Updates in the Rodin plug-in ecosystem

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1 Introduction

The Rodin platform [1] is an integrated development environment for designing systems with Event-B [2]. It is extensible through a plug-in system provided by its Eclipse base, which is heavily used to improve the capabilities of the platform or experiment with new concepts. We give an overview of the work[1] done on some plug-ins since the previous Rodin workshop.

2 Context instantiation plug-in

The Context instantiation plug-in was first introduced in a previous Rodin workshop [3]. After lots of internal testing inside the EBRP project, a public, 1.0 release is being prepared, along with a user manual. While the internals of the plug-in have largely been reworked since the initial announcement, the core concepts and user interface have remained mostly stable.

Generic contexts are defined as normal contexts in which, by convention, some carrier sets represent abstract types and some constants represent abstract values. Then, the plug-in is able to instantiate these contexts and replace their carrier sets and constants with concrete types and concrete values, respectively. These instantiations can be done through an easy to use wizard dialog, or by directly typing a specification of the instantiation next to the instantiated axioms or theorems.

The proof obligation generator of Rodin is adapted by the plug-in: when theorems proved in the generic context are instantiated, they do not have to be proved again. Indeed, if they are true on abstract types and constants, they have to be true on some specific, concrete values. To ensure this correctness, axioms in the generic context require special care: they are considered to be "assumptions" made by the context on the abstract types and constants. Therefore, these axioms are added as new proof obligations during the instantiation, as the user must prove that they hold on the concrete values that have been provided.

3 B2LaTeX

A new version of B2LaTeX is being developed with a major new feature: optional support of theories. Until now, B2LaTeX only supported core components of Rodin, namely machines and

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contexts. With this new version, an optional dependency is added on the Theory plug-in: if it is also installed, then B2LaTeX will be able to generate LaTeX files from theories, in the same style as the ones generated for other components. On the other hand, if the Theory plug-in is not installed, B2LaTeX will keep working as before.

4 SMT provers plug-in

In last year's Rodin workshop [4], we announced the development of a new version of the SMT provers plug-in, including support for Apple Silicon (ARM) processors. This is the last element preventing us from using Rodin natively on recent Apple computers. However, it is more challenging than expected: the plug-in includes several SMT provers that are quite old and unmaintained. Not only are there no Apple Silicon builds of these provers distributed by their authors, but they often do not build out of the box on Apple Silicon computers. We have either to patch them to fix the issues or to remove them from the plug-in. Removing these provers would not have a large impact on new proofs (since newer provers generally have better capabilities), but it would break the replay of old proofs done with these provers. On the other hand, maintaining ourselves an increasingly large number of obsolete provers will become unmanageable at some point. The development team of the plug-in and the Rodin platform is exploring these different possibilities and has not yet taken a decision on this issue.

5 Conclusion

In addition to maintaining the Rodin platform itself, we also support a number of plug-ins and develop new ones when needed. The Context instantiation plug-in fills a void in generic design of components; it is the last main idea suggested by Jean-Raymond Abrial for the Rodin platform. Other, older, plug-ins are maintained and new features are occasionally added when needed by the users, such as theory support in B2LaTeX.

References

[1] Jean-Raymond Abrial, Michael Butler, Stefan Hallerstede, Thai Son Hoang, Farhad Mehta, and Laurent Voisin. *Rodin: an open toolset for modelling and reasoning in Event-B.* International Journal on Software Tools for Technology Transfer, 12(6):447–466, Nov 2010.

[2] Jean-Raymond Abrial. *Modeling in Event-B: System and Software Engineering.* Cambridge University Press, New York, NY, USA, 1st edition, 2010.

[3] Guillaume Verdier and Laurent Voisin. *Context instantiation plug-in: a new approach to genericity in Rodin.* 9th Rodin Workshop, June 2021.

[4] Guillaume Verdier, Laurent Voisin, and Idir Ait-Sadoune. *Rodin 3.10 and its plug-ins.* 12th Rodin Workshop, June 2025.