Enterprise Product Lifecycle Management

How large, product-driven companies secure their PLM success.
Create. Together.
CONTACT is a leading vendor of standard software for the innovation process. Our mission – captured in our catchphrase ”Create. Together.“ – is to produce best-in-class solutions for collaborative product development and to provide the most advanced suite of applications for comprehensive, enterprise-scale PLM.

**Cutting-edge R&D performance powered by IT**

Our solutions help organize projects, execute processes reliably and efficiently and collaborate in teams and networks across the globe by means of virtual product models. Our open technology provides end-to-end business process support. It is ideal both for integration with other enterprise IT systems such as ERP as well as tools such as CAx. Our architecture is synonymous with highly scalable and interoperable solutions.

**Partner for global enterprises**

Our Enterprise PLM solutions are used by companies around the globe, across multiple industries. We provide efficient support to customers setting up and running a globally distributed PLM infrastructure. We take pride in our ability to listen and in our many long-standing relationships with customers.
Challenges for today’s R&D organizations

When it comes to B2B, close customer relationships and reliability are the keys to success. Providers therefore continually adapt their portfolios as promptly as possible to the ever more rapidly changing needs of their customers. To achieve the necessary agility, they rely on closely-knit collaboration, consistent information management, end-to-end processes and an appropriate flexible and future-proof IT infrastructure.

Increasing complexity
Numerous factors contribute to the continuous increase in complexity in R&D. Among these are the globalization of markets and competition, the pressure to innovate and adopt new technologies more rapidly, keep cost down and fulfill increasingly specific customer needs, and increasingly rigorous rules and regulations.

Collaboration across multidisciplinary teams
The development of products is one of the biggest challenges facing companies. It demands mastery of a huge range of methods and skills. Engineers and specialists from different disciplines must work together in a coordinated fashion. But the software tools used are anything but simple and homogeneous. That is why the methodology and software landscape in product development rates as one of the most complex applications of information technology and goes far beyond the use of a specific CAD tool.

Global business and the extended enterprise
Not only Logistics and Production are increasingly organized along the entire length of the value added chain but also R&D. Large companies distribute their development activities according to the principle of “follow the sun” or dynamically maximize utilization of their R&D resources in line with local capacities in their global development organization. Products are increasing being developed in networks that incorporate partners and suppliers. This means that collaboration must be distributed globally and function smoothly together with third parties.

Compliance with local markets, international standards and government agencies
Compliance with statutory regulations and industry-specific or customer-specific stipulations is today an important success factor. Enterprise-wide compliance management plays a key role in fulfilling the ever more comprehensive compliance requirements according to FDA, RoHS, CMLI, SPICE, etc. and, for example, ensuring the conformity of the processes and satisfying the extensive documentation obligations.

Larger numbers of projects and programs
A high level of customer orientation means greater product variance. A challenge for project management that can only be mastered through rigorous process orientation, the use of best practices, and systematic multi-project and program management. And then there is also the matter of providing appropriate support for the different roles in a company from management to controlling to project manager and PMO through to the project staff with their comprehensive collaboration requirements.
Time
Reduce time to value
Front loading, faster collaboration, supported and automated routine work, seamless IT systems and flow of data

Cost
Control product costs
Target costing, front loading, reuse, modular design

Quality
Satisfy customer requirements
Requirements management, best practice templates, process management, quality issue management, KPI metrics

Agility
Mature and agile processes for delivery
Cutting-edge process and collaboration platform; open, interoperable systems; cost effective, agile IT infrastructures
The PLM vision: embracing the entire lifecycle

Given the wide variety of methods and potential solutions, companies face a huge challenge in developing the ideal PLM strategy and finding the right partner to implement it.

CONTACT is meeting this challenge with CIM DATABASE PLM. It provides a solid foundation with its robust and advanced technology stack. Built on this foundation, it delivers a comprehensive suite of applications to satisfy the diverse requirements of engineers, various disciplines and different departments. CIM DATABASE PLM addresses the following core processes along the product lifecycle.

Portfolio and product management

Prior to any development activities, it is necessary to perform a strategic analysis to identify gaps and need for improvement and to systematically collect and prepare ideas and innovations. On the one hand, this records the concrete development measures that are needed and the ideas and knowledge that are already present to meet these needs.

Product management then defines the business framework for development on the basis of market requirements, sales potential, as well as performance characteristics and USPs. Starting with portfolio control on the basis of risk classes, innovation level and so on, through the involvement of Sales and the definition and control of the budget, this process ultimately leads to program management, which synchronizes the various development projects.
Project management controls and supports the operational activities in the individual development projects. This includes defining and scheduling activities on the basis of the work breakdown structure and planning the resources needed.

Alongside time and cost, consideration of the maturity level reached is a crucial factor in controlling the content of the project. Project management is also responsible for ensuring that all development activities and deliverables are documented in compliance with the relevant processes.

Risk and compliance management accompany the development process. The foundation for this is laid by the ongoing definition of best practices and by mapping these to robust standards coupled with efficient process management that provides direct support for clearly-focused project implementation.

Product elaboration: detailed design

The product architecture then forms the basis for detailed elaboration of the production-ready product using CAD and CAM models. BOMs are generated and decisions are made as to what parts are to be purchased. Changes during the development iterations are handled in a systematic change process.

As the product development process progresses, a variety of validation methods from simulation to the construction of samples and prototypes, as well as physical tests, are available to provide input for making judgments regarding the maturity of the product.

Product architecture

The product architecture defines the structure from the perspective of functionality and modularity. The starting point for this is the objectives and requirements of the customer and/or the market and any relevant procedural regulations. On the basis of existing platform or module concepts and strategies for identical parts, the maximum structure and the permitted variants are then defined in line with technical and commercial considerations. This results in a product structure that allows digital mock-ups to be created.

Industrialization: ready for production

Industrialization activities are initiated in preparation for manufacturing the previously virtual product. These comprise deriving manufacturing BOMs and commissioning tool making. The process for manufacturing the product is developed in parallel with the product itself and Purchasing is tasked with procuring purchased parts.

Finally the utilization level of production capacity is ramped up starting with sample parts and prototypes. Regardless of whether series, contract or single-piece production is involved, strict quality and action management is in all cases crucial to resolving delivery problems early and systematically.
The proud boast of PLM is that it is capable of systematically accompanying products from cradle to grave and providing end-to-end support for the processes used to develop them. CIM DATABASE’s advanced component architecture supports companies in pursuing that vision in well-managed stages. Its modular approach meets the most demanding requirements in terms of flexibility, adaptability and long-term stability.

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To companies whose innovative strength gives them a competitive edge, it is vital that their intellectual property be protected if they want to maintain this edge. This is all the more true in light of the fact that cross-site and cross-enterprise value added chains, in which sensitive information is exchanged, have become the rule. It is therefore even more important that effective mechanisms for protecting a company’s own know-how be integrated in these processes.

11.8 BILLIONS OF EUROS is the annual loss incurred by companies in Germany as the result of industrial espionage. In Austria, the figure is 1.6 billion.
Controlling data security centrally
Effective data protection requires an integrated approach to collaboration, e.g. in research and development departments as well as manufacturing and service. Individualized data protection is implemented by means of central server components and policies which manage, monitor and log collaboration and data access throughout the entire lifecycle of a product.

In CIM DATABASE PLM, harmonized protection mechanisms intermesh seamlessly: authentication via single sign-on, finely graded yet easy to manage access rights, wide-ranging data encryption and digital documents that are integrated in sensitive testing and release processes.

Automated access rights
CIM DATABASE PLM reliably ensures the protection of sensitive data with a wide range of automated procedures. Properties like the degree of confidentiality, market readiness or also product groups and classes are defined and assigned different protection categories.

Combined with the structures used to organize work and projects, a matrix for access rights is created into which data consumers are entered. When data is accessed, the system evaluates this matrix in real time, applies it and logs the action taken.

Encryption for secure transfer via the Internet
The powerful encryption of confidential data is the most effective way of protecting intellectual property.

Encrypted data which is transferred using network protocols that have also been encrypted is particularly secure. CIM DATABASE PLM ensures that processes, both internal and external, are especially secure. Incorporated deep in the workflows, the desired encryption is strategically applied in the context of the task at hand.

Digital signatures ensure data integrity
Digital signatures provide additional protection against unauthorized data access: Like a stamped seal, it ensures the authenticity of all those involved in a data exchange operation and signifies the integrity of the data.

With CIM DATABASE PLM, individual objects and documents can be signed electronically as can entire file packets.

ESPIONAGE TARGETS 2014
The industries shown were particularly hard hit by espionage attacks in the year 2014.
PLM in global enterprises

All over the world, customers expect increasingly sophisticated, preferably customer-configured, product innovations at an ever more rapid pace. Development, Production and Service can only meet these expectations by collaborating closely in cross-site networks. The key to the efficient synchronization of data needed to do this is a common IT and PLM landscape designed for maximum performance.
Cleverly synchronized, distributed product creation
Crucial to the success of collaboration in globally distributed teams is ensuring that the development and production data generated locally is made available quickly and efficiently. Using state-of-the-art technology, CIM DATABASE PLM helps users at all company sites to concentrate on what is important: rolling out attractive products in a collaborative effort.

Distributing centrally managed data intelligently
If the data needed locally is made available in a central vault, CIM DATABASE PLM’s vault replication mechanism automatically synchronizes the data, for example CAD models, documents, etc., from different sites and time zones.

This synchronization is performed according to a set of intelligent rules. Intelligent in this context means that windows of time with little data traffic can be utilized, that logically linked data structures are retained, and also that the data is only made available to the sites that are involved in the project in question.

Efficient collaboration worldwide
The IT infrastructure and the PLM architecture determine the speed at which the sites can work together. The expectation is that distance will no longer play a role, even in intercontinental collaboration scenarios.

This is achieved with carefully harmonized, state-of-the-art technologies: CONTACT’s EdgeServer optimizes the communication protocol in wide area networks. The automatic availability of native, high-volume CAD data courtesy of document conversion services using lighter-weight formats also supports fast data access.

Collaboration with other companies
The development of products across different companies is steadily gaining in importance. CONTACT’s collaboration portal technology provides ideal support for collaboration with partners and suppliers in the engineering supply chain. This means that product data is synchronized reliably, transparently and rapidly along defined processes in the engineering network.
Global deployment

**KOSTAL AUTOMOTIVE**
- Electronic and mechatronic products
- 39 locations
- 15,083 employees (2013)
- Revenues of €1.973 billion (2013)
- Global backbone for mechatronic product development
- 3,500 users at 27 locations
- CIM DATABASE since 2006

**OLYMPUS HIGH-TECH & ELECTRONICS**
- Minimally invasive surgery
- 4 locations
- 1,100 employees (2015)
- Platform for document and compliance management
- 600 users at 3 locations
- CIM DATABASE since 2012

**KIRCHHOFF AUTOMOTIVE AUTOMOTIVE**
- Metal and hybrid structures
- Locations in 12 countries
- 8,400 employees (2014)
- Revenues of €1.205 billion (2014)
- Global development and project management platform
- 600 users at more than 9 locations
- CIM DATABASE since 2012
**SENNHEISER CONSUMER PRODUCTS**
- Audio technology
- 22 locations
- 2,600 employees (2014)
- Revenues of €634.8 million (2014)
- Global platform for mechatronical product development
- 850 users at 22 locations
- CIM DATABASE since 1997

**AUTOMOTIVE LIGHTING**
- Automotive headlights and rear lights
- 24 locations on 4 continents
- 16,350 employees (2015)
- Revenues of €2.6 billion (2015)
- Global collaboration platform
- 1,650 users at 16 locations
- CIM DATABASE since 1999

**EBERSPÄCHER AUTOMOTIVE**
- Exhausts and vehicle heating systems
- 65 locations in more than 25 countries
- 8,385 employees (2014)
- Revenues of €3.599 billion (2014)
- Platform for product data, project and program management
- 1,800 users at 26 locations
- CIM DATABASE since 2005
CONTACT's global ecosystem

Large companies utilize a global development organization and a network of production sites that is often distributed across the globe. This allows them to serve local markets, exploit regional strengths and accelerate their time to value, e.g. by applying the principle of "follow the sun". And they expect to be able to operate their PLM solution in this distributed environment in exactly the same way they would at a single central location.

Think global, act local
What properties must a solution provide if it is to meet these requirements? First of all, there are of course technical requirements such as multilingual capability and Unicode support, performance in wide area networks, powerful security measures and transparent replication.

In addition, there are the services needed to ensure operation at each location: The actual administration is monitored and executed by the company’s central and ancillary service centers in order to ensure end-to-end compliance with the requisite quality guidelines, e.g. according to ITIL. These service centers also aid first level support provided to users via the help desk. We take care of second and third level support as required within the framework of the service level agreement until consistent 24/7/365 operation is achieved.

Training: self service and e-learning are increasingly important
On-site training courses are often ideal. The dynamics and geographical spread of the companies, however, make new training concepts increasingly attractive. CONTACT therefore also offers tried-and-tested e-learning concepts so that training courses can be used in digital classrooms or on demand in a self-service mode. This is particularly crucial during global roll-outs when hundreds or thousands of users need to be trained efficiently within a short period of time.

The global ecosystem powered by CONTACT Elements
CONTACT’s global ecosystem is the key to delivering this quality of service. The starting point is CONTACT’s international team for large-scale international deployment projects (see Professional Services, pages 22 and 23). Other components are worldwide hotline support and CONTACT’s global network of partners. It comprises certified partners who can provide direct support to regional service centers.

CONTACT and its partners and customers have one thing in common: be it CIM DATABASE, customer or partner add-ons or OEM solutions, they all use the leading PLM technology platform CONTACT Elements and share the same know-how. This means that employees at an OEM partner like Zuken in Japan or a Chinese service partner like AMT have the same comprehensive know-how when it comes to deployment and service as do our own employees.
Agility and forward compatibility

Actively protecting investments
Companies that opt for a PLM system will profit from the expenditure in terms of money and time not just for a few years but in the long term. This requires a reliable partner who can provide them with competent support for 10 years and longer.

CONTACT is an independent, owner-managed company. We therefore stand for a high level of continuity and sustainability. As numerous renowned customers such as BASF Polyurethanes, Automotive Lightning and Sennheiser, some of which have made use of the continued innovation of CIM DATABASE for more than 20 years, will testify. They also prove the value of open systems through the adaptability and interoperability of their IT infrastructures.

Better architectures reduce costs
The constraints to which large companies are subject change frequently and in a number of different ways, for example as the result of new lines of business, partnerships, the acquisition of other companies or new national and international regulations, which means that business processes, interfaces and compliance procedures must keep pace.

The employed platform determines just how easily applications can be introduced and maintained. CIM DATABASE’s component architecture and technology platform map the core requirements, which have to be met by highly scalable, flexible solutions that are available worldwide. It encapsulates architectural elements such as the data model, business process logic, storage and background services. This translates into outstanding adaptability, update capabilities and maintainability, which are setting new standards compared with others in the industry.

Interoperability ensures end-to-end business processes
In complex IT and organizational structures, product development demands teamwork and a project-based approach. The optimum overall solution consists of a set of open best-in-class solutions, each of which responds ideally to the needs of its specific area of application. Examples include integrated CAx applications and synchronization with other enterprise-wide IT systems for end-to-end business processes. CIM DATABASE provides all the elements needed to do this:

• Open architecture in conjunction with ISO and industry standards such as REST API Web Services, Eclipse, XML, JT, LDAP, etc.
• Standard interfaces to leading ERP systems such as SAP, Infor/Baan, Axapta, Navision, Psipenta, IFS, etc.
• Standard interfaces to CAx authoring systems from the mechanical engineering, E/E and software sectors

Adaptability is today a fundamental building block for sustainable business success. This applies to the business models, the portfolio, the processes and, of course, the IT infrastructure. That is why the agility and adaptability of the PLM solution in question and, at the same time, the sustainability of the investments involved are of crucial importance when selecting a partner.
Industry know-how

Our portfolio of technologically unique, continuously updated standard software helps our customers organize their work, run their processes reliably and efficiently and collaborate successfully in teams and enterprise networks. The glowing references from market leaders and the loyalty of our long-standing customers testify to the quality and long-term reliability of our product range.

High Tech

Development of cutting-edge technology is associated with the need to constantly change and validate mechanical, electrical and electronic components, and even software. Our solutions provide the ideal tools to meet this challenge.

Infrastructure

We deliver a comprehensive information system to provide support for the planning, construction, operation and maintenance of technical infrastructures such as traffic and utility networks. Here, the focus is on the entire lifecycle from the network as it was originally designed to the network as it is maintained.

Automotive

The automotive industry is marked by extensive supplier networks, established industry standards, large-scale series production and often complex mechatronic products. Our PLM solutions support collaborative work processes and provide management with effective control mechanisms. We have implemented several hundred projects in the automotive supply sector.
Machinery

The PDM/PLM solution CIM DATABASE offers the practical, turnkey solutions, customer orientation and ability to adapt flexibly to growth that are needed by the mechanical engineering and plant engineering industries, which are often dominated by small and medium-sized companies.

Medical

Medical engineering is characterized by an extremely high number of regulatory requirements. CIM DATABASE links the data, documents, projects and processes from the entire product development process in order to provide systematic support for meeting compliance requirements.

Consumer

The development of consumer goods can be compared to development in the automotive industry in that it demands reliable processes and is subject to an increasingly dynamic market. Aspects such as engineering change management and maturity methodologies also provide the basis for a high level of process quality in this field.
Every company is unique. It is characterized by its products, processes and its innovative culture. Only solutions that take this into account, in combination with robust standards, can be expected to deliver the maximum benefit. That is why we listen. Our consultants work with our customers to develop roadmaps, specialist concepts and system solutions that are implemented on time and in budget using best practice project methods. We call this the ability to deliver, which has proven its worth in hundreds of projects worldwide.

**Standards mean optimal front loading**

Large companies rarely profit from mere turnkey solutions. Proven standards nevertheless provide significant advantages by enabling better front loading and thus saving time and money as well as increasing the quality of the solution. This requires standards that suit the industry and the size of the company in question along with adaptability that does not have a negative impact on update capabilities.

CIM DATABASE provides unique support through the use of such proven standards and the logical separation of software and orgware. This allows system behavior in many areas to be adapted much more easily, rapidly and in a more maintenance-friendly manner. One example is business rules, which control the release processes and can easily be modified using a rule editor.

**Agile project methodology for greater certainty that objectives will be achieved**

PLM objectives are often ambitious. They are therefore particularly well suited to agile implementation methods, which significantly increase the degree of certainty that a project will achieve its objectives. Best practices therefore include an agile yet methodical approach, which is based for example on user stories, mock-ups and prototypes.

They are also supported by CIM DATABASE’s outstanding adaptability, which means that requirements can be implemented quickly and validated together with the stakeholders and key users. This supports change management and ensures a high level of system acceptance.

**The value of professional services increases with the scope of the processes**

The greater the degree of support software provides for processes, the more important the ability to introduce it efficiently and supervise its use. This demands expertise, experience and a methodical approach. Our project managers are GPM/IPMA-certified and possess many years of experience in the field of project control. In consultation with the customer, they make use of our project and process management solution Project Office in combination with tools such as checklists, quality issues and quality gates.

We offer a full range of services including consulting, products, specifications, project management, implementation, training and global rollout. If necessary, we expand the project team to include specialized partners.

**Support for international projects in particular**

Large companies make it necessary to perform rollouts across globally distributed locations. This not only requires the appropriate logistics but also that subproject managers and key users at these locations are included early on in the planning, design, evaluation, training and change management. We have highly competent specialists on our international team who can manage this type of project together with the customer’s project management team.
CONTACT's solutions impressed us with the speed at which they are implemented.

Herbert Janssen, Head of Standardization and Technical Services Siempelkamp

Even though Andritz is a large group, Andritz Metals thinks and acts with all the versatility of a midsize business. We need a partner who is used to working with this type of customer. CONTACT immediately understood what we want.

Stefan Denk, Director Mechanical and Special Units Engineering, PDM Systems Product Manager CPL/PPL Andritz Metals Wien, Austria

The question of whether investments in software pay for themselves in the long term doesn't depend solely on product features. The provision of reliable support by the vendor is also important, as our 20 years of experience of doing business with CONTACT shows.

Dietmar Fillinger, Head of IT Applications until 2013; today, Head of Executive Affairs (technical and strategic projects), Stuttgarter Straßenbahnen AG