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Environmental Data Dissemination at the Environment Agency

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Abstract

The Environment Agency places a high priority on the provision of information in achieving environmental goals. Its vision is environmental information freely available to all – quickly and easily, where and when people want it, and tailored to meet particular needs.

Many public bodies have developed web based geographic portals to public sector information. Indeed the Agency was at the forefront of such developments with its "What's in your backyard?" service. However, to date much of the effort has been concentrated on the enabling technology and the 'offering' of information for access.

In a new approach, the Agency is developing a range of eBusiness services to meet specific user needs. The first of these is already delivering environmental searches to meet the needs of those involved in the conveyancing process. The service provides the consumer with the information necessary in order that a consideration of the local environment is bought in to the decision making process of whether to purchase a property. In essence, the Agency has identified the public's requirements and provided public access according to those needs.

The Agency have continued to invest in spatially enabling their business information and providing leading edge spatial tools to better enable the delivery of environmental information to the public. The objective for the Agency is to support the public in their decision-making, while raising their awareness and interest in their local environment.

The Agency views this service as the first of many which are built upon open standards and take advantage of the improvements in spatial and information technology software. By taking advantage of leading edge systems, the Agency will be able to develop from the passive provision of information to active participation by the public in environmental decision-making.

This paper will provide an overview of the Agency's aims and objectives for the system, the system architecture and how this may be further developed to provide new and improved services to the public.

Keywords

Environment, information systems, e-government, public registers, decision making, electronic document and records management system, XML, n-tier solution, NLIS, business benefits, system benefits

¹ The views expressed in this paper are those of the authors and not necessarily those of the Environment Agency

1 Introduction

The Agency has developed considerable experience in provision of information. Based on this experience, this paper considers the elements that need to be put in place to successfully deliver Information Services. This is followed by a case study illustrating how the approach can be put into practice with the establishment of an eConveyancing information service. Finally, an insight into the future potential is given.

1.1 Background

The Environment Agency (the Agency) is the leading public organisation for protecting and improving the environment in England and Wales. Its duties include regulating industry, maintaining flood defences and water resources, and improving wildlife habitats. The Agency also monitors the environment, and makes the information collected widely available.

Informed Solutions were engaged to work alongside the Environment Agency to develop a commercially robust and scaleable Property Search solution and integrate the solution with existing corporate business systems.

1.2 Information and Environmental Improvement

The Agency places a high priority on the provision of environmental information and the key part it plays in achieving environmental goals. The necessity of ensuring that the public has up-to-date environmental information is essential as their power and influence help to achieve sustained environmental improvements. Operating openly is also essential in maintaining the credibility of regulatory functions, and in enabling fully informed decision-making by regulatory bodies and the public alike.

The Agency's track-record in information provision is considerable, as highlighted by its experience in providing key environmental datasets through 'What's in Your Backyard?' - a GIS, internet based national portal'. The vision of the Agency for the future is a much wider range of environmental information freely available to all – quickly and easily, where and when people want it, and in formats designed to meet particular needs. An overview of the approach is outlined in Figure 1, where the main concept is that system components are re-used to meet a range of user requirements.

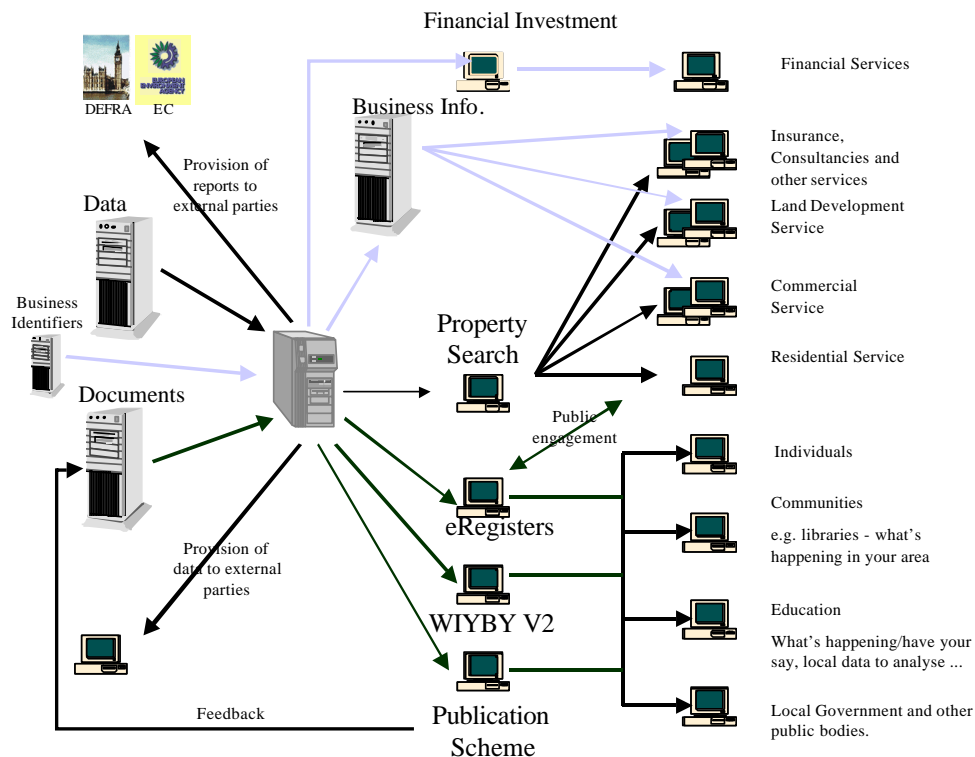


Figure 1: Logical Diagram of Future Data Dissemination by the Environment Agency

On this basis, public bodies, business and the public in general will be well equipped to make better decisions for the environment. Through engagement and public participation, the Agency itself will also be better positioned to make more informed decisions. Exciting opportunities for achieving this vision present themselves in today's 'Information Age' and the potential for environmental benefit is great.

2 The Agency's Approach to Delivering Information Services

The successful delivery of information services is much more than simply delivering a technical solution. The necessary components include proper management of data – the 'raw materials', a full understanding of user needs and a clear vision of how to meet them, senior commitment to the importance of information provision, and a strategy to fund both implementation and ongoing maintenance and development.

2.1 The Agency's Policy

The importance of information provision is recognised in a wide range of national and European legislation, and in international agreements, including Public Register laws, the UK Freedom of Information Actⁱⁱ and the UN-ECE Convention on 'Access to Information, Public Participation in Decision Making and Access to Justice in environmental Matters' (the 'Aarhus' Convention)ⁱⁱⁱ.

The interaction between these and other laws result in complex issues surrounding information provision. These include balancing requirements to make information available against respect for commercial, personal and other confidentiality; and applying rules on charging and cost recovery in light of copyright and other intellectual property rights. The right policy decisions are vital in meeting all the various legal requirements in a way that enacts the 'spirit' of the legislation.

The approach by the Agency towards the dissemination of environmental information has been specifically designed to ensure that information is made as freely and widely available as possible, whilst maximising the effectiveness of the resources at our disposal. To meet this aim we recover costs in some instances, but also consider intellectual property rights in data and licence some uses to which our data is put.

2.2 Data and Information Base

New legislation is increasingly focussing on pro-active information supply to complement re-active supply on request. In the UK, one of the requirements of the Freedom of Information Act is a clear duty to pro-actively provide information through the adoption and maintenance of a 'Publication Scheme' to cover all the information and data that a Public Authority makes available. As well as paper reports and publications, Publication Schemes include databases, public registers, functional initiatives, technical guidance and educational material.

Given such considerations it is essential that public authorities make as much information available as possible in an electronic form. In part to meet this need, the Agency is introducing 'Electronic Document and Records Management' throughout its range of operations. This will result in a step change in access to information, as not only data, summaries and reports, but individual documents can then be provided via the internet. To maximise the potential for disclosure of information, the Agency is also categorising all the data and information it holds in terms of accessibility. Where policy and legal checks confirm that the information in a category will always be released upon demand, it is also defined as suitable for pro-active release.

2.3 Technical Infrastructure

Providing access to environmental information is a legal requirement for the Environment Agency, and the Information Age Government initiative has set targets that require the Agency to provide all such services by means of on-line, electronic facilities. In order to meet the Government targets and the general public's requirements for environmental information, the Agency must ensure that there are no significant barriers to accessing information. This is only possible if information provision does not become prohibitively expensive to maintain.

In order to deliver information that can be made freely available, a robust and scalable technical solution is required. An infrastructure built upon standards that has the ability to process eXtensible Markup Language (XML) has enabled the Agency to retain it's existing business investment and provide a scalable and robust infrastructure for the future. To this extent the Agency have selected a Java enterprise, n-tier

solution that can provide the scalability, availability and resilience required to meet Government and European initiatives and raise public awareness.

The technical infrastructure will permit the Agency to use applications and disseminate information in new and innovative ways that may not require human intervention.

2.4 Identifying User Needs

Technical infrastructure and developments in electronic information supply are of little use without a thorough understanding of why people want information and how they want to access it. If the concept that the environment is of importance and relevance to all is correct, then it is important to address the fact that some people do not currently see the relevance of environmental information to them.

This is essential if goals are to be achieved, but it can also be the hardest task in the success of information services. Therefore the Agency has ongoing research to inform future development.

2.5 Funding Information services

The Agency operates a cost recovery 'charging for information' scheme for the re-active supply of information upon request. This scheme is based on the premise that, within reason, all the information provided is accessible in one form or another without charge. Only when asked to supply information that we have already made 'reasonably available' to the public (e.g. via the Internet, public registers, or in reports and libraries), will we recover the extra costs involved in answering that specific request.

The Agency's Intellectual Property Rights when supplying information allow for greater use of information than that required by statute. However, in some instances, environmental information has a commercial value over and above that of its use for internal business purposes, and commercial suppliers market services for re-packaging and passing on information. Where we consider that the commercial use is in accordance with our aims and goals, we 'licence' activities, recover royalties - and most importantly allow our information to reach wider audiences.

There is also potential for public authorities such as the Agency to develop their own 'tailored' information services and products that give added value to certain customers who choose to pay to access information in ways particular to their needs. An example of this is the recognised need from people involved in property transactions for key environmental information to be provided in a tailored way to inform their purchase decisions. In the UK, Government guidance^{iv} indicates that such products and services should be priced to achieve full cost recovery or, where there is an element of competition with the private sector, the market price, in the interests of fair competition.

To ensure that such developments do not compromise access to information, the Agency is seeking to develop such services based upon data sets that are also generally accessible to the public without charge. This clarifies that the customer is choosing to pay for an 'added-value' service rather than being charged for the information itself.

3 Case Study: Establishing An e-Conveyance Service

The Property Search System is one example of the Agency's innovative use of technology to provide environmental information to the public.

3.1 Business Requirements

Amongst an estimated 500,000 requests for information and general enquiries, the Agency receives some 30,000 ad-hoc site based searches per annum. Providing responses has traditionally been through manual methods, and has been a time consuming and expensive service for the Agency to provide.

The Property Search System (PSS) is concerned with the productisation, integration, deployment and launch of new on-line systems that will reduce costs to the Agency and enable solicitors to request environmental information in support of property conveyancing activities.

The Agency, in order to meet their business aims and objectives, were required to deliver a PSS that is able to support over one million residential property conveyancing transactions per annum. The PSS was further required to be delivered within a four month period. The Agency commissioned Informed Solutions to work

in partnership with in-house personnel, to manage the full lifecycle of the project, including the identification and documentation of business requirements, the design and implementation of the system architecture and the delivery of its business components.

The objective for the project team was to deliver a system that was commercially robust, performant, flexible and scalable for a number of future business uses. These uses included interfaces to solicitors who may be able to request an environmental search either on-line, through the National Land Information System (NLIS) Portal, or directly from the Agency through the National Customer Contact Centre (NCCC).

The high-level business requirements were:

- Provide a fully electronic Property Search System that can support NLIS and enable mandatory inclusion of environmental searches in conveyancing by May 1st 2003.
- Reduce the time involved by Agency staff in the processing of Property Search requests to seconds rather than hours or days.
- Enable the Agency to process several thousand Property Search requests per day.
- Provide the ability to archive and retrieve all Property Search requests and reports for auditing purposes.
- Ensure that the Property Search Engine is accessible to a number of different business systems, such as the Agency's web site or a fulfilment house for the provision of hardcopy reports.

3.2 System Requirements

The PSS is required to provide a live service for the NLIS between the core working hours of 08:00 and 18:00. Secondary search queries, which may arise from information contained within the reports, will also be completed within core working hours. However, to ensure future scalability, The Agency required the system itself to be designed so that it may perform under a 24 / 7 service level agreement.

The high-level system requirements were:

- To deliver an open and scalable architecture solution that is performant and can deliver the business objectives.
- Provide an open and flexible application interface that is able to quickly and efficiently integrate the PSS to enhance and extend other business systems such as 'What's In Your Back Yard' (WIYBY).
- Provide an architectural framework that is scalable, resilient and able to accommodate unforeseen, new or changed business requirements.
- Provide a system to meet existing Service Level Agreement (SLA) of 99.97% availability.

3.3 Project Approach

An essential ingredient to the successful delivery of the PSS was the partnership between the Agency and Informed Solutions. As a single project team both organisations worked seamlessly at all levels to ensure that all project deliverables were met. This was particularly important given the highly ambitious time-scales within which the project operated.

Working within a PRINCE II framework, delivery of the PSS was accomplished by decomposing the project into twelve logically related workstreams. This permitted both the Agency and Informed Solutions to assume lead roles for workstreams based upon their respective expertise and under the overall corporate governance of the Agency and the Project Executive Board.

The Agency project team represent the business and user perspectives, providing business know-how as to current and proposed work practices, existing systems, and property search and environmental data expertise. The Agency had overall responsibility for the following:

- The identification of network, hardware and software requirements for the PSS.

- The configuration and specification of development, test and live environments for the PSS.
- The identification of data and data repository requirements for the PSS.
- The configuration and documentation of the data repository for development, test and production environments.
- The configuration of a generic data loader to assist the data maintenance process in the loading of pre-conflated Agency business data into the PSS repository.
- The definition of the overall test approach for the PSS project and the provision of a Functional System Test Strategy for User Acceptance Testing (UAT) and Business Readiness Testing (BRT).
- The definition of individual tests to be performed on the PSS and the production of a Functional System Test Specification.

Within the timescales provided by the Agency, Informed Solutions had overall responsibility for the following:

- The formal documentation of business requirements.
- The design and specification of the PSS Architecture through a series of technical workshops attended by design teams from Informed Solutions, the Agency and the Internet Service Provider.
- The integration of the PSS to a number of internal and external business systems to ensure delivery of all business processes.
- The definition and implementation of an electronic storage system for the PSS to archive and automatically retrieve PSS reports.
- The definition and implementation of an electronic financial reconciliation system to ensure that all PSS requests are fully audited by the Agency.
- The definition of the overall test approach for the PSS project with the Agency and the production of a functional test strategy.
- The delivery and rollout of the PSS.

3.4 Quality Control

Appropriate Project and quality management strategies and procedures were implemented in order to track and control the delivery of the project, and its numerous inter-related workstreams. These strategies are considered key to the success of this project and, in particular, cover quality, communications, risk and issue management.

The project was also fully audited by the Office of Government Commerce (OGC) Gateway Review. This process forms part of the Agency's quality control review procedures, which the project successfully passed to an extremely high and proficient standard.

3.5 The Property Search System Process

The PSS can be logically divided into a number of components as shown in the diagram below (Figure 2). The components have been identified in such a way as to provide hooks for later Phases of the systems' development

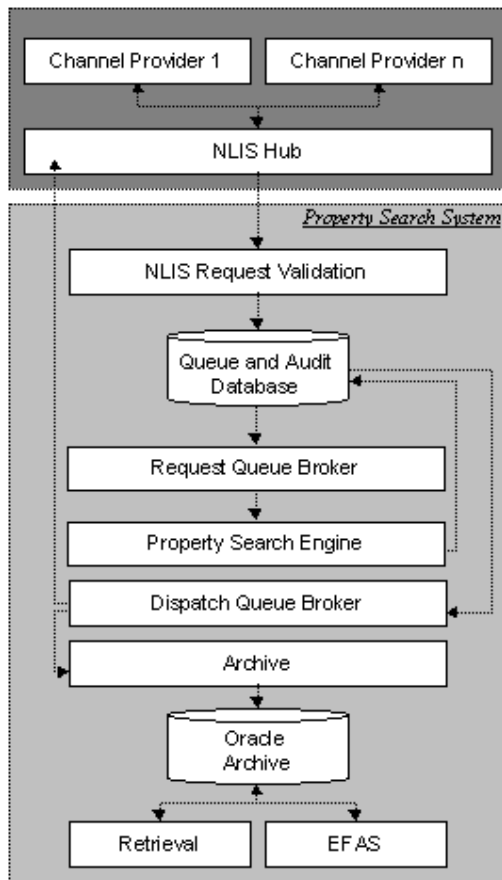


Figure 2 - Logical Architecture Diagram - Property Search System Processes (note: dark grey items were developed by NLIS, and do not form part of the main Property Search System).

The process flow through the system is detailed as:

- Validation of NLIS Request
The PSS receives a request from NLIS, in the form of an XML document. The PSS request process validates the structure of the document and the information it contains before adding the request to the Oracle queue instance where it awaits processing.
- Generation of Property Search Report
The Property Search Engine generates the Property Search report, referencing the Geodatabase for source data within a five hundred metre search radius of the property. Figure 3 displays the front page of a report, a map of the property and the surrounding five hundred metre search.

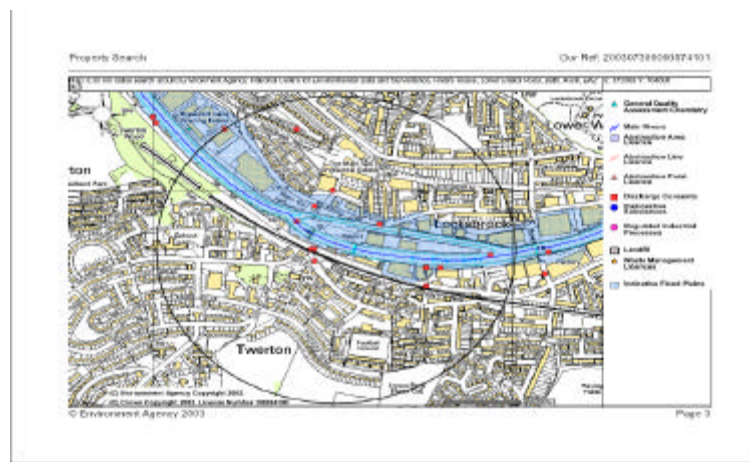
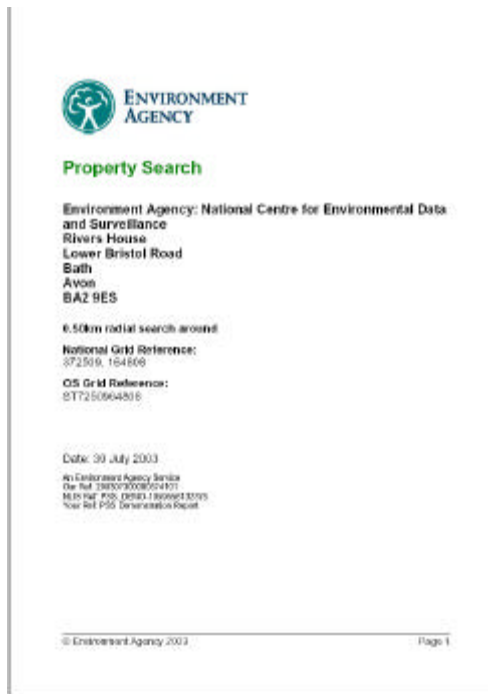


Figure 3 - The Property Search Report front page and map page

- The Dispatch Process

The Property Search Report and metadata are dispatched to NLIS where the PSS will await confirmation of receipt of the report from NLIS. Once this has been received the report and the Property Request metadata are dispatched for Archive at the Agency's Host Data Centre (HDC) in Leeds.

3.6 Technical Baseline

Technical platform requirements for the deployment of the PSS are detailed below. In brief, the following environments were identified within the framework of existing Agency standards and software licence agreements:

- Sun Solaris environment, to host the core Property Search System.
- Hewlett Packard HP_UX environment to host the Property Search Archive and Retrieval processes.
- BEA Weblogic to provide a scalable and robust J2EE standard application server technology.
- Oracle Database (Standard Edition) to host the spatial database environment.

- ESRI ArcIMS spatial web mapping technology.
- ESRI ArcSDE spatial database.
- Java JDK development framework.
- Cocoon publishing framework.
- Microsoft Internet Explorer

3.7 Business Benefits

The development of the PSS is viewed by the Agency as an investment for the future that will yield real benefits to the business over time. The system is able to provide a fully electronic Property Search System and has been fully integrated to NLIS. The system is able to process several thousand Property Search requests per day and will be able to quickly and efficiently provide reports for future conveyancing requirements (e.g. Law Society best practice or inclusion in Home Information Packs).

The system is able to archive and retrieve all property search requests and reports for auditing purposes, and for dealing efficiently with 'follow on' enquiries related to reports. It also provides the Agency with functionality to financially reconcile all Property Search requests that have passed through the system.

Overall, the system has dramatically reduced the time taken by Agency staff in the processing of Property Search queries.

3.8 System Benefits

The PSS makes use of a n-tier architecture to deliver manual business processes that the Agency had identified as costly and outdated. The success factors for the PSS architecture are that it has enabled the change in the Agency's business operations and objectives for the dissemination of environmental information in the future.

The principal system benefits include the provision of new business applications at reduced costs and within an efficient time to market. Indeed, the provision of a flexible infrastructure has provided a blueprint for the development and management of further services and applications, and the accommodation of new business requirements.

Also, the PSS architecture, and the use of common design standards, should ensure maximum longevity and reuse of components to maximise the Agency's return on investment.

Finally the PSS provides the ability to facilitate interoperability for Agency requirements with regard to e-business and joined-up government initiatives.

4 Summary

The Property Search System has been extremely successful in delivering the Agency's requirement to provide electronic access to environmental information. This has been implemented through a partnership approach between the Agency and Informed Solutions which has delivered the technology architecture, application, information and data architecture that the business can leverage for future systems and applications.

The PSS has provided an efficient and effective framework that in the future can provide ready access to environmental information for both the Agency's operational services and external services. The Agency has already identified a number of projects that can reuse system components and exploit the flexibility and low cost of entry offered by the PSS.

An example of one such project is the introduction of electronic public registers which is seeking to not only provide information, but facilitate 2-way communication and thereby encourage public participation in the decision making of regulatory bodies. Such 'environmental democracy' will be one of the first examples of the practical application of the principles enshrined in the UNECE Aarhus Convention.

5 Conclusions

The Agency's experience to date in providing electronic access to environmental information has provided the knowledge upon which a range of integrated information services can be developed. This integrated approach, in 'feeding' off the same base data sets and being built upon flexible applications, is both efficient and effective in providing ready access to information for a wide range of user requirements.

Future development must be concerned with more than solely making ever more information available in an electronic format. Information must be made relevant to particular needs at particular times, as in the case of the 'Property Search' example which encourages informed decision making by people in their normal lives.

The public must be made aware of the wider environmental impacts of their consumer choices and the implications to themselves and others. They must also understand the real effect of the environment on their daily lives and why it is in their interest to be interested.

ⁱ www.environment-agency.gov.uk

ⁱⁱ Freedom of Information Act 2000, Chapter 36; The Stationery Office Limited; ISBN 0-10-5436000-3; 2000.

ⁱⁱⁱ Convention on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters; United Nations Economic Commission for Europe, Fourth Ministerial Conference "Environment for Europe"; Aarhus, Denmark, 23-25 June 1998.

^{iv} Charge for Information: When and How; HM Treasury, July 2001.