Business Contribution and History

Dr. Sidney L. Bryson

Alcatel Lucent

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## Function, Products and Expertise

**Job Position**: Principal R&D Architect Wireless CTO

**Activity Domain**: Strategy, Research & Development

**Technical Function**:

* Chief Technical Analyst
* Architecture Engineering
* System Engineering

**Fields of Expertise**:

* LTE (Expert)
* CDMA 2000/3G Data and Voice (Expert)
* Machine Learning (High)
* GPRS/UMTS (High)
* Call Processing Design (Expert)
* Carrier Grade VoIP (High)
* Wireline Signaling (SS7/SIGTRAN) (High)
* Distributed Load Balancing Design (High)
* IP Based Protocols (L2/L3) (High)
* Operating Systems (UNIX/Linux/Solaris) (High)
* AGILE Development (Medium)
* Rhapsody Model Driven Engineering (High)
* CMMI/TL90000 (High)
* Network Planning (High)
* QoS (High)
* Simulations (High)
* Python (High)
* Hadoop (Medium)
* MySQL (Medium)
* Java (Low)
* Open Source Applications (High)
* Wireless Access (High)

## Short Biography

**Short Biography**:

Dr. Sidney L. Bryson is a Distinguished Member of Technical Staff at Alcatel-Lucent where he has worked for the past 17 years currently serving as a Principal Architect in the wireless division in Naperville, IL. Dr. Bryson finished East Rome High School, graduated with a BSEE from Tuskegee University in Electrical Engineering, graduated with an MSEE from Purdue University and was the first ever Ph.D in Electrical Engineering at North Carolina A&T State University.

At Alcatel-Lucent, Dr. Bryson creates network software and hardware system architectures to deliver new capabilities for wireless data networks. Dr. Bryson is currently designing and delivering the wireless data networks that help the iPhone™ and DROID™ wireless devices provide next generation services. Dr. Bryson is a member of the Alcatel-Lucent Technical Academy and a Distinguished Member of Technical staff recognizing his technical contributions by peers and judges. Dr. Bryson has served and worked as a teacher, lecturer, tutor, and consultant for a wide variety of areas including but not limited to engineering, technology, recruitment, and basic computer skills. Dr. Bryson has a passion for computers, enjoys fishing, golfing, media, arts, travel and networking. Dr. Bryson has been a partner at Living Water Community Church since 2007 and is currently active in KidzQuest sound and video area as a producer and technician. Dr. Bryson is a native of Rome, Georgia has two children Jared (17) and Kevin (16). Dr. Bryson has one brother Dr. L. Sebastian Bryson of Lexington, KY and mom Claudette S. Bryson of Rome, GA.

Dr. Bryson’s personal brand is impossible situations are achievable through perseverance and faith in God.

## Career Description

**Career Description**:

2012-Present Principal Wireless Chief Technical Office.

* Developing Technical Strategy for wireless operators with an emphasis on LTE network deployment and multi-carrier solution architecture.

2008-2012 Solutions Specification Architect, Wireless Solutions Department.   
• Modeled and Designed architecture for distributed load balancing algorithm with 2x load improvement and fault tolerant processor overload protection with a robust per node protection mechanism.

2004-2008 CDMA Architect, Wireless Architecture Department.   
• Designed architecture for multi-carrier allocation per active user over High Rate Packet Data (HRPD or 1xEV-DO) system. Innovation allows 3x bandwidth improvement over current 3G architecture  
• Designed architecture for HRDP Radio Network Controller (RNC) Groups creating a 64x virtual expansion of the coverage area on a single logical RNC.

• Patent on “Method and apparatus for providing QoS level in broadband communications systems”  
• Designed architecture for commercial VoIP over HRPD network.  
2000-2004 UMTS/GSM Architect, Wireless Architecture Department  
• Defined SS7 and SIGTRAN architecture and product evolution for Serving GPRS Service Node (SGSN) for UMTS packet networks.  
• Defined distributed call processing algorithms and architecture for UMTS packet network. Developed expertise in IP and ATM and protocol inter-working   
• Authoring SS7/IP SIGTRAN based network strategies for the converged wireless signaling network.   
• Patent on “Portable Wireless Gateway” and “Mobile Facsimile Communications” applications.  
1999-2000 System Engineering, 7R/E System Engineering Department.   
• Defined internal and external system-level requirements for IP Telephony and IP Telephony services.   
• Team leader of 7R/E IP Telephone projects including vendor management and technical specifications, standards based interface work (H.323, SIP), and OAM&P issues.   
• Developed architecture for services based on wireline video streaming applications.  
• Patent on “IP Packet Access Gateway.”  
  
1998 Adjunct Faculty, North Carolina A&T State University, Greensboro, NC.   
• Served as adjunct professor and member of the Machine Intelligence and Power Associated Research Laboratory.   
• Published “Artificial Potential Field-Based Planning/Navigation…” in Journal of Simulation v. 71.3  
1995 Engineer, MicroDyne Systems Incorporated, Greensboro, NC.   
• Worked with the Adept Technologies real-time vision system on manufacturing related computer vision projects.   
  
1994 Researcher, Sandia National Labs, Albuquerque, NM.   
• Research in the area of object recognition for automatic learning systems developing an application that could identify mechanical parts from any angle on a conveyor belt.   
• Published "Appearance Based Pose Estimation". In Symposium on Research for Future Supersonic and Hypersonic Vehicles. Volume 1.

## Technical Achievements

**Summary of Technical Achievements**:

In 2015, I used big data analytic techniques including portable and scalable Liinux container techniques to develop a virtual computing environment that quickly extracts meaningful data patterns from very large mobile generated data sets. The virtualization techniques saves more than $10K in estimated high performance server cost by allowing the tool development to be done on off the shelf personal computers. The techniques led to being able to take 3rd party drive test data and create new insights and inferences from multi-variate data sets. The results have allowed our teams to pinpoint network issues and generate root cause identification of issues leading to network improvement. The techniques also allow limited resources to be focused on prioritized issues discovered through the data inference steps that yield the highest return on improvement user experience and performance.

In 2015, I’m developing strategies to improve implementation of inter-frequency load balancing algorithms to help operators achieve 30%-40% performance efficiency gains in the LTE systems. My contributions are to take more than 50 independent parameters from independent features creating a framework to help increase the user experience and efficiency of the network. I show customers how to understand the complex and large number of parameters in a way that achieves goals of increasing the overall user experience. I help to propose an innovative combination of network parameters to assess a users overall experience while in both 3G and 4G networks as well as recommendations to optimize the users time in 4G networks.

In 2012 I modeled and designed a system that allows a wireless system to dynamically balance mobiles forward link or downlink (access network to mobile) access sector to increase carrier loading capacity and improve user throughput. I am the lead design architect for a multi-feature multi-year project. The designs will lead to a 20% gain in user utilization in heavily loaded sectors and potentially a 40%-50% gain in some users experience in a balanced sector. The achievement allows ALU to keep pace generate additional revenue with the highest performance offerings in eHRPD/HRPD systems.

In 2010, I developed and modeled algorithms for distributed load balancing within an existing multi processor platform. I was instrumental in creating and selecting the optimal algorithm based on Monte-Carlo simulations and automated tools used to simulate the system performance. I created custom simulations and models to uniquely allow actual field data as input to drive algorithm modeling and predict system performance to less than 3% error margin. I incorporated state of the art modeling tools based on IBM’s Rhapsody™ to generate data models, sequence flows, and activity diagrams reducing specification cycles by 50% and design errors observed into the field deployment to record lows (less than .1% release CRs). The resulting innovation was a wide scale deployment across multiple operators on average increasing available performance of the system by more than 30%.

**Technology Transfer and New Solution Incubation**

In 2011 I integrated 3GPP2 based sector load balancing technology into the ALU eHRPD/HRPD wireless system. My unique contribution was adapting a centralized architecture into ALU’s distributed architecture to achieve optimal performance gains for customer carrier equipage.

In 2010 I integrated 3GPP2 mult-link multi-flow technology enhancements into ALU’s eHRPD/HRPD wireless system. My unique contribution was developing UML based use cases to improvement a 3x mobile user capacity handover by 50%. Developed algorithms and admission control for assigning multiple bandwidth frequency units simultaneously to each active user in 1xEV-DO. The design solved the problem of finding and combining an equal number of sectors from multiple frequency units based on a mobile's signal strength report. This achievement allows ALU to provide a three times the 3GPP Rev. A bandwidth capacity increase per subscriber using the existing 1xEV-DO network equipment.

In 2009 I contributed to a solution that would dynamically adapt a wireless data dormancy timer to improve carrier capacity. The improvement promises at least 10% improvement in processor utilization and is currently being incubated for delivery.

**Product/Quality Improvements and Innovations**:

In 2010 I introduced at least six new overload control improvement design units for data traffic processors in the ALU eHRPD/HRPD system to provide an increase in reliability for data explosion (> 50% traffic increase per quarter) scenarios.

**Process Changes and Best Practices**:

In 2009 to present I’ve contributed interface, behavior, and call flow process change of Model Driven Engineering and UML based specification and design by building common reusable models for HRPD RNC architecture.

**Customer Focus**:

**Awards and Representation in External Organizations**:

Distinguished Member of Technical Staff Award in May 2010 while contributing in the CDMA/Solutions HRPD organization.

20+ years experience and affiliation with external organizations which helps provide ALU representation into key standards organizations as well as insights into leading innovative practice is directly related industries for ALU businesses.

IEEE Member 21 Years

Member of Location Bases Services Group, M2M Communications Group (LinkedIn)

**Patents & Technology Licensing**:

Awarded:

“Apparatus For Providing Quality Of Service Level In Broadband   
Communications Systems” Patent number 7652990

This patent leverages intellectual property for ALU across access technologies to provide differential services for customers.  
“IP Packet Access Gateway” Patent number 7068598

This patent provides the basis of interfacing circuit switch access technologies with IP based technologies which is fundamental to bridging ALU’s legacy and future business in wireline access.  
“Portable Wireless Gateway” Patent number 7346025

This patent provides intellectual property for ALU in personal WiFi access with broadband wireless backhaul and represents a huge potential in royalty revenue for ALU.

**Pioneering of New Approaches or Tools:**

In 2014 I created a data syndication solution using Linux containers and machine learning techniques to predict wireless hotspots from network data and geotagged social media data for congestion detection. The innovation allows operators to determine the optimized locations to increase cell density or to add spectrum capacity reducing the need and expense for drive tests and site surveys.

In 2012, I developed a tool to simulate data traffic to test a 12 core processor system. The tool saved more than 100K in testing equipment and testing resources and allowed system architecture to model the delay sensitivity of the device in preparation for new feature deployment. Skills used included recompiling a Linux kernel used by the system and integrating a virtual machine data generation environment inside the single board computer.

In 2011, I am the lead specification architect on ALU’s CDMA project teams first end-to-end AGILE project. Pioneered integrating Agile techniques into the specification process to help reduce development, test, and delivery intervals by three months to meet extremely high/critical customer demand. The introduction of an iterative requirement approach will allow ALU to avoid budget sensitive requirements changes and to absorb unknown technical changes without jeopardizing a critical customer delivery.

In 2010, I introduced model driven engineering (MDE) concepts and UML to specify the requirements and architecture of the system. By mastering UML and MDE concepts the specification to design phase is reduced by four weeks and the amount of requirements rework is reduced by two major scope change iterations or 50%. My MDE approach is also reducing the testing effort by 25% as Feature Test and Integration Test are given scenario driven requirements as complete test cases. My contribution utilizes these approaches in 85% to 95% of the specification deliveries to development and test organizations ahead of the typical 50% delivery of UML by my peers.

In 2010, I designed and delivered a unified reusable common model tool to describe the key architecture of the eHRPD/HRPD RNC. My contributions were to design a tool to reverse engineer the existing code based to extract key interface descriptions and data for design level exposure. This tool helps ALU to reduce future design effort by at least 25% and to improve maintainability and duplicate interface creation by at lest 10%.

**New Solution Definition:**

In 2009, 2010 and 2011 I have contributed to a series of solutions to enhance total eHRPD/HRPD system processing capability by configuring a series of ALU supported features all of which I was the lead design architect. The solutions allow the support teams to reduce/manage an explosion of data usage for wireless devices within existing hardware equipment extending the capacity of the system by six months before exhaustion.

**Technical Sales Support:**

In 2010 I supported at least seven customer sales markets and teams in investigating processor overload, network configuration, and eHRPD/HRPD system configuration issues.

I was given an award by the Sprint Customer team in response to my technical contributions and solutions for their eHRPD/HRPD network architecture. This work resulted in a 700 million contract win for ALU.

**Services Excellence and Service Innovation:**

I have contributed heavily to Alcatel-Lucent’s services organizations outside of the product development team in reviewing and consulting on tools developed to trace call procedures in the 1xEV-DO RNC. One such tool is sold commercially to external customers and Sidney contributed by helping to review the viability of the tool as well as to help design internal attributes that allow data to be generated for the tool.

## Ambassador, Mentorship, Best Practitioner

**Ambassador, Mentorship, Best Practitioner**: (2500 characters maximum, white space included)

* In 2013, presented several “Deep Dives” to external customers on the technical aspects of LTE multi-carrier user management design for load balancing and congestion avoidance.
* Presenter at 2011 Professional Development Conference in Naperville IL, “Virtualization for Beginners”
* In 2010, I mentored a summer intern who under my leadership was able to develop the first ALU performance model and characterization of a twelve core Intel processor used across four different wireless projects. I used my skill to relate to people of all ages and cultures to maximize the contribution of the student and to expand both the students knowledgebase and ALU’s technical understanding of a new product.
* These activities are important as I share my contributions and skill base with other ALU colleagues.
* In 2010, A member of the Innovation Day sub group in the Indian Hill ALTA Chapter. Volunteered with “Innovation Day One” activities and contributing to ideas and goals of the Innovation sub team. The one day conference energized the entire campus and quickly led to a second conference in Sprint 2011.
* In 2009 ALTA Indian Hill Technical Presentation: HRPD (1xEV-DO) Service and Coverage Boundaries: “Stopping Illegal Border Crossing” November 2009. Extending knowledge and understanding of mobile network behavior to entire ALTA membership.
* 2008-2010 Participated as a member of the local ALTA Hotline sub group. Contributions included heavy local advertisements for use of the ALTA hotline, creating a local Subject Matter Expert use for reference, and responding or redirecting ALTA hotline questions. Result was a heavy usage of the hotline by Illinois teams and affiliated teams in India PRC.
* "1xEV-DO RNC Code Reverse Engineering Study" ALU 1st Annual UML Modeling Conference, October 2009.
* Presenter at 2006 Professional Development Conference in Naperville IL. “1xEV-DO VoIP”  
  Presenter at 2005 Lucent Technologies Professional Developers Conference in Naperville, IL. “IP Multimedia Systems Architecture: Why it matters”  
  Instructor for Network Basics at University of Phoenix on Campus in Warrenville, IL. 2005  
  Instructor for “Java Basics’ at University of Phoenix on Campus in Warrenville, IL. 2005