DIRECTORY/MAIL SERVER HARDWARE OPERATIONAL REQUIREMENT

1 INTRODUCTION

The Computer Board, via the Joint Network Team, proposes to fund the purchase of a number of machines each to serve the dual role of an ISO 9594/X.500 Directory Service Agent (DSA) and an Electronic Mail protocol convertor for installation at various UK Academic Community sites. These machines will be complete Unix systems.

The software to provide both the DSA and Mail convertor functions is being developed at the Department of Computer Science, University College London. This software does not form part of this Operational Requirement. The supplier is required to provide X.25 and X.29 communications software.

Where the words 'shall', 'will', 'must', 'required' or 'mandatory' are used the requirements are mandatory. Where the words 'should' or 'desirable' are used the requirements are desirable.

Suppliers must make a point by point response to the mandatory and desirable requirements outlined in the OR. Suppliers must make clear which facilities, if any described in their tender will not be available by the quoted delivery date.

2 EQUIPMENT REQUIRED

The equipment required initially is between 10 and 20 systems running the Unix operating system. It is anticipated that further systems up to an overall total of approximately 60 will be purchased in the future, but no commitment to this can be given at this stage.

Suppliers must quote terms under which further systems could be purchased using Computer Board funds or other funds.

2.1 System Details

Suppliers should quote for a fully integrated system comprising of at least the following:-

- CPU of approximately ten times the power of a SUN 3/50 running a Berkeley Unix compatible operating system. Suppliers must state the CPU power and which version of Unix will be supplied. The number of file descriptors allowed for each process is a critical resource. Suppliers must state the current maximum and any plans to increase this number.

- At least 16 Megabytes of memory.

- At least 600 megabytes (formatted) of on-line disc storage. Suppliers should indicate the performance of all configuration options to provide this storage, as disk i/o performance is a critical factor.

- A removable magnetic media to enable the loading of initial software and backup of small files. Quarter inch cartridge tape would be preferable with support for at least QIC-11 and QIC-24 formats.

- The capability of driving an X.25 synchronous line capable of supporting a clock speed of at least 64 kb/s. The X.25 interface should be capable of presenting optionally an X.21 hardware interface for running at high speed and a V.28 interface for running at speeds of 9.6 kb/s and 19.2 kb/s. Suppliers must provide details of the interfaces provided including any clocking arrangements. See Section 2.3 for further requirements.

- The capability of attaching to an ethernet with software providing OSI Connection-Mode Network Service conforming to the Pink Book (Reference 4). See Section 2.4 for further requirements.

- An X.25/CONS implementation providing a service interface meeting the functional requirements below (i.e. sockets) over both the synchronous interface and the ethernet:

  · the ability to listen on multiple descriptors (network connections and other file descriptors), and return when activity occurs, or after a timeout (e.g., the functionality provided by the BSD select call).

  · Asynchronous establishment of connections

  · Asynchronous (non-blocking) writes, with buffering in the kernel

  · All X.25 level 3 functionality must be provided by a kernel interface. It is highly desirable that X.25 level 3 and below is implemented on an intelligent card.

  · There should be no 'hidden state': an application process should be able to fork and exec, and continue a set of associations.

- Some systems will require a colour display; some may require a monochrome display; others may not require a display (but those without a display require an asynchronous port and the capability of an asynchronous terminal being the system console). Suppliers must indicate all display options.

2.2 Performance and Limitations

The supplier must indicate the values of the following system limits which apply to the proposed system:

- Maximum number of simultaneous virtual circuits.
- Guaranteed data and packet throughput for a range of packet sizes and numbers of simultaneous calls for clock speeds of 64kb/s, 19.2kb/s and 9.6kb/s.
- CPU overheads of supporting the above throughput.
- Average disc access times, including seek and rotational delay for the proposed discs.
- Packet, data throughputs and CPU overheads for various packet sizes and number of calls when using Pink Book.

Any other system limits and configuration details related to such limits must also be specified.

2.3 X.25 Support

Support for X.25 must be provided to both the CCITT 1980 specification and to the CCITT 1984 specification. The CCITT 1980 specification must be in conformance with the requirements for operation with the British Telecom Packet Switchstream Network (PSS) as defined in Reference 5. Permission to connect to PSS must be available.

The X.25 interface must support both X.25(1980) and X.25(1984) on a per call basis.

The support of the X.25(1984) protocol must be conformant to ISO 8208 (Reference 1) and the interface must support the OSI Connection-Mode Network Service as defined in ISO 8878 (Reference 2). Specific requirements for X.25 (1984) are defined in OSI Requirements Note 1 (ORN 1 - Reference 3).

The capability of operating either as a DTE or DCE is desirable.

The LAPB level 2 link access procedure must be supported.

The level 3 facilities supported must included Fast Select and associated Extended Formats. It must be possible to either:

(a) negotiate Packet and Window sizes; or
(b) handle all legal values of Packet and Window size.

Full technical specifications of the X.25 implementation must be supplied, including maximum packet and window sizes supported.

2.4 10 Mbps CSMA/CD Baseband Communications

An interface to a CSMA/CD 10 Mbps (500m max segment) baseband local area network must be provided. The physical interface must conform to the ISO 8802-3 standard (Reference 7). Link level control must conform to the ISO 8802-2 Class II standard (Reference 8). The level 3 protocol must be X25 (1984) conforming to the ISO 8208 specification (Reference 1). The support of the X.25(1984) protocol must be conformant to ISO 8208 (Reference 1) and the interface must support the OSI connection-Mode Network Service as defined in ISO 8878 (Reference 2). Specific requirements for X.25 (1984) are defined in OSI Requirement Note 1 (ORN 1 - Reference 3).

An implementation of the OSI connection-mode Network Service must be provided as specified in ISO 8348 (Reference 9). The implementation of options available within the above standards must conform to the requirements of the academic community described in Reference 4.

2.5 Network Service

A module (or collection of modules) must be provided to implement a Network Service so as to act as a general interface between user processes and any given communications subnetworks. The interface to user processes and application processes must allow efficient transfer of data between applications and communications subnetworks.

2.6 Network Terminal Access

Support must be provided for the X.29 host protocol in a manner compatible with the facilities described in Part IV of Reference 5 and in accordance with the recommendations of Reference 6.

All facilities available to directly connected terminals must be usable over the network in a convenient and efficient manner. If there are any facilities that require special hardware and direct connections, they must be listed. Where a change to the style of working expressed by the values of terminal parameters is essential, the system must set and change these as required and users themselves are not required to set parameters. The Message, Transparent and Native modes defined in Reference 6 must be supported.

The system's network terminal handlers must include appropriate buffering and flow control mechanisms in both directions between application and network.

It is desirable that an alternative means of access based on the TS29 protocol defined in Annex C of Reference 6 is available.

Suppliers should state what X/Windows client facilities are currently available on the proposed systems and indicate what plans have been made to make such facilities available over OSI supporting services.

2.7 Call Management Facilities

Facilities must be provided to enable logs to be kept of all incoming network terminal calls including the call source and user identifier used and attempted.

It is desirable that this logging can be selective on ranges of calling addresses and/or user identifiers. It is desirable that the facility to display currently active user identifiers should include the call source for all (network) calls. It is desirable that facilities are provided for the temporary prevention of incoming network calls from specific sources.

It should be possible at the system level to enquire what addresses the system is listening on and what calls are currently in progress.

The ability to log X.25 connection attempts that fail is also desirable. This should include calls that are connection attempts to non existent listening addresses with a trace of Protocol ID, CUDF as well as X.25 calling address.

It is mandatory that network access to certain (privileged) user identifiers should be able to be confined to calls from specific network addresses.

3 MAINTENANCE AND SUPPORT

Suppliers must offer a hardware, firmware and software support service, as relevant, for all items offered.

Each site receiving one or more of the Servers which are the subject of this OR must have the option of taking out a maintenance contract under which the supplier repairs any hardware fault that might arise in return for a fixed monthly maintenance charge. Suppliers should state what response time is being offered and should state costs for both an 8 hour and a 24 hour response. Suppliers must guarantee to provide this maintenance service for a period of seven years from acceptance of the equipment.

It is desirable that suppliers also offer the option of hardware maintenance on a time and materials basis; such a service must also be guaranteed for a period of seven years from acceptance of the equipment.

It is desirable that suppliers should also offer a hardware maintenance service based on a return to factory of faulty components. The maximum delay between recovering a faulty module and delivering a replacement must be quoted.

A software support contract must also be offered under which software faults are reported, fixes are provided for all but the most trivial of faults, and customers are supplied with new releases of software. Suppliers must specify the proposed terms of their software support contract.

The supplier must confirm that all maintenance and support services apply to all parts of the UK.

Suppliers must also state any differences in cost between a contract taken out centrally for all systems or contracts taken out on an individual university basis.

4 PROCEDURES AND SPECIAL CONDITIONS

Tenders are invited for the supply of the equipment as described in section 2. Tenders must contain all the information necessary to evaluate the proposals fully. They must include in particular:

1. a hardware and software specification of the equipment offered must be given;

2. the price per unit of equipment offered;

3. the total purchase price for the complete set of equipment offered;

4. the cost per unit of each of the hardware maintenance options offered in response to section 3 of this OR;

5. the cost per unit of the software support service offered in response to section 3 of this OR;

6. the formula to be used for varying the cost of hardware and software support services during the lifetime of the equipment;

7. a specification of the warranty conditions associated with the proposed equipment;

8. the cost of further units purchased by the Academic Community or Research Organisations.

9. an indication of the delivery schedule for an order placed in mid June 1989.

All prices quoted must include VAT at the current rate. Prices for the equipment must be fixed and must cover all costs of delivery to nominated Universities or other academic sites.

5 EVALUATION CRITERIA

Equipment which does not meet all mandatory requirements specified in this OR will not be considered. The extent to which desirable requirements are met will be taken into account. Any prices quoted for subsequent orders will be taken into account but with a lower priority than the other criteria.

The final choice nevertheless remains with the JNT who shall not be obliged to disclose the reasons for their choice nor to accept the lowest or any tender.

6 TENDERS AND FURTHER INFORMATION

Tenders must be submitted by 18th May 1989 to:

Mr J A I Craigie (1 copy)
Joint Network Team
c/o Rutherford Appleton Laboratory
Chilton
Didcot
Oxon OX11 OQX

Mr J Dyer (1 copy)
Joint Network Team
c/o Rutherford Appleton Laboratory
Chilton
Didcot
Oxon OX11 OQX

For further detailed information please contact Mr J A I Craigie (Tel: 0235 445539) or Mr J Dyer (Tel: 0235 445433).

REFERENCES

1. ISO 8208 Information Processing Systems - Data Communications - X.25 Packet Level Protocol for Data Terminal Equipment

2. ISO 8878 Information Processing Systems - Data Communications - Use of X.25 to Provide the OSI Connection-Oriented Network Service.

3. UK Academic Community OSI Requirements Note 1 "X.25 (1984) Level 3", JNT 86-10-2

4. Implementation Details for Protocols on CSMA/CD LANs, JNT Ethernet Advisory Group, JNT/CSMA/CD LAN (85), August 1985

5. British Telecom Technical User Guide 17 (February 1984).

6. Character Terminal Protocols on PSS (Revision 1), SG3/CP(81)6, Study Group 3 of British Telecom PSS User Forum (Feb 1981).

7. ISO 8802-3 CSMA/CD Access Method and Physical Layer Specifications.

8. ISO 8802-2 Logical Link Control.

9. ISO 8348 Information Processing Systems - Data Communications - Network Service Definition.

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