



Autonomic Management of User-centric Cloud Services for Smart Cities

Data61 funded PhD Scholarship at Swinburne University, Melbourne, Australia

A PhD scholarship is available for carrying out PhD research in a new project on **Autonomic Management of User-centric Cloud Services for Smart Cities** funded by Data61 (CSIRO's Digital Productivity flagship and NICTA merge) jointly supervised by the Data61 and www.SmartCloudBroker.com team at Intelligent Agent Technology Group & Smart Energy Management Research at Swinburne University of Technology.

The project aims to create an innovative user-centric solution for autonomic management of quality-assured cloud service provision in a diverse and dynamic multi-cloud environment based on the dynamic resource requirements of cloud-based IoT applications for Smart Cities. Specifically, the project aims at developing a novel cloud management framework and the associated mechanisms for proactive identification, prevention and mediation of CSLA violation in the best interest of the consumers of the cloud-based IoT applications. The project will focus on the use case scenario of Smart Campus involving distributed multi-sensor monitoring and management of energy in university buildings.

The following activities are envisaged within the scope of the project:

- **Literature review, specification of the case study scenario/s and definition of relevant QoCS/CSLA parameters.** A detailed case study scenario for Smart Campus will be defined with the relevant QoCS/CSLA parameters based on data/QoCS requirements scoped from the existing Building Energy Management Systems (BEMS) at Swinburne University.
- **Design of framework for autonomic management of dynamic cloud resources.** A novel conceptual framework for user-centric adaptive quality-assured cloud resource provision will be designed. This framework will provide the foundation for the subsequent development of the management mechanisms and the prototype implementation.
- **Development of quality-assurance mechanisms for the adaptive management of resource provision.** New mechanisms will be devised for the proactive identification and detection of CSLA violation. Then new mechanisms will be developed for adaptive quality assurance involving automated prevention and mediation of CSLA violation. It includes/involves automatic updates to auto-scaling rules in case of QoCS degradation to prevent future CSLA violations, automatic migration to a new location or a new provider in case of CSLA violation or changed QoCS requirements, and opportunistic migration to new provider locations when more competitive offerings become available.
- **Implementation of Autonomic Management System of User-centric Cloud Services and Evaluation and Validation using the Smart Campus Scenario.** A proof-of-concept prototype will be implemented for the proposed framework and the associated mechanisms for the autonomic management of the user-centric cloud services for validation and demonstration. The implemented prototype will be used to validate the proposed management framework and mechanisms against the use case scenario of Smart Campus i.e. smart energy management in campus buildings.

Eligibility Criteria

- A prospective candidate must have completed at least four years (or equivalent) of tertiary education studies in computer science, software engineering or related disciplines at a high level of achievement
- The candidate should have strong expertise in distributed systems, virtualization and cloud computing. Good communication and writing skills. Excellent analytical and programming skills

Value

- Annual stipend \$26,288 (indexed and tax-free) for three years (with possible 6 month extension)
- Tuition fees scholarship for up to four years
- Relocation and thesis allowance

Applications close: 30 November 2015

How to Apply

To express your interest in this project, please send your resume and academic transcripts to Prof. Ryszard Kowalczyk rkowalczyk@swin.edu.au or Assoc. Prof. Quoc Bao Vo bvo@swin.edu.au