Chapter XV

An Integrated Network Management Framework Using CORBA, Mobile Agents and Web-Based Technologies

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ABSTRACT

Today’s network management is still dominated by the platform-centered paradigm based on client/server technologies. This centralized approach has drawbacks in scalability, reliability, efficiency and flexibility, and is unsuitable for large and heterogenerous networks. Modern networks require an open management architecture, which can provide standard interfaces for information sharing among management systems, has extensibility for handling
change quickly, and has means to manage large networks. Emerging
technologies such as Web-, CORBA-, and Mobile Agent-based technologies
represent an excellent opportunity to solve these problems. In this chapter a
new Web-based network management framework is proposed, which combines
the strengths of these novel ways of managing networks and the results of a
prototype implementation are discussed. Our preliminary results indicate
that the integration of Web-, CORBA-, and Mobile Agent-based technologies
within an Integrated Network Management System framework can
dramatically improve the performance of the networked environment.

**BACKGROUND**

Global competition has led to a greater reliance on information processing
systems. Networks are required to extend beyond physical boundaries to support
virtual corporations, virtual LANs, inter-enterprise systems, inter-networking,
outsourcing and electronic commerce. Despite the fact that networks are becoming
larger and more complex, today’s network management is still dominated by the
platform-centered paradigm based on client/server (C/S) technologies (e.g.,
SNMP). This centralized approach has drawbacks in scalability, reliability, effi-
ciency and flexibility, and is unsuitable for large and heterogeneous networks
(Goldszmidt & Yemini, 1998; Lazar, Saracco & Stadler, 1997; Yemini, 1993).

Numerous studies have shown that new technologies such as Mobile Agents
(MA), CORBA and Web technologies have individually solved some of the
problems associated with network management (Baek, Ha & Park, 1998; Baldi,
Gai & Picco, 1997; Bieszczad, Pagurek & White, 1998; Cheikhrouhou, Conti,
Labetoulle & Marcus, 1999; Deri & Ban, 1997; Goldszmidt & Yemini, 1998;
Haggerty & Seethapaman, 1998; He & Shayman, 2000; Hegering, Abeck &
Neumair, 1999; Liotta, Pavlou & Knight, 2002; Luo, Confrey & Trivedi, 1999;
Terplan, 1999; Wren & Gutiérrez, 1999). However, few studies have looked into
the impact of combining the strengths of these new technologies on an integrated
network management system (INMS). Integrated management of a networked
system involves several disciplines and different levels of managed objects. In
recent years, the emphasis in network management has moved from managing
machines to managing functionalities and the performance of these functionalities.
On the other hand, there are no widely established methods today for dealing with
large numbers of network elements. Managing large enterprise networks requires
powerful abstractions that capture the essentials of the state of the network rather
than the details.
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