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QoS transport mechanisms, functions and protocols; 3.5. QoS transport ontology specification; 3.5.1. TCP semantic description; 3.5.2. UDP semantic description; 3.5.3. SCTP semantic description; 3.5.4. DCCP semantic description; 3.5.5. MPTCP semantic description; 3.6. Usage of the QoS transport ontology specification; 3.6.1. QoS transport services characterization; 3.6.2. Transport components and transport composite characterization; 3.7. Summary; Chapter 4. Model-Driven Design Methodology of Transport Mechanisms and Functions 4.1. Introduction 4.2. Software engineering process; 4.2.1. Unified Modeling Language; 4.2.2. UML 2.4.1-based methodology; 4.2.3. UML diagrams; 4.2.4. Summary and additional resources; 4.3. Applying the UML-based software engineering methodology for transport services; 4.3.1. Contextual model of transport functions and mechanisms; 4.3.2. Analysis of requirements guiding transport functions; 4.3.4. Design of transport functions and mechanisms; 4.4. Summary; Chapter 5. Model-Driven Specification and Validation of Error Control Transport Mechanisms and Functions; 5.1. Introduction 5.2. Design of an error control function 5.2.1. Behavior specification of the sending side protocol entity; 5.2.2. Behavior specification of the receiving side protocol entity; 5.3. Functional validation of the error control function; 5.3.1. Functional validation using a perfect medium; 5.3.2. Functional validation using an imperfect medium; 5.4. A new design of the error control function; 5.4.1. Functional validation using an imperfect medium; 5.4.2. More open questions; 5.5. A model-driven simulation environment; 5.5.1. Model-driven simulation framework 5.5.2. Model-driven network simulator package

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## Sommario/riassunto

The current diversity of transport services, as well as the complexity resulting from the deployment of specific transport protocols or mechanisms over the different services provided by heterogeneous networks, demand a novel design of the transport layer. Moreover, current and future applications will only be able to take advantage of the most adapted and available transport services if they are able to interact (i.e. discover, compose, deploy and adapt) efficiently with this advanced transport layer. The work presented in this book proposes a model-driven methodology and a service-or

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