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File sharing and synchronization: evolved for business

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1 Summary

File sharing and synchronization services offer organizations a new way to share information. Many businesses, however, often rely on older technologies like file servers and physical media to share files, while others have turned to collaboration platforms that can prove hard to configure and difficult to adopt. Although many file sharing and synchronization services have evolved to the point that they can provide value to business users, they are not without their risks. Organizations seeking to deploy this technology need to actively and purposefully engage in the design of work experiences that mitigate risks and maintain productivity.

While large organizations have a wide array of tools at their disposal, small and medium-sized business are best poised to leverage the benefits of file sharing and synchronization services. All organizations, however, need to heed the following five key points in order to safely and securely deploy file sharing and synchronization services:

- Co-create the file sharing and synchronization experience with employees to ensure that information sharing and collaboration specifications align with or enhance existing work approaches, including mobile scenarios.
- Don't force expensive existing services as solutions just because existing investments make doing the right thing hard to see.
- Take into account file access and encryption needs when building the security model.
- Have IT take an active role in selection, deployment, and management of the file sharing and synchronization service.
- Select solutions from credible vendors that demonstrate ongoing product investments, delivery on their promises, and a solid track record for reliability and security.

Feature image courtesy Flickr user Sara

2 Introduction

File sharing and synchronization technology has grown into a multifaceted set of technologies and capabilities that provides services to consumers and to organizations. Although the number of vendors in the market continues to grow, this space is already nearing a bubble. As the list of new features differentiating new products saturates, market strategy is now shifting toward integration and pricing. As the market continues to evolve, it will become an increasingly important and integral component of information technology and collaboration architectures. The best solutions will strike a balance between the ease of file sharing found in the consumer market and the organizational requirements to protect information and enhance the productivity of the workforce.

Sharing stuff is hard

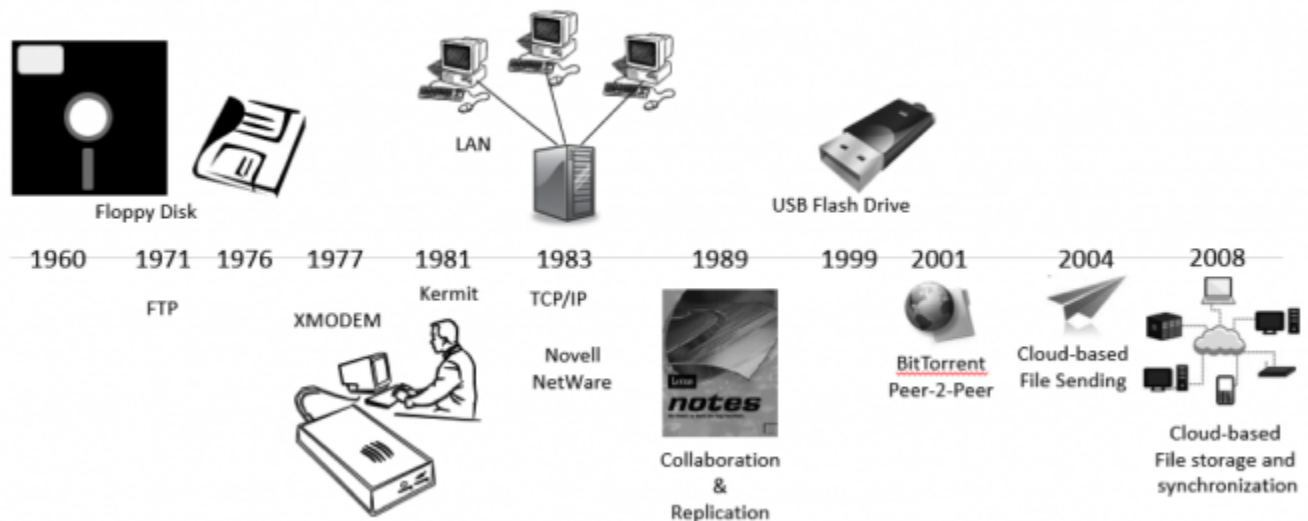
Organizations consist of individuals attempting to coordinate their work to realize value, often through shared objects like reports or files. In the not too distant past, coordination took the form of interoffice memos, meetings, phone calls, forms pushed through pneumatic tubes, and several other technologies designed to help people working together share information. Some of those methods persist today, and others have been supplanted, mostly by information technology. Developers of file sharing services approach work-related problems from a multitude of perspectives, leading to many different solutions to the same problem. Sharing information, particularly files, has a long history that hasn't seen its conclusion yet, but it has evolved a number of workable and effective models. To understand the future, it is useful to understand a little bit about the history of file sharing.

3 A brief history of file sharing

Computers were invented to analyze and to manage transactions. Files related to documents were seen as discrete bits often targeted toward paper and therefore digitally transitory. At the advent of the personal computer era, file sharing consisted of writing a file to tape or disk and then handing or mailing that magnetic media to another person.

As personal computers matured and businesses adopted them, the manual transfer of files started to look pretty arcane, especially as modems and local area networks were evolving, though the practice of exchanging files via a physical medium persists with high-capacity USB flash media. The figure below provides a graphic overview of the history of file sharing.

A brief history of file sharing



Source: Gigaom Research

Toward collaboration

From its roots in 1989, collaboration technology platforms like Lotus Notes, now IBM Notes, and Microsoft’s SharePoint have come to dominate the file sharing experience within organizations. Over the years, various internet-based features have been added, from wikis to blogs, all in an attempt to create a more cohesive environment for file sharing. The advent of these technologies has helped in some cases in which organizations have been very diligent about

approach, but in most cases, file sharing remains chaotic. The new technologies have added to that chaos by introducing new places to share rather than constraining them. In all of this, a technology not intended for file sharing at all — email — often becomes the fallback technology of choice as it crosses organizational boundaries with little restriction. As the section “What’s wrong with email?” illustrates, email fails to offer a managed approach to collaboration or the control of information.

File sharing in the cloud: an alternative arrives

In 2008, a startup named Dropbox introduced cloud file storage that synchronized files between multiple devices and remote file systems. The success of Dropbox opened up the equivalent of a gold rush for file synchronization services designed to solve problems ranging from individuals taking work home to global teams sharing critical project files. Some vendors, like Box.net, introduced enterprise management features. LogMeIn’s Cubby introduced IT-centric data security controls, compliance features, and share monitoring aimed at providing small and medium-sized businesses with enterprise-level services. Scope and functional targets are important when evaluating a solution to ensure that the service provider offers scale and functionality that meets the needs of the specific business.

File sharing and synchronization services solve many issues related to more monolithic collaboration solutions, most importantly the ability to ensure access anytime and anywhere to files in a secure and seamless way. However, organizations that don’t acquire managed services face risks when those systems are administered entirely by end users. IT departments need to effectively move from uniformed or disinterested file sharing and synchronization services to taking active leadership positions in order to rationalize IT portfolios and securely manage information assets.

4 What's wrong with email?

Before exploring the benefits of file synchronization and sharing services, it is important to look at email. All of the machinations in the file sharing space seem pretty unwarranted when email sits relatively unchanged as a de facto standard for exchanging files and text across company and country boundaries. Email introduces many of its own problems because, like the original file sharing, it wasn't meant to be used as a collaboration tool but as a messaging tool. Because of that, email introduces the following issues:

- **Boundless.** An email can go to anyone at any time, and the person who sent it loses control over the message.
- **No context.** If a person doesn't receive an original copy of an email, they may be dropped into a thread at any point and never really understand how the conversation started.
- **Personal memory, not institutional memory.** Email repositories are typically personal and local or assigned to a remote client with access restricted to the recipient. It is very difficult to share information within email with wider audiences without escalating the number of messages, which often increases the likelihood of messages being missed in broader organizations.
- **Overuse and enterprise spam.** Email has become the de facto standard for notification from business processes as well as for high-priority business information, such as organizational announcements, messages from management, policy changes, etc. The use of email for internal business communications, especially in large enterprises, quickly becomes unwieldy with features like reply-all that fill inboxes with content really only applicable to a subset of participants.
- **Not collaborative.** Despite email's very direct connection between two or more individuals, its model is decidedly not collaborative. It may be used to share files, but any feedback is restricted to comments made within the body of the email. If the file itself contains updates, like a Microsoft Word file with comments, the email system has no way to distinguish between versions of attached files. This often leads to a number of versions of files in different states existing simultaneously with older files sometimes holding newer "sent dates" than files that are actually more recent.
- **Not secure.** Though most email systems handle authentication of users effectively, they do not restrict the destinations for outgoing email. Server-side email monitoring systems may restrict certain sites, but with the ubiquity of email, most systems do not restrict destinations, nor do they restrict content beyond operational parameters like file size.

- **You never know if you have the right file.** Just because you are looking at the most recent message with a file attached, there is no guarantee that the file is the latest version of the file. An earlier version may be attached, or someone may be working on the file at that moment. Email doesn't check the document to preserve its state; in fact, it creates a new copy of the file that has a life of its own.

5 Cloud-based file sharing evolves

Current cloud-based file sharing and synchronization vendors offer fast, reliable services that support popular platforms, but as all watchers of technology know, this market and the technologies that underpin it will continue to evolve. They will become even more transparent and even better integrated with the way people work. Businesses that use file sharing and synchronization services will also continue to evolve, becoming more sophisticated as their understanding of how secure file sharing can be effectively employed and how the risks associated with making more channels available for information sharing can be mitigated by employing services that meet internal security policies and practices. Despite the continued evolution of the market, existing tools offer powerful capabilities that can provide immediate value to the organizations that employ them.

The problems of traditional collaboration environments

Enterprise file sharing and synchronization created new challenges compared to issues that continue to plague traditional collaboration environments. In many cases, the issues associated with traditional collaboration environments created the market need for file sharing and synchronization.

Many organizations have invested in collaborative platforms like IBM Domino or Microsoft SharePoint, but unfortunately, these platform solutions fail to meet needs in a number of areas:

- Managing a system of record. In practice, central collaboration systems often become duplicate, secondary systems rather than the system of record. People place work there for review while keeping personal copies and perhaps simultaneously routing files through email, making versions of documents very difficult to manage and control.
- Creating cross-organizational projects that span not only organizations but also infrastructures.
- Solving problems in the moment in real-time.
- Including ad-hoc relationships with various partners in the ever-increasing web of relationships that represent modern business.
- Platforms can prove inconvenient and time-consuming to master, and they can be very difficult to configure to meet the needs of flexible working relationships. The same holds true for product data management systems and document management systems that, while necessary for many business purposes as systems of record, should not be considered as viable facilitators of collaborative work.

In addition to this list, when traditional collaboration systems are forced into play as the collaborative standard, many organizations fail to co-create the work experience, leading to cumbersome workflows and taxonomies that don't reflect individual information or organizational approaches. When people are invited to join a place, they are often invited mid-project, when things are already underway. They must therefore conform to what already exists, often contributing using the least amount of effort.

When individuals face these inconveniences, they look for alternatives, and if the organization doesn't provide them, they will implement their own workarounds. The workarounds aren't an act of defiance but a statement that the systems and tools provided by the organization are inadequate or that they get in the way of productive work. Many individual workers see the deployment of alternative technologies like file sharing as cost-effective solutions. They think they are doing their employers a favor by implementing them; they don't, however, recognize the risks associated with unmonitored, non-secured information dissemination. And without seeing that others are implementing similar tools, the focus on immediate local solutions completely ignores the information technology management costs related to monitoring, the traffic associated with several solutions or the resources required to remediate information control problems when they do occur.

File sharing and synchronization offers an alternative

The initial file sharing services were built to solve a particular problem often experienced by individual users, namely making their important content available anywhere. Enterprise-grade services arrived and offered better security than their consumer cousins. Many service providers asked organizations to just "trust them" when it came to security. Although some organizations accepted this model, information technology departments increasingly pushed back against consumer technology because of opaque infrastructures and other unknown risks associated with using such services.

Newer services offer true enterprise-level scalability and security features that help individual users integrate sharing and synchronization with their workflows, while IT tools provide control for provisioning, content sharing monitoring, and encryption.

The problems and opportunities of bring-your-own-app

As individuals bring in their own applications, a behavior known as bring-your-own-app (BYOA), the situation can become even more challenging because people end up sharing information

not just within a file system that hasn't been designed well but within multiple file system services that don't coordinate their information. If a team uses multiple services simultaneously on the same project, chaos ensues, and people will spend inordinate amounts of time searching for and managing information across systems.

But BYOA isn't all bad. The introduction of file sharing and synchronization services was a necessary component of the IT infrastructure that evolved in the consumer space first. As people implemented their own file sharing practices, it allowed the organization to learn what worked and what didn't.

BYOA exposes the following issues within organizations:

- The accelerating pace of IT consumerization
- A general disregard for IT standards
- IT's lack of monitoring and engagement when employees go around standards
- Inconsistent application of security policies and practices

Without this consumerization of an IT valve for innovation, however, and the subsequent market development, organizations leveraging file sharing and synchronization might have been doing so in riskier, even more primitive circumstances. Because consumers are also working inside various types of organizations, consumer vendors are stepping up to include more enterprise features in their products, making the entire market safer. Vendor/consumer cooperation, however, does not absolve IT from purposefully and actively engaging in the new world of BYOA. If they don't, they risk losing control of ever-greater portions of the IT infrastructure and the information transmitted through it.

The case for file sharing and synchronization

The files shared daily through existing systems, however they were implemented, make the case for the business value to be found in file sharing and synchronization services. But organizations need to be cautious. Not all solutions offer enterprise-grade security and management features. Even small businesses need to think about how they protect their information because they will often keep client and customer information in simple spreadsheets or other types of documents that are much more vulnerable than records stored in databases. Larger organizations face similar issues with file extracts, proposals, reports, and human resource and recruiting documents.

In the collaborative world of the internet as fueled by global networks of customers and suppliers, many of the older, more monolithic forms of collaboration and sharing just aren't

flexible enough to meet the demands of rapidly evolving relationships and emergent information requirements. File sharing and synchronization services emerged to meet these needs and will continue to evolve as that business environment shifts under the influence of political, technological, and economic developments. File sharing and synchronization permit organizations to:

- Meet information sharing needs in a rapidly changing market
- Integrate with individual work approaches to minimize the impact on productivity
- Safely and securely share information with authorized partners through centralized access and file security

While organizations should remain vigilant about their implementations of file sharing and synchronization, they will likely find the benefits of a well-designed file sharing and synchronization experience outweigh the risks.

6 Design the work experience: Don't let file sharing just happen to you

In order to manage file sharing and synchronization and the collaborative work associated with it, organizations need to design their work experiences. The premise of my book, *Management by Design*, is that too often individuals and managers just let work happen and permit technology to happen to work. File sharing and synchronization is a work experience, one that often breaks because organizations fail to work with their employees and partners to co-create an effective experience that balances the needs of individuals to get work done with those of the organization to secure and retain its assets. Organizations can use the following list to help them design a meaningful file synchronization and sharing experience that enhances work while mitigating the risk of information loss.

- **Design a place.** Too many file sharing and synchronization options create productivity friction by pushing tool analysis into each project. This increases risks through the number of platforms that must be monitored and managed and by a lack of knowledge about the underlying technology. It is the need to share information — files, in particular — with colleagues and partners that drives this proliferation of offers. With so many services available, many project conversations begin by negotiating tools rather than attacking the work. Organizations need to define clear policies and practices that ensure, at least within the organization, that this debate is curtailed. Guidance about which system to use, the policies related to security and sharing, and proven internal practices for the use of such systems is imperative or else the organization's productivity will continue to suffer, the victim of debates about a productivity tool.
- **File sharing as a collaborative activity.** File sharing is by its nature collaborative. It may be used to back up valuable information to the cloud, but its primary role is to facilitate the transfer of information between people so they can more easily work together. Organizations need to understand how files fit into their collaborative experiences and align file sharing and synchronization capabilities to those collaborative experiences.
- **Manage freemium models.** Freemium models, in which vendors offer a “free” service with limited storage and reduced features, provide consumers with easy access to file storage and synchronization. Businesses large and small should consider freemium models as a convenient way to evaluate products and features. IT departments need to create clear policies around the use of consumer and freemium services beyond product evaluation.
- **Know why you are hiring a file sharing service.** Think about the use of a file sharing system like you would the hiring of an employee. What is its job description? How will you measure its success? Knowing why you hire a file sharing service also includes understanding the context, including the risks you are willing to accept, such as information leaks and how easy

those are to discover or mitigate. As your organization “hires” a file sharing service, it is likely that it will be used cross-organizationally as well as cross-functionally, so the needs of all potential stakeholders inside and outside of the organization should be recognized in the “job description” for the service.

- **Reinforcing personal responsibility and accountability.** File sharing systems can either be used as part of an enforcement program that restricts how people share files or as a monitoring and alerting system. Information leaks cannot be stopped by tightening security on file sharing services because there are so many other ways for information to leave the organization. This reality calls for policies and practices that make the protection of information a personal responsibility for which people are held accountable. It is easier to implement responsibility and accountability policies and practices if the file sharing and collaborative system implementations support and reinforce responsible file sharing by making it easy and desirable to follow the policy.
- **Integration.** Because some solutions to file sharing and synchronization represent larger market share than others, they have attracted developers who have integrated their data stores with various business applications as well as mobile apps. The ability to easily save content from within applications, particularly mobile applications, is an important design concern. Good design should ensure that file sharing and synchronization enhances the application experience rather than just acting as a feature check-off for evaluators.
- **Transitions and migrations.** Any work experience that requires the movement of content from one place to another or the transition from one tool to another can introduce problems. Good experience design should minimize or eliminate the need to move content or reorganize it arbitrarily for the sake of a particular product’s technical implementation.
- **Security.** Ensuring the security of information is always a difficult balance, but it is one in which individuals must give way to organizational needs, even if the work experience ends up being more awkward in the process. In many industries, tight restrictions forbid customer data from leaving secured premises. In other situations, data, like bids, proposals, and bill-of-material costs, are necessarily protected in order for organizations to maintain a competitive advantage. Security requires policy and practice as much as it requires technology. It is important to always note that failures in policy and practice, such as copying unencrypted files to a USB drive, can circumvent even the most stringent of file sharing and synchronization implementations.
- **The federated organization.** Organizations must design for a reality that exacerbates file sharing issues, that of the “federated organization,” which consists of outsourced functions, contingent staff, and partners all working in concert with traditional employees. An outsourcing company, for instance, may have its own file sharing solution that meets its needs, but for projects within a given company, those people who work for the outsourcer must comply with their contract holder and work through their systems on joint projects. Contingent staff offer a bigger challenge because they don’t really have an affiliation with

the company beyond their current assignment. It is particularly important that contingent staff onboarding includes policy and practice information related to file sharing.

- **Mobility.** Although mobile is a key element of the entire work experience and needs to be considered as part of the holistic solution, given the current proliferation of mobile devices it is important to call out the mobile experience in order to ensure that it receives the attention required. In mobile design, it is critical to balance between the platform, file, and application constraints and the overall experience. It should be made clear to individual workers in order to set expectations that mobile device experiences can differ significantly from desktop or web experiences in terms of application features, offline access to files, and user interface.

7 Evaluating file sharing and synchronization solutions

Once an organization designs its file sharing and synchronization-related experiences, which include identifying the key functional and technical features necessary to support that environment, they need to evaluate solutions. This list of evaluation features attempts to be exhaustive. It may include features that are not required by all organizations. However, as mentioned in the section above, awareness of these features may inspire work experience design innovations that wouldn't be considered if the capability remained unknown. Evaluation is a learning process that may, therefore, affect design and add requirements that didn't exist before the designers were aware of the capability.

Sharing. Services for sharing files via links as well as via clients should be included and integrated with security features to ensure that only authorized accounts access shared files.

File synchronization. Not all file synchronization is the same. Make sure that services outlined in your design requirements are available from the services under evaluation. File synchronization can include the following elements:

- **File size.** The largest file size required should be able to be uploaded to a service within a reasonable amount of time.
- **Synchronization approach.** The service should be evaluated to see if it uses “smart” synchronization, which means moving only changed bits, or if it copies entire files or structures each time. This can affect the time required to move files after they have been saved.
- **File names.** The file synchronization service effectively manages long file names and deep file paths across platforms.
- **Versioning and file locking.** Depending on need, the file system maintains and provides easy access to previous versions of documents. In addition to versioning, some organizations may want to explore file locking, which “checks out” a file to an individual account and does not allow write-access while this file is checked out, while others may find visibility to files in use sufficient.
- **Peer-to-peer synchronization.** The service allows peer-to-peer synchronization across devices without copying content to a cloud storage service. This can be effective for users who simply want to keep two or more devices synchronized or to manage files in a small team. Peer-to-peer synchronization also keeps cloud storage size and costs to a minimum as

only the data to be shared or backed up would be included in the cloud and therefore accrue to file storage limits.

- **Archiving.** Some systems provide backup copies of files that will be changed or overwritten during a synchronization session. This may be an important feature for distributed teams when content is highly volatile, especially if versioning isn't being used.
- **Capacity.** Services need to be able to accommodate the total aggregate file storage for the largest user accounts.
- **Conflict management.** Identify if files have been modified by two different accounts at the same time and clearly mark them as being in conflict.
- **Exclusions.** Individuals or IT should be able to exclude files or directories from synchronization and replication. Exclusions may also include files that are stored locally on machines in the synchronization pool that have limited storage (such as solid-state-based tablets and notebook computers).
- **Status.** Include icons or other ways to provide the synchronization status of files and directories.

Ease of deployment. Individuals should be able to easily download the file sharing client or app or have it pushed to their devices via network configuration services.

Integration with the way people work. The file sharing system should integrate with the native file system and not require the movement of files from their current location for personal use while also providing easy ways to create shared directories for team and function-oriented work. File sharing systems should not require end users to duplicate, mirror, or otherwise change their existing file structures in order to leverage the service.

Client support. File sharing should be available as a service across Microsoft Windows 7 and 8, Apple OS X, as a web client, and, as required, Linux. Mobile clients should include Apple iOS, Android, and Microsoft Windows Phone as necessary.

Cost. The incremental cost of adding storage has become a major business model differentiator, and it can be a key determinant in making a file sharing vendor selection. Cost of storage, however, should be only one element of the decision. If other factors like security and centralized configuration are required and those features can't be purchased from a particular service provider, then low cost is trumped by lack of features. Advanced features also increase costs and should be itemized in any bid and tiers outlines so there are no surprises as capacity increases take place.

Search. For local files, search should rely on native search in the host operating system and also allow for service-oriented search when accessing files via cloud storage over a browser. Search should recognize security restrictions when they exist.

Security. Service providers should, at minimum, permit monitoring and organizational administration of accounts installed on their devices, including the ability to lock and wipe accounts when an employee is terminated. Single sign-on authentication is also a positive feature when it comes to work experience design. Depending on the level of security and control required, encryption (file and transport) and buyer-side user keys should be available as options.

Configuration management. IT should be able to deploy and update clients and manage accounts assigned by the organization, including revoking privileges, excluding files, or completely wiping file stores.

Cloud storage partnerships. All file and synchronization service providers should provide clear information about their cloud storage partnerships. In other words, which firm, if not them directly, runs their data centers, owns their storage facilities, and manages service levels?

Application partnerships. Vendors should provide a current list of application integration partners or be able to match an organization's IT portfolio against such a list. It is important that in applications in which the file sharing and synchronization experience is integral to their effective use that any service support for those applications maintains a consistent file sharing and synchronization experience across the entire suite of applications.

Market position. The service has sufficient customers to use as reference to prove its market claims, and if acquired, the service is likely to require continuity from its new owner rather than replacement or retirement. The service is sufficiently viable as a business so it is likely to survive for a significant amount of time.

Geographical/political considerations. Depending on where business is conducted, it may be necessary to explore if a particular service is available and legal in a target geography.

8 Bottom line

File sharing and synchronization services have become pretty low-risk cloud services to deploy, although the market remains relatively young. It is highly unlikely that significant data will be lost using these systems, though breaches in practice could still yield breaches in access. Innovations in business models and technology have driven existing enterprise vendors into the market, either through internal development or acquisition. As these mature organizations engage the market, risk will continue to reduce.

The file sharing and synchronization market will experience significant consolidation over the next several years, leading to a market with fewer offerings. It is not clear if technological innovation or market strength will determine the dominant players in the future market. The volatility of this market means that any existing solution may be at risk over the long-term. Selecting a service from an established enterprise vendor can help mitigate service switching costs and will likely ensure continued investment in the platform of choice. Regardless of the solution, organizations need to concentrate on deploying file sharing and synchronization services that meet the work experience design criteria delivered by credible companies, demonstrate ongoing product investment, deliver on their promises, and exhibit a solid track record for reliability and security.

9 Key takeaways

A summary of recommendations made throughout the report in order for IT (buyer-side) to help guide the right solutions into their organizations.

- Include file sharing as an information technology architecture component. This should include the specifications for acceptable applications and document if an application's standard has been selected.
- Design work experiences related to file sharing and synchronization that maximize productivity while minimizing risk. This also means making clear choices about which and how many services are acceptable and approved.
- Develop security policies that clearly state personal responsibility as well as reiterate and share the assurances and obligations of any file sharing and synchronization service providers so employees and partners can make informed choices about what can be safely shared over those services.
- Only authorize the use of file sharing and synchronization services that permit organizational monitoring of use.

10 About Daniel W. Rasmus

Daniel W. Rasmus, the author of *Listening to the Future*, is a strategist and industry analyst who helps clients put their future in context. Rasmus uses scenarios to analyze trends in society, technology, economics, and politics in order to discover implications used to develop and refine products, services, and experiences.

His latest book, *Management by Design*, proposes an innovative new methodology for work experience design. Rasmus' thoughts about the future of work have appeared recently in *Chief Learning Officer Magazine*, *Fast Company*, *Talent Management*, *KMWorld*, *iPhone Life*, *PopMatters*, and on HBR's blog. Rasmus is an internationally recognized speaker. He has addressed audiences at *Enterprise 2.0*, *CeBIT*, *UBTech*, *ProjectWorld*, *KMWorld*, *SAE International*, and *Future Trends*.

Prior to starting his own consulting practice, Rasmus was the director of business insights at Microsoft, where he helped the company envision how people will work in the future. Rasmus was the creative leader for Microsoft's Center for Information Work. Before joining Microsoft, Rasmus was a vice president and research director at Forrester Research.

Rasmus attended the University of California at Santa Cruz and received a certificate in intelligent systems engineering from the University of California at Irvine. He is the former visiting liberal arts fellow at Bellevue College in Bellevue, Wash., where he continues to teach strategy and social media.

11 About Gigaom Research

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