

Open PDM - A white paper

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1. Background

This paper has its origins in a workshop held at Volvo, Gothenburg in September 1996. The objective of the workshop was to identify the common interests, direction and concerns of major companies using PDM from several different industries.

The companies represented at the workshop were: Volvo, Ford, Boeing, British Aerospace, Daimler Benz, ABB, Ericsson, plus the University of Darmstadt.

The companies involved all recognised that while the emerging STEP standard provides some of what is needed, more positive action is required, particularly with respect to PDM practices.

2. What is Open PDM?

Open PDM is a response to the needs of companies to manage product data in a way which supports both internal requirements **and** facilitates partnership with customer and partners, using multiple, different PDM and functional systems.

Open PDM must also:

- Make appropriate use of standards;
- Support future as well as current processes.

3. Why is Open PDM needed?

The current and future business environment is characterised by:

- partnerships between companies
- concurrent engineering approaches
- globalisation

The effect of these characteristics is that the design, manufacture and use of products typically involves multiple companies with different PDM systems. Therefore PDM systems and the way they are configured and used needs to support data exchange and sharing between companies as well as within a company.

4. Current barriers to Open PDM

The following barriers exist:

1. **PDM system differences:** The basic way in which a given PDM system holds data may not be compatible with another PDM system.
1. **PDM system configuration:** PDM systems offer the flexibility to configure them to specific needs. Different companies may configure the same or different systems quite differently. If a company configures their PDM to follow a given process, this may hinder exchange with others as well as hindering change to the process.
1. **The nature of the PDM market:** The PDM market is young and is both growing and changing fast. There are different architectures (in terms of information, systems and functionality) and the default “out-of-the-box” processes vary between

PDM system, as does the way in which the PDM systems are configured for use in a particular situation.

PDM vendors are often working with closely customers to develop their products and meet specific customer requirements. The resulting variation in set-up makes exchange of data difficult.

1. **Lack of standards:** While there are standards available for key functional areas such as Design data, there is a severe lack of standardisation to support necessary parts of the business process. Areas lacking standards are:
 - Work flow
 - Project management data
 - Systems engineering
 - Security and access control

Where there are standards, there is not sufficient linkage between them. The following standards all could be better linked to product data management and standards than at present:

- CORBA
- The X-n00 family of standards
- SGML

The existing standards do not support all the functionality inherent in some PDM systems.

5. Response to the barriers

Taken together, these barriers give rise to considerable cost in partnership projects which adds no value.

One business response for large companies is to use their purchasing position to force the use of a given PDM system onto suppliers. However, unlike with CAD systems, the use of the same PDM system does not guarantee exchange will work given the configuration potential of most PDM systems. Therefore a more open approach to PDM is necessary.

Open PDM recognises that partnerships will lead to data exchange and sharing across multiple PDM systems.

So what is needed to support a future Open PDM approach? The following requirements have been identified for PDM vendors, for CAD vendors and for standards development.

5.1 Requirements for PDM vendors

1. PDM vendors to adopt a common format for describing the information structures inherent in their systems. This description has to be available to all interested parties. The format shall be compatible with system configuration tools.
1. PDM vendors to adopt a common configuration approach, based on a language such as EXPRESS, to allow equivalent facilities to be developed in different PDM systems across a partnership.
1. PDM vendors to provide access to (a library of) standard components for use in configuring systems. Such components shall include the PDM relevant entities from STEP, enabling use of STEP for exchange.
1. PDM vendors to provide a common API using the Standard Data Access Interface (SDAI - ISO 10303-22).

1. PDM vendors to provide support for the process of mapping from their system into other formats. This mapping capability is necessary to enable cost-effective interfacing:
 - between system versions
 - between different configurations of the same system
 - to legacy systems
 - to external information formats (such as STEP Application Protocols).

Three other general concerns have been recognised:

- Scalability.
There are concerns over how well current PDM approaches scale to large projects with many users. The adoption of an open approach should facilitate the partitioning of PDM within large projects.
- Internal solution viewpoint.
Currently PDM is focused on providing a solution to the data management problems within companies. The PDM industry must develop a greater understanding of the consequences of business drive towards partnership and outsourcing if it is to meet the needs of its customers.
- Certification
There will be a need to have conformance testing of PDM implementations to ensure the consistency necessary for Open PDM to work.

5.2 Requirements for CAD and other functional system vendors

A standardised interface is needed between CAD and PDM systems. Currently there is no specification of the information that a CAD system shall maintain or support about a design to support PDM. This applies equally to other functional systems such as analysis, etc.

To enable Open PDM, there has to be widespread support for a consistent CAD-PDM interface. This interface shall be based on and support standard data items in line with STEP.

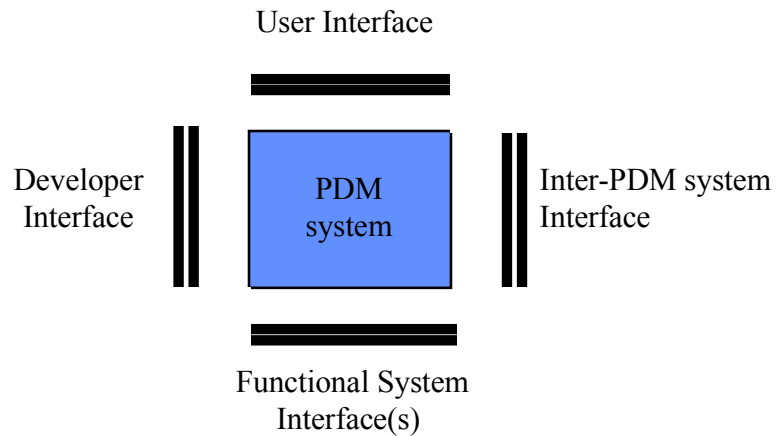
5.3 Requirements for standards

Standards be developed to define the data necessary for the areas . However, just as important is the need for the continuing development of existing standards, particularly STEP, to take into account the requirements for Open PDM.

6. Conclusions

The current business environment increasingly requires communication between PDM systems. Yet there are currently many barriers to effective exchange. To overcome these barriers requires a standards-based approach.

There are four different interfaces of importance to PDM:



To support Open PDM, the interfaces to the developer, to the functional systems and to other PDM systems should all have characteristics common to all PDM systems, based on use of standards. This is not the case at present.

This white paper presents a basic set of requirements. A more detailed set of requirements should be developed for each of the interfaces.

7. Action

1. This paper may be copied freely. It is available from <http://www.eurostep.se/>
2. Discuss this paper with your partner companies.
3. Discuss this paper with your PDM vendor.
4. Provide feedback to openPDM@eurostep.co.uk