

## Data-Backup Guidelines – 2011

### The Importance of Backups

A properly planned and implemented backup process is vital to any organization. While hardware is a substantial capital investment, it is easily repaired or replaced. Failures can be covered by warranties or service contracts, or can be fixed by purchasing replacement parts. New hardware can be purchased if the existing hardware cannot be repaired. Insurance can be purchased to cover damage. ***However, business-critical data lost due to equipment failure is difficult (and expensive) to replace.***

The data stored on the network server represents many hours of effort over a long period of time. Recreating this information is next to impossible. Even if printed records are available, re-entering the information is an expensive, labor-intensive task. Notes and other detail information that don't make it into the printed reports are likely lost forever.

There is no substitute for a properly functioning backup. The disk arrays in modern servers protect against service interruption and the loss of a day's work due to a single disk failure. However, a server's disk array does not protect against a user or application error.

A backup will usually be used to restore a single file or directory – not the whole server. The most common situations where a backup is useful are:

- A user makes changes to a document, and then wishes to recover the previous version.
- Changes are saved to a template document, rather than creating a new file.
- Access is needed to a deleted file.
- An application upgrade fails and corrupts its data files

Backup technologies include:

- Tape-based backup
- Disk-to-disk backup
- Internet-based backup
- Remote-server replication

These technologies are discussed in the next section, Backup Technologies.

This document is oriented to tape-based backups and includes information on:

- Daily procedure – Tape-based backup
- Tape-based backups and scheduling
- Cleaning the tape drive
- Tape-cartridge rotation
- Tape storage
- Tape replacement
- Backup Rotation Calendar and Backup Event Log

## **Backup Technologies**

### Tape-based backup

Tape-based backup use backup software (typically Symantec BackupExec) and a tape drive(s) to create a rotation of tapes for both onsite and offsite storage. Contents of the server are backed-up to a tape at least daily. Tapes are labeled for the day of the week (or month) and are rotated to a secure, offsite location to protect data in the event of a local disaster. Note: Tapes should be encrypted to ensure privacy is a backup tape is lost or stolen.

### Disk-to-Disk (D2D) backup

An additional server is installed to store data backups. Generally, there is sufficient space for multiple backup sets. The backups complete quickly, and administrators can quickly select and restore from several different points in time.

Proper disaster recovery capability still requires that the data be moved offsite in some way. The simplest is a tape drive installed in this backup server via Disk-to-Disk-To-Tape (D2D2T). The backup data is copied to tape without loading the production servers or the network, and there are fewer worries about open files. This approach costs more than simply installing a tape drive in the data server. The ease of restoration and the reduced interference of the workday by the backup may make the extra cost worthwhile.

Some disk-based backups avoid the need for a tape drive by copying the data to a removable hard disk. While disks are less susceptible to most problems which damage tapes, they are more susceptible to shock damage, and should be transported in a padded case or box to prevent this.

### Internet-based backups

Backup data is transferred to a server or backup device over the Internet to a provider of remote backup services (like Bryley' BU/DR). This is almost always done using a disk to disk (D2D) backup as described above, so that the data can be compressed and transmitted efficiently.

One consideration to this type of backup is that the amount of data that needs to be transferred can often exceed the available bandwidth. The backup data needs to be transferred when the connection is not being used for other business purposes, so the transfer is restricted to overnight hours unless a dedicated circuit is purchased.

If there is adequate time and bandwidth to transfer the data, this is a viable replacement for a tape-based backup. (This is more appropriate to smaller companies since larger companies tend to have too many modified files every day, or make use of large databases that need to be transferred in their entirety every night.)

Restore times are lengthened by the need to transport the files from the remote location – either over the network link or by transporting the files on physical media. Bryley minimizes this problem by providing an onsite appliance to store backups locally.

Bryley offers its Backup/Disaster Recovery (BU/DR) option. Back Up/Disaster Recovery provides secure, real-time, automated, disk backup, disk imaging, file-level backups, and bare-metal restore for Microsoft Windows-based servers, workstations, and notebook computers.

Benefits:

- Safe, secure, encrypted backup of mission-critical data without user intervention.
- Quick-and-easy restoration of data at file, disk, or hardware level.
- Eliminates tape swapping and administration.

The Bryley BU/DR process:

- Bryley initially takes an image of your data and copies this image to our data center.
- Bryley then streams encrypted, incremental/differential changes from your site to our data-center daily.
- When the streamed incremental/differential backup exceeds the throughput of your Internet connection, we retrieve a new image.

Bryley BU/DR data storage and availability:

- Data-center storage is fully redundant with daily, weekly, and monthly backups.
- Weekly and monthly backups are stored offsite locally at a secure site in a fire-proof safe.
- For mission-critical equipment (servers), we install an appliance onsite to provide local backup and speed the process.

### Remote-server replication

Files are replicated over a WAN or Internet link to a redundant server in real-time. This provides quick recovery for any problem with the production server – with the proper software; the replica server can stand in for the production server without the users realizing that there was any interruption. Most replication programs support common database and messaging servers, allowing for individual messages and transactions to be replicated.

This is a way to provide enhanced availability, but does not replace a proper backup. Like redundant disk drives in a server, all changes are replicated to the remote server, including undesired ones. A backup, with offsite rotation and multiple versions to restore from, is still required.

### **Daily Procedure – Tape-Based Backup**

A designated backup administrator should perform these tasks every morning, as part of his or her daily routine. This procedure should be done as early in the day as possible, to allow the maximum amount of time for any problems to be resolved before the next scheduled backup.

1. Launch the backup program and check the status display. If the program is already running, refresh the display.
2. If the previous backup is not yet complete, or shows an error status, do not proceed until the problem has been resolved.
3. Verify that the schedule for the next backup is correct.

4. Remove the tape cartridge from the drive and store it properly
5. Insert the tape for the next backup.

There should be at least one other person familiar with these tasks to perform them when the primary administrator is unavailable.

The backup status must be checked and the tape changed every workday. If a day is missed, the scheduled backup will run as soon as a tape cartridge is inserted. ***Any file that is in use when a backup is running will not be backed up properly and cannot be reliably restored.*** The drive will unload the tape cartridge when the backup is complete and the same sequence will occur the next day. Backups will continue to run at the wrong time until the problem is noticed and corrected.

## Tape-Based Backups and Scheduling

The purpose of a backup is to ensure that needed information can be quickly recovered, whether a user inadvertently deletes files, or a disaster requires restoring all files to a new server.

All server drives should be backed up every after every workday. For most companies, this will be every weeknight, but Saturday and Sunday should also be included if substantial changes are made during the weekend.

A full backup involves copying all files on the server to tape. Incremental and differential backups can save time (by backing up only those files that have changed), but they increase the complexity of a restore. Unless the time required for a full backup cuts into the workday, all backups should be full backups. (A faster tape drive should be considered if this situation exists.)

At a minimum, backup applications should have scheduling, verification, and logging functions. The most widely used applications are Backup Exec from Symantec and ARCserve from Computer Associates. Both applications are available for several network operating systems. Both products also have optional agents available to backup additional file servers, workstations, database servers and messaging servers. (Because database and message store files are always open, the agents are required to back them up properly. The agent creates the backup by querying the server for all records.)

***Most backup routines backup the server drives only. All users should store their data files on the server drives.***

Often there are sensitive files that users are reluctant to store on the server. Modern server operating systems have sufficient security that this should not be an issue. If it is deemed necessary to store these files on a workstation hard drive, provisions must be made to backup these files as well.

Most server-backup programs can be configured to backup workstations. Windows XP Professional or Windows Vista should be used on such a workstation if all necessary applications are supported. XP and Vista provides security for the locally stored files, and it is not necessary

for the user to be logged in when the backup takes place. (Windows 2000 Professional provides similar security, but it is best to run the most modern operating system possible.)

The other alternative is separate, locally installed, tape drive and backup software for the workstation. Like the server backup, this backup must be checked daily, and a second set of tapes must be purchased, properly stored, properly rotated, and replaced when necessary.

The drawback to both workstation backup alternatives is that the user must remember to log off, rather than shut down at the end of the day. Failed backups happen regularly, especially if the user is used to shutting down at the end of the day.

## **Cleaning the tape drive**

The magnetic tape surface is a layer of metal or metallic oxide. A small amount of this surface rubs off on to the tape drive's heads with each use. The buildup of these magnetic particles eventually prevents the tape heads from reading and writing reliably. To prevent this, clean the tape drive on a regular schedule.

Some tape drives can indicate, either through a light on the drive or a signal to the backup application that they need to be cleaned. It is important to note that this indication is based on a self-test (that was not 100% successful), or the drive has encountered a threshold number of soft (correctable) errors. While the drive should be cleaned at this indication, it should be cleaned before these errors appear.

### Cleaning cartridges

Cleaning cartridges should be manufactured or approved by the drive manufacturer.

Cleaning the tape drive involves inserting the cleaning cartridge in the drive the same way a regular tape cartridge is inserted. The cleaning cycle runs for 30-90 seconds, and then the cleaning cartridge is ejected. Follow any specific instructions included with the tape drive or cleaning cartridge.

All cleaning cartridges are provided with a card or label to record each use. After the recommended number of uses, discard and replace the cartridge.

### Cleaning schedule

In general, tape drives should be cleaned weekly.

DAT, Mammoth, Travan, and other 4mm, 8mm and ¼ inch tape formats should always be cleaned weekly. If the tapes are being used at or near their full capacity may need to be cleaned more often than once per week.

Half-inch (DLT and LTO) tape drives with low utilization may not need to be cleaned weekly. If the total runtime of the backups for a week is less 40 hours, and the server is in fairly clean,

climate-controlled environment, clean the drive every other week. If errors occur, or the server environment is less than ideal, perform weekly cleanings.

Cleaning cartridges were not available for SDLT drives when they were initially released. It was later determined that cleaning did benefit the drives, especially when they were not located in a climate-controlled datacenter.

In addition to scheduled cleanings, the tape drive should be cleaned when:

- The drive or software indicates a cleaning is required.
- A backup fails due to a tape drive error.
- A new tape cartridge has been used for the first time. (This does not apply to newer ½ inch drives (SDLT and LTO.) Clean these drives normally unless errors occur.)

## **Tape-cartridge rotation**

Multiple tape cartridges should be used to:

- Insure that there is a complete backup available in the event of a backup error
- Allow at least some backups to be kept offsite
- Provide more than one potential source to replace a corrupt or missing file

Tape cartridges should be rotated according to a set schedule and labeled appropriately, so that the proper tape can be found when it is needed for a restore. Tape labels should also indicate the date that the tape was placed in service, so it can be replaced when appropriate. If there is more than one tape drive in use, the server name or drive number should also be indicated on the label.

Any tape rotation that is easy to follow and ensures that at least a week passes before data is overwritten will be effective. As more tape cartridges are used, it is more likely that there will be copies of a corrupt or missing file available.

### Five-tape rotation

This rotation uses five tape cartridges with the following labels:

Monday      Tuesday      Wednesday      Thursday      Friday

Each cartridge is used on the indicated day of the week. Data can only be recovered from the preceding week. This is a minimal, but adequate, tape rotation

A common variation of this rotation uses ten tape cartridges, which are labeled Monday-A, Monday-B, Tuesday-A, Tuesday-B, etc. The tape cartridges are used in alternate weeks, and data can be recovered from the preceding two weeks.

### Nine-tape rotation

This rotation uses only nine tape cartridges, but allows for recovery of files for up to a month.

The nine tape cartridges have the following labels:

Monday	Tuesday	Wednesday	Thursday	
Friday-1	Friday-2	Friday-3	Friday-4	Friday-5

The Monday through Thursday tape cartridges are used each week. Friday-1 is used on the first Friday of each month. The remaining Friday tape cartridges are used in subsequent weeks.

Data can be restored from any of the previous five business days, or from the end of the previous four weeks.

### Thirteen-tape rotation

This is a hybrid of the five-tape and nine-tape rotations above.

The thirteen tape cartridges have the following labels:

Monday-A	Tuesday-A	Wednesday-A	Thursday-A	
Monday-B	Tuesday-B	Wednesday-B	Thursday-B	
Friday-1	Friday-2	Friday-3	Friday-4	Friday-5

The Monday through Thursday tape cartridges are used in alternating weeks. Friday-1 is used on the first Friday of each month. The remaining Friday tape cartridges are used in subsequent weeks.

Data can be restored from any day in the previous two weeks, or from the end of the previous four weeks.

### Twenty-tape rotation

This rotation uses twenty tape cartridges with the following labels:

Monday	Tuesday	Wednesday	Thursday
Friday-1	Friday-2	Friday-3	Friday-4
January	February	March	April
May	June	July	August
September	October	November	December

The Monday through Thursday and Friday-1 through Friday-3 tape cartridges are used the same way as the nine tape rotation. The January through December tape cartridges are used on the last Friday of the month (Friday-4 is used on the fourth Friday of a five Friday month.).

Data can be restored from any day of the previous week, any of the last four Fridays, or from the end of any of the preceding twelve months.

If a tape from the last day of the month is preferred, add a Friday-5 tape to the rotation and insert the tape for the month on the appropriate day.

## **Tape storage**

### Preferred storage methods

Tape cartridges should not be stored in proximity to the server. The server's monitor and UPS generate magnetic fields that can corrupt data if tape cartridges are placed too close.

Tape cartridges should be stored in a locked box or cabinet, preferably a fire-resistant one. This should be a sufficient distance from the server that a minor incident (such as a broken water pipe) that damages the server will not damage the tape cartridges as well.

### Offsite Storage

To protect against a major disaster, at least one recent tape cartridge should be stored offsite. This should be at a branch office or the home of a trusted employee. A small fire-resistant storage container for the remote site is recommended.

Offsite storage, usually with courier service, is available. There are companies that specialize in tape storage, and the service is often also available from companies that provide storage for paper files.

All offsite tapes should be encrypted to protect data in the event of loss or theft.

### Storage environment

The tapes need to be stored so they are protected from:

- Unauthorized access
- Inappropriate temperature and humidity levels
- Dust
- Magnetic fields
- Physical shock

### Access to tape cartridges

Tape cartridges should be stored in a secure location. Secure them as you would secure any other confidential business records.

### Temperature and Humidity

Tape cartridges should be stored in a location where the temperature and humidity are at levels where people are comfortable. They should not be subject to wide variations in temperature and humidity.

A tape cartridge that has been left in an area where the temperature is above 90°F or below 50°F should be kept in a normal storage environment for 24 hours before being used.

## Dust

The storage area should be clean and free of airborne particles. Cartridges should be stored in their plastic cases, which should in turn be put into a storage box or file drawer.

## Magnetic fields

Tape cartridges should be protected from exposure to magnets and magnetic fields, including those generated by monitors, speakers, UPS, motors, and other machinery.

## Shock damage

Tape cartridges should be handled carefully. The internal parts of the cartridge can become misaligned if the cartridge is dropped or handled roughly.

## **Tape replacement**

Tape cartridges wear out. In addition to the loss of magnetic particles each time the cartridge is used, there is wear on the internal moving parts of the cartridge, and the plastic tape substrate stretches slightly. Eventually, the drive will no longer be able to align the heads to the tracks on the tape.

Smaller cartridge formats are more susceptible to misalignment due to wear.

If a single tape cartridge is suspect, clean the drive before inserting that cartridge for its next scheduled use. If the backup still fails, replace the cartridge. If the cartridge is near scheduled replacement, all cartridges of similar age and usage frequency should be replaced.

Continuing to use worn or damaged cartridges will result in failed backups. It will likely create a need for additional drive cleaning, and can result in reduced lifetime for other cartridges.

### **Recommended Cartridge Replacement Intervals**

<u>Tape format</u>	<u>Used weekly</u>	<u>Used bi-weekly</u>	<u>Used monthly</u>
4mm (DDS)	6 months	12 months	24 months
8mm (AIT, Mammoth)	18 months	36 months	
1/4" (SLR, Travan)	12 months	24 months	
1/2" (DLT,SDLT,LTO)	36 months		

Replacement cartridges should be either manufactured by or approved by the drive manufacturer.

## **Backup-Rotation Calendar and Backup-Event Log**

The following pages are provided to assist in the backup rotation.

Use the Backup Event Log to record backup errors. Also, note when a new tape or cleaning cartridge is placed into service.

Check off each successful backup in the calendar pages. Note each drive cleaning as well. The calendar also notes which cartridge should be used each day.

The calendar is based on a nine-tape rotation. The month-end tape cartridges for 20 and 21 tape rotations are indicated in **bold** (last Friday) and *italic* (last business day). The left column labels each week A or B for ten and thirteen tape rotations.

## January 2011

	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
<b>A</b> Backed up Cleaned Tape							1
<b>B</b> Backed up Cleaned Tape	2	3 <input type="checkbox"/> <input type="checkbox"/> Monday	4 <input type="checkbox"/> <input type="checkbox"/> Tuesday	5 <input type="checkbox"/> <input type="checkbox"/> Wednesday	6 <input type="checkbox"/> <input type="checkbox"/> Thursday	7 <input type="checkbox"/> <input type="checkbox"/> Friday-1	8
<b>A</b> Backed up Cleaned Tape	9	10 <input type="checkbox"/> <input type="checkbox"/> Monday	11 <input type="checkbox"/> <input type="checkbox"/> Tuesday	12 <input type="checkbox"/> <input type="checkbox"/> Wednesday	13 <input type="checkbox"/> <input type="checkbox"/> Thursday	14 <input type="checkbox"/> <input type="checkbox"/> Friday-2	15
<b>B</b> Backed up Cleaned Tape	16	17 <input type="checkbox"/> <input type="checkbox"/> Monday	18 <input type="checkbox"/> <input type="checkbox"/> Tuesday	19 <input type="checkbox"/> <input type="checkbox"/> Wednesday	20 <input type="checkbox"/> <input type="checkbox"/> Thursday	21 <input type="checkbox"/> <input type="checkbox"/> Friday-3	22
<b>A</b> Backed up Cleaned Tape	23	24 <input type="checkbox"/> <input type="checkbox"/> Monday	25 <input type="checkbox"/> <input type="checkbox"/> Tuesday	26 <input type="checkbox"/> <input type="checkbox"/> Wednesday	27 <input type="checkbox"/> <input type="checkbox"/> Thursday	28 <input type="checkbox"/> <input type="checkbox"/> Fri-4/ <b>Jan</b>	29
<b>B</b> Backed up Cleaned Tape	30	31 <input type="checkbox"/> <input type="checkbox"/> Monday					

## February 2011

	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
<b>B</b> Backed up Cleaned Tape			1 <input type="checkbox"/> <input type="checkbox"/> Tuesday	2 <input type="checkbox"/> <input type="checkbox"/> Wednesday	3 <input type="checkbox"/> <input type="checkbox"/> Thursday	4 <input type="checkbox"/> <input type="checkbox"/> Friday-1	5
<b>A</b> Backed up Cleaned Tape	6	7 <input type="checkbox"/> <input type="checkbox"/> Monday	8 <input type="checkbox"/> <input type="checkbox"/> Tuesday	9 <input type="checkbox"/> <input type="checkbox"/> Wednesday	10 <input type="checkbox"/> <input type="checkbox"/> Thursday	11 <input type="checkbox"/> <input type="checkbox"/> Friday-2	12
<b>B</b> Backed up Cleaned Tape	13	14 <input type="checkbox"/> <input type="checkbox"/> Monday	15 <input type="checkbox"/> <input type="checkbox"/> Tuesday	16 <input type="checkbox"/> <input type="checkbox"/> Wednesday	17 <input type="checkbox"/> <input type="checkbox"/> Thursday	18 <input type="checkbox"/> <input type="checkbox"/> Friday-3	19
<b>A</b> Backed up Cleaned Tape	20	21 <input type="checkbox"/> <input type="checkbox"/> Monday	22 <input type="checkbox"/> <input type="checkbox"/> Tuesday	23 <input type="checkbox"/> <input type="checkbox"/> Wednesday	24 <input type="checkbox"/> <input type="checkbox"/> Thursday	25 <input type="checkbox"/> <input type="checkbox"/> Fri-4/ <b>Feb</b>	26
<b>B</b> Backed up Cleaned Tape	27	28 <input type="checkbox"/> <input type="checkbox"/> Monday					

## March 2011

	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
<b>B</b>			1	2	3	4	5
Backed up			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Cleaned			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Tape			Tuesday	Wednesday	Thursday	Friday-1	
<b>A</b>	6	7	8	9	10	11	12
Backed up		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Cleaned		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Tape		Monday	Tuesday	Wednesday	Thursday	Friday-2	
<b>B</b>	13	14	15	16	17	18	19
Backed up		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Cleaned		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Tape		Monday	Tuesday	Wednesday	Thursday	Friday-3	
<b>A</b>	20	21	22	23	24	25	26
Backed up		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Cleaned		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Tape		Monday	Tuesday	Wednesday	Thursday	Fri-4/Mar	
<b>B</b>	27	28	29	30	31		
Backed up		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Cleaned		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Tape		Monday	Tuesday	Wednesday	Thursday		

## April 2011

	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
<b>B</b>						1	2
Backed up						<input type="checkbox"/>	
Cleaned						<input type="checkbox"/>	
Tape						Friday-1	
<b>A</b>	3	4	5	6	7	8	9
Backed up		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Cleaned		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Tape		Monday	Tuesday	Wednesday	Thursday	Friday-2	
<b>B</b>	10	11	12	13	14	15	16
Backed up		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Cleaned		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Tape		Monday	Tuesday	Wednesday	Thursday	Friday-3	
<b>A</b>	17	18	19	20	21	22	23
Backed up		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Cleaned		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Tape		Monday	Tuesday	Wednesday	Thursday	Friday-4	
<b>B</b>	24	25	26	27	28	29	30
Backed up		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Cleaned		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Tape		Monday	Tuesday	Wednesday	Thursday	Fri-5/Apr	

## May 2011

	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
<b>A</b>	1	2	3	4	5	6	7
Backed up		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Cleaned		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Tape		Monday	Tuesday	Wednesday	Thursday	Friday-1	
<b>B</b>	8	9	10	11	12	13	14
Backed up		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Cleaned		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Tape		Monday	Tuesday	Wednesday	Thursday	Friday-2	
<b>A</b>	15	16	17	18	19	20	21
Backed up		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Cleaned		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Tape		Monday	Tuesday	Wednesday	Thursday	Friday-3	
<b>B</b>	22	23	24	25	26	27	28
Backed up		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Cleaned		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Tape		Monday	Tuesday	Wednesday	Thursday	Fri-4/ <b>May</b>	
<b>A</b>	29	30	31				
Backed up		<input type="checkbox"/>	<input type="checkbox"/>				
Cleaned		<input type="checkbox"/>	<input type="checkbox"/>				
Tape		Monday	Tuesday				

## June 2011

	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
<b>A</b>				1	2	3	4
Backed up				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Cleaned				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Tape				Wednesday	Thursday	Friday-1	
<b>B</b>	5	6	7	8	9	10	11
Backed up		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Cleaned		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Tape		Monday	Tuesday	Wednesday	Thursday	Friday-2	
<b>A</b>	12	13	14	15	16	17	18
Backed up		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Cleaned		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Tape		Monday	Tuesday	Wednesday	Thursday	Friday-3	
<b>B</b>	19	20	21	22	23	24	25
Backed up		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Cleaned		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Tape		Monday	Tuesday	Wednesday	Thursday	Fri-4/ <b>Jun</b>	
<b>A</b>	26	27	28	29	30		
Backed up		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Cleaned		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Tape		Monday	Tuesday	Wednesday	Thursday		

## July 2011

	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
<b>A</b> Backed up Cleaned Tape						1 <input type="checkbox"/> <input type="checkbox"/> Friday-1	2
<b>B</b> Backed up Cleaned Tape	3	4 <input type="checkbox"/> <input type="checkbox"/> Monday	5 <input type="checkbox"/> <input type="checkbox"/> Tuesday	6 <input type="checkbox"/> <input type="checkbox"/> Wednesday	7 <input type="checkbox"/> <input type="checkbox"/> Thursday	8 <input type="checkbox"/> <input type="checkbox"/> Friday-2	9
<b>A</b> Backed up Cleaned Tape	10	11 <input type="checkbox"/> <input type="checkbox"/> Monday	12 <input type="checkbox"/> <input type="checkbox"/> Tuesday	13 <input type="checkbox"/> <input type="checkbox"/> Wednesday	14 <input type="checkbox"/> <input type="checkbox"/> Thursday	15 <input type="checkbox"/> <input type="checkbox"/> Friday-3	16
<b>B</b> Backed up Cleaned Tape	17	18 <input type="checkbox"/> <input type="checkbox"/> Monday	19 <input type="checkbox"/> <input type="checkbox"/> Tuesday	20 <input type="checkbox"/> <input type="checkbox"/> Wednesday	21 <input type="checkbox"/> <input type="checkbox"/> Thursday	22 <input type="checkbox"/> <input type="checkbox"/> Friday-4	23
<b>A</b> Backed up Cleaned Tape	24	25 <input type="checkbox"/> <input type="checkbox"/> Monday	26 <input type="checkbox"/> <input type="checkbox"/> Tuesday	27 <input type="checkbox"/> <input type="checkbox"/> Wednesday	28 <input type="checkbox"/> <input type="checkbox"/> Thursday	29 <input type="checkbox"/> <input type="checkbox"/> Fri-5/Jul	30
<b>B</b> Backed up Cleaned Tape	31						

## August 2011

	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
<b>B</b> Backed up Cleaned Tape		1 <input type="checkbox"/> <input type="checkbox"/> Monday	2 <input type="checkbox"/> <input type="checkbox"/> Tuesday	3 <input type="checkbox"/> <input type="checkbox"/> Wednesday	4 <input type="checkbox"/> <input type="checkbox"/> Thursday	5 <input type="checkbox"/> <input type="checkbox"/> Friday-1	6
<b>A</b> Backed up Cleaned Tape	7	8 <input type="checkbox"/> <input type="checkbox"/> Monday	9 <input type="checkbox"/> <input type="checkbox"/> Tuesday	10 <input type="checkbox"/> <input type="checkbox"/> Wednesday	11 <input type="checkbox"/> <input type="checkbox"/> Thursday	12 <input type="checkbox"/> <input type="checkbox"/> Friday-2	13
<b>B</b> Backed up Cleaned Tape	14	15 <input type="checkbox"/> <input type="checkbox"/> Monday	16 <input type="checkbox"/> <input type="checkbox"/> Tuesday	17 <input type="checkbox"/> <input type="checkbox"/> Wednesday	18 <input type="checkbox"/> <input type="checkbox"/> Thursday	19 <input type="checkbox"/> <input type="checkbox"/> Friday-3	20
<b>A</b> Backed up Cleaned Tape	21	22 <input type="checkbox"/> <input type="checkbox"/> Monday	23 <input type="checkbox"/> <input type="checkbox"/> Tuesday	24 <input type="checkbox"/> <input type="checkbox"/> Wednesday	25 <input type="checkbox"/> <input type="checkbox"/> Thursday	26 <input type="checkbox"/> <input type="checkbox"/> Fri-4/Aug	27
<b>B</b> Backed up Cleaned Tape	28	29 <input type="checkbox"/> <input type="checkbox"/> Monday	30 <input type="checkbox"/> <input type="checkbox"/> Tuesday	31 <input type="checkbox"/> <input type="checkbox"/> Wednesday			

## September 2011

	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
<b>B</b> Backed up Cleaned Tape					1 <input type="checkbox"/> <input type="checkbox"/> Thursday	2 <input type="checkbox"/> <input type="checkbox"/> Friday-1	3
<b>A</b> Backed up Cleaned Tape	4	5 <input type="checkbox"/> <input type="checkbox"/> Monday	6 <input type="checkbox"/> <input type="checkbox"/> Tuesday	7 <input type="checkbox"/> <input type="checkbox"/> Wednesday	8 <input type="checkbox"/> <input type="checkbox"/> Thursday	9 <input type="checkbox"/> <input type="checkbox"/> Friday-2	10
<b>B</b> Backed up Cleaned Tape	11	12 <input type="checkbox"/> <input type="checkbox"/> Monday	13 <input type="checkbox"/> <input type="checkbox"/> Tuesday	14 <input type="checkbox"/> <input type="checkbox"/> Wednesday	15 <input type="checkbox"/> <input type="checkbox"/> Thursday	16 <input type="checkbox"/> <input type="checkbox"/> Friday-3	17
<b>A</b> Backed up Cleaned Tape	18	19 <input type="checkbox"/> <input type="checkbox"/> Monday	20 <input type="checkbox"/> <input type="checkbox"/> Tuesday	21 <input type="checkbox"/> <input type="checkbox"/> Wednesday	22 <input type="checkbox"/> <input type="checkbox"/> Thursday	23 <input type="checkbox"/> <input type="checkbox"/> Friday-4	24
<b>B</b> Backed up Cleaned Tape	25	26 <input type="checkbox"/> <input type="checkbox"/> Monday	27 <input type="checkbox"/> <input type="checkbox"/> Tuesday	28 <input type="checkbox"/> <input type="checkbox"/> Wednesday	29 <input type="checkbox"/> <input type="checkbox"/> Thursday	30 <input type="checkbox"/> <input type="checkbox"/> Fri-5/Sep	

## October 2011

	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
<b>B</b> Backed up Cleaned Tape							1
<b>A</b> Backed up Cleaned Tape	2	3 <input type="checkbox"/> <input type="checkbox"/> Monday	4 <input type="checkbox"/> <input type="checkbox"/> Tuesday	5 <input type="checkbox"/> <input type="checkbox"/> Wednesday	6 <input type="checkbox"/> <input type="checkbox"/> Thursday	7 <input type="checkbox"/> <input type="checkbox"/> Friday-1	8
<b>B</b> Backed up Cleaned Tape	9	10 <input type="checkbox"/> <input type="checkbox"/> Monday	11 <input type="checkbox"/> <input type="checkbox"/> Tuesday	12 <input type="checkbox"/> <input type="checkbox"/> Wednesday	13 <input type="checkbox"/> <input type="checkbox"/> Thursday	14 <input type="checkbox"/> <input type="checkbox"/> Friday-2	15
<b>A</b> Backed up Cleaned Tape	16	17 <input type="checkbox"/> <input type="checkbox"/> Monday	18 <input type="checkbox"/> <input type="checkbox"/> Tuesday	19 <input type="checkbox"/> <input type="checkbox"/> Wednesday	20 <input type="checkbox"/> <input type="checkbox"/> Thursday	21 <input type="checkbox"/> <input type="checkbox"/> Friday-3	22
<b>B</b> Backed up Cleaned Tape	23	24 <input type="checkbox"/> <input type="checkbox"/> Monday	25 <input type="checkbox"/> <input type="checkbox"/> Tuesday	26 <input type="checkbox"/> <input type="checkbox"/> Wednesday	27 <input type="checkbox"/> <input type="checkbox"/> Thursday	28 <input type="checkbox"/> <input type="checkbox"/> Fri-4/Oct	29
<b>A</b> Backed up Cleaned Tape	30	31 <input type="checkbox"/> <input type="checkbox"/> Monday					

## November 2011

	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
<b>A</b>		1	2	3	4	5	6
Backed up		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Cleaned		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Tape		Monday	Tuesday	Wednesday	Thursday	Friday-1	
<b>B</b>	7	8	9	10	11	12	13
Backed up		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Cleaned		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Tape		Monday	Tuesday	Wednesday	Thursday	Friday-2	
<b>A</b>	14	15	16	17	18	19	20
Backed up		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Cleaned		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Tape		Monday	Tuesday	Wednesday	Thursday	Friday-3	
<b>B</b>	21	22	23	24	25	26	27
Backed up		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Cleaned		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Tape		Monday	Tuesday	Wednesday	Thursday	Fri-4/Nov	
<b>A</b>	28	29	30				
Backed up		<input type="checkbox"/>	<input type="checkbox"/>				
Cleaned		<input type="checkbox"/>	<input type="checkbox"/>				
Tape		Monday	Tuesday				

## December 2011

	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
<b>A</b>					1	2	3
Backed up					<input type="checkbox"/>	<input type="checkbox"/>	
Cleaned					<input type="checkbox"/>	<input type="checkbox"/>	
Tape					Thursday	Friday-1	
<b>B</b>	4	5	6	7	8	9	10
Backed up		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Cleaned		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Tape		Monday	Tuesday	Wednesday	Thursday	Friday-2	
<b>A</b>	11	12	13	14	15	16	17
Backed up		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Cleaned		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Tape		Monday	Tuesday	Wednesday	Thursday	Friday-3	
<b>B</b>	18	19	20	21	22	23	24
Backed up		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Cleaned		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Tape		Monday	Tuesday	Wednesday	Thursday	Friday-4	
<b>A</b>	25	26	27	28	29	30	31
Backed up		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Cleaned		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Tape		Monday	Tuesday	Wednesday	Thursday	Fri-5/Dec	

