CLPCCD DATA BACKUP
DISTRICT ADMINISTRATIVE SYSTEMS

INTRODUCTION

A comprehensive backup solution is essential in ensuring timely recovery of critical user information in the event of accidental deletion, hard drive crashes and corruption, security breaches, and natural disasters. Non-existent or inadequate backup capability can be very expensive due to loss of productivity, time spent re-entering data, and permanent loss of critical information.

This document describes CLPCCD's backup requirements, strategy, hardware and software suites to meet those requirements, and the implementation timeline.

SCOPE

The backup plan provided in this document pertains specifically to CLPCCD's administrative network to include the Novell Netware and e-mail infrastructures. It does not include backups for college-specific Windows-based systems and user data. It also does not include the Banner system, which is maintained by ITS application developers.

REQUIREMENTS

Currently, CLPCCD backup hardware and software are based on older technology. A desktop PC server attached with 2 DAT tape devices running Netware 4.11 operating system backs up District office user data, District email, and Chabot user data. This PC server resides at Chabot College and backup is done over the wide area network using an older version of Arcserve software.

LPC backup is being done with 2 DAT tape drives attached to the LP6Server running Veritas 9.1. Further, there is no comprehensive system to backup GroupWise e-mail in a timely and efficient manner.

ITS previously purchased an HP LTO tape drive and Symantec Backup Exec version 9.2 for testing and proof of concept. Additionally, new HP DL-380, rack-mountable servers were purchased.

In keeping with the move toward new server technology, improving the storage and backup solutions used for administrative Novell servers, GroupWise e-mail, and network folders become the next logical step. As higher storage volumes are needed for future end-user applications, it is important to select technologies that are expandable and compatible. Other relevant selection criteria are as follows:

Operating System support – As a Netware server site, it is critical that all technologies under consideration are fully tested and certified by Novell and are forward compatible to Netware's SUSE Linux migration.
Product Architecture – The storage products must not be isolated in design and function. They must support a family of technologies that can be enhanced as new solutions are released in the industry.
Backup Software solutions – All storage products must be supported to their fullest feature set by backup software.
Flexible Storage sizes – User storage requirements are often unpredictable due to changes in business processes and application software.
Cost of Consumables - To effectively maintain a backup rotation, CLPCCD must continually invest in media that can be stored off-site and rotated as needed. This requires a sizeable investment in media.

CLPCC ADMIN STORAGE REQUIREMENTS

User files are distributed across multiple servers and sites. Today, the storage requirements are as follows:

Email:	110 Gigabytes
File Storage:	90 Gigabytes

Growth is projected to be up to 300 Gigabytes in a year. While the direction is toward server consolidation at one site, the network connectivity speeds currently limit response time and servers will continue to be deployed in each site. Today, servers are being procured each with 300 Gigabyte disks.

BACKUP STRATEGY

The backup strategy uses a multi-tiered approach that enhances backup performance and optimizes recoverability when restoration is required. The strategy is:

File consolidation – Using Novell's server consolidation utility, files can be transferred at raw speeds from server to server. The utility copies entire volumes or specific directories to one or more destination servers in the same Novell eDirectory tree or in different Novell eDirectory trees. The accompanying rights, trustees, ownership and namespace information are copied to the destination server along with the files. This utility will be used to move files from server to server.

Disk-to-secondary disk using virtual tape - The initial backup process will perform a disk-to-secondary disk using virtual tape. This proceeds very rapidly and immediately creates an online backup of the data. If a file is lost or deleted, it can be quickly restored from the secondary disk.

Disk-to-Tape archive – This backup method requires a transfer of the data from the Backup Disk to removable tape media. Backup to tape is usually a lengthy process, scheduled for overnight processing. As storage volumes increase, it becomes impossible to back everything up overnight. Also, if the backup fails for any reason, the staff is not onsite to perform recovery and initiate a new backup. By performing a backup from the secondary disk volume, the backups can be run during the daytime, when they can be monitored by CLPCCD technical staff.

Backup Locations - For disk-to-tape archival, tape backup hardware and software will be installed at the District Office, Chabot College, and Las Positas College. Tape archival would be performed at LAN speed. For disk-to-secondary disk backup, the storage server can be located in a central location. In this case, backups could be performed across the WAN during non-business hours.

Backup Hardware

There are several hardware solutions that can be used for tape backup. LTO backup solutions are the preferred storage for CLPCCD. They offer the best storage density/performance for the size of the disks on the CLPCCD servers, with expansion for the future. The LTO units can be procured as internal or external drives to be added to the servers discretely.

Disk-to-tape:

For the District Office, the HP Ultrium 232 will be deployed. For Chabot and Las Positas colleges, the HP Ultrium 448 auto loader will be installed. The HP Ultrium tape drive is a SCSI device that would need to be attached to a new or existing server. The table below provides a comparison:

Drive Technology	**Ultrium 960**	**Ultrium 232**
Capacity	3.2 TB	800 GB
Data Transfer	80 Mbit/sec	16 Mbit/sec
SCSI Interface	Ultra 320 SCSI	Ultra 160 SCSI

Disk-to-Secondary Disk:

For disk-to-secondary disk hardware, the HP StorageWorks 1000i Virtual Library System (VLS1000i) will be deployed. The VLS1000i is a disk-based storage solution that provides unattended backup and rapid restores of user data. This is accomplished by emulating a tape drive device and creating virtual tape drives stored on disks. The VLS1000i uses iSCSI (gigabit Ethernet) connectivity, and it can perform simultaneous backup of multiple servers. Restoring data from the virtual tape drives takes much less than restoring from physical tapes. The virtual tape drives stored on disk will be archived to tapes for storage offline.

Backup Software

Although there are hundreds of backup solutions available in the marketplace, the most important factor to consider is robust support of a Novell Enterprise multi-server network.

Syncsort's Backup Express software will be installed. The software is Certified with Novell SUSE® LINUX Enterprise Server 9, Service Pack 1 and Open Enterprise Server (OES) Linux. Backup Express offers data protection for clustered OES environments and offers more backup and recovery features for SLES and OES than any other software vendor. Backup Express includes protection for NSS (Novell Storage Services) volumes and properties on OES and SLES9 systems, and allows users to backup data on NetWare today, and restores it to OES LINUX after they migrate. While offering a superior feature set, this solution is also higher priced that other backup products.

While Backup Express is essential for backing up data stored on Novell network folders, Novell GroupWise e-mail requires a separate backup system. To backup and provide a hot spare for the GroupWise e-mail system throughout the district, Reload software will be installed. Reload is a hot backup and restore solution that allows restoring single messages or mailboxes and recover deleted e-mail in minutes. Reload is specifically designed for Novell GroupWise. A dedicated Linux-based server is required to host the software.

Backup Express will also be used to backup the Reload server and Linux servers used for network management.

Summary of Hardware and Software Backup Solution

All backup hardware and software components were ordered April 2007 and delivered June 2007. The following table summarizes hardware and software solution suites for all sites:

Location	Hardware	Software
Chabot (ITS Data Center)	• HP Ultrium 960 • HPVLS100i • HPservers(qty 2)	• BackupExpress • Reload • Linux
LPC	• HP Ultrium 960 • HP server (qty 1)	• Backup Express
DO	• HP Ultrium 232 • HP server (qty 1)	• Backup Express

Planned Implementation Timeline

Implementation schedule for the comprehensive Data Backup System is targeted in 2007 as follows:

- July 16 - August 17: Install and configure HP Proliant servers, HP Ultium tape drives, HPVLS100i

- August 20 – 31: Install and configure Syncsort and Reload software.
- September 4 – 14: Testing and training
- September 17 – 28: Migrate data stored in tapes from old system to new system
- October 5: New backup system in production