

Reprint of the Quarter

R. H. Glitho and S. Hayes, Telecommunications Management Network: Vision vs. Reality, *IEEE Communications Magazine*, March 1995

Introduced by George Pavlou

I have been involved in activities related to the Telecommunications Management Network (TMN) since 1989, through my participation in applied research projects funded by the Research in Advanced Communications in Europe (RACE) program. I still remember early versions of the pivotal ITU-T recommendation M.3010 [1], which introduces the TMN principles and architecture, as a highly evolving document with hand-written annotations on which I had to comment.

While a lot of telecommunications management research took place in the first half of the nineties, there were almost no tutorial articles explaining the essence of the emerging TMN framework and the issues behind its deployment. This gap was filled by R. H. Glitho and S. Hayes' tutorial [2], which should take its place as a classic introduction to TMN. Another good tutorial introduction published later that year was K. Shrewsbury's *TMN in a Nutshell* [3], biased though towards the Network Management Forum's (NMF)¹ view of TMN.

There exist aspects that make Glitho and Hayes' tutorial special, shedding light on a number of issues that help the reader understand the essence behind the TMN architectural framework. First, the difference between the functional and physical views of the TMN architecture is crisply presented, while a reference point is for the first time associated with an Application Program Interface (API). Since then, the advent of distributed object technologies has emphasized more the difference between logical (reference point / API) and physical (interoperable protocol stack) communications.

One of the less well-defined components of the TMN was the Mediation Device (MD), which is associated with the equally less well defined Qx interface. The article points this out clearly, which is something that the author of this introduction had also pointed out at the same time [4]. In the latest version of M.3010, both the MD and Qx have been abandoned.

The ITU-T recommendation M.3020 [5] proposes a top-down TMN interface specification methodology. The tutorial points out that it had never been applied successfully in its entirety, with a bottom-up or a mixed approach being used in most cases. The substantial revision of this recommendation and the introduction of enterprise and other modeling concepts from Open Distributed Processing (ODP) [6] validates this viewpoint.

At the time, and to some extent still today, the TMN was closely associated with OSI Systems Management (OSI-SM) [7], which is the underlying technology for the Q and X interfaces. The article contains a concise introduction to OSI-SM and points out correctly that the key benefit is not so much the robust OSI protocol stack but the object-oriented information specification together

¹ Now the Tele-Management Forum (TMF).

with the existence of a host of generic object specifications - the Systems Management Functions (SMFs). It also criticizes the complexity of OSI-SM, which has been a key factor behind the lateness of TMN deployment. It points out though that emerging OSI-SM toolkits, one of them by the author of this introduction [8], would turn the TMN vision to reality; this prognosis has been verified in practice.

On the other hand, a lot has changed in the four years that elapsed since the article was first published. The authors considered the Simple Network Management Protocol (SNMP) as the rising technological challenge to OSI-SM in TMN environments. The recent advent of ODP-based technologies, such as the Object Management Group's (OMG) Common Object Request Broker Architecture (CORBA) [9], has turned the spotlight to them instead of SNMP. In addition, Java and the World Wide Web (WWW) have provided much more flexible mechanisms for Customer Network Management (CNM) and for graphical displays for the human network manager.

In summary, although R. H. Glitho and S. Hayes' tutorial is now relatively old in a very rapidly changing field, it remains an excellent starting point for anyone interested in telecommunications management. Even if some of the TMN architectural concepts are currently being challenged by distributed object and mobile agent technologies, it would be impossible to comprehend the development of future management architectures without an understanding of the starting point. This article provides exactly that, in the best possible fashion.

References

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Biography

George Pavlou is a full professor of Telecommunications Networking at the Center of Communication Systems Research (CCSR), School of Electronic Engineering and Information Technology, University of Surrey, UK. He holds a Diploma in Electrical and Mechanical Engineering from the National Technical University of Athens (NTUA), Greece, and MSc and PhD degrees in Computer Science, both from University College London (UCL), UK. Prior to joining Surrey in 1998, he was first a Research Fellow and then a Senior Research Fellow and Lecturer at UCL, where he led a team that gained world-wide recognition in network and service management and control. In the early 90's, he architected the openly available OSIMIS platform, the first fully object-oriented TMN development environment that has been used extensively in research projects. His research interests include protocol performance evaluation, network planning and dimensioning, integrated management and control frameworks, management of ATM and QoS-based Internet, IP/ATM integration, broadband signaling, open network control, distributed system platforms and service engineering. He serves on the editorial board of the Journal of Network and Systems Management (JNSM), the IEEE Communications Surveys and he sits on the program committee of a number of international conferences on management and service control. He has contributed to standardization activities in ISO, ITU-T, NMF/TMF, OMG and TINA.