

## ACRC Case Study: Calculating Insider Trading Portfolio Returns

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### Overview

Stock trading profits made by corporate executives and directors (‘insiders’) have long interested investors, stock market regulators and academics. To have a better understanding of the magnitudes of the profits and their sources, ever richer datasets are analysed. Adriana and Piotr from the School of Economics, Finance and Management are in the vanguard of exploration of international data spanning more than 20 national stock markets over 15 years with over 175,000 recorded transactions. The analysis involves matching daily share prices against reported insider trades and tracking portfolios of transactions and their returns over time. Faced with many months of number crunching on her desktop computer, Adriana approached the ACRC to see if her calculations could be accelerated using the University's supercomputer—BlueCrystal.



Daily returns were calculated for portfolios of shares built by tracking insider trades.

### Intelligent Consultation and Requirements Analysis

Adriana and Piotr were using some well known business analytics software and in principle this could have been deployed on the supercomputer. However, after an initial investigation, it became apparent that the bottleneck was due to a barrage of file system operations. In this situation, a move to BlueCrystal would offer little or no benefit.

### Solutions

Instead of naively installing more software on BlueCrystal, colleagues from the ACRC and zone A worked together to install a RAM disk on Adriana's desktop. This facility offers much faster file system access and gave Adriana a 5x speed-up for her work. This was a significant improvement, but more time savings could be made. Working with Adriana and Piotr, Gethin strived to understand the problem at hand and was able to recreate the appropriate calculations using an optimised Python script. Using this script, calculations that previously took several hours could now be completed in only a few seconds—a **speed-up of several orders of magnitude**.

#### Technical Highlights

- An informed requirements consultation highlighting the true bottleneck in a workflow.
- Flexible support able to offer both generic hardware and bespoke software solutions.

Adriana and Piotr are submitting their findings to an international journal. *“The interesting questions evolve around changing stock market regulations and their impact on different groups of insiders and different types of firms. The speed-up in calculations made exploring a number of individual questions possible. We will work with Gethin for future studies.”*