Full-featured collaboration
with an Intel® processor-powered tablet*

Microsoft® Surface Pro® 3

Make and join Skype™ group video calls

Send multiple files at once in Skype

Manage your Lync® contacts

Start a Lync meeting

...and more!

*compared to the ARM®based Apple® iPad Air™and Samsung Galaxy Note® 10.1

Many companies are investing in tablets for their employees to use for collaboration. While Skype and Microsoft Lync, two popular collaboration tools, have versions for just about every device, the user experience on different tablets can vary dramatically in terms of features and quality of audio and video.

In the Principled Technologies labs, we looked at the features of three tablet devices and conducted a user survey of audio and video quality using Lync and Skype on each of the three devices: the Microsoft Surface Pro 3, the Apple iPad Air, and the Samsung Galaxy Note 10.1.

We found that compared to the other two tablets, the Surface Pro 3 offered greater functionality through a fuller set of features. It also delivered superior audio and video quality in Skype and offered superior video quality in Lync. These advantages make it attractive to companies who want their employees to have the highest quality collaboration experience.

COLLABORATION IS KEY

Workers today need to communicate and collaborate, both with each other and with customers. Many employees seek the flexibility and mobility of tablet devices for participating in meetings and performing other collaboration tasks.

Skype and Lync offer both enterprise- and consumer-level applications for audio, video, and text-based communication. Skype's ubiquity makes it convenient for client communication, while Lync's integrations with the Microsoft Office suite make it a better fit for presentations, meetings, and inter-office communication.

To learn more about how the three tablet devices support collaboration with Skype and Lync, we performed a thorough feature review and conducted a user survey. As we will elaborate in the following sections, the Surface Pro 3 outperformed the iPad Air and Galaxy Note 10.1, delivering full functionality, better audio and video for Skype, and better video for Lync.

For detailed configuration information for the devices we tested, see Appendix A. For details of our testing, see Appendix B.

DEVICES AND APPS WE COMPARED

Figure 1 shows the three devices we compared and the Lync and Skype apps available for each device. For the Microsoft Windows® platform, we tested both the touch-optimized Windows Store apps and the desktop versions of Lync and Skype. We compared the Intel processor-powered Surface Pro 3 to the ARM processor-based iPad Air and Samsung Galaxy Note 10.1 tablets.

Surface Pro 3	iPad Air	Galaxy Note 10.1
Intel Core™ i5-4300U processor	Apple A7 processor	Samsung Exynos® 5 Octa processor
Windows 8.1 Pro	iOS 7.1.1	Android 4.4.2
Skype for Modern Windows, Skype for Windows Desktop	Skype for iPad	Skype for Android
Lync Windows Store app, Lync 2013	Lync 2013 for iPad	Lync 2013

Figure 1. The devices and apps we compared.

MORE INDEPENDENCE WITH THE SURFACE PRO 3

When setting up Lync and Skype on the iPad and Galaxy Note, we found that many features and customization options were available on only the Windows Desktop apps. This made working with contacts more difficult on the iPad and Galaxy Note compared to our experience on the Surface Pro 3. Adding contacts to a Lync account on the iPad or Galaxy Note first requires installation of Lync on a Windows computer or may require help from an IT administrator, as these devices are unable to manage contacts in any way by way of the tablet apps. Similarly, the Skype for iPad app does not have a way to block contacts, and by default user information is included in Skype's public directory. This leaves user accounts open to messaging from bots and spam accounts. The only way to block a contact on the iPad is to log into a desktop (Windows, Mac, or Linux) or other capable tablet.

These feature differences mean that the iOS and Android platforms are effectively tethered to another computer when it comes to configuring Lync and Skype. The Intel processor-powered Surface Pro 3, on the other hand, can download and install Windows Store apps and desktop apps for these collaborative applications. When a feature is missing from the touch-optimized version of an app, Windows provides the flexibility to switch to a desktop app and get the full feature set.

More collaboration on Skype and Lync with the Surface Pro 3

We found that using the iPad Air or Galaxy Note 10.1 to collaborate with others, such as in conference calls, could present challenges.

- In Skype and Lync, neither the iPad nor the Galaxy Note 10.1 could start group audio or video calls. The Surface Pro 3 can do both and can record audio and video calls for later reference with the Lync desktop client.
- Skype's peer-to-peer protocol means you can send and receive files of any size.[1] When sharing large project drafts, only the Surface Pro 3 can take advantage of Skype's file sharing. The Galaxy Note 10.1 could not send multiple files at once and the iPad Air was limited to sharing only photos.
- With Lync, only the Surface Pro 3 could screencast its desktop and program windows. The Galaxy Note 10.1 could not present or view shared desktops.
- For PowerPoint presentations, the Surface Pro 3 was the only tablet to

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[1] https://support.skype.com/en/faq/FA3091/how-do-i-send-and-receive-files-using-skype-for-windows-desktop

offer a full-featured experience. While the iPad Air could view presentations, it could not view annotations and notes for specific slides, and it could not present PowerPoint documents at all.

What was missing with Skype on the iPad Air

Figure 2 compares Skype features of the Surface Pro 3 and the iPad.

	Surface Pro 3 (Windows Store)	Surface Pro 3 (Desktop)	iPad Air
Started a group **audio** call	✓		✗
Started a group **video** call	✓		✗
Sent any file type	✓		✗
Started a group **instant message (IM)** conversation	✓		✗
Downloaded any file type	✓		✗
Blocked a contact	✓		✗
Added custom contact names and phone numbers	✓		✗

Figure 2. Key differences in the Skype experience between the Surface Pro 3 and the Apple iPad Air.

What was missing with Skype on the Galaxy Note 10.1

Figure 3 compares Skype features of the Surface Pro 3 and the Galaxy Note 10.1.

	Surface Pro 3 (Windows Store)	Surface Pro 3 (Desktop)	Galaxy Note 10.1
Started a group **IM**	✓		✗
Participated in a group **video** call	✓		✗
Sent multiple files at once	✓		✗
Cleared chat history	✓		✗

Supported spellchecking in IM conversations	✓	✗
Started a group **video** call	✓	✗
Started a group **audio** call	✓	✗

Figure 3. Key differences in the Skype experience between the Surface Pro 3 and the Galaxy Note 10.1.

WHY THE DEVICE MATTERS WITH SKYPE

Audio quality matters in Skype. On a call, users want to hold a conversation without pausing to decipher garbled speech. We found that issues regarding latency—audio dropping out, stuttering, or skipping— were largely the effect of network interference, resulting from things such as corporate firewalls and poor Wi-Fi reception; when we used the Surface Pro 3, iPad Air, and Galaxy Note 10.1 on a properly configured network, they all performed similarly in terms of reception. However, we found that the perceived quality of the audio transmitted from each device—the quality of the tablets' microphones—varied a great deal from device to device.

We conducted a survey to get subjective opinions on which device transmitted the best audio. We used an audio-editing booth in our studio to set up a microphone test environment, then selected a speech sample and set up a laptop with Skype and Evaer to connect to a call with each device and automatically record incoming audio.[2] We located each tablet's microphone and positioned the microphone an equal distance from reference-grade studio speakers. We initiated a Skype call between one tablet and our test laptop, and began recording after one minute of silence to ensure each call had a stable connection. Finally, we played a speech sample over the speakers for our test devices; the tablet's microphone captured this sample and the test laptop recorded it.

The resulting audio recordings simulated what someone on the other end of a Skype call would hear from each device. For the purposes of our survey, we clipped each recording to 30 seconds, gave it a non-revealing filename, and randomized a playlist for each survey participant. We included a control—the unprocessed speech sample—for our survey participants to score alongside the recorded samples.

We selected 11 Principled Technologies employees that had no relationship to the project. The test proctor asked each participant to listen to the series of samples at least once all the way through and score the audio quality on a 1-star to 5-star scale. Our scale mimicked the traditional mean opinion score for audio quality, which asks

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[2] www.evaer.com/

participants to consider to what degree degradation, or impairment, is present in the recording. A score of five stars meant that the audio was clear without distortion, and a score of one star meant the audio had significant distracting or annoying artifacts (see Figure 4). See Appendix C for more information on survey parameters and results.

No. of stars	Rating	Level of impairment
5	Excellent	Imperceptible
4	Good	Perceptible but not annoying
3	Fair	Slightly annoying
2	Poor	Annoying
1	Bad	Very annoying

Figure 4: Opinion scale.

As Figure 5 shows, our survey participants preferred the Surface Pro 3's microphone quality over that of the iPad Air and Galaxy Note.

Figure 5. Mean opinion score for Skype audio. A higher amount of stars is better.

When it comes to video chat, an inconsistent stream with choppy playback is not just annoying, it is not conducive to work and collaboration. You want the clearest video possible for your users. Similar to our audio test, we set up a survey environment to capture video from each tablet's front-facing camera. We used a high-resolution, color-accurate monitor to play video to each tablet as they were connected to a Skype video call. We used a laptop with Evaer to capture the incoming video from the tablets and saved the uncompressed video clips. In the surveys themselves, we used the same 1-star to 5-star scale (see Figure 4) to have participants score each video clip. For more details about our survey environment, see Appendix B.

As Figure 6 shows, we found that with Skype video chat, our 11 survey participants preferred the Surface Pro 3 over the iPad Air and Samsung Galaxy Note 10.1.

Skype video opinion score

Surface Pro 3	★ ★ ★ ☆ ☆
iPad Air	★ ★ ☆ ☆ ☆
Galaxy Note	★ ★ ☆ ☆ ☆
Control	★ ★ ★ ★ ★

Figure 6. Mean opinion score for video with Skype. A higher amount of stars is better.

What was missing with Lync on the iPad Air

Although Android and iOS devices have Lync apps, they do not get the full Lync experience. Figure 7 shows important Lync features that were missing with the iPad Air.

	Surface Pro 3 (Windows Store)	Surface Pro 3 (Desktop)	iPad Air
Added and removed contacts	✓		✘
Added contacts **to favorites** and organized contacts into groups	✓		✘
Started a Lync meeting and invited participants	✓		✘
Recorded a **Lync** call	✓		✘
Recorded a **video** call in 1080p	✓		✘
Sent and received files	✓		✘
Viewed PowerPoint annotations	✓		✘
Presented a program window during a Lync Meeting	✓		✘

Figure 7. Key differences in the Lync experience between the Surface Pro 3 and the iPad Air.

What was missing with Lync on the Galaxy Note 10.1

Until May 2014, the only Lync client available for the Android platform did not support tablets and was limited to installing only on Android phones.[3] Microsoft's latest update added tablet support and additional features for Android devices, but we found that the Galaxy Note 10.1 was still missing important features, as shown in Figure 8.
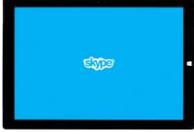
	Surface Pro 3 (Windows Store)	Surface Pro 3 (Desktop)	Galaxy Note 10.1
Started and participated in multiparty video conferencing		✓	✗
Added a contact outside of organization		✓	✗
Presented and viewed PowerPoint presentations		✓	✗
Viewed a shared program window during a Lync Meeting		✓	✗
Synchronized conversation history with Exchange server to back up and retrieve previous conversations		✓	✗
Created a poll during a Lync meeting		✓	✗
Requested to take control of a Lync meeting		✓	✗
Changed individual contact privacy settings		✓	✗

Figure 8. Key differences in the Lync experience between the Surface Pro 3 and the Galaxy Note 10.1.

WHY THE DEVICE MATTERS WITH LYNC

We repeated our audio and video surveys for Lync. The Windows desktop Lync client includes Lync Recording Manager, which can record both audio and video calls—another feature not available on the iPad Air or Samsung Galaxy Note 10.1. The three tablets averaged within half a point of each other, as shown in Figure 9. See Appendix C for more information on survey parameters and results.

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[3] blogs.office.com/2014/05/12/lync-mobile-update-for-android-tablet-support-and-conversation-enhancements/

Lync audio opinion score

Surface Pro 3 ★★☆☆☆

iPad Air ★★★☆☆

Galaxy Note ★★☆☆☆

Control ★★★★★

Figure 9. Mean opinion score for the audio with Lync. A higher amount of stars is better.

When it came to video on Lync, the Surface Pro 3 was the clear winner, as shown in Figure 10.

Lync video opinion score

Surface Pro 3 ★★★☆☆

iPad Air ★☆☆☆☆

Galaxy Note ★☆☆☆☆

Control ★★★★★

Figure 10. Mean opinion score for the video with Lync. A higher amount of stars is better.

THE BOTTOM LINE

Skype and Microsoft Lync offer collaborative opportunities for many mobile platforms but not every device can deliver full-featured performance. Our tests showed that only the Intel processor-powered Surface Pro 3 allowed for full-featured collaboration in Skype and Lync in comparison to the Apple iPad Air and the Samsung Galaxy Note 10.1. According to our polls, audio and video were better with Skype on the Surface Pro 3 and video was better for Lync compared to the other devices. The flexibility that the Surface Pro 3 can provide as a laptop replacement means that when a touch-optimized version of an app is missing certain features, the desktop version can fill in the feature gaps.

APPENDIX A: THE DEVICES WE TESTED

Figure 11 provides detailed configuration information for the devices we tested.

System	Microsoft Surface Pro 3	Apple iPad Air	Samsung Galaxy Note 10.1 2014 Edition
Processor	Intel Core i5-4300U processor	Apple A7 processor	Samsung Exynos 5 Octa processor
Processor frequency	1.9 GHz	1.4 GHz	1.3 GHz Quad + 1.9 GHz Quad
Processor cores	2	2	4 + 4
Memory	4GB LPDDR3 RAM	1GB LPDDR3 RAM	3GB RAM
Storage	128 GB	64 GB	32GB SSD + 32GB SanDisk Ultra microSDHC card
Graphics	Intel HD4400 Graphics	PowerVR™ G6430	ARM Mali™-T628
Battery capacity (Wh)	42	32.9	31
Display	12" 2,160 × 1,440	9.7" 2,048 × 1,536	10.1" 2,560 × 1,600
Wireless	802.11ac/802.11 a/b/g/n	802.11 a/b/g/n	802.11 ac (802.11 a/b/g/n compatible)
Bluetooth® version	4.0	4.0	4.0
Weight (lbs.)	1.76	1.0	1.2
Lync version	MX 16.0.1929.1162 64-bit (Windows Store), MSO 15.0.4623.1003 64-bit (Desktop)	5.4.1485	5.4.1106.0
Skype version	2.8.0.1001 (Windows Store), 6.16.0.105 (Desktop)	4.17.3	4.9.0.45564
OS	Window 8.1 Pro	iOS 7.1.1	Android 4.4.2

Figure 11: Detailed configuration information for the devices we tested.

APPENDIX B: HOW WE TESTED

This section details our process for surveying audio and video quality in Skype and Lync.

Preparing the microphone test environment

1. We selected our studio's audio editing room to conduct our recordings. The room is acoustically treated with sound isolation foam and has a low ambient noise level with no discernable echo.
2. We selected a speech sample from an in-house podcast to serve as our capture sample and control.
3. We set up a router in the studio to ensure consistent signal between devices.
4. We set up a test laptop and wired it to the router to handle recording. For recording Skype calls, we used Evaer. For recording Lync calls, we used Lync's built-in recording manager.
5. We used a desktop computer to handle audio playback.
6. We used reference grade speakers (KRK Rokit 5 G3) to aim sound at each device based on the speaker manufacturer's suggestions:
    a. *"The left and right studio monitors should be approximately 1 to 1.5 meters (3 to 5 feet) apart and directed at a 60 degree angle towards the listening location. Measure the distance between the left and right studio monitors and note the listening position is equal distance to both sides. This will form an equilateral triangle."[4]*
7. We erected a stand to position each device in the middle of the listening area.
8. We located the primary microphone on each device and centered the tablet's position in the listening area based on each tablet's microphone location. We positioned the tablets so that the stand did not interfere with incoming audio.
9. For recording, we placed the tablets one at a time on the stand. We connected the first tablet to a Skype call with the recording laptop.
10. Before recording started, we gave each call 60 seconds of silence to ensure a stable connection between the tablets and the recording laptop.
11. We began recording on the laptop, and then played the audio on the desktop computer to send the speech sample through the speakers.
12. We saved the samples in the highest quality available through Evaer and Lync.
13. We repeated steps 9-12 for the remaining two devices using Skype, and then repeated the steps for all three devices using Lync.

Preparing the audio survey environment

1. We used the same acoustically treated room, the same speakers, and the same audio playback desktop computer for our survey environment.

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[4] www.krksys.com/manuals/rokit/RokitG3-Manual.pdf

2. We prepared a survey to mimic the "mean opinion score" test, where participants listen to samples and score them on a scale of 1 to 5 (see Figure 2).
3. There were two groups (Skype and Lync) with four samples for participants to evaluate. The samples comprised the recordings from the Surface Pro 3, iPad Air, and Samsung Galaxy Note 10.1, and the original podcast audio sample (the control element).
4. We changed the file names of the recordings to hide the details of the recordings from the participants.
5. We loaded the four samples into a playlist on the audio playback computer and randomized their order.
6. We seated participants in the listening area and told them to listen to the samples once through, and then to listen however many times they needed to make a judgment on the audio quality.
7. The survey proctor left the room, and the participants scored and then ranked each sample.
8. We tallied the survey scores and took an arithmetic mean from the total scores for each sample.

Preparing the video test environment

1. We selected a room with low ambient light levels to test the tablets' camera recording quality.
2. We selected a video clip to serve as our capture sample and control. No audio was transmitted or recorded for this test.
3. We selected a computer with a high-resolution monitor with accurate color properties for the test.
4. We set up a router in the room to ensure a consistent signal between the devices.
5. We set up a test laptop and wired it to the router to handle video recording. For recording Skype video calls, we used Evaer. For recording Lync video calls, we used Lync's built-in recording manager.
6. We erected a stand to position the tablets so that their front-facing cameras pointed towards the monitor.
7. For recording, we placed the tablets one at a time on the stand. We connected the first tablet to a Skype video call with the recording laptop.
8. We set up the tablets to have their cameras facing the monitor. We used a static image to make sure the tablets' cameras would capture the monitor's contents only and that the image was level and centered.
9. Before we started recording, we gave each video call 60 seconds of silence to ensure that a stable connection existed between the tablets and the recording laptop.
10. We started recording on the laptop and began playing the selected video clip on the computer.
11. We saved the samples in the highest quality available through Evaer and Lync.
12. We repeated steps 7-11 for the remaining two devices using Skype, and then repeated the steps for all three devices using Lync.

Preparing the video survey environment

1. We used the same room and the same video playback computer for our survey environment.
2. We prepared a survey to mimic the "mean opinion score" test, where participants watch video samples

and score them on a scale of 1 to 5 based on their quality and perceived level of impairment, or degradation.

3. There were two groups (Skype and Lync) with four samples for participants to evaluate. The samples comprised the video recordings from the Surface Pro 3, iPad Air, and Samsung Galaxy Note 10.1, and the original, unprocessed video clip (the control element).

4. We changed the video file names to the hide details from the participants.

5. We loaded the four samples into a playlist on the video playback computer and randomized their order.

6. We seated participants in the room and told them to watch the samples once through, and then to watch the samples however many times they needed to make a judgment on the video quality.

7. The survey proctor left the room, and the participants scored and then ranked each sample.

8. We tallied the survey scores and took an arithmetic mean from the total scores for each sample.

APPENDIX C: DETAILED SURVEY RESULTS

Figure 12 provides the mean opinion survey results conducted for Skype and Lync audio and video transmissions. We listed the number of participants that voted for each score and a mean calculation. We calculated the mean by adding all of the scores together, then dividing by the sample size (11). For example, the mean for the Skype audio score of the Surface Pro 3:

$$(5*9) + (4*2) = 53 \qquad 53 / 11 = 4.818181\ldots$$

In cases where there was a repeating decimal, we rounded up to the hundredth place (for the previous example 4.818181… = 4.82). We rounded the star scores up to the nearest whole number.

	Control	Microsoft Surface Pro 3	Apple iPad Air	Samsung Galaxy Note 10.1
Skype audio				
Opinion score/ number of stars	**Number of participants who voted for each score**			
1	0	0	7	5
2	0	0	4	3
3	0	3	0	3
4	2	8	0	0
5	9	0	0	0
Mean Calculation:	**4.82**	**3.73**	**1.36**	**1.89**
Skype Video				
Opinion score/ number of stars	**Number of participants who voted for each score**			
1	0	1	2	6
2	0	4	5	4
3	0	4	4	1
4	5	2	0	0
5	6	0	0	0
Mean Calculation:	**4.55**	**2.64**	**2.18**	**1.55**
Lync Audio				
Opinion score/ number of stars	**Number of participants who voted for each score**			
1	0	1	1	3
2	0	5	2	3
3	1	4	5	3
4	2	1	3	2
5	8	0	0	0
Mean Calculation:	**4.64**	**2.45**	**2.91**	**2.36**
Lync Video				

	Control	Microsoft Surface Pro 3	Apple iPad Air	Samsung Galaxy Note 10.1
Skype audio				
Opinion score/ number of stars	**Number of participants who voted for each score**			
1	0	1	8	10
2	0	5	2	1
3	1	3	1	0
4	3	2	0	0
5	7	0	0	0
Mean Calculation:	4.55	2.55	1.36	1.09

Figure 12: Detailed results of our survey tests. The numbers under each sample (control, Surface Pro 3, iPad Air, and Galaxy Note 10.1) represent how many participants scored in each range.

ABOUT PRINCIPLED TECHNOLOGIES

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We provide industry-leading technology assessment and fact-based marketing services. We bring to every assignment extensive experience with and expertise in all aspects of technology testing and analysis, from researching new technologies, to developing new methodologies, to testing with existing and new tools.

When the assessment is complete, we know how to present the results to a broad range of target audiences. We provide our clients with the materials they need, from market-focused data to use in their own collateral to custom sales aids, such as test reports, performance assessments, and white papers. Every document reflects the results of our trusted independent analysis.

We provide customized services that focus on our clients' individual requirements. Whether the technology involves hardware, software, Web sites, or services, we offer the experience, expertise, and tools to help our clients assess how it will fare against its competition, its performance, its market readiness, and its quality and reliability.

Our founders, Mark L. Van Name and Bill Catchings, have worked together in technology assessment for over 20 years. As journalists, they published over a thousand articles on a wide array of technology subjects. They created and led the Ziff-Davis Benchmark Operation, which developed such industry-standard benchmarks as Ziff Davis Media's Winstone and WebBench. They founded and led eTesting Labs, and after the acquisition of that company by Lionbridge Technologies were the head and CTO of VeriTest.