



Virtual Networks SIG 'The End of Network Architecture'

7th May 2015

Hosted and Sponsored by PA Consulting



This SIG is championed by *Philip Bridge* of *EE*, *Martin Crack* of *Amdocs* and *Dirk Trossen* of *InterDigital UK*

Venue – PA Consulting, Cambridge Technology Centre, Back Lane, Melbourn, Herts, SG8 6DP

AGENDA

13:30 Registration & Networking over Refreshments. Please note lunch is not provided

14:00 Introduction to the CW Virtual Networks SIG from **Martin Crack** of **Amdocs**

14:10 'In a virtual world, what defines an operator?'

Simon Tonks, Principal Consultant, **PA Consulting**

In the hard-wired world the answer has always been clear – they own the RAN or exchanges, they have Core nodes, and licences to operate telecom services. But as the network becomes virtual the definition becomes blurred. More parties become involved, the business model becomes more complex, and operational responsibilities become fragmented. And where is the core network anyway? If it is on a cloud system it could move from country to country in an instant. Whose jurisdiction is it under?

This presentation will explore some of the questions that should be asked by those involved in operating or governing virtual telecom networks.

14:30 Q&A

Session chaired by **Philip Bridge** of **EE**

14:35 'SDN/NFV: Is it game over for Network Hardware?'

Dimitra Simeonidou, Professor of High Performance Networks, **University of Bristol**

This talk will discuss new requirements for hardware innovation arising from current trends of "software-ising" the network. Benefits of "white box" and programmable hardware deployment will be addressed and lessons learned through the design and deployment in the "Bristol Is Open" Programmable City testbed.

14:55 Q&A

15:00 'New approaches to multi-tenant networking through software-based networks'

Dirk Trossen, Principal Engineer, **InterDigital UK**

Control in today's networks is inherently coupled to the aspect of ownership of assets, with concepts like virtual network operators only slowly relaxing this relation. Operation of 5G networks is expected to span multi-tenant and multi-owner networks in a flexible and dynamic manner, driven by new application areas like the Internet of Things, Smart Cities, Smart Transport and many others. This talk will explore such novel concepts as well as work in this space, piggybacking on the increasing software-based operation of telecom infrastructure through software-defined networking and network virtualization solutions.

15:20 Q&A

15:25 Refreshments & Networking

Session chaired by **Dirk Trossen** of **InterDigital UK**

16:00 'Evolution of OpenCache: an OpenSource Virtual Content Distribution Network (vCDN) Platform'

Daniel King, **University of Lancaster**

Operators recognise that Content Delivery Networks (CDNs) are essential for meeting user Internet application and content demands, while tightly integrating to provide request routing, content caching, load balancing. A major step towards achieving these goals is to embrace recent Software Defined Network and Network Function Virtualisation objectives and design principles. OpenCache, an experimental caching platform, includes architectural design decisions, functional components and highlights of virtualising the key processes of caching content and control functions. We provide examples of how OpenCache may be deployed to provide a vCDN infrastructure, and the benefits it can provide. We also highlight how OpenCache may evolve to integrate with recent Standards Development Organisation (SDO) initiatives.

16:20 Q&A

16:25 Panel Session with All Speakers, chaired by **Martin Crack** of **Amdocs**

16:55 **Fill in Evaluation Forms**

17:00 **Event Closes**

With the permission of the speakers, presentations will be loaded to the Cambridge Wireless website on the day following the event

Profile of Organisers

Cambridge Wireless (CW)

CW is the leading international community for companies involved in the research, development and application of wireless & mobile, internet, semiconductor and software technologies. With 400 members from major network operators and device manufacturers to innovative start-ups and universities, CW stimulates debate and collaboration, harnesses and shares knowledge, and helps to build connections between academia and industry. CW's 19 Special Interest Groups (SIGs) provide its members with a dynamic forum where they can network with their peers, track the latest technology trends and business developments and position their organisations in key market sectors. CW also organises the annual Future of Wireless International Conference and Discovering Start-ups competition along with other high-quality industry networking events and dinners. With headquarters at the heart of Cambridge, UK, CW partners with other international industry clusters and organisations to extend its reach and remain at the forefront of global developments and business opportunities. For more information, please visit www.cambridgewireless.co.uk

Profile of Host

PA Consulting

An employee-owned firm of over 2,500 people, PA Consulting work with business and governments worldwide through their offices in North America, Europe, the Nordics, the Gulf and Asia Pacific.

PA's mobile wireless capabilities include leading-edge technology consultancy in all wireless technology issues such as LTE and the emerging 5G, through to product development in areas such as chipset, software, core technology and femtocells. They have a full design, development and prototyping capability at the component, board and software level, and support a wide range of studies, investigations and analysis in the use and deployment of new wireless and communications technologies.

Clients include vendors, carriers, users and regulators and we help them to maximise the effective use of new technologies, to reach the market quickly, and to optimise the deployment of scarce resources such as spectrum and Intellectual Property. For further information please visit: www.paconsulting.com

Profiles of SIG Champions

Philip Bridge, EE

Phil Bridge has spent over three decades in the telecommunications and networking industries. He has worked in research labs, academia, start-ups, equipment vendors and service providers, in the UK and Switzerland, in technical, marketing and management roles. From 2002 he worked at Orange as a network designer and architect, and continues that role at EE since it was formed from the merger of Orange UK and T-Mobile UK. Currently he is concerned with the technical strategy for mobile data in general, and the evolution of the architecture of the mobile data core network in particular. For more information please visit www.ee.co.uk

Martin Crack, Amdocs

Martin has more than 25 years of experience of working in the Telecoms services industry providing expertise in information management, IT virtualization, transformation and data migration. He has led many initiatives for major European Operators within these disciplines and provides an all round perspective on NFV and the benefits and challenges that it presents for them. Currently he works within Amdocs OSS Division as a product manager working since early 2013 with the NFV-O initiative on Next Generation OSS.

For more information please visit www.amdocs.com

Dirk Trossen, InterDigital UK

Dirk Trossen has more than 15 years of experience in network architectures, wireless technology, and context-aware services. He has led numerous research projects in his corporate positions as well as in international collaborations with world-leading universities and institutions like MIT, Cambridge University, GeorgiaTech and Columbia University. Prior to joining InterDigital as a Principal Engineer, Dirk held a position as Senior Researcher at the Computer Laboratory of the University of Cambridge. He also held prior positions as Chief Researcher with BT Research and as Principal Scientist with Nokia Research. He is a research affiliate with the Advanced Network Architecture group at MIT CSAIL and one of the co-founders of TecVis LP.

For more information please visit www.interdigital.com

Profiles of Speakers

Simon Tonks, Principal Consultant, PA Consulting

Simon Tonks is a Principal Consultant at PA Consulting Group in the Networks and Applications team. He carries out studies of various wireless and wired telecom systems for clients in the government, commercial, transport and defence sectors. These range from feasibility studies and due diligence reports through to detailed engineering analyses. He started at PA in 1997 developing cellular base stations and terminals, and is still involved in development work in the defence sector. Prior to joining PA, Simon worked as a development engineer on PMR at Philips Telecom and on TV transmitters at Marconi Communication Systems.

For further information please visit: www.paconsulting.com

Dimitra Simeonidou, University of Bristol

Dimitra Simeonidou is a full professor of High Performance Networks at the University of Bristol and the Chief Technology Officer of Bristol Is Open. She joined Bristol in September 2012 after 15 years at the University of Essex where she established the internationally renowned High Performance Networks group (HPN). The HPN group has grown to 45 researchers and is consistently being recognised as one of the top Optical Networking groups in the world. She is a leading academic in the field of Optical Networks, a pioneer in the fields of optical Grid and Cloud Networking and a founder of Transport Software Defined Networking. She is currently involved in 16 National and EU funded research projects focusing in the fields of optical networks, Data Centre Networking, Software Defined Transport Networking and smart city infrastructures. Dimitra is in the editorial teams of leading Journals in her field and chairs committees, conferences, standardisation groups and forums in the relevant bodies. She is the author and co-author of over 400 papers in peer reviewed journals and international conferences, book chapters, several standardisation documents and patents.

For further information please visit: www.bristolisopen.com

Daniel King, Senior Researcher, Lancaster University

Daniel is a senior researcher at Lancaster University and works on a variety of European Commission and UK funded Software Defined Network (SDN) projects. With over 16 years' experience within leading technology companies, he founded Aria Networks and held key roles at Bell Labs, Cisco Systems, Redback Networks and Movaz Networks. He has an MBA and is completing his PhD at Lancaster University, researching Network Functions Virtualisation (NFV) in co-operation with British Telecom and Intel Labs.

Daniel is the co-chair of the Software Defined Networks (SDN) Research Group (SDNRG) at the Internet Research Task Force (IRTF). He is an editor and author on numerous Internet-Drafts and RFCs related to traffic engineering and network optimization, packet forwarding, Software Defined Networks (SDN), Network Functions Virtualisation (NFV), and Application-Based Network Operations (ABNO).

For further information please visit: <http://www.lancaster.ac.uk/research/>

Delegate List

| Name | Organisation | Company Profile |
|-------------------|---------------------------------|--|
| Sophie Barc | Anritsu EMEA Ltd | Test equipment manufacturer |
| Ian Bartlett | Intel Corporation | Intel Corporation |
| Ashweeni Beeharee | Satellite Applications Catapult | |
| Denis Bidinost | Nextg-com | LTE M2M Technology experts |
| Kreso Bilan | NEC | |
| Adam Branscombe | Avidity IP | European Patent and Trade Mark Attorneys |

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| James Brice | PA Consulting Group | |
| Philip Bridge | EE | |
| Kun Chen | Accenture | |
| Philip Christian | EE | Mobile Phone Company |
| Mary-Ann Claridge | Mandrel Systems | |
| Phil Claridge | JDSU UK | |
| Martin Crack | Amdocs | |
| Robert Driver | Cambridge Wireless | |
| David Duckworth | Arkessa | Arkessa enables organisations of all sizes to monitor, manage and control remote devices. Our passio |
| Claudia Duffy | Avidity IP | |
| Andrew Entwistle | New Street Research | |
| Stirling Essex | Espansivo | Helping organisations make better strategic decisions in technology, marketing and business devt. |
| Hamid Falaki | Connected Digital Economy Catapult | |
| Marko Falck | Aeroflex | Aeroflex |
| JF Fava-Verde | Innovate UK | |
| Simon Fletcher | NEC Telecom MODUS | |
| Shane Flint | Affarii Technologies | |
| Gerard Foster | Surrey University | University hosting the 5GIC |
| John Freeman | Arkessa | |
| Naran Gorasia | BBC | UK's Public Broadcaster whose primary mission is to 'inform, educate and entertain' |
| Matthew Griffin | tfl | Transport in London |
| Brian Harper | Cambridge Consultants | |
| James Henderson | Plextek Consulting | Plextek provides a range of consultancy services to commercial and government organisations |
| John House | Smallfry | |
| Bill Ives | MobileWorks | Software company developing the MaestroLIVE platform |
| Mark Jarman | Nokia | Telecommunications Equipment Vendor |
| Babis Kalatzis | Cobham | |
| Kit Kilgour | ip.access Ltd | ip.access is the leading provider of 2G, 3G and LTE small cell systems, with over 1M cells deployed |
| Daniel King | University of Lancaster | |
| Tony Lavender | Plum Consulting | |
| Behrooz Lessani | VisionTel Consulting | |
| Zhuoqun Li | PA Consulting Group | |
| Charles Macfarlane | Macfarlane Consulting | Consultancy for mobile and middleware technologies while touching network solutions |
| Allan MacLean | Amdeo | User driven innovation |
| Katie Matthews | AsiaInfo | |
| Ray McConnell | Blu Wireless Technology | Blu Wireless Technology |
| Davood Molkdar | InterConnect Communications | |
| Rajkumar Paulraj | Aricent | |

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|---------------------|-------------------------------|--|
| Tim Phipps | Cambridge Consultants | Leading product design and consultancy |
| Derek Pirie | BT | |
| Sebastian Robitzsch | InterDigital Europe | |
| Stuart Ryan | BluWireless Technology | BluWireless Technology |
| Nihal Samaraweera | Airwave Solutions | Airwave leads the world in delivering mission critical communications |
| Simon Saunders | Real Wireless | |
| Mauro Scagnol | CSR | |
| Mohamed Sha | AsialInfo | |
| Paul Sharma | CSR | |
| Dimitra Simeonidou | Bristol University | |
| Stephen Skipp | Plextek Consulting | |
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| Howard Thomas | JDSU Arieso | Mobile radio network performance analysis and optimization based geolocated call data. |
| Peter Thompson | Predictable Network Solutions | Data Network Performance Engineering |
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