

Research Article

Dynamic Tracking of Web Activity Accessed by Users Using Cookies

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Abstract: The motive of this study is to suggest a protocol which can be implemented to observe the activities of any node within a network whose contribution to the organization needs to be measured. Many associates working in any organization misuse the resources allocated to them and waste their working time in unproductive work which is of no use to the organization. In order to tackle this problem the dynamic approach in monitoring web pages accessed by user using cookies gives a very efficient way of tracking all the activities of the individual and store in cookies which are generated based on their recent web activity and display a statistical information of how the users web activity for the time period has been utilized for every IP-address in the network. In a ever challenging dynamic world monitoring the productivity of the associates in the organization plays an utmost important role.

Keywords: Cookies, policing, resource monitoring, resource utilization, W-catch, web page tracking

INTRODUCTION

In the daily routine of several big organizations which have a huge number of employees working for it. It is pretty obvious that each individual cannot be constantly monitored for the work he is doing. We need an automated tool that is capable in doing so and this concept is an initiative in monitoring the web activity of all the individuals working. It dynamically generates cookies which store information regarding all the web activity and gives a detailed statistical report of the entire user activity in every fixed time period.

There are several previous studies in this field which have attempted to establish a protocol to constantly and efficiently monitor the resources of an organization, like creating registers and using JavaScript code to track the traffic (Richard *et al.*, 2006). There have also been efforts to track the web activity using temporary cookies as a medium of storage (Ashkan *et al.*, 2009). This project utilizes the concept of persistent cookies in storing the web traffic accessed. It overcomes all the limitations expressed in the previous attempts by creating dynamic cookies as and when a user generates traffic using Java Script which is embedded to a nodes browser and records all the activities.

MATERIALS AND METHODS

Structure of cookies: Cookies were designed to be a reliable mechanism for websites to remember Stateful information of the local by the server. This

concept is extensively used in the project. These are nothing but piece of information sent to a server by the browser to identify itself. There are different types of cookies like Session Cookies, Super Cookies, Zombie Cookies and others. We make use of Persistent Cookies which lasts in memory for a user defined time period.

In general the structure of a cookie contains the following parts:

- (Name, value) pair of the cookie (i.e., name = value)
- Expiry of the cookie
- Path the cookie is good for
- Domain the cookie is good for

An example of the servers response to a http request:

Set-cookie: Name2 = Value2; Expires = Wed, 09 Jun 2021 10:18:14 GMT.

We use the properties of these cookies to store the information of the user activity during a time period. We use cookies because they are fast and effective their lifetime can be pre-defined by us to expire after a certain time frame.

Proposed block diagram: The below represented Fig. 1 will give an idea of what we propose.

Description of the proposed protocol: The protocol basically requires in capturing of all the web pages accessed by the system user and then storing each of the

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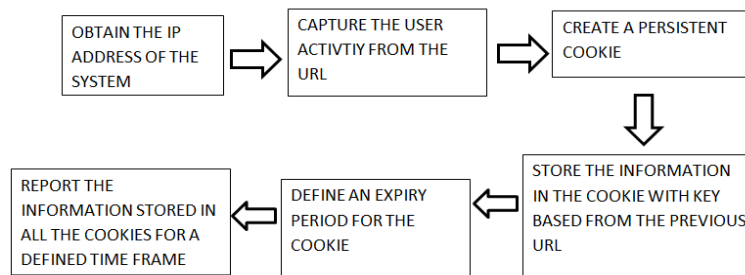


Fig. 1: Proposed block diagram

data systematically using cookies (Alexander and Heiko, 2003). In order to first identify the user we extract the ip address of the local machine using java script. We then capture all the activity the user performs like in the websites he visited from the URL address bar and store them in Cookies. We create each cookie with a certain key value pair. The value part would be the information regarding the URL site visited which is to stored and the key part would be dynamically generated based on the previous activity of the user (i.e.) in this case we would like to extract the last five letters in their order and give in as input to a hashing function which would give its output as a unique value. We can use this value as the key for the next value and the loop continues to as long as the user works on different sites during his working hours.

Code snippet: The below code is used to extract and display the IP address of a machine. We take the help from a predefined vendor to extract the network IP address of the current machine and store it:

```

window.onload = function () {
var script = document.createElement ("script");
script.type = "text/javascript";
script.src = "http://jsonip.appspot.com/?callback = DisplayIP";
document.getElementsByTagName ("head") [0].
appendChild (script);
};
functionDisplayIP (response) {
document.getElementById ("ipaddress") .innerHTML = "Your IP Address is" +response.ip;
}
}

```

Tracking and storing using cookies: Every time the user enters anything into the URL tab the extension developed records the contents of the web page using native java script commands (Janet *et al.*, 2006). We can use any method to extract the contents from the URL like using a specific timed key logger etc. But in this protocol we use java script chrome.tabs.query() command to pull the data of the entered URL:

```

chrome.tabs.query ({'active': true, 'lastFocused Window': true}, function (tabs) {

```

```

varurl = tabs[0].url;
printt(url);
});

```

Once the data is pulled using the method shown above we store it a local variable this data is the url in our case. Now is the time to store the data in cookies by generating a key value pair every time a web page is loaded by the user:

```

document.cookie = "username = XXX; expires = Thu, 8 Jan 2015 12:00:00 UTC"

```

The script command document.cookie() is used to create a cookie with a key and value which are username and XXX in the above statement. We need a key for every value because the system must be able to identify the appropriate cookie while retrieving the information to the user. Shown below is a code snippet of how we can store the values in cookies:

```

functionsetCookie (cname, cvalue, exdays) {
var d = new Date ();
d.setTime (d.getTime () + (exdays*24*60*60 *1000));
var expires = "expires = " + d.toGMTString();
document.cookie = cname+" = "+cvalue+"; "+ expires;
}

```

We use the above shown method to store every value of which is viewed by the user into a cookie. In this implementation to generate the key for storing the next viewed web page we use the name of the previously viewed page as the key. We extract the last five characters of the previous URL and use it as a key for the next cookie. We can even improvise this by giving it as a input to any hash function that generates a unique value as output and utilize this output as the key value pair for the cookies (Lewis *et al.*, 2003). Thereby creating a dynamic environment in storing any number of web pages viewed.

We then use the document.cookie.split (',') command to extract the values from the cookies and display it in a loop. Here we use a semi colon as a delimiter to distinguish between different values of the cookie. The memory allocation of the cookies need not



Fig. 2: Snapshot of a URL being captured by the extension

be worried about as they are automatically set to expire once they reach their expiry time which set as 1 week in the above example. Figure 2 represents the sample URL being captured by the extension.

CONCLUSION

The above mentioned protocol can be implemented to drastically improve the productivity of any organization by efficiently monitoring the activity of all the individuals working in it. It creates a hassle free environment for all the people working in a organization in monitoring and increasing the throughput of the organization by correctly managing it resources. The automation of work in monitoring the activities of others helps the organization to spend more quality time over actual productive work in developing the organization. This increases the efficiency and throughput of the time each individual works towards the organizational benefits (Liangzhao *et al.*, 2007).

RECOMMENDATIONS

This project has a huge scope in the future and can be extended to all kinds of devices such as smart phones, tablets etc. This can be incorporated towards efficiently managing all the resources available in the company. In a forthcoming era where productivity is the future and keeping a check over the constructive utilization of time is very important.

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