



*In partnership with*



Siemens Digital Industry Software

<http://standardsdays.afnet.fr> - AFNeT Standards Days 2020 : 6 & 7 October 2020 – team@afnet.fr

# Siemens Digital Industry Software

Openness

Afnet Standard Days – October 6, 2020

## Siemens DI Software's leadership in openness

### Open Culture



- Openness is a core company value at Siemens DI Software
- Approachable and engaging business practices
- Open technology and open business model

### Open Data



- Interoperability enables data exchange throughout the value chain
- Siemens DI Software supports open data and standards
  - JT (ISO 14306:2012)
  - PLM XML
  - XT

### Open Products



- Open architecture enables integration with other applications
- Open applications can be tailored to specific needs with user-friendly customization tools
- Open **PLM Components**:  
*de facto* standard functionality for integration in other applications

### Open Communities

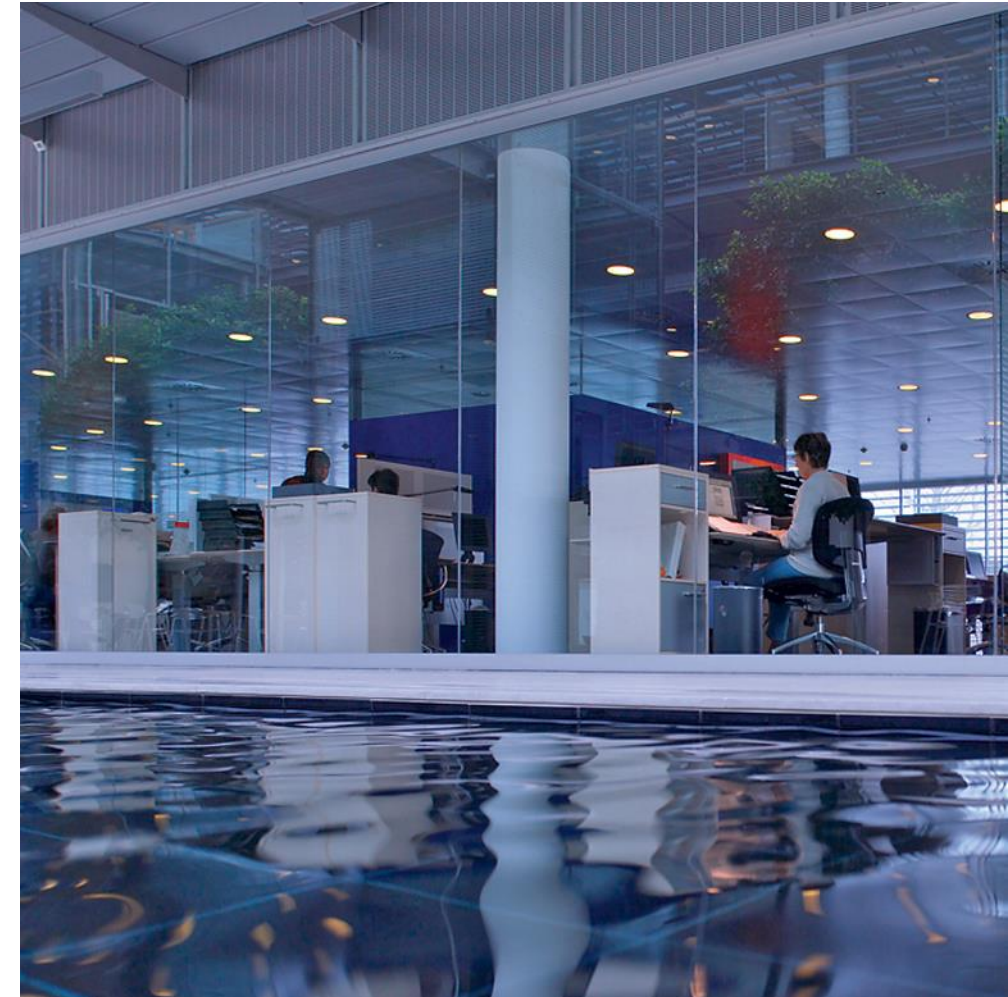


- Code of PLM Openness (CPO)
- JT Open
- Siemens PLM Partner Ecosystem
- Customer Communities
- Technical Communities
- PLM Components adopters

# Siemens DI Software Open Culture

## Importance of Openness to Company Reputation

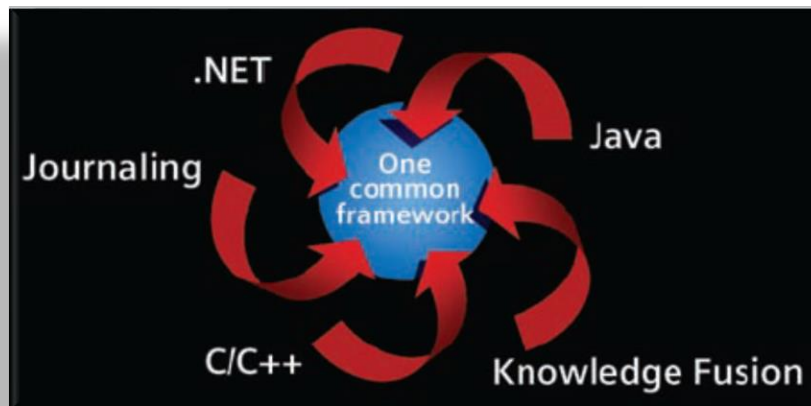
- Customers value supplier “openness”
  - Interoperability of heterogenous systems is required to support supply chain, legacy systems, etc.
- Siemens PLM Software demonstrates openness by licensing technology to other software vendors, including competitors, to enable interoperability with other systems for the benefit of end users
- A strong reputation for openness has helped Siemens PLM Software win major accounts



# Siemens DI Software Open Products

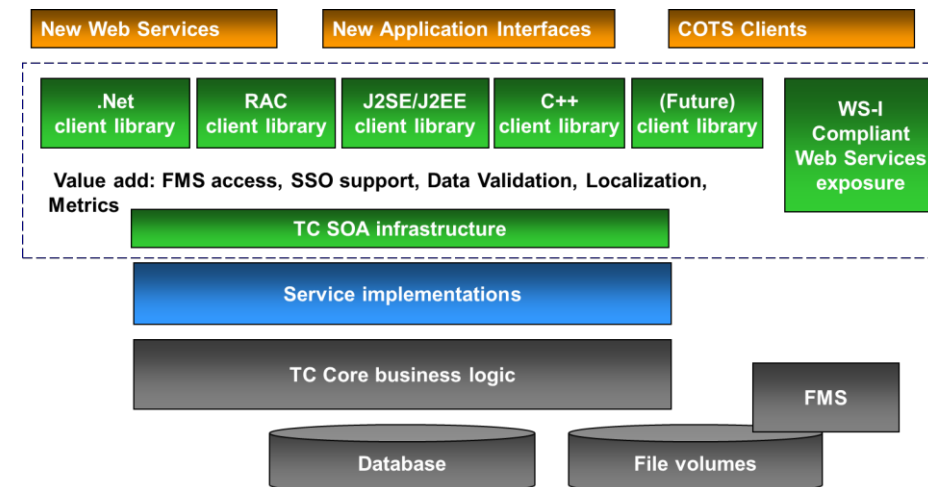
## NX Open

- Provides full access to all functionality delivered with the graphical user interface through the NX Open Common Application Programming Interface (API)
- NX API's provide an open architecture that serves as the foundation for interfacing to NX processes



## Teamcenter Service Oriented Architecture

- Teamcenter SOA services provide full and open access to functionality
- Used by Teamcenter's OOTB clients
- Can be used by custom/specialized clients
- Enables authoring programs to act as clients for Teamcenter



# Siemens DI Software Open Products



## PLM Components

- Software Development Toolkits for building world-class applications for product design, simulation and manufacture
- Used internally by application developers (NX, Teamcenter, Tecnomatix...)
- Licensed under an open business model to 240 Independent Software Vendors (ISVs) **including competitors**
- Integrated into more than 350 commercial software applications
- Used by more than 6 million software end-users

### Parasolid



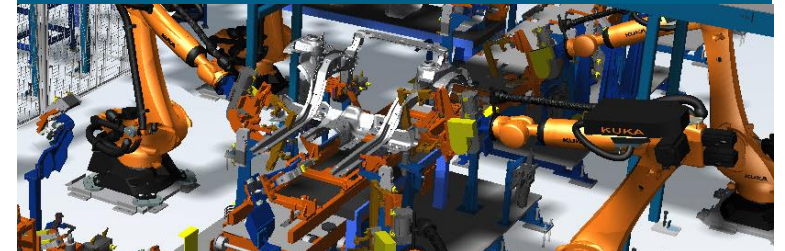
World's leading solid modeling  
component software

### D-Cubed



World's leading geometric constraint  
solving component software

### Kineo



World's leading path planning  
component software

# Siemens DI Software Open Communities

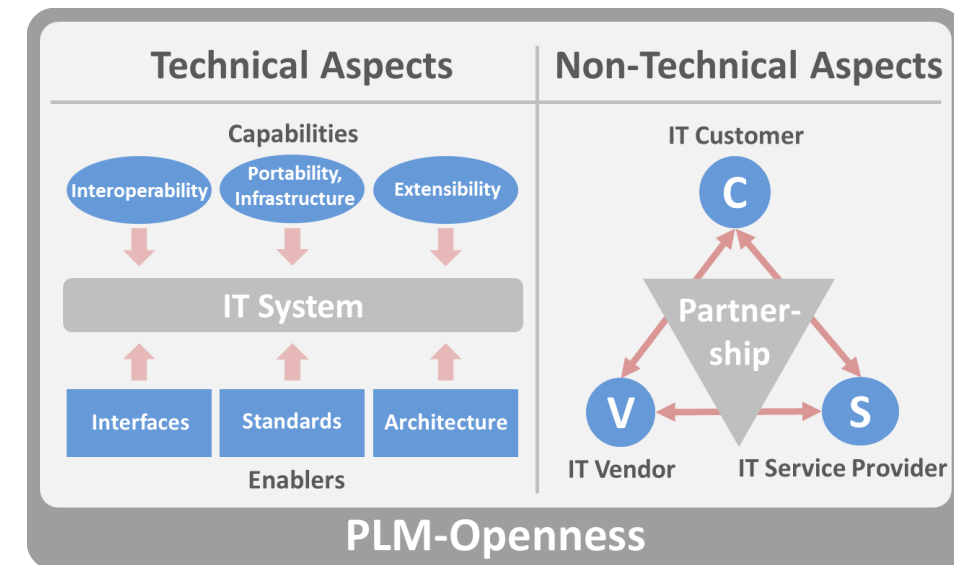


## Code of PLM Openness

- An initiative for establishing a common understanding on the openness of IT systems in the context of PLM between IT customers, IT vendors and IT service providers.
- Created by ProSTEP iVip in conjunction with a core team of industry leaders in 2011
- <http://www.prostep.org/en/cpo.html>
- Provides transparency on openness capabilities & needs, combining technological IT requirements with business needs.
- Covers key criteria of interoperability, infrastructure, extensibility, interfaces, standards, architecture and partnerships.
- Provides a guideline for negotiations between customers, vendors and service providers.
- CPO is based on the voluntary self-commitment of the participants, documented by signing the CPO.



CODE of PLM OPENNESS



# Siemens PLM Software Open Communities



## Code of PLM Openness

- IT Vendors publish product statements to document alignment with the CPO criteria, for example:
  - Supported standards
  - Supported hardware platforms and operating systems
  - Supported programming languages
  - etc.
- Siemens DI Software publishes CPO Statements for
  - NX
  - Solid Edge
  - Tecnomatix
  - Teamcenter
  - Mentor Graphics

**SIEMENS**  
Siemens PLM Software  
**CPO Statement for Teamcenter software**

White Paper

Following the prerequisites of ProSTEP AWP's Code of PLM determine and provide a list of their relevant products a Statement" (cf. CPO Chapter 2.8).

This CPO Statement refers to:

Product name	Teamcenter
Product version	10
Contact	cpo.contact.plm@siemens.com

This CPO Statement was created and published by Siemens assessment with regard to the CPO.

Publication Date of this CPO Statement: 22 May 2015

A white paper issued by: Siemens PLM Software.

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### 1. Executive summary

Siemens PLM Software is pleased to participate in the Code of PLM Openness. Openness must be ingrained in a company's culture. Siemens PLM Software has maintained openness as a core value throughout its history. Open companies are approachable and engage with customers and partners as a standard way of doing business. They have an open business model at the foundation of their open strategy, because even open technology is not effective if it is locked behind restrictive legal agreements and business practices; company must be approachable and engaging with both customers and competitors to truly be considered open. Siemens PLM Software has led the industry with its open strategy and actively delivers open tools and technologies.

Company name	Siemens PLM Software	Contact person
Product name	Teamcenter	

CPO Item	Fulfilled (100%)	Comments
2.1 Interoperability	☑	See relevant
2.2 Infrastructure	☑	See relevant
2.3 Extensibility	☑	See relevant
2.4 Interfaces	☑	See relevant
2.5 Standards	☑	See relevant
2.6 Architecture	☑	See relevant
2.7 Partnership	☑	See relevant

List of inherent supported neutral standards: API: B2C++ / BJava / BNET / B ID: DIGS / BJT / B3TL / B3TFL / DX: DACH / DPM / D20X / D

See relevant sections for further

A white paper issued by: Siemens PLM Software.

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### 2. Details of self-assessment

The following chapters summarize the results of the CPO-related self-assessment of Siemens PLM Software with regard to Teamcenter software.

2.1 CPO Chapter 2.1: Interoperability

Teamcenter is based on a client-server architecture. Both the client and server layers can be customized. APIs have the following standard language bindings:

- Java
- C++
- .net

For detailed information about certified versions of language bindings, please visit: [http://www.plm.automation.siemens.com/plm\\_support/cpo/certified\\_languages.html](http://www.plm.automation.siemens.com/plm_support/cpo/certified_languages.html)

2.2 CPO Chapter 2.2: Infrastructure

Supported platforms (hardware and OS):

For detailed information about certified versions of Runtime/Buildtime OS, databases etc. that can be used with Teamcenter, visit: [http://www.plm.automation.siemens.com/plm\\_support/cpo/certified\\_platforms.html](http://www.plm.automation.siemens.com/plm_support/cpo/certified_platforms.html)

2.3 CPO Chapter 2.3: Standards

Supported data exchange formats:

- Extensible markup language (XML): PLMXML; XSD
- JTM file format
- CXEL including Java server pages (JSP), J2SE, Java API for XML processing (JAXP); Java architecture for XML binding) JAXB
- MMX
- IT14 Encoding of Unicode
- W3C (HTML 1.1); Web Services UDDI; Web Services WSDL; ISO 9241 (Usability)
- APQD – product configuration; AP210 – Electronic assembly, interconnect and packaging design;
- AP212 – Electro-mechanical; AP214 – Core data for automotive mechanical design processes
- STL
- VIML
- Common object request broker architecture (CORBA)
- IGES; JT; IFC; UG; CATIA; INTC; IGES; DWG; DWG (6.0 and above) and DWG

2.4 CPO Chapter 2.4: Architecture

The IT system's architecture is conforming CPO 2.6

Yes ☑ / No ☐

Teamcenter four-tier, service-oriented architecture (SOA) is flexible and scalable from the smallest implementation up to the largest PLM deployment in the world. The Teamcenter architecture consists of the following tiers:

- Client tier - comprises the Teamcenter clients: the thin client and rich client.
- Web tier - responsible for communication between the client tier and enterprise tier.
- Enterprise tier - retrieves data from and stores data in the database.
- Resource tier - database server, database, volumes, and file servers with a file management system.

2.5 CPO Chapter 2.5: Standards

Supported platforms (hardware and OS):

For detailed information about certified versions of Runtime/Buildtime OS, databases etc. that can be used with Teamcenter, visit: [http://www.plm.automation.siemens.com/plm\\_support/cpo/certified\\_platforms.html](http://www.plm.automation.siemens.com/plm_support/cpo/certified_platforms.html)

2.5.1 Data Generated by Users

Data generated by IT users with an IT system is and remains the intellectual property of these IT users, according CPO 2.7.4

Yes ☑ / No ☐

2.5.2 Partnership Models

Partnership models are offered according CPO 2.7.7

Yes ☑ / No ☐

The Siemens PLM Solution Partner Program provides global customers with a variety of high-quality products, services and solutions relating to Teamcenter. For further information, please visit: [http://www.plm.automation.siemens.com/en\\_us/partners/index.html](http://www.plm.automation.siemens.com/en_us/partners/index.html)

2.5.3 Support of User and Innovation Groups

Supported groups are:

- Siemens PLM Community Discussion Forum, knowledge base and blog that enable users to learn how to get the most out of their experience with Teamcenter

Website: <http://community.plm.automation.siemens.com>

PLM World

PLM World® is an independent, not-for-profit organization whose mission is to be the Voice of the User in providing an open forum for the exchange of ideas within the Siemens Product Lifecycle Management (PLM) Software product environment. Website: <http://www.plmworld.org>

A white paper issued by: Siemens PLM Software.

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# Siemens DI Software

## Open Data : Standards Supported

- Extensible Markup Language (XML); PLMXML; XSD
- ISO JT 14306:2012
- J2EE including Javaserer Pages (JSP); J2SE; Java API for XML Processing (JAXP); Java Architecture for XML Binding) JAXB
- MIME
- UTF-8 Encoding of Unicode
- W3C (HTML 1.1); Web Services UDDI; Web Services WSDL
- ISO 9241 (Usability)
- AP210 – Electronic assembly, interconnect and packaging design; AP212 – Electro-Mechanical; AP214 – Core data for automotive mechanical design processes
- Common Object Request Broker Architecture (CORBA)
- JT File Format, DXF/DWG, Parasolid XT, stl
- PLMXML
- IDF v2.0, v3.0, v4.0 – Current industry standard format for data exchange with ECAD
- IDX – Newer ProSTEP format for data exchange with ECAD
- GenCAD – Older format
- STEP AP203 (ISO 10303-203)
- STEP AP214 (ISO 10303-214)
- STEP AP242 (ISO 10303-242)
- IGES
- IFC 2X3 and IFC4
- ASME Y14.1 ASME Y14.1M, ASME Y14.2M, ASME Y14.2, ASME Y14.3, ASME Y14.4M ASME Y14.5, ASME Y14.6, ASME Y14.24, ASME Y13.34M, ASME Y14.36, ASME Y14.36M, ASME Y14.41, ASME Y14.100, ASME Y14.100
- ANSI/AWS A2.4, ANSI B4.2
- SASIG – 3D Annotated Model Standard
- ISO 128-1, ISO 128-20, ISO 128-21, ISO 128-22, ISO 128-24, ISO 128-30, ISO 128-34, ISO 128-40, ISO 128-44, ISO 128-50, ISO 129, ISO 129-1, ISO 286-1, ISO 1101, ISO 1302, ISO 1660, ISO 2553, ISO 2692, ISO 2768-1, ISO 2768-2, ISO 3040, ISO 5457, ISO 5458, ISO 5458, ISO 5459, ISO 5459, ISO 6410-1, ISO 6410-2, ISO 6410-3, ISO 10578:1992, ISO 14405, ISO 16792
- JIS B 0001, JIS B 0021, JIS B 0022, JIS B 0023, JIS B 0024, JIS B 0031, JIS B 0401, JIS B 0403,
- JIS B 0405, JIS B 0419, JIS B 0601, JIS B 0610, JIS B 0612, JIS B 0613, JIS B 0614, JIS B 0621,
- JIS B 3402, JIS Z 3021, JIS Z 8310, JIS Z 8311, JIS Z 8312, JIS Z 8313, JIS Z 8314, JIS Z 8315,
- JIS Z 8316, JIS Z 8317, JIS Z 8318
- JEITA – 3D Annotation Model Guidelines

# Thank you

[denis.goudstikker@siemens.com](mailto:denis.goudstikker@siemens.com)