

The Use of Layers and Planes for Architectural Design of Communication Systems

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Abstract

Do we have the right set of concepts for modeling and describing distributed real-time systems in software engineering? Languages like ROOM (Real-Time Object-Oriented Modeling) and UML-RT (Unified Modeling Language for Real-Time) offer some basic concepts; however, system engineers of the application domain (e.g. in telecommunications) work with a variety of concepts, which do not have a corresponding counterpart in software engineering. There seems to be some potential for transfer. This report explores the power of a well-known concept in telecommunications, the Service Access Point (SAP). SAPs not only prove to be more powerful than layering is, they even subsume the concept of planes, which are almost unknown in software engineering. Eventually, SAPs turn out to be a basic modeling construct, which allows us to describe in a precise manner any communication architecture that is structured in layers and planes. Here, it is shown that some few improvements to ROOM/UML-RT can make the full power of SAPs available to the object-oriented design of distributed real-time systems.