

Chocoa Communicator

– A New Communication System Based on Awareness and Text Communications –

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This paper explains the concept, main functions, services, and other aspects of the Chocoa Communicator, which is a new communication system based on text communications and making the user aware of the existence and activities of others connected to the network. By providing “awareness information,” a user can confirm at a glance whether the status of another person is, for example, “on-line,” “off-line,” or “do not disturb” and so can select the most appropriate mode of communication. The text element incorporates machine readability, allowing the system to easily increase the value of communication through tie-ups with existing information processing technologies such as a WWW or database retrieval.

1. Introduction

It has been 120 years since the telephone appeared as a communication medium, and in that time it has come to be used not only as a means of transmitting information but also as a means of communicating emotions. However, our way of contacting people on the phone has changed very little. Whether we are making a business appointment or checking to see how a friend is feeling, we usually make a call without knowing for sure whether the person we are calling is available. This does not present a problem if the person we are calling is available. However, if the person is not available and somebody else answers the call, not only have we wasted our own time, but we have probably inconvenienced the call answerer as well.

When the user of a communication system learns the status of a person on the other side of the communication medium, the user is said to obtain “awareness” of that person. Since about 1990, there has been considerable research into how awareness can be used to make groupwork more dynamic in office environments.¹⁾ ICQ

(“I Seek You,” <http://www.icq.com>), which is said to have over 500 million registered users, is a well-known example of a practical service that uses the awareness principle. This type of service was originally used for chats (real-time discussions via networks) and for finding people to play on-line games with; but more recently it has gained attention as a service for arranging business meetings. Fujitsu Laboratories has also been conducting research in this field, having realized the importance of awareness.²⁾

Our Chocoa (CHat Oriented COmmunication Augment) Communicator is an awareness-based communication system that applies the special features of the new and growing trend known as “text communication.” By providing awareness information via continuous packet communication connections,³⁾ Chocoa Communicator enables us to confirm the status of the person we are calling in advance. Because of this feature, Chocoa Communicator can be considered to be a communication medium that suggests a new etiquette of communication.

This paper describes the Chocoa Communicator.

2. Service features

Figure 1 shows some typical uses of Chocoa Communicator. The most notable feature of this system is that the users can communicate while confirming the current status of the other people connected to the network. In this way, the users have the feeling that they are working together in the same room even when they are in separate locations. The authors refer to this type of environment as a “shared virtual space.”

Figure 2 shows the communication window of Chocoa Communicator Client (CHOCOLAT) and some examples of operations that can be performed in it. The icons in the Awareness window display the current status of the users that are logged into the same channel. Each channel is a type of conference room. The users set their own status (e.g., “on-line,” “off-line,” or “do not disturb”), then the status is transmitted in real time to the other users and reflected as an icon on their screens. In this way, users can confirm the status of other users at a glance.

The Message window in Figure 2 displays the comments of users who have logged into this channel in the order in which they were transmitted.

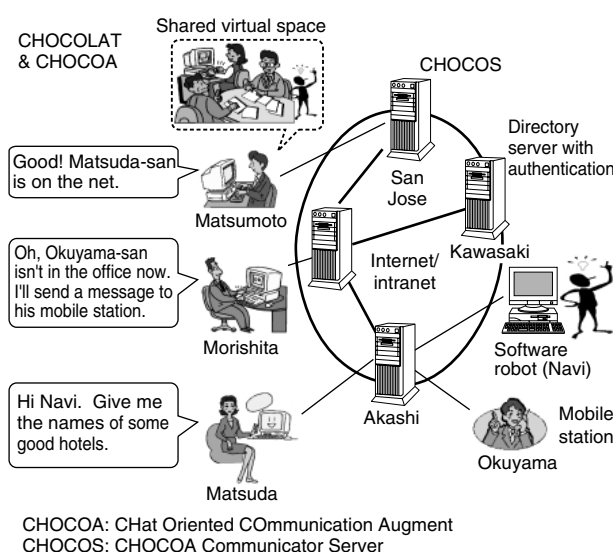


Figure 1
Typical uses of Chocoa Communicator.

This allows real-time information sharing that would be impossible with ordinary e-mail. For example, it enables real-time debates and Q&As within the group and real-time sharing of information such as departmental notices, the latest product information, and emergency information on bugs related to software development. In addition, users can display the same page on everyone’s browser by posting a Uniform Resource Locator (URL) instead of a message or they can instantly transfer a file by dragging and dropping it to the intended receiver’s icon.

3. System specifications

3.1 System configuration

Chocoa Communicator is comprised of the following three elements:

1) Server (CHOCOS: CHOCOA Communicator Server)

The server is based on the Internet Relay Chat (IRC) protocol, which is prescribed in RFC1459 and is written in Java. The services can be expanded using servlets. The server has a built-in WWW server for server management.

2) Client (CHOCOLAT)

Each client is a dedicated CHOCOS application program that runs on Windows. The clients’ features include graphical display of awareness information, user authentication via “Challenge & Response,” message encryption, and automatic transmission of awareness information via keyboard sensing.

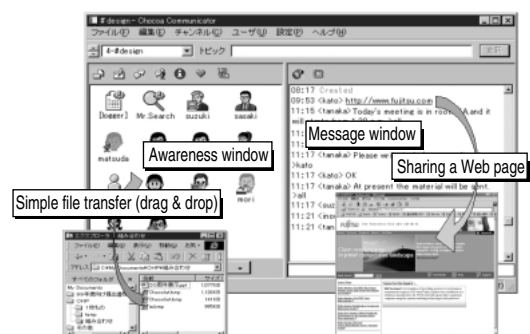


Figure 2
Communication window of CHOCOLAT.

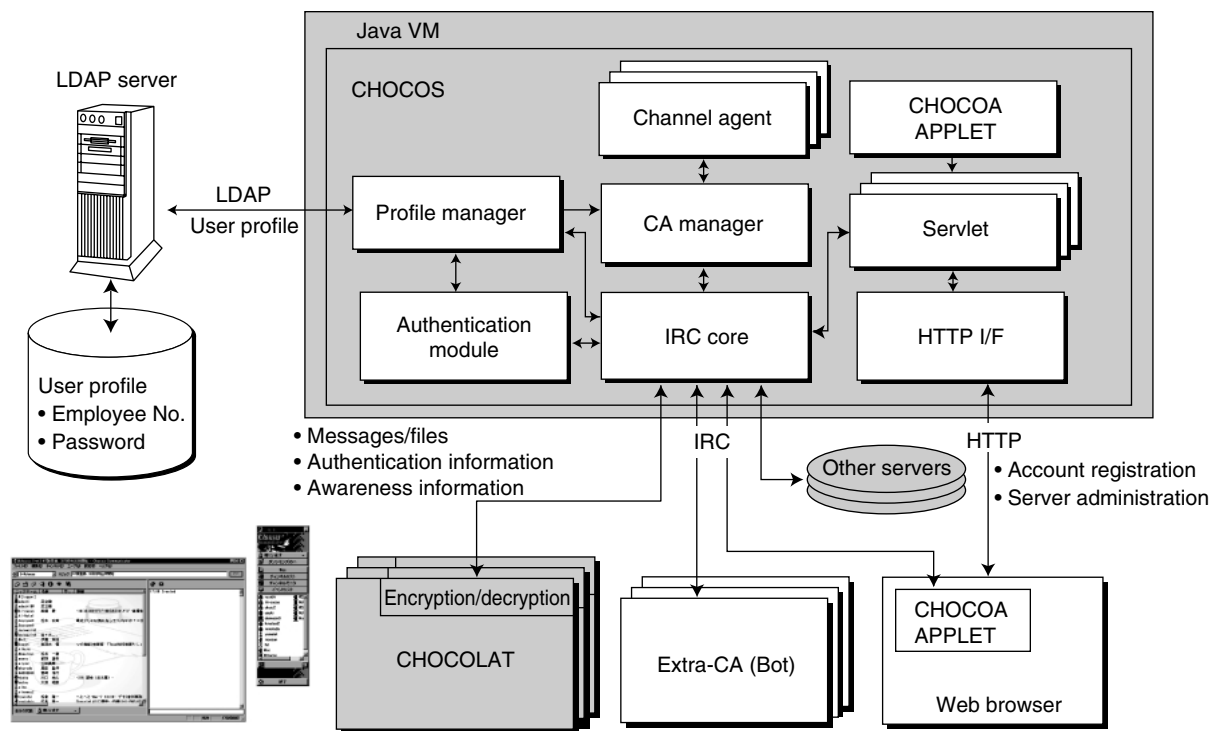


Figure 3
System configuration.

3) Applet version client (CHOCOA APPLET)

This is a JAVA APPLET version of CHOC-OA, which is a free version of the IRC software used via the built-in CHOCOS WWW server. As long as a Web browser is available, CHOCOA APPLET enables real-time communications with no need for any installations.

3.2 Server (CHOCOS)

Figure 3 shows the system configuration. The system is a client-server system centered around an IRC core developed by Fujitsu Laboratories. It has the following features:⁴⁾

1) Multi-platform

Because the server software is written in Java (Java2 compatible), it can be run on a variety of platforms, including Windows95/98/NT and UNIX (Solaris2.5.1 or later). In the future, it will also be compatible with Windows2000, Linux, and FreeBSD.

2) Based on IRC standard protocol

Because the server is based on the Internet

standard IRC protocol, interoperability with free IRC servers (IRCDs) is possible.

3) User authentication

To ensure worry-free applications even in operations on intranets and extranets, the system prevents impersonation by adopting a personal authentication function that is tied into a Light-weight Directory Access Protocol (LDAP) authentication server.

4) Message encryption

By encrypting the messages exchanged among clients, the system prevents unauthorized access to messages by persons other than the parties concerned (i.e., the users of CHOCOLAT).

5) Customization via servlets

The server functions can be expanded and customized through software plug-ins known as “servlets.” Using such a function, a software robot called an “agent” can be stationed on the server to provide services. There are several types of agents, for example, search support agents, which support searches on the Internet; file holder

agents, which accept files on behalf of users while they are away on business trips or otherwise unavailable; conversation log agents, which make logs of conversations on a given channel; and messaging agents, which transfer messages via mobile stations and other devices.

6) Fully-developed operation management support functions

General users can apply for an account, register a new channel, and make a number of other settings via their Web browser. Server administrators can also monitor information internal to the server and carry out server management via a Web browser.

7) Scalability

The system can support approximately 1000 simultaneous log-in users per server. With server interconnections, it can support simultaneous communications among approximately 50 000 users.

3.3 Client (CHOCOLAT)

CHOCOLAT is a dedicated client for CHOCOS. It runs on Windows (Windows95/98/NT) and has the following features:⁵⁾

1) Awareness icons

Awareness icons indicate the status of other users (“on-line,” “off-line,” “business trip,” “do not disturb,” etc.). The system also senses the status of a given PC’s keyboard or mouse and automatically advises others of the user’s status. For example, if there has been no keyboard input for a specified period of time, the user status is automatically changed from “on-line” to “off-line;” conversely, if there is a keyboard input in the “off-line” status, the status is automatically changed back to “on-line.” The awareness information is transferred in XML format. **Figure 4** shows a detailed user information view of CHOCOLAT.

2) Instant messages (chat)

Based on the IRC protocol, the system allows users to transmit short messages in real time in the same way as regular chat-client software. The messages exchanged within a given channel are

shared by all participants on that channel. Messages are input and displayed using the message window.

3) Tool pallet

If the communication window shown in Figure 4 was displayed all the time, it would get in the way of other work. To prevent this, we have prepared a tool pallet (**Figure 5**) on which icons for frequently accessed users and channels can be registered. Because the registered icons change in real time based on the status of the users or channels, it is possible to maintain a grasp on such status items even while doing other work and to quickly start communications as the need arises.

4) WWW links

Using a single quick operation, a user can

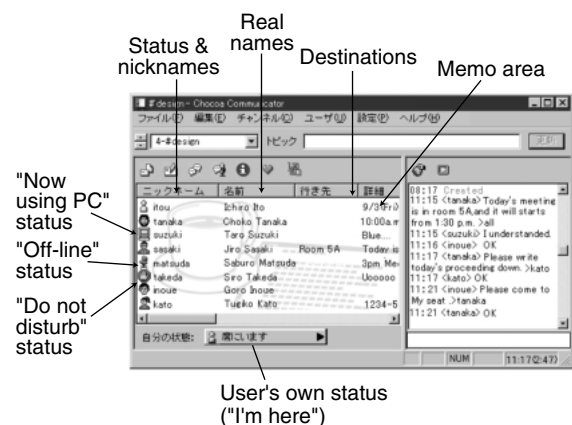


Figure 4
CHOCOLAT detailed user-information view.

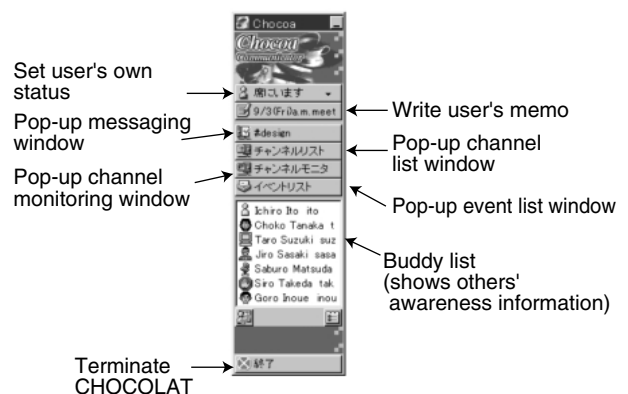


Figure 5
CHOCOLAT tool pallet.

send the URL for a Web page the user is currently viewing in the form of a message. When the message is received, a browser link function automatically displays the page for the URL on the receiver's browser. URLs contained in messages are clickable, so receivers can click on them later to reference the relevant Web pages.

5) Simple file transfer

A file can be transferred by simply dragging and dropping the file to the icon of the intended recipient.

6) Internet phone link

The system allows the user to make a telephone call using a single quick operation with no need for dialing. By right-clicking the icon of the user you want to talk to and selecting the voice conversation menu, you can communicate by voice using NetMeeting or Internet Phone functions.

4. Practical applications for Chocoa Communicator

The system is not limited to the in-business applications originally imagined by the developers; it can also be used for business-to-business and business-to-consumer communications. Also, the system is notable as a method of achieving effective Customer Relationship Management (CRM). We are looking forward to expanding these

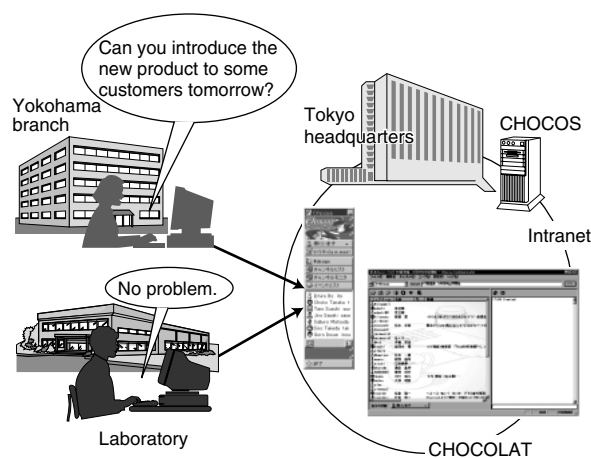


Figure 6
Destination bulletin board on intranet.

applications to include consumer-oriented services through links with mobile stations. Some examples of applications using the Chocoa Communicator are described below.

1) Intranets/extranets

Chocoa Communicator makes inter-office communications smoother by presenting awareness information in the form of a destination bulletin board (**Figure 6**). The following are a few example application areas:

- Communications between design and production divisions
- Administration of destinations for mobile sales staff
- Communications between hearing-impaired and non-hearing-impaired persons

2) Chat services for consumers

Chat services offered by Internet Service Providers (ISPs). Member user administration is conducted via an LDAP server, allowing membership-based chat services to be offered (**Figure 7**). Channel leasing and other services are also possible.

3) On-line customer support/education

Applications in on-line customer support and on-line education in e-commerce scenarios (**Figure 8**). Possible applications include enabling support staff to share a Web page with a customer to provide assistance and Q&A sessions

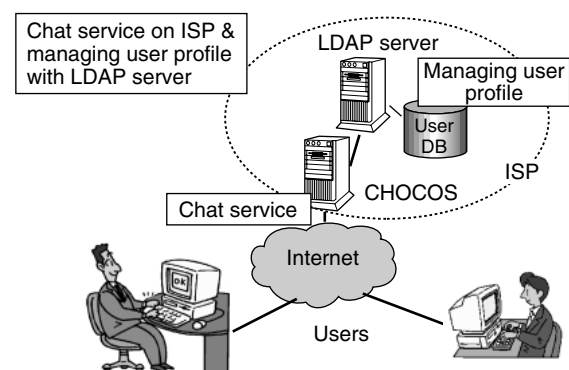


Figure 7
ISP chat service.

between a teacher and a student in on-line education.

4) Links with broadcast services

Opinions and requests from listeners regarding radio broadcasts can be uploaded in real time (in place of existing postcards and faxes) to achieve interactive broadcasting (**Figure 9**). Other applications include subtitling services for TV programs offered by volunteers for hearing-impaired viewers.

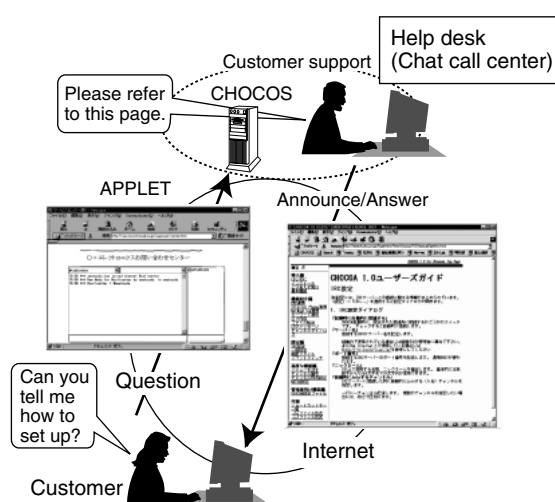


Figure 8
Online help desk.

5) Mobile awareness services

Chats and exchanges of awareness information can be carried out between portable terminals by establishing gateways with portable telephone networks using the CHOCOS Servlet Application Program Interface (API). It is also possible to carry out chats and share awareness information with clients connected to intranets and the Internet (**Figure 10**).

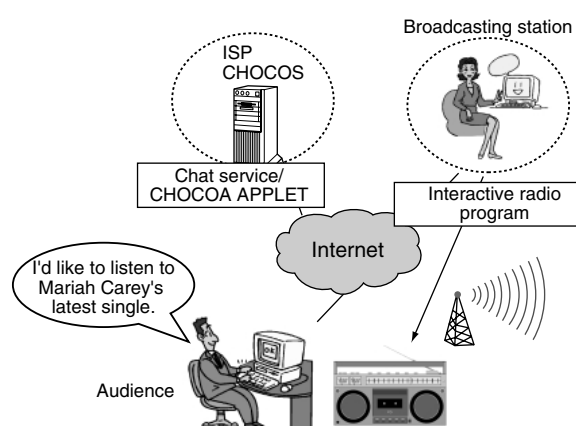


Figure 9
Interactive radio program.

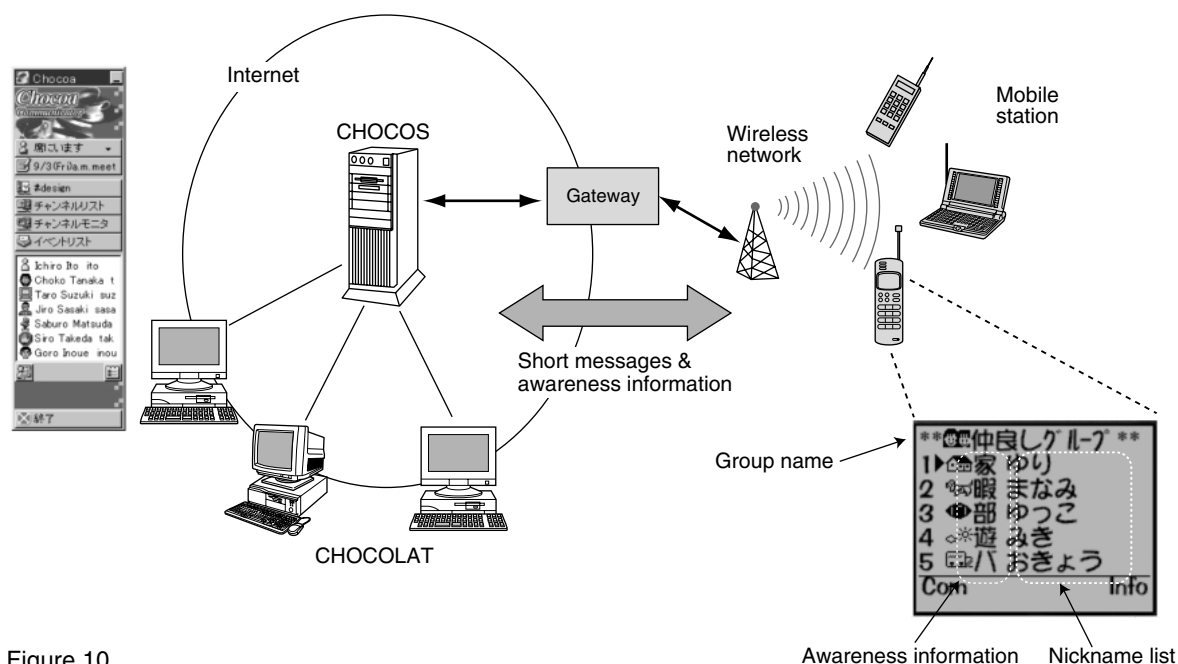


Figure 10
Mobile awareness service.

5. Future directions

To allow the addition of a variety of new services, we will strengthen the customization API on the server side. We are also planning to separate the graphical user interface (GUI) and awareness modules on the client side to allow customization of the GUI.

The standardization of next-generation awareness protocols has been under debate at the Internet Engineering Task Force (IETF) Instant Message and Presence Protocol (IMPP) Working Group (WG).⁶⁾ Fujitsu Laboratories has been participating in these discussions in the capacity of joint chair of the WG. In the future, we will cooperate with the IMPP as we continue to promote research into the framework of large-scale communication systems that take into account applications in mobile environments.

6. Conclusion

This paper explained the concept of the Chocoa Communicator, which is a new communication medium developed at Fujitsu Laboratories, and explained the main features, specifications, and other aspects of the system. We discussed how the system has the potential to fundamentally change the existing etiquette surrounding how we contact people on the telephone by applying the principle of “awareness.” We also presented some examples in which efficient communications have been achieved through the application of this system.

CHOCOA,⁷⁾ a multipurpose IRC client and the origin of CHOCOLAT, is being distributed free

of charge from Fujitsu’s website. We are also conducting consumer-oriented chat service tests⁸⁾ using CHOCOS.

The Japanese version of Chocoa Communicator has already been commercialized and is currently being shipped in Solaris and WindowsNT versions.

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