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PART 103 - PLM Bulk Migration Strategies Best Practices

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Agenda

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1. Challenges in PLM Migration
2. Migration Strategies
3. Aligning Risks and Strategies
4. Project Considerations
5. Where to Start ?

If Migration Means Introduction - Plan Accordingly

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Dependency on the PLM Introduction

- Moving target during the development
- Bugs in the system result in bugs in the migration
- Migration is incredibly performance intensive
- Release schedules are inter-twined
- New systems are not well understood by customers, they need to learn how to use it!
- Any business case ROI from migration is in the new system

Requirements Analysis

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- Differentiate the requirements for decommissioning your legacy PLM from the requirements for introducing the new PLM
- For Legacy PLM
  - What is the required data that needs to be extracted?
  - What version / iteration requirements? All history? Just released?
  - How to handle “other” system data like tasks, workflow history, etc. that may not map to new PLM?
- 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?

Migration Event Risks

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- Migration Timing
  - Calculate expected downtime vs. migration performance
  - Weekends? Merry Christmas here's the new PLM?
  - Incremental migrations can take too long and enable bad behavior in the transition
- Data Disaster Risks
  - First migration to empty system shouldn't ever corrupt production data with proper testing
  - Adding a large volume of data to existing production PLM requires *practiced* disaster recovery plan.

Data Cleanup

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- Typically CAD data needs to be able to open without errors in the CAD system to be processed correctly
- Different systems have different dependencies that can involve data loss without creative mapping
  - Your revision / version model may not match your legacy
  - Part BOM and CAD BOM could need to be merged! (or managed in another way)
- Migration is not a good time to correct those historical issues
  - Still, Garbage in = Garbage out
  - The preferable options are:
    - Cleanup data in the legacy system
    - Cleanup data in a intermediate staging DB
    - Cleanup data in the target system after migration

New System Acceptance is Critical

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- 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 comprehensive and bug free day one?
  - Have you done a good job with public relations and PLM change acceptance?

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Migration Strategy Overview

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- Data Migration Methods
  - ETL (Extract, Transform, Load)
  - Transactional
- Data Migration Strategies
  - Big Bang Strategy
  - Migrate and Update Until Go-Live
  - Incremental One-Way Strategy
  - Co-existence Strategy
- External Dependencies
  - 3rd party integrations and business organization
- Migration Testing & Rehearsals

Methodologies for Migrating Data

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- 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
- 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

Benefits and Risks of ETL

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- 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
- 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

Benefits and Risks of Transactional

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- The Benefits
  - Enables staged migration of data
  - Errors are more easily controlled
  - Enables migration to move at the pace of business
- The Risks
  - Garbage in, Garbage out
  - Order of import operations is not always transparent
  - Performance is not as good
  - Testing can be cumbersome

Migration Strategies

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- Big Bang or One Time Migration
  - Export and Import over a weekend
  - ETL or Transactional
- Update until Go-Live One Time Migration
  - One time, test & delta update production until go-live
  - ETL or Transactional
- Staged Migration
  - Move in Program by Program
  - Transactional
- Co-existence
  - Flexible to move in data
  - Transactional

One Time vs. Co-existence Strategies

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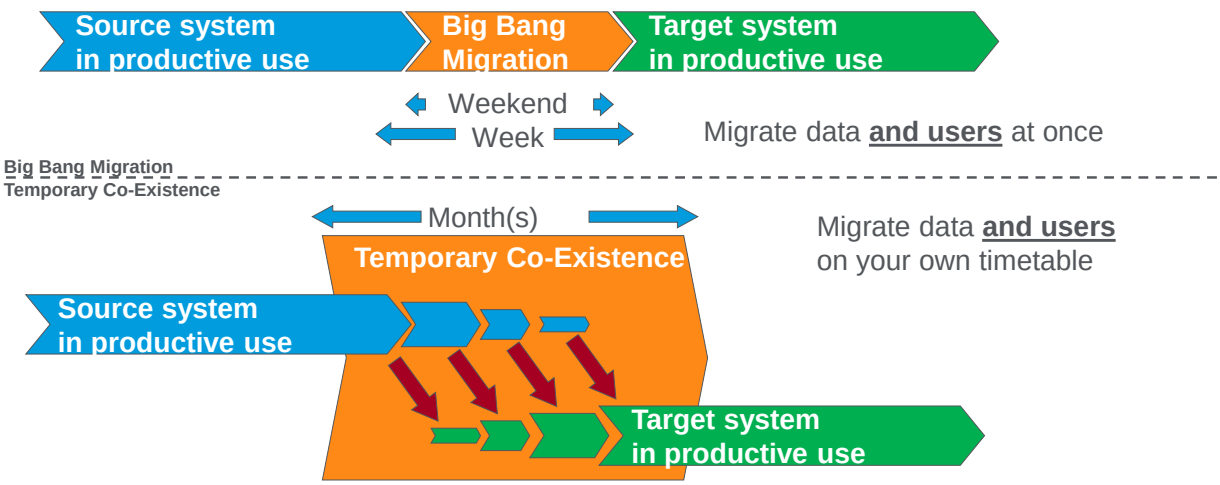

One Time Migration - Theory

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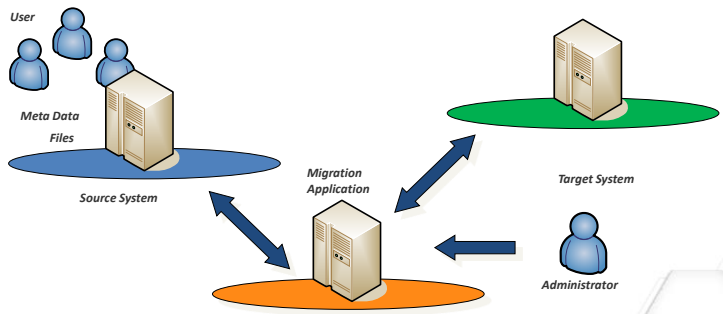
- Migrate data and users all at a one-time migration event such as over a weekend.



One Time Migration - Execution

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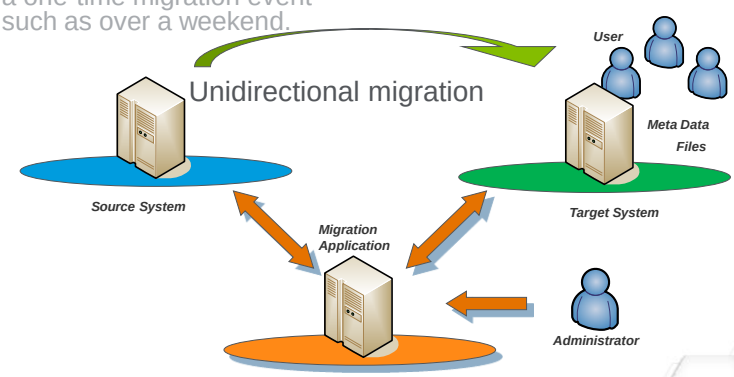
- Migrate data and users all at a one-time migration event such as over a weekend.



Co-existence or Staged Theory

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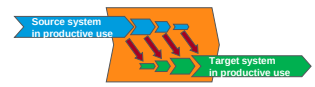
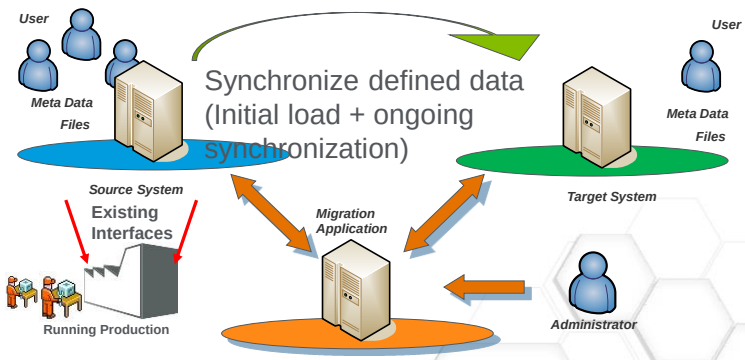
- Focus on quick wins:
- Target system is in productive use with its out-of-the-box features from the start
  Examples: DMU, Change Management, …
- Existing interfaces are untouched





Co-existence User Migration

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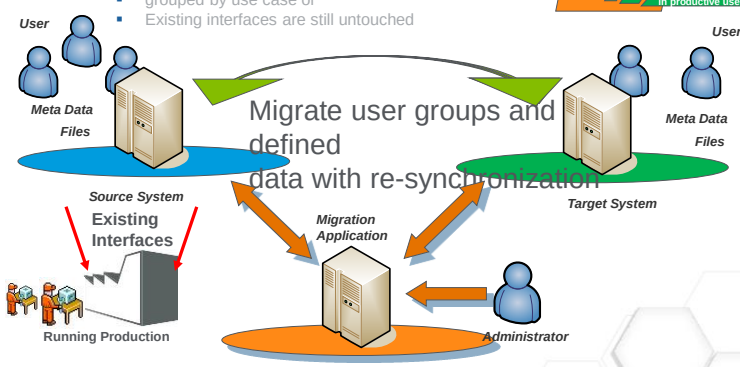
- Lower your risk:
- Migrate data and users
- project by project or
- grouped by use case or
- Existing interfaces are still untouched



Co-existence Developing Interfaces

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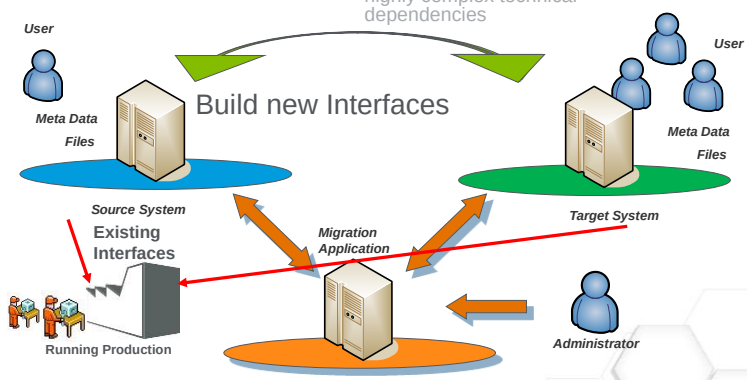
Low risk:

- Migrate interfaces with full control of highly complex technical dependencies



Co-existence Migration Finalization

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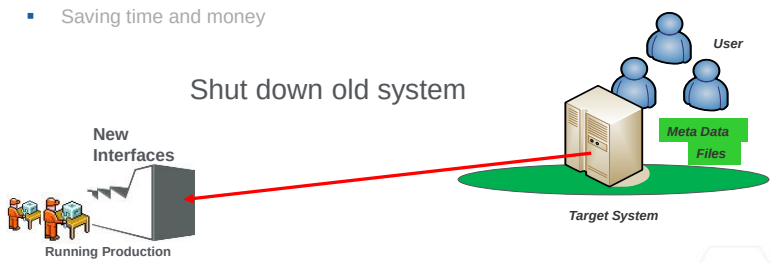
Smooth Migration with temporary co-existence

- Controllable in going step by step
- Low risk for users and management!
- Saving time and money



Migration Testing Methodology

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- Duplicate the complete PLM with files. Update the replica's often to test the latest data (especially if there are conflicts)
- Determine significant sample sizes for functionality to test
- For One Time Migrations
  - No unit testing
  - 1% data integration tests until rehearsals
  - 3 - 100% data "**migration rehearsals**" and iterate until perfect
- For Co-existence Migrations
  - Unit Testing, Integration Testing
  - Process data in test environment previous to live migrations until satisfied with results
- Conflicts and errors will happen, shoot for 99.9% effectiveness

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Migration Strategy Recomendations

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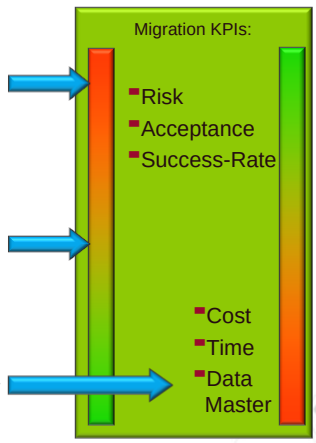
- One Time Migration
  - Exact preparation
  - Long test phase
  - Emergency plan to go back
  - Unidirectional
- Staged Migration
  - Process oriented
  - Focus on semantic group of data
  - Controlled Replication
- Incremental Migration, Temporary Coexistence
  - Transfer of small data packages
  - Controllable in going step by step
  - Bidirectional



Smaller PLM Projects

Larger PLM Projects

One-Time vs. Incremental Migration

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One-Time Migration		Incremental Migration
– Less technically challenging – Less organizational effort on user side	Pros	– Risk reduction (old system stays alive) – New system can be used earlier (complete customization is not needed)
– High risk of failure – Customization of new system must be complete – Longer preparation phase	Cons	– Higher technical effort – Clear data master definition necessary – New system might be under utilized by users because the old system is still available

Mitigating Risks for a One-Time Migration

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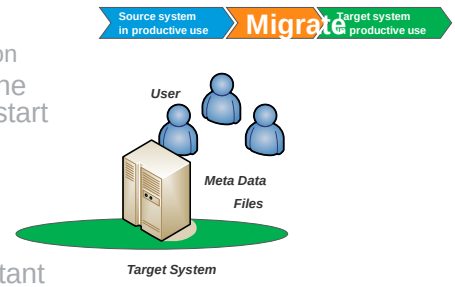
- Short Execution Timeframe
  - Be prepared for disaster recovery
  - Backup system & execute migration
- The new system must support the complete functionality from the start
  - All users and processes
    - User acceptance is critical
  - All technical interfaces
    - Complex technical dependencies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



Incremental Migration Mitigating Risks

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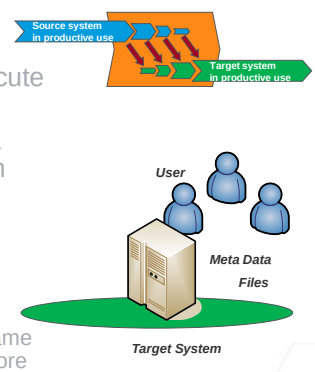
- Long Execution Timeframe
  - Hold to the plan timeline, execute in under a year
  - Delay means more updates & maintenance with new system
- Transactional Data Risks
  - Not all data is tested like in a migration rehearsal
  - Run the data twice –
    - Perform transactions with the same data in the test environment before production until comfortable with the solution performance



Requirements for Migration Software

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- Connectivity to Engineering systems, including software solutions for the hard-to-implement features without shortcuts
- Mapping functionality, best by adding visual functionalities
- Workflow support, for complex business requirements
- Ability to be deployed in a clustered environment
- Sophisticated approaches to parse and export complex product structures (top-down, bottom-up) to meet different customer requirements
- Filter and Split mechanisms (vertical or horizontal), to reduce the data volume to the really required information
- Packaging mechanisms that are able to transfer only subsets of data, but still keeping all relevant relationships
- Import conflict management to enable conistent import processes to databases that already contain information

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Technical Considerations for File Based CAD Import

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- 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 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

General Migration Project Steps

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• Definition – 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 – Implement migration process	40 %
• Test and validation – 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 %
• Execution – Segment the migration into manageable parts – Control and monitor the migration and react on errors	20 %
• Final reporting – Create a documentation and metrics of the migrated data	10 %


Timeline Budgeting for Services and Licensing

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- **Services**
  - **Planning / Specifications** (10-30 days typical)
  - **Migration / Integration** workflow implementation: export, mapping, manipulation, (CAD conversion), import (30-90 days typical)
  - **Testing** (30 days typical)
  - **Execution** and reporting (depends on migration methods)
- **Infrastructure**
  - Migration / Integration server, [illegible] and document transfer (1 Medium Sized Server typical)
  - Multiple CAD licenses (in case of [illegible] transactions)
- **Licenses**
  - Migration tools and PDM connectors
  - Permissions 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)

Don't leave Integrations and Migrations for the last 2 weeks of the project. 6 Months or more is typical !

Final Lessons Learned for Sucess

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Upfront Planning and Understanding

Seek Active Stakeholder buy in and participation

The purpose of testing is to FAIL

A united team will find a solution more quickly than a divided team.

Communicate success as well as failure…..

Don't Panic !

or, Hire a consultant so there is someone else to blame !

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Company Overview

PROSTEP integrate the future

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A vendor neutral / independent engineering services and software company since 1993

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MEYER WERFT, EWD, NEPTUN WERFT, aselsan

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Electrical/Electronics

NOKIA, SIEMENS, MOTOROLA, Miele, ERCO, tyco

Other Sectors

GSI, STADTWERKE MAINZ AG, IBM, SIEMENS, VDA, RHEINMETALL DEFENCE, vector, GPLAN, ProSTEP iVIP, SAP, trona, ENTEGA, DiViBib

OpenPDM – The PLM Migration Platform

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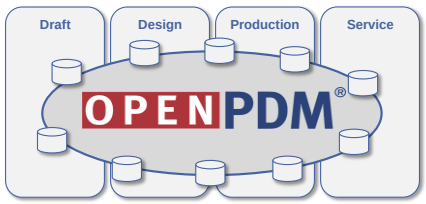
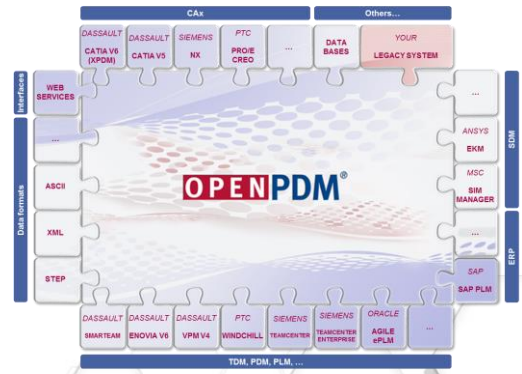


- **OpenPDM integrates and migrates your product data**
  - Across corporate borders
  - From systems of different vendors
  - Between different domains and disciplines

- **OpenPDM is the leading PLM integration platform**
  - Standard connectors for a multiplicity of systems
  - Optimized for the process and data synchronization in the background
  - Use of standard interfaces and data formats
  - Flexible integration into customer processes



OpenPDM Connectors

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Standard Functionality of all OpenPDM Cnnectors

- Import/Export of PDM Meta Data
  - Parts, Part Versions (incl. attributes)
  - Documents (incl. physical files and attributes)
  - Assembly Structures / BOMs
  - Configuration data (150%BOMs incl. configuration options, effectivities, …)
  - Change data
  - Roles & Rights management

- Import prognosis / dry run
  - Calculate import result before starting a real import
    - Calculate differences between import data and actual data base content
  - PDM-system import logic is in place
    - Check for missing mandatory attributes
    - Check for write access to all touched PDM objects

- Highly configurable import logic
  - Control "Insert/Update" on each object depending on use case
  - Control ID generation
  - Control handling of structure updates (managing relationship updates)

OpenPDM Integration Concept

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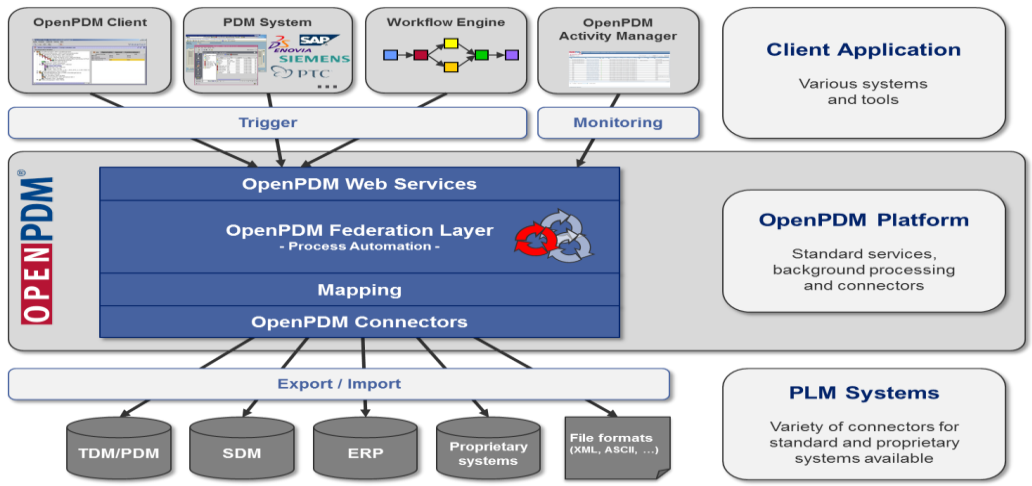

OpenPDM Data Migration
Controlled One Time Migration of large Data Amounts

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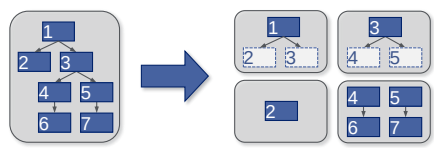
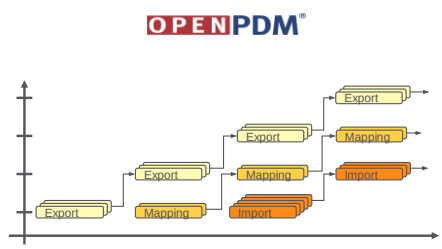
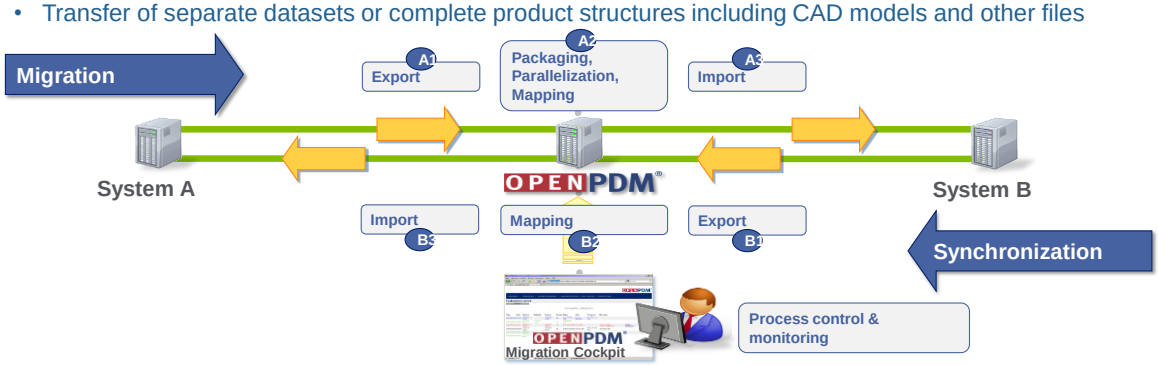
- **Functional principle**
  - Data structures are split into small packages
  - Packages can be processed independently and in parallel
  - Sub-processes can be monitored and controlled via migration cockpit
  - Utilize intermediate database for transformation or process via transactional logic



- **Advantages and benefits**
  - Processing and transfer of large data amounts become controllable
  - Parallel processes increase the performance extensively
  - Integrated report functions
  - High flexibility due to OpenPDM modularity



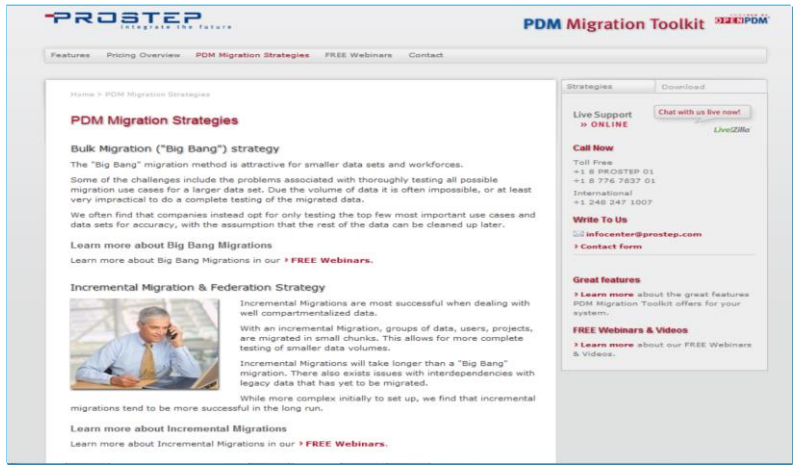
- Incremental migration with temporary co-existence and synchronization using transactional implementation strategy
- Transfer of separate datasets or complete product structures including CAD models and other files



Additional Resources

- www.prostep.com
  - All links to all PROSTEP companies and Brands
- www.pdmmigrationtoolkit.com
  - Tools, articles, webinars around PDM Migration Topics
- www.pdfgenerator3d.com
  - Server based 3D PDF Generation, Trial Conversions
- www.opendesc.com
  - Translation Services (ad hoc or project based)
- www.prostep.org
  - The non-profit standards body (ProSTEP iViP)
- infocenter@prostep.com
  - Any Questions on Any Topic

Resource:
www.pdmmigrationtoolkit.com



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