

An Indian-Australian research partnership

**Project Title:** **A software-defined testbed for real time network simulation**

**Project Number** **IMURA0482(a)**

**Monash Main Supervisor**

(Name, Email Id, Phone)

Emanuele Viterbo  
emanuele.viterbo@monash.edu

*Full name, Email*

**Monash Co-supervisor(s)**

(Name, Email Id, Phone)

**Monash Department:**

ECSE

**IITB Main Supervisor**

(Name, Email Id, Phone)

Nikhil Karamchandani, [nikhilk@ee.iitb.ac.in](mailto:nikhilk@ee.iitb.ac.in),  
+91-22-25769419

*Full name, Email*

**IITB Co-supervisor(s)**

(Name, Email Id, Phone)

D Manjunath

**IITB Department:**

EE

## Research Academy Themes:

**Highlight which of the Academy's Theme(s) this project will address?**

*(Feel free to nominate more than one. For more information, see [www.iitbmonash.org](http://www.iitbmonash.org))*

1. **Advanced computational engineering, simulation and manufacture**
2. Infrastructure Engineering
3. Clean Energy
4. Water
5. Nanotechnology
6. Biotechnology and Stem Cell Research

## The research problem

This project addresses the challenge of investigating large network architectures in realistic settings before the actual deployment, targeting for example large-scale storage centers or videoconferencing services.

## Project aims

The aim is to design a multi-step integrated approach that combines the flexibility of simulation with the realism of a testbed, using emulation as an intermediate step. The core task will be the creation of an interpreter capable of translating selected elements of the simulations (e.g., topologies, queue management at switches) into a running emulation of network elements and, further, into a network of real OpenFlow switches

## Expected outcomes

The project will develop a tool to test routing/queuing policies and network topologies using a combined

simulation-emulation-testbed approach that leverages the flexibility of software-defined networking. It envisions the role of the simulator as essentially a tool that rapidly enables the setup of traffic sources and the creation of complex topologies, in addition to providing the collection of end-to-end statistics and metrics at a later stage.

### **How will the project address the Goals of the above Themes?**

*Describe how the project will address the goals of one or more of the 6 Themes listed above.*

The project will be carried out in synergy between IITB and the Software Defined Telecommunications Lab in ECSE Dept. at Monash.

The tool designed by this project will enable to accurately predict the performance of complex networks under fully realistic traffic sources and novel protocol strategies. This approach will bring the design phase very close to the final deployment phase and can provide enormous savings to both network designers and end-users during the development of new network architectures.

### **Capabilities and Degrees Required**

*List the ideal set of capabilities that a student should have for this project. Feel free to be as specific or as general as you like. These capabilities will be input into the online application form and students who opt for this project will be required to show that they can demonstrate these capabilities.*

Experience in:

Network simulation

Openflow switches

Linux (Raspberry PI)