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Clickstream Analysis: a Strategy to improve e-Business

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Abstract - E-business can be defined as the sale of services and goods via electronic channels or through internet for household or personal use by customers [1]. This definition includes electronic commerce tasks that results in transactions of a business with end customers rather than business consumer i.e. business to consumer rather than business to business. In short, electronic business is one that is done with internet as a market place. With increasing business operations through internet, organizations have started adapting strategies to make their web pages competitive than that of their rivals. Clickstream is a process of analyzing, collecting and reporting data about visitor's path through the internet, including websites and the pages of sites that the user visited in what order and how long the visitor stayed on that page. Clickstream analysis helps organizations in tracking their customers and their preferences. This paper discusses in detail the contribution of clickstream analysis in promotion of e-business.

Keywords— Clickstream, Analysis, Strategy, Improving e-Business, e-Commerce.

I. INTRODUCTION

Clickstream is a process of analyzing, collecting and reporting data about visitor's path through the internet, including websites and the pages of sites that user visited in what order and how long the visitor stay on that page. A series of work done by user in web pages in a single visit is known as session. The collection of sessions in the website is called Clickstream. Clickstream data are derived from the hits (page request) that recorded in the web server files[2].

The Internet shapes the existing business environment in many ways to introduce a new business environment, but there may be advantage and it act as a supporting tool for many companies. The e-Business tools such as CSR (Corporate Social Responsibility), e-Commerce, e-Procurement are the supporting tools for the companies to improve the performance and make success in the e-business [3]. E-Business is the broader definition of e-Commerce or EC. The e-Commerce describes the process of selling, buying, exchanging products, services, transferring via computer networks. E-business is not only selling and buying the goods, but also collaborating with the business partner, conducting electronic transaction, servicing the customers and conducting e-learning within the organization [4]. E-Business is about an organization that exploits the IT and Internet to transform all of its activities to increase their efficiencies, advantage and to reach new markets. "Information Technology and Business are becoming inextricably interwoven. I don't think anybody can talk meaningfully about one without talking about the other" – Bill Gates Co-founder, Microsoft.

II. AN OVERVIEW OF E-BUSINESS

Electronic business is commonly referred to us as e-Business. E-Business is the fundamental in the way that the business will be done- supported, abetted, enabled and aided by the technology. E-business is not World Wide Web and it is conducted by using the technologies like internet, extranets or by intranets [5]. The Electronic business methods allow the companies to link between their external and internal data processing systems more flexibly and efficiently to work with the partners and suppliers and to satisfy the needs of the customers. Electronic business solutions that applied in the organization allow the inter firm and integration of business processes. The e-Business is the adventurous of technologies to enhance the shareholder return by breaking the traditional business models, transforming the key processes to compete in better ways, faster, and new including multi-channels, effective interactions with all the stakeholders, creating the brand experiences, leveraging knowledge to maintain competitive advantage. Simply the e-Business is a tool that increase the organizations productivity, reduce costs and to improve the customer service.

Umar et al describes, that e-Ccommerce is selling and buying the products over the internet or any network, while the e-Business is conducting the business including selling and buying over the internet or any network. E-Business systems must be built, deployed, architected and managed within the security, goals, budgetary and constraints of an organization. The E-business spans the technology and business together. It is DCS (Distributed Computing System) that are designed to support the business activities. The Distributed Computing System is the collection of too many computers that interconnected to a network to achieve the business or the other functions [6].

The e-Business model gives new opportunities for the organization and the business that are currently practiced. The e-Commerce business transaction can be done between various parties, as follows [4]:

B2B (Business to Business): Here the business organizations are the both buyers and sellers.

- **C-Commerce (Collaborative Commerce):** Here the business parties collaborate electronically.
- **B2C (Business to Consumer):** Here organizations are the sellers and the individuals are the buyers.

- **C2B (Consumer to Business):** Here the consumers ask for the particular service or products and the business (suppliers) compete to provide that service or product to the customers.
- **C2C (Consumer to Consumer):** Here the individuals sell the services or products to the other individuals.
- **Intrabusiness commerce:** It is also known as Business to its Employees) B2E. Here the organization uses B2E to improve its activities.
- **M Commerce (Mobile Commerce):** E-Commerce with wireless environment such as mobile phones to access internet then it is called as mobile commerce.

The above business models are used in e-commerce to generate a value to the business organization.

III. WHAT IS CLICK STREAM ANALYSIS?

The company's web server record each and every page event is known as Clickstream and it contains sessions, referrer and page. The most exciting development in the data warehousing is the clickstream [7]. The clickstream maintains a record of each and every request from every user to a site. It is used to identify both the successful and unsuccessful pages of the sites [8]. A clickstream analysis identifies the user moves in the sites by clicking the link and also it identify how long the user stays in particular site. The important measurement in the e-commerce is conversion rate. It explains about the rate at which the user who buy a service or product from the site. The success of e-commerce in the organization is calculated by the number of sales made in and the overall profit generated through it. It is also necessary to measure the transactions, visitors and percentage of the visitors who made transactions and also how many of them complete the transaction [9].

Clickstream is the record of the user's activity on the internet and it is valuable to the internet advertisers and marketers [10]. The clickstream analysis in the marketing includes web usage, internet advertisement, navigation, online shopping and e-commerce. The clickstream applied in the e-commerce environment on online stores provides the information that is to understand the essential and effectiveness of the marketing such as how the customers find the store, what kind of products they buy and what product they see. Analyzing this information that embedded in the clickstream the online stores can understand about the effectiveness.

The clickstream data can be captured by four ways such as Web beacons, weblogs, packet sniffing and JavaScript tags [11].

A. WEB LOGS
The Web logs are the original source of data collections from the Web.
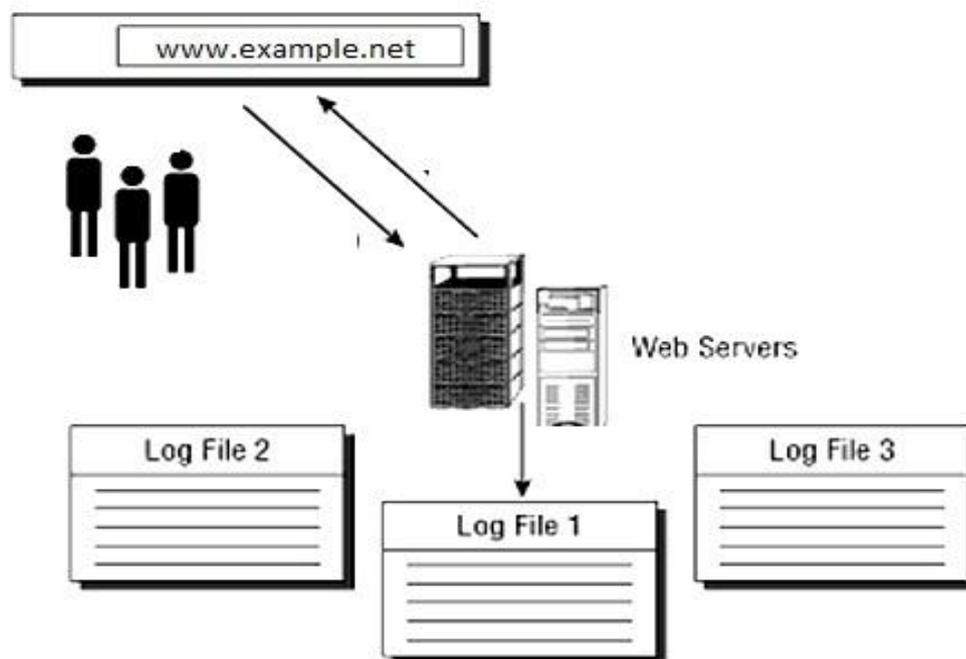

Fig.1. Web logs data capture flow

The above figure shows how the data are captured in the web logs. Web logs are easiest way to capture the data and by using this method one can able to own the data.

B. WEB BEACONS
These are developed when the banners ruled the Web as way of "capturing eyeballs" and delivering "sticky" websites in the measurement of hits. A company banner ads run across many websites and there may be similar ads but it is to find how many people saw this particular banner ads by clicking.
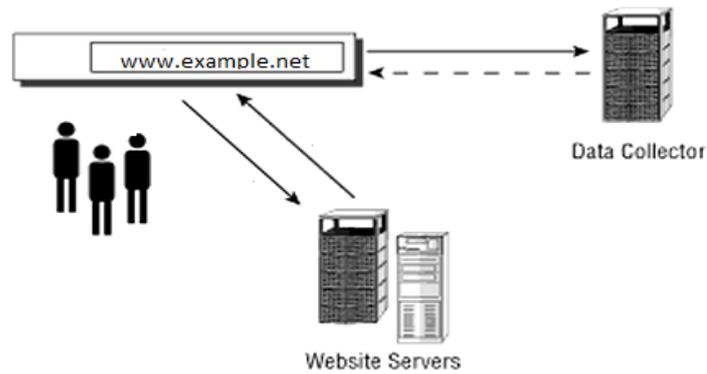
Fig.2. Web beacons data capture flow.

The above figure shows the process of data capturing in the web beacons.

C. JAVASCRIPT TAGS

The JavaScript tags became standard development in web. JavaScript tags starts working when they install a code in webpage that calls the JavaScript function and that collects the data. The JavaScript data call from the remote location and the data also stored remotely.
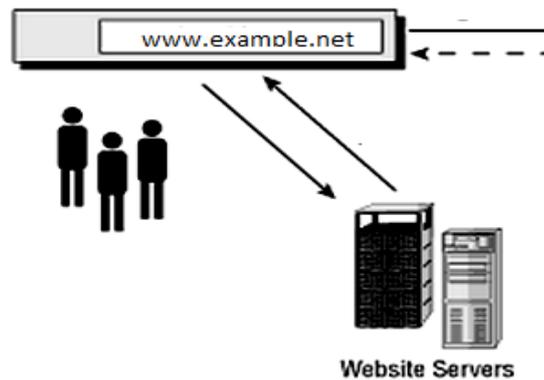

Fig.3. JavaScript tags data capture flow

The above figure shows the complete view of data capturing by using the JavaScript.

D. PACKET SNIFFING

The Packet Sniffing is a technical method that every one wishes to skip. It can be piece of hardware that placed between web and the server or in software that installed in the web server. All the process is sent through the sniffer and this allows knowing about what is happening in the site.
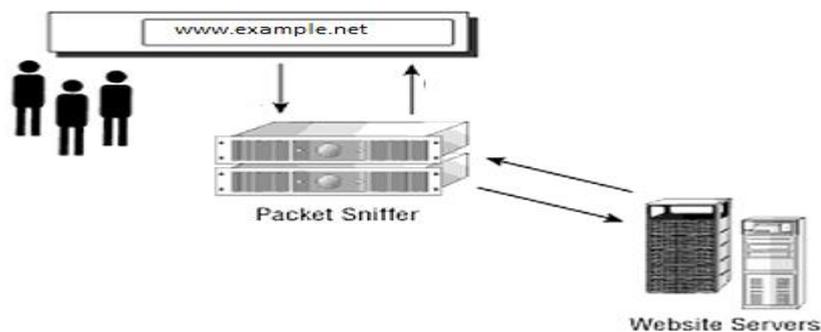

Fig.4. Packet sniffer data capture flow

The above diagram shows the data capturing by using the Packet Sniffing in the clickstream. All the data's are passed through the sniffer, so there is no need to use JavaScript or the history of the websites.

IV. HOW DOES CLICKSTREAM ANALYSIS HELP IN PROMOTING E-BUSINESS?

The clickstream analysis helps to promote the e-business in many ways such as to increase the performance, analyzing and reporting about the particular organization. There are many challenges in e-business including protecting fraud, consumer privacy, hard to use web sites, unreliable and problems with deliveries [12].

The Business process mining is a technique that reveals existing process work and provides investment to discover the new process efficiencies [13]. It is also known as workflow mining. The web process mining is the task of extracting the useful information that related to work process from the clickstream of a usage logs or websites collected by the web server. Giudici et al describes, the clickstream analysis that applied within the organization helps to improve the customer offering, promoting sales and other products. It helps to identify the statistical unit such as debtor, customer and business values. The data analyzed in the site becomes to establish e-shopping of the products [14].

The e-Business promotes many services that related to products. Likewise, the clickstream is method that helps to analyze and collects the data from the sites and helps the organization by reporting the standards and statistical view of the companies. It is necessary to improve the real time web site communication and interaction to obtain the quality in the e-Services [15]. The monitoring is also an important method to improve the performance of the organization. The two main things to change the business views are the observation and changing the existing one according to the trends.

The commercial organizations use the clickstream to gather data and then they started to learn how to design the sites, how to market them and how to make them as user friendly. In the commercial internet company, the clickstream data value is the evident. It is used to design the site and to determine the advertising strategy. It is one of the requirements for the effective training. Here the aim of this site is to attract the learners to the site, thus the clickstream promote the learning for this organization [16]. Likewise the clickstream helps many organizations to promote their e-business.

V. REAL TIME EXAMPLES

The e-business environment has a strategic business plan about the organizational structures, productivity, decision making, consulting, small management, HR management and finally motivates the employee towards the goal of the organization. The Bank is the one of the real time examples for the business. The clickstream data are stored in a data warehouse or the data webhouse [17]. Now a days, the e-Business management has attracted by many unrelated companies and their clients are demanding for the e-business services. Many large scale companies have established the e-business management. The IBM (computer hardware vendors), Accenture (Management consulting firms), AT&T (telecommunication firms) are the competing companies to achieve a growth opportunity [18].

The e-Commerce had begun with a few enterprises like Ebay.com and Amazon.com. The Amazon first opened the door for the online business on July 16, 1995. It was one of the online bookseller companies but today it achieves a great success much more than merely [19].

The clickstream analysis is the method for the companies to analyze the customer value. For example, the Web managers in Chicago (Playboy.com) started analyzing the clickstream to grow their business. The site allows the free visitors to paying members to reach profitability in the Cyber Club. Here the WebHancer in playboy.com examine where it gain customers and where it loses. The Webhancer's e-business activity focuses on the user activity. The companies like Playboy.com reports the data about the failed conversions, traffic flow and also compare about the competitors [20].

Now the Tesco operates the most successful programmes that ever created. The Clubcard allows the Tesco to collect the transaction information on the two thirds of shopping baskets processed among 14 million users. This scheme is useful but it was too critical to Tesco that was to turn the data towards customer knowledge and act on it. Tesco recognized the importance of data analyzing. The Clubcard scheme was started in Tesco and the company decided to outsource the project (data analysis) to the company – DunnHumby which is specialized in data analysis. Tesco maintains the ability to improve the reality for customers and common sense responses. The analytic tools are used for various purposes while collecting the evidence. The clickstream and Quality analysis are the two powerful tools that help in data analysis [21].

VI. ADVANTAGES AND DISADVANTAGES OF CLICKSTREAM ANALYSIS

The click stream analysis helps to identify the data analysis. The security is the major advantage and the clickstream tracking is also possible by using the web bugs [22]. The cost of maintaining the clickstream database is easily altered and easily accessible to the customers. The clickstream allows capturing the data in a useful format and a rich data. The clickstream represents the actual www usage data. It is used for marketing purposes and can be generated without the interactions of the customer. The clickstream share their transaction IDs and it is robust to make the changes in URL. The clickstream provides advantage in performance and flexibility [23]. It gives greater flexibility for increasing revenues and innovation, profit and it improves the quality of services and products based on the requirements of the user. The privacy is one the main disadvantages in the clickstream analysis. It provides the reasonable access and security. The security is not reaching the consensus to the amount and type of access that provide to the customer. It is one of the major issues [24]. The clickstream does not rely upon the usage for Self-Reports. It does not capture the network affects. There are many disadvantage occurs during the implementation of the online business. While using the web server log file analyzer, it is necessary to buy all the software and hardware in advance [25]. In clickstream there are some other disadvantages like data integration problems, overload problems, brand control and advertising problems [26].

VII. CONCLUSION

The process of identifying the user's way is the clickstream analysis. The Clickstream is a tool that helps the e-

commerce business environment in various ways by act as a supporting tool for the business activity. The e-commerce links the business, suppliers, customers, distributers, workers and competitors. The internet is used to connect all the people in the world and it allows sharing the information. The internet that connects with organization that may be interconnected to share the business information is the e-business. The e-business changes the traditional business environment to the new environment. It is an evolution by using this technology, the organization achieve more technologies, competitions, transactions and marketplaces. From the rapid development in the internet and technology, the supportive tool for the business is identified as e-business. The IT and e-Business offers a huge benefit to the business.

Thus from the above study it is clearly reveals that the clickstream analysis is one of the supporting tool to the business. It promotes the business by increasing the performance and by reporting the statistical view about the competitive companies. The e-business promotes the economic development and innovation. The e-business acts as a complete solution for the online business organization and it meets the customer requirements.

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