Chapter 5

Results and Discussions

5.1 Basics

Chapter 4 discussed the proposed frameworks and algorithms addressing the research issues highlighted in previous chapters. This chapter aims to present the results of the proposed work and a comparison of traditional approach with the proposed work is being presented.

5.2 Performance Analysis of PECA

PECA [24] has presented a novel approach for enhancing the computational performance of web service discovery by applying the concept of extended cache memory. Two cases namely case1 and case2 including three test cases in each of the case were considered. The performance improvement gained by introducing a cache is satisfying requests directly from the cache instead of generating traffic to and from the server. To work effectively, the footprint of a cache could cover a large population of users. This is to increase the likelihood that two or more users will request the same resource that can then be returned at least once from the local cache. Also, the cache server should be kept as local to the end-user as far as possible – ideally within the local area network of the organization. So as to avoid flooding expensive or low-bandwidth long distance links with traffic [96 and 98].

The network traffic having images, videos, first page and any other large files should be available at client side as priori. The user can get the same via the authorized extended cache memory provided by the organization or via the Internet. In case of Internet, first time user has to follow the traditional process and the organizations have to provide a special link to download the heavy data on user’s machine. Once the data is saved at user end, user can use this data via any memory device. The user just has to follow the instruction to provide the main link of the
heavy data on the main page of the site. Then the organizational site will link the same data with its site.

The updation may be conveyed to the user periodically either manually or automatically by the server. Performance times are measured using Web Performance Load Tester [75]. Table 5.1 lists the comparison of case1 and case2 on different performance parameters as already mentioned.

<table>
<thead>
<tr>
<th>Test Cases</th>
<th>Total Duration (min.)</th>
<th>Pages</th>
<th>URLs</th>
<th>Images</th>
<th>Total Size (KB)</th>
<th>Avg. Page Size (KB)</th>
<th>Total Image Size (KB)</th>
<th>Avg. Image Size (KB)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Case1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C1T1</td>
<td>01:02:71</td>
<td>8</td>
<td>27</td>
<td>19</td>
<td>393.3</td>
<td>49.2</td>
<td>353.5</td>
<td>18.6</td>
</tr>
<tr>
<td>C1T2</td>
<td>00:44:26</td>
<td>8</td>
<td>16</td>
<td>8</td>
<td>44.8</td>
<td>5.6</td>
<td>8.9</td>
<td>1.1</td>
</tr>
<tr>
<td>C1T3</td>
<td>00:17:62</td>
<td>6</td>
<td>13</td>
<td>6</td>
<td>37.8</td>
<td>6.3</td>
<td>7.4</td>
<td>1.2</td>
</tr>
<tr>
<td>Case2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C2T1</td>
<td>01:09:06</td>
<td>12</td>
<td>39</td>
<td>28</td>
<td>8806.4</td>
<td>730.5</td>
<td>8704</td>
<td>310.5</td>
</tr>
<tr>
<td>C2T2</td>
<td>00:55:37</td>
<td>10</td>
<td>24</td>
<td>14</td>
<td>80.6</td>
<td>8.1</td>
<td>13.3</td>
<td>0.95</td>
</tr>
<tr>
<td>C2T3</td>
<td>00:41:43</td>
<td>9</td>
<td>22</td>
<td>12</td>
<td>74.9</td>
<td>8.3</td>
<td>11.8</td>
<td>0.98</td>
</tr>
</tbody>
</table>

The results of each test case is different for example, the total time to traverse the site in each case is very different. The total time duration, total size and total image size is too much decreased using the proposed PECA. The same method is being applied for each test in Case2 as in Case1. It is worth mentioning that the effect of images at server side on total duration measured in case1 & each test led to reduction in total size, average page size, total image size and average image size respectively.

5.2.1 Statistical Analysis

Figure 5.1(a) through Figure 5.1(g) presents an analysis of results obtained during the experiments performed and in x-axis 1 represents traditional approach, 2
initial PECA and 3 improved PECA respectively. Figure 5.1(a) represents a comparison of access time amongst traditional approach vs initial PECA and improved PECA. It can be seen that overall access time has been reducing continuously in improved PECA for both the cases and tests conducted through as compared to traditional and initial PECA.

Similarly, Figure 5.1(b) to Figure 5.1(g) compares the three approaches on different parameters such as number of web pages traversed, number of URLs traversed, number of images, size of web site, size of images, effect of average image size respectively.

It can be easily observed from the above results that the overall performance of web site has considerably improved in terms all parameters choose for comparison.
Figure 5.1(b): Performance in Terms of Number of Web Pages

Figure 5.1(c): Performance in Terms of Number of URLs
Figure 5.1(d): Performance in Terms of Total Number of Images

Figure 5.1(e): Performance in Terms of Size of Web
Figure 5.1(f): Performance in Terms of Total Image Size

Figure 5.1(g): Performance in Terms of Average Image Size
These statistics shows that with the use of PECA [24] not only the load on the server remain same even after increasing the no of images and other attachments on the site, but also the network traffic remains unaffected.

This further reduces the bottleneck problem at network, reducing the problem of latency and thereby improving the performance of the site. The results of this research work were compared with the traditional approach and it was discovered that overall performance could boost due to new approach.

### 5.3 SWAM

The number of various sectors e.g. banking, E-commerce, Govt. transactions, military etc. is facing the security problems regarding their sensitive database and transaction. *Secure Web Access Model (SWAM)* [25 and 47] is proposed to make user authentication more powerful in the context of fingerprint recognition. Biometric techniques are in use for local network and for single user systems and these are providing better output and much more secure than traditional method. The proposed security model SWAM provide an interface to the authorized user’s and reduce the threats regarding their sensitivity. For online authorization of valid users and sensitive transaction the biometric approach will be much more secure.

### 5.4 AOLB

The work presented in this research work is an effort to introduce the concept of collective intelligence [48] for improving the performance of web servers. The core idea was motivated from various agent oriented applications that have demonstrated that agents can not only perform simple tasks but are also effective while solving complex and distributed tasks. It is evident from the work presented that global intelligence on the web will crucially depend on agent technologies as these are able to integrate and synthesize knowledge which is highly useful for users. The presented framework allows us to incorporate techniques and methods of analysis common in
the study of collective intelligence and apply it to the quantitative study of such intelligence on the internet.

5.5 Conclusions

This chapter discussed the results obtained during the research work. The performance of initial PECA and Improved PECA was compared with the traditional approach and a distinctive improvement in the overall performance of web could be observed. Therefore, the ultimate aim of improving the performance of web achieved to an extent. However, the implementation of SWAM and AOLB is still in progress and it is expected to obtain the consistent results for these two approaches.