



The Power of Presence™

# WHITE PAPER

Jabber, Inc. :: 1899 Wynkoop Street, Suite 600 :: Denver, CO 80202 :: P: 303.308.3231 :: F: 303.308.3219 :: E: info@jabber.com :: W: www.jabber.com

## BEYOND INSTANT MESSAGING

### Jabber XCP: Presence and Routing Engine for the Real-Time Internet

#### INTRODUCTION

Speed and agility are increasingly important elements to success in a wide variety of domains. Whether the people involved are Wall Street traders executing a transaction, war fighters in hostile territory, front-line emergency responders or health care providers saving lives, online gamers enjoying a multi-player gaming experience, or shoppers looking for a great deal, life and work move faster and faster all the time. This trend is shaped by innovation in communication technologies and continues to drive further innovation in those technologies.

One key aspect of this trend is that existing communications are migrating to the Internet Protocol (IP). Consider some examples. Voice over Internet Protocol (VoIP) is aggressively replacing the Public Switched Telephone Network (PSTN). Popular Internet syndication technologies such as Really Simple Syndication (RSS) and Atom are obsoleting older, closed news tickers. Independent editorial and musical voices are increasingly being heard via streaming Internet broadcasts and podcasts rather than on traditional radiocasts. Even television is not immune, given the recent and rapid emergence of Internet Protocol Television (IPTV) as well as web-based services such as YouTube.

The transition to Internet Protocols is also enabling the creation of completely new communication modes, such as collaborative document editing, shared whiteboarding, open application sharing, and even things like distributed musical performance. The combination of ephemeral information such as network availability, geolocation, and activity with more static data such as personal profiles, interests, and preferences enables fascinating "mash-ups" such as 1:1 marketing regardless of connection end-point, personalized pricing, and just-in-time content delivery. And given the deployment of networking capabilities to an ever-wider range of devices, these developments are not limited to person-to-person interactions but increasingly are being extended to person-to-application interfaces and to application-to-application communications.

As a result, the Internet is inexorably becoming a more dynamic, user-centric, real-time environment. Although this next-generation Internet goes by many names, the best-known being Web 2.0, for this paper we will call it the real-time Internet.

Some questions naturally arise: What are the characteristic technologies of the real-time Internet? How can enterprises, governments, service providers, and other organizations leverage those technologies to build competitive advantage in today's fast-paced world? In this white paper, we attempt to answer these questions by focusing on the capabilities of the Jabber Extensible Communications Platform (Jabber XCP).

#### THE POWER OF PRESENCE™

The pulse of the real-time Internet is presence — i.e., information about the availability of entities, end-points, and content for communication over the network. Because the half-life of information is continuously

shrinking, interaction is most productive with people, applications, and devices that are online and available right now. Thus we believe presence is the most critical catalyst for communication on the Internet today, and lays the groundwork for more advanced capabilities within the Internet tomorrow.

**Presence and Identity**

The availability information that presence provides is in fact a kind of real-time identity. The key is to distill information about multiple devices and locations into one coherent perspective on a person's availability for major communication methods such as voice, video, email, and IM. Jabber XCP provides that perspective and thus enables end users to utilize a single identifier for converged communications.

Typically, presence is tied to a specific device or resource. This is not particularly challenging, as long as a presence server can understand multiple presence formats and provide availability information through a consistent application programming interface (API) or in standardized formats. Jabber XCP supports this kind of presence handling with ease, since it can consume and generate presence data in formats such as the Extensible Messaging and Presence Protocol (XMPP), Session Initiation Protocol (SIP) for Instant Messaging and Presence Leveraging Extensions (SIMPLE), and Instant Messaging and Presence Service (IMPS).

Slightly more difficult is the management of multiple presence sources associated with the same entity. For example, the many presence-enabled devices used by any given person, which today might include a cell phone, PC soft phone, laptop or desktop instant messaging (IM) application, gaming console, and portable music player. Here the key is to aggregate these multiple presence sources into a consistent picture of the controlling entity's online availability, without necessarily hiding the identity of each resource or device. Jabber, Inc. is developing multi-protocol presence compositing or aggregating technologies to provide a central store of presence from a range of clients and devices supporting SIP and/or XMPP, allowing a single identity associated with the entity to support the multiple end-points that may represent that identity.

**BEYOND PRESENCE: IDENTITY AND CAPABILITIES**

Basic, on/off network availability is a key catalyst for communication, but it is not the only such catalyst. Already, more sophisticated information is being used to determine which people, applications, and devices an individual can interact with. This information generally falls into the categories of extended presence, real-time identity, and capabilities. Although these categories are somewhat flexible, they include data about an entity's location and direction (e.g., GPS coordinates and bearing), activity (e.g., the music being listened to, video being watched, or game being played by a person), dynamic state (e.g., a person's mood or an application's load), environment (e.g., whether it is quiet enough to field a voice call), and potential for interaction (e.g., support for voice, video, media sharing, file transfer, or collaborative editing can be dynamically determined and then shown in the user interface).

Naturally, access to such data may be more limited than data about on/off network availability, especially since aspects such as geolocation may reveal information that could compromise a person's privacy and physical security or may be of interest only to a subset of a person's communication partners (e.g., only to one's fellow gamers). For these reasons, simply overloading such information on top of basic presence is not optimal, which is why Jabber XCP provides a more sophisticated approach to extended presence through its InfoBroker technology, including fully granular access control for each data type.

**MESSAGING: BEYOND IM**

Presence is a catalyst for communication and interaction. The classic example is IM, which first came to prominence with the rise of ICQ and then AOL® Instant Messenger™ (AIM®) in the early 1990s. Because these IM services enabled you to see when your "buddies"

**Real-Time Teams**

Presence, identity, and capabilities enable the creation of real-time teams, such as the virtual incident rooms formed among first responders who participate in the CapWIN project in the Washington, D.C., area. If, say, someone threatens to jump off a bridge across the Potomac River, CapWIN administrators can quickly pull together a team with the right skills (profile information) who are nearby (geolocation) and able to participate in a text conference or voice chat (device capabilities). The result is faster response times and more efficient crisis intervention.

### Thinking Fast

XML messaging makes it easy to integrate applications in real time for increased operational efficiencies. For example, Reynolds and Reynolds, a provider of automobile dealer management systems, is using data forms transported via Jabber XCP to integrate and connect logistics, inventory, and point-of-sale information systems in near real time. Moving away from batch processing has resulted in faster data transfer, better decision-making, and higher profitability for thousands of automobile dealers throughout North America. Now that's thinking fast!

were online, they familiarized a whole generation of Internet users with the concept of presence-based communication.

The flexibility of Extensible Markup Language (XML) has made it a key format in the development of the real-time Internet. One of the earliest technologies to take advantage of XML was XMPP, often referred to as the "Jabber" protocol. Jabber/XMPP technologies provide a pure XML foundation for real-time messaging, opening up tremendous possibilities for both IM and more advanced real-time applications beyond IM.

### DATA FORMS EXCHANGE

As an example, consider the Data Forms extension defined by the Jabber Software Foundation (JSF) in XMPP Extension Protocol 0004 (XEP-0004). This XMPP extension enables entities on a Jabber network to exchange lightweight forms similar to the HyperText Markup Language (HTML) forms found on web pages across the Internet. Yet there is a crucial difference: Jabber data forms can be pushed out and submitted in real time, rather than requiring a web server to wait for a user to show up at a website. One application this enables is real-time voting and online polls, for everything from marketing feedback to classroom interaction. The participants don't even need to be people: they could be data-gathering devices, remote instruments, or networked applications that provide information about ambient conditions or internal states.

Data forms can also be used for more efficient workflow processing. Consider a scenario in which three different

people have authority to approve certain kinds of purchase orders. Traditional billing or enterprise resource planning (ERP) systems might require approval from a particular person, with the other two being "backup" approvers. A smart, presence-aware system can see that the primary approver is offline and automatically re-route the approval request to the other two approvers, resulting in faster organizational decision-making and improved time to market.

### SMART MESSAGE ROUTING

Many of the foregoing scenarios can be implemented with simple one-to-one messaging, but others require more advanced delivery semantics. Data syndication especially is best built using a one-to-many messaging model, wherein entities subscribe to a particular topic (e.g., market data) and receive an update whenever new content relevant to that topic is published. This "publish-and-subscribe" model forms the basis of Jabber XCP's InfoBroker technology formally specified in XEP-0060 published in the JSF's XEP series. InfoBroker enables fine-grained access control over publishing and subscribing as well as a payload-agnostic routing model that enables publishers to syndicate any XML data format.

Another form of smart message routing is enabled by Jabber XCP's EventBroker technology. Sophisticated content matching — based on everything from simple keywords to structured data embedded in an XML message — makes it possible to call out text of particular importance, dynamically link things like stock ticker symbols or airline ticket sales to real-time information, trigger automated answers to frequently-asked questions, invoke specialized logging and archiving options, and generate invitations for interested individuals to join a discussion. This is just one more example of the advanced communication capabilities that come standard with Jabber XCP.

### Got Structure?

Real-time communication systems need to be flexible regarding the kinds of data they can deliver, from highly unstructured (e.g., text chat, voice, and video) to semi-structured (e.g., dynamic workflow forms) to formally structured (e.g., SOAP, XML-RPC, and other XML vocabularies). With its foundation in XML routing, Jabber XCP excels at handling the full range of message structures, including signalling traffic used to establish point-to-point media flows.

### Helping the Helpers

Customers measure service by how quickly their questions are answered and their problems are solved. Jabber XCP technologies make customer service agents more efficient through just-in-time information updates. InfoBroker keeps agents apprised of best practices, provides updates on trouble tickets, and much more. EventBroker picks up on customer-agent dialogue to insert information (e.g., instructions for a common bug fix), alert a supervisor, or invoke an expert system.

### GETTING CREATIVE WITH REAL-TIME MESSAGING

The potential range of non-IM messaging applications is as wide as the range of XML formats. Emergency systems can push out critical data such as earthquake, tornado, and tsunami warnings. Centralized network management systems can update the configuration of devices at the network edge as needed to meet changing loads or online threats, as one large Internet Service Provider (ISP) currently does with its model pools for dialup customers. IPTV systems can push personalized marketing messages or real-time polls directly to the screen based on what a viewer is watching right now. A trader's financial model can be updated instantly with the latest data regarding market interest rates or company sales. Data-heavy applications in realms such as bioinformatics can receive Simple Object Access Protocol (SOAP) payloads as they are generated rather than "blocking" on a traditional web services request for calculations on a large data set. Product marketing managers can receive Really Simple Syndication (RSS) information about their competitors as it emerges on the Internet. Finally, because XML and therefore Jabber/XMPP is fully extensible, organizations can develop their own custom formats for specialized applications if one of the existing XML formats does not quite fit the bill.

### BEYOND MESSAGING: THE PROMISE OF JINGLE

The scenarios described above are still recognizable forms of messaging, even if the payloads are XML data rather than text messages. An emerging XMPP extension called Jingle takes things one step farther by making possible an even wider range of real-time applications.

Jingle is a highly modular framework for XMPP-based streaming multimedia sessions that grew out of efforts to standardize the multimedia methods first released in the Google™ Talk service. Jingle is described in XEP-0166 and several related specifications. Jingle's modularity extends in two directions. First, Jingle sessions can be carried over a growing variety of underlying transport methods including raw User Datagram Protocol (UDP) connections; Real-time Transport Protocol (RTP) communications in devices that support SIP; simple SOCKS5 bytestreams; and the Inter-Asterisk eXchange (IAX) protocol used in Asterisk, an open-source private branch exchange (PBX) project. Second, Jingle sessions can carry nearly any multimedia communications type; the first two supported modes are voice chat and video chat, but support for modes such as whiteboarding, collaborative editing, and application sharing is under development.

Although the Jingle framework is still a proposed extension to XMPP, it already provides the promise for flexible, advanced multimedia interactions over XMPP networks, and for a great deal of innovation at the edges as developers and service providers deploy applications that take advantage of Jingle's next-generation multimedia capabilities.

Jingle is not intended to supplant SIP-based voice and video technologies. Indeed, it is being developed in a standards-compliant manner for full interoperability. This will enable the tens of millions of existing Jabber/XMPP users to participate in emerging open voice and video communication networks, rather than being relegated to a walled garden. Furthermore, Jabber XCP's matchless combination of SIP and XMPP capabilities will enable seamless bridging of multimedia communications across networks and devices regardless of the underlying protocols and technologies used.

### Jingle, IMS, and You

Jabber XCP's support for routing of Jingle negotiations will enable Jingle-powered clients to seamlessly do voice and video chats with users of existing SIP-based systems. This allows operators to get to market quickly without depending on a full IMS rollout. Yet, Jabber XCP's SIP presence support also fits well into IMS infrastructures as the presence server of choice for major service providers worldwide.

### JABBER XCP: WHERE IT ALL COMES TOGETHER

Jabber XCP stands at the center of presence, messaging, and real-time application development. Its core

engine provides carrier-grade XML routing capabilities. It includes fully integrated presence awareness and the ability to aggregate availability information from multiple sources and formats. Its powerful InfoBroker technology enables targeted content delivery for any XML payload type. Its forthcoming support for Jingle will make it possible to initiate any kind of multimedia session with entities on many different networks, including SIP and Asterisk. Jabber, Inc.'s software development kits (SDKs) and technology experts ease the task of integrating these real-time capabilities into any existing application: mobile devices, softphones, set-top boxes, gaming consoles, enterprise-wide data systems, specialized hardware, and much more. Jabber XCP is truly the presence and routing engine for the emerging real-time Internet.

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