

DarwinSPL

Managing Evolving Context-Adaptive Software Product Lines

Software Product Lines (SPLs) capture variable families of software systems. To react to environmental influences, SPLs have to be context-adaptive. As all software systems, context-adaptive SPLs need to evolve. DarwinSPL is a tool suite to model evolving context-adaptive SPLs in an integrated way, providing context-dependent reconfiguration and evolution-aware analyses.

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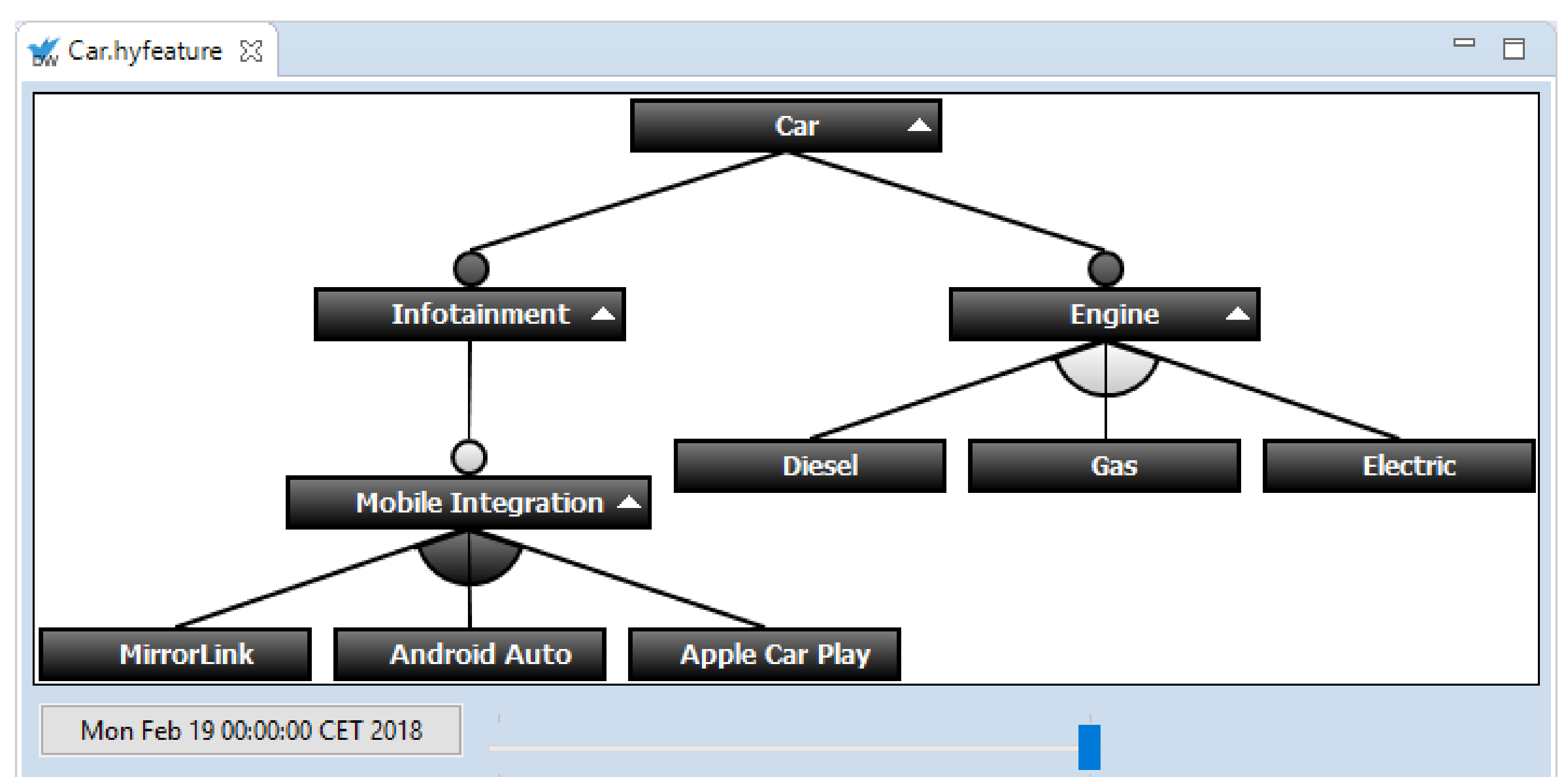
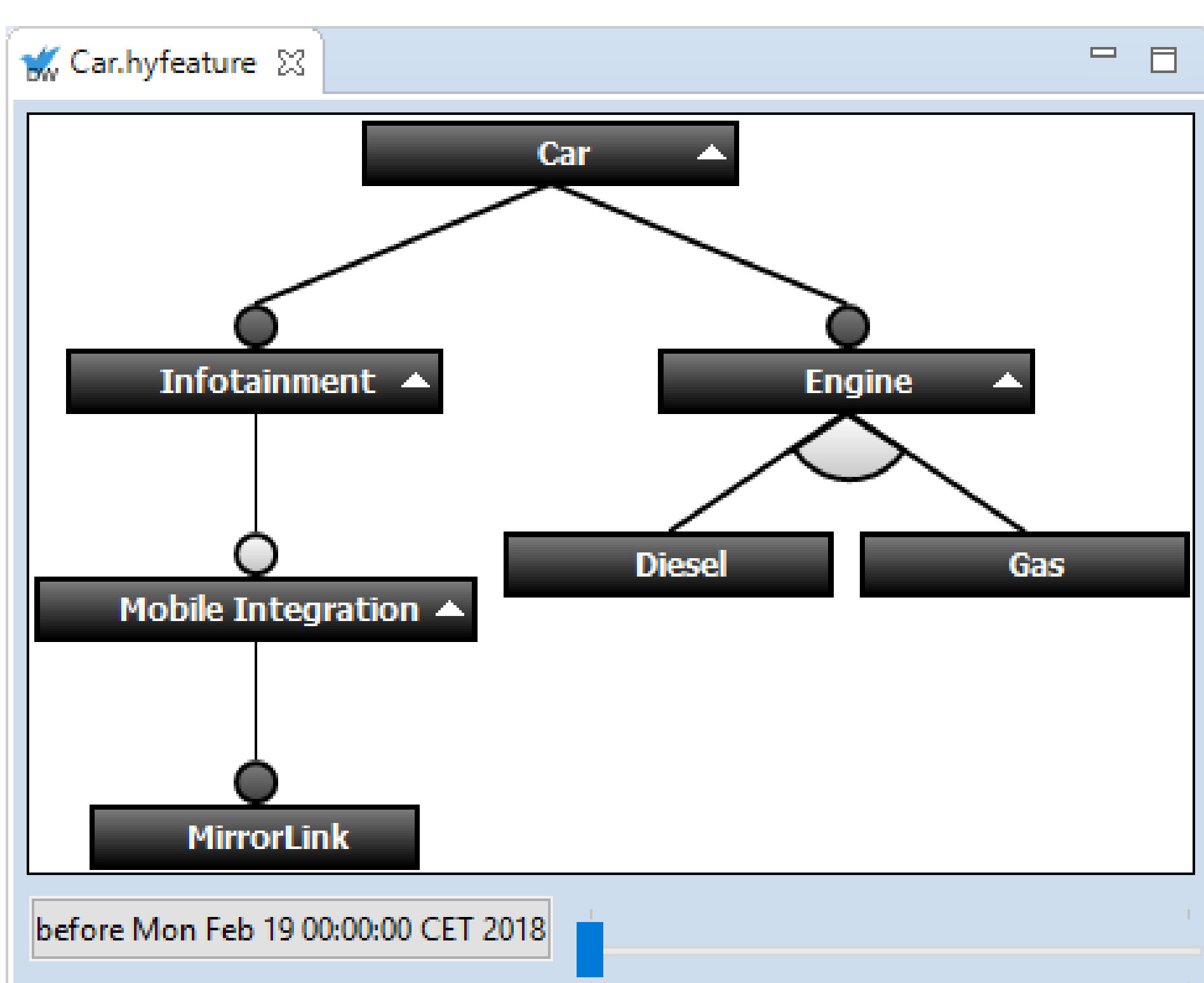


1. Core Features

- Supports modeling of evolving context-adaptive Software Product Lines
- Based on the concept of extended feature models
- Provides graphical and textual editors for intuitive use
- Integrates with DeltaEcore to be able to generate fully-fledged products using delta modeling
- Allows the definition of Multi Software Product Lines
- <https://github.com/DarwinSPL/DarwinSPL>

2. Past and Future Evolution

- Seamless modeling of evolution with Temporal Feature Models (TFMs)
- Track all past evolution steps and plan future evolution in one model
- Generic concept of **temporal elements**, allowing to capture evolution for models of arbitrary metamodels
- Each **temporal element** has a **temporal validity** – a timespan in which the respective element is valid
- Supports evolution-aware analyses by translating the whole evolution history in one request, resulting in reuse of unchanged elements



3. Modeling Context Adaptivity

- Relevant contextual information can be modeled using a tree editor
- To model environmental influence on features, contextual information can be referenced in the standard constraints of TFMs
- Contextual information can be mapped to delta modules of DeltaEcore
- Uses the concept of **temporal elements** to model evolution
- Sophisticated analyses check for anomalies in all possible contexts

4. Reconfiguring on Context Change

- On context change, a **reconfiguration process** can be triggered
- Using the solving engine HyVarRec (<https://github.com/HyVar/hyvar-rec>), the current configuration is checked for validity
- If not valid, HyVarRec provides a new valid and most similar configuration, which can be used to generate a new product
- DarwinSPL provides a reconfiguration simulation integrating HyVarRec

