

Productivity, Part 2: Cloud Storage, Remote Meeting Tools, Screencasting, Speech Recognition Software, Password Managers, and Online Data Backup

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It is an opportune time for radiologists to focus on personal productivity. The ever increasing reliance on computers and the Internet has significantly changed the way we work. Myriad software applications are available to help us improve our personal efficiency. In this article, the authors discuss some tools that help improve collaboration and personal productivity, maximize e-learning, and protect valuable digital data.

Key Words: Productivity, cloud applications, collaboration

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Performance expectations are at an all-time high for radiologists and are predicted to continue to rise in the future, making it an opportune time to focus on personal productivity. Productivity is not only about getting tasks completed on time but is also about simplifying one's life and removing unwanted distractions so that important tasks may be completed in a timely manner [1,2]. Ever increasing reliance on computers and the Internet has significantly influenced the way we work, but not optimizing their use can lead to distraction and wasted time. Myriad software applications have been developed to boost personal efficiency. In this article, we discuss some tools that help improve collaboration and personal productivity, maximize e-learning, and protect valuable digital data.

CLOUD APPLICATIONS

Utility

Loss of data often translates into great losses of time, money, and effort and is a common problem when users

rely on devices such as external drives or multimedia CD/DVD-ROMs for personal storage. Theft, fire, accidental deletion, and hardware failure can all contribute to lost files. The fallibility of personal data storage tools was addressed by the development of cloud applications. In simple terms, the "cloud" refers to a model of networked personal or enterprise storage whereby data are stored not only in users' computers but also in virtualized pools of storage, which are generally hosted by third parties.

The utility of cloud apps goes far beyond their capabilities as remote backup and file retrieval tools. To understand how that is accomplished, it is important to understand the distinction between cloud storage and cloud sharing. "Cloud storage" refers to storing a computer's files and folders, or in some cases the entire hard drive content, for future access. "Cloud sharing" refers to storing selected files from a computer on the Internet so that they can be shared with others. This is accomplished by having a folder on a user's computer; only the contents of that folder are shared and synchronized on the cloud server.

The ability to share the contents of a folder on a user's computer and synchronize files makes cloud apps important productivity tools. In the past, collaboration would have to be completed face to face or via e-mail. This was highly inefficient, resulting in delay and duplication of work. There are also limitations to the amount of data that can be transmitted via e-mail. Cloud sharing allows the collaboration of several users spread all over the globe, working together simultaneously on a particular task, while using different devices (Fig. 1). A potential use of cloud sharing in academic radiology is the creation of a universally accessible and safe repository of educational materials. An online cloud-based library of lectures, video files, presentations,

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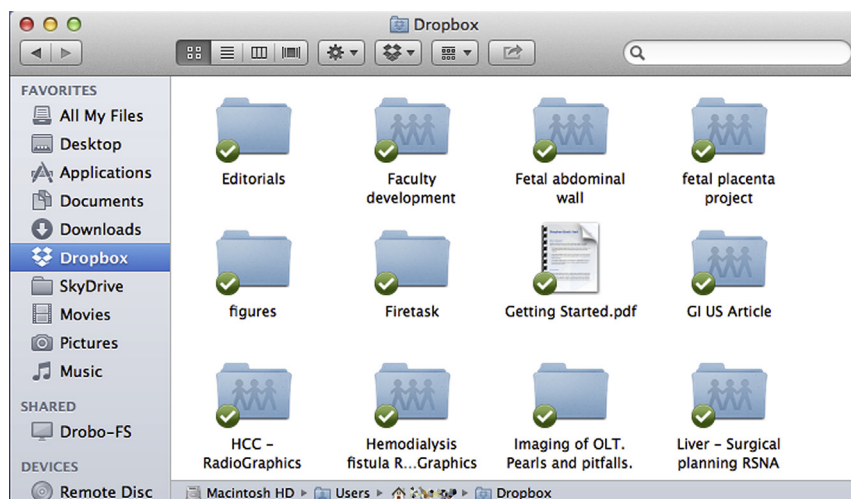
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Fig 1. Screenshot from Dropbox shows how multiple research project documents can be shared with other users' to enhance collaboration.



articles, test-taking modules, and so on, can be created, catalogued, easily updated, and synchronized to be accessed not only by a host of computers but also from the convenience of a tablet computer or smart phone [3]. Some important features of various cloud apps are summarized in Table 1 [4-7].

Impression

Cloud apps have dramatically changed the way data are transmitted and stored and have opened new opportunities for collaboration, thus increasing productivity.

Cloud sharing increases efficiency by reducing the delays and duplication of work that are an inherent part of collaboration when only face-to-face, phone, or e-mail communication is used. The creation of a universally accessible and safe repository of educational materials is a unique use of cloud apps with tremendous potential to increase productivity in academic radiology [2].

A limitation of cloud apps is that they potentially pose new security risks. Critical information such as patient information and passwords should not be stored on a cloud server.

Table 1. Some of the most popular cloud applications

Application	Platform	Pricing/Plans	Maximum File Size	Backup Facility	Additional Features
Dropbox	Linux, Mac, Windows, Android, Blackberry, iOS (all)	Free up to 18 GB; Pro (100–500 GB, \$8.25–\$41.60/month); Business (1 TB for \$795/year for 5 users)	300 MB	Only pictures, music, and movies	Encrypted data storage, but no personal encryption; offers file versioning for 1 month
Box	All except Linux	Free up to 10 MB; Starter (100 GB, \$5/user/month); Business (1 TB, \$15/user/month); Unlimited (call for pricing)	250 MB (free); 2 GB (paid)	Media and data files on the drive	Encrypted data storage, but no personal encryption; offers file versioning
Google Drive	All except Linux	Free up to 15 GB; paid (\$4.99/100 GB/month)	10 GB	Data files on the drive	Real-time collaboration and simultaneous editing with Microsoft Office; encrypted data storage, but no personal encryption; offers unlimited file versioning for data files, 1 month for others
SugarSync	All except Linux	Free up to 5 GB; Personal (60–250 GB, \$7.49–\$24.99/month); Business (1 TB, \$55/month for 3 users); Unlimited (call for pricing)	100 MB (web); no limit (client application)	Complete system backup	Personal encryption facility; offers file versioning with up to 5 older versions of the file available
SkyDrive	All except Linux	Free up to 7 GB; paid (up to 100 GB, \$10/\$25/\$50 for extra 20/50/100 GB/year)	2 GB	Data files on the drive	Encrypted data storage, but no personal encryption; offers file versioning

REMOTE MEETING TOOLS

Utility

Remote meeting tools are applications that allow meetings between individuals or audiences at different geographic locations. Although e-mail or conference calls are usually relied upon for a majority of long-distance communications, a virtual meeting may be more efficient and offer higher impact, especially for an important initiative. Web conferencing allows anyone with an Internet connection to collaborate and interact online in real time, often at short notice, saving time and money [8-10].

For large radiology groups with specialists spread among different clinics and hospitals, a remote meeting can be a vehicle for difficult case consultation between colleagues, or as a less disruptive way to conduct multidisciplinary conferences. Practice leaders can also quickly bring the entire group together to discuss important business details such as finances in a remote meeting. Teaching institutions can use remote meeting tools by hiring outside expert teachers to deliver quality educational content without the cost or time of travel.

A range of remote meeting tools are available, with slight variations in functionality and user interface. Individual features of some of the most popular remote meeting tools are highlighted, using GoToMeeting as a prototype (Table 2) [11-14].

Impression

Remote meeting tools have the potential to increase productivity by allowing real-time collaboration without the hassle or cost of travel. Busy radiology groups can benefit from the ability to interact with colleagues at various locations for difficult case consultations, multidisciplinary conferences, or group business meetings. Educational webinars also become time and cost efficient.

A potential limitation of this type of application is the cost and administrative expertise required for setup and operation of some of the more elaborate tools. Given the potential to enhance productivity by enhancing communication, some of the cost may be defrayed by the hospital or care network in an overall effort to improve patient care with less waste. Security is an important consideration when confidential information is being discussed or shared, for which most providers offer a host of standard security features.

SCREENCASTING

Utility

Teaching a colleague how to do something on the computer either on the phone or via e-mail can be frustrating and time-consuming. Screencasting can increase productivity when used as a "how-I-do-it" tool, allowing an "expert" to easily teach by example. A screencast is a screen capture of the actions on a user's computer screen [15]. In simple terms, it is a video counterpart of a

screenshot, with the added dimension of time, capturing what happens on a monitor over a specified period. It is typically associated with accompanying audio such as the sound from an application being demonstrated, a narrative from the presenter, or background audio from another application.

Screencasting can also be used as a remote learning tool (Fig. 2). Prerecording a lecture for a situation in which physical presence is not required allows the presenter to tackle other responsibilities and creates a fixed presentation that can easily be accessed within a screencast library for future use. An advantage of screencasting for learners is the ability to control the pace of the educational content to suit their personal styles of learning, with the ability to revisit confusing topics, something a classroom cannot always offer.

Several screencast tools are available that offer a host of useful functionality, platform compatibility, and ease of use. Key features of some of the most popular screencasting programs are further discussed in Table 3 [16-19].

Impression

Screencasting can increase productivity when used to show, rather than tell, a colleague how to do something on the computer. A busy faculty member can save time by creating a library of prerecorded lecture material, from which learners also benefit by being able to listen and learn at their own pace.

Learning by watching a screencast of a lecture or presentation lacks direct audience participation, which is a well-recognized limitation of this tool.

SPEECH RECOGNITION AND DICTATION SOFTWARE

Utility

Most radiologists today are proficient with the use of speech recognition software for dictating radiology reports. Radiologists can use the same applications to simplify their lives and increase productivity in all facets of their academic lives. For a busy radiologist trying to maximize time, typing skills are outrun by the speed of the mind and getting words onto paper. Speech recognition software provides an enhanced level of personal productivity by allowing interaction with the computer by voice alone. To-do lists, e-mails, and presentations can all be handled with these applications [20-22]. Voice recognition software provides the benefits of "immediacy" and thought organization, making radiologists more productive by changing the way we interact with and organize information. Currently, Dragon, Nuance NaturallySpeaking, and Nuance 360 (Nuance Communications, Inc, Burlington, Massachusetts) are the market leaders in this category [23].

Dictating research ideas and to-do lists immediately when they are formed is very useful, because it is easy to

Table 2. Some of the most widely used remote meeting tools

Remote Meeting Tool	Software and Platform	Pricing/Plans	Invitation Tools	Collaboration Tools	Additional Features
GoToMeeting	No software required (web based); Mac and Windows; no Linux support	Free 30-day trial; GoToMeeting, \$49/month or \$468/year (up to 25 people); GoToWebinar, \$99/month (up to 100 people) to \$499/month (1,000 people); GoToTraining, \$149–\$349/month (200 people)	Automated e-mail templates* and webinar registration pages; start scheduled or spontaneous meetings from Microsoft Outlook, IBM Lotus Notes, or various instant-messaging services	Screen sharing via desktop and applications* with mouse and keyboard controls; multiple presenters, annotating tools,* text chat, teleconferencing, and free VoIP; has added mobile access and HD videoconferencing	Recording capability; polling and survey capability; can generate postmeeting reports including length of stay and interest metrics
Watchitoo	No software required	Free 30-day trial; free for up to 5 people for 5 hours and up to 5 rooms; 3 different paid versions: Meeting Pro, Streaming Pro, and Learning Pro	Multiple embed locations, internal e-mail invitations	Screen sharing with up to 25 presenters while playing any form of rich media, text chat, questions, Twitter and Facebook posting, mobile access, video conferencing, video editing, whiteboard and website integration	Recording capability; polling and survey capability; can generate postmeeting reports
Illuminate (now Blackboard Collaborate)	Requires software download; Mac, Windows, or Linux	Free 30-day trial; \$499/year for licensing 1 room with up to 50 users, with pricing option for smaller rooms	Various	Share applications, files, documents, and desktops; multiple (up to 6) video feeds; annotating tools, text chat, teleconferencing, VoIP, video conferencing; virtual breakout rooms are available for larger audiences/conferences	Recording capability; polling and survey capability; can generate comprehensive reports
join.me	No software required; will run on any Internet server or smart phone, Mac or Windows	Free 14-day trial of join.me pro; free for up to 10 participants; pro, \$19/month or \$149/year (250 participants)	Meeting Scheduler and Meeting Lock facility is available in the pro version only	Screen sharing, desktop applications†; multiple presenters,† annotating tools,† text chat, teleconferencing, VoIP, mobile access; no videoconferencing; send files, share control, multimonitor, annotation,† window sharing†	No recording capability; no polling or survey capability; can generate postmeeting reports (pro version)
WizIQ	No software required; Mac and Windows; needs Adobe Flash	Free 30-day trial; free membership as well as paid plans for individuals, organizations or facility to integrate virtual classroom in own website; educators can create paid courses	Needs registration to join session, but educators can allow access to their content without signup; can import contacts from various e-mails and send bulk invites; can schedule meeting using the Calendar Tool	Screen sharing, supports multiple whiteboard, chat, multiple “classes” that can be created/joined, VoIP, webcam; can also share files: documents, video, audio, even embedded YouTube videos	Recording capability; polling and survey capability; can generate postmeeting reports including detailed attendance reports

Note: HD = high-definition; VoIP = voice-over-Internet protocol.
 *Not available for Mac users.
 †Only in pro version.

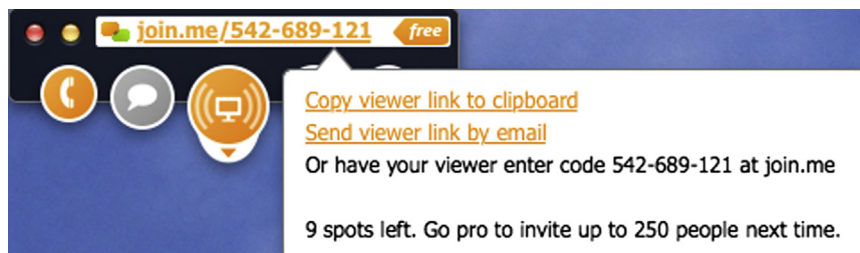


Fig 2. Screenshot from join.me shows how users can share their screens with others. There are options to view a user’s screen using a meeting number or a web link.

forget such items during a busy day. Dragon Notes is a quick note-taking application, optimized for Microsoft Windows 8 devices, that allows recording, organizing, sharing lists, and ideas using voice dictation, thereby providing a simple way to capture notes and ideas in the office, at home, or on the go. Dragon NaturallySpeaking Premium 12 Home and Dragon Dictate for Mac offer a fast, fun, and convenient way to interact with a PC or

Mac. Usable with virtually any Windows application, a very high degree of accuracy can be achieved with regular use [23].

Impression

Speech recognition software can be a major time saver by recording thoughts much faster than writing or typing. These tools allow voice interaction with the

Table 3. Some of the popular screencasting applications

Applications	Provider/ Platform (Cost)	Recording Features	Editing Features	Sharing Features
Adobe Captivate	Adobe Systems/ Windows and Mac OS X (\$799)	Full-screen HD capture with full motion recording; can record in multiple recording modes for demo, simulation and assessment; full PowerPoint integration; can add interactive elements to solicit audience response and scenario branching for different learner paths; drag and drop feature, in-course web browsing and YouTube help feature	Allows use of project templates, master slides, themes, table of content builder, and host of other workflow enhancements, such as ability to add learning notes and autotext captions; imports video in popular formats (avi, mov, flv, mpeg) and synchronizes video with selected slides; adds audio and animations to e-learning projects	Publish projects to the web, desktops, notebooks, and tablets; deliver e-learning content to iOS and Android devices; collaborate more efficiently by leveraging Acrobat.com and using the Twitter widget from Adobe
ScreenFlow	Telestream/Mac OS X (\$99)	Full-screen capture keeps file size small; can capture HD video and audio, Keynote and PowerPoint presentations, fast-moving video games; recording timer and pause feature	Multilayer track editing, zoom and pan effects, trim clips, freeze frames, closed caption, transitions, adjust audio levels	Exports videos in both Windows and Mac formats; can publish to YouTube, Vimeo and Flash; supports timeline exports
Camtasia	TechSmith/Windows and Mac OS X (\$99)	Capture web page, PowerPoint or Keynote presentation, with full-screen, window, or region capture option; SmartFocus automatically zooms video into the active key stroke or mouse position	Several useful editing features, such as freeze region, extend frame, control clip speed, spotlight, mask, cursor effects, and annotations make it quite user friendly	Export straight to YouTube or free hosting site, Screencast.com ; video hyperlink and embed code can be shared via email, tweet or blog post; supports a multitude of devices
Snagit	TechSmith/Windows and Mac OS X (\$49.95)	Allows single click “grab” of entire desktop, a region, a window, or a scrolling window from any web page or application; has other features like delay capture, auto store, capture tray and spell check screenshot	Markup tools: customizable arrows, colorful speech bubbles, unique stamps Special effects: can add effects such as a special border, shadow and perspective to the entire capture Combine Images: allows creation of custom graphics by taking multiple captures and putting them together	Save, share, or send your image and video captures in variety of outputs; share through Facebook, Twitter, and Evernote; can also send to Screencast.com , YouTube, FTP for easy sharing

Note: FTP = file-transfer protocol; HD = high-definition.

computer, expediting the creation of to-do lists, e-mails, and presentations without using the keyboard.

Accuracy is the limiting factor when choosing speech recognition software. Some users may experience problems, especially if they do not speak clearly (ideally speaking like a news reader is best while using these applications) or if they use low-quality microphones. Accuracy of transcription improves after training the software using built-in training modules and with 4 to 6 weeks of regular use [23].

PASSWORD MANAGERS

Utility

New-age hackers and cyber thieves use highly sophisticated algorithms to crack passwords. With this increasing cybercrime and greater online vulnerability, using stronger passwords and frequently changing them has become critical. Using different passwords at different sites is now imperative to protect data. However, stronger passwords are often complex and cannot be remembered easily, especially when dealing with multiple websites and frequently changing passwords [24]. Managing so many passwords can be cumbersome and frustrating, but more important, it can significantly compromise productivity [25].

Password managers (PM) are software that securely organizes passwords and personal identification numbers and also works as form fillers (automatically filling out online forms) [26]. Furthermore, PMs can also safeguard against phishing (the act of attempting to acquire information such as usernames, passwords, credit card information, etc, by masquerading as a trustworthy source in an electronic communication) and pharming (redirecting a website's traffic to another, bogus site) by storing or incorporating an automated login script of the original website. If the login script of an existing website does not match that for the stored website, the login data will not be filled in by the software. This measure is crucial for protection because hackers often use visual imitations and lookalike websites to steal confidential information and passwords. With this built-in feature, PMs can be exceptionally valuable, even if multiple passwords are not used for different websites.

PMs can be broadly classified as online or web based and desktop or browser based [27]. Online or web-based PM software securely stores login details on a server and can be used on any computer with a web browser and a network connection. These PMs are better suited than more conventional desktop or browser-based versions. Desktop or browser-based PMs cannot be used on other computers, and the information is stored on the local hard drive, which can be easily lost through theft or damage to that system. On the other hand, online PMs are often dependent on third-party hosting websites, and the key logger is not installed on the computer the user is operating. Moreover, such servers and clouds could be

potential targets of cyberattacks. An ideal PM should be easily incorporated into any computer system, not require extensive computer or server modifications, be able to tackle the more complex login processes (especially those now enforced by many financial institutions), safeguard against key loggers or keystroke-logging malware, and should provide foolproof and scrupulous security measures [28].

The security features of a PM could be decisive for many guarded or cynical users. Security measures such as user-selected master passwords or passphrases offered by PMs such as 1Password could significantly encrypt protected passwords. Obviously, the level of security is governed by strength of the chosen master password, and a vulnerable master password could compromise all of the protected passwords. Additionally, some online PM systems allocate their unique source code, which can be verified and installed separately. Besides, a robust PM will not allow more than a limited number of false authentication entries before it is locked down. Likewise, it will also allow exchange of its memory into the computer's hard drive (which might be susceptible to attackers and allow extraction of unencrypted passwords) and will create truly random but strong passwords for users. It is noteworthy that an ideal and strong password goes well beyond 11 characters, contains uppercase and lowercase letters and numbers, and does not follow a pattern. Key features of the two most commonly used PMs are described in Table 4.

Impression

PMs can significantly increase productivity by eliminating the time and frustration associated with creating, remembering, and frequently changing passwords. There are multiple options when choosing a PM, which range in price from \$12.99/year to \$49.99.

None of the PMs available on the market perfectly meet all the requirements described above [29]. However, if used wisely and appropriately, they are unquestionably a productivity asset and improve online security.

ONLINE DATA BACKUP SERVICES

Utility

Have you ever thought of losing your digital data? What if you lose all your important files and valuable multimedia collection because of an unanticipated event such as a hard drive crash, a natural calamity or disaster, theft, or accidents? Backing up your digital data and files could be a lifesaver in such circumstances [30]. An external hard drive or rewritable DVD could be an economical but time-consuming backup option. Moreover, regular manual backup not only can be cumbersome but is also not always feasible. Besides, events such as accidents, thefts, and natural calamities may wipe out both your computer and backup data concurrently, especially if they are at the same location.

Table 4. Comparison of the two most popular password managers

Software	Platform	Cost	Synchronization Support	Additional Features
LastPass	Mac, Windows Premium subscription supports iPhone, BlackBerry, Windows Phone, Windows Mobile, Android, Dolphin browser, Firefox mobile, Symbian S60, HP Webos	Free Premium, \$1/month (billed annually)	Automatic synchronization with its own encrypted servers	Can generate strong random passwords with options that can make the password pronounceable or to avoid ambiguity; supports multifactor authentication via USB thumb drives (LastPass Sesame), and YubiKey
1Password	Mac, Windows, Android, Chrome, Firefox, and Safari	Single user, \$49.99 Family, \$69.99 Mac/Windows bundle Single user, \$69.99 Family, \$99.99	Built-in support across all of their applications for Wi-Fi as well as Dropbox synchronization	Can generate strong random passwords; both iPhone/iPod Touch and iPad apps (\$7.99)

Note: USB = universal serial bus.

An online data backup service (ODBS) could be a practical, easy, and secure way to automatically back up data at an offsite location [31]. It is important to understand that an ODBS does not back up your program files and is different from a routine “computer backup” [32]. The backed-up intact data can be retrieved from another computer anytime and anywhere in the world through the Internet. Besides, some ODBS also offer mobile applications, permitting access to files from mobile devices. Fundamentally, an ODBS actually works as a secure and automatic cloud service. The first and foremost requirement of an ideal ODBS is high levels of security. Encryption during the synchronization, backup, storage, and retrieval is crucial. Moreover, an ideal ODBS should be economical and should offer unlimited space. An instinctual and simple user interface, allowing automatic transfer and synchronization, makes an ODBS more practical. Furthermore, the backup should be ideally performed on a daily and

ongoing basis [33]. Adequate help and support options, such as a developed customer care base, online user manual, frequently asked questions page, and proven customer satisfaction record should also be available.

There are multiple ODBS options available in the market. Two of the most popular and time-tested ODBS are Backblaze (Backblaze, Inc, San Mateo, California) and Carbonite (Carbonite, Inc, Boston, Massachusetts). Backblaze is a simple and user-friendly online backup tool, which offers unlimited storage at a reasonable price (\$50/year), with the option of continuous backup monitoring (Fig. 3). There is no restriction on maximum file size or upload speed, and backup of an external hard drive is allowed. It also allows adding a personal encryption key and can locate a lost computer. Online retrieval is free, but there is a fee for retrieving data on a hard drive (\$89–\$199). Carbonite also offers unlimited storage with the option of continuous backup monitoring, but at a slightly higher cost than Backblaze

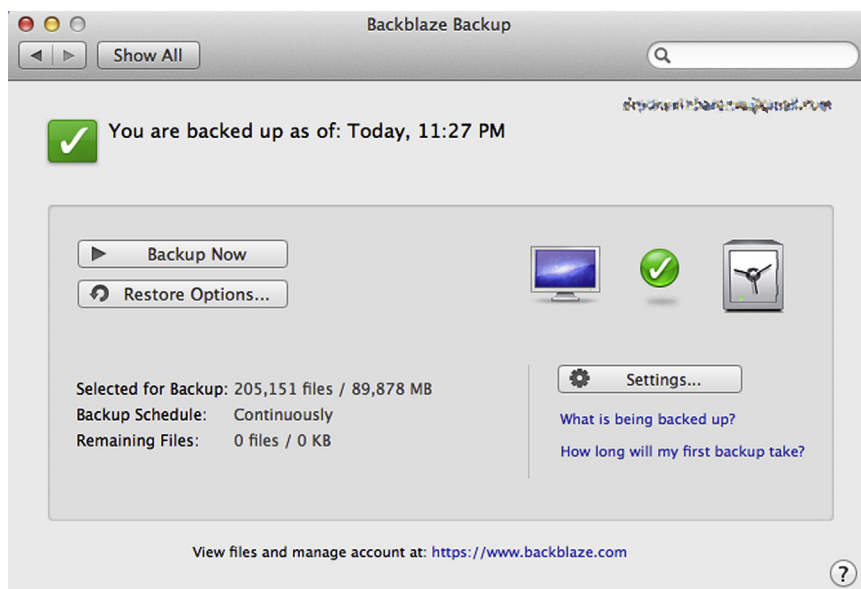


Fig 3. Screenshot from Backblaze (an online data backup service) shows continuous backup from the user’s computer that can be double encrypted (one password for website access and another for entry into encrypted files). Backup is automatic and continuous. Lost data can be retrieved either via direct download from Backblaze or through an external storage device.

(\$59.99/year). However, files larger than 4 GB need manual backup. Moreover, the maximum upload speed is throttled after 200 GB. It allows access on smart phones and mobile devices. However, external hard drive backup is available only with premium service (\$99.99/year).

Impression

Loss of digital data results in a significant amount of frustration and wasted time. Protecting valuable digital data is imperative, but traditional methods of performing a regular, manual backup to an external hard drive or rewritable DVD are not only extremely time consuming but also susceptible to many of the same threats such as theft and natural calamities. ODBS is an easy, secure way to automatically back up data at an offsite location. Backblaze and Carbonite are two of the most popular ODBS. For \$50 to \$60 yearly, users can obtain full encryption, unlimited space, and a simple user interface allowing automatic data transfer and synchronization.

While selecting any ODBS service, encryption policies of the service should be carefully reviewed and exceptions should be added to sensitive files kept on a linked computer.

CONCLUSIONS

We have reviewed the utility of some of the most effective personal productivity tools designed to help us work smarter. We encourage readers to experiment with different products to improve their productivity. Taking the time to ultimately build a personalized, simple, and reliable productivity system ultimately allows us not only to excel in our radiology practice but also to spend more time with family and people who matter.

TAKE-HOME POINTS

- Cloud storage solutions have dramatically changed the way data are transmitted and stored and opened new opportunities of almost real-time collaboration.
- Remote meeting tools play a pivotal role in the gamut of web conferencing by allowing meetings between individuals or audiences at different geographic locations.
- Screencasting not only increases productivity when used as a “how-I-do-it” tool, allowing an “expert” to easily teach by example, but can also be an easy vehicle for e-learning.
- Speech recognition software can be a major time saver, even outside the reading room, by recording thoughts much faster than writing or typing.
- PMs can significantly increase productivity by eliminating the time and frustration associated with creating, remembering, and frequently changing passwords.

- Online data backup services are an easy, secure way to automatically backup data at an offsite location.

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