New Function for Displaying Static Document Dynamically with DACS Scheme

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Summary

Web Service on extended DACS Scheme and new form of information usage by that Web Service is proposed by authors. In this method, data related to the user logging in to the client computer, can be displayed only by inputting URL on Web browser. Then, the distributed data in the network is displayed on each divided window with frame by using a static HTML file. In the organization such as universities, information is not only stored as database, but also stored as information medium with document type. Here, the function which displays different contents from document medium by inputting same URL to Web Browser is developed. Since general user can send characterized information to other users more freely and easily in comparison with Web Service on extended DACS Scheme, information usage becomes largely wide. In this paper, new function to display different contents to each user dynamically, is proposed and examined from information medium with document type, which is distributed on the network.

Key words:
 web service, cgi, destination nat, packet filtering, name resolution

1. Introduction

  New form of information usage by Web Service on extended DACS Scheme in the network of universities, is proposed [1] [2] [3] [4]. Information, which is related to each user logging in to the client computer (client), can be displayed only by inputting one URL to Web Browser. Then, by setting URL in a static HTML file, the information is displayed on each divided window of Web Browser with frame. Because user can create and update Web pages freely and easily, information usage is promoted. In the organization such as universities, information is not only stored as database, but also stored with document type. For example, static Web pages and simple text file, PDF file, word file are often used. In those information medium with document type (document

medium), various information is stored. The document medium can be created and updated by general user freely and easily with some tools, and is able to have expressive power with variety, complicity and sophistication more than Web page created dynamically by the program such as CGI [5] [6].

  Therefore, if the function as Web Service on extended DACS Scheme is realized by using the document medium as substitution of database, general user can send characterized information more freely and easily. In other words, if the function which displays different contents to each user from document medium by inputting same URL to Web Browser is realized, general user can send characterized information to other users via Web Service more freely and easily. Since general user can send characterized information to other users more freely and easily in comparison with Web Service on extended DACS Scheme, information usage becomes largely wide.

  In this paper, new function of displaying different contents dynamically from document medium is proposed and examined. In other words, new function of displaying different contents to each user only by inputting same URL to Web Browser is realized. Then, experiments are performed to confirm the possibility of realization.

2. Problem of Web Service on Extended DACS Scheme

In Web Service on extended DACS Scheme, which is proposed by authors, information in database is referred by the program such as CGI on Web Server. The database is used as a part of information system such as a system to manage student's result. Because information is registered and updated into the database by use of exclusive application software as user interface for the information system, only limited information is accumulated. Only system administrator, who builds and introduces the application software, can determine a kind of information to be stored. In such mechanism, it is difficult for general user to send the information to other users freely and easily. However, if document medium can be substituted for database, it is possible for general user to send

characterized information via Web Service to other users. This is because document medium can be created and updated without the exclusive application as user interface. This function can be realized by using the mechanism such as CGI. To be concrete, different contents are displayed to each user from document medium on one server. However, when document medium exists on different servers in the network, complicated mechanism is needed. For example, a large-scaled mechanism is shown in Fig.1, which is called here Type1. First, document medium is gathered onto Web Server with the program such as CGI. Next, through steps from (1) to (4), different contents are displayed to each user as Web page from document medium on Web Server. However, information usage same as Web Service on extended DACS Scheme can't be realized. Because document medium needs to be gathered on to one specific server, information usage can't be realized in the state that information is distributed on different servers in the
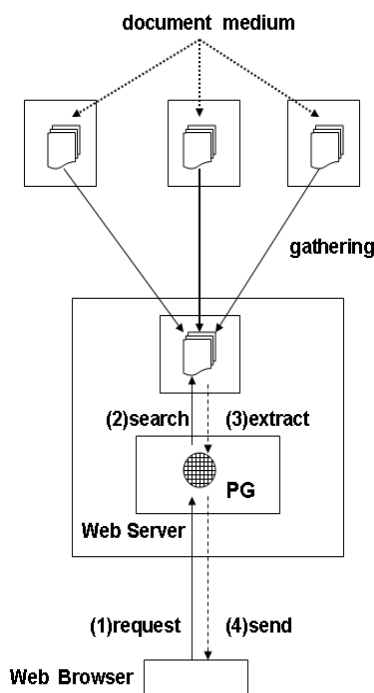
the point of using the distributed information in the network, this mechanism can realize the function same as Web Service on extended DACS Scheme. However, it is difficult to do access control to the document medium every user. The reason is because Web Server promises usage of unspecified number of user. If URL to refer the document medium is acquired, unexpected user can access it. Furthermore, complicated program is needed for realizing this mechanism.
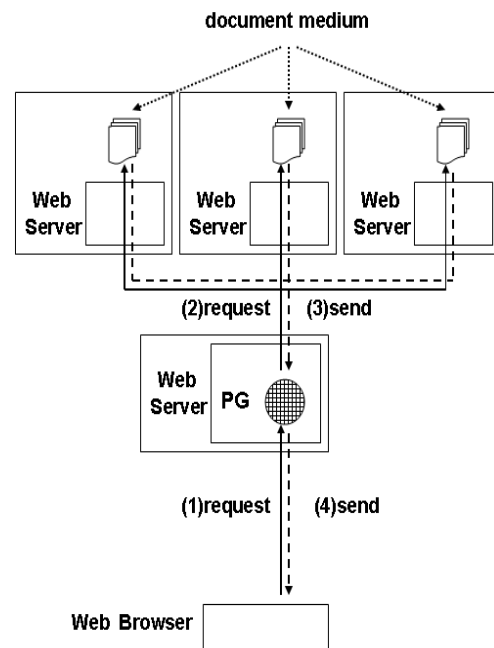

Fig. 2   Mechanism of Type2

Fig. 1   Mechanism of Type1

network.

In addition, another mechanism of Type2 is shown in Fig.2. (1)Web Browser requests to Web Server. (2)The program requests reference to Web Servers with document medium, which are distributed on the network. (3)The distributed Web Server sends contents of document medium to the program on Web Server. (4)The program sends the contents to Web Browser. As the result, different contents are displayed to each user via Web Browser. At

On both mechanisms, the function same as Web Service on extended DACS Scheme can't be realized. Therefore, if the function as Web Service on extended DACS Scheme is realized in the document medium as substitution of database, general user can send characterized information to other users more freely and easily. In other words, if the function which displays different contents to each user from document medium by inputting same URL is realized, general user can send characterized information to other users via Web Service more freely and easily.

In this paper, to explain this function, summary of DACS Scheme is described in chapter 3. In chapter 4, Web Service on extended DACS Scheme is described. Then, new function to display different contents to each user from document medium on Web Browser, are proposed in chapter 5. In chapter 6, experimental results to confirm the possibility of realization are described.

3. Synopsis of DACS Scheme

3.1 Basic Principle of DACS Scheme

Fig.3 shows the basic principle of the network services by DACS Scheme. At the timing of the (a) or (b) as shown in the following, DACS rules (rules defined by user unit) are distributed from DACS Server to DACS Client.

    (a) At the time of user's logging in the client
    (b) At the time of a delivery indication from the system administrator

According to distributed DACS rules, DACS Client performs (1) or (2) operation as shown in the following. Then, communication control of the client is performed for every login user.
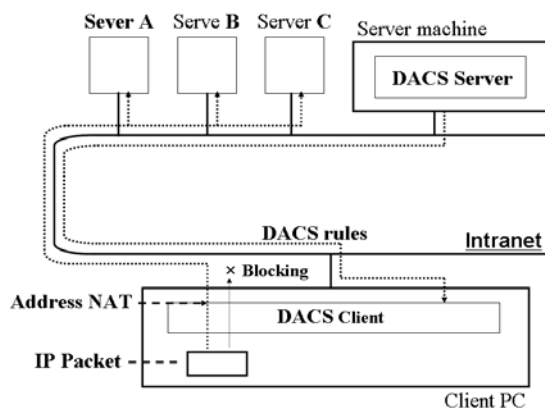

Fig. 3 DACS Scheme

(1) Destination information on IP Packet, which is sent from application program, is changed.
(2) IP Packet from the client, which is sent from the application program to the outside of the client, is blocked.

An example of the case (1) is shown in Fig.3. In Fig.3, the system administrator can distribute a communication of the login user to the specified server among servers A, B or C. Moreover, the case (2) is described. For example, when the system administrator wants to forbid user to use MUA (Mail User Agent), it will be performed by blocking IP Packet with the specific destination information. In order to realize DACS Scheme, the operation is done by DACS Protocol as shown in Fig.4. As shown by (1) in Fig.4, the distribution of DACS rules is performed on communication between DACS Server and DACS Client, which is arranged at the application layer. The application of DACS rules to DACS Control is shown by (2) in Fig.4. The steady communication control, such as a modification of the destination information or

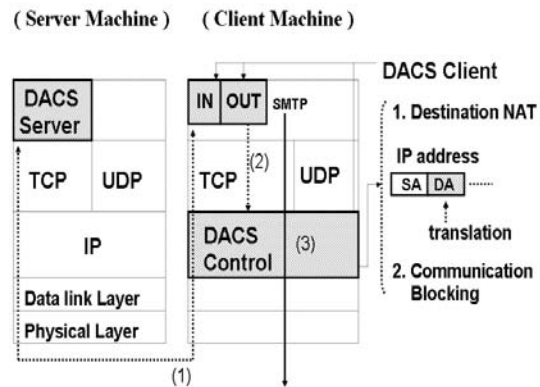the communication blocking is performed at the network layer as shown by (3) in Fig.4.

Fig. 4 Layer setting of DACS Scheme

3.2 Assuming Scope

To change destination information on IP Packet and block IP Packet by destination information, the system administrator needs to know the IP address of a network server. For that reason, the intranet under management of the system administrator becomes the scope of DACS Scheme mainly.

3.3 Comparison with Existing Technology

Here, the difference between DACS Scheme and the existing technology is explained. Specifically, the difference from the technology of name resolution service (ex, WINS,DNS) and server load balancing is discussed.

First, the difference from the name resolution service is explained. Although the mapping of a host name and an IP address is performed in the existing name resolution service, the mapping of the group of a host name, a user name and an IP address can be performed altogether by DACS Scheme. As the result, the IP address to be different for every user can be determined for the same host name. Next, the difference from server load balancing technology is explained. To realize server load balancing, there are methods by DNS round robin [7] and by the load balancer [8] [9]. Then, the difference from how to use the load balancer using Destination NAT is explained. The large difference from DACS Scheme is the place which arranges Destination NAT. Although the load balancer arranges Destination NAT on the network course, it is

arranged on the client in DACS Scheme. When Destination NAT is arranged on the network course, it

information (user name and the IP address of the client) is notified from DACS SV to the program on Web Server
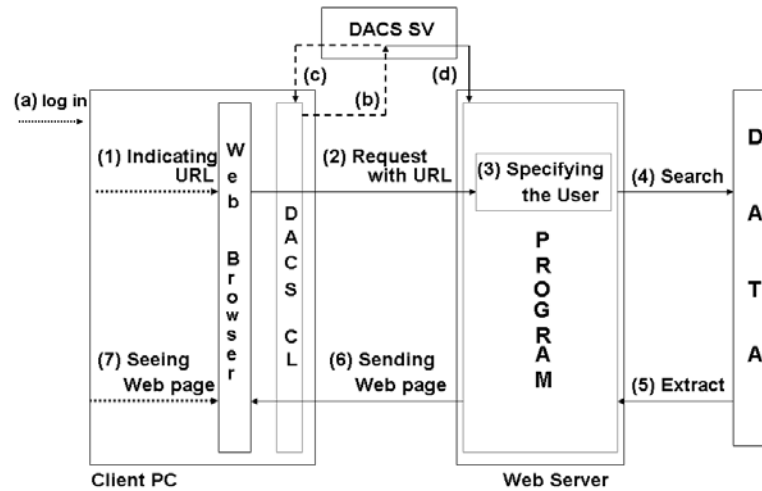

Fig. 5   Web Service on extended DACS Scheme

cannot be specified whether IP Packet was sent by which user. For the reason, it is difficult to control communication per user. However, it can be guaranteed in DACS Scheme by arranging on the client that all IP Packet at the time of Destination Nat conversion is sent by the login user. But, when the client is multi-user system, the mechanism in the no login from remoteness is required. It is confirmed that the communication is sent by the user who sits down before a client and logs in directly, by the method of intercepting the unnecessary communication from the client outside.

4.   Web Service on Extended DACS Scheme

4.1 Basic Mechanism

In this chapter, the mechanism of Web Service corresponding to DACS Scheme and an extension of DACS Scheme are explained. It is assumed that the extended DACS Scheme is introduced on the network. In that case, the program on Web Server is implemented in corresponding to a DACS Scheme. At first, starting the Web Service corresponding to DACS Scheme (initialization processing) is explained in Fig.5. After user logs in to the client (a), DACS CL requests it so that DACS SV transmits DACS rules to itself (b). DACS rules transmitted from DACS SV is applied to DACS CL (DACS CTL) (c). This processing is same as initialization processing of the DACS Scheme. Furthermore, in the extended DACS Scheme, after the processing of (b), login

corresponding to DACS Scheme (d). A characteristic of the extended DACS Scheme is that the server side program on Web Server specifies user by checking the login information and the source IP address of communication from the client. After those processing, Web Service corresponding to DACS Scheme begins a normal operative state (steady state). Next, summary of Web Service corresponding to DACS Scheme is explained. The user who logs in to the client inputs URL into Web Browser for executing the server side program (1). The request from Web Browser reaches to Web Server after changing a communication address by DACS CL (DACS CTL) (2). The Web Server side program can acquire the IP address of the client with request through an environment variable of Web Server. The requested user is specified by checking the login information and the IP address. Then, information related to user is searched (4) and extracted (5) from information which is accumulated beforehand. Thus, Web page is created from the information and sent to Web Browser side (6). It is possible for user to see the information related to oneself, that is displayed in the form of Web page on Web Browser (7). In Web Service on extended DACS Scheme, the information related to user is displayed on Web Browser by only executing the server side program by inputting URL into Web Browser.

4.2 Information Usage by Web Service on DACS Scheme

In Web Service on the extended DACS Scheme, the constitution of the system is enabled as shown in Fig.6. First, in Fig.6, Server A ～ C which has programs corresponding to DACS Scheme (1) and information (2), respectively, are distributed on the network. In the extended DACS Scheme, information related to user is displayed on Web Browser by only inputting the URL. The following mechanism is built on this principle. One window of Web Browser is divided into some frames. For
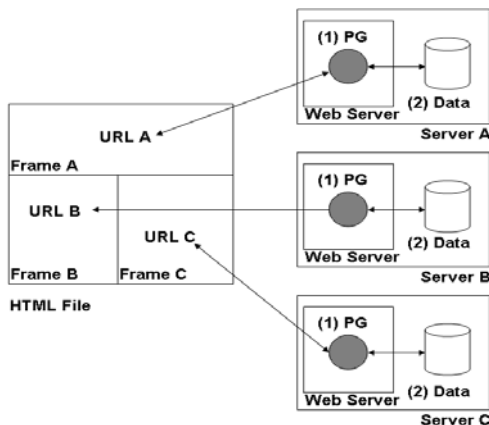

Fig. 6 Conventional system constitution for information usage

example, it is divided into three frames (Frame A-C). The static HTML file with each URL (URLA～C) in each frame is created for displaying Web page as Personal Portal. The static HTML File is put on Web Server or on the client. When the static HTML file is opened through Web Browser, information extracted from each server is distributed on Web Browser. In the conventional scheme, distributed information on the network is collected and Web page is created by the program dynamically. In the extended DACS Scheme, URL corresponding to each server is only incorporated in the static HTML file. Thus, if the static Web page is created, user can create Web page as Personal Portal easily. Since the Personal Portal is created easily and freely by oneself than the conventional one.

5. New Function of Displaying Static Document Dynamically

In the network with DACS scheme, different IP address and TCP port can be assigned for one host name by a user unit. Therefore, different document medium with same file name on different Web Server can be referred every each user by inputting same URL to Web Browser. If this

principle is combined with the function of virtual host [10] which is equipped as Web Server, it is possible to use Web Server as shown in Fig.7. By the function of virtual host, multiple groups of socket (IP address and TCP port) can be assigned for one Web Server. The referred document can be changed every socket. First, it is explained about Fig.7. In Document root of Web Server, directories (Dir A,B,C,D・・) are prepared for each user. By the function of virtual host, each directory is connected to each socket as one pare. By changing TCP port number (3000,3001,3002・・) for one IP address (192.168.1.1), sockets corresponding to each directory are prepared. Next,
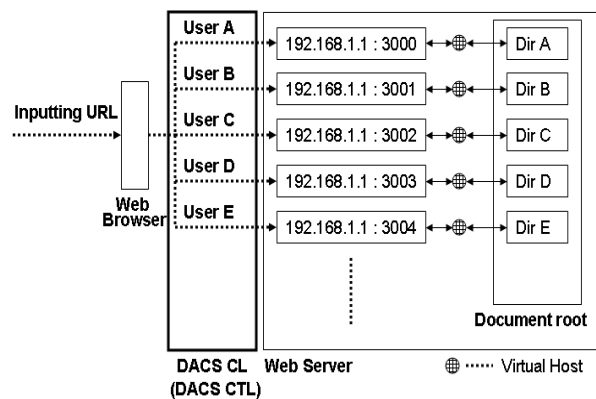

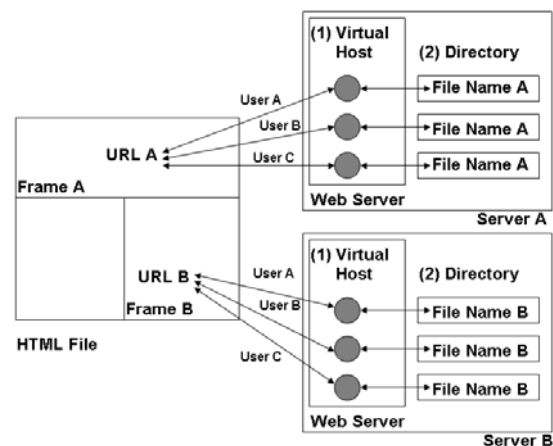**Fig.** 7   Cooperation of DACS Scheme and Virtual Host on Web Server

Fig. 8   New system constitution for information usage

movement on this mechanism is described. One user inputs one URL to Web Browser. If the URL is inputted by User A, the file in Dir A which is connected to the

socket (192.168.1.1:3000) is referred. Equally, if by User B, the file in Dir B which is connected to the socket (192.168.1.1:3001) is referred. If by User C, the file in Dir C which is connected to the socket (192.168.1.1:3002) is referred. If the document medium with same name exists in each directory (Dir A,B,C ・ ・), each user can see different contents by inputting same URL to Web Browser. At the point of user's view, same function of Web Service on extend DACS Scheme is realized. At the point of information sender's view, because it is possible to notify information to the specific user by uploading document medium to the predetermined directory, information usage becomes largely wide. The system constitution as shown in Fig.8 can be realized by using this function. Each URL (URL A,B) is prepared. URL and the kind of information which can be seen after inputting the URL to Web Browser are notified to users. For example, URL for acquiring an issue in one classroom and URL for communicating from office to each individual user is enumerated as a kind of URL. By inputting URL to Web Browser, the file with same name (File Name A or B) is referred. The file is stored in each directory for each user. Each user can see the file which is stored in the directory for oneself. In other words, each user can see the information to oneself. Therefore, the same function to create personal portal, which is shown in paragraph 2 of section 4, is realized. Each information sender only uploads the file with same name in the directory for the notified user. As means for uploading, there are various ways such as using FTP and using file sharing function with Samba. In Web Service on extended DACS Scheme, information usage is limited to the information which is stored as same kind of database. Because the function same as Web Service on extended DACS Scheme is realized by using document medium, information usage becomes largely wide. Moreover, information can be sent more freely and easily because general user can create document medium.

6. Experimental Results

In this chapter, the experimental results are described in order to confirm the possibility of realizing dynamic displaying function of static document medium. Network with DACS Scheme is essential to be cooperated with the function of virtual host on Web Server to change accessible directory for one URL. Therefore, the prototype, which is shown in Fig.9, is built to confirm this point. In Web Server using the function of virtual host, a static HTML file in Dir A is referred if access for destination (1) is done. If access for destination (2) is done, static HTML file in Dir B is referred. Movement of prototype is confirmed as following. After User A's logging in to a client, URL (a) is inputted to Web Browser. By DACS CL (DACS CTL), destination of the communication is

changed to destination (1). As the result, the file named "user.html" in Dir A is referred. Character string of "document for user A" is displayed on Web Browser. Equally, if URL (a) is inputted to Web Browser after User B's logging in to a client, destination of the communication is changed to destination (2). The file named "user.html" in Dir B is referred and Character string of "document for user B" is displayed on Web Browser.

7. Conclusion

In this paper, new function of Web Service, which can display different contents to each user for same URL in the state of using document medium as substitution of database, was proposed. At the point of user's view, the function same as Web Service on extend DACS Scheme is realized. Therefore, information usage can be realized in the form of personal portal as shown in Fig.8. At the view point of sending information to other users, because information can be sent more freely and easily in comparison with Web Service on extended DACS Scheme, information usage becomes largely wide.
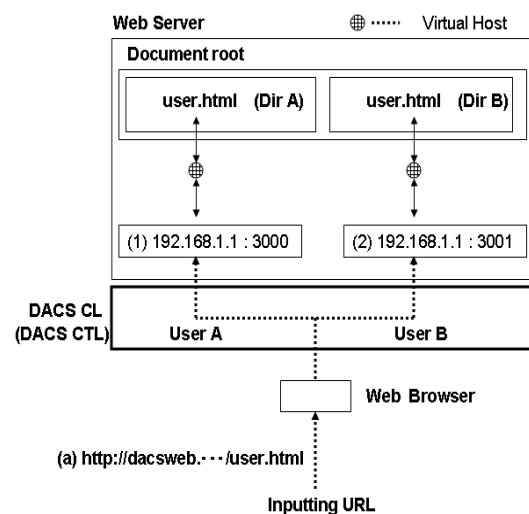

Fig. 9   Prototype

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