

# FILE-HOSTING SERVICE COMPARISON: FASTER SYNCING WITH DROPBOX FOR BUSINESS

## SUMMARY

Productive employees are what your business needs to succeed. Your employees need great tools, such as a fast file-hosting service, to work with coworkers and clients as smoothly and efficiently as possible.

A fast file-hosting service can provide a positive user experience. When you're waiting for a file to sync, or to receive a file from a co-worker, patience can quickly turn into frustration. After all, there are only so many hours before the next deadline.

In test environments in San Francisco, Dublin, and Tokyo, we performed a series of tasks using four file-hosting services:

- Dropbox® for Business
- Google Drive™
- Box®
- Microsoft® OneDrive® for Business

All of these services offer a local desktop sync app that you can install on your device and use to host your files. We used these apps on an HP ProBook 430 running Windows® 7. We found that, across the board, performing tasks with Dropbox for Business was quicker than with the other three services. For more information about the devices on which we tested, see [Appendix A](#). For details on how we tested, see [Appendix B](#). For detailed results from our testing, see [Appendix C](#).



# WHAT WE FOUND

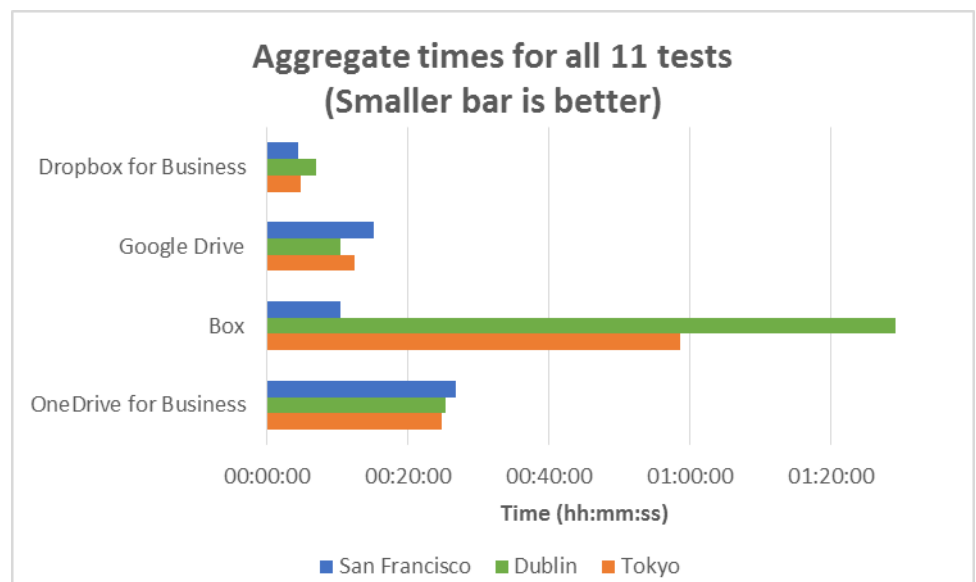
## Faster overall

For each location, we totaled the times for each service to complete all of our 11 tests. Our tasks:

1. Uploading a large file (25 MB)
2. Downloading a large file (25 MB)
3. Uploading a large file (250 MB) with a 30-second interruption
4. Editing a large file (25 MB)
5. Performing an end-to-end sync (25 MB)
6. Uploading a batch of files (100 MB, approximately 400 files split into 40 directories)
7. Uploading a small file (50 KB)
8. Downloading a small file (50 KB)
9. Editing a random file (50 KB)
10. Performing an end-to-end sync (50 KB)
11. Uploading a real file corpus (100 MB, approximately 98 files split into 15 directories)

Dropbox for Business took up to 6 minutes and 57 seconds to complete all 11 tasks; the competition took up to an hour and 29 minutes. Figure 1 shows the aggregate results separated by testing location. Dropbox for Business beat the competition in each location.

**Figure 1: On the Windows 7 PCs, Dropbox for Business took less time overall to complete 11 sync tasks than the competition.**



In our testing, we used files ranging in size from 50KB to 250MB. Figure 2 shows the total time for each file-hosting service to complete our tests using a file 25MB or larger. Dropbox for Business took up to 5 minutes and 44 seconds to complete the large-file tasks; the competition took up to an hour and 22 minutes. Dropbox for Business, again, beat the competition in each location.

**Figure 2: On the Windows 7 PCs, Dropbox for Business was faster completing the large-file tasks than the competition.**

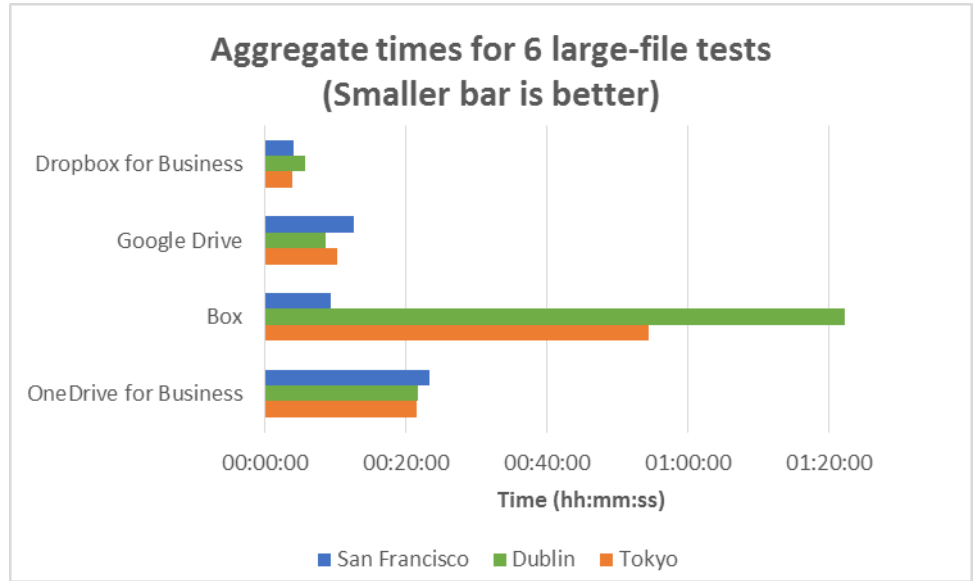
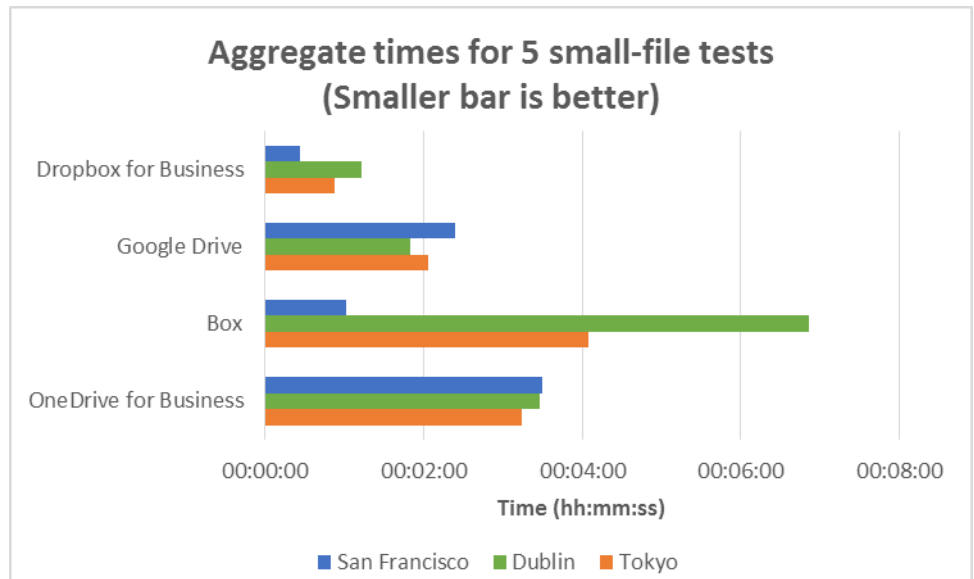


Figure 3 shows the total time for each file-hosting service to complete our tests using a file 50KB or smaller. Dropbox for Business took up to 52 seconds to complete the small-file tasks; the competition took up to 6 minutes and 51 seconds. Dropbox for Business beat the competition in each location.

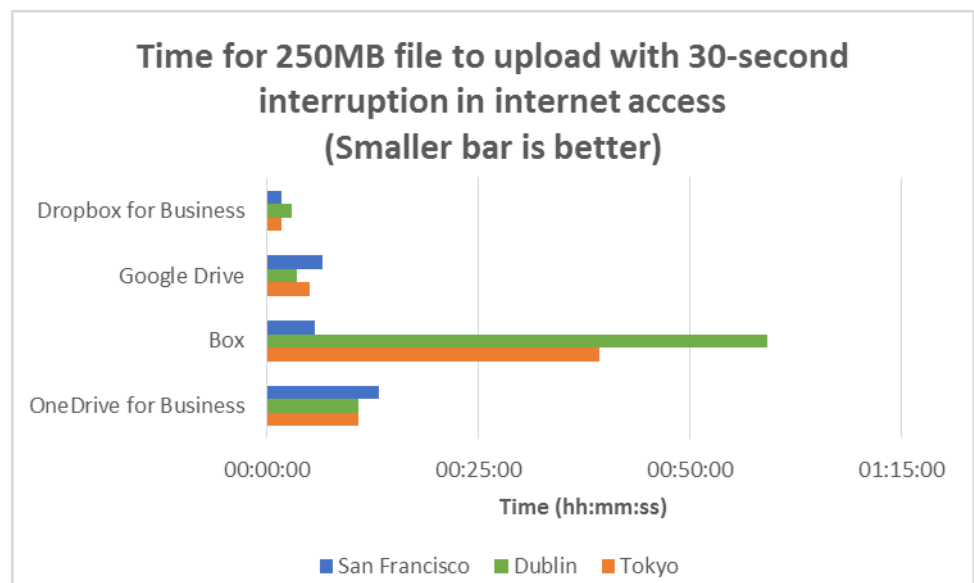
**Figure 3: On the Windows 7 PCs, Dropbox for Business was faster completing the small-file tasks than the competition.**



## Faster syncing with an interruption in Internet access

With a flexible work environment, whether you're on an airplane, at home, or on the road, you can't always expect your Internet connection to be consistent. There are also times when you can't wait for a file to finish syncing before you have to head to your next meeting. One of the 11 individual tasks we tested above was to simulate this situation. To test how the file-hosting services behaved when an upload was interrupted, we pasted a rather large 250MB file to the local sync folder and disconnected the Windows 7 PC from the network to create a 30-second interruption in the middle of the sync. Timing how long it took to upload the file showed how well the file sync recovered with this interruption. Figure 4 shows results for each file-hosting service in each location. Dropbox for Business beat the competition in each location, taking up to 3 minutes to complete the task. The competition needed up to 59 minutes.

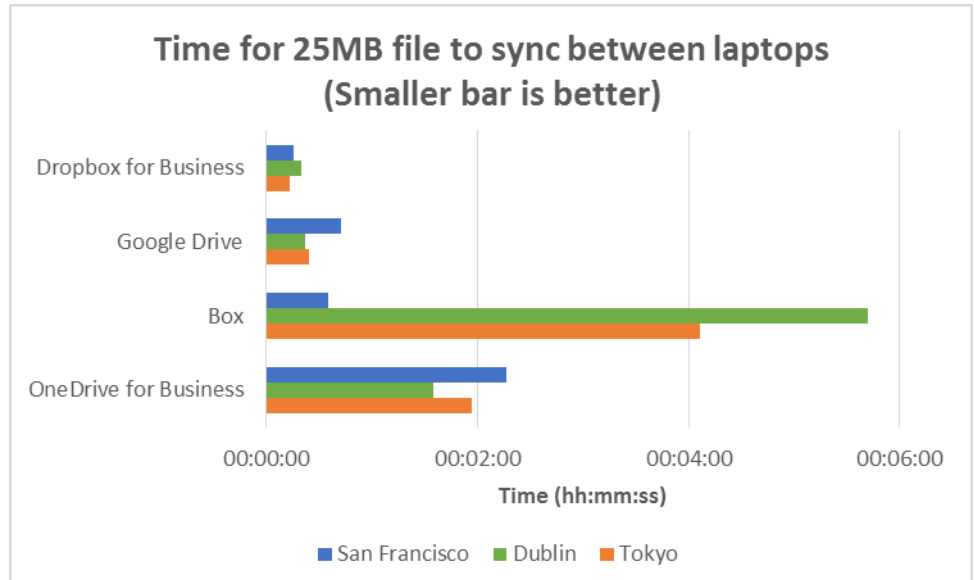
Figure 4: On the Windows 7 PC, Dropbox for Business uploaded a 250MB file with a 30-second interruption faster than the competition did.



## Faster end-to-end syncing between two laptops

Another common use case, and one of our 11 individual tasks, was to test the end-to-end synchronization of a file from one device to another. Frequently, teams sync files between offices and team members, and individuals sync files from their work computer to their home computers. We timed an end-to-end synchronization by copying a 25MB file to the desktop sync folder on the Windows 7 laptop and measuring the time it took to sync to a MacBook Air®. Figure 5 shows results for each file-hosting service in each location. Dropbox for Business beat the competition in each location, taking up to 19 seconds to complete the task. The competition needed up to 5 minutes and 41 seconds.

Figure 5: Dropbox for Business was faster than the competition when syncing a 25MB file from a Windows 7 PC to a MacBook Air.



## CONCLUSION

Providing your employees with a private file-hosting service to store important files can be a great decision that can promote productivity through collaboration—and choosing a fast service can mean the difference between good experiences and frustrating ones. Overall, on a Windows 7 laptop, we found that Dropbox for Business offered a faster experience compared to Google Drive, Box, and OneDrive for Business.

## APPENDIX A – SYSTEM CONFIGURATION INFORMATION

Figure 6 provides detailed configuration information for the test systems.

System	HP ProBook 430	Apple® MacBook Air
Screen size (inches)	13.3	13.3
Display resolution	1,366 × 768	1,440 × 900
PPI	118	127.68
Dimensions – length × width × height (inches)	12-7/8 × 9-1/4 × 3/4	12-3/4 × 9 × 1/2
Weight (lbs.)	3.40	2.90
CPU	Intel® Core™ i3-4010U 1.7 GHz	Intel Core i5-4260U 1.4 GHz
Storage	Samsung® 128GB SSD	Apple 256 GB SSD
OS	Windows 7 Professional SP1	Apple OS X® 10.9.4

Figure 6: System configuration information for the test systems.

## APPENDIX B – HOW WE TESTED

We used four identical models of an HP ProBook 430 running Windows 7 and installed one file-hosting service on each. We performed each test on all devices sequentially at approximately the same time of day in San Francisco, Dublin, and Tokyo, using a 100Mbit+ downstream connection. To avoid possible bandwidth conflicts among applications, only the device under test was powered on. For each file-hosting service, we stopped the stopwatch when the following indications occurred:

- Dropbox: The blue arrows became a green checkbox.
- Google Drive: The icon stopped blinking.
- OneDrive for Business: The animated bar below the cloud disappeared.
- Box: The orange arrows became a blue checkbox.

The indicators were the same for upload, download, and synchronizing actions.

### Setting up the test

1. Create a very large random test file (250MB), a large random test file (25MB), and a small random test file (50KB) using the `make_rnd_file.sh` bash shell script:

```
#!/bin/bash

# create a file (named arg 1) of size (arg 2) n KBytes filled with random data

# djs, 21 july 2014

# usage  make_rnd_file.sh file.txt 10

if [ $# -ne 2 ] ; then
    echo "usage: $0 file.txt size_in_kb"
    exit 1
fi

file=$1
size=$2

echo "Creating file $file of size $size kB"

dd if=/dev/urandom of="$file" count="$size" bs=1024

# check for error?

ls -lh "$file"
echo Done
```

2. Create several 100MB random test directories made up of 400 files split across 40 folders using the `make_mess_of_files.sh` bash shell script:

```
#!/bin/sh

do_sample () {
```

```

local sample=$1
local file=a
local d="directory_1G_$(printf "%02s" $sample)"

echo "$sample: Working on Sample $sample"
mkdir $d
echo "$sample: Creating 100MB of random data"
dd if=/dev/urandom of="$d/$file" bs=1M count=100 > /dev/null 2>&1
echo " $sample: Splitting file in 40 parts"
(cd "$d" ; split -a 5 -n 40 "$file" x)
echo " $sample: Deleting temporary file"
rm -f "$d/$file"
echo " $sample: Splitting each sub-file into 10 parts in their own
directory"
(cd "$d" ; for i in x* ; do mkdir d$i; cd d$i; split -n 10 ../$i $i ; cd
.. ; rm -f $i; done)
echo " $sample: Done with this sample"

}

for s in $(seq 12) ; do
do_sample $s
done
wait
echo "Done"

```

3. Create several 100MB test directories made up of 98 “real files” of varying types (Word Docs, Excel® Docs, PowerPoint® Docs, MP3s, PNG images, GIF images, and PDFs) split across 15 folders.
4. To perform the file edit tests, install Python 2.7.8 from [www.python.org/download/](http://www.python.org/download/) on each laptop and run the update\_files.py python script on each file:

```

import os
import sys

def insert(filename, str, frac):
    lenStr = len(str)
    if lenStr < 1:
        # nothing to insert
        return

    f = open(filename, 'r+b')
    sizeFile = os.path.getsize(filename)
    pos = int(sizeFile * frac)
    if pos < 0:
        pos = 0
    elif pos >= sizeFile:
        pos = sizeFile-1

    if lenStr > sizeFile:
        print "Error: file too small for the data to be written"

```



```

        return

    if pos + lenStr > sizeFile:
        str = str[:sizeFile-lenStr]
        lenStr = len(str)

    f.seek(pos)
    f.write(str)
    f.close

fileName = sys.argv[1]

```

5. Install the Google Chrome™ web browser on each laptop.
6. At [www.dropbox.com](http://www.dropbox.com), create a Dropbox for Business account.
7. At [drive.google.com](http://drive.google.com), create a Google Drive account.
8. At [onedrive.live.com/about/en-us/](http://onedrive.live.com/about/en-us/), create a OneDrive for Business account.
9. At [www.box.com/](http://www.box.com/), create a Box account.
10. Place the 100MB random test directory, large random test files, and small random test files in the documents folder on each laptop.
11. Connect a PC laptop with access to each storage account to the network through a wired connection with a downlink of at least 100 Mb/s.
12. For the end-to-end syncing task, connect a Mac laptop with access to each storage account to the network through a wired connection with a downlink of at least 100 Mb/s.

## Running the large file tests

### Uploading and downloading a large random test file (25 MB)

1. Navigate to the Documents folder, and prepare the stopwatch.
2. Right-click the large random test file, and click Copy.
3. Navigate to the desktop sync folder for the storage solution under test.
4. Right-click the desktop sync folder for the storage solution under test, and simultaneously click Paste and start the stopwatch.
5. When the file has completely uploaded, stop the stopwatch.
6. Record this result as the large random test file upload.
7. Delete the file on the storage solution under test and wait for the files to completely sync.
8. Open a browser, and navigate to the web interface of the storage solution under test.
9. Prepare the stopwatch.
10. Click a different large random test file, drag it over the web interface storage folder, and drop the file.
11. When the file has completely uploaded, start the stopwatch.
12. Navigate to the desktop sync folder for the storage solution under test.
13. Stop the stopwatch when the file has finished synchronizing to the laptop under test.
14. Record this result as the large random test file download.

### Uploading a 100MB random test directory upload

1. Reboot the system and wait 5 minutes.
2. Open the desktop sync folder for the storage solution under test, and prepare the stopwatch.
3. Navigate to the Documents folder on the laptop.
4. Select the 100MB random test directory.
5. Simultaneously start the stopwatch and drag the 100MB random test directory onto the desktop sync folder for the storage solution under test.
6. When the directory has completely uploaded, stop the stopwatch.
7. Record this result as the 100MB random test directory upload.

### Uploading a large random test file (250 MB) with 30-second interruption

1. Navigate to the Documents folder, and prepare the stopwatch.
2. Right-click the large random test file, and click Copy.
3. Navigate to the desktop sync folder for the storage solution under test.
4. Right-click the desktop sync folder for the storage solution under test, and simultaneously click Paste and start the stopwatch.
5. After 30 seconds, disable the Internet connection by unplugging/disconnecting the Ethernet connection.
6. After another 30 seconds, plug in/reconnect the Ethernet connection.
7. When the file has completely uploaded, stop the stopwatch.
8. Record the result as the large random test file upload with 30-second interruption.

### Editing a large random test file (25 MB)

1. Navigate to the desktop sync folder for the storage solution under test, and prepare the stopwatch.
2. Open the large file from the storage solution sync window.
3. Run the Python script that will place 1KB of random data precisely in the middle of the file.
4. Click Save document and simultaneously start the stopwatch.
5. When the file has completely synchronized, stop the stopwatch.
6. Record the results as the large random test file edit.

### Performing end-to-end synchronization for a large random test file (25 MB)

1. Prepare another desktop on the network by opening the desktop app of the storage solution under test.
2. On the system under test, navigate to the Documents folder and prepare the stopwatch.
3. Right-click the large random test file, and click Copy.
4. Navigate to the desktop sync folder for the storage solution under test.
5. Right-click the desktop sync folder for the storage solution under test, and simultaneously click Paste and start the stopwatch.
6. Switch to the desktop that was set up in step 1.
7. When the large random test file has completely synchronized and shows up as synchronized on the remote desktop in the sync folder, stop the stopwatch.
8. Record the result as the large random test file end-to-end synchronization.

## Running the small file tests

### Uploading and downloading a small random test file (50 KB)

1. Navigate to the Documents folder, and prepare the stopwatch.
2. Right-click the small random test file, and click Copy.
3. Navigate to the desktop sync folder for the storage solution under test.
4. Right-click the desktop sync folder for the storage solution under test, and simultaneously click Paste and start the stopwatch.
5. When the file has completely uploaded, stop the stopwatch.
6. Record the result as the small random test file upload.
7. Open a browser, and navigate to the web interface of the storage solution under test.
8. Prepare the stopwatch.
9. Click a different small random test file, drag it over the web interface storage folder, and drop the file.
10. When the file has completely uploaded, start the stopwatch.
11. Navigate to the desktop sync folder for the storage solution under test.
12. Stop the stopwatch when the file has finished synchronizing to the laptop under test.
13. Record this result as the small random test file download.

### Editing a small random test file (50 KB)

1. Navigate to the desktop sync folder for the storage solution under test, and prepare the stopwatch.
2. Open the small file from the storage solution sync window.
3. Run the Python script that will place 1 KB of random data precisely in the middle of the file.
4. Click Save document and simultaneously start the stopwatch.
5. When the file has completely synchronized, stop the stopwatch.
6. Record the result as the small random test file edit.

### Performing end-to-end synchronization for a small random test file (50 KB)

1. Prepare another desktop on the same local network by opening the desktop app of the storage solution under test.
2. On the system under test, navigate to the Documents folder, and prepare the stopwatch.
3. Right-click the small random test file, and click Copy.
4. Navigate to the desktop sync folder for the storage solution under test.
5. Right-click the desktop sync folder for the storage solution under test, and simultaneously click Paste and start the stopwatch.
6. Switch to the desktop that was set up in step 1.
7. When the small random test file has completely synchronized and shows up as synchronized on the remote desktop in the sync folder, stop the stopwatch.
8. Record the result as the small random test file end-to-end synchronization.

### Uploading real file corpus

1. Open the desktop sync folder for the storage solution under test, and prepare the stopwatch.
2. Navigate to the Documents folder on the laptop.

3. Select the 100MB Real File Corpus test directory made up of 98 files split across 15 folders.
4. Simultaneously start the stopwatch and drag the 100MB Real File Corpus test directory onto the desktop sync folder for the storage solution under test.
5. When the directory has completely uploaded, stop the stopwatch.
6. Record this result as the 100MB Real File Corpus test directory upload.

## Running the test: Additional steps

### Performing a Checksum

1. At the end of each of the various upload/download tests, download the real file corpus.
2. To make sure all the files are the same and intact, perform a batch-run of MD5 hash verifications against the original real file corpus using the tool Checksum Compare.
3. Record the results.

### Repeating the tests

1. Once you have completed all of the tasks above, reboot the systems and repeat the tasks two more times with a new set of randomly generated files.

## APPENDIX C – DETAILED RESULTS

Figure 7 presents our aggregated times for the 11 tasks we ran, for each file-hosting service, in each location.

	Dropbox for Business	Google Drive	Box	OneDrive for Business
<b>Aggregate total time</b>				
San Francisco	00:04:26.95	00:12:20.14	00:10:20.98	00:26:46.12
Dublin	00:06:57.09	00:10:21.35	01:29:07.10	00:25:14.54
Tokyo	00:04:48.70	00:15:01.36	00:58:35.40	00:24:46.57
<b>Aggregate large-file results (Six tests)</b>				
San Francisco	00:04:00.73	00:12:37.55	00:09:19.73	00:23:15.97
Dublin	00:05:44.17	00:08:31.11	01:22:15.78	00:21:47.10
Tokyo	00:03:56.15	00:10:16.47	00:54:30.30	00:21:32.67
<b>Aggregate small-file results (Five tests)</b>				
San Francisco	00:00:26.22	00:02:23.82	00:01:01.25	00:03:30.15
Dublin	00:01:12.92	00:01:50.24	00:06:51.32	00:03:27.44
Tokyo	00:00:52.55	00:02:03.67	00:04:05.10	00:03:13.89
<b>Sync with internet interruption</b>				
San Francisco	00:01:45.44	00:06:34.37	00:05:41.87	00:13:12.31
Dublin	00:03:00.32	00:03:29.83	00:59:09.00	00:10:48.85
Tokyo	00:01:41.16	00:05:00.42	00:39:20.00	00:10:49.86
<b>Syncing between devices</b>				
San Francisco	00:00:16.03	00:00:42.41	00:00:35.30	00:02:16.69
Dublin	00:00:19.87	00:00:22.52	00:05:41.73	00:01:35.20
Tokyo	00:00:13.31	00:00:24.73	00:04:06.64	00:01:56.88

Figure 7: Time in (hours:minutes:seconds.00) for each of the four file-hosting services.

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