

Keynote Talk

Runtime Application Adaptation in Practice: Why, When and How?

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ABSTRACT

Runtime application adaptation, reconfiguration and software evolution is concerned with performing application updates while the system keeps on operating to a certain extent. By avoiding a complete application shutdown, runtime software evolution tries to preserve application state and keep service interruption at an absolute minimum. However, runtime software evolution is a very complex issue, and many difficulties are encountered in its realization. The presentation will motivate the need for runtime software evolution, and describe the challenges faced by supporting runtime application adaptation on the issues how and when to perform component updates. Some of our experiments in developing component frameworks supporting runtime application adaptation will be presented.

An adaptive runtime component environment enables to replace components at runtime while the application remains in operation. This will create the need for identifying safety criteria for dynamically updating stateful components. These safety criteria allow to detect when an application can be safely updated without breaking application consistency. On top of this component environment, a hierarchical runtime architecture that is capable of monitoring of important timing constraints can enforce application adaptations in order to ensure certain critical constraints. Such adaptations are defined by adaptation policies executed at run-time by reified entities that can activate, replace or deactivate certain components.

Categories and Subject Descriptors

D.2.11 [Software Engineering]: Software Architectures, D.2.7 [Software Engineering]: Distribution, Maintenance, and Enhancement.

General Terms

Design, Management.

Keywords

Dynamic Update, Reconfiguration, Run-Time Adaptation, Software Evolution.