The Steps towards a Decrease of an external IP Traffic

Proposal

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THE PRELIMINARY VERSION

`Remarks, criticism, advices are welcome.`

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Abstract

It is well known the rapid growth the data volume and data diversity in Internet, It makes more difficult effective use of Internet information. That appears in a difficulty to locate relevant information and in a many times transfer over a network of the popular documents in the Internet. Here it is discussed how to avoid the unnecessary network traffic.

Chapter 1

The Problem

It is well known the rapid growth the data volume and data diversity in Internet, It makes more difficult an effective use of the Internet information. That appears in two ways:

- it is difficult to locate relevant information - as a result it might lead to unnecessary network traffic;
- on other hand the popular documents in the Internet are transferred over a network many times, that gives in turn an unnecessary network traffic.

This problem will grow because the WWW traffic is expected to be increased faster than IP traffic.

Several words about the term "unnecessary" network traffic. I prefer in this paper to give the short explanation rather than correct definition.

First of all this term is understandable in an intuitive level. We can consider the second transfer of the same data is unnecessary network traffic. For example, on the host B several users requested and transferred the same FAQ on Mosaic. It is clear that it is enough to transfer it only once.

Chapter 2

What people do in this Area

To reduce the scale of the first problem it can be undertaken an installation a various searching tools such a HARVEST, for example. The HARVEST is the system which permits flexible construction of information services that use both the network and information servers efficiently [1]. There are several other systems with approximately same goals, for example, InfoSeek [2], Robot [3], etc.

The advantage of a using these systems is obvious. A user will find required information much faster instead of a slow occasional search in WWW space. It is clear this can save both: a user working time and a network capacity.

I would like to pay a special attention that the system like Harvest can reduce the traffic from both side: for the users inside DESY who try to search an information on non DESY WWW servers and for the users which are outside DESY who try to find out something in DESY WWW servers.

The second part (or second problem) may be solved by special caching technic. The caching on a user level exists already, for instance in Netscape browser. Hence we can discuss the caching on a host and LAN level. There are several places where people do caching for HTTP or at least do interest for this problem [4, 5, 6, 7, 8]. There is also an approach to a caching through the AFS [11].

Yet another possible caching scheme is described below in this proposal.

The caching mechanism can save a lot of time for users inside an organization like DESY.

There is also more general study of the HTTP traffic problem [9, 10].

As a simplest method to reduce the unnecessary traffic on a host level is to give to everybody the access to the whole list of HTTP, WAIS, FTP, and gopher sites which were accessed from this host by any other user. It is clear that experience of neighbor colleagues is probably most useful.

These actions:

- an introducing a some kind of the indexer and gatherer;
- an introducing the caching schemes;

both may reduce the volume of an unnecessary network traffic. Apparently the more large organization the more profit in saving the resources.

2.1 THE POSSIBLE CACHING SCHEME ON A HOST/LAN LEVEL

During the serving of every request from a user a browser will check every HTTP address against the list of files which are kept at a local host. If a file is kept at a local host then local copy will be displayed on user terminal instead remote one. Of course user can ask to get a remote file copy instead of a local copy.

From where will be the set of the local file copies?

The browser should collect the HTTP addresses. Once per period TA (parameter) special server will analyze this set of HTTP addresses. If the server will find repeated addresses (NN times) - the server will put these addresses into a list of HTTP addresses which will be served by another server which mirrors this file on local host.

In mirror list a file HTTP address may leave certain period LT (parameter). More precisely that is time after last access. When this time is expired the HTTP address should be removed from this list.

Of course, the best effect will be obtained in the case when in large organization there are a lot of files which are accessed several times per day.

Please see the picture.

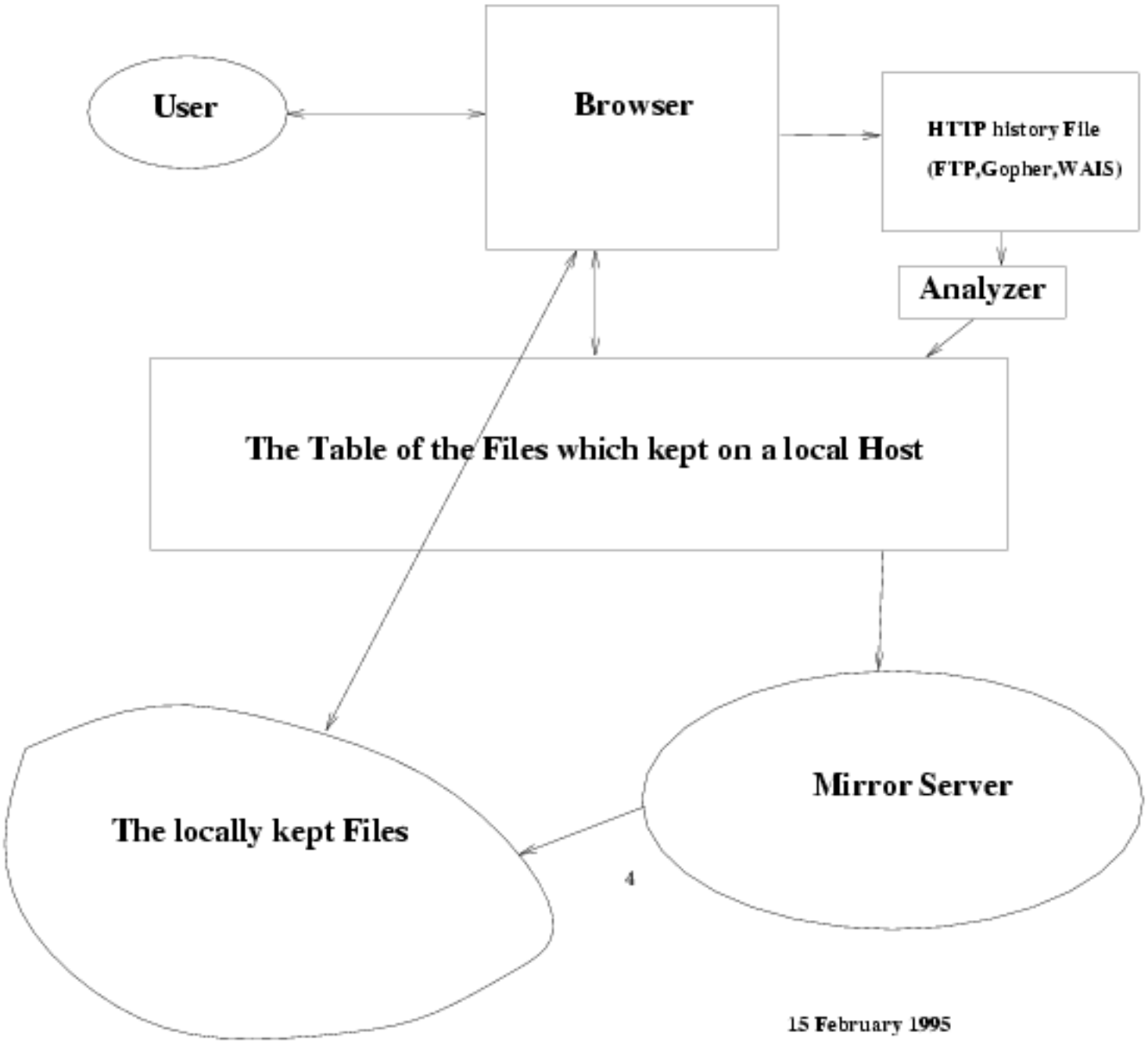
2.2 The Estimations

In particular from [6, 7] we can derive that it is possible to decrease the network traffic by 1/3 or even by 1/2 with an using of an appropriate caching scheme.

To estimate the degree of the network traffic decrease with an gatherer, indexer, and similar tool is more difficult. However it is clear that an using such an intelligent tool will increase a general effect of the external network traffic.

I think with an undertaking the set of the steps we can hope to decrease the total DESY network traffic by 25-35

The suggested caching Scheme



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Chapter 3

What we can do

I think we can consider several directions of a concrete activity at DESY:

- to study the type and volume of the DESY external network traffic;
- to study and install the indexer;
- to begin to use the World-Wide Web Proxies [4] or other caching scheme (by development or adoption).

No doubt with a transition towards the decrease the traffic we will make more precise imagination and decision.

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