WHITE PAPER

DATA MIGRATION IN THE PLM ECOSYSTEM

Massive advancements in computing and storage have compelled almost every business to embrace digital transformation. However, such digital transformations rely upon an enterprise's ability to adopt 'Next Generation' Systems and access IP (Intellectual Property) without disruption.

In this context, a well-crafted Data Migration strategy from a legacy to a new system becomes pivotal for the success of the transformation initiative.

The intent of this paper is present a practitioner's view of Data Migration in PLM based on experiences and observations. The paper does not prescribe a solution, fully recognizing that there is no 'one stop' solution for a given problem.

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Introduction

A fundamental aspect of a PLM transformation initiative is a high quality, efficient and cost-effective data migration from the legacy systems to the new PLM system.

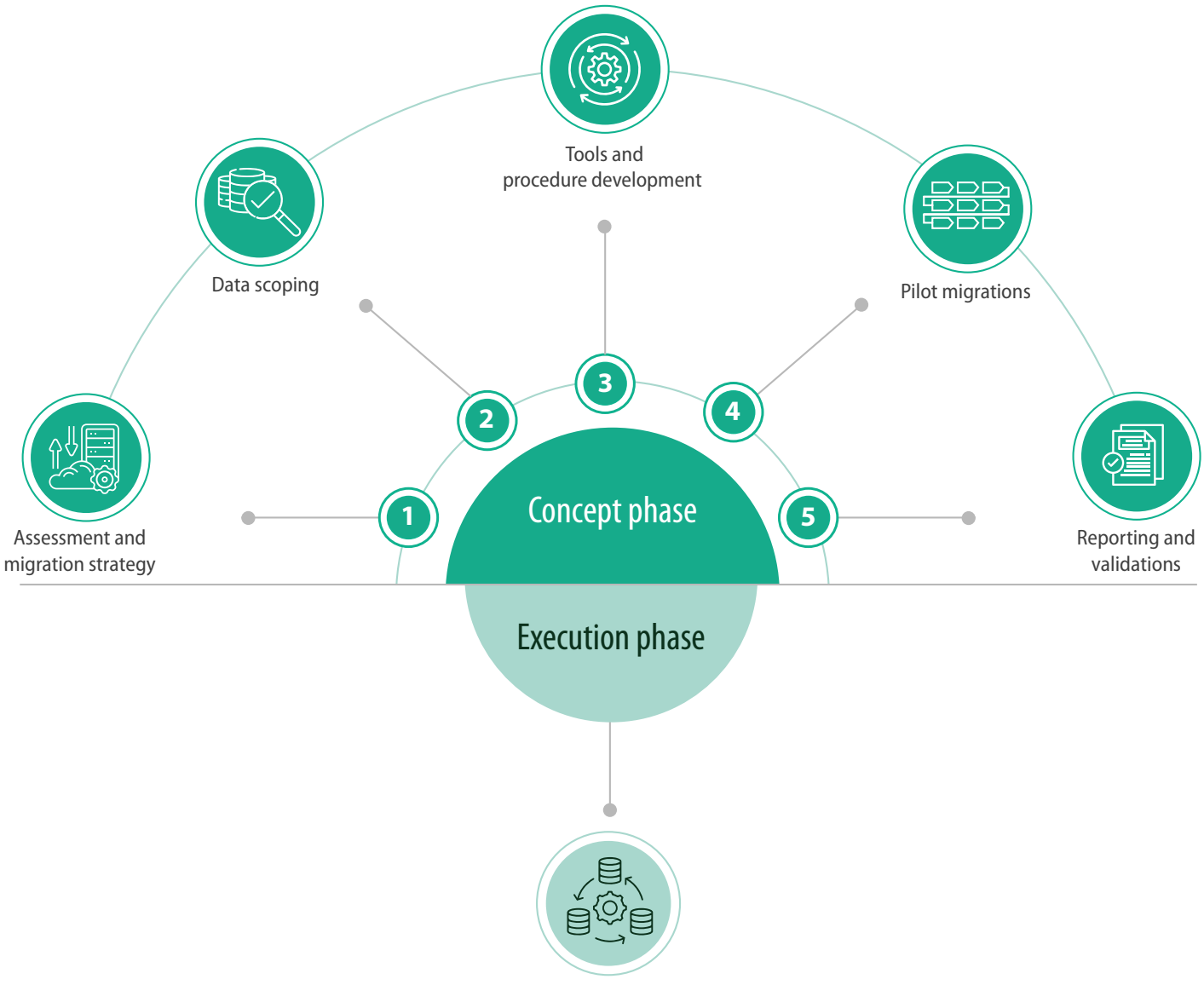
It must be treated as something other than a routine matter of moving data/artifacts from one system to another. In most instances, there is a high degree of uncertainty and unknowns concerning the volume and complexity of data (especially involving CAD) to be migrated across the program phases; Therefore, it is imperative to have a migration strategy that can handle the ambiguity while still being transparent.

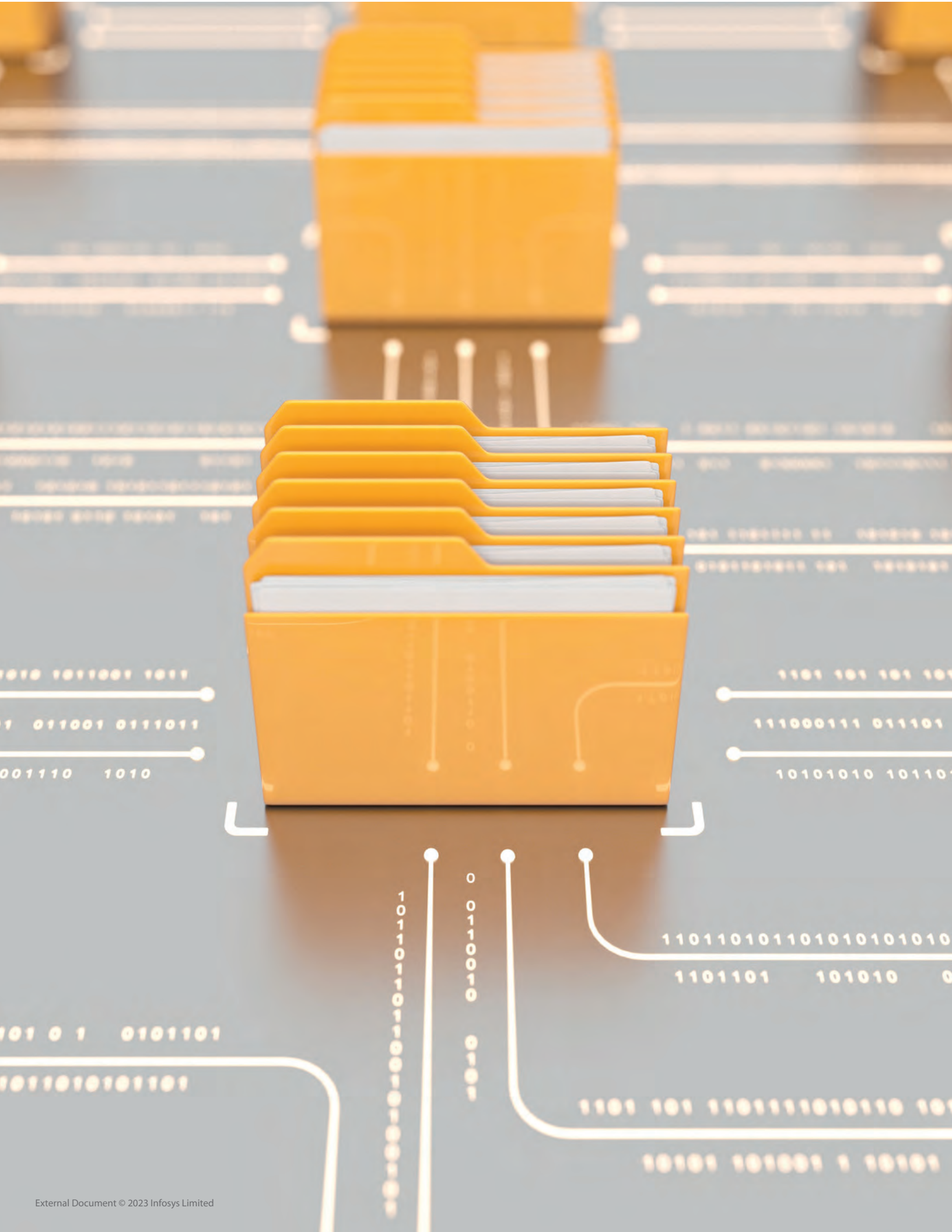
Comprehensive planning

A comprehensive migration planning should address aspects of:

- Right data scoping – define what data is needed in the new system
- Choosing the right methodology – choose between a big bang or incremental approach
- Define acceptance criteria for quality and quantity of migration performed
- Communication plan to provide visibility
- Setting practical expectations with the business team, especially on validation and cleaning efforts
- Plan for the coexistence of systems

Figure 1. Different phases of migration

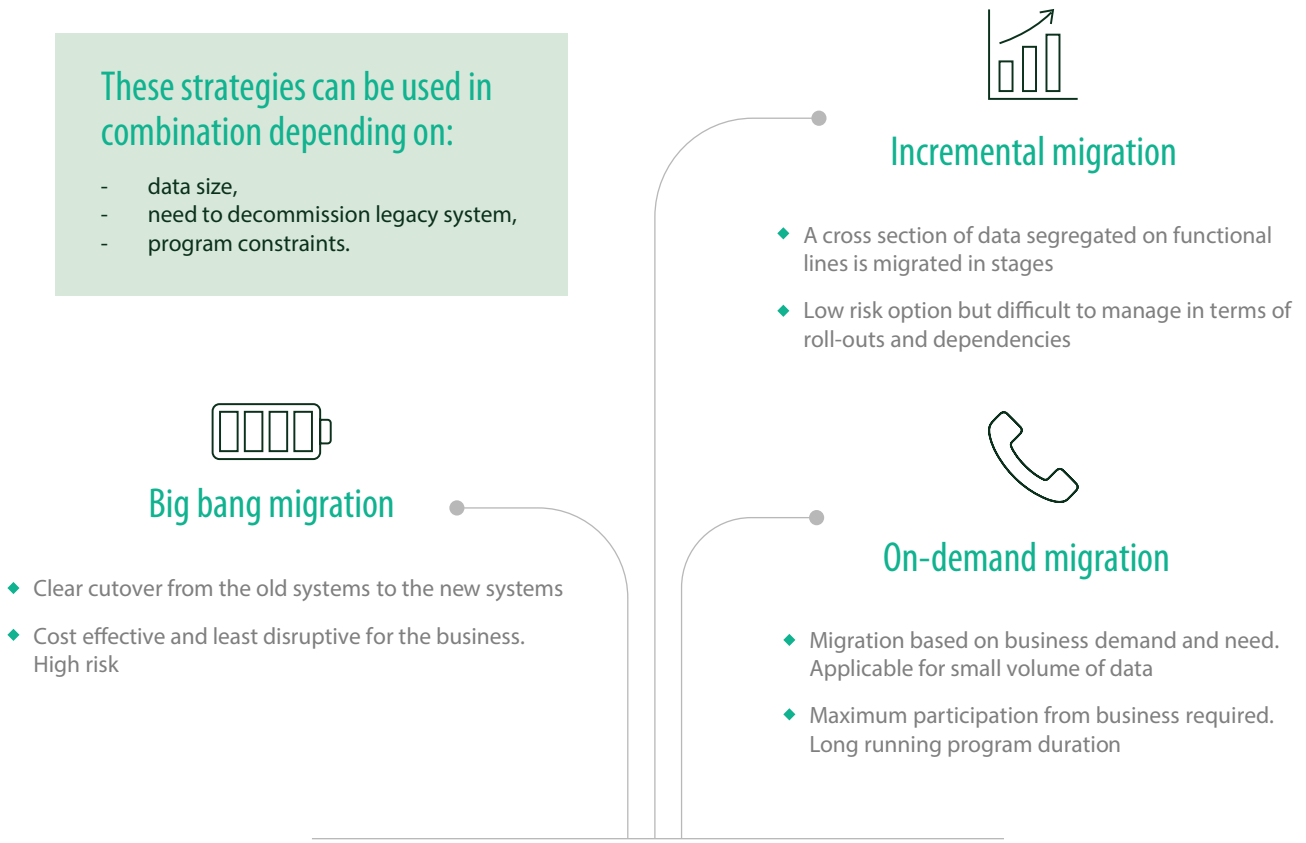




Strategy

Deciding the migration strategy will depend upon multiple factors like the nature of the business and product, data scoping criteria (e.g., products, projects, geographies), number of systems involved, data size, locations and the target PLM system.

Figure 2. Various possible strategies for migration



Available strategy	Pros	Cons
Mass migration	• Eliminates the complexity of managing the sanctity of CAD data for parts that are common in the source and target platforms • More cost-effective overall	• Managing delta changes over a large migration period leads to many delta cycles that can become complex • Increases validation load on end-user engineers
Incremental	• Reduced data loss and business continuity risk • Provides flexibility to configure packages to be migrated based on business priorities	• Introduces the complexity of managing the sanctity of common parts in the source and target platforms
On-demand	• Gives business teams the flexibility to bring data from legacy systems based on the need • Provides more control to business • Helps limit the scope of data to be migrated	• Technical rules and process to migrate needs to be defined with high precision • Higher probability of data conflicts, especially for data shared between products/projects

Data scoping

The most central element for any data migration program is 'what' and 'how much' data needs to be moved from legacy systems.

While due attention is given to technology, validation cycles, cut over timings and migration rate, data scoping often gets overlooked. Data discovery and assessment must ensure that each potential source system is analyzed for data types and volume.

Business SMEs play a pivotal role as most legacy systems have limited documentation, and know-how is mostly managed with limited tribal knowledge.

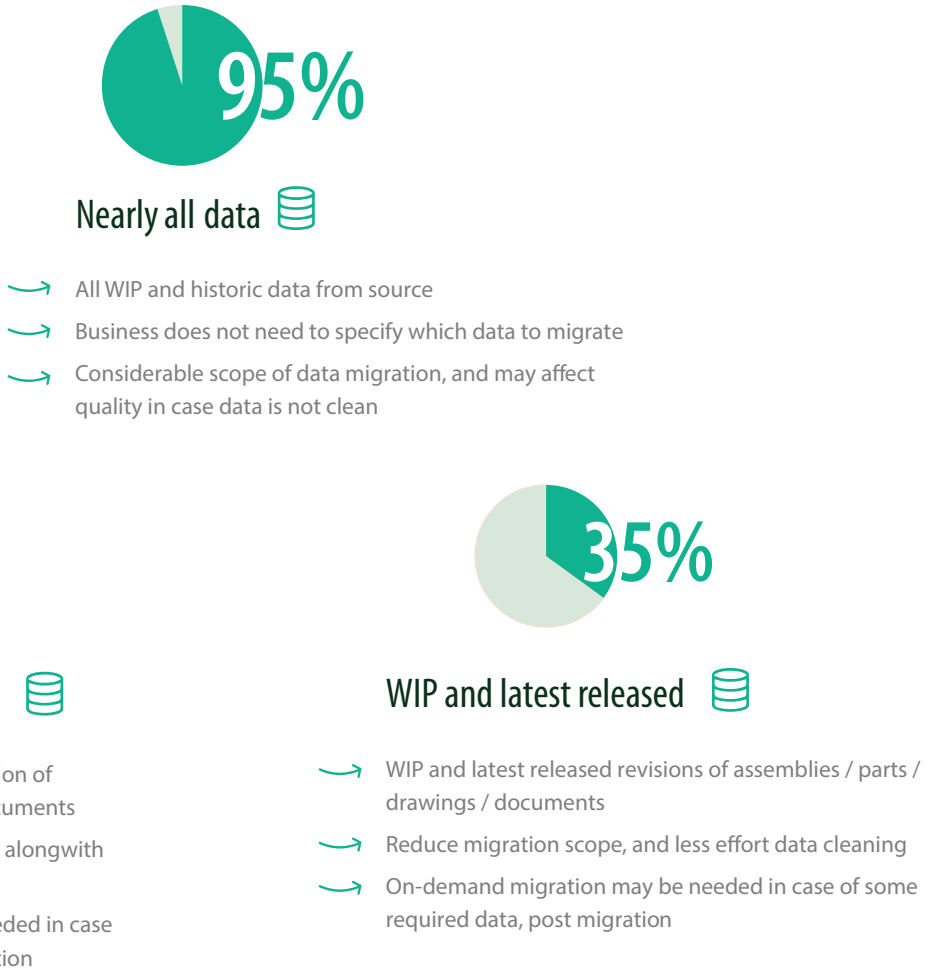
Each scoping strategy will impact the timeline and associate resource needs of effort & infrastructure.

How much data?

A comprehensive migration planning should address aspects of:

- Answering 'how much' data may consider the following factors to arrive at a suitable scope –
  1. Latest released and work-in-progress
  2. Finding the right master system of the data
  3. Reuse of various revisions across assemblies
  4. Legal restrictions to manage data history
  5. Current supported product versions
  6. Find data sharing patterns between legacy systems, reducing duplicates
  7. Can product line data be isolated?

Figure 3. Scoping scenarios



Migration package

Performing migration in stages may be relevant where data sources are considerable, cutting across engineering and other disciplines.

It is critical to scope migration packages appropriately to ensure the predictability of timelines and to manage the impact on business users.

The selection of data to be part of the package may use the following factors:

- migrate late-stage programs first
- migrate common parts and standard parts as part of the first (or early) migration packages

The quantitative mechanism to define the volume can be based on the Package Migration Index (PMI), which determines size by considering the number of unique design artifacts in the migration package, including unique parts, assemblies and drawings.

> Migration packages should be 'sized' to balance 'go-lives'. Focus should be to minimize the amount of delta change and avoid a prolonged freeze period.

Delta migration

Delta migration is a complex and key activity, especially relevant in bulk migration. The larger the data size, the higher the number of delta runs required to migrate all the source data.

A few key elements should be planned and defined such that Delta migration is efficient -

- Define update rules based on data types like metadata, files, relationships
- Migrate data, starting with historical data first, onto the latest. This would reduce the number of delta runs required
- Consider recreating, instead of updating in cases of data objects like BOM

Selecting the pilot

A pilot for data migration should be selected such that it

- does not present geographical location challenges in terms of representation
- has a good mix of system characteristics and lifecycle stages undergoing low design activity
- has user distribution such that validation could be done from one or two locations to reduce the validation setup, execution and support complexity
- has a low PMI of pilot migration

Incorporating design intent during migration

The design intent is the intellectual arrangement of features and dimensions of a design. It governs the relationship between features in a part and parts in assemblies.

Each component of a design intends to work as a solution to the design problem.

To keep the design intent intact during migration, as it would be key to the end user's acceptance of the quality of data migrated, migration strategy should focus on identifying the features (which capture design intent) like:

- Design tables
- Assembly constraints
- Symmetric part relationships
- Kinematics

> Validation needs to focus both on the functional (design intent) and technical aspects (volumetric assessment).

Volumetric assessment

Volume verification can be done by getting a count of "in-scope" items from the source system which are "eligible" for migration and cross-checking the results with the count of migrated Items. It can be based on scanning data migration log files using database native scripts

The key issues to look for:

- Migration completeness
- Ownership validation
- Status of data (group by Release State) matches
- Structure validation
- Missing files

Providing visibility

A key aspect of easing anxieties is to ensure appropriate communication during the program through a comprehensive migration dashboard.

The migration dashboard assists with overall tracking and reporting of status and issues, highlighting the 'lifecycle phase' of the migration for package(s), tracking delays for programs, enlisted major data issues and identifying the programs/areas that need attention.

A consolidated view, as shown below, provides the status across the program lifecycle.

Coexistence

Migrating data in packages requires both the legacy and new systems to coexist until all the required data is moved to the target system.

Most contemporary PLM offerings include OOTB integration platforms which can be utilized for this purpose, where the newly created data is synced back to the legacy system (or need base bi-directional) to keep the business running or even sent to suppliers who are accessing data from the legacy systems. Devising a robust coexistence strategy is even more important and, in fact, a must when the volume of data is large.

Program name	Discovery	Extract	Cleanse	Load to test	Validate	Delta	Load to prod	Start date	End date	Overall status	Remarks
Name X	●	●	●	●						●	
Name Y	●	●	●	●						●	

● On track
● Caution
● Alert

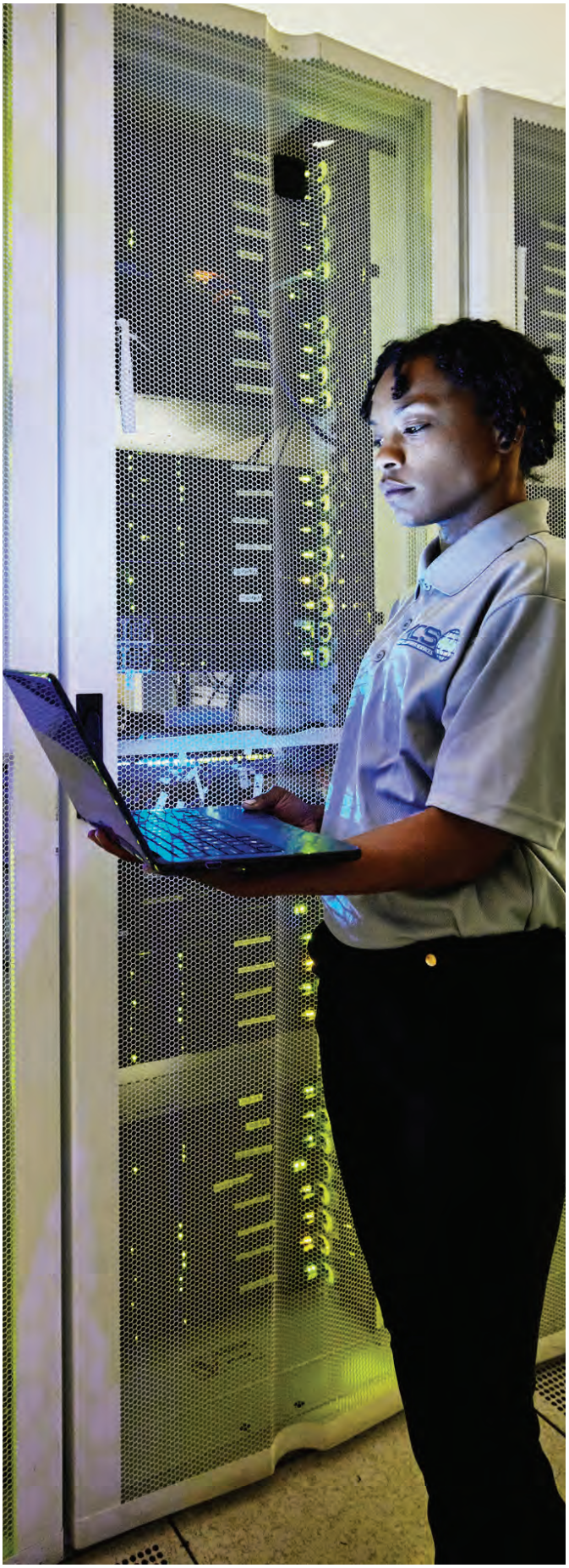
Program wise issue report

Program name	Name X
Issue type	#
Duplicate version number	6
Invalid import export locks status	12
Invalid migrated drawing	18
Duplicate part number	28
Missing part number	15
Multiple part numbers	42
Missing item name	14

Conclusion

The key takeaways when executing data migration in the PLM ecosystem are:

- Know the data you are migrating – Use a rules and catalog based migration approach. Start with a set of pre-defined rules in catalogs and continue to enrich catalogs based on learning
- Deploy SMEs to undertake cleansing activities that require knowledge of product structure, geometry and design characteristics
- Group data for migration - A project/program can be an "atomic unit" for data migration
- Migration packages - should be sized to balance "go-lives"
- Consider migrating "latest"/WIP data on a priority
- Define validation rules that allow for a combination of technical and functional validation
- Plan for coexistence methodologies in case of long duration migration programs



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