# Domain 3 Research Questions

## Case Study 19:
## Preservation and Authentication of Electronic Engineering and Manufacturing Records

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1. **What types of entities does the diplomatic analysis identify in this case study? (i.e., records, publications, data, etc.)**

   The first two entities listed below are created during an actual production process, while the last three were generated as part of a preservation experiment. The 5 entities are:

   a. The original entities (1) are created by product designers using proprietary Pro-Engineer CAD systems and are provided to colleagues charged with computer-aided manufacturing of high-tolerance, high-assurance objects used in complex assemblies.

   b. Business rules ensure that the proprietary CAD design record (1) is translated into Standard for the Exchange of Product Model Data (STEP) AP203 format (ISO 10303) (2)

   c. From there, the experiment took the logical form of this STEP record (2) and enhanced it into another logical form (3) that supported the delineation of additional geometric relationships and reasoning about part shape using C++ based knowledge representation tools.

   d. These entities (3) were then taken through a proprietary reasoning engine (Logistica) to complete the addition of required attributes and metadata (4).

   e. The Logistica output (4) were converted to WC3 Ontologic Web Language (OWL) XML format (5).

To date, no diplomatic analysis of this case study has been done. However, the first two entities would be candidates for long-term preservation, being the original form in which the record was created and the long-term preservation format selected by the creator.

The third and fourth entities might require long-term preservation since information was added to the record at this point. The entities created in (5), had the experiment been successful, would have replaced (2) as long-term preservation format selected by the creator.

Relationships among the entities is based on the fact that each entity is derived from the preceding one. Also, entities (1) and (2) represents a single part within a larger assembly of multiple parts known as a bill of material structure, which is stored in the creator's proprietary product data management system.

**1a.     If there are no records, should there be records? If not, why not?**

Not applicable.

**1b.     If there should be records, what kinds of records should be created to satisfy the creator's needs (as defined by an archivist)?**

Not applicable.

**1c.     What characteristics of records (as defined by an archivist) are missing yet necessary to preserve these entities?**

No characteristics of records are missing. They offer:
- a fixed documentary form
- a stable content
- an archival bond with other records either inside or outside the system
- an identifiable context

**2.     Are the entities reliable? If not, why not?**

Yes. They were created and stored in a secure environment, and properly documented at the time of creation.

**3.     Are the entities accurate? If not, why not?**

Yes. They are accurate to the degree that current technology can express. This falls short from the creator's requirement.

**4.     To what degree can the entities be presumed to be authentic, and why?**

The entities are authentic in that they are what they purport to be and they have not been tampered with or corrupted. They meet the following Benchmark Requirements for Authenticity:

**Benchmark Requirements Supporting the Production of Authentic Copies of Electronic Records** (these apply to the creator):

1. Capture of identity and integrity metadata
2. Enforcement of access privileges
3. Protection against loss and corruption
4. Protection against media and technology obsolescence
5. Established documentary forms
6. Ability to authenticate records
7. Procedures in place to identify the authoritative record
8. Procedures in place to properly document removal and transfer of records from the creator's originating system

**5.    For what purpose(s) are the entities to be preserved?**

The records support the manufacture of machined piece parts to exact specifications over long periods of time.

**6.    Has the feasibility of preservation been explored?**

Yes. Partial preservation is possible outside a proprietary environment (e.g., the entities produced in step (2), but even they are incomplete without the information recorded in the creator's proprietary product data management system. There is no non-proprietary environment available which is capable of storing the entities produced in steps (3) and (4).

**6a.    If yes, what elements and components need to be preserved?**

All the elements and components described above currently require preservation in their originating, proprietary environment.

**7.    Which preservation strategies might most usefully be applied, and what are their strengths and weaknesses, including costs and degree of technical difficulty?**

The creator is currently using an incomplete version of Preservation Method B1.3. (Normalization) for the "bill of materials" records by converting files to ASCII. Additional metadata about the relationships among the various entities remain in the proprietary product data management system.

**7a.    Which alternative preservation strategies might be applied? What are their strengths and weaknesses, including costs and degree of technical difficulty?**

Should this option disappear due to the disappearance of the required applications on the market, the creator would have to investigate:

B2. Technology dependence
Which in this case would involve the maintenance, not of the original technology, but of the last viable platform on which the application functioned.

B2.5. Emulation
This would involve emulation of the last viable platform.

Both options are expensive and technically complex. Instead, the creator is already investigating Preservation Method B1.3.( Normalization) through the standardization of files into a non-proprietary file format.

**8.** **What additional information does the preserver need to know to facilitate appraisal and preservation?**

Adequate information is available to support appraisal and preservation.

**8a.** **If required information is missing, where should it come from and how should it be made manifest?**

Not applicable.

**9.** **Are there any policies in place that affect preservation**?

[Not answered.]

**9a.** **Are there any policies in place that present obstacles to preservation?**

Industry practices relating to the marketing and protection of proprietary formats.

**9b.** **Are there any policies that would need to be put in place to facilitate appraisal and preservation?**

No.