OPC DAY FINLAND 2016

TUESDAY, OCTOBER 18TH 2016 @BECKHOFF, HAKAKALLIONTIE 2, HYVINKÄÄ

Data EXchange in the Process Industry (DEXPI) group and OPC UA

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Overview

- Challenge of interoperability
- ISO 15926 standard
- Proteus schema for P&ID and 3D data
- DEXPI Group - Data Exchange in the Process Industry
- OPC UA companion specification for the Proteus XML format
- Questions

Challenges…

- **Interoperability** between Computer Aided Engineering tool vendors is very poor
- A (short term) business interest for software vendors to **restrict** their customers to their platform (**vendor lock-in**)
- **This lack of interoperability is problematic** for the adoption of new practices towards industry 4.0 factories of the future, etc.

The ISO 15926 standard

- “ISO 15926 Integration of life-cycle data for process plants including oil and gas production facilities”

- Initiated, maintained and enhanced by the **POSC Caesar Association** (PCA)
  - “A non-profit global-standardization member organization that shall promote the development of open specifications to be used as standards for enabling the interoperability of data, software and related matters” (https://www.posccaesar.org/)

- ISO 15926 iRINGTools User Group (Fiatech initiative): An attempt to describe a central system which connects different approaches through mapping. It was not so successful. The name “iRing” is used sometimes instead of ISO 15926.

Proteus schema for exchanging P&ID and 3D data

- Started its life with the name "**XMpLant**", the schema was managed by a consultant company (Noumenon consulting ltd), now managed by Nextspace

- "**Proteus**" Fiatech project
  - "The Proteus project was originally called Matrix 1,2,3 and was initiated in response to the IDS-ADI Workshop in Houston April 2008. **The goal was to determine the business requirements for and define the ISO 15926 model to support the exchange of intelligent P&ID and 3D models** between different vendor systems." (http://fiatech.org/component/content/article/196-project-deliverables/project-deliverables-information-management/1115-proteus-project)

- Now the schema is called "Proteus" and it is used by ISO 15926

- It is **managed by the ISO 15926 Information Models and Proteus Mappings (IIMM) Fiatech project** (http://fiatech.org/information-management/projects/1161-iso-15926-information-models-and-proteus-mappings-iimm)

DEXPI - Data Exchange in the Process Industry

- Objective of DEXPI group: "to **develop and promote a general standard for the process industry covering all phases of the lifecycle of a (petro)chemical plant**, ranging from specification of functional requirements to assets in operation. This standard shall cover formats and content to address various problems seen today" (http://www.dexpi.org/).

Who is behind DEXPI group?

- DECHEMA ->
  - -> Processnet (DECHEMA initiative)
    - -> DEXPI (working party of ProcessNet)

- **DECHEMA**: "Founded in 1926, this is a non profit organisation based in Frankfurt. It has over 5000 chemists, biotechnologists, and engineers as personal members as well as other organisations and company members" (https://en.wikipedia.org/wiki/DECHEMA)

- "**ProcessNet** is a joint initiative of DECHEMA and VDI-GVC and bundles all activities in process engineering, chemical engineering and technical chemistry" (http://www.dechema.com/en/Chemical+Engineering+_+ProcessNet-p-122836.html)

DEXPI Group – members (dynamic list)

The DEXPI initiative is a joint initiative by

- **BASF SE (Richard Welke)**
- **Bayer Technology Services GmbH (Lars von Wedel)**
- **Evonik Technology & Infrastructure GmbH (Heiner Temmen)**

The initiative is supported by executing research of

- AixCAPE e.V. (Manfred Theißen)
- RWTH Aachen University, AVT.SVT (Michael Wiedau)

Cooperating Software Partners are

- **Autodesk (Reiner Meyer-Rössl)**
- **AVEVA group plc (Maged Selim)**
- **Bentley Systems (Glen Worrall)**
- **Intergraph (Paul Snijder)**
- **Siemens (Marcus Elo)**
- **X-Visual (Wolfgang Welscher)**
- **Dassault Systèmes (Phillipe Audrain)**

Further Industry partners:

- Air Liquide (Thomas Lanzendorf)
- VTT Technical Research Centre of Finland (Nikolaos Papakonstantinou)

DEXPI Group - deliverables

- “The involved owner/operator companies from the DEXPI working group **will define a common data model which is based on the ISO 15926 standard**.

- The resulting data model will be aligned with other projects in the global ISO 15926 community, e.g. within Fiatech.

- **The CAE vendors will implement this common data model as the basis for data exchange and will deliver it as part of their default system configuration**.

- In addition, it is expected that CAE vendors agree on a **common exchange format** for the graphical representation of a P&ID and implement the result in their systems as well.” (http://www.dexpi.org/)

- Latest specification: “DEXPI Specification 1.0” (http://www.dexpi.org/?p=169)

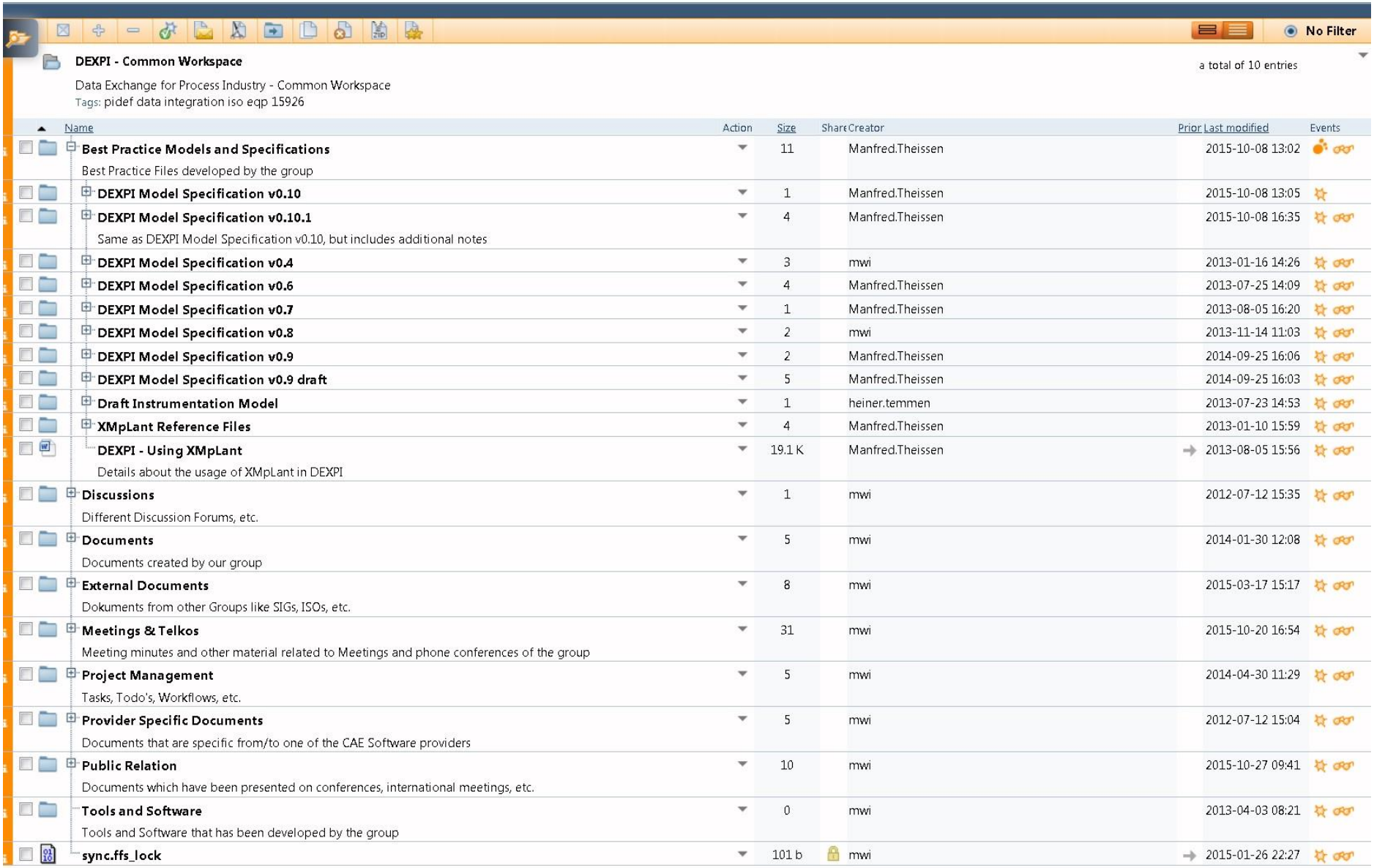
DEXPI Group – meetings between Owner/Operators and CAE vendors

- Every about 6 weeks there in a full day meeting in Frankfurt for extending the DEXPI specification, identifying **needed schema extensions and monitoring the progress of the CAE vendors**

- Twice a year there is a 2-3days "Hackathon" event, where **all vendors try to solve interoperability problems**.
  - VTT participated in the two last Hackathon events, during Feb 2016 in Aachen, Germany and in August 2016 in Munich, Germany.

- **Owners/Operators (like BASF, BAYER and EVONIK) are big enough to motivate CAE vendors**. The interoperability progress is closely monitored in the meeting in Frankfurt and a yearly management meeting.
  - The current goals are:
    - *Equipment*
    - *Piping*
    - *Labels/Symbols*
    - **Instrumentation**

DEXPI Group – workspace



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DEXPI - Common Workspace

a total of 10 entries

Data Exchange for Process Industry - Common Workspace

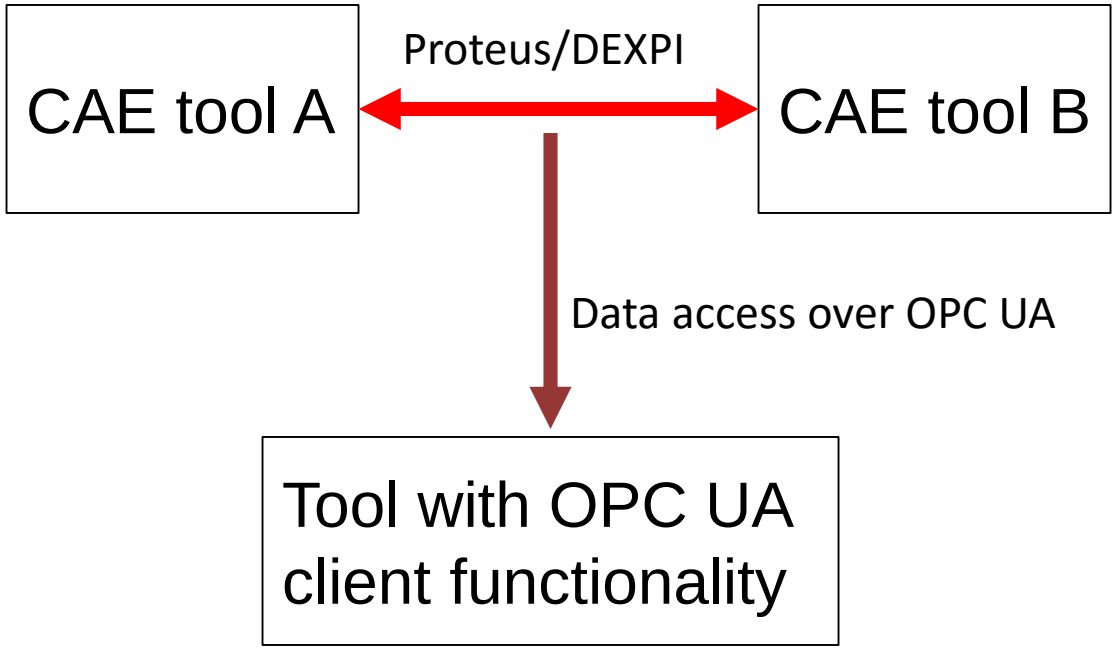
Tags: pidef data integration iso eqp 15926

Name	Action	Size	Share	Creator	Prior	Last modified	Events
Best Practice Models and Specifications Best Practice Files developed by the group		11		Manfred.Theissen		2015-10-08 13:02	
DEXPI Model Specification v0.10		1		Manfred.Theissen		2015-10-08 13:05	
DEXPI Model Specification v0.10.1 Same as DEXPI Model Specification v0.10, but includes additional notes		4		Manfred.Theissen		2015-10-08 16:35	
DEXPI Model Specification v0.4		3		mwi		2013-01-16 14:26	
DEXPI Model Specification v0.6		4		Manfred.Theissen		2013-07-25 14:09	
DEXPI Model Specification v0.7		1		Manfred.Theissen		2013-08-05 16:20	
DEXPI Model Specification v0.8		2		mwi		2013-11-14 11:03	
DEXPI Model Specification v0.9		2		Manfred.Theissen		2014-09-25 16:06	
DEXPI Model Specification v0.9 draft		5		Manfred.Theissen		2014-09-25 16:03	
Draft Instrumentation Model		1		heiner.temmen		2013-07-23 14:53	
XMpLant Reference Files		4		Manfred.Theissen		2013-01-10 15:59	
DEXPI - Using XMpLant Details about the usage of XMpLant in DEXPI		19.1 K		Manfred.Theissen		2013-08-05 15:56	
Discussions Different Discussion Forums, etc.		1		mwi		2012-07-12 15:35	
Documents Documents created by our group		5		mwi		2014-01-30 12:08	
External Documents Dokuments from other Groups like SIGs, ISOs, etc.		8		mwi		2015-03-17 15:17	
Meetings & Telkos Meeting minutes and other material related to Meetings and phone conferences of the group		31		mwi		2015-10-20 16:54	
Project Management Tasks, Todo's, Workflows, etc.		5		mwi		2014-04-30 11:29	
Provider Specific Documents Documents that are specific from/to one of the CAE Software providers		5		mwi		2012-07-12 15:04	
Public Relation Documents which have been presented on conferences, international meetings, etc.		10		mwi		2015-10-27 09:41	
Tools and Software Tools and Software that has been developed by the group		0		mwi		2013-04-03 08:21	
sync.ffs_lock		101 b		mwi		2015-01-26 22:27	

OPC UA companion specification for the Proteus XML format

- **The preparation to start working on porting the Proteus XML as an official OPC UA companion specification is almost done.**

- **The DEXPI group and the OPC Foundation are committed to this effort, some bureaucracy left.**



Status now

- We have the green light from the OPC foundation and the commitment to this effort by the Dexpi group
- There was a small delay related to license of the companion specification, it was resolved recently and now we are waiting for the final green light
- We have examples of the documents needed to start this joint (DEXPI group – OPC foundation) effort
  - 2 documents (MoU – Charter)
- VTT has committed to put resources for the mapping and prototype development work.
- VTT can lead the effort and handle the collaboration with the OPC foundation on behalf of the DEXPI group. Dr. Nikolaos Papakonstantinou can be the chairman to drive the initiative.

Joint effort (DEXPI – OPC Foundation)

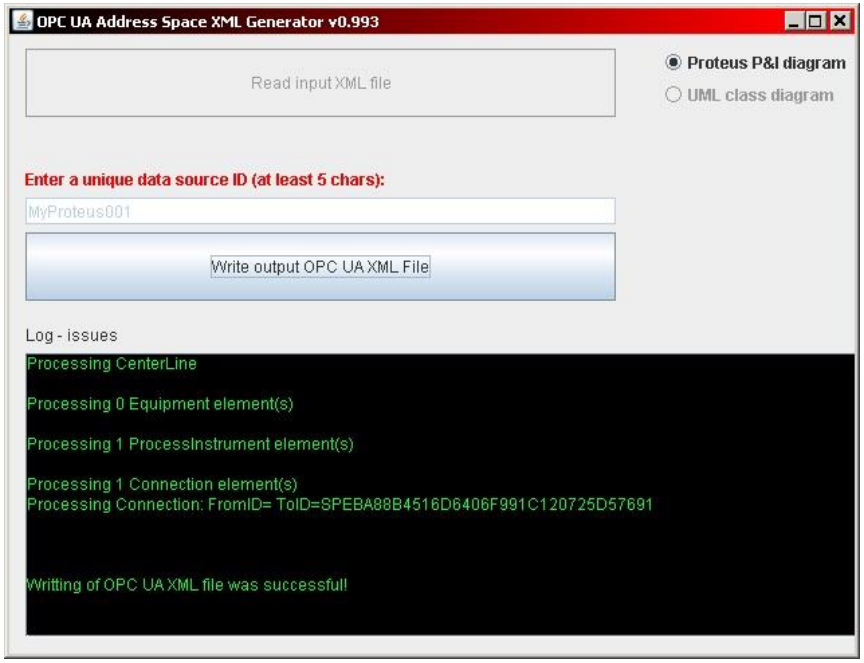
JOINT	• Initiated by other organization – MoU with OPC Foundation • TCB and MCB have to approve • TAC members are informed about work item and progress • Open to OPC Foundation members • Chairman can be of either organization • Results are voted for release by TAC members. 30 days. • Dual logo specification e.g. OPCF + PLCopen • Agreements of use for both organizations

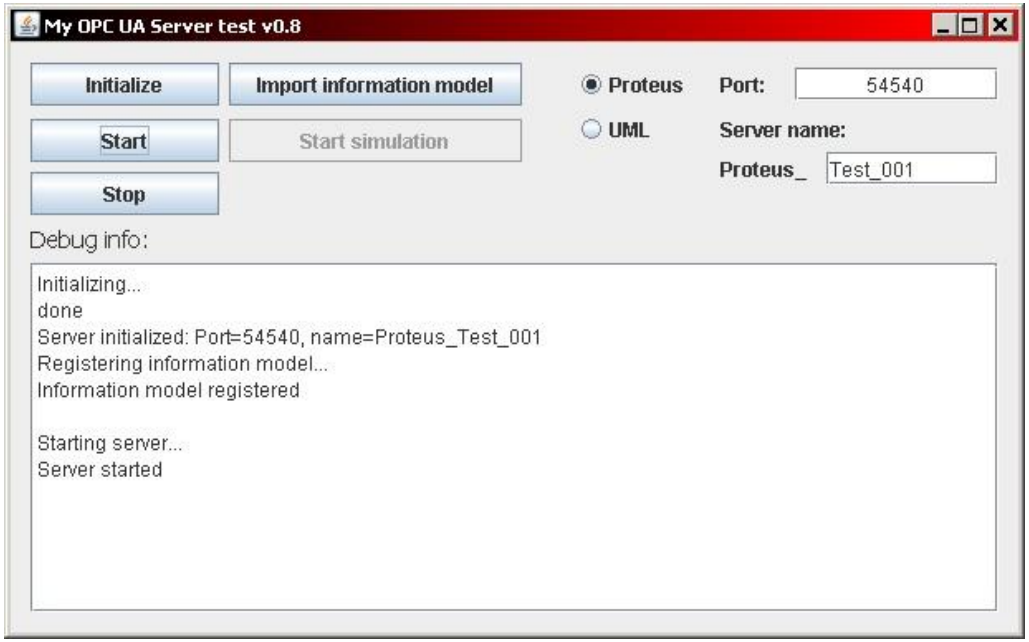
- 4. Joined: → Goal Companion specification
  - Contact OPC Foundation
  - Start process of MoU (Memorandum of understanding)
    3 page paper, high level, generic goal of collaboration
    Press release, marketing activities
  - Start Charter: More concrete technical paper about goals
    Charter has to be accepted by internal OPC group
    Reason: OPCF is involved and helps to get best results
  - Both organizations send out call for participation
  - Select Work group chair
  - Create IT working environment (e.g. OPCF sharepoint – or external)
  - Do meetings, F2F, webcons..
  - Companion Spec will be reviewed and voted by OPC group

Proof of concept, prototype software

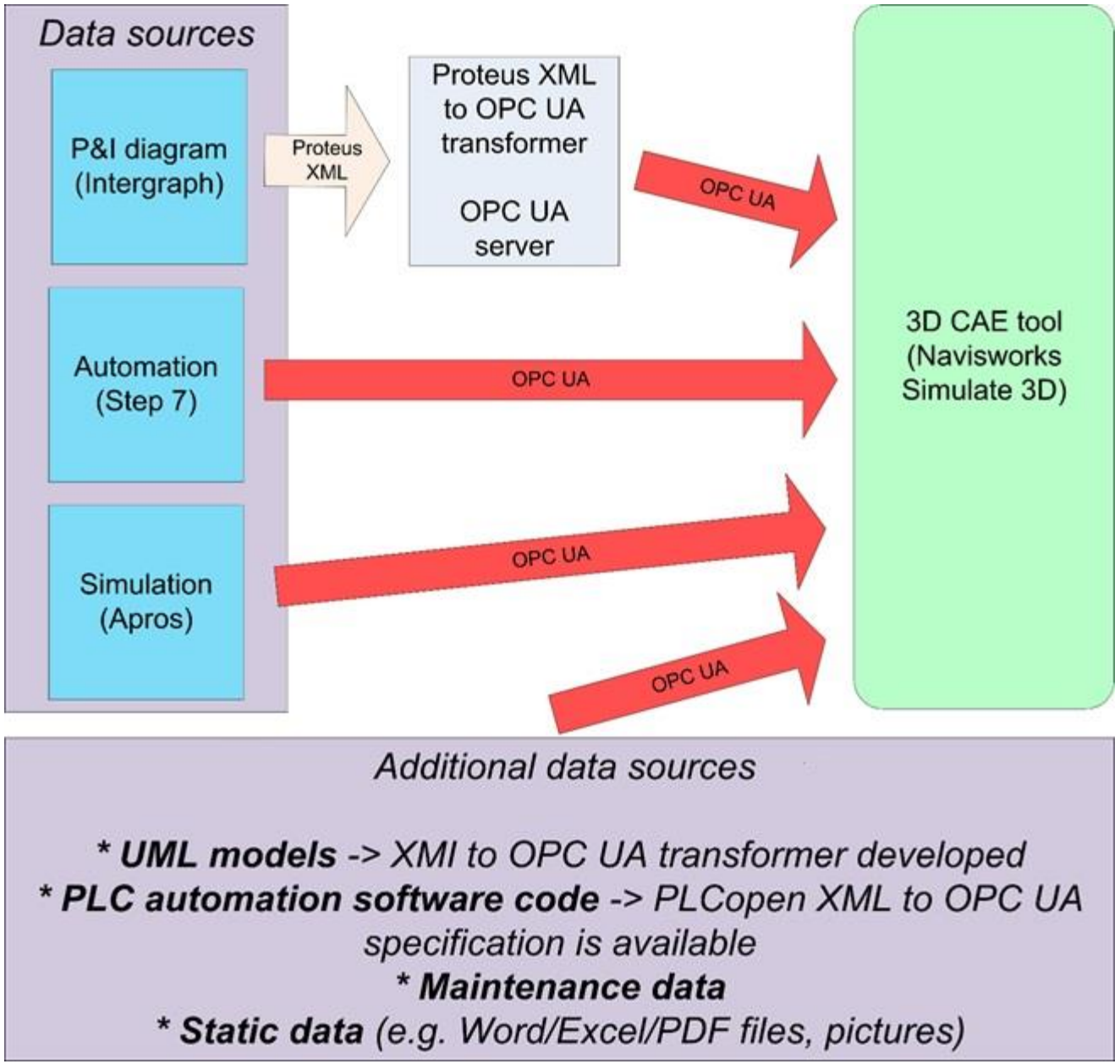
- **At VTT we have developed proof of concept mappings and software (transformers) from Proteus to OPC UA address space models**

- **Now we are ready to work on the standard and official implementation**





OPC UA in context, unified data access



- The **OPC UA platform** provides homogeneous access to the different data sources
- In some cases **custom OPC UA transformers and servers** are developed
- Visualization, data mining an other decision support applications through a gateway such as the 3D model of the plant

Thank you!

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