Moving Forward on Backups

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This week in the IS342 *Management of Information Assurance* course< http://www.mekabay.com/courses/academic/norwich/is342/index.htm > at Norwich University< http://programs.norwich.edu/business/csia/ >, my students and I have been discussing backups. As part of my usual continuous process improvement, I've updated my lecture notes< http://www.mekabay.com/courses/academic/norwich/is342/is342_lectures/index.htm > (which we no longer use in class, preferring to watch lectures from respected industry or academic experts and have vigorous discussions). The topic corresponds to Chapter 57< http://www.mekabay.com/courses/academic/norwich/is342/is342_lectures/csh5_ch57_backups.pptx > in the *Computer Security Handbook,* 5th Edition.< http://www.amazon.com/Computer-Security-Handbook-Volume-Set/dp/0471716529/ >

The biggest changes for choosing appropriate backup strategies since the 2009 publication of the 5th Edition are in

- The capacity and costs of backup media
- Transfer speeds
- The growing popularity of cloud backup.

I started the class discussion with a plea to my students to back up their work: I absolutely *hate* having to redo something I've already finished, and I asked if they would agree that trying to reconstitute work after we've already done it is much harder than one might expect. Especially in writing, we naturally suppress repetition – and as we rewrite our lost manuscript, we're constantly fighting the legitimate sense that we've already dealt with each topic. It's bad enough to have the dog eat our homework: having a dead or lost disk drive eat our homework should be much more embarrassing.

Luckily, the price of storage in many media has been dropping steadily for years. For example, a 3 TB magnetic disk drive currently costs around U\$120 – about U\$40/TB or \$0.000038/MB. When I started work with Hewlett Packard in 1980, our biggest disk drive (the HP7925 with 120 MB) cost U\$25,000 – around U\$100,000 in today's currency. That's about \$833/MB. Out of curiosity, I computed the annual change in price over 33 years (33rd root of today's price divided by the old price): it's about 0.6 per year. In other words, the price has dropped to 60% of the previous year's price every year for 33 years! I guess Moore's Law< http://www.mooreslaw.org/ > is still in force even for storage costs.

Transfer speeds are steadily rising, too. In 1980, we were happy with a seek time of around 25ms (millseconds) and a transfer rate of ~7 Kbps(kilobits per second)< http://www.hpmuseum.net/document.php?hwfile=2686 >; today's *cheap* disk drives typically provide seek times in the millisecond range and data transfer rates in the Gbps range.

These changes are allowing us to increase the frequency and extent of our backups for fixed costs or to lower costs for existing backup patterns.

Another change is the availability of cloud backups<

http://www.thetop10bestonlinebackup.com/cloud-backup >, which allows users and organizations to store backups at a distance using Internet communications. Some of the services are free and many user-level services are relatively inexpensive. By configuring client software – or even just using a Web browser – users can store, update and retrieve their data from any of their computers from any of the locations that have 'Net access.

A useful guide called "Why Cloud Backup: Top 10 Reasons"< http://www.ironmountain.com/arma/docs/top_ten_reasons.pdf > from Iron Mountain < http://www.ironmountain.com/ > discusses, well, 10 reasons for considering cloud backup:

1. Achieve disaster recovery with secure offsite cloud backup
2. Freedom from manual and complex tape backup tasks
3. Predictable costs for simpler budgeting
4. Reliable and guaranteed data recovery
5. Minimized risks and costs of downtime
6. Fast data restores
7. Take advantage of service provider's expertise and resources
8. Offload regulatory compliance requirements to service provider
9. Well-managed cloud more secure than your own
10. Ease of setup and use, set-and-forget, no training required.

Some of the concerns< http://www.zdnet.com/despite-risk-more-smbs-consider-cloud-backup-7000012745/ > about cloud backups are confidentiality of unencrypted data stored on someone else's system, the risks of having files inadvertently or deliberately deleted when cloud folders are shared with colleagues or friends, and the critical bottleneck of network bandwidth: regardless of how fast the cloud servers are working, the rate-limiting factor is usually the user's available bandwidth.

The rest of the class notes continue with the usual discussion of issues in backing up, such as storage and disposal of backups, extended costs (e.g., media, time, storage, maintenance), and questions of types and frequency of backups. Feel free to have a look!

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