

# MICROSOFT SURFACE® DEVICES COME OUT ON TOP FOR WORKPLACE PRODUCTIVITY

Test results show that workers complete tasks faster and more easily on a Surface® device than a comparable Apple® device.

## Executive Summary

Prowess Consulting set out to determine which of the following—Microsoft Surface® devices, Apple® MacBook Pro® devices, or Apple® iPad Pro® devices—could provide the best overall user experience and productivity for workers, while reducing management and support needs for organizations. Our tests examined 10 common work scenarios involving typical tasks for office, creative, and mobile workers. We also looked at IT admin tasks required to manage and secure the devices.

Specifically, our testing compared the following devices:



Microsoft Surface® Laptop, powered by an Intel® Core™ i5 processor



Apple® MacBook Pro®, powered by an Intel® Core™ i5 processor



Microsoft Surface® Pro with Long-Term Evolution (LTE), powered by an Intel® Core™ i5 processor



Apple® iPad Pro® with LTE, powered by an Apple® A10X processor



Microsoft® Surface Book® 2, powered by an Intel® Core™ i7 processor



Apple® MacBook Pro®, powered by an Intel® Core™ i7 processor

The results showed that workers using the tested Surface® devices can consistently perform tasks faster, more easily, and in fewer steps than those using the Apple® devices tested.

# Surface Devices Consistently Outperformed Apple® Devices in 10 Tested Scenarios

**Note: For full results, see Appendix A: Results Summary.**

	Scenario and Description	Functional Area	Value Statement
	<b>SCENARIO 1</b> Quickly organize and execute team meetings	Teamwork	<b>2x faster and with 6 fewer steps</b> to organize and execute team meetings on a Microsoft Surface® Laptop, compared to an Apple® MacBook Pro®.
	<b>SCENARIO 2</b> Develop shared documents collaboratively	Teamwork	<b>8 percent faster</b> for enterprise teams to develop content collaboratively with a Surface® Pro, compared to an Apple® iPad Pro®.
	<b>SCENARIO 3</b> Easily design a creative asset	Creativity	<b>59 percent faster and with 17 fewer clicks</b> to design a rich Microsoft® PowerPoint® presentation with 3D graphics using a touchscreen and pen on a Microsoft® Surface Book® 2, compared to a MacBook Pro.
	<b>SCENARIO 4</b> Securely manage devices	Security and manageability	<b>169 percent faster and with 21 fewer steps</b> to add and manage a Surface Laptop in a Windows® domain, compared to a MacBook Pro.
	<b>SCENARIO 5</b> Work efficiently on the road	Mobility	<b>41 percent faster and with 14 fewer clicks</b> to complete photo capture and editing tasks on the road by using only one, flexible device—the Surface Pro—compared to using a MacBook Pro and an iPad Pro.
	<b>SCENARIO 6</b> Log on quickly and easily	Productivity	<b>3x faster</b> to log on with a Surface Book 2, compared to a MacBook Pro. <b>More than a full workday per year, per user,</b> saved by logging on to a Surface device instead of a MacBook Pro. <sup>1</sup>
	<b>SCENARIO 7</b> Simplify teamwork using a digital whiteboard	Teamwork	<b>41 percent faster and with 11 fewer taps</b> for team members to collaborate on a whiteboard with a Surface Pro compared to an iPad Pro when using join.me®.
	<b>SCENARIO 8</b> Complete development workflows across a suite of applications	Productivity	<b>25 percent faster</b> for enterprise web developers to perform multi-app tasks on a Surface Laptop compared to a MacBook Pro.
	<b>SCENARIO 9</b> Efficiently create and publish an image portfolio	Productivity	<b>67 percent faster and with 17 fewer clicks</b> to organize, retouch, and publish photos online with a Surface Book 2 compared to a MacBook Pro.
	<b>SCENARIO 10</b> Switch between laptop and tablet modes	Simplicity	<b>15 percent faster</b> to perform typical office tasks on a Surface Pro, compared to an iPad Pro.

# Is There an Ideal Device for Modern Workplace and Creative Team Members?

The days of working on a stationary computer at a desk are disappearing rapidly. Modern business workers want the flexibility to get their work done anywhere, at any time. That means crunching numbers from an airport, scheduling meetings from home, attending a Skype® meeting on the train, editing graphics for a presentation during a taxi ride, docking to an external monitor in an office, and taking digital notes with a pen in a meeting.

But workers also demand convenience, simplicity, and performance from the devices they use. They need a multi-faceted tool for productivity that lets them minimize the number of devices and external peripherals they carry around all day. They want devices that make their work lives simpler and more enjoyable through a better hardware and software experience.

It's not all about the end user, either. When employees enjoy a smoother, more convenient device experience, their companies reap the rewards through greater organizational efficiency and productivity, which helps the bottom line. That effect is magnified across dozens or hundreds of workers, where even small efficiency gains add up to hours, days, or weeks of savings over the course of a year.

At the same time, business IT personnel struggle to meet employee needs with devices they can keep more secure and up to date, within their limited budgets. Help desks want to shave support hours by reducing the number and types of devices they work with, and admins don't want the extra time and complexity involved in managing devices that don't work with existing domain-management tools.

## Putting Devices to the Test

Microsoft promotes Microsoft Surface devices as ideal solutions for modern workers. Surface Pro, Microsoft® Surface Book® 2, and Surface Laptop devices all include touchscreens, which give users more ways to interact with apps for convenience and productivity. The Surface Pro and Surface Book 2 can both be used as laptops or tablets, which makes them ideal for sketching, writing, photo editing, and media consumption.

Apple also makes a strong case for having devices for office and mobile users. The iPad Pro is light, portable, and offers a touchscreen. It can also be used with add-on Apple Pencil® and keyboard accessories. The MacBook Pro is a powerful desktop PC that supports popular applications from Microsoft and other companies, but it does not have a touchscreen, and it can't be used as a tablet.

Prowess Consulting set out to compare these two sets of devices to determine which—if any—could best meet the demanding requirements of modern users and admins while ensuring productivity of users and the IT staff that support them. For each scenario, we looked at a specific pair of devices: one Surface device versus one Apple device. Our engineers selected specific devices to reflect what organizations and workers would realistically use for each particular task, and to ensure each pairing of Surface and Apple devices would have similar price points and specifications for CPU and memory.

## Real-World Scenarios

To create realistic test cases, our engineers investigated the use-case scenarios most applicable for workers and IT administrators in both enterprise and small and medium-sized business (SMB) environments. Our engineers also examined scenarios that include typical mobile and office use cases.

To cover those scenarios, we grouped testing into the following six key functional areas:

1. Productivity
2. Creativity
3. Teamwork
4. Security and manageability
5. Mobility
6. Simplicity

In addition, we wanted to ensure that the test scenarios included popular software applications that are required or frequently used by organizations, workers, and IT administrators. After reviewing several options, our engineers selected the following applications:

- Microsoft® Office 365®
- Microsoft Teams®
- Microsoft® Visio®
- Microsoft OneDrive®
- Microsoft® Visual Studio®
- Microsoft® System Center Configuration Manager
- join.me®
- Adobe® Lightroom®
- Adobe® InDesign®
- Adobe® Reader®

We then created 10 specific test cases built on real-world scenarios. Each test case compared a specific pair of devices: one Surface device and one Apple device, as shown in Table 1.

**Table 1.** Tested scenarios and device pairs

Scenario and Description	Functional Area	Device Compared
<b>SCENARIO 1</b> Quickly organize and execute team meetings	Teamwork	Microsoft Surface® Laptop vs. Apple® MacBook Pro®
<b>SCENARIO 2</b> Develop shared documents collaboratively	Teamwork	Surface® Pro vs. Apple® iPad Pro®
<b>SCENARIO 3</b> Easily design a creative asset	Creativity	Microsoft® Surface Book® 2 vs. MacBook Pro
<b>SCENARIO 4</b> Securely manage devices	Security and manageability	Surface Laptop vs. MacBook Pro
<b>SCENARIO 5</b> Work efficiently on the road	Mobility	Surface Pro vs. iPad Pro
<b>SCENARIO 6</b> Log on quickly and easily	Productivity	Surface Book 2 vs. MacBook Pro
<b>SCENARIO 7</b> Simplify teamwork using a digital whiteboard	Teamwork	Surface Pro vs. iPad Pro
<b>SCENARIO 8</b> Complete development workflows across a suite of applications	Productivity	Surface Laptop vs. MacBook Pro
<b>SCENARIO 9</b> Efficiently create and publish an image portfolio	Productivity	Surface Book 2 vs. MacBook Pro
<b>SCENARIO 10</b> Switch between laptop and tablet modes	Simplicity	Surface Pro vs. iPad Pro

## Testing Through Personas

To replicate real-world scenarios, our engineers performed each test case from the perspective of a named persona: a typical worker conducting relevant steps to complete tasks specific to that scenario. Full steps for each scenario are listed in [Appendix C](#).

## Surface Devices Do More

In every comparison we tested, we were able to complete the task faster on the Surface device. The Surface devices were also easier to work with because they provided a more unified experience across Office 365 applications, with common, integrated features. They all supported touchscreen capabilities. And they worked seamlessly with external displays and peripherals.

The Apple devices were often cumbersome for users because they did not offer a unified software experience across applications. In addition, workflows sometimes required users to switch between two devices—an iPad Pro and a MacBook Pro—in order to complete the same work that a Surface user could accomplish easily on one device.

In summary, our testing found that the Surface devices offered:

- Richer features
- Full support for Office 365 and other business-critical apps
- Easier integration into existing office infrastructure for management and support
- A more productive and collaborative experience for users, compared to the Apple devices

Based on our test results, IT decision makers comparing Surface and Apple devices for their organizations will find that Surface devices are more versatile, can save workers time, and are easier for users and IT personnel to work with.

# Test Scenarios

Each of the 10 scenarios is presented below with the full user experience and results. (See Appendix A for a summary of the results for all 10 scenarios.)

## Scenario 1: Quickly Organize and Execute Team Meetings

**Surface Laptop vs. MacBook Pro** (Intel® Core™ i5 processor–based model)

### SCENARIO

Rodrigo manages a team of product marketing specialists, and he regularly uses Microsoft® Outlook® to organize and schedule meetings. For efficiency, he includes detailed agendas in his meeting invitations, and he often adds photos to illustrate concepts for the team to review ahead of time. To work efficiently, he needs to be able to perform these tasks seamlessly.

Karen is in a similar managerial role, and she also schedules meetings in the Outlook client on her MacBook Pro and provides photos to her team.

### RESULTS



## 2x faster and 6 fewer steps

to organize and execute team meetings on a Microsoft Surface® Laptop, compared to an Apple® MacBook Pro®.

Rodrigo was able to quickly schedule his meeting on the Surface Laptop by working in Outlook in Office 365. He created a new meeting, selected the time and date, added required attendees, and then used the built-in scheduling assistant to select a time that worked well for everyone. He then used the Insert Online Pictures function from within the Outlook client to attach an image for discussion in the meeting.

Karen followed a similar process on her MacBook Pro, but her device did not have a scheduling assistant. To determine availability for her required attendees, she had to send an email to her colleagues asking for their availability, wait for their responses, and then finally send out the meeting request. In addition, Karen did not have the Insert Online Pictures function on the MacBook Pro, so she needed to switch from Outlook to Safari®, search for and download a photo, and then return to Outlook to attach the image to her email.

In our testing, the added steps were cumbersome and doubled the time required to complete the task. Note that the time difference is based on the best-case scenario, where every attendee responds instantly to Karen's request for availability. In reality, some participants could take hours to respond, which would significantly increase the lost time and reduce Karen's productivity.

### WHY THE SURFACE DEVICE PERFORMS BETTER

- **Schedule meetings in seconds:** The Surface Laptop lets users make use of the built-in scheduling assistant in Outlook to determine availability and schedule a meeting in one step.
- **Enjoy a complete workflow from within one app:** On the Surface Laptop, users can quickly locate and attach an online photo directly from Outlook, without needing to switch apps.

## Scenario 2: Develop Shared Documents Collaboratively

### Surface Pro vs. iPad Pro

#### SCENARIO

Rahul is a manager heading up a new project to create a product brochure, and he needs to collaborate with his globally dispersed team members to share initial scoping documents. He and his colleagues are using Microsoft Teams on their Surface Pro devices to schedule and attend meetings, and to collaborate by sharing and collectively editing Microsoft® Word documents and Microsoft® PowerPoint® slides.

Rahul's colleague, Tomas, also needs to collaborate with colleagues, but he is working on an iPad Pro.

#### RESULTS



**8 percent faster**

for enterprise teams to develop content collaboratively with a Microsoft Surface® Pro, compared to an Apple® iPad Pro®



**More than 72 workdays per year**

saved, for 200 workers conducting only two teamwork sessions per day on a Surface® Pro, compared to an iPad Pro.<sup>1</sup>

On the Surface Pro, Rahul was able to use Microsoft Teams as an end-to-end tool for teamwork. He created a Microsoft Teams channel for his project, created a meeting request for the new channel, invited users, and then used the built-in scheduling assistant to determine availability for all participants. He added a PowerPoint file to the invite and scheduled the meeting. During the meeting, Rahul opened and shared the PowerPoint presentation from OneDrive. Participants were able to collaborate by discussing changes and editing the document in real time during the meeting.

Tomas ran into limitations trying to do the same workflow on his iPad Pro. When scheduling the group meeting, he did not have access to a scheduling assistant on the iPad Pro, so he had to ask participants for their availability from a chat session, note all their available times, and then open Outlook to schedule the meeting. Tomas was also slowed by the way the iPad manages files. By default, the iPad saves PowerPoint files to iCloud®. Before he could share the PowerPoint file with his colleagues, Tomas needed to reopen the file in PowerPoint, tap Save a Copy, and then specify the OneDrive folder where he shares files with his colleagues.

Because of the limited functionality on his iPad Pro, Tomas experienced a slower workflow that hindered collaboration. Conversely, Rahul's experience was seamless on the Surface Pro, which enabled faster, more productive teamwork. Although each individual collaboration time difference was small, the collective time for multiple meetings per day for hundreds of workers over a standard work year would be considerable. If an organization had 200 workers collaborating in just two meetings per day, the time savings for Surface Pro users would add up to more than 577 hours—more than 72 workdays saved. That's equivalent to an employee's full calendar quarter of time saved.<sup>1</sup>

## WHY THE SURFACE DEVICE PERFORMS BETTER

- **Schedule a meeting in seconds.** The Surface Pro simplifies meeting creation by integrating with Office 365 to automatically show the availability of all participants.
- **Enjoy an end-to-end, integrated experience with Office 365.** Users enjoy full integration of Office 365 apps within Microsoft Teams on the Surface Pro, which enables an end-to-end experience without needing to switch between apps.
- **Enjoy a richer collaboration experience in Microsoft Teams.** Surface Pro users enjoy a full teamwork experience because they can co-author files on a call within Microsoft Teams. iPad Pro users must open files from within their associated apps and then upload the changes to a shared drive before other teammates can see the changes.

## Scenario 3: Easily Design a Creative Asset

**Surface Book 2 vs. MacBook Pro** (Intel Core i7 processor–based model)

### SCENARIO

Meghan is a middle school teacher who uses PowerPoint in her classroom. She regularly includes 3D graphics to help retain student interest, and she likes to draw on the slides in addition to using built-in shapes. She performs these tasks on her Surface Book 2 using the Surface Pen and touchscreen functionality and the 3D graphics feature of PowerPoint.

One day, her IT department asks Meghan to test a MacBook Pro for her daily use. She tries to perform the same steps on the new device.

### RESULTS



#### 59 percent faster

to design a rich Microsoft® PowerPoint® presentation with 3D graphics using a touchscreen and pen on the Microsoft® Surface Book® 2, compared to the Apple® MacBook Pro®.



#### 17 fewer clicks

on the Surface Book 2 means workers can design presentations faster, without cumbersome workarounds.

Meghan was able to work 59 percent faster on the Surface Book 2 than on the MacBook Pro. Her work on the MacBook Pro was slower because the device does not include a touchscreen or pen. As a result, many of Meghan's tasks took more steps and more time.

The additional steps are just part of the story for Meghan. The MacBook Pro does not provide the same rich support for 3D graphics as the Surface Book 2, so Meghan needed to use a browser to find comparable images online, and then copy and paste those images into PowerPoint. Meghan was also hindered by the lack of support for a touchscreen and pen on her MacBook Pro. Manipulating and altering graphics was a time-consuming struggle with a touchpad, and she had to forego hand-written notes altogether.

### WHY THE SURFACE DEVICE PERFORMS BETTER

- **Work faster and more creatively with a touchscreen and pen.** Touchscreen capabilities and Surface Pen functionality with the Surface Book 2 enable users to work faster and with more creativity than on a MacBook Pro.
- **Work natively with 3D graphics in apps.** Built-in 3D graphics capabilities in PowerPoint on the Surface Book 2 allow users to get work done directly within PowerPoint, without having to use multiple apps.

## Scenario 4: Securely Manage Devices

### **Surface Laptop vs. MacBook Pro** (Intel Core i5 processor–based model)

#### **SCENARIO**

Li is an IT administrator at a midsized enterprise. He works with a team of other admins to manage and secure more than 1,000 endpoint devices in his organization. His company is planning to roll out Surface Laptop devices during the next user-device upgrade, so Li and his team are preparing with a trial run. Li has the choice of using mobile device management (MDM) software or Active Directory® to help manage and secure devices, but his company has used Active Directory and System Center Configuration Manager for years because they provide granular control of device features and user access. He decides to use Active Directory and System Center Configuration Manager to disable cameras and USB storage devices on the Surface Laptop, in accordance with his company's security policies. Then he connects a Surface Laptop to the enterprise infrastructure and adds it to the domain to automatically receive the domain policies.

Barbara is one of Li's teammates, and she is responsible for managing Apple devices in the organization's design and publishing department. She needs to join new MacBook Pro devices to the same network infrastructure and ensure they receive domain policies, including policies to disable the camera and USB storage devices.

#### **RESULTS**

Li was able to quickly and painlessly add the Surface Laptop to the existing Windows® operating system–based domain, where it automatically and seamlessly inherited all the required policies for management, including the policies Li configured earlier using System Center Configuration Manager. The Surface Laptop camera was disabled as intended, and users were successfully prevented from accessing external drives (such as thumb drives) from the USB ports on the Surface Laptop.

The process was quick and simple, and users would not be able to override the settings, even if they logged on to their devices as local admins. In addition, the USB policy settings in System Center Configuration Manager were extremely granular, which gave Li the ability to disable the use of USB storage devices, while still allowing users to plug in and use safe USB peripherals, such as keyboards, mice, or USB headsets.

For Barbara, adding a MacBook Pro device to an existing Windows infrastructure required IT personnel with specific knowledge of Apple devices, added complexity and steps, and did not provide the same level of management or security as the Surface Laptop. To apply company settings to the new MacBook Pro, Barbara needed to log on to the device as a domain administrator, manually download, install, and run a System Center Configuration Manager client tool, and then reboot the device to receive the System Center Configuration Manager policy settings.

There was no way for her to enforce security for the MacBook Pro, because any user with technical knowledge would be able to bypass protections at startup to gain local admin rights and subsequently undo or change any of the settings Barbara applied to the device through System Center Configuration Manager.

In addition, Barbara discovered that disabling the USB ports on the MacBook Pro was not granular, like it was on the Microsoft Surface Laptop. On the MacBook Pro, the policy didn't just prevent USB storage devices from being used, it completely disabled access to the port. That meant users would not be able to access safe peripherals, like keyboards and headsets.

## WHY THE SURFACE DEVICE PERFORMS BETTER

- **Quickly and easily add new devices to your Windows domain.** Surface Laptop devices are easy to add to any existing Windows domain infrastructure, where they inherit all required policies.
- **Enjoy granular control of devices from System Center Configuration Manager.** Settings on the Surface Laptop can be controlled easily and granularly by using System Center Configuration Manager.
- **Protect devices from users bypassing corporate safeguards.** Surface Laptop devices are protected from users overriding security policies because only domain admins can undo or change the policies and settings pushed down from the domain.

## Scenario 5: Work Efficiently on the Road

### Surface Pro vs. iPad Pro

#### SCENARIO

As a real-estate agent, Melody spends most of her time in the field, showing houses and taking photos. She then adds those images to her listings brochure, which she shares with clients in an Adobe® PDF document. She needs a seamless experience to take photos, add the photos to her brochure using InDesign, and then export the brochure as a PDF document that she can share with her clients.

Sebastian is also a real-estate agent who spends the bulk of his time in the field. He wants to perform the same tasks, but he works with an iPad Pro.

#### RESULTS



**41 percent faster  
and 14 fewer clicks**

to take and edit a photo on the road using a Microsoft® Surface® Pro, compared to an Apple® iPad Pro®.



**Use 1 flexible  
device**

instead of two and work more productively with a Surface® Pro, instead of an iPad Pro and an Apple® MacBook Pro®.

A road warrior (such as a real-estate agent) relies on the ability to quickly take photos and create brochures and fliers in fully featured applications. On her Surface Pro, Melody was able to work with full-featured productivity applications, such as InDesign. These applications work in tablet mode or in laptop mode, which made it easier for Melody to complete all her tasks from one device.

By contrast, the iPad Pro does not support InDesign, so in order to produce fliers for his properties, Sebastian needed to switch from his iPad Pro to a MacBook Pro to complete the task. That meant transferring the image file from the iPad Pro to the MacBook Pro, which added steps and time. Because the MacBook Pro does not have an LTE network connection, Sebastian had to transfer his image to the MacBook Pro using the Apple® AirDrop® software feature, and then later transfer the completed brochure back to his iPad Pro in order to have it available to show clients. Sebastian wasted time switching between two devices—and he had to carry both with him throughout his day on the road. Sebastian also potentially put his files at greater risk because AirDrop defaults to using less-stringent security settings.

In our testing, Melody could work an average of 41 percent faster than Sebastian when completing the same tasks. However, in practice, the difference for the two real-estate agents would probably be much larger because Sebastian consistently needs to pull out his MacBook Pro, power it up, log on, and then perform the file transfer. That adds up to a lot of wasted time and frustration for Sebastian.

### WHY THE SURFACE DEVICE PERFORMS BETTER

- **Work with full-featured apps in Windows.** Surface Pro users have access to full-featured productivity applications, like InDesign, which are not available on an iPad Pro.
- **Benefit from a seamless, mobile experience.** The Surface Pro includes a high-resolution camera and LTE data connection, allowing for a more seamless work experience for mobile workers.
- **Work in laptop or tablet mode, as desired.** The full-featured, flexible design of the Surface Pro enables mobile users to do everything with a single device, without compromise.

## Scenario 6: Log On Quickly and Easily

**Surface Book 2 vs. MacBook Pro** (Intel Core i7 processor–based model)

### SCENARIO

Ruth, an enterprise employee, starts up her device and logs on when she arrives in the morning. In compliance with her IT department’s security requirements, Ruth dutifully shuts down her computer at night and logs off when away from her device for more than 20 minutes. She also locks her device when she leaves her desk. She logs on again every time she returns to her desk.

Mark, a colleague of Ruth’s, uses a MacBook Pro for work. He is equally conscientious about shutting down each night and logging off after 20 minutes of inactivity to help ensure company information is secure when the device is unattended.

### RESULTS



**3x faster**

to log on with a Microsoft® Surface Book® 2, compared to an Apple® MacBook Pro®: just look at the screen and you’re in.



**45 weeks/year saved**

for a 500-user organization using Windows Hello® near-instantaneous logons on a Surface Book 2, compared to typing passwords on a MacBook Pro.<sup>1</sup>

Whether restarting, unlocking the screen, or logging back on, Ruth was able to authenticate almost instantaneously on her Surface Book 2 with Windows Hello®. All she needed to do was look at the screen and the built-in camera used optical recognition to log her on, even in low-light conditions. Before her hands even touched the mouse or keyboard, she was securely logged on to Windows, her domain, and her Office 365 resources through single sign-on.

Mark’s MacBook Pro includes an Apple® Touch Bar™ with Touch ID®, the Apple fingerprint sensor, but it doesn’t include support for Windows Hello. Mark could use Touch ID to quickly authenticate after a screen lockout, but he still needed to manually type in his password every time he restarted or logged out from the computer.

In our testing, it took Mark eighteen seconds to wake his device, enter his password, and access an Office 365 PowerPoint document every time he needed to log back on. That’s an average of 12 seconds longer than Ruth needs to perform the same steps.

Even if Mark only needs to log on once per day, that extra step adds up to nearly an hour per year (at 52 weeks per year). Add in restarts after macOS® updates or security patches, in addition to logons after automatic logoffs when he leaves his desk, and the lost time could increase considerably.

For example, if he leaves his desk and experiences an auto-logoff just three times per day, he needs to start the device once per day, and he needs to reboot after a system update once per week, the lost time per year adds up to 3.64 hours.<sup>1</sup> Extend that lost time across an enterprise of 500 workers and it adds up to 227.5 workdays of lost productivity, just from slower times to log on to the device.

Windows Hello offered Ruth additional security benefits, too, because the technology replaced her password with strong two-factor authentication based on a new type of user credential that is tied to her device and a biometric identifier or PIN. As a result, Ruth did not need to rely on weak or reused passwords that she could remember. Eliminating passwords also reduced her risk of falling victim to a security breach.

### WHY THE SURFACE DEVICE PERFORMS BETTER

- **Log on instantly using Windows Hello.** Windows Hello provides a seamless, near-instantaneous sign-on experience for users on the Surface Book 2. It works effortlessly—even in low-light conditions—and saves users time and frustration.
- **Improve user security with biometric, two-factor authentication.** Windows Hello reduces the risk of having an unsecure or reused password stolen. That saves IT and users time and hassle from remediation.
- **Authenticate across all domain resources, near instantaneously.** Windows Hello works with single sign-on capabilities, so users are logged on everywhere without having to re-authenticate to different apps and resources.

## Scenario 7: Simplify Teamwork Using a Digital Whiteboard

### Surface Pro vs. iPad Pro

#### SCENARIO

Jennifer and her team of remote workers collaborate regularly in an enterprise environment. They find that sharing ideas and group brainstorming are critical elements in the team's success. Several times a week, remote team members need to work together on documents and drawings. Jennifer's team uses Surface Pro devices with Surface Pen styluses.

Another enterprise team, led by Carlos, also wants to improve teamwork by working collaboratively in a digital whiteboard, but Carlos's team has standardized on iPad Pro devices.

#### RESULTS



### 41 percent faster

for team members to collaborate on a virtual whiteboard with a Microsoft Surface® Pro compared to an Apple® iPad Pro®.



### Nearly a dozen fewer taps

facilitates more teamwork between colleagues when using a virtual whiteboard on a Surface Pro, compared to an iPad Pro.

Jennifer's team first tried working with join.me, a common collaboration tool used by both Windows and Apple users. On the Surface Pro, Jennifer was able to create and copy a workflow diagram image from Visio, a popular diagram and flowchart application. Jennifer then pasted the image into a join.me session and modified it with shapes and text.

When a colleague wanted to contribute additional design changes, Jennifer simply delegated the presenter role to him. The team could pass control to each other for full collaboration until satisfied with the changes. Jennifer then exported the image to OneDrive and sent the completed image to her manager from Outlook, for approval.

Carlos and his team had a different experience on the iPad Pro. Carlos shared out a whiteboard session in join.me. Visio is not supported on iOS®, so he switched to a browser to locate and copy a workflow image, and then pasted it into the join.me whiteboard session. He then modified the image with built-in shapes, lines, and text. But because join.me does not support delegating virtual whiteboard sessions on the iPad Pro, there was no way to simply hand off the session to a team member. Carlos had to save the join.me project as an image file, email it to one of his teammates, and then make his colleague a presenter. The colleague then opened the file in join.me, made additional edits while team members watched and commented, and then exported the project to OneDrive. Finally, the completed image file could be sent to Carlos's manager from Outlook.

For Jennifer and her team, the overall experience was much simpler on the Surface Pro. The same task took less time, fewer steps, and involved true collaboration. Teamwork on the iPad Pro was limited by missing functionality.

In addition, Jennifer's team discovered they could simply use Microsoft® Whiteboard as a built-in collaboration tool on the Surface device, instead of installing join.me as a third-party application. Using Microsoft Whiteboard, her team shared ideas using shapes, images, and text by working with built-in tools and the Surface Pen. She saved the final project as an image file, and then shared it with her manager via Skype for Business. Microsoft Whiteboard made teamwork even easier for Jennifer's team, and it increased the time savings even further compared to Carlos's team working on iPad Pro devices.

### WHY THE SURFACE DEVICE PERFORMS BETTER

- **Microsoft Whiteboard enables teamwork.** Microsoft Whiteboard on the Surface Pro lets team members work together efficiently and in real time, wherever they are.
- **Built-in apps and features simplify teamwork.** The lack of a built-in whiteboard app on the iPad Pro makes teamwork more difficult. Teamwork with a third-party app is awkward and time-consuming, and it requires sending files repeatedly between team members.

## Scenario 8: Complete Development Workflows Across a Suite of Applications

**Surface Laptop vs. MacBook Pro** (Intel Core i5 processor–based model)

### SCENARIO

As a web developer at a fast-moving company, Larry is used to getting urgent requests for code and page updates. Today, his project manager has sent a request to update a web app and to add a graphic to a website. Larry works on a Surface Laptop running Visual Studio.

Alecia is also a developer, but she works primarily on a MacBook Pro. Like many developers, she runs Visual Studio in Parallels Desktop® for Mac®, a Windows emulator, because she often develops Windows operating system–based software.

### RESULTS



**25 percent faster**

**for enterprise web developers to write code and collaborate with designers and managers on a Microsoft Surface® Laptop, compared to an Apple® MacBook Pro®.**

Using his Surface Laptop, Larry made the required code change, and then recompiled the app. He then opened Microsoft® OneNote® and used his finger on the touchscreen to quickly sketch a simple drawing to show the graphic designer what she needs to design for the webpage. When done, Larry clicked Email Page from the OneNote taskbar and sent the page with his sketch to the graphic designer. Finally, he responded to the project manager in Outlook to let her know the task was complete.

Alecia ran the same scenario on her MacBook Pro. She made the necessary code changes, and then waited for the app to compile—a task that took measurably longer running in the virtual environment. Like Larry, she also needed to create a mock-up for her graphic designer, but she did not have a touchscreen on her MacBook Pro. Creating a simple drawing in OneNote was slow and awkward because she needed to work with the built-in trackpad instead of her finger on a touchscreen.

Larry completed the same task 25 percent faster on his Surface Laptop. The compile process was faster in Visual Studio running natively in Windows. In fact, the time difference would be considerably larger if Alecia needed to start Parallels Desktop from scratch before running and using Visual Studio.

In addition, Alecia's two-operating-system solution added cost and complexity for her and her IT department. The company would need to purchase separate licenses, address support issues, and provide software updates and security patches for both operating systems.

Finally, even the process of creating a simple drawing for the graphic designer was faster and easier for Larry, thanks to the built-in touchscreen on his Surface Laptop.

### **WHY THE SURFACE DEVICE PERFORMS BETTER**

- **Enjoy a complete, end-to-end development workflow.** Integrated support for Visual Studio, OneNote, and the touchscreen on the Surface Laptop allows for a smooth and seamless workflow.
- **Develop Windows apps faster in a native environment.** Developing for Windows operating system-based software can be done natively on the Surface Laptop, allowing developers to compile programs faster than on a MacBook Pro running Visual Studio in an emulated Windows environment with Parallels Desktop.
- **Sketch quickly and easily on a touchscreen.** The touchscreen on the Surface Laptop make simple on-screen sketches a breeze.

## Scenario 9: Efficiently Create and Publish an Image Portfolio

**Surface Book 2 vs. MacBook Pro** (Intel Core i7 processor–based model)

### SCENARIO

Erin is a freelance photographer who does a lot of work for magazines. She uses Adobe Lightroom and Adobe® Photoshop® to retouch photos, and she shares those photos with customers using the portfolio capability in Lightroom. She uses a Surface Book 2 for her workflow.

Tobias is also a freelance photographer doing work similar to Erin's. He works on a MacBook Pro and also uses Lightroom and Photoshop for editing.

### RESULTS



## Less than 1/2 the time

**to organize, retouch, and publish photos online, using a Microsoft® Surface Book® 2** compared to using an Apple® MacBook Pro®.

With the Surface Book 2, Erin simply inserted her camera's SD card into the card slot, transferred the photos to her device, and used Lightroom to import, organize, and perform basic edits to her photos. She then performed more detailed edits in Photoshop, where she made extensive use of the Surface Pen on the touchscreen to edit and retouch photos.

She enjoyed a more efficient experience with the pen on the Surface Book for delicate tasks, such as creating a drop shadow and removing dust specks. In addition, the flexible design of the Surface Book 2 allowed her to adjust the screen to her ideal position for working with the pen. After completing her edits, Erin saved her updated portfolio from Lightroom and shared the location with her manager for final approval.

Tobias followed the same workflow as Erin on his MacBook Pro, but he ran into several obstacles and limitations. Because there is no SD card slot in the MacBook Pro, Tobias had to fumble through his bag for a dongle that he could plug into the solitary USB-C® port in his device. In addition, the lack of a touchscreen or support for a pen made detailed edits a chore. Tobias was forced to work with the touchpad, which slowed down his edits and was less precise. He considered using a Wacom® digitizing tablet for more precision, but that would add considerable cost, would require carrying another separate hardware device, and would potentially require yet another dongle.

## WHY THE SURFACE DEVICE PERFORMS BETTER

- **Edit photos quickly and efficiently with the touchscreen and pen.**

The Surface Pen and the touchscreen on the Surface Book 2 can improve speed and efficiency for creatives performing precise tasks. Complex selections and image cleanup are accomplished with only a few taps, compared to many clicks on the Apple device, which means users can spend less time editing images and more time creating them.

- **Work at any angle with a fully adjustable screen.** The hinged screen on the Surface Book 2 allows creatives to work at the ideal angle for their workstyle. Users can even convert the device into a tablet to hold in one hand while drawing or editing with a pen in the other hand, making it easy to edit in the field.

- **Access cards and peripherals without a dongle.** The built-in card reader on the Surface Book 2 simplifies the transfer of photos from a camera, allowing photographers to work more efficiently.

## Scenario 10: Switch Between Laptop and Tablet Modes

### Surface Pro vs. iPad Pro

#### SCENARIO

Kumar starts every workday with his Surface Pro while it is docked at his desk. This lets him use multiple monitors and peripherals, which helps him be more productive. But he also attends many meetings, and works on the train ride home, so sometimes the tablet form factor is more convenient. With the Surface Pro, Kumar enjoys the benefits of a docked computer experience with a single lightweight device, but he can also use it as a tablet or a laptop while away from his desk.

Lara also needs to be productive as she moves from office desk to meeting to the train ride home, but she works on an iPad Pro. She enjoys the portability of her device, but doesn't have an option to connect to an external monitor or easily connect to other peripherals at her desk. And although she has access to a keyboard with the iPad Pro keyboard cover, she doesn't have the convenience of a mouse.

#### RESULTS



**15 percent faster**

to perform typical office tasks on a Microsoft Surface® Pro while moving from desk to meeting to commute, compared to an Apple® iPad Pro®.



**More than 3 months**

saved per year for 200 workers to perform typical office tasks using a Surface Pro instead of an iPad Pro.<sup>1</sup>

At the office, Kumar connected his Surface Pro to the Microsoft Surface® Dock. That instantly let him work productively with an external monitor and gave him access to his peripherals, like his USB headset, external storage, and external keyboard and mouse. When he needed to attend a meeting, he simply disconnected the Surface Pro from the power/dock cable and took his laptop to the meeting room, where he could use the attached Surface keyboard cover to type notes in OneNote. In addition, he could quickly switch to an open Word document and use his Surface Pen to highlight some key sections for reference. On the train ride home, Kumar used the built-in LTE connection to initiate a Skype chat with colleagues and to share and edit the Word doc he marked up earlier.

Lara used her iPad Pro in the office, but she was not able to connect her device to external, peripheral devices, including a mouse. She also couldn't easily extend her screen to a second display because the iPad Pro only supports that functionality through a special adapter that plugs into the charging port on the device, or wirelessly through Apple® AirPlay® or a third-party app—but both options add cost and complexity. Because Lara did not have an adapter, she was forced to work on the smaller, built-in screen, and she was forced to constantly move her hand from the keyboard to the screen to make selections, instead of clicking with a mouse.

On her commute, she initiated a Skype for Business chat, but she was unable to share her Word document directly in Skype for Business for collaborative editing. As a workaround, she needed to share the doc from Word, and then wait for her colleague to receive a notification, open the shared doc, review it, and respond. The extra steps added time and resulted in less-effective teamwork.

Overall, Kumar experienced less complexity and more productivity. If he followed the same routine even just once per day, the time savings would add up to more than half a workday per year. Multiply that out to 200 workers in a small enterprise, and the savings are more than 101 workdays a year—more than three months—all from using the flexible Surface device instead of the iPad Pro.<sup>1</sup>

### WHY THE SURFACE DEVICE PERFORMS BETTER

- **Go from docked office PC to laptop to tablet with one device.** The Surface Pro converts seamlessly from a docked desktop computer at the office to a laptop during a meeting to a tablet while on the go, giving workers greater flexibility and a better overall user experience.
- **Access external displays and peripherals from one, convenient dock.** The Surface Pro provides full access to peripherals, including an external display, for improved usability and productivity.
- **Get a full-featured app experience, whether you're in laptop or tablet mode.** The Surface Pro lets you stay productive and benefit from using full-featured Windows apps, whether you use the device as a laptop or a tablet.

## A Winner Surfaces

Today's workers expect simplicity, convenience, and the freedom to work how and where they like. Many devices can offer one or two of those traits. But our testing shows that, of the devices tested, only the Microsoft Surface devices provide all three. Compared to the Apple products we tested, the Surface devices offer richer features, full support for Office 365 and other business-critical apps, easier integration into existing office infrastructure for management and support, and a more productive and collaborative experience for users. The Surface devices also provided significant time savings and the ability to accomplish the same tasks in fewer steps.

For IT personnel looking to provide the best user experience, productivity, and flexibility for workers, our testing showed that the tested Surface devices will be a better choice than the tested Apple devices for most organizations.

# Appendix A: Results Summary

Scenario	Description	Devices Compared	Time Faster for the Microsoft Surface® Device	Number Fewer Clicks for the Surface Device	Factor Faster for the Surface Device	Percent Faster for the Surface Device
1	Quickly organize and execute team meetings	Surface® Laptop vs. Apple® MacBook Pro®	0:00:48	6	2.17	117%
2	Develop shared documents collaboratively	Surface Pro vs. Apple® iPad Pro®	0:00:40	2	1.08	8%
3	Easily design a creative asset	Microsoft® Surface Book® 2 vs. MacBook Pro	0:00:41	17	1.59	59%
4	Securely manage devices	Surface Laptop vs. MacBook Pro	0:03:09	21	2.69	169%
5	Work efficiently on the road	Surface Pro vs. iPad Pro	0:00:30	14	1.41	41%
6	Log on quickly and easily	Surface Book 2 vs. MacBook Pro	0:00:12	5	3.00	200%
7	Simplify teamwork using a digital whiteboard	Surface Pro vs. iPad Pro	0:01:34	11	1.41	41%
8	Complete development workflows across a suite of applications	Surface Laptop vs. MacBook Pro	0:01:22	5	1.25	25%
9	Efficiently create and publish an image portfolio	Surface Book 2 vs. MacBook Pro	0:03:54	17	1.52	52%
10	Switch between laptop and tablet modes	Surface Pro vs. iPad Pro	0:00:56	6	1.15	15%

# Appendix B: Hardware and Test Environment

## Microsoft® Devices

Microsoft® Device	Microsoft Surface® Laptop	Surface® Pro	Microsoft® Surface Book® 2
Processor:	Intel® Core™ i5-7200 processor, 2.50–3.10 GHz	Intel Core i5-7300U processor, 2.60 GHz	Intel Core i5-7300 processor, 1.90–3.50 GHz
Model Number:	1769	1807	1832
Storage:	256 GB solid-state drive (SSD)	256 GB SSD	256 GB SSD
Memory:	8 GB	8 GB	8 GB
Display:	13.5-inch, 2256 × 1504 (201 pixels per inch [PPI])	12.3-inch, 2736 × 1824 (267 PPI)	13.5-inch, 3000 × 2000 (267 PPI)
Graphics:	Intel® HD Graphics 620	Intel HD Graphics 620	Intel UHD Graphics 620/NVIDIA® GeForce® GTX 1050
OS:	Windows® 10	Windows 10	Windows 10
Cellular Network:	N/A	4G LTE	N/A

## Apple Devices

Apple® Device	Apple® MacBook Pro®	MacBook Pro	Apple® iPad Pro®
Processor:	Intel® Core™ i5-7360U processor, 2.30–3.60 GHz	Intel Core i7-7267U processor, 3.10–3.50 GHz	Apple® A10X processor, 2.34 GHz
Model Number:	A1708	A1706	1671
Storage:	256 GB SSD	256 GB SSD	256 GB SSD
Memory:	8 GB	8 GB	4 GB
Display:	13.3-inch, 2560 × 1600	13.3-inch, 2560 × 1600	12.9-inch, 2732 × 2048
Graphics:	Intel® Iris® Plus Graphics 640	Intel Iris Plus Graphics 650	12-core PowerVR® Series 7XT
OS:	macOS® High Sierra	macOS High Sierra	iOS® 11
Cellular Network:	N/A	N/A	4G LTE

## Software Applications and Versions

Software	Microsoft Surface® Laptop	Surface® Pro	Microsoft® Surface Book® 2	Apple® iPad Pro®	Apple® MacBook Pro® (Intel® Core™ i5 processor)	MacBook Pro (Intel Core i7 processor)
<b>Microsoft® Office 365®</b>	16.0.9226.2114	16.0.9226.2114	16.0.9226.2114	Not applicable	16.11	16.11
<b>Microsoft® Outlook®</b>	16.0.9226.2114	16.0.9226.2114	16.0.9226.2114	2.72.0	16.11	16.11
<b>Microsoft® OneNote®</b>	16.0.9226.2114	16.0.9226.2114	16.0.9226.2114	16.11	16.11	16.11
<b>Microsoft® PowerPoint®</b>	16.0.9226.2114	16.0.9226.2114	16.0.9226.2114	Not installed	16.11	16.11
<b>Microsoft® Excel®</b>	16.0.9226.2114	16.0.9226.2114	16.0.9226.2114	2.12	16.11	16.11
<b>Microsoft® Word</b>	16.0.9226.2114	16.0.9226.2114	16.0.9226.2114	2.12	16.11	16.11
<b>Microsoft Teams®</b>	Not applicable	1.4.4.0	Not applicable	1.077.2018040503	Not applicable	Not applicable
<b>Microsoft® Visio®</b>	Not applicable	16.0.9162.2152	Not applicable	1.12	Not applicable	Not applicable
<b>Microsoft OneDrive®</b>	Included in Office 365 subscription	Included in Office 365 subscription				
<b>Microsoft® Visual Studio®</b>	15.6.27428.2015	15.6.27428.2015	Not applicable	Not applicable	Not applicable	Not applicable
<b>join.me®</b>	Not applicable	Not applicable	Not applicable	4.19.1	Not applicable	Not applicable
<b>Adobe® Lightroom®</b>	Not applicable	Not applicable	1.2.0.0	Not applicable	20180131-1556-7f481f8	Not applicable
<b>Adobe® InDesign®</b>	Not applicable	13.1.0.76	Not applicable	Not applicable	13.1	Not applicable

# Appendix C: Test Steps

## Scenario 1: Quickly Organize and Execute Team Meetings

### On the Surface Laptop:

1. Open Outlook.
2. Start the timer.
3. From the ribbon, click **Home**.
4. In the **New** section, click **New Items**.
5. Click **Meeting**.
6. Add four users in the **To** field.
7. In the **Subject** field, enter **Product planning meeting**.
8. In the **Location** field, enter **Skype**.
9. In the **Description** field, enter **See attachment**.
10. From the ribbon, click **Insert**.
11. From the **Illustrations** section, click **Online Pictures**.
12. Perform a Bing search for **bulb**.
13. Double-click the desired picture.
14. Select the first suggested time.
15. Click **Send**.
16. Stop the timer.

### On the MacBook Pro:

1. Open Outlook.
2. Start the timer.
3. From the ribbon, click **Home**.
4. In the **New** section, click **New Email**.
5. Add four users in the **To** field.
6. In the **Subject** field, enter **Important!**
7. In the body text field, enter **Product planning meeting - reply with availability**.
8. Click **Send**.
9. Pause timer. Wait for responses. (Test recipients respond immediately by clicking **Reply**, entering their availability, and then clicking **Send**.)
10. Tabulate responses to determine an appropriate meeting time.
11. Restart timer.
12. From the ribbon, click **Home**.
13. In the **New** section, click **New items**.
14. Click **Meeting**.
15. Add four users in the **To** field.
16. In the **Subject** field, enter **Product planning meeting**.
17. In the **Location** field, enter **Skype**.
18. In the **Description** field, enter **See attachment**.
19. Open Safari.
20. Search for **bulb**.
21. Right-click the desired image, and then click **Save image** and save to **Downloads**.
22. Switch back to the **New Meeting** dialog box in Outlook.
23. From the ribbon, click **Format Text**.
24. Click **Attach File**, and then attach the recently download **bulb** image.
25. From the ribbon, click **Organize Meeting**.
26. Click **Send**.
27. Stop the timer.

## Scenario 2: Develop Shared Documents Collaboratively

### On the Surface Laptop:

1. Start the timer.
  2. Open Microsoft Teams.
  3. Click **Join or create a team**.
  4. Click **Create team**.
  5. In the **Team name** field, enter **Brochure Product Development**, and then click **Next**.
  6. Add two users to the team, and then click **Close**.
  7. Click **Join or create a team**.
  8. Click **Create team**.
  9. In the **Team name** field, enter **Legal**, and then click **Next**.
  10. Add one user to the team, and then click **Close**.
  11. Click the **More options** icon next to **Brochure Product Development** team, and then click **Add channel**.
  12. In the **Channel** name field, enter **Brochure scope discussion**, and then click **Add**.
  13. From the sidebar, click **Meetings**.
  14. Click **Schedule a meeting**.
  15. In the **Title** field, enter **Scope Discussion**.
  16. In the **Details** field, enter **Let's get together this afternoon and talk about the requirements for this new project. Action Item: Change brochure title to "New Title."**
  17. From the **Select a channel to meet in** drop-down menu, expand **Brochure Product Development**, and then click **Brochure Scope Discussion**.
  18. In the **Invite People** field, enter two user names.
  19. Click **Scheduling Assistant**.
  20. Click **Schedule Meeting**.
  21. From the sidebar, click **Teams**.
  22. Click the **Brochure Scope Discussion** channel.
  23. From the sidebar, click **Files**.
  24. Click **Upload**, select **Brochure.pptx**, and then click **Open**.
  25. From the sidebar, click **Meetings**.
  26. Select the newly created meeting.
  27. Click **Chat with participants**.
  28. Enter the following text: **Hello team, I'm looking forward to meeting later today to talk about this new project. I've uploaded a sample of the type of brochure I would like created, please take a look before the meeting and have any assets ready that you might need to share.** Click **Send**.
  29. From the sidebar, click **Files**.
  30. Click **Upload**, select **Example Brochure.pptx**, and then click **Open**.
  31. Open **PowerPoint**, and then open **Example Brochure.pptx** from OneDrive.
  32. From the menu bar, click **Share**.
  33. Enter a name in the **Invite people** field, and then click **Share**.
  34. The remote tester receives the shared link, opens the file, and edits the presentation title:
    - a. Open **Microsoft Outlook**.
    - b. Open the new email message and click the link in the email to open the PowerPoint presentation.
    - c. Revise the slide title to **"New Title."**
    - d. Click **Save**.
    - e. Click **Share**.
- After the remote user completes the edits:
35. From the bottom of the **Share** sidebar, click **Get a sharing link**, and then click **Create an edit** link. Click **Copy**.
  36. Return to Microsoft Teams.
  37. From the sidebar, click **Teams**.
  38. Under the **Legal** team, click the **General** channel.

39. In the **Chat** window, paste and send the link.
40. Enter a message for the legal team: **Please review and approve the brochure.**
41. Stop the timer.

**On the iPad Pro:**

1. Start the timer.
2. Open the Microsoft Teams app.
3. From the menu bar at the bottom, tap **Teams**.
4. At the top of the **Teams** sidebar, tap the **Manage teams** button, and then tap the plus icon.
5. In the **Name** field, enter **Brochure Product Development**, and then tap **Done**.
6. In the **Add people** dialog box, add two users to the team, and then tap **Done**.
7. At the top of the **Teams** sidebar, tap the **Manage teams** button, and then tap the plus icon.
8. In the **Name** field, enter **Legal**, and then tap **Done**.
9. In the **Add people** dialog box, add two users to the team, and then tap **Done**.
10. Tap the three-dots icon next to the **Brochure Product Development** team.
11. Tap **Manage Channels**.
12. Tap the plus icon to create a new channel.
13. In the **Name** field, enter **Brochure Scope Discussion**.
14. In the **Start a new conversation** field, enter **What is your availability to talk about the requirements for this new project?** Tap the **Send** icon, and then tap **Save**.
15. Wait for a reply. (The other testers reply immediately to the message.)
16. Open the Outlook app.
17. Tap the **Calendar** icon.
18. From the top menu bar, tap the plus icon.
19. In the **Title** field, enter **Scope Discussion**.
20. Tap the meeting time, and then change the start and end times to the previously agreed-upon meeting time. Tap the check mark to close the dialog box.
21. Tap **Description**, and then enter **Let's get together and talk about the requirements for this new project. Action Item: Change brochure title to "New Title."** Tap the check mark to close the dialog box.
22. Tap **Location**.
23. In the **Enter a place** field, enter **Brochure Scope Discussion Channel**, and then tap the name to close the dialog box.
24. Tap **People**.
25. Add two users to the meeting, and then tap the check mark to close the dialog box.
26. Tap the check mark to send the meeting request.
27. Switch back to the Microsoft Teams app.
28. From the menu bar at the bottom, tap **Teams**.
29. Expand the **Brochure Product Development** team.
30. Tap to select the **Brochure Scope Discussion channel**.
31. In the chat field, enter **Ron, would you please upload the brochure to the team files?** Tap the **Send** icon.
32. In the **Chat** field, enter **I've uploaded a sample of the type of brochure I like created, please take a look before the meeting and have any assets ready that you might need to share**, and then tap the **Send** icon.
33. Open the PowerPoint app.
34. From the menu bar on the left, tap **Open**.
35. Open **Brochure.pptx** from iCloud®.
36. Tap **File**, and then tap **Save a Copy**.
37. Save a copy of the file to a OneDrive folder.
38. Tap **Share**, and then tap **Invite People**.
39. Tap the plus icon, add a user to share the file with, and then tap **Send**.

40. The remote tester receives the shared link, opens the file, and edits the presentation title:
  - a. Open Microsoft Outlook.
  - b. Open the new email message and click the link in the email to open the PowerPoint presentation.
  - c. Revise the slide title to **“New Title.”**
  - d. Click **Save**.
  - e. Click **Share**.

After the remote user completes the edits:

41. Tap **Share**.
42. Tap **Copy Link**.
43. Switch to the Microsoft Teams app.
44. From the menu bar at the bottom, tap **Teams**.
45. Expand the **Legal** team, and then tap the **General** channel.
46. In the **Chat** field, paste the share link copied from the PowerPoint file.
47. In the **Chat** field, enter a message for the legal team: **Please review and approve the brochure**. Tap the **Send** icon.
48. Stop the timer.

## Scenario 3: Easily Design a Creative Asset

### On the Surface Book 2:

1. Start the timer.
2. Open PowerPoint.
3. Tap **Blank Presentation**.
4. Tap in the title area, and then enter **Title**.
5. From the ribbon, tap **Draw**, use the Surface pen to tap the highlighter, and then highlight the title.
6. Tap the red pen icon, and then use the Surface Pen to draw two red squares and one red cube on the slide.
7. From the ribbon, tap **Insert**, tap **New Slide**, and then tap **Blank** slide.
8. In the **Illustrations** section, tap **3D Models > From Online Sources**.
9. Tap **Dinosaurs**, tap the **Tyrannosaurus Rex**, and then tap **Insert**.
10. Resize the dinosaur to make it larger, and then rotate it to a profile view.
11. On the **File** ribbon, tap **Save As**, and then save the file to OneDrive as **Dinosaur Project.pptx**.
12. From the ribbon, tap **Share**.
13. In the **Invite** people field, add a user to share the file with, and then tap **Share**.
14. Stop the timer.

### On the MacBook Pro:

1. Start the timer.
2. Open PowerPoint.
3. Click **Blank Presentation**.
4. Click in the title area, and then enter **Title**.
5. Use the highlighter tool to highlight the title text.
6. From the ribbon, click **Insert > Shapes**, and then click the rectangle shape.
7. Click and drag on the slide to draw a rectangle.
8. From the ribbon, click **Shape Fill**, and then select the white color fill.
9. Copy the rectangle and paste three copies on the slide.
10. From the ribbon, click **Insert > Shapes**, and then click the line shape.
11. Click and drag to draw a line on the slide.
12. Copy the line and paste two copies on the slide.
13. Reposition the three lines with two squares to form a cube shape.
14. From the ribbon, click **Home > New Slide**.
15. Open Safari, and then search for a **Tyrannosaurus Rex** image.
16. Right-click the desired image and select **Copy Image**.
17. Return to PowerPoint.

18. Right-click in the new slide and select **Paste**.
19. Resize the newly pasted image to fit on the slide.
20. From the ribbon, click **File > Save As**, and then save the file to OneDrive as **Dinosaur Project.pptx**.
21. From the ribbon, click **Share**.
22. In the **Invite people** field, add a user to share the file with, and then click **Share**.
23. Stop the timer.

## Scenario 4: Securely Manage Devices

### On the Surface Laptop:

1. Start the timer.
2. Click the **Start** menu, and then search for **Camera**.
3. Click **Camera** to open the app.
4. Verify that the camera works as designed, and then exit the app.
5. Insert a USB storage device, such as a USB thumb drive.
6. Verify that the USB storage device is accessible and that you can view the contents of the device, and then safely remove the drive from the computer.
7. Click the **Start** menu, and then search for **System**.
8. Click **System Control Panel**.
9. In the **Computer name, domain, and workgroup settings area**, click **Change settings**.
10. On the **Computer Name** tab, click **Change**.
11. Select **Domain**, enter the fully qualified domain name (FQDN) of the domain, and then click **OK**.
12. In the **Username** and **Password** fields, enter the credentials of a domain administrator account, and then click **OK**.
13. Click **Close**.
14. Click **Restart now**.
15. After restarting, log on using your domain user account.
16. Click the **Start** menu, and then search for **Camera**.
17. Click **Camera** to open the app.
18. Verify that the camera app no longer functions.
19. Insert a USB storage device, such as a USB thumb drive.
20. Verify that the USB storage device is no longer accessible.
21. Stop the timer.

### On the MacBook Pro:

1. Start the timer.
2. Click the **Apple** icon, and then click **System Preferences**.
3. Double click **Users & Groups**.
4. Click the padlock.
5. In the **User Name** and **Password** fields, enter local administrator credentials, and then click **Unlock**.
6. Click **Login Options**.
7. Click **Join**.
8. Enter the FQDN of the domain.
9. In the **User Name** and **Password** fields, enter domain administrator credentials.
10. From the dock, click **Launchpad**.
11. Click **Photo Booth**.
12. Verify that the camera functions as designed, and then quit **Photo Booth**.
13. Insert a USB storage device, using a USB-C to USB-A dongle if necessary.
14. From the dock, click **Finder**.
15. Verify that the USB storage device is accessible.
16. On a Windows device, download the Mac System Center Configuration Manager client from Microsoft.com.
17. Run the System Center Configuration Manager client .msi file to extract the Mac OS-compatible **Macclient.DMG** file.
18. Using the USB storage device or a network connection, copy the **Macclient.DMG** file to the desktop of the MacBook Pro.

19. Double-click the **Macclient.dmg** file to expand the compressed image file.
20. Double-click the **CMClient.pkg** file.
21. Click **Continue**.
22. Click **Install**.
23. Enter local administrator credentials, and then click **Continue Installation**.
24. Click **Restart**.
25. Log on to the computer using your local administrator credentials. The SCCM Configuration Manager Computer Enrollment dialog will appear automatically.
26. Click **Next**.
27. In the **Username** and **Password** fields, enter credentials of a domain administrator with System Center Configuration Manager enrollment rights.
28. Enter the FQDN of the System Center Configuration Manager server.
29. Click **OK**, and then wait for the profile settings to be pushed to the computer from the System Center Configuration Manager server.
30. Click the **Apple** icon, and then click **Restart**.
31. From the dock, click **Launchpad**.
32. Click **Photo Booth** and verify that the camera no longer functions, and then close the Photo Booth app.
33. Insert a USB storage device.
34. From the dock, click **Finder**.
35. Verify that the USB storage device is no longer accessible.
36. Stop the timer.

## Scenario 5: Work Efficiently on the Road

### On the Surface Pro:

1. Start the timer.
2. From the **Documents** folder, open **Brochure.pdf**. (The file should automatically open in a Microsoft Edge® browser window.)
3. Scroll down to review both pages of the document.
4. Click the **Start** menu, and then search for **Camera**.
5. Click to open the **Camera** app.
6. Take a new picture for the brochure cover.
7. Click the **Start** menu, and then search for **InDesign**.
8. Click to open the **InDesign** app.
9. Click **Open**.
10. Open **Brochure.indd**.
11. Click **File**, and then click **Place**.
12. Place the image recently taken from the camera.
13. Click the right arrow to view the second page.
14. Click the background of the second image.
15. Click **Color**.
16. Edit the color levels to set **Magenta** at **85%** and **Black** at **15%**.
17. Click **File > Export**.
18. Click **Save**.
19. Click **Export**.
20. Open the newly exported PDF file.
21. Scroll down to view both pages of the document.
22. Stop the timer.

### On the iPad Pro:

1. Start the timer.
2. Tap to open the **Files** app.
3. Find and open **Brochure.pdf**.
4. Scroll down to review both pages of the document.
5. On the home screen, tap to open the **Camera** app.
6. Use the iPad Pro camera to take a new picture for the brochure cover.
7. On the home screen, tap to open the **Photos** app.
8. Tap the recently taken picture.
9. Tap the **Share** button, and then use **AirDrop** to share the photo with your MacBook Pro.
10. Switch to the MacBook Pro.
11. Click **Accept** on the **AirDrop** request, and then click **Save to downloads**.
12. From the dock, click **LaunchPad**.
13. Click **Adobe InDesign**.
14. Click **Open**, and then open **Brochure.indd**.
15. Double-click on the first-page background image.
16. Select the new photo you just transferred from the iPad Pro.
17. Click the right arrow to view the second page.
18. Click the background of the second image.
19. Click **Color**.
20. Edit the color levels to set **Magenta** at **85%** and **Black** at **15%**.
21. Click **File > Export**.
22. Click **Save**.
23. Click **Export**.
24. From the dock, click **Finder**.
25. Navigate to the newly exported file.
26. From the **Favorites** section of Finder, right-click AirDrop, and then click **Open new window**.
27. Click and drag the newly exported file into the AirDrop window.
28. Switch to the iPad Pro.
29. Tap **Accept** to accept the AirDrop share from your MacBook Pro.
30. From the **Open** with dialog box, tap **Files**.
31. From the **Files** window, tap **iCloud**, and then tap **Add**.
32. Tap to open the brochure.
33. Scroll down to review the brochure.
34. Stop the timer.

## Scenario 6: Log on Quickly and Easily

### On the Surface Book 2:

1. Start the timer.
2. Touch the touchpad to wake the device.
3. Look at the screen to log on.
4. Click the **Start** menu, and then click **PowerPoint**.
5. Click **Open**, and then open a file from **OneDrive** to verify account access.
6. Stop the timer.

### On the MacBook Pro:

1. Start the timer.
2. Tap the Touch ID sensor on the Touch Bar.
3. Enter your password.
4. From the dock, click **LaunchPad**.
5. Click **PowerPoint**.
6. Click **Open**, and then open a file from OneDrive to verify account access.
7. Stop the timer.

## Scenario 7: Simplify Teamwork Using a Digital Whiteboard

### On the Surface Pro:

1. Start the timer.
2. From the desktop, double-click the **join.me** icon to start join.me.
3. Select **One time code**.
4. Click the orange **Play** button.
5. Click the **Send an email** link.
6. Add a user in the **To** field.
7. Click **Send**.
8. In the **How will you talk and listen?** field, click **Computer**.
9. Click **Start**.
10. From the **Start** menu, search for **Visio**.
11. Click to open **Visio**.
12. Double-tap a blank drawing.
13. From the ribbon, click **Insert**, and then click **Pictures** from the **Illustrations** section.
14. Click the **manager** image, and then hold Ctrl and click the **people** image.
15. Click **Open**.
16. Click and drag the images to reposition them on the page.
17. From the ribbon, click **Insert**, and then click **Online Pictures** from the **Illustrations** section.
18. Use Bing to search for **bulb**.
19. Click the desired image.
20. Click **Insert**.
21. Click and hold to reposition the images.
22. From the ribbon, click **Insert**, and then click **Pictures** from the **Illustrations** section.
23. Click the meeting image.
24. Click **Open**.
25. Click and hold to reposition the image.
26. From the ribbon, click **Review**, and then click **Ink** from the **Comments** section.
27. From the ribbon, click **Pens**, and then click **Color**.
28. Tap **bright red**.
29. Draw a red circle around the bulb image.
30. From the ribbon, click **Pens**, and then click **Color**.
31. Tap **blue**.
32. Draw a blue box.
33. From the ribbon, click **Pens**, and then click **Color**.
34. Tap **black**.

35. Draw a black arrow pointing from the blue box to the red circle.
36. Draw a black arrow pointing from the red circle to the group of images.
37. Label each figure in the people image with a name and an arrow pointing from the name to the image.
38. Return to join.me and tap the **Chat** button.
39. In a chat session, enter **Please add tips in the blue box**.
40. Wait for the other user to respond and click **Request control**.
41. Click **Allow control**.
42. Pause the timer.
43. Wait for other user to complete any edits.
44. Restart the timer.
45. From the ribbon, click **File > Save as**, and then save the file in a OneDrive folder.
46. From the ribbon, click **File > Share**.
47. Click **Email**.
48. Click **Send** as attachment.
49. Add a user in the **To** field.
50. Edit the **Subject** line to **Please approve**.
51. Tap **Send**.
52. Stop timer.

#### **On the iPad Pro:**

1. Start the timer.
2. Tap to open the **join.me** app.
3. Tap **One-time code**.
4. Tap **Share** link.
5. Tap **Outlook**.
6. Add a user in the **To** field.
7. In the **Subject** field, enter **Join Me**.
8. Tap the **Send** icon to send the message.
9. Tap the **Select what to share** icon.
10. Tap **New Whiteboard**.
11. Tap the **Photo** icon.
12. Tap **Add photos**.
13. Tap **All Photos**.
14. Tap to add the people image.
15. Tap to add the manager image.
16. Tap and drag to reposition the images.
17. From the home screen, open **Safari**.
18. Search for a **bulb** image.
19. Tap the desired image.
20. Tap and hold the image, and then tap **Save image**.
21. Switch back to join.me.
22. Tap the **Photo** icon.
23. Tap **Add photos**.
24. Tap **All Photos**.
25. Tap the bulb image.
26. Tap the photo icon.
27. Tap **Add photos**.
28. Tap **All photos**.
29. Tap the meeting image.
30. Tap the **Pen** tab.
31. Tap the **Color** menu, and then tap the **red** color.
32. Draw a red circle around the bulb image.

33. Tap the **Color** menu.
34. Tap the **blue** color.
35. Draw a blue box to the right of the red circle.
36. Tap the **Color** menu.
37. Tap the **black** color.
38. Draw an arrow pointing from the blue box to the red circle.
39. Draw an arrow pointing from the red circle to the group of images.
40. Label each figure in the people image with a name and an arrow pointing from the name to the image.
41. Tap the **Chat** icon.
42. In the chat session, enter **Please add tips to the blue box**.
43. Tap the three-dots icon.
44. Tap **Export this document**.
45. Tap **Export as JPG**.
46. Tap **Entire whiteboard**.
47. Tap **Outlook**.
48. Add a user in the **To** field.
49. In the **Subject** field, enter **Add tips**.
50. Tap the **Send** icon to send the message.
51. Tap the three-dots icon.
52. Tap **Pass presenter role**.
53. Wait for other user to present.
54. Wait for other user to perform the following steps:
  - a. Tap **Accept** to present.
  - b. Tap **New whiteboard**.
  - c. Tap the **Photos** icon.
  - d. Navigate to and tap the **Exported Whiteboard** image.
  - e. Tap the **Pen** tab.
  - f. Tap the **Color** menu.
  - g. Tap **Green**.
  - h. Draw three dollar signs in the blue box.
  - i. Tap the triple dots.
  - j. Tap **Export as jpg**.
  - k. Tap **Entire whiteboard**.
  - l. Tap **Outlook**.
  - m. In the **To** field, insert the manager's address.
  - n. In the **Subject** field, enter **Please review and approve**.
  - o. Tap the **Send** icon.
  - p. In join.me, tap **Chat**.
  - q. In the chat field, enter **Sent to manager**.
55. Stop the timer.

## Scenario 8: Complete Development Workflows Across a Suite of Applications

### On the Surface Laptop:

1. Open Outlook on the web in the default web browser.
2. Start the timer.
3. Open an email message from the manager.
4. From the email message, copy the text that the manager wants changed.
5. Click the down arrow next to **Reply all**.
6. Click **Forward**.
7. Add the recipient user in the **To** field.
8. In the **Subject** field, enter **See new design plan on share**.

9. Click **Send**.
10. Click **Start**.
11. Search for **Visual Studio**.
12. Click to run **Visual Studio**.
13. Click **File**.
14. From the **Open** menu, click **Project/Solution**.
15. Navigate to and open the test solution.
16. Expand **Accessibility**.
17. Expand **Fetch timer**.
18. Double-click **Program.cs**.
19. Paste the copied text into line three.
20. Click **Build**.
21. Click **Rebuild solution**.
22. Click **Save all**.
23. Click **File > Exit**.
24. Switch back to Outlook on the web.
25. Click the app launcher icon in the upper left.
26. Click **SharePoint**.
27. Click to open your SharePoint site.
28. Click **Documents**.
29. Click **Upload**.
30. Click **Files**.
31. Navigate to and upload the edited test solution from Visual Studio.
32. Click the app launcher icon.
33. Click **OneNote**.
34. From the **Draw** ribbon, click the **Pen** tool.
35. Click the **blue** color.
36. Using the Surface Pen, draw a test diagram of a cloud containing the text "**Web**," and arrows pointing from the text "**client**" and "**server**" to the web cloud.
37. Click **Share**.
38. Add a user to the share.
39. Click **Send**.
40. Switch back to Outlook on the web.
41. Click to open the original email from the manager.
42. Click **Reply all**.
43. In the message's body content, enter **Done**.
44. Click **Send**.
45. Stop the timer.

#### **On the MacBook Pro:**

1. Open Parallels Desktop and create a Windows 10 session.
2. Open Outlook on the web in the default web browser.
3. Start the timer.
4. Open an email message from the manager.
5. From the email message, copy the text that the manager wants changed.
6. Click the down arrow next to **Reply all**.
7. Click **Forward**.
8. Add the recipient user in the **To** field.
9. In the **Subject** field, enter **See new design plan on share**.
10. Click **Send**.
11. Click **Start**.
12. Search for **Visual Studio**.

13. Click to run **Visual Studio**.
14. Click **File**.
15. From the **Open** menu, click **Project/Solution**.
16. Navigate to and open the test solution.
17. Expand **Accessibility**.
18. Expand **Fetch timer**.
19. Double-click **Program.cs**.
20. Paste the copied text into line three.
21. Click **Build**.
22. Click **Rebuild solution**.
23. Click **Save all**.
24. Click **File > Exit**.
25. Switch back to Outlook on the web.
26. Click the app launcher icon in the upper left.
27. Click **SharePoint**.
28. Click to open your SharePoint site.
29. Click **Documents**.
30. Click **Upload**.
31. Click **Files**.
32. Navigate to and upload the edited test solution from Visual Studio.
33. Click the app launcher icon.
34. Click **OneNote**.
35. From the **Draw** ribbon, click the **Pen** tool.
36. Click the **blue** color.
37. Draw a test diagram of a cloud containing the text "**Web**," and arrows pointing from the text "**client**" and "**server**" to the web cloud.
38. Click **Share**.
39. Add a user to the share.
40. Click **Send**.
41. Switch back to Outlook on the web.
42. Click to open the original email from the manager.
43. Click **Reply all**.
44. In the message's body content, enter **Done**.
45. Click **Send**.
46. Stop the timer.

## Scenario 9: Efficiently Create and Publish an Image Portfolio

### On the Surface Book 2:

1. Start the timer.
2. Insert a MultiMediaCard (MMC) into the Surface Book.
3. Copy test pictures from the card to the local **Pictures** folder.
4. From the desktop, double-click to open **Adobe Lightroom**.
5. Click the plus icon to add files.
6. Navigate to the local **Pictures** folder and select the test pictures.
7. Click **Review for import**.
8. Click **Add 5 photos**.
9. Click the plus icon next to **Albums**.
10. Click **Create Album**.
11. In the album title field, enter **Travel**.
12. Click **Create**.
13. Select the three travel pictures.
14. Drag and drop the images into the **Travel** album.

15. Click the plus icon next to **Albums**.
16. Click **Create Album**.
17. Enter **Critters** for the album title.
18. Click **Create**.
19. Select the two animal pictures.
20. Drag and drop the pictures into the **Critters** album.
21. Click the **Travel** album to view it.
22. Click the **Taj Mahal** photo to view it.
23. At the top right, click the **Settings** icon.
24. Under the **Color** section, expand the **White Balance** drop-down menu.
25. Select **Auto**.
26. Click the **Healing** tool icon.
27. Using the healing tool, click on open sky, and then click on dust spots in the image.
28. Repeat the previous step eight times until dust is removed from image.
29. Right-click the **Travel** album.
30. Click **Share Album**.
31. Click **Copy**.
32. Click **Close**.
33. Switch to the Outlook desktop app.
34. Click **New email**.
35. Add a user in the **To** field.
36. In the **Subject** field, enter **Review**.
37. In the message's body content, enter **Check these out;**, and then paste the shared link into the message body.
38. Click **Send**.
39. Switch to the desktop and double-click to open **Photoshop**.
40. Note receipt of an **Approved** message from the manager, in response to your email.
41. Click **File**.
42. Click **Open**.
43. Navigate to the local Pictures folder, and then select the **Clydesdale** test image.
44. Click **Open**.
45. Click the **Channels** tab.
46. Click the **Create new channel icon**.
47. Toggle the channel visibility icon to **Visible** for the **RGB** channel.
48. Using the Surface Pen, trace around the horse in the image.
49. Click the **Quick** select tool.
50. Click **Edit**.
51. Click **Fill**.
52. Click **OK**.
53. Select the newly created channel.
54. Click the **Load channel as selection** icon.
55. Click the **Layers** tab.
56. Click the **Lock** icon to unlock the background.
57. Click the **Add mask** icon.
58. Click **Channels**.
59. Select the **Alpha 1** channel.
60. Click **Filter**.
61. Under **Blur**, click **Gaussian blur**.
62. Click **OK**.
63. Click the **Layers** tab.
64. Click the **New layer** icon.

65. Click and drag the new layer behind the first layer.
66. Select the new layer.
67. Click **Edit**.
68. Click **Fill**.
69. Expand the Contents drop-down menu, and then click **Foreground color**.
70. Click **OK**.
71. Click the **Channels** tab.
72. Select the created channel.
73. Click the **Load channel as selection** icon.
74. Click the **Layers** tab.
75. Click the newly created layer.
76. Click **Edit**.
77. Click **Fill**.
78. Expand the **Contents** drop-down menu, and then click **Background color**.
79. Click **OK**.
80. Click **Channels**.
81. Toggle the **Channel visibility** icon to **Invisible** for the created channel.
82. Click **File**.
83. Click **Save as**.
84. Expand the **Save as type** drop-down menu, and then select **jpeg**.
85. Click **Save**.
86. Click **OK**.
87. Click **File**.
88. Click **Open**.
89. Navigate to the local **Pictures** folder.
90. Select the **Alhambra** and **Andromeda** images.
91. Click **Open**.
92. In the **Andromeda** tab, click **Image**.
93. Under **Image rotation**, click **Arbitrary**.
94. Enter **57 degrees**.
95. Click **OK**.
96. Click **Image**.
97. Click **Image size**.
98. Edit the width to **5000 pixels**.
99. Click **OK**.
100. Right-click the image, and then click **Copy**.
101. Click the **Alhambra** tab to switch images.
102. Using the quick-select tool, click in the white space of the background.
103. Click the **Layers** tab.
104. Click the **New layer** icon.
105. Select the new layer.
106. Click **Edit**.
107. Under **Paste special**, click **Paste into**.
108. Click **File**.
109. Click **Save as**.
110. From the **Save as type** drop-down menu, click **jpeg**.
111. Click **Save**.

112. Click **OK**.
113. Switch back to Lightroom.
114. Click the plus icon to add files.
115. Navigate to and select the two new jpeg files.
116. Click **Review for import**.
117. Click **Add 2 photos**.
118. Click the plus icon next to **Albums**.
119. Click **Create Album**.
120. Enter **Portfolio** for the album title.
121. Click **My photos**.
122. Select the two edited images and the three unedited images.
123. Drag and drop the files into the **Portfolio** album.
124. Right-click the **Portfolio** album.
125. Click **Share Album**.
126. Click **Copy**.
127. Click **Close**.
128. Switch to the Outlook desktop app.
129. Click **New email**.
130. Add a user in the **To** field.
131. In the **Subject** field, enter **Portfolio**.
132. In the message's body content, paste the share link.
133. Click **Send**.
134. Stop the timer.

#### **On the MacBook Pro:**

1. Start the timer.
2. Attach the USB-C dongle with MMC to the MacBook Pro.
3. Double-click the MMC folder on the desktop.
4. Copy the test pictures from the MMC to the local **Pictures** folder.
5. Click **Launchpad**.
6. Click to start **Adobe Lightroom**.
7. Click the plus icon to add files.
8. Navigate to the local **Pictures** folder and select the test pictures.
9. Click **Review for import**.
10. Click **Add 5 photos**.
11. Click the plus icon next to **Albums**.
12. Click **Create Album**.
13. Enter **Travel** for the album title.
14. Click **Create**.
15. Select the three travel pictures.
16. Drag and drop the images into the **Travel** album.
17. Click the plus icon next to **Albums**.
18. Click **Create Album**.
19. Enter **Critters** for the album title.
20. Click **Create**.
21. Select the two animal pictures.
22. Drag and drop the pictures into the **Critters** album.
23. Click the **Travel** album to view it.
24. Click the **Taj Mahal** photo to view it.
25. At the top right, click the **Settings** icon.
26. Under the **Color** section, expand the **White Balance** drop-down menu.

27. Click **Auto**.
28. Click the **Healing tool** icon.
29. Using the healing tool, click on open sky, and then click on dust spots in the image.
30. Repeat the previous step eight times until dust is removed from image.
31. Right-click the **Travel** album.
32. Click **Share Album**.
33. Click **Copy**.
34. Click **Close**.
35. Switch to the Outlook desktop app.
36. Click **New email**.
37. Add a user in the **To** field.
38. In the **Subject** field, enter **Review**.
39. In the message's body content, enter **Check these out;**, and then paste the shared link.
40. Click **Send**.
41. Click **Launchpad**.
42. Click the **Photoshop** icon to start the app.
43. Note receipt of an **Approved** message from the manager, in response to your email.
44. Click **File**.
45. Click **Open**.
46. Navigate to the local **Pictures** folder, and then select the **Clydesdale** test image.
47. Click **Open**.
48. Click the **Channels** tab.
49. Click the **Create new channel** icon.
50. Toggle the channel visibility icon to **Visible** for the **RGB** channel.
51. Using the trackpad, trace around the horse in the image.
52. Click the **Quick select** tool.
53. Click **Edit**.
54. Click **Fill**.
55. Click **OK**.
56. Select the newly created channel.
57. Click the **Load channel as selection** icon.
58. Click the **Layers** tab.
59. Click the **Lock** icon to unlock the background.
60. Click the **Add mask** icon.
61. Click **Channels**.
62. Select the **Alpha 1** channel.
63. Click **Filter**.
64. Under **Blur**, click **Gaussian blur**.
65. Click **OK**.
66. Click the **Layers** tab.
67. Click the **New layer** icon.
68. Click and drag the new layer behind the first layer.
69. Select the new layer.
70. Click **Edit**.
71. Click **Fill**.
72. Expand the **Contents** drop-down menu, and then click **Foreground color**.
73. Click **OK**.
74. Click the **Channels** tab.
75. Select the created channel.
76. Click the **load channel as selection** icon.

77. Click the **Layers** tab.
78. Click the newly created layer.
79. Click **Edit**.
80. Click **Fill**.
81. Expand the **Contents** drop-down menu, and then click **Background color**.
82. Click **OK**.
83. Click **Channels**.
84. Toggle the **Channel visibility** icon to **Invisible** for the created channel.
85. Click **File**.
86. Click **Save as**.
87. Expand the **Save as type** drop-down menu, and then click **jpeg**.
88. Click **Save**.
89. Click **OK**.
90. Click **File**.
91. Click **Open**.
92. Navigate to the local **Pictures** folder.
93. Select **Alhambra** and **Andromeda** images.
94. Click **Open**.
95. In the **Andromeda** tab, click **Image**.
96. Under **Image rotation**, click **Arbitrary**.
97. Enter **57 degrees**.
98. Click **OK**.
99. Click **Image**.
100. Click **Image size**.
101. Edit the width to **5000 pixels**.
102. Click **OK**.
103. Right-click the image, and then click **Copy**.
104. Click the **Alhambra** tab to switch images.
105. Using the quick-select tool, click in the white space of the background.
106. Click the **Layers** tab.
107. Click the **New layer** icon.
108. Select the new layer.
109. Click **Edit**.
110. Under **Paste special**, click **Paste into**.
111. Click **File**.
112. Click **Save as**.
113. From the **Save as type** drop-down menu, click **jpeg**.
114. Click **Save**.
115. Click **OK**.
116. Switch back to Lightroom.
117. Click the plus icon to add files.
118. Navigate to and select the two new jpeg files.
119. Click **Review for import**.
120. Click **Add 2 photos**.
121. Click the plus icon next to **Albums**.
122. Click **Create Album**.
123. Enter **Portfolio** for the album title.
124. Click **My photos**.
125. Select the two edited images and the three unedited images.

126. Drag and drop the files into the **Portfolio** album.
127. Right-click the **Portfolio** album.
128. Click **Share Album**.
129. Click **Copy**.
130. Click **Close**.
131. Switch to the Outlook desktop app.
132. Click **New email**.
133. Add a user in the **To** field.
134. In the **Subject** field, enter **Portfolio**.
135. Paste the share link into the body of the message.
136. Click **Send**.
137. Stop the timer.

## Scenario 10: Switch Between Laptop and Tablet Modes

### On the Surface Pro:

1. Start the timer.
2. Click the **Start** menu.
3. Search for **Word**.
4. Click to open Microsoft Word.
5. Click **Open**.
6. Click **Browse**.
7. Navigate to the **010-portionA.docx file**.
8. Click **Open**.
9. Add the following text to the end of the document: **They were drawing near to the place where there was an island in the river. The island was a good spot to make camp. It was isolated and had the protection of the surrounding water. They would sleep on the island tonight.**
10. Click the **Start** menu.
11. Search for **OneNote**.
12. Click to open **OneNote**.
13. Click **Add Page**.
14. Enter **Test Meeting** as the page title.
15. Enter the following text on the page body: **MEETING NOTES: Attendance: Bill, Ray, Ngan, Jose, Patty. Absent: none. Tardy: none. Accomplishments: Bill brought name tags for each person. Patty brought plastic protectors. We now look like a real team! Jose researched Java IDEs and is prepared to brief the team on available selections.**
16. Switch back to the open Word doc.
17. Using the Surface Pen, circle three areas of the doc to cover in the meeting.
18. Disconnect the Surface Pro from the keyboard.
19. Swipe from the right side of the display to open the Windows side menu.
20. Tap **Network**.
21. Tap the connected wireless network.
22. Tap **Disconnect**.
23. Tap the cellular network.
24. Tap **Connect**.
25. Tap **Start**.
26. Tap the **Skype for Business** tile.
27. Double-tap the user you want to connect with.
28. Tap the **Phone** icon.
29. Tap **Skype call**.
30. Tap the **Screen** icon.
31. Tap **Share your desktop**.

32. Tap the **Conversation** icon.
33. In chat window, enter the following text: **Here is the document we discussed.**
34. Switch to the open Word doc to show the other user.
35. The other user responds in the Skype chat window with “Change the last sentence to: Lara fell asleep to the sound of the waves.”
36. Reply in the chat window with **OK**.
37. Switch to the open Word doc.
38. Change the last sentence of the doc to **Lara fell asleep to the sound of the waves.**
39. Tap **File**.
40. Tap **Save as**.
41. Tap **OneDrive**.
42. Tap **Save**.
43. Stop the timer.

#### **On the iPad Pro:**

1. Start the timer.
2. Tap the Microsoft Word app, and then tap **Open**.
3. Tap **iPad**.
4. Tap **010-portionA.docx**.
5. Add the following text to the end of the document: **They were drawing near to the place where there was an island in the river. The island was a good spot to make camp. It was isolated and had the protection of the surrounding water. They would sleep on the island tonight.**
6. Tap the **Home** button.
7. Tap the **OneNote** app.
8. Tap **New page**.
9. Enter **Test Meeting** as the page title.
10. Enter the following text on the page body: **MEETING NOTES: Attendance: Bill, Ray, Ngan, Jose, Patty. Absent: none. Tardy: none. Accomplishments: Bill brought name tags for each person. Patty brought plastic protectors. We now look like a real team! Jose researched Java IDEs and is prepared to brief the team on available selections.**
11. Double-tap the **Home** button to switch to the Word app.
12. Tap the **Draw** tab, and then tap the **Pen** tool.
13. Use the Apple Pencil to circle three areas of the doc to cover in the meeting.
14. Tap the **File** icon.
15. Tap **Save a copy**.
16. Tap **OneDrive**.
17. Tap **Save**.
18. Double-tap the **Home** button.
19. Tap the **Wireless** icon to turn off Wi-Fi.
20. Tap the **Cellular** icon to turn on the cellular connection.
21. Tap the **Home** button to return to the desktop.
22. Tap the **Skype for Business** app.
23. Double-tap a user to connect with.
24. Tap the **Phone** icon.
25. Tap the **Chat** icon.
26. In the chat window, enter the following text: **Please review the doc we discussed.**
27. Double-tap the **Home** button and switch to the Word app.
28. Tap the **Share** icon.
29. Add a user to share with.
30. Tap **Send**.
31. The other user responds in the Skype chat window with “Change the last sentence to: Lara fell asleep to the sound of the water.”
32. Tap the chat notification to switch to Skype.
33. Reply in the chat window with **OK**.

34. Double-tap the **Home** button and switch to the Word app.
35. Change the last sentence of the doc to **Lara fell asleep to the sound of the water.**
36. Tap **Save**.
37. Stop the timer.

<sup>1</sup> Based on five standard eight-hour workdays per week, 52 weeks per year, 23 workdays per month, and three months per quarter.



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