THE CHALLENGES OF
PLM COLLABORATION

The development of smart, connected products makes cross-company collaboration even more complex. Users from non-engineering departments and partners outside the industry sector involved have to be integrated. Their disparate requirements call for adaptable IT solutions that support cross-company collaboration and guarantee the highest possible level of data security and know-how protection.

This white paper provides an overview of different collaboration scenarios and the appropriate IT solutions for secure data exchange and partner integration.

Content

Abstract

There is cross-company collaboration- and then there is cross-company collaboration. A machine and plant manufacturer who works with a large number of small partners has different requirements of a collaboration (which is taken to stand for engineering collaboration in the following) from those of an automobile manufacturer who wants to work together closely with one of their large system suppliers. Large-scale cooperations and joint ventures need different mechanisms to protect intellectual property from those required for communication between different company locations with heterogeneous IT landscapes. Collaboration during the offer or aftermarket phases requires different information to be provided than in the product engineering process. Companies thus need collaboration tools that can be configured flexibly, and they need a partner who understands their process requirements and who can support them in implementing and integrating an appropriate solution. The complexity of data communication is often underestimated. And anyone who believes that the IT department will somehow sort it out misunderstands the strategic dimension of collaboration within a company.
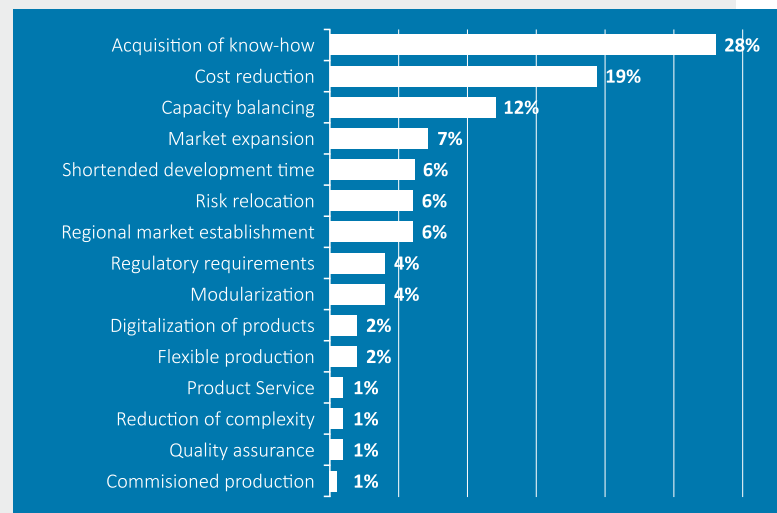
Growing demand

It is nothing new that companies collaborate with external partners in developing and manufacturing products. In sectors such as the automotive industry, the proportion of outsourced work has been stable at around 70 or 80 percent for a considerable time. In other words, the majority of the value added is generated in the supply chain. So where is the growing demand for collaboration, as noted by many PLM experts and indicated by recent surveys, coming from?

One important driver is undoubtedly the development of smart, connected products and services, which demands additional expertise that many companies simply do not have in adequate measure. At the same time, the connectivity provided by the Internet of Things (IoT) promotes the development of new, service-oriented business models, and this leads to the integration of departments outside of engineering in the collaborative processes. Of course, in industries such as machine and plant engineering, which continue to have a relatively high manufacturing depth, the traditional drivers of collaboration, such as cost savings and compensating for capacity fluctuations by outsourcing peripheral activities, still apply.

The growth of cross-company collaboration has a qualitative aspect as well as a quantitative one. The complexity of the information to be exchanged is increasing. Companies are not content with exchanging just development data; they also want to exchange other sensitive information reliably and safely. Because development cycles are getting ever shorter, it is necessary for this information to be sent back and forth and synchronized at very frequent intervals. As a rule, data is not simply passed in one direction in the course of collaboration. In particular, Tier 1 system suppliers often act as an information hub between OEMs and the extended supply chain.

And the exchange relationships themselves are becoming more complex. On the one hand, joint ventures and other forms of long-term collaboration demand regular synchronization of the information, and manually controlled exchange processes are unable to guarantee that this can be done with the required level of process reliability at an acceptable outlay. On the other hand, there are development cooperations whose composition changes from project to project, with the result that it is necessary to establish partner networks and dismantle them again rapidly.

Driver	Percentage
Acquisition of know-how	28%
Cost reduction	19%
Capacity balancing	12%
Market expansion	7%
Shortended development time	6%
Risk relocation	6%
Regional market establishment	6%
Regulatory requirements	4%
Modularization	4%
Digitalization of products	2%
Flexible production	2%
Product Service	1%
Reduction of complexity	1%
Quality assurance	1%
Commisioned production	1%

Drivers for cross-company collaboration

Source: Fraunhofer IPK Berlin

Adaptable solution

The requirements on cross-company collaboration are becoming more complex, and they demand solutions that can be adapted flexibly to match the requirements of the partners with whom data is exchanged. On the one hand, they have to support the secure exchange of data via the Internet and other communication channels. And yet, on the other, they have to be so deeply integrated in the enterprise systems (PLM, ERP, etc.) that the exchange processes and ancillary processes such as any data conversion that may be necessary can be fully automated. Flexibility must not come at the price of excessive outlay for customization. In other words, the collaboration software should be preconfigured or should be simple to configure via templates. And it should provide standardized connectors that use the official interfaces of the systems that are being integrated to make sure that it can be rapidly integrated into the corporate IT landscape.

Exactly what information is to be exchanged or provided to the partners, what IT systems this information comes from and in what formats will depend on the use case in question. And so, it is not enough to simply implement a given software solution. Prior to implementation, it is necessary to carefully analyze the current exchange processes and future requirements in order to ensure that the solution can be used as efficiently as possible. Part of this analysis involves clarifying some fundamental questions, such as who is to operate the collaboration solution and who has ultimate sovereignty over the data. Under certain circumstances, it may be expedient to use the collaboration solution as a cloud-based service rather than actually installing it. In some areas, PROSTEP AG is already offering such operator models.
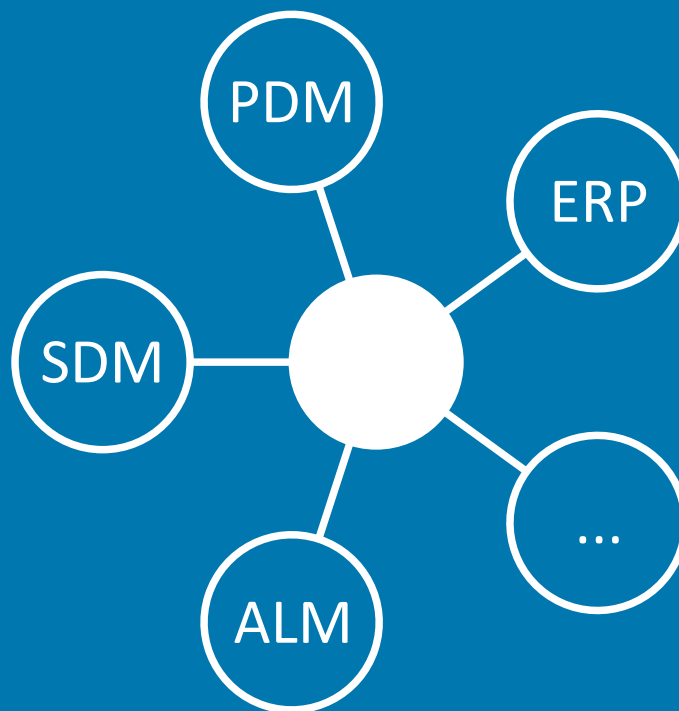
Different use cases

Ultimately, the choice of operator model will depend on the use case. On the basis of its experience from many customer projects, PROSTEP has identified four use cases or application scenarios and developed corresponding best practices for implementing a suitable solution. There will undoubtedly be other use cases or hybrid forms, but these can be catered for without difficulty, thanks to the openness and scalability of the software solution. The core components of a collaboration solution are the integration platform OpenPDM and the data exchange solution OpenDXM GlobalX.

Fluid partnerships

In industries such as machine and plant engineering and shipbuilding, the supply chains are not subject to such strict hierarchies as in the automotive industry. The clients generally cooperate directly with a large number of partners of different sizes, who each take on very different tasks. And this means that there is a huge variety in the type of information exchanged, generally entirely unencrypted and via email or non-secure FTP servers. Which is an open invitation for product pirates and other data thieves. Since well before the NSA scandal, however, companies have been becoming more aware of the risk to their intellectual property when collaborating with external partners and of the need for reliable data exchange.

In this scenario, the relationships with the partners are generally not so close as to result in a regular exchange of data in both directions, and the relationships are subject to more frequent change. It is therefore not worth fully automating the data exchange process. Despite this, however, companies want the exchange activities to be automatically logged so that they can be traced. The users define what they want to send, and check incoming data back into the backend system. Thanks to a special partner client, which will generally be provided by the customer, companies that do not have their own PLM system are able to easily visualize the PLM structure information and the associated metadata that they receive.
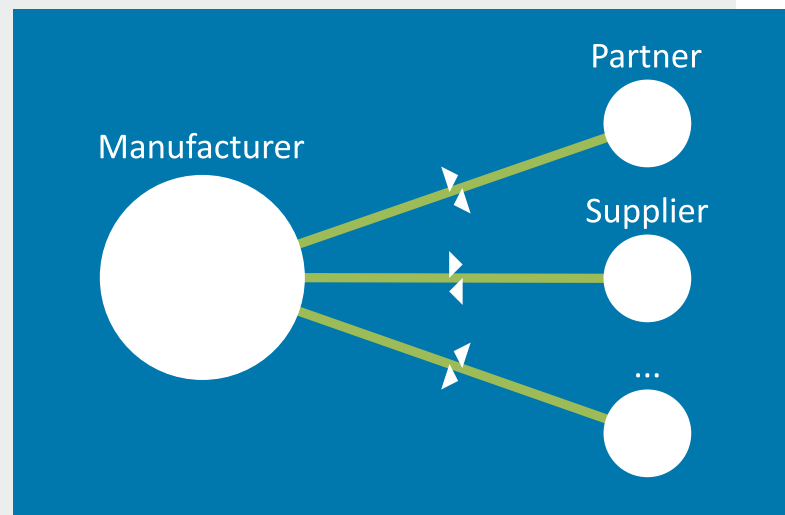
Integration of the data exchange solution in the users' familiar Windows and Office environment ensures that files of a certain size, with a particular filename extension and/or for recipients in particular countries are always made available in encrypted form on the exchange platform. The possibility of sending data simply, on the fly, and nevertheless securely is an important aspect of promoting acceptance of the solution.

Long-term data exchange relationships

In the case of companies that collaborate over the long term and/or constantly have to exchange data, it makes sense to establish a facility that offers the regular provision of data. Such a facility is often used when two OEMs collaborate with each other or when an OEM collaborates with a Tier 1 supplier and high volumes of data need to be exchanged and synchronized on an almost daily basis. To achieve this, the PLM systems on both sides are coupled via connectors. The integration platform OpenPDM controls extraction of the metadata and CAD data, any necessary adaptation of the structure and metadata, packing of the data, transfer via OpenDXM GlobalX, inspection of the data quality and import into the data structures of the recipient system. As a rule, regular provision of data of this kind is designed as a round trip, since the data has to be processed and returned by the recipients.
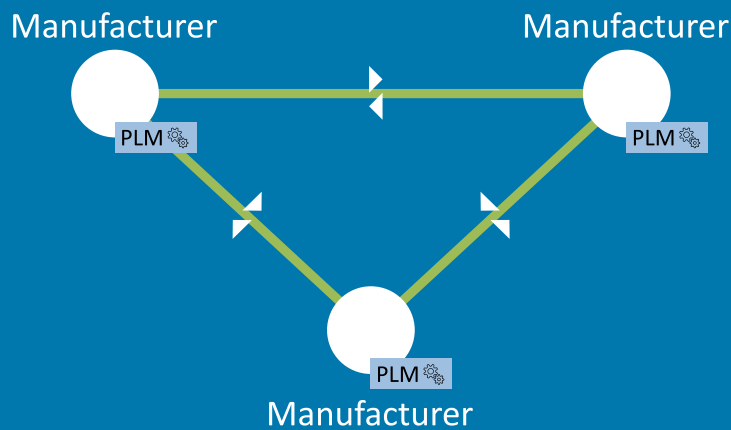
If the provision of data is to be largely automated, the partners first have to clarify what data is to be exchanged. They also need to decide whether the entire set of data is to be returned or only any data that may have been changed. Unlike many PLM systems, OpenPDM is able to identify what data has changed and therefore minimize the volume of data to be transferred. In order to map, or harmonize, the data and structures, the partners have to have defined binding rules, for instance for handling part structures, materials, etc. Establishing the regular provision of data thus demands a certain amount of preparatory work. On the other hand, the advantage is that users then no longer have to concern themselves with data exchange.

Collaboration in joint ventures

In the case of joint ventures and other long-term collaborations, such as those between Daimler and Renault or between the motorcycle division of BMW and Indian motorcycle manufacturer TVS, a selective regular provision variant is often used. This combines automated data exchange with protection of intellectual property. The challenge here is to filter the data and documents contained in the backend systems in such a way that the partners receive all the information needed for their work, but no more. Selective regular provision is also of interest to companies that have locations in countries in which there is an underlying risk to intellectual property or where the government of the country has stipulated that the development data for a collaboration must be present in the local network of the partner.
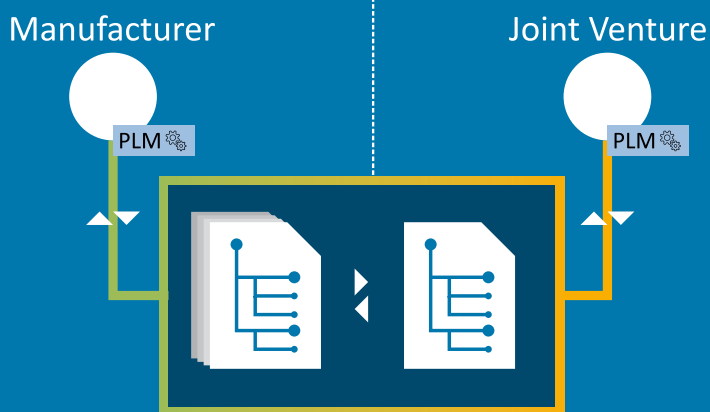
OpenPDM permits finely tuned filtering of the source data down to attribute level. This allows even parts and components fitted in different products to be cleanly extracted and kept synchronized. If the exchange partners use different PLM systems, as is the case with BMW and TVS, the metadata can be converted to a neutral format during export and then made available in PLM Services XML or STEP AP242 format. On the partner side, this is used to generate a Windchill model, which serves as a reference structure for Catia data provided in native format. It is also possible to extract neutral formats such as JT or to trigger conversion of the data into these formats during export. The integration platform checks and documents whether the data complies with the rules agreed between the partners.

Close collaboration with multiple partners

When dealing with distributed development with multiple partners, conventional data exchange is stretched to its limits, even if it is largely automated. If regular provision is to be established, it would be necessary to set up numerous point-to-point connections, which would entail considerable administrative overhead. This makes it more difficult not only to incorporate new partners, but also to dismantle the development networks quickly once the project has been concluded. Furthermore, it is possible that the backend systems used by some of the partners may not be designed for cross-company collaboration, for example because they do not offer sophisticated role and permission functionality.

For companies that deal with globally distributed development projects with changing partners, PROSTEP offers a Collaboration Center for the provision of jointly used data. The metadata, CAD data and structure data can be extracted automatically from the backend systems, converted as required and synchronized at the touch of a button when changes are made. Synchronization is carried out by comparing the data. The Collaboration Center supports both secure online access via Internet and offline processing of the data in a special offline client. The offline client makes it possible to work in PDM and CAD structures and allows online synchronization with the Collaboration Center, thus making sure

that the data is up to date on both sides. The platform provides the project partners with all the important PDM/PLM functions, including version management, workflow management and project management, thus allowing them to coordinate their work on the project extremely well. One of the biggest advantages is that clients can incorporate new partners in the project quickly and with a minimum of effort.
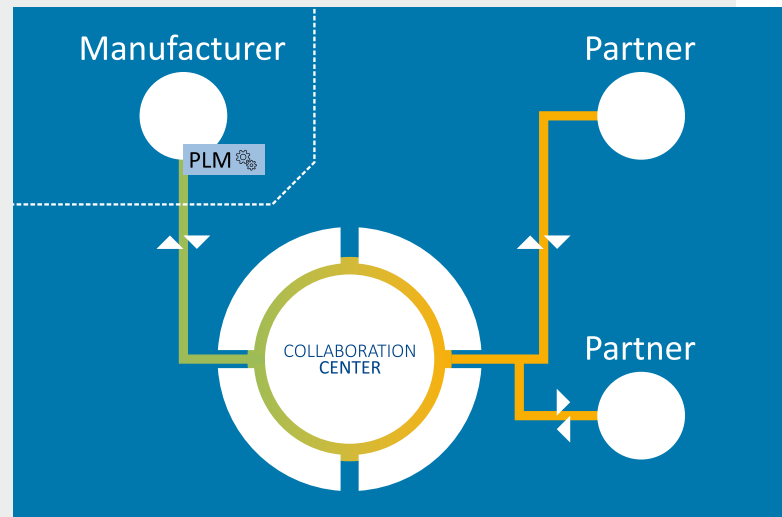
Simplification of data logistics

In conclusion, we can say that cross-company collaboration will continue to grow and will lead to the integration of partners from different industries and non-engineering departments in the partner networks. The traditional PDM/PLM systems that have become the established backbone for digital development within companies provide little support for this in their standard configurations. Implementation of PROSTEP's collaboration solutions plays a key role in simplifying and automating data provision in this context. In the form of the Collaboration Center, it for the first time provides partners with PDM/PLM functions for joint work on a project that they had previously only known in their own backend systems. In this way, it makes an important contribution to improving efficiency in distributed development projects. But it is equally important that the partners harmonize their collaboration processes more closely. When analyzing and optimizing their processes, they are able to take advantage of the support of the consultants at PROSTEP, who are thoroughly familiar with a variety of different collaboration scenarios.

If you have any remarks or questions?

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