

## **SERC'S ONFIG PROGRAM GENERATES PROMISING RESEARCH RESULTS FOR INDUSTRY TO EXPLOIT**

Can you imagine data communication speeds of up to 40 gigabits per second running on integrated dynamically reconfigurable optical Ethernet networks which are capable of allowing an organisation to backup their data in a fraction of the time, more reliably and more cost effectively?

This is one of the potential scenarios that is envisaged by investigators of the Optical Network Focused Interest Group (ONFIG) Phase II, who will be presenting their work at the 2<sup>nd</sup> ONFIG Program Wide Forum (PWF) on 2 February 2007. Organised by the Science & Engineering Research Council (SERC) of the Agency of Science, Technology and Research (A\*STAR), it will be held at the Institute for Infocomm Research (I<sup>2</sup>R) and comprise a half-day seminar, demonstration of the technologies presented and a poster session.

The investigators of the eight ONFIG II projects will showcase their significant achievements to industry partners, who will be able to utilise these technologies in turn-key solutions they may be proposing for the Infocomm Development Authority of Singapore's (iDA) Next Generation National Broadband Network.

ONFIG Program Director, Professor Lye Kin Mun, said, "This forum will bring the program one step closer towards the transfer of technologies from test-beds in the laboratories into a real environment - SERC's new physical sciences and engineering hub, Fusionopolis, which will be ready next year."

Significant achievements to be showcased at the forum include:

- a. Quantum dots – an innovation that is centred on the realisation of new semi-conductor compounds that could be used to create these nano-sized particles which can be incorporated into lasers for highly efficient data transmission using light, rather than today's conventional metal wiring. Scientifically, it has been estimated that such miniaturised optical technology, using quantum dots, could produce data transmission speeds up to 40 gigabits per second.
- b. Development of 2.5-Gbps continuous-mode/burst-mode ICs. Four types of ICs – Laser Diode Driver (LDD), Trans-Impedance Amplifier (TIA), Limiting Amplifier (LA) and Clock and Data Recovery (CDR) – suitable for 2.5-Gbps continuous-mode operation and three ICs (LDD, TIA and CDR) for burst-mode have been developed.
- c. Development of TO-can/SFF optical modules. Two types of optical packages – Transmitter Optical Sub Assembly (TOSA) and Receiver Optical Sub Assembly (ROSA) – have been developed using low cost TO-can packaging and passive alignment.
- d. Development of transceiver module. Burst-mode ICs and optical packages will be integrated on an organic substrate to realize a functional 2.5-Gbps burst-mode transceiver.
- e. Convergence of optical and wireless (including current and future) services on a low-cost fiber-based next generation, high-speed multi-services wireless network.

- f. SAN-based backup system – a service that runs on the 'state-of-the-art' ONFIG II network that potentially allows an organisation to backup their data at a fraction of the time taken by conventional tape-based backup utilities. This is done more reliably and more cost effectively in, literally, a period more than 100 times shorter.
- g. A simple bandwidth reservation protocol, based on the RSVP protocol, has been developed to allow the system to offer effective and flexible bandwidth guarantee to end users, when the latest Virtual Bridged LAN (VLAN) technology is used for traffic engineering purposes.
- h. iOPEN – possibly the first of its kind, an integrated dynamically reconfigurable optical Ethernet network architecture which is capable of extending Ethernet transport services from local area networks to metro-area networks.
- i. WDM-PON test-bed – a Wavelength Division Multiplexed Passive Optical Network research test-bed capable of demonstrating novel technologies for performance improvement, data increase and network cost reduction.
- j. Progress made in the development of microelectromechanical systems (MEMS) including a tunable laser and a newly designed variable optical attenuator (VOA).

Professor Chong Tow Chong, Executive Director of SERC and the forum's Guest of Honour, said, "The ONFIG program has demonstrated that close collaboration between A\*STAR's research institutes, Singapore's institutions of higher learning and other national agencies has given rise to several outstanding research achievements. This synergy will be further enhanced in Fusionopolis where close proximity of industry partners and ample test-bedding opportunities will help to plant Singapore firmly on the global scientific map."

## **About ONFIG**

The Optical Network Focused Interest Group (ONFIG) was initiated by the A\*STAR's Science and Engineering Research Council (SERC) in April 2001 to work on strategic areas related to optical access technology. It brings together competencies in photonics, electronics and software available in the various research institutes and universities in Singapore.

## **ONFIG Phase I & II**

Projects under ONFIG Phase I facilitated the development of technology required for the wide deployment of optical access network technology to individuals, homes and businesses. The know-how generated from ONFIG Phase I provided the foundation necessary for the next stage - ONFIG Phase II - which will involve the transfer of the test-bed from the laboratory into a real environment, with greater emphasis on systems and architectures. This concept will be realized at our new facility, Fusionopolis.

## **Test-bedding Facilities at Fusionopolis**

The Fusionlight Test-bed, hosted at Fusionopolis, based on a multiple test-bedding concept aims to:

- a. have flexibility and configurability
- b. have multiple, interconnected sub-test-beds
- c. showcase futuristic and state-of-the-art technology
- d. anchor industry-research partnerships
- e. become a digital living lab where occupants may live, work and play

## **ONFIG II MEMBERS**

The key members of ONFIG II are:

### ***A\*STAR Research Institutes***

- Data Storage Institute (DSI)
- Institute for Infocomm Research (I<sup>2</sup>R)
- Institute of Microelectronics (IME)
- Singapore Institute of Manufacturing Technology (SIMTech)

### ***Institutes of Higher Learning***

- Department of Electrical and Computer Engineering, National University of Singapore (NUS-ECE)
- School of Electrical and Electronic Engineering, Nanyang Technological University (NTU-EEE)

### ***Other National Agencies***

- Economic Development Board (EDB)
- Infocomm Development Authority of Singapore (IDA)

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