# Getting Started

## Initial Guidance to Data Providers and Publishers

## Guide 4: Publishing Discovery and View Services

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uk location

# Document Control

## Change Summary

| Version | Date | Author/Editor | Change Summary |
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| 1-0 | 5/7/2010 | Tim Manning | First edition of guide. |
| 1.1 | 18/3/2011 | John Dixon | Draft second edition. |
| 2.0 | 21/07/2011 | John Dixon | Second edition of guide. |

# Contents

# Publishing Discovery and View Services

*This fourth guide in the series "Getting Started" sets out what Data Providers and Publishers need to do to publish location information into UK Location. This edition of the guide focuses on Discovery and View Services only. Later editions will cover Download, Transformation and Data services.*

***The guide provides a general action plan only. It's important to stress that your point of entry and the detailed nature of your actions will be specific to your own organisation.***

## Discovery and View Services

The action plan has 6 stages, split across the roles of Data Provider and Data Publisher:

### *Data Provider Situation*

| Stage | Task | Decisions / Actions |
|---|---|---|
| 1 – Strategic Planning | We need to consider UK Location within the context of our organisation's overall information strategy, as it relates to the sourcing, sharing and publishing of location information internally, externally to strategic partners and externally for wider re-use.<br>We need to consider UK Location alongside our organisation's response to other UK Government policies on the publishing of public sector information, in particular the Government's Transparency Principles and Data Sharing and Re-use policies and standards. | • Does the UK Location Strategy and INSPIRE impact us?<br>• If so, how will we respond?<br>• How does this fit within our overall corporate information strategy (for sourcing, sharing and re-use)?<br>• What data shall we publish and which services shall we provide?<br>• How will it be funded - what is our financial model for making data available for re-use?<br>• Are there any licensing implications of providing data to others, including the general public?<br>• Are there any 'derived data' implications of making the data available? |
| 2 – Operational (Business) Planning | We need to determine our operational arrangements for publishing location information through UK Location.<br>How do these relate to our arrangements for the publishing of other forms of information for sharing and re-use? | • What is our channel strategy for publishing our datasets - will we publish directly, get someone else to do it for us, or a mixture of both?<br>• How will we manage this process on a regular basis – what additional operational capability do we need?<br>• What are the operational costs – fixed and variable? |

## *Data Publisher Situation*

| Stage | Task | Decisions / Actions |
|---|---|---|
| 3 - Data Publishing Capability | We need to establish a Data Publishing Capability for our chosen publishing channels.<br>This needs to take account of our likely future capability needs, as well as our immediate needs. | • Will we publish your own data or get a third party to perform this service for us? Note: we will remain fully responsible for delivery<br>• Discuss the approach with related organisations, such as community or thematic group/s<br>• Consider the creation/use of shared services<br>• Make sure what you decide for today, is appropriate for tomorrow, for example publishing INSPIRE compliant data and likely future developments, such as Linked Data |
| 4 - Publish Discovery Metadata | We need to create UK Location compliant metadata for the datasets we wish to publish. | • As Data Provider, we create UK Location compliant discovery metadata for the data we wish to publish and supply it to the Data Publisher<br>• As Data Publisher, we supplement and maintain the discovery metadata for the datasets we are publishing<br>• As Data Publisher, we publish discovery Metadata into UK Location on behalf of the Data Provider |
| 5 - Publish View Services | We need to create a View Service for the datasets we have published. | • The Data Publisher establishes a View Service<br>• The Data Publisher creates service discovery metadata for the View Service<br>• The Data Publisher updates the discovery metadata for the datasets supported by the View Service<br>• The Data Publisher publishes the View Service into UK Location, by registering the service discovery metadata<br>• The Data Publisher re-publishes the discovery metadata for the datasets supported by the View Service, using the original registration |
| 6 - Maintain published data and services | We need to maintain the information resources we have published. | • The Data Provider and Data Publisher establish data management procedures for the data being published into UK Location |

## Stage 1: Strategic Planning

The UK Location Strategy and INSPIRE represent a potentially significant change in the environment your organisation operates within, impacting the data you publish externally, for sharing and re-use, and possibly also the data you create and distribute internally. The purpose of Stage 1 is to establish your strategic response to this change. As a Data Provider you need to consider:

- Does UK Location apply to us, do we need to make this journey (are we mandated under INSPIRE), or are we choosing to make it?[1]
- What datasets do we own and what is our strategy for each, in the context of UK Location and INSPIRE?
- How does it impact our overall information management strategy and the information flows within our organisation and across our strategic partners and to the general public?

Having established a general position regarding the UK Location Strategy and INSPIRE, the next key step is to decide what data to publish into UK Location and how you will integrate the INSPIRE policy and standards into your organisation.

As a Data Provider you may currently produce location information that is intended for internal use only, for community use, e.g. across your strategic partners, or for public use.

These different datasets and distribution channels should in future be operated against a common set of policies and standards. You should consider basing these on INSPIRE as much as possible, to increase interoperability and to simplify your internal operations, in particular the adoption of UK GEMINIn2 as your internal metadata standard and the use of the INSPIRE network services for the distribution of your data internally, to external partners and publicly.

As part of this, you also need to consider rights of access and re-use. This should start from a policy of open data and then consider any exceptions that apply, for the reasons set out in the INSPIRE Directive.

Under rights to re-use, you need to consider any issues related to Intellectual Property Rights (IPR) and derived data, that is, constraints derived from any third party data you use in the creation of the datasets you wish to publish.

You need to check your funding model, that is, how the publishing of your data will be funded.

It is important that your approach to issues concerning licensing, charging and the use of derived data, takes account of latest UK Government policy. Please refer to UK

[1] Note that it could be a mixture of both, that is, some of your datasets come under an INSPIRE Theme, whereas others do not. On the latter, you need to decide if you will volunteer them for publication. See Guide 2 for information on organisation and data coverage.

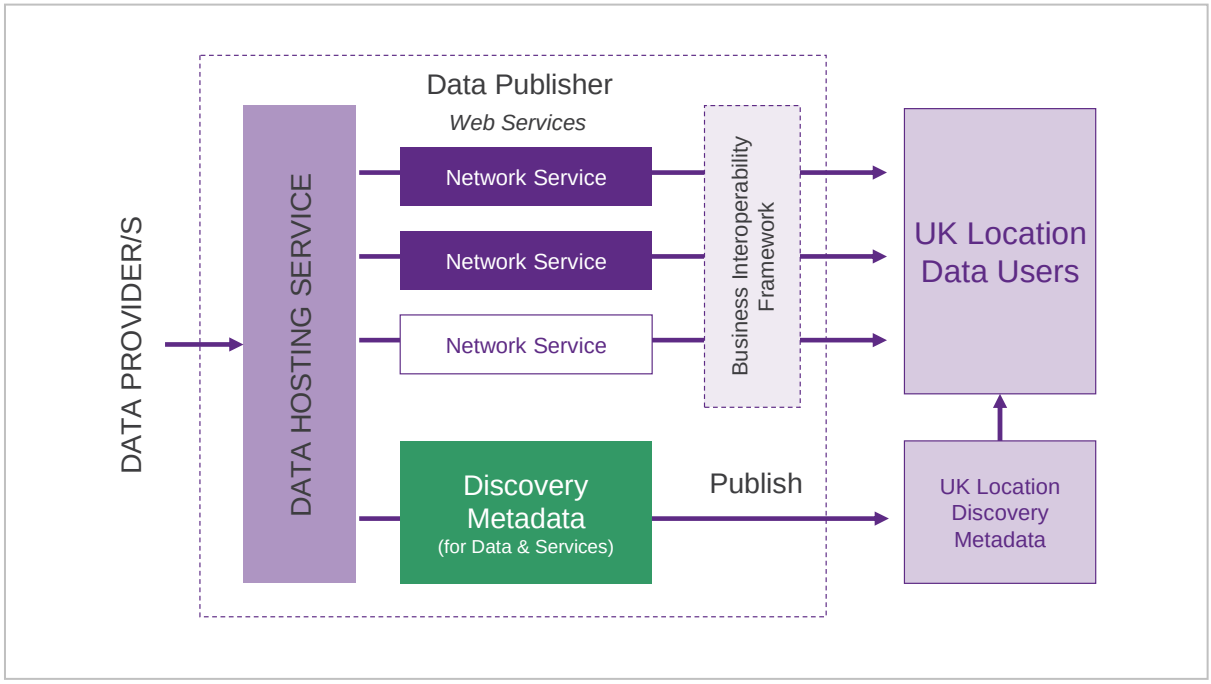
Location's Data Sharing Operational Guidance Part 2 for more information on the UK Government Licensing Framework which has been designed by The National Archives.

## Stage 2: Operational Planning

Your final decision as a Data Provider is 'how to publish' - your operational arrangements for publishing location information into UK Location.

Publishing location information into UK Location requires a number of generic operational components to be put in place (see Generic Data Publishing Model below).

At a conceptual level, these components will be common to all Data Publishers, but their physical form will vary significantly, depending on the chosen technology, solution and hosting arrangements.




| | |
|---|---|
| Data Hosting Service | This component imports and holds the Data Provider's source publication data. If within a Data Provider's own environment, this is likely to be a publication platform, rather than the source data itself. |
| Network Services | These are the Data Publisher's INSPIRE Network Services, e.g. View and Download services.<br>These services are hosted on a web server. There are a range of commercial and open source products that support the creation of these services. The UK Location Programme has developed an INSPIRE conformant open source platform for anyone to use. |

| | |
|---|---|
| Discovery Metadata | This is the data about the data and associated services being published. The base discovery metadata for the data should be imported alongside the data itself, from the Data Provider. This is then supplemented by the Data Publisher, before publication.<br>The publishing point for the metadata might be a catalogue or web file server local to the Data Publisher, or a shared catalogue, which pools the metadata for a given community or topic.<br>The catalogue does not need to be limited to UK Location only records, nor to UK GEMINI 2. UK Location will collect only what you tell us to collect. |
| Business Interoperability Framework (rights management, ecommerce, etc) | This is an optional layer on top of the Network Services. If access and licensing constraints need to be applied, or charges levied before a Network Service can be accessed, then this is achieved by inserting an additional service to handle the transaction. |

### *Publishing directly or through a third party*

Having gained an understanding of the infrastructure that needs to be put in place, you are ready to consider your final question as a Data Provider: Shall I publish directly, or get someone else to do it for me? Your answer to this question will be determined by a range of factors:

- To what extent is the creation and distribution of location information part of our core business?
- How much data are we publishing and what range of services?
- To what extent is the data part of a series, rather than stand-alone?
- How often does the data change?
- Do we have specific rights management requirements and/or charging arrangements?
- What will be the likely demand for our data (the need for scalability and data user support services)?
- Do we, or do we plan to, distribute location information internally, or at a community level, using web services?
- Do we already have community/thematic collective publishing arrangements in place – can we build on these?
- What third party services are available. Are these more cost effective than doing it ourselves?

In making your decision, a key point to remember is that if using a third party to publish your data, you still have the considerable task of supplying your raw data to them. That could be more involved than setting up and running the web services, particularly if you are already using these same services to distribute location information to your internal or community users, that is, over a private network.

Equally, you may already have a shared publishing service in place for your community, or a larger Data Publisher who could provide such a service to you.

The decision process is unlikely to be black and white, but you should consider the longer term when making your decision. Publishing discovery metadata and View Services is fairly straightforward. Incorporating Download and Transformation Services is considerably more complicated and you may want to leave this to a specialised third party.

*Remember to discuss options across your community and with your public sector representative bodies, such as the Local Government Association (LGA). There may be facilities already in place or planned.*

## Stage 3: Establish an initial capability for Data Publishing

Stage 3 now moves into the role of the Data Publisher. Note: under INSPIRE the responsibility for conformance and delivery still rests with you. This stage is about establishing a data publishing capability to publish your own location information (if also a Data Provider) and/or other people's location information (if providing a shared service to other Data Providers).

Referring back to the Generic Data Publisher Model, the only capability that you need on day one is the ability to create and publish the discovery metadata for the datasets you intend to publish. Hosting the actual data and creating the capability to publish Network and Data Services can be phased in, subject to your Data Provider's requirements and INSPIRE regulatory time-scales.

## Stage 4: Create and publish Discovery Metadata

With an initial Data Publishing capability in place, Stage 4 is about creating and publishing UK Location compliant discovery metadata as part of UK Location Discovery Metadata Service.

### *Creating Discovery Metadata*

Discovery metadata is what makes UK Location work. It provides the means for data users to discover what data exists and what services are available, or vice versa.

You will need to create two types of discovery metadata:

- Metadata for the dataset being published
- Metadata for the Network and Data Services being published

Both need to be managed together, as both must reference each other. The data metadata includes service metadata telling you what services have been published for this dataset; and the service metadata tells you what datasets the service supports. This process of linking is critical to the way UK Location is intended to work.

As a Data Publisher, you need to decide how you will create and maintain the elements of the data discovery metadata that relate to the data itself. Ideally, this should be created and maintained by the Data Provider, as close to the point of creation as possible (see box), and supplied to you along with the data to be published.

**Moving to a system of Integrated Metadata Creation**

UK Location Discovery Metadata Service is based on the creation of discovery metadata as part of the provision of the data and services it relates to, that is, by the Data Publisher. In the past, the task of creating metadata has often been part of a later documentation activity, for example as part of the production of a catalogue, or directory of information resources. Metadata was frequently created by someone removed from the creation of the data and thus lacking knowledge about the data, such as its providence and the constraints surrounding its collection.

UK Location encourages discovery metadata to be produced as part of the data production process itself, as part of the same tools, and stored in parallel with the data, ideally in the same data storage. It seeks to retain a clear distinction between the master record held by the Data Publisher and the copy held by the UK Location central metadata catalogue service.

### *Publishing Discovery Metadata*

To publish the data and services metadata into UK Location, you must first register yourself as a Data Publisher using the central registration service of data.gov.uk. Once registered, it is then a simple process of registering the URL for the data and service discovery metadata resources you are publishing.

This is then collected through a URL http request. UK Location will support two forms of http binding, either OGC CSW (see box), or a simple http call to a Web Accessible File (WAF) server.[2]

#### *Devolved Administrations*

The model includes the support for 'satellite' UK Location Metadata Catalogue nodes, operated by the Devolved Administrations, under a partnership agreement.

At present it is intended that Scotland will operate their own Metadata Catalogue/Discovery Service, linked appropriately to the UK Location central services.

[2] This second option is provided both because it is easier to implement than CSW and it allows you to expose your metadata on the Internet, such that it can be discovered directly, using Google or another Internet Search Engine. You also have the option to publish both in XML and HTML, so that the metadata can also be discovered in human-readable form.

## Stage 5: Publish View Services

The next step is to create and publish a View Service for the datasets that you have decided to publish, both under an INSPIRE obligation and voluntarily.

UK Location View Services must be compliant with the INSPIRE Regulation on Network Services and conformant with the INSPIRE View Services Technical Guide.

### INSPIRE View Services

The INSPIRE Regulation for View Services defines the operations that the service needs to support and the quality of service criteria that it needs to meet. These operations are based on the use of the OGC standard for Web Mapping Services (see box).

### OGC Web Mapping Service (WMS)

Web Mapping Services present location information as an image (GIF, JPEG or PNG). This can be displayed in a map viewer, either singly, or in combination, against a base map layer such as OS Mastermap.

Many on-line web mapping services are heavily tied into vendor software, that require the web mapping service to access data on a local system in a specific way. These mapping applications can only use those datasets that are specially prepared for them. Although this has helped people become familiar with such applications, it limits the ability to combine data from a diverse range of sources.

The OGC (Open Geospatial Consortium) Web Mapping Service (WMS) interface defines a standard language through which data users can access and view location information published by a wide range of data providers, through a single map viewer application; or a computer application can access and use within an end user business application.

These web client applications can request location information from a WMS through a simple, URL-based protocol. The types of information that can be accessed from a WMS include (multiple) map layers, layer styles and specific data about a map feature.

The OGC WMS standard has been adopted as an ISO standard, ISO 19128.

For information on the OGC Web Mapping Service, a good starting point is "Open GIS Consortium – Web Map Service Primer". This provides a high level overview and links to more detailed information on setting up Web Mapping Servers and distributing data products via WMS. "Guide to Distributing Your Data Products via WMS, a Tutorial for Data Providers" provides a good follow-on, for those looking for more detailed information on the protocols and XML encoding forms. Both these documents are well written and provide a clear general description of the OGC specification, before moving on to the specifics of the INSPIRE regulation and technical guidance for implementation.

## INSPIRE View Service Operations

There are a number of aspects of the INSPIRE View Service regulation that have a bearing on the complexity of setting up and running a View Service, which you need to factor into your initial plans, including your work and cost estimates.

### *Portrayal*

There are no specific requirements relating to Styles at this stage[3], other than providing a list of rendering styles available for a given layer. Therefore for current "as is" data the Data Provider is expected to provide a default style. Community groups may wish to take this further by agreeing common styles for related features.

[Note: this may be challenge in some themes prior to data compliance, owing to weak harmonisation currently and associated costs of change in the interim]

### *Coordinate Reference Systems*

Coordinate Reference Systems enable every location on Earth to be specified as a set of coordinates (x, y, z) or latitude, longitude and height. The term Spatial Reference System is also used.

Most WMS platforms will support a range of common coordinate systems, fed by the same source data.

To improve interoperability, INSPIRE requires that View Services are published in at least the specified coordinate reference systems for two-dimensional geodetic coordinates (latitude, longitude) using the European system. For more information, please refer to commission regulation 2007/2/EC.

UK Location also includes the current national systems as well (for GB and NI).

In addition, WMTS is also being adopted and a tiling pyramid for the national systems is being developed to supplement the pyramid used by the European reference system.

### *Image Format*

The INSPIRE View Service must support at least one of the following image formats:

- Portable Network Graphics (PNG)
- Graphics Interchange Format (GIF), without compression.

### *Feature Information*

There are no INSPIRE requirements for the support of Feature information (see box), but you may wish to optionally provide this service as part of your WMS. Note this will only function properly if the client (application) includes functionality to retrieve and display the data.

[3] A Portrayal schema is provided in the INSPIRE data specifications. Although limited in the current generation, these can be expected to be developed for conformant data in future and may form a 'spatial data service'.

**"Get Feature"**

The WMS operation "Get Feature" enables feature information to be displayed alongside a map image. This would typically be some associated text about the feature in question, for example disease outbreaks might be shown as points on a map, with details of the outbreak being displayed as feature information.

This is an optional operation within the OGC standard and is not specified in the INSPIRE regulation, but you are free to provide it as part of your service. In some cases this feature data may represent the primary re-use value of the dataset and therefore be critical to its evaluation for re-use.

Note that not all clients (map viewers) will necessarily support this function.

*Quality of Service*

The following quality of service criteria are specified in the INSPIRE Regulation and further developed in the Technical Guide:

- **Performance**
  - The response time for sending the initial response to a Get Map Request from a view service needs to be a maximum 5 seconds. This is on the basis of a 470 Kilobytes image and excludes the impact of third party cascaded effects, that is, the required response time is measured from the point of receipt to the point of response
- **Capacity**
  - The minimum number of served simultaneous service requests to a view service against the required response time is 20 per second.
- **Availability**
  - The required availability of the View Service is 99% of the time.

Note that Quality of Service compliance is not mandated during the Initial Operating Capability period but is required for Full Operating Capability.

### Publishing Steps

There are 7 basic steps you need to go through to create, publish and operationally support UK Location View Services:

1. Establish a View Service (if not already in place).
2. Create Discovery Metadata for the View Service (if not already in place).
3. Apply the View Service to the datasets you wish to publish.
4. Update the 'Resource Locator' element of the dataset Discovery Metadata.
5. Update the 'Coupled Resource' element of the View Service Discovery Metadata.
6. Publish/re-publish the Discovery Metadata for the Datasets and View Service into the UK Location.
7. Establish operational and management procedures for the published datasets and services, including the handling of enquiries from data users.

How you implement the View Service will be dependent on whether you are using an in-house or third party data publishing route; and the data management systems you or your third party Data Publisher are using to store your data. A number of open source software products exist and these are a very cost effective way of establishing a View Service. UK Location has commissioned configuration of one such Open Source solution. This is freely available for use by Data Publishers. For more information please contact the UK Location Coordination Unit: http://location.defra.gov.uk/resources/contact-us/. Equally, most GIS vendors offer their own OGC compliant solutions – but you need to ensure that these are INSPIRE conformant.

## Stage 6: Maintaining the Published Data and Services

Having published your data and services, the final stage is to ensure that you have adequate maintenance procedures in place. These need to support:

- Configuration management of the published datasets and services, that is, change control and release management
- Quality assurance of the published metadata
- Continuous improvement, that is, mechanisms for receiving and processing feedback from external users of the data, as part of your internal data management processes

It should be stressed that it is up to individual Data Providers to determine the extent that external users are consulted/informed about planned changes to the data. This will be influenced by the original purpose of the data, that is, whether it is intended for external use or if the data is being made available for others to re-use - but at their own risk.

When publishing the data, this degree of 'responsibility' should be made clear in the metadata.

In relation to receiving feedback, there will be multiple points of access for your data. These may or may not provide data users with a mechanism for feeding back information about your data. The UK Location point of access - data.gov.uk, will provide such a mechanism. You should also consider providing a contact point in your metadata, which data users can use to feedback information directly to you.