.hamburg.de/OGCFassade/HH_CSW.aspx?REQUEST=GetCapabilities&version=2.0.2&service=CSW</p>
ZPR	MiCKA (http://giz.zpr.gov.lv/catalogue/)	<p>Zemgale planned and current zoning WMS(draft version) - http://giz.zpr.gov.lv/glog/Glog/entry.php?class=Mapman.MapmanWms&mapProject=mapproject9&instance=&SERVICE=WMS&REQUEST=GetCapabilities</p> <p>Zemgale planned and current zoning (draft version) - http://giz.zpr.gov.lv/glog/Glog/entry.php?class=Mapman.MapmanWfs&VERSION=1.0.0&mapProject=mapproject9&instance=&SERVICE=WFS&REQUEST=GetCapabilities</p> <p>SimpleCMS- http://giz.zpr.gov.lv/simplecms/?menuID=3&action=article&presenter=Article</p>

		<p>Map Viewer - http://giz.zpr.gov.lv/map/?ows=http%3A//giz.zpr.gov.lv/glog/Glog/entry.php%3Fclass%3DMapman.MapmanWms%26mapProject%3Dmapproject7%26instance%3D%26SERVICE%3DWMS%26REQUEST%3DGetCapabilities</p> <p>WMS - http://giz.zpr.gov.lv/catalogue/libs/cswclient/cswClientRun.php?serviceName=ZPR&format=application/xml&id=DCAD7E1F-7A1B-053F-34D8-7A541FD0D331</p> <p>WFS - http://giz.zpr.gov.lv/catalogue/libs/cswclient/cswClientRun.php?serviceName=ZPR&format=application/xml&id=DCAD7E1F-7A1B-053F-34D8-7A541FD0D331</p>
<p>FTZ</p>	<p>Geonetwork tested locally, Need to contact service providers to host data on server - testing done with Land Cover data</p>	<p>Geoserver - hosted locally http://ftzgeo.org:8080/geoserver/web/</p> <p>Uploaded Land Cover data - data in shapefile format WMS/WFS - service available on Geoserver</p> <p>WMS http://ftzgeo.org:8080/geoserver/wms?service=WMS&version=1.1.0&request=GetMap&layers=CorineLandcover:CLC2006_UTM_region&styles=&bbox=426573.732,3962764.804,461831.604,3993551.661&width=512&height=447&srs=EPSG:32633&format=application/atom+xml</p> <p>WFS http://ftzgeo.org:8080/geoserver/ows?service=WFS&version=1.0.0&request=GetFeature&typeName=CorineLandcover:CLC2006_UTM_region&maxFeatures=50&outputFormat=GML2</p>

<p>GEORAMA</p>	<p>GeoNetwork: http://plan4all.georama.org.gr/geonetwor k/ CSW service based on GeoNetwork: link</p>	<p>GeoServer: http://plan4all.georama.org.gr/geoserver/ WMS/WFS service - http://plan4all.georama.org.gr/geoserver/web/?wicket:bookmarkablePage=:org.geoserver.web.demo.MapPreviewPage</p>
<p>NASURSA</p>	<p>Since March 2010: http://idena.navarra.es/busquedas/catalog /main/home.page (Spanish/English) Geoportal Extension (ESRI)</p>	<p>WMS: ArcGIS Server (ESRI). WFS: ArcGIS Server (ESRI), Initially restricted access, until levels of right to access established.</p> <ul style="list-style-type: none"> • http://idena.navarra.es/ogc/csw.aspx • http://idena.navarra.es/ogc/wms.aspx
<p>PROVROMA Hyper</p>	<p>Geonetwork at http://plan4all.hyperborea.com/geonetwo rk (CSW getCapabilities at http://plan4all.hyperborea.com/geonetwo rk/srv/en/csw?REQUEST=GetCapabilitie s&SERVICE=CSW&ACCEPTVERSIO N=2.0.0,0.7.2&outputFormat=application /xml) (please note that since Hyperborea is not a data provider, we are currently publishing sample data)</p>	<p>Geoserver client at http://plan4all.hyperborea.com/geoserver Geoserver WMS at http://plan4all.hyperborea.com/geoserver/ows?service=wms&version=1.1.1&request=Get Capabilities Geoserver WFS at http://plan4all.hyperborea.com/geoserver/ows?service=wfs&version=1.1.0&request=GetC apabilities Navigator at http://plan4all.hyperborea.com/geoexplorer (please note that since Hyperborea is not a data provider, we are currently publishing sample data)</p>
<p>GIJON</p>	<p>Catalogue service based on Geonetwork: http://ide.gijon.es:8080/geonetwork/srv /en/csw?REQUEST=GetCapabilities&SER VICE=CSW&ACCEPTVERSION=2.0.0,0.7.2 &outputFormat=application/xml</p>	<p>WMS service based on Geoserver: http://ide.gijon.es:8080/geoserver/wms?Request=GetCapabilities WFS service based on Geoserver: http://ide.gijon.es:8080/geoserver/wfs?Request=GetCapabilities</p>

MAC	<p>Geonetwork CSW published at http://gis.mac.ie/geonetwork/srv/en/csw</p>	<p>WMS published at [http://http://gis.mac.ie/geoserver/wms?service=WMS&request=GetCapabilities] Catalogue and WMS reference Limerick County Councils Special Areas of Architectural conservation</p>
CEIT ALANOVA	<p>AGEOportal:Beta: ESRI Geoportal Extension</p>	<p>Centropemap: UMN Mapserver, Geoserver, PostGIS SQL, WMS 1.1.1, WFS 1.0.0 Centropemap Website: http://www.centropemap.org/ Centropemap Geoportal: http://map.centropemap.org/ Centropemap STATISTICS Extension: http://statistics.centropemap.org/</p> <p>NOTE: CEIT ALANOVA is not a data provider. AGEOportal is an example of an Austrian catalogue and has not been implemented by CEIT. Regarding Centropemap – CEIT ALANOVA is doing the technical implementation.</p>
AVINET	<p>A dedicated Norwegian Plan4all site using Geonetwork as catalog service has been installed and is available at: plan4all.avinet.no/geonetwork/</p>	<p>The web map viewer and server for OGC WMS/WFS services is based on Avinet's own solution Adaptive 2.0, an integration framework sitting on top of UMN Mapserver, PostgreSQL and PostGIS (live). plan4all.avinet.no</p>
DIPSU	<p>Catalogue: GeoNetwork http://www.dipsuwebgis.uniroma3.it:8081/csw-dipsu/srv/it/main.home</p> <p>CSW service (version 1.1; soon available version 2.2): http://www.dipsuwebgis.uniroma3.it:8081/csw-dipsu/srv/en/csw?request=GetCapabilities&service=CSW&acceptVersions=2.0.2</p>	<p>WMS - GetCapabilities: http://www.dipsuwebgis.uniroma3.it:8081/geoserver_dipsu/wms?VERSION=1.1.1&REQUEST=GetCapabilities&SERVICE=WMS</p>
EPF	<p>Geonetwork at: http://www.geoportal-bg.com/geonetwork</p>	<p>WMS: ArcGIS Server (ESRI)(installed see: (http://www.geoportal-bg.com))</p>

		WFS: ArcGIS Server (ESRI)(in process)
ADR Nord Vest	Micka (http://geoportal.nord-vest.ro:8080)	<p>Gehosting</p> <p>MapViewer: http://geoportal.nord-vest.ro:8080/glog/Glog/entry.php?class=Mapman.MapmanShowMap&mapProject=mapproject1&</p> <p>WMS service example: http://geoportal.nord-vest.ro:8080/glog/Glog/entry.php?class=Mapman.MapmanWms&mapProject=mapproject1&instance=&SERVICE=WMS&REQUEST=GetCapabilities</p> <p>WFS service example: http://geoportal.nord-vest.ro:8080/glog/Glog/entry.php?class=Mapman.MapmanWfs&VERSION=1.0.0&mapProject=mapproject1&instance=&SERVICE=WFS&REQUEST=GetCapabilities</p>
Lazio	Catalogue: GeoNetwork	<p>WMS - Regional Landscape Plan: Landscape system – Section A: http://www.regione.lazio.it/ArcGIS/services/TAVOLA_A/MapServer/WMSServer</p> <p>WMS - Regional Landscape Plan: Landscape assets – Section B: http://www.regione.lazio.it/ArcGIS/services/TAVOLA_B/MapServer/WMSServer</p> <p>WMS - Land cover Regione Lazio: http://www.regione.lazio.it/ArcGIS/services/CUS_Regione_Lazio/MapServer/WMSServer</p>
HF	Connection to Micka on Plan4all portal (http://portal.plan4all.eu/metadata/?lang=eng)	<p>Gehosting (UMN Mapserver, Geoserver)</p> <p>Gehosting Sumperk - http://apps.hfbiz.cz/apps/sumperk/gehosting/</p>

		<p>Metadata - http://www.plan4all.eu/catalogue/?anytext=sumperk&type=&menuId=menu0</p> <p>WMS - http://apps.hfbiz.cz/ows/wms/sumperk/up/wms.php</p> <p>MapView - http://www.plan4all.eu/glog/Glog/entry.php?class=Tools.MapFileViewer&map=/data/www/www.plan4all.eu/data/Glog/Temp/viewer34c479ae866384baf55dcf4f693e7158.map&language=en&useToolsPanel=true&useLayerSwitcher=true&showTopPanel=true&showMapTitle=true&useDataObjects=true</p> <p>MapView (e-UP) - http://apps.hfbiz.cz/apps/mappub/demo2en.html</p>
<p>MEEDD AT</p>	<p>The ministry uses the ADELIE system for cataloguing geographic data produced by all the services of the ministry (http://adelie.application.equipement.gouv.fr/). This catalog identifies the datasets that are available on the INTERNET as well as the web services that display dynamic maps via WMS/WFS services. ADELIE is harvested by the French GeoCatalog (http://geocatalog.fr) which in term is harvested by the Plan4all Geoportal through a WCS service.</p>	<p>Therefore WMS and WFS services related to spatial planning datasets can be identified using the keywords "PLU" or "SUP" in querying the geocatalog. Some URL are given below:</p> <ul style="list-style-type: none"> • http://mapserveur.application.equipement.gouv.fr/map/mapserv?map=/opt/data/cartelie/prod/CETE_Est/servitudes_aube.www.map • http://mapserveur.application.equipement.gouv.fr/map/mapserv?map=/opt/data/cartelie/prod/DDE_24/08_1bis_Servitudes_Patrimoine_Naturel_Culturel.www.map • http://mapserveur.application.developpement-durable.gouv.fr/map/mapserv?map=/opt/data/cartelie/prod/DDEA_65/geopl65.www.map • http://mapserveur.application.developpement-durable.gouv.fr/map/mapserv?map=/opt/data/cartelie/prod/DDEA_30/EADU.www.map • http://mapserveur.application.developpement-durable.gouv.fr/map/mapserv?map=/opt/data/cartelie/prod/DDEA_25/TOUTES_SERVITUDES_DOUBS_INTERNET.www.map

- http://mapserveur.application.developpement-durable.gouv.fr/map/mapserv?map=/opt/data/carto/cartelie/prod/DDEA_28/partena_riat_SDAP.www.map
- http://mapserveur.application.developpement-durable.gouv.fr/map/mapserv?map=/opt/data/carto/cartelie/prod/DDEA_60/Sup.www.map
- http://mapserveur.application.developpement-durable.gouv.fr/map/mapserv?map=/opt/data/carto/cartelie/prod/DDEA_19/0810_PT2_cartelie.www.map
- http://mapserveur.application.developpement-durable.gouv.fr/map/mapserv?map=/opt/data/carto/cartelie/prod/DDEA_63/Portail_Cartographique_DEP63.www.map
- http://mapserveur.application.developpement-durable.gouv.fr/map/mapserv?map=/opt/data/carto/cartelie/prod/DDEA_46/Le_Boulevard_PLU.www.map
- http://mapserveur.application.developpement-durable.gouv.fr/map/mapserv?map=/opt/data/carto/cartelie/prod/DDEA_46/St_Projet_PLU.www.map
- http://mapserveur.application.developpement-durable.gouv.fr/map/mapserv?map=/opt/data/carto/cartelie/prod/DDEA_46/Gagnac_sur_cere_PLU.www.map
- http://mapserveur.application.developpement-durable.gouv.fr/map/mapserv?map=/opt/data/carto/cartelie/prod/DDEA_46/St_Chamarand_PLU.www.map
- http://mapserveur.application.developpement-durable.gouv.fr/map/mapserv?map=/opt/data/carto/cartelie/prod/DDEA_46/Valroufie_PLU.www.map
- http://mapserveur.application.developpement-durable.gouv.fr/map/mapserv?map=/opt/data/carto/cartelie/prod/DREAL_Aquitaine/SuiviMarcheNum_Cartelie.www.map
- http://mapserveur.application.developpement-durable.gouv.fr/map/mapserv?map=/opt/data/carto/cartelie/prod/DREAL_Aquitaine/SuiviMarcheNum_Cartelie.www.map

		<p>durable.gouv.fr/map/mapserv?map=/opt/data/carto/cartelie/prod/DREAL_H_Normandie/Cartelie_ADS_PLU.www.map</p> <ul style="list-style-type: none">• http://mapserveur.application.developpement-durable.gouv.fr/map/mapserv?map=/opt/data/carto/cartelie/prod/DDEA_33/planification_jourJ.www.map• http://mapserveur.application.developpement-durable.gouv.fr/map/mapserv?map=/opt/data/carto/cartelie/prod/DDEA_2B/Patrimoine_Culturel.www.map• http://mapserveur.application.developpement-durable.gouv.fr/map/mapserv?map=/opt/data/carto/cartelie/prod/DDEA_65/perimetres_protectionMH.www.map• http://mapserveur.application.developpement-durable.gouv.fr/map/mapserv?map=/opt/data/carto/cartelie/prod/DDEA_82/SDAPI1.www.map
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3. Conclusions & Next Steps

All pilot partners of the Plan4all project succeeded to deploy their regional (local) infrastructure for discovery, visualisation and sharing of spatial planning data. This step was a key issue for future Plan4all activities, but also bring a lot of experiences:

- There exist a lot of technological solutions, which could be used for discovery, visualisation and sharing of spatial planning data;
- It is possible to integrate both open source and commercial platforms;
- It is possible to reach interoperability for discovery, visualisation and sharing services using different platform.

Pilot demonstrations use different solutions and could be used as a form of a cook book or best practices for other European regions. For this reason, their description of implementation will be freely available in the Annex and will be also part of the future Plan4all publication. These pilots are also described on the Plan4all portal and visualisation services are accessible trough the Plan4all discovery services.

This implementation is also necessary step for WP7 – deployment of harmonised data and metadata and Validation of Plan4all Data and Metadata models in WP8.

For harmonisation of data all three workpackages (WP6, WP7 and WP8) will prepare a common training event about tool for data harmonisation.