International Journal of Innovative
Computing, Information and Control
Volume **6**, Number **11**, November **2010**

ICIC International ©2010 ISSN 1349-4198
pp. 5131–5142

ANALYZING BIND DNS SERVER SELECTION ALGORITHM

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Received July 2009; revised January 2010

Abstract. *BIND is by far the most widely used DNS server software. As the server selection algorithm has a significant operational impact on the recursive resolution, it is worth being thoroughly studied, especially for BIND. We analyze BIND server selection algorithm in this paper and present complete characterization to the algorithm, including the selection preference, the interval of requests and the selection periodicity. Some special cases, such as request collision and rtt drift are also examined to complement the analysis. Besides, we generalize the two parameters of the algorithm as smoothing factor and descending factor and analyze their impacts on the performance. Simulation results provide further insights into the evaluation of the server selection algorithm and validate the theoretical analysis.*

Keywords: BIND, DNS, Server selection, Recursive server

1. **Introduction.** The Domain Name System is a fundamental and indispensable component of the modern Internet [1]. In essence, the DNS is a globally distributed and decentralized database of network identities. Its most common use is to resolve host names into the Internet addresses.

In order to enhance availability, robustness and reliability, each domain is usually served by multiple DNS name servers. These IP addresses are the items contained in the NS resource records, which could be obtained and cached by a local DNS server [2]. When there is a query for this domain, the local DNS server chooses one from the cached NS records to forward the query via some criterion, which is referred to as the DNS server selection (see Figure 1).

According to the annual DNS survey conducted by Infoblox [3], over 70 percent of measured recursive servers all over the world are installed with Berkley Internet Name Domain (BIND) software [4], and therefore BIND is by far the most common DNS software in use. In this paper, we draw attention to BIND server selection algorithm and quantify its impact on DNS server selection. Our main contributions can be summarized as,

1) The quantification of the impact of BIND server selection algorithm on the selection preferences, the intervals and periodicity;
2) An analysis of some special cases, such as request collision and *rtt* drift. The study of the two parameters as smoothing factor and descending factor;
3) An extensive simulation study of the algorithm.

In the next section, we give a brief overview of related work. Section 3 discusses and quantifies the effects of BIND DNS server selection algorithm, including some special cases in the server selection and their impacts on the previous analysis results. Section 4