DIAMOND
Project reference: 248613
Funded under: FP7-ICT

Diagnosis, Error Modelling and Correction for Reliable Systems Design

From 2010-01-01 to 2012-12-31

Project details

<table>
<thead>
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<th>Total cost:</th>
<th>Topic(s):</th>
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<tr>
<td>EUR 3 863 697</td>
<td>ICT-2009.3.2 - Design of semiconductor components and electronic based miniaturised systems</td>
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<tr>
<td>EU contribution:</td>
<td>Call for proposal:</td>
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<td>EUR 2 893 000</td>
<td>FP7-ICT-2009-4</td>
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<tr>
<td>Coordinated in:</td>
<td>Funding scheme:</td>
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<tr>
<td>Estonia</td>
<td>CP - Collaborative project (generic)</td>
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</tbody>
</table>

DIAMOND develops methodology and integrated environment for diagnosis and correction of errors regarding the design and implementation of digital ICs.

The aim of DIAMOND project is improving the productivity and reliability of semiconductor and electronic system design in Europe by providing a systematic methodology and an integrated environment for the diagnosis and correction of errors. Increasing design costs are the main challenge facing the semiconductor community. Assuring the correctness of the design contributes to the major part of the problem. However, while diagnosis and correction of errors are more time-consuming compared to error detection, they have received far less attention, both in terms of research works and industrial tools introduced. Another, orthogonal threat to the development is the rapidly growing rate of soft-errors in the emerging nanometer technologies. According to roadmaps, soft-errors in sequential logic are becoming a more severe issue than in memories. However, the design community is not ready for this challenge because existing soft-error escape identification methods for sequential logic are inadequate. The DIAMOND project aims at developing a unified, holistic diagnostic model for design and soft errors as well as automated localisation and correction techniques based on the unified model, both pre-silicon and post-silicon. In addition work will be directed to the implementation of a reasoning framework for localisation and correction, encompassing word-level techniques, formal, semi-formal, and dynamic techniques and to the integration of automated correction with the diagnosis methods. DIAMOND reaches beyond the state-of-the-art by proposing an integrated approach to localisation and correction of specification, implementation, and soft errors. In addition, it considers faults on all abstraction levels, from specification through implementation down to the silicon layout. Handling this full chain of levels allows DIAMOND take advantage of hierarchical diagnosis and correction capabilities incorporating a wide range of error sources.

Objective

Increasing design costs are the main challenge facing the semiconductor community. Assuring the correctness of the design contributes to the major part of the problem. However, while diagnosis and correction of errors are more time-consuming compared to error detection, they have received far less attention, both in terms of research works and industrial tools introduced. Another, orthogonal threat to the development is the rapidly growing rate of soft-errors in the emerging nanometer technologies. According to roadmaps, soft-errors in sequential logic are becoming a more severe issue than in memories. However, the design community is not ready for this challenge because existing soft-error escape identification methods for sequential logic are inadequate. The DIAMOND project addresses the above-mentioned challenges. The aim of DIAMOND is improving the productivity and reliability of semiconductor and electronic system design in Europe by providing a systematic methodology and an integrated environment for the diagnosis and correction of errors regarding the design and implementation of digital ICs.
correction of errors. DIAMOND will develop:

- A unified, holistic diagnostic model for design and soft errors;
- Automated localisation and correction techniques based on the unified model, both pre-silicon and post-silicon;
- Implementation of a reasoning framework for localisation and correction, encompassing word-level techniques, formal, semi-formal, and dynamic techniques;
- Integration of automated correction with the diagnosis methods.

DIAMOND reaches beyond the state-of-the-art by proposing an integrated approach to localisation and correction of specification, implementation, and soft errors. In addition, it considers faults on all abstraction levels, from specification through implementation down to the silicon layout. Handling this full chain of levels allows DIAMOND to take advantage of hierarchical diagnosis and correction capabilities incorporating a wide range of error sources.

Related information

**Top Stories**

- Feature Stories - Breaking through the fault-testing bottleneck in chip production

**Documents and Publications**

- D5.3 Articles in international journals and proceedings
- D2.1 Transaction-level diagnosis
- D4.2 Definition of the DIAMOND Platform
- Achieved Milestones - 1st year
- publishable summary 2nd year
- D1.2. Definition of the diagnostic model
- Achieved Milestones - 3rd year
- D1.4 Report on reasoning engines and dynamic techniques
- publishable summary 1st year
- D1.1 Requirements & Concept of the Diagnostic Model
- Achieved milestones - 2nd year
- Publishable summary - 3rd year
- D5.6 Dissemination report

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Subjects
Electronics and Microelectronics - Information Processing and Information Systems

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