

ANGUS COUNCIL

RESOURCES AND CENTRAL SERVICES COMMITTEE – 3RD FEBRUARY 2005
EDUCATION COMMITTEE – 24TH FEBRUARY 2005COMPUTER SYSTEM BACKUP AND RECOVERY
JOINT REPORT BY THE DIRECTORS OF INFORMATION TECHNOLOGY AND EDUCATION**ABSTRACT**

This report highlights proposals to upgrade the processes involved in providing back and restore facilities for computer servers located across the Council.

1. RECOMMENDATION

The Resources and Central Services Committee is recommended to;

- a) approve the upgrading of the current backup and recovery processes at a cost of approx £122,000
- b) agree that the procurement should be exempt from competitive tendering in terms of section 16.3.2(a) of the Council's Financial Regulations as the contract is required urgently to suit the exigencies of the service, and
- c) authorise the Director of Information Technology in consultation with the Director of Finance to conclude negotiations with Commvault Systems and their UK suppliers, Wisdom IT.

The Education Committee is asked to note and approve the contents of the report.

2. INTRODUCTION/BACKGROUND

The Council is heavily dependent on the use of computers and the data stored on them. In such an environment it is essential that adequate provision is made for the management and safe keeping of that data. This is normally done by "backing up" or copying data on a frequent basis. When a computer failure is experienced and data is lost then the copied data is re-instated as quickly as possible to minimize disruption to the normal business operation.

Angus Council has more than 160 servers located at sites throughout Angus and they form a key element of IT infrastructure. The Department of Information Technology's support section has witnessed an increasing number of incidents and problems associated with the backup of server disk storage. Although the reliability of disk storage technology has improved over the years it is still vital to maintain offline backups to allow data recovery in the event of data corruption or disk failure. The main issues behind these incidents are :-

- Server backups exceeding the time window available;
- Reliance on users to follow the tape rotation procedures and interpret backup status reports correctly;
- Difficulty implementing a central monitoring console;
- Reliability of tapes and tape drives; and
- Lack of support from the application software authors.

Backup Time Window

To conserve physical floor space we now purchase rack mounted servers where a rack can house up to ten servers and has a single high performance tape backup device shared by all servers in the rack. Server backups are carried out daily but must be run outside normal office hours to avoid operational disruption. As rack server density increases the duration of

the backup operation for an entire rack is nearing or in some cases exceeding the time available.

The problem can only get worse as many of the servers in question have significant unused disk capacity. There are an increasing number of system administration tasks which have to be carried out overnight e.g. operating system security patching, virus definition updates and file transfers. These system administration tasks cannot be carried out during a backup session.

Reliance on Users

With the advent of racks servers owned by different departments but housed in the same rack now share a common tape device. This often makes it is difficult to organise and train user staff to ensure that tape rotation and cleaning procedures are carried out each morning and backup status reports scrutinised to ensure each backup operation succeeded.

Central Monitoring Console

The product used by the council for server backup is BackupExec from Veritas. While this has proved to be a suitable backup product, its central monitoring capabilities are inadequate. This has meant that Department of Information Technology staff has been unable to provide a central monitoring service which would relieve users of having to scrutinise the backup reports.

Tape and Tape Drive Reliability

Although tape and tape drive reliability has improved over the years they are mechanical devices and as such are prone to failure. Manufacturers recommend tapes be replaced at specific intervals and tape drives are regularly cleaned using special cleaning tapes. It has proved very difficult to ensure users follow manufacturers' guidelines which in turn significantly reduces reliability and increases the support effort.

Application Software Support

Server backup is a complex technology as it has to be capable of supporting an ever changing environment including new applications, software upgrades and hardware changes. Until recently the only support available to IT staff to resolve numerous issues has been the software supplier's website which has not always been able to assist adequately.

3. CURRENT POSITION

As a result of the increasing frequency of problems outlined above the Department of Information Technology instigated a backup strategy review which made a number of recommendations.

Following the Backup Strategy Review mentioned above IT staff have implemented the recommendations intended to speedup the backup process in the rack at County Buildings. However, this has only produced marginal performance improvements. In order to ensure the backup for this particular rack does not exceed the time available the backup schedule has been altered so that servers are backed up on alternate nights. This is not a satisfactory arrangement.

Because of the increasing incidence of backup failure support staff have now implemented a procedure where they scrutinise the daily backup reports for all corporate rack mounted servers which include many of the key infrastructure servers. However, the overall situation regarding server backup is less than satisfactory.

In addition the Education Department recently received committee approval (Report 1316/04 refers) to begin the rollout of servers to primary schools. It is acknowledged that while this will bring considerable benefits it will raise some operational issues for primary schools, particularly those with part-time clerical staff, to ensure that staff carry out the daily backup procedures.

To alleviate these current weaknesses two main options have been considered.

Improvements to the current tape based regime

1. It would be possible to reduce backup times by replacing some of the existing tape backup devices with recently introduced higher performance tape drives. It would also be possible to install more than one tape drive into a rack effectively reducing the number servers sharing a single device.
2. The suppliers of the Council's current backup software now offer for sale direct support with the latest versions of their product. It is possible therefore to purchase upgrades for older versions of software and purchase annual support for each server.
3. It is essential that a central monitoring facility is implemented to allow the IT department to monitor performance of all backup services. In order to setup central monitoring there is a requirement for appropriate training for the IT staff and assistance from the software supplier/vendor.

Users will always play an important part with any tape based backup system where servers are geographically dispersed. Issues relating to user staff will have to be addressed by providing clearer guidelines for departments and user staff training.

Introduction of disk-to-disk backup

The advent of lower cost disk storage has allowed the introduction of cost effective disk based alternatives to tape backup often referred to as disk-to-disk backup. Using disk for backup offers the following advantages over tape:-

- Much faster backup and restore;
- Multiple servers can backup simultaneously to disk rather than sequentially as is the case with tape;
- Disks are much more reliable than tapes; and
- Disks remove the need for user intervention and therefore eliminate difficulties with user error in tape handling.

Staff from the Department of Information Technology and the Education Department have had extensive discussions with representatives of CommVault Systems and their UK supplier Wisdom IT, the market leader in this field and HP, the council's preferred server platform regarding the implementation of CommVault System's Galaxy Backup and Recovery disk-to-disk system.

Initially the system would involve installing a central management server and a storage server known as a media agent with an attached disk storage array at County Buildings. Appropriate data agents are then installed on each server to be backed up.

The CommVault system is extremely efficient and will allow servers to be backed up overnight across the council's wide area network. The system also allows additional media agents with attached disk arrays to be sited remotely, e.g. Bruce House, making it sufficiently scalable to cater for the council's future needs.

A summary of the comparative costs of the options examined are shown in Appendix 1.

From the detailed work carried out it has been concluded that the introduction of a disk based

backup system for the Council would have financial and operational benefits. Implementation of this option will not only address the current issues but will provide the Council with a scalable and sustainable solution for elements in its Business Continuity strategies. Given the extent of the growing inadequacies in the current methods it is recommended that in terms of Financial Regulation 16.3.2(a) negotiations are concluded with Commvault Systems and Wisdom IT to enable an early start to implementation.

4. FINANCIAL IMPLICATIONS

The estimated cost of implementing the proposals is £122,000 which will be part funded from the 2004/2005 revenue budget of the Department of Information Technology (£65,000). A further £25,000 will be funded by reductions in cost of the Primary school server project previously allocated IT Repairs and Renewals funding (Report 1314/04). The remaining funding (£32,000) will be met from the 2004/2005 revenue budget of the Education department. The recurring costs associated with the corporate functions (£7233) will be contained within existing revenue estimates within the Department of Information Technology. The Director of Education confirms that the costs associated with the schools (£5316) will be contained existing revenue estimates.

5. HUMAN RIGHTS

There are no human rights implications arising from this report.

6. CONSULTATION

The Chief Executive and the Directors of Finance and Law and Administration have been consulted in the preparation of this report.

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03.02.2005

NOTE: No background papers, as defined by Section 50D of the Local Government (Scotland) Act 1973 (other than any containing confidential or exempt information) were relied on to any material extent in preparing the above Report.

Appendix 1

Improved Tape Regime – Rack Mounted Servers

Group	Element	Purchase £	Annual Support £
Primary Schools	Hardware	17,600	
Primary Schools	Software	5,580	945
Secondary Schools Racks	Hardware	76,300	
Secondary Schools Racks	Software	6,676	2,390
Corporate Racks	Hardware	80,400	
Corporate Racks	Software	5,850	2,100
Central Management Console	Hardware	5,392	
Central Management Console	Software	2,000	
Central Management Console	Installation	3,500	
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		203,298	5,435

CommVault Disk-to-Disk – Rack Mounted Servers

Group	Element	Purchase £	Annual Support £
Primary Schools	Software	5,985	748
Secondary Schools Racks	Software	36,546	4,568
Corporate Racks	Software	32,924	4,116
Central Management Console	Hardware	37,180	2,408
Central Management Console	Software	5,671	709
Central Management Console	Installation	3,500	
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		121,806	12,549