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IOT-INTERNET OF THINGS:IOT DEVICES OPERATIONS IN SENSING AND COMMUNICATING BY CACHE BANDWIDTH MANAGEMENT – IMPROVEMENT IN THE PERFORMANCE OF REAL TIME WEB BASED IOT APPLICATIONS

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ABSTRACT

In this paper we have analyzed the data from different computers for the improvement in the cache utilization and also to improve the performance of the system. In the IoT (Internet of Things) Era this paper is helpful in the future applications and web based projects. As in future almost everything will be get related to the internet; the management of cache plays the key role. IoT communicates between the physical objects, components, devices with different network architecture and henceforth requirement of huge bandwidth [2]. Any devices can be made alive by using IoT. Devices which are not related to connectivity, IoT makes it connection oriented. For example simply a car without any electronic devices fitted inside can be connected to internet or GPS [4]. So it states that the things or objects which can perform limited operations can perform more due with the help of IoT. Not only IoT, all the things related to internet will get benefit of this cache management concept as bandwidth going to be very crucial [5]. By our analysis most of the unnecessary data get cached in the memory like the newspaper, share market, which is having no meaning to get cached. Because, caching can improve application performance by reducing the time required to get the requested resource. As per our experimentation mostly the multimedia files like images are cached in the memory and those are static in nature. In this paper the experimentation carried to prove that there is no meaning to store dynamic files in cache as this will consume the memory as well as it will reduce the system performance especially latency response time [12].

Keywords: Internet of Things (IoT), Digital India, Bandwidth reduction, Pre-fetching and Post-fetching,

I. INTRODUCTION

In this paper the experimentation conducted and scenarios considered for performance improvement by cache management during the applications of Web Based Services like Internet of Things (IoT) [2].

So, we have divided the files in two categories Static files and Dynamic files.

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By this we can analyze the data properly, again we divided these files in to cacheable data and noncacheable and again we analyzed. The thing we are trying to prove is, there is no mean to store the dynamic files in the cache. By the use of graphs we have shown in the paper that the js and text as well as html files consumes some space in memory. Lots of case study has been done for research that why cache management is important .Survey from server side has been done and proper indexing of various files is accomplished. Cache is an entity that stores a temporary data in some place so that it can be retrieved in future on request the data stored in a cache might be the result of an earlier computation, or the duplicate of data stored elsewhere [7]. A browser or Web cache does exactly that, except with program and website. Caching improves and speeds up browsing. Once you've downloaded an asset, it resides for a specific time on your computer. Retrieving files from your hard drive will always be faster than retrieving them from a remote server, no matter how fast your Internet connection is .When you browse some data temporary files are stored in secret folder which are hidden files like HTML, Jscript, jpeg, gif, PNG etc. The cache provides in-memory storage and management for your data. Cache is stored in folder name "Temporary internet files" which is in hidden format so it is hard to find for a normal user. Option like "clear cache" is available to discard the temporary cache files from the browsing history [9].

Static files are the files that do not change and dynamic files are files whose size varies. Static files are jpeg, png, gif etc. Dynamic files are Text, HTML, JScript, CSS etc. In static cache we cannot insert or update any value in file. It means that additional operation cannot be performed, once it is created alteration is not allowed. In Static Cache the Integration Service does not update the cache while it processes the transformation. But in case of dynamic cache we can insert or update the values in files resulting in increase of size [7]. Dynamic cache is synchronized according to operation or target. The survey done on various machines we found that sizes static files like media files(JPEG,GIF,PNG)has more number size than Dynamic files this is because static data is loaded again and again while we visit different sites or pages. Due to duplication of same files, size of cache increases and hence results in reduction of access time; so more algorithms and processes are working on these issues [10].

II. LITERATURE SURVEY

Physical objects, Devices, components or any hardware material senses or communicate with other network infrastructure is called Internet of things (IoT) [2]. Internet of things enables various components to collect and exchange data. IoT can be remotely accessed from network located at different places. "Things," in the IoT sense, can refer to a wide variety of devices such as heart monitoring implants, biochip transponders on farm animals, and automobiles with built-in sensors, devices for environmental/food/pathogen monitoringor field operation devices that assist firefighters in search and rescue operations. Internet of things has ability to transfer data over a network without requiring human-to-human or human-to-computer interaction [4].

Best example for the IoT will be that Google tie up with Tata trust the body arm of Tata group to educate rural women about internet by sending 1,000 specially- designed bicycles equipped with internet devices into remote villages. Each of these bicycles will be operated by "Internet Saathis" trained by Google and the target is to train about 500,000 Indian women in the next 18 months. Every bicycle will be Wi-Fi compatible so that the location of bicycle can be traced. The internet cart would be available in a village for a minimum of two days every week

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for over a period of four to six months. Once the cart has completed the training in a cluster of three villages, it will be moved to the adjoining cluster for completion of a similar cycle. Another Example for internet of things is Using your smartphone's range of sensors (Accelerometer, Gyro, Video, Proximity, Compass, GPS, etc) and connectivity options (Cell, Wi-Fi, Bluetooth, NFC, etc.) you will have a well-equipped Internet of Things device in your pocket that can automatically monitor your movements, location, and workouts throughout the day [2,4].

III. PROPOSED METHODOLOGY - EXPERIMENTATION AND RESULTS

Analysis of cache files for knowing the amount of size required for static and dynamic. Cache data has been taken from several machines for survey of sizes of different types of files. Calculation of all files has been done and commutated according to types of files. Different types of cache files are partitioned. Bifurcation of cache files in different columns has been done.

Laboratory No.	**Static Data (KB)**	**Dynamic Data (KB)**
LAB1	10951.6	2109
LAB2	1579	1818.08
LAB3	1114	1016
LAB4	49.4	74.5
LAB5	1124.86	685.7
TOTAL	**14818.86**	**5703.28**

Table 1: Static Vs Dynamic Data analysis

In the Table 1 LAB No. indicates the specific Lab from which we have collected the data for analysis.

Table 2: Classification of Data based on Occurrences and Size

File Type	**Occurrences**	**Data Size**	**% Share**
Script files	8	34.5	0.16
Text files	92	220.66	1.07
HTML files	62	1381	6.72
JPEG files	67	1632.6	7.95
EOT files	23	1073	5.23
PNG files	217	10458.6	50.96
GIF files	33	53	0.25
CSS files	52	1266.7	6.17
JS files	86	3296.08	16.06
XML files	13	269	1.31
Zip files	1	837	4.07
Total ~			100%

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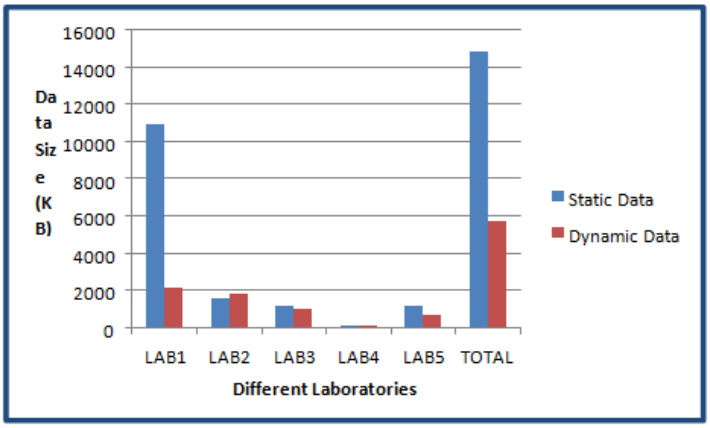

Figure 1: Analysis of Data from Different Laboratories

As shown in Figure 1 we can see that the static data consumes more space that dynamic data. The data is collected from different computers from different laboratories, from this we can see that static count of data in the selected computers is more than dynamic data so if we calculate for whole organization the data will be more than this.

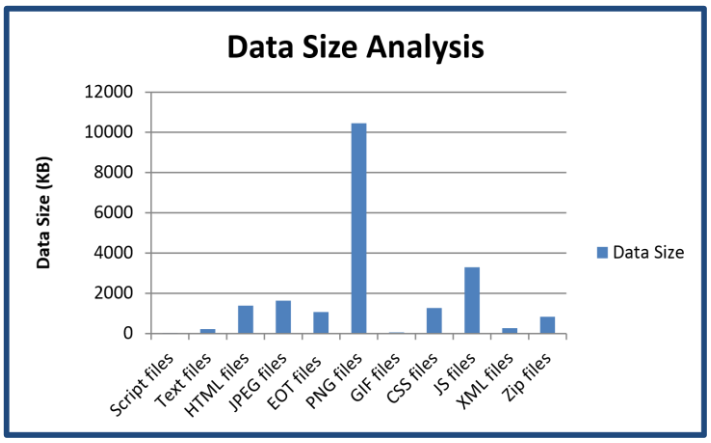

Figure 2: Analysis based on Data Size on Server

In figure 2 the Cache server analysis performed based on the size of the data. Where PNG files occupied most of the space in static category.

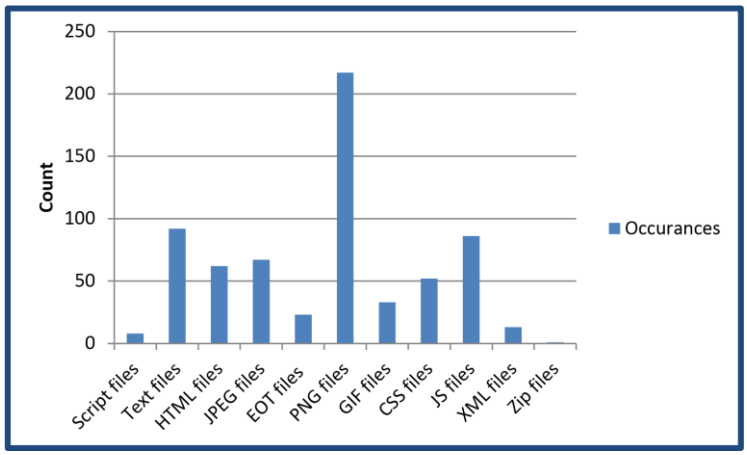

Figure 3: Occurrence parameter for quantified role of Specific Type

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Interestingly as shown in Figure 3 the Text files has second highest number of occurrences but the size occupied is hardly 1%

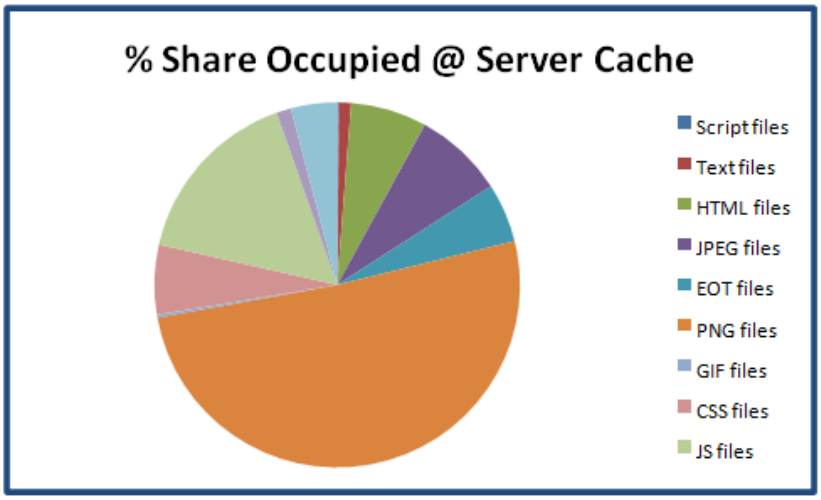

Figure 4: Summary of % Share Occupied at Server Cache

Various data types are summarized in the Figure 4 which reflects the size occupied on the cache server in %. HTML and PNG has the major share when it comes to measurable size.

Table 3: Cacheable Vs Non-Cacheable Data Analysis

Cacheable Data			Non-Cacheable Data		
File Type	**Data Size**	**% Share**	**File Type**	**Data Size**	**% Share**
JPEG	808	7.11	TEXT	3	0.02
PNG	9369.6	82.53	JS	1044	10.08
GIF	46	0.44	HTML	82	0.79

In the Table 3 the analysis of Cacheable Vs Non-Cacheable files is done as per their type. The percent share column show us how much size out of total data consumed by the type of file.as we can see PNG files consume most of the space and script files consumes very less space .so again we can see that most of the static files are acquiring the space .

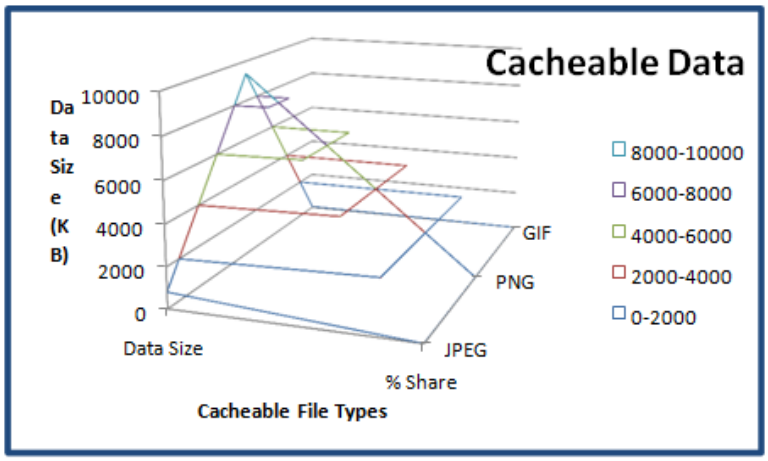

Figure 5: Cacheable data Pyramid Structure

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Figure 5 indicates the pyramid structure analysis of the Cacheable Data based on the respective file types.

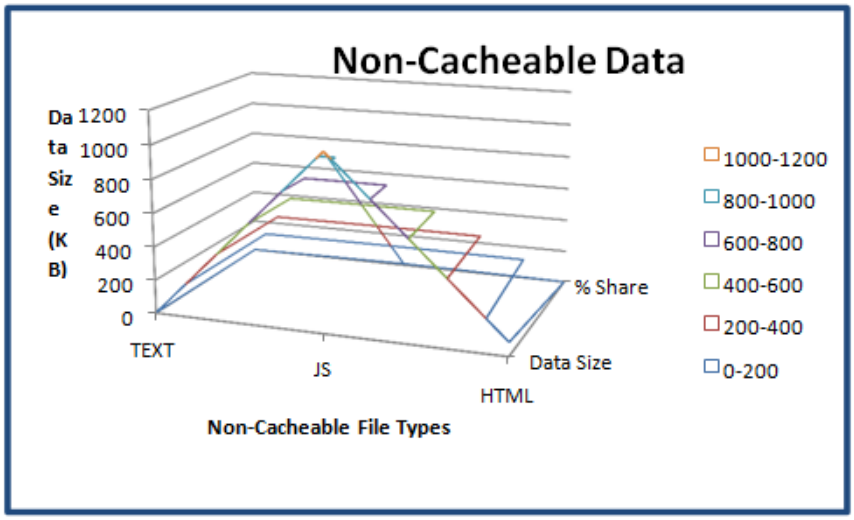

Figure 6: Non-Cacheable data Pyramid Structure

Figure 6 indicates the pyramid structure analysis of the Non-Cacheable Data based on the respective file types.

IV. ACKNOWLEDGEMENT

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V. CONCLUSION

Due to IoT a daily human life is becoming more sophisticated and less stressful. Remembering some task and we use to forget it can be overcome like Glowcaps fitted on medicine bottle will remind you to take medicine, Cobra tag is the device which will help you to find keys, WeMo allows you to turn off you electronic devices across the world or from living room. This make a sense that Internet oriented objects or devices makes the daily life comfortable and easier; subject to the proper and effective Bandwidth Management as shown in this paper. Hence we conclude that by managing the cache we can improve the processing time as well as the system performance, the duplication can be avoided or overcome. Cache is responsible for a great deal of the system performance improvement of today's PC .without Cache the computer will be very slow and all our works get delay; due to cache management fetching the data from server becomes faster. By applying proper algorithms for the cache management we can achieve goals mentioned above this paper can be used in IoT (internet of things). We analyzed the data from different machines and took the average as per the type of data just like text, JPEG, PNG, script etc. as we can see in some laboratories the count of dynamic files is more than the static files, which is not required and as per the calculations the static count is almost thrice of dynamic count the PNG files share most of the percentage over all files almost 50.96% of files that we have analyzed are

PNG files. The text files, it is having second most number of counts in the list but it has only share of 1.07% in Server Cache memory at the same time JS (java script files) are acquiring quantifiable size more than 16% which we have ignored in this experimentation considering its dynamic nature.

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