PRISM2GSN: Eclipse Plugin for Transforming PRISM Artefacts into Goal Structuring Notation

User Guide

Version: 1.0.0

Release Date: 2025-08-26

The University of Manchester

Document Control

Document Title	PRISM2GSN: Eclipse Plugin for Transforming PRISM Artefacts into Goal Structuring Notation – User Guide
Document ID	PRISM2GSN-1.0.0
Version	1.0.0
Release Date	2025-08-26
Author	Dhaminda Abeywickrama [Dhaminda.Abeywickrama@manchester.ac.uk]
Project	CRADLE, The University of Manchester
Repository	https://github.com/DhamindaA/prism2gsn-eclipse-plugin
License	Academic and Research Use Only

1. Introduction

This User Guide explains:

- Prerequisites
- How to obtain and import the project
- How to run the plug-in in a runtime workbench
- How to configure PRISM and generate GSN artefacts
- Troubleshooting and known limitations

Platform scope: Windows 10/11 (x86_64) only. macOS/Linux are out of scope for this release.

Installation note: This guide uses PDE runtime (no installation into Eclipse). You can import the source project and run it as an "Eclipse Application".

2. Prerequisites (Windows)

- **Eclipse**: *Eclipse IDE for RCP and RAP Developers* **2025-03 (4.35.0)** or newer.
  (This package includes the Plug-in Development Environment, PDE.)

- **Java**: **JDK 21** (recommended).
  - Verify (Command Prompt): java -version

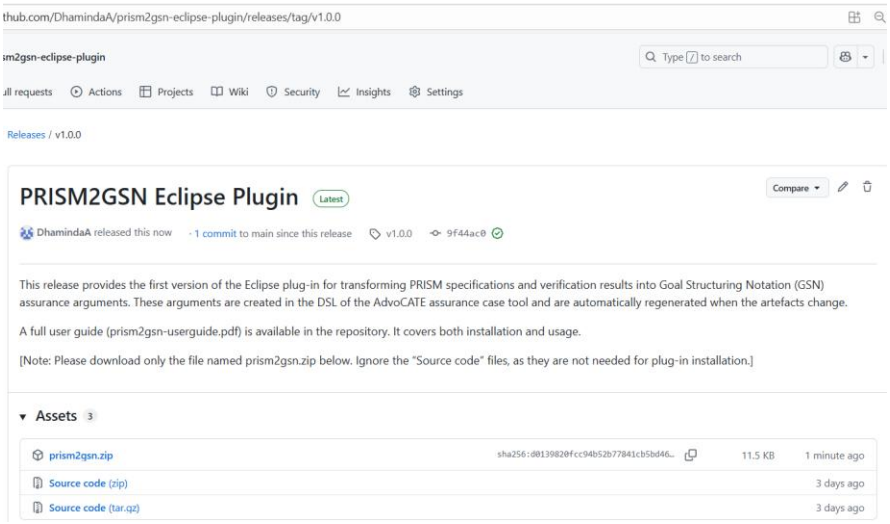
- **PRISM Model Checker (Windows)**: e.g., **PRISM 4.8.1** installed locally.
  - You will point the plug-in to the **PRISM bin** directory (e.g., C:\Program Files\prism-4.8.1\bin which contains prism.bat).

3. Obtain the PRISM2GSN Project

- GitHub Release ZIP

  Please download the ZIP attached to the FMAS 2025 paper's release:
  https://github.com/DhamindaA/prism2gsn-eclipse-plugin/releases/tag/v1.0.0

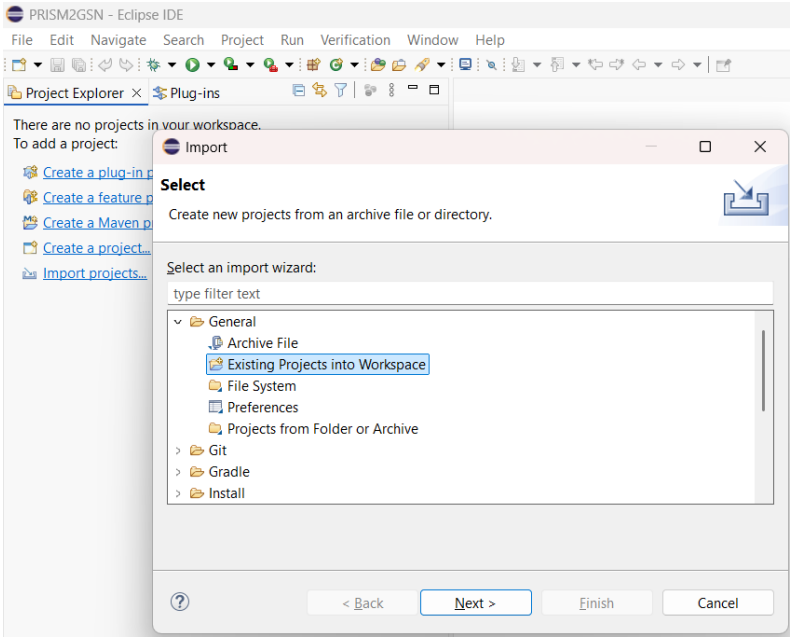
  Save the ZIP file to any location on your computer.

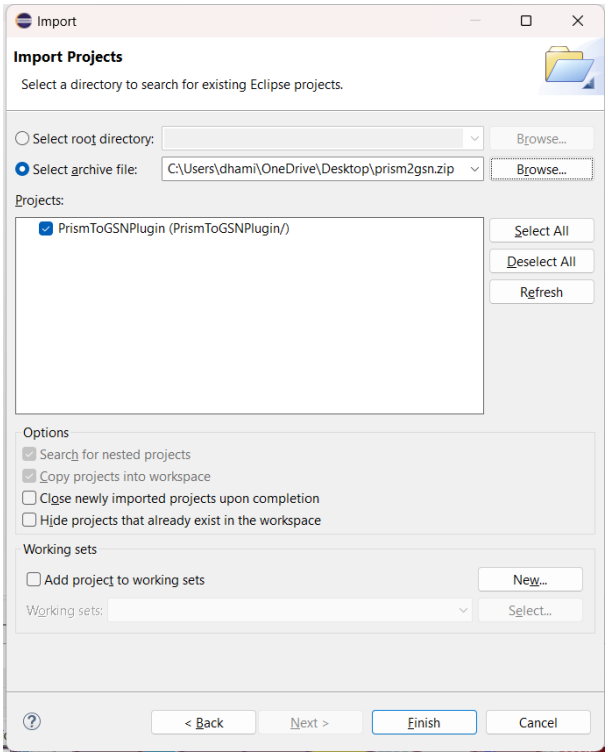


4. Import the Project (Development Workspace)

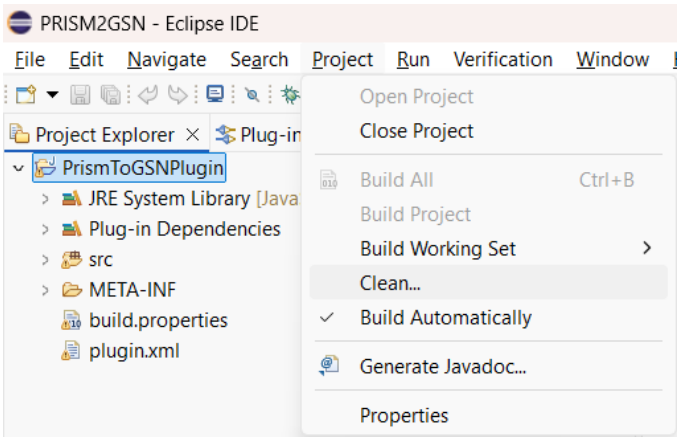
- Start **Eclipse (development workspace)**.
- **File → Import… → General → Existing Projects into Workspace → Next**.
- Choose:
  - **Select archive file** → browse to the downloaded ZIP, **or**
  - **Select root directory** → browse to the cloned project folder.
- Ensure the project (e.g., PrismToGSNPlugin) appears ticked → **Finish**.

  The project should build cleanly with Java 21.





Build the Project:

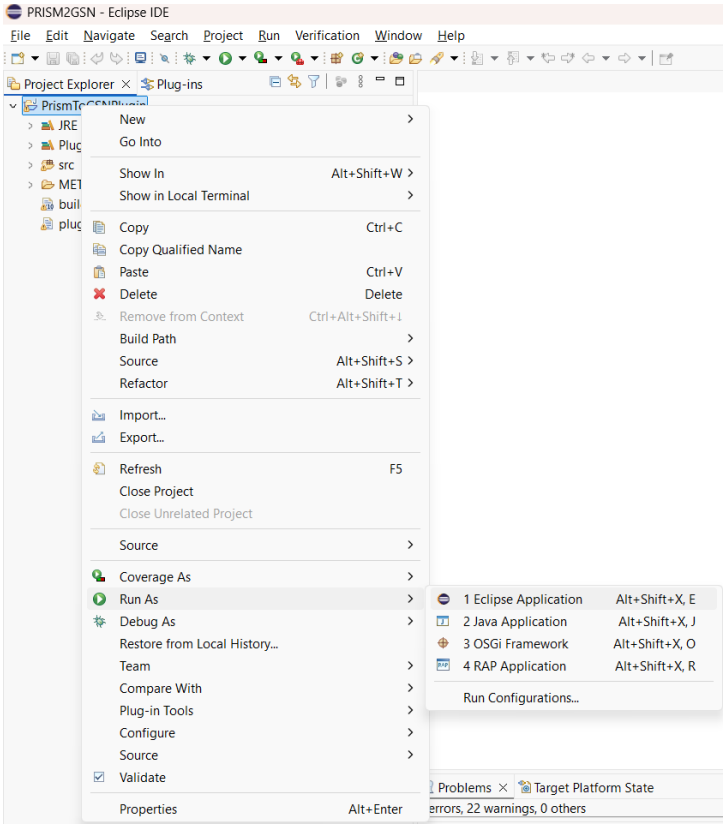


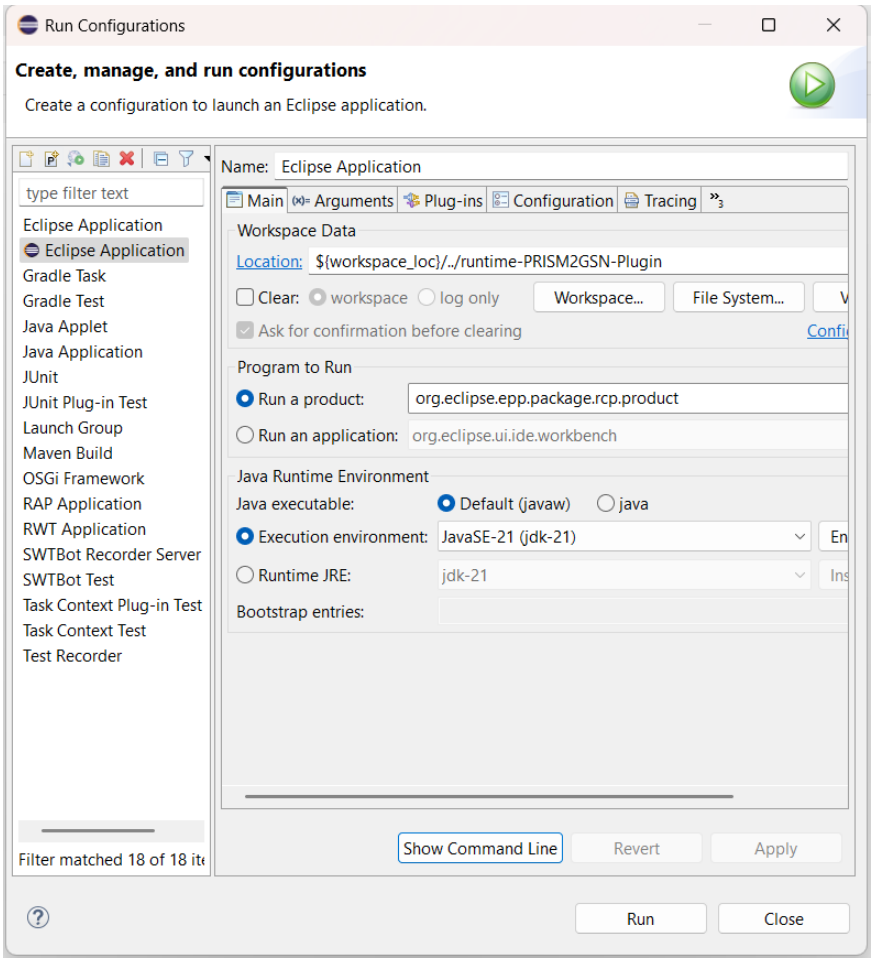
5. Launch the Runtime Workbench (PDE)

- In **Project Explorer**, select the project.
- **Run → Run As → Eclipse Application**.

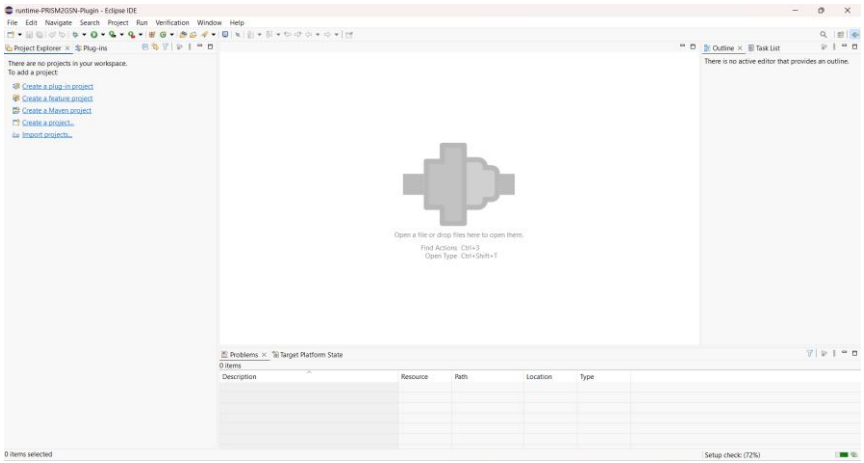
  A **second Eclipse** window opens: this is the **runtime workbench** where the plug-in is active.

  Select Run Configurations:


PRISM2GSN - Eclipse IDE
File Edit Navigate Search Project Run Verification Window Help
Project Explorer
Plug-ins
New
Go Into
Show In Alt+Shift+W
Show in Local Terminal
Copy Ctrl+C
Copy Qualified Name
Paste Ctrl+V
Delete Delete
Remove from Context Ctrl+Alt+Shift+↓
Build Path
Source Alt+Shift+S
Refactor Alt+Shift+T
Import...
Export...
Refresh F5
Close Project
Close Unrelated Project
Source
Coverage As
Run As
Debug As
Restore from Local History...
Team
Compare With
Plug-in Tools
Configure
Source
Validate
Properties Alt+Enter
1 Eclipse Application Alt+Shift+X, E
2 Java Application Alt+Shift+X, J
3 OSGi Framework Alt+Shift+X, O
4 RAP Application Alt+Shift+X, R
Run Configurations...
Problems
Target Platform State


Run Configurations
Create, manage, and run configurations
Create a configuration to launch an Eclipse application.
type filter text
Eclipse Application
Eclipse Application
Gradle Task
Gradle Test
Java Applet
Java Application
JUnit
JUnit Plug-in Test
Launch Group
Maven Build
OSGi Framework
RAP Application
RWT Application
SWTBot Recorder Server
SWTBot Test
Task Context Plug-in Test
Task Context Test
Test Recorder
Filter matched 18 of 18 ite
Name: Eclipse Application
Main Arguments Plug-ins Configuration Tracing
Workspace Data
Location: ${workspace_loc}/../runtime-PRISM2GSN-Plugin
Clear: workspace log only
Workspace... File System...
Ask for confirmation before clearing
Program to Run
Run a product: org.eclipse.epp.package.rcp.product
Run an application: org.eclipse.ui.ide.workbench
Java Runtime Environment
Java executable: Default (javaw) java
Execution environment: JavaSE-21 (jdk-21)
Runtime JRE: jdk-21
Bootstrap entries:
Show Command Line
Revert
Apply
Run
Close

Runtime Workbench:

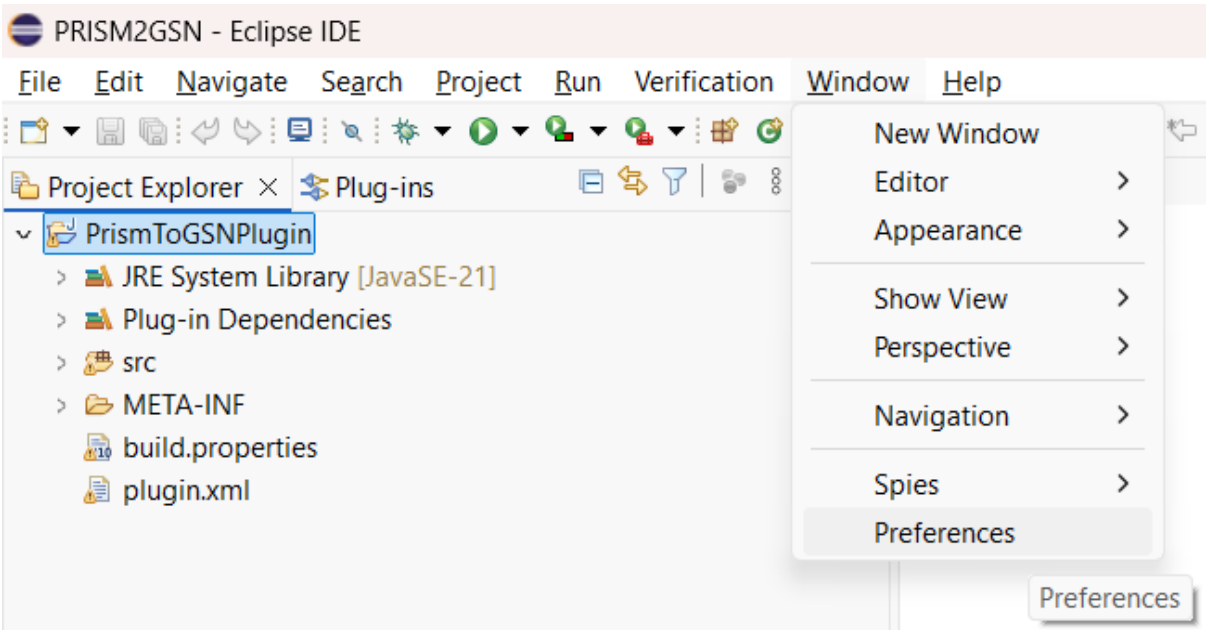


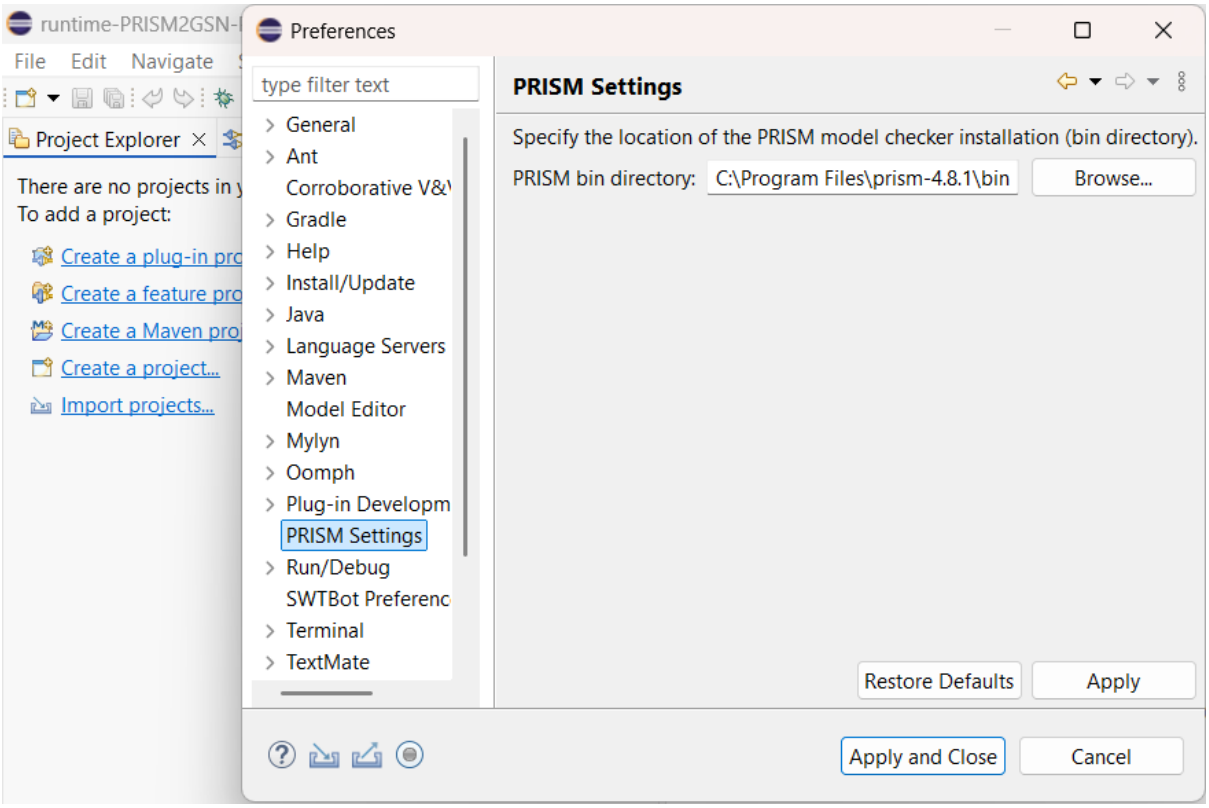
6. Configure PRISM (in the Runtime Window)

Important: Perform this in the **runtime** window (the second Eclipse), not the development window.

- **Window → Preferences → PRISM Settings**.
- Set **PRISM bin directory** to the folder that contains **prism.bat**, e.g.: C:\Program Files\prism-4.8.1\bin
- **Apply and Close**.

No restart is required. The plug-in reads this setting each time it invokes PRISM.





7. Create a Test Project (Runtime Window)

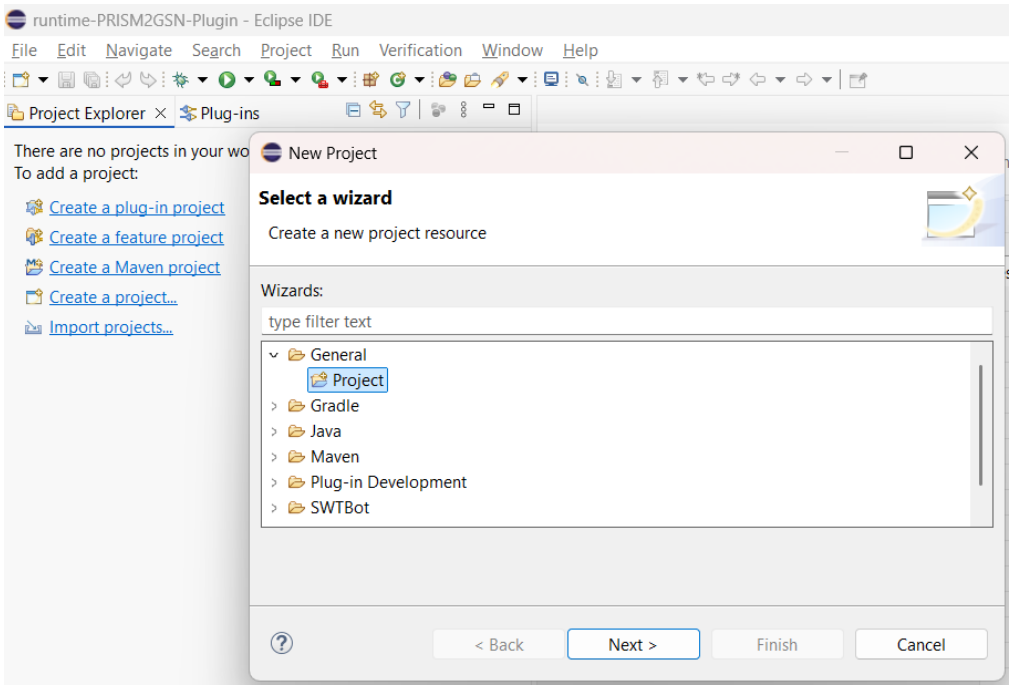
- **File** → **New** → **Project…** → **General** → **Project** → name it (e.g.) TestPRISM2GSN → **Finish**.
- Right-click the project → **New** → **File** → create model.prism.

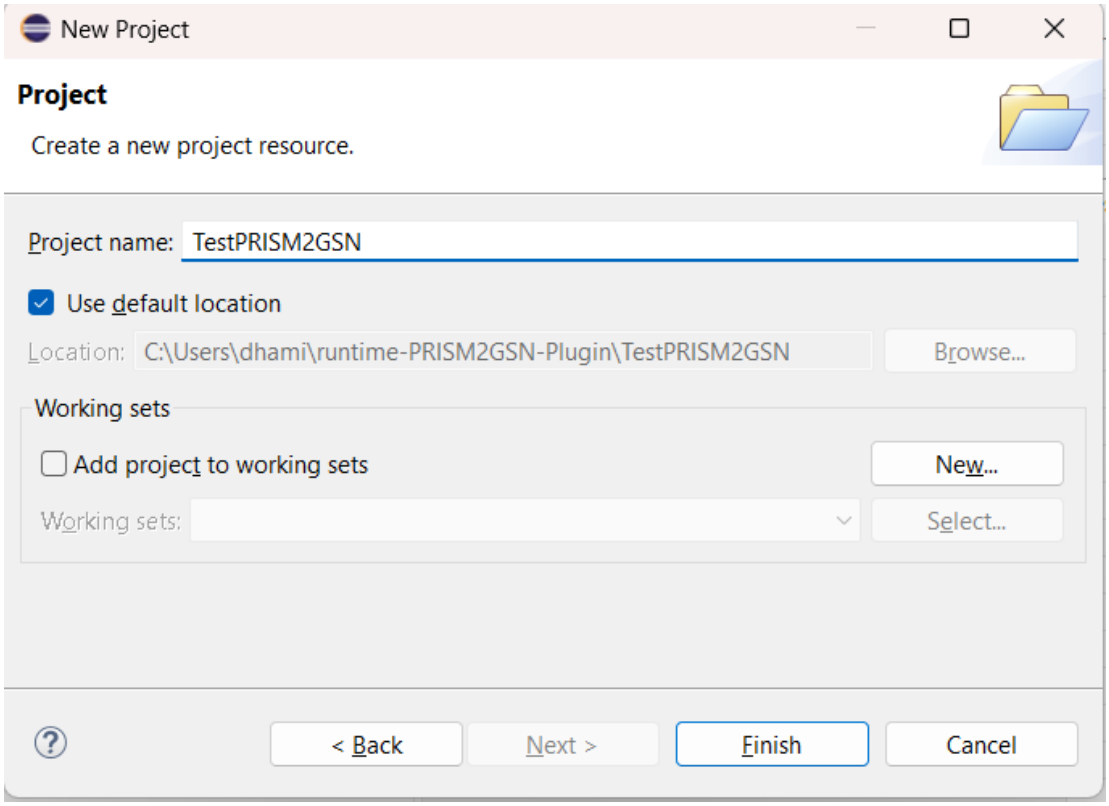
  You can use the model.prism provided in GitHub:

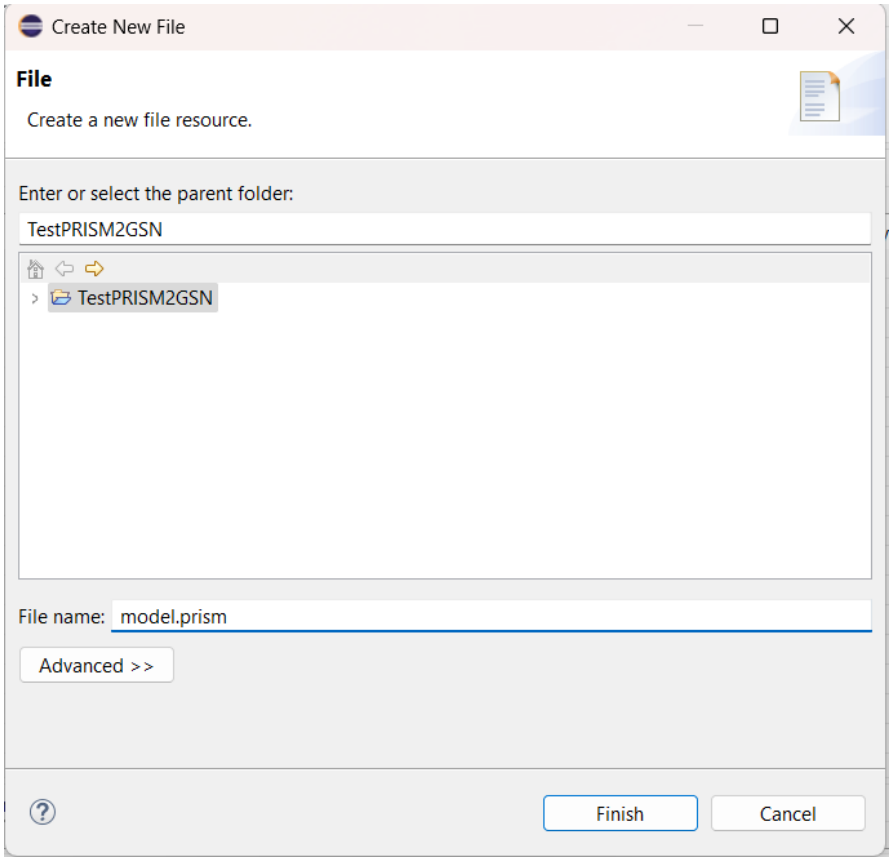
- Right-click the project → **New** → **File** → create properties.props.
  Add one property **per line**, for example:

  You can use the properties.props file provided in GitHub:

  Note: Keep model.prism and properties.props in the **same folder**.


runtime-PRISM2GSN-Plugin - Eclipse IDE
File Edit Navigate Search Project Run Verification Window Help
Project Explorer
Plug-ins
There are no projects in your wo
To add a project:
Create a plug-in project
Create a feature project
Create a Maven project
Create a project...
Import projects...
New Project
Select a wizard
Create a new project resource
Wizards:
type filter text
General
Project
Gradle
Java
Maven
Plug-in Development
SWTBot
< Back
Next >
Finish
Cancel

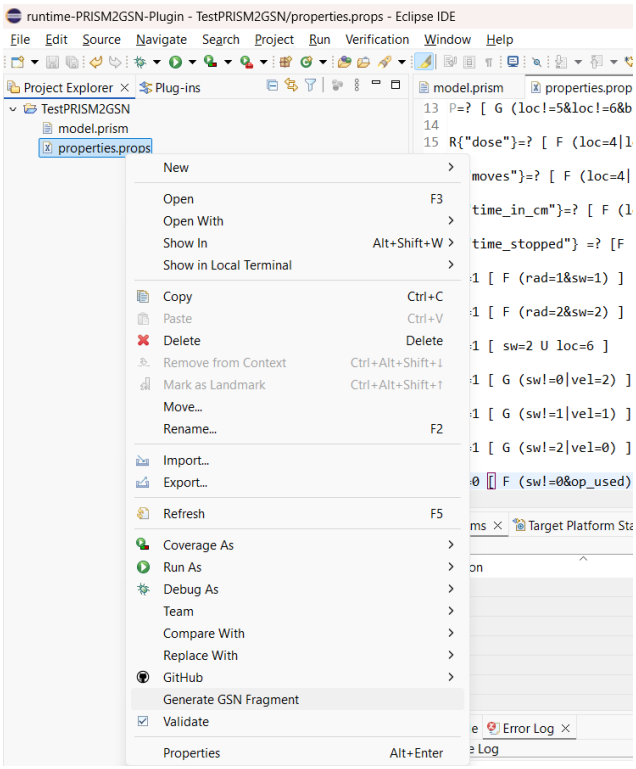

New Project
Project
Create a new project resource.
Project name: TestPRISM2GSN
Use default location
Location: C:\Users\dhami\runtime-PRISM2GSN-Plugin\TestPRISM2GSN
Browse...
Working sets
Add project to working sets
New...
Working sets:
Select...
< Back
Next >
Finish
Cancel

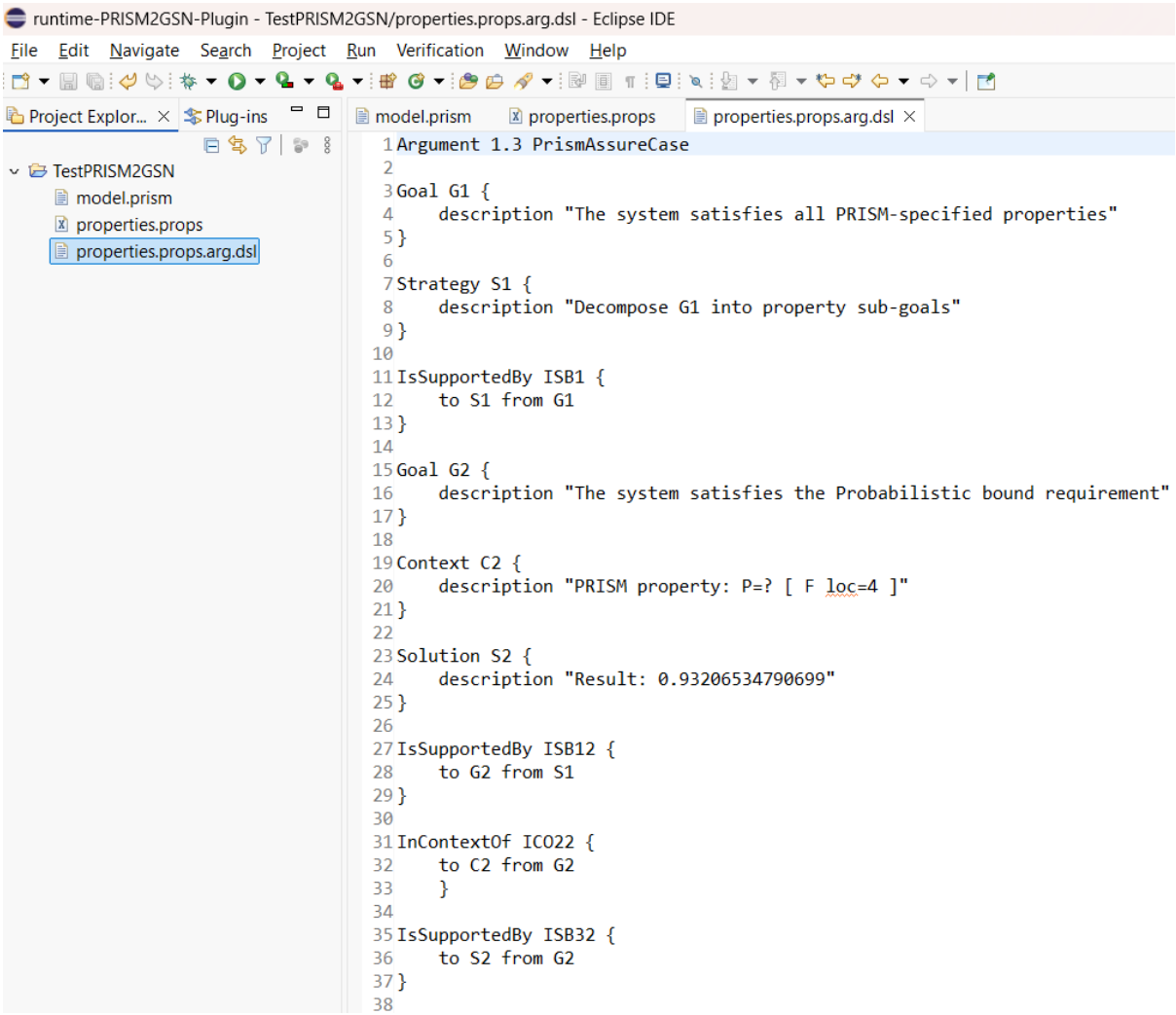


8. Generate GSN Artefacts

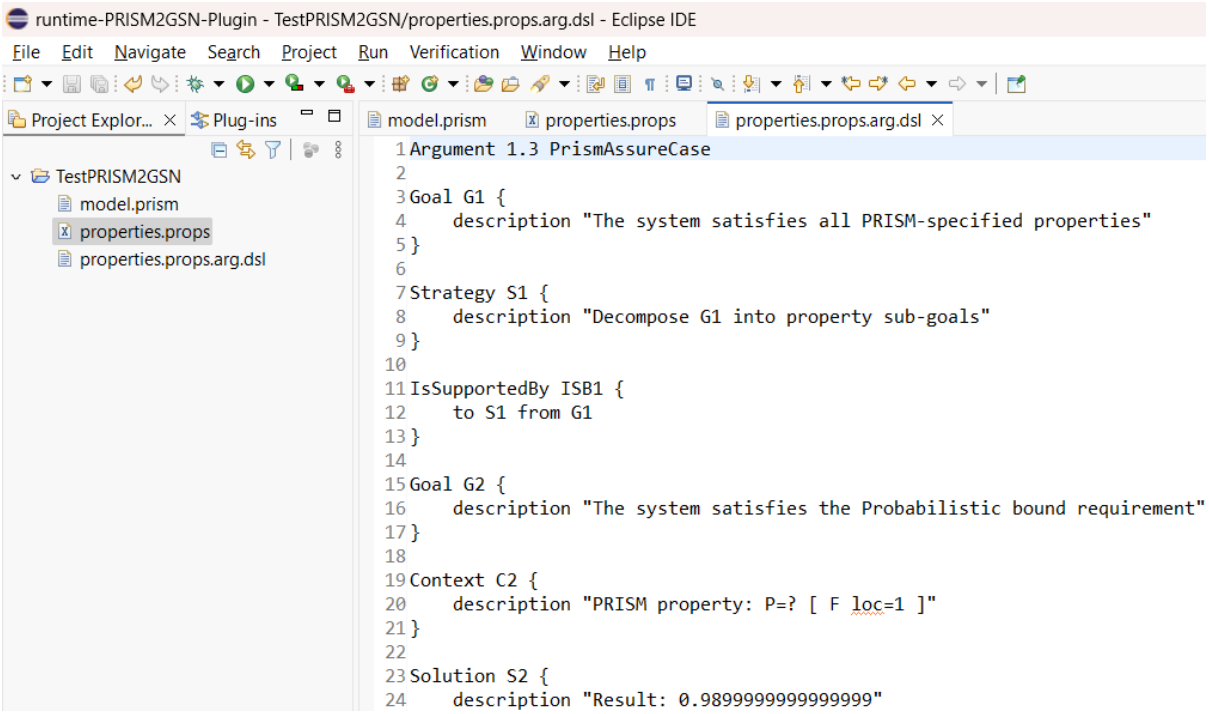
You can generate in two ways:

- **Automatic on Save**
  - Open properties.props, make a small edit (even a space), **Save**.
  - The plug-in runs PRISM and writes:
    properties.props.arg.dsl (in the same folder).
- **Manual via Context Menu**
  - Right-click properties.props → **Generate GSN Fragment**.
  - Also produces **properties.props.arg.dsl**.
- **Notes**
  - For **multi-property** output, use a *.props file with **one property per line**.


runtime-PRISM2GSN-Plugin - TestPRISM2GSN/properties.props - Eclipse IDE
File Edit Source Navigate Search Project Run Verification Window Help
Project Explorer
Plug-ins
TestPRISM2GSN
model.prism
properties.props
New
Open F3
Open With
Show In Alt+Shift+W
Show in Local Terminal
Copy Ctrl+C
Paste Ctrl+V
Delete Delete
Remove from Context Ctrl+Alt+Shift+↓
Mark as Landmark Ctrl+Alt+Shift+↑
Move...
Rename... F2
Import...
Export...
Refresh F5
Coverage As
Run As
Debug As
Team
Compare With
Replace With
GitHub
Generate GSN Fragment
Validate
Properties Alt+Enter
model.prism
properties.prop
13 P=? [G (loc!=5&loc!=6&b
14
15 R{"dose"}=? [F (loc=4|l
moves"}=? [F (loc=4|
time_in_cm"}=? [F (l
time_stopped"} =? [F
1 [F (rad=1&sw=1)]
1 [F (rad=2&sw=2)]
1 [sw=2 U loc=6]
1 [G (sw!=0|vel=2)]
1 [G (sw!=1|vel=1)]
1 [G (sw!=2|vel=0)]
0 F (sw!=0&op_used)
Target Platform Sta
Error Log


runtime-PRISM2GSN-Plugin - TestPRISM2GSN/properties.props.arg.dsl - Eclipse IDE
File Edit Navigate Search Project Run Verification Window Help
Project Explor...
Plug-ins
TestPRISM2GSN
model.prism
properties.props
properties.props.arg.dsl
model.prism
properties.props
properties.props.arg.dsl
1 Argument 1.3 PrismAssureCase
2
3 Goal G1 {
4 description "The system satisfies all PRISM-specified properties"
5 }
6
7 Strategy S1 {
8 description "Decompose G1 into property sub-goals"
9 }
10
11 IsSupportedBy ISB1 {
12 to S1 from G1
13 }
14
15 Goal G2 {
16 description "The system satisfies the Probabilistic bound requirement"
17 }
18
19 Context C2 {
20 description "PRISM property: P=? [F loc=4]"
21 }
22
23 Solution S2 {
24 description "Result: 0.93206534790699"
25 }
26
27 IsSupportedBy ISB12 {
28 to G2 from S1
29 }
30
31 InContextOf ICO22 {
32 to C2 from G2
33 }
34
35 IsSupportedBy ISB32 {
36 to S2 from G2
37 }
38

A new file appears next to your .props file: properties.props.arg.dsl. Whenever the properties are changed and saved DSL will be updated.



Console (Runtime):

When the runtime window starts, you should see messages like:

[Prism2GSNPlugin] earlyStartup() called

[Prism2GSNPlugin] Listener registered in earlyStartup

When generating GSN:

[Prism2GSNPlugin] Transform called for: /TestPrism/properties.props

[Prism2GSNPlugin] Loaded PRISM path from preferences: C:\Program Files\prism-4.8.1\bin

[PRISM] Version: 4.8.1

...

[Prism2GSNPlugin] PRISM returned <n> result(s)

[Prism2GSNPlugin] Wrote /TestPrism/properties.props.arg.dsl

PRISM2GSN - Eclipse IDE

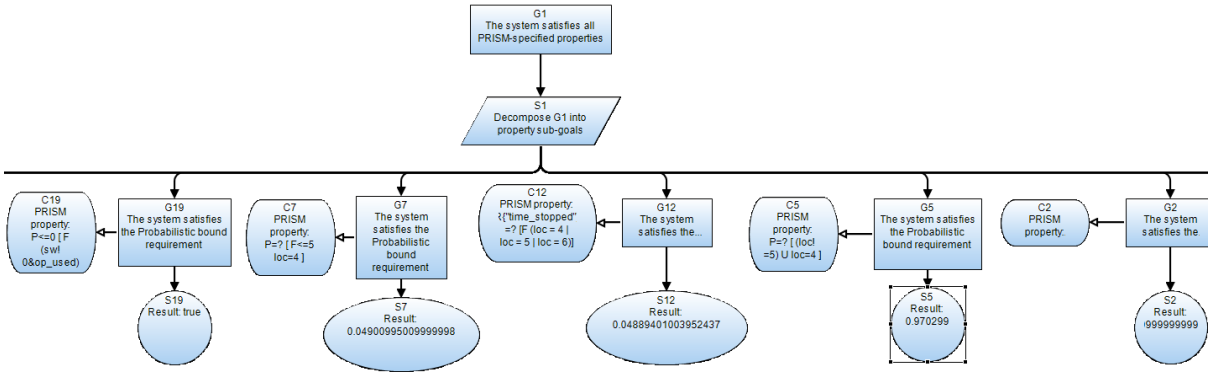
File Edit Navigate Search Project Run Verification Window Help

Console × Eclipse IDE for RCP and RAP Developers 2025-06 Release

Eclipse Application [Eclipse Application] C:\Program Files\Java\jdk-21\bin\javaw.exe (29 Aug 2025, 00:30:32 elapsed: 0:31:37) [pid: 33380]

```
[PRISM] Property satisfied in 1 of 1 initial states.
[PRISM]
[PRISM] Time for model checking: 0.001 seconds.
[PRISM]
[PRISM] Result: true
[PRISM]
[PRISM] ------------------------------------------------------------------
[PRISM]
[PRISM] Model checking: P>=1 [ G (sw!=2|vel=0) ]
[PRISM]
[PRISM] Probability bound in formula is 0/1 so not computing exact probabilities...
[PRISM]
[PRISM] yes = 0, no = 142, maybe = 0
[PRISM]
[PRISM] Property satisfied in 1 of 1 initial states.
[PRISM]
[PRISM] Time for model checking: 0.0 seconds.
[PRISM]
[PRISM] Result: true
[PRISM]
[PRISM] ------------------------------------------------------------------
[PRISM]
[PRISM] Model checking: P<=0 [ F (sw!=0&op_used) ]
[PRISM]
[PRISM] Probability bound in formula is 0/1 so not computing exact probabilities...
[PRISM]
[PRISM] Prob0: 4 iterations in 0.00 seconds (average 0.000000, setup 0.00)
[PRISM]
[PRISM] Prob1: 3 iterations in 0.00 seconds (average 0.000000, setup 0.00)
[PRISM]
[PRISM] yes = 56, no = 58, maybe = 28
[PRISM]
[PRISM] Property satisfied in 0 of 1 initial states.
[PRISM]
[PRISM] Time for model checking: 0.002 seconds.
[PRISM]
[PRISM] Result: false
[PRISM]
[Prism2GSNPlugin] PRISM returned 21 result(s)
[Prism2GSNPlugin] Wrote /TestPRISM2GSN/properties.props.arg.dsl
[Prism2GSNPlugin] Resource change event detected
```

To visualize the generated DSL file as a partial assurance case (goal structuring notation model), create an Argument Model in the AdvoCATE assurance case tool and paste the DSL into the underlying DSL of the diagram.



9. Uninstall / Clean-up

Because this workflow uses the **PDE runtime**, nothing is installed into your Eclipse. To remove:

- Close the **runtime** window.
- In the **development** workspace, delete the imported project if desired.
- No actions in *About → Installation Details* are needed for this workflow.

10. Troubleshooting

- **"PRISM not found" / CreateProcess error=2**
  - You likely didn't set the PRISM path **in the runtime window**.
    → **Window → Preferences → PRISM Settings** (runtime window), point to the folder that contains prism.bat (e.g., …\prism-4.8.1\bin).
- **No .arg.dsl appears on save**
  - The file must be named ***.props** and be **co-located** with a *.prism or *.pm model.
  - Make a small edit and **Save** to trigger the automatic transformation, or use the **Generate GSN Fragment** menu.
- **Context menu item missing**
  - Right-click a **file** (not a folder). For multi-property output, right-click the *.props file.
- **Java / bundle errors in the development workspace**
  - If Eclipse shows bundle-resolution errors, confirm you're using the **RCP/RAP** package and that the project's Java compliance is **21**.
    Use **JDK 21** and the **RCP/RAP** Eclipse package.
- **Different machine with a different PRISM path**
  - Just re-set **PRISM Settings** in the **runtime** workspace you launch on that machine. No code changes required.

11. Known Limitations

- **Windows-only** artifact (this release does not support macOS/Linux).
- PRISM path preference is stored **per runtime workspace**—if you create a new runtime workspace, set it again.
- Multi-property generation expects **one property per line** in a *.props file, located next to the model.

12. Support

For any questions, please contact: Dhaminda.Abeywickrama@manchester.ac.uk

License

The PRISM2GSN plug-in is provided **for academic and research use only**. Redistribution, modification, or commercial use is not permitted without prior written permission from the author.