

## **Build 2017**

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(Music, cheers, applause.)

**JOE BELFIORE:** Hello, Build! Good morning. Thank you for that nice welcome. I'm thrilled to be back here at Build with all of you talking about the Windows platform and what we'll do in Windows. What do you think? You like it? (Cheers, applause.)

I call this "graphite gold." Graphite gold? You know, I'm trying to help out all the people who are confusing me and Alex Kipman. I figured I'd make it a little more obvious.

So what did you think about Lorraine's demo? Pretty cool, huh? (Cheers, applause.)

What I'm going to do, I want to take you through some of the technology and features behind what she did and talk about how we're expanding those ideas into Windows into all of your apps.

So think about what she showed in Story Remix. She was moving between devices seamlessly, even from Windows to different platforms, but it involved multiple users. She used different input modalities. There was touch and mouse and inking. And she took advantage of totally cool new technologies like 3D and mixed reality.

And all of those things make the app more engaging and we want to spend some time talking about this notion of love and engagement and how we can help you solve today's challenges of device, input, and platform diversity. And make it easy for your apps to take advantage of things like 3D and mixed reality, all in a way that will drive higher engagement and love for your app.

So today I'm going to talk about two things. First, a new design system that will power the experiences for a multi-device, multi-input world.

And then, second, how by connecting to the Microsoft Graph, Windows PCs will enable unmatched cross-device experiences.

So let's get started with this new design system.

I want you to think about what we're trying to do with Windows at Microsoft. We're building experiences for mouse, ink, touch, gesture, gaze, for an incredible range of devices which include PCs, tablets, phones, TVs and mixed reality headsets.

This diversity of experiences requires an expansion of our current design system. And today's the day we're going to introduce that system. We call this Fluent Design. Do you

want to get a chance to see what it looks like and how it feels? Yeah? All right, let's roll the video.

(Video: Fluent Design System.)

**JOE BELFIORE:** What do you think? (Applause.)

So the Fluent Design System has five elements that we're playing with and evolving, and each of these is intended to help all of us developers build more expressive and engaging experiences.

So let's take a look at each and get a sense for how the canvas evolved.

**Light.** Light has a way of drawing our attention. It's warm and inviting, fluid, and purposeful. We use it to create an atmosphere and a sense of place, and we need it to practically guide us to illuminate information.

Now, light's been used by game designers and photographers for years, and with Fluent, it'll be an intuitive way for us as developers to draw focus to the right thing at the right time.

**Depth.** Imagine the depth of the real world transforming your flat design. Think about the typical frame that contains the information you present. Now, break it apart and reconstruct how those things relate to each other in a more layered, physical environment.

With better use of depth, we can redefine how people stay focused and organized.

**Motion.** Motion design has a special power to bring all of our experiences to life. And I want you to think of this like a director who's making a movie where the transitions keep the watcher focused on the story on what the artist wants you to see.

We can bring more of that quality to our design to lead people from one task to another with a cinematic ease, making even subtle actions feel alive.

**Material.** The things that surround us in the real world are sensory and invigorating. They bend, stretch, they bounce like these acrylic cubes, they shatter. We want to bring more of that character to our design in the right way with a physical quality, inviting people to touch and interact.

**Scale.** We've been designing our experiences in 2D for years and years, but it's time to move beyond mere rectangles confined to a plane. The constrained designs of yesterday are giving way to tomorrow's digital world. And we're going to use scale to deliver benefits and experiences that once were impossible.

Now, this design system isn't theoretical, and it's not just about visuals, it's about interaction models and spaces and how all of these things come together.

And what I want to do is go through a particular example and show you how we're thinking about that. And that is Windows Ink.

Now, the usage of ink has grown tremendously on Windows. In fact, in the past year, the number of ink-enabled devices that people are using has doubled.

And what's even more important is that when we see users engaging with the tons of now ink-enabled apps in the Windows Store, we see higher customer satisfaction and more usage and engagement.

As part of our design evolution with Fluent, we're updating the way pens interact with existing Windows experiences to give a more complete interaction model. In fact, we want to make it so that people can navigate all of Windows just using the pen.

Now, what I want to do is take you through this example. And so we're going to start a demo by looking at Edge and think about inking with Edge.

So I open up Edge, the best ink-enabled browser, for sure. And when I click in the text box here, I can just start writing, and a handwriting panel that appears in place at the text box where I'm writing.

And in this case, the text box was unmodified. The system handles this for me, but I want you to look at the nice material design of that panel and watch as I gesture. I can just strike through here and the ink recognition does what I'd expect.

So I can rewrite the word I was writing, and the whole thing is designed to create a seamless experience. My candidates are right near my pen at the top, and the Edge and Bing implementation of suggestions is unmodified right below. So all of this works smoothly and really nicely.

Now, I want to show you how the pen is going to help people navigate through this system. I'm staying in Edge here. So I'm on a Surface Pro and I've got a pen in my hand. And you'll see one of the ways that Fluent evolved here is that I can now scroll right here by using the pen.

And if I want to go to a new page, I can just click a link, there we go, and we'll navigate. And once again, I can scroll through the page.

And we thought not just about the navigation, but also about things like selection. So I'm going to press the barrel button on the pen and just drag here to select some checks.

I get a context menu, I can copy, I can switch to Word, I can again use the barrel button to get a context menu. I click, I choose paste, and it's as simple as that to move quickly between apps and experiences.

Now, of course, an app like Word supports things like that same ink gesturing. So I can strike through and items are removed. And the sense I want you to get here with Fluent is that the holistic thinking evolves the way the pen works so that I get a natural, complete interaction.

But it's not only about navigating the system, but also making ink work better and be more complete.

So, once again, with Edge, we're working hard to make sure that annotation and use of the pen with your browsing and reading works terrifically.

So one of the new things we're doing is enabling ink annotations in PDFs.

So imagine here I'm a contractor and I'm going to actually ink into this PDF, it's a proposal that I'm writing for one of my clients. So I'll go here and I'll get my pen, I've measured this patio, I'm going to do a refurbishment. I know the width and here I know the depth and you see how the ink just overlays the image and the page itself.

Now, when I'm doing, I can just save the PDF. And imagine I send this off to my client, all those annotations are saved within the PDF document, so on the receiving end, when someone gets that PDF, all the ink is right there where they left it.

So that gives you a sense of how the pen is evolving. And that's one example of all the things that we're doing within Fluent Design to think holistically about all of these interactions and cross-device scenarios.

And you're going to see Fluent Design show up in the Windows Shell, in our built-in apps over time and across devices.

We want to invite all of you to learn more and participate in the evolution of the Windows Design System at sessions at Build and online with us over the next month.

Okay. I want to change topics now and go into some depth and show you a range of ways that Windows will connect to the Microsoft Graph.

And I have to admit, as a user scenario guy, when I say "Windows connects to the Microsoft Graph," I realize it sounds kind of abstract. But stick with me. I think this is actually a pretty big deal.

But before I do a demo, I want to set up the problem. Meet Sherry. She's a typical creator. As an interior designer, Sherry's world is filled with possibilities and complexities. At any point, she has a lot of different activities going on. She might be reading or researching or authoring a document or making a presentation. She could be shopping, communicating, she's doing all of those things. Her activities are broad and frequent.

One of the things that complicates this is that she does those activities across a wide range of devices. She has not just one, but more than one PC, and the PCs is connected to devices like printers and she uses a camera and she has a phone and she's even thinking about getting some of these new Windows mixed-reality glasses to use with her clients.

This is super powerful, but it's also complex and it creates some inconveniences for Sherry. And, you know, you think about as she does these activities, her content might be stuck on one device, and there's no easy way to pick up where she left off as she moves from one to the next.

We think Sherry could benefit from a more organized system where content and activities can seamlessly move from one device to another.

Windows and the Microsoft Graph will enable this system. Windows PCs will love all your devices.

Now, today we're going to announce a set of new features in Windows which will bring your files and your activities and even the live content that you're working on from separate device islands into a unified intelligent cloud where the Windows PC will help you roam from device to device, using the Microsoft Graph.

So I'm going to take you through some scenarios and explain how this works.

First, let's talk about files. Today, I'm thrilled to announce OneDrive Files on Demand. This is a complete solution for getting all your files into the cloud and then making them available on all your devices.

OneDrive Files on Demand will be built into the Windows 10 Fall Creators Update and available cross-device.

Now, let me show you exactly how this works. Let's think about Sherry. As I said, she's an interior designer, and at work, she has a lovely Surface Studio.

And what you see here on the screen is her documents folder, which she's been using for years, and she's super comfortable with saving things to documents and opening things from documents.

But you can see here, the Windows user experience has evolved to show that some of her files are in the cloud and not on the hard drive, some are on the hard drive, and some are locked to the hard drive or pinned to the hard drive.

Let's think about a common scenario. Sherry's going to collaborate with some of her coworkers on a kitchen remodel project. And one of them sent her the beginning of a PowerPoint deck in Outlook in e-mail. And in Outlook, she said, "Save this to OneDrive." Maybe she did that on her phone, maybe she did it at home, and now she wants to work with it on her PC.

Well, it shows up in her documents folder because her documents folder roams to OneDrive with Files on Demand.

She double-clicks, the file is pulled from the cloud, and she's off and running. Totally simple. Nothing all that amazing about that except that Sherry didn't have to think about where the file was.

So that's sort of the first thing. What's happening here is OneDrive Files on Demand is figuring out which things should be on her hard drive. And it does that in an intelligent way, but it also gives Sherry some control over this. So if she goes to the interior design guidelines document, which she looks at all the time, she can make an explicit decision to always keep it on this device. It'll synch from the cloud, and then you'll see right there it'll be on the hard drive where it will stay.

This is great for her personal documents and her work documents, but I want you to also think about collaboration within a business.

At Contoso, where Sherry works, there's a whole bunch of people that are all creating documents. And you can see, their team sites on OneDrive take up a lot of space. This is 1.37 terabytes. And she can navigate that, double-click files, or pin them to her hard drive in the same way she would anything else, and therefore have the documents that she wants and uses all the time exactly where she needs them.

And if someone else makes a change in the cloud, those changes will synch right back down to her device.

Now, the last thing I want to mention, I'm showing you this in her documents folder because making the core parts of Windows that people use all the time work well with this is an important part of the story.

And so I'm going to give you one more demo here and I'm going to create a document which you'll know I'm making in real time, hello Build, because I'm going to type quickly and there will be typos -- there will be typos -- I'm sure it's bad. We'll put a little smiley face here, and I'm going to save this to the desktop.

Then we'll do save, I'll call this "Hello." And we'll save it to the desktop. And there it is, "Hello" is on the desktop.

Now, in this situation, the desktop is stored in OneDrive Files on Demand, and so synching is going to happen and this enables great cross-device scenarios.

So let me move over here and we'll switch the screens there to show how this works across Windows devices. So on screen, you should see on the left Sherry's brand new Surface Book. And she didn't have to do anything, and there's an icon for "Hello" right there on the desktop.

Similarly, right next to that, you see a Windows Phone. And here on the Windows Phone, thank you, I can open the OneDrive experience and inside there is a desktop folder because Sherry's content is syncing across all her devices. And when I open it up, there is the "Hello" file on her desktop.

So what she experiences is the cloud helping her get her content wherever she wants to go.

Now, I want you to realize how this works. This "Hello" file is not actually stored on the hard drive of this machine yet because Sherry hasn't interacted with it. Instead, there's an item right there that she can double-click and then it'll be pulled from the cloud, as I showed you earlier.

But one important thing about how this works is that it's not implemented literally in the Windows Shell, it's implemented as part of the operating system underneath the shell and the applications.

And so I want to sort of illustrate that directly by showing you in PowerShell here that I can do a dir and use the "type" command. We'll type "Hello.text." And at that point, the file will get pulled down from the cloud, cached on her hard drive, and any application can use it, even if the shell isn't involved. (Applause.) Thank you.

So that gives you a sense of how we're going to help users deal with the files that they're creating across multiple devices.

Now, I showed OneDrive Files on Demand to you on Windows devices, but of course OneDrive is available on iOS and Android as well. So this story spans those platforms.

Next, I want to talk about all the activities that I described that happen on your devices using apps or the Web.

And to change the way we think about this and give users better tools for managing the complex world of activities, we're announcing today Windows Timeline, the easiest way to get back to whatever you were working on.

So I want to take you on a little journey here and show you how Timeline works. And we're going to start on one device, but then we're going to expand our thinking across devices.

So let's think of Sherry again at work on her Surface Studio. She's running some Windows apps here, like always, and when she goes down to the task switcher button, you'll see the UI has evolved to include Timeline.

At the top, as today, are her running apps. But below is a history of all the app activity and Web activity that she's been doing.

And you see these beautiful Adaptive Cards? Those beautiful cards were implemented because the app developer called the Project Rome APIs to provide Adaptive Cards to the Microsoft Graph.

For Sherry, this is simple. She can pan back in time and just pick an app. But all of this data being stored in the Microsoft Graph allows some pretty interesting and powerful things to happen. For one, all that data is there so Sherry can search. She just goes up here, clicks the "search" button and she can type whatever term she wants and we'll look at all that activity data.

She types "kitchen" because she wants to pick up her kitchen remodel project. And when she does, the PowerPoint deck opens up and goes exactly back to where she was last using it. So that's nice and handy.

Now, this gets even more interesting when you think about multiple devices. So let's imagine that Sherry's got her brand new Surface Book and she hasn't opened the kitchen remodel file on it, she hasn't moved it to that device, but when she starts using it, the right things just happen.

As she begins using it, Cortana implemented as an AI in the cloud, able to look at that Graph data, recognizes that Sherry was just working on the kitchen remodel project on her desktop PC, so Cortana suggests that she might pick up where she left off.

She clicks the PowerPoint item, the file is pulled from the cloud. She didn't need to put it on her PC in the first place, and she picks up exactly where she left off.

I think you're starting to get a sense for the power of this. With the data in the cloud, the content and the activity data, we can use AI to prompt and help make these activities move smoothly from one device to the next.

So imagine Sherry's in the meeting with the architect and they're working on their slide deck, they're thinking about where they might bring the client to look at some furniture samples for the kitchen remodel. And time passes, the architect leaves, and Sherry decides she's going to kill some time by reading the news.

So she launches a news reader app on Windows. And she's looking at this story about life in a small Kentucky town, and she realizes, "Oh, it's time for lunch, I've got to go."

So she closes her laptop lid, grabs her phone, in this case it's an iPhone. And when she heads off for lunch, there's Cortana again installed on the iPhone, an AI based in the cloud looking at all the data in the Microsoft Graph and knowing she was just using a news reader app on Windows.

So Cortana prompts, "Would you like to pick up where you left off?" Sherry chases the notification, and Cortana opens. And you can see here's Timeline-aware Cortana on the iPhone serving up the things Sherry's been doing.

She might resume her kitchen remodel task. But in this case, she wants to keep reading the news. So she clicks the news reader link. The news reader app resumes right back to where she was, and Sherry can keep reading.

Now, all of you developers are looking at this and you're thinking critically. And I know you have one question in mind. Well, what would happen if she didn't have the news reader app installed on the phone?

One of the beautiful things about the system is that these apps can register with the Microsoft Graph. And if we know that the app is available on a cross-platform device, then at that point, we can prompt the user to install.

And that's another way that we can help patch these gaps. So as Sherry moves from her PC to the phone, or the other way around, if a cross-platform app is available, we'll help the user get it installed.

Okay, one more thing. Sherry goes back to her home screen, and she realizes she's got one more thing she wants to do, so she launches the Story Remix app that you saw Lorraine showing earlier. She was a parent at that game and she has some video clips she wants to contribute to the story of the Banshees, so she does that on her iPhone. And she heads back to work.

When she gets to work, she goes back to her Surface Studio, and of course when she looks at the Timeline view on the Surface Studio, everything she was doing cross-device is there.

When she pans down, there's Story Remix she was using on her iPhone, there's the news reader app she was using on her Surface Book, and so on.

So the Windows Timeline with these things in the Graph all provide a powerful new way for Sherry to move from device to device and resume the things she was working on.

Now, we realize that some of you are asking yourself this question, we realize that people might not know what they need to do to get their phones connected to their PCs and make these cross-device scenarios happen.

So one of the things we're working on in the Windows 10 Fall Creators Update is a way to help users discover this.

You see here a phone item at the top level of settings to help people realize they can connect their iPhone, their Android phone, or their Windows Phone to their Windows PCs and get a great cross-device experience.

You'll see this show up in Insider builds, and we'll iterate on this and improve it as we go.

Okay, I've got one more scenario to talk through. I want to see a show of hands. How many of you have e-mailed yourself a photo or some text to get it from your phone to your PC or from your PC to your phone? Yeah, I'm not surprised. (Cheers, applause.)

Today, that's kind of a pain. Why don't we solve that problem?

So up next, I'd like to introduce what we hope will be the best way to move live data quickly from one device to another, the Cloud-Powered Clipboard.

In the Windows 10 Fall Creators Update, the clipboard itself will become Graph aware. So you'll be able to do a paste from one device to the other.

And this is another feature that will work without all of you developers needing to modify your apps, but if you do modify your apps, it'll get even better.

Let's take a look at how this works. So here's Sherry again in PowerPoint and as I said, she and the architect were coming up with some places they might want to bring their client. And they decide, they said take the client to Serafino Interiors furniture store.

So Sherry wants to navigate there with her phone. All she needs to do is do a copy in PowerPoint, switch over to her phone, in this case let's imagine it's an Android phone. And in Google Maps, she clicks to type some text, but in this case she doesn't have to type be with the SwiftKey keyboard installed, being Graph aware, the SwiftKey keyboard can display the content of the Cloud-Powered Clipboard. (Cheers, applause.) Thank you.

When Sherry clicks, the last thing she copied is available. She chooses Serafino Interiors, and voila, there it is in Google Maps, no need to type or e-mail to get those things from one device to the next.

And I mentioned, this will work in Windows without developers needing to modify their apps. But because of the Project Rome APIs and the Microsoft Graph, it'll be possible to add value on top of this.

So as an example, here are a couple things that we're working on. One is within Windows, we're working on designs to show the Cloud-Powered Clipboard when users do a paste, that's what you see on the left. And on the right, our Office team is working on adding a visual clipboard right within the Office apps so people can choose things that they've copied in the past.

And these APIs are available to all of you to enhance your applications as well.

Okay. So the system that I hope you've seen here will help all of us. We're all working to deliver this love and engagement for our users in the app experiences we build. And with the Microsoft Graph, we think we can reconnect our users over time and across devices.

Our intent is that these features will facilitate people reengaging on their PCs using Timeline to go back and do things again, or helping them discover new value cross-device, finding an app they didn't know was on their PC or on their phone.

And when users have a great experience doing all those things, that generates more love and engagement, creating a virtuous cycle that's better for end users and better for all of us as developers.

In our Fall Creators Update, for the first time, Windows PCs will love all your devices. Fluent Design, Files on Demand, Timeline, Cloud-Powered Clipboard, these are all ways that we're going to make our users' lives better.

And all of this is possible because of the Microsoft Graph, the intelligent cloud and the Project Rome SDK.

I know all of you are curious about how you can get your hands dirty and start doing this. So I'm excited to help you out on that front and introduce to the stage the architect for Project Rome, Abolade Gbadegesin. Abolade, come on out. (Cheers, applause.)

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