

# Effect of Losing LNO Services on Site Operations

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## Introduction

Site information managers have long recognized that it is beneficial to their own site operations to leverage each others work. Recently, they have been encouraged to be less autonomous, with supplement funds awarded specifically to formalize local code projects capable of serving a larger group. As part of this process, the UNM-LNO emerged as the de facto 'hub', and the most appropriate place to store and distribute common tools. As a result, there are a number of services that the LNO supplies, and which various LTER sites now rely on for their day to day operations. Recent indications that some services may be lost or receive limited support during the LNO transition period triggered an exercise by IMExec to assess the impact of any potential loss of service.

This report is a summary of technical UNM-LNO services used by sites in their day-to-day operations. There are other site-LNO interactions that it specifically does not address: a) contributions from sites to LNO-maintained databases, b) other types of services provided by the LNO to other communities (e.g., educational material or websites for LTER Schoolyard), or c) the specific requirements for maintenance of any service. However, incomplete notations on some of those interactions may be available.

## Methods

IMExec assembled a list of services and individually interviewed each primary information manager about usage at his/her site. Caveat: in some cases, the primary information manager may not know about all usage of a service at his/her site (e.g., software licenses, internet chat, or database queries). Consequently, numbers reported here should be considered minimums. But generally, site information managers are involved in system and website administration, are responsible for data package generation and other Network contributions, and are often the point of contact for site-LNO interactions.

## Results

A total of 23 services were tallied, aggregated into types, and LTER sites interviewed during February and March 2015. For simplicity, further discussion will be for services aggregated into types. Generally, if a site uses one service of a type, it uses others of that same type. The UNM-LNO has provided an anticipated timeline for their operation for the next year, and the plans for each service, which can be covered by three classes:

- A. Included in transition proposal, and changeover to replacement planned (be it either communications office or data center)
- B. Included in transition proposal, but disposition after May 2016 is uncertain
- C. Not included in transition proposal, service ending by July 2015

Table 1 describes services grouped by type, and how that service is treated in UNM LNO transition proposal.

Table 1. Types of information management-related services provided by the UNM LNO and used by LTER sites for their local operations, with code for handling during transition.

<b>Type</b>	<b>Service</b>	<b>Transition</b>
Software licenses	ArcInfo, ERDAS, ENVI	C
Computing infrastructure	server hardware, VM hosting, file system backup	C
Communication	Email lists, personnel directory, internet chat	A
Data catalogs (EML based)	Metacat, PASTA, Data Access Server	A - PASTA, C - others
Databases and web services	GeoNIS, climDB, siteDB, biblioDB, unitDB, vocabDB	B
Domain name management	name registration, redirects, SSL Certificates	A
Other	Subversion (code) repository, document repository, Network website links for local website	A

Some services are general and integral to smooth operation (e.g., file system backup), and some affect specific activities, such as the consumption of web services during data package generation. Some services require comparatively little effort, and so may not appear in a budget or work plan, but their loss would cause upheaval for an entire site or even the network (e.g., VM hosting, DNS administration). Table 2 shows a summary of services by type, and the effect on site operations of losing that type, the number of sites affected, Raw data (matrix) and readme (original instructions) are available in the accompanying file (PDF).

Table 2. Service type (from Table 1) with scope, effect and total number of sites affected by loss of one or more of the services in that type (25 sites reporting).

Service type	Affects	How loss will be felt	# Sites
Software licenses	Site scientists	procure new license	2
Computing infrastructure	An entire site	loss of data integrity &/or web presence	4
Communication	An entire site	procure new email list/chat server	9
Data catalogs (EML based)	Site info mgrs	determine alternate source, recode	12
Databases and web services	Site info mgrs	determine alternate source, recode	20
Domain name management	Entire network	loss of web presence &/or redirects	25
Other	Entire network, site info mgrs	loss of network identity, "broken links" on local websites, decentralized code, documents	25

## Discussion

Computing infrastructure: LNO maintains a server room for its own computing hardware that is shared by the two co-located LTER sites, SEV and MCM. LNO also provides off-site backup of data for several sites' file servers via remote synchronization (GCE, LUQ, MCM, NTL), and "virtual machines" for various purposes (HBR, LUQ, SEV). Sites not using LNO services have them provided by their host institutions or the site itself.

Software licenses: LNO maintains three software license servers: ARCInfo, ERDAS, ENVI. These licenses are used at two sites (SEV, BES).

Communication: All email lists (i.e. "*listname-at-lternet.edu*") rely on the main personnel directory. In addition to network-wide email lists, the LNO maintains email lists for nine sites (CAP, CWT, HBR, JRN, LUQ, MCM, MCR, SBC, SEV). An internet chat server is used primarily for short communication among site information managers and LNO developers.

Data catalogs (EML-based): Through approx. April 2015, there are two EML-based data catalogs as we transition from the older Metacat system to the PASTA-based catalog. All sites are required to contribute to these catalogs. Additionally some sites historically use LNO's EML storage to serve content for their local catalogs (SBC, MCR, VCR, MCM). As of this writing, those sites have probably accomplished their migrations away from Metacat. The

PASTA system provides web services of various types that 11 sites consume for local use (mode is DOI retrieval for data citation, see raw data). It should be noted that PASTA also serves as the LTER DataONE member node, an indirect service to all sites and the Network which exposes LTER data to a broad audience.

Other databases (with web services): There are six non-XML databases: GeoNIS, climDB, siteDB, biblioDB, unitDB, vocabDB. Two of these in particular (unitDB and vocabDB) are widely used by site information managers during their data package construction, either by consuming web services or as a knowledge base (20 sites, see raw data). One site uses the Network biblioDB as a content-source for its site bibliography (VCR), three rely heavily on climDB (PIE,KNZ, BES) and one on GeoNIS (CAP).

Domain name management: the UNM LNO manages all IP addresses in the "lternet.edu" domain. All sites either use that domain for the hostname of their local websites, or request that their primary web host be redirected from it. Three sites (SBC, MCR, MCM) also use the Network's SSL certificate for local logins to private websites and/or data areas.

Other (persistent network URLs, websites, repositories): All sites' websites contain links to a suite of Network URLs that are maintained by the UNM LNO. These vary widely: from database interfaces, community web sites, other LTER sites, ASM material, plus imagery, Schoolyard and other educational material.

## **Conclusion**

This report highlights the potential loss of service resulting from the reduced support that is likely with the UNM-LNO transitional budget approved by the National Science Foundation LTER program. IMExec, which represents site information managers, undertook the exercise of compiling this information to ensure that the risk of service degradation is properly communicated and understood by the wider LTER community. While not every service listed is guaranteed to fail, some of these services will be lost and the information managers within the network will bear the brunt of the effort required to replace or provide alternative solutions. Consequently, this group will be most heavily affected during the LNO transition. IMExec provides this information for planning purposes, and to help ensure that local sites operate as smoothly as possible during a transition.