Pounamu Developments

- **Aim of section:**
  - Look at work undertaken to extend Pounamu core features (recent and current)
  - Problems being addressed and solutions adopted

- **Contents**
  - Core model
  - Behaviour specification
  - Back end code import/export
  - External interface
 - Collaboration/awareness
  - Front end improvements

Core model

- **Problems**
  - Weak type support (strings and collections of strings)
  - Weak relationship support in metamodel (no cardinalities, no inheritance, no explicit repn of links)

- **Solutions**
  - Addition of type suite including user defined types
  - Consequent changes to property sheet definer
  - Addition of better relationship support

- **Status**
  - Underway

Behaviour specification

- **Problems**
  - Event handler specification tool requires sophisticated user
    - Understanding of Java
    - Familiarity with Pounamu API
  - Difficult to debug

- **Solutions**
  - Kaitiaki visual event handler specification tool (Karen Liu PhD)
    - Aimed at handlers for view manipulation
    - Debug view
  - Metamodel constraint language
    - Like OCL for specifying computations at meta model level (like spreadsheets at a type level)

- **Status**
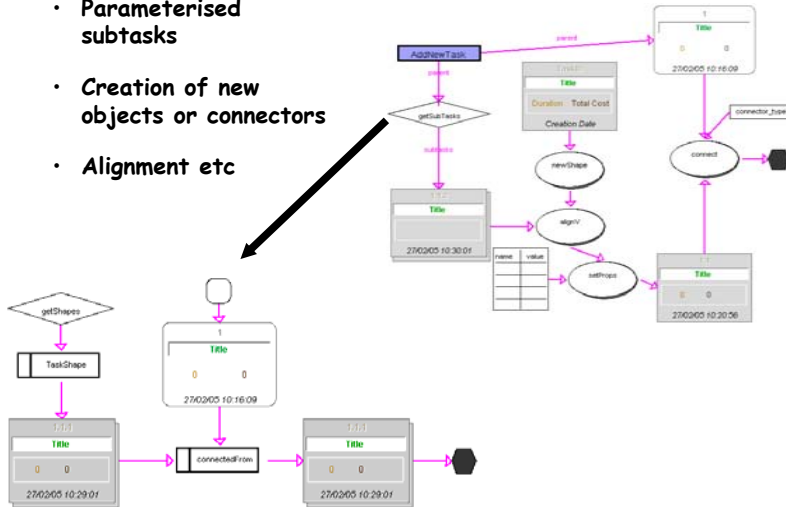 - Both projects at design/early prototype stage

Kaitiaki
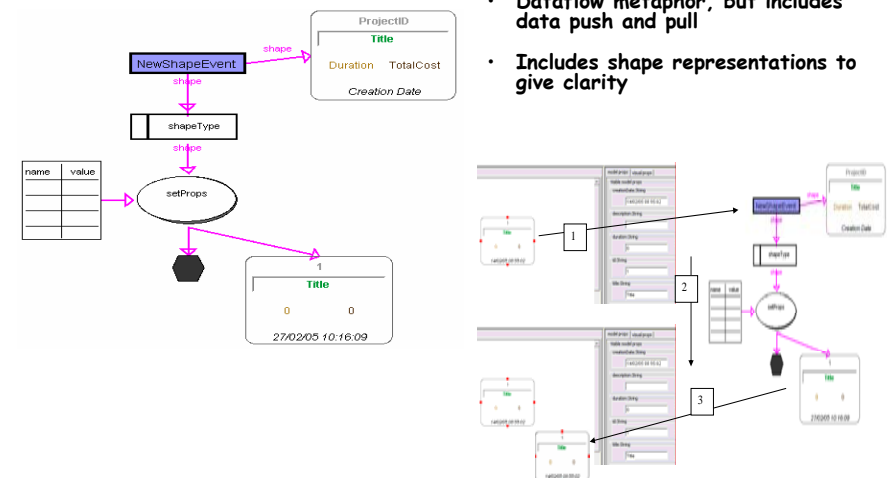
- Dataflow metaphor, but includes data push and pull

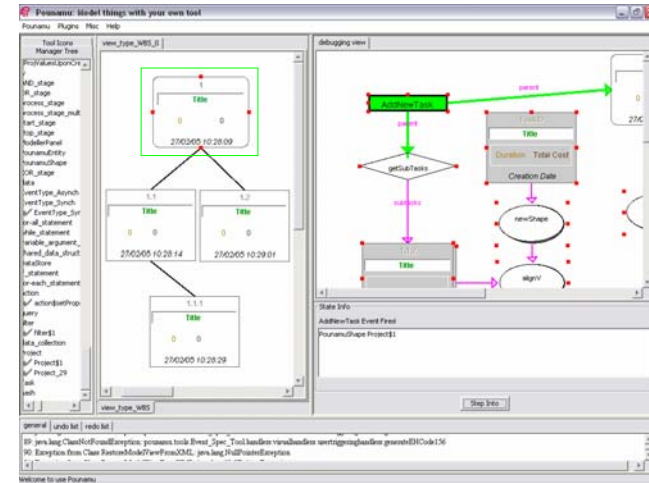- Includes shape representations to give clarity

More complex example

- **Parameterised subtasks**

- **Creation of new objects or connectors**

- **Alignment etc**


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Kaitiaki Debug view

Back end code import/export

- **Problem**
  - **Backend code generation and code import facilities require bespoke code for each generator/importer**

- **Solution**
  - **Develop framework for code import and export tools – Sydney Xing 380 and 780 projects**
  - **Framework for export plus exemplar for export to XMI**
  - **Framework for import plus exemplar for XMI import**

- **Status**
  - **Proof of concept implementation done**
  - **Additional exemplar for AOCE tool being developed (Max Wang)**

Code import

ArgoUML

XMI

Pounamu view
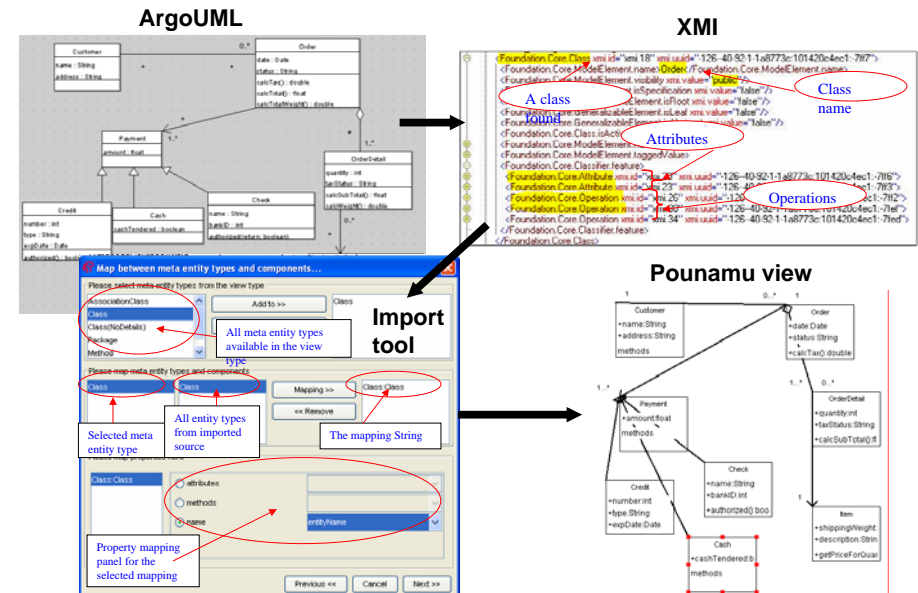
External interface

- **Problems**
  - **Need to access Pounamu tools remotely on a variety of different devices**

- **Solutions**
  - **RMI interface to Pounamu API (Therese Helland project - done)**
  - **Thin client interface for web browser interaction with any Pounamu generated tool (Penny Cao MSc thesis done)**
  - **Mobile phone interface for Pounamu generated tools (Joe Zhao MSc thesis done)**
  - **Generalise framework and add VRML interface (Joe Zhao current)**
  - **Add games engine interface (Mek Bhumiwat & Joseph Shi SE project current)**

Thin client interface

- **Developed by Penny Cao (MSc thesis)**
  - **Uses Web services API to generate GIF or SVG versions of Pounamu model views (model only, not tool spcfcn)**
  - **Can interact with these to perform editing actions**
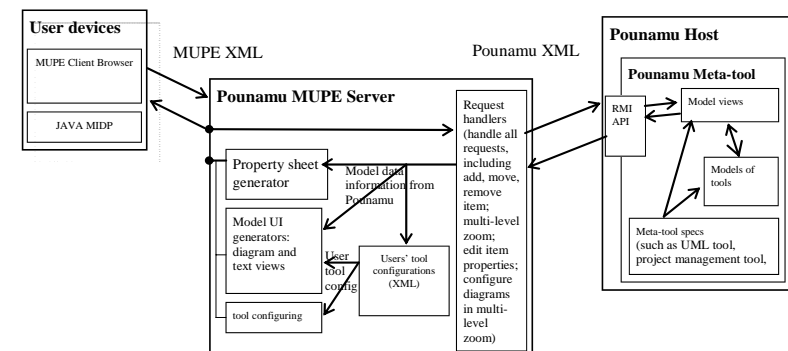 - **Support multi-user interaction with Pounamu tools**
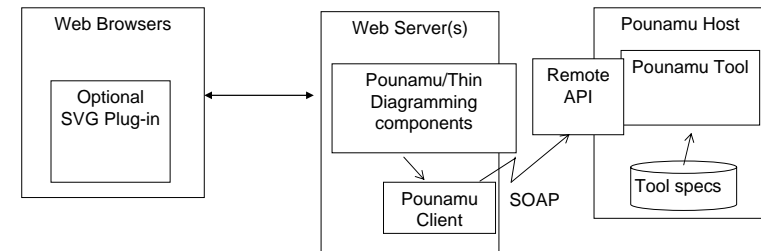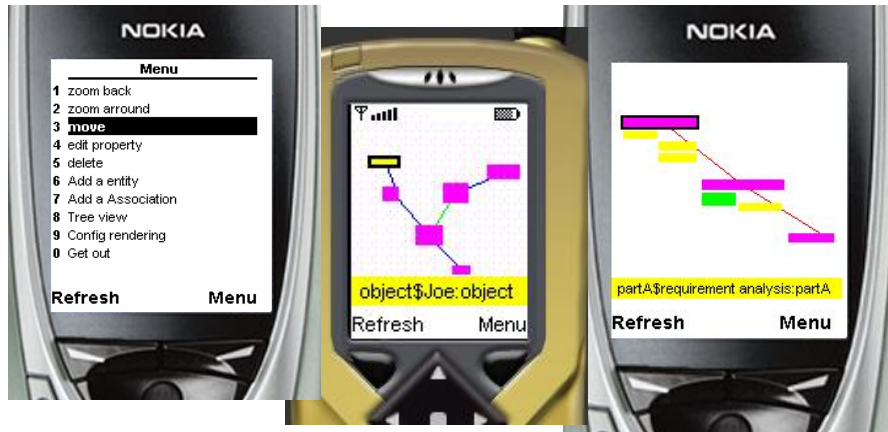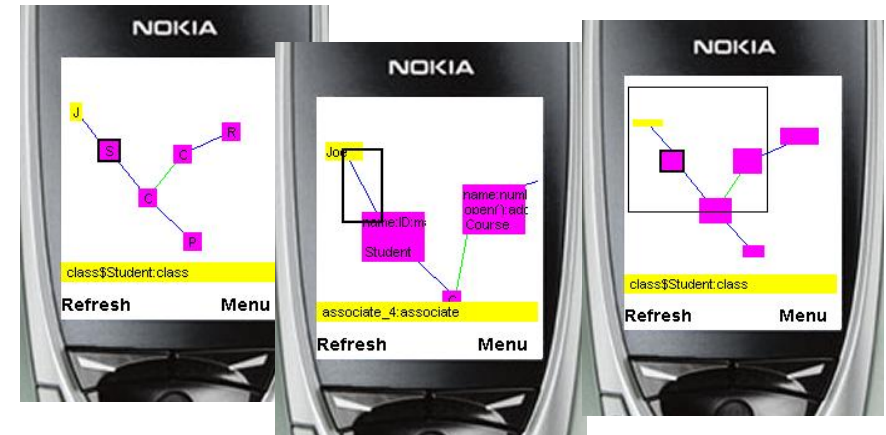
Thin client interface
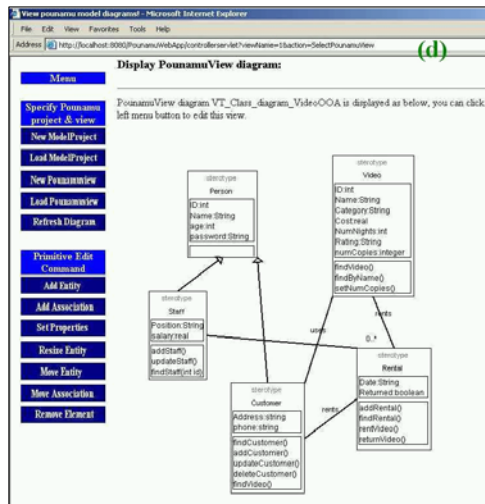
MUPE interface

- **Support for viewing and editing Pounamu tool views on cellphones**

- **Uses Nokia's MUPE open source mobile collaboration server plus MUPE client on phone**

- **Has several features for semantic zooming to allow diagrams to be sensibly visualised/edited on small screen**

# Example MUPE interface usage

Element zooming and overview

Collaboration & group awareness

- **Problems**
  - **Want to use Pounamu tools in collaborative situations & hence need support for both synchronous and asynchronous collaboration**

- **Solutions**
  - **Web service based collaboration plug in provides synch and asynch multi user support (Akhil Mehra project)**
  - **Web service based group awareness plugin extends this to provide visual indication of other users' actions when collaboratively editing (Akhil Mehra MSc thesis)**
  - **Web service based CVS interface provides versioning support. Combined with visual diff tool, provides support for asynch group awareness (Akhil Mehra MSc thesis)**
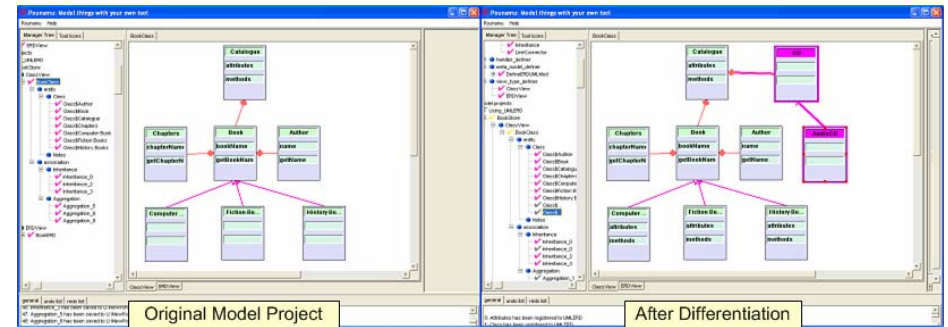
Collaboration architecture
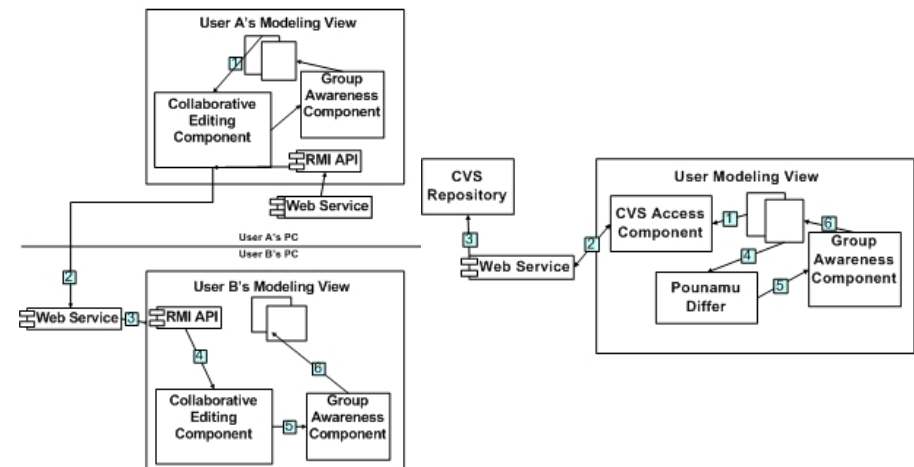
Group Awareness Example
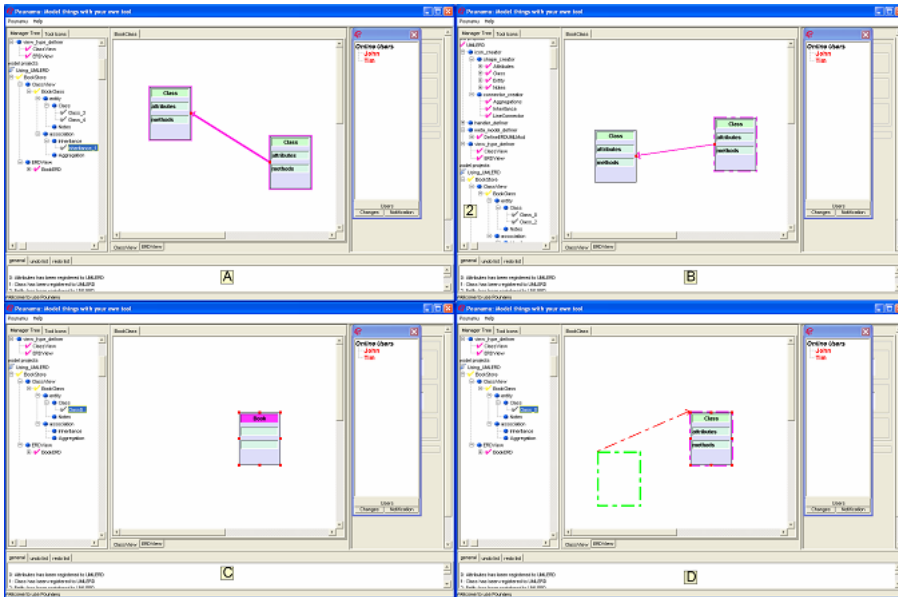
Visual Differ Example


Original Model Project   After Differentiation

Front End Improvements

- • **Problems**
  - • **Need for base set of shape primitives etc**
  - • **Need to be able to deal with large diagrams**
  - • **Numerous usability issues that are (generally) of low priority but require attention**
    - • **Eg diagram in diagram**
- • **Solutions**
  - • **Shape primitives (Xiaomin Tian Project)**
  - • **Zoomable User Interfaces (Karen Liu summer project)**
  - • **LIDS pen based interface (building on Qi Chen's MSc thesis)**
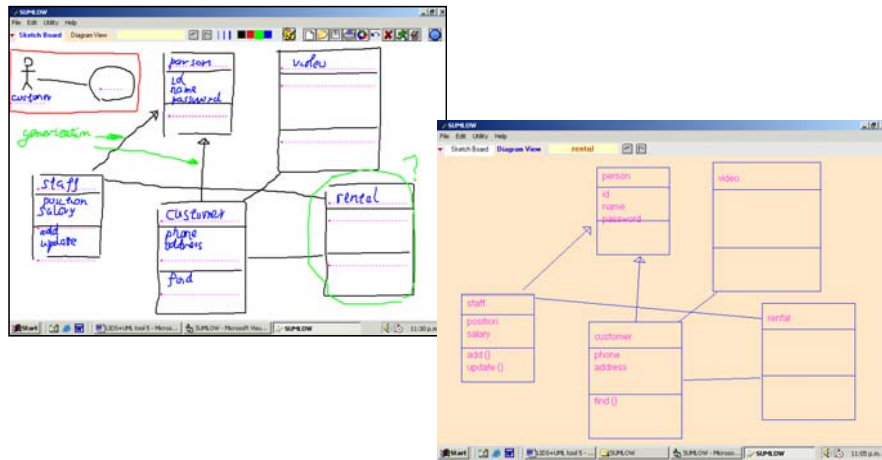 - • **On going list of "things to do" (Nianping Zhu, project students, current/future)**

ZUIs
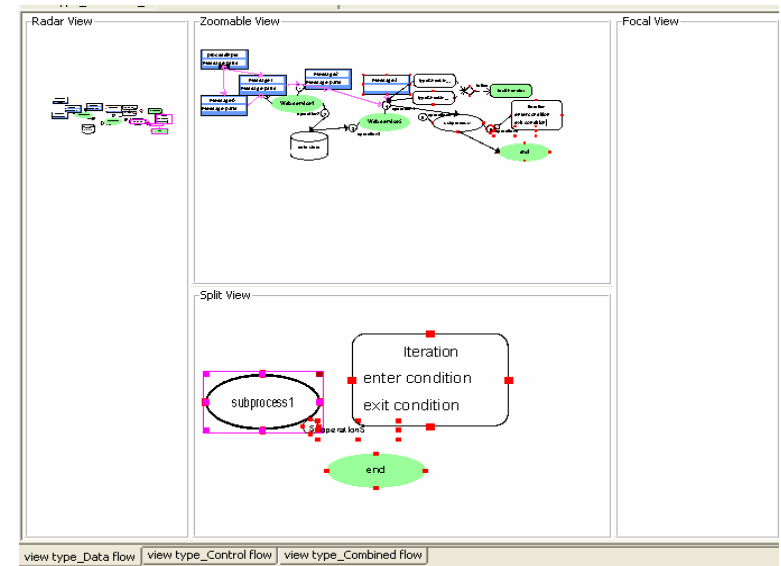
Sketch interface

Summary

- Pounamu is an evolving tool that has itself been developed out of earlier tool projects (MViews, JViews)

- Very much a research prototype to provide proof of concept implementation of research ideas
  - However, now developed to a level of semi-robustness
  - Third year of use in 732!

- Plenty of scope to undertake projects/theses developing or applying Pounamu