Modelling and Verification of Wireless Mesh Network Routing Protocols

(Research Internship Offer in Computer Science/Engineering)

Background

Wireless Mesh Networks (WMNs) are a promising technology that is currently being used in a wide range of application areas, including Public Safety, Transportation, Mining, etc. Typically, these networks do not have a central component (router), but each node in the network acts as an independent router, regardless of whether it is connected to another node or not. They allow reconfiguration around broken or blocked paths by "hopping" from node to node until the destination is reached. Unfortunately, the performance of current systems often does not live up to the expectations of end users in terms of performance and reliability, as well as ease of deployment and management.

Research Question and Tasks

Routing protocol specifications are usually written in plain English. Often this yields ambiguities, inaccuracies or even contradictions. Moreover no formal guarantees can be given based on such a description. The use of Formal Methods such as process algebra avoids these problems, leading not only to a precise description of protocols, but also allowing formal reasoning.

The project's work will be in this area. It can include the modelling of a protocol and the verification of its fundamental properties. Since we are also aiming for tool-support, the generation of tools for (semi)automatic reasoning is of high interest.

General Information

NICTA (National ICT Australia) is Australia's Information and Communications Technology (ICT) Centre of Excellence. It is an independent company in the business of research, commercialisation and research training. With over 700 people, NICTA is the largest organisation in Australia dedicated to ICT research.

The internship is integrated in *Concurrency and Protocol Verification* (`http://ssrg.nicta.com.au/projects/concurrency/home.pml`), a highly motivated group with different backgrounds (e.g., formal methods and network engineers), working at different institutes (UNSW, NICTA, UQ, and Macquarie University). The successful applicant will work together with Prof. Rob van Glabbeek and Dr. Peter Höfner.

Sydney is the largest and most populous city in Australia. It is located on Australia's south-east coast of the Tasman Sea. With an approximate population of 4.5 million in the Sydney metropolitan area the city is the largest in Oceania. Sydney also ranks among the top 10 most liveable cities in the world according to Mercer Human Resource Consulting and The Economist.

Unfortunately, NICTA, as the host institute, cannot offer further financial scholarships.

Contact Information

If you have any questions concerning the internship, please do not hesitate to contact us:

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