SCIENCE AND ENGINEERING RESEARCH COUNCIL
RUTHERFORD APPLETON LABORATORY

COMPUTING DIVISION


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issued by
Dr D A Duce

VISITS

Notes on a visit to Dr K H Bennett,
University of Keele, 19 January 1983            2 February 1983

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## 1.  X25 CONNECTION

Keele want a connection to SERCnet.  The JNT recently visited Keele
and the following long-term strategy was accepted.  Keele will have
two rings, a campus ring and a computer science ring connected by a
gateway.  The latter ring will accommodate Keith's machines - 11/34,
2 x 11/23, Perq, Terak, Apple and Microengine.  The computer centre
are replacing their GEC 4082's with 4190's and these will go onto the
campus ring.  There will be a gateway from the campus ring to SERCnet
which will be either through one of the 4190's or one of the existing
4082's will be retained for the purpose.  A third alternative is the
Camtec ring-X25 gateway.  (Note the Camtec gateway is not yet a
product - JNT may fund this - delivery is estimated for July 1983 as
it uses modules from the JNT pad and ring terminal concentrator which
Camtec have develope.

The GEC machines will run GEC X25 code; which is currently being
rewritten to run on OS4000.  It is unlikely that the software to
support X25 switching on the GEC's will be available before mid-83.
Switching at transport service level rather than X25 level 3 does not
seem likely in the near future.

I was under the impression that Keele had (were getting) a direct line
to the Daresbury SERCnet node.  This turns out to be untrue.  Keele
will be linked to the network through the planned 41xx front end at
Manchester.  Installation of this is planned for October 83 - before
the Manchester Amdahl enters field trials.

Keele currently have a 4.8K line to UMRCC for rje.  Initially this
will be split into 2x2.4 half running existing HASP RJE protocol, the
other half for X25 service testing.  Keele have never had enough work
to make a case for a direct tariff J line to Daresbury.

This all sounds rather unpromising. Keele have basically 2 requirements:

1. SERCnet access for FTP, Mail etc – the standard 'access to the community'.

2. collaborative research with Newcastle on the Newcastle connection.

Requirement 2 is in many ways the most urgent. This could be satisfied by dial up to Newcastle. This will entail:

1. modem purchase (preferably 1200/1200 or better)
2. dial up charges
3. some software development – datagram protocol over asynchronous lines – serial line rpc.

It is likely that (3) will be generally useful and Newcastle are interested in doing this. RAL should be involved. This route is attractive also because it will enable useful work to be done whilst X25 is sorted out. Finally Keele could access SERCnet via the Newcastle connection!

It was agreed that KHB and DAD will investigate cost/availability of 1200/1200 or better modems and report. DCS should pay.


## 2. MISCELLANEOUS

1. Keele have now had the Unix overlay kernel working for some time and are happy with it. Performance degradation is unnoticeable. Paul Singleton will send a tape to DAD. RAL should try to mount this and if successful distribute to DCS community. A nice job for a DCS support person.

2. Keele would like 2 DMA Unibus DMA interfaces. I agreed to send one a.s.a.p. from DCS pool and look into availability of a second.

3. Keith is concerned about STI Perq for EMR contract with Neil White:

   (a) is 1 April still realistic delivery date?
   (b) what Pascal compiler will they get?
   (c) they would like advance documentation so they can think and plan.
   (d) they would like a ring interface as available.

4. Keith said that Amsterdam (Tanenbaum) are developing a new Pascal compiler. It compiles to a new virtual machine (em 2). They are developing table driven native code backends that produce code for your favourite machine at a specified level of optimisation. Tanenbaum has said it would be finished by February 1983.


## 3. FUTURE PLANS

Keith believes they have now established the infrastructure for the next phase of their work viz the Unix overlay kernel and Newcastle connection (running on 11/34 and 2 x 11/23).

Keith and Paul spent last week in Newcastle discussing Newcastle's plans and how they might collaborate. The intention is to compliment activities at Newcastle by building on the existing project, in areas the Newcastle are not tackling directly. Keele seem to be establishing a good dialogue with Newcastle.

Possible areas of common interest include:

1. multiple copy algorithms - Pearl Brereton is looking at this.

2. network partitioning - consistency etc. there are many problems here - Newcastle are not directly looking at this area.

3. performance (Bettridge/Mitrani). Keele will run Newcastle's monitoring code on their system.

4. atomicity, recovery

5. naming/binding of names

6. internetworking, routing

7. authentication and accounting

8. heterogeneity and facades - should an abstract filestore interface be used rather than the Unix one?

9. should the Newcastle connection be put into the kernel? There are serious drawbacks to having the Newcastle connection code in the i/o library.

   (1) yes, all you have to do is recompile your program - trouble is to relink all the system utilities takes 15 hrs and you have to do this every time you change the library code.

   (2) the connection at present only works for C programs (i.e. is in the C library). If you use other languages you do not get it!

   (3) user processes grow when you link in the connection code. The side effect of this is that 'all' the utilities have had to be reduced in size to get them to fit into the machine!

Putting the Newcastle Connection into the kernel seems inevitable at some stage, but exploitation issues etc mean this needs careful thought.

10. user ids in an infinite system.

11. scheduling i/o activity.

12. typing in rpc. File portability etc. Keele think Newcastle are sweeping these problems under the carpet!

13. process migration, load balancing.

14. fragmenting/distributing the kernel. Functional specialisation is attractive, e.g. a TAC would only support read and write system calls. The TUNIS kernel (Waterloo, written in concurrent Euclid seems the best starting point).

15. network topology, updating. At present changes to the network topology mean recompiling. Algorithms are known to handle topology updates dynamically and consistently. A respectable area!

Newcastle clearly intend to work in some of these areas. Likely areas for Keele are replication, atomicity and network partitioning.

Keith was encouraged to make a submission in April if they can see the directions they wish to go in by then. This will in principle give them a secure footing for the next $3\frac{1}{2}$ years. Keith was encouraged to ask for the equipment necessary to do the job whatever that might be. Two or three PERQs seems a likely request. Keele wish to persue research directions in distributed filestores rather than building products.

Keith is suffering increasingly from a high teaching/administration load and would like time off to devote to research. Send details of SERC Senior Fellowships etc.

jg