

Working Party To Rationalize Communications Infrastructure in SE Queensland

Meeting 2:00 pm 5/5/92 at Prentice

MINUTES

Present: Mark Williams, Adrian Mengede, Laurie Barram, Norm Cornwell, Ted Mync.

Apologies: Graham Rees, Rod Ibell

- **Presentation and discussion of present and planned communications links by each member body.**

Each Delegate presented a list of the external links that his department controlled. (see attachments)

- **Discussion of possible strategies to satisfy the needs of all parties with fewer/cheaper links.**

It was decided that Mark Williams would devise a draft configuration using microwave links and AOTC bandwidth to serve the data and voice communication needs of the four represented institutions, to serve as a discussion paper for the next meeting. For the sake of argument it is to be assumed that some notional cross-institutional body would be required to provide the necessary link capacity between all sites in the most economical manner.

Adrian Mengede to advise on the cost of voice tie-lines.

Site 1	Site 2	Link	Link Type	Link Speed	Link Content	Recurrent Cost	Microwave Saving (recurrent)
Inter-							
Institution							
QUTGP	UQ St. Lucia	Megalink		2048	Data	\$26,424	\$21,424
USQ Tba	UQ St. Lucia	Megalink		2048	Data	\$81,372	\$66,372
BU Gold Coast	UQ St. Lucia	DDS		48	Data	\$20,787	
QTAC Milton	UQ St. Lucia	Megalink		2048	Data	\$15,180	\$12,680
USQ Milton	UQ St. Lucia	DMS		9.6	Data	\$4,726	\$4,726
GU Nathan	UQ St. Lucia	Megalink		2048	Data	\$33,084	\$31,584
GU Nathan	UQ St. Lucia	Anal. Tieline		3*64	Voice	\$7,929	\$7,929
						\$189,502	\$144,715
UQ							
Internal							
UQ St. Lucia	Dental School	DMS		4.8	Data	\$3,816	\$3,816
UQ St. Lucia	Pinjarra Hills	2W PAPL		14.4	Data	\$1,371	
UQ St. Lucia	Uni Downtown	Datel		9.6	Data	\$4,266	
UQ St. Lucia	JKMRC	ISDN BRI		64	Data	\$2,940	\$500
UQ St. Lucia	Herston	Megalink		2048	Data	\$33,084	\$28,584
UQ St. Lucia	PA Hosp.	ISDN BRI		64	Data	\$3,852	\$1,300
UQ St. Lucia	Pinjarra Hills	Microwave		2048	Voice	\$5,000	
UQ St. Lucia	UQ Gatton	Microwave		2048	Voice+Data	\$15,000	
UQ St. Lucia	PA Hosp	Anal. Tieline			Voice		
UQ St. Lucia	CSIRO Cunn.	Anal. Tieline			Voice		
UQ St. Lucia	Herston	Anal. Tieline			Voice		
Herston	FBH	Anal. Tieline			Voice		
Herston	QMR	Anal. Tieline			Voice		
Herston	Mater	Anal. Tieline			Voice		
UQ St. Lucia	Dental School	Microwave		2048	Voice	\$2,500	
						\$71,829	\$34,200

QUESTNET Statistics

Accompanying this document, you will find four graphs. The first one shows total throughput of all the QUESTNET links, the second shows the link utilizations, and the third graph shows the link utilizations on the high-speed QUESTNET links, starting from the upgrade of the link to the University of Southern Queensland. A fourth line chart give an indication of the total busy-hour throughput on QUESTNET links.

All graphs show busy-hour traffic or utilization, giving an indication of how much traffic is flowing at the times when people are using the network. At night and on the weekends, the traffic is naturally somewhat lower.

The first graph gives an indication of absolute usage by the QUESTNET member institutions. The University of Queensland as QUESTNET hub and site of several archives is, not surprisingly, the largest user. However, even small institutions show significant usage.

The second graph shows utilization of links over time since mid-1991. It can be seen that busy hour link utilization for those links that carried only 48 kilobits/second were loaded at between 30 and 60% at the time of upgrade. On a 48 kbps link for packet-switched traffic, the packet delay becomes greater than is acceptable under the CCITT X.135 and X.136 standards at a utilization of about 40% (this varies according to the packet size distribution). Those links that were upgraded were nearing the margins of acceptable delay at the time of upgrade. It is interesting to note that maximum acceptable load on a 48kbps link would impose less than 2% utilization on any of the high-speed QUESTNET links.

The third graph shows the current utilization levels of the high-speed QUESTNET links. At link capacities of 1 and 2 Mbps, acceptable delay criteria are met at link utilizations up to 90-95% (depending on packet size). From the graph, we can see that at present, the utilization is comfortably below this level. The graph also shows a traffic growth rate at which carried data volume doubles every six to nine months. Simple calculation suggests that the links will become saturated in between 20 and 30 months. In other words, speed upgrades are unlikely to be necessary for about 2 years.

There is a very steep growth shown for the past 6 weeks or so. At this early stage, it is difficult to interpret the sudden rise in traffic. My guess is that it is partly due to end-of-semester activity and the impending conference season giving rise to a seasonal high, as we did observe a similar (although much lower) peak at the end of semester 2, 1991.

Factors which almost certainly will affect this forecast are:

Digital Video

Queensland tertiary institutions are at present actively investigating the provision of teaching at remote centres. One consequence of this is that the interest in the provision of video transmission, be it videoconferencing or full-motion video for remote lecture theatres, has skyrocketed. At present Prentice is investigating the possibility of transmitting compressed full-motion video via packet-switched networks. When this becomes viable, there may be a good case to expand the capacity of QUESTNET considerably in order to make the provision of remote lecture theatres and similar facilities economic. There are other network-based services which may have a similar impact on the demand for data communications infrastructure.

Recency of Installation

Most of the QUESNET links have been at their current capacity for less than 12 months, and QUESTNET has only existed since February, 1991. At this stage, it is still difficult to forecast growth in demand, as new services are being established.

As services penetrates the user base, the rate of growth of demand will decrease. At the University of Queensland, however, networking services are easily available to only about 20% of the potential users, and it is certain that penetration at other institutions is little, if any, better. Thus, while it is likely that we can look forward to the growth in demand slowing down to a doubling perhaps biannually rather than every 8 months, this time is still several years away.

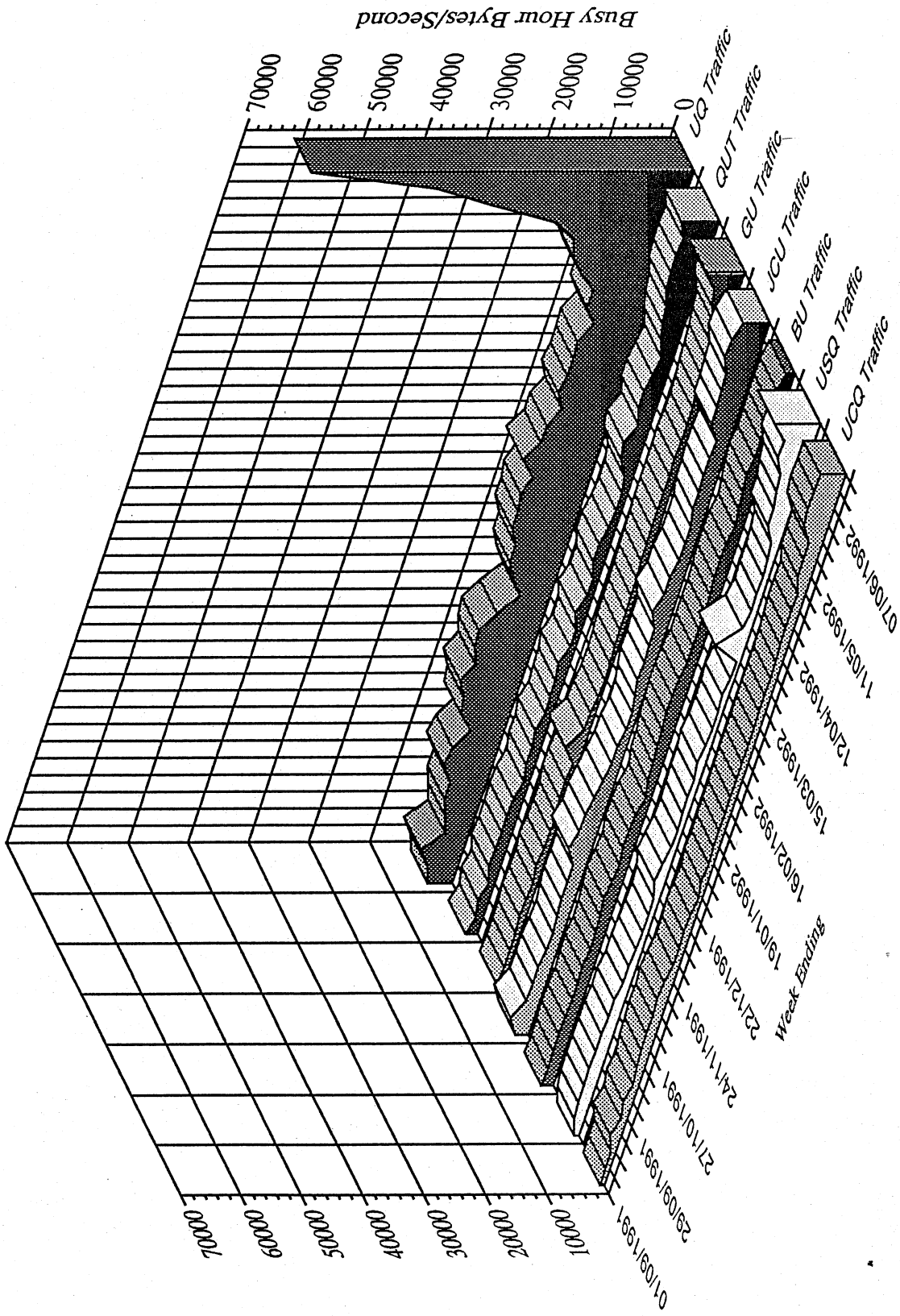


Chart t 1: QUESTNET Traffic

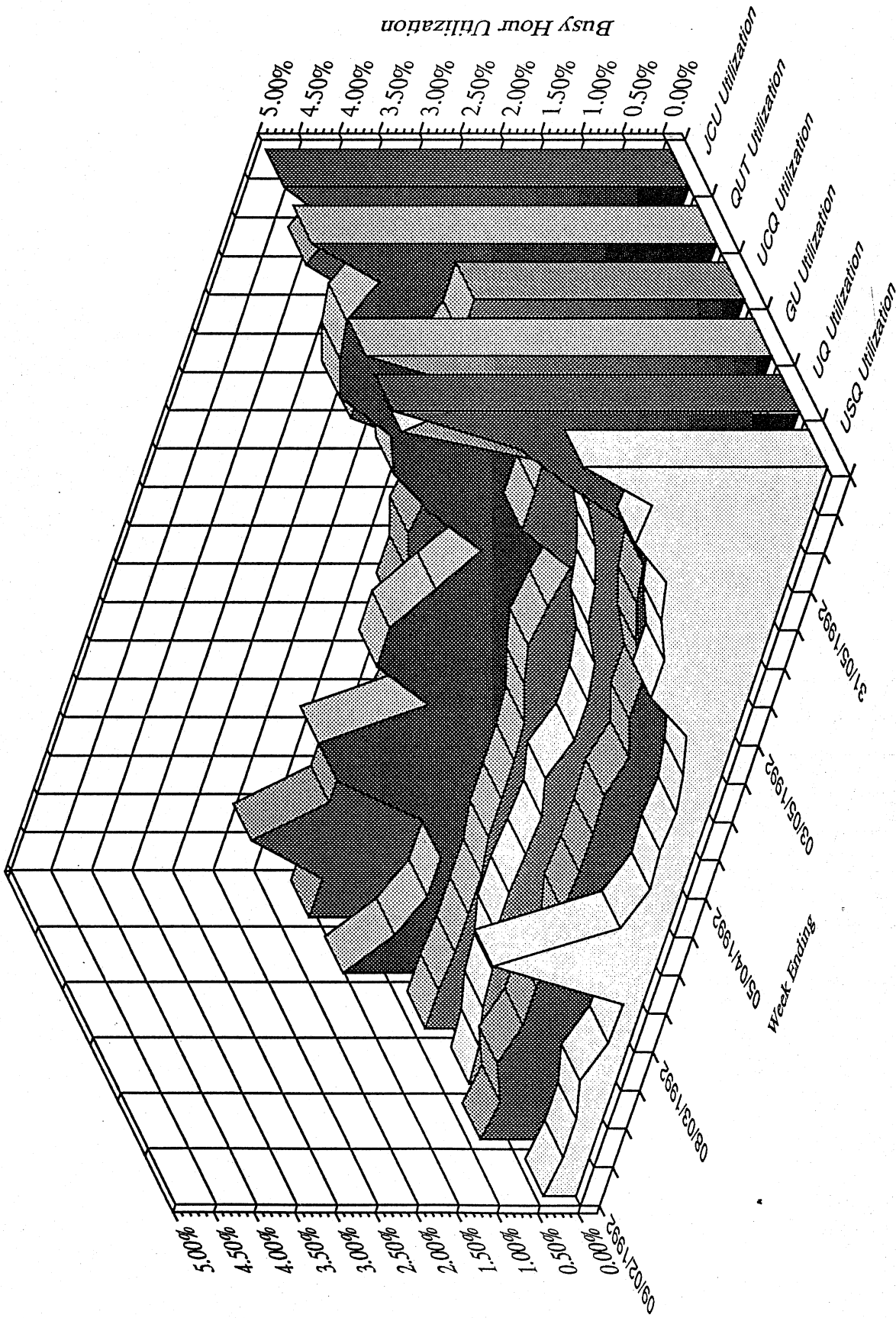


Chart 3: High-Speed Link Utilization