Updates in the Rodin plug-in ecosystem

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Introduction

- in addition to the core Rodin platform, but also maintain and develop several plug-ins
- this is an overview of upcoming releases of several plug-ins
- development is supported by the French ANR project Event-B Rodin Plus (EBRP, ANR-19-CE25-0010)

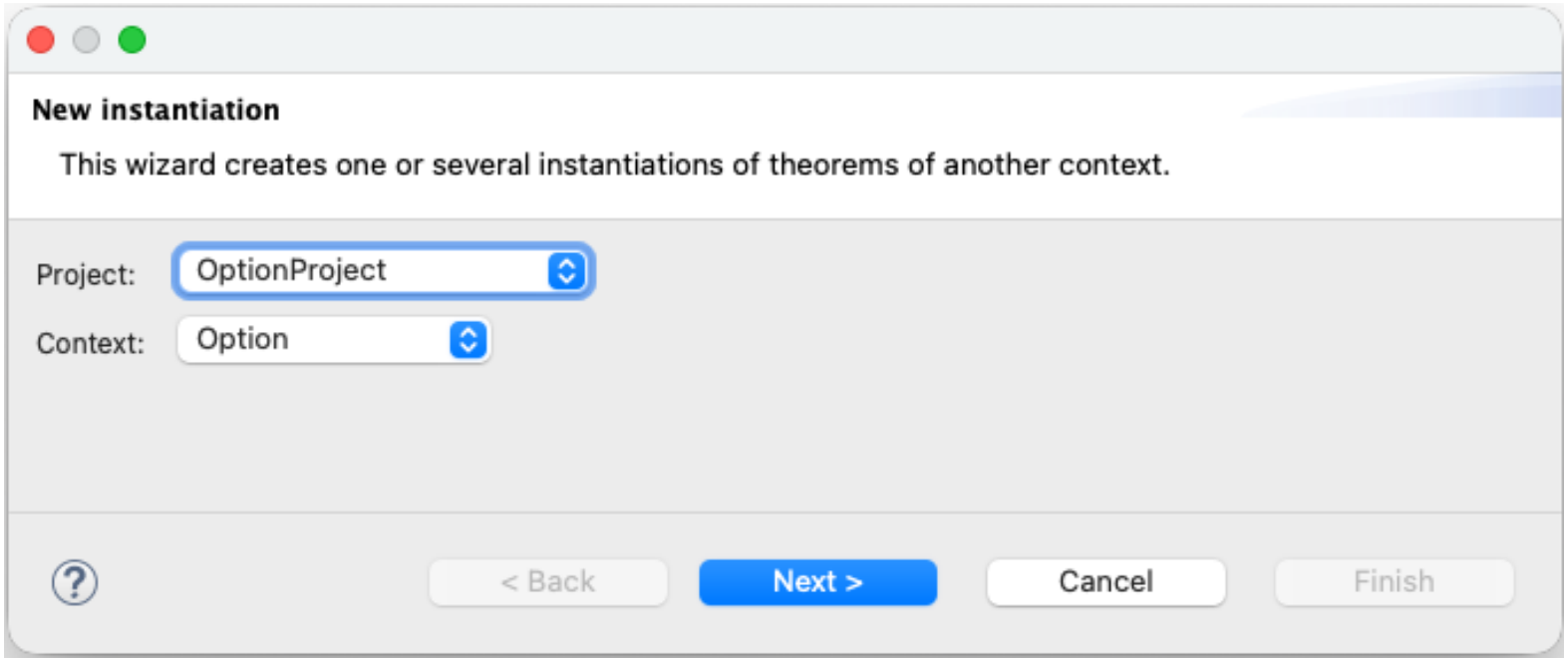
Context instantiation plug-in

- first presented at the 9th Rodin workshop
- many internal changes and rewritings, but the interface mostly stayed the same
- core idea:
  - reuse normal Rodin contexts with a convention: carrier sets and constants can be interpreted as generic parameters
  - a context can instantiate another context by replacing carrier sets with types and constants with values
  - the plug-in checks that instantiations are valid and manages proof obligations

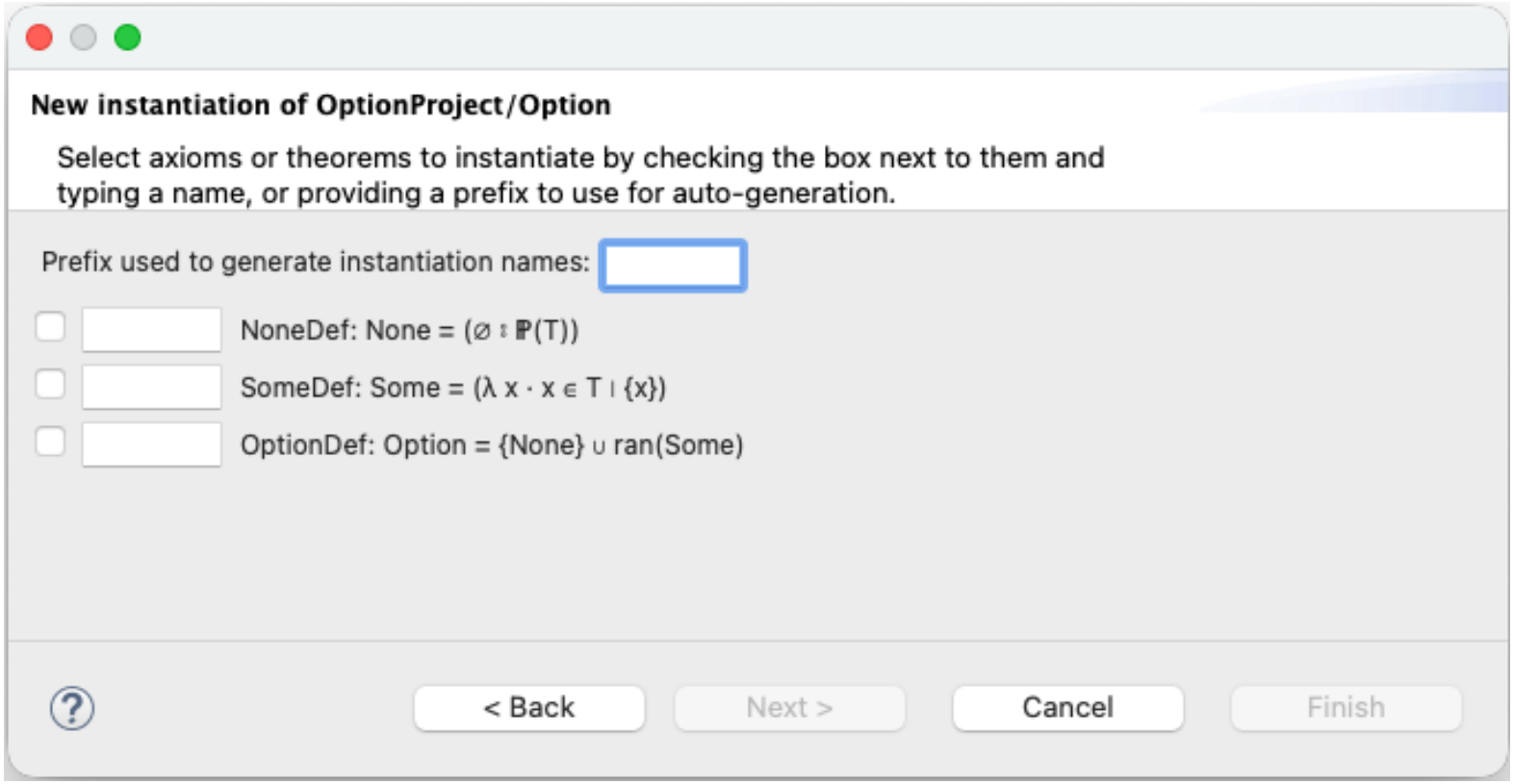
Example: a generic context

```
CONTEXT
    Option ›
SETS
  ◦ T ›
CONSTANTS
  ◦ Option ›
  ◦ None ›
  ◦ Some ›
AXIOMS
  ◦ NoneDef: None = ∅ ∶ ℙ(T) not theorem ›
  ◦ SomeDef: Some = (λ x · x ∈ T ∣ {x}) not theorem ›
  ◦ OptionDef: Option = {None} ∪ ran(Some) not theorem ›
END
```

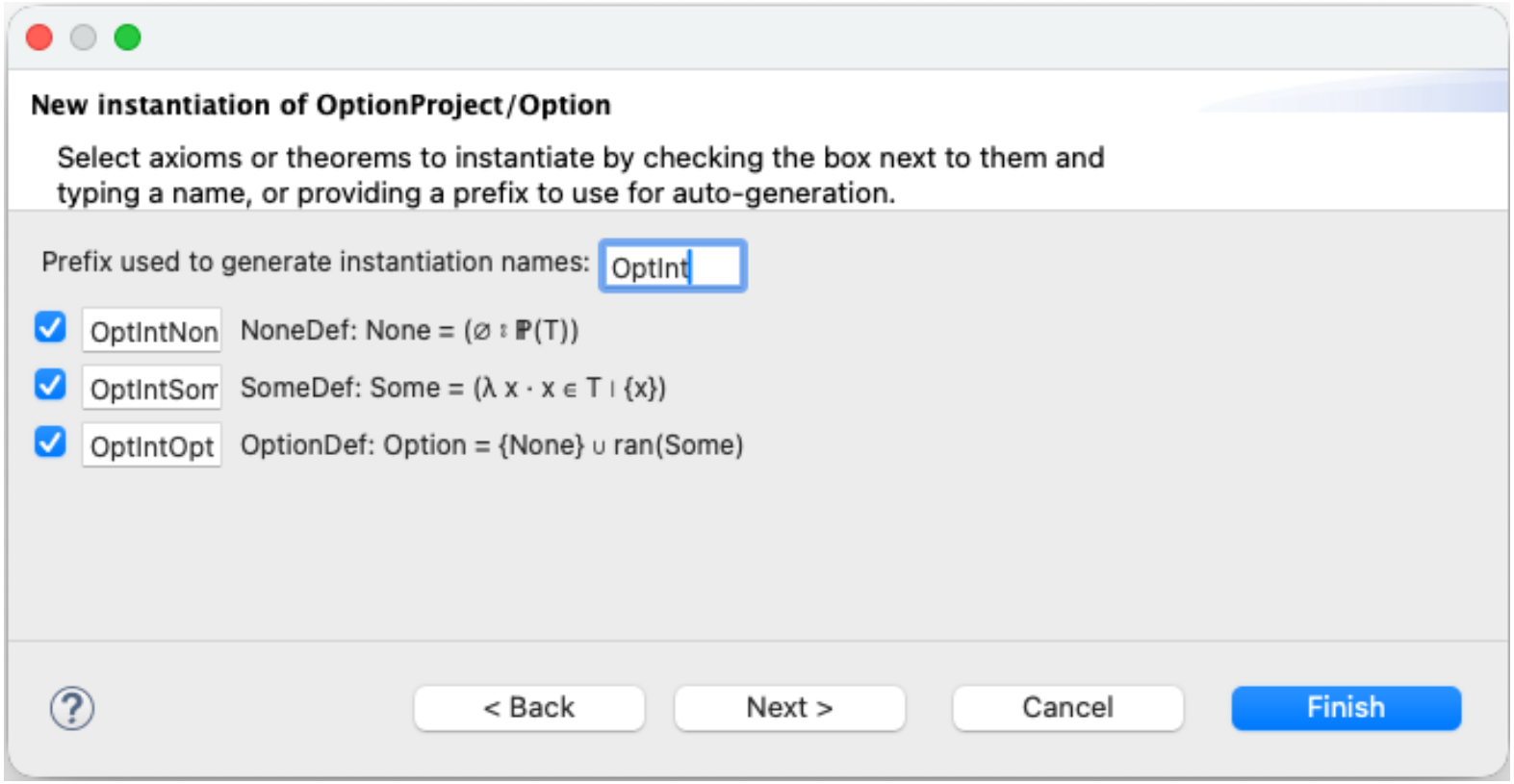
Example: an instantiation



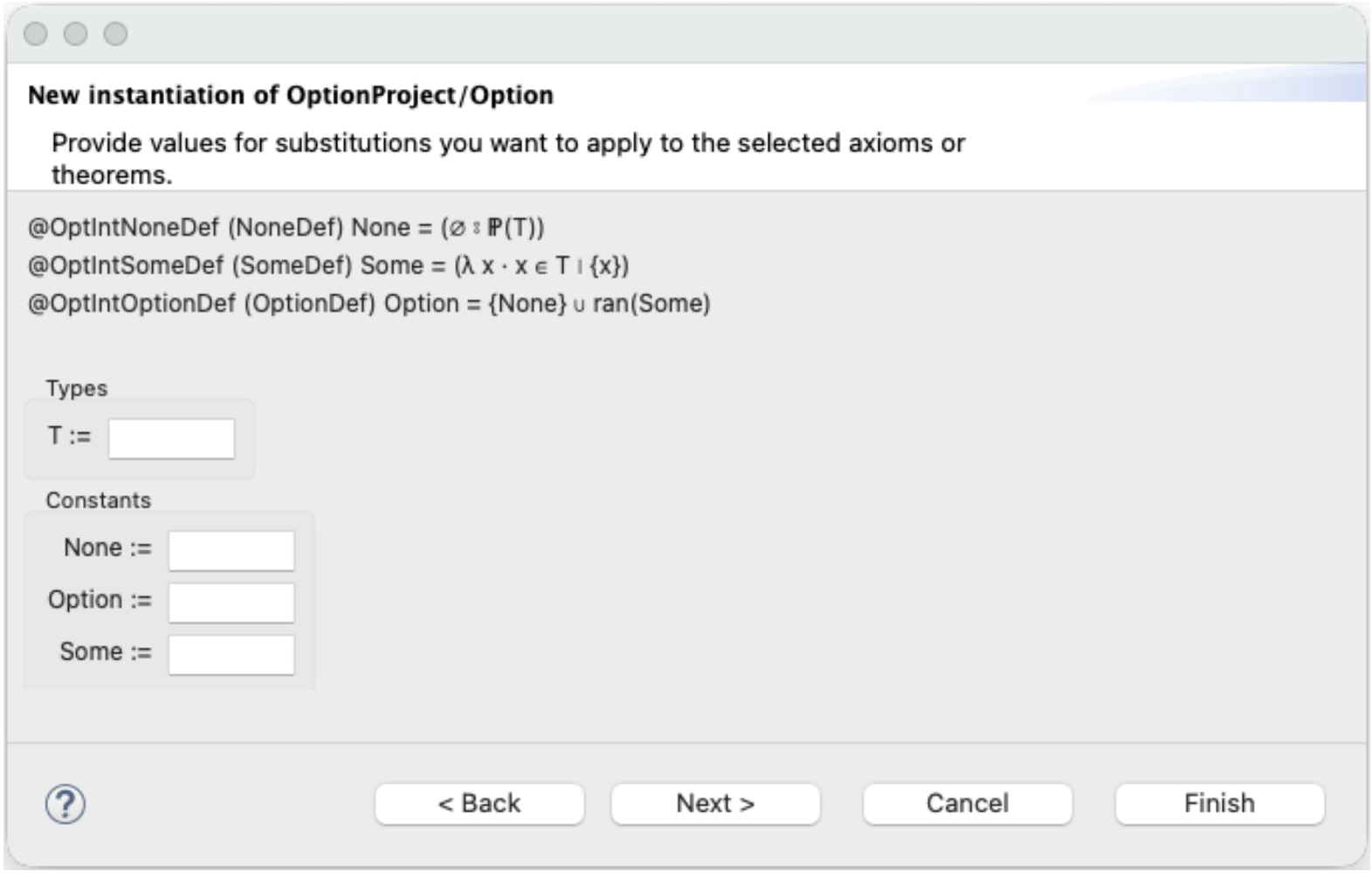
Example: an instantiation



Example: an instantiation



Example: an instantiation



Example: an instantiation

```
CONTEXT
    TestOptInt  ›
CONSTANTS
◦   Option    ›
◦   None      ›
◦   Some      ›
AXIOMS
◦   @OptIntNoneDef: None=(∅ ⦂ ℙ(ℤ)) not theorem ›Option|T:=ℤ|NoneDef
◦   @OptIntSomeDef: Some = (λx·x∈ℤ ∣ {x}) not theorem ›Option|T:=ℤ|SomeDef
◦   @OptIntOptionDef:   Option = {None} ∪ ran(Some) not theorem ›Option|T:=ℤ|OptionDef
END
```

Theorems

- the instantiation of a theorem is a theorem, but its proof obligation is suppressed by the plug-in
- if the instantiated theorem is preceded by axioms, proof obligations are generated for these *assumptions*
- *definitions* are excluded from this (definition: axiom matching *ident* $=$ *expr* where *ident* is fresh)

Release

- 10 prototype versions and a release candidate have been tested by members of the EBRP project
- a final 1.0 release should be published soon
- a user manual will also be published

B2LaTeX

- B2LaTeX generates LaTeX files from Event-B components (contexts and machines)
- the next version introduces optional support for theories
- when the Theory plug-in is installed, B2LaTeX will be able to generate LaTeX files from theories in the same style as other components
- if the Theory plug-in is not installed, B2LaTeX will keep working as before
- a few layout issues remain to be fixed before release

SMT provers

- support for Apple Silicon (ARM) processors is still causing issues, particularly with some old, unmaintained provers
- these provers may not be useful for new proofs, but are needed to keep replaying old proofs
- blocking issue for the next Rodin release, especially since Apple announced the retirement of Rosetta in macOS 28

Theory plug-in

- a major release is (still) being prepared
- a bit of work left on the application of user-defined proof rules
- a new user manual is also prepared

Conclusion

- we keep maintaining both the core Rodin platform and plug-ins, developing new ones when needed
- several plug-in releases in the next months
- a new release candidate of the next Rodin version soon
- do not hesitate to report bugs to us

Thanks

Questions?