The internet based on presence system technology

M Styugin¹, A Kaygorodov²
¹Research fellow, Siberian State Aerospace University named after Academician M.F. Reshetnev, Krasnoyarsk, Russia
²CEO, LLC SilverLab, Krasnoyarsk, Russia

E-mail: styugin@gmail.com

Abstract. In our study we analyze how to create the systems based on “communication-resource-presence” technology. We formulate functional and architectural requirements. It is shown some new features in this systems that pertain to communication and information search on the Internet. The Internet passed three infrastructure stages from the communication between two hosts to the resource intermediation and communication in real presence systems. The systems based on the presence technologies have just started to develop. Our study shows what criteria’s they must meet. One of this criteria is the division of site resources into the "rooms" logically separated from each other. The users can see and connect to each other. The contextual data of user presence in a particular "room" can be used when searching for them in the context of professional competence.

1. Introduction

The Internet was created as an instrument of communication and remains so today. However, it went through several basic stages. Surely the information transmission rate has increased, the Web design technologies have changed and a wide variety of protocols have appeared, but the development of the Internet is structured only in several basic stages.

Simple data transfer protocols that enabled two network hosts to exchange messages could be considered to be the first stage of development of the Internet [1]. At the same time, we need not regard particular technological solutions of setting up tunnels, it means an e-mail or the Skype videoconference, because all this refers to the means of communication. We call this systems C-systems (from the word «communication»). They are displayed by the symbols A, B, C and D on the fig. 1.

Figure 1. C-systems

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The second stage of development of the Internet is appearance of resources initially presented as Web pages using HTTP protocol. It does not make any difference whether this pages are static or dynamic, programmatically generated according to any variable values transferred via HTTP protocol. We call all this systems R-systems (from the word «resource»).

![Figure 2. R-systems](image)

Source hosts are displayed by the symbols $R_1$, $R_2$ and $R_3$ on the fig. 2. They are available in a wide area network according to the unique values of IP-address and return any information when requesting them.

The age of social networks and Web 2.0 created a special class of CR-system [2, 3].

![Figure 3. CR-systems](image)

CR-system includes a possibility to communicate via Internet sources themselves. The online forum on the Web site is a classic example of the CR-systems that evolved into the multifunctional social networks.

The social networks were subsequently the first sources offered the option to fix whether the user is online or not. This was possible by registering the time of the last request to the site after a timeout at a given time interval. The fixation of user presence on the Web site at a particular time decided the appearance of P-systems (from the word «presence»).
The CRP-systems include not only CRP-system functional but also possibility to fix user presence at the same site where you are yourself. There is little doubt that CRP-systems should be considered as separate stage of development of the Internet. But firstly, we should note – today there is no real Internet CRP-system that will be described in what follows. Secondly, the analysis of the CRP-system model, as we shall see, makes possibly to create new and more efficient technologies of communication and information search, the main functions of the Internet.

2. Structural model of the CRP-system
It is sufficient for our purpose to consider general structural pattern using RP-system as an example. The existence of an user authentication server is obligatory for the system because it is necessary for user identification on the third-party sites. In addition, the RP-Part module working on each page of Internet applications should be added for user identification. The RP-Part module fixes the «room» of user presence and transmits the data to the server. The server transmits (according to the data on presence of other users in the «room») the data to the RP-Client that shows it to user. The RP-Client could be designed as a single console application, browser plug-in or could be built in at the RP-Part module. The RP-Part module includes not only data on presence of users but also Room-filter that ranks the territory of user presence. The basic pattern of the Room-filter prescribes reserving of a separated «room» for each Web page (unique URL). The site owner himself is expected to differentiate site rooms easily. The difference between CRP-system and RP-system is in addition of a channel of direct communication between users through the CRP-Client that could be regular channel of short messages (messenger) or a videoconference.

3. Communication and information search in the CRP-system
CRP-system contains full information about sites visited by user, as well as all details of the text messages sent and received by user through the messenger. When visiting Web sites, CRP-system enables to observe who is on the same site, who is reading the same article or is in the same forum thread as you are at the moment. It means the CRP-system gives a possibility to create threads in the context of presence both with single user and all users in the «room». The second important advantage of communication in the CRP-system is that it enables to form a database that could be used for context search of conversation partner (with the same topics, requests etc.). It forms the basis of new and more efficient Internet communication technologies.
When searching for information, CRP-system enables to use the user presence data to improve the pertinency of queries. Today's search engines reached the limit of page relevance determination on the basis of their content and reference information. User, when looking through the pages from the search results, could better determinate relevance of pages for his query. This information could be used during the fixing of the «rooms» visited by user. For example, on the fig. 5 we can see that Room 3 turned out to be the most relevant for the user.

**Figure 5.** The pattern of user's motions through the «rooms»

### 4. Schedule drawing of the CRP-system structure

The process of the system operation is formed in the following manner: the particular programme code provided by CRP-system designer is embedded into the pages of Web sites. From now on, sites are included into the CRP-system and the site visitor monitoring process starts. The chat client is integrated into the interface of pages of the site involved. Site visitors who are on the same page could see each other on the list of online chat partners and could communicate with each other, they are in the same «room».

The whole CRP-system operation process consists of following:
- identification of site visitor;
- fixation of site visiting;
- providing a possibility of conversation with visitors who are on the same page.

**Architecture of the system.** The system needs particular software to operate properly according to the desired functionality.

User software:
- programme code embedded in the page;
- messenger.

Server software:
- server applications handling requests from sites; requests represent what pages user visited.
- server applications serving messenger, sending and receiving messages and doing other operations.
5. Prospects of further development of the CRP-system.

Creation of statistical and analytical services

During the operation, CRP-system accumulates large amounts of statistics. The most important data is:

- site traffic data;
- user time spent online;
- whether user communicated with each other and how the exchange of messages was intensive.

All this data could be available for site owners who use CRP-system.

The behavior of users on the site pages could be analyzed using statistics. As a result, the site owner could receive information about what pages the visitors are interested in, what pages cause discussions etc.

Social services. Using analysed data, it is possible for each user to form a «cloud» of his favorite topics and to choose for him suitable conversation partners. You could create a «topical portrait» of every user in his profile, for example, it could contain for one user world news, politics, business, public relations and for another – web server, algorithms, databases. The CRP-system users could form a social network with an emphasis on conversation where the friends would be «conversation partners» and there would be «topics for conversation» instead of groups. The news would report the hottest topics and reflect pages (that use CRP-system) with heated arguments and discussions.

Expansion of functionality of sites used with CRP-system. It is possible in the future that some solutions enable to integrate communication system of the site with the CRP-system. CRP-system could provide API that helps us integrate the communication system. The site is given following advantages:

- the site is given complete powerful communication system, there is no necessity to develop new own communication system;
- users could communicate with visitors of other sites and thus new visitors could be attracted from other sites;
users of communication system could communicate using video and audio connection; it is difficult for common sites to provide such option.

Conclusion
The CRP-systems described in our study create new directions for functional development of Internet communication tools, as well as more efficient systems of information search and evaluation. The CRP-technology is considered to be an universal means to expanse functionality of Web sites based on HTTP-technology without using of Internet application design technologies.

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