

Data Exchange in the Process Plant Industry: **P&ID Exchange through DEXPI and ISO 15926**

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Global Business Development Process Plant

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Class summary

DEXPI is the German industry initiative to support and promote the **ISO 15926** standard for plant data transfer, and it has reached a major milestone: the definition of standard specification covering a complete piping and instrumentation diagram (**P&ID**).

Autodesk developed a proof-of-concept application for **AutoCAD P&ID** software to import/export P&ID data fully implementing this DEXPI specification.

Key learning objectives



At the end of this class, you will – hopefully – be able to understand:

- Challenges and opportunities of implementing a data exchange standard for semantic PI&Ds
- ISO 15926 / DEXPI in the context of P&ID data exchange
- Autodesk DEXPI/ISO15926 strategy and implementation
- The rationale and benefits of a close partnership between industry and Autodesk

These are **NOT** Key learning objectives



- What a PID is (Hope you know it though)
- How to use AutoCAD P&ID
- How to develop an interface for AutoCAD
- How to win the US presidential elections

Agenda

Problem Statement

Data – Information – Knowledge

Data exchange in Process Plant

IFC & BuildingSMART

ISO15926

DEXPI/ISO15926 Initiative

Cooperation w/ Industry Groups

Summary, Q&A

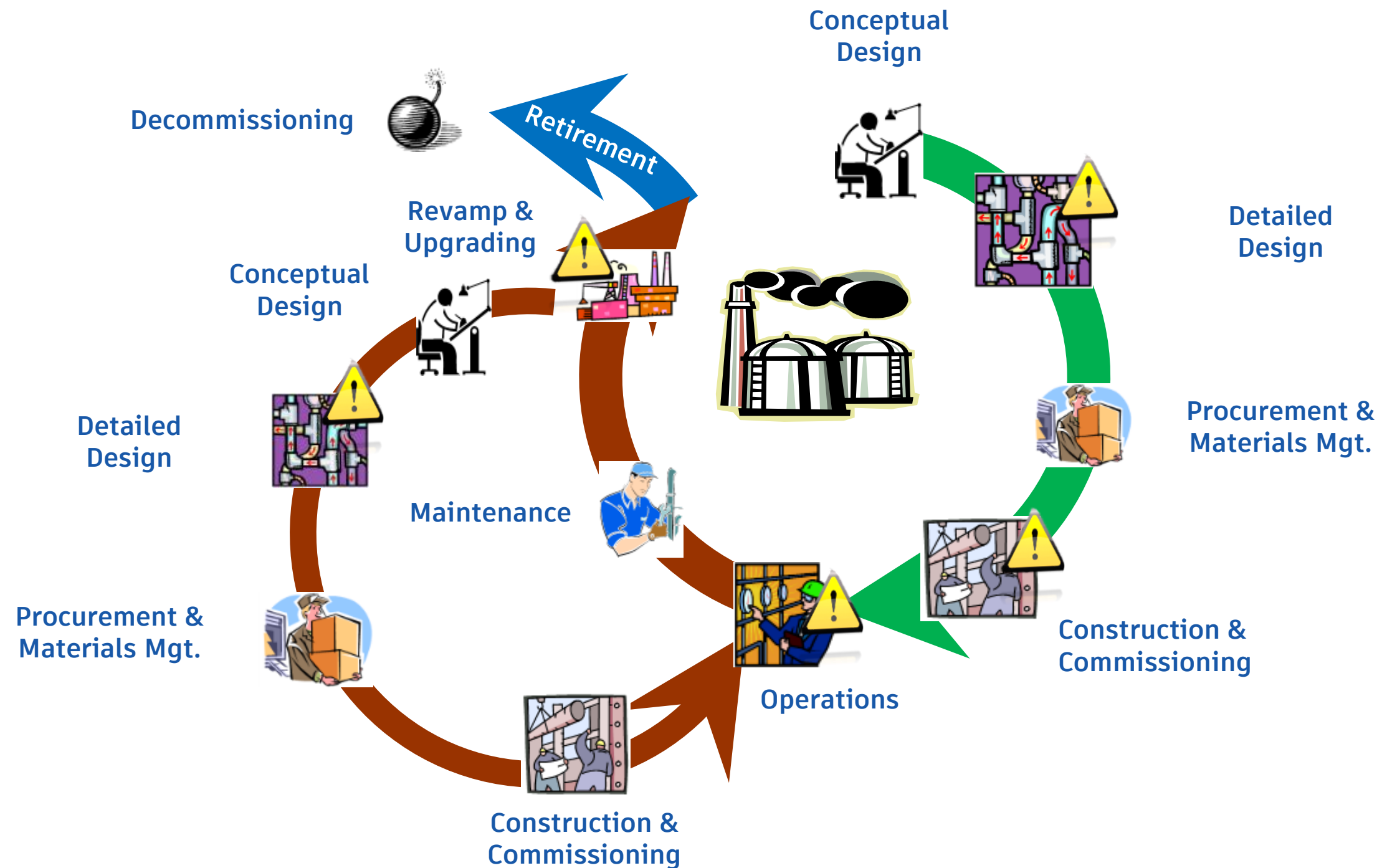


Agenda

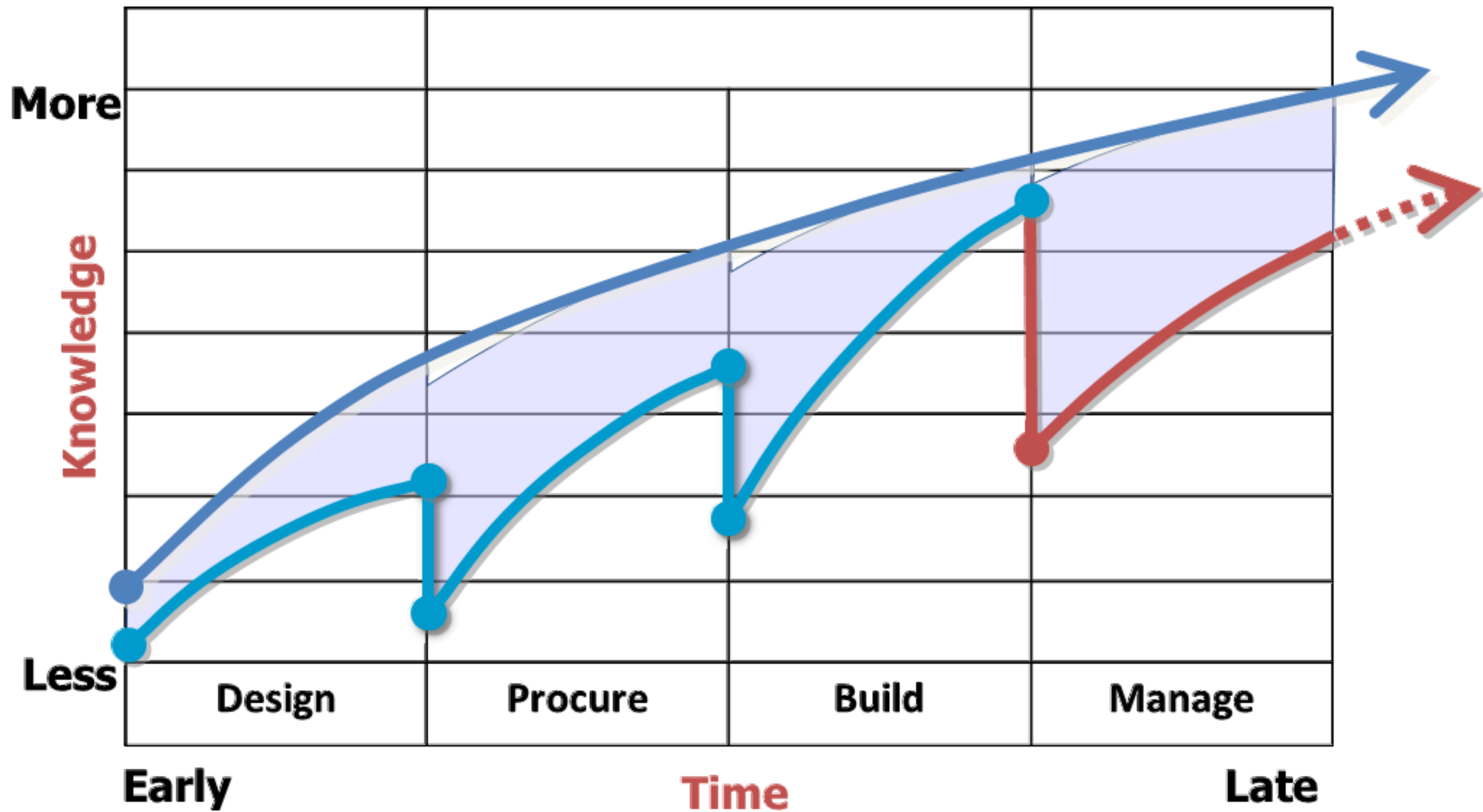
- Problem Statement
 - Data – Information – Knowledge
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 - IFC & BuildingSMART
 - ISO15926
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Data exchange in plant life cycle



Loss of information during life cycle



Loss of information during life cycle



“To do data handover from design to operations in our last project - 100,000 man hours”

Martin Rittmeister, October 2013
VP of Engineering @ Linde Engineering

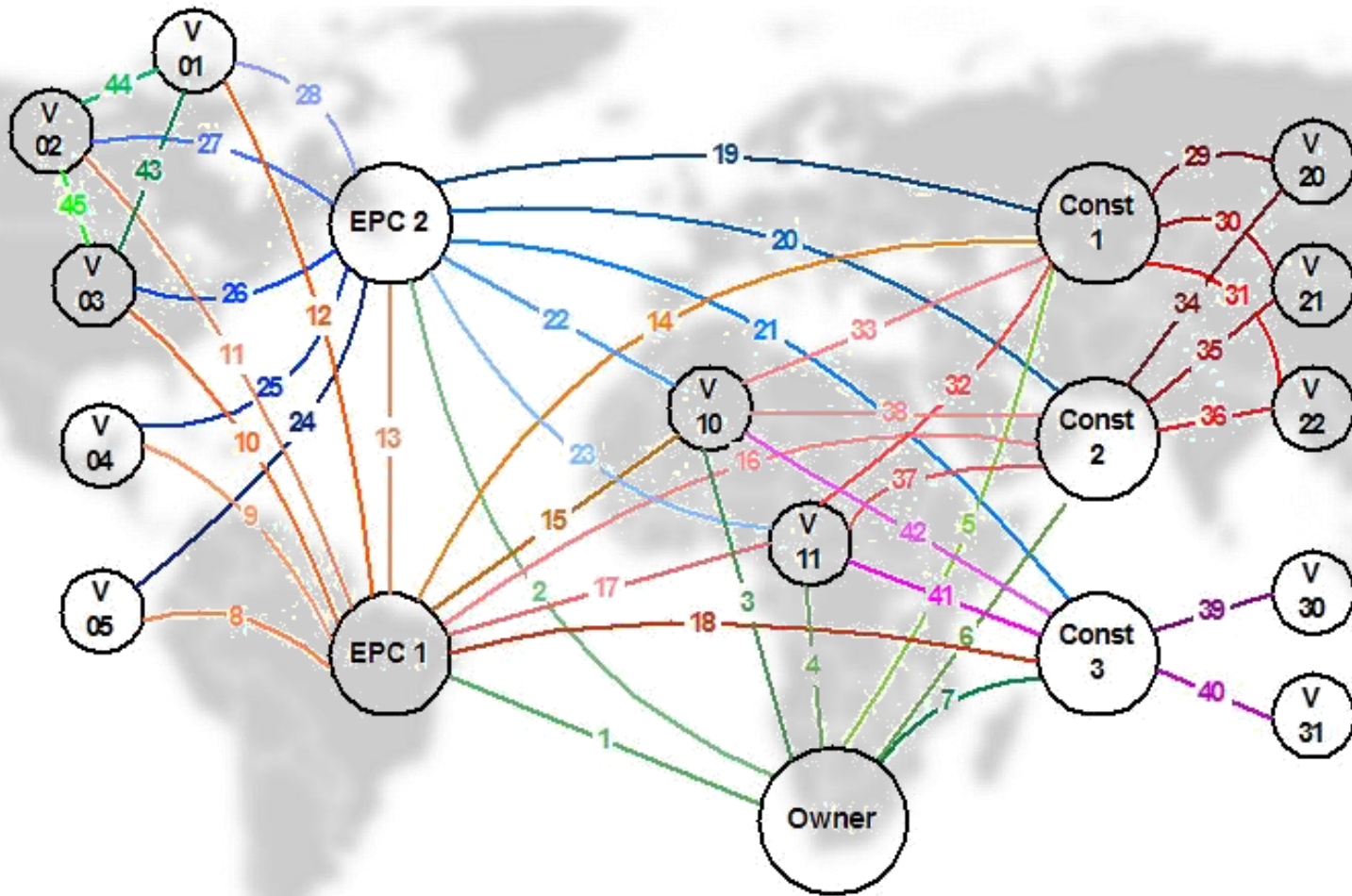
<http://www.linde-engineering.com/en/index.html>



Project in Process Plant

who with whom what why and how

- Projects are complex and global with permanent data exchange
- Multiple of:
 - Interfaces
 - Communication paths
 - Languages incl. barriers



Communication paths and media



Paper



Data media (CDRW, USB)



FTP



E-Mail



VPN

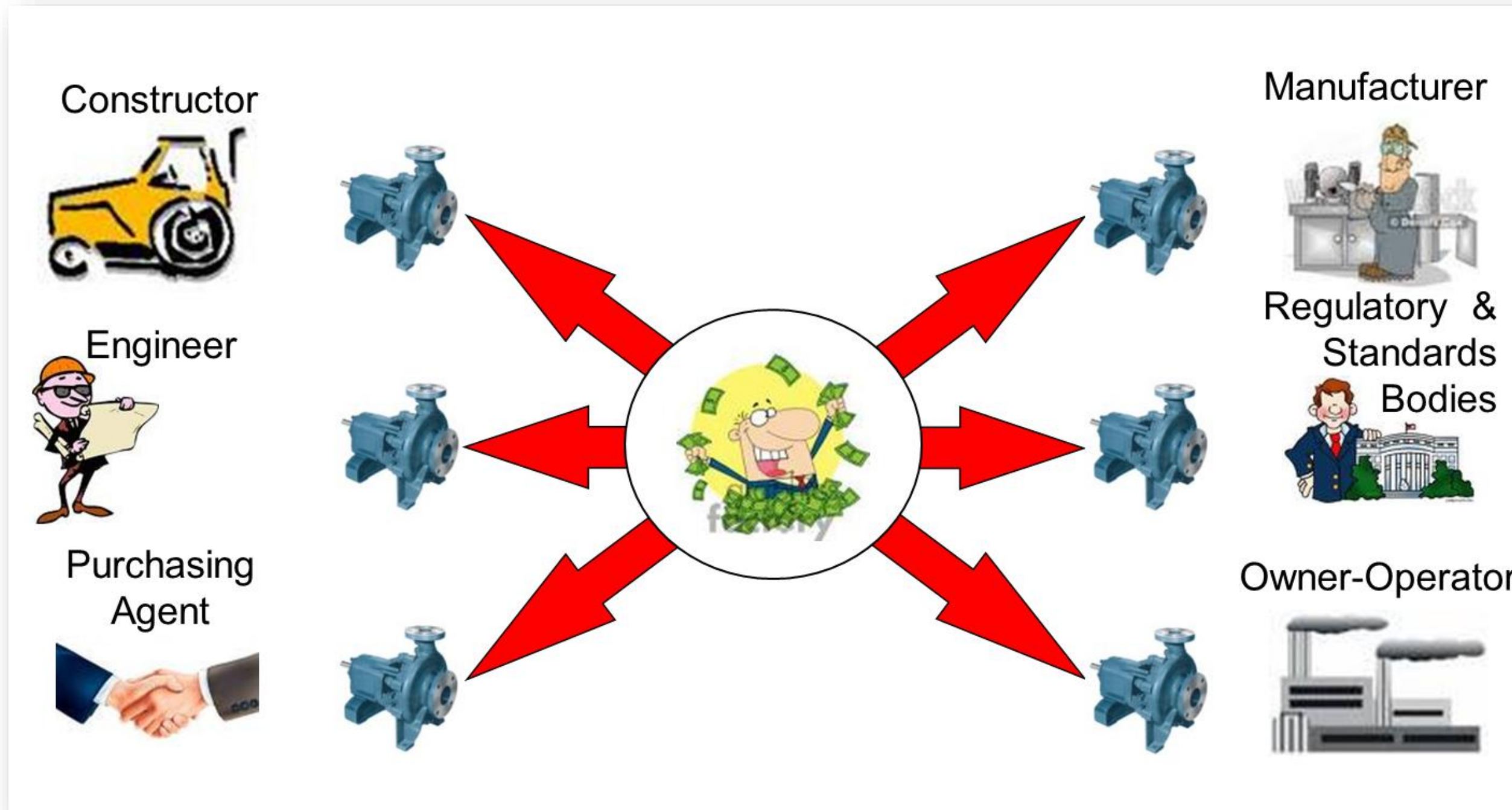


Cloudstorage

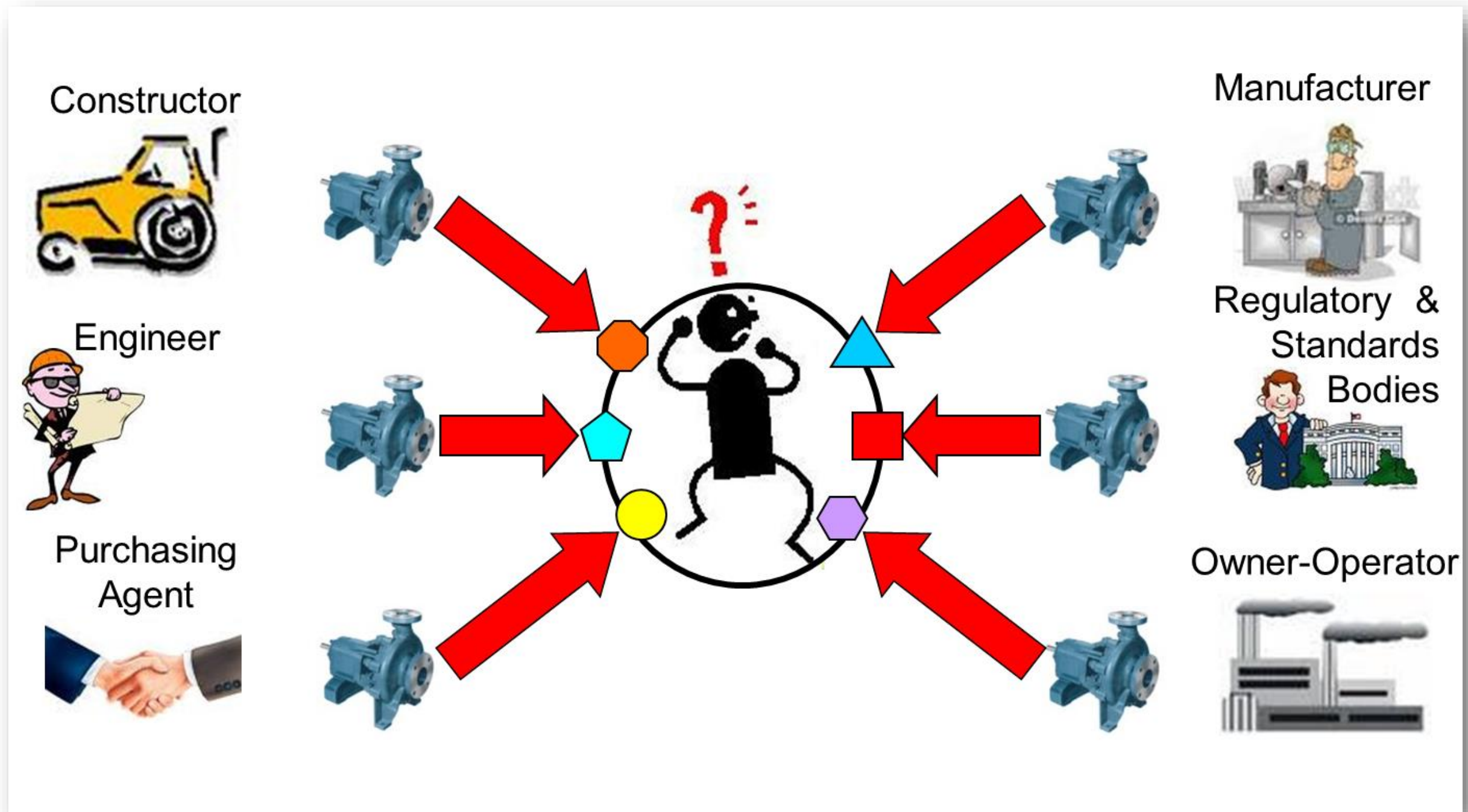


Social Networks

How Information Exchange is Supposed to Work



How Information Exchange Actually Works



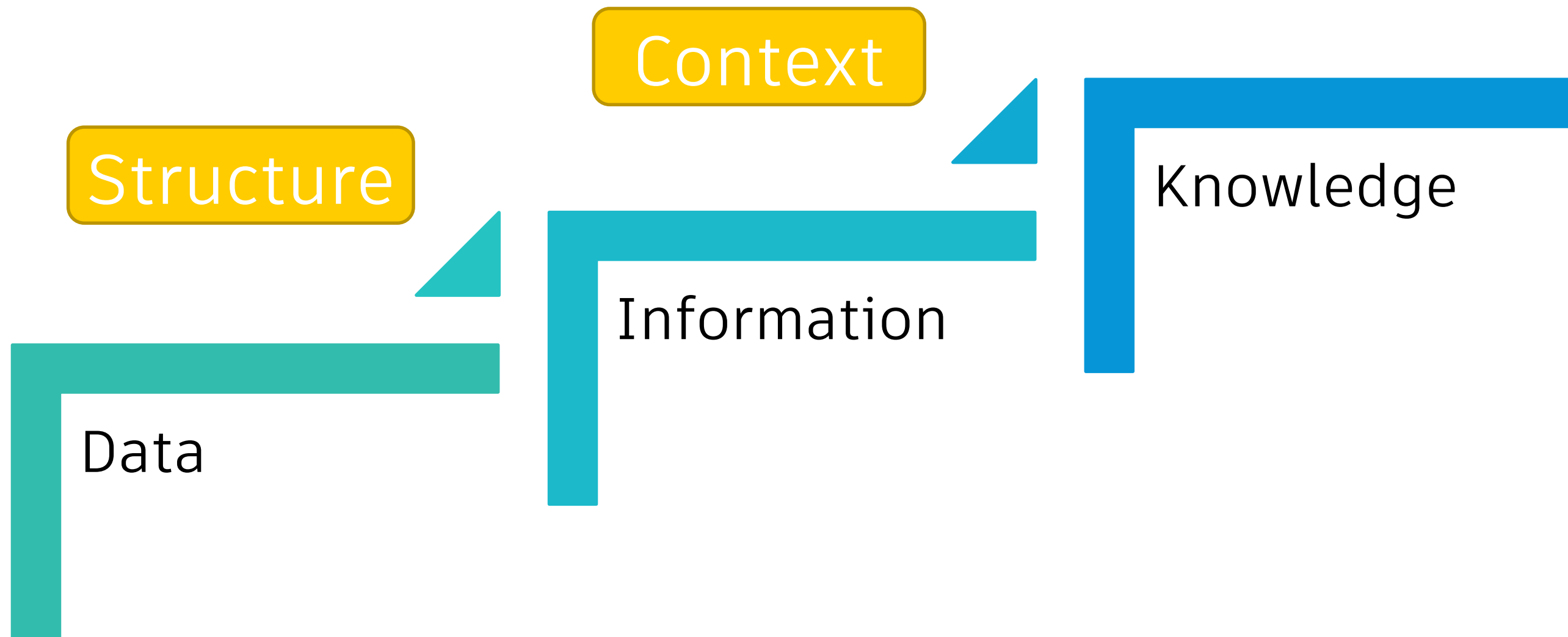
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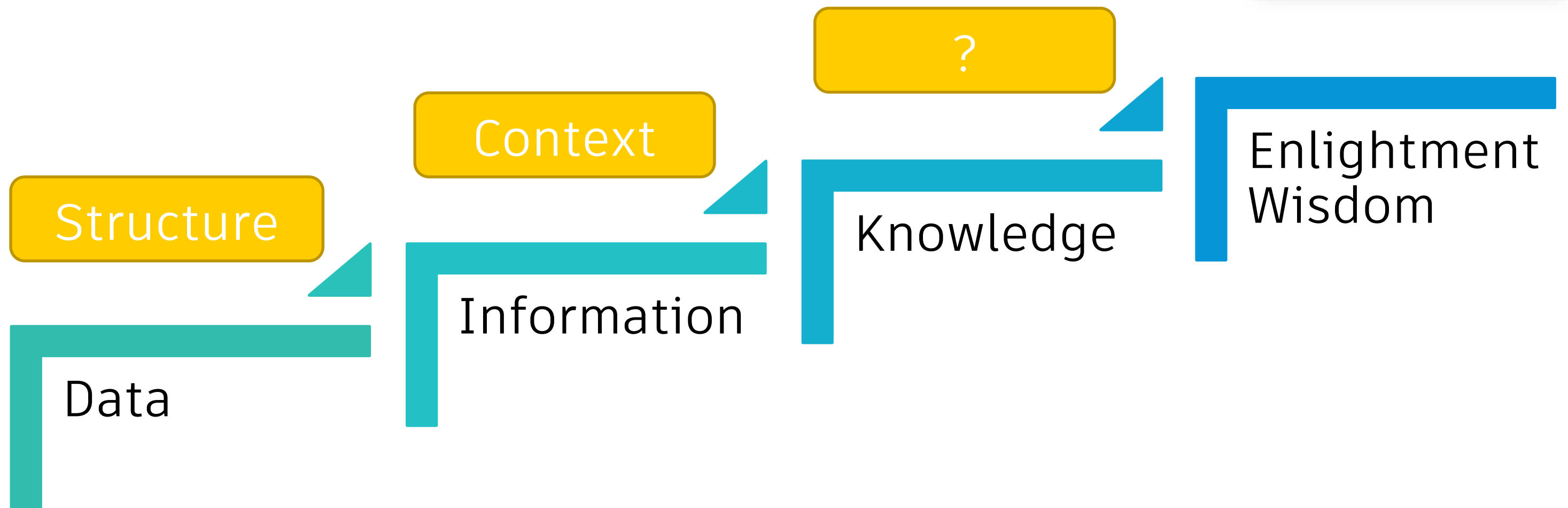
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Data, Knowledge, Information



Logic is the beginning of wisdom, not the end.
Lt. Spock, USS Enterprise

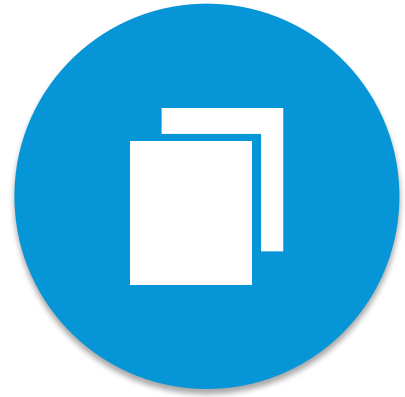








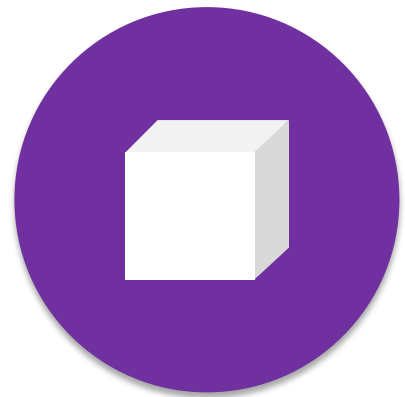
Three eras of technological disruption



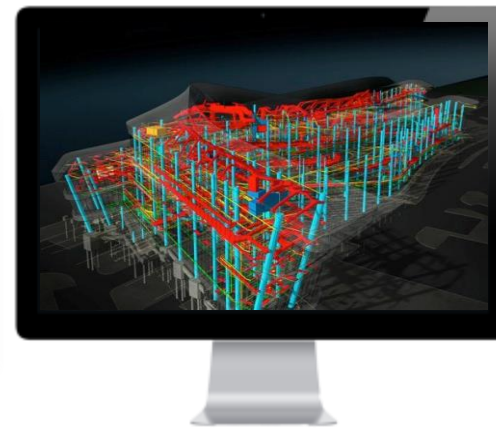
Era 1:
Documentation
(Measurement)



Drafting



Era 2:
Optimization
(Performance)



Modeling



Era 3:
Connection
(Outcomes)



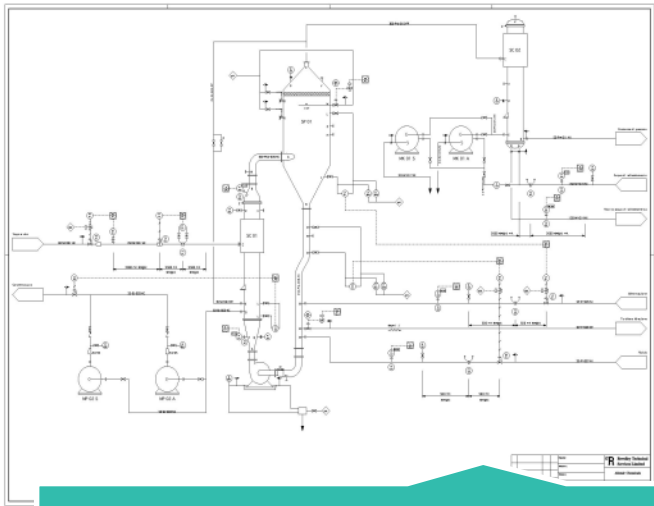
Context



Different types of data



Documents

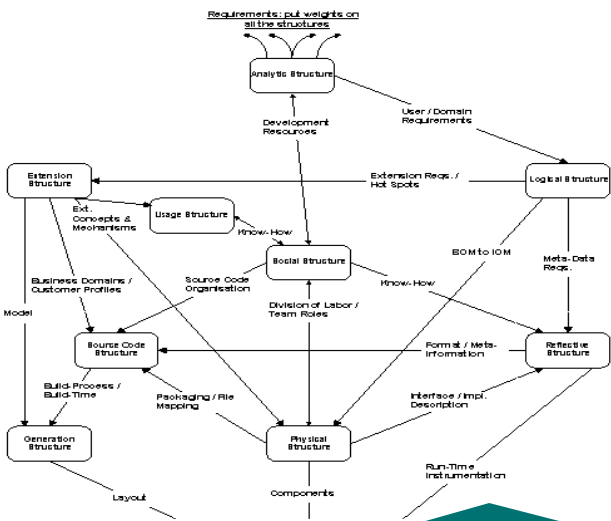


Graphics (2D, 3D)

Stückliste zur Schubflange Zeichnung Nr. ...

Zeichen	Gegenstand	Stückzahl	Material	Bemerkungen
A	Schubflange	1	Siemens-Martin-Stahl	Im Gabelende Keilnut.
B	Verchlußstück	1		
C	Bolzen	2	Schmiedeeisen	Mit 3/4"-Gewinde und je zwei Muttern O und N nebst Sicherung M. Neues Modell, ausgießen mit Lagermetall.
D	Lagerschalenhälfte	2	Bronze	
E	Zwischenlagen	2	Messing	
F	Kreuzkopfbolzen	1	Stahl	Mit 3/4"-Gewinde und Keilnut.
G	Scheibe	1	Schmiedeeisen	
H	Mutter	1		3/4"-Gewinde.
J	Keil	1	Stahl	
K	Scheibe	1	Schmiedeeisen	
L	Kopfschrauben	4		5/16"-Gewinde.
M	Sicherungsschraube	2	Stahl	
N	Mutter	2	Schmiedeeisen	S. a. C.
O				
P				

Lists



Structures

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PCF

Piping Component File

- Originally input for ISOGEN®
- Exchange of pipelines
- Additional uses:
 - Stress calculation
 - Spool creations

```
ISOGEN-FILES ISOGEN.FLS
UNITS-BORE INCH
UNITS-CO-ORDS MM
UNITS-BOLT-DIA INCH
UNITS-BOLT-LENGTH INCH
PIPELINE-REFERENCE 3"-LSA-3250

REVISION 2
AREA AR-26A
PIPING-SPEC SP1
NOMINAL-CLASS 150#
DATE-DMY 08/11/95
PIPELINE-TEMP 150.0

END-CONNECTION-EQUIPMENT
CO-ORDS 6000.00 10210.00 1400.00 3
CONNECTION-REFERENCE H-152-NZ-6

GASKET
END-POINT 6000.00 10210.00 1400.00 3
END-POINT 6000.00 10210.00 1403.00 3
PIPING-SPEC SP1
ITEM-CODE JFA150R2
ERECTION-ITEM

BOLT
BOLT-DIA 5/8
BOLT-LENGTH 3.75
BOLT-QUANTITY4
BOLT-ITEM-CODE BAA5/8X3.75
ERECTION-ITEM

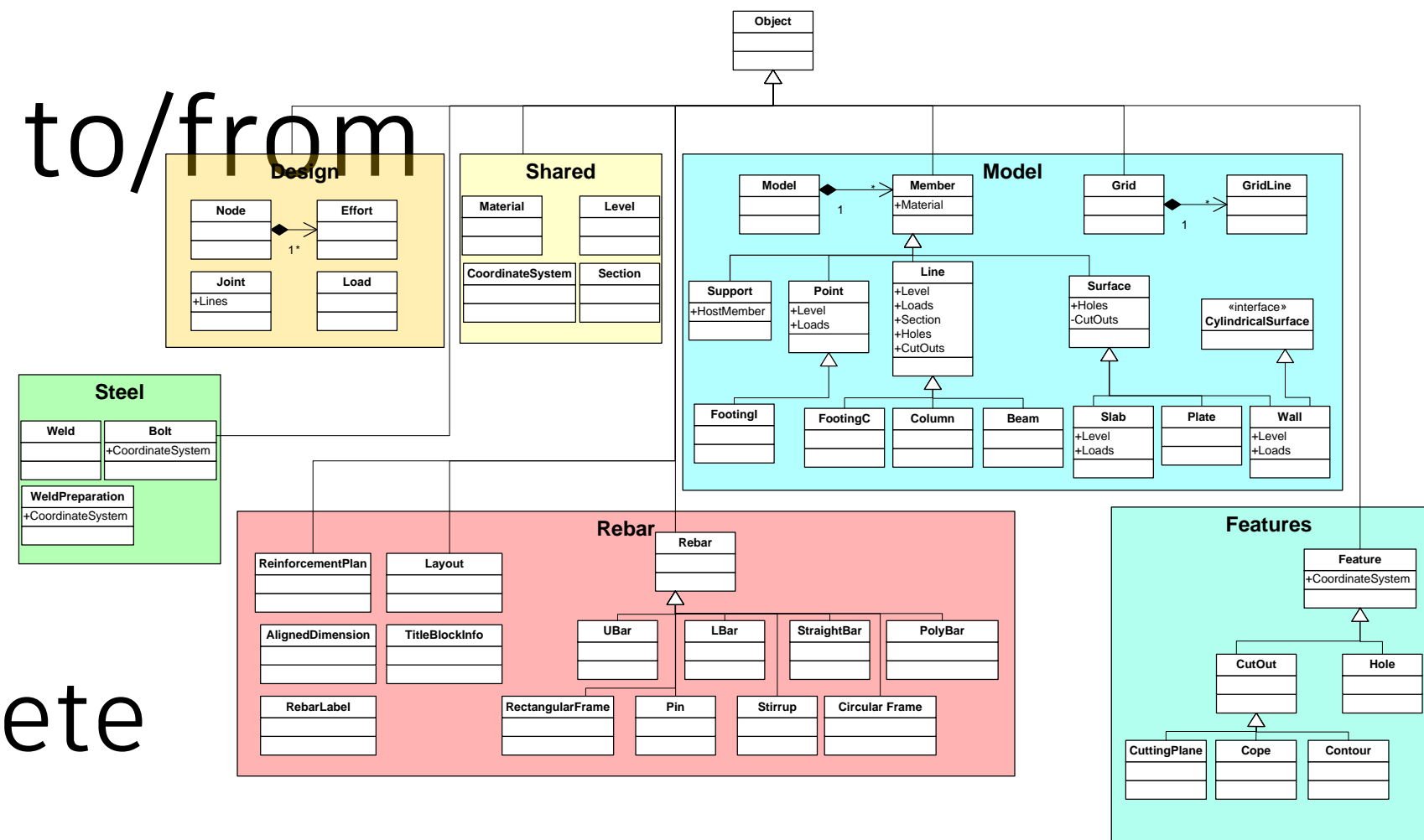
FLANGE
END-POINT 6000.00 10210.00 1403.00 3
END-POINT 6000.00 10210.00 1323.60 3
PIPING-SPEC SP1
ITEM-CODE FAM150WN40
SKEY FLWN
FABRICATION-ITEM
FLOW 2

PIPE
END-POINT 6000.00 10210.00 1323.60 3
END-POINT 6000.00 10210.00 917.30 3
PIPING-SPEC SP1
WASTE 10.0
PLANT-AREA 1
ITEM-CODE PAW-40
FABRICATION-ITEM
```

Quelle: <http://www.alias.ltd.uk/pcf.asp> (22.11.2013)

Graitec Model Objects

- <http://www.graitec.com/us/gtc.asp>
- Open XML format
- Transport Structures to/from
 - SDNF
 - CIS/2
 - Revit Structure
 - Advance Steel/Concrete
 - IFC 2x2



SDNF

Steel Detailing Neutral Format

- Originally developed by Intergraph FrameWork user community
- **Different Elements:**
 - Linear Elements
 - Plate Elements
 - Hole Elements
 - Loads
 - Connection Information
 - Raster Information
 - Bend Elements

```
?packet 00
SDNF Version 3.0"
"
"
"
09/02/10" "12:12:48"
{ "_Issue_Code_"
  "_Design_Code_"
}
?packet 10
millimeters" 211
:00001 1 0 0 "beam" "" 0
L160X80X10" "S235JR2" 0.000000 0 0
1.000000 -1.000000 0.000000 2002.500000 9997.200000 5870.000000 2002.500000 9997.200000 5970.000000 0.000000 0.000000
1.000000 0.000000
1.000000 0.000000 0.000000 0.000000 0.000000 0.000000 0.000000
1 0 0 0 0 0 0 0 0 0
} "" 0 "5/17/2010" "8:47:25" "09/02/10" "12:12:48" 0 0
1 0 0 0 0 0 0 0 0 0
1 0 0.000000 0 0 0.000000 0.000000
1 0 0 0 0
:00002 1 0 0 "beam" "" 0
L160X80X10" "S235JR2" 0.000000 0 0
1.000000 -1.000000 0.000000 1997.500000 9997.200000 5970.000000 1997.500000 9997.200000 5870.000000 0.000000 0.000000
1.000000 0.000000
1.000000 0.000000 0.000000 0.000000 0.000000 0.000000 0.000000
1 0 0 0 0 0 0 0 0 0
} "" 0 "5/17/2010" "8:47:25" "09/02/10" "12:12:48" 0 0
1 0 0 0 0 0 0 0 0 0
1 0 0.000000 0 0 0.000000 0.000000
1 0 0 0 0
:00003 1 0 0 "beam" "" 0
L160X80X10" "S235JR2" 0.000000 0 0
1.000000 -1.000000 0.000000 3002.500000 9997.200000 5870.000000 3002.500000 9997.200000 5970.000000 0.000000 0.000000
1.000000 0.000000
1.000000 0.000000 0.000000 0.000000 0.000000 0.000000 0.000000
1 0 0 0 0 0 0 0 0 0
} "" 0 "5/17/2010" "8:47:25" "09/02/10" "12:12:48" 0 0
1 0 0 0 0 0 0 0 0 0
1 0 0.000000 0 0 0.000000 0.000000
1 0 0 0 0
:00004 1 0 0 "beam" "" 0
```

Quellen (Internet am 22.11.2013):

<http://www.sdnf.de/>

http://help.aveva.com/AVEVA_Everything3D/1.1/SDUVPDMS/wwhelp/wwhimpl/common/html/wwhelp.htm#href=OSUG3.32.01.html&single=true

XMpLant

- **XMpLant:** A brand name owned by Nextspace
- **XMpLant Schema:** An XML schema using ISO 15926 Part 4, released into the public domain by Noumenon in 2001.
- **Proteus:** The name given to a PCA/Fiatech project in 2008 which used the XMpLant Schema version 3.3.3.
- **Proteus Schema:** The new name for the XMpLant schema, published by the Proteus project as a valid schema for ISO 15926 at the Dictionary Compliance level.

Source: <http://iringtoday.com/whats-the-difference-between-xmplant-and-proteus/>



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► IFC & BuildingSMART

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There is only one buildingSMART's openBIM®



[About](#) [Standards](#) [Compliance](#) [Chapters](#) [Members](#) [Sponsors](#) [News](#)



The worldwide authority driving transformation of the built asset economy through creation & adoption of open, international standards.



buildingSMART Members



Autodesk supports IFC and buildingSMART International openBIM

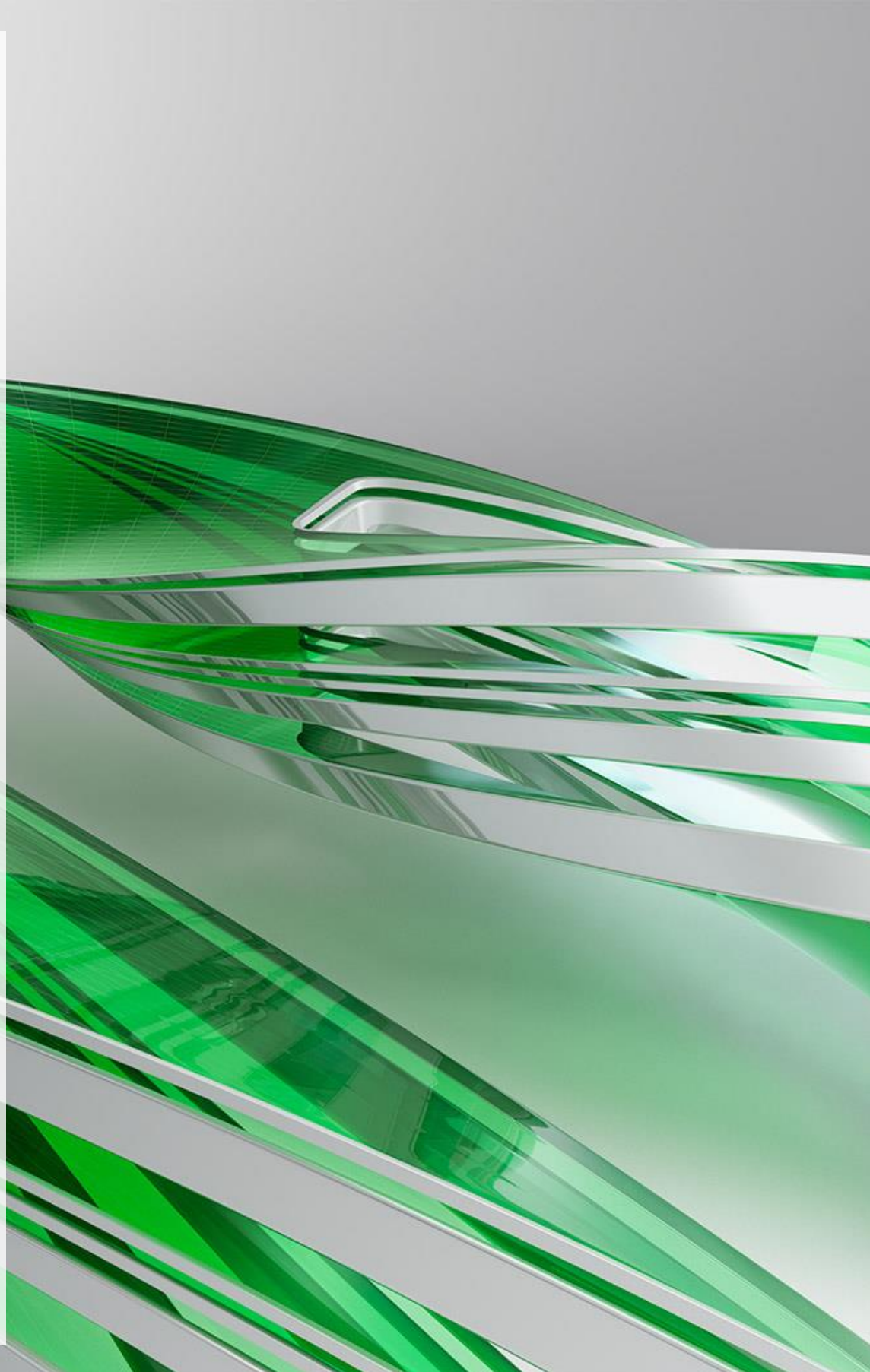
Actively participates in buildingSMART's Strategic Advisory Committee and Standards Committees

- Secured the rigorous IFC 2x3 Coordination View 2.0 certification in the first wave of vendors
- Includes IFC 4 capabilities in AutoCAD® and Revit® 2017
- Maintains the most IFC certifications of any vendor
- Made IFC import/export tool for Revit open source (only vendor)

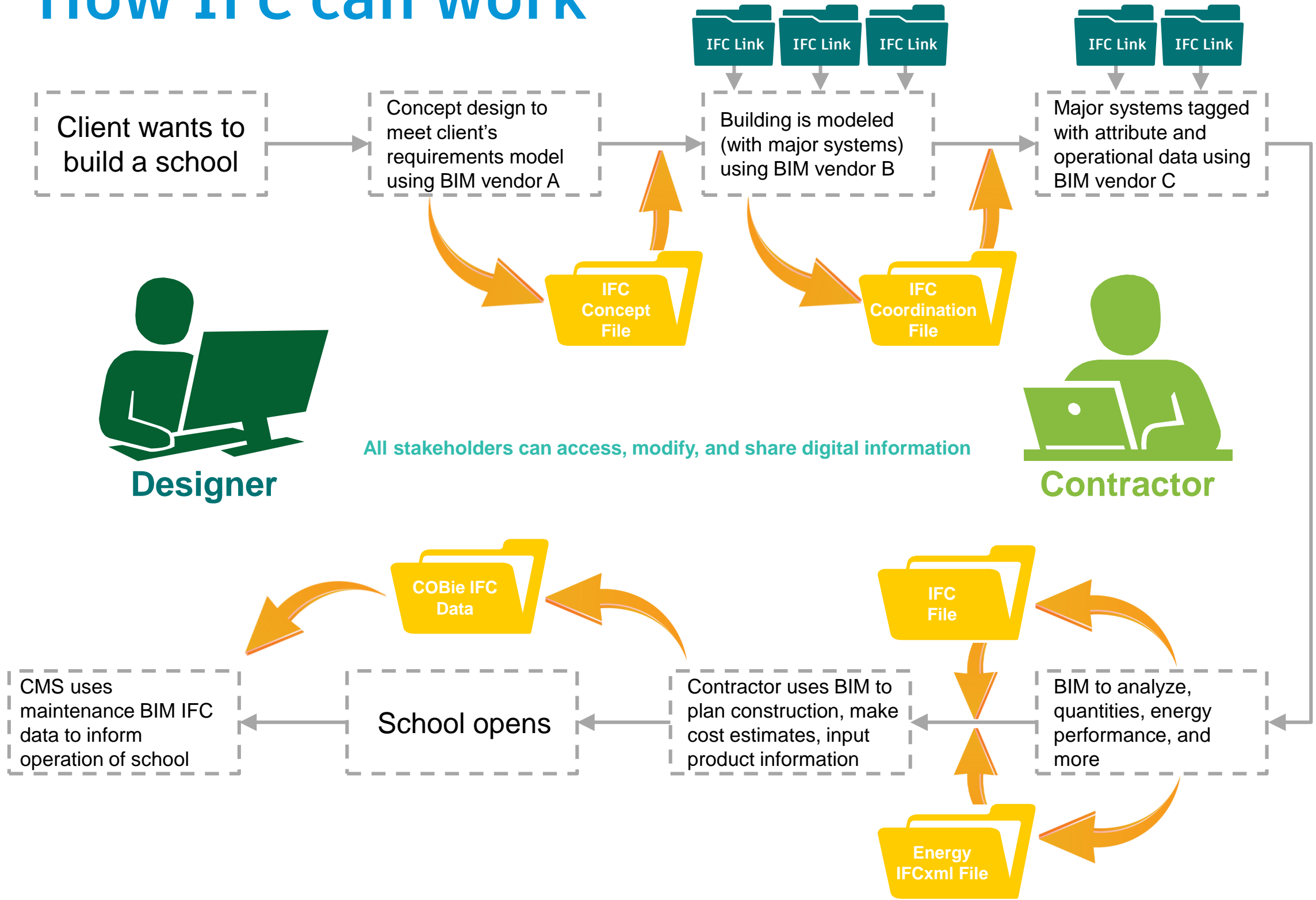


14 Autodesk 2017 products that support IFC

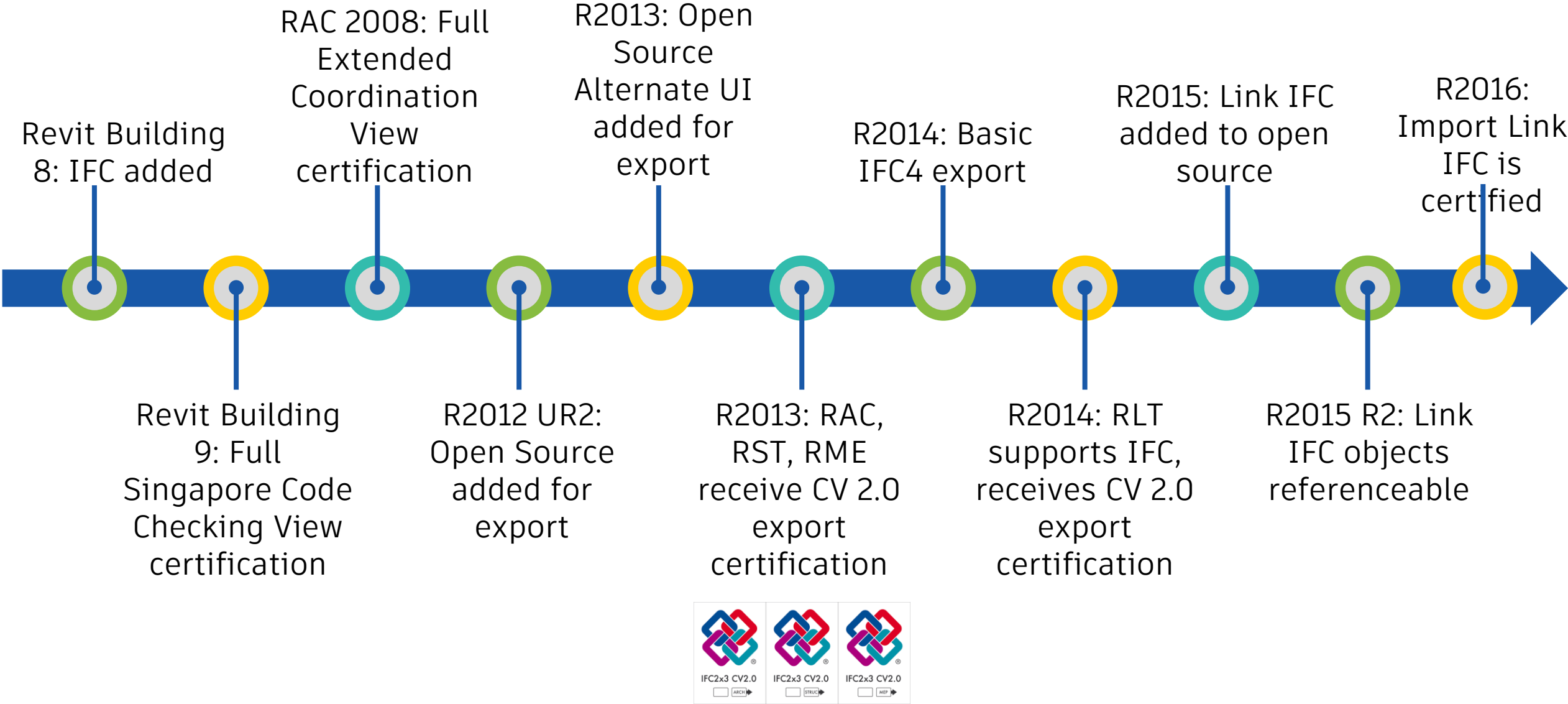
- A360
- Advance Steel
- AutoCAD Architecture, MEP
- AutoCAD Civil 3D
- BIM360 Glue
- CADmep
- Fabrication ESTmep
- Infraworks
- Autodesk Inventor
- Navisworks solutions
- Autodesk Revit (Architecture, Structure, MEP) (IFC certified)
- Autodesk Revit LT (IFC certified)
- Robot Structural Analysis



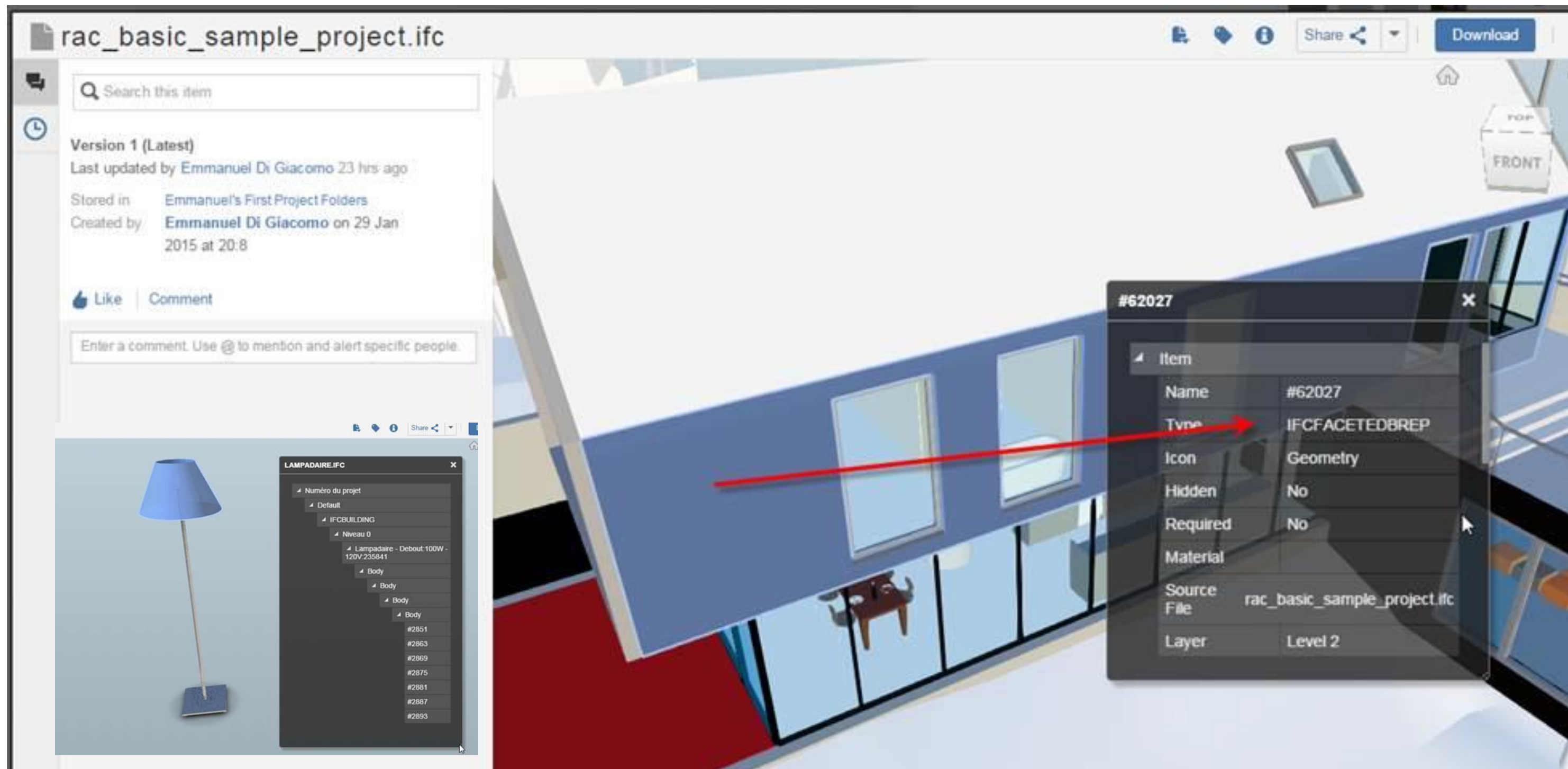
How IFC can work



History of IFC in Revit (through R2016)



IFC Viewing - A360 Platform / BIM 360



openBIM communication

EMEA openBIM URLs:

- www.autodesk.com/ifc
- www.autodesk.com/openbim
- www.autodesk.com/interoperability
- www.autodesk.fr/ifc
- www.autodesk.fr/openbim
- www.autodesk.fr/interoperability
- www.autodesk.de/ifc
- www.autodesk.de/openbim
- www.autodesk.de/interoperability

AUTODESK RECHERCHER SE CONNECTER MENU

BIM, openBIM® et Interopérabilité par Autodesk®

Autodesk, une société engagée en faveur de l'interopérabilité, de l'openBIM® et du standard IFC

Les bâtiments et les infrastructures sont complexes, tout comme les données des maquettes BIM pluridisciplinaires (BIM : Building Information Modeling) et les applications les prenant en charge. Autodesk est l'un des seuls éditeurs AEC et BIM proposant autant de solutions favorisant un flux de production BIM. Toutefois, nous estimons que les professionnels du secteur de l'AEC doivent pouvoir utiliser n'importe quelle application de n'importe quel éditeur, à n'importe quel stade de la conception, de la construction jusqu'à sa phase de gestion et maintenance. Autodesk s'engage donc en permanence à faire progresser l'openBIM® et l'interopérabilité dans l'ensemble du secteur.

Autodesk soutient activement buildingSMART International, l'organisation qui développe et gère le standard IFC, la plus importante norme en termes d'interopérabilité, en étant notamment membre actif d'une majorité de ses chapitres comme Medi@construct en France. Depuis 2011, plus de 100 000 utilisateurs ont téléchargé notre moteur d'import-export IFC Open Source pour Revit certifié par buildingSMART. Aucun autre éditeur n'a obtenu autant de certifications d'import et d'export IFC qu'Autodesk (plus de 14 de nos solutions pour l'AEC).

Autodesk a soutenu l'initiative de buildingSMART pour le développement de la norme d'échange de données BIM COBie (Construction Operations Building Information Exchange). En janvier 2013, nous avons relevé le défi COBie lancé par la buildingSMART Alliance nommé « Design Challenge for Architectural Design and Coordinated Design ». Il fut audité par une autorité indépendante et nous avons obtenu 100 % de résultats positifs en générant un élément livrable complet, conforme à la norme COBie et ne nécessitant aucun traitement ni aucune modification supplémentaire.

Enfin, Autodesk est le premier éditeur à avoir intégré le format IFC 4 au sein de sa plateforme BIM d'excellence, Revit il y a 4 ans au sein de Revit 2014.

Autodesk est le premier éditeur de solutions BIM et CAO à être en mesure de faire fonctionner ses applications sur du matériel non propriétaire et se consacre ainsi activement au concept d'ouverture ou Open Source. Autodesk:

- a créé une solution ouverte pour extraire et injecter des données dans ses applications principales, avant n'importe quel autre fournisseur majeur de CAO (le format DXF)
- a conçu un outil d'import/d'export IFC Open Source pour Revit
- a été parmi les premiers à garantir la certification au standard IFC version 2.0 Coordination View
- a contribué à la fondation de l'International Alliance for Interoperability en 1995, organisme devenu ensuite buildingSMART International
- Dédie à buildingSMART un soutien considérable dans son travail de promotion de l'ouverture du BIM ou openBIM®

buildingSMART
International home of openBIM®

IFC2x3 CV2.0 IFC2x3 CV2.0 IFC2x3 CV2.0 IFC2x3 CV2.0

En savoir plus sur le processus de certification

Compléments Revit

Les compléments pour Revit vous aident à vous conformer aux standards d'interopérabilité (IFC) et à répondre aux exigences des maîtres d'ouvrage en termes de DOE (dossiers des ouvrages exécutés).

[Télécharger maintenant](#)

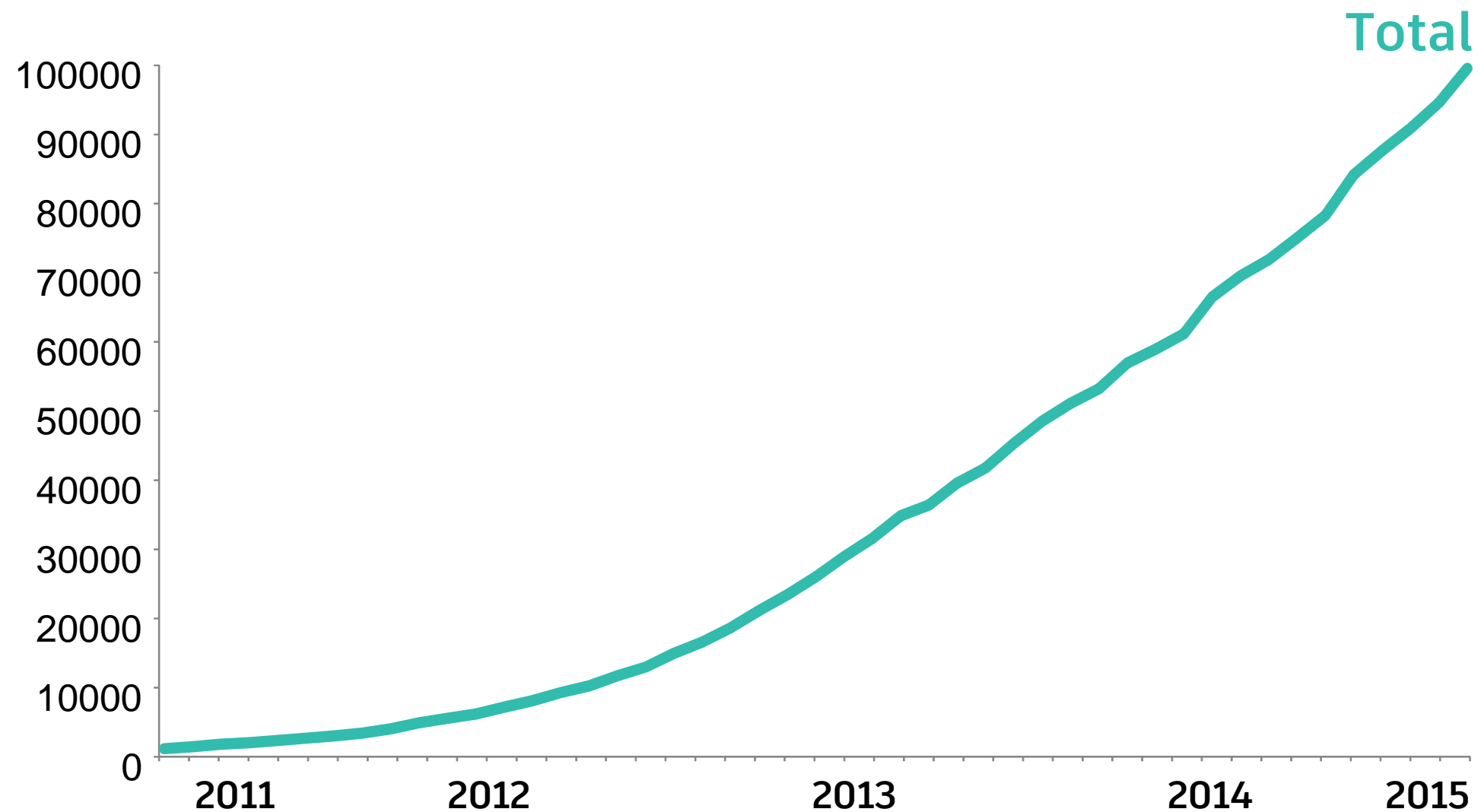
Autodesk Revit IFC is open source

Advantages of Autodesk Revit IFC open source

- Increase customer flexibility to add new property sets and data
- Updates are decoupled from Revit's release cycle with 40 software releases of the open source toolkit since its release.
- Provide a method for quick support of IFC standard extensions (MVD's) as they are introduced
- Allow others outside the Revit software development team to make contributions to IFC functionality

Revit IFC has 100,000 downloads

Download momentum is growing every day



Where to get Revit IFC open source



<http://sourceforge.net/projects/ifcexporter>

- Only public location containing source code
- Contains all versions from Revit 2012 to 2016



<http://apps.exchange.autodesk.com/RVT/Home/Index>

- Contains all versions from Revit 2013 to 2016, no code

Is there something
like IFC for Plant?



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► ISO15926

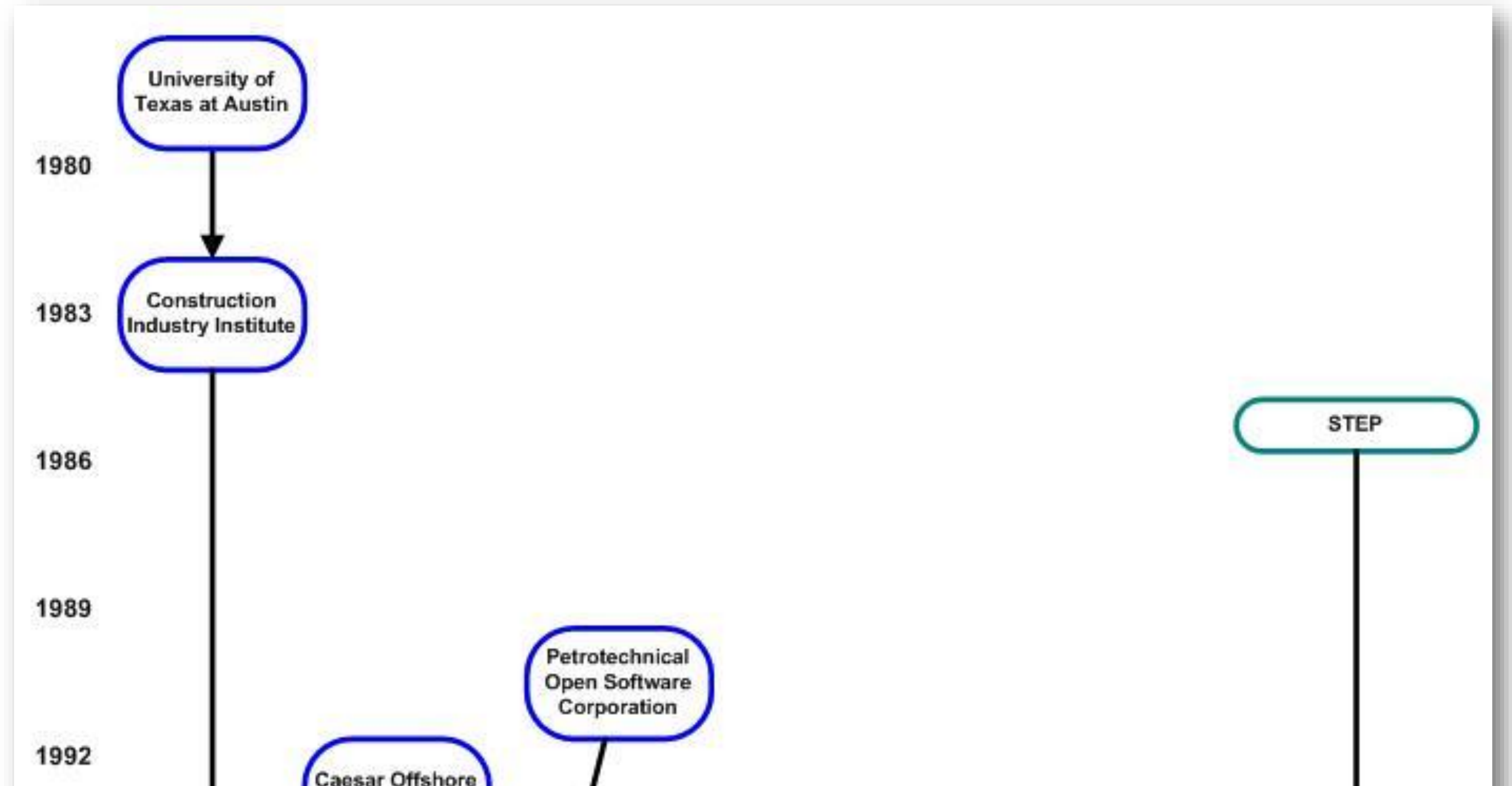
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A bit of history



Data standards in O&G Process Plant

ISO/TC67 standards published

ISO 10418 Surface safety systems
ISO 10423 Wellhead & christmas tree equipment
ISO 13533 Drill-through equipment
ISO 13534 Hoisting equipment - care/maint RP
ISO 13535 Hoisting equipment - specification
ISO 13702 Control & mitigation of fire & explosion
ISO 13703 Offshore piping systems
ISO 14224 Reliability/maintenance data
ISO 14692 GRP piping
ISO 15156 Materials for H₂S environments
ISO 15138 HVAC offshore
ISO 15544 Emergency Response
ISO 15663 Life Cycle costing, Parts 1 & 2
ISO 17776 Assessment of hazardous situations

ISO 13637 Mooring MODUs

ISO 13625 Marine drilling riser couplings
ISO 13628-1 Subsea production systems
ISO 13628-2 Subsea flexible pipe systems
ISO 13628-3 Subsea TFL pumpdown systems
ISO 13628-4 Subsea wellhead & christmas trees
ISO 13628-5 Subsea control umbilicals
ISO 13628-6 Subsea production controls
ISO 13628-8 ROV interfaces
ISO 13628-9 ROT intervention systems

ISO 10405 Care/use of csg/tub
ISO 10407 Drill stem design
ISO 10414 Field testing of drilling fluids
ISO 10416 Drilling fluids - lab testing
ISO 10426 Casing and tubing
ISO 10427 Bow spring casing centralizers

ISO 10432 SSSV
ISO 11960 Casing and tubing
ISO 11961 Drillpipe
ISO 13500 Drilling fluids
ISO 13678 Thread compounds
ISO 13679 Connection testing

ISO 19900 Offshore Structures
ISO 13819-2 Offshore Structures Fixed Steel

ISO 3977-5 Gas turbines – procurement
ISO 10434 Steel gate valves
ISO 10437 Steam turbines
ISO 10440 P D rotary compressors
ISO 10441 Flexible couplings – special
ISO 10442 Integrally geared air compressors
ISO 13631 Reciprocating gas compressors
ISO 13691 High speed enclosed gear units
ISO 13704 Calculation heat tube thickness
ISO 13705 Fired heaters for general service
ISO 13706 Air-cooled heat exchangers
ISO 13707 Reciprocating compressors
ISO 14961 Flexible couplings – general
ISO 15547 Plate heat exchangers
ISO 15649 Piping
ISO 15761 Steel valves DN 100 and smaller
ISO 16812 Shell & tube heat exchangers

ISO 3183 Linepipe
ISO 13623 Pipelines
ISO 13847 Pipeline welding
ISO 14313 Pipeline valves
ISO 14723 Subsea pipeline valves
ISO 15590 Induction bends

ISO 13680 CRA casing and tubing
ISO 14310 Packers and bridge plugs
ISO 15136 Progressing cavity pump systems
ISO 15546 Aluminium drillpipe
ISO 16070 Lock mandrels and landing nipples
ISO 18165 Performance testing of cement float equipment

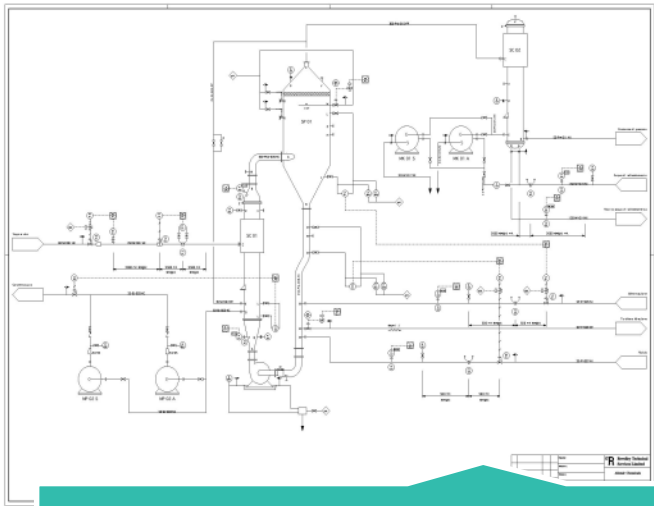


Standards in brown issued in 2002

Different types of data



Documents

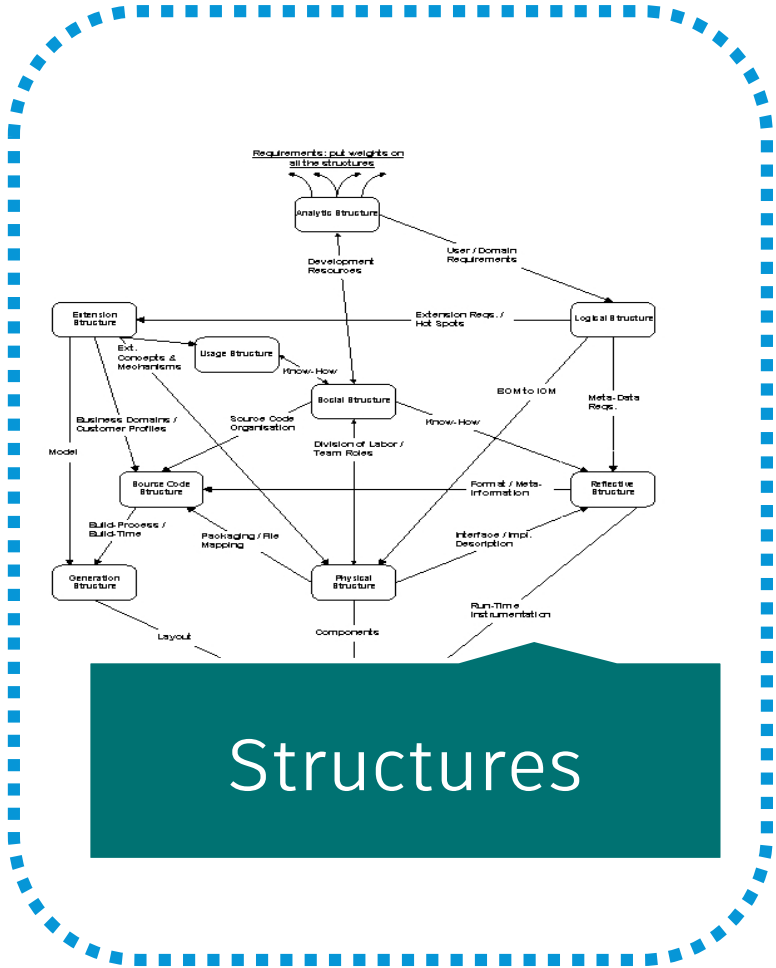


Graphics (2D, 3D)

Stückliste zur Schubflange Zeichnung Nr. ...

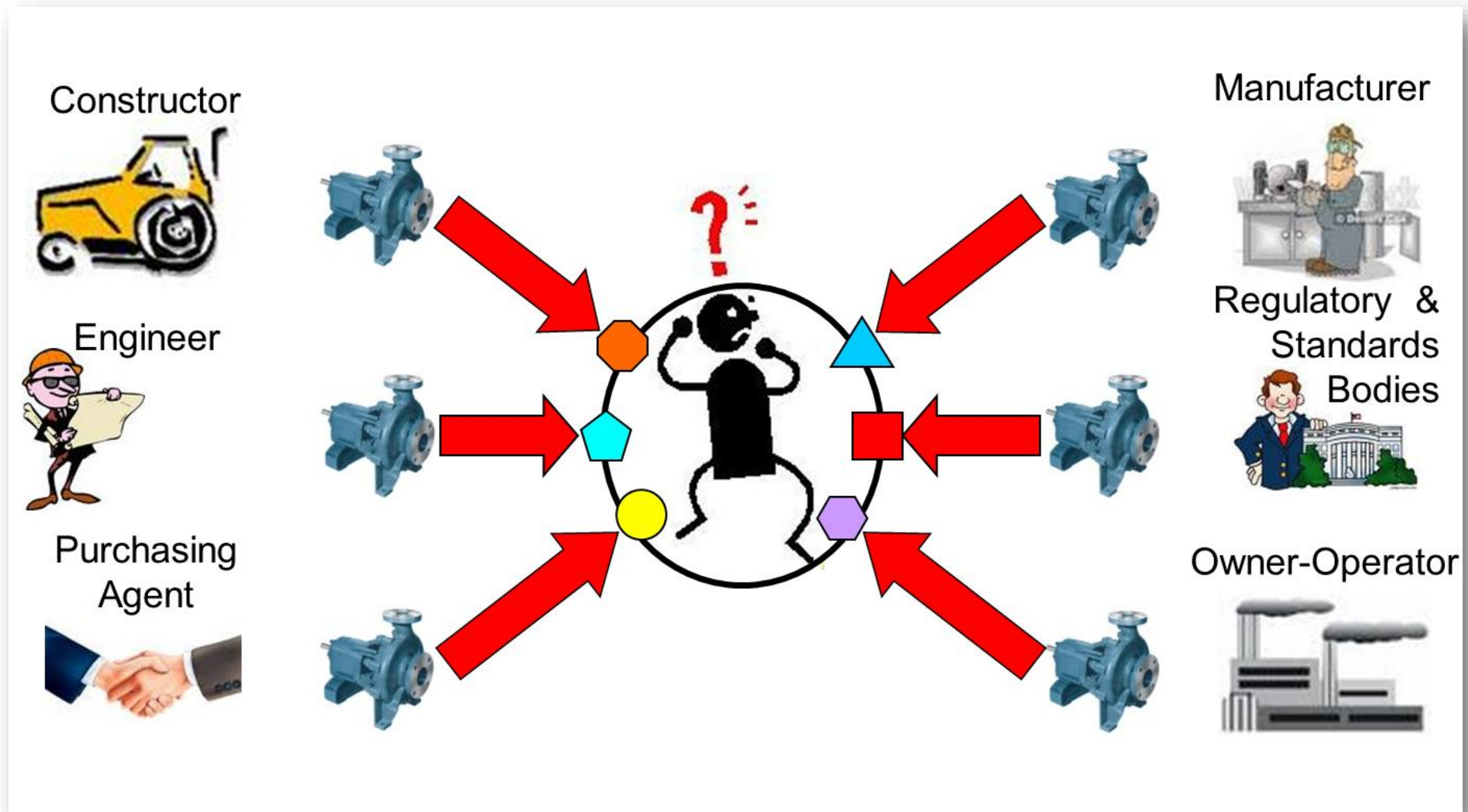
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O				
P				

Lists

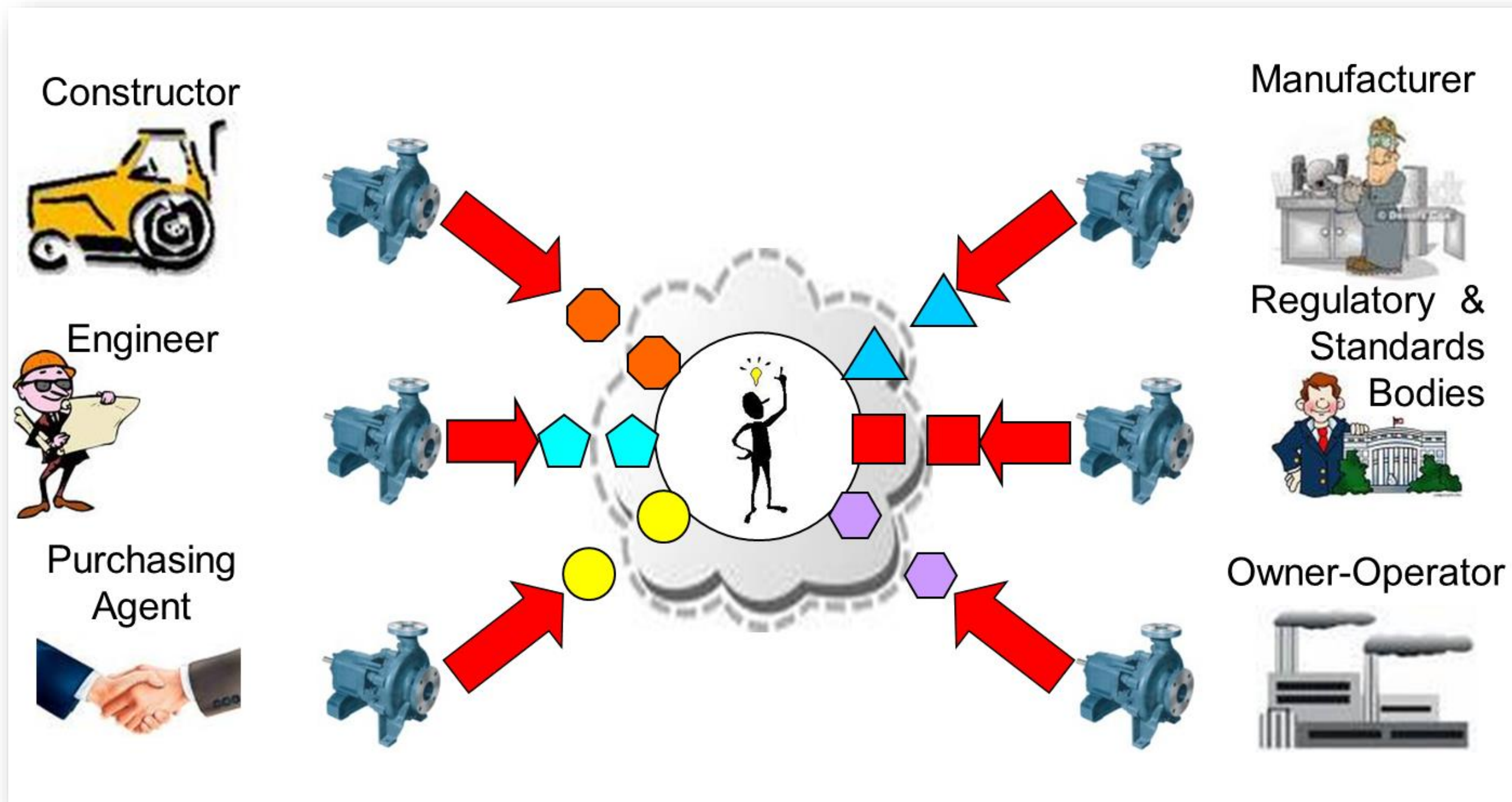


Structures

How Information Exchange Actually Works



How ISO 15926 Handles Information Exchanges



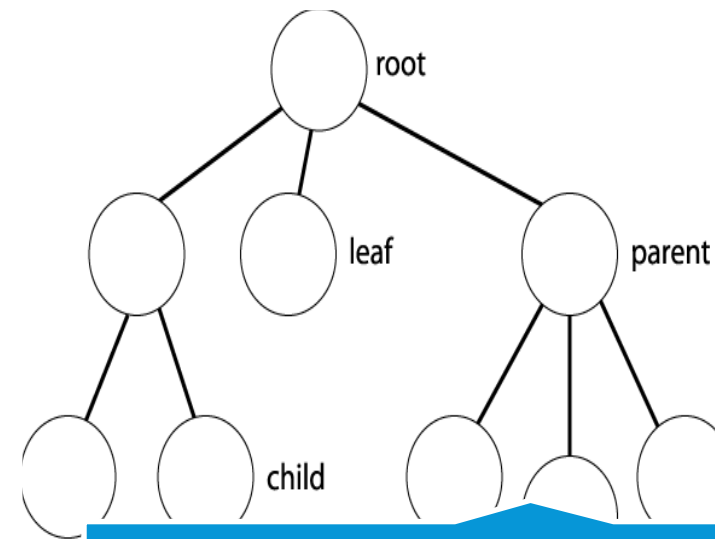
The Basic Concepts of ISO 15926



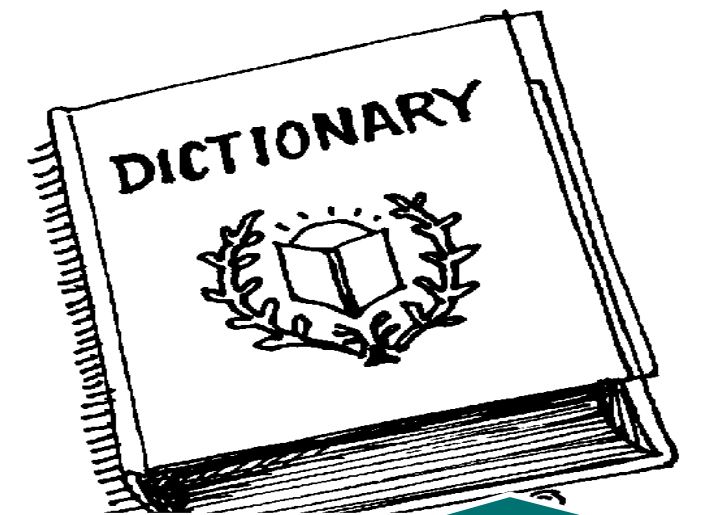
Describe the how
not the what



Exchange data
between machines

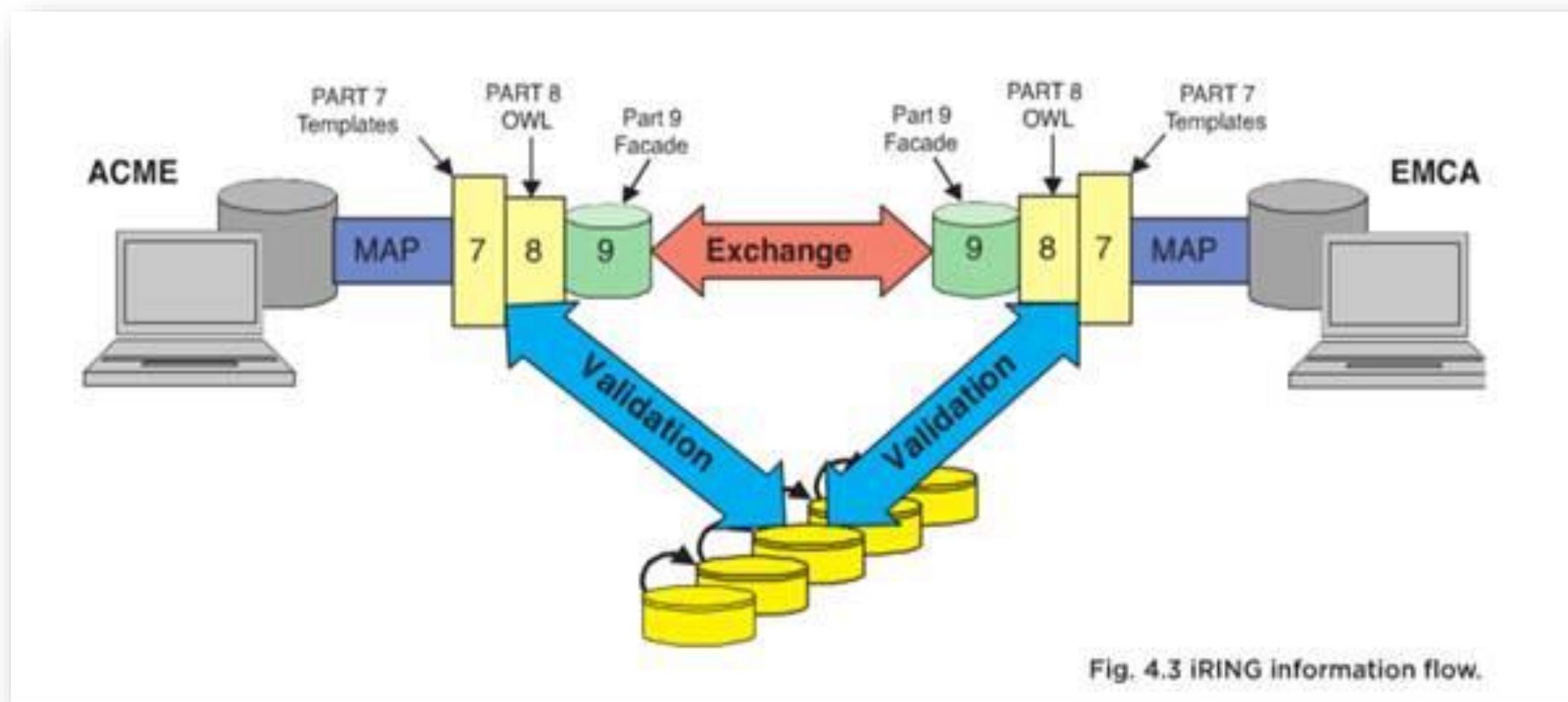


Knowledge about
family

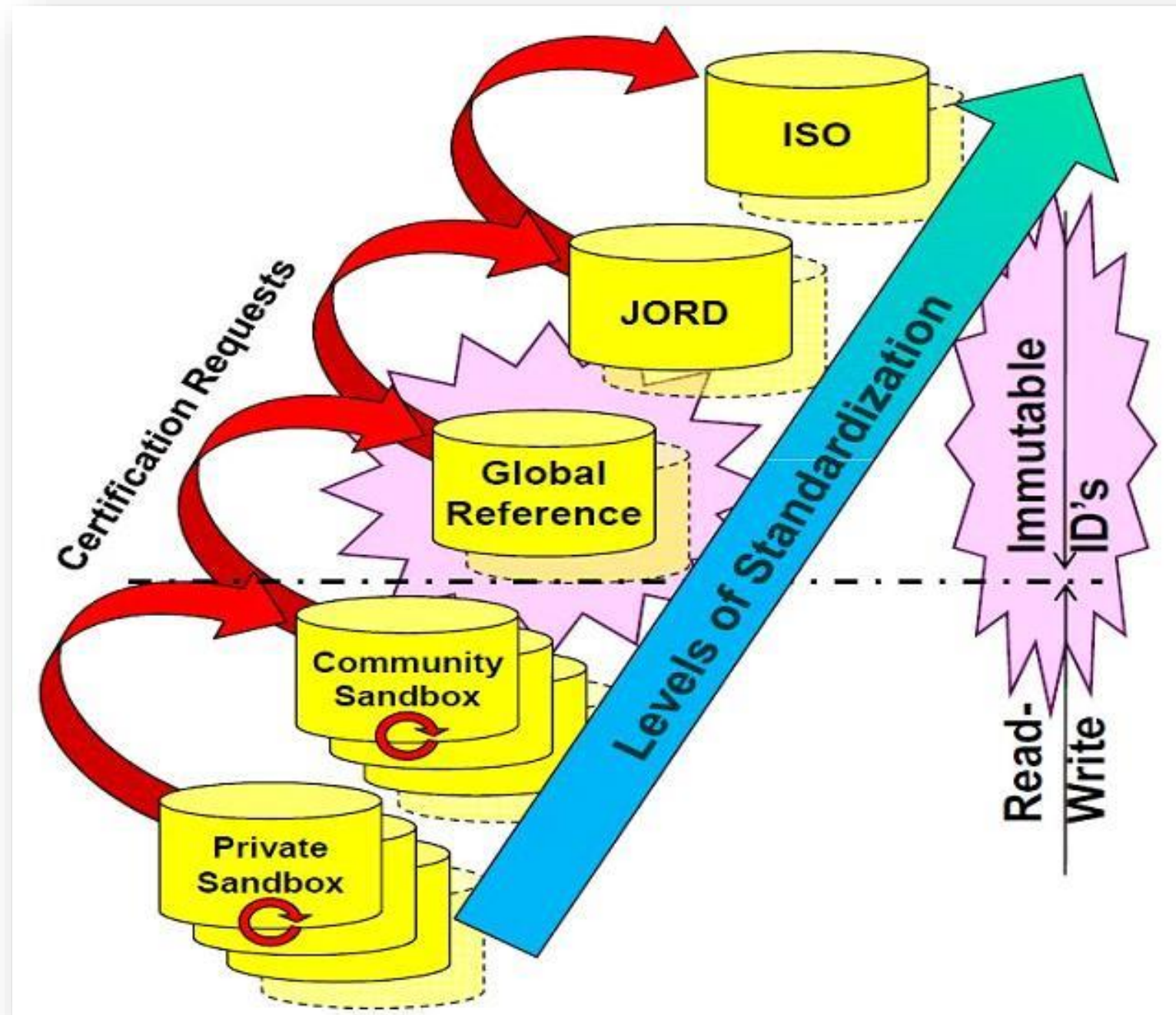


Centralized common
dictionary (RDL)

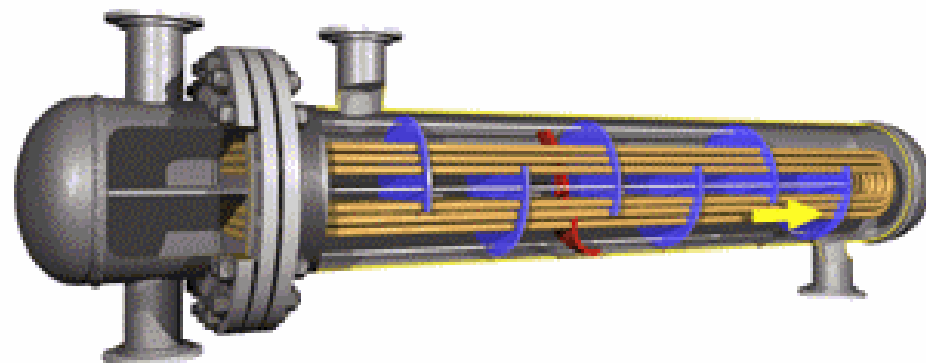
The ISO 15926 framework



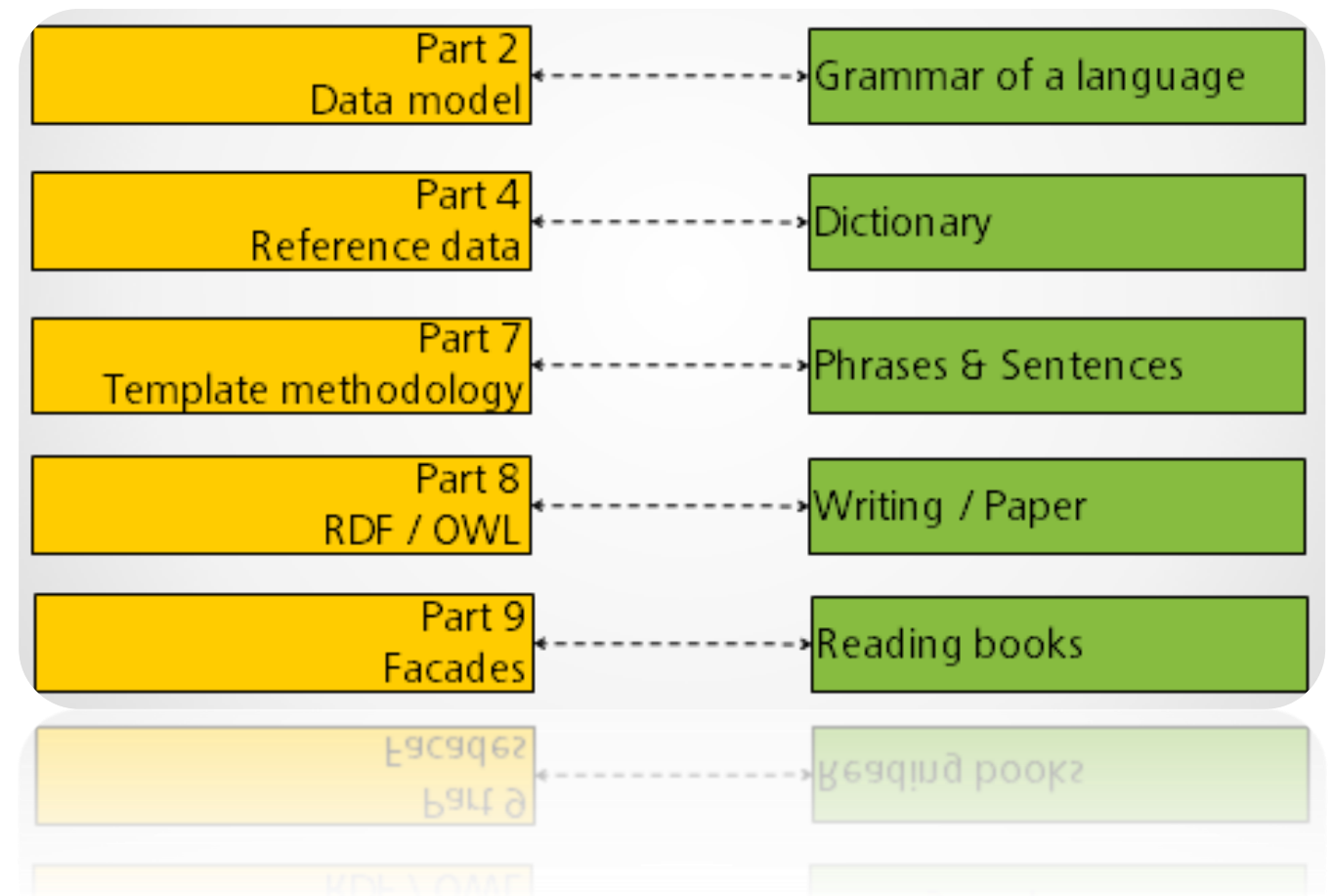
Standardization



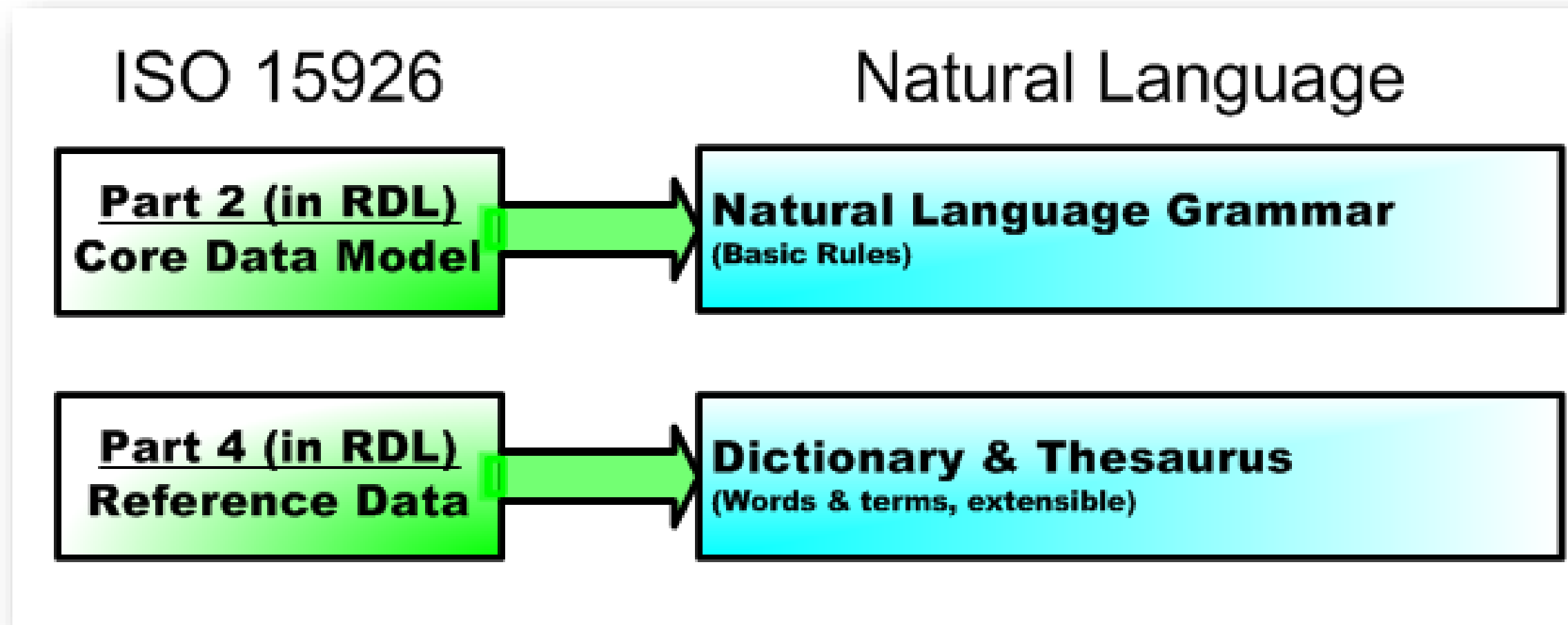
How ISO15926 works: Modelling a heat exchanger



Copyright Southern Heat Exchanger Corporation

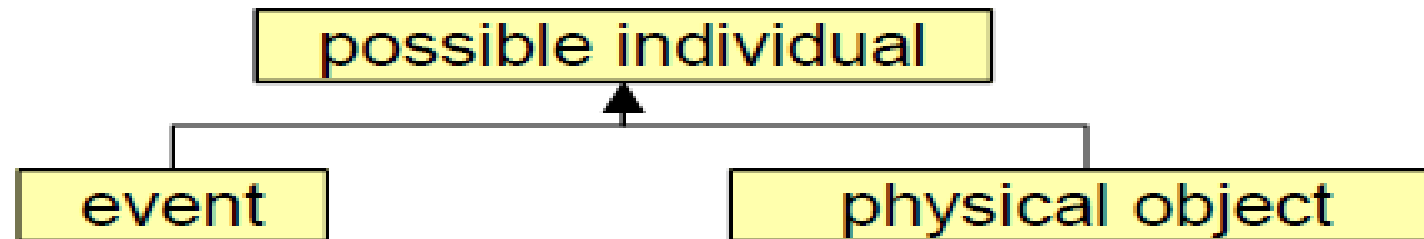


How ISO 15926 Works - Part 2 and Part 4



ISO 15926 – part 2

ISO 15926: Part 2
Data Model



Notation



specialization, e.g.: an *event* is a special kind of a *possible individual*



classification, e.g., *HE231-23-1* is a *physical object*.

Note that this is a simplified UML-like representation instead of the verbose graphical notation of ISO 15926.

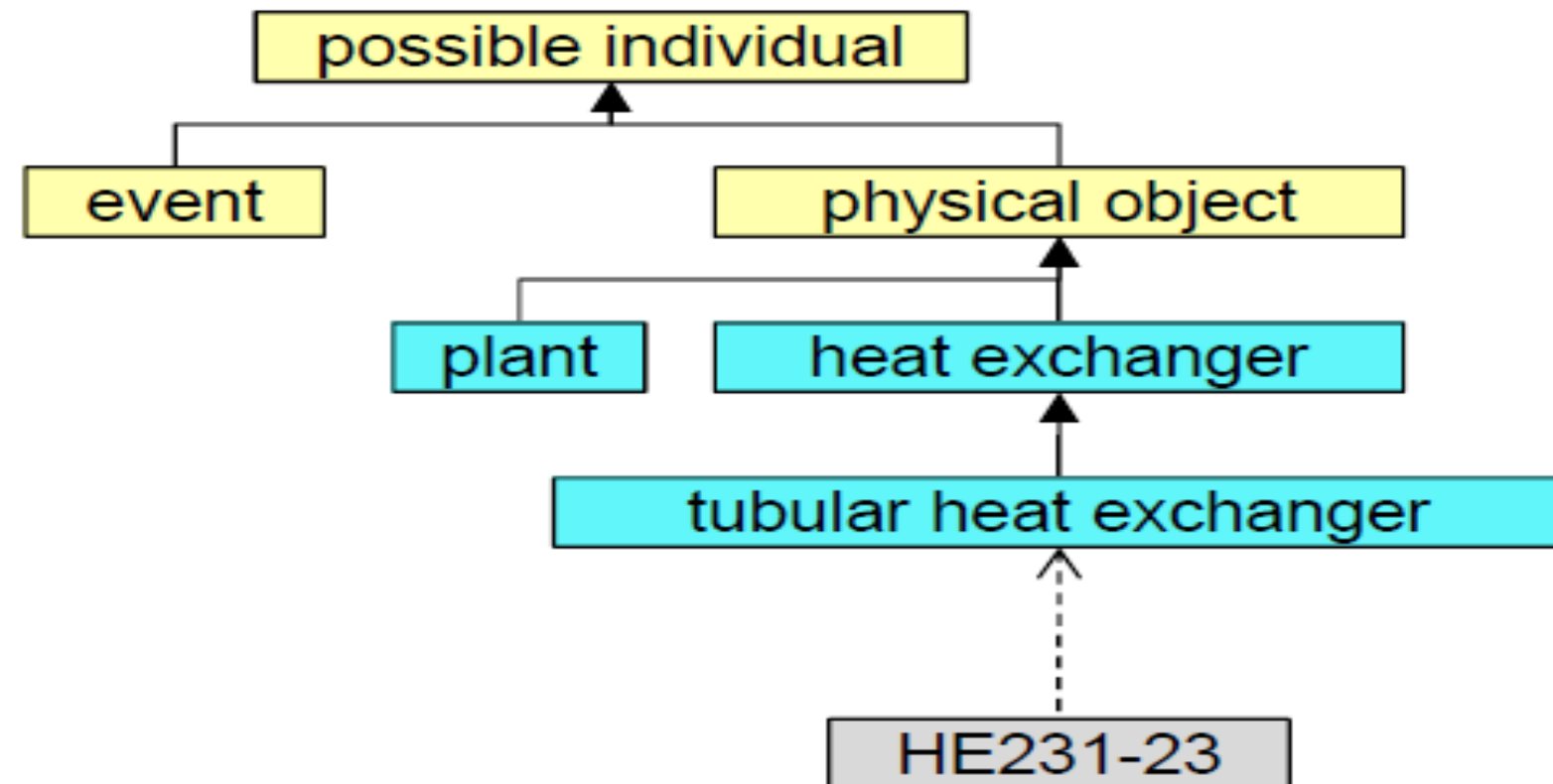
HE231-23

HE231-23 is a physical object.

ISO 15926

ISO 15926: Part 2
Data Model

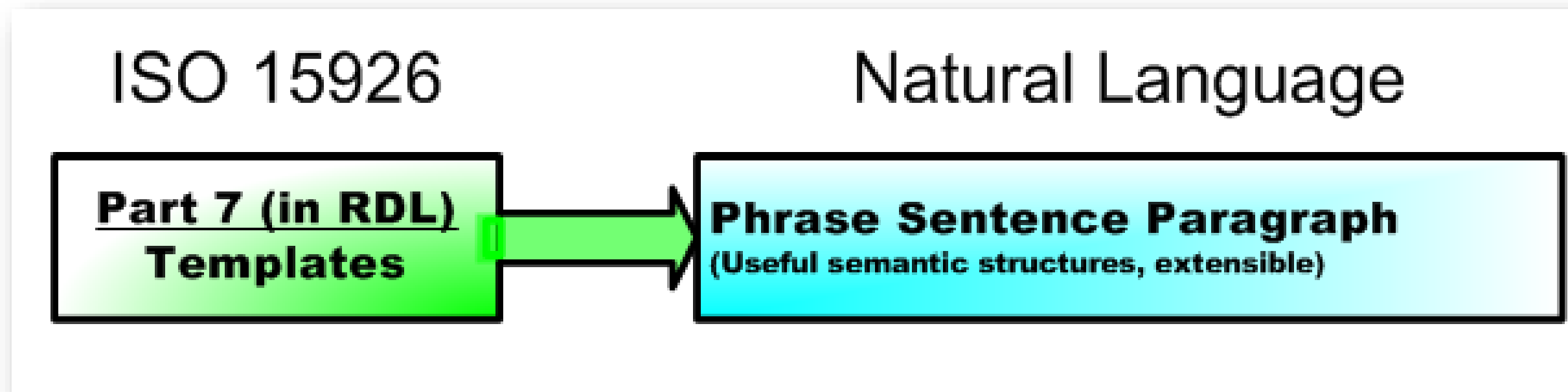
ISO 15926: Part 4
Initial Reference
Data



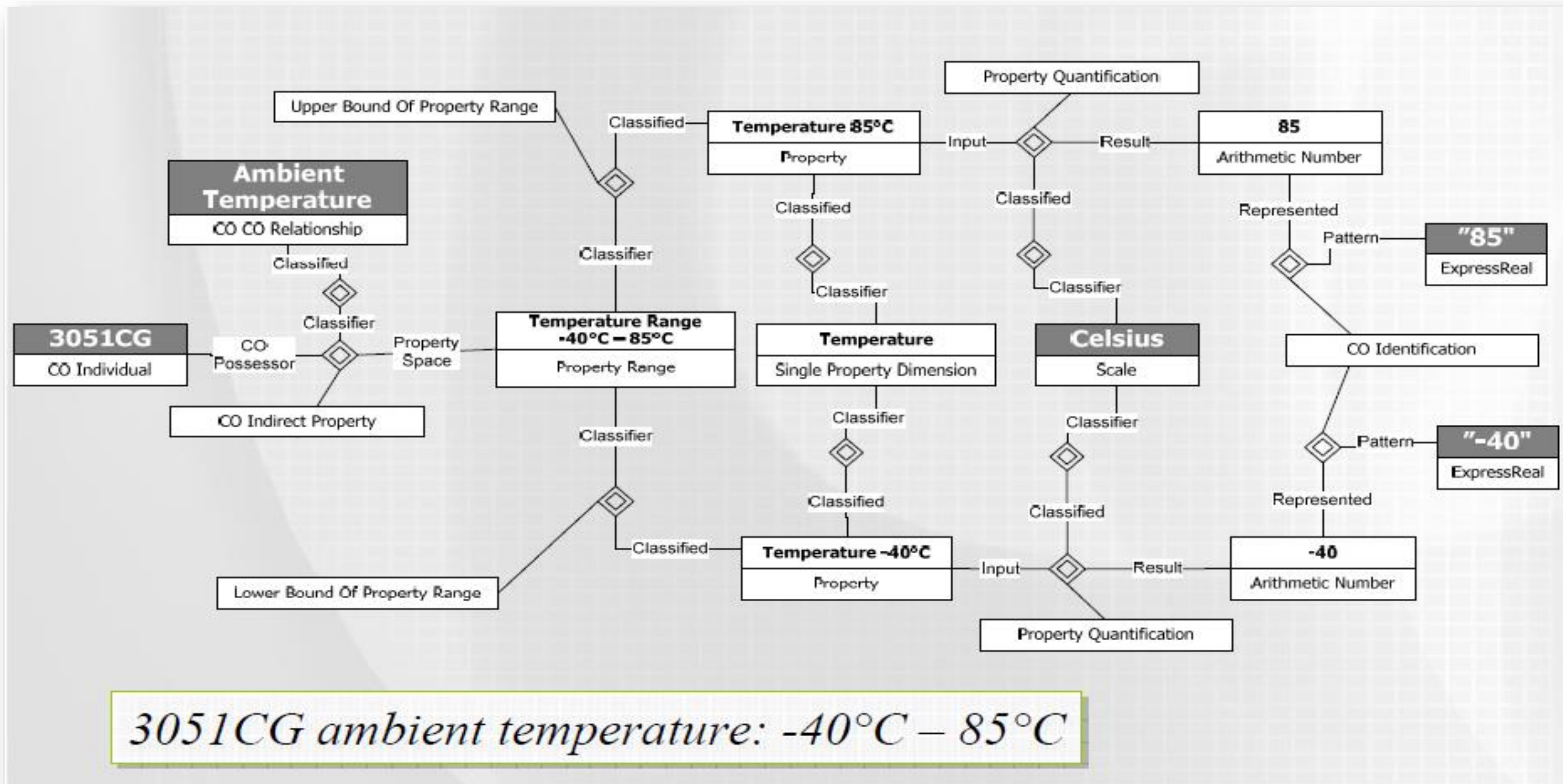
HE231-23

- is a *tubular heat exchanger*,
- has an ambient temperature range of 10°C - 30°C,
- ...

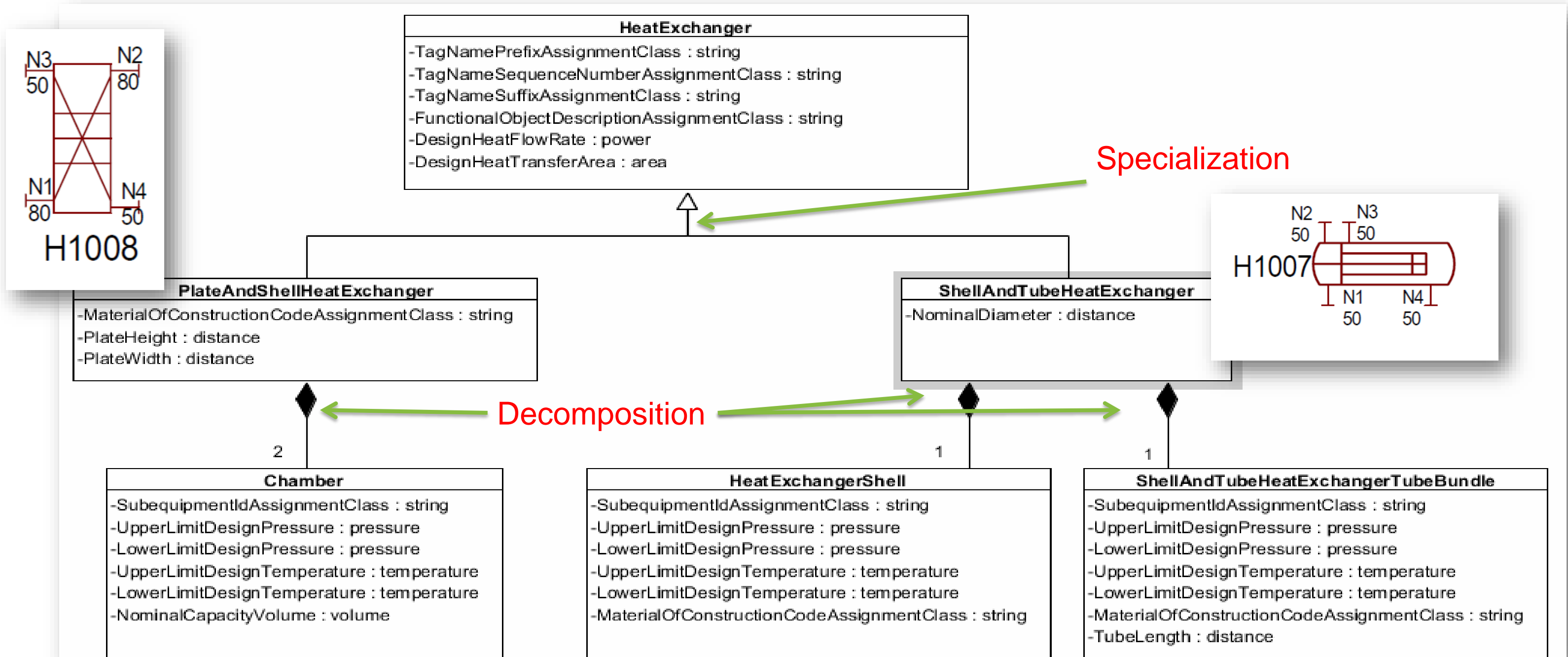
How ISO 15926 Works - Part 7



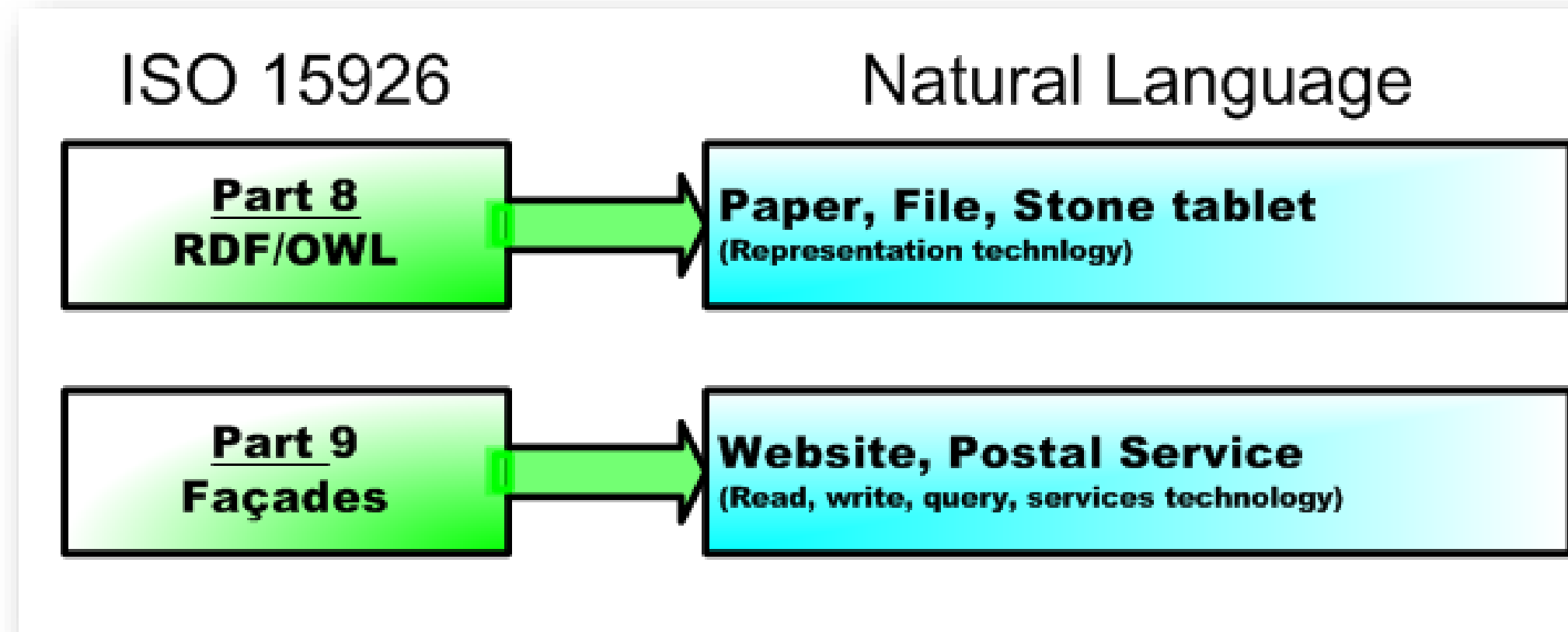
A Simple Example of a Data Record



Heat Exchanger Modelling

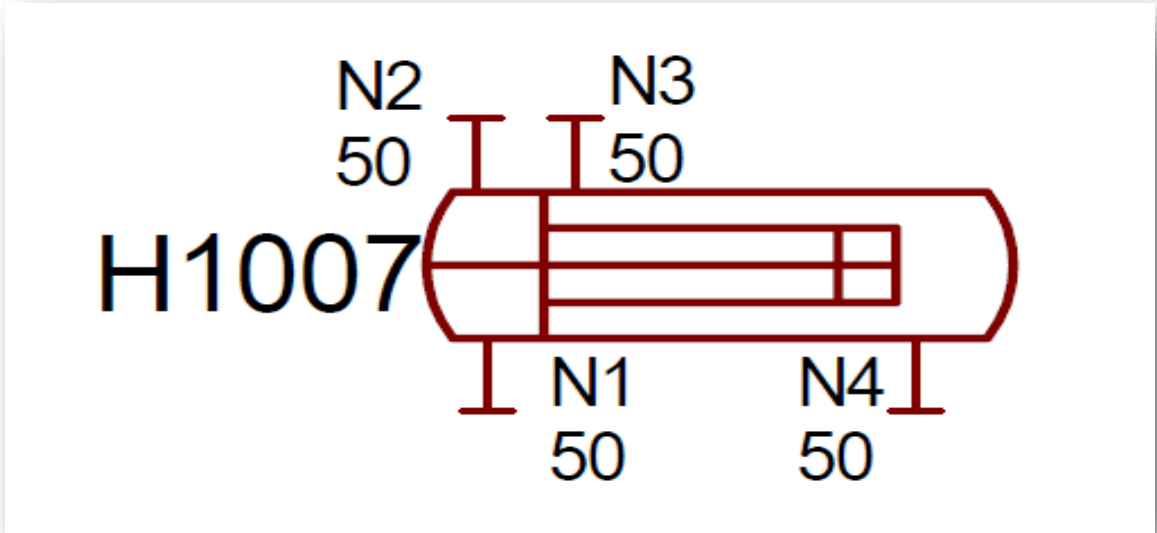


How ISO 15926 Works - Part 8 and Part 9



Heat Exchanger in the Sample PID

Here:
Shell and Tube Heat Exchanger



Ident	H1007	
Design Press. min. Chamber 1 / 2	-1 barg	-1 barg
Design Press. max. Chamber 1 / 2	60 barg	30 barg
Design Temp. min. Chamber 1 / 2	-45 °C	-45 °C
Design Temp. max. Chamber 1 / 2	100 °C	100 °C
Design Duty / Design Heat Transfer Area	313 kW	46,8 m²
Nominal Diameter / Tube Length	DN 800	2200 mm
Material Tubes / Material Shell	1.4306	1.4308

Agenda

Problem Statement

Data – Information – Knowledge

Data exchange in Process Plant

IFC & BuildingSMART

ISO15926

- ▶ DEXPI/ISO15926 Initiative
- Cooperation w/ Industry Groups
- Summary, Q&A



Anno 2011: Bayer asked us to join the initiative

Sent: Dienstag, 12. Juli 2011 13:29

Subject: Koordinationskreis Working Group "ISO 15926 und EQP-Liste" in Leverkusen

Sehr geehrte Herren,

Im Nachgang zum Jahrestreffen der Fachgemeinschaft "Prozess-, Apparate- und Anlagentechnik" (PAAT) im November 2010 in Magdeburg haben die Firmen Evonik Degussa, BASF und Bayer Technology Services eine Arbeitsgruppe zur Evaluierung der ISO 15926 gegründet.

Dabei spielt die Verzahnung der technischen Möglichkeiten der ISO 15926 mit Anforderungen aus Planung und Betrieb verfahrenstechnischer Anlagen eine wichtige Rolle. Bisheriger Fokus der Zusammenarbeit ist eine gemeinsame, firmenübergreifende Informationsmodellierung von Apparaten und Maschinen. Nächster Schritt ist eine Abbildung dieses gemeinsamen Verständnisses in eine ISO 15926-kompatible Darstellung.

Weiterhin möchten wir in dieser Fallstudie auch den Umgang aktueller CAE-Werkzeuge mit der ISO 15926 einbeziehen. Wir möchten Sie daher einladen, mit uns beim nächsten Termin unserer Arbeitsgruppe am **27.7.2011 in Leverkusen** mögliche Szenarien zu diskutieren.

Es wird angestrebt, erste Ergebnisse auf dem Jahrestreffen der PAAT 2011 in Fulda vorzustellen.

Auf Ihre Rückmeldung und eine Zusammenarbeit zum Thema ISO 15926 freuen wir uns.

Mit freundlichen Grüßen,

T. Kügerl
(Evonik Degussa GmbH)

H. Mannsperger
(BASF SE)

J. Kussi
(Bayer Technology Services GmbH)

DEXPI Project



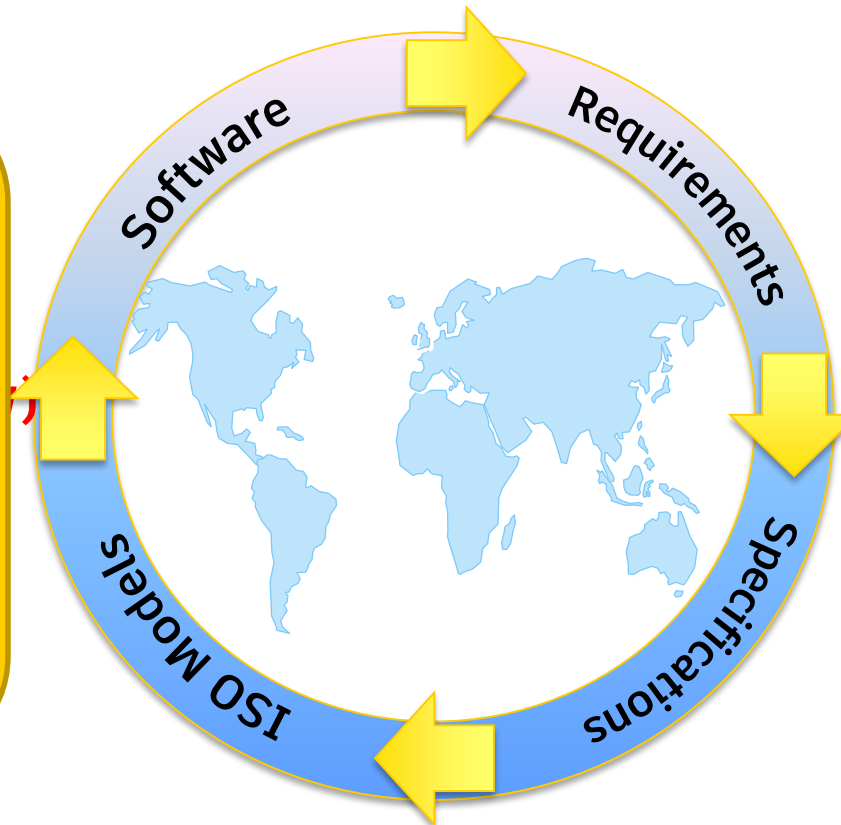
Three major O/O, two EPC's *and* the major CAE vendors in *one* working group.

Very pragmatic approach with an agile touch.

Operational working mode adapted when required.

Coordination
Requirements

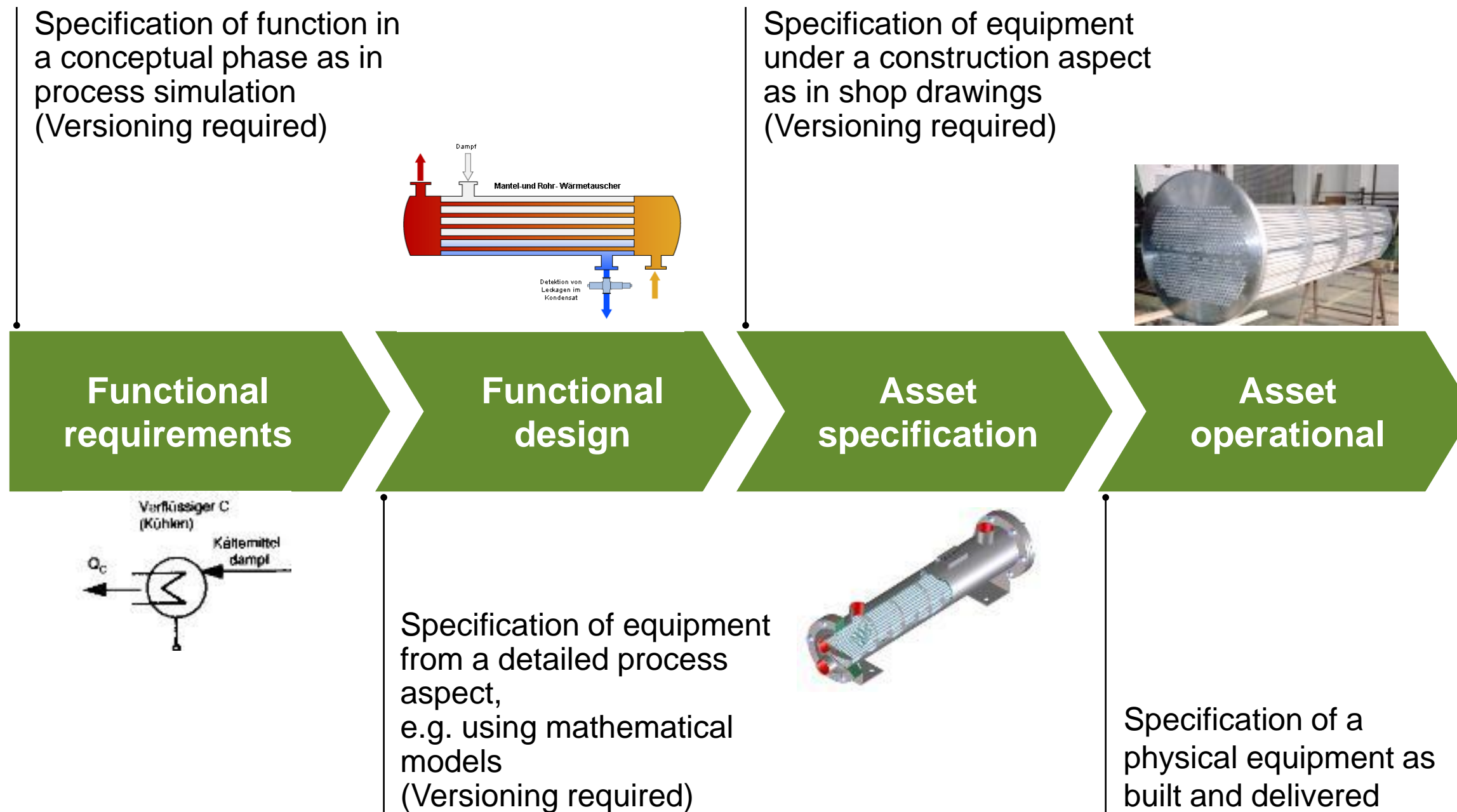
Implementation
Proteus know-how
ISO knowledge
Interface building
Graphic exchange



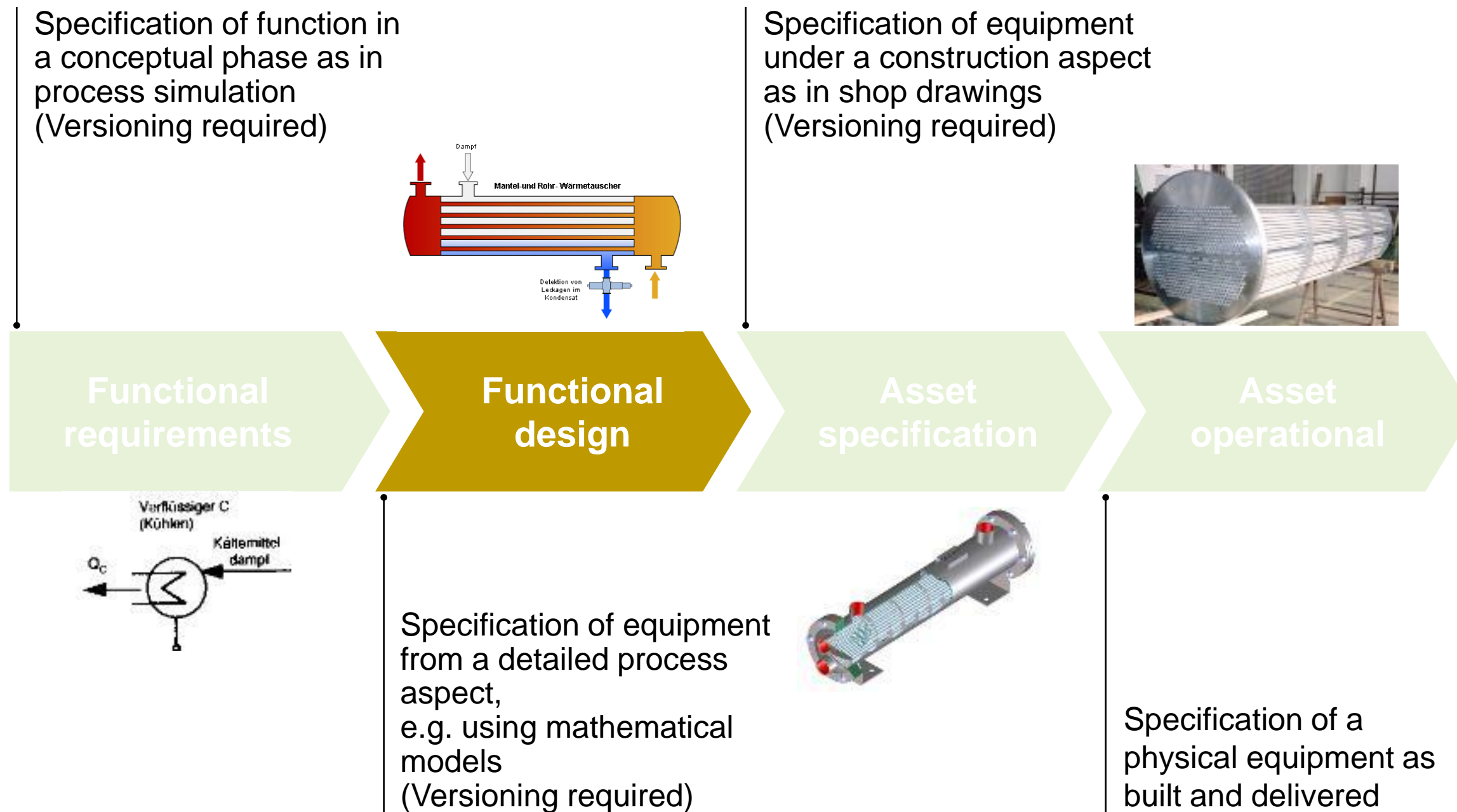
Conceptual model
Specifications
Validation /
Verifier
DEXPI home
page

Model support
Model extension

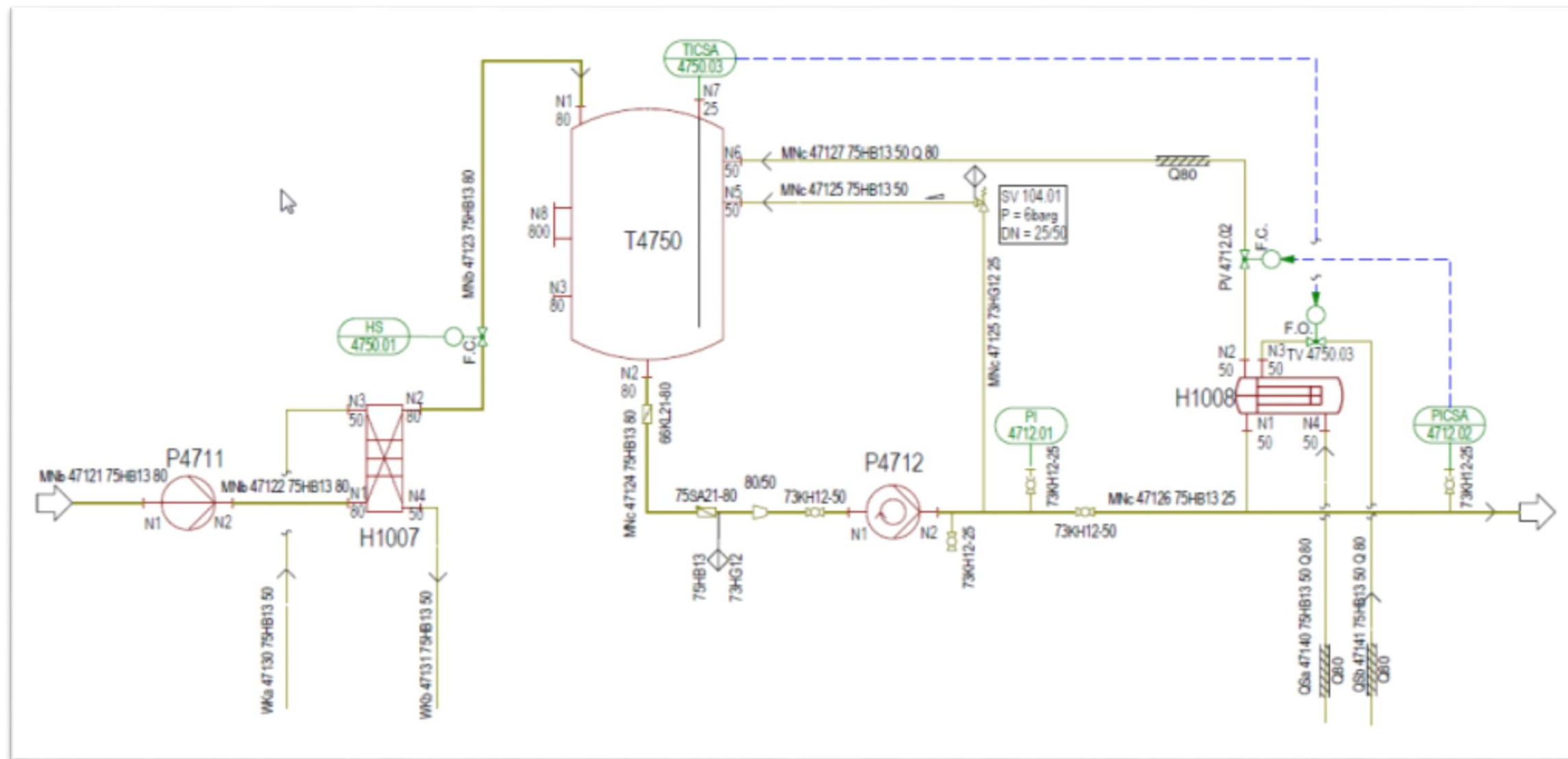
Life cycle



Life cycle



Scope for data exchange - P&ID fragment



DEXPI approach



Methodology: ISO 15926 + Proteus (XMpLant) scheme

All main CAE software vendors involved

Impact of DEXPI work to international standards

Bottom up, pragmatic approach

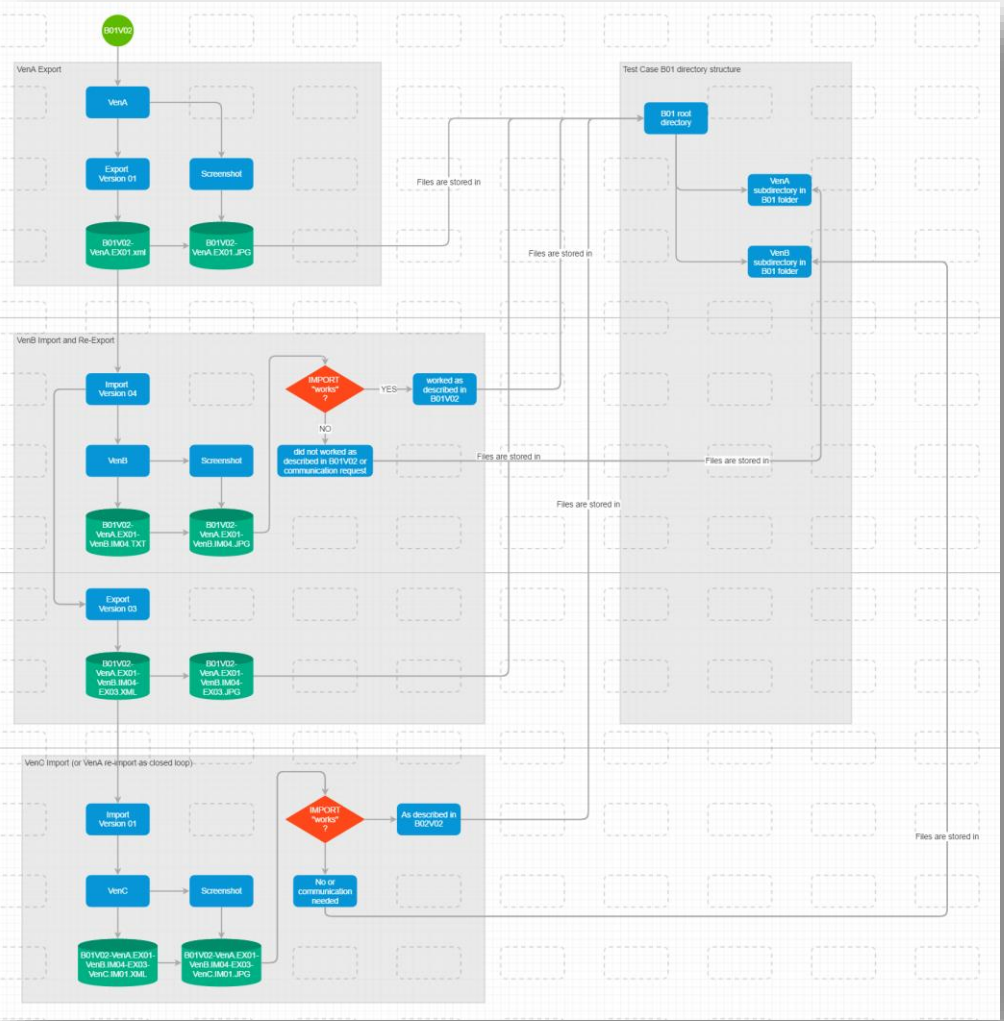
International coverage, not only local



Proteus Scheme as bridge

Test Cases as Collaboration Methodology

Exx	Pxx	Ixx	Dxx	Cxx
• Equipment	• Pipelines, • Inline Items, • OPC	• Instrumentation	• Drawing annotation, • title block	• Complete small loops • Combination



Agile Approach implemented



Current State of AutoCAD P&ID DEXPI interface

DEXPI-Interface

November 2016

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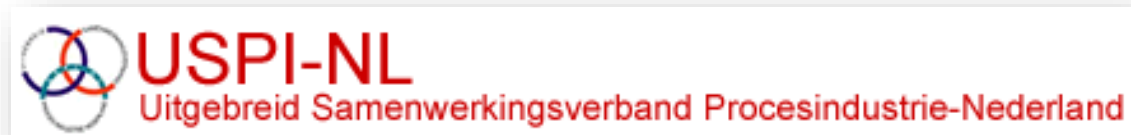
ISO15926

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Influence and cooperation





FiatechTM

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DRIVING INDUSTRY
SOLUTIONS

SEPTEMBER 19 - 21, 2016 NEW ORLEANS, LA



Contact & More Information

<http://dexpi.org>



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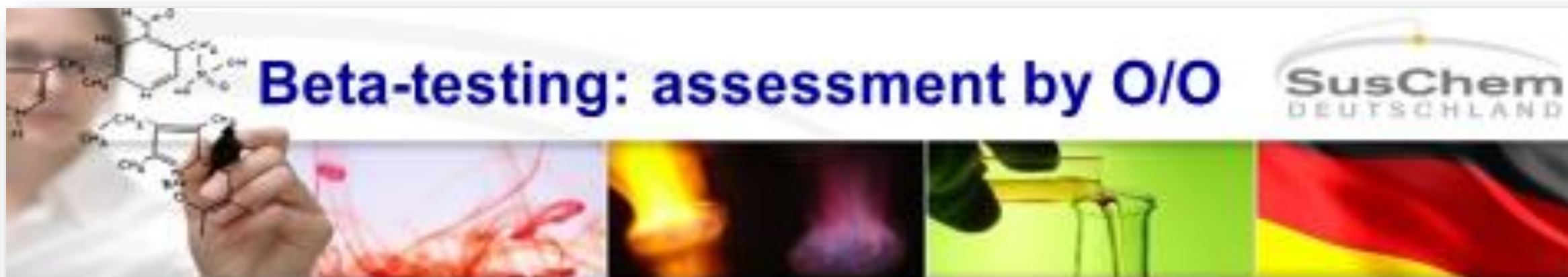


Zum Datenaustausch zwischen P&ID-Systemen – Von der DEXPI-Spezifikation zur Implementierung

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Thomas Lanzendorf, Air Liquide, Frankfurt/D;
Hannes Richert, Evonik Technology & Infrastructure GmbH, Hanau-Wolfgang/D;
Franz Schulze, AixCAPE e. V., Aachen/D;
Heiner Temmen, Evonik Technology & Infrastructure GmbH, Marl/D;
Manfred Theißen, AixCAPE e. V., Aachen/D;
Lars von Wedel, Bayer AG, Leverkusen/D;
Richard Welke, BASF SE, Ludwigshafen/D;
Michael Wiedau, RWTH Aachen, Aachen/D*

ProcessNet – A joint initiative of DECHEMA and GVC/VDI





O/O EPC	Tool 1 (vendor)		Tool 2 (vendor)	Setup; Export DEXPI Example P&ID	Equipment; Piping; Symbols; OPC; Title block;	Instrumen- tation
Air Liquide	SP P&ID (Intergraph)	⇒	AutoCAD P&ID (Autodesk)	☺	In progress	In progress
BASF	COMOS P&ID (Siemens)	↔	AutoCAD P&ID (Autodesk)	☺	In progress	In progress
Evonik	SP P&ID (Intergraph)	⇒	COMOS P&ID (Siemens)	☺	☺	In progress
				Proof of concept	Investment projects	



Vendor	Import (Imp) Export (Exp)	Piping	Equip- ment	Symbols and labels	Instrumen- tation	OPC title blocks
AVEVA	Imp+Exp	☹	☺	☺	✗	✗
Autodesk	Imp+Exp	☹	☺	☹	✗	✗
Intergraph	Exp	☹	☹	☹	✗	✗
Siemens	Imp+Exp	☹	☹	☹	✗	✗
X-Visual	Imp ¹	☹	☺	☹	✗	✗
Bentley ²	—	—	—	—	—	—

¹Export development started

²Bentley does not support Proteus XML

☺	≥ 85%
☹	≥ 75%
✗	< 75%



- DEXPI specification based on international standards
- Applicable for ANSI, IEC and DIN based P&IDs

P&ID standard	Instrumentation	Data exchange
ISO 10628	IEC 62424	ISO 15926
	ANSI 5.1	Proteus
	DIN 19227	(formerly XMPlant)
	IEC 61987	

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Summary

Data Handover is a business issue

Autodesk supports open Standards

If there is no standard, we help to develop

DEXPI PID interface for AutoCAD PID is in Beta state

Autodesk continues investment in PP Industry



Thank you

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Q&A - Comments





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Section/chapter title slide

