



Creating and Maintaining a GIS Portal— Management Considerations

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An ESRI White Paper

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Creating and Maintaining a GIS Portal—Management Considerations

Introduction

Purpose and Scope of This Document

The principal purpose of this document is to describe the level and breadth of management commitment required to install and maintain a Web-based GIS Portal Toolkit (GPT) portal for the discovery and exchange of geospatial information.

While the document identifies the management considerations and dedication of resources essential to the successful installation and ongoing operation of a geospatial information portal developed with ESRI's GIS Portal Toolkit software in particular, findings are also applicable at a generic level to the installation and ongoing operation of *any* geospatial information portal.

What Is a GPT Portal?

A *portal* is a Web-accessible catalog that enables the posting, discovery, and exchange of information resources. A *geospatial information portal* is a portal that specializes in the posting, discovery, and exchange of map-based geographic information and is commonly installed as an element of a more comprehensive spatial data infrastructure (SDI). A *GPT portal* is a geospatial information portal that is implemented using ESRI's GPT software.¹

Applicability of This White Paper

A GPT portal can be implemented to support the discovery and exchange of geospatial information at a working-group level within an organization, at the organization level, across a designated community of organizations and other stakeholders, or as an element of a broad-based spatial data infrastructure that connects users throughout the world.

Though this document focuses on management issues related to the establishment of a GPT portal at the organization level, the management issues that are described, including resource allocation requirements, are also applicable and scalable to any level of geospatial information portal operation.

Overview of Contents

Management issues recommended for consideration and action prior to installation of a GPT portal are described at the outset of this document. That is followed by descriptions of installation, prelaunch, and operation-phase requirements and tasks. A summary review of principal prerequisites for geospatial information portal success concludes the document.

¹ An overview of ESRI's GIS Portal Toolkit—including a description of what it is, the functionality it provides, how it is structured, and its underlying requirements—is provided in the ESRI white paper entitled *ESRI Geospatial Portal Technology* (available for download at esri.com).

Creating a GPT Portal— Considerations for Management

Executive Charter or Sponsorship

A GPT portal needs clear executive sponsorship.

Operation of a GPT portal by any organization—large or small—can have a profound impact on the way geographic information is produced, managed, used, and shared by that organization. Likewise, maintenance of an operational GPT portal can have an impact on the structure and allocation of an organization's technical and personnel resources. For these reasons, it is advisable that a decision to move forward with implementation of a GPT portal be informed at the outset by a clear statement of objectives and a clear understanding of the organizational implications of doing so.

The process of establishing a charter or other formal expression of management intent will provide the opportunity for management's full consideration of the business case for GPT portal implementation, including objectives, resource requirements, and benefits specific to the organization, prior to making the commitment to install. The formal expression of management intent that results from such a process will itself be essential to the successful establishment and stakeholder participation in a GPT portal within an organization.

Whether the communication of executive support is issued in the form of a legal charter, policy statement, or directive or by other means, formally stated backing from management will motivate the acceptance and support that is essential to the successful deployment of an organization's GPT portal once the decision to proceed has been made.

Base of Operations

A GPT portal needs a clearly designated base of operations within the sponsoring organization.

Such a designation requires reinforcement by management-mandated allocation of staff, facilities, and funds to ensure ongoing utility and vitality. Experience shows that where no management mandate exists for establishing a GPT portal at a particular point of installation within an organization, political issues and insufficient organizational resources can lead to limited success.

Most often, the base of operations for a successful GPT portal within an organization will rest with the IT department or the agency responsible for geographic information system (GIS) technology.

Funding

A GPT portal needs sufficient funding to realize its potential value.

The creation and healthy growth of a geospatial information portal requires more than a onetime software purchase.² The principal costs are related to allocation of the organizational support structures, technologies, and staff time that are necessary to

² In the case of a GPT portal, the GPT software is actually provided at no cost to graduates of a standard, minimal-cost, three-day GPT installation training course.

support a geospatial information portal over time. While a GPT portal will likely realize cost benefits for an organization by increasing the efficiency of GIS data distribution, reducing redundant data creation, and standardizing the quality of geospatial data used in daily operations, it will also involve ongoing line-item management costs.

Principal cost items will include the following:

- Establishment and maintenance of organizational arrangements and internal workflows that may be necessary to host and support GPT portal operations
- Hardware and underlying software
- Staff time for GPT portal installation including programming for any organization-specific customizations
- Staff time to undertake GPT portal content management
- Staff time to undertake GPT portal operations management
- Staff time to prepare and maintain participating data services and associated metadata
- Technical training on GPT portal management and use

Though costs will vary depending on the specific role of the GPT portal and its intended scale of operation, each installation will nevertheless require some level of funding related to the cost items listed.

- *Initial Funding*—Organizational arrangements and workflow engineering, hardware, and underlying software (assuming the intended number of users, frequency of use, and size of the metadata database are correctly anticipated at the outset) will all require a onetime capital expenditure. Likewise, technical installation, management training, and inaugural user training will require a onetime expenditure with minimal subsequent training costs as management personnel change (new users will be assisted by online help and intuitive interfaces).
- *Ongoing Funding*—Staff time will be the principal ongoing cost and will change (increase or decrease) depending on how the scale of operations develops.

The most significant factors for anticipating and scaling staff costs are (1) the number of metadata records (citations to geospatial information services and other items) that are published on the portal and the frequency of new metadata submittals, (2) the number of users and frequency of use, and (3) the extent of user-based functionality that is maintained (collaborative tools, special interest group functionality, user security functionality, user tracking tools, etc.).

In general, experience shows that a small internal GPT portal that services a known, static number of users and a known, relatively static number of metadata records—after establishment of its inaugural user base and metadata base—will require minimal content

management, possibly done part-time by a single staff member. A GPT portal for a globally accessible spatial data infrastructure with tens of thousands of metadata records and thousands of users can require full-time management by a dedicated group of 5 or 10 professionals.

User Outreach ***A GPT portal needs a prelaunch user outreach plan.***

The existence of a geospatial information portal within an organization—or within a broader interorganizational user base—can significantly impact the way business is done.

Data production and use workflows may change when the GPT portal mechanism for data discovery and exchange is made available, and data creation responsibility itself can be more narrowly assigned because datasets will be discoverable even if they are produced only by a single source (redundant data creation undertaken by each user in the absence of such discoverability will no longer be necessary).

A user outreach plan designed to introduce the value and utility of a GPT portal prior to launch will encourage acceptance and positive anticipation of the change the GPT portal will engender. Communication of management intentions for the specific use of the GPT portal to enhance productivity in the existing workflow context will also advance acceptance. Those same workflow-based intentions can also provide a baseline for tracking usage and measuring success.

Though the ultimate impact of a GPT portal will likely be beneficial and exciting for its stakeholder community, the idea of changing workflows and routines can often be initially challenging. For this reason, commencement of a formal outreach effort to promote acceptance and adoption of the GPT portal prior to installation is recommended.

Required Technology Environment ***A GPT portal needs supporting hardware and software in its underlying operational environment.***

The specification of hardware requirements for support of a GPT portal will necessarily be tied to the existing architecture of the hosting organization and the intended level of use. In general, however, common practice for running all GPT portal software components is to use a minimum of two dedicated servers with Internet connectivity along with at least one desktop computer with Internet connectivity. In addition, provision of database servers within the hosting organization will be required to serve data maintained by the organization itself. Networking hardware and capacities will be dependent on the intended scale of operations for the GPT portal and on the size and location of the stakeholder community. In terms of basic underlying software, GPT requires an operating system (e.g., Windows[®] or Linux[®] based). In addition, a database management system (Oracle[®], SQL Server[®], DB2[®], or PostgreSQL); ESRI's ArcSDE[®]/ArcIMS[®]/ArcGIS[®] Desktop software or ArcGIS Server; and Java[™] Web Server, a servlet engine, a directory server, and a number of third-party Java packages are required, the choice of which depends on GPT version.³

³ GPT version-specific software requirements are specified at esri.com.

Organizations contemplating implementation of a GPT portal often already have licenses for much of the needed underlying software. Nevertheless, a review of an organization's existing software and architecture, together with a review of the specific software required to support a GPT portal, is recommended to determine the level of effort and expense that will be involved in preparing for implementation of a GPT portal.

Required Data Environment

A GPT portal needs data.

To serve its purpose, a GPT portal needs accessible GIS data services and high-quality, complete metadata that describes those services. Data services and other GIS data items must be maintained as described by the associated metadata.

This means that data and data services must be cataloged systematically according to a metadata standard and schema designated by the GPT portal host organization. This data cataloging and maintenance work is ongoing, and the associated costs reflect the amount and type of data that is published using the GPT portal. Since a GPT portal is really about data, this data inventorying and maintenance element of GPT portal support is the single most important investment required. If the metadata describing data is faulty, and if the data described is out-of-date, wrong, or only available sporadically, a perfectly functioning GPT portal will be of little use.

Though data can be maintained and associated metadata can be created and published on a GPT portal by entities other than the portal's host organization (depending on the designated breadth of stakeholders), the host organization will be responsible for reviewing metadata prior to publication to ensure its completeness and conformity to established schemas.

Prior to GPT portal installation, it is recommended that a host organization's management conduct an inventory and review of the data it currently maintains—and that it will require—to understand the level of effort that will be involved in installing and maintaining a viable and useful GPT portal.

Required Staffing

A GPT portal needs staff support.

Significant staff time is required to maintain and use a GPT portal. GPT portal management requirements will vary depending on a hosting organization's intentions and the extent to which the COTS functionality of the GPT portal is engaged. In all cases, however, people will be needed to perform the following roles:

- Chief information officer
- GPT portal operations manager
- GPT portal content administrator
- GPT portal metadata publishers (external and internal)
- GPT portal channel stewards (if channel functionality is engaged)
- End users

These roles need to be formalized in the context of each hosting organization's staffing arrangements and with a view toward the breadth and frequency of GPT portal use. The costs of dedicating time for the GPT portal management and user responsibilities can be

balanced against the efficiencies realized by a fully functioning mechanism for discovery and exchange of geospatial information and the extent to which that can support the central mission and workflows of the organization itself.

Technology Transfer and Training

A GPT portal needs a training program.

A formal training program for GPT portal managers and users is essential to success. Such a program will consist of both installation-phase technology transfer and the ongoing training of general users.

Installation training for GPT portal managers and operations personnel is normally five days. User training is normally one day at the outset, with refresher sessions over time. This basic training program may be supplemented by training in cataloging (metadata creation) or other specialized GPT portal-related activities.

Promotion of acceptance for the GPT portal at the initial stages—including provision of clear direction on how management intends the GPT portal to support the work of stakeholders in the context of their workflows—can be effectively undertaken as part of the formal training program as well.

Summary of Recommended Preinstallation Management Actions

In summary, the following basic management actions are recommended prior to installing a GPT portal in an organization:

- Establish an executive charter or sponsorship.
- Designate a base of operations.
- Authorize funding.
- Plan a prelaunch user outreach strategy.
- Review the required technology environment.
- Review the required data environment.
- Provide required staffing.
- Anticipate technology transfer and training.

Each organization contemplating the installation of a GPT portal will need to tailor its decision-making and preparation activities to its own policies and practices. This list of recommended actions is intended to introduce such organizations to a scope of generic management issues that may inform their decision making and program for GPT portal installation and operation.

Managing GPT Portal Installation

Scope of Required GPT Portal Installation Activities

In addition to activities and actions that may be taken by management prior to installation, as recommended above, the following represents the scope of technical activities required for installation of the basic GPT portal:

- Undertake technical GPT installation training provided by ESRI or an ESRI-authorized agent as a GPT software licensing prerequisite.
- Identify intended breadth and level of use of the GPT portal.

- Designate how the GPT portal and its components will fit into existing architecture, including existing firewall architecture.
- Modify existing architecture/firewall policies that may be required to meet GPT portal use objectives and requirements.
- Install and/or configure hardware and firewall connections per architecture.
- Install and/or configure underlying software as required.
- Locate or create required external data services (basemap, gazetteer/locator service).
- Install GPT software and components per existing GPT installation documentation and authorized ESRI installation training course.
- Undertake prelaunch user outreach program.

An out-of-the-box version of a GPT portal—ready for prelaunch detailing—will result from these activities. Likewise, the core technical staff trained in the context of GPT portal installation will be prepared to undertake the prelaunch detailing.

Staffing Required for GPT Portal Installation Tasks

Generic staff roles that will be engaged in GPT portal installation activities are as follows:

- Chief information officer
- GPT portal operations manager
- GPT portal content administrator

The chief information officer (or other technical lead with overall responsibility for the GPT portal) will identify the breadth and location of the stakeholder community, determine the projected level of use, and specify system networking and load requirements accordingly. The chief information officer will also refine the existing systems architecture, adjust associated policies necessary to enable the GPT portal and its components to fit, arrange for technical staff installation training by ESRI or an authorized ESRI agent as required for GPT licensing, and undertake prelaunch user outreach activities.

The GPT portal operations manager (or other technical manager with authority to configure organization systems) will install and/or configure hardware and firewall connections according to the architecture provided by the chief information officer, install new underlying software as indicated by the architecture, undertake GPT portal installation training provided by ESRI as a GPT portal software licensing prerequisite, and install the GPT software accordingly.

The GPT portal content administrator will undertake GPT portal installation training provided by ESRI as a GPT portal software licensing prerequisite, identify basic external data services required to support GPT portal functionality, and arrange for portal availability.

Options for GPT Portal Installation

Under the direction of the chief information officer, GPT portal operations manager, and GPT portal content administrator, ESRI or ESRI-authorized agents can be contracted to assist with all GPT portal installation activities as an elaboration of the basic installation training activities required for licensing.

Managing Prelaunch Detailing

Scope of GPT Portal Prelaunch Detailing

Once the GPT portal base is installed and the organization's technical staff is trained, additional steps will be required as follows to prepare for launch:

- Delete portal installation test data files (test accounts, test metadata, test channels, etc.).
- Apply custom interface graphics (organization banner, colors, etc.).
- Apply custom interface content (help text, disclaimer text, About Us text, etc.).
- Configure portal to basic services (basemap, gazetteer/locator, etc.).
- Engage inaugural content creation/management team (channel stewards, key content contributors).
- Create and load inaugural metadata.
- Create inaugural user accounts (administrator, channel stewards, key content contributors, and users).
- Create inaugural special interest channels.
- Create inaugural special interest user groups.
- Conduct prelaunch testing.
- Designate how the GPT portal will support existing workflows.
- Design user training and outreach programs.
- Conduct inaugural user training.

At the conclusion of these activities, the portal will be ready for inauguration and the organization will be ready to initiate its GPT portal outreach and operations programs.

Staffing Required for Prelaunch Detailing Tasks

Generic staff roles involved in GPT portal prelaunch detailing activities are as follows:

- Chief information officer
- GPT portal content administrator
- GPT portal metadata publishers

- GPT portal channel stewards
- GPT portal end users

The chief information officer (or other technical lead with overall responsibility for the GPT portal) will provide banner graphics or other organization graphics, designate how the GPT portal will support existing workflows, and design user training and outreach programs.

The GPT portal content administrator will delete portal installation test data files, apply custom interface graphics, apply custom interface content, and configure the portal to basic services. This person will also nominate and engage an inaugural content creation/management team consisting of stewards for special interest channels and key publishers who will perform inaugural tasks: load metadata, create user accounts, create special interest channels, create special interest user groups, conduct prelaunch testing, and coordinate user training.

The inaugural GPT portal metadata publishers (internal to the hosting organization or external to the organization as engaged by the GPT portal content administrator) will create and load inaugural metadata and synchronize and verify links between metadata and associated data services.

The inaugural GPT portal channel stewards will populate special interest channels with relevant metadata under the direction of the GPT portal content administrator and attend inaugural user training.

Key end users will attend the inaugural user training.

Options for GPT Portal Prelaunch Detailing

Under the direction of the chief information officer or GPT portal content administrator, ESRI or ESRI-authorized agents can be contracted to assist with all GPT portal installation activities as an elaboration of the basic installation training activities required for licensing.

Managing GPT Portal Operations

Scope of GPT Portal Operations

The following activities will be ongoing and require a continuing allocation of sufficient authority, funding, and other organizational resources required to maintain and grow the GPT portal:

- Maintain GPT portal hardware/software environment.
- Maintain GPT portal database environment.
- Review and perform QA/QC on all newly submitted metadata and metadata links.
- Update metadata records as associated data services change.
- Review and perform QA/QC on all newly modified metadata records.
- Manage GPT portal administrators and stewards.
- Update channels.
- Consolidate use statistics.
- Apply for and maintain funding.
- Conduct outreach and user training.

Staffing Required for GPT Portal Operations Tasks

Generic staff roles involved in GPT portal operations activities include the following:

- Chief information officer
- GPT portal content administrator
- GPT portal operations manager
- GPT portal metadata publishers
- GPT portal channel stewards
- GPT portal end users

The chief information officer will apply for and maintain funding and staff time for the ongoing GPT portal operations and manage the GPT portal activities of the GPT portal content administrator.

The GPT portal content administrator will submit funding and staff requests, manage the GPT portal activities of the GPT portal channel stewards, review and perform QA/QC on new metadata and metadata links as submitted as well as all newly modified metadata records, consolidate and publish GPT portal use statistics, and conduct outreach and user training.

The GPT portal operations manager will maintain the underlying GPT portal hardware/software environment and the GPT portal database environment.

The GPT portal metadata publishers (internal at cost to the host organization and external with no cost to the host organization) will submit updates to the metadata catalog consisting of new metadata to reflect new data services and metadata modification to reflect changed data services.

The GPT portal channel stewards will update special interest channels as channel users change and new metadata is published.

The end users will engage the GPT portal to discover and download or otherwise access data in the course of their jobs.

Options for GPT Portal Operations

Ongoing operations are the responsibility of the host organization unless hosting is outsourced. In the event hosting is outsourced, the GPT portal would still require that the GPT portal content administrator, GPT portal metadata publishers, GPT portal channel stewards, and end users participate as described above.

Conclusions for Management

To be successful for a hosting organization, a GPT portal requires clear executive sponsorship. Both the dedication of resources required at the outset for GPT portal installation and the dedication of resources required for the ongoing vitality and growth of the GPT portal will be highly dependent on such sponsorship. Likewise, the ready adoption and use of the GPT portal by staff members to support their daily workflows and realize associated efficiencies will be greatly encouraged if management backing is understood.

To provide clear executive sponsorship, the host organization's management must first be convinced of the value of hosting a GPT portal by reviewing the breadth of requirements and outcomes that it can expect. This document provides a checklist of issues that have a

bearing on the adoption and maintenance of a GPT portal by an organization and is intended to provide a starting point for management.

**For More
Information**

For additional information on the ESRI® GIS Portal Toolkit and associated installation and hosting requirements, please contact

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E-mail: portal@esri.com

Or, go to the ESRI Web site at www.esri.com/gisportal.