

INTEGRATING PRESENCE WITH MULTI-MEDIA COMMUNICATIONS

*The compelling value proposition of 'Presence'
for potential IP-based communications subscribers*

RUSSELL BENNETT

rbennett@dynamicsoft.com

JONATHAN ROSENBERG

jdrosen@dynamicsoft.com

dynamicsoft™.

UNLEASHING A SERVICES RENAISSANCE™

TABLE OF CONTENTS

The Objective of this White Paper	2
Abstract	2
The IP Communications Industry: Current and Future	3
Presence is an Integral Part of Enhanced Services	5
What is Needed in a Presence Protocol?	9
The Current Status of Presence Protocols	10
Why an Open Protocol is Critical	11
The Session Initiation Protocol	12
How SIP Addresses the Requirements	13
The Benefits for Service Providers	14
Providing SIP Users with Presence	15
SIP for Instant Messaging	16
dynamicsoft's Presence Strategy	16

THE OBJECTIVE OF THIS WHITE PAPER

The objective of this paper is to make the case for SIP as the basis of a future IP-based communications Presence standard.

There is currently no open standard for Presence, and certainly none that supports the whole spectrum of IP-based interactive communications (IPIC), e.g. voice, instant messaging, chat and video conferencing. We, at dynamicsoft Inc., believe that IPIC Presence is the key service enabler that will entice consumers from circuit-switched telephony to IPIC. This paper explains why we believe this to be so, and presents the case for using the Session Initiation Protocol (SIP) as the basis for Presence and IPIC.

The last section of this paper explains dynamicsoft's Presence strategy and our view of the way forward. dynamicsoft Chief Scientist, Jonathan Rosenberg, is coordinating a small team of people in creating a Presence extension to SIP which will be submitted to the IETF for consideration.

If you would like to provide input on the specification or to learn how you can support SIP for Presence as an IETF standard, please contact:

Jonathan Rosenberg
Chief Scientist
dynamicsoft Inc.
jdrosen@dynamicsoft.com

ABSTRACT

Until recently, the compelling value proposition for IP-based voice communications was toll-bypass. Despite Quality of Service (QoS) issues, people have been willing to make IP-based phone calls because it was free and it was fun. However, the cost differentials are rapidly eroding. As a result, service providers must find a new value proposition for IP communications. We believe that this value proposition comprises a range of new services that take advantage of other IP applications, such as web, email, instant messaging and most importantly, Presence. Blending these applications with voice means that a whole new set of features and communications experiences are enabled for consumers. Presence, in particular, can significantly enhance communications services for consumers. Unfortunately, despite the popularity of Presence and instant messaging systems on the Internet, there is no open standard, and insufficient support for multimedia. We believe that the Session Initiation Protocol (SIP), already an integral part of communications services on the Internet, can serve as a strong foundation for building an open, scalable, secure, multimedia-enabled Presence protocol.

THE IP COMMUNICATIONS INDUSTRY: CURRENT AND FUTURE

IP communications emerged in the late '70s as part of research efforts on voice services on the Arpanet. It then began to gain commercial acceptance in the mid-'90s as a hobbyist technology for making free phone calls. From there, consumer usage and service provider interest grew, with the one and only motivation being reduced cost compared to traditional long distance and international calls. The quality of the calls was often low, and the feature set and reliability were not on par with the telephone network. However, the cost benefits enticed consumers to dismiss these problems. Toll bypass, as it became known, continued to drive the industry forward throughout the 1990s. However, the cost benefits to the technology have been steadily eroding. At the time of writing, long distance rates in the U.S. were as low as 5 cents per minute; some mobile plans are approaching 4 cents per minute; while some high volume route (e.g. Europe) international rates are as low as low as 10 cents per minute. CLECs (Competitive Local Exchange Carrier) and others are currently rolling out partial flat rate plans. Some Canadian and Scandinavian service providers have moved to a complete flat rate structure.

This trend must also be coupled with the fact that traditional telephony, (i.e. circuit-switched telephony), has a huge penetration across the world. Mobile telephony, which has gained significant consumer acceptance (approaching ubiquity in Europe and Asia) in the last decade, is based on traditional networks and tends to be dominated by mainstream providers.

From a consumer perspective, IP-based communication is no longer cheaper; the quality and reliability are not yet on par with circuit switched telephony and landline and mobile services are widely available. This leads to the critical question for consumers:

**If IP communications services are not better, cheaper, or more available,
why purchase them?**

The answer can be found by looking to the mobile telephony market. Mobile phones are more expensive to buy and operate, the voice quality is poor, reliability is low, and features are only just coming to par with landline. Why, then, has it seen so much success? Because it brought significant added value – enough so that consumers were willing to sacrifice emulation of the landline experience for it.

We believe the same is true for IP-based interactive communications (IPIC). To be successful, IP communications must present significant new added value. What is this added value? It is the way in which other Internet applications, such as web, email, chat, Presence, Instant Messaging (IM), on-line games and e-commerce can be blended with voice to provide entirely new classes of services and features not available with circuit switched telephony. This added value is changing the way in which communications services are perceived and used – making them more like a web experience than a PSTN experience.

**IF IP COMMUNICATIONS
SERVICES ARE NOT BETTER,
CHEAPER, OR MORE
AVAILABLE, WHY
PURCHASE THEM?**

There are strong signals in the industry that validate this claim on added value. In recent years, various uses of the Internet, as expressed in the new-economy business models, have demonstrated a latent need in communications services – the need for telecommunications to expand to encompass the total spectrum of human interaction. This can be observed, for example, in the tremendous growth of ‘buddy lists’ and other Presence services on the Internet. To date, these services have been used almost exclusively to communicate on-line status in order to facilitate delivery of instant messages. However, a much broader notion of Presence, which encompasses all forms of communications, can significantly enrich the IP-based interactive communications (IPIC) experience.

That service offering will come with an open Presence standard, one which is openly embraced. Presence is the **key service enabler**: as will be described later, Presence takes the current ‘follow-me’ aspect of IP communications to the next level.

PRESENCE IS AN INTEGRAL PART OF ENHANCED SERVICES

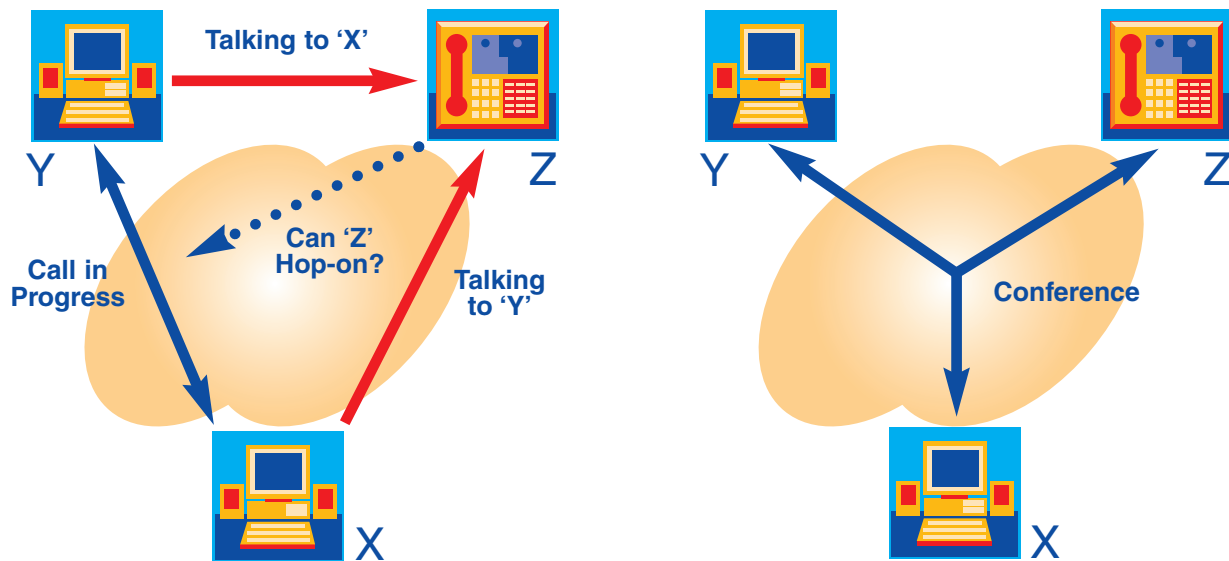
Presence has the potential to communicate not just on-line status, but also:

- **Physical location** – e.g. ‘at the office’ or ‘at home’
- **Call state** – e.g. ‘ready to accept communications’; ‘on another call’; this might even include the identity of the other party
- **Willingness to accept communication** – e.g. ‘available’, ‘in a meeting’, etc. This might depend on who is asking.
- **The preferred medium** – e.g. video, voice, IM, email, etc.

As has been discussed, the compelling value proposition for IPIC lies in new kinds of services. Many of these services are based on Presence. For example:

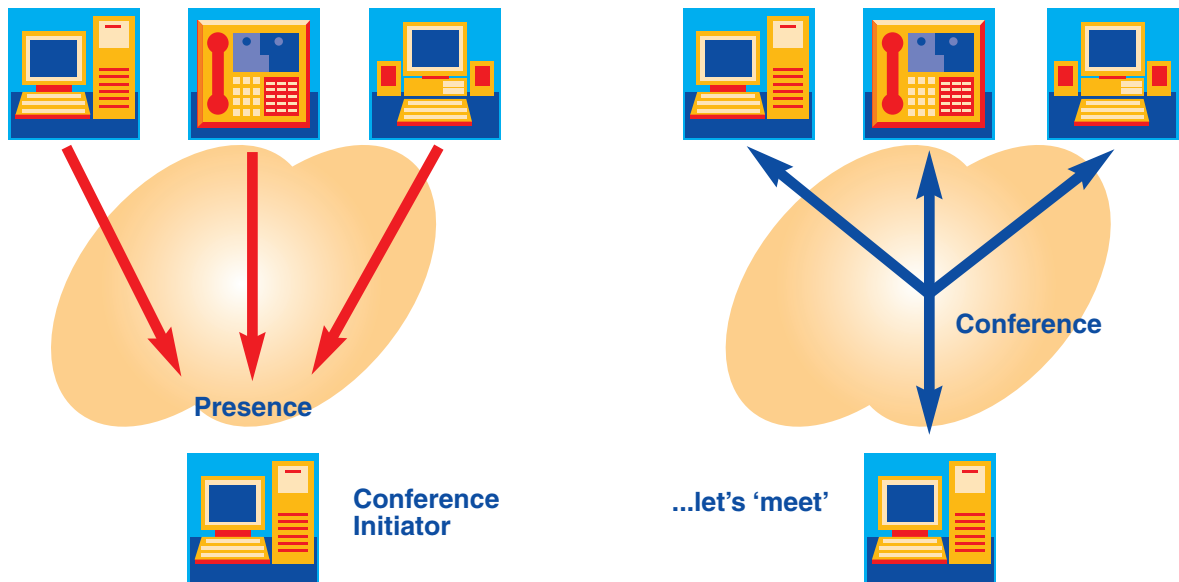
‘Hop On’ – to an Existing Call

- If a Presence subscriber could see that one of her subscribers was involved in a telephone conversation, she could request permission to join the call. If permission were granted, it would immediately become a conference call.



Instant Conferencing

- If a Presence subscriber could see that all constituents in a potential conversation were on-line, she could immediately invoke a conference call.



Subscribing to Mobile Phone State

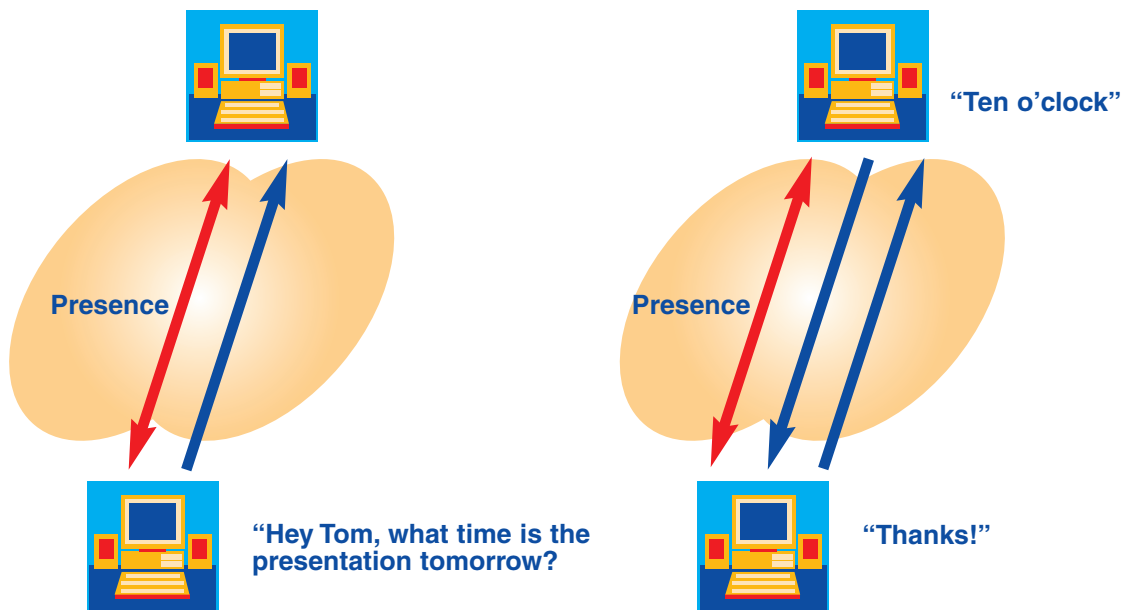
- If a Presence subscriber was trying to contact a subscribee in transit, he could be immediately notified when the mobile phone was switched on. A combination of this and traditional 'call camp-on' would automatically dial the mobile phone as it came on-line. This would supersede mobile phone voice mail which may, or may not, generate a returned call.
- An enhancement of this service would be to communicate the location of the cell phone user, possibly by polling the identity of the base station to which the mobile phone was connected.

Location-based Screening

- Location-based screening would enhance traditional call screening, which is usually based on time of day or calling party, to allow it to depend on the location of the subscriber. For example, a subscriber may purchase a service where only select individuals can call him if he is at home, while anyone can call him when he is at work.

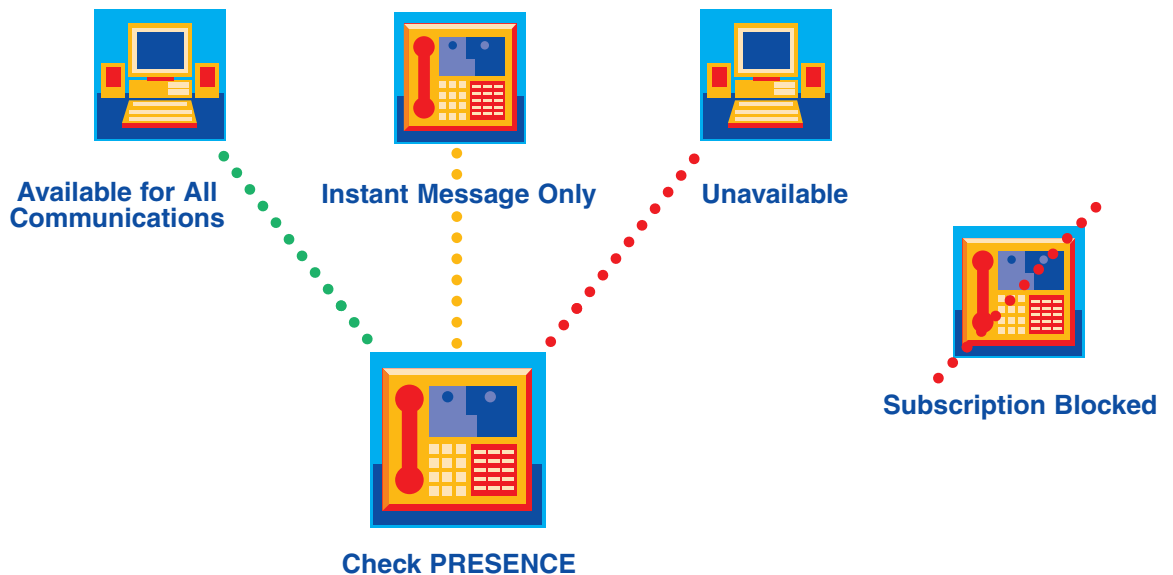
'Intercom' Telephony

- For many years, the international investment community has made use of live connections between trading desks, often on different continents. One example of this was 'Hoot 'n Holler', e.g. you pressed a buzzer to alert the other end (Hoot) and then you started talking (Holler). Nextel® has implemented this in the mobile domain with their Direct Connect® service. However, what is required to make this particularly compelling is some indication that the other party is present and willing to accept communications and in what medium.
- The social and work related implications of this are huge – people who are geographically separate, but want to interact as if they were in the same room, (or perhaps the next room), could do so no matter where either party was located or what they were doing. Friends and family, colleagues and partners need never again feel remote from each other whenever it is possible and convenient, for them to instantly communicate.



Checking Communications State

- If Presence becomes a ubiquitous service, subscribers would tend to check the communications state before establishing communications with anyone, whether they normally subscribed to them or not. Knowing in advance what the person's communications state was and the methods of communication for which they were available could alleviate the irritation of constant busy signals and 'voice mail tag'.



Subscribing to the Complete Call State of Another

- Full use of the potential capabilities of Presence would be a very powerful mechanism. One implementation would be for an executive assistant to be fully apprised of his boss' call state. This would allow him to interact with her as if she were in the office, even while she was on the road.

The flexibility and power of software-delivered telephony is starting to fulfill the potential of IPIC by providing a platform for an infinite array of services. Our example Presence services are just the beginning. The only limitations are the imagination and ingenuity of the service providers and the lack of an open Presence standard.

WHAT IS NEEDED IN A PRESENCE PROTOCOL?

It has already been discussed that an ideal Presence protocol would be open, and openly embraced, in order to provide transparency of service across the network. In addition, a basic Presence scheme must have certain attributes:

- A method for people to keep the system apprised of their communications state
- A method for people to subscribe to the communication state of others and to be notified of changes in that state
- A method for the system to store subscriptions and notifications
- A method for subscriptions and notifications to be routed appropriately
- A method to address scalability in a system that, for each incremental user, would require an exponential increase in resources

A more sophisticated Presence scheme may have the following attributes:

- A method that requires authentication of peoples' identity in order to avoid abuse and fraudulent use
- A method to ensure privacy allowing people to be selective about the types of Presence information they provide and to whom they provide that information. This consent could be:
 - Specific – you could consent to subscriptions of specific individuals, or define specific communications states that you would send in a given time or situation
 - General – sending limited communications state notifications to anyone
 - Implicit – you could consent to the subscriptions of members of a clearly identified group
- A method that monitors the subscribers' state in order to avoid sending redundant notifications – including to subscribers who were no longer enrolled in the service

Presence provides information upon which to base decisions on the timing and means of communication establishment. Therefore, a Presence protocol should be tightly coupled with the protocol that actually establishes the communications.

A PRESENCE PROTOCOL SHOULD BE TIGHTLY COUPLED WITH THE PROTOCOL THAT ACTUALLY ESTABLISHES THE COMMUNICATIONS.

**THERE IS NO STANDARD
FOR IM OR PRESENCE.**

THE CURRENT STATUS OF PRESENCE PROTOCOLS

Presence is currently implemented in the various Instant Messenger technologies (e.g. AOL IM, ICQ, MS Messenger, Yahoo! IM, etc.). Presence allows people to maintain a passive check (from their perspective) on the communications state of people with whom they may wish to communicate; e.g. those on their 'buddy lists' and 'community' interest pages. Like traditional telephony, 'no answer' IP-based calls incur no cost. However, a positive Presence 'indication' invites communication and therefore acts as a communications facilitator. The addition of 'voice chat' and instant conferencing serves to illustrate the power of this technology as a communications medium.

However, Instant Messaging clearly illustrates the issues associated with moving a communications technology from a niche proposition to a mainstream commercial service:

there is NO STANDARD for IM or Presence

Paradoxically, proprietary technology (coupled with litigation) is being used in the IM domain to restrict open communication. Proprietary standards have, once again, become a competitive weapon to grab and maintain market share. The notion that 'communities' should be required to adopt a specific proprietary technology in order to interoperate is counter to everything we have learned about open standards over the last 20 years. If there is no change in this situation, IM will certainly be constrained from being adopted as a mainstream commercial service.

However, IP communication is more than just Instant Messaging, it can encompass the following:

- Voice
- Video
- Unified Messaging (UM)

Presence certainly has more potential as a communications facilitator than within the IM domain.

WHY AN OPEN PROTOCOL IS CRITICAL

Metcalf's Law states that:

The value of a network grows by the square of the number of devices attached.

By applying this principle to the next layer in the system:

The value of a communications service grows by the square of the number of users connected to that service

This is fundamentally why a Presence and IM protocol must be standard and open. A Presence service that limits subscribers to a subset of the overall IP user domain is not a 'must have' service. IPIC users should be able to subscribe to Presence from anyone, regardless of the service provider:

No one bothers to find out what email protocols are supported by other people's service provider!

Users want to use one, and only one, tool to communicate; and that tool should be capable of communicating with anyone.

In order to increase the appeal of Presence as a service, Presence information should be generally available across the range of service providers. Open interoperability is the key to general acceptance – a service that does not cross service provider boundaries has limited utility. Therefore, the general acceptance of Presence requires an open, and openly embraced, standard.

USERS WANT TO USE ONE, AND ONLY ONE, TOOL TO COMMUNICATE; AND THAT TOOL SHOULD BE CAPABLE OF COMMUNICATING WITH ANYONE.

THE SESSION INITIATION PROTOCOL

The Session Initiation Protocol (SIP – RFC 2543) is already an IETF standard and is rapidly emerging as the defacto standard for IPIC because it provides a lightweight, flexible call setup mechanism as well as forming the basis for enhanced services (e.g. personal mobility services).

As a call setup protocol, SIP addresses a number of needs:

Interoperability – SIP is:

- An open standard
- Quickly becoming a defacto industry standard
- Proven at Bake-Offs (interoperability tests between various vendors' products)

Scalability

- SIP is a lightweight text-based, stateless protocol based on HTTP
- The SIP scalability model meets the needs of Presence because it:
 - Is fast in the large devices which need to handle high traffic volumes
 - Has intelligence in the smaller scale devices which handle lower traffic volumes

Extensibility

- SIP has numerous features that allow it to be extended while still maintaining backwards compatibility
- It is easy to layer Presence on top of SIP due to the strong linkage between SIP REGISTER messages and NOTIFY messages

A range of hardware and services vendors have declared support for SIP, including:

- 3Com
- Lucent Technologies
- Level(3) Communications

HOW SIP ADDRESSES THE REQUIREMENTS

Call setup and Presence are related conceptually and technically. Call setup and Presence are about initiating person-to-person interactions as well as device-to-device interaction. Furthermore, the SIP concept of registration and storage of the communications state in a location service is a significant portion of what is required for a Presence service. A Presence subscription is a request for active notification of this communications state.

Session initiation requires a form of Presence in order to deliver initiation messages. Notifications of changes in Presence state are just initiation messages in reverse. With its provision for DNS look-up and stateless routing via Proxy servers, SIP satisfies routing needs of call setup, IM and Presence in a highly scalable and lightweight fashion.

Note that:

- SIP already has a register mechanism that sends location state into the network – ‘location’ accounts for half of what is required for Presence
- A SIP extension, caller preferences, allows registrations to carry ‘willingness’ and ‘communications capabilities’ – accounting for the other half of Presence
- SIP provides a location server element which is already a store of Presence
- SIP provides routing capabilities for delivering invitations to servers where Presence (e.g. registrations) are stored – in the same way that subscriptions would be delivered
- SIP’s usage of MIME means SIP messages can easily carry:
 - Presence data
 - Instant Message text
- Existing SIP headers all have usage for Presence messages

The challenges of routing messages are identical, regardless of the purpose of the message:

- SIP routes session invitations
- IM routes text messages
- Presence routes subscriptions and notifications

THE SIP CONCEPT OF REGISTRATION AND STORAGE OF THE COMMUNICATIONS STATE IN A LOCATION SERVICE IS A SIGNIFICANT PORTION OF WHAT IS REQUIRED FOR A PRESENCE SERVICE.

THE BENEFITS FOR SERVICE PROVIDERS

The benefits for service providers of integrating SIP and Presence are compelling:

Reduced technical complexity in that it requires:

- A single architecture
- A single protocol – dealing with one stack
- One (logical) persistent data store – lists of subscriptions and subscribers are logically related to the list of registrations

Reduced costs:

- Hardware costs are significantly less because the same system can run call setup and Presence
- System management overheads are minimized by having a single integrated system and (potentially) a single integrated management console
- Staffing costs are reduced because only a single skill set is required in each technical role

THE BENEFITS FOR SERVICE PROVIDERS OF INTEGRATING SIP AND PRESENCE ARE COMPELLING.

PROVIDING SIP USERS WITH PRESENCE

What would it take to integrate a Presence layer into SIP? As previously discussed, a Presence protocol requires:

- A method for registering communications state
- A way for users to request notifications of changes in this state
- A way for subscribers to be notified of changes in state

These requirements can easily be met by modest SIP extensions.

The first requirement, registering communications state, requires no extensions. This is a fundamental capability of SIP, and it is needed for both session initiation and Presence. SIP's registration capabilities allow users to indicate location, communications means (through any URL scheme), preferences and capabilities. Communications state can be updated by multiple independent entities (for example, a subscriber's Presence could be composed of his cell phone state, generated by an HLR with an IP interface, and his Instant Messenger state, generated by his IM client). SIP's REGISTER supports numerous entities updating the state of a single user.

The next requirement, requesting notifications of changes in state, is composed of several sub-functions. The first is a means to request a subscription. The second is to address the subscription to the target user. The third is to allow the subscription to be routed to the appropriate Presence server. The fourth is to allow the protocol to be extensible so that it can carry descriptions of complex subscription rules.

SIP already addresses most of these sub-functions. SIP's addressing and routing capabilities are exactly what is needed to deliver a subscription to the correct Presence server. Since SIP messages can contain bodies, the protocol is extensible so that complex subscription rules can be carried. The only missing piece is the ability to say, "This is a subscription". This is the simplest function of all and is supported by defining a new SIP method: SUBSCRIBE.

The third requirement outlined above is the generation of notifications of changes in the communications state. This requirement also has sub-functions, including addressing and routing; conveyance of state and indication of notification. The requirements for addressing and routing are identical to those for subscriptions and readily supported in SIP. Conveyance of communications state can be done for simple Presence through SIP's Contact headers, which fundamentally convey communications locations, means and capabilities. Additional complex state can be defined through new bodies carried in notifications. SIP must be extended to include a new method, NOTIFY, which conveys the fact that the message is actually a notification.

***THESE REQUIREMENTS
CAN EASILY BE MET BY
MODEST SIP EXTENSIONS.***

SIP FOR INSTANT MESSAGING

SIP with Presence could easily address the needs for an open IM protocol. Note that:

- SIP is fundamentally a transactional messaging service
- One additional method, MESSAGE, could be defined
- The body of the MESSAGE would be the IM text
- Existing proxies can route it
- No new headers would be needed

Furthermore, the conversion from an IM session to a 'voice chat', or even video session could be supported by the same protocol and technical architecture!

DYNAMICSOFT'S PRESENCE STRATEGY

A small team of individuals, coordinated by dynamicsoft Chief Scientist, Jonathan Rosenberg, has developed the Presence extension to SIP. They will submit this to the IETF for consideration as an adjunct to SIP or as a protocol in its own right.

dynamicsoft Inc. intends to publish the specification for SIP for Presence for consideration and comment by the wider Internet telephony community. However, dynamicsoft will ultimately conform to the protocols generated by the IMPP working group of the IETF.

In order to provide input on the specification or to learn how you can support SIP for Presence as an IETF standard, please contact:

Jonathan Rosenberg
Chief Scientist
dynamicsoft Inc.
jdrosen@dynamicsoft.com

If you would like further information on dynamicsoft's Presence strategy or related product developments, please contact:

Russell Bennett
Product Manager, Presence
dynamicsoft Inc.
rbennett@dynamicsoft.com



UNLEASHING A SERVICES RENAISSANCE™

CONTACT US @ +1 973.952.5000

www.dynamicsoft.com

sales@dynamicsoft.com

© 2000 dynamicsoft Inc. All rights reserved. dynamicsoft and eConvergence are registered trademarks of dynamicsoft Inc. in the United States and other countries. All other trademarks are the property of their respective owners.