



## Developing an LTER Information System for the 21st Century: Report to the LTER Coordinating Committee - 10/21/95

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### Why an LTER-wide information system?

#### Problems with existing systems

- **Unwieldy queries:** To find out what data is available on LTER site information servers, you need to make individual connections to each of the site servers.
- **Difficult to analyze and synthesize data from different sites:** site servers return data in different formats.

*The Dream: While sitting by pool in Tahiti, we casually query the LTER information server asking: "why is there biodiversity in this world?". In a few seconds, the system queries all site servers, answers the question exhaustively and automatically submits a paper to Nature, which is immediately accepted..... then we woke up..... — Rudolf Nottrott et al. 1995 LTER DM Workshop*

#### Previous Developments

- 1990 Connectivity Team assesses state of Internet connectivity within the LTER Network and makes recommendations.
- 1990 All sites establish full Internet connectivity at main administrative locations and begin working to improve connectivity at field sites.
- 1990 Data managers compile the LTER Core Dataset Catalog, distributed in hardcopy.
- 1991 Electronic personnel directory and LTER-wide email groups established
- 1991 Email distribution of the Data Catalog on LTERnet.
- 1992 Gopher information servers at LTERnet and the sites begin to simplify data and information exchange.
- 1993 World Wide Web servers at LTERnet and several sites further improve user access to LTER data and information. Several sites install SQL database servers (Ingres and Oracle) accessible over the Internet.
- 1993 All-Site Bibliography implemented and accessible on LTERnet.
- 1994 CC mandate to make at least one major dataset available online at every LTER site
- 1994 DM commitment to building a system that facilitates cross-site data exchange for intersite research

#### Mission of the LTER Network Office

The LTER Network Office will foster expansion of the existing LTER-wide Information System. This will include substantive participation in the development of advanced query and information systems which integrate data from the individual site information systems. To further this end, it will support planning activities, aid in coordination of site activities, promote standards development, and provide access to software, storage and network resources.

#### Core activities

- LTERNET Information Server with links to site and international servers
- Personnel Directory
- Cross-site Bibliography
- Satellite Imagery Archive
- Electronic Connectivity
- Core Dataset Catalog
- Query and retrieval systems

#### Development of LTER-wide Information Server

- Design activities
  - workshops
  - assessment
  - testing
  - prototyping
- Implementation
  - core activities
  - cross-site dataset catalog (metadata model)

- special purpose datasets (used to test data model)
- **Training**
  - workshops
  - collaboratories
  - video conferencing capabilities

#### **Possible Resources Coming from the Network Office**

- Funds for workshops
- Funds for hardware
- Funds for "hired guns"

#### **System Characteristics (Preliminary)**

- **Functionality**
  - Search for data available anywhere in the LTER network
  - Combining and analyzing data from different sites
  - Capability to answer "standard" information requests (those requests that occur >80% of the time)
  - Capability to economically build query systems for specific projects and special information requests
  - Automatic retrieval of data and documentation
  - Query, analysis and display tools that are intuitive to researchers (user-friendly)

- **Technical**
  - Integrate site information systems, not replace them
  - Use advanced network tools
  - Generic: not tied to any specific computer platform

The envisioned system will be a distributed system that naturally includes present functions such as the Catalog and the All-Site Bibliography. Use of advanced network tools will ensure that the system is useful into the coming decade. For example, network client/server technology is well suited to this application and can be implemented independent of the specific computer platform. Some defacto standards that can help ensure hardware and software independent functionality have emerged in this area and would be considered in our design (e.g. ODBC).

- **Critical Players in system development**
  - LTER Coordinating Committee
  - Sites
  - Network Office Staff
  - Data/Information Management Committee
  - Collaborators (e.g., SDSC)