# Philip Smith - Career Highlights



## January 2014 to date: PFS Internet Development Pty Ltd

PFS Internet Development Pty Ltd is an Australian consulting company established by Philip Smith, with the aim of supporting Internet training and network development activities around the world. The trading name of the company is BGP4ALL, indicating the company's desire to ensure that Internet network operators, especially in the developing countries, become more experienced and assertive when using the fundamental routing protocol that ensures the reliable and scalable operation of today's Internet.

Philip works with several organisations to carry out network infrastructure development, training, and best practice deployment around the world.

### Network Startup Resource Center

The Network Startup Resource Center is based at the University of Oregon, Eugene, Oregon, in the United States. Philip is and has been involved in many Internet infrastructure projects for NSRC since January 2014, including:

- Campus Network Design & Operations Workshops for LERNET (in Lao PDR), PREGINET (Philippines), KENET (Kenya), RENU (Uganda), Northern Marianas Universities & Colleges, BDREN (Bangladesh), MYREN (Malaysia), MORENET (Mozambique), GARNET (Ghana), PERN (Pakistan), DrukREN (Bhutan), and Myanmar's Universities.
- Technical assistance for many Universities and Colleges following on from the various Campus Network Design & Operations Workshops.

- BGP for NRENs Workshops for ASREN and Ubuntunet Alliance
- BGP Workshop for PhOpenIX (Philippines)
- LINX (London) and BKNIX (Bangkok) BGP Peering Workshops
- MARIIX (Marianas Islands Internet Exchange) and BKNIX (Bangkok Neutral Exchange) technical assistance
- Middle East Network Operators Group (MENOG) conferences (technical presentations and tutorials), and MENOG BGP Workshop (UAE)
- Trans-Pacific R&E network infrastructure technical assistance
- Technical assistance for IDREN (Indonesia) and for LEARN (Sri Lanka)
- Bhutan Network Operators Group (btNOG) conferences (teaching IPv6, BGP and Campus Design workshops, technical presentations)
- Launch of Rwanda NOG and teaching Routing Workshop, plus technical assistance for RWEDNET (Rwanda's R&E network) and RINEX (Rwanda's Internet Exchange)
- APRICOT Summit, teaching BGP and Campus Workshops (Japan, Auckland, Vietnam, Nepal, Korea)
- The specification, technical design, implementation and deployment, as well as ongoing operation of DrukREN, the Bhutanese Research & Education Network
- Mongolian IXP Workshop, IXP best practices design and implementation, in partnership with Netnod and the Mongolian CRC
- Technical assistance for ERDEMNET (Mongolia)
- Pacific Network Operators Group (PacNOG) conferences teaching variations of Routing, BGP and IXP/Peering Workshops (Solomons, Samoa, Fiji)
- Samoa IXP Workshop as part of PacNOG, and technical assistance to implement the IXP infrastructure
- AfNOG 2014 in Djibouti (teaching Advanced Routing)
- Southern African Network Operators Group conferences (Johannesburg & Swaziland)

**APNIC**

APNIC is the Regional Internet Registry for the Asia Pacific region, based in Brisbane, Australia. Philip has been involved in the following activities for APNIC since January 2014:

- BGP Workshops for BDNOG (Bangladesh), APNIC conferences (Australia, Indonesia) and btNOG (Bhutan)
- IPv6, IXP & BGP Tutorials for SANOG (Sri Lanka & India)
- IPv6 Deployment Workshops for New Caledonia Internet community, SANOG (Bangladesh, Bhutan) & APNIC conferences (Taiwan, New Caledonia)
- IPv6 Technical Training & IPv6 Deployment Roadmaps in partnership with ITU-D (Thailand, Lao PDR, Mongolia, Cambodia, Tonga)
- IPv6 Workshops in partnership with CNNIC (Chengdu & Beijing)

**ITU-D**

Philip has been involved in the following activities for ITU-D since January 2014:

- IPv6 Technical Training & IPv6 Deployment Roadmaps in partnership with APNIC (Thailand, Lao PDR, Mongolia, Cambodia, Tonga)
- Traffic Engineering and Advanced Wireless Network Planning in partnership with PITA (Fiji)

**Internet Society**

Philip has been involved in the following activities for ISOC since January 2014:

- Internet Exchange Point design and implementation training in Papua New Guineau for PNG-IX with NSRC

## July 2011 to December 2013: Asia Pacific Network Information Centre (APNIC)

Director of Learning and Development for APNIC, responsible for educational activities and services provided by APNIC, for APNIC Conferences, the IPv6 Programme and for APNIC's Community Grants activity.

APNIC's responsibility as one of the five Regional Internet Registries extends over the 56 economies in the Asia Pacific region. The Director's role was focused on APNIC member and general Internet operations and stakeholder community requirements.

There were four activities within the role. The first was responsibility for the APNIC Training Team, and developing the Training programme offered by APNIC to transfer industry-leading expertise in IPv6 Deployment, Internet routing, Security and DNS infrastructure via training programmes for members and for the general operations community (via the Internet Network Operations Groups). Collaboration with industry partners such as the Network Startup Resource Center (NSRC) and the other Regional Internet Registries was vital for ensuring quality of content and delivery.

The second responsibility was for APNIC's IPv6 programme. 2011-2013 was a critical time for the Internet infrastructure, with global runout of IPv4, and the requirement to transition to IPv6. APNIC provides a leadership role to decision makers in policy, business, and network operations arenas, providing technical, operational and general advice on the new protocol.

The third responsibility was for APNIC's 6 monthly member conferences. The APNIC Events Team assemble the entire event, which is primarily for member benefit, but in the last few years has taken on a greater operational focus to provide value to the entire Internet Operations Community in Asia Pacific. One event is organised in partnership with APIA, to form APRICOT.

The fourth responsibility was for APNIC's grants programme, run in conjunction with two of APNIC's partner RIRs, AfriNIC and LACNIC, and generously supported by IDRC.

The Director's role also continued many of the industry responsibilities built up during the time at Cisco, with leadership roles in the Internet operations community APIA, APRICOT, SANOG, PacNOG, MENOG, etc, as well as continuing to support the Internet operations community with training and educational activities beyond those offered by the APNIC Training Team.

## January 1998 to June 2011: Cisco Systems Inc.

Senior Consulting Engineer for Cisco Systems, working as a member of the Chief Technology Officer's Corporate Consulting Group, specialising in Internet Architectures.

The role, based in Brisbane, Australia, had responsibilities covering the entire Asia Pacific region. The position involved working with the major ISP accounts and Cisco Sales account teams in the region to

enhance existing customer ISP network services, carry out network designs, network design reviews, operational audits, and advising regarding industry best current practices. Major accounts included many of the region's major Internet Service providers, but also many national providers and start-ups as well.

The role also involved helping guide Cisco's product and software strategy according to requirements of the Internet Service Provider Industry. That included taking views, comments, and feedback, ideas for product and software features, and providing colleagues in corporate HQ with an unbiased view of needs and realistic requirements. An important part of my function has been working with IPv6 deployment planning, discussing needs with customers, the product teams in Cisco, as well as with the Regional Internet Registries and the standards bodies.

The role also had a significant training element. 40% of my time was spent travelling around the region presenting ISP Workshops from materials I had developed, combining my previous experience at WorldCom with my operational experience working with major industry providers and colleagues. These workshops have contributed significantly to the growth of the Internet in Asia, Pacific, Africa and the Middle East in recent years. In all, around 80 workshops were presented, either standalone, or with the support of major Internet Network Operations Groups. The workshops specialised in covering OSPF, ISIS, BGP and IPv6. As well as the workshops, I have provided many shorter training courses and seminars based on these key topics.

The training activities also meant extensive involvement with developing countries, and I have assisted with many connecting many countries to the Internet, including being invited to connect The Kingdom of Bhutan to the Internet to coincide with the then King's 25th anniversary in June 1999. I have supported the Bhutanese Internet through the years since, making several visits to assist development and growth of the Internet there. I've used that experience to help grow and scale the Internet provisioning in many other countries of the world.

The other element of the role comes from being a respected Internet expert. Early on it involved me taking part in the Internet standards bodies, especially the IETF meetings (where the new Internet standards are discussed, debated and developed). However, I also actively participated in the meetings of four of the five Regional Internet Registries (where I chaired APNIC's Internet Exchange Point and Routing Special Interest Groups for a number of years), as well as many of the operator forums in Australia, Asia, the United States, and Europe.

Finally, with the support of APNIC, I run a daily analysis of the Internet Routing Table, the results of which are posted to all the global operator forums. The growth of the Internet has been significant, and with the pursuit of maximum profits, fewer operators are paying good attention to the core global infrastructure. My report looks as growth and utilisation, and is widely referenced in the Internet community, providing a clear reminder to all operators about the state of the infrastructure and what their obligations are.

## February 1993 to January 1998: Worldcom Inc

Note: WorldCom was the parent company resulting from mergers of the original PIPEX with its parent Unipalm, and subsequent mergers with UUNET Technologies Inc, MFS, and WorldCom. The UK operations HQ of WorldCom was based in Cambridge. Following WorldCom folding in bankruptcy, the UUNET Internet business is now operated by Verizon. July 1996 to January 1998

Head of Network Engineering for UUNET UK and UUNET PIPEX, reporting to the Technical Director. This position had full technical responsibility for the UUNET UK network, including backbone, leased

connections, dialup networks (PIPEX DIAL and Microsoft Network UK) and included the two main operational groups in the company. Network Engineering consisted of Network Operations and Network Development – combined both teams had around 60 members of staff. Within Network Operations, there were teams to cover server systems, dialup services, and the 24-hour Network Operation Centre. The Network Development team was a smaller team, reporting to me through team leaders who were responsible for particular development areas. In particular, the leading edge technical development work wais very strong, working closely with vendors such as Cisco on technologies such as IPv6, BGP routing enhancements, and infrastructure design.

The technical responsibility included working with and advising the International Engineering team of UUNET based in the US, as well as working closely with the International Customer Support team, based in Cambridge. Technical content was strong and a necessary part of the role, and I provided advice and consultancy on all manner of technical issues within the organisation. Other responsibilities included representing the company at the UK Internet Exchange Point forums (LINX), attending IETF and RIPE meetings, providing technical advice to the management board, and driving the development of customer services in innovative and market leading directions. The position was the ultimate technical authority within the UK business, and the final point of contact in the technical escalation tree.

**April 1995 to June 1996**

Head of Network Engineering for Unipalm PIPEX, reporting to the Corporate Delivery Manager, and latterly the Product Engineering Manager. This position had full technical responsibility for the PIPEX UK Corporate network and the teams that ensure its operation. This included developing network strategy, procuring new points of presence, designing scalability into existing infrastructure (WAN and LAN), managing the network systems and network infrastructure teams (11 members), investigating and introducing new technology. Further responsibilities included liaison with PIPEX International and PIPEX DIAL technical managers over areas of mutual interest, and working with PIPEX International at expanding the infrastructure across Europe. The role has also included assisting the PIPEX International Head of Engineering in international policy and connectivity issues.

**June 1994 to April 1995**

Senior Development Engineer for PIPEX, reporting to the Technical Manager. Responsibility for developing new PIPEX services, as well as carrying out second line duties for more complex support and connectivity issues. This role included deputising for the Technical Manager on many occasions. Projects included pioneering introduction of Primary Rate ISDN and Channelised bearers to the Internet market in the UK. Also development/testing work with router vendors, primarily Cisco, the design and building of the core of the PIPEX DIAL network, development of new connection services, the installation of new PoPs, and the creation of better resilience and resource sharing on the Internet Unix servers.

**February 1993 to June 1994**

Joined PIPEX, the UK’s first commercial Internet service provider as a Support Engineer, reporting to the Network Manager. This role covered frontline customer support, installation of dialup, ISDN and leased line services, and support of the network systems such as Nameservers, News, and Mail

Relays. A considerable amount of development and project work included finalising the specification and equipment used for PIPEX Caller, Local and ISDN backup services, introducing the UK's first Internet ISDN service, and assisting in the roll out of new PoPs.

## October 1989 to January 1993: University of Aberdeen

### October 1992 to January 1993

Computer and Network Manager for the Department of Engineering: responsibility for the specification, configuration and operation of the network of PC workstations, Unix CAD systems, and departmental servers. Also managed the network connection to the University's new IP backbone, and worked with the University Computing Centre on Internet related connectivity and technology issues.

### October 1989 to September 1992

Postdoctoral Research Fellow in the Department of Engineering (the University's Physics Department was merged into Engineering following restructuring): research project in "Non-linear Signal Processing in Ultrasonics". Also carried out a lot of support and advice work for the Department's fledgling IP computer network, including its design and specification. Provided operational support when the network was running, including the network devices and the TCP/IP stacks installed on staff and research computers. Also worked with contacts in other departments and the University Computing Centre to explore the upcoming TCP/IP protocol, and how to utilise Internet access via the Universities existing JANET X.25 infrastructure.

## University Education

### 1986 to 1989

- PhD in Science, University of Aberdeen, Aberdeen, Scotland

### 1982 to 1986

- BSc (First Class Honours) in Natural Philosophy (Physics), University of Aberdeen, Aberdeen, Scotland

## Industry Responsibilities

### Internet Society Board of Trustees

- Three year term as a Trustee from July 2009 to July 2012.
- ISOC Nomination Committee from 2011 to 2013.
- ISOC Community Grants Committee from 2011 to 2013.

## APRICOT

#### Board

- Member – August 2002 to date.
- Vice-Chair of the Board – March 2003 to February 2004.
- Secretary of the Board from March 2004 to February 2009
- Chair of the Board from March 2009 to date.

#### Working Committee

- Member – August 2002 to date
- Chair from August 2002 until February 2009.

#### Fellowship Committee

- Member – August 2002 to date
- Chair from March 2015 to date

## MENOG

- Coordination Team – January 2007 to 2018
- Programme Committee – January 2007 to 2018.
- Programme Committee Chair – January 2007 to January 2011.

## PacNOG

- Coordination Team Member – April 2005 to date.

## SANOG

- Core Committee – February 2003 to date
- Programme Committee – February 2003 to date
- Programme Committee Chair - May 2016 to date

## APOPS

- Chair – January 2001 to date.

## NANOG

- Steering Committee member – July 2005 to October 2008.
- Chair of the Steering Committee – October 2007 to October 2008.

**APNIC Special Interest Groups**

- Routing SIG – Elected Chair – August 2000 to November 2011.
- IX SIG – Elected Chair – August 2001 to February 2007.

**European Operators Forum**

- Programme Committee Member – January 2001 to May 2011.

## Skills

- Internet router configuration, operation and troubleshooting. BGP4, ISIS, OSPF routing protocols. All aspects of inter-AS peering, and all the current features of BGP.
- Extensive knowledge of Internet politics, inter-provider politics, and policies.
- Internet and Wide Area Network design, including fault tolerance, scalability, and cost optimisation. Also design of customer connections to a public network, with good knowledge of packet filtering, proxies, and firewalls.
- Internet Exchange Point design, construction, management and operations, as well as the politics and business of peering.
- Experience of using Cisco and Juniper routing and switching products across commercial as well as research & education network infrastructures and end-user sites
- Collocation site design, management and implementation experience, including management of what was the UK's largest and most successful public wide area IP network.
- Considerable experience with leased circuits from 64kbps to SDH at 9.6Gbps, ISDN basic and primary rate, analogue connections from 9600bps to 56kbps. Good deployment and operational experience of Broadband networks (ADSL, Cable, Wireless). Some experience of outdated technologies such as X.25, ATM and Frame Relay.
- Thorough knowledge of Cisco router and switching products from the early 90s to products current in late 2011. Extensive involvement in beta testing of Cisco's first ISDN router, through to the introduction of Q.931 and channelised E1 products to the UK. Extensive involvement in beta testing of Cisco's first STM-1 line card for its 7000 series routers, including one of the first deployments of a commercial use STM-1 link in Europe. Beta test work for Cisco in routing protocols, and was instrumental in constructing one of the first IPv6 sites in Europe using Cisco early trial IPv6 software.
- Extensive Internet Operations troubleshooting skills, from routing protocols through to security and system services problems.
- Considerable experience in the installation and administration of Unix and Linux based systems (Sun, RedHat family, MacOSX) in LAN and WAN environments. Good knowledge of Microsoft Operating System products (Windows 95, 2000, XP, etc).
- Some knowledge of Perl and shell scripting.

I have been part of the global Internet industry more or less since the commercial industry started, developing my interest at University, and then being one of the original PIPEX team. I have built up considerable experience in creating, developing, and running such a business. Experience ranges from Customer Helpdesk, 2nd and 3rd line customer support, Customer and Network Installation Engineer, Software Engineer, Remote Hands, Network Design Engineer, Peering Coordination, Consulting, Relationships, Business and Financial planning, team structure, and people management skills.

## Affiliations

- Member of the Institute of Physics and Chartered Physicist (MInstP CPhys)
- Member of the Institution of Engineering and Technology (MIET)

## Books

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  P Smith and B Greene Cisco ISP Essentials (Cisco Press – ISBN
1-58705-041-2 – April 2002)
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