



COE 2018

Annual Experience & TechniFair

April 15-18 | San Diego

coe
COMMUNITY OF EXPERTS
OF DASSAULT SYSTEMES SOLUTIONS

Founding Partner
DS DASSAULT
SYSTEMES

6061 - (DEM) DIY ENOVIA PLM Migration (Reality or Fiction)



Migration Strategies and Planning
Common Migration Mistakes to Avoid
Budgeting for Migrations





Migration Strategies and Methods

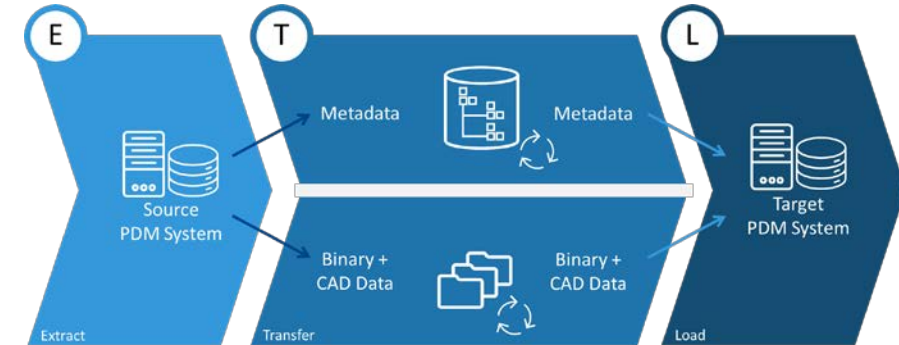
Bulk Migrations / (Big Bang) / (Extract Transform Load)

Incremental Migrations / (Coexistence Strategy) / (Transactional)

Migration Methods

- ETL (Extract, Transform, Load)

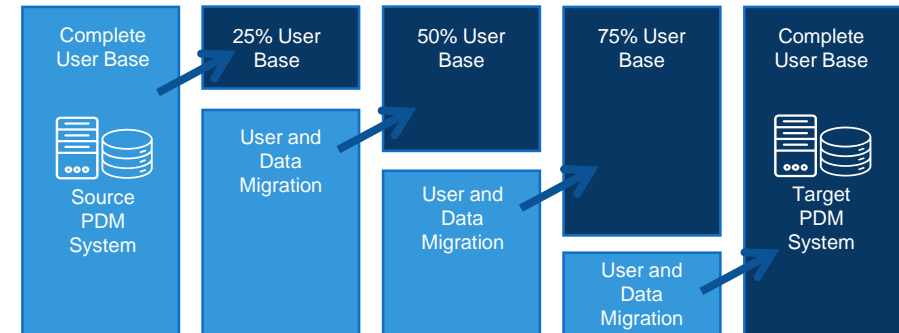
- Extract: Export the data from the source system to a staging database
- Transform: Map data to the target system format & fix data issues
- Load: Import complete staging database to the production system
- Define initial load and delta update for extraction to staging database
- Define initial load and delta update for import to new PLM



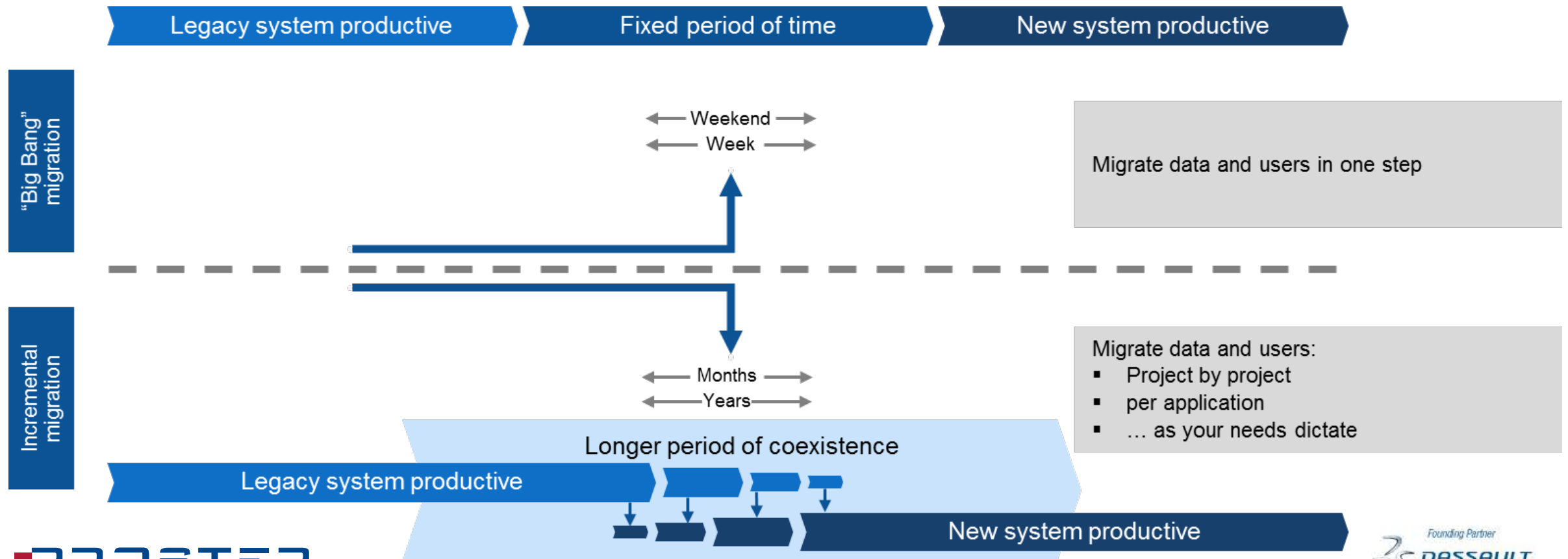
Migration Methods

- Transactional

- Define packages from dependencies to migrate
- Export, map and import a small data package within a transaction
- Define insert / update import strategy for new PLM
- Iterative with more users and more data each iteration



Migration Strategies



One Time vs Incremental Migrations

- One Time (Aligns with ETL)
 - The Benefits
 - Ability to modify data and correct issues in the staging database
 - Good performance for large volume of data
 - Lends itself to good repeatable testing scenarios
 - High quality results for a one-time first go-live of new PLM with proper test cases
 - The Risks
 - Staging database gets out of sync quickly
 - Intermediate database means export / import is done twice
 - Modification of data does not always sync up to legacy PLM or 3rd party integrations
- Incremental (Aligns with Transactional)
 - The Benefits
 - Enables staged migration of data
 - Staged migration allows for easier PLM adoption strategies
 - Errors are more easily controlled and corrected
 - Enables migration to move at the pace of business
 - The Risks
 - Garbage in, Garbage out
 - Order of import operations is not always transparent
 - Performance may not be as good for bulk
 - Can take too long



Migration Planning

Getting it right, from the start!

PLM System Migration Considerations

ARCHITECTURE VIEW

- Replace or realign current PLM system?
- Setup a brand new target system or migrate into an existing one?
- Which interfaces to other systems?

PROCESS VIEW

- Which processes to be implemented?
- Which cross-system processes to be implemented?
- Which data is shared between old and new system?

ORGANIZATION VIEW

- Time frame / Deadline?
- Internal and external resources / budget?
- Switch over at once or per project / per business unit?
- Where to continue ongoing projects?

DATA VIEW

- Which data to be provided, and how much?
- Quality of meta data and CAD data?
- Migrate whole history? Quality of historical data?
- How to transform old data to fit to new processes?

Migration Requirements

Differentiate the requirements for decommissioning your legacy PLM from the requirements for introducing the new PLM

- For Legacy PLM
 - What are the required data that needs to be extracted?
 - What version / iteration requirements?
 - All history? (**Expensive!**)
 - Just Latest released?
 - How to handle “other” system data like tasks, workflow history, etc. that may not map to new PLM?



Migration Requirements

- For New PLM
 - Define what is needed to be operational in your new PLM system?
 - Is all the CAD history required or maybe just the top 20 programs CAD data?
 - Do you have an alternative archiving strategy for unused legacy data?
 - Often it is cheaper to archive and re-master as needed



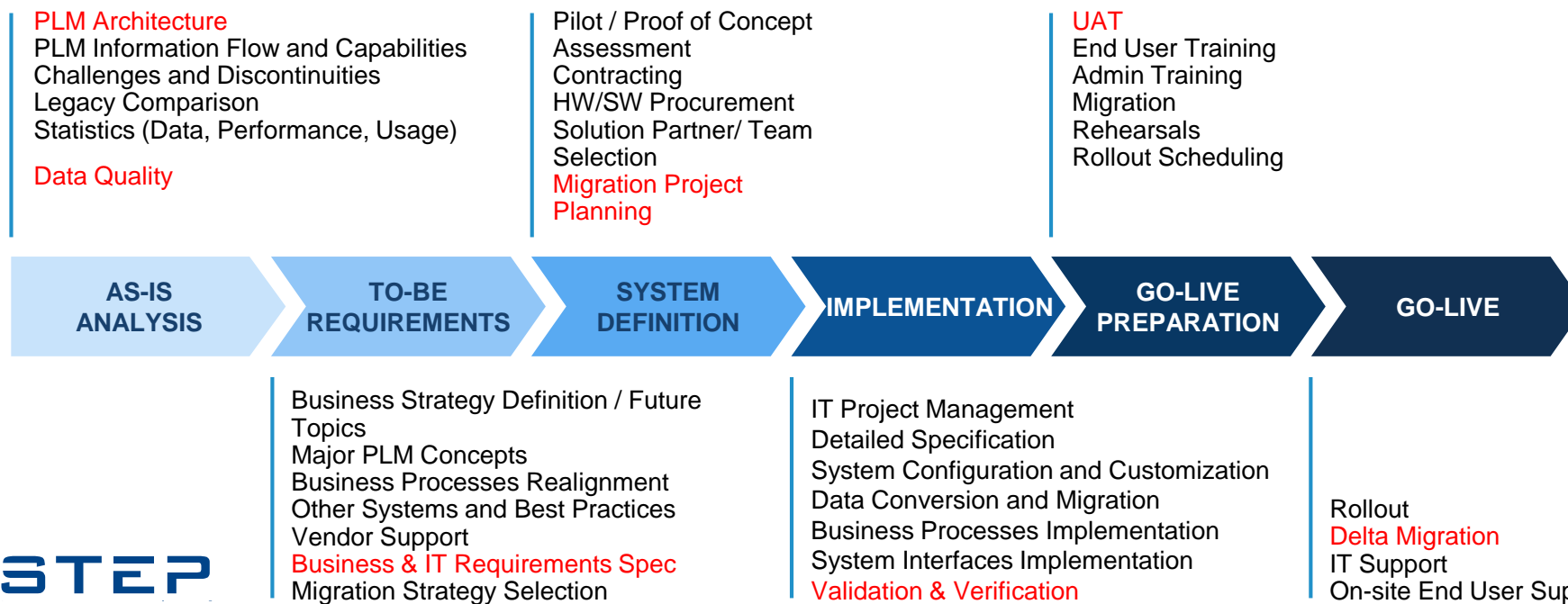
Migration Requirements

- Document Everything
 - **Requirements Documentation** can easily be 100's of pages long.
 - **Critical for project success and acceptance**
 - **All stakeholders should review** and sign that they agree with the stated requirements and implementation plans
 - Strict Change Control should be practiced

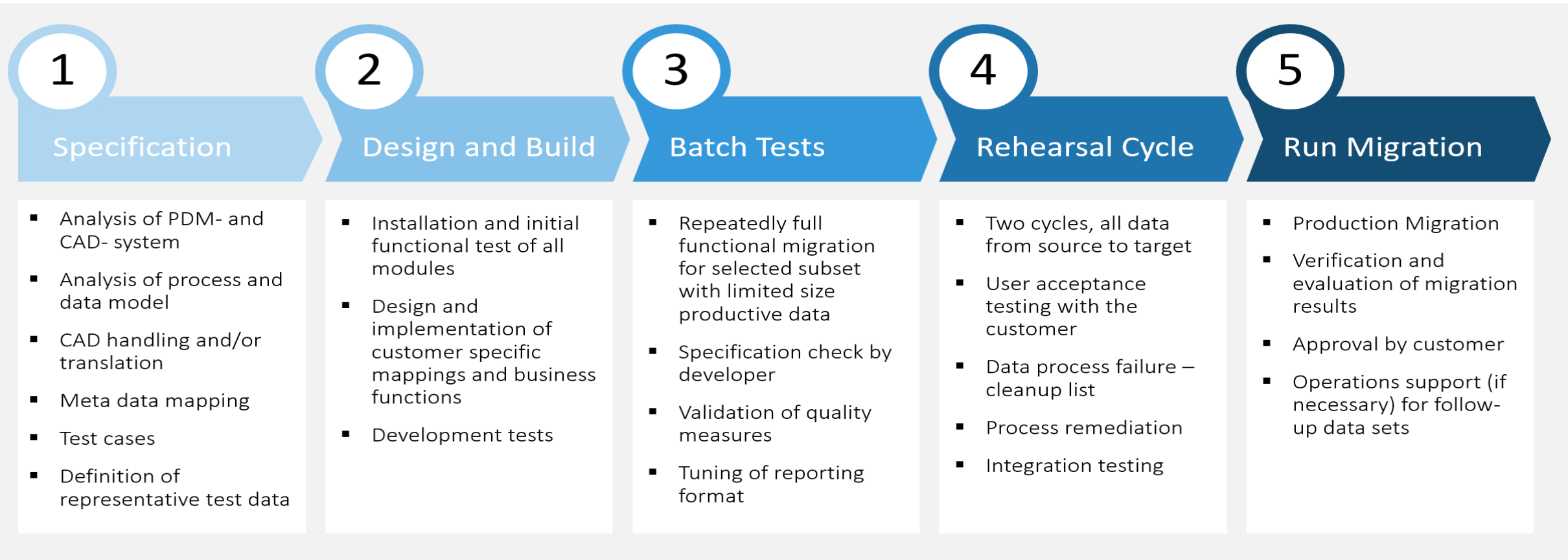


Migration Overall Roadmap

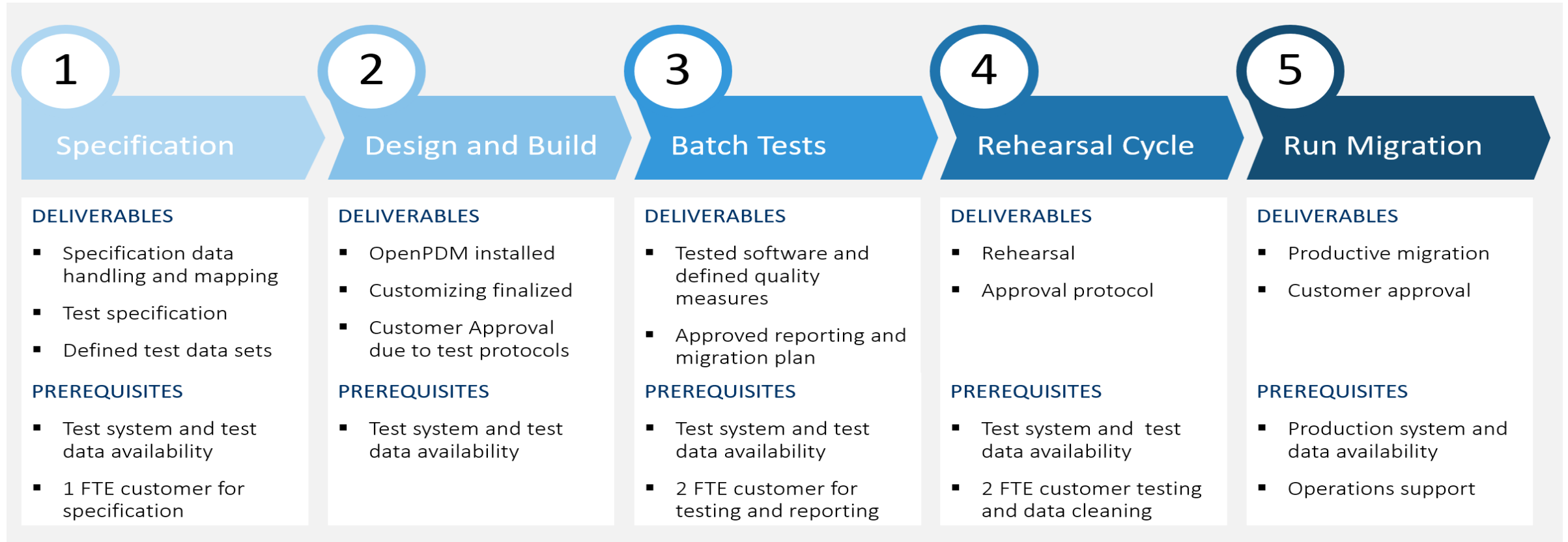
- From As-Is Analysis To System Go-Live. PLM Introduction or System Consolidation



Typical Migration Tasks



Typical Migration Deliverables



Understanding Parallel Development

- Remember that there is a strong dependency on the PLM introduction
- Sometime this is a **moving target** during the development affecting data conditions, mapping and process
- Bugs in the system result in bugs in the migration
- Migration is incredibly performance intensive and new systems do not always perform well
- Release schedules are inter-twined
- New vendor systems are not always well understood by customers, they need to learn how to use it!
- Any business case ROI from migration is in the new system
- Migration means introduction to someone!

Planning for Migration Acceptance

- Do you have full (and **active**) **Stakeholder Buy-in** from all groups?
- How long does it take to steer the enterprise to the new PLM?
- Is your business capable of handling a one time event to switch to a new PLM?
- Is your ERP / MRP / 3rd party integration capable of a cut over?
- Is the training and support for the new PLM in place and comprehensive?
- Will the solution be bug free day one?
- Will the solution satisfy the needs of the majority of it's users day one?
- Have you done a good job with **public relations and PLM change acceptance**?
- New system acceptance is critical to any migration project!

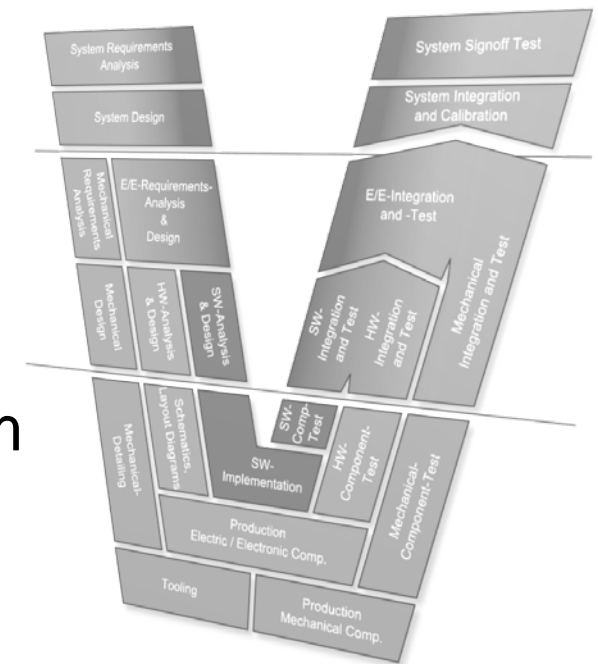
Advice on Migration Project Planning

- Start Early, this is not a last second thing
- Strategy and Requirements Workshop resulting requirements and implementation plans should be done first and not short changed.
- Execute a phase project and build on knowledge and success. (Start Small)
- Target 3-5 integration use cases per development period and iterate in a standard software development pattern. Sprints should be between 2 to 4 weeks.
- Don't forget
 - Implementation of integration use cases and unit and integration testing
 - Business and User acceptance testing



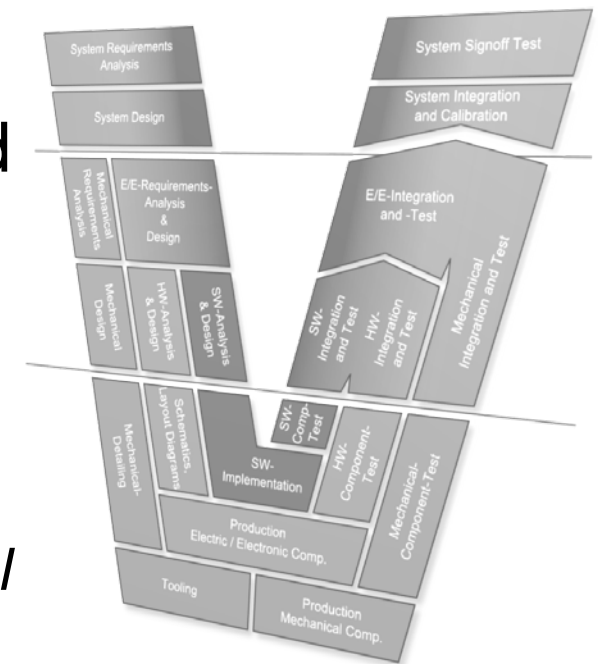
One Time Migration Considerations

- For One Time Migrations - Target complete migration development, testing and execution
 - Strategy and Requirements workshop resulting requirements and implementation plan
 - Implementation of migration use cases with basic system testing
 - Execute “Migration Rehearsals” that include:
 - Limited data (10%) to test requirements
 - Full data (100%) to test migration data success
 - Test Infrastructure not just the data



Incremental Considerations

- For Incremental Migrations - Target 3-5 migration use cases per development period and iterate in a standard software development pattern. Sprints should be between 2 to 4 weeks.
 - Strategy and Requirements Workshop for each sprint
 - Implementation of migration use cases with unit tests and system integration tests
 - Execute user acceptance for incremental functionality
 - Migration execution utilizing group that *includes migration tool developers*
 - Create an institutional feedback loop so that lessons learned from the prior phases can be carried onto next phases



Budgeting your Time

<ul style="list-style-type: none">• Definition Phase<ul style="list-style-type: none">• Clearly define the scope of the project, Involve representatives of each domain• Define criteria for a successful migration• Define a realistic project budget and timeline, Outline the risks!• Audit all source data in scope, Refine the scope through profiling and auditing• Write mapping specifications	40 %
<ul style="list-style-type: none">• Test and validation Phase<ul style="list-style-type: none">• Define test data for all data types and scopes early• Define volume test data as early as possible• Allow time for volume testing and resolving issues	30 %
<ul style="list-style-type: none">• Execution Phase<ul style="list-style-type: none">• Segment the migration into manageable parts• Control and monitor the migration and react on errors	20 %
<ul style="list-style-type: none">• Final reporting<ul style="list-style-type: none">• Create a documentation and metrics of the migrated data	10 %

Budgeting Hardware and Software

- **Infrastructure**
 - Development, Test, and Production Migration Servers
 - Multiple CAD servers (in the case of CAD transactions)
- **Licenses**
 - Migration Tools, incl. PDM connectors
 - PDM licenses (for export and import process)
 - CAD licenses
 - CAD toolkit (e.g. Pro/E toolkit or CATIA CAA) for access of file based attributes
 - CAD translators, quality checker (only in case of CAD translations)

DIY ENOVIA 3D EXPERIENCE PLM MIGRATION

- Requirements & Planning
- Strategy
- **Risks**
- Technical Considerations
- Final Thoughts

Overall Migration Risks

- Migration Timing
 - Calculate expected downtime vs. migration performance.
 - Weekends? Merry Christmas here's the new PLM?
 - Coexistence migrations can take too long and enable bad behavior in the transition.
- Data Disaster Risks
 - Be prepared to roll back at any stage.
 - Adding a large volume of data to existing production PLM requires practiced disaster recovery plan.
- PLM Migration without planning tend to “de-scope” data to better fit the new data model
 - Know at your strategy phase what is able and realistic to be moved



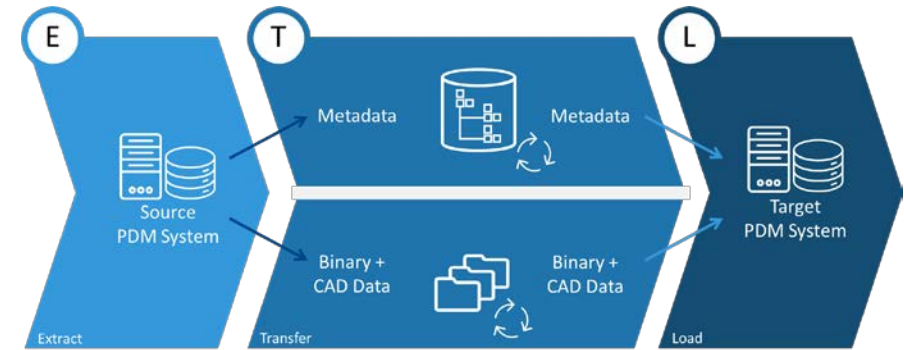
Overall Migration Risks

- Training and Roll Out
 - Minimize gap between Training and Go Live
 - Is it possible to train 1000's of users the week before going live with the new system?
 - Consider a Subject Matter Expert or key GO TO person per functional area or group.
- Best Players vs. 3rd Stringers
 - Too often the most skilled employees can't be tied up for months or years working on a migration project.
 - Make a plan to have a mix of all levels of skilled workers on the project, for the entire project.

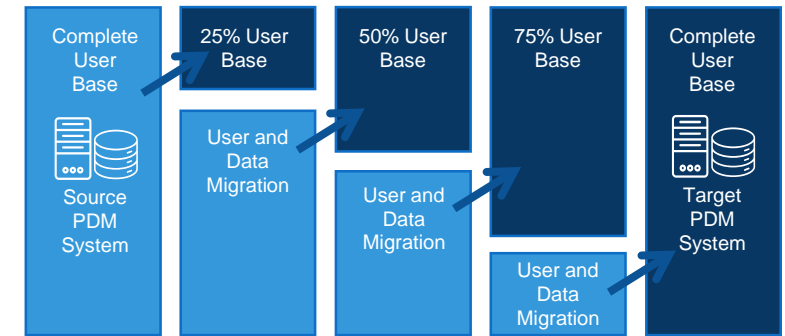


One Time Migration Risks

- Short Execution Timeframe
 - Be prepared for disaster recovery
 - Backup system & execute migration
- The new system must support the complete functionality from the start
 - All users and processes
 - User acceptance is critical
 - All technical interfaces
 - Complex technical dependencies can make the project fail
- Continuity of resources is important
 - Migration developers should be testing and executing the production migration if possible



Incremental Migration Risks



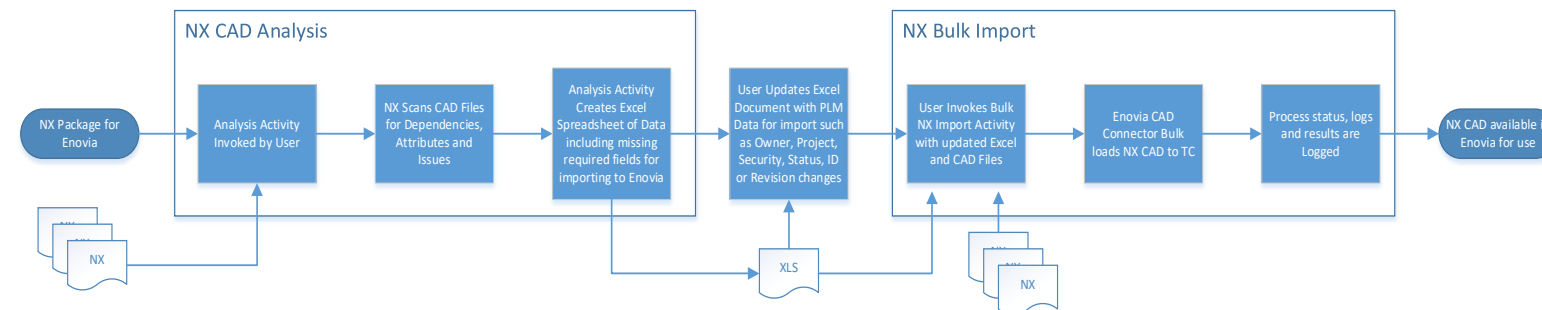
- Long Execution Timeframe
 - Hold to the plan timeline, (eg. execute in under a year)
 - Delays means more updates & maintenance with new system
- Transactional Data Risks
 - Not all data is tested like in a migration rehearsal
 - For problem data test by running the data in test environment
 - Perform transactions with the same data in the test environment before production until comfortable with the solution performance

DIY ENOVIA 3D EXPERIENCE PLM MIGRATION

- Requirements & Planning
- Strategy
- Risks
- **Technical Considerations**
- Final Thoughts

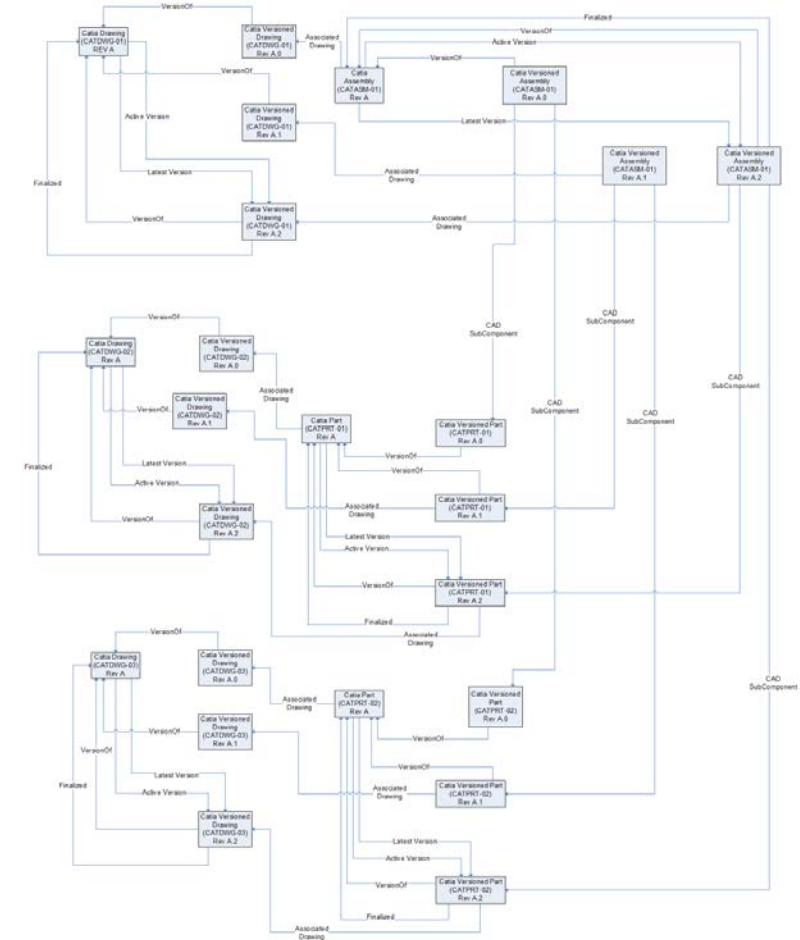
Technical Considerations for File Based CAD Import

- CAD Data does not have enough information to import on it's own. PLM data should be added to the process
- Unmanaged data is generally “dirtier” with considerably more issues than PLM managed data
- Recommended Process Steps –
 - Scan directories with CAD interrogation tool (CAA, etc) and get all data attributes and file dependencies
 - Move all data to staging database or Excel file(s) with attributes and:
 - Determine which file is the master between multiple instances
 - Add PLM metadata (owner, group, projects, status, etc)
 - Transform metadata into import packages
 - Execute bulk import with appropriate PLM interface tool



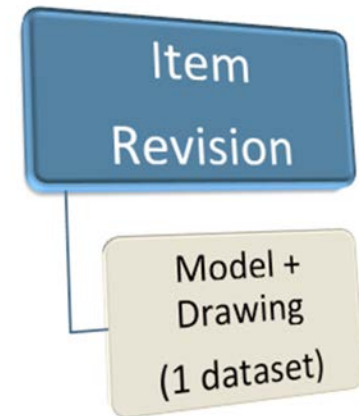
Technical Considerations for Enovia / 3D Experience

- RMI API for Enovia V6
- Separate CATIA (V5) API for export / import to Enovia provides sufficient functionality for many tasks
- XPDM adapter for VPM Central CATIA V6
- Modern Enovia has a lot of object model dependencies! Test your UI for everything!
- Understand the object models in the database
- Dependency order is important
- Can support relatively fast export / import



Technical Considerations for Teamcenter

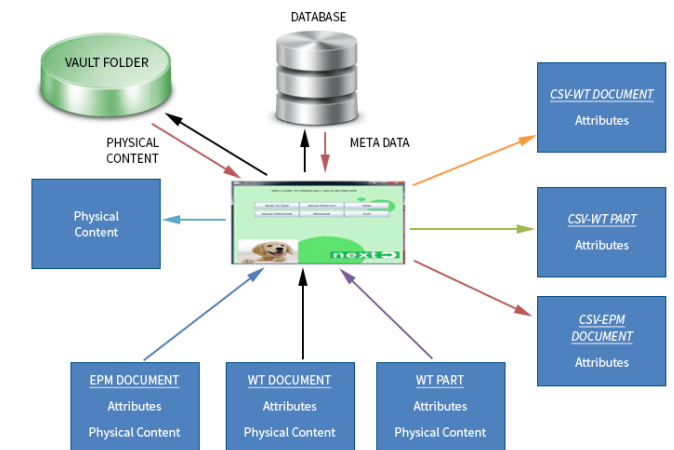
- Tools for interfacing with Teamcenter:
 - Teamcenter Portal Client API (Legacy ITK)
 - Teamcenter SOA API
 - IPS CSV loading tool for metadata
 - PLM XML for metadata and document export / import
 - Global Services for limited data in legacy Teamcenter
- CAD Import/Export For Teamcenter
 - UGClone for NX data export / import
 - TCIC bulk spreadsheet for export / import for CATIA
 - Creo IPEM Command line for export / import
- API performance in Teamcenter may require alternative methods depending on use-case
- CAD and Parts are historically built on the same BOM in Teamcenter - meaning CAD Document and Part 1:1



Technical Considerations for Windchill

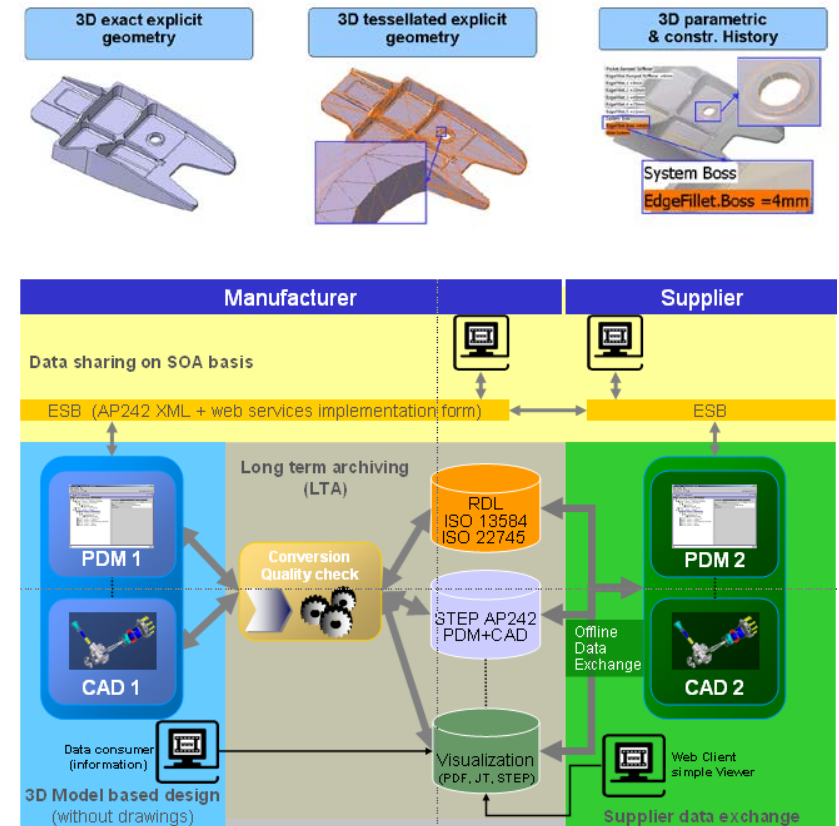
- Tools for interfacing with Windchill
 - RMI API for integration export / import
 - Windchill Bulk Migrator for import Creo, Metadata & Document
 - Work Group Manager Batch Import / Export for other CAD
 - Pro/Toolkit + Jlink for Import / Export of CREO
- Pro/Toolkit for Import / Export for legacy Pro/Intralink (3.x)
- Scripted Interface for Pro/E export
- Family Tables can be tricky

Windchill[®]
A PTC Product



Using Neutral Formats

- PROSTEP iViP leads the definition of many engineering neutral formats and processes
 - ISO STEP 10303 AP 214, 239, 242
 - PLM Services
 - Open JT, LOTAR, 3D PDF and other working groups
- Neutral Formats are beneficial for more than one party that agree on the standard (for partner collaboration)
 - Exchanging standards based data give good definition to all parties
- Lightweight Formats can assist in short term co-existence as they are easier to integrate
- Neutral formats may complicate migrations where a strong independent semantic definition is not needed
 - Point to point solutions generally do not require neutral formats
 - Neutral formats add a layer of transformation
 - Maybe useful for more than two interfaced systems



Archiving Strategy

- Remember Decommissioning Requirements!
- LOTAR – (LO)ng (T)erm (A)rchiving and (R)etrieval
 - Many industries require CAD data for 50+ years
 - CAD and PDM formats and versions cannot be supported indefinitely.
 - Your data in those formats needs to be accessible forever.
 - Using standards-based CAD Formats (like STEP 242) and repository you can archive this data
 - This partitioning of old data and archiving is natural at migration when you may not want to carry over all data
 - Aerospace and Automotive have standard practices for archiving. Look into workgroup best practices and recommendations.
 - Manage your data so that you don't need to keep every all versions of CAD that you have used (ever) with unsupported software and hardware!

The screenshot shows the ProSTEP IVIP website. The main navigation bar includes Profile, Projects, Services, Events, Medialibrary, and CPO. The page title is "Long-term Archiving and Retrieval (LOTAR)". The content area features a large graphic with the text "Network Flexibility", "International Standard", "Collaboration solutions", and "Optimization". The "LOTAR" logo is prominently displayed. The "Aim" section states: "The project goal is to develop, test, pilot, publish and maintain standards designed to provide the capability to archive and retrieve digital product and technical information, including CAD, PDM, Composite Design, Electrical Harness and 3D Visualization data, in a standard form that can be read and reused throughout the product lifecycle, independent of changes in the IT application environment originally used for creation. The multi-part standard covers the information content as well as the processes required to ingest, store, administer, manage and access the information. It is published as EN/NAS-9300." The "Project Chairmen" section lists Jean-Yves Delaunay (Airbus) and Rick Zuray (Boeing). The "ProSTEP IVIP Contact" section lists Jochen Boy with email jochen.boy@prostep.com, phone +49 6151 9287-382, and fax +49 6151 9287-326. The "Project Partners" section lists Europe: AFNet, Airbus Commercial Aircraft, Airbus Defence & Space, and SAFRAN.

DIY ENOVIA 3D EXPERIENCE PLM MIGRATION

- Requirements & Planning
- Strategy
- Risks
- Technical Considerations
- **Final Thoughts**

DIY Benefits

- Just like a home improvement project you may be able to save time and money doing much of the migration on your own. You can also improve your core competency in your systems. Some elements for success might include the following;
- NON Technical (Engineering)
 - Clean / Heal your legacy data before the migration
 - Document existing usage and customizations in legacy environment
 - Be exhaustive in mapping legacy data model to future data model
 - Archive as much as you can ahead of time
- Technical (IT Related)
 - Optimize technical environment for test labs, snap shot backups, quick restoration of test systems
 - Determine framework requirements for programming scripts and data mapping
 - Hands on project guidance and management



DIY Risks

- Just because you think you can, does not mean you really can
- Does your team have the skills?
 - PLM Source and Target Expertise
 - Complete Understanding and Access to Systems API's for complex workflow
 - Check In, Check Out, Insert Update, Conflict Management, Complex Mapping
 - Java, C++, SOAP, REST, SOA, XML, XSLT.....
- Does your team have the time ?
 - This is a full time job for x people and y months.
 - This should be planned and worked on throughout PLM deployment not just the last few weeks.
 - Does the rest of the company have time for repeated testing?



DIY Final Thoughts

Don't Panic !

- Many companies have successfully worked on their own PLM migrations with varying degrees of success.
 - Allocate enough time
 - Allocate enough resources
 - Do what you can, but know when to get extra help
 - Plan Hard
 - Test Hard
 - Document Success Criteria
 - Over Communicate with Everyone (success and failures)
 - Consider using commercial tools where available instead of reinventing the wheel each time



PROSTEP – 100% PLM

Products and Implementation

PROSTEP

PROSTEP Products

OPENDXM[®]
GLOBAL X

Secure Data Exchange
Block Chain / Additive Mfg

OPENPDM[®]

Migration / Integration
COTS Software

OPENDESC[®]
COM

CAD Services
Translation / Migration

**3D
PDF**

Server Based
TDP, DRM, Animation

Founded in 1993, we are

- an independent company specializing in PLM consultancy services and engineering solutions.
- experts in providing leading global manufacturing companies with the support they require for designing and optimizing their internal and cross-enterprise development processes.
- the specialist for distributed engineering processes involving heterogeneous IT systems



DAIMLER

DELPHI



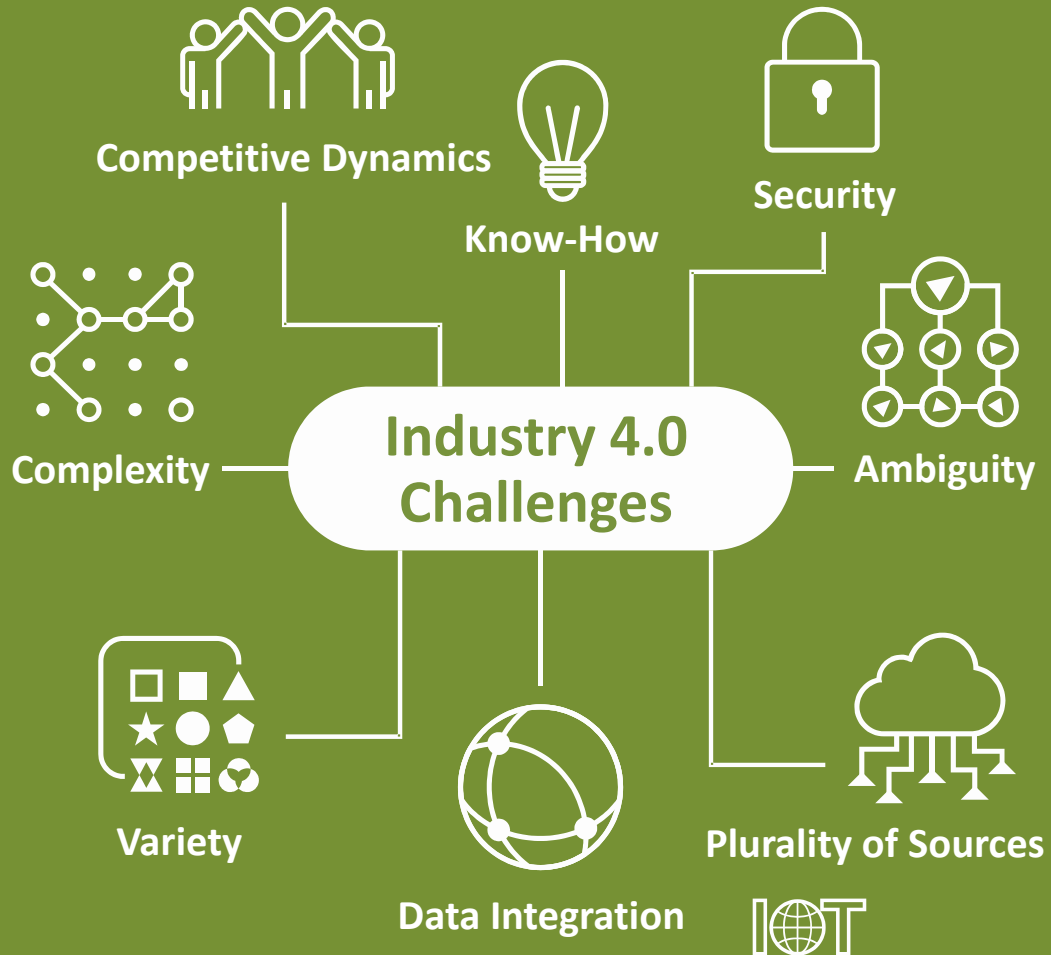
SIEMENS

VOLKSWAGEN
KONZERN



Core Focus Area

Technologies for Interoperability, Security, Visualization



Strategic PLM-Themes

- Agile Product Development
- Integration
ALM – PDM – ERP
- Digital Master & Digital Twin
- Systems Engineering
- Cross-Company Collaboration
- Complexity and Variant Management
- Model Based Design

PLM Technologies

- Real-Time Collaboration
- Linked Data & Semantic Networks
- Data and Interface Standards
- Federated, Modular and Open Architecture
- Cloud and Platform Technologies
- Role-Based Functionality
- Virtual Reality

PROSTEP Partnerships



Technology Partners



PROSTEP is Here to Help

- 100's of skilled PLM and CAD consultants
- More than 20 years of experience since 1993
- Global Reach
- Part of the ProSTEP iViP non profit consortium
- Standards based software
- Best in class processes methodologies
- Field Tested Commercial grade Software
- Flexible Rental or Purchase Options
- Certified and Maintained Connectors to most popular systems





Questions ?



THANK
YOU!

Paul W. Downing

President / CEO – PROSTEP INC

paul.downing@prostep.com

PROSTEP Inc.

300 Park Street Suite 410

Birmingham, MI 48009

www.prostep.us / www.prostep.com

US Toll Free Company Voice: 8-PROSTEP-01 (877-678-3701)

US Toll Free Company Fax: 8-PROSTEP-02 (877-678-3702)

OpenPDM MIGRATE

WOULD YOU LIKE TO REPLACE YOUR PLM SYSTEM?

With OpenPDM MIGRATE, you can migrate your existing data either as

a "Big Bang" or "incrementally"

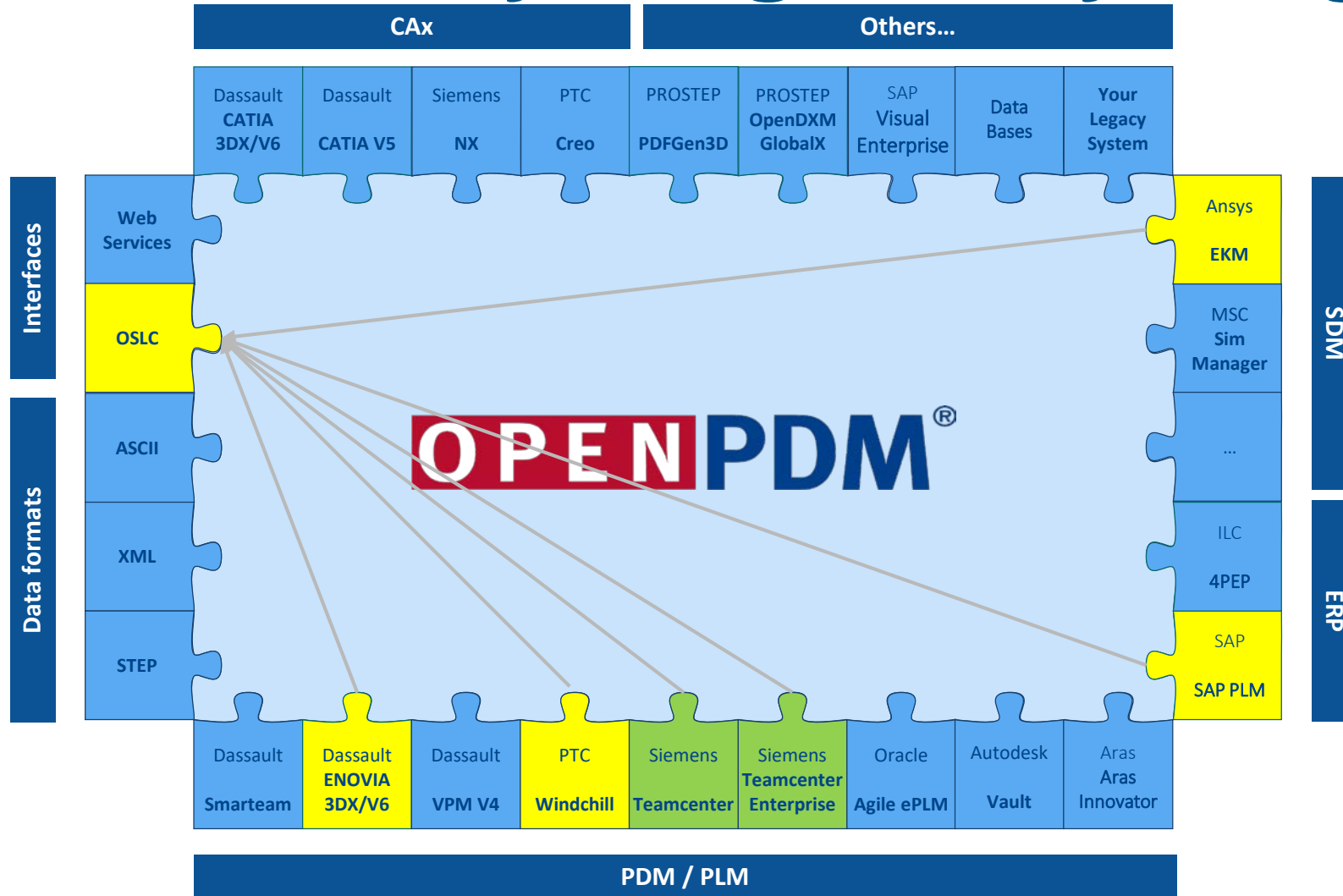
- Analysis tools for checking the source data (volume, type, etc.)
- Flexible structuring of the data to be migrated (project, product, etc.)
- High level of performance and error tolerance thanks to packing and parallelization
- Transfer of CAD models and structures
- Bidirectional synchronization for incremental migration
- Migration from multiple data sources (systems and files)
- Process monitoring using migration cockpit

Master your migration with OpenPDM MIGRATE!

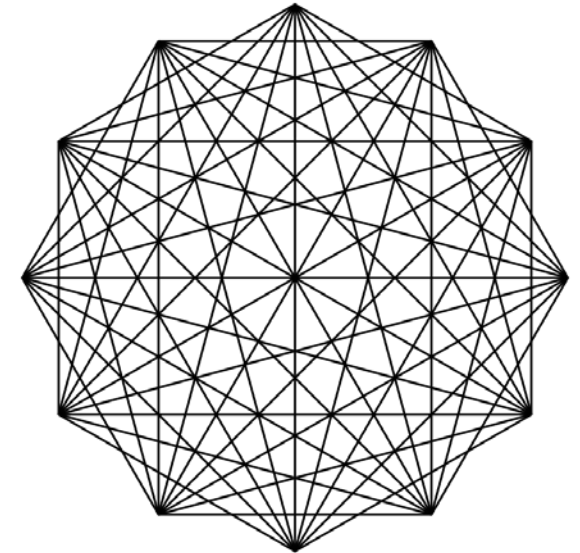
PROSTEP



Connect Anything to Anything



N-N solution vs. Point to Point Connectors



OpenPDM Connectors

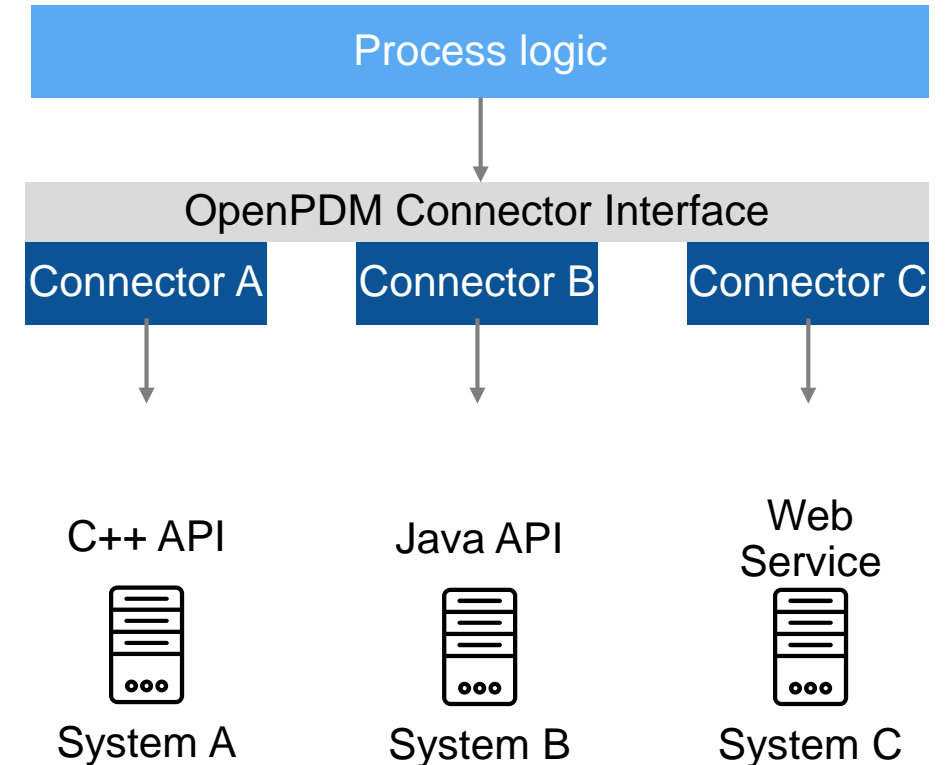
SIMPLIFICATION

- All connectors offer the same interface
- System specific technologies are encapsulated
- System upgrades are decoupled
- Only external and official standard interfaces of the system is used
- Configuration via OpenPDM administration GUI

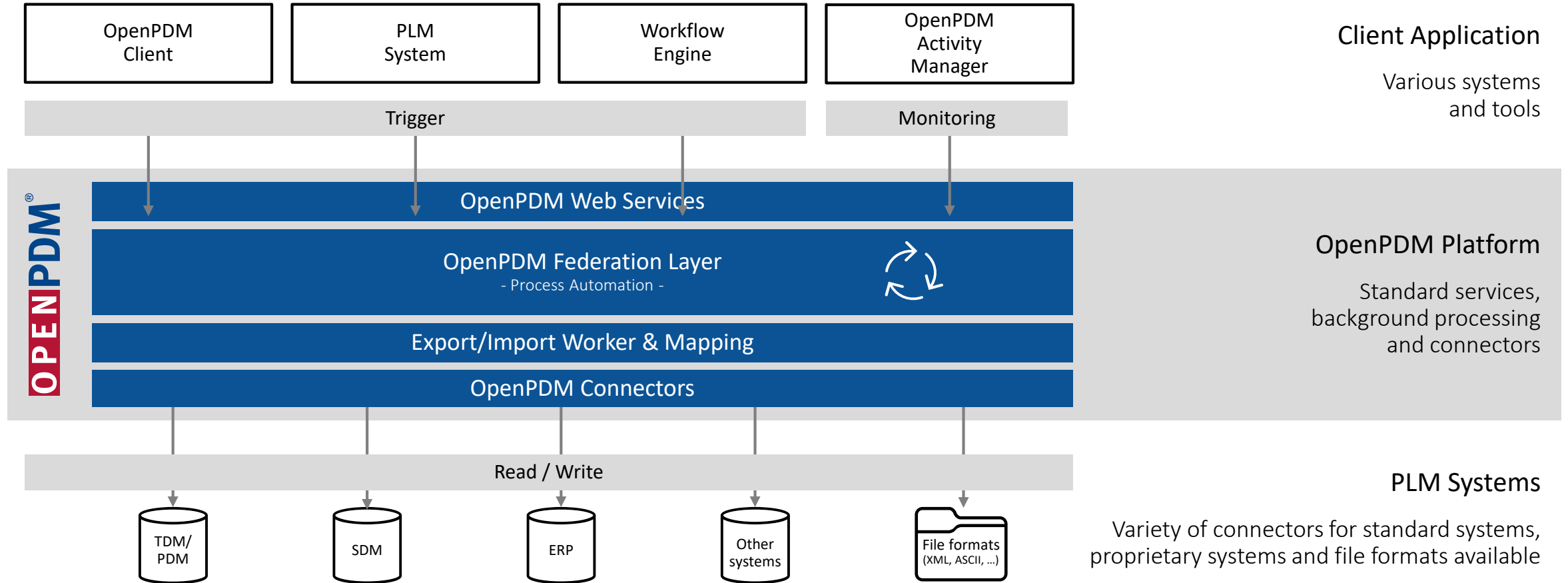
FLEXIBILITY

- Huge range of well-proven standard connectors is “out-of-the-box” available
- New connectors of legacy systems may be easily implemented and integrated

OPENPDM®



OpenPDM Framework Overview



SAMPL Project on a page

Secure Additive Manufacturing Platform (www.SAMPL-3D.de)

PROSTEP

Challenges

- Copy- and product liability law
- Distinction of original parts from counterfeits
- Support licensing and printing rights
- Support of new value added and business models

Objectives

- Trusted 3D printers and Chain of Trust
- Marking and traceability by RFID-chips
- Development of a reference platform
- Blockchain-Technology for the supply of licence information



Partner



Supported by:



on the basis of a decision
by the German Bundestag

Term: Nov 1st, 2016 - Oct 31th, 2019

Volume: ca. 4 mio €

Project leader: PROSTEP

AG:

Contact Person: Dr. Martin Holland; holland@prostep.com; 0511-54058100