

**Concurrency Modeling**  
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**Technology Transfer**

Designers exploit design reuse to enhance system design productivity. We propose to design a library of reusable components at various design phases such as UML component library for specification phase, MLDesigner component library for modeling phase, systemC/C++ library for development phase and ImpluseC (HW-SW Co-Design) library for prototyping phase. We further propose to integrate a system from sub-system and sub-system from components. Integration of pre-designed reusable blocks may fail if these blocks execute in parallel, share resources, and/or interact with each other. Such concurrency issues, if not addressed, may be detrimental to normal functioning of the system. Concurrency issues, if not addressed, may lead the system into a deadlock or a livelock state. System design integration and verification approaches will not be cost-effective in exposing concurrency failures as they are intermittent; this can be costly (significantly increased time to market and field failures). One would have to develop abstract concurrency models and do exhaustive analysis on these models to test for concurrency problems.

We have conceptualized a design flow for modeling concurrency. We propose that concurrency issues must be modeled after the system specification step and before defining system components. Concurrency modeling will help us to design reusable design block, thus is likely to enhance system design productivity.