HARVARD | BUSINESS | SCHOOL

9-811-065

REV: OCTOBER 24, 2014

THOMAS R. EISENMANN

MICHAEL PAO

LAUREN BARLEY

Dropbox: "It Just Works"

Drew Houston, the 27-year-old cofounder and CEO of Dropbox, a downloadable application that allowed users to easily share, sync, and store files (photos, documents, videos, etc.) across most personal computers (PC) and smartphones, saw the fog rolling over the hills as he headed up US Route 101 to the company's headquarters in San Francisco, California. It was June 2010, and he had just finished a board meeting. Things were going well: Dropbox had plenty of cash in the bank, activations continued to ramp up, and the company's freemium business model was working well. However, Houston had plenty on his mind.

He reflected on the board's discussion of Dropbox's product strategy and ways to accelerate growth. Dropbox, founded in April 2007 and launched to the public in September 2008, stored and tracked tens of billions of files for a user base of several million users, two-thirds of whom resided outside the U.S. The company reached this scale by offering a single product version to both consumers and business users and without conducting much formal market research on these users and their preferences. Exchanges in support forums suggested that many customers relied on Dropbox for specific tasks, such as backing up photos, running a startup, or collaborating on Microsoft Office documents. Users were constantly requesting new features, many of which would violate the company's commitment to offering a simple, easy-to-use product.

As Houston approached the office, he wondered if Dropbox should continue its strategy of offering a single product for all users or whether it should segment its diverse and growing user base, perhaps by creating a "professional" version that targeted the "power" user or a separate product for small to medium-sized businesses. Houston looked forward to discussing these options with his team.

Drew Houston

Houston was introduced to computer programming and startups at a young age. He was writing software at age 5 and testing an online game at age 14. When he identified security problems with that game, its developer hired him as a network engineer. In 2001, Houston attended Massachusetts Institute of Technology (MIT) where he also cofounded Accolade, an online SAT preparation service. Houston graduated from MIT with a bachelor of science in computer engineering in January 2006.

Professor Thomas R. Eisenmann, Michael Pao (MBA 2011), and Research Associate Lauren Barley prepared this case. HBS cases are developed solely as the basis for class discussion. Cases are not intended to serve as endorsements, sources of primary data, or illustrations of effective or ineffective management.

After graduation, Houston joined Bit9, an enterprise security software company headquartered in Cambridge, Massachusetts. However, after watching friends leave for Silicon Valley to pursue their entrepreneurial dreams, he was determined to follow. Houston commented, "I was working full-time at Bit9 and part-time on the online SAT prep startup that I'd launched in 2004. That startup was profitable, but I didn't have much passion for the product. I was searching for a new opportunity that was more technically challenging."

Dropbox met this requirement. Houston got the idea for Dropbox while waiting for a bus at Boston's South Station in December 2006. He had planned to work on a programming project for Bit9 during the four-hour ride to Manhattan, but left his USB flash drive at his Cambridge apartment. Frustrated, he began designing a service to sync and share files between personal computers over the Internet.

Launching Dropbox

It's hard to imagine Tom Cruise in Minority Report *sending himself files via Gmail or lugging around a USB thumbdrive.*

— Drew Houston[1]

After his frustrating experience on the bus, Houston started working full-time on Dropbox. He said:

> I needed it badly. I worked on multiple desktops and a laptop and could never remember to keep my USB drive with me. I was drowning in email attachments trying to share files for my previous startup. My home desktop's power supply literally exploded one day, killing one of my hard drives, and I had no backups. I tried everything I could find but each product inevitably suffered problems with Internet latency, large files, bugs, or just made me think too much.[2]

To help with the project, Houston recruited Arash Ferdowsi, who dropped out of MIT to work with Houston, later becoming Dropbox's cofounder and chief technology officer. The pair spent the next four months coding a prototype in a tiny Cambridge apartment.

Dropbox was a late entrant to the fiercely competitive online backup and storage services space. The first firms in the space, which had small businesses as customers, were launched in the late 1990s by startups offering outsourced storage at remote data centers. As costs declined, services also became available for consumers seeking to back up their data online. Most early users were technically adept, for example, college students downloading music from peer-to-peer file-sharing services.

Few firms in this first wave of services survived the dot-com crash, but by late 2006 the market was crowded again with new offerings. (See **Exhibit 1** for competitors.) In July 2007, the tech blog Mashable published a list of more than 80 online backup and storage services.[3] Market research vendors such as IDC fueled the hype by predicting in 2007 that the worldwide market for online backup services would grow to $715 million by 2011.[4] Investor interest in online storage surged when Mozy, an online backup service, was acquired by EMC, a publicly held storage company, for $76 million in late 2007.

Houston was confident that Dropbox could succeed in the face of intense competition. He reasoned that Dropbox would be able to collect revenue from some users, because consumers generally understood that storage cost money, whether it came in the form of a physical drive or an

online service. When challenged by venture capitalists to explain why the world needed another cloud backup company, Houston asked them, "How many of those services do you personally use?" The answer from VCs was almost invariably, "None of them."[5] Houston asserted that direct experience with rival services, which often failed to transfer data across firewalls and sometimes balked with big files or a large numbers of files, was helpful in understanding what would become Dropbox's performance advantages. Houston said:

> The first generation of cloud storage services was based on a simplistic model, where file accesses were redirected over the Internet instead of to your computer's hard drive. Your operating system and all your applications assume that accessing your hard drive is cheap and fast, but when these requests are instead routed to a server thousands of miles away, they can take an order of magnitude longer. This subtle but critical distinction explains why when working remotely, even simple actions like browsing a directory can freeze your computer for seconds at a time. We needed to take a completely different approach by storing files locally and updating the cloud copy in the background using a number of time- and bandwidth-saving optimizations.

Product Development and Early-Stage Financing

Houston and Ferdowsi created a prototype that allowed Windows PC users to access files of any size or type via an encrypted Internet connection from other Dropbox-enabled PCs or from any web browser. The Dropbox client software tracked changes in real time to any file placed in the user's local Dropbox folder, then almost instantly synchronized a copy of that file on Dropbox's servers, updating only those portions of the file that had changed, in order to save bandwidth and time. Likewise, within milliseconds, copies of the file were synchronized in local Dropbox folders on all other devices connected through the user's account. "We engineered Dropbox so it just worked, all of the time," Drew explained, "We handle all kinds of obstacles, from flaky wireless connections to corporate firewalls, which is not an easy task."

With a working prototype in hand, Houston came up with an innovative approach for testing demand. He had produced recruiting videos for his college fraternity; with this know-how, he created a three-minute screencast of a product demo and uploaded it to Hacker News, a popular online forum for developers. "I did this out of necessity. There was no way I could ask for people's files before we were 100% sure our code was reliable. But I had a prototype that showed off the product's best features," he said.[6] Houston used the screencast to recruit beta users and solicit feedback on features. He added, "Not launching is painful, but not learning can be fatal. We got a lot of feedback through that video, so we were learning while we were building."

Houston had another reason for posting the video on Hacker News: he hoped to connect with its founder, Paul Graham, who was also the founder of the prestigious and selective Y Combinator seed fund and incubator program. Houston recalled, "I had just submitted my application to Y Combinator and as a gambit to get their attention, I submitted the video to Hacker News. I hoped it would work."[7]

It did: in April 2007, Dropbox received $15,000 in funding from Y Combinator. (See **Exhibit 2** for excerpts from Dropbox's Y Combinator application.) In exchange for a small percentage of a startup's common equity—usually 2% to 10%—Y Combinator provided up to $20,000 of seed capital as well as mentoring, workspace, and introductions to other advisers and investors over a three-month period. At the end of three months, it held a "demo day" where its most promising companies made funding

pitches to a large group of startup investors. Many startups applied to Y Combinator's program, which had a track record for matching strong technical teams with elite venture capital firms.

The cofounders planned to build a single version of Dropbox that would be targeted to individuals—both consumers and business users. Houston explained:

> Before I launched Dropbox, I worked at a security software startup, where I got a formative lesson about targeting enterprise customers. Their decision cycles seemed endless, and involved lots of gatekeepers. You run into this Catch-22 where you can't make sales unless you are certified by IT, and you can't get certified until you have a track record. It's especially hard if you call on small and medium-sized businesses. They don't talk to each other, so you can't rely on references. And as a startup, the customer is always worried about whether you'll be around to support their product.
>
> Based on these lessons, we decided to target Dropbox to individual users, both consumers and businesspeople. The idea is to get people using it inside companies without IT's permission. Once IT sees that Dropbox is in heavy demand and that it works reliably, we'll get certified for use across the company. This approach worked with Wi-Fi equipment and BlackBerrys. That's been our go-to-market strategy for enterprise: personal use as a Trojan horse.

Houston proposed using a freemium business model that offered both free and premium (i.e., subscription) accounts. Initially, he planned to give away 1 gigabyte (GB) accounts for free and charge for additional storage, perhaps by offering an individual user 10 GB of storage for $5 per month.

Upon conclusion of the Y Combinator program in September 2007, Dropbox raised $1.2 million of convertible debt from Menlo Park, California–based Sequoia Capital. "We fit into Sequoia's sweet spot: we were two young technical founders, working out of an apartment, targeting a big market. It helped that we were ranked at the top of our Y Combinator cohort," Houston recalled. He and Ferdowsi then relocated to San Francisco, but despite the capital infusion, they continued to run lean, operating the company out of a 900-square-foot office sublet. Dropbox delivered its service through Amazon's Simple Storage Service (S3) cloud storage platform, avoiding the need for infrastructure investments and positioning the company to scale rapidly.

Beta Testing

The cofounders created a private beta program for a limited group of users who registered through a simple landing page. The page contained a short description of Dropbox and requested an e-mail address from visitors interested in participating in the beta test. (See **Exhibit 3** for the landing page). Beta testers would receive a 2 GB Dropbox for free; a premium version was not yet offered. Houston commented:

> There's a spectrum of well-informed opinions about when to launch your product. At one end, Paul Graham tells entrepreneurs, "Launch early and often" to accelerate learning. At the other end, [respected software guru] Joel Spolsky says, "Launch when your product doesn't completely suck." We were managing people's files, and it's a big deal if you lose or ruin them. That meant moving toward Spolsky's end of the spectrum and keeping our beta test small.

Next, Houston devised ways to generate demand for the beta service. Developing a Macintosh client expanded the potential user base. Houston also undertook some guerilla marketing. He

produced another short demo video and posted it in March 2008 on Digg, a site that showcased web content deemed popular by Digg's users. Houston felt it was essential to communicate in an authentic manner with the tech enthusiasts who frequented Digg. He sprinkled virtual "Easter eggs" (intentional hidden messages, jokes, or features inserted into a software program or video game by its developer) into the video, for example, references to Chocolate Rain (a YouTube phenomenon), TPS reports used in the movie *Office Space*, MIT's Killian Hall, and the 09 F9 key for decrypting Blu-ray disks (dissemination of which, in the face of movie studio legal threats, was a hacker crusade). With this tongue-in-cheek nod to its tech-savvy audience, the Dropbox video soared to the top of Digg, generating hundreds of thousands of views within a few days. Overnight, the list for Dropbox's private beta jumped from 5,000 to 75,000 names, far exceeding the team's expectations.

Building the Company

Make something people want.

— Y Combinator motto

Based on consumer response to the second video, it appeared that the promise behind Dropbox—"It just works"—resonated with potential early adopters, especially those who were familiar with the performance limitations of existing online backup and storage services. Dropbox opened its beta to the public in September 2008 at TechCrunch50, an annual competition showcasing high-potential startups. Dropbox was one of 50 startups selected to present at the event from a pool of over 1,000 applicants. TechCrunch50 served a dual purpose: it would generate buzz for Dropbox's launch and also provide a product development deadline for the team.

In September 2008, Dropbox publicly launched its Windows and Mac clients, and added a Linux version in response to beta user requests. All of the clients were functionally identical. At the same time, the company offered a 50 GB Dropbox for $9.99 a month or $99 a year; a 100 GB option for $19.99 per month or $199 per year was added in early 2009. Users continued to receive 2 GB accounts for free.

After launch, Houston shifted his focus back to product development. Dropbox's first six hires hailed from MIT's computer science program, and its team was mostly composed of engineers during the company's first two years. Houston felt these first hires were critical for setting the company's culture, which he characterized as being obsessed with quality and taking pride in both working hard and in making something "good."

Early on, board members tasked Houston with hiring a product manager (PM) to help coordinate engineering efforts and prioritize features. Houston reflected:

> If you ask 10 people what a product manager is, you'll get 10 different answers. They tend to fall on a continuum with the end points being "librarian" and "poet." A librarian is focused on blocking and tackling, coordination, and facilitating communication. This type of PM is inherently organized and follows up relentlessly. A poet PM listens to the voice of the customer during usability tests and focus groups and based on that insight formulates an aesthetic vision, a grand strategy, and a product road map. Our first product manager was more of a librarian than a poet, because we needed a librarian's discipline: even today we don't have enough of that DNA in the company. But he just drove people nuts. It was painful, but we had to let him go after six months.

For the next year until Dropbox hired another product manager, the company relied on Houston and Ferdowsi to drive the product road map. Development proceeded more slowly than Houston expected. In his April 2007 Y Combinator application, Houston had predicted that Dropbox would offer a commercial version of its product within eight weeks, but launching Dropbox to the public actually took 18 months. Houston said, "As a result of doing a few things well, we left a lot of other things behind. We had no business people, we were terrible at getting mainstream PR, and running fast and loose didn't make for the most predictable engineering organization."[8]

Early Marketing Efforts

Houston mused that since Dropbox was following a tried-and-true blueprint for launching a consumer Internet service, his next step would need to be devising a marketing plan. Dropbox retained an online marketing consultant to help with this task. Houston said, "What do most web companies do? Apply to TechCrunch50, check. Buy AdWords, check. Get real marketing people, check."[9]

Early on, Dropbox attempted to acquire new customers through paid search advertising. However, incumbents had bid up the cost per click for obvious search keywords. As a result, it cost Dropbox more than $300 to acquire a paying customer. (See **Exhibit 4** for sample AdWords campaign performance.) This was not economically sustainable, since an annual subscription for 50 GB service was priced at $99.

Dropbox tweaked its sign-up process to increase the conversion rate from free user to paying customer. In addition, the team experimented with display ads and affiliate programs (through which partner sites referred users in exchange for a fee). However, as with search ads, these efforts yielded unacceptably high acquisition costs per paying customer. The company also tried hiding the free service option for visitors who arrived via ads. Houston recalled, "Our average acquisition cost per paying customer went from thousands of dollars to hundreds, but we still had a problem with our economics. And we didn't feel good about doing sneaky things to our users to get them to pay."[10]

Sequoia Capital and Accel Partners subsequently led a $6 million Series A round of financing in October 2008, but even with additional capital in the bank, relying on advertising for customer acquisition would not be a viable long-term option.

Growth through Analytics

Houston realized that with a freemium strategy, optimization of marketing messages and pricing would be critical to Dropbox's success. Consistent with this priority, the company hired an analytics engineer as its eighth employee. Inspired by Facebook's growth team, which was dedicated to user acquisition and engagement, Houston later assigned 30% of engineering resources to optimizing customer acquisition efforts. This team closely tracked metrics across Dropbox's conversion funnel by cohort.[a] Metrics included the percent of landing-page visitors who registered as free users; the percent of registrants who still were active free users after X months; and the percent of free users who upgraded to paid subscriptions after Y months. Houston said, "We run our business based on the Startup Metrics for Pirates 'AARRR' framework developed by investor Dave McClure. He says firms should closely track metrics around the *acquisition* of landing-page visitors; *activation* of those visitors into users; *retention* of users; *referral* of new visitors by satisfied users; and *revenue* earned from users."

[a] A cohort was a set of prospects or users acquired at the same time and/or via the same marketing method.

The team used A/B testing to fine-tune page layouts and content.[b] Based on test results, Dropbox also decreased the amount of free storage given to users. Analytics showed that gigabytes were not necessarily the best measure of value for Dropbox users. "We had all kinds of people paying us for Dropbox but not even bumping against their quota," Houston said.[11]

Analytics likewise revealed that few users were accessing past versions of their files, all of which—including deleted files—were being permanently stored by Dropbox at a significant and rapidly growing cost. The company modified its policy, offering all Dropbox users 30 days of "undo" history free of charge. Unlimited undo history became a $39-per-year add-on feature called Pack-Rat, available to subscription users only. Houston said, "Just a tenth of a percent improvement in conversion rates, or a small decrease in the cost of serving a customer can have a huge impact on profitability. Freemium is a spreadsheet game—one you win with lots and lots of little moves."[12]

Growth through Partnerships

Houston initially believed that partnering might be another strategy for accelerating growth. He approached PC security software providers shortly after Dropbox's launch, hoping they might bundle Dropbox with their applications. He did so against the advice of his cofounder Ferdowsi, who was skeptical that large companies would ever sign deals with an unknown startup. Houston said, "I figured we'd get our first 100,000 users through expensive search marketing, then we'd need an awesome Plan B to make our economics work. At that time, my best idea for Plan B was distribution deals." After wasting weeks on discussions that invariably stalled, Houston decided to scrap the idea. He recalled:

> Big companies sometimes seem happy to talk to a startup. They'll bring in 12 middle managers—none of whom have any authority—to kick the tires and learn all about your technology. They'll spin your wheels for months. We got close to a deal with one of the antivirus software providers. At the 11th hour, they brought in an SVP who announced that they were going to bury our brand in a white label deal, contrary to everything we'd discussed prior to that point. And the SVP said, "Oh-by-the-way, we'll need all this customization."
>
> I came back and looked at my board slides, which showed how we'd take over the world with distribution deals. I felt like an idiot. Arash was furious; he said, "I told you this would happen." Since then, I've realized that no significant tech company has been built solely through distribution deals without having a strong brand of its own.
>
> Partly due to the way I got burned in these discussions, we still don't have a VP of business development. We're looking for one, but I'm worried that if we hire the wrong person, we could get pulled in too many different directions.

Organic Growth

Despite improvements through analytics, Houston and his colleagues struggled to make the company's marketing programs profitable. Nevertheless, the service grew rapidly, reaching 200,000 users 10 days after launch and 1 million users by June 2009. The vast majority of these users were acquired through word-of-mouth referrals and viral marketing efforts, rather than paid advertising.

[b] A/B tests divided a set of similar individuals into a control group that experienced a status quo product and a test group that experienced a product with one modified element. Its purpose was to determine if the modification yielded a statistically significant improvement in conversion rates.

A relentless focus on ease-of-use and reliability had paid dividends in the form of loyal users who encouraged friends, family, and coworkers to try Dropbox. Houston commented, "The power of focus can't be understated. If you look at a feature matrix of Dropbox versus everyone else, we would never come in first. We would rather do a few things well rather than present Dropbox in a confusing way."[13]

In mid-2009, Dropbox management abandoned paid search advertising entirely in favor of an exclusive focus on organic customer acquisition efforts. Houston commented, "It dawned on us that Dropbox was different. It's not like the average user wakes up in the morning wishing to get rid of their USB drive. If you don't think you have a problem, you're not going to look for a solution. Search is great for harvesting demand, not for creating it."[14] Focusing on organic growth proved successful: Dropbox registered its 2 millionth user in October 2009, one month after launching its iPhone application.

To identify ways to improve ease-of-use and product features, the Dropbox team tracked support forums closely. Houston said, "We get feature requests for things we already have. These are particularly bad because it means that even though we've implemented something, our users can't find it. We pay close attention when that happens."[15] In November 2009, the company launched "Votebox" on its site, which allowed users to vote and comment on features they would like to see added. (See **Exhibit 5** for the Votebox landing page.)

Since the team gained considerable insight on users' preferences through support forums, the Votebox, and A/B testing, Dropbox did not conduct regular consumer surveys. However, it did conduct occasional usability tests. In one early instance, the entire team watched as not one of five typical consumers recruited from Craigslist could successfully install and interact with the application. Houston recalled:

> Watching them fail was excruciating. Imagine if your coffee maker just spit coffee all over the counter every third time you used it or your car stopped in the middle of the road. That's the computer experience for a normal person. The PC is always conspiring against you to lose your stuff or break in some weird way. You have no idea what happened or what you did wrong. Watching those five consumers struggle to try to figure out how to use our product was probably the most painful day we ever had as a team, but afterward, we created a list of 70 things to fix.

The team also devised better tools for satisfied users to spread the word about Dropbox. The most successful was a referral program whereby an existing user who referred a new user to Dropbox received 250 megabytes of additional free storage (up to 8 GB total for users with free accounts). Additionally, the new user upon sign-up received 250 megabytes of space on top of the 2 GB allocated to a free account. This two-sided incentive structure, modeled on one used by PayPal in its launch phase, served to reduce the distrust normally associated with spam-inducing, one-sided marketing campaigns.

Houston and his colleagues improved other viral features, including password-protected shared folders that were accessible by multiple Dropbox users. Public folders also encouraged users to refer Dropbox. When users placed a file in their public folder (which was automatically nested within their Dropbox folder), they were given a link they could share, making the file accessible to anyone with Internet access.

Word-of-mouth referrals and viral marketing generated strong results. In April 2010, Dropbox's 4 million users produced 2.8 million direct referral invites. Of the recent sign-ups, 35% originated from

the referral program and 20% from shared folders and other viral features.[16] The rest were acquired through word-of-mouth referrals and PR efforts. Houston reflected, "It's hard to master freemium products unless you can build an organic customer acquisition engine. If you think of your free user costs as your marketing budget, then things begin to make more sense."[17]

Dropbox did not publish financial results, but industry observers had attempted to calculate both its revenue and its data storage costs. Analysts estimated that 2% to 3% of Dropbox's users were paying customers, which implied a $10 million to $15 million annual revenue run rate in mid-2010.[18] Dropbox was reported to be storing 433 MB of data per user in late 2009.[19] Using this figure as the average amount of data stored for each free user and assuming an average of 25 GB for each paid user, an analyst estimated Dropbox's monthly spending for storage and bandwidth to be $0.11 per free user and $3.18 per paid user, based on published prices for high-volume Amazon S3 customers.[20]

Accelerating Growth

With product and marketing strategies in place, Houston was ready to focus on ways to accelerate Dropbox's growth and capture a larger share of the rapidly growing global market for file synchronization and backup services. IDC projected 28% annual growth for this market, from $724 million in 2009 to $2.5 billion in 2014.[21] Industry growth was being fueled by declining costs for both storage and bandwidth. According to IDC, the per gigabyte cost for enterprise-grade storage equipment had fallen from $5.35 in 2005 to $1.23 in 2010, and would decline further to $0.36 in 2014. According to the DrPeering International consultancy, the average monthly wholesale cost for high-bandwidth Internet data delivery, measured per megabit per second, had fallen from $75 in 2005 to $5 in 2010, and would decline further to $0.94 in 2014.[22]

Among the options the Dropbox team debated was whether to continue to offer a single product for both consumers and business users. Houston commented:

> You can categorize Dropbox users along two dimensions: whether or not they share files with others, and whether or not they use the application for business. These dimensions define a 2x2 matrix, and we have lots of users in all four cells. Dropbox is a general-purpose application, much like Microsoft Word. My mom uses the same version of Word to record recipes as my lawyer uses to mark up a 40-page contract. Deciding to offer a single product for consumers and business users was a big hurdle for us, and building a product that was compelling for both types of users was no small task.

Staying the Course

Since launch, Dropbox's team had continuously upgraded their product's ease-of-use and features, often in response to users' requests. The list of additional functionality desired by users continued to grow, for example, offering the service in languages other than English. (See **Exhibit 6** for nationalities represented by its user base.) Pursuing incremental product improvement opportunities as part of a "stay-the-course" strategy could keep Dropbox's 25-person team busy for years.

However, some of the most requested features threatened the company's commitment to providing an easy-to-use product. The team had deliberately avoided implementing the most requested feature on Votebox: enabling the service to sync files outside of the Dropbox folder, in particular, the "My Documents" folder within Windows (or its Macintosh counterpart, "Documents"). While a Dropbox folder could contain any number of other user-created folders, it

could not hold folders generated by the PC operating system (e.g., "My Documents"). Moving such a folder into the Dropbox folder could break crucial connections and cripple the operating system.

Allowing Dropbox to sync outside folders would make the service more flexible, but also more difficult to use. Users would have to make potentially confusing, high-stakes decisions about synchronization priorities across multiple devices. Mistakes by users could generate complex support issues. Houston explained:

> Imagine you're a new user at home and you link to your "My Documents" folder and everything goes just great. Then you go to work and you blaze through the installer and you say, "Yeah, yeah, just sync it all." You don't think carefully about the implications of telling Dropbox to merge the contents of your "My Documents" folders on your home and work machines. You discover you've created this giant, ugly conglomeration of home and work files on both machines, and there's no undo button.

As part of a stay-the-course strategy, Dropbox could also revisit the idea of pursuing partnerships. In May 2010, Dropbox made moves in that direction, announcing a mobile application programming interface (API) that allowed third-party software developers to access files within a user's Dropbox. Early partners leveraging the API included QuickOffice (mobile editing and creating of Office documents), FuzeMeeting (web conferencing), and GoodReader (document retrieval and viewing).

Also, in the past few months, a number of PC and smartphone manufacturers had approached the company about pre-installing Dropbox on their devices. They saw a parallel between online storage and antivirus/security software or search toolbars, which had generated hundreds of millions of dollars in bounties for OEMs, while significantly expanding their partners' customer acquisition funnels. Houston commented:

> It was clear early on that there were strong similarities between our business and PC security software. We both have a product you probably don't know that you need. You're not looking for it. You're happy when you have it, but if you don't have it, life goes on. Products like this probably should come pre-installed on a PC, so you only have to think about them once.

Although Houston's earlier partnership talks came to naught, perhaps the situation had changed now that Dropbox had millions of users and a strong reputation. Along those lines, the Android ecosystem represented a promising opportunity. In May 2010, at the same time Dropbox released a native iPad application, it also offered its official Android application. Houston asked:

> Shouldn't every Android device ship with Dropbox? This could be a powerful differentiator for a device maker. And it could drive customer acquisition for us. A big barrier to adoption for Dropbox is that we require a client installation, which can be a high friction experience. Having the service bundled and pre-installed on millions of devices would remove this obstacle.

Opportunities to partner with Android device makers raised a related question for Houston: what were the odds that Google—Android's creator—would move aggressively into Dropbox's space? Houston said:

> Imagine a day when Google flips the switch and gives away a terabyte of free storage to 100 million machines. We think about this a lot; it pushes us to get big fast and lock in customers. We don't want to become a fallen star like Netscape, which was crushed by Microsoft.

> Past efforts around cloud storage at Google have failed for internal political reasons. It's not like they don't have the technical talent to make this work, and cloud services are certainly aligned with their mission. But the project has been a black sheep inside Google since 2005. At first they were worried about runaway server costs, like they had with YouTube. More recently, they've viewed file management as a feature of Google Docs. But deep down, all the ugly, grungy engineering we've done to make Dropbox work across multiple PC platforms seems irrelevant in their eyes. They think that PCs in their current incarnation, with local storage, will disappear as the cloud takes over. But with the grandeur of their vision, trying to move everything to the web, Google is not solving problems that real people have today.

Product Segmentation

There were many ways that Dropbox could segment its diverse and growing user base and tailor separate products or add-on features for the segments. The online backup and data storage services space remained fragmented and fiercely competitive in 2010. Among leading vendors serving individual users, Dropbox remained distinct in offering the ability to synchronize files across devices and to share files through public and private folders, although some smaller startups provided similar capabilities (e.g., SugarSync). By contrast, offerings from large rivals like Mozy and Carbonite were limited to automated backup and remote file access via any web browser. Mozy's service was free for up to 2 GB of storage; unlimited storage for a single computer was available for $4.95 per month. Carbonite did not offer free service (other than 15-day trials); its unlimited storage service for a single computer cost $54.95 per year.

Since 2005, the website BackupReview.com had ranked the top 25 online backup and data storage companies in the consumer, small-medium business (SMB), and enterprise segments. (See **Exhibit 7** for June 2010 rankings.) Dropbox ranked sixth in the consumer segment, but it was not mentioned as a top-25 provider in either the SMB or enterprise segments. By contrast, Mozy ranked No. 3 on the consumer list and No. 4 in the enterprise segment; Carbonite ranked No. 1 on the consumer list and No. 4 in the SMB segment.

Dropbox could follow its rivals' lead and offer a version specifically designed for small businesses, as Carbonite had done by launching Carbonite Pro in February 2010. According to Carbonite's CEO, "Now we have a version of Carbonite that incorporates everything that these small-business users have been asking for: no per-PC fees, administrative tools that are simple enough for any office manager to use, the ability to back up external drives, and priority support."[23] Pricing for Carbonite Pro, which supported an unlimited number of PCs, depended on the total volume of data storage a business required: rates ranged from $10 per month for up to 20 GB to $250 per month for 300 to 499 GB. The service featured a dashboard that allowed an office manager to easily track the backup status and volume of data stored for all of a company's PCs, along with a restore wizard that guided the recovery of backup file copies.

It was unclear how Carbonite's push into the SMB segment would impact its profitability. Carbonite had incurred an operating loss of $14.2 million during the first six months of 2010, largely due to aggressive marketing spending (see **Exhibit 8** for its P&L statement). Unlike Dropbox, Carbonite relied heavily on paid advertising for customer acquisition, including radio, TV, and online display ads, as well as search engine marketing. Carbonite's business model differed from Dropbox's in another important way: Carbonite stored customers' files on its own servers, rather than relying on a cloud services partner like Amazon S3.

Conclusion

As he arrived at Dropbox's San Francisco office, Houston wondered if his team was ready for the rapid expansion ahead. He reflected on the company's long-range goals:

> What we want to do as a company is let you sit at any computer or device and have access to all your stuff. For example, in college I could go from one workstation to any of the thousands of others on campus and not only could I see all my files but my entire desktop and environment. But after I graduated, I was on my own. So we're trying to build that kind of seamless experience for the rest of the world. It's a simple idea, but very challenging to build—certainly enough to keep us busy for the next five years.[24]

Exhibit 1 Online Backup and Data Storage Competitors (January 2006)

	Box.net	eSnipe	Freepository	Go Daddy	iStorage	Mozy	Multiply	Omnidrive	Openomy	Streamload	Strongspace	Xdrive
Basic Plan Price	Free/1GB $4.99/5GB	Free/1GB	Free/ 150MB	$4.99/yr/ 50MB	$4.99/ 250MB	Free/1GB	Free/ Unlimited	Free/2GB+	Free/1GB	Free/25GB	$8/4GB	$10/GB
Minimum account size	1GB	1GB	150MB	50MB	250MB	1GB	unlimited	2GB	1GB	25GB	4GB	5GB
Maximum storage	15GB		?	2GB	15GB	2GB	N/A	N/A	N/A	1000GB	100GB	N/A
File versioning								•				•
Permissions/access controls	•				•			•		•	•	•
Secure communication	•		•		•			•		•	•	•
Encrypted storage			•		•	•		•				•
Web access	•	•	•	•	•	•	•	•	•	•	•	•
API								•				
Free/trial version	•	•	•		•	•	•	•	•	•		•
Mobile version	•				•			•				•
Cross-platform support	•		•		•			•	•	•	•	•
Business edition					•					•		
Consumer edition			•	•	•					•		•
Monthly plan	•		•		•			•		•	•	•
Yearly plan				•	•					•		•
Public sharing	•						•	•				•
Private sharing	•	•	•	•	•		•	•	•	•	•	•
Company sharing/workgroups	•		•					•	•		•	•
Email/embedded support form	•	•	•	•	•	•	•		•	•	•	•
Manuals/screenshot Help	•	•	•	•	•	•	•			•	•	•
Forum/chat			•		•		•					•
User friendly website	•	•			•	•	•		•	•	•	•

Source: Adapted from "The Online Storage Gang," TechCrunch.com, January 31, 2006, http://www.flickr.com/photos/michaelarrington/93730415/sizes/l/.

Exhibit 2 Excerpts from Dropbox's April 2007 Y Combinator Application

 # What is your company going to make?

Dropbox synchronizes files across your/your team's computers. It's much better than uploading or email, because it's automatic, integrated into Windows, and fits into the way you already work. There's also a web interface, and the files are securely backed up to Amazon S3. Dropbox is kind of like taking the best elements of subversion, trac and rsync and making them "just work" for the average individual or team. Hackers have access to these tools, but normal people don't.

There are lots of interesting possible features. One is syncing Google Docs/Spreadsheets (or other office web apps) to local .doc and .xls files for offline access, which would be strategically important as few web apps deal with the offline problem.

 # Please tell us in one or two sentences something about each founder that shows a high level of ability.

Drew - Programming since age 5; startups since age 14; 1600 on SAT; started profitable online SAT prep company in college (accoladeprep.com). For fun last summer reverse engineered the software on a number of poker sites and wrote a real-money playing poker bot (it was about break-even)

 # What's new about what you're doing?

Most small teams have a few basic needs: (1) team members need their important stuff in front of them wherever they are, (2) everyone needs to be working on the latest version of a given document (and ideally can track what's changed), (3) and team data needs to be protected from disaster. There are sync tools (e.g. beinsync, Foldershare), there are backup tools (Carbonite, Mozy), and there are web uploading/publishing tools (box.net, etc.), but there's no good integrated solution.

Dropbox solves all these needs, and doesn't need configuration or babysitting. Put another way, it takes concepts that are proven winners from the dev community (version control, changelogs/trac, rsync, etc.) and puts them in a package that my little sister can figure out (she uses Dropbox to keep track of her high school term papers, and doesn't need to burn CDs or carry USB sticks anymore.)

At a higher level, online storage and local disks are big and cheap. But the internet links in between have been and will continue to be slow in comparison. In "the future", you won't have to move your data around manually. The concept that I'm most excited about is that the core technology in Dropbox -- continuous efficient sync with compression and binary diffs -- is what will get us there.

 # What do you understand about your business that other companies in it just don't get?

Competing products work at the wrong layer of abstraction and/or force the user to constantly think and do things. The "online disk drive" abstraction sucks, because you can't work offline and the OS support is extremely brittle. Anything that depends on manual emailing/uploading (i.e. anything web-based) is a non-starter, because it's basically doing version control in your head. But virtually all competing services involve one or the other. With Dropbox, you hit "Save", as you normally would, and everything just works, even with large files (thanks to binary diffs).

 # What are people forced to do now because what you plan to make doesn't exist yet?

Email themselves attachments. Upload stuff to online storage sites or use online drives like Xdrive, which don't work on planes. Carry around USB drives, which can be lost, stolen, or break/get bad sectors. Waste time revising the wrong versions of given documents, resulting in Frankendocuments that contain some changes but lose others. My friend Reuben is switching his financial consulting company from a PHP-based CMS to a beta of Dropbox because all they used it for was file sharing. Techies often hack together brittle solutions involving web hosting, rsync, and cron jobs, or entertaining abominations such as those listed in this slashdot article ("Small Office Windows Backup Software" - http://ask.slashdot.org/article.pl?sid=07/01/04/0336246).

 # How will you make money?

The current plan is a freemium approach, where we give away free 1GB accounts and charge for additional storage (maybe ~$5/mo or less for 10GB for individuals and team plans that start at maybe $20/mo.). It's hard to get consumers to pay for things, but fortunately small/medium businesses already pay for solutions that are subsets of what Dropbox does and are harder to use. There will be tiered pricing for business accounts (upper tiers will retain more older versions of documents, have branded extranets for secure file sharing with clients/partners, etc., and an 'enterprise' plan that features, well, a really high price.)

I've already been approached by potential partners/customers asking for an API to programmatically create Dropboxes (e.g. to handle file sharing for Assembla.com, a web site for managing global dev teams). There's a natural synergy between Basecamp-like project mgmt/groupware web apps (for the to-do lists, calendaring, etc.) and Dropbox for file sharing. I've also had requests for an enterprise version that would sit on a company's network (as opposed to my S3 store) for which I could probably charge a lot.

 # Who are your competitors, and who might become competitors? Who do you fear most?

Carbonite and Mozy do a good job with hassle-free backup, and a move into sync would make sense. Sharpcast (venture funded) announced a similar app called Hummingbird, but according to (redacted) they're taking an extraordinarily difficult approach involving NT kernel drivers. Google's coming out with GDrive at some point. Microsoft's Groove does sync and is part of Office 2007, but is very heavyweight and doesn't include any of the web stuff or backup. There are apps like OmniDrive and Titanize but the implementations are buggy or have bad UIs.

 # What tools will you use to build your product?

Python (top to bottom.) sqlite (client), mysql (server). Turbogears (at least until it won't scale.) Amazon EC2 and S3 for serving file data.

 # If you've already started working on it, how long have you been working and how many lines of code (if applicable) have you written?

3 months part time. About ~5KLOC client and ~2KLOC server of python, C++, Cheetah templates, installer scripts, etc.

 # If you have an online demo, what's the url?

Here's a screencast that I'll also put up on news.yc: http://www.getdropbox.com/u/2/screencast%20-%20Copy.html If you do have a Windows box or two, here's the latest build: http://www.getdropbox.com/u/2/DropboxInstaller.exe

 # How long will it take before you have a prototype? A beta? A version you can charge for?

Prototype - done in Feb. Version I can charge for: 8 weeks maybe? (ed: hahaha)

 # Which companies would be most likely to buy you?

Google/MS/Yahoo are all acutely interested in this general space. Google announced GDrive/"Platypus" a long time ago but the release date is uncertain (a friend at Google says the first implementation was this ghetto VBScript/Java thing for internal use only). MS announced Live Drive and bought Foldershare in '05 which does a subset of what Dropbox does. Iron Mountain, Carbonite or Mozy or anyone else dealing with backup for SMBs could also be interested, as none of them have touched the sync problem to date.

In some ways, Dropbox is for arbitrary files what Basecamp is for lightweight project management, and the two would plug together really well (although 37signals doesn't seem like the buying-companies type). At the end of the day, though, it's an extremely capital-efficient business. We know people are willing to pay for this and just want to put together something that rocks and get it in front of as many people as possible.

 # If one wanted to buy you three months in (August 2007), what's the lowest offer you'd take?

I'd rather see the idea through, but I'd probably have a hard time turning down $1m after taxes for 6 months of work.

 # Why would your project be hard for someone else to duplicate?

This idea requires executing well in several somewhat orthogonal directions, and missteps in any torpedo the entire product.

For example, there's an academic/theoretical component: designing the protocol and app to behave consistently/recoverably when any power or ethernet cord in the chain could pop out at any time. There's a gross Win32 integration piece (ditto for a Mac port). There's a mostly Linux/Unix-oriented operations/sysadmin and scalability piece. Then there's the web design and UX piece to make things simple and sexy. Most of these hats are pretty different, and if executing in all these directions was easy, a good product/service would already exist.

 # Do you have any ideas you consider patentable?

(redacted)

 # What might go wrong? (This is a test of imagination, not confidence.)

Google might finally unleash GDrive and steal a lot of Dropbox's thunder (especially if this takes place before launch.) In general, the online storage space is extremely noisy, so being marginally better isn't good enough; there has to be a leap in value worthy of writing/blogging/telling friends about. I'll need to bring on cofounder(s) and build a team, which takes time. Other competitors are much better funded; we might need to raise working capital to accelerate growth. There will be the usual growing pains scaling and finding bottlenecks (although I've provisioned load balanced, high availability web apps before.) Acquiring small business customers might be more expensive/take longer than hoped. Prioritizing features and choosing the right market segments to tackle will be hard. Getting love from early adopters will be important, but getting distracted by/releasing late due to frivolous feature requests could be fatal.

 # If you'll have any major expenses beyond the living costs of your founders, bandwidth, and servers, what will they be?

None; maybe AdWords.

 # Do any founders have other commitments between June and August 2007 inclusive?

No; I've given notice at Bit9 to work on this full time regardless of YC funding.

 # Are any of the founders covered by noncompetes or intellectual property agreements that overlap with your project? Will any be working as employees or consultants for anyone else?

Drew: Some work was done at the Bit9 office; I consulted an attorney and have a signed letter indicating Bit9 has no stake/ownership of any kind in Dropbox

 # If you had any other ideas you considered applying with, feel free to list them. One may be something we've been waiting for.

One click screen sharing (already done pretty well by Glance); a wiki with version-controlled drawing canvases that let you draw diagrams or mock up UIs (Thinkature is kind of related, but this is more text with canvases interspersed than a shared whiteboard) to help teams get on the same page and spec things out better (we use Visio and Powerpoint at Bit9, which sucks)

Source: Company.

Exhibit 3 Dropbox Closed Beta Landing Page

Source: Drew Houston, "Customer Development Case Study: Dropbox," April 23, 2010, video file, Justin.tv, http://www.justin.tv/startuplessonslearned/b/262672510.

Exhibit 4 Dropbox Sample AdWords Campaign Performance

Hey guys,

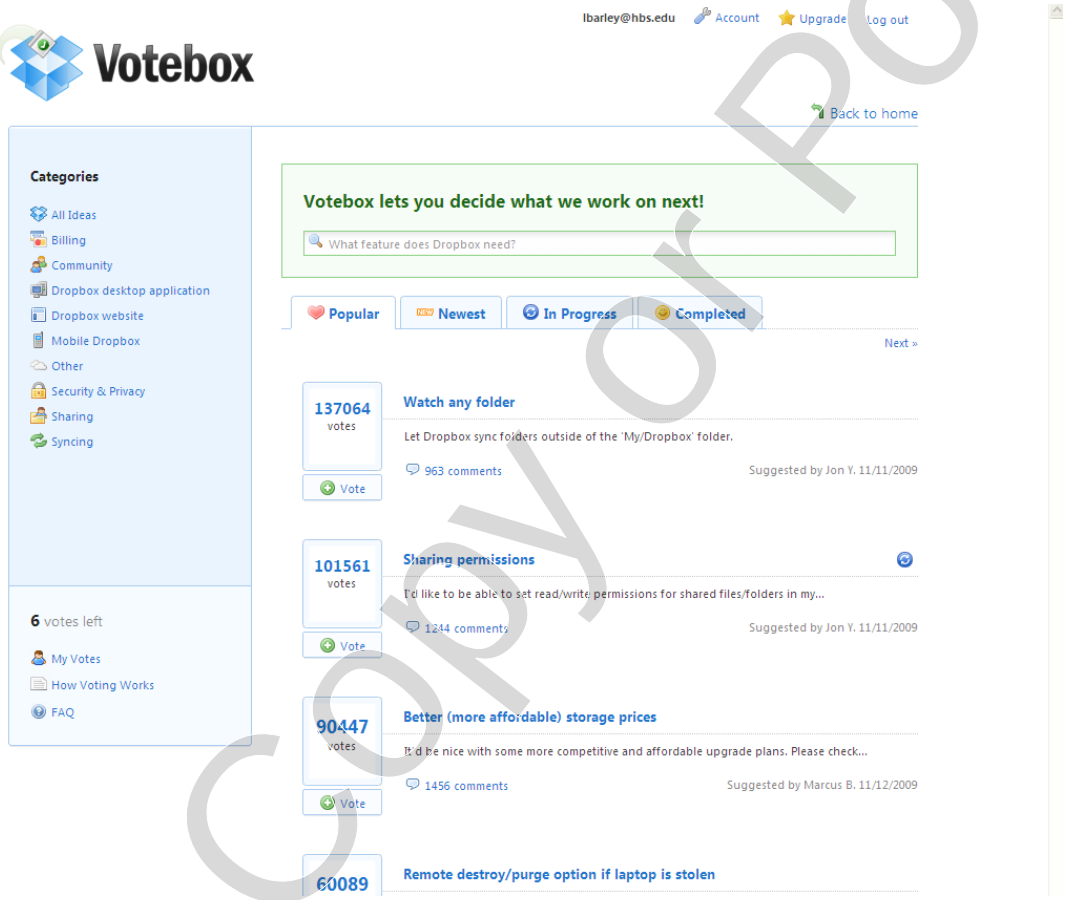
So the AdWords interface on Google is showing inaccurate campaign conversion numbers (and by extension inaccurate cost per conversion figures), so I had Aston pull up the true conversion numbers from our own database - both total number of conversions ever recorded for each campaign (people who gave us their CCard info, and people who are still paying customers today. We can't figure out why (even after contacting Google) the numbers on their interface are wrong. Anyway, the correct data (aggregate for all keywords in each campaign, key numbers in bold) is below:

FTP (inactive)	
Impressions:	648,540
Clicks:	706
Click-thru rate:	0.11%
Signups:	74
Total conversions ever recorded:	4
Conversions still active today:	3
Avg. cost per click:	$1.65
Cost per conversion:	**$291.08**
Cost per conversion that sticks:	**$388.11**
Subscription retention rate:	75%
Total cost of campaign to date:	$1,164.33

SYNC (active)	
Impressions:	319,393
Clicks:	1,312
Click-thru rate:	0.41%
Signups:	100
Total conversions ever recorded:	12
Conversions still active today:	10
Avg. cost per click:	$1.78
Cost per conversion:	**$194.43**
Cost per conversion that sticks:	**$233.31**
Subscription retention rate:	83%
Total cost of campaign to date:	$2,333.11

Source: Drew Houston, "Customer Development Case Study: Dropbox," April 23, 2010, video file, Justin.tv, http://www.justin.tv/startuplessonslearned/b/262672510.

Exhibit 5 Votebox Landing Page



Source: Company website, https://www.dropbox.com/votebox#votebox:popular:0.

Exhibit 6 Users by Nationality (February 2010)

Nationality	Percent (%)
U.S.	32.7
U.K.	6.7
Germany	6.5
Japan	4.7
Canada	4.0
Spain	3.5
Netherlands	3.2
China	2.8
France	2.7
Italy	2.5

Source: Company website, http://blog.dropbox.com/?s=nationality.

Exhibit 7 Backup Review Top-25 Online Backup Companies (June 2010)

Rank	Consumer	Small–Medium Business	Enterprise
01	Carbonite	KineticD	Backup-Technology
02	Keepit.com	Asigra	Intronis
03	MozyHome	Vembu	StorageGuardian
04	IDrive	CarbonitePro	MozyPro
05	BackBlaze	IBackup	CoreVault
06	DropBox	SOSonlinebackup	AmeriVault
07	SugarSync	DataPreserve	LiveVault (Iron Mountain Digital)
08	JungleDisk	BackupDirect.net	DataBarracks
09	LiveDrive	KeepVault	CrashPlan
10	ADrive	Dmailer	BackupMyInfo
11	SpiderOak	ElephantDrive	SecurStore
12	MyOtherDrive	BackupRight	GlobalDataVault
13	Concentsus	FilesAnyWhere	Evault (Seagate i365)
14	Acronis	Ahsay	CentralDataBank
15	F-Secure	OnlineITbackup.co.uk	DriveHQ
16	Steek	DataCastle Corp	DataProtection
17	Diino	BackupSolutions	RemoteDataBackups
18	Verizon	KeepITsafe.ie	Zmanda
19	Fabrik	BackupAgent	RemoteDataBackup.net
20	SecureBackup	Exacep	FireVault
21	Backupify*	Carroll.net	OnCoreIT.co.uk
22	Norton Online Backup	Egnyte	ClunkClick.net (Risc Group)
23	SafeCopyBackup	OnlineBackupVault	Yotta280
24	Comcast.net	NetCDP	Genie-Soft
25	AngelBackup	Consonus	SafeEVault

Source: Adapted from Backup Review, June 1, 2010, http://www.backupreview.info/2010/06/01/top-75-online-backup-companies-for-june-2010/, accessed October 1, 2011.

Note: Some companies might have products and/or services in two or more categories.

Note: According to the Backup Review website, Top-75 Online Backup Companies rankings were determined mainly by the following criteria: security; speed, reliability, and uptime; quality and accessibility of technical support; and cost. The Backup Review also took into consideration server stability, reports from its mystery shoppers, its own reviews, and user feedback.

Exhibit 8 Carbonite Profit-and-Loss Statement (in thousands, except for percentages)

	Year Ending 12/31/08	Year Ending 12/31/09	6 Months Ending 6/30/10
Revenue	$8,202	$19,114	$16,685
Cost of Revenue*	4,273	8,954	7,449
Gross Profit	3,929	10,160	9,236
Research & Development	4,663	6,210	4,973
General & Administrative	2,389	2,485	2,033
Sales & Marketing	14,729	21,067	16,464
Total Operating Expenses	21,781	29,762	23,470
Operating Loss	(17,852)	(19,602)	(14,234)
Customers, End of Period	281	590	782
Retention Rate**	78%	78%	80%

* Includes costs for data storage servers (which were depreciated over 2–4 years), bandwidth, and data center operations, which accounted for about 60% of total cost of revenue in 2010; customer support costs, which were outsourced to a vendor in India, accounted for the remaining 40%.

** Percentage of customers who renewed annual or multi-year contracts that expired during the period. 70% of customers signed annual contracts; the balance signed multi-year contracts.

Source: Carbonite S-1 statement.

Endnotes

[1] "Meet the Team" interview, Dropbox blog, February 9, 2009, http://blog.dropbox.com/?p=23, accessed December 30, 2010.

[2] Ibid.

[3] Sean Aune, "Online Storage," Mashable, July 27, 2007, http://mashable.com/2007/07/28/online-storage, accessed December 30, 2010.

[4] "Worldwide Online Backup Services 2007–2011 Forecast: A New Market Emerges," IDC, December 2007.

[5] Drew Houston, "Customer Development Case Study: Dropbox," April 23, 2010, video file, Justin.tv, http://www.justin.tv/startuplessonslearned/b/262672510.

[6] Ibid.

[7] Ibid.

[8] Ibid.

[9] Ibid.

[10] Drew Houston, "Drew Houston: Freemium for Consumer Internet Businesses, Part 2," April 16, 2010, video file, YouTube, http://www.youtube.com/watch?v=9I30YUSb568.

[11] Drew Houston, "Drew Houston: Freemium for Consumer Internet Businesses, Part 1," April 16, 2010, video file, YouTube, http://www.youtube.com/watch?v=TBTyjBQ9Eq4.

[12] Ibid.

[13] Drew Houston, "Customer Development Case Study: Dropbox," April 23, 2010, video file, Justin.tv, http://www.justin.tv/startuplessonslearned/b/262672510.

[14] Ibid.

[15] "Meet the Team" interview, Dropbox blog.

[16] Drew Houston, "Drew Houston: Freemium for Consumer Internet Businesses, Part 3," April 16, 2010, video file, YouTube, http://www.youtube.com/watch?v=WOOYqK1qE3g.

[17] Houston, "Drew Houston: Freemium for Consumer Internet Businesses, Part 2."

[18] Victoria Barret, "Dropbox: Files Without Borders," *Forbes*, June 28, 2010, http://www.forbes.com/forbes/2010/0628/technology-file-sharing-dropbox-google-files-without-borders.html.

[19] Liz Gannes, "Dropbox raises $7.25M, Crosses 3M Users," GigaOm blog, November 24, 2009, http://gigaom.com/2009/11/24/dropbox-raises-7-25m-crosses-3m-users/, accessed October 1, 2011.

[20] Michael Woloszynowicz, "The Economics of Dropbox," Web 2.0 and Business Development Blog, April 11, 2011, http://www.w2lessons.com/2011/04/economics-of-dropbox.html, accessed October 1, 2011.

[21] IDC, Dropbox Private Vendor Watchlist Profile, September 2011.

[22] Studies cited in Carbonite S-1, August 11, 2011, p. 2.

[23] "Carbonite, Inc. Launches Carbonite Pro, Online Backup Service for Small Business," *Computer Weekly News*, February 18, 2010, via Factiva, accessed September 26, 2011.

[24] "Meet the Team" interview, Dropbox blog.