SPEC INNOVATIONS

DEVELOPERS OF INNOSLATE

TRANSITION GUIDE

CATIA to Innoslate

Introduction

The transition from CATIA No Magic Tools to Innoslate represents a pivotal shift in an organization's systems engineering approach. This guide is a comprehensive resource, offering both the rationale and practical methods necessary for a seamless transition from CATIA No Magic Tools comprising MagicDraw, Cameo System Modeler, and Cameo Enterprise Architecture to Innoslate. By understanding the unique capabilities and benefits of each platform, organizations can navigate this transition effectively, ensuring a smooth integration of Innoslate into their modeling ecosystem.

What Is Innoslate?

Innoslate is a model-based systems engineering tool that covers the entire product/system lifecycle from requirements management to verification and validation. It provides features for project management, requirements analysis, modeling and simulation, and more. As a collaborative cloud-based platform, it fosters seamless teamwork and accessibility. Enterprise and government versions are also available.

How Does Innoslate Compare to CATIA No Magic Tools?

Innoslate and CATIA No Magic Tools both serve the systems engineering community. Innoslate is a comprehensive lifecycle tool offering a variety of capabilities in a modern, cloud-based interface. On the other hand, CATIA No Magic Tools are traditionally local solutions providing standard-based modeling solutions focusing on analyzing, designing, and simulating systems. Both offer modeling and simulation solutions, but their use often hinges on the organization's needs. Those prioritizing standard-based modeling and simulation might gravitate towards CATIA No Magic Tools, while those seeking a broader, more integrated, comprehensive approach might find Innoslate more useful.

Definitions

The following are some definitions for clarity throughout the rest of the guide.

- **Model** is the data created for the entirety of the modeled system, most likely contained in a single database.
- **Diagram** is the visualization of a select subset of the data in the model.
- **Migration** is the relocation of the model and visuals to a new environment, preserving integrity and functionality.
- **Transition** is the process of moving from one environment to another through the adjustment of practices, processes, and resources to align with the new environment, along with the migration of data.

Transition

The transition from CATIA No Magic Tools to Innoslate is a complex process that can take hours of migration and effort. Given this, we must analyze why, when, and how to transition from one platform to another, as well as the impacts of this transition.

Why Transition?

There are a variety of reasons for users to transition from the CATIA No Magic Tools to Innoslate. Some of these reasons include cloud-based live access, modern user interface, additional functionality, security, continuous software improvements, and possible lower long-term costs.

- **Cloud-Based Service:** Innoslate offers cloud-based live access, which allows real-time collaboration and accessibility from anywhere, without the need for local installations.
- **Continuous Updates:** Continuous updates with new software improvements are crucial in a rapidly evolving environment, and Innoslate's cloud-based nature allows for seamless updates without the need for user intervention. Users will have immediate access to the latest features and updates.

- **Simulation and API:** Innoslate provides simulation and API integration capabilities that can be critical for systems engineering tasks.
- **Automated Importing and Data Integrity:** Innoslate offers the ability to import files of information without data loss, which is crucial for maintaining the integrity of complex systems engineering data. This automated import process facilitates the migration of diagrams, requirements, and other systems engineering artifacts.

The reasons for transition will be different for each organization, program, and person.

Program and Organization Perspective

Innoslate offers organizations and programs advantages over CATIA No Magic Tools through its centralized digital environment, which captures the entire system lifecycle, thereby reducing the need for multiple tools and associated costs. Moreover, Innoslate's system modeling methodology inherently incorporates critical factors, such as cost, schedule, performance, and risk analysis, upfront. By accounting for these factors during modeling, organizations can optimize their systems for better outcomes.

Innoslate's intuitive user interface and views cater to technical and non-technical users with minimal training. Its cloud-based, collaborative platform provides comprehensive modeling, simulation, and lifecycle management capabilities in one integrated solution, allowing organizations to fulfill all MBSE needs seamlessly. While the choice depends on specific requirements, project complexities, and existing tool familiarity, Innoslate's lifecycle-oriented approach offers compelling advantages for cost-effective, integrated model-based systems engineering.

Value

The value of transitioning from CATIA No Magic Tools to Innoslate is about delivering a comprehensive and integrated systems engineering experience that is tuned to the demands of modern project environments.

- **Real-Time Collaboration and Accessibility:** With live access from anywhere and anytime, teams can collaborate synchronously, regardless of geographical barriers. This feature fosters a collaborative culture that does not exist in the CATIA No Magic Tools world.

- **Centralized Cloud-Based Environment:** Innoslate's cloud infrastructure offers an all-in-one workspace that facilitates the centralized management of systems engineering tasks. This eliminates the need for different plug-ins, disparate tools, and disjointed workflows, thereby improving efficiency and reducing the time to completion for systems engineering projects.
- **Simulation and Analytical Capabilities:** Innoslate's advanced simulation tools allow for the modeling and analysis of complex systems to simulate cost, schedule, and performance and identify potential risks early in the development cycle.
- **Cost-Effective Scalability:** The shift to Innoslate can be economically advantageous, as it offers a scalable solution that grows with the organization's needs. By reducing the total cost of ownership, including savings on infrastructure, licensing, license management, and maintenance.
- **Enhanced Data Management and Security:** Innoslate is a cloud and on-site solution. All cloud solutions are held in secure data centers, and on-site solutions can be placed on a company's internal network behind a firewall, ensuring the integrity and security of sensitive engineering data.
- **Project Management:** Innoslate provides users with a project management dashboard that allows engineers to take advantage of features such as Timeline Diagrams, Gantt Charts, Calendars, and Kanban Boards, ensuring the integration of systems engineering with project management.
- **Help Center and Support:** Innoslate is committed to continually improving and providing support. Feedback can be submitted on the dashboard interface. The help center website is available 24/7 to help users with specific questions, and live support is provided during business hours by SPEC Innovations' support team.

The return on investment for Innoslate is greater than for CATIA No Magic tools due to Innoslate having a lower training duration/cost, a higher number of integrated features, and a lower cost for equivalent functionality.

Risks

Transitioning to a new platform like Innoslate introduces risks that must be carefully evaluated against the potential benefits. At the same time, not transitioning carries its own risks.

Risks of Transitioning:

- **Data Integrity:** Migrating large, complex models carries the risk of data loss or changes. There's a chance that certain nuances or data of the original model may not migrate as expected to the new environment due to a lack of compatible entity/attribute types or features available. Data loss could occur during migration when data is lost or not imported into Innoslate. To mitigate this risk and ensure the integrity of the data, form and follow a migration plan with a defined data mapping to ensure the data is migrated correctly to Innoslate.
- **Culture Change:** Programs and organizations may have well-established practices of modeling systems using CATIA No Magic Tools and SysML. The culture change needed to implement Innoslate and LML will be challenging if there is opposition. People will range from being very open to being very closed off to the change. This risk should be handled case by case but should be acknowledged and understood if the decision is made to transition to Innoslate.
- **Learning Curve:** Even though Innoslate's interface is much more intuitive and user-friendly than CATIA No Magic Tools, it will take time to learn how to use the tool and the new language. However, this learning curve will not be as steep nor require as much time or resources for users to acclimate to Innoslate. The learning curve can be mitigated through proper training and access to resources.

Risks of Not Transitioning:

- **Loss of Competitive Edge:** Failing to transition to more advanced tools can leave an organization using outdated methodologies, potentially affecting its competitive edge and falling behind the power curve and competition.
- **Integration and Collaboration Setbacks:** Not transitioning may mean missing out on advanced collaboration features and integrations offered by new tools, which can improve user productivity and efficiency.
- **Security Risks:** New tools might have improved security features and receive regular updates to protect against the latest threats. By not transitioning, an organization may expose itself to increased cybersecurity risks.

- **Maintenance Overhead:** Older tools may require more effort to maintain, potentially causing compatibility issues with new systems or software.

Organizations must carefully assess and balance these risks against the potential benefits of transitioning to determine the best course of action.

When to Transition

Programs and organizations should ideally transition at a point that minimizes the risk and can maximize the benefits to them or when the potential future benefits outweigh current costs and risks. This will be different for every organization and program. The decision-makers will have to decide the best time and approach to initiating and executing the transition.

Transition Points

An ideal time to switch to a new system, such as Innoslate, is near the end of a significant development cycle. This allows for a smooth transition into the following phase of development with the least amount of disturbance. Making the switch before a large project scale-up guarantees that the subsequent growth utilizes the improved integration and collaboration features of the new tool. Transitioning ahead of significant project milestones allows teams to acclimate to the new system without risking deliverables.

Furthermore, times of organizational transition, like a reorganization or a change in leadership, offer excellent chances to introduce new tools that complement a revitalized transformation agenda.

Minimizing Risk & Maximizing Benefits

- **Risk Assessment:** Conduct a thorough risk assessment to identify potential challenges and the impact of transitioning on ongoing operations. The transition should be timed to mitigate these risks effectively.
- **Pilot Programs:** Running a pilot/demo transition on a smaller scale can help identify the best practices and time frames for a full-scale rollout to verify the methodology and approach.
- **Training and Support:** Transition when adequate resources are available for training and support to ensure a smooth changeover and quick adaptation by the workforce.

- **Technology Readiness:** Align the transition with the maturity of the new tool. Ensure that it has been tested and proven in similar environments to reduce the likelihood of unforeseen issues.
- **Cost-Benefit Analysis:** Perform a cost-benefit analysis, combined with the product costs, to quantify the potential return on investment. Transition is viable when the future benefits in efficiency gains, cost savings, and competitive advantage significantly outweigh the costs and risks when moving from CATIA No Magic Tools to Innoslate.

How to Transition

The following sections detail a proposed approach to performing the transition from CATIA No Magic Tools to Innoslate.

Preparing to Transition

Transition preparations should establish a transition process that preserves model integrity and functionality. The following are recommendations to take into consideration when preparing and planning to transition:

- Establish training programs to train all necessary people on Innoslate and LML.
- Form a migration team to coordinate and handle the strategy and planning for migrating all necessary existing models and data. The team should be composed of members with strategic, technical, and operational expertise in CATIA No Magic Tools and Innoslate to ensure the integrity of the content being translated. This team must be aware of the properties and specifications of entities in either platform.
- Go through the SysML models.
    - Identify SysML models that need to be migrated to Innoslate and identify the old or unused ones that can be put into a repository to keep.
    - Clean up SysML models to facilitate cleaner migration of models. This may include removing any unnecessary elements, ensuring standard naming and numbering conventions, simplifying customizations, ensuring that the elements of the models that cannot be mapped to the new tool are properly documented, etc.
    - Identify key element types used in the SysML models that will need to be mapped to LML entities.

    - Determine any extensions that need to be made to LML in Innoslate to capture all necessary data in the SysML model.
    - Establish diagram configuration management for diagrams moving from the CATIA No Magic Tools to Innoslate.
- Establish a Data Management Plan for the migration to outline how the models are handled during the migration to preserve integrity and ensure the migration is completed without duplication or loss of information.
- Maintain and update documentation for the transition.

Migration

The migration of models will require exporting data from CATIA No Magic Tools, cleaning the data, importing the data into Innoslate, and recreating or remodeling diagram visuals. Prior to importing the data into Innoslate, establish a mapping of SysML element types and attributes to LML entity classes and attributes. When necessary, extend LML to accommodate specific data in SysML needed to maintain the integrity and functionality of the model.

Though we aim for the migration between the tools to be as automated as possible, it still requires the migrator to map, move, and ensure the integrity of the data. Innoslate aids this process with its Import Analyzer, where various file types can be imported, and then the file data is automatically added as entities in Innoslate's database using a specified mapping.

Once the files are exported, migrators must review the new entities and ensure the information is correct, accurate, and a good representation of the data from the CATIA No Magic Tools. Once the data is in Innoslate, relationships can be added by additional imports or manually to begin recreating the visuals of the model, such as diagrams and documents. Some of these visuals will be auto-populated with data as the relationships are added, but others may have to be remodeled.

Mapping Between SysML and LML

Migrating models from CATIA No Magic Tools (SysML) to Innoslate (LML) involves mapping and allocating SysML's element types and attributes to LML's entity classes and attributes. This mapping will define the success and effectiveness of the migration of the models.

A general mapping should be established before starting the model migration to ensure consistency across all model elements imported. Table 1 and Table 2 below show examples of how SysML diagrams and elements map to LML diagrams and entities.

SysML Diagram	LML Diagram	LML Entities
Activity	Action Diagram	Action, Input/Output
Sequence	Sequence	Action, Asset
State Machine	State Machine	Characteristic (State), Action (Event)
Use Case	Asset Diagram	Asset, Connection
Block Definition	Class Diagram, Hierarchy Chart	Input/Output (Data Class), Action (Method), Characteristic (Property)
Internal Block	Asset Diagram	Asset, Connection
Package	Asset Diagram	Asset, Connection
Parametric	Hierarch, Spider, Radar	Characteristic
Requirement	Hierarch, Spider	Requirement and related entities

Table 1. SysML Diagram Mapping to LML Diagrams and Ontology

SysML	LML
Block	Block (Asset)
Package	Package (Asset)
ValueProperty	Values (Characteristics)
Operations	Operations (Action)
PartProperty	Block (Asset)
Constraints	Constraints (Equations)
Port	Port (Port)
Signal	Input/Output (I/O)
Requirement	Requirements

Table 2. SysML to LML Entity Class Mappings

Since SysML and LML do not have a one-to-one mapping, some elements and attributes may not fit the established mapping. For these elements and attributes, LML can be extended in Innoslate to fit those elements and attributes better, as well as relationships. Often, SysML has more language specificity than LML since LML was created to capture many concepts with its core entity classes; for example, an "Asset" in LML can represent a "Block" and a "Package" from SysML. To capture the entirety of the data captured in the SysML model, LML may have to be extended by:

- Adding subclasses to the existing core classes,
- Adding attributes to the classes,
- Adding relationships between classes,
- Adding attributes on relationships, and
- Adding labels to classes.

Keep any mapping documentation up-to-date for added extensions to maintain consistency in the migration.

Recreate or Remodel Diagrams and Visuals

When migrating models from CATIA No Magic Tools (SysML), the diagrams and visuals may be recreated or remodeled. Recreating involves using the data migrated to

LML from the SysML model and recreating desired diagrams and visuals from the existing data. Remodeling consists of adding new entities and rebuilding the diagrams and visuals in LML based on the original SysML model. All of the visuals in Innoslate are created from the data in the database based on a subset of entity classes and relationships that connect them. The decision to recreate or remodel each diagram and visual will depend on multiple factors, which are summarized in Table 3 and discussed further below. The migration of models will most likely consist of a mix of diagrams and visuals that are recreated and remodeled to be the most similar to the original while preserving the integrity and functionality of the models.

Factor	Recreate	Remodel
Quality of Model	High quality, well-maintained	Low quality, inaccurate
Model Age	Up-to-date	Outdated
Model Size	Large	Small
Cost & Schedule	Limited budget & schedule	Flexible budget & schedule

Table 3. Recreate or Remodel Factors Comparison

Quality of Model:
The quality and accuracy of the SysML model will determine if each diagram can be recreated from the data or if it needs to be remodeled. High-quality and well-maintained models are desired for migrating because they have valuable system data and will be quicker to migrate since the diagrams can be recreated instead of remodeled. Recreating will involve migrating the entity data to Innoslate (LML) and creating the diagram through Innoslate's Diagram Dashboard. If the data is not of great quality or does not represent the system well, then the SysML model is used as a reference to remodel the diagram in Innoslate. When migrating models, diagrams should combine recreating and remodeling to model the best and highest-quality version.

Model's Age:
Outdated models result from a lack of technology updates, compliance with new standards or operational requirements, or a mismatch with the existing system. Remodeling outdated models will be beneficial as it provides an opportunity to update the model data to match technologies, standards, requirements, and the system. Migrating might require extensive revisions, diminishing the benefits of reusing old models.

Model Size:
The complexity and scale of existing models are important to consider in preparation for the migration. Larger

and more complex models involve more dependencies and intricacies, which can complicate and delay the migration process due to the difficulty of understanding the model and ensuring it is captured correctly in Innoslate. The effort to migrate and recreate can be justified by the volume of existing data and configurations that would be costly and time-consuming to remodel manually. For smaller models, the benefits of starting fresh and remodeling with Innoslate might outweigh the costs of migrating, which must be considered.

Cost and Schedule:
The budget and time constraints for the project are very important to consider, especially for the PM of the project. Migrating models to Innoslate is more cost-effective than starting from scratch, as it leverages the existing entities and avoids the exhaustive development costs tied to new models. Being able to migrate the model and recreate the diagrams in Innoslate will save time and money, but there is a benefit to remodeling parts of the model to ensure its integrity and functionality.

When migrating models, use recreation, remodeling, or a combination of both as necessary to preserve model integrity and functionality while considering all migration factors.

Approach and Methodology

This section will summarize the approach and methodology to migrate the data from CATIA No Magic Tools to Innoslate using a straightforward process.

- Review and analyze the model in the CATIA No Magic Tools to understand the contents of the model, i.e., diagram types, types of elements, etc.
    - Identify subsets of the model to export. Subsets of the model could be the elements and data for a single diagram or a single type of element. Exporting subsets will keep data sets small and easy to review before importing.
- Create CSV files for each of the subsets by using the Generic Table feature in the tool.
    - Ensure necessary attribute columns are included in the generic table to migrate the data. These columns will be mapped to some entity attribute field, label, or relationship in Innoslate.
- Identify how each CSV will be parsed into the different SysML element types, i.e., Block, Values, Part, Constraint, etc. Separating the CSV into different element types simplifies the import into Innoslate as one entity type at a time.

    - Separating the elements in a CSV into the different element types can be aided by the use of Generative AI.
- Import each CSV file into Innoslate using the CSV Import Analyzer according to the LML class entity that maps to the SysML element type of the CSV.
- Once Imported, review the imported entities for correctness and completeness.
- Add relationships between entities in Innoslate. This can be done manually through each entity's Entity View or automatically with another CSV import.
- Create diagrams and visuals.
    - Use the Diagram Dashboard to create diagrams and create new entities or pull in existing ones.
    - Use the Diagram Dashboard to create diagrams from existing entities.
- Adjusts diagrams to emulate the original model.

V&V

Once the model migration is complete, migrators must verify the implementation of the model in Innoslate replicates and emulates the model in the CATIA No Magic Tools.

Verify that the migration was performed correctly and all data is correct and complete.

Objective: To compare the original and migrated models to ensure that the Innoslate models are consistent with the original CATIA No Magic Tools models and are complete.

Since the comparison is between models in two separate tools, it will be done manually by checking that the models are consistent and complete.

Validate that the migrated model's data preserves the model's functionality and integrity.

Objective: To confirm that the migration was accurate and that the Innoslate models are true to the original CATIA No Magic Tools models in terms of functionality and design.

Use methods for model comparison to validate the functionality of the migrated model with model users.

These are examples of the V&V that should be done to ensure that the migrated model is as close to the original as possible while preserving the functionality and integrity of the model.

Impact of Transition

This section discusses the impact of transitioning from CATIA No Magic Tools to Innoslate on an organization, its personnel, methodologies, and the industry, and how the technology can help shift the paradigm.

Organizational Impact

Impact on Roles: Organizational roles, from system engineers to project managers, will experience shifts in responsibilities and workflows, necessitating a well-structured training and support program to facilitate a smooth transition from CATIA No Magic Tools to Innoslate. System engineers may find their day-to-day workflow altered as they now have to adapt to new functionalities and modeling paradigms that they are not familiar with. Project managers may need to reevaluate timelines and deliverables in light of the transition. Support staff may face an increased volume of questions and inquiries as users across the organization are learning the new system and its many complexities.

Training and Support: Comprehensive training programs will be critical to facilitate a smooth transition from CATIA No Magic Tools to Innoslate. Training modules must be tailored to address specific skill gaps and to adapt to Innoslate. Ongoing support will be a huge contributing step to whether or not the transition will be successful.

Toolchain Impact: The introduction of Innoslate may necessitate changes in the existing toolchain. Integrations with other software will need to be assessed and potentially reconfigured to ensure the SE tool interface can still integrate with other software.

Learning Curve: Management can anticipate a learning curve that may initially reduce productivity and efficiency in work for engineers. Project managers must account for cost, schedule, and performance impacts. Engineers' learning curve should be monitored until proficiency is reached, with milestones for measures of performance and progress.

MBSE/Digital Engineering Impact

Changes to MBSE Methodology: Transitioning to Innoslate will encourage a shift from a reliance on diagrams to a more data-driven and traceability-focused methodology. Innoslate emphasizes collecting, analyzing, and utilizing data throughout the system

lifecycle. Prioritizing data encourages and ensures comprehensive traceability and alignment across all phases of development. Organizations can foster a more systematic and efficient approach to system engineering, enabling better decision-making and collaboration.

Impact on Modeling: With the data-driven approach, models will encompass databases for a system. This approach enables various views and diagrams to be created and generated based on the contained data, encouraging more flexible views that can be tailored to the viewers. This will impact the way modeling is thought about and practiced.

Integration With Other Tools: Innoslate's deployment on the cloud and local systems opens up the opportunity space for integrations with other tools in a Digital Engineering ecosystem. Connections can be made with various tools and software to facilitate the sharing of data and enable the Digital Engineering ecosystem.