Clustering Simple Object Access Protocol (SOAP) Web Services: A Review

Article *in* International Journal of Scientific and Engineering Research · November 2018

CITATIONS
2

READS
208

2 authors, including:

Mohamud Mohamed Hassan
Zamzam University of Science and Technology
8 PUBLICATIONS **9** CITATIONS

SEE PROFILE

International Journal of Scientific & Engineering Research, Volume 8, Issue 1, January-2017
ISSN 2229-5518

Clustering Simple Object Access Protocol (SOAP) Web Services: A Review

Mohamud M Hassan
Faculty of Engineering Technology,
Zamzam University of Science and Technology
mohammudharbi@gmail.com

Husein Osman Abdullahi
Director of Admission and Records,
SIMAD University
xuseengurey@gmail.com

Abstract— Abstract-The goal of this paper is to analyze and review about cluster SOAP massages for enhancing web services performance. We will discuss the similarity measurement on dynamic clustering model and how it can support aggregation scenarios of SOAP messages with the aim to achieve potential SOAP message size reduction. This paper summarizes the work done in all techniques and methods on clustering SOAP web services.

Index Terms— SOAP, Clustering, Web Services, Fractal factor

1 Introduction

Simple Object Access Protocol or simply SOAP is lightweight protocol that is platform independent, transport independent, and operating system independent, all because it is built using time testing systems like the HTTP protocol and text mark-up in XML. SOAP is designed to enable separate distributed computing platforms to interoperate. The purpose of this is accomplished by following the same principles as other successful web protocols: simplicity, flexibility, firewall friendliness, platform neutrality as well as XML based messaging.

SOAP has been designed and developed to enhance interoperability of Web services. However, SOAP Web services inherit the disadvantages of XML such as messages being bigger than the real payload of services creating high network traffic. Aggregation is a modern and effective model to reduce network traffic by aggregating SOAP messages and multicasting them to Web clients and later splitting them at the closest routers. The figure 1 below shows that numerous SOAP responses can be combined in such as a compressed packet by aggregation.

Aggregation model consists of two main activities: transforming the XML tree of SOAP messages into minimized SOAP textual expression and then encoding it with either fixed-length or Huffman encoding techniques. Although this aggregation technique can aggregate as many messages as requested by the Web server, advanced cluster based similarity measurements are still required in order to find out which sets of SOAP messages are optimum to be aggregated as an alternative to the traditional pair-based SOAP similarity measurement.

This review paper consists of four sections and it is organized as follows. Section ii, discusses on Clustering SOAP techniques, Section iii, Fractal clustering model and final section is the conclusion of the paper.

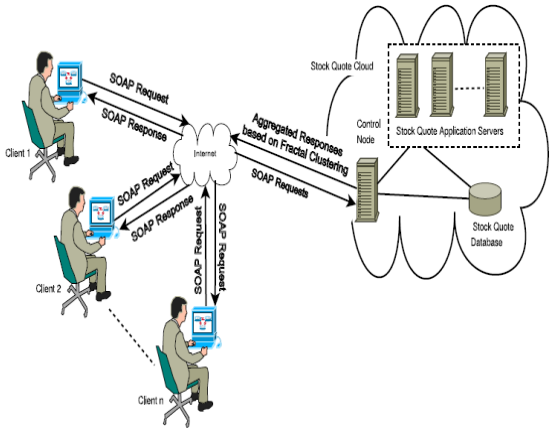

Figure 1. Clustering based aggregation model support Web services over the Internet.

2. Clustering SOAP techniques

Several studies have been done in order to develop an efficient textual documents and Web messages clustering technique. The basic strategy of most these clustering models has been based on exploiting the structural similarities of XML documents that are usually examined by computing the edit distance of the XML trees. However, many models have considered the content of XML and textual documents. XML compression methods which can be classified according to two main distinctive features: First is based on the structure of XML document. While, second is based on the ability of performing and supporting queries on the compressed documents. XML documents can be viewed as a text representation of tree structured data. Therefore, using conventional general text compression tools as XML compressors would be an effective approach to reduce the size of SOAP messages.

Aggregation based on clustering process would enable fast connectivity between service providers and clients. Several researches have proposed efficient clustering techniques for Web applications such as information retrieval and automatic topic extraction. Most of these clustering techniques are based on the structural similarities of XML documents by measuring the distance of XML trees.

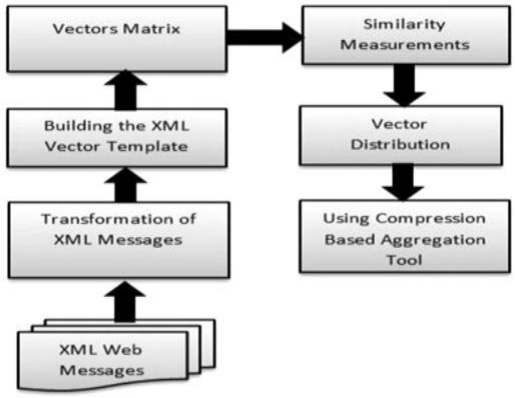

Figure 2. **Architect model for SOAP massaging**

vector

Al-shammary. 2011. Has discussed techniques on XML clustering which mainly based on the Principal Component Analysis (PCA) approach to transforming the XML documents into a set of vectors that form the dataset. This method suggests that the vectors in the dataset have statistical information that represents the occurrences of XML items. PCA is developed to summarize all the features of the considered XML documents in order to reduce the

dimensionality of the generated vectors.

3. Fractal clustering model.

Fractal clustering technique provides important contributions in many fields such as remote sensing applications. The basic strategy of this model is to find out new common Fractal factors that can be calculated distinctly on domain and range blocks of the search area. In this technique, the matching computations do not require checking the resemblance of a range block with all the domain blocks, the range blocks are checked and associated with only the domain blocks that have the same Fractal index value.

The below Equation computes the approximated range blocks, Fractal parameters scale $\boldsymbol{S}$ and $\boldsymbol{O}$ offset are required to approximate range blocks ($\boldsymbol{R}'$).

$$\boldsymbol{R}' = \boldsymbol{S} * \boldsymbol{D} + \boldsymbol{O} \quad \ldots\ldots\ldots (1)$$

Dhiah Al-Shammary, Ibrahim Khalil For this equation we can develop and derive new formulas to determine the best match of range blocks by computing the Fractal Root Mean Square (RMS).

$$RMS = \sqrt{\frac{1}{n}\left[\sum_{i=1}^{n} r(p_i)^2 + S\left(S\sum_{i=1}^{n} d(p_i)^2 - 2\sum_{i=1}^{n} d(p_i)r(p_i)\right) + 2O\left(nO - 2\sum_{i=1}^{n} r(p_i)\right)\right]}$$

First Fast Fractal Factor (F1):

$$F1 = \frac{\left(\sum_{i=1}^{i=n}\left(D_i - \hat{D}\right)^2\right)^2}{\sum_{i=1}^{i=n}\left(D_i - \hat{D}\right)^4}$$

Second Fast Fractal Factor (F2):

$$F2 = \frac{\left(\sum_{i=1}^{i=n}\left|D_i - \hat{D}\right|\right)^2 \times \sum_{i=1}^{i=n}\left(D_i - \hat{D}\right)^2}{\sum_{i=1}^{i=n}\left(D_i - \hat{D}\right)^4}$$

4. Conclusion

As we know web services are widely used over internet. Web Service performance is becoming an important factor. From the above analysis we conclude that static and dynamic clustering models for SOAP messages to support compression based aggregation tool that could potentially reduce the overall size of SOAP messages in order to reduce the required bandwidth between the clients and their server and increase the performance of Web services.

REFERENCES

[1] F. Alshahwan and K. Moessner, "Providing SOAP Web Services and RESTful Web Services from Mobile Hosts," *Fifth Int. Conf. Internet Web Appl. Serv.*, 2010.

[2] D. Al-shammary, I. Khalil, and L. E. George, "Clustering SOAP Web Services on Internet Computing Using Fast Fractals," 2011.

[3] D. Al-shammary, I. Khalil, Z. Tari, and A. Y. Zomaya, "Fractal self-similarity measurements based clustering technique for SOAP Web messages," *J. Parallel Distrib. Comput.*, vol. 73, no. 5, pp. 664–676, 2013.

[4] A. Mohammed, A. A. Bakar, and M. Z. Ahmad, "Fast dynamic clustering SOAP messages based compression and aggregation model for enhanced performance of Web services," *J. Netw. Comput. Appl.*, vol. 41, pp. 80–88, 2014.

[5] D. Al-shammary and I. Khalil, "SOAP Web Services Compression using Variable and Fixed Length Coding," 2010.

[6] Al-Shammary D,KhalilI. Redundancy aware soap messages compression and aggregation for enhanced performance. J Network Computer Appl 2012; 35 (1):365–81.

BIOGRAPHY/BIOGRAPHIES

1. Mohamud Mohamed Hassan

(Dean of Faculty of Engineering Technology) Web technologist interested in Open data, ICT for Agriculture, and Application Web in farming.

Email: mohammudharbi@gmail.com

2. Husein Osman Abdullahi

(Director of Admission and Records, SIMAD University) Web 2.0 & Social Media Trainer