CLOUD STORAGE: RISKS AND REWARDS (2)

By Jérémy Legendre

This is the second of two articles by Jérémy Legendre, a brilliant student in computer security at Norwich University's School of Business and Management. He submitted an excellent paper on cloud storage for his IS340 Introduction to Information Assurance class in Fall 2012 and has graciously allowed us to publish his work here. Everything that follows is M. Legendre's with minor edits by Mich.

Security of Data Transfers

During transfer is the only time that your files are out of both your and your provider's hands. Your data can be captured and read or modified during transfer using a man-in-the-middle (MitM) attack if not encrypted.[1] Most cloud services have a secure socket layer for safer file transfer.[2] Do not choose a service without a valid SSL certificate.3 You can encrypt files yourself before you upload them to your storage device but encrypted transfer is one step safer and practical. There are a few different ways to upload your data depending on your provider.

FTP

FTP or File Transfer Protocol had its first standard in 1971, prior to TCP/IP's existence. "FTP has traditionally used clear text passwords."[4] Your login information can be read by anyone running a MitM attack between you and your provider's server; even if your data is encrypted your credentials can still be compromised.[4] Alternatively, there is SFTP that uses a secure shell to encrypt your credentials when logging in.

SSL

"SSL (Secure Sockets Layer) is the standard security technology for establishing an encrypted link between a web server and a browser."5 This means that if your cloud storage service's website has a valid SSL certificate, any information sent from your browser to the server and vice versa is encrypted. [5] There was a vulnerability in SSL that allowed hackers to strip the encryption that has been fixed but many service providers have yet to update their versions of SSL.[6] Be sure to check the encryption offered by a service before subscribing.

Encryption in Storage

"As innovators like Apple and Microsoft, Google and Amazon, turn their customers on to the benefits of storing in the cloud, the importance of data encryption steps to the forefront."[7] You can back up any legal file you would like to your cloud storage including tax forms, utility bills, pay stubs, ebill receipts and medical records. These are files you do not want getting out as they may contain sensitive information like credit card numbers, social security numbers, addresses, phone numbers, email addresses which can all be used for identity theft.

Many cloud storage providers have built in storage encryption for no extra charge.[26] You can also encrypt your files yourself or use an additional cloud storage encryption service such as Box Cryptor for additional security.[8] SSL tunnels only encrypt your data during the transfer to your cloud storage server, so your data will be readable by anyone who compromises your account if there is no encryption during storage.

Cloud Storage and the U.S. Government

The U.S. government has even started using the cloud. In June 2012, The U.S. General Services Administration launched an "Effort to Transition Federal Government to Cloud Computing"[9] Before this announcement the General Services Administration had already accomplished two things:

"1. First to Move Email to the Cloud:

Last year, GSA was the first federal agency to move to a cloud based email system, which has saved $2 million dollars in costs so far. In addition, email system operating costs are expected to see additional 50 percent in savings with an estimated $15 million in savings over five years.

2. Working to Standardize Security of Cloud Services:

FedRAMP is an initiative to standardize security assessments of cloud products and services. By addressing one of the key barriers to cloud adoption, this program will accelerate adoption by federal agencies. It will allow agencies to share authorizations, saving time and money otherwise spent on duplicative security reviews."[33]

During the next year they are:

"3. Working on Blanket Purchase Agreements for the Federal Government:

Everything agencies need to move to the cloud is available right now through GSA. The products currently available from GSA include data storage, virtual machines, and web hosting. GSA is working to provide more cloud services to federal agencies, including email services."[33]

Concluding Remarks

Cloud storage is the future of storing digital data and early adopters will benefit in the long run.[10] However, you must make sure your data is well protected. This chart, which M. E. Kabay and I have put together, may help you see which service might best fit your needs.

SERVICE	FUNCTIONS	OPTIONS	CAPACITY	COST	BACKUPS	SECURITY	PLATFORMS
ADrive	Files, sharing	Personal, Business, Adrive Enterprise	50 GB - 10 TB - unlimited	free- $7/mo - $16/mo	Manual	SSL transfer for paid services	PCs, Mac, Unix
BACKBLAZE	System, versions, locate stolen computer	Personal	unlimited	$5/mo	Continuous, scheduled, or manual	encrypted on client; user-added key	Windows, Mac
BackupGenie	Automated backup, versions, sharing	Home, Business, Partners	75 GB, 250 GB, unlimited	$5/mo, $7/mo, $10/mo	daily	SSL transfer, 256bit AES storage	Windows, Mac, iPad, iPhone
BackupandShare	Automated backup, versions, sharing	Individual, Business	10 GB, unlimited	free, $50/mo, $150/mo	daily or manual	SSL transfer	Windows, Mac, iPad, iPhone, Android, Windows Mobile
backupify | Google Apps	backup, restore, search	Professional, Enterprise, Enterprise +	unlimited	$3/user-mo, $4/user-mo, $990/domain -mo	daily or manual	SSL transfer, storage	Google Apps domains
backupify | Salesfore	backup, restore, search, export	Professional, Enterprise, Unlimited Salesforce	1 GB/user	$50/mo for 10 users base + $5/user-mo additional	daily or manual	SSL transfer, storage	Salesforce CRM software
backupify | Personal Apps	backup, restore	MyCloud Personal, 100 & 500	1 GB, 10 GB, 50 GB	free, $5/mo, $20/mo	weekly, nightly	SSL transfer, storage	Facebook, Twitter, Gmail, Google Drive, Google Calendar, Google Sites, Google Contacts, Flickr, Picasa, LinkedIn, Blogger, Zoho
Barracuda	backup appliance, cloud, private cloud, revisions history, restore	Models 190, 390, 490, 690, 890, 990, 1090	from 500GB to 80 TB	from $1,000 to $135,000	total control	SSL transfer, storage	Windows
Box							
Box Backup	open-source software	n/a	n/a -- do-it-yourself	free	total control	SSL transfer, storage	UNIX, Windows
Carbonite	backup, restore	Home, HomePlus, HomePremier, Business, BusinessPremier	unlimited, 250 GB, 500 GB	$60/year through $600/yr	continuous or scheduled	SSL, Blowfish storage; user-added key	Windows, Mac

SERVICE	FUNCTIONS	OPTIONS	CAPACITY	COST	BACKUPS	SECURITY	PLATFORMS
CRASHPLAN	backup, restore, versions, multiple storage sites	CRASHPLAN, CRASHPLAN+, CRASHPLANPRO, CRASHPLANPROe	unlimited	free through $25/yr; also perpetual licenses -- e.g., $3,000 for 50 users + annual support	daily	encrypted on client; user-added key	Windows, Mac, Linux, Solaris
Dropbox	sharing, backups, restore, two factor authorization	Free, Pro, Teams	2 GB up to 1 TB	free through $63,000 for 500 users	continuous	by client	Windows, Mac, Linux, iPad, iPhone, Android and BlackBerry.
Druva	sharing, backups, restore, data analytics, remote deactivation	Professional, Enterprise, Unlimited	15 GB/user up to 100 GB/user	$6/user-mo up	scheduled	SSL transfer, 256bit AES storage	Windows, Mac, Linux, iPad, iPhone, Android and BlackBerry.
egnyte	local cloud, file server, file sharring, file transfer/FTP, remote file access, mobile apps, third party integration	Group, Office, Business, Enterprise	150 GB up to 3 TB	$24.99/month - $129.99/month. Enterprise: $12.99/employee/month	continuous or scheduled	SSL transfer, 256bit AES encryption in transit and at rest,	PC, Mac, iOS, Android, Windows Mobile, WebOS
Elephantdrive	web access, secure sharing/sending,	Free, Personal, Business	2 GB up to 2 TB	Free - $169.95/month, Variation in Business Tier	Automated	256bit AES encryption, optional personal key encryption	PC, Mac, Android (Beta), NAS
Google Drive	web access, OS integration	Free, 25 GB, 100 GB, Peronalized Plan	5 GB up to 16 TB	Free - $799.99/month	N/A	SSL transfer	PC, Mac, Android, iOS
IBackup	API for 3rd party developers	n/a	10 GB up to 300 GB	$9.95/month - $299.95/month	N/A	SSL transfer, 256-bit AES encryption	PC, Mac, Linux, Android, iOS
iCloud	iTunes, Photo Stream, Documents, Safari, Calendar, Contacts, Mail, Apps, iBooks, Backup, Restor, Find my iPhone, Find my Friends	n/a	5 GB up to 55 GB	Free - $100/year	Automatic	SSL Transfer, 128-bit AES encryption	Mac, iOS
Jungle Disk	web access	Personal, Business	Unlimited	$2/month - $5/month + $0.15/GB	Automatic	AES-256 encryption	PC, Mac, iOS
Justcloud	sync multiple computers, web access, file sharing, mobile	n/a	Unlimited	n/a	Automatic	265 Bit Encryption	PC, Mac, iOS, Android, Blackberry

SERVICE	FUNCTIONS	OPTIONS	CAPACITY	COST	BACKUPS	SECURITY	PLATFORMS
Keepit	backup history, restore from backup, replicated backups,	Home Plan, Business Plan	Unlimited	£4.95/month - $49.00/month	Automatic	256-bit Rijndael encryption	PC, Mac, Linux
livedrive	Reseller options	Backup, Briefcase, Pro Suite, Business	Unlimited, 2 TB, 10TB+	$7.95/month - $159.95/month	Automatic	"256-bit military grade encryption"	PC, Mac, Android, iOS
Microsoft SkyDrive	remote access, version tracking, online slide shows	n/a	7 GB up to 107 GB	Free - $50.00/year	Automatic	SSL transfer	PC, Mac, Windows Phone, Android, iOS
mimedia	access media on demand, music, photo, and video streaming	Free, Premium	7 GB up to 100 GB	Free - $4.99/month	Automatic	SSL transfer, NSA level 256-bit encryption	PC, Mac, iOS, Android
Mozy	local backup service, bandwidth throttling, web based and DVD restore, server support, custom domain, custom install	Home, Pro, Enterprise	50 GB - 1 TB	$5.99/month/ computer - $379.99/mon th/computer	Automatic	SSL transfer, 256-bit AES encryption	Mac, PC, iOS, Android
MyOtherDrive	collaboration, secure links, DDL for your files, USB drive backup	Free, Pro, Enterprise	2 GB - 10 TB	Free - $2,400/year	Automatic	SSL transfer, AES 128-bit	PC, Mac
myPCBackup	multiple computer sync, web access, free trial, file versioning	n/a	unlimited	Pay-as-you-go	Automatic	SSL transfer	PC, Mac, iOS, Android, Blackberry
OpenDrive	file sync, web access	Personal, Business	5 GB - 1 TB (custom plan available)	Free - $25/month	Manual	SSL transfer, custom encryption	PC, Mac, iOS, Android
PennyBackup	fast backups, free software, data recovery	n/a	unlimited	$0.089/GB	Manual	256-bit AES encryption	PC
S3	Encryption client, versioning	Free, Paid	5 GB - Unlimited	Free - Pay as you go	Manual	SSL transfer, server side encryption	n/a
SOS Online Backup	Mobile bakcup	Home, Business	5 GB - 2 TB	$79.99/year - $7,490.00/ye ar	Manual	military-grade encryption	PC, Mac, NAS, iOS, Android

SERVICE	FUNCTIONS	OPTIONS	CAPACITY	COST	BACKUPS	SECURITY	PLATFORMS
SugarSync	Sync multiple devices, mobile apps, remote access, outlook integration, versioning	n/a	5 GB - Custom	Free - Custom	Manual	SSL transfer, 128-bit AES server side encryption	PC, Mac, iOS, Android, Kindle, Symbian
Zip cloud	Sync multiple computers, web access	Personal, Business, Partner	75 GB - 5 TB	$4.95/month - $791.20/month	Automated	256bit SSL encryption	PC, Mac, iOS, Android, Blackberry

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NOTES

[1] (Peterson and Reiher)

[2] (Kabay and Legendre)

[3] (Jefferies)

[4] (Process Software)

[5] (SSL)

[6] (Kumar)

[7] (Top 10 Cloud Storage)

[8] (Box Cryptor)

[9] (General Services Administration)

[10]   (Maltais 2012)

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