

**NUS Graduate School for Integrative Sciences and Engineering
Research Project Write-up**

Title of Project : Systematic Design Methods and Tools for Developing Location Aware, Mobile and Pervasive Computing Systems

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Short Description

"On-the-Move" computing systems have become increasingly distributed, dynamic and pervasive. The notion of locality and mobility are two key features in those systems. For such computing systems, the complex state and dynamic interfaces of software components and their location-based concurrent interactions provide challenging research problems in system specification, design and development. Currently, there are no integrated systematic design methods and case tools for developing such systems. This proposed project aims to address two research areas, design methods and case tools, for location-aware, mobile and pervasive computing systems.

From design methods point of view, it is desirable to have the appropriate modeling constructs that can precisely capture the notion of locality and mobility. In this project, we aim to develop high level design methods that may extend state-based formalism with additional *locality* and *mobility* dimensions.

From case tools point of view, it is desirable to have an integrated case tool that can facilitate the design and development of the location-aware, mobile and pervasive computing systems. The case tools should have analytical, reasoning and synthesis capability, which allows users to construct precise design models and ontology for modeling various contexts, to check their designs and ontology, to verify important system properties and to (semi-)automatically generate implementations from high level designs.