InterPARES 2 Project
International Research on Permanent Authentic Records in Electronic Systems

Diplomatic Analysis

Case Study 14:
Archaeological Records in a Geographical Information System: Research in the American Southwest

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INTRODUCTION

The following report is a diplomatic analysis of case study 14, *Archaeological Records in a Geographic Information System: Research in the American Southwest*. The focus of the case study encompasses the Coalescent Communities database and Geographic Information System (GIS) created by the Centre for Desert Archaeology (CDA). The primary focus of the CDA is information management through upgrading the quality of the legacy data (i.e. various maps, site data, and duplicate information). This contributes to the overall goal of the CDA, which is to improve the management and understanding of the country's archaeological heritage.

The following text presents the results of the diplomatic analysis on the digital entity identified in the case study Final Report. Since the creator considers the various versions of the CC Database to be records,[1] this analysis will focus on the CC Database as a whole, rather than on records that may be created as part of the process of querying the database.

The purpose of the diplomatic analysis is to assess the status of the identified digital entity as a record. Once the status of the digital entity has been determined, preservation strategies may be proposed by Domain 3.

IDENTIFICATION OF RECORD(S)

A record, as defined by the InterPARES glossary, is a document made or received and set aside in the course of a practical activity. A record must also possess all of the following five components, as established by InterPARES 1 research conclusions: fixed content and form, embedded action, archival bond, persons and contexts. The application of the definition of a record to the creator's Coalescent Communities database is therefore analyzed accordingly:

[1] See answer to core research question 17 in the Case Study 14 Final Report.

1. To be identified as a record, the digital entity must possess fixed content and form,[2] and be affixed to a stable medium (or physical carrier).

The Coalescent Communities database uses a basic versioning process; once a certain amount of changes have been made or new data added to any instantiation of the database, it is saved and set aside and additions and changes continue in the newer version. In addition, before a new layer is added, a version is fixed and set aside so that each version is preserved. In both cases, the version that has been saved and set aside possesses fixed form and a stable content as no further changes are made to it.

2. A record must also participate in an action, defined as the conscious exercise of will by an officer of the creator or by an external person, aimed to create, maintain, modify or extinguish situations. A record results as an unintended by-product or product of the action.

The GIS system participates in the activity of research, by allowing archaeologists to work with manipulated data to obtain real and hypothetical results to research questions. The GIS supports a number of activities, but also contains data and creates views, so it does not just support the work, it is the work. Decisions are based on the work and within the work itself.

3. A record must possess an archival bond, which is the relationship that links each record to the previous and subsequent record of the same action and, incrementally, to all the records which participate in the same activity. The archival bond is originary (i.e., it comes into existence when a record is made or received and set aside), necessary (i.e., it exists for every record), and determined (i.e., it is characterized by the purpose of the record).

The database is part of the Coalescent Communities Project series within the Center for Desert Archaeology fonds. As such, it possesses an archival bond with all other records in that series. These include the original researcher's datasets, the AZSITE dataset, the BR dataset, government geospatial data, NSF grant records, records documenting analysis and administrative records.

4. Record creation must involve at least three persons, whether or not they explicitly appear in the record itself. These persons are the author, addressee and writer; in the electronic environment, one must also take into account two additional necessary persons: the creator and the originator.

- The record's **author** is the physical or juridical person having the authority and capacity to issue the record or in whose name or by whose command the record has been issued.

  The author of the Coalescent Communities database is the GIS Specialist, an archaeologist whose primary function is "to develop and manage" the GIS.

[2] The InterPARES1 Authenticity Task Force has defined fixed form as the following: 1) binary content of the record, including indicators of documentary form, must be stored in a manner that ensures it remains complete and unaltered, and 2) technology must be maintained and procedures defined and enforced to ensure that the content is presented or rendered with the same documentary form it had when set aside. (See ATF Research Methodology Statement, available at: http://www.interpares.org/documents/interpares_ResearchMethodologyStatement.pdf).

- The **addressee** the physical or juridical person(s) to whom the record is directed or for whom the record is intended.

  The addressees of the Coalescent Communities database are the CDA archaeologists who use it for research purposes.

- The **writer** is the physical or juridical person having the authority and capacity to articulate the content of the record.

  The GIS Specialist is the only person who enters data into the system and manipulates datasets. He is therefore the writer of the database.

- The **creator** is the person in whose fonds the record exists.

  The creator in this case is the Centre for Desert Archaeology (CDA).

- The **originator** is the person to whom the Internet account issuing or the server holding the record belongs.

  Since the database resides on the Coalescent Communities server, the originator is the CDA.

5. Finally, a record must possess an identifiable context, defined as the framework in which the action in which the record participates takes place. The types of context include juridical-administrative, provenancial, procedural, documentary, and technological.

- The **juridical-administrative context** is the legal and organizational system in which the creating body belongs.

  The Final Report for this case study contains an extremely detailed account of the juridical administrative context in which the CDA participates, and should be consulted for further information. For the purposes of this analysis, it is sufficient to note that the actions of archaeologists in the United States are governed and influenced by a complex variety of federal and state legislations, as well as by ethical and professional guidelines and standards, thus ensuring that certain standards and ethical codes are adhered to. Federal legislation includes, but is not limited to: the *National Historic Preservation Act* (NHPA), the *Archaeological Resources Protection Act* (ARPA), and the *Environmental Policy Act*. State legislation includes: the *Arizona Antiquities Act*, the *Arizona Preservation Act of 1982*, and the *Arizona Burial Protection Act*. In addition to legislation and accepted codes of conduct, conditions set by various state and federal granting agencies will affect the juridical context of the records created by CDA.

- The **provenancial context** refers to the creating body, its mandate, structure and functions.

  The Center for Desert Archaeology is a private, not-for-profit organization whose primary mandate is to promote "the stewardship of archaeological and historic resource in the American Southwest and Mexican Northwest through active research, preservation, and

public education." The CDA employs seven Preservation Archaeologists who manage day-to-day operations, and three Preservation Fellows who assist in research. The CDA also employs one full-time archaeologist whose primary function is "to develop and manage a Geographic Information System (GIS)," as part of the Center's goal to improve the management of the archaeological heritage. The specific goal of the GIS project is "to assist Center's staff and partners in integrating our growing archaeological knowledge of the region with recent computer advances in the analysis of attributes such as terrain, hydrology, and land-ownership."

- The **procedural context** comprises the business procedure in the course of which the record is created.

  There are no formal business or documentary procedures associated with the creation[3] or use of the GIS system. The GIS Preservation Specialist determines his own procedures on an ad-hoc basis, and these are not documented except through occasional notes and in cases where he believes an analysis is going to be replicated. Researchers provide the GIS Specialist with their research questions, and he gathers pertinent material from the database. When researchers need broader access to the database itself, the GIS Specialist provides them with a read-only copy. Presumably, the precise procedures involved in responding to a particular research question depend on the scope and nature of the question itself.

  [Editor's note: Analysis of the **procedural phases** was not carried out for this case study.]

- The **documentary context** is defined as the archival fonds to which a record belongs and its internal structure.

  The GIS system is part of the CDA fonds, which is organized primarily around specific projects and grants. The Coalescent Communities Database is part of the Coalescent Communities Project series, which also consists of the original researchers' datasets, the AZSITE dataset, the BR dataset, government geospatial data, NSF grand records, records documenting analysis and administrative records.

- **The technological context** is defined as the characteristics of the technological components of an electronic computing system in which records are created.

  The GIS is a spatially referenced dataset incorporating a database management system with graphic display. It stores, mathematically manipulates and displays spatially referenced data. The GIS model contains four interrelated subsystems:

  1. A data entry subsystem that transfers both analogue and digital data to a storage device (digitizers, scanners, CD ROMs and GPSs)
  2. A data storage and retrieval subsystem (computer plus various storage devices i.e., hard drives, DVD drives and tape drives)
  3. A data manipulation and analysis subsystem (software application[s] to provide data querying, create new data, spatial and statistical analyses)

[3] See the Case Study 14 Activity Model for activities involved in the creation of the CC Database.

4. A data visualization and reporting subsystem (various output devices, including high resolution graphic monitors, plotters and printers)

Further information on raster and vector data formats can be found on p. 9 of the Final Report. More specifically, the GIS system employs administrative technology such as PCs and a central file server. Depending on the circumstances, storage devices include a Local Area Network and CDs.

CONCLUSIONS

According to the above analysis the authoritative record is the GIS itself; on the other hand, more thought needs to be put into the issues surrounding its preservation over time.

From the creator's viewpoint reliability and accuracy relate to the reliability and accuracy of the data, so it is assumed that if the source is reliable the data will be reliable.

Reliability and accuracy are given more attention than authenticity. Archaeologists are sceptical of the concept of authenticity because they view their work as a compilation and as ongoing.

The persons involved in the operations of the GIS have only thought about the concepts of reliability, accuracy and authenticity in terms of the data rather than in terms of the record.