

ATM: A Retrospective on Systems Legacy

OR

“A technology with a fabulous future behind it?”

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Abstract

The following four papers were selected from submissions for a proposed workshop that was to have been held during the 2002 ACM SIGCOMM Conference. Due to time, we cancelled the event, but the papers capture some of the past, present and future lessons to be gleaned from the whole ATM experience, and we felt that these lessons should be provided with a forum.

Broadband ISDN is not a very catchy phrase; nor is *Asynchronous Transfer Mode*. However, networking research, development and standards groups in the last two decades of the 20th century were alive with a debate over the merits of these technologies. At the same time, the Internet grew from a research baby to a commercial adult. In some places, there was tension, in others, harmony, between the work carried out on ATM and on IP.

Last year, some folks in the SIGCOMM community felt that it would be good to have a retrospective look at ATM, so that we could pull out some lessons for the future. The broad remit we felt we had was to examine the political, technical and economic pressures that bore on networking during this period of very rapid innovation and growth.

The four papers here cover four aspects of ATM and we've chosen them to span the problems and the solutions, as well as the past and the future:

The Technology Charles Kalmanek, from AT&T, describes the actual technology behind ATM, including the range of different visions that different networking communities had. He takes us from the early days of a unified replacement for the SDH/SONET system that the telcos required, through to today's reality of widespread use of ATM as a layer 2 technology in much of the broadband access networks (DSL) and in some ISP's and corporate network cores where hard QoS is required.

Performance Dan Grossman, from Motorola, takes a look at the performance trade-offs inherent in the architectural technology choices of Cell Switching, and the Virtual Channel style of network service. The goals of low latency for voice, and of QoS assurance proved to have perhaps unexpected costs.

Control Planes Simon Crosby, Sean Rooney, Rebecca Isaacs and Herbert Bos, from Cplane, IBM, Microsoft and LIACS respectively, examine signalling systems in the most general sense of the term. They also include an informal analysis of the business case for end-to-end ATM services versus IP.

End Systems Jonathan Smith, from the University of Pennsylvania, shows how many of the ideas that ATM forced us to revisit in operating systems' networking support have re-emerged as the performance curve gets to the point where the time to service an IP packet is similar to

that of ATM cells in older systems. This is one of the more important technical lessons that can be generalised in the old adage: “What goes around comes around”.

Between the lines you may read many things in these four contributions. We don't want to spoil things by spelling all of them out, but the way that different Fora develop standards is an important factor in the breadth of the success of those standards. An open approach has the advantages of being susceptible to close technical, but also business case analysis by the broader community. We should not neglect the role and influence of government funding in growing technologies too. Thus socio-economic comparisons between the 3G and ATM communities are inevitable, as are comparisons between the government research agencies' effect in funding say Active Networks, Grid and Peer-To-Peer, with the 1990s funding of B-ISDN in Europe and the US.

Enjoy.