Please answer the following three questions--limiting your responses to no more than 500 words per question.

DESCRIPTION OF ACCOMPLISHMENTS

A. Briefly describe:

- **The nature of the challenge the agency needed to address.**
- **The IT solution and key steps the agency IT team (and key stakeholders) took to address the challenge.**

Geospatial data plays a vital role in enabling the Agency to carry out its mission of protecting human health and the environment. Because of geospatial data's prominent role in Agency decision-making, it is critical that it is properly documented with metadata and maintained so that it may be shared as an enterprise resource. Attempting to do this at the Agency over the past 5 years has been a challenge, seemingly due to two main problems. First, there was not a single access point to EPA's geospatial resources, which meant that Agency staff members could not obtain a comprehensive view of EPA's geospatial assets. Second, a number of EPA's geospatial data and resources were not being properly documented or managed. This meant the Agency was not meeting federal and Agency metadata standards and metadata publishing and management requirements. A few underlying issues for this were identified.

Because the Agency is made up of more than two dozen subordinate organizations, enterprise metadata management has been relatively fragmented over the years. Past attempts at setting up a central geospatial metadata catalog were not very efficient or user friendly because they were not standards-based or integrated with the Agency's GIS software- ArcCatalog. In addition, the distributed repositories of all the subordinate organizations were not synchronized with the central repository and standard procedures and policies were not in place for overseeing Agency-wide contributions. This caused users to enter and update entries manually and left the process for doing those updates wide open. If users did submit entries, there was no mechanism for them to manage their submissions at the central catalog so that once entries were submitted it was up to the central catalog steward to maintain them, which led to entries quickly being out of date. It also put the decision of which entries were submitted to the federal-wide geospatial metadata catalog, Geospatial One-Stop (GOS), in the hands of the central catalog steward instead of the data owner. One final issue was that many data owners found the creation of metadata complicated and time consuming. Thus, metadata creation was often left as a last priority or the responsibility for creation was deferred to the central steward. Agency personnel were using a variety of COTS and/or custom-developed geospatial metadata editing tools to help them create metadata. However, none of these met all the requirements for developing EPA specific geospatial metadata.

In order to tackle all of these challenges and meet all user, Agency and federal requirements, EPA's Office of Environmental Information (OEI) has architected a comprehensive geospatial metadata sharing and management framework using an approach that includes equal emphasis on policies and procedures, technology, and user outreach. The GeoData Gateway (GDG) and the EPA Metadata Editor (EME) are the two key pieces of technology used in this framework. Their implementation has ensured users are able to easily comply with the policies and procedures.

B. TECHNOLOGY USED

Briefly detail the technologies (hardware, software and services) used to address the challenge and the rationale for selecting them.

A central component of the framework is the GDG. The GDG utilized ESRI's GIS Portal Toolkit software. The GDG is a web portal that provides EPA staff with a central location for discovering, accessing and managing the Agency's geospatial resources. Hundreds of Agency geospatial resources can be found at the GDG through a simple search interface.

Finding and Accessing Geospatial Assets
The GDG has a number of interfaces that provide the ability for a user to discover and access information. Simple or advanced searches can be performed to allow users to quickly find information. Advanced search allows a user to search by data category, time period, data type, and geographic extent. The application will search through information contributed to the central catalog and then display the search results. From the results page, the user can view a map of the data, get more details or go to a Web site related to the results. Once users have found resources at the GDG, they can access them via web-based or desktop tools. Users can also use the Data Delivery Extension (DDE) that allows them to download services to their local machine in a variety of different formats. Advanced GIS Analysts can access the GDG Metadata Service using ArcCatalog to see all the records posted in the GDG organized by collection.

User Administration
A key benefit of the GDG is that it allows users to manage the information they have contributed to the central catalog. This puts ownership of central records back in the hands of the authors, improving relevancy and currency. Users can publish metadata to the central catalog manually or have it automatically harvested. Harvesting is an automated exchange and synchronization of geospatial metadata across repositories. Users can then manage all the entries assigned to their account through the GDG or ArcCatalog, allowing them to create, edit, and delete entries and determine which records to share with GOS.

Central Catalog
The central catalog is accessible through standard interfaces. This allows information to be shared not only through web-based interfaces but also through other standard catalog retrieval mechanisms. The centralized catalog is built on the same framework as GOS, which provides an easy mechanism for integration by allowing harvesting from the central repository. This in turn helps the Agency more easily comply with its eGovernment Initiative metadata-sharing requirement.

Metadata Creation

In order to simplify and improve metadata production, the EME was developed. The EME is an ArcCatalog extension that allows users to efficiently edit geospatial metadata records that meet EPA and FGDC requirements. It simplifies editing by allowing users to access drop-downs and default buttons to populate fields. Defaults are derived from a Microsoft Access database, making them flexible and easily modifiable. Required elements are easily identifiable and definitions are quickly accessed. An EPA validation web service allows users to validate records against EPA and FGDC requirements. The EME has greatly reduced the time required to produce metadata records and had dramatically improved the quality of information contributed to the GDG.

C. IMPACT

Briefly describe the significance of the accomplishment to the agency, its employees, its constituents or the public. What specific benefits, cost-savings, improvements in service resulted from the project? How does it position the agency to be more agile, more cost effective in the future?

EPA's Metadata Framework is now comprised of a complete set of resources that deliver an enterprise solution for geospatial information sharing that meets internal and external needs. EPA personnel have a single access point to EPA's geospatial resources from various EPA Program and Regional Offices, and have a simplified editing tool to assist in metadata production. Standard practices for metadata management and sharing are being implemented Agency-wide. This helps the Agency discover, leverage, and share its geospatial resources. Additionally, the Metadata Framework helps the Agency meet legislative and regulatory mandates and Agency requirements for geospatial metadata compliance, sharing, and management. Finally, the EPA's GDG and EME have become recognized as a federal model for deploying a comprehensive metadata management solution. Federal, State, and local agencies have met with the GDG Team to inform their own approach to metadata management. The EME has been downloaded by over 1,400 users and deployed by states and other public communities highlighting its success.

Offices who contribute to the GDG receive the following benefits:

- Meet Federal/Interagency Requirements- Ensures offices/regions are contributing to GOS for relevant geospatial assets and automatic harvesting of the central catalog.
- Reuse of Geospatial Assets- Highlights/markets office/region data, maps, applications, or other geospatial resources.
- Metadata Assistance- Geospatial metadata can be created more quickly and accurately by using the EME. It is also estimated that the Agency will save approximately $200,000 a year due to reduced staff time needed for metadata management once the EME is fully integrated across offices.

Offices who use the GDG to access data receive the following benefits:

- Increased availability and access to data across the Agency- Provides improved analyses, better/newer data, increased efficiency, and one-stop shopping. Additionally, there are multiple methods for accessing, retrieving, and viewing critical data sets.