

## Supporting Micro-computers - Small World but lots of consequences

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### Introduction and definitions

The advent of the personal computer has caused several different aspects of information processing to change. The rapid change in technologies associated with the microcomputer revolutions means that the machines bought today will soon be outdated. The obsolescence can be caused by outdating in either the hardware or the software. The problem is that although the investment in any one workstation is a fraction of the cost of a larger computer, micros require software, backups, documented procedures, and hardware maintenance.

The process of supporting a group of micros must start with a few assumptions.

- 1) Micros are to be justified over a useful life of 2-3 years.
- 2) Micros are to be used only in those areas which the usual data processing methods cannot respond or respond as quickly as the end user requires. Most of the applications which fall into the latter category are spreadsheets, wordprocessing, databases, access to information services, electronic mail, and decision support systems.
- 3) Micros are being used to support the job functions of professionals. Keeping the micro from wasting the professional's time trying to get the hardware or software to work is of prime importance.
- 4) There are a number of levels of support available the cost of each is varies as does the response time.

The ultimate in hardware support would be to have each workstation completely duplicated. This option however becomes very costly as the ratio of workstations to professionals becomes higher. For software support there would be a computer specialist to assist each professional in applying the hardware and software to his/her job.

The information centre concept addresses this problem by centralizing purchasing, and hardware/software support. Generally an information centre will support up to 3 brands of micros for the general user with exceptions for user's whose application software does not run off the selected brands. To be able to support the users adequately there are often a limited number of approved software packages and peripheral options (printers, modems, plotters, etc.) which the centre will provide guidance and support for.

The problem is not so much finding the correct hardware support, as realizing that the micros are going to become assistants to the professionals and will by the late 1980's be as commonplace on management desks as telephones. The problem to be addressed is simplified when viewed from an economic standpoint.

If the life of a micro is 3 years, the number of hours of work per year is 2000 then the cost of the micro is divided by 6000 hours. Even if we include the cost of maintenance, software, a plotter and a printer to raise the cost to \$12,000 per work station then the cost is only 2.00 per hour. The cost of the micro per hour

is much less than the cost of the professional. If a loaner micro was available for every 10 micros in use the cost would only cost \$2.20 per hour/station for the 10 stations. This also takes the immediate time constraint off the repair cycle and allows less costly modes

of repair to be contracted for. The problem therefore is to ensure the machine and software are always available to the professionals who are using them. This involves both hardware software and application support.

### Hardware support

There are several aspects to hardware maintenance. The cost of hardware maintenance varies for the micro just as it would for the mini computers or mainframes. The cost is a factor of the level of service desired. The level of service should be driven by the requirement to support the professionals using the machines with the minimum of disruption of their normal work. Remember the machine is only a tool to help the professional to do his job. You wouldn't keep a car which broke down all the time nor one which was hard to control.

Costs associated with hardware maintenance are:

- Labour
- Parts
- Tools
- Travel (if onsite)
- Shipping (either parts or machine)
- Loaner equipment
- Training

When hardware is chosen there should be local support if possible for it. The cheapest support is actually to mail the piece of equipment back to the manufacturer or dealer. High  $O(1/mMean)$   $O(1/mTime)$   $O(1/mBm)$  between  $O(1/mFailure)$  (MTBF) statistics often justify the risk of allowing equipment to be placed in locations which do not have service facilities nearby. District offices can take advantage of the new technology knowing that if there is a breakdown of a machine a replacement can be swapped in from the region within 24 hours.

What are the ultimate options on hardware maintenance?

Full onsite spares, loaners and maintenance personnel:

Advantage: Quick repair of machinery, if many machines can assure all have preventative maintenance.

Disadvantage: Cost of spares kit, cost of personnel

Note: To select the spares for a machine the manufacturer gets an engineering opinion on the MTBF by component. This estimate can be used to select a spares kit which will solve the

majority of problems. The full spares kit would include every possible component, the reduced spares kit will solve less than 100% of the possible problems but will cost less. The trade-off is how often will the failure occur versus how much does it cost to stock the part to repair the hardware.

If loaners are provided the downtime of the professionals will be minimized. The loaners can be provided while the repairs take place. Who does the repair will also affect the cost of the maintenance. The manufacturer is usually the lowest cost repair option but also if done through depot service will have a turnaround of up to 1 week. If there is a warranty the manufacturer will require that the repairs are done through authorized repair centres or the warranty will be voided. The offsite versus onsite service will also make a difference. If a service company offers onsite service there will be a built-in cost for the technicians time, wear and tear on the vehicle, cost of stocking spares, cost of tools etc.

The key item when selecting the service option is to ask the question "What does it cost to be without the machine for 1 hour, 2 hours, 1 day, 2 days, 5 days etc.?" Knowing the costs associated with not having the machine available to the professional will assist the budgeting process for the maintenance options. This question should be reviewed for each workstation quarterly as the dependence on a workstation often increases as time goes on.

Now that's fine for individual machines but how about an overall plan?

At present there are several different agencies which will repair and maintain various micro computers on a Canada-wide basis. These organizations will offer service on both a time and materials basis or a contractual basis. Onsite service will cost different amounts depending the distance from the suppliers depot. Most service is provided on a "zone basis" where the travelling time is allowed for by a variance in rates. The contract will vary according to where the repair depot is, thus a nationwide contract with any one company has to take into account the possibility of zone charges in each city. The service companies always charge depending on the response time requested, 4 hour response is a standard. The

charges for the service in under 1 hour, 2 hours, 4 hours, 8 hours are the first stage. Then the next question is what hours will you want your service on call for 8,10,12,18 and 24 hr coverages all cost different amounts.

If the service company does not currently service the machine (or peripherals) you have selected then it will have the cost of purchasing spare parts and training. That cost will have to be spread over the number of con-

tracts it expects to service from that location over the expected useful life of the spares kit. If the only one being serviced from the depot belongs to your organization you will pay for the spares kit. Long term service contracts are usually better under such circumstances.

To understand the economics of having a micro one must understand the costs and benefits associated.

- COSTS - Purchase -
- cpu
  - printer (dot matrix or daisywheel)
  - plotter
  - modem
  - monitor
  - disk drives (floppy or hard disk)
  - cabling
  - software
  - computer magazines
  - training courses
  - conferences/seminars
  - user groups
- Supplies -
- disks
  - paper
  - ribbons
  - printheads/printwheels
  - plotter pens
  - spare parts
- Labour -
- Hardware technician
  - Software or application specialists
  - Trainers
  - end users

Your variable costs should be traded off against each other. The trade-offs are based on support objectives.

- 1) Allowable MTTR 2) Cost of support (max. budget) 3) Cost of spares

The concept of support is actually quite vague unless we have some kind of measures to determine whether the support is good or bad.

A measure of how well the support is going is a machine availability statistic. Another might be the number of failures and the average length of failure. A log should be kept for each piece of equipment and peripheral so that each piece can have it's own record kept. Remember you can get a lemon.

The aspects of hardware support (a summary)

1. How fast do you want the problem repaired.
2. What hours of coverage do you want.

3. How many different pieces of equipment do you want covered?
4. Where are you going to locate the equipment?
5. Where do you want the equipment repaired? On-site, local, regional, central
6. How many spares kits are you going to purchase?
7. How many loaners will you need and where will you locate them?
8. What is the procedure if a hardware fault is suspected?
9. How is support handled? local, regional, national contracts, employees, warranty
10. How long is a piece of equipment to be supported for? (eg. 3yrs)

- 11 .Are the non-warranty period economics different from the warranty period.

These factors will change in both importance and cost over time and therefore should be reviewed from time to time.

The computer industry has set up networks to supply and service machines. The manufacturers network, the third party service network and then your own network are the three networks to look at for service for your machine. Just as for the cost of a telephone system you must decide which network is the cheapest to go for. It may well be that while under warranty the manufacturers network

provides the least cost service for the time frame desired. Later it may prove less expensive to use third party service.

The use of the existing service networks should be examined before attempting to build your own. If you build your own you will also have to maintain it, staff it buy spare part etc. In a few localized cases where the number of machines in a particular locale is large enough to support it, it may be cost effective to have your own service but in the majority of locations other alternative would be preferable.

Some of the corporations now supplying service for hardware in Canada are:

Xerox	- 12 locations in Canada (carry in service)
Aabex	- 17 locations (Electrohome on site )
Miscoe	- several major cities
Eatons	- 44 locations (2hr service on site )
TRW	- many locations
Dataforce	- Bell locations almost everywhere.
CGE	- also getting into micro software sales and printers

To determine the costs of using any one of these organizations one must first know how many of what brand of machine will be located where? To attempt to determine the strategy at this point in time would not be effective. The best that can be done is to develop a pro-forma breakdown of the expected machine population by location and brand and then obtain pricing information from each one.

#### The role of the Micro-centre

The micro centre has several functions:

- 1) To assist in acquisition of micro computers
- 2) To assist in acquisition of software, hardware and peripherals
- 3) To act as an advisor to end users wishing to acquire micros
- 4) To support the end users and assist in solving any problems which might arise regarding the micros.
- 5) To maintain lists of tested software as well as reviews both by the centre's staff, end users and trade magazines.
- 6) Maintain a library of relevant DP publications.
- 7) Co-ordinate both hardware and software support.

A step-by-step approach to the acquisition process would be as follows:

1. Statement of requirements to be prepared.  
This can be filled in by the user using a checklist provided by the microcentre; Microcentre staff will be available to help at any time should the user desire.  
Statement of requirements to include expected benefits, data volume estimates, communication requirements, implementation schedules, anticipated growth.
2. Examine Feasibility of proposal in light of
  - a) Alternative solutions (minis, mainframe, existing manual systems)
  - b) Estimated cost versus benefit
  - c) Organizational policies
  - d) Security requirements
  - e) Manpower required to install, support and maintain.
  - f) Importance of project to organization as a risk factor should the project fail or data be lost or destroyed etc.

3. Make a preliminary recommendation to the end user.  
Include a copy of the feasibility findings and all caveats.
4. Assist the user in a software selection. Be sure to select for all projects to be run by this enduser as the software ought to run on the same hardware.
5. Assist user with hardware configuration plan including:
  - a) RAM requirements - amount of main memory
  - b) Output requirements - printers, plotters, monitors
  - c) Data storage requirements - hard disk, floppies
  - d) Communications equipment requirements - modems, LAN links
  - e) Workstation furniture - desks, acoustic covers etc.
6. Assist user with software configuration.
7. Assist user with implementation schedule, include installation, training, allow for lead times as not all items are instantly available.
8. Assist user with vendor selection; include hardware maintenance recommendation if applicable.
9. Purchase equipment.
10. Follow implementation schedule to get user up and running.

The micro centre will provide configuration support by testing any proposed configuration. The software can be supported by having the micro centre purchase tutorial learning packages, and sponsor courses. Once users become familiar with the packages, the organization should develop an informal user group for each package so the the users of the package can swap ideas. To facilitate this an electronic mailbox system could be set up so the users could browse hints, suggestions, known problems and work-arounds. This way a user could try to solve the problem via self-help. The first line of defense for a user would be the micro users in his office followed by the micrx@ centre. A list of subject matter specialists should be maintained, and these persons encouraged to contribute their ideas, suggestions and even to teach on behalf of the micro-centre.

Any problems referred to the micro-centre would be documented and the fix put on the bulletin board. Part of a new users "getting started" kit would included a hardcopy of the bulletin board. If the microcentre has trouble solving a problem, the micro centre will go to the manufacturer or software supplier for help. This way the micro centre can maintain the known problems, helpful hints etc. on the bulletin board.

The micro-centre should have in its budget the funds to purchase magazines, join user's groups and attend certain conferences.

Attendance at a conference would be based on certain criteria being met:

1. That the conference is relevant to the hardware or software environment.
2. The attendee is given five of the problems which are currently under study by the micro-centre and is briefed on the background. Part of the attendees job is to come back with the solution and the phone numbers and addresses of the persons who provided the relevant information regarding the problem.
3. The attendee writes a report on the portions of the conference which were relevant to his/her position. The attendee should conduct a presentation within 1 week of the conference to the members of his operating group.
4. There should be a rating form to be filled out evaluating the conference/seminar as a whole, and noting any particularly good speakers, ideas or features.

This way the micro-centre budget could be used both by the micro-centre and any users of the micro-centre.

The micro-centre will provide support to a limited number of hardware and software alternatives. Those alternatives which are not on the supported list will be acquired only against the recommendations of the microcentre. The justification for purchasing a non-standard

alternative must be submitted as part of the requirements definition. It is probable that certain engineering packages are only available on certain brands of hardware and therefore if after

confirming investigation no supported alternative is available then the purchase

would go ahead. The micro centre will determine with the user what level of hardware support is necessary for the system and will if

requested arrange for the necessary contracts to be negotiated. The micro centre has a responsibility to assist the justified non-standard equipment user.

The organization must consider what to do about existing equipment which does not qualify as supported equipment yet serves a useful function. How long will these systems receive support? This decision will be partly based upon the support required by these systems.

### Software Support

Training (classroom)- it has been estimated that it takes 100 to 200 hours to master the personal computer for a managers needs. The use of classroom training allows some of the frustration for managers and executives to be cushioned. The trouble is that not every application can get the instant results which are so evident with the simple spreadsheets which are usually the first application the personal computer is used for by managers or executives.

Tutor programs - this allows self-paced learning which is sometimes a less embarrassing way for executives to get familiar with PC's and their uses.

Binders of application notes by software package shipped for installation. - these assist the new users to avoid the same problems other users had. By including templates for the most frequent application of the software package, the learning curve can be shortened.

Organizations hotline - if a user does get stuck there can be someone there on the other end of the phone to help out.

Hints & tips published from time to time - as more and more is placed on personal computers it will become easier for the micro-centre to identify the common problems and let the organization's personal computer users know about how to avoid them.

Manufacturers hotline - to be used by the micro-centre. All major problems should have

the micro-centre as a middleman in order that they learn the problems and can collect the answers. In the case of extreme difficulty the micro-centre should set up a conference call with the user and the manufacturer (and listen in), to help solve the problem.

Grassroots - the best form of support will be through the users themselves. Application specialists should be tapped to assist the micro-centre wherever possible.

Conclusion: It must be remembered that the micro-centre plays a vital role in supporting professionals. The support is in several forms but the entire purpose is to allow the professional to get on with his/her job and not have the productivity tools slow him down.

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