

## ABSOLUTE ANALYSIS: THE IMPORTANCE OF PROTOCOL TEST

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INTERVIEWEE. NIGEL BROWNLOW  
DIRECTOR OF TECHNOLOGY AND PRODUCT DEVELOPMENT  
TEL. 925 699 1512  
EMAIL. nigel.brownlow@absoluteanalysis.com  
COMPANY. ABSOLUTE ANALYSIS, INC.  
WEB. <http://www.absoluteanalysis.com/>

**Q. First of all, tell us a little bit about yourself and Absolute Analysis.**

- A. Absolute Analysis has been providing communications protocol test solutions to the industry for over 17 years. We provide a suite of tools covering protocol analysis, traffic generation, bit error rate testing, error injection, impairment testing, and performance statistics across multiple protocols. Development engineers choose our solutions for their power, flexibility, granularity, ease-of-use, and customizable database. The company is based in Southern California and has a worldwide sales force covering North America, Asia, and Europe.

I joined Absolute Analysis in 2006 and my role is to pilot new technologies and support our current product offerings. I have worked with communications protocols for over 30 years, starting with proprietary interfaces which were based on RS422 technology and ran at 300kbps, right through present day technologies like Ethernet, Fibre Channel, Serial FPDP, and Serial RapidIO that run up to 10Gbps and beyond.

*About the Interviewee.* Nigel Brownlow is director of technology and product development at Absolute Analysis. He holds a BSc in Electrical Engineering and Electronics from the University of Manchester Institute of Science and Technology, and an MBA from the Open University. Nigel has been responsible for the successful implementation of a number of international collaborative projects under the European Union ESPRIT program and has participated in several international standards activities.

**Q. Most of the readership of this Boards Guide will be focused either on purchasing a standard board or perhaps on designing their own board. That said; they might be involved in transitions to new protocols like 10GE or PCI Express. Explain to us where your products and services might come in handy here:**

- A. Whether you are designing your own board or purchasing an off the shelf unit, the ability to examine the communications interface is essential. In custom designs it is necessary to test the physical layer interfaces using tools such as a BERT. Once this is achieved and firmware is integrated, the board's response to different stimulus (both good and bad) needs to be examined using traffic generation and protocol analysis equipment. As the board evolves through the life cycle, tests are required to check performance under load conditions and system performance under error conditions.

Even when using off the shelf components there is still a need to examine the communications link to ensure there are no performance bottlenecks and the system will survive under error conditions.

**Q. Are there particular vertical industries, such as storage or mil/aero where you find most of your customers? What verticals seem to have the most need for your products?**

A. Absolute Analysis test solutions are used in a wide variety of industries such as the ones you describe. Telecommunications and the computer industry are two more examples. However, high speed communications links are found just about everywhere from fighter aircraft to automobiles and we provide the tools to capture, generate, alter, and statistically present this data to the bit level from 10Mbps to 10Gbps.

Our products and services are also very customizable. Many companies that purchase our solutions are looking for custom protocol needs or non-standard speeds.

**Q. Protocol test along with I/O often takes a back seat to selecting a boards provider based on form factors like AdvancedTCA. Is this always logical to you? Or can you make the case that a wider audience of engineers should be involved in protocol testing at an earlier stage?**

A. Yes, it is logical to select a form factor to suit the environment where the solution is going to be implemented. This does not mean that you can ignore the test requirement. Failure to do so can result in the communications link being embedded on the PCB with no test points. We have come across this situation with several customers and solutions to this type of problem can be complex and quite expensive.

**Q. In mid-May you announced a 10Gbps Ethernet protocol analyzer that employs a SFP+ (Small Form-Factor Pluggable) interface and supports the new 10GBase-LRM (Long Reach Multimode) standard. That's a mouthful! Can you break this down for us? What sorts of engineers or OEM managers will find this announcement exciting? What sorts of problems does it solve?**

A. SFP+ is the technology of the future. Although other solutions have provided a stop-gap, SFP+ has a lower cost point and provides a smaller form factor than current technology. It also provides compatibility with existing 10Gbps implementations and backward compatibility with existing SFP technology. LRM overcomes the current distance limitations of today's 10Gbps technology.

Developers and engineers working in embedded systems, storage networking, data communications, telecom, and military and aerospace should all find our new 10Gbps solutions very interesting. To be able to conduct complete analysis at 10Gbps speeds with absolutely no data loss, even as far away as 220 meters, will certainly allow companies in these markets to expand their engineering capabilities.

Providing 100% line rate traffic capture with concurrent traffic generation and statistics gathering means no data loss, and developers can actually view, manipulate, shape and even corrupt traffic at 10Gbps speeds.

**Q. 10GE is getting a lot of press these days as an industry transition. Where do you see this happening among your customers? What applications and needs are driving the earliest adopters of 10GE?**

A. The proliferation of data is of course driving 10Gbps. In the storage market the need to access information quickly and efficiently is pushing bandwidth limits. Technologies such as iSCSI will also become much more interesting with 10Gbps support. Triple Play

technology (voice, video and data) going across a single cable is creating much higher data requirements than seen previously. When these signals meet in the core of the network the necessary bandwidth must be available to respect the timing requirements of this type of traffic.

The move to Carrier Grade Ethernet technology in the telecoms industry is yet another example of a 10Gbps requirement, and there are also specialized applications such as simulation, animation, etc. where speed is king.

**Q. In your press release you mention Fiber Channel over Ethernet (FCoE) as attracting the attention of project managers and creating a need for protocol test among designers. Are there any pitfalls or issues that you can alert our audience to in this regard?**

A. FCoE provides the ability to carry both Fibre Channel and Ethernet traffic across a single network eliminating the need for multiple interfaces in certain parts of the network. Fibre Channel has timing and delivery constraints that must be respected and therefore constraints need to be placed on Ethernet to ensure that these requirements are met. Additionally, the solution requires a specific flavor of Ethernet called DCE (Data Center Ethernet) to work properly. Perhaps the most important thing to keep in mind is that FCoE is really just another protocol.

**Q. How important is it to analyze 100% of the traffic bit level --wire speed?**

A. It is very important to capture *all* of the data or there will be dropped frames. This makes it impossible to correctly diagnose a problem, as you are unsure if a response did not happen or whether the test tool missed the frame. Many commercial tools and free tools such as *Wireshark* are unable to capture 100% of the data when link speeds exceed even modest loads. We capture 100% of the data.

**Q. I see you can export traces gathered from your analyzer to *Wireshark*. Why not just use *Wireshark*?**

A. *Wireshark* simply cannot capture 100% of the data at higher speeds. *Wireshark* runs across standard network interface cards so data gathering is limited to the throughput of that type of card when used with their software. Even though the *Wireshark* viewer supports over 900 different protocol decodes, throughput is very low even at 100Mbps speeds, and it certainly cannot keep-up with 10Gbps traffic. Customers can use our tools to capture 100% of the data for whatever protocol, and then export this trace data to a *Wireshark* format for import and analysis.

*"Whether you are designing your own board or purchasing an off the shelf unit, the ability to examine the communications interface is essential." –Nigel Brownlow, Absolute Analysis, Inc.*

**Q. Thank you for this interview.**