Chapter IV

Network Quality of Service for Enterprise Resource Planning Systems: A Case Study Approach

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Abstract

The research reported in this chapter studied the relevance of the application of network quality of service (QoS) technologies for modern enterprise resource planning (ERP) systems, explored the state-of-art for QoS technologies and implementations, and finally provided a framework for the provision of QoS for ERP systems that utilise Internet protocol (IP) networks. The motivation for conducting this research has been the fact that, to date, there is a dearth of literature on the realisation of network QoS for mission-critical ERP systems. Nor have the current implementations of QoS been studied with the objective of developing a practical framework, based on the knowledge and experiences of the practitioners, to allow a structured approach for the provision of QoS for modern ERP systems. Due to the intent and the nature of the research, an interpretivist research paradigm underlies the work and
informed a qualitative research method. Based upon the research problem and the context of research, a case study research method has been selected. Four individual cases—including both leading ERP vendors and network technology vendors—were conducted. The primary data collection was done using semi-structured interviews and this data was supplemented by an extensive array of secondary material. The case data collected was then analysed using qualitative data analysis strategies derived from the existing literature. Cross-case analysis confirmed that the traditional approaches for ensuring the performance of ERP systems on IP networks do not address network congestion and latency effectively, nor do they offer guaranteed network service quality for ERP systems. Moreover, a cross-case comparative data analysis was used to review the pattern of existing QoS implementations and it concluded that while QoS is increasingly being acknowledged by enterprises as an important issue, its deployment remains limited. The findings from the cross-case analysis ultimately became the basis of the proposed framework for the provision of network QoS for ERP systems. The proposed framework focuses on providing a structured, yet practical approach to implement end-to-end IP QoS that accommodates both ERP systems and their Web-enabled versions based on state-of-art traffic classification mechanisms. The value of the research is envisioned to be most visible for two major audiences: enterprises that currently utilise best-effort IP networks for their ERP deployments and ERP vendors.

**Introduction**

According to Kumar and Hillegerberg (2000), ERP systems are configurable information system packages that integrate information and information-based processes within and across functional areas in an organisation. Other definitions may differ in their wording, but a common theme surfaces upon closer inspection: the integration of enterprise information.

Traditionally ERP systems have targeted the large, complex business organisation, facilitating the integration and the flow of information between functions within an enterprise in a consistently visible manner. Even with the current movement of repackaging their systems for small to medium enterprises (SMEs) by the ERP vendors, the governing concept remains: how can ERP systems support the integration of enterprise information across functional boundaries in an enterprise, across geographical boundaries for multi-site enterprises, or even across organisational boundaries to reach external entities such as suppliers and customers. It has been suggested that IS academics have been asleep at “the wheel of the ERP phenomenon,” and most of the early research has not examined the implications and complexities of enterprise-wide information integration (Kumar & Hillegerberg, 2000).

To support enterprise-wide information integration, the enterprise network infrastructure should be considered as a critical component of the overall IT strategy and ERP system deployments. This is largely due to the fact that modern ERP systems have evolved from centralised mainframe systems to the more scalable client-server architecture. The client-server ERP systems are inherently distributed, and therefore are capable of supporting large, multi-site enterprises. However, ERP client and server communicate with each other mainly through network connections and the quality of the network connections therefore has a very strong influence on the stability and performance of the entire ERP system.