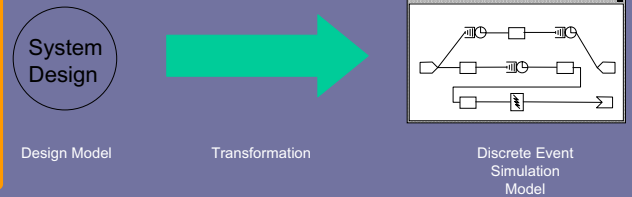


## Overview

- 8 years in Research
- 2 major projects plus additional research
- Permabase – Performance Prediction from Designs
- PhD – Model Transformation
- DSE4DS – Formal Analysis from Design Specs
- KMF/OCL tools – MDA based tools
  
- Consistent theme of developing tools to support the analysis of systems from design specs and mapping design models into analysis models.

## Permabase

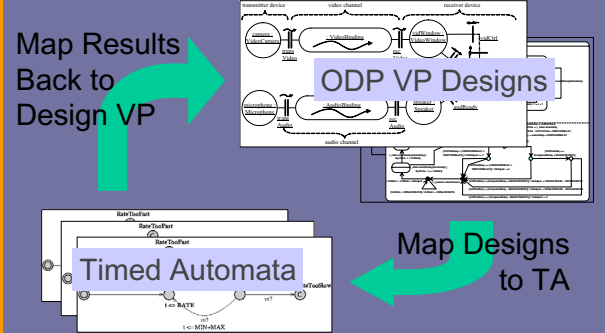
- Performance Prediction of ATM based Multimedia Systems from Design Specifications
  - Multi Viewpoint Design specifications in (early) UML based languages
  - mapped to DES for performance analysis
  - Inadequacies of UML as a suitable language, and no technique for specifying Model Transformations



## DSE4DS

- Design Support Environments for Distributed Systems
  - System Design using ODP based Viewpoints and UML profiles as languages for the different viewpoints.
  - Formal Analysis by way of Model Checking Timed Automata
  - Map designs from ODP viewpoints to Timed Automata
- UML Profiles not as suitable as promoted
  - clash of base concepts
  - better to specify ODP Domain Specific Language (DSL)
- Difficult issue mapping analysis results back into the designers domain.
  - Think about it whilst defining the forward mapping
  - Good MT language should help support this

## DSE4DS



## Thesis – Model Transformation

- Model Translation: An UML based Specification Technique and active implementation approach.
  - Pre-dating the OMG MDA initiative
  - Motivated by experience on the Permabase project.
- Techniques for specifying Model-to-Model mappings
  - Based on OO specification of models
  - UML/OCL based language
- Many different types of MT Language
  - Incremental/Batch, Uni/Bi-directional, declarative/imperative
  - My approach was incremental, declarative, bi-directional
- Has been improved on in subsequent work/papers

## KMF / OCL Tools

- Kent Modelling Framework
- A major part of both projects was development of tools to support the design and analysis techniques.
- This requires repositories for the respective models
- KMF is tooling for building repositories from class diagrams and providing basis of a tool skeleton around it.
- KMF includes support for OCL, both as constraint checking and code generation.
- IBM funded development of our OCL tools to support their EMF project.

## Kent Model Transformation Language

- Partially developed
- To form part of KMF
- Originating on my thesis ideas and subsequent development of them
- Based on OCL and Relation Theory
- Possible basis for development of MT verification tools.

## ModEasy – Proposed Work Plan

- Build Eclipse based Repositories for:
  - SysML OMG Standard – UML variation more suited for Embedded systems design.
    - Provide support for import of designs from existing design tools
  - SystemC meta-model
  - SystemC verification tool (TBD)
- Select or Develop a Model Transformation Language
  - possibly INRIA ATL (ATLAS Transformation Language)
  - possibly Kent MTL
  - possibly some OMG QVT std – if agreed on soon!
- Write rules for
  - SysML <-> SystemC
  - mappings to verification tool input (include reverse)

## ModEasy – Proposed Work Plan

- Develop techniques for verification of MT rules
  - use the SysML <-> SystemC rules as examples
  - could use existing work on refinement as a basis
  - this is a major contribution to the field when successful
- Develop tools to implement MT rules in eclipse
  - should be considered part of the choice of MT language
  - and part of the tools to support an MT language
- FPGA & Hardware aspects ???
  - Other RA...not started yet.