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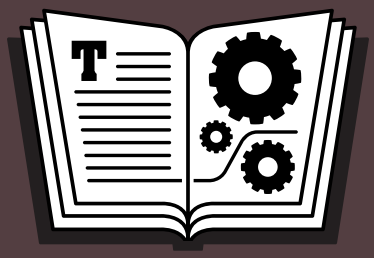

TAKE CONTROL OF

# THE CLOUD

## CUT THROUGH THE HYPE
## UNDERSTAND CLOUD SERVICES
## ENHANCE PRIVACY & SECURITY

*by* JOE KISSELL

$15

2ND EDITION

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# Read Me First

Welcome to *Take Control of the Cloud, Second Edition,* version 2.1, published in July 2017 by alt concepts inc. This book was written by Joe Kissell and edited by Kelly Turner.

This book helps you understand the Cloud—what it is, what it can do for you, and what you need to know to make smart decisions when purchasing cloud products and services.

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## What's New in Version 2.1

This small update adds details on, and updated links to, the live webinars recorded for this book. See Take Control of the Cloud Webinar.

## What's New in the Second Edition

In the three years since the first edition of this book, a huge number of changes have occurred in the Cloud, and I've revised this book accordingly to reflect the current facts:

- Added "Joe's Recommendations" to the end of most chapters to offer specific, concrete advice on choosing cloud services of various types
- Updated Example Cloud Storage Providers to reflect current prices, storage levels, and features of popular services
- Added a sidebar, Options for the More Technically Minded, about low-cost cloud storage services such as Amazon S3 and Backblaze B2 for users with programming know-how
- Included a topic called Figuring Out Where Your Data Is, to help you understand when your files are stored locally, when they're in the Cloud, and when they're in both places



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- Added a new topic called Using Cloud Storage Meta-services that discusses various services that enhance, extend, or combine cloud storage services
- Updated Backing Up Stuff from the Cloud to cover additional cloud-to-cloud backup options
- In the Productivity Apps discussion, added examples of cloud-based Databases, expanded Meetings and Screen Sharing to include Face to Face Broadcasting (F2F), and added Slack and Workflowy to the list of Other Productivity Apps
- Included a sidebar called Chromebooks and Other Thin Clients about how cloud apps and storage bring greater computing capabilities to cheaper, less-powerful equipment
- Provided new and improved information on VPNs; see Protecting Data in Transit
- Updated and expanded options for creating a personal cloud (adding new products and removing discontinued ones); see Personal Cloud Server Software and Personal Cloud Server Appliances
- Completely revamped and greatly expanded the chapter Choosing Cloud Providers, which now contains considerably more advice
- Added a new chapter about the wide variety of cloud-connected devices that aren't computers, smartphones, or tablets (think: light bulbs, thermostats, appliances, interactive speakers, and so on) and potential pitfalls; see The Cloud and the Internet of Things
- Included an introduction to the ways in which you can simplify your life by getting cloud services to interact with each other (and with desktop and mobile apps) automatically; see Automation and the Cloud
- Developed a live webinar that expands on some of the topics in this book; see Take Control of the Cloud Webinar



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# Introduction

It's hard to think of a more overused technology marketing term than *cloud*. Vendors proudly tout everything from word processors to light bulbs as being cloud-enabled, cloud-friendly, cloud-this, cloud-that. There's cloud computing, cloud storage, cloud sync, cloud services, cloud providers. iCloud, Creative Cloud, Cloud Drive, Cloud Mate. The list could go on for many pages.

Companies seem to believe that invoking the magic word "cloud" casts a spell over potential customers, as if everybody knows that anything having to do with the Cloud is modern, sexy, exciting, and well worth shelling out money for, regardless of its other attributes.

And yet, few companies bother explaining what they mean by "cloud," how—if at all—it's any different from "online," and what it is about the Cloud that so obviously makes everyone's life better.

Meanwhile, we consumers face a bewildering array of choices when it comes to products and services that make use of the Cloud. While you're trying to make up your mind about signing up for a service that, say, backs up your files online or lets you edit spreadsheets in a Web browser, a dozen more companies spring up that offer more or less the same thing, each one begging for your business.

And still, you may have a little voice in the back of your head saying, "What exactly *is* the Cloud, anyway? Is it a good thing? Is it even necessary? What real advantages does this nebulous concept bring me? Is it safe? Is it worth spending money on? What can I do with it? How do I make good choices about it?"

As recently as 2012, a national survey of 1,000 adult Americans indicated that 51 percent of them believed stormy weather could interfere with cloud computing, 29 percent thought the Cloud was an actual cloud, and only 16 percent had a pretty good idea what it truly is. But even among people who are crystal clear on the concept of the Cloud, understanding when a cloud-based service is the best way to solve a



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problem and which of countless providers to choose from can be frustrating and confusing.

Well, enough of that. I decided it was high time someone condensed this vaporous concept into an easy-to-read book. I'm here to dispel the darkness, banish the mist, shine sunlight on the landscape, show you the silver lining, and work my way through as many other cloud metaphors and puns as necessary to explain what's going on. If you've ever wondered what the Cloud is all about, what you can do with it, or how it might affect your future, this book will help you make sense of it. Instead of being subject to arbitrary marketing whims, you'll be able to take control of the Cloud.

Unlike most Take Control books, this one is not primarily how-to in nature. It would be pointless for me to attempt exact, step-by-step instructions for most activities related to the Cloud because there are so many—and services, features, and prices change almost daily. However, even though the facts are fluid, I do my best to offer guidance and recommendations for choosing cloud services and providers. I also offer a thorough and clear explanation that will help you make good decisions even as the technology changes.

I wrote this book for ordinary folk—people who might want to sign up for services or buy products for their personal use, for a home office, or for a small business. I don't address the sorts of questions that enterprise users or developers might have, and I approach the subject mainly from the consumer's point of view, as opposed to the provider's. And finally, what I discuss here is entirely platform-neutral: whether you use a Mac or PC; an iOS or Android mobile device; an Apple TV or an Xbox One, you'll find plenty of useful information in this book.



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# Cloud Concepts: The FAQ

You probably have a number of questions about the Cloud, so let's address some of the most common ones right here at the beginning. This first chapter is an FAQ that lays out the main facts and points you to parts of the book where I go into more detail.

## FAQ Topics


What Is the Cloud?

Where Does the Term "Cloud" Come From?

What Is Cloud Computing?

How Is Cloud Computing Different from Good Old-fashioned Servers on the Internet?

What Are Cloud Services?

What Are the Major Types of Cloud Services?

What's Great about the Cloud?

What's Not So Great about the Cloud?

Will the Cloud Mean I Won't Need My Own Computer or Software?

Can I Trust the Cloud with My Data?

Will I Maintain Ownership of Data I Store in the Cloud?

What Are the Security Considerations?

Do I Have Any Hope of Privacy If My Data Is in the Cloud?

Does the Cloud Mean Something Different to Developers and Big Businesses?

What's with the Weird Cloud-related Acronyms like SaaS, PaaS, and IaaS?

What Is a Private Cloud?

What Is a Personal Cloud?

How Can I Choose a Cloud Provider?




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## What Is the Cloud?

First things first. This being a book about the Cloud, we should start by clarifying what that term means. And that's trickier than it sounds: there's no single, universally agreed-upon definition.

For many people, "the Cloud" is synonymous with "the Internet." It's a global network of smaller, interconnected networks, that if viewed diagrammatically at a large enough scale, might vaguely resemble an actual cloud. In this sense, the word "cloud" is intended as a clever if overused metaphor, but doesn't add any shades of meaning.

Increasingly, however, "the Cloud" is used in a more specific sense to refer to storage, applications, and other services made available over the Internet—sometimes for free, but often for a small fee—to people and businesses as a replacement for similar products that would otherwise run on local devices. (Think: Google Docs versus a copy of Microsoft Word installed on your computer.) Such services are provided by large, distributed computer networks rather than individual servers, adding another stratum to the cloud metaphor. Given this usage of the term, a conventional FTP server would just be "on the Internet" whereas Dropbox is "in the Cloud." (If that doesn't make sense yet, don't worry—more details are coming soon.)

In this book, I look at the Cloud in this more restricted sense. I'm not going to tell you everything there is to know about the entire Internet, but I help you make sense of the endless barrage of cloud products and services companies are trying to sell you.

By the way, you'll notice that I capitalize "Cloud" when it's used as a noun to refer to the set of Internet services available globally. Not everyone does, but just as people sometimes distinguish between the Internet (the global network) and *an internet* (a smaller, usually local network that may or may not connect to the Internet as a whole), there can be *a cloud* (a particular collection of networked devices) that may or may not be part of the Cloud. That will become especially evident when I talk about The Personal Cloud.



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# Cloud Storage

One of the oldest, most common, and most useful types of cloud service is based on the simple notion of storing your files in the Cloud (instead of, or in addition to, storing them on a hard disk, SSD, or other local storage device).

In fact, many popular cloud storage services try to mimic the operation of a disk plugged into your computer—there's an icon on your Desktop that you can use just like any other disk (open files, delete files, create subfolders, drag files in and out, etc.), except that everything inside it happens to be stored on a server in some anonymous data center far away. As I discuss later in Local vs. Cloud Data Storage, keeping data in the Cloud also enables mobile devices to be more useful, even with much less internal storage than laptop or desktop computers.

Since your files are in the Cloud anyway, secondary tasks (like syncing them to other devices or sharing them with friends) become that much simpler. And some cloud storage services go considerably farther by adding more features, security, and flexibility.

In this chapter, as in many of the following ones, I'll begin by laying out the important considerations and then offer some specific suggestions at the end (see Joe's Recommendations: Cloud Storage).

## Cloud Storage Basics

Copying files to a server somewhere—whether that's a single computer or a virtual server distributed over numerous computers and locations—is a pretty straightforward task. What makes cloud storage different from merely storing files on a remote file server is that cloud storage *usually* involves most, if not all, of the following features:

- **Redundancy:** Each file is stored not just on one disk attached to one server, but in multiple places (to guard against hard drive failures, accidental file corruption, and suchlike).



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- **Flexible storage space:** Most providers offer a modest amount of storage space for free (or very inexpensively) and let you pay for additional space as your needs grow.
- **Desktop and mobile integration:** Unlike the old days in which you had to use a special app like an FTP client (or even, *gasp,* a Web browser) to upload files to a server, modern cloud storage services almost invariably offer software that integrates with popular platforms, enabling you to interact with your remotely stored files as easily as local files. Most cloud storage providers have software for at least macOS, Windows, iOS, and Android.
- **Data preservation:** Cloud storage services usually have internal backups that enable them to restore their customers' files even if a glitch wipes out all the redundant live copies on various hard disks. Whether you, as a user, can retrieve such backups is another question; see Backup, ahead.
- **Encryption:** Although sadly not universal, encryption is quite common among cloud storage services. Your files are generally encrypted before they leave your device, and remain encrypted in the Cloud. (As I explain later, in Security Overview, encryption isn't a guarantee of security, but it's an essential component.)
- **Delta encoding:** Suppose you upload a big file to the Cloud, and then later change only a tiny part of it. Will you have to upload the whole thing again? In order to save time, preserve bandwidth, and conserve storage space, cloud storage providers typically use a process called *delta encoding* (also known as block-level or byte-level incremental updates, among other names) to upload only the portions of files that change from one sync or backup to the next.

Beyond those basics, providers spin their services in numerous different ways, as I discuss next.



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# Cloud Syncing

In the previous chapter, Cloud Storage, I discussed syncing files and folders between local devices and the Cloud. Here, I want to look at smaller chunks of data—small enough that they can often sync almost instantaneously. I'm thinking of things like email, contacts, calendars, tasks, bookmarks, notes, and passwords. You almost certainly want to keep that sort of data in sync across all your computers and mobile devices, and the ubiquitous Cloud offers numerous excellent ways to do so.

## Overview of Cloud Syncing Services

Just a few years ago, syncing personal information like contacts and calendars between a mobile device and a computer often required connecting the two with a *cable*—how barbarian! Then Wi-Fi sync came along, which cut the cable but still sometimes forced you to sync a single pair of devices at a time—and even then, only when they were both present on the same network. The biggest problem with that old-fashioned, manual syncing (with or without the cable) was that conflicts were common, because during the time between syncs, it was all too easy to change the same piece of data on more than one device.

Nowadays, most of us use a cloud-based service to hold all this information, and because our devices are connected to the Internet almost all the time, changes sync to the Cloud immediately and then bounce back down to our other devices.

### Syncing to a Server vs. the Cloud

Of course, nothing about the services I'm discussing here intrinsically requires the Cloud. That is, you could very well have (and many people do, even today) a single, conventional server that handles email, contact and calendar syncing, and other such services—some small ISPs and shared hosting providers still operate this way.



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However, the trend is increasingly to use true cloud infrastructure for syncing this sort of data—witness Google (Gmail, Google Calendar, Google Contacts, etc.), Apple's iCloud, Microsoft Office 365, and Yahoo, to list a few prominent examples. Of course, when you're providing a service to hundreds of millions of people, the kind of elasticity and scalability that cloud computing offers is essential. From the user's point of view, cloud-based syncing tends to be more reliable—and potentially faster—than syncing with a single server.

If you're looking for service providers, it may not always be apparent what sort of infrastructure they use—but in many cases, you won't notice a difference one way or another.

## Push Synchronization

One key feature that differentiates modern cloud syncing from the click-a-button-to-sync norm of yesteryear is *push synchronization*, which means that changing data in one place causes an immediate update of that data on your other devices, rather than forcing you to wait for a manual or periodic sync to occur. Because push updates happen immediately, the probability of a conflict occurring goes way down—there usually isn't time for data to change in two places between syncs.

I should clarify that push synchronization rarely goes directly from one device to another. What normally happens is that you change (add, delete, edit) data such as a contact phone number on one device, and as soon as you're finished, your device pushes that change to the Cloud, which holds the master copy of the data. And then, as soon as the change registers there, the cloud service pushes it back down to your other devices. In this way, a push update may consist of two or more separate push operations, but all of them may occur within the span of a few seconds.

What I've described so far is the way push synchronization works for contacts, calendars, tasks, bookmarks, and the like. But email is a bit messier.



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# Cloud Backups

A bit earlier, in Cloud Storage, I talked about cloud services that let you store files online, sync them across devices, and share them with other people. In the same vein, you can use cloud storage to back up your Mac, PC, or other device. In this chapter, I go into more detail about how cloud backup differs from cloud syncing, explore the pros and cons, and mention a number of providers that offer backup services.

As useful as it may be to back up your data *to* the Cloud, you should also consider the importance of backing up data *from* the Cloud (either to local storage or to another cloud service). After all, no service is bulletproof—hardware malfunctions, software glitches, and Internet outages could prevent you from reaching your email, contacts, documents, and other data created online in a Web browser. I offer some advice about that issue in the second part of this chapter.

## Backing Up Stuff to the Cloud

The fundamental truth about backups is that if your data is in just one place (as in, on your computer's hard disk or SSD), it's not safe. Anything from user error to theft to a natural disaster could wipe out your valuable documents, photos, email, and other digital assets in an instant. If you have never experienced data loss, the law of probability suggests it's only a matter of time. Having a copy of your data in another location (or, better yet, two other locations) is an insurance policy no one should be without.

One of the places you might choose to back up your data is the Cloud. Lots of services offer cloud data backup, often charging only pennies a day for unlimited storage.

### Cloud Sync vs. Cloud Backup

To reiterate what I said in Backup, it's tempting to think of a cloud syncing service (such as Dropbox) as a backup too. After all, it does



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put a copy of your data in the Cloud (a second location) and on each of your other devices (even more locations). But before you get too comfortable, be sure to read the fine print. If a service syncs all your changed files immediately—as most do—then accidentally changing or deleting a document on your computer would result in that change propagating to the Cloud and to all your other devices; you might not be able to retrieve the older or deleted file.

Many cloud storage providers offer versioning, which keeps earlier versions of files that have since been updated, and some also let you undelete files that you've removed locally. Even so, beware:

- A cloud service may store old versions and deleted files only for a short period of time. For example, Dropbox keeps them for only 30 days, unless you pay an extra $39 per year for the Extended Version History option, which increases the storage time to a year. (Of course, the same consideration applies to cloud backup providers. While unlimited versioning is common, Backblaze, for example, saves old versions and deleted files for only 30 days.)
- At best, a cloud storage service syncs (and keeps versions of) only the folders you tell it to—and you'll probably keep that number small if for no other reason than cost, since most cloud storage providers charge by capacity. If you lose a file that's located somewhere else, tough.
- Services that focus on syncing tend to place less emphasis on security than services for whom backup is the primary function. Check how (if at all) your data is encrypted (refer to Security in the Cloud). Specifically, ask prospective providers whether there's any way they could read your files without your explicit permission.

In contrast to the typical sync service, cloud services whose main business is backing up files typically have the following characteristics:

- **Unlimited (or at least generous) storage:** It's easy to find companies that will charge you, say, $5 per month to back up unlimited data from a single computer. Even when a backup



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# Cloud Apps

The topics covered in the previous two chapters, Cloud Storage and Cloud Syncing, are mostly passive from the user's point of view. Sure, you may drag a file into a folder, update a contact, or click a Share button, but for the most part, storage, sharing, and syncing are just "plumbing"—stuff that goes on behind the scenes without requiring much interaction. In this chapter, we turn to cloud-based apps with more overt user interaction, from productivity apps to entertainment.

To summarize the next few pages: almost any computing task you may need to perform, you can probably do in a cloud-based app.

I should point out that, when I say "cloud app" or "cloud-based app," I don't merely mean apps that run in your Web browser, although there are many such apps—and I mention quite a few of them in this chapter. For our purposes, a cloud app is one for which the bulk of the heavy lifting—the actual computation—happens in the Cloud. You'll need some way to interact with them, and Web browsers are often the logical choice. But you might equally well use a client app on your computer, mobile device, or set-top box. The input/output method isn't as crucial to cloud apps as where the "app" part happens.

Cloud-based apps are rarely the only way to accomplish tasks, and they're not always the best way—but they're getting better all the time. The major selling points for cloud apps tend to be:

- **Economy:** It's often less expensive over time to do something using a cloud app than to purchase local software that does the same thing. And when it comes to entertainment, it's far less expensive to subscribe to an all-you-can-watch service like Netflix than to buy or rent individual movies or TV shows (but see Subscriptions for Everything, later, for more perspective).
- **Sharing and collaboration:** Documents created online can be shared with others more conveniently than documents created on your computer. In many cases, multiple people can even edit a



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document at the same time, which is difficult to pull off when using local apps.

- **Compatibility:** As long as you have a modern Web browser or the appropriate (and often free) app on your computer, mobile device, or set-top box, it doesn't matter which operating system you're using or whether all your software is up to date. Cloud-based apps have broader compatibility than their local counterparts. It doesn't even matter if you're using your own device or a borrowed (or rented) device—everything should continue to work the same way regardless of how you access it.
- **Online storage:** The documents you create and media you consume via the Cloud need not chew up storage space on your devices; online storage is effectively unlimited. You should, however, take claims that the provider handles all the backups for you with a grain of salt—see Backing Up Stuff from the Cloud.

I won't attempt the Sisyphean task of cataloguing every cloud app out there. But I do want to provide a rich set of examples to illustrate the types of cloud apps currently available and some of the ways in which they compare, and to make some casual recommendations for each of several major types of cloud apps. I've divided the discussion into two broad categories: Productivity Apps and Entertainment from the Cloud.

# Productivity Apps

Let's start with productivity apps—cloud-based tools for accomplishing day-to-day business tasks. Most of these examples use a Web browser for an interface, at least on Macs and PCs; in many cases, you can (and indeed must) download dedicated apps for mobile devices.

## Office Suites

For the big three office tasks—word processing, spreadsheets, and presentations—there are many options. The following are all free in



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# Other Cloud Services

Cloud Storage, Cloud Syncing, Cloud Backups, and Cloud Apps (broadly defined) constitute the major categories of cloud services most consumers will care about. But just to broaden your horizons a bit, I want to mention a few other wispy fringes of the Cloud that even you, as an ordinary non-geeky individual, might find interesting.

## Virtual Private Servers

Way back when, I signed up with a Web hosting service, and my personal Web site sat on a server with dozens of others. At a certain point, I decided I wanted more control, so I moved my site onto a Mac in my home office. But that didn't have enough bandwidth or a reliable Internet connection, so I bought an Xserve (remember those?) and rented space, power, and bandwidth for it in a rack at a data center (that's called *colocation*, in the lingo). After a few years, the Xserve started acting up, and I decided I had better things to do with my time than babysit my own server hardware. But I still wanted more control and flexibility than I could get with shared Web hosting. So I signed up for a *virtual private server* (VPS) account at a company called Linode.

As I explained in What's with the Weird Cloud-related Acronyms like SaaS, PaaS, and IaaS?, a virtual private server is an example of IaaS, infrastructure as a service. I'm renting a virtual machine running Linux. That virtual machine, in turn, is running on a cluster of servers that also hosts numerous other such virtual hosts. I can do *anything* with my virtual machine, including turning it on or off as I please, installing a completely different operating system, putting whatever software I like on it, and fiddling with every last setting—exactly as if it were a physical PC running Linux.

But unlike physical PCs, my virtual server is scalable, up or down, at the click of a button. If I decide I need more (or less) RAM, disk space, processing power, or bandwidth, I simply log in to my account, change



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the settings, agree to pay a different monthly fee, and wait a few minutes for the changes to take effect. If the physical server on which my VPS is running were to develop hardware problems, I'd probably never even notice, because another server could take over almost seamlessly. And for all this, I pay a fraction of what it would cost to buy and colocate my own physical server.

Virtual private servers aren't for everyone. They do require at least *a little* technical know-how, since you as the operator are responsible for everything, including installing the operating system. But as far as I'm concerned, this is on the low end of the geek scale—it doesn't require any programming skills, for example. I know several other people who use a VPS for their domains, including Web, database, and email hosting among other tasks.

Besides Linode, other examples of VPS providers include Amazon Elastic Compute Cloud (EC2), DigitalOcean, Google Compute Engine, Media Temple, Microsoft Azure, and Rackspace.

## Computing Engines

Suppose you don't want or need to run an entire server (virtual or otherwise) but you *do* know a bit about programming—or want to learn—and you aspire to make some sort of cloud service available to other people. How might you do that?

The increasingly popular answer is to use a cloud computing engine—this is an example of PaaS, or platform as a service. A computing engine, like a VPS, is easily scalable to meet your needs. But it doesn't require that you install or even be aware of low-level things like operating systems and apps. You simply write software and it runs in the Cloud—no compiling, building, or other tedious steps required.

Three of the largest and best-known computing engines come from Amazon (AWS Elastic Beanstalk), Google (Google App Engine), and Microsoft (Microsoft Azure). Although the details vary by provider, they all support such common programming languages as Java, PHP,



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# Privacy and Security in the Cloud

One of the questions I hear most frequently about using cloud services and storage is "What about security?" Is the Cloud…*safe*?

The simplest answer would be no, the Cloud isn't safe. But the reality is considerably more nuanced.

For starters, let's be clear about what we mean by "security." *Security* is freedom from danger or harm. What harm could come to you when using the Cloud? Well, apart from all the usual risks of using any computer network (such as intruders trying to gain unauthorized access to your equipment, exposure to viruses and other malware, and accidental data loss), the biggest danger of the Cloud is that someone could see private information about you—the contents of files you store online, your schedule, your current location—and use that information to harm you. Harm could mean taking your money, stealing your identity, or damaging your reputation, among other things.

In other words, when it comes to the Cloud, the main reason for security is to protect your privacy, where *privacy* is freedom from observation or attention.

You can have privacy without security (think: a changing room at a department store), and you can have security without privacy (imagine locking yourself in a glass cage). But in general—especially online—actions that increase your security also increase your privacy. In the Cloud, security and privacy are two sides of the same coin.

This chapter starts by exploring the threats to your privacy—who might want to obtain your private data and why, how privacy policies work, and more. Then, in Security in the Cloud, I turn to the security portion of the equation, which mainly has to do with encrypting data in various ways to prevent other people from accessing it.



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# Privacy in the Cloud

I want to begin by discussing some of the threats to your privacy when using cloud-based services (especially those accessed in a Web browser), what you can do about them, and how you should think about the Cloud in terms of privacy. (Portions of this topic were taken from my book *Take Control of Your Online Privacy*, which covers online privacy in much greater breadth and detail.)

## Who Wants Your Private Data and Why

When you use cloud services, lots of information you may want to keep private—from email to files to your media viewing preferences—travels over the Internet. That in itself isn't a problem; after all, you *want* to share private information with your family, friends, doctor, and so on. Problems can occur when someone accesses personally identifiable information without your consent or even, in some cases, your knowledge.

Who exactly might be trying to learn private information about you online? I'm glad you asked; in the next few pages I explain who wants to know about you and, crucially, *why*. Knowing who you're trying to keep your private data private *from* is a useful first step.

### Advertisers

The Web is powered by advertising as much as it's powered by servers and routers. Many Web sites devote far more space and resources to ads than to their actual content. As you know, it's difficult to read the news, watch a video, check your email, or even peruse pictures of cute cats without being bombarded by ads.

Web sites sell advertising space because that's the only way most of them can make any money. However irritating, or even slimy, you may consider online advertising, it is the mechanism that has kept most Web sites and other Internet services free.

The companies that purchase advertising want to get their money's worth, and that happens only if the ads result in sales. So advertisers



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# The Cloud and Mobile Devices

Mobile devices—by which I mean smartphones, tablets, and similar compact, Internet-connected gadgets—are largely responsible for the Cloud's popularity. The device in your pocket may not have enough storage or processing power to perform all your essential computing tasks itself, but the vast array of computers in the Cloud do. As long as you have an Internet connection of some sort, the Cloud lets you stream, edit, and create data of all kinds while on the go. And because the Cloud offers numerous ways to sync data across your devices, you need never be without your crucial information.

In this brief chapter, I look at what makes mobile devices different from conventional computers when it comes to the Cloud—including both the benefits and the limitations of mobile cloud computing.

## Mobile Cloud Differences

The Cloud is the Cloud, regardless of how you access it. But when you do so with a mobile device, a few important elements are different:

- **Cellular connectivity:** Smartphones and many tablets can use cellular data networks to stay connected to the Cloud even when Wi-Fi is unavailable. Because cellular networks have such broad coverage, users can stay connected nearly all the time. Reliable Internet connections like this are great for syncing small chunks of data through the Cloud—it usually happens almost instantly.

  On the downside, the average cellular connection is slower than the average Wi-Fi connection (although this is changing; some LTE networks provide more bandwidth than residential DSL and cable providers in the same area). And data caps—the amount of data your carrier lets you transfer in a given month before incurring an



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extra fee or other penalties—are typically much lower with cellular data plans than with home broadband service. For these reasons, some devices and apps restrict data-hungry cloud-based activities to Wi-Fi networks.

**Tip:** Most cellular providers impose monthly data caps, or restrict data speed after a certain threshold. If yours does, take a look through your mobile device's settings to see which apps and services permit you to restrict data usage to Wi-Fi connections. But don't go overboard, because you'll still want instant updates of data like email, contacts, and calendars—even over a cellular connection.

- **Mobile browsers and plug-ins:** Despite considerable progress in recent years, mobile browsers can't do everything that desktop browsers can. To cite a well-worn example, Web browsers on Apple's iOS devices can't use Flash-based Web sites. Although these are thankfully becoming fewer and farther between, that limitation means some cloud activities you might otherwise perform on your mobile device have to wait until you're in front of a conventional computer—or, at best, require complicated workarounds.
- **Mobile apps:** For many activities, a service-specific app with direct connectivity to the Cloud yields a better experience than a Web page—and, in some cases, it may be your only option due to browser limitations. Fortunately, major cloud media services (such as Hulu Plus, Netflix, and HBO Go) have apps for the most popular mobile platforms. The same is true in most other cloud service categories.

Those aren't the only differences mobile users experience with the Cloud, though. The story about storage, security, privacy, and backup also changes, as I explain next.

## Local vs. Cloud Data Storage

Suppose a cloud storage provider offers you 50 GB of space in the Cloud. If you're accustomed to using a computer with 4 TB of disk



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# The Personal Cloud

If you need the benefits of cloud sync, storage, and collaboration, but want better control over security and privacy, you can set up your own *personal cloud*, which means you own and control the hardware and software that provides the services. This lets you set your own privacy policy, storage quotas, and service settings—and you can make your system as secure as you like.

Although a personal cloud can solve many problems, it comes with a couple of gotchas:

- **Time, money, and effort:** I said earlier that what cloud computing means to me is that it's *somebody else's problem*. You don't have to buy hardware, install or update software, maintain equipment, and so on. Somebody else takes care of all that. But in a personal cloud, all that stuff is back on you. Even in cases where the setup itself is simple enough for a child, you'll be responsible for troubleshooting, which may require technical skill.
- **Flexibility:** If you want to use a personal cloud for file syncing and sharing, backups, or syncing contacts and calendars, you can choose from numerous convenient solutions. But if you're looking to replace cloud apps, your choices are limited. Although it's possible to find cloud apps for things like image editing, spreadsheets, project management, and video chat that you can install on your own equipment and then access in a Web browser, those sorts of things require a nontrivial amount of time, effort, and technical skill to set up and maintain. Allowing all that to be someone else's problem is, after all, part of the appeal of using publicly available cloud services!

Depending on how you approach your personal cloud, you may encounter other barriers too, as I discuss ahead. I say all this not to discourage you from creating a personal cloud, but to set your expectations properly. You're gaining control and privacy but giving up the simplicity of paying someone else to figure everything out.



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Like the rest of this book, this chapter omits step-by-step instructions. There isn't just one way to set up a personal cloud; the options are unlimited. You'll have to decide which capabilities you need, which hardware and software you prefer, what trade-offs you're willing to make, and what cost you can bear—and the biggest consideration of all will be your level of technical expertise. If it's high, you'll have more options available; if it's low, you'll want to gravitate toward simpler, more consumer-friendly products that lack fancier features.

Instead, the remainder of this chapter looks at the major questions you'll have to think through when designing your personal cloud: What services do you want to provide? What sort of hardware and software will you use? And where will you put the equipment? In some cases, the obvious answer turns out to be more complicated than you might imagine.

## Personal Cloud Basics

Every service in the public cloud is provided by a server of some kind—in most cases, a distributed cluster of virtual servers. But whatever the server's specific form, it has to reside on a device somewhere running server software of some sort and be connected to the Internet. So if you're going to create a personal cloud, then by definition, you have to set up one or more servers of your own.

However, a server doesn't have to be a stand-alone computer. It could be software running on a computer you already own. It could be a tiny appliance that you plug in to your home network (or someone else's network) and configure in a browser window. It could even be a virtual private server you rent monthly. Just ahead I explore these options in more detail.

## Choosing Personal Cloud Services

In this book I've talked about lots of different cloud services. If you want to take just one or two of them—say, file storage and sharing—



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# Choosing Cloud Providers

I've mentioned many cloud providers in this book, and in the preceding chapters I've offered brief recommendations for each type of service (cloud storage, syncing, backup, and so on). However, I now want to step back and help you ponder some broader considerations, such as these:

- How many different cloud services do I need, and how can I combat cloud overload?
- Are there cases in which a non-cloud solution makes more sense?
- How do I evaluate different providers when the range of services each offers is different, and they overlap in confusing ways?
- How can I keep up with changing prices, features, and service providers?
- How can I cope with the relentless shift toward subscription models?

In many cases, the question is less "Which provider should I use?" and more "Which provider(s) can I do without?"

I'll begin by addressing cloud storage, sync, and backup services (which often overlap), and then I'll move on to other areas.

**Note:** Portions of this chapter were adapted from my book *Are Your Bits Flipped?*, which is about overcoming common tech misperceptions.

## Storage, Sync, and Backup Services

For a number of years, I signed up for every new cloud storage, sync, and backup service that came along—I had accounts with Dropbox, Amazon Drive, Box, Google Drive, iCloud Drive, OneDrive, and Sugar-



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Sync (among others). I also had a personal cloud storage appliance (the now-discontinued Transporter), a personal cloud storage server (OwnCloud), and a desktop app for directly syncing folders across my devices (Resilio Sync). On top of that, I had multiple online backups (Backblaze, CrashPlan, DollyDrive, SpiderOak ONE) and several ways to sync notes across devices and with the Cloud (Evernote, iCloud Notes, OneNote).

One day it hit me: I'd become a cloud storage junkie. I needed help.

I was spending lots of money on cloud services and lots of time trying to manage them, but not using any of them fully. I could never figure out which service to use for what, and I found all those syncing folders and semi-overlapping services more of a burden than a benefit.

There was yet another complication: figuring out where a file was physically located. Depending on the service, version, and platform, what a given device shows me might be simply a list of files in the Cloud, or it might be local copies of those files. I was left wondering what would happen if I lost Internet access on a particular device—would I still be able to see my files there? Or, what if I wanted to delete files from a device to save space—would they still be in the Cloud and on my other devices?

I eventually found my own solution to these problems. Yours may be different, of course, but I'll walk you through the process I followed.

## Factors to Consider

As I explained in a Daily Mac View article, The Task-Based Approach to Tech Purchase Decisions, I generally follow what some of my fellow tech geeks consider to be a heretical practice: I don't buy new things just because they're shiny and cool and everyone else is getting them. I buy products in order to solve specific problems or address existing needs. If I don't have a problem that the new iDoohickey SE will solve, I'm not going to plop down my credit card. It's that simple.

It's a bit different with cloud storage and services, in that you can nearly always sign up and try them for free—and only later (after a trial period ends or you've exhausted the free storage allotment) are you



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# The Cloud and the Internet of Things

Back in 1982, some smart aleck at Carnegie Mellon University thought it would be fun to modify a Coke machine by giving it a network interface. That way, anyone on campus could remotely check in on the machine's stock of their preferred beverage (and even how cold it was). When I first heard about this, long ago, I thought it was a brilliant but silly hack—fun, sure, but ultimately pointless.

In the years since, however, people have figured out how to connect almost any conceivable object to the Internet. Using tiny, low-cost controllers (usually with embedded Wi-Fi transceivers, but sometimes with Bluetooth or other wireless circuitry), engineers have added Internet connectivity to light bulbs, thermostats, door locks, cameras, refrigerators, bathroom scales, speakers, water bottles, and thousands of other devices. In some cases, as with the Coke machine, the device merely reports on its status over the Internet; in others, sophisticated two-way communication and control is possible. Some of these objects have no built-in user interface, while others use screens, buttons, microphones, and other controls to interact directly with users.

All these devices—Internet-connected objects of all kinds that don't fall into conventional categories such as computers, tablets, and phones—are collectively called The Internet of Things, or IoT. (You'll frequently hear the individual devices referred to as *smart* objects.) With rare exceptions, they connect—directly or indirectly—to the Cloud and rely on cloud apps and services to function. So I thought it was important to spend at least a few pages talking about these objects and what their connection to the Cloud might mean to you.

**Tip:** To learn more about the Internet of Things, see the Wikipedia article Internet of things.



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## The Good News

Among the key capabilities the IoT promises are *knowledge* and *control*. For example, you no longer have to wonder, while you're at work, whether you left the door unlocked or the air conditioner on; you can *know*. And if that object at home is in the wrong state, you can change it remotely, no matter where you are. You don't have to record your weight every morning, just step on your scale and the data is stored automatically in a cloud-accessible app. If you're cold in the middle of the night, don't get out of bed, just talk to a smart speaker on your shelf, which in turn tells your thermostat to raise the heat. And a device in your pocket or on your wrist can tell you about the state of nearly any object in your home or car, and enable you to control it too.

IoT devices can also make the activities you already do simpler and quicker. If you want to remember to perform a task, you could open a reminders app on your phone and type it in. Or you could do what I do, which is to raise my left wrist and say, "Hey Siri, add 'Trim the hedges' to my To Do list." It's already easy to turn off the lights in one room by flipping a switch, but with IoT devices, you can turn off all the lights in the house as you climb into bed. Lost your keys, wallet, or phone? Instead of turning the house upside down, you can track their location or have them emit an audible signal by using an app on another device. Running low on laundry detergent? No need to sign in to Amazon on your computer; all you need is a single press on the Amazon Dash button stuck to your washing machine, and a new container magically arrives tomorrow.

All this, of course, is the barest beginning. If you embrace the idea of a connected future in which we're all immersed in a sea of smart objects that instantly tell us whatever we want to know and reduce once-complicated tasks to a casual gesture or command, you surely greet the Internet of Things with optimism and enthusiasm—all signs are that we're heading to the future of your dreams. Except…



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# Automation and the Cloud

If you want to truly take control of the Cloud, you'll want to do more than sign up for a bunch of individual services and use them independently. You'll want them to work together, often in ways that require no manual interaction. And there are some excellent ways to make that happen.

Entire books have been written about automation. (In fact, I wrote one myself: *Take Control of Automating Your Mac*!) In this short chapter, I can't offer any of the nuts-and-bolts details, but I do introduce you briefly to the two most common and popular tools for automating cloud services: IFTTT (for If This, Then That) and Zapier.

It will come as no surprise, I'm sure, that IFTTT and Zapier are, themselves, both cloud services! Although their features differ somewhat, their underlying purpose is roughly the same: to serve as the glue that connects other cloud apps and services. Each service looks for a user-specified condition in one cloud service and then takes action involving one or more other cloud services. For example:

- Each time a new graphic appears in your Twitter feed, save it to a specified Dropbox folder.
- Create a new card in Trello whenever a message is starred in Gmail.
- Send yourself an SMS message whenever you're tagged in a Facebook post.
- Automatically add release notes from your favorite iOS apps to a Google spreadsheet.

And, because your home automation gadgets and other smart devices connect to the Cloud too, they can often serve as either triggers for, or recipients of, the automated actions you set up.



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# IFTTT

IFTTT is a free service that's extremely easy to use, and geared primarily toward consumers. It starts with several hundred services, which include most major cloud services and apps, social media and blogging platforms, home automation products, generic tools like email and SMS, and much more. You specify which of the available services you want to use and, where appropriate, fill in your credentials or other account details. Each service offers one or more conditions or actions that you can then use to build simple automations that IFTTT calls *applets*.

You can set up and create IFTTT applets either on the Web or in a mobile app. In its most basic form, an applet involves filling in just two blanks: "If ____, then ____." That is, the applet checks for a condition somewhere in the Cloud, and if that condition is met, it takes a single action. (IFTTT provides many prebuilt actions; you can also build your own from scratch, use actions other people have created, or edit an existing applet to meet your needs.) Here are a few examples of prebuilt actions:

- Back up your new Facebook photos to Google Drive.
- Post to Trello when a specific tag is added to an Evernote note.
- Whenever you add a new iOS contact, mark it in your Google Calendar.
- Turn on your lights automatically as you arrive home.
- Automatically post a reminder to a Slack channel 15 minutes before a calendar event starts.
- Receive a mobile notification when your Whirlpool Dryer cycle finishes.

As you see, applets are customizable to include things like time, date, and location, among other attributes.



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# Take Control of the Cloud Webinar

The final chapter in this book isn't a chapter at all, but rather a webinar! Because I've seen so much confusion and frustration about cloud topics, I wanted to offer a forum in which I could answer questions, give interactive explanations, and offer advice and illustrations that go beyond the text of this book. So I developed a one-hour webinar to provide that opportunity.

I presented the webinar live on July 6 and 8, 2017; both times, I took questions in advance and also answered questions that audience members asked during the webinar. The sessions were recorded, so you can watch them at your leisure on YouTube (see links ahead).

Some of the topics I cover in each one are:

- Quick overview of the Cloud
- What's the story on cloud storage, sync, sharing, and backup?
- When I use a cloud service, where's my stuff?
- Is the Cloud safe?
- How should I think about cloud ecosystems?
- Which cloud services should I use?
- When should I *not* use the Cloud (and what should I do instead)?

Because there's so much overlap between the two, I suggest picking one or the other; and if you want to hear the questions and answers in the second webinar, skip ahead to the final 20 minutes or so.



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# About the Author

Joe Kissell is the author of more than 60 books about technology, including *Take Control of Your Online Privacy* and *Take Control of Dropbox*. He is a contributing editor to TidBITS, a senior contributor to Macworld, and a popular speaker at conferences and other events.

When not writing or speaking, Joe likes to travel, walk, cook, eat, and practice t'ai chi. He lives in San Diego with his wife, Morgen Jahnke; their sons, Soren and Devin; and their cat, Zora. To contact Joe about this book, send him email and *please* include `Take Control of the Cloud` in the subject.

## Shameless Plug

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alt concepts inc., publisher of Take Control Books, is operated by Joe Kissell and Morgen Jahnke, who acquired the ebook series from TidBITS Publishing Inc.'s owners, Adam and Tonya Engst, in May 2017. Joe brings his decades of experience as author of more than 60 books on tech topics (including many popular Take Control titles) to his role as Publisher. Morgen's professional background is in develop-



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ment work for nonprofit organizations, and she employs those skills as Director of Marketing and Publicity. Joe and Morgen live in San Diego with their two children and their cat.

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