

The NDIA logo consists of the letters "NDIA" in a bold, red, sans-serif font, enclosed within a white rectangular box. The background of the slide features a large, stylized, light gray gear-like shape with rounded teeth, set against a white background.

26th Annual Systems & Mission Engineering Conference

Digital Engineering Systems Model Exchange Framework

Approved for Public Release - Q3-2023

 SODIUS

Presenter's Bio



LinkedIn: [linkedin.com/in/jeffpilato](https://www.linkedin.com/in/jeffpilato)

Jeff Pilato has been in business development for over 30 years and worked for companies such as Harris Corp., Mentor Graphics, Wind River, Telelogic, IBM, Oracle, and ANSYS. His areas of expertise are primarily in Aerospace, Defense, and Automotive industries.

Today, Jeff is the Chief Strategy Officer at Sodius Corp. He has broad responsibilities in supporting SodiusWillert's executive leadership team in defining and executing the company's long-term growth strategies and key business development initiatives. In addition, Jeff is responsible for Sodius Corp.'s U.S. sales revenues, human resources, and contracts.

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- [Publisher for Rational Software Architect](#)
- [Licensing and Support](#)
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Introduction

Sodius Corp. is a U.S. company and is the global leader in **software solutions for data transformation in classified and non-classified environments, enterprise interoperability, and model-based code generation** to improve data exchange, transformation, traceability, and the linking of engineering data in mission- and safety-critical industries thereby enabling digital engineering workflows.

We primarily deploy our solutions in:

- **U.S. Aerospace & Defense Companies**
- **DoD Agencies**
- **Automotive**



Our Mission: To Enable the Thread of Digital Engineering

We help break down tool silos across these engineering disciplines:

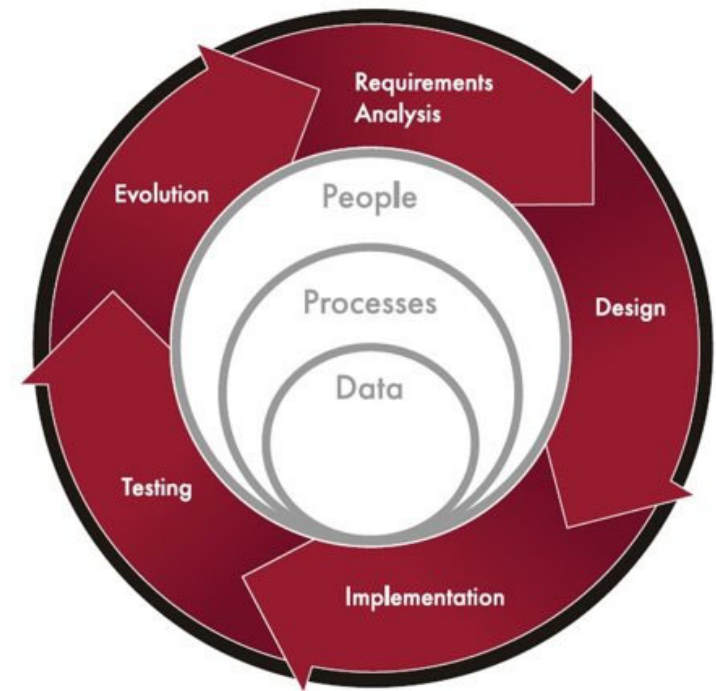
- ALM / PLM
- MBSE
- Requirements Engineering
- Software Engineering
- Test and Validation

Interoperability experts

- 20 years of expertise working with engineering teams in mission and safety-critical industries

Systems Model Transformation experts

- Transforming systems models since 2006



System Model Exchange between different modeling tools

Industry leaders trust Sodius to help them improve productivity



Commercial Item Description (CID) for the Publisher from NAVAIR

Sodius Corp. is excited to announce that in April 2023, we received CUI from the U.S. NAVAL AIR SYSTEMS COMMAND HEADQUARTERS with a **Commercial Item Description (CID) for the Publisher for Rhapsody** per definitions (1)(i) and (1)(ii) of FAR 2.101 for a commercial product **that enables single source of truth data for the MQ-25 Stingray MBSE program.**

Defense Contract Management Agency (DCMA) Commercial Item Group (CIG) stated that **this CID will make it much easier for systems engineers to leverage the Publisher for Rhapsody on other DoD programs.**

Customer Proof Points

Raytheon
Integrated Defense Systems



NORTHROP GRUMMAN

Content to export: 200 diagrams,
18,000 elements.

Expected time w/o Publisher: “a quick computation leads to 18 weeks of remodeling and validation without the reproducibility and confidence brought by automated solution.”

Total time to export: ~ 1 hours

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“By leveraging the MagicDraw Publisher for Rhapsody, the total time to export the end-customer deliverable was less than two hours.”

Chris Finlay – Project Manager

Content to export: 37,331 files in Rhapsody UML format with 812,405 elements and 703 diagrams

Expected time w/o Publisher: “This kind of transformation, if done manually, would take man-years to complete.”

Total time to export: Less than half a day

--

“The Publisher for Rhapsody quickly enabled us to automate the migration from Rhapsody UML models to Cameo/MagicDraw SysML models.”

Sean F., Dynetics Project Manager and Lead Systems Architect
Redstone Arsenal

Content to export: 220,000 elements and 300 diagrams in Rhapsody SysML

Expected time w/o Publisher: “Redoing an entire model that months were spent on because of tool changes, would have been a huge waste of resources.”

Total time to export: 20 minutes

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“We like it, and the management is very pleased. Redoing an entire model that months were spent on because of tool changes, would have been a huge waste of resources.”

Maxwell Yavaraski., Principal System Engineer

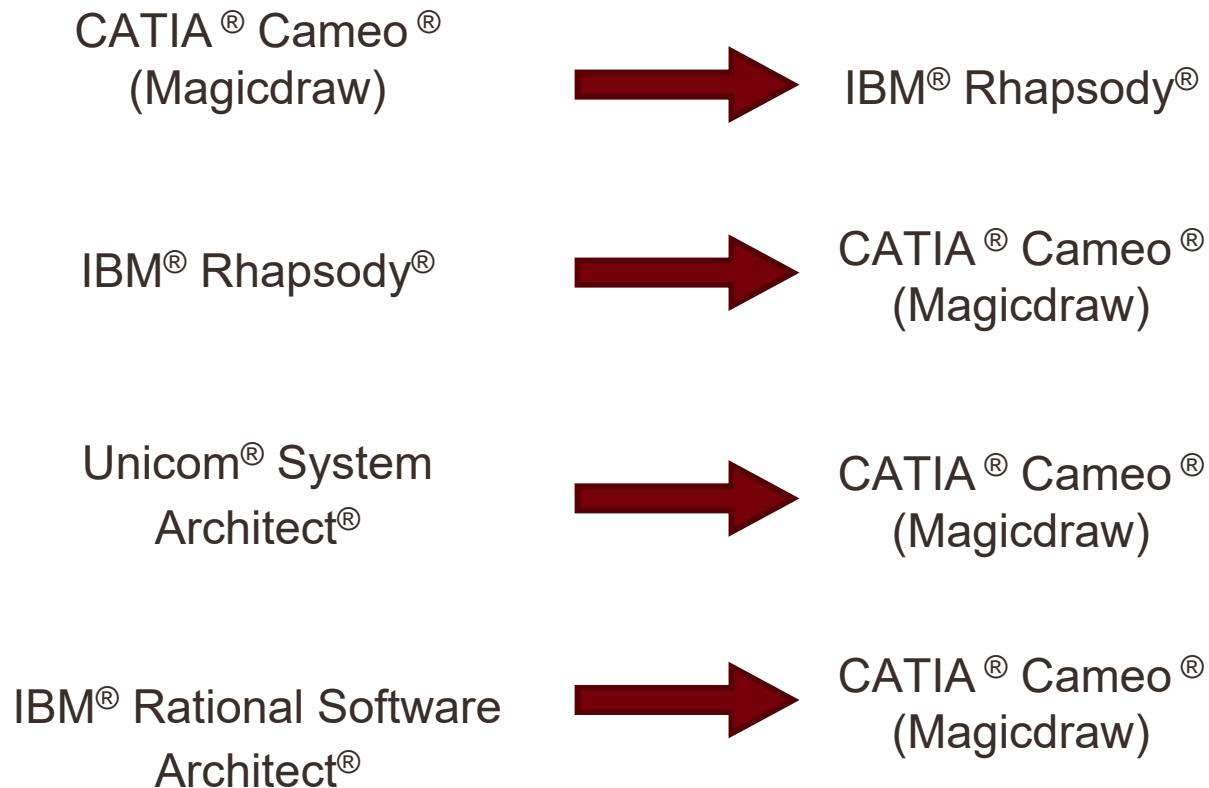
System Model Exchange between different modeling tools

If you want to design in one modeling tool and **deliver in another**, you need to be able to **export and publish your model data from Cameo (MagicDraw), Rhapsody, System Architect, or Rational Software Architect.**

Until recently, there was no comprehensive solution, and you would have encountered three key challenges:

- *How do you get years of modeling IP exported quickly?*
- *How do you transfer data consistently and accurately for very large models?*
- *How do you transfer thousands of diagrams?*

Sodius Publisher family of products are the only fast, automatic, and proven solutions used to overcome model exchange challenges



How MagicDraw Publisher products have helped our customers



SAVE ENGINEERING TIME *(faster)*

Save months or years of critical engineering resources converting and validating manually re-written models.

With the **Publisher for Rhapsody or Cameo model Importer for Rhapsody**, users can **automate the export and publish models** to meet industry standards within minutes or hours.



MAINTAIN DATA INTEGRITY *(better)*

With a fully automated transformation, data is checked and converted consistently within and between projects, in a **reproducible** way.

Any transformed data is uniquely identified **preserving traceability** after the conversion.



INCREASE ROI *(cheaper)*

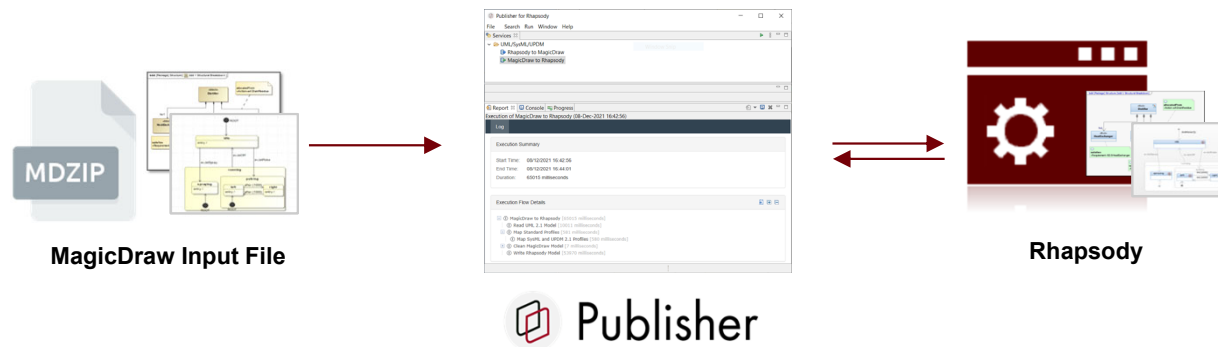
By converting semantic and diagrams in the transformation process, you preserve the modeling intent. Your **engineering added-value is transferred to your new target environment increasing the ROI of modeling activities** in your organization by saving months to years of manual re-modeling.

Cameo model Importer for Rhapsody

Cameo Model Importer for Rhapsody

Simplifies the model exchange process from MagicDraw to Rhapsody

Enables automated import of Cameo/MagicDraw UML, SysML or UPDM models into Rhapsody for System / Sub-System or System-to-Software scenarios



Consistent way to achieve Import / Export / Publish scenarios between Cameo and Rhapsody including:

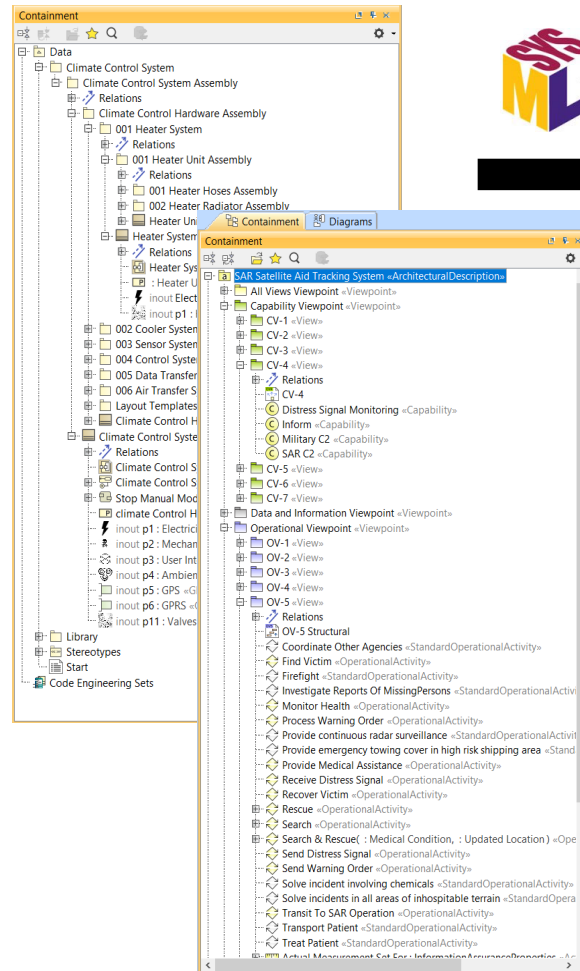
- **Unique ID generation**
- **Alignment of profiles and libraries in both directions**

DoDAF & SysML from Cameo to Rhapsody

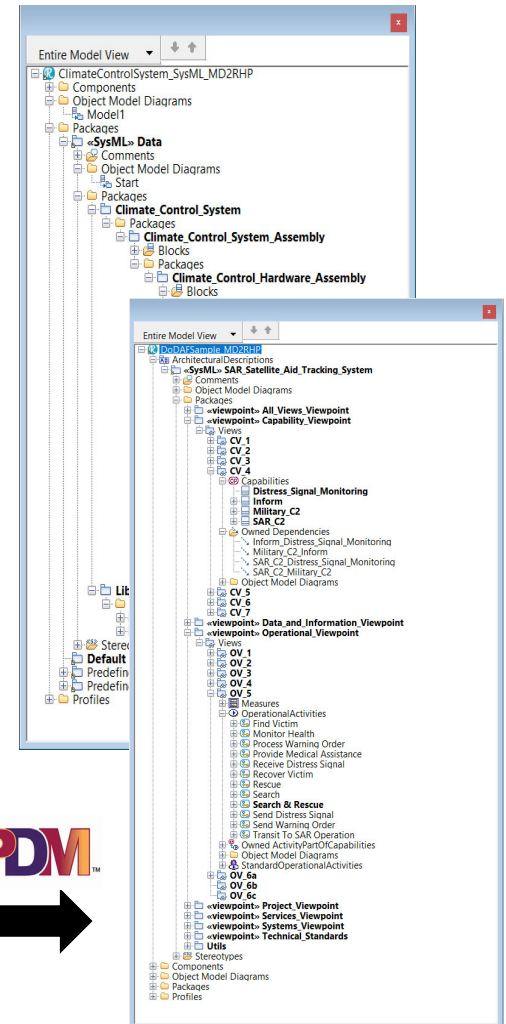
This new service of the Publisher includes:

- Mapping of UPDM/ SysML elements
 - Hierarchy, elements and relationships for UPDM, Architecture Description, Packages and Viewpoints
- Import Cameo diagrams into Rhapsody
 - Import of Structural and Behavior diagrams
 - Specialization of UPDM diagram import

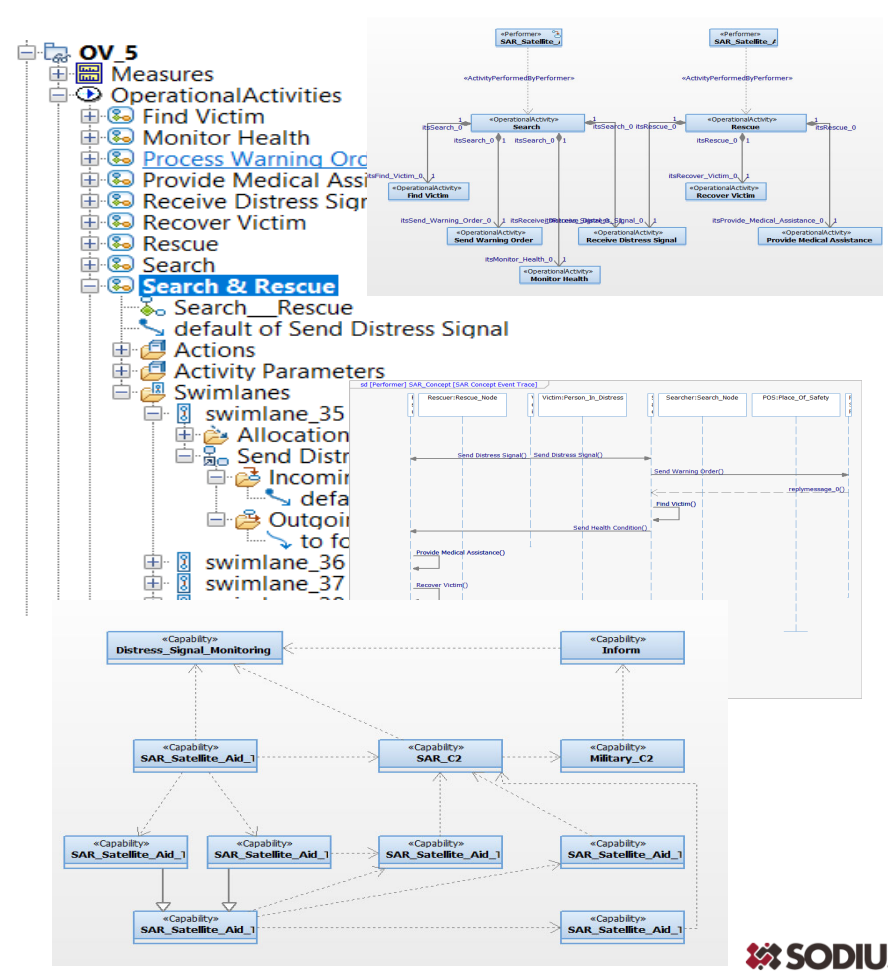
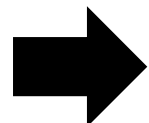
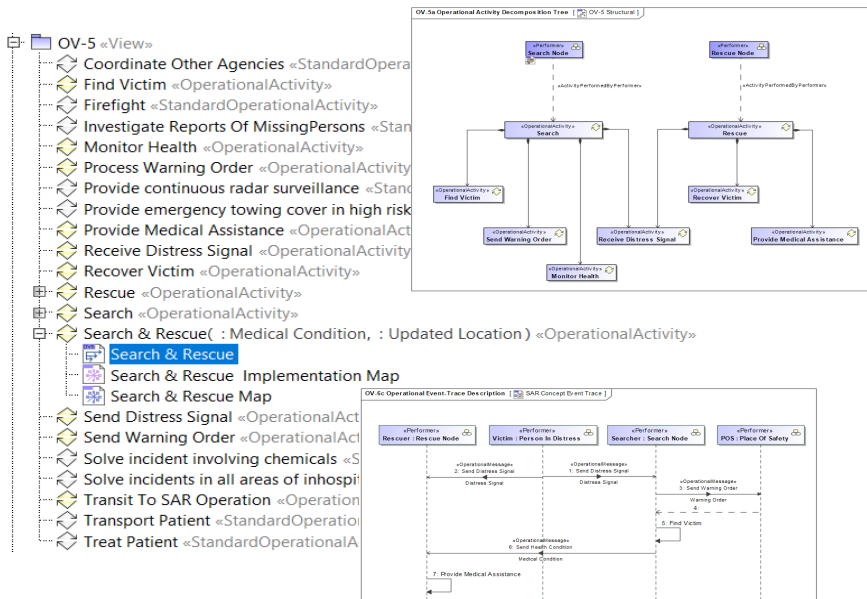
Cameo Source Models



Rhapsody Target Models



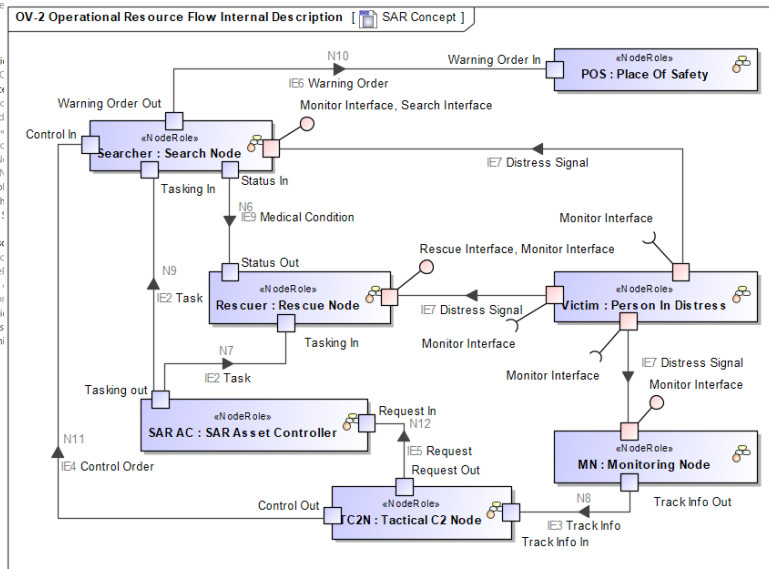
Semantics and Diagrams From Cameo to Rhapsody



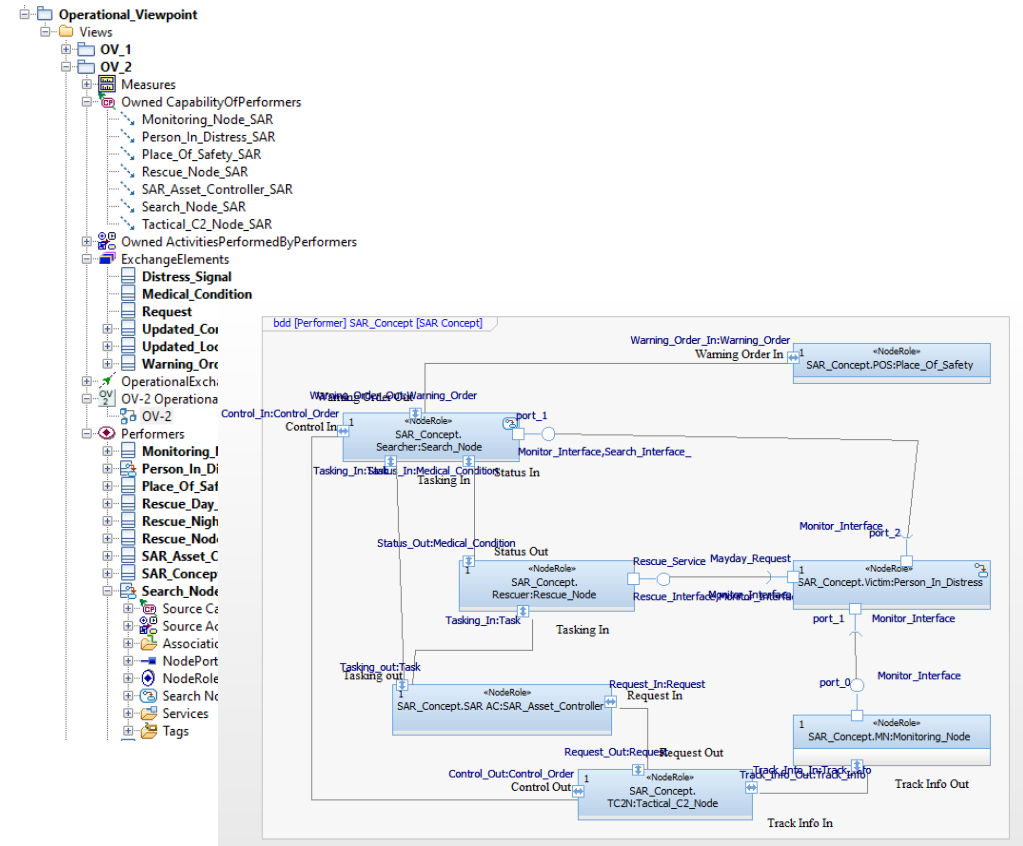
Composite Diagrams

- Support for Composite Diagrams

- OV-2 «View»
 - IE5 Request «ExchangeElement»
 - IE6 Warning Order «ExchangeElement»
 - IE7 Distress Signal «ExchangeElement»
 - IE8 Updated Location «ExchangeElement»
 - IE9 Medical Condition «ExchangeElement»
 - IE10 Updated Condition «ExchangeElement»
 - Monitoring Node «Performer»
 - Person In Distress «Performer»
 - Place Of Safety «Performer»
 - Rescue Day Shift «Performer»
 - Rescue Night Shift «Performer»
 - Rescue Node «Performer»
 - SAR Asset Controller «Performer»
 - SAR Concept «Performer»
 - SAR Concept Impact Map
 - SAR Concept Implementation
 - SAR Concept Event Trace «C
 - SAR Concept Event Trace «C
 - MN: Monitoring Node «Nc
 - POS: Place Of Safety «Nod
 - Victim: Person In Distress «
 - Searcher: Search Node «N
 - TC2N: Tactical C2 Node «N
 - SAR AC: SAR Asset Control
 - Rescuer DS: Rescue Day Sh
 - Rescuer NS: Rescue Night!
 - Search Node «Performer»
 - Search Node Transition desc
 - Rescue Day Shift «NodeRc
 - Rescue Night Shift «Node
 - Tasking In: Task «NodePort
 - Status In: Medical Conditio
 - Distress Signal In: Distress
 - Warning Order Out: Warni
 - Search «Service»
 - Tactical C2 Node «Performer»



Cameo Source Model



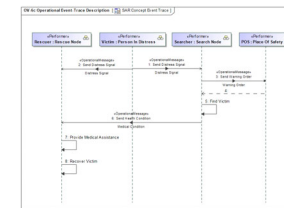
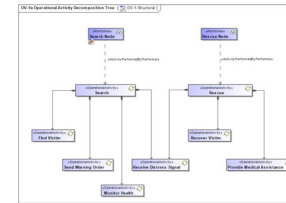
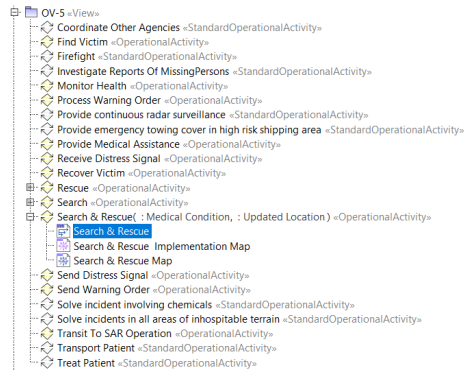
Rhapsody Target Model

Behavior Diagrams

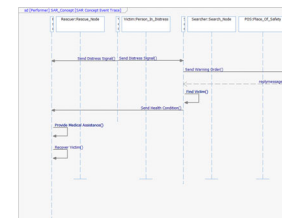
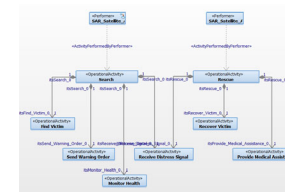
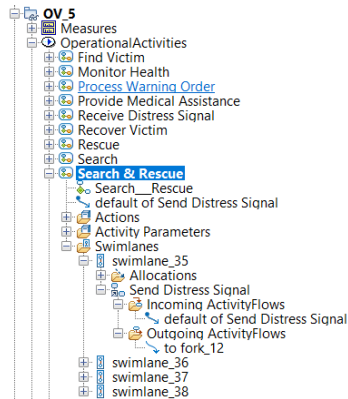
All Behavior Diagrams are Published:

- Use Case
- Activity
- State
- Sequence

Cameo Source Model



Rhapsody Target Model

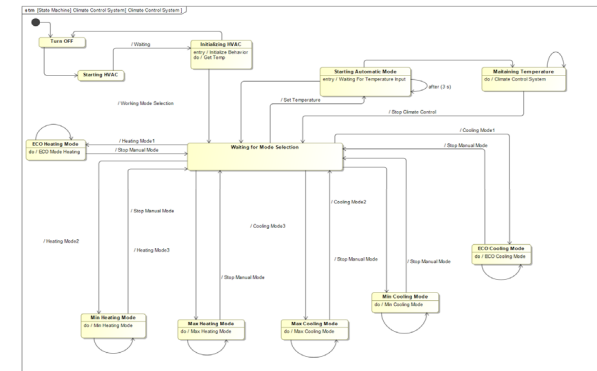
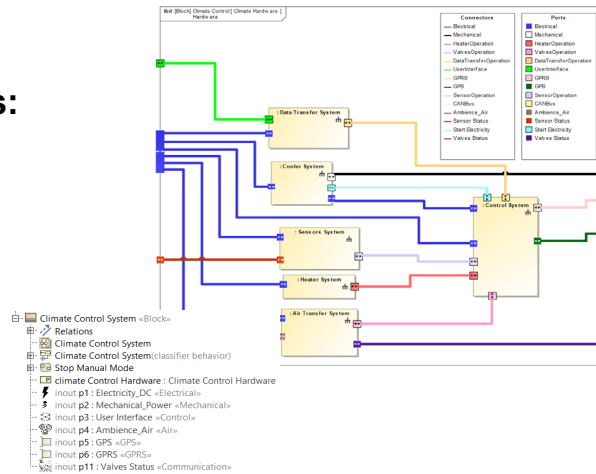


Other SysML Examples

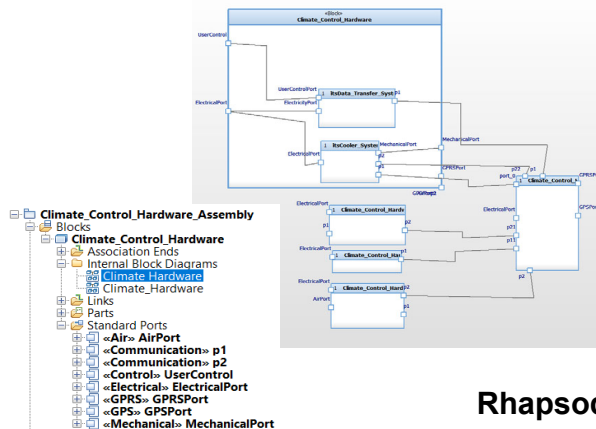
Support for Standard SysML views:

- Activity diagram
- Block definition diagram
- Internal block diagram
- Package diagram
- Parametric diagram
- Requirement diagram
- Sequence diagram
- State machine diagram

Cameo Source Models



Examples: IBD & State Diagram



Rhapsody Target Models

Approved for Public Release SODIUS



Publisher for Rhapsody

The Publisher for Rhapsody is a plug-in that automatically generates complete **SysML/ UML/ UPDM2** MagicDraw models from Rhapsody, including:

- **Model elements, structure, and hierarchy**
- **Diagrams** maintaining layout and colors
- **Logs** of model transformation actions
- **Metrics and Reporting**
- **User Configurable Options**

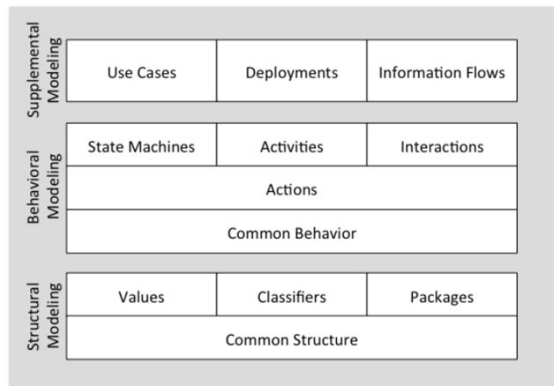
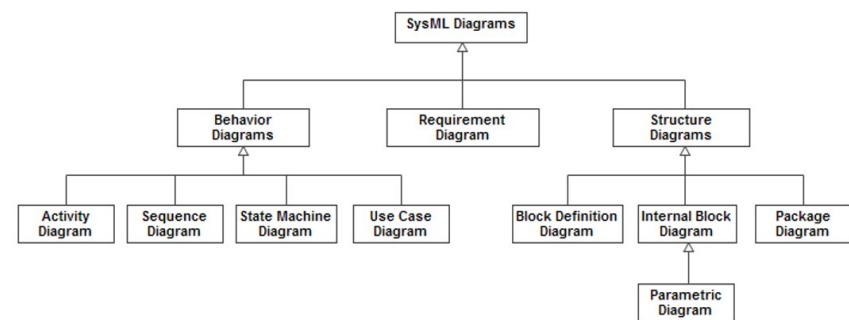


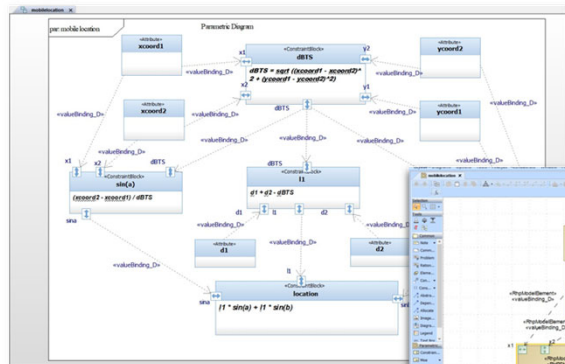
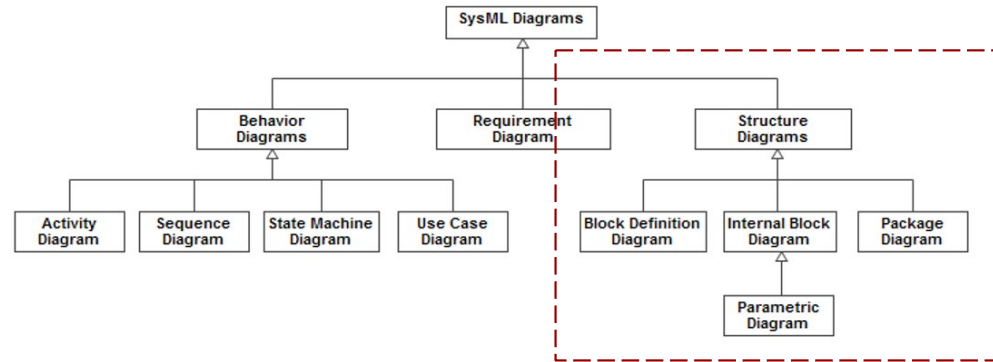
Figure 6.1 Semantic Areas of UML



SysML Structure Diagrams

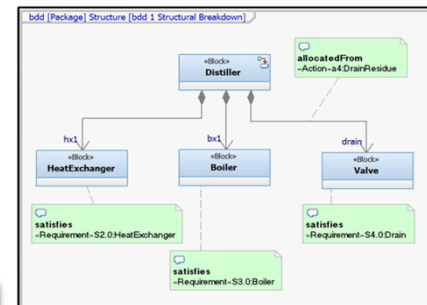
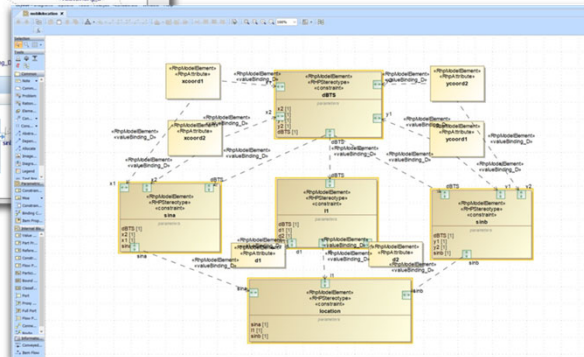
The Publisher converts SysML Structure Diagrams:

- Block Definition Diagrams
- Internal Block Diagrams
- Package Diagrams
- Parametric Diagrams

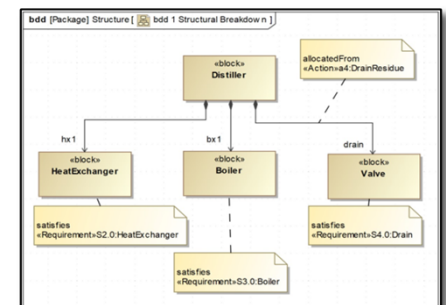
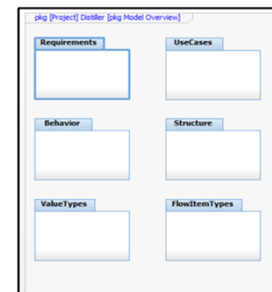


Rhapsody

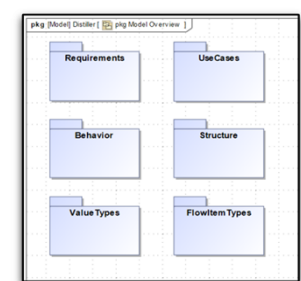
MagicDraw



Rhapsody

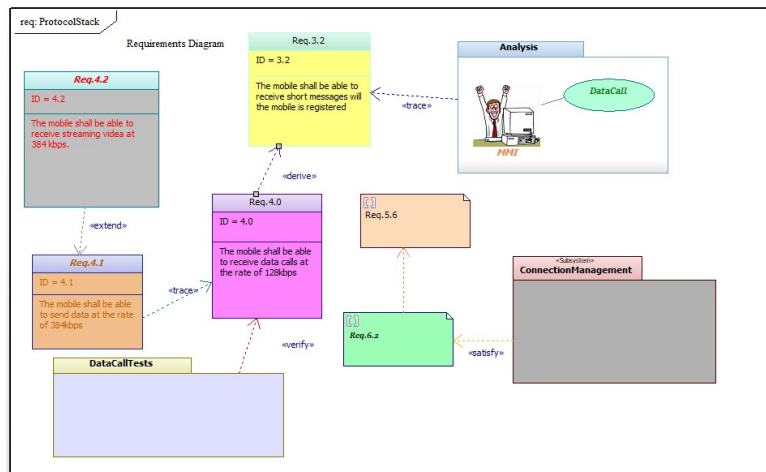
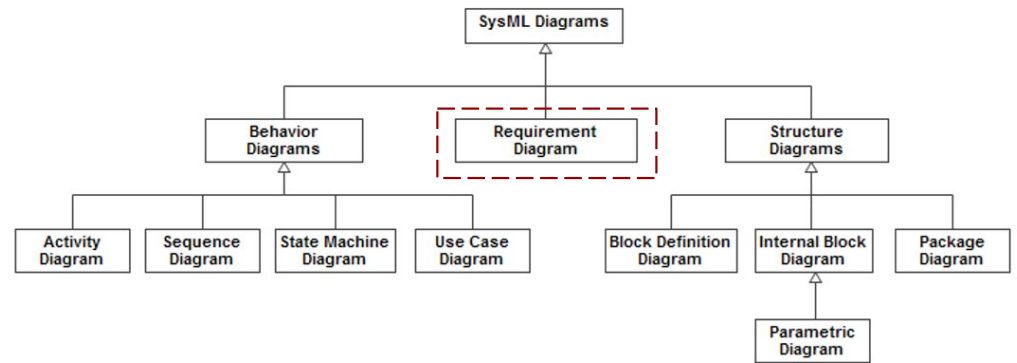


MagicDraw

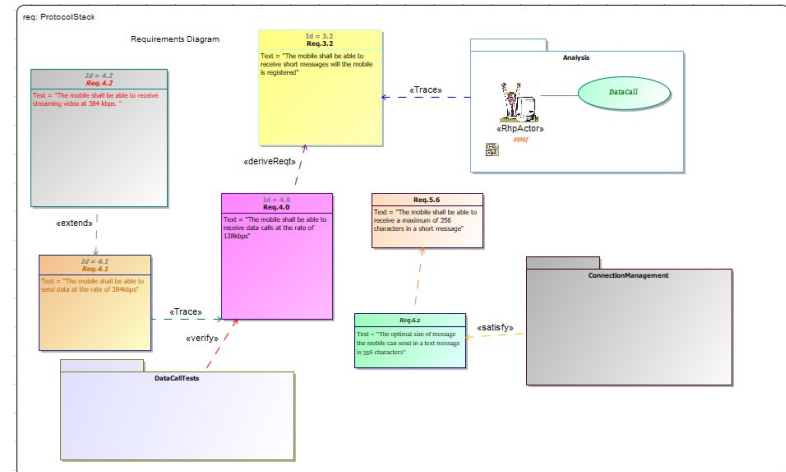


SysML Requirement Diagrams

Requirement Diagrams Conversion



Rhapsody

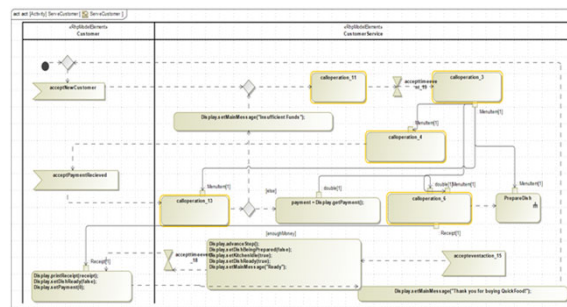
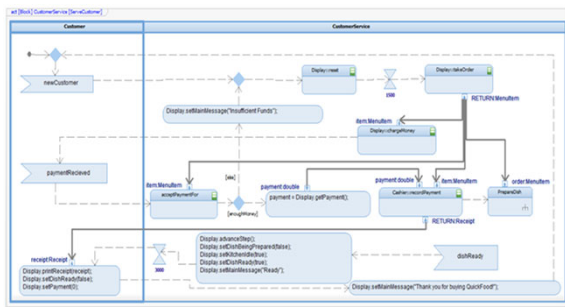
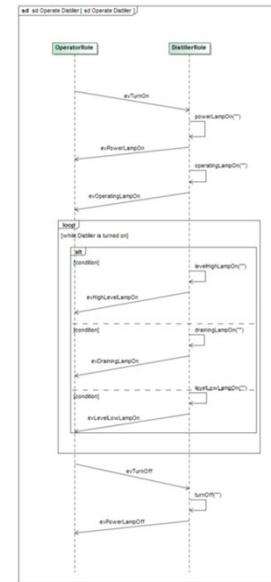
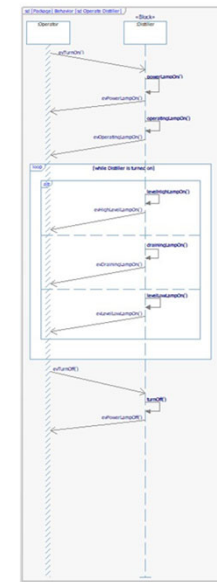
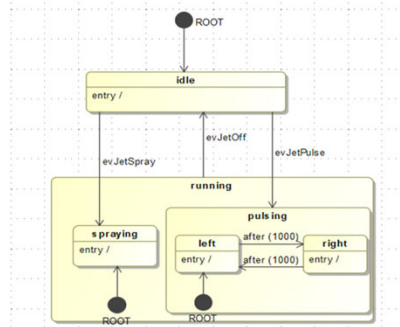
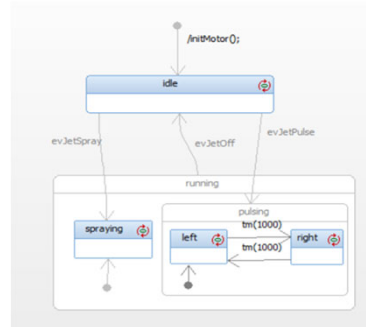
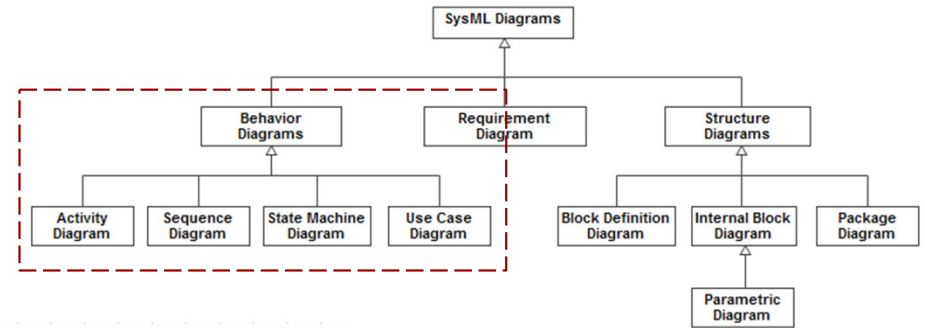


MagicDraw

SysML Behavior Diagrams

SysML Behavior Diagram Conversion:

- Activity Diagrams
- Sequence Diagrams
- State Machine Diagrams
- Use Case Diagrams



Rhapsody

MagicDraw

Rhapsody

MagicDraw

User Configurability

Customers have User Configuration

- The publisher provides two configuration files allowing different teams to control and consistently apply their defined methods and styling

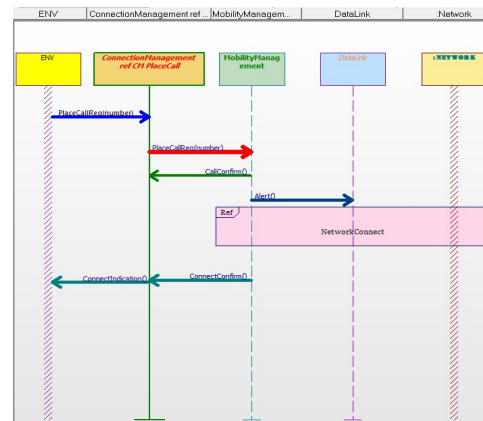
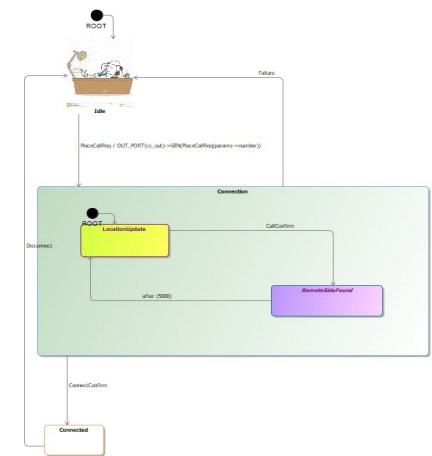
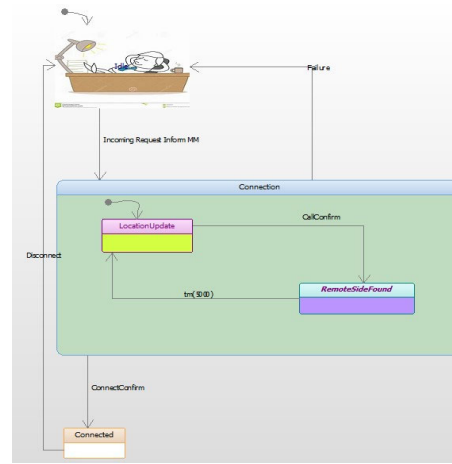
Publishing Options

- MagicDraw Silent Path
- Name or Label of Elements Transformation
- Colors Transformation
- Unapplying Rhapsody Profiles
- Item Flows Transformation
- Object Model Diagrams Transformation
- Metrics Generation
- Flow Ports Visibility Transformation
- MagicDraw Profile Version
- Rhapsody Accessor
- UPDM2-DoDAF Transformation

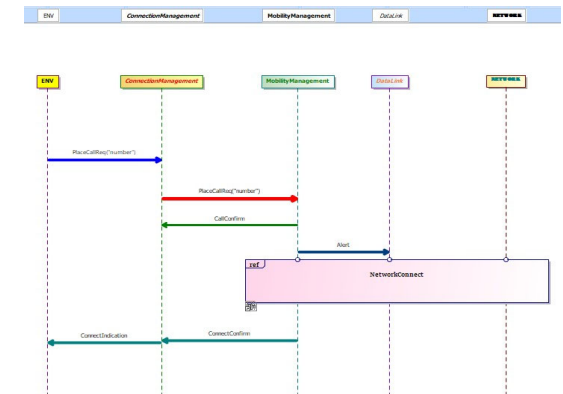
Diagram Display Configuration

Default Properties

- Default Activity Diagram's Graphical Properties
- Default Composite Structure Diagram's Graphical Properties
- Default Deployment Diagram's Graphical Properties
- Default Diagram's Graphical Properties
- Default Sequence Diagram's Graphical Properties
- Default State Machine Diagram's Graphical PropertiesTopic
- Default Structure Diagram's Graphical Properties
- Default SysML Activity Diagram's Graphical Properties
- Default SysML Block Definition Diagram's Graphical Properties
- Default SysML Internal Block Diagram's Graphical Properties
- Default SysML Parametric Diagram's Graphical Properties
- Default SysML Requirement Diagram's Graphical Properties
- Default SysML Sequence Diagram's Graphical Properties
- Default SysML State Machine Diagram's Graphical Properties
- Default SysML Use Case Diagram's Graphical Properties
- Default Use Case Diagram's Graphical Properties



Rhapsody



MagicDraw

Silent Batch Mode

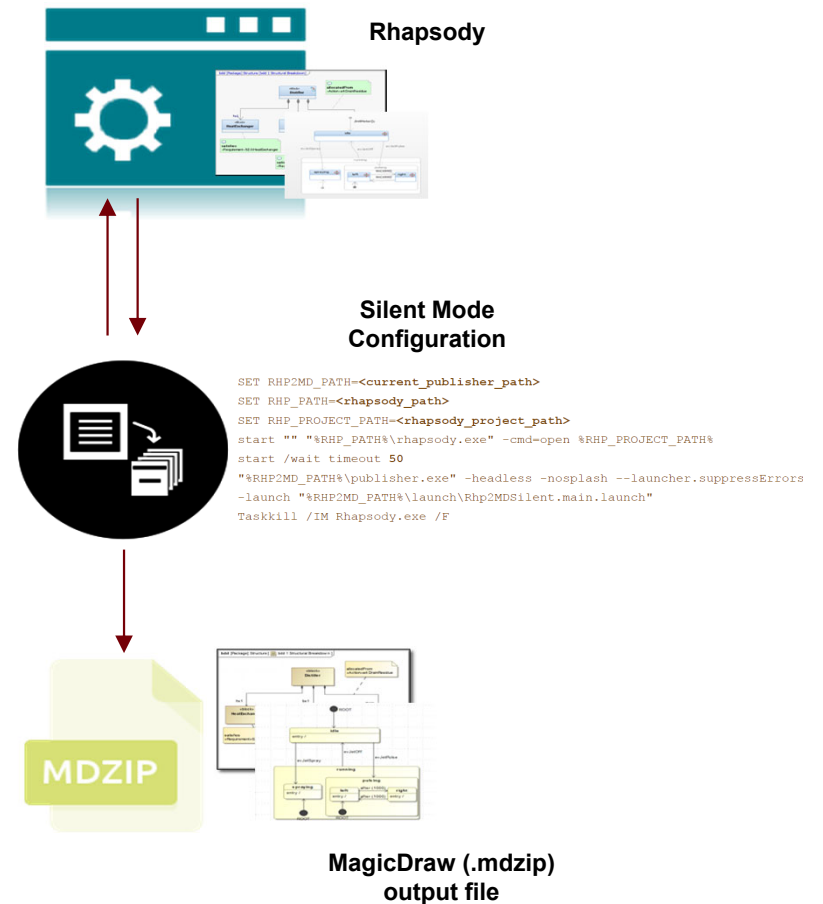
The Publisher can fully automate your publication activities in Silent Mode by using the batch mode and a fully configurable options set.

The Rhp2MDSilent.bat file will automate the following actions:

- Launch Rhapsody
- Open a project in Rhapsody
- Run the Rhapsody to MagicDraw transformation
- Close Rhapsody

Silent Mode also handles typical options:

- Rhapsody model file path
- Semantic options
- Diagram formatting configurations
- Cameo .mdzip output file path





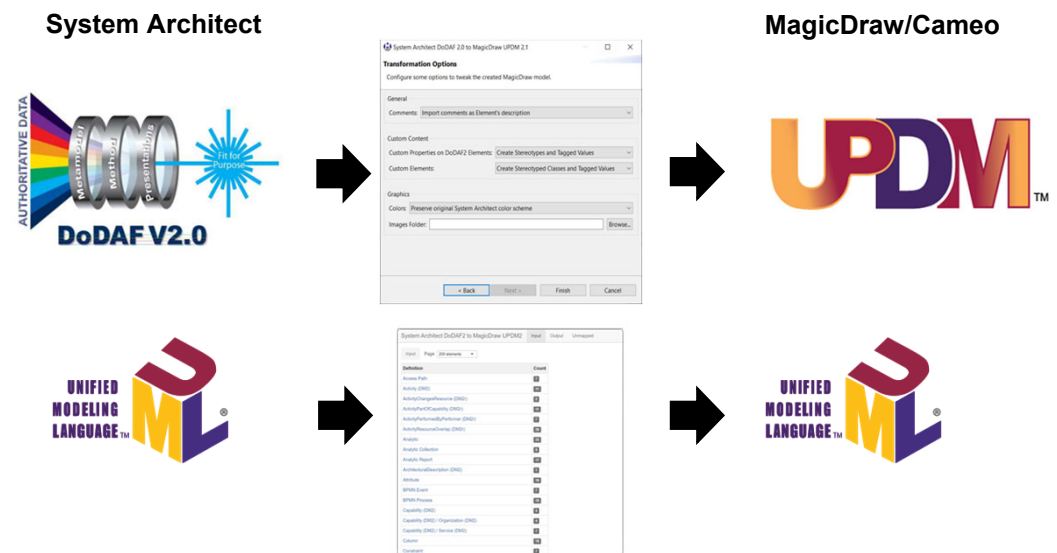
Publisher for System Architect

Publisher for System Architect is a plug-in that automatically generates complete MagicDraw models from System Architect including:

- DoDAF 2.0 to UPDM 2.1
- DoDAF 1.5 to UPDM 2.1
- UML to UML

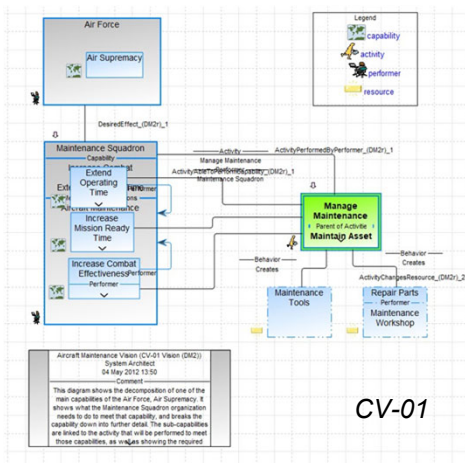
The ruleset includes the publisher of the following:

- **Model Elements, structure, and hierarchy**
- **Diagrams** - maintaining layout and colors
- **Full Logging** of model transformation actions



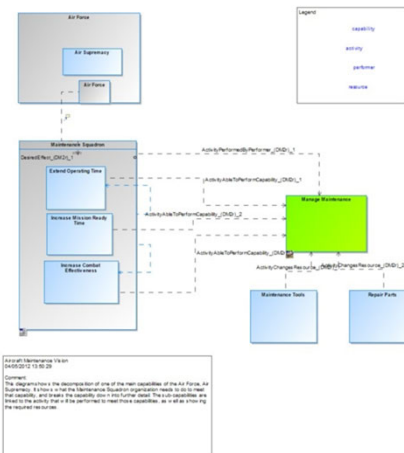
DoDAF 2.0: Capability & Operational Examples

System Architect

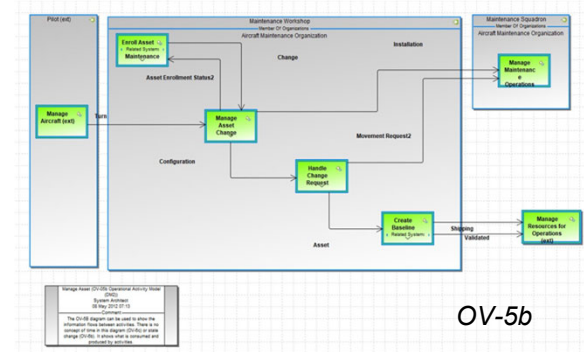


CV-01

MagicDraw

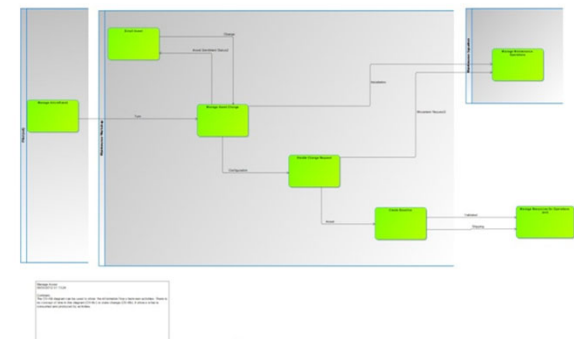


System Architect

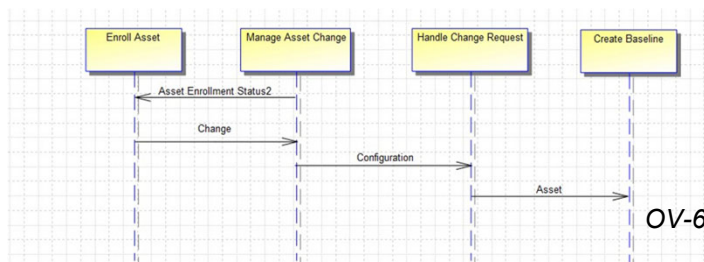


OV-5b

MagicDraw

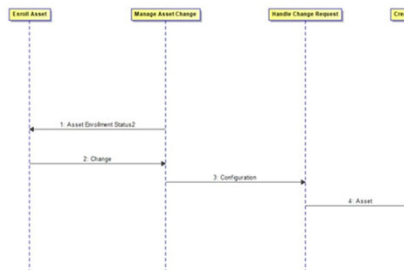


System Architect



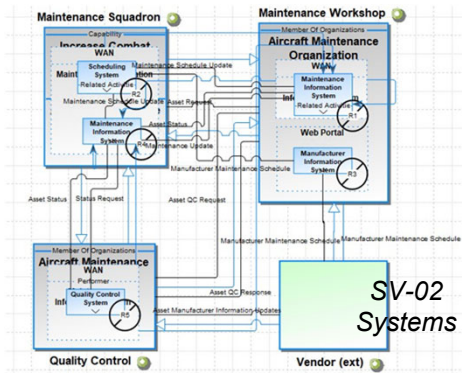
OV-6c

MagicDraw

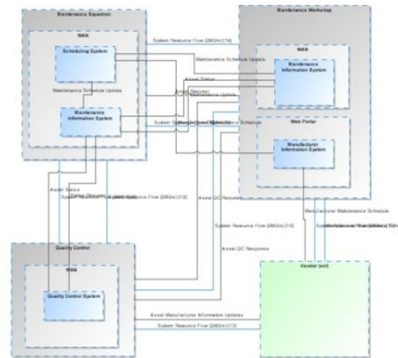


DoDAF 2.0: Systems & Services Viewpoints + Logical Data model examples

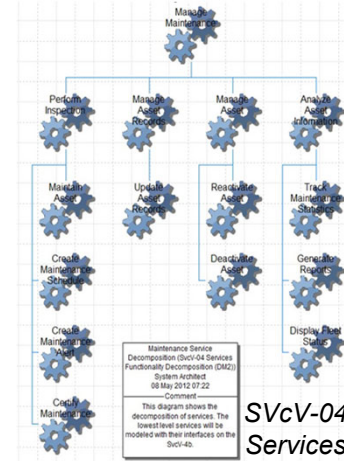
System Architect



MagicDraw

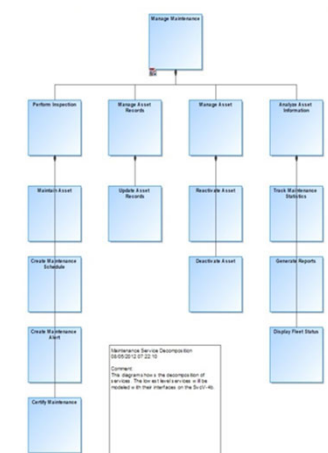


System Architect

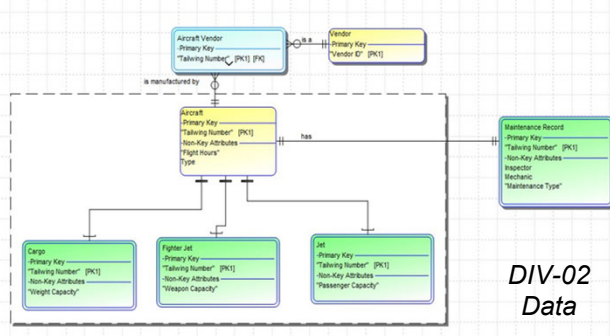


SVcV-04 Services

MagicDraw

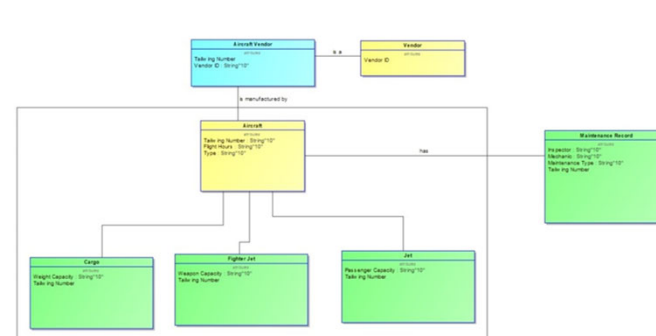


System Architect



DIV-02 Data

MagicDraw



UML Examples

Publisher for System Architect is a plug-in that automatically generates complete MagicDraw models from System Architect including:

- **Model Elements, structure, and hierarchy**
- **Diagrams** - maintaining layout and colors
- **Full Logging** of model transformation actions

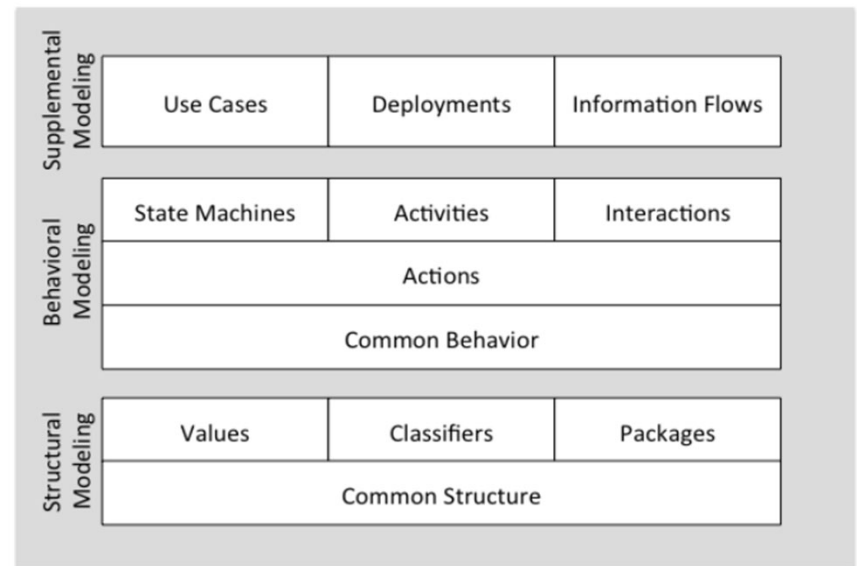
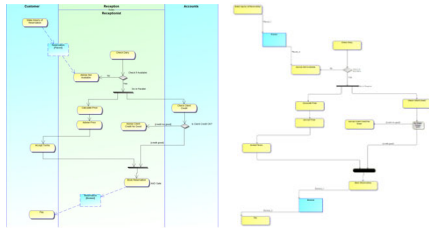


Figure 6.1 Semantic Areas of UML

Examples of Published UML diagrams in MagicDraw format

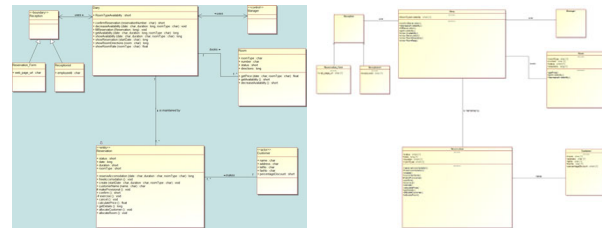
Activity Diagrams



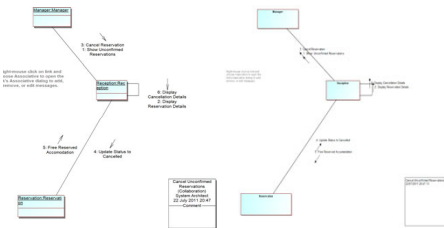
System Architect

MagicDraw

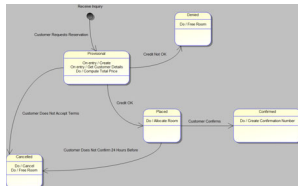
Class Diagrams



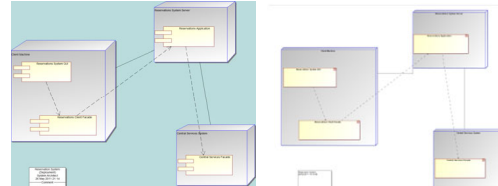
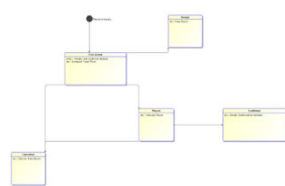
Collaboration Diagrams



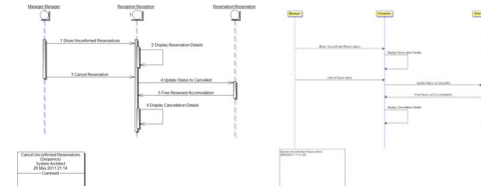
UML State Diagrams



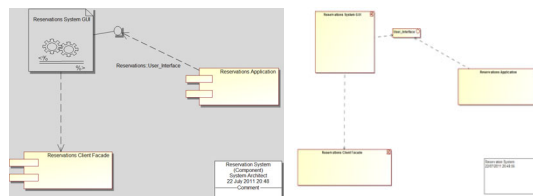
Deployment Diagrams



Sequence Diagrams



Component Diagrams





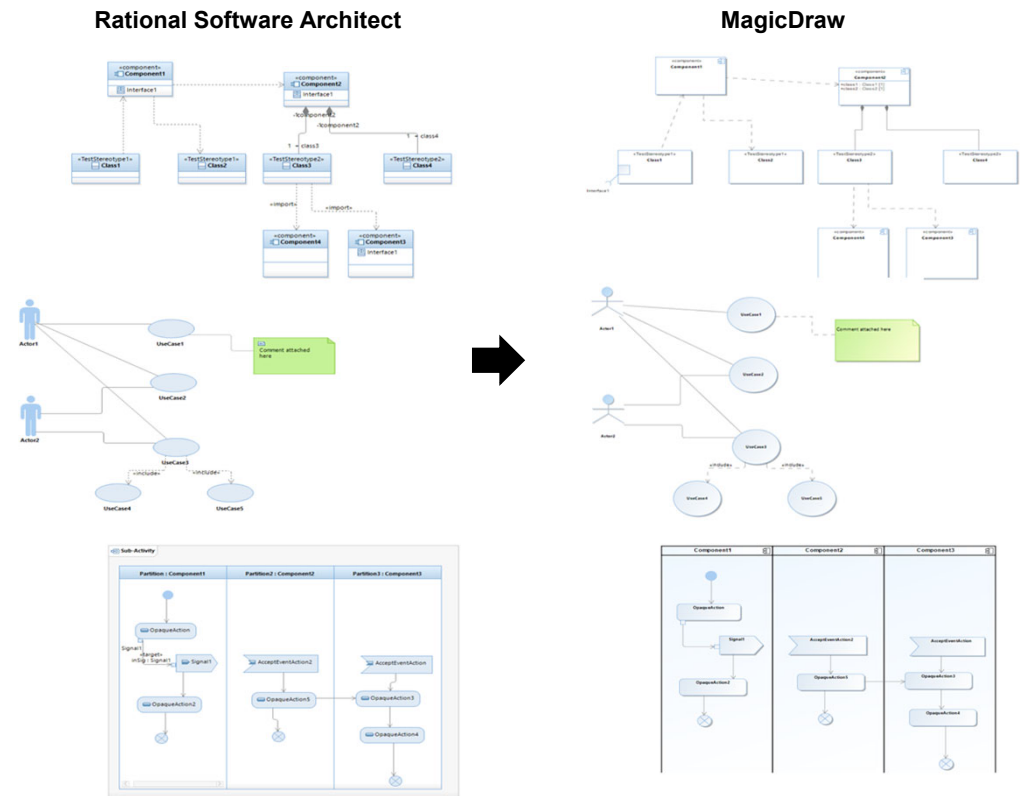
Publisher

for Rational® Software Architect

Publisher for Rational Software Architect

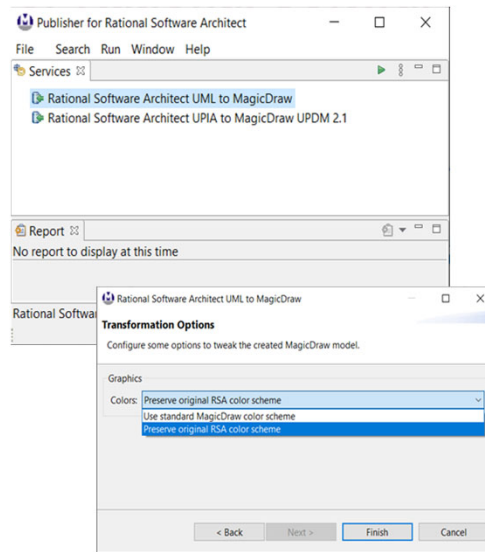
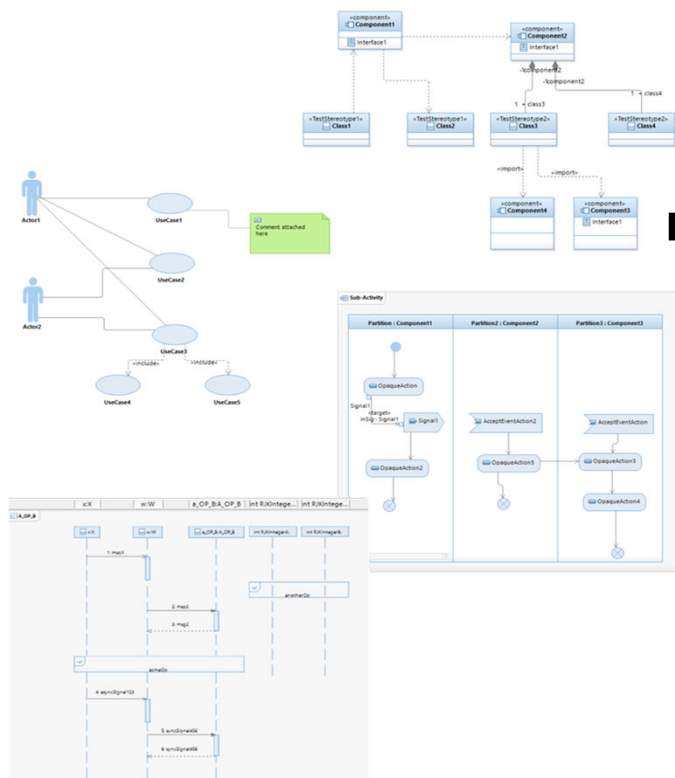
Publisher for Rational Software Architect is a plug-in that generates complete UML MagicDraw models from RSA UML and UPIA, including:

- **All model elements, structure, & hierarchy**
- **Custom Profiles**
- **Diagrams** - maintaining layout
- **Full logging** of model transformation actions
- **Transforms large models**
 - *U.S. Army: 7,000 diagrams/ 850,000 elements*

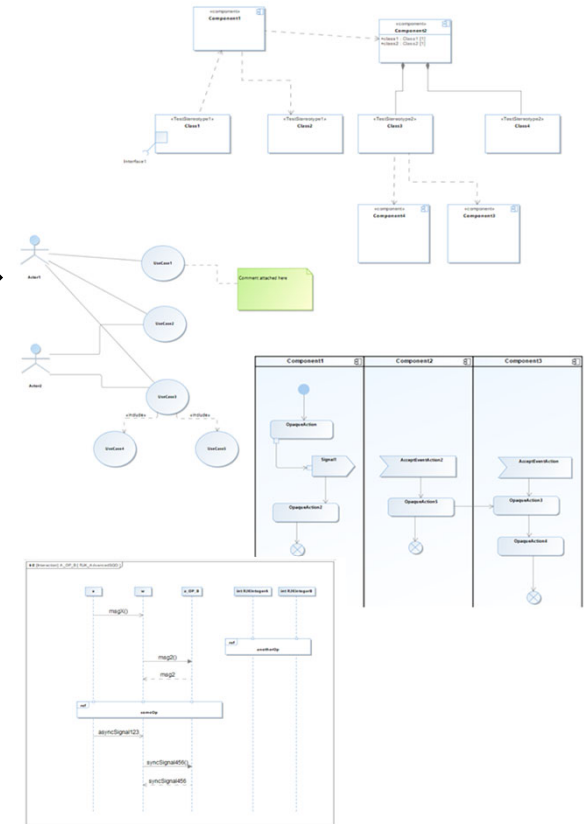


IBM Rational Software Architect Examples

Rational Software Architect



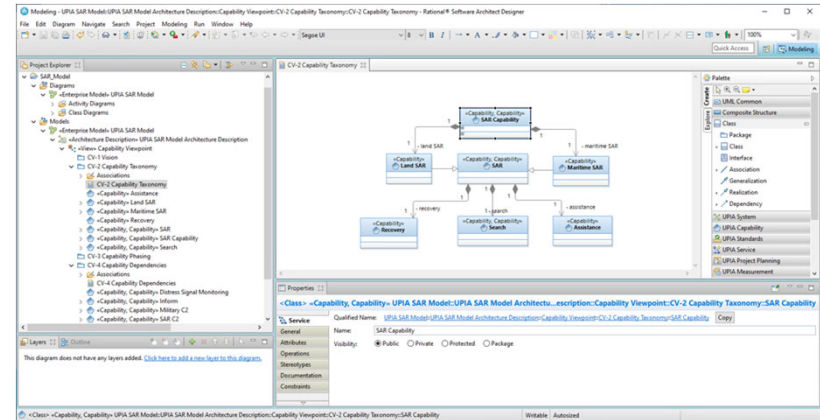
MagicDraw



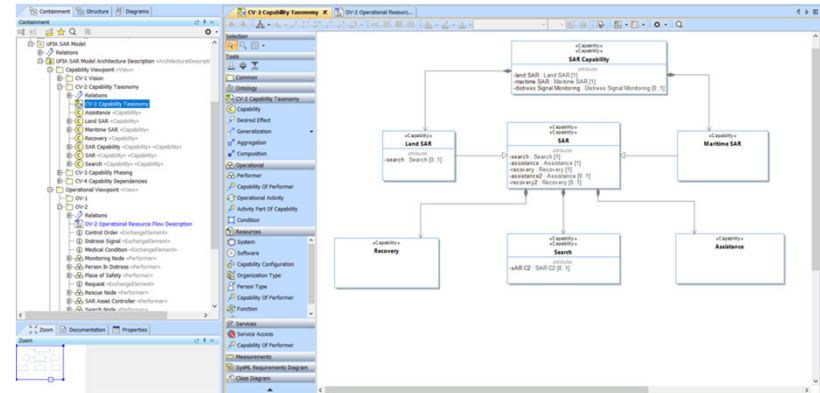
Add-on: Publisher for RSA UPIA

- The Publisher for Rational Software Architect UPIA add-on enables support for RSA's UPIA profile.
- Elements stereotyped with the UPIA profile are automatically converted into MagicDraw with the UPDM 2.1 profile.

Rational Software Architect UPIA



MagicDraw UPDM 2.1



Licensing and Support

Licensing & Support

Licensing

- Program Based
- One-year Term or Perpetual licenses
- Floating and Node-locked
- Designed for use in both Secure and Non-secure Lab Environments
- Enterprise (unrestricted - available upon request)

Try before you buy

- Full software, with only a disclosure watermark on the diagrams
- No network connection necessary
- Adjust the many user configurable styling settings to your team's preferences
- See the actual exported model in Cameo or Rhapsody file formats
- Manipulate the new model accordingly

Whfkqldc#xssrw

- [Rqdh#xssrw](#)572: #urp #cxu#ndp #riwhfkqldc#{shuw#q#k#rrow#lqg#khluxvdjhv
- [Rqdh#xvhu#grfxp hqvdwrc](#)
- [Nqrz dhqjh#Edvh#Dwifdv](#)
- [Grz qrdq#Srwlv](#)

The Value of the Publisher Products

- ✓ The ability to Export and Publish very large models (*successfully exchanged 12,000 diagrams and 900,000 elements*)
- ✓ No manual work or cleanup is needed by leveraging user-configurable settings and display styling
- ✓ Model checking is implemented to identify, log, and report inconsistencies in the source model with the potential to cause rework or cleanup in the target model (*maintains or improves model quality*)
- ✓ Models can be manually changed after publish and export
- ✓ Same form and function model, but in a different tool

Publisher 12 Month Roadmap

- Enable exchange of a program's model data inside and outside of their organization, supporting various integration or co-development scenarios.
- To achieve this, the Publisher will include a set of new capabilities, dealing with 4-major attributes:
 - Rhapsody to Cameo / Cameo to Rhapsody model transformation Improvements
 - Management of unique identifier (UID) enhancements for iterative scenarios (*Rhapsody-Cameo-Rhapsody and Cameo-Rhapsody-Cameo*)
 - Export of Units
 - Sharing Best Practices
- Two new releases of this Publisher that will provide bi-directional workflow enhancements within the next 12-months: Next product releases in December 2023 and June 2024.

- **Rhapsody to Cameo / Cameo to Rhapsody model transformation Improvements:** Improve Cameo model imports in Rhapsody, related to differences between Cameo and Rhapsody implementations for diagrams and specific UML structures.
- **Management of unique identifier (UID) enhancements for iterative scenarios (*Rhapsody-Cameo-Rhapsody and Cameo-Rhapsody-Cameo*):** Enables preserve and select when iterating the model, independent of the start direction, and will be used to export source model data to the target model.
- **Export of Units:** To minimize merge scenarios in iterative and / or bi-directional workflows, we recommend export / import of only what's needed to minimize the modelling tool's merge process.
 - Customers typically manage this using model references in both tools and define "export" models including only what is needed for the exchange or simply dealing with their product line variants.
 - To simplify this, the export of Units will ease integration in the target system. This feature will enable the SME to respect the structure of the source models and will enable multiple units when exporting. In combination with the UID enhancement, it will ease integration and merge steps, by recognizing, for example, client / supplier packages' structure.
- **Sharing Best Practices:** We're working with companies in aerospace, defense, and automotive. Each has specific workflows and common questions. Dealing with bi-directional workflows, we'll provide guidance / suggestions to ease sharing and merging of model data for both Rhapsody and Cameo.

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