

Project Number: IST-2001-33234
Project Acronym: PEPITO
Title: PEer-to-Peer Implementation and TheOry
Axiomatisation of Transactions
Due date: project month 18
Delivery Date: 2003-06-01
Responsible Partner: EPFL
Participating Partners: EPFL

Deliverable no:	D1.3
Title:	Axiomatisation of Transactions
Workpackage no:	WP1
Due date:	project month 18
Delivery date:	2003-05-15

Short Description

This derivable presents the result of our work on the decomposition and axiomatisation of transactions.

Transactions are commonly described as being ACID: All-or-nothing, Consistent, Isolated and Durable. However, although these words convey a powerful intuition, the ACID properties have never been given a precise semantics in a way that disentangles each property from the others. Among the benefits of such a semantics would be the ability to trade-off the value of a property against the cost of its implementation.

This report gives a sound equational semantics for the transaction properties. We define three categories of actions, A-actions, I-actions and D-actions, while we view Consistency as an induction rule that enables us to derive system-wide consistency from local consistency. The three kinds of action can be nested, leading to different forms of transactions, each with a well-defined semantics. Conventional transactions are obtained as ADI-actions.

From the equational semantics we develop a formal proof principle for transactional programs, from which we derive the induction rule for Consistency.

Partner owning:	EPFL
Partner contributing:	EPFL
Available to:	Public