The numbers in brackets are counts of the number of movements on each path. For example, it can be seen that the mean interval between demand page requests is 94·9 ms. Demand paging accounts for only 26·7 per cent of all page movements.

During periods when the system is processing mainly batch and detached work and there is a continuous supply of work, the CPU-utilisation rises to about 85 per cent, of which about 10 per cent is supervisor time.

In comparing these figures with other systems it should be remembered that in a virtual memory system, all file accessing operations are performed on the user's behalf by supervisor.

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Book reviews

Computer Networks, Infotech State of the Art Report No. 6, 605 pages, 1971. (Infotech, £40·00)

This publication is based on Infotech's State of the Art lecture series of the same title held in 1971. It combines both the principles and practice of modern computer networks, with reviews of planned and present computer networks, and their environment. The format follows the now familiar format of the series—the first 150 pages are devoted to a digest of the proceedings of the lecture series, form a summary of the state of the art of the subject, and also contain a record of many of the questions asked, and the answers given. The next 307 pages cover the presentations delivered in lecture form, and the last 114 pages contain invited papers. There is some overlap between the presented and contributed papers, as might be expected —for example the presented paper by Tien Phuc entitled 'Traffic Routing Techniques in Telecommunications Networks' covers the adaptive routing of packets in a store and forward network system, while the paper by L. Kleinrock and G. L. Fultz entitled 'Adaptive Routing Techniques for Store and Forward Computer Communication Networks' similarly covers the same area. However, the duplication is in many ways justified, as the earlier paper goes on to cover in more detail the general and planning aspects of such networks, whilst the latter paper goes on to discuss their detailed technology, and covers such aspects as the updating of leg-to-leg delay times, which are a direct function of the traffic carried over any particular leg.

In many ways the presented papers complement each other—for example a paper by Charles Read, now director of the Interbank Research Organisation, outlines the influences which will lead to the enlargement and interconnection of computer networks over the next decade, leading to a complex series of interlinked networks, whilst a paper by Philip Hughes, chairman of Logica, discusses the interaction between tariffs and the development of computer networks, including the development of loop type computer networks. An interesting parallel between the development of data networks, and data management systems emerges from the last mentioned paper—just as data management systems have evolved from hierarchical or 'star-like' systems, into loop or interconnected systems, in a like manner communications networks are evolving from tree-type or star-type structures into group type networks, which will further evolve into a series of interconnected loops in the future. There are a considerable number of references in this volume to the ARPA network—widely quoted as the prototype for large store and forward networks, handling packets of information. Whilst these references provide an introduction to the technology of the ARPA network, and similar networks, there are one or two noteworthy omissions—for example the present reviewer could find no mention of the critical design parameters as packet size, and the critical relationship between packet size, frequency of error occurrence, and trunk line speed requirements. Further, one of the most important areas related to the design of computer networks—that of standards, and the interchange of information between dissimilar hardware and software, and networks, is only covered briefly in one paper which discusses the problems relating to standards, rather than proposing solutions, and means for their international implementation.

Summarising, this is a substantial volume, which accurately reflects the technology of networks as at the end of 1971. As a source document containing details of the principles and operation of computer networks, it is unparalleled. However, the delay between the presentation of the lectures and publication of the volume is somewhat noticeable—for example one could not expect the volume to incorporate details of two British networks which have become significant since that time—viz. the Manchester Regional Computing Centre Network providing a service to many northern academic institutions, and the Post Office Experimental Packet Switched System, which will become operational next year. Such aspects reinforce the reviewer's opinion that, in such a fast moving subject area, there is a good case for repeating such events on a periodic basis—say every two years or so, and publishing the proceedings of such lectures extremely rapidly—possible by sacrificing a little of the high quality of this volume. In terms of binding, typesetting and presentation, the volume cannot be faulted.

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