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## Professional Experience

### *Big Switch Networks*

2011–*current*
*Mt. View, CA*

- **Solutions Architect**
  Was the principal solutions architect for *next–generation* Software Defined Network (SDN) applications within Big Switch Networks. Advocated for a platform approach to SDN controller architecture, and delivered a number of capabilities, such as routing integration, network access control, and traffic engineering for large enterprise and carrier customers, and potential customers. Able to drive proof–of–concept solutions with little or no development resources to advance Big Switch's position within potential customers. Led in developing carrier solutions for Big Switch. Substantial efforts in working with both hardware and software partners to extend the state of the industry in SDN. Represented Big Switch, and SDN concepts in the IETF and other standards bodies.

# Professional Experience (continued)

## *Telstra*

2009–2011
*Melbourne, Australia*

- **Director of Cross–Domain Architecture**
  Created a new centralized architecture team to coordinate and deliver a set of end–to–end architectures for Telstra's services and infrastructure with a three year horizon. Specific deliverables included breaking down duplication in various engineering and IT silos, leveraging Telstra's significant investment in a recently conclued *transformation* project, and preparing Telstra for competition from *over–the–top'* providers in a world where Telstra would no longer control the access network.[1]

  - Took multiple hosting and *cloud* projects that were languishing in various silos and delivered a common scale–out compute and storage architecture (still under evolution) that will serve all of internal (enterprise IT), service (host services that Telstra sells), and external (IaaS/PaaS) requirements. First instantiation delivered by an XDA (cross–domain architecture) lead effort in six months.
  - Delivered an *any–service on any–network* architecture model that went beyond *wireline/wireless convergence* to *wireline/wireless irrelevance*.
  - Delivered an architecture plan to coalese all internal networks into one cohesive enterprise network, simplifying the security and deployment model, while increasing robustness.
  - Delivered a new, Ethernet–centric switching fabric model which will radically reduce the cost of bit–carridge across the core of Telstra's network, as well as provide an interconnection fabric for the scale–out computing and storage model discussed earlier.
  - Evaluated the multiple SOA busses deployed or under development at Telstra and delivered a comprehensive archtiecture for a common SOA/Service Delivery Framework that will, over time, abstract the OSS/BSS complexity in Telstra's infrastructure from the service creation process.
  - Started an effort to rationalize and formalize the software engineering practice at Telstra.
  - Started a project to develop a meta–data rich, mineable knowledge capture and management system, which would make design, engineering, and architecture artifacts actually relavent and useful.
  - Introduced a concept of architecture, engineering design, and operations being an iterative *vs.* waterfall process.

[1] The Australian Government is driving a carrier neutral access network called the National Broadband Network, otherwise known as *NBN*.

# Professional Experience (continued)

## *WovenSystems*

2007–2008
*Santa Clara, California*

- **Systems Architect, *Network Heretic***
  Developed a distributed router architecture based on the existing WovenSystems Ethernet switching fabric. Also provided system–level architectural guidance on existing products. Woven Systems ceased operations in late 2008.

  — Collected requirements from internal and external sources.

  — Drafted a complete architecture that leveraged the existing WovenSystems Ethernet switching fabric, merchant switching silicon, FOSS routing protocols, and a third–party XML–based management platform.

  — Designed a data–path that controlled flooding across an Ethernet network for broadcast traffic by heavy utilization of multicast infrastructure.

  — Designed a control–plane protocol that would scale to 1000's of nodes while guaranteeing atomic operation at the level, reduce the amount of duplicated traffic, and handle both large start–up events as well as normal operational traffic loads.

  — Drove feature requirements into Ethernet switching silicon vendors as well as third–party software vendors and ODM hardware manufacturers to enable said router architecture.

  — Did initial design work on a second generation data–path using standard encapsulation techniques to isolate internal fabric traffic from external (customer) traffic.

  — Evaluated existing platform issues as they related to existing base infrastructure (such as kernel and third–party control–plane code).

  — Proposed a high–level architecture to decouple internal control plane protocol processing from external control plane protocol processing, and possibly replace the internal control plane protocols with a more tailored solution.

# Professional Experience (continued)

## *Alcatel–Lucent*

2006–2007
*Shanghai, China*

- **Chief Solutions Architect, Asia Pacific CTO's Office**
  Developed architectural solutions for Alcatel–Lucent's network transformation offerings; consult with leading customers on architectural requirements; develop multi–product solutions, including identification and development with third–party partners. Technologies involved include wireline, wireless, and application space.

  — Developed a set of packet core network architectures to challenge existing industry practice and products. Papers have been published internally, and externally (pending).

  — Executive engagement with CTM to design next–generation packet network for Macau.

  — Provided a flexible *AS–neutral* MPLS core architecture to TNZI (Telecom New Zealand International) for their unified international core.

  — Consulted with the Vietnamese *Ministry of Posts and Telecommunications* on rural broadband projects.

  — Developed a positioning statement for the APAC region for Ethernet platforms between overlapping products from the Optical and IP product divisions.

  — Led the technical product roadmap training workstream in APAC for the Alcatel–Lucent merger activities as well as contributing to the product roadmap — customer variance planning.

2004–2006
*Shanghai, China*

- **Asia Pacific CTO, IP and Data Product Division**
  Developed IP/MPLS/Ethernet talent in the APAC region; improved Alcatel's perception as an IP vendor in the APAC customer base; developed IP/MPLS/Ethernet architectures for key customers; drove Alcatel solutions, such as VPLS, into the APAC region.

  — Led consulting discussions with China Telecom on the CN2 project at the CTO and provincial levels, primarily focusing on metro technologies. Led to significant wins for Alcatel and the acceptance of VPLS as a metro architecture in China.

  — Consulted with TNZ on all aspects of their transformation to a single, converged, IP/MPLS core network.

  — Consulted with Telstra on IP transformation, and IP/MPLS network design concepts, leading to the original architectures for the Telstra network transformation project, a multi–B€ win for Alcatel.

  — Consulted with Telekom Malaysia on IP network design, leading to wins for Alcatel in the IP services space.

  — Headed network architecture workshops with CAT, TOT, CamGSM, KT, NTT, Chunghwa, and IndoSat.

  — Evaluated multiple network architectures for the Singapore IDA FTTH network. Assisted Alcatel's partners in preparing responses to the IDA.

  Also responsible for business development and support operations in the Australasia sub–region for the IP division. Recruited a full–time managing director for that role.

# Professional Experience (continued)

2003–2004
*US & Canada*

- **Principal Network Consulting Engineer**
  Key member of a team established to bring carrier IP expertise to Alcatel North America, in particular, but also to the wider Alcatel community. Provided internal training to Alcatel sales force and SE's on carrier IP networks. Improved Alcatel's visibility in the IP standards and operations community (namely IETF and NANOG). Met with a number of key Alcatel NA customers on the topics of network convergence and IP/MPLS architectures, including MCI, Telus, Verizon, and AOL.

## *Cable & Wireless*

2000–2003
*US based, UK and EU*

- **Chief Architect, Cable & Wireless Global Networks**
  Responsible for next–generation technology and architecture for C&W's global network. Developed, identified, and validated new technologies and vendors to meet the evolving requirements of C&W and its customers (increased capabilities and services at an ever reducing cost basis). Directed a team of five architects covering all layer two and three technologies, as well as some application space. Areas included IP/MPLS, ATM/FR, Ethernet, Optical, VoIP, and CDN.
  - — Drove the C&W IP backbone from an Internet only, ATM infrastructure based on STM-4 links to a 7 PB/week multi-service IP/MPLS backbone running on OC-192/STM-64 links.
  - — Converged C&W layer 2 services (such as ATM & FR) onto the MPLS backbone.
  - — Designed a *multi–service plane* concept that allowed for multiple disjunct IP networks (*e.g.* for voice or layer 3 VPN) to share the same MPLS substrate *without* fate sharing the control plane.
  - — Key driver of the PWE3 work in the IETF and brokered a deal in the IETF and ITU-T for ATMoMPLS.

1999–2000
*US based, UK, EU, AP*

- **Lead Engineer, Cable & Wireless International IP Network Expansion**
  Responsible for expanding the ex-iMCI network (AS 3561) from a US–centric network to a global infrastructure. Expanded from 23 to 47 routing PoPs, and over 1000 routers. Developed the architecture to be the first tier–1 backbone to span the globe with a single AS. Deployed the first POS routes on AS 3561 (vs. classic IPoATM).

## *US Antarctic Research Program*

1996–1999
*deployed Antarctica, NZ, US*

- **Network Engineer**
  Deployed to Antarctica for 19 months, responsible for all data communications for all US research stations in Antarctica. Links included intra–base LAN/MAN, satellite, 802.11, and HF circuits. Responsible for all *baseline* services such as DNS, DHCP, E–Mail, file transfer, *etc.* Supported NASA in evaluating high–bandwidth store–and–forward capabilities on TDRSS, later to be used for the ISS. While providing on–going support for installed facilities, designed a new architecture to move the program from a mixed LAN and protocol environment to a unified Ethernet/IP infrastructure.

## *SSDS*

1994–1996
*US*

- **Lead, Security Practice**
  Developed the commercial network and server security practice. Responsible for twenty–five engineers spread over ten offices. The practice delivered security consulting and solutions to Fortune 500 financial firms, state government agencies, and various entities of the US federal government.

# Professional Experience (continued)

1993–1994 *US*

- **Network & Systems Engineer**
  - — Delivered one of the first governmental *intranets* for a county government in California, including routed network design, DNS and addressing development, e-mail infrastructure, *etc.*
  - — Part of a team of three software engineers that delivered multiple versions of SunNet Manager and developed Cooperative Consoles (multi–host SunNet Manager).

# Industry Activities

## *IETF*

- **OPSAWG** Current co-chair of the Operations Area Working Group.
- **PWE3/L2VPN/L3VPN**
  - — Co-chaired the BOF that became the PWE3 working group.
  - — Co-authored many drafts in this area of IETF activity.
  - — Coordinated IETF and ITU-T activity for ATM over PWE3 encapsulation.
- **Traffic Engineering Working Group** Authored a draft on IP traffic engineering principles and trade-offs using carrier experience (Cable & Wireless) at the request of the working group chair. Covered layer 2 vs. layer 3 options and on-line vs. off-line calculations.
- **NOMCOM** Served on the NOMCOM for the 2004–2005 year. This committee selects the leadership of the IETF.
- **Other working groups and activities** Active in many security area and some routing area working groups. Starting work with the Routing Area Director on a solution to BGP security issues.
  Hosted two IETF's (chaired Cable & Wireless's hosting, and assisted with Alcatel's hosting). Have participated on the infrastructure team for most IETF's since the 47th meeting.

## *Other Activities*

- **ITU–T**
  Active in the ITU–T when ITU was discussing ATM and MPLS interworking. Was instrumental in brokering a deal between Alcatel/Nortel and Cisco/Lucent/Laurel on ATM over MPLS encapsulation. Before getting involved the standardization activity in this space had stalled for one year in both the ITU and the IETF.
- **NANOG**
  Active in NANOG since 1999. Have presented invited talks on traffic engineering in large carrier networks in past meetings.
- **Cable Labs**
  Active in the Cable Labs SDN working group
- **Isocore Steering Commmittee**
  Represented C&W on the Isocore carrier's committee. Co-Chair of MPLS 2012's Software Defined Networking Track.
- **Open Networking Foundation**
  Active on multiple ONF working groups
- **Invited Talks/Presentations**
  Have presented invited talks and presentations on large scale IP network architectures, network convergence, traffic engineering, MPLS network design, and PWE (see IETF section – this is the IETF terminology for ATM/FR/Ethernet/TDM over IP/MPLS) technologies. These have been given at ONS 2011, MPLS 200$x$, MPLS World Congress, NANOG, PITA (Pacific Islands Telecommunications Association) Supercom, Networld + InterOp, OIF, IEC conferences, and ITU TelecomWorld 2006, as well as other similar venues.
  While at Cable & Wireless, was asked by US Government agencies, and other carriers to come and present on Cable & Wireless's convergence strategies.

# Competencies

## *Technologies*

- **Packet Networking**
  Conversant with all aspects of packet network design and implementation, including protocol selection and optimization (BGP, IS-IS, OSPF, LDP, RSVP, MPLS, PNNI, etc.), traffic engineering mechanisms, topological considerations, resilience planning, equipment selection, performance modeling, and scalability planning.
- **Transport Networking**
  Familiar with most issues around transport networking, including SDH/SONET, DWDM, CWDM, amplification, ring vs. mesh architectures, the role of GMPLS in the transport network, and packet-ring/RPR technologies. Also experienced with issues surrounding CEM over packet.
- **VoIP & IPTV**
  Versed in the much of the VoIP and IPTV space including multicast design issues, SIP, MegaCO, MGCP, SS7 signaling gateways, RTP network dynamics, DRM, and similar issues.
- ***Cloud* Architectures**
  Have developed a scale–out archtiecture for compute and storage that is distributable (from highly centralized deployments, distributed (*i.e.* exchange–based) deployments, to CPE deployments that continue to behave as one scale–out, multi–tenant, fabric. This includes IP networks as interconnect, live image migration, distributed storage, point–of–use image replication, *etc.*
- **Structured knowledge capture/management**
  Have developed a model for creating design and architecture artifacts in a colaborative method that allows for those artifacts to be *mashed–up* and re–used and also drive tools like dependency graphs for architectures on an as–needed basis.
- **Applications & Services**
  Significant experience with complex Unix environments, and their design. Familiar with multiple mechanisms to provide inter-server resilience including ANYCAST, high availability clustering, SAN/NAS/scale-out storage infrastructures, and state mirroring/summarization.

## *Equipment Vendor*

- **Product / Systems Architecture**
  Successfully designed a non–orthodox L2/L3 platform using primarily COTS and FOSS technologies while making use of specific capabilities of the underlying system. Designed the data–path as well as control–path transport and intra–system protocols.
  Capable of evaluating a complete system for architectural coherence and un–necessary complexity. Practiced at arguing against the NIH (*Not Invented Here*) syndrome.
  Capable of distilling *complex* problem spaces into constituent single-vector problems and delivering an architecture to solve those vectors in a problem space complete way.
- **Vendor Selection and Management**
  Experience in evaluating functional blocks in an architecture for build/buy decisions, and then qualifying potential vendors if a "buy" decision makes sense. Have been principal contact with vendors to ensure project completion and that both vendor and customer are well aware of requirements and potential problem points in vendor solution.

## *Carrier Business*

- **Commercial Network Design**
  Well versed in technical business case creation, and evaluation. Have performed evaluations on both OPEX and CAPEX portions of new network business cases. Versed with the limitations in most carriers in clearly quantifying OPEX impacts of network evolutions.
  Have performed network audits to optimize CAPEX spend in a CAPEX constrained network. Optimizations have included capacity, technology selection and deployment, and reuse of existing infrastructure.
- **Carrier Customer Requirements**
  Have served as part of an executive team that met with key customers (mainly other carriers and FT 100 corporations) to discuss features and requirements.

# Competencies (continued)

## General Business Skills

- **Communications**
  Have a strong communications capability with the ability to convey complex technology issues to a wide variety of audience levels. Many presentations given to multiple communities at the same time (*e.g.* engineering, operations, and marketing) with the ability to balance the discussion to keep all parties engaged in the discussion.
  Significant experience at presenting at the C*x*O level both internally and externally. Capable of distilling technical discussions to business drivers that are relevant to executive management.
  Have undergone formal corporate spokesperson training for an FTSE 100 corporation, and a Global 1000 corporation. Have delivered product launch press breifings, acted as corporate spokseman and numerous top–tier industry conferences (such as Telecom World, Supercomm, *etc.*), spokseman for numerous press breifings, *etc.*
- **Personnel Management**
  Have managed small teams of highly technical and motivated staff. Have ensured focused product from those teams, while keeping them engaged and interested. Have created and implemented personnel development plans for direct reports and second line staff where necessary, and have also developed and delivered training programs where necessary.
  Have also developed methodologies for developing cross–department virtual teams, with the goal of breaking down existing parochial stove–pipe development behaviors.
- **Business Development**
  Key responsibilities in many assignments have included being an *external* face to present technical information to customers and potential customers in a non-biased format in order to steer project planning or requirements to a more favorable outcome.
  Have supervised a sub-regional business development and delivery group to ensure that business was being developed in a coordinated, sustainable manner. Also tracked progress against business development goals.
- **Corporate Leadership**
  Have been part of a corporate *rising star* development program in both a major carrier and major equipment vendor to develop the skills necessary for future corporate leadership roles. This included off-site work, on-site retreats, 360 reviews, and customized skill-set reviews and action plans.

# Education

## Professional

2002–2003 • **Corporate Leadership Development Program – Cable & Wireless**
A development program for identified potential tier one leaders in the three to five year time–frame. Focused on corporate governance, broader corporate visibility and managing outside of the comfort zone.

## University and Beyond

1991–1993 *Omaha, NE US* • **Creighton University**
Post-baccalaureate studies in Molecular Immunology and Computer Science. CS studies focused on Operating Systems, Networking, and Distributed Systems.

1986–1990 *Northfield, MN US* • **St. Olaf College**
Bachelor of Arts in Chemistry and Computer Science.

## Interests

- A desire to become more active in the role that commodity hardware and FOSS software can play in improving communications and networking reach in low–density, disadvantaged areas, especially in low–density and low–GDP environments. Participation in the Network Startup Resource Center and similar activities is a goal. A further extension is the use of scale–out models and edge–driven platforms that reduce the cost of entry for SP's in those economies to offer compelling, necessary services to their customers
- An interest in looking at network, exchange, and data center design from a holistic approach rather than a collection of silos in order to maximize compute, energy, space, and cooling efficiencies. Especially by exploring non–traditional approaches.
- An interest in modeling the classical OSS/BSS environment of a service provider in an object–oriented, key/value, mapReduce distributed environment.
- Outdoor activities (such as cannoning, landscape photography, bicycling, hiking, *etc.*), music and audio system design.

## References

- Michael Lawrey, Executive Director, Architecture, Online, and Media, Telstra. `Michael.Lawrey@team.telstra.com` +61.3.9634.6319
  *Please contact Mr.* L*iljenstolpe before contacting this reference.*
- Daniel Maltbie, Vice–President, Software Development, Juniper Networks, Founder and Chief Product Officer, WovenSystems. `dmaltbie@juniper.net`, +1.650.854.1906
- Jeff Thermond, CEO, WovenSystems, past executive–in–residence, Mohr Davidow Ventures. `jthermond@wovensystems.com`, +1.408.654.8100
- Vince Pizzica, Senior Executive VP, Digital Delivery, Technicolor, past CTO & CMO for Asia–Pacific & EMEA Alcatel–Lucent. `vince.pizzica@tecnicolor.com`
- Jeffrey Young, Senior Analyst Burton Group, past VP, Global Engineering, Cable & Wireless. `young@jsyoung.net`, +1.571.277.8286
- Charlie Hutchison, Director of Service Integrity & Support, The Royal Mail Group, past CIO of Cable & Wireless and Chairman of Gemini Cable PLC. `charlie.hutchison@royal.com`, +44.7788.917.120
- Phil Green, Chairman, Cable & Wireless International, Caribbean. *Details being revised*
- James Johnson, Kabul Area Manager, TAC-SWACAA IT&T Systems, past IT & Communications capture team lead, USAP contract bid, IT&T, past director of IT & Communications, USAP contractor. `mahatma@freemasonic.org`, +1.719.637.7571