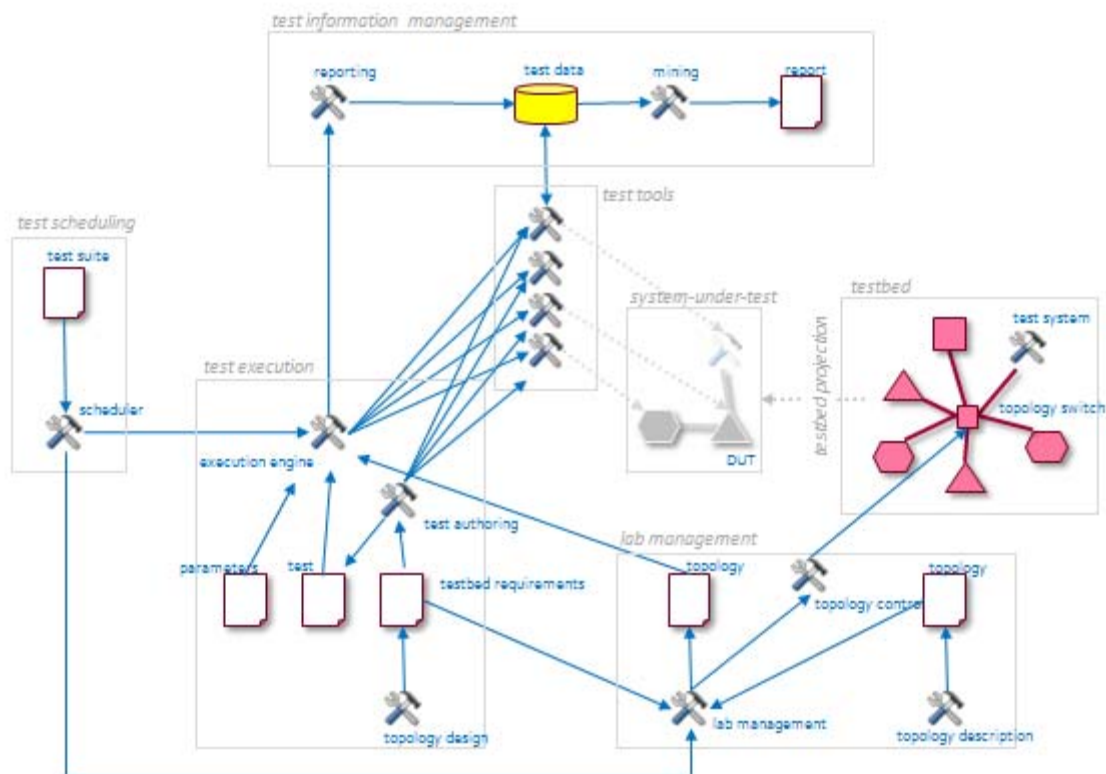




# NTAF Plugfest 1 - Test Report

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## NTAF Plugfest 1 - Test Report

Event date: October 18-22, 2010

### Report Summary

This report reviews the interoperability event that occurred on October 18<sup>th</sup> and the subsequent presentation at the NTAF Board of Directors virtual meeting on October 22<sup>nd</sup>.

The goal of the Plugfest was to implement the functionality defined by the NTAF Technical Committee and to reveal any shortcomings of the current draft standards.

### Introduction to NTAF

The Network Test Automation Forum (NTAF) was founded to develop and promote interoperability standards in the communications test community.

The NTAF charter states that:

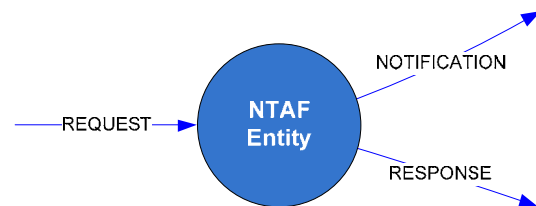
*“The goal of the Network Test Automation Forum (NTAF) is to facilitate and promote the interoperability of commercial testing tools and test infrastructure for the data communications and telecommunications industry. The organization will bring together commercial testing vendors, test equipment vendors, and other industry experts to create interoperable testing solutions for service providers, network equipment manufacturers, and other enterprise organizations with large network deployments”.*

The inaugural in-person meeting of the Technical Committee took place in Montreal in April 2010. The members defined the initial NTAF abstract reference model as seen on the cover of this report. This model formed the basis for elucidating common requirements, identifying potentially useful technologies and exploring candidate solution approaches.

From this reference model, the definition of an NTAF entity was created. This entity is defined as having the following capabilities:

- Sends/receives NTAF schema messages
- Supports the standard NTAF Request/Response model
- Provides support for standardized error handling
- May emit asynchronous notifications (events)

The decision was made to adopt [XMPP](#) as the core protocol for communication amongst NTAF entities. Hence each NTAF entity will be embodied as an XMPP node. Figure 2 provides a view of the different interfaces to the reference NATF entity.



### Interfaces:

- Activation
- Discovery/capabilities
- Actions (requests)
- Notifications
- Publication

FIGURE 1 NTAF ENTITY INTERFACES

### Why NTAF choose XMPP as its base protocol?

After exploring a range of alternatives, the Extensible Messaging and Presence Protocol (XMPP) was found to be well matched to the NTAF requirements and goals for tool inter-operability.

XMPP is very widely used today and mature in its feature content and testing. The standard comes in two parts: Core and Instant Messaging (IM).

The IETF standardized XMPP in 2002 - 2004 based on the Jabber initiatives in the late 1990's. The core RFC is 3920.

In short, XMPP defines a standard for entities find out about and communicate with one another via a network of servers. The communication is from client to server, server to server, and server to client. The



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standard addresses all of the important questions of discovery, privacy, authentication, authorization, encryption and security. The communication itself is all done as a sequence of textual XML messages (called 'stanzas') passed over a socket. Certain special messages are used for requesting information (such as presence).

XMPP can be carried over a variety of transports. But notably it supports transport over HTTP, which is in wide use today on the Internet. This greatly alleviates potential problems with access through firewalls without coming into conflict with corporate IT security policies. An essential attribute of any candidate solution!

A key driver choosing XMPP relates to the fact that almost everything in XMPP is relevant to the notion of two (or more) tools interacting with each other over a network. The fact that XMPP was originally intended for humans to do instant messaging is interesting -- it leads us to a metaphor of NTAF-compliant tools effectively acting like people chatting with each other. The notions of being *online*, *offline*, *available* or *unavailable* are also interesting to consider.

Having chosen XMPP, the Technical Committee defined goals for how it should be applied to the NTAF problem. These included:

- Leverage as much as possible from the XMPP Core and any relevant extensions
- Avoid any server-side customization

For NTAF interoperability, our goal is to avoid the need for a proprietary XMPP server implementation. Since there are many existing server implementations, including open-source and/or free ones, the aim is to enable NTAF users to adopt any standards-compliant XMPP server off the shelf.

NTAF-compliant tools will become XMPP clients -- meaning that they can register and will participate in messages, inquiries, and presence information exchange. We may take advantage of certain XMPP extensions on which to build our XMPP standards if and when they fulfill our needs. We may develop other extensions that are unique to NTAF where we cannot find a suitable existing extension. Note that each

extension may place requirements on a server, on a client, or on both. Creating new NTAF client-only extensions is likely to happen, but we will try to avoid creating new extensions that place additional requirements on the server.

## The road to NTAF Technical Specifications

A set of documents was defined to encompass the definition of all of the functionality illustrated in Figure 1.

Three are currently under development in the Technical Committee:

**NTAF-0001 Network Test Automation Interoperability Framework.** This provides an overview of NTAF, provides the reference model, common definitions and foundation requirements for interoperability amongst compliant tools.

**NTAF-0003 Tool Registration, Discovery and Activation.** Defines the mechanisms (built on top of XMPP) for compliant entities to register themselves and to discover what other NTAF entities are available within their environment. It also defines the mechanisms for awakening dormant entities (as opposed to those that are "always on") via a proxy agent.

**NTAF-0004 Tool Automation Services.** Defines the mechanisms (built on top of XMPP) by which compliant entities can provide or consume automation capabilities that can be accessed via XMPP transactions. It also defines how tools can publish information that other tools may be interested in and the generation/reception of asynchronous notifications.

This document defines the Tool Automation Harness XMPP client-side extension. An automation harness describes a set of actions that the harness provider (an NTAF entity) is capable of performing on request from a harness user (another NTAF entity). These actions are always provided in the context of an automation session. An NTAF entity may declare support for zero, one, or many automation harness capabilities. Some of these capabilities are being standardized by NTAF. Others will be vendor-specific or created by other unofficial sources. For all automation harnesses supported by an NTAF entity (whether standard or

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custom) a mechanism is required for NTAF entities to "learn" about these harnesses. For NTAF standards, there may be a formal document describing the contract, but for custom harnesses, one should be able to discover them from the providers. This document defines that mechanism.

The idea to prototype the draft specifications and test the proposed technology in the real world emerged in the Technical Committee and this led to Plugfest 1.

## Part II

### Cast and Characters

Eleven companies, seven sites, seventeen people, eight pieces of software, and fifteen possible interoperability combinations – logistical nightmare or irresistible technical challenge? This was the setting for the first NTAF Plugfest, which was held from October 18<sup>th</sup>–22<sup>nd</sup>, 2010.

Companies participating included BreakingPoint, BT, Cisco, Empirix, EXFO, Fanfare, Ixia, JDSU, Spirent, TechMahindra and Verizon, with organization and logistics provided by AMS. The seventeen company representatives either attended live in Silicon Valley, or participated remotely from Massachusetts, Texas, Virginia, Canada and Germany. To further complicate matters, the software prototypes "brought" to the event were also running on multiple machines connected across the world through VPNs, hidden behind the firewalls of companies participating in the demonstrations. To top it all off, the humans operating and witnessing the event were connected by teleconference, WebEx sessions, and Telepresence.

While taking on such a logistical challenge may seem slightly ambitious, the fact that the participating companies were able to pull it all off is a testimony to both the commitment of the participants, and the viability of the NTAF specification.

The week started off with informal technical trials, with several members meeting face-to-face at Fanfare's headquarters in Mountain View, and others dialed in remotely. Plugfest trials consisted of "connecting" combinations of NTAF implementations together in debugging sessions. All NTAF implementations are XMPP clients, acting either as an NTAF "requestor" or

"provider". Requestors spoke to providers through an XMPP server as shown in Figure 2.

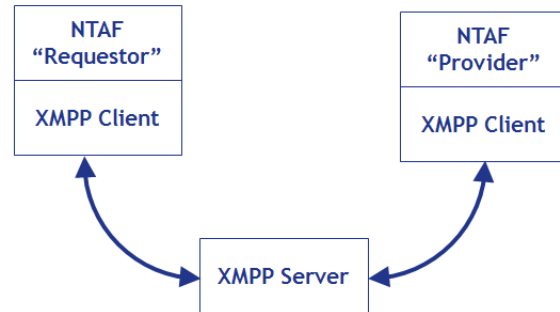


FIGURE 2 - BASIC NTAF MODEL

The XMPP server for this event was also located remotely in the cloud, hosted by Amazon, and sponsored by Spirent. The table below lists each company's software implementation:

Company	NTAF Implementation
BreakingPoint	Provider
Fanfare	Requestor, Provider
Ixia	Requestor, Provider
Spirent	Requestor, Provider
Verizon	Provider

Providers, in the case of BreakingPoint, Ixia and Spirent, means that an additional software interface, or plug-in, was created to drive existing traffic generator/protocol emulator products, namely BreakingPoint's simulator (Figure 3), Ixia's IxN2X (Figure 4), and Spirent's TestCenter (Figure 5).

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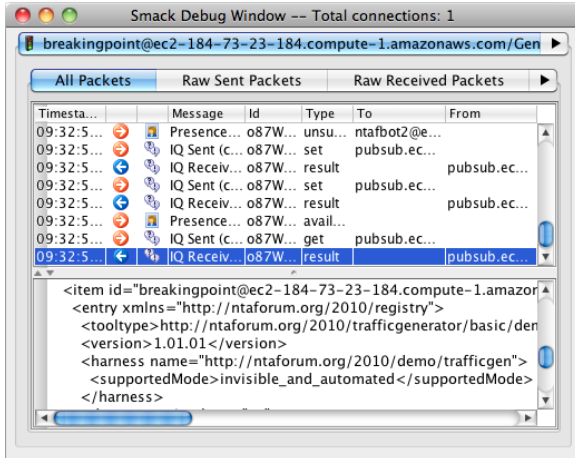


FIGURE 3 - BREAKINGPOINT NTAF PROVIDER

Fanfare provided an “NTAF toaster” which is the reference NTAF provider documented as an example in the draft specification. Fanfare also provided a traffic generator simulator.

Ixia provided another implementation of the reference toaster (Figure 6).

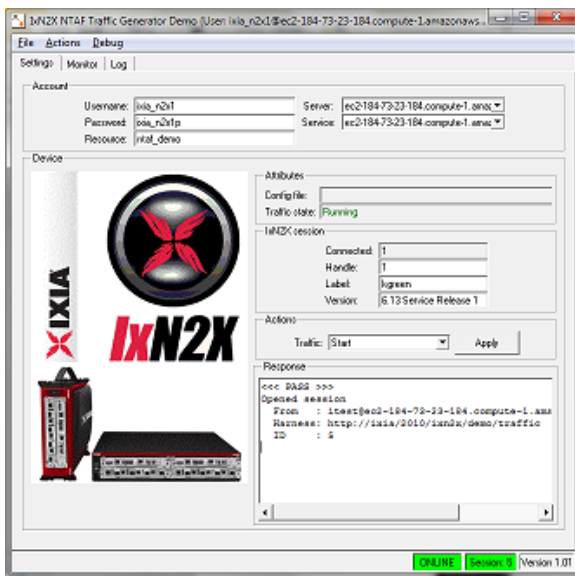


FIGURE 4 - IXIA'S IxN2X NTAF PROVIDER

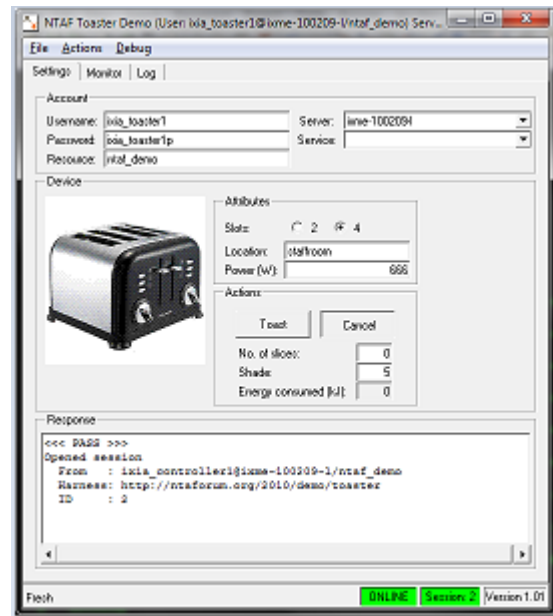


FIGURE 6 - REFERENCE NTAF TOASTER PROVIDER

Verizon, perhaps offered the most interesting twist to the event by supplying a “phone dialer” application (see Figure 7 below), which when driven, placed a telephone call on Verizon’s network and provided text-to-speech synthesis, all driven via an NTAF automation harness.

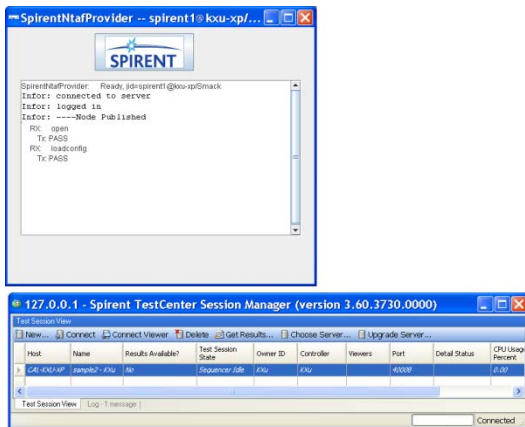


FIGURE 5 – SPIRENT’S NTAF PROVIDER & SPIRENT TESTCENTER



FIGURE 7 - VERIZON'S PHONE DIALER NTAF PROVIDER

Requestors were provided in the form of Fanfare's iTest and NTAF "Bot", Ixia's TestConductor and Spirent's NTAF Requestor, screenshots for which are shown in Figures 8, 9 and 10 below.

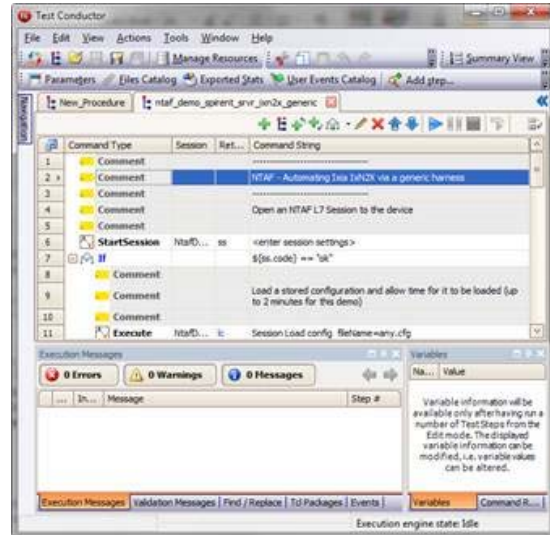


FIGURE 9 - IXIA'S TESTCONDUCTOR NTAF REQUESTOR

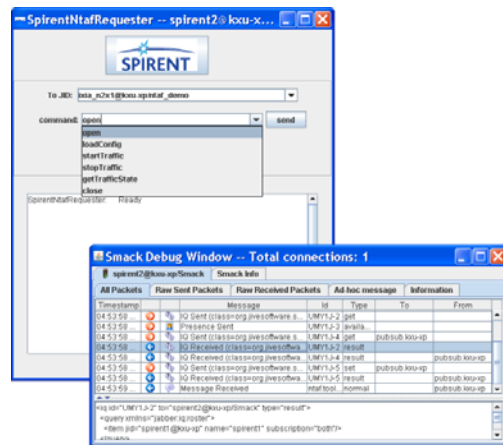


FIGURE 10 - SPIRENT'S NTAF REQUESTOR

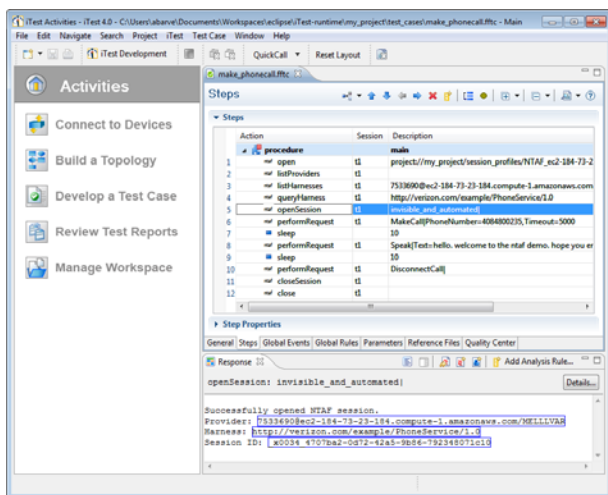


FIGURE 8 - FANFARE'S ITEST NTAF REQUESTOR



FIGURE 11 - DEBUGGING SESSIONS



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## Getting Connected

Fanfare hosted the first part of the plugfest week at its headquarters in Mountain View. Requestors and providers were displayed side-by-side on two large screens, as shown in Figure 11. Developers then ran a series of interoperability sessions, taking turns trialing various requestors with various providers. The process allowed developers to work out discrepancies in the specification and bugs in their code. Fanfare's NTAF "Bot" proved to be an invaluable tool for debugging, even allowing remote developers to participate.

## Formal Demonstrations to BoD

The week culminated in a series of demonstrations to the NTAF Board of Directors at a live meeting held at the Cisco, San Jose campus, augmented by a combination of WebEx sessions, and Telepresence videocalls – see image in Figure 12.

Three demonstrations were chosen to highlight the progress of the week:

1. Ixia and Spirent:
  - a. Ixia's TestConductor driving Spirent's NTAF Provider, which in turn drove Spirent TestCenter
  - b. Spirent's NTAF Requestor driving Ixia's NTAF Provider, which in turn drove Ixia's IxN2X.
2. Fanfare and BreakingPoint: Fanfare's iTest driving BreakingPoint Systems NTAF Requestor, which in turn drove the BreakingPoint Storm.
3. Fanfare and Verizon: Fanfare's iTest driving Verizon's phone dialer.

## In their own words

We asked each of the companies who contributed demonstrations to give their comments. Here is what they had to say.

From **BreakingPoint's** Kris Raney, Director of Software Engineering, "During the successful NTAF prototype demonstration, BreakingPoint contributed an implementation of the NTAF standard that could be embedded directly on the BreakingPoint Storm CTM enabling the product to operate seamlessly with several third-party network testing products. This initial

demonstration shows that the mission of NTAF is on track, both in terms of the technology standard, and in our approach to finalizing the standard."

From **Fanfare's** Kingston Duffie, CTO: "It was extremely gratifying to see the industry's leading test authoring and execution platform, iTest, controlling test equipment from competing vendors as well as proprietary script libraries from Verizon using the emerging NTAF framework," commented Kingston Duffie, founder and CTO of Fanfare. "The icing on the cake was the fact that the equipment and libraries were physically located in four different locations. Fanfare looks forward to helping its customers benefit from NTAF by offering commercial, agnostic implementations of these new standards as they are finalized and ratified."

From **Ixia's** Kenneth Green, Solution Architect: "The plugfest successfully demonstrated solutions from multiple vendors at several global locations discovering and interoperating with each other using cloud-based services. Ixia's NTAF-enabled TestConductor and IxN2X products demonstrated seamless interoperability with all the NTAF implementations at the plugfest. This event was a compelling illustration of key strengths of the proposed NTAF architecture."

From **Spirent's** Andrew Armstrong, senior Product Manager and Vice-President of NTAF, "Spirent successfully demonstrated both an NTAF requestor and provider at the plugfest. The Spirent NTAF Requestor was used to drive multiple test solutions, including an Ixia traffic generator, the reference NTAF toaster, and the Verizon SIP dialer. Likewise, the Spirent NTAF provider worked in conjunction with other NTAF implementations to drive Spirent TestCenter. These demonstrations are important steps to achieving interoperability across test solutions that our customers are increasingly demanding."

From **Verizon's** Brian Bonnet, Consulting Member at Verizon Labs, "We demonstrated a VoIP soft client that was controlled using an NTAF harness. The harness had basic call functionality including MakeCall, Speak and Disconnect, as well as enhanced features, such as the ability to connect to another NTAF entity which recorded the user actions."

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## What's next?

The plugfest marks an important milestone for NTAF, with real implementations based on a common specification. Nevertheless, at the time of the plugfest event (Q4 2010), the NTAF specifications continue to be works in progress. The natural goal for the NTAF technical committee is to work towards a stable and ultimately ratified version of the specifications. The end of Q1 2011 is the current target for ratifying the first set of documents.

## Reference

RFC 3920, Extensible Messaging and Presence Protocol (XMPP): Core, P. Saint-Andre, Ed., Jabber Software Foundation, October 2004

RFC 3921, Extensible Messaging and Presence Protocol (XMPP): Instant Messaging and Presence, P. Saint-Andre, Ed., Jabber Software Foundation, October 2004

## Acronym

HTTP	Hypertext Transfer Protocol
IETF	Internet Engineering Task Force
RFC	Request For Comments
IM	Instant Messaging
NTAF	Network Test Automation Forum
XMPP	Extensible Messaging and Presence Protocol
XML	Extensible Markup Language

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FIGURE 12 BOARD OF DIRECTORS MEETING – LEFT TO RIGHT: JITIN DINANI (IXIA), KRIS RANEY (BREAKINGPOINT), KENNETH GREEN (IXIA), DAVE SHEAFFER (FANFARE), KEITH KIDD (VERIZON), AMEYA BARVE (FANFARE), GORDON EDDY (EMPIRIX), KINGSTON DUFFIE (FANFARE), MADHU SUDAN NANJANAGUD (CISCO), JULIANNE FITZPATRICK (AMS), KAUSHAL AGRAWAL (CISCO), TODD LAW (SPIRENT)