

Chapter 3.13

SLA Monitoring of Presence-Enable Services: A New Approach Using Data Envelopment Analysis (DEA)

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ABSTRACT

The concept of presence was initially associated with an instant messaging service, allowing an end user to recognize the presence of a peer online to send or receive messages. Now the technology has grown up to include various services like monitoring performance of any type of end user device, and services are accessible from anywhere, any time. The need for enhanced value remains the driving force behind these services, for example, Voice over Internet Protocol (VoIP) services, which is drawing tremendous research interest in services performance evaluation, measurement, benchmarking, and monitoring. Monitoring service level parameters happens to be one of the most interesting application-oriented research issues because various service consumers at the customer companies/end users' level

are finding it very difficult to design and monitor an effective SLA (Service Level Agreement) with the presence-enabled service providers. This chapter focuses on to these specific issues and presents a new approach of SLA monitoring through Data Envelopment Analysis (DEA). This extreme point approach actually can work much better in the context of SLA monitoring than general central-tendency-based statistical tools, a fact which has been corroborated by similar application examples of DEA presented in this chapter and has therefore it acts as the primary motivation to propose this new approach. Towards this end, this chapter first builds up the context of presence-enabled services (Day, Rosenberg, & Sugano, 2000), its SLA and SLA parameters, and the monitoring requirements. Then it explains the basics of DEA and its application in various other engineering and services context.

Ultimately, a DEA application framework for monitoring an SLA of presence-enabled services is proposed which can serve as a clear guideline for the customers of presence-enabled services, not only for SLA monitoring but also at various other stages of implementing presence-enabled services frameworks. This approach exploits the definitive suitability of the application of DEA methods to presence-enabled service monitoring problems, and can be easily implemented by the industry practitioners.

INTRODUCTION

Presence-Enabled Services

Presence technology allows end users and network elements to know the status and availability of other end users in order to improve communications efficiency. Today, presence has expanded to include monitoring the registration and the busy or idle status of any type of end user device, including wireless phones, VoIP clients, traditional POTS phones, push-to-talk clients, multimedia clients, and more. In addition, the concept of presence has been extended to include various other dimensions. For example: Availability: It allows an end user to explicitly share their availability to communicate with their colleagues (Gurbani, Faynberg, Lu, Brusilovsky, Gato, & Unmehopta, 2003). Typical availability states include out of office, in a meeting with a client, in a conference call, on vacation, and so forth. An end user can provide this information, or it can be inferred from the end user's online calendar. Other dimensions include Location: geographical location of an end user's device. Wireless networks can triangulate signal strength measurements to provide the location of wireless handsets and PDAs. Instant messaging clients is another dimension where the concept of location was extended to laptop-based, instant messaging clients, or IP softphones that might connect to wireline access networks

at work, home, or remote locations (Sun, 2002). Presence server and presence policies are important dimensions which determine the ability of the end user to control access to their presence and location information, using the presence server in conjunction with their presence policy. The presence server, in accordance with the end user's policy, provides the presence and location information to various presence applications.

By collecting and disseminating presence information (status of end user devices, availability of the individual, and location), the most effective and appropriate means of communicating to a person or a device can be identified. Network applications (for example, find me/follow me service) can use presence information to efficiently and appropriately route or block incoming communication requests (Roach, 2002).

Presence-Enabled Services Architecture

Presence service architecture (Day, Rosenberg, & Sugano, 2000) includes a wide variety of end user communication clients, integration of multiple real-time communication services into an integrated communications suite, and new end user services that can be developed for spanning and combining wireline telephony, wireless telephony, messaging services, and so forth. Types of information and protocol elements include presence information from a wide variety of end user clients and network elements that can be accessed through a central presence server, plus standard presence protocols and standard event packages that allows presence-enabled services to be developed separately from the end user clients and presence server vendors. These all support the basic requirement of seamlessly integrating or enhancing existing services through the inclusion of presence information.

Presence-enabled services may be classified broadly as:

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