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Stochastic models for quality of service of component connectors

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Propositions belonging to the PhD dissertation
Stochastic Models for Quality of Service of Component Connectors
by Young-Joo Moon, defense scheduled on 25 October 2011

1. Software composition plays an important role in increasing the reusability of software. Such reusability is supported by connector coordinating software (this thesis).
2. To deal with the heterogeneity of distributed software, a flexible and expressive semantic model for a connector coordinating its distributed components is desired (this thesis).
3. The desired behavior of a system considers not only its correct functionality, but also the satisfaction of its non-functional features, i.e., its quality of service (QoS). The QoS aspects of systems vary widely according to the context of the systems, and the analysis of the QoS aspects can be used to improve or to optimize the performance of the systems (this thesis).
4. For a practical analysis of the QoS aspects in software composition, it is required to consider the QoS aspects of both software components and the connectors that coordinate those components, plus the QoS properties of the composed system interacting with its environment, i.e., end-to-end QoS aspects (this thesis).
5. Activities in a synchronized region of a connector, i.e., sequential or parallel activities according to the topology of the connector, are partially ordered (Chapters 3 and 4 of this thesis).
6. Analyses based on a mathematical framework provide exact and trustworthy results, but in practice, certain abstractions and conditions on the framework limit the use of the framework. Simulation-based analyses can be used to overcome this limitation. (Chapter 6 of this thesis)
7. Translation from a new semantic model into a well-known stochastic model for analysis is another way of supporting software reusability using the existing tools implemented for the well-known model.
8. To guarantee infallible semantics of scalable systems, compositional semantic models for the behavior of scalable systems are desired.
9. Tool development in a team causes a slow start, but enables fast implementation.
10. Growth is controlled not by the total amount of resources available, but by the scarcest resource (limiting factor). – Liebig’s law of the minimum