**Components of the GeoNIS**

**GeoNIS**

The LTER NIS (Network Information System) PASTA framework is intended to be a repository for all network datasets, harvested via EML, and stored on centralized servers. The PASTA framework is tabular centric. . The GeoNIS, a module to the NIS, is intended to specifically address geospatial data. Using a similar framework to PASTA, the GeoNIS will properly store data, as well as offer a series of value added products that can assist in their use.

**Best Practices**

The collection of best practices will enumerate agreed-upon methods, policies, and procedures for the ingestion, processing and access to geospatial data. Best Practices are:

* EML Best Practices for Geospatial Data
* Data Packaging
* Attribute Definitions
* Metadata Entry
* Symbology
* Coordinate Systems / Projections
* Data Structures / Spatial Database Engine (SDE) databases
* Web Services
* Geoprocessing
* Data Submission to GeoNIS
* Workflows

**EML and Other Metadata in GeoNIS**

Structured and standardized metadata is critical to the operation of GeoNIS Encoding information using the Ecological Metadata Language (EML – the standard adopted by LTER) facilitates data discovery and supports data integration and synthesis.

GeoNIS uses EML and other GIS native metadata formats such as the geographic-data-oriented XML specification by the International Standard Organization (ISO-19139) and XML implementation for the Content Standard for Digital Geospatial Metadata (a Federal Geographic Data Committee 1998 product), or the evolving industry standards such as the ESRI profile of the FGDC metadata standard.

GIS native metadata formats will be the default, since the GeoNIS system operates with native formats. EML is generated through the aid of the latest version of the *ESRI2EML* stylesheet hosted at <http://im.lternet.edu/project/Esri2EML>. Manual intervention may be needed to handle site-specific details.

GeoNIS-derived data products of interest will require EML generation for discovery through the PASTA data portal. For other synthetic products produced using the GeoNIS services, the metadata default would be the native formats mentioned above.

**Data Portal**  
The GeoNIS data portal provides for discovery of and access to the GeoNIS geodatabase. The data portal provides access to geospatial data using a variety of interfaces: thematically grouped links, graphical mapping interface, and a textual search interface.

**Ingestion Workflows**  
Ingestion workflows consist of operations that extract, transform, and load spatial data from a variety of file formats into the GeoNIS geodatabase.  They will likely be written in Python so that both ArcGIS and operating system tools can be employed and used to automate the ingestion of site data into the GeoNIS.

**Temporary Data Storage**  
A set of local file folders on the GeoNIS server will be used for the temporary storage of spatial data files while they are being operated on by   
workflows.

**Map/Image Services**

These web services will be populated with GeoNIS data and act as the backend for applications that will be used to serve spatial data for all LTER sites. From these services, data can be easily explored and visualized in mapping applications. The backend for these services will be built on ArcGIS Server using the GeoNIS geodatabase. The advantages of sharing data resources on ArcGIS Server are: the data are centrally managed, multiple users are supported, and clients are provided with the most up-to-date information.

**Geodatabase**

ArcSDE geodatabases allow use of other ESRI products, such as ArcGIS Desktop, ArcGIS Server, as well as custom applications, to store, use, and manage all GIS data in a database management systems (DBMS). Additionally, they allow storage of data in a central database and support the concurrent multiuser editing necessary for most GIS data management workflows.

The GeoNIS geodatabase will contain geospatial data and associated metadata from LTER sites as well as synthesized data products.

**Value-Added Products**

One of the rationales for integrating GIS data across sites is the ability to create new products and services, and support cross-site science. For example, locations where data collection took place can be coupled with information from external services (such as the Geographic Names Information System) to create a gazetteer that would be used to assign spatial keywords to LTER datasets. Similarly, maps specialized to serve specific purposes can be assembled using LTER and non-LTER GIS resources via web mapping services.

**Linkages to other projects/NIS modules**

GeoNIS data will be linked with data tables from other NIS modules and project sources such as ClimDB, HydroDB, sensor data, etc.

**SiteDB as a Component**

SiteDB contains location data for study sites within the network and could be compiled in the GeoNIS following best practices.

**Geoprocessing Workflows**

Geoprocessing workflows will provide tools for manipulating geospatial data. This includes automating tasks, performing spatial analysis, and modeling. One example of a geoprocessing workflow is a python script for calculating the area of polygons in a layer.

