

Applying the Universe Type System to an Industrial Application

Thomas Hächler
Supervising Assistant: Werner Dietl
Supervising Professor: Prof. Peter Müller

September 17th 2004 – March 16th 2005

1 Mission

The Software Component Technology Group has developed the Universe Type System to control aliasing in object-oriented programming languages.

While a compiler for Java with the Universe-Extensions and some test programs have been implemented, only a few classes of standard Java API have been annotated with the extended type information and experience with large programs is still missing.

The mission of this masters thesis is to get realistic experience in applying the Universe Type System to a real-world application.

Focussing on a delimited amount of classes (about 40 to 50) is preferred rather than typing the whole application. Therefore some stubs of other application classes have to be implemented and used by the observed component(s). Additionally, the used Java API classes will be identified and annotated with the Universe Types.

Based on the experience made while applying the Universe Type System to the application the following topics are expected to be documented:

- Patterns that occurred several times in the application.
- Problems occurring while applying the Universe Type System to the application.
- If casts were necessary to be used, description of the situations and explanations why these casts work at runtime were needed.
- Relationship of upcoming problems with the Universe Type System to the ownership model.
- Applicability of other type systems.

1.1 Possible Extensions

Type System Modifications Proposals how to modify the Universe Type System such that encountered problems can be solved.

Invariants How can ownership-based invariants be introduced?

More APIs or components To advance the usability of the Universe Type System for software developers, more APIs are needed to be annotated with the Universe Types. Some of those may be implemented and provided by library archives.

More components of the observed application may be annotated with Universe Types to get more experience with it.