

## PROPOSAL TO PORT A UNIX ENVIRONMENT TO APM

While APM's are currently reaching a mature stage in terms of both quality and quantity of hardware, the software has never provided the rich environment which should be expected in a computer science department, such as that provided on VMS or Unix.

The original report of the departmental computing requirements committee which met during 1981 and 1982 made a number of recommendations one of which was that an operating system be provided which would allow porting of Unix utilities. With the advent of the new operating system this must now become a real possibility and I propose that steps be taken to achieve this.

It should be noted that this will not be a port of Unix but only those utilities which are meaningful in the environment developed. The key items, of course are one or more of the shells, and thereafter porting would take place as required.

The areas which will require to be examined are:

1. Process control. Does the new operating system give enough of this, and if not what would be required.
2. Memory management. Ditto, but note that as this is not a port of the Unix kernel, hardware memory management should not be required.
3. Interprocess communication. Again the requirements in a Unix environment should be examined and compared with those available in the new operating system.
4. File system. Hierarchical directories will have to be provided, and indeed, some thought is being given to this and further incorporation of the nicer features of the Unix file system into our file servers. However as long as Unix path names can be meaningful in the context of our file servers there should be no significant problem.

There are bound to be many other problems and an evaluation period of a couple of months should bring most of these to the surface.

As this proposal does not involve porting the Unix kernel, but will instead use the CS-APM operating system, any improvements in the system (memory management, new processors etc.) will be available to the new environment as soon as they are incorporated into the operating system. In addition this will not require any significant maintenance to this proposed software package as long as the clearly defined set of OS primitives used in this implementation continue to be maintained for the APM.

It is intended that existing APM utilities will be available from this Unix environment and programs developed under this environment will equally be available on a raw APM. This will be of limited usefulness as programs developed under a shell will tend to use the command language extensions available therein.

### Resources

The main problem is in providing manpower for this. The present development staff are already heavily over committed in just maintaining the current systems in the application areas we already involved in. Further dilution of this resource is not acceptable. Funds for further staffing must be sought. There have been problems interesting industrial parties in direct involvement with the APM but a route through Alvey is possible.

I have spoken briefly with a few other interested parties:

1. ERCC They are interested in the project and can probably be persuaded to support it, especially if further development suggested below are incorporated into the proposal. They would probably only lend strong support to the proposal but the Unix support group and the compiler group could become involved, both in management and implementation aspects.
2. Laboratory for the Foundations of Computer Science. There are strong indications of interest from Alvey in this scheme. It already has a minor investment in APM's and if a suitable environment could be provided, would probably be prepared to consider APM's as a significant element in the computing resource required by them. Again their co-operation would make both approval of the project and management of it more straightforward.

I would suggest that two people working for two years, would be adequate for an initial sound implementation. During this time about two-thirds of the resource would be dedicated to this specific proposal, but a significant amount of effort would be available for other, more general, APM related activities.

Hardware. As well as people, an application for two fully configured APM's should be submitted with an element for filestore usage. Say #15,000.

### Other Related Developments

1. Multi processor APM's. To be used typically in a teaching environment. Each system would have a master processor which would do the I/O, memory management and other general housekeeping tasks for multiple application processors on the same bus. Each user would have a terminal connected to a dedicated processor. This would decrease the incremental cost of adding users significantly.

2. New language availability. Fortran-77 and one or more dialects of LISP would open the system to a vast number of potential users.
3. Window management utilities. Efforts would be made to integrate the graphics screen closely into the environment developed. Initial thoughts would be to work along the same lines as the Blit device but new directions would soon become apparent.

George Cleland 15th August 1984