SICSA SDN Workshop - Event Report

Summary:

1. The workshop was held successfully on 19 September 2013 at the Informatics Forum within the School of Informatics, University of Edinburgh.
2. The event has attracted 41 attendees from both industry and academia across the UK
3. The full day event consists of six presentations, ten posters and a panel discussion.

Event Organisers:

- Dr Myungjin Lee, University of Edinburgh
- Dr Dimitrios Pezaros, University of Glasgow
- Dr Posco Tso, University of Glasgow

Workshop URL:

We have set up a webpage to promote the workshop:
http://www.dcs.gla.ac.uk/sicsasdn/home.html

Workshop Objectives:

We set ourselves two objectives for organising this SICSA SDN workshop:

- To increase the awareness of new research opportunities on software defined networking (SDN) and its applications in Scotland.
- To bring together industry and academia to discuss latest trend of SDN research and applications.

Workshop Outcome:

Funded by SICSA, the first public workshop on SDN was held on 19 September 2013 in the School of informatics, University of Edinburgh. The event was very successful with a number of valuable outcomes: First, the workshop has seen participants not only from SICSA institutions, but also from rest of the UK. Through this UK-wide meet-up we have sent away messages about Scotland's interest, potential and strength for SDN research; second, the workshop has attracted industry leaders in Networking/SDN such as Cisco, InMon, JANET(UK). This offered a good opportunity for industry to communicate their positions, needs and difficulties which gave academic participants a glimpse of real SDN research problems. Last but not least, this workshop complemented regular SCONE meetings as a platform for prompting topic-specific collaborations within SICSA's NGI theme.

Workshop Programme:

11.00 - 11.30 Welcome and Registration

11.30 - 12.30 Session 1 – SDN Infrastructures, Products and Testbeds
- Software Defined Networking and Beyond, Einar Nilsen-Nygaard, Cisco Systems
- Building a SDN testbed facility on JANET, David Salmon, JANET(UK)

12.30 - 13.30 Lunch

13.30 - 14.30 Session 2 – SDN Applications
- Exploiting SDN for Video Content Distribution, Panagiotis Georgopoulos, Lancaster University
- OpenFlow powered Software Defined Networks for Optical Layer, Tasos Vlachogiannis, University of Bristol

14.30 - 14.45 Coffee break

14.45 - 15.45 Session 3 – SDN
- Baatdaat: Exploiting path diversity in Data Centre networks, Posco Tso, University of Glasgow
- CityFlow: SDN for a City, Nick Johnson, Edinburgh Parallel Computing Centre (EPCC)

15.45 - 16.30 Poster session and networking break

16.30 - 17.15 Panel session
- Opportunities and challenges for Software-Defined Networking (SDN) research

17.15 - 17.30 Wrap-up and closing remarks

List of Speakers:

1. Software Defined Networking and Beyond
Einar Nilsen-Nygaard, CISCO (einarnn@cisco.com)

Abstract: As networks grow in complexity, traditional techniques of management are becoming less and less practical. As the importance of the network to the day to day operation of many businesses, the need for flexibility and agility in how the network and its applications are managed becomes ever more important. The challenge is how we achieve that flexibility and agility while retaining some of the key characteristics networks have today. Cisco is adopting a multi-pronged approach to this challenge.

Bio: Einar Nilsen-Nygaard is a Principal Engineer in the Network & Operating Systems Technology group of Cisco, and works out of Scotland. Today, he works primarily on the recently released onePK software development kit targeted to opening up Cisco platforms to the wider development community and on Cisco's SDN strategy. In his past he has also worked on service provider and enterprise edge access products, introducing deeper identity awareness and policy control for network administrators. Even further back, he was part of the system architecture team for Atlantech Technologies, a startup based in Scotland that built element and network management systems, which was acquired by Cisco in 2000.

2. Building a SDN testbed facility on JANET
David Salmon, JANET(David.Salmon@ja.net)

Abstract: N/A

Bio: David Salmon works with academics and research colleagues to understand their activities and the implications for the Janet network and the services it supports. This focuses on current and potential future services with an explicit research orientation such as the Janet Lightpath service for dedicated high-capacity data transmission; Janet Aurora, a dark-fibre platform for photonics and optical-systems research, and the e-Infrastructure programme.

3. Exploiting SDN for Video Content Distribution
Panagiotis Georgopoulos, Lancaster University (panos@comp.lancs.ac.uk)

Abstract: Recent years have seen the growing popularity of video streaming in best effort IP networks. In 2011, Internet video traffic accounted for 51% of all consumer Internet traffic, and High Definition content became the de facto quality level consumed by users. This talk will discuss an SDN-based solution that addresses the high strain the resource intensive video traffic is placing on the underlying network. We will present an OpenFlow-based intelligent in-network caching service that removes the need for transmitting the same Video-on-Demand content end-to-end, multiple times, over the network. Our solution aims not only to improve network utilisation, but also to provide a higher Quality of Experience for the video streaming users of a network.

Bio: Panagiotis Georgopoulos is a Research Associate (Post Doc) at the School of Computing and Communications at Lancaster University. His work in the Ofelia FP7 EU project is focused on developing an OpenFlow-based in-network caching service for Video-on-Demand traffic. He is also part of the Security Lancaster initiative, for which the University has been awarded the "Academic Centre of Excellence in Cyber Security Research" title. He holds a PhD in Computer Science and an MSc in Critical Software Engineering from Lancaster University.

4. OpenFlow powered Software Defined Networks for Optical Layer
Tasos Vlachogiannis, University of Bristol (Tasos.Vlachogiannis@bristol.ac.uk)

Abstract: Some of the main topics we intend to present/discuss in the workshop are the following:
- Extensions to Stanford proposed OpenFlow circuit specifications to add switching constrains, power equalization, impairments functionality
- Integrated OpenFlow - GMPLS solution to utilize best of both worlds
- Standalone OpenFlow approach unifying circuit - packet domains under the same SDN control plane.

5. Baatdaat: Exploiting path diversity in Data Centre networks
Posco Tso, University of Glasgow (posco.tso@glasgow.ac.uk)

Abstract: Data Center (DC) networks exhibit much more centralised characteristics than the legacy Internet, yet they are operated by similar distributed routing and control algorithms that fail to exploit topological redundancy to deliver better and more sustainable performance. Multipath protocols, for example, use node-local and heuristic

information to only exploit path diversity between shortest paths. In this talk, I will present Baatdaat, a measurement-based approach to schedule flows over both shortest and non-shortest paths based on temporal network-wide utilization.

Bio: Posco Tso is SICSA Research Fellow at the School of Computing Science, University of Glasgow. He is also a member of ENDS research group. He is currently focused on Cloud computing, Cloud Data Center (DC) network, architecture and resource management. Dr Tso received his PhD degree from City University of Hong Kong in 2011. Before joining Glasgow, he had participated in a number of Hong Kong Innovation Technology Fund (HKITF) funded mobile networking system research projects including multimedia data transmission, security system, network protocol as well as network measurement.

6. CityFlow: SDN for a City
Nick Johnson, EPCC (Nick.Johnson@ed.ac.uk)

Abstract: In this talk I will introduce CityFlow, an EU FP7 project exploring the use of SDN in managing traffic prioritization for a city of around 1 million users. I'll provide an overview of the system setup including the challenges of modelling and simulating such a system, how you test it, what we've learned and some future thoughts regarding how we might make use of emerging SDN technologies to provide varied services at scale.

Bio: Nick Johnson is an Applications Consultant at EPCC specializing in novel architectures and advanced networking. Nick graduated with a PhD in network tomography and analysis of Tor from the University of Edinburgh in 2010 before moving to Agilent Labs Scotland where he worked on near-real-time monitoring systems. He joined EPCC in January 2011 and has worked on a variety of HPC projects and is now exploring SDN.

List of Posters:

1. OpenCache: A Platform for Efficient Video Delivery;
   Matthew Broadbent (Lancaster University)

2. TinyDC: Scalable modelling of Data-Center SDN Network Infrastructures;
   Dimosthenis Pediaditakis (University of Cambridge)

3. Software Defined optical Networking (SDN) : HPN on SDN;
   Tasos Vlachogiannis (University of Bristol)

4. Measurement-Based TCP Parameter Tuning in Cloud Data Centers;
   Simon Jouet (University of Glasgow)

5. Power and Type Aware Routing Algorithm for Emergency-Response Wireless Mesh Network;
   Tawfik Al Hadhrami (University of the West of Scotland)

6. Enhancing mobile crowd-sensing for indoor space characterization (WiFi

monitoring);
Valentin Radu (University of Edinburgh)

7. Auction based spectrum management in TV White space networks;
   Saravana Manickam (University of Edinburgh)

8. Delay-Constrained Adaptive Early Drop for Real-time Video Delivery over IEEE 802.11 Wireless Networks;
   Yohaan Yoon (KAIST)

9. Fast directional handoff using Geomagnetic Sensor in Indoor WLANs;
   Sangyeop Han (KAIST)

10. Security: a killer app for SDN?
    Dongting Yu