The ETI Online Service in Action

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1 ETI's Goals

The Electronic Tool Integration platform (ETI) associated to the Intern. Journal on Software Tools for Technology Transfer (STTT) [7] is designed for the interactive experimentation with and coordination of heterogeneous tools¹. ETI users are assisted by an advanced, personalized Online Service guiding experimentation, coordination and simple browsing of the available tool repository according to their degree of experience. In particular, this allows even newcomers to orient themselves in the wealth of existing tools and to identify the most appropriate collection of tools to solve their own application-specific tasks.

Typical users of the ETI platform are tool builders and members of software projects looking for adequate tool support in their project area, but also researchers and scientists interested in tools as a research aid. The effectiveness of the ETI approach depends on the richness of the ETI repositories, which steadily grow with the integration of new tools, transformations and benchmarks.

A more detailed exposition, including background and related work can be found in [5].

2 The ETI Online Service

ETI contains and manages a heterogeneous wealth of information, functionalities and data. From the ETI Service homepage, <http://eti.cs.uni-dortmund.de>, it is possible to

1. **access online information** on the tools via hyperlinks to each tool's home site. These may provide information (documentation, literature, user manuals, prominent case studies) or, depending on the tool providers' choice even the tool's code (executable or source).
2. **access online a stand-alone version** of each tool, centrally located at the ETI service sites and executing (running) there.
3. **access the ETI repository** of integrated tools. The platform's repository contains a collection of functionalities offered by each integrated tool, classified for ease of retrieval according to behavioural and interfacing criteria.
4. **experiment** at ease with the integrated tools, by

¹ The ETI platform is realized on top of the **METAFrame** environment [6,4].

- (a) *running the* (stand-alone or integrated) *tools* on libraries of examples, case studies, and benchmarks made available on the ETI platform,
 - (b) *testing and running single tool functionalities*, capturing specific features offered by the integrated tools, on the same examples, from within a uniform graphical user interface provided by ETI,
 - (c) *constructing own application-specific heterogenous tools* through combination of single functionalities available in the ETI platform. This way users can prototypically solve problems which require the cooperation of several integrated tools, and experience the interplay of the integrated functionalities,
 - (d) *loosely specifying coordination tasks*, which can be then automatically completed by means of ETI's coordination support. This, in particular, takes care of any type (data format) incompatibilities, as detailed in [3].
5. **experiment with own sets of data**, to be deployed in user-specific, protected home areas.

The tool demonstration focusses on ETI's unique support for high-level tool coordination, while illustrating the steadily improving features of personalization, statistic analysis and automatic evaluation.

3 Experimentation by Loose Coordination

Tool coordination is freed from any programming and technicalities, so that little or no specific knowledge is prerequisite to the use of ETI as a coordination environment. In particular, ETI provides high-level task specification languages, graphical support for specifications and user interaction, as well as automatic coordination support by means of automatic synthesis and prototype animation [3]. This eases the access and use of the functionalities offered by different tools, implemented in different languages of different programming paradigms (functional, imperative, object-oriented) and running on different platforms.

The perhaps most prominent application example for loose coordination is the type-based completion of type-incorrect tool combinations. In a heterogeneous collection of tools, with all its advanced input and output formats, exact/correct tool coordination is extremely difficult. ETI provides convenient coordination interfaces even for newcomers, whose attention is kept free from typing constraints in order to concentrate on the desired functionalities.

The formal backbone of loose coordination is model synthesis/construction for Linear Time Temporal Formulas[5]. Users of the ETI service need not know this logic. Rather, they may choose between several specification formats, like e.g. the above mentioned type-incomplete coordination sequences, graphical formats or (application-specifically) derived logics. All these specification formats can be handled automatically by our synthesis mechanism, which, in particular, transforms type-incorrect coordination sequences into directly executable ones[3].

ETI can be operated without any previous knowledge about the content of the current tool repository. In fact, besides incompleteness (looseness) in the

Fig. 1. ETI in Use: Taxonomies and Coordination

above-described fashion (along a coordination execution), looseness in the specification of single functionalities allows newcomers to specify tools just by selecting desired properties. The system will then return the set of all corresponding (satisfying) functionalities, which can be investigated online using a hypertext documentation system.

Figure 1 shows a screenshot summarizing the essential features and components offered by the ETI Online Service via the standard browsers in a platform independent fashion.² A browser (left upper corner), serves as the documentation facility (white frame), the console (upper frame), and the entry point for the other service functionalities (menu in the left frame). The core functionalities are invoked via the **tool bar**:

- the *type* and *activity taxonomy* browsers,
- the *synthesis editor*,
- the *graph editors*.

The screenshot additionally displays a synthesized coordination graph (upper right corner) and an example graph, reachable via the graph editor (lower right corner).

Experts may use the coordination system in an even more flexible manner: they may use the full power of the SLTL linear time temporal logic[5] and request e.g. the presentation of the set of all (minimal) coordination sequences as feedback. This way, they may investigate the full potential of the ETI repository by successively refining the logical specification.

Thus people with different programming skills and professional profiles are able to profitably develop and test even complex tool coordination structures in a comfortable, intuitive manner.

4 Conclusions and Perspectives

The ETI Online Service plays a public service role, giving users the possibility of direct, *hands-on, experience* with a wealth of available tools and functionalities. This also includes features like the *ETI Online Forum*, where users may e.g., propose case studies, and report on their experiences [2]. The service is intended to develop into an *independent tool presentation and evaluation site*: potential customers (or project partners) are intended to use the service as a

- *directory* for possible tools and algorithms satisfying totally or partially their needs,
- (vendor- and producer-) *independent test site* for trying and comparing alternative products and solutions, which may be accessed without the overload of getting demo copies, demo licenses, making own installations, etc.,

² A typical user will not be confronted with all these windows at once, as they only appear on demand.

- *quality assessment site* for the published tools, which are refereed according to requirements like originality, usability, installability, stability, performance, design, etc.,
- *independent benchmarking site* for performance on a growing basis of problems and case studies.

This should simplify the communication between tool builders and tool users as well as between academia and industrial practice, supporting the transfer of tool-related technology. In fact, we are optimistic that the typical hesitation to try out new technologies can be overcome because serious hurdles, like installation of the tools, getting acquainted with new user interfaces, lack of direct comparability of the results and of performances, are eliminated. Moreover, the intended collaborative effort of the ETI user community to provide easily accessible information about fair, application-specific evaluations of various competing tools on the basis of predefined benchmarks, will be of inestimable help for everybody in need of tool support.

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