# CSC 2231

# Project: Application Level Speculative Processing through VM Forking.

## Progress report 2

Francesco Iorio

Alex Tessier

Our current status is that we now have 2 machines setup and configured with Xen and SnowFlock. Various API schemes have been designed and investigated. We have set up a minimal Debian VM based on the same kernel as our Xen+SnowFlock guests, 2.6.26, for application development work.

An event driven, GUI test application based on Qt 4.7 and ImageMagick has been created and is now working which performs various types of image processing. The application is designed to be able to work effectively on the target SF guests. As a result, all support for hardware graphics acceleration are disabled. The ImageMagick library has been custom built and configured to be only single threaded and with no OpenMP support.

We have implemented a C++ based API and integrated it into the test app. We are currently in the process of extending SnowFlock to provide the application level/fork join on top of VM clone. The current API has a test path which uses unix fork() and some basic IPC to simulate the Xen+SnowFlock VMfork facility. This test path is only meant as an interim placeholder to exercise and test the speculative execution API. The fork() based code path is temporary and is not expected to behave identically to the VMfork system currently in development.

The current API design uses an embedded speculation manager which exists inside of the application’s event loop. The manager is responsible for querying the application for possible speculations and orchestrates the execution of these speculative tasks. Speculation logic is handled in a fork-like manner and is inserted into application logic using a startSpeculation/endSpeculation set of API calls to clearly denote speculation scope and opportunities. The manager keeps track of speculation tasks and uniquely identifies them using a specially formulated signature.

Coding is being managed within a perforce repository on a shared server. Application development VMs are being run through Oracle’s VirtualBox on individual workstations and laptops.