11042019 Ignite Satya Nadella

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Satya Nadella - CEO
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(Video segment.)

SATYA NADELLA: Good morning. (Cheers, applause.)

It's great to be back in Orlando with all of you. We have over 30,000 people from all corners of the world here, and it's great to be celebrating what you all do.

I first wanted to start by saying a big thank you, a big thank you for being that community that builds tech capability in every organization in the world, because what you do and your push, your feedback to us is so important. And today and throughout this week we're going to celebrate that tech capability and that tech intensity. In fact, my entire keynote is going to be about tech intensity.

Now, as I was coming down, someone told me that there is this new exhibit at the Universal Studios that perhaps best typifies what tech intensity is all about. A team came together in less than 110 days. They built this pretty amazing exhibit. And I said, wow, to really get into the mood for this morning's keynote, I should go see it. So, let's roll the video to show you what happened.

(Video segment.)

SATYA NADELLA: Yeah, that's my niece saving my life. (Laughter, applause.) I learned a lot about Demogorgons.

But really, in fact, that entire exhibit was created, as I said, by a group of people from Universal who came together and used some amazing tech. Azure Kinect is at the edge. So, this is a great example of the intelligent edge and the intelligent cloud in action. Azure Kinect on the edge did the skeletal understanding, environmental understanding. Then they had speech reco right on that walkie-talking, natural language understanding for the dialogue, as well as Neural TTS. And so that in some sense captures the spirit of what we want to talk about.

Tech intensity as a formula is something that we've talked about for a while now. It's a pretty straightforward formula but there are some nuances. The first thing is how quickly can you adopt new technology, because the last thing when you are building tech capability in your organization is for you to recreate the wheel. You want world-class input. And then the most key thing, of course, is for you to build your own tech capability.

And then trust is of paramount importance. The power law in this equation is all around trust. Of course we as platform creators have to care deeply about it, ensure trust, but you all as creators of tech capability will also have to treat trust as a first-class construct.

Our mission is simply put, to empower you to build that tech capability. We want every organization to be a digital software company. And that means you all need to have the capabilities to be able to turn every organization into a digital company.

In fact, our goal is to commoditize digital tech. We don't want it to be just the province of a few companies in the West Coast of the United States or the East Coast of China, we want every company out there to be a tech company in its own right, and you are the community that's going to make that happen, and our mission is to empower you to do that.

And today, what I want to do is walk up the tech stack and talk about how you go about building that tech capability. I want to start at the very bottom of it with Azure and start building up from there. In fact, I want to have some fun with numbers just to motivate each of the layers of the tech stack.

When you look at these two numbers, 50 billion devices by 2030, and 175 zettabytes of data by 2025, up from around 40 today, that's what's motivating us, that's what is motivating the need for us to build Azure at this distributed computing fabric as the world's computer.

We have over 54 data center regions, more regions than anyone else, to meet the real-world needs out there in the marketplace, and also to ensure that it has the right certifications, it's supporting all of the digital sovereignty rights all over the world.

It's also open, both Windows and Linux, Java and .NET, Kubernetes, RedShift, VMware, Oracle, SQL Server, Postgres, so every layer of the stack there is openness.

And of course as we built out this global footprint, sustainability is of paramount importance to us. In fact, this summer, we launched a new data center design that is zero waste and 100 percent renewable energy. It's so exciting to see this. This is going to roll out in Sweden and it's going to spread throughout every region of Azure.

And so, we're really ensuring that the power utilization efficiency of every workload as it moves from traditional data centers to the cloud is something that's contributing to the sustainability.

Now -- yeah, you can clap for that. (Applause.)

Now, when we talk about the cloud, it doesn't end in the cloud. In fact, the cloud and the edge form that distributed computing fabric. That's been at the core of our vision, our design point for how we built Azure.

And we wanted to make sure that there is consistency in the management control plane, there's consistency in the development environment, as well as the infrastructure across the cloud and edge. It's so critical. When you're building distributed applications, you need that consistency.

And of course that has been our competitive advantage, and today we want to push that even further. The first thing we're doing is extending the Azure Edge family with some tremendous new innovation. And I wanted to throw it out to Natalia on the show floor to show you some of the latest innovation on Azure Edge. Natalia?

NATALIA MACKEVICIUS: Thanks, Satya.

I'm on the show floor where you can see the full spectrum of Azure's intelligent edge portfolio. Edge computing requires processing data closest to the source. The Azure Stack portfolio of products meets all of your edge computing needs.

Azure Stack Hub provides a full hybrid cloud on-premises. It's an integrated system that includes an Azure consistent cloud control plane. It delivers Azure services such as serverless computing with Azure Functions and Azure Kubernetes Engine to simplify Kubernetes deployment and management. Azure Stack Hub can run in connected or fully disconnected scenarios, literally air gapped from the public network.

Azure Stack HCI lets you deploy high-performing VMs in your own software-defined data center and connect to Azure for cloud services such as Azure Backup, Azure Monitor or Azure Security Center. There are over 150 hyperconverged solutions offered from 20 hardware providers.

Azure Stack Edge Systems are Azure managed appliances that bring compute, storage and intelligence to any edge.

First is the Azure Stack Edge Commercial series. We are continuing to add new services and functionality to Azure Stack Edge. For instance, we're adding the GPU option, as seen in this system, for ML preprocessing and inferencing. We're also enabling private cellular networks as a service by adding the tech preview of Multi-Access Edge, MAC, on Azure Stack Edge.

We've expanded the Azure Stack lineup with the new rugged series. It offers the same capabilities as the commercial series but ruggedized and even portable for use in harsh or disconnected environments.

This rugged series system is small enough to fit into a backpack. It's portable and weighs less than 10 pounds, including the battery, allowing you to run Azure services for things like disaster relief, search and rescue, or even mining.

And all of the Azure Stack Edge offerings are available directly as an Azure service from Microsoft, ordered and managed from the Azure portal, no initial cap-ex required, no minimum commit.

As you can see, we have hardware solutions from compute to storage, all the way to AI and mixed reality devices. Come see our full spectrum on the show floor.

Back to you, Satya.

SATYA NADELLA: Thank you so much, Natalia. It's great to see the innovation on the Azure Edge.

And in fact, we see tremendous customer momentum already. If you look at Gojo Industries, the creators of Purell, they're already using Azure IoT to build, in fact, sanitization solutions for hospitals. They're going to use Azure Sphere going forward for even better detection in control loops.

We have Johnson Controls building out a complete new badge solution for smart buildings that uses facial recognition and some of the cognitive capabilities in Azure IoT with a container on the edge, as well as Hong Kong stock exchange, which is obviously running regulated workloads all on Azure Stack at the edge.

So, these are just good, great examples today, and with what Natalia showed, we expect this momentum to continue to really meet the world's needs out there for distributed computing.

Now, today, one of the most exciting announcements for us is this next big step forward in hybrid computing. I'm really thrilled to announce Azure Arc. Azure Arc really marks the beginning of this new era of hybrid computing where there is a control plane built for multi-cloud, multi-edge.

And not only that, but we for the first time support managed data services to be anywhere your compute is, so again managed data services that are multi-cloud, multi-edge.

We also have two open source projects that allow you to build these cloud-native distributed applications, both a new programming model that simplifies enterprise application development and a deployment model.

And to show you all this, I wanted to throw it out to Erin on the show floor. Take it away, Erin.

ERIN CHAPPLE: Thank you, Satya.

I'm excited to show you how we've fundamentally redefined hybrid, so you can bring Azure innovation to your data center virtually anywhere.

Imagine I'm responsible for IT operations at Wood Grove Bank. Here is my IT dashboard. Now, I'm responsible for managing a heterogeneous environment with increasing system sprawl and data silos. And it's my responsibility to deliver the agility, the business demands, while ensuring the compliance and security of the entire estate.

With Azure Arc I can manage all of my resources seamlessly from the Azure portal, extending management capabilities, Azure management capabilities to my data center.

Now, through a few simple steps I can connect my data center to Azure. We ran through the steps moments ago on this HP Superdome Flex here onstage, and momentarily you'll see my Orlando data center show up as an Azure location. There it is.

Now, with Azure Arc I can extend Azure data services to my data center. My bank is rolling out a new risk management application. Let's see how Azure Arc fundamentally changes the game.

So, within the Azure marketplace you can see preview container instances of the Azure SQL DB and Azure Database for Postgres SQL. My risk management application runs on Azure SQL DB, so I'm going to select that. I'm going to choose to deploy it to that Orlando data center I just created and click Create.

Now, what we're deploying is the same evergreen version of SQL, available only in Azure. Typically, deploying a DB into a VM on-premises is a lengthy process that can take hours, but as you can see, in a matter of seconds, I was able to install Azure SQL DB to my data center.

Even better, I now have access to all of Azure's unique security capabilities, so I can enable advanced data security, and that risk management database can take advantage of Azure capabilities like Advanced Threat Detection and vulnerability assessment. And I can enable this by default with a policy. This is a first for on-premises customers.

Let's see what else Azure Arc can do for me. My Chicago location, another Azure Arc location, is running a number of Azure Arc enabled data services. Here I see an update reminder.

Now, typically, updates and patching is a task that requires constant diligence. I know that Azure automates this for me, but what about Azure Arc? Well, with Azure Arc I can automate updates in accordance with my bank's policy. So, I can specify a custom maintenance window or I can enable automatic patching and never have to worry about a single update.

Back in my IT dashboard I have another warning. This time, the Postgres SQL hyper-scale database that's powering my mobile banking applications is reaching a CPU limit.

Now, typically in this scenario provisioning the servers and the databases to deal with this unexpected spike in demand is very time consuming. But Azure Arc understands the

capacity available in my data centers, enabling me to scale out on-demand. And with Postgres SQL Hyper-Scale I can add instances to power that application. I can even scale to over 3,000 nodes, if needed.

Back in my IT dashboard I see that the core count increased, the CPU limit is resolved, and I was able to scale out just as I do in Azure with no application downtime.

Now let's take a look at how Azure Arc simplifies IT management and governance for my organization.

Most of the workloads that are running in my Chicago data center are running in containers on Kubernetes. With Azure Arc I can manage Kubernetes from within the Azure portal. Here are all my Kubernetes clusters that are across Azure Arc locations.

Now, security is top priority for the bank, and with Azure Arc I can create a single policy that will encrypt the disks that are running on the databases on the clusters across on-premises in Azure, so I don't have to worry about the application, the database, where it's running, who's running it. I can rest easy knowing that my data is secure, all with a single policy. This is another first for on-premises customers.

Now, as a global bank I need to serve my customers 24/7 worldwide with minimal downtime. With geo-replication in Azure Arc I can easily replicate from one on-premises location, Chicago, to another, or to an Azure data center, or even to AWS. This is a first again this time for the industry.

So, as you can see, Azure Arc unifies my operations, enabling consistency and agility across all of my data centers. Azure truly is the world's computer and its innovation is available at my fingertips.

This is just one example of how Azure's innovation is empowering customers to achieve more across on-premises and multi-cloud at the infrastructure and data services layer.

Now let's take a look at another example, this time at the application layer, where we're simplifying the programming model and deployment of cloud-native distributed applications.

A great example of a distributed system is the railway system, with millions of kilometers of railway track around the globe, creating a complex network of interconnected parts that all must work seamlessly. It's really challenging. Owners and operators must make decisions on their own and with limited information. And with no interconnected interfaces between those railways, it's a challenge. And even with a system as complex as the railway, minimal downtime could have serious implications.

Willow Rail believed there was a better way. They teamed up with Strukton, a maintenance operator, to create a digital twin solution in Azure, creating a comprehensive and real-time view of their network. So Willow Rail's distributed application has

powerful insights, which will enable decision-makers to predict faults, optimize utilization and increase efficiency.

Now, we recently released two new open source projects to help our partners like Willow and Strukton. Dapper provides a simplified cloud-native programming model for distributed applications, and Rudder simplifies the deployment and management of distributed applications, irrespective of where they reside. We look forward to seeing what you do with these innovations.

Back to you, Satya.

SATYA NADELLA: Thank you so much, Erin. It's fantastic to see the innovation.

(Applause.)

You know, the next layer of Azure that again is very differentiated and very important is the data layer. To support again your data estate needs, last summer we made some giant strides around operational stores. We brought hyper-scale SQL and with Cosmos DB you now had the support for the variety, the velocity, the volume, your scale needs, of course the cloud and edge needs for operational data stores.

And today, I am really thrilled to announce Azure Synapse. We are taking the same approach of using the cloud-native memory hierarchy and storage hierarchy to redefine the rules around analytic workloads.

We want to bring together what until today have been two separate categories, data warehousing and big data. That means your unstructured and structured analytics can be brought together with unprecedented scale.

Azure Synapse changes the game around analytics. To show you all of this, let me throw it over to Rohan on the show floor.

(Cheers, applause.)

ROHAN KUMAR: Well, thank you, Satya, and good morning, everyone.

For the purpose of this demo please imagine that I'm a product manager at a gaming company. We've recently launched a new mobile game and I'd like to analyze our telemetry to significantly enhance user engagement.

No matter what the public cloud platform, building end-to-end analytic solutions is really hard and project timelines are measured in several months.

Welcome Azure Synapse Analytics. Synapse is the next generation of the Azure SQL data warehouse, which blends together big data analytics, data warehousing and data integration into a single unified service that provides end-to-end analytics at cloud scale.

As you see on the screen, Synapse makes building these complex end-to-end pipelines into a single, intuitive visual no-code experience. With Synapse, project timelines will be measured in hours and not months.

In addition to empowering users to gain quick access and insights across all of their data, Synapse enables a whole new level of performance and scale that is simply unmatched in the industry. Let's take a look.

What you see on the screen is that analytics application that's powered by Azure Synapse. Now to essentially analyze end user engagement, I need access to a variety of data, including the current engagement time, in-game clickstream, application metrics and telemetry data from our device partners; in short, petabytes of data.

With the Open Data Initiative, accessing additional high-value data from systems like Adobe is really simple.

Now, to start, I'd like to find out the longest playing duration of players per feature, with a total playing time is less than 20% of the average playing time, filtered by user demographics and add-on feature names.

Now, this may sound like a simple query but it's actually quite complex, because we're accessing and joining data across multiple very large, disparate data sources.

In fact, a key part of Synapse is the ability to query both relational and nonrelational data at petabyte scale, blazingly fast, using an ANSI SQL language. Let me issue the query against Synapse.

Now, what's happening behind the scenes is the intelligent distributed query optimizer of Synapse is executing this query across hundreds of nodes in a fault tolerant manner. Wow, it just took 9 seconds to execute this complex query against a petabyte scale dataset.

(Applause.)

Now, in the interest of some friendly comparisons, let me run the same query against Google's BigQuery. Now, what I'm doing here is running the exact same query against the exact same dataset running in Google's BigQuery.

Now, as you can see, it's taking a little longer. Now, in the interest of time, we ran this query earlier. Any guesses on how long it took Google's BigQuery to complete the same query? Two minutes? Five minutes? Eight minutes maybe? Let's take a look. It took a whopping 11 minutes. For this complicated query Synapse is 75 times faster than Google's BigQuery.

Now, TPCH is a very comprehensive benchmark for analytics. The current state of the art for TPCH is 30 terabytes.

I'm really excited to announce that with Synapse we have successfully run all the 22 TPCH queries at record time at 1 petabyte. (Applause.)

Now let's take a look at a different capability of Synapse.

Query concurrency has long been a challenge for all analytic systems. Now, to showcase how Synapse empowers users with limitless scale, I have a dashboard here that compares that with the other offerings in the market.

Now, what's backing this dashboard is a system that allows me to show concurrent user access using industry standard benchmark queries. Let's start with 50 concurrent users. As you can see, even with this few a user set, Synapse, based on the query response time, is three times faster than Amazon's Red Shift and five times faster than Google's BigQuery.

How about raising the stakes a little bit? Let's go to 150 concurrent users. As you see on the screen, while Synapse continues to do great, we've hit the limits with both Amazon's Red Shift and Google's BigQuery. Red Shift starts queuing requests at around 100, resulting in significantly increased query response time and a vastly degraded end user experience. BigQuery users actually have a worse experience. By default, BigQuery starts failing requests beyond 100. So, if you happen to be the 101st user, you're out of luck.

How about raising the stakes to true enterprise scale? Do you think Synapse can handle 10,000 concurrent queries? Let's try it out. As you can see onstage, Synapse is easily able to handle 10,000 concurrent users. What you're seeing on the screen is it working flawlessly with 10,000 concurrent queries operating on the system.

Now let's take a look at a couple of additional capabilities of Synapse. As you see on the screen, we've deeply integrated Synapse with Power BI, making them the best combination in the industry.

For example, you can build Power BI reports and enterprise-grade semantic models right from within the Synapse workspace. With this level of deep integration between Power BI and Synapse, business users can gain insights that they need to make their data-driven decisions in a timely manner.

Synapse also deeply integrates with Azure Data Share, enabling secure sharing of data and insights, both within an organization and across organizations with your partners with just a few simple clicks.

Now, some of you may be wondering, what's the magic behind Synapse? Well, to achieve this limitless performance scale and true simplicity, we've completely re-

architected the analytic stack on Azure from the ground up. Specifically, we've merged Data Lakes and data warehouses into a single system that essentially enables querying across both relational and nonrelational data. We support true online elasticity through a cloud-native design that separates out our compute and storage layers so that they can be scaled out independently.

We have intelligent, multi-level caching, which leverages the memory hierarchy and SSDs in an efficient way to give you the best price performance for workloads of any size and scale. Our query scheduling is workload aware and we support multi-master clusters over shared datasets, giving us infinite concurrency and scale.

Finally, Synapse supports both a serverless query service and a cluster-based form factor for both Apache Spark and ANSI SQL, enabling all the analytic workloads that you can imagine.

Well, a modern analytics platform, all the stuff is cool, but what about predicting the future? Isn't a modern analytics platform supposed to do that? Well, with Synapse's deep integration with Azure machine learning, you can scale out, build and operationalize complex and very powerful machine learning models, right from the Synapse workspace.

Let me show you how.

I'd like to predict the propensity of the likelihood of a user-base actually buying in-game addons, filtered by age demographics.

Synapse enables me to do this by actually writing a pretty – modeling a simple query that also includes native scale out machine learning-based scoring on the Synapse nodes.

Let's see how the querying works.

As you saw, the response time was near instantaneous, and I got my predictive analytics within Synapse.

Synapse makes AI and ML really simple for our data professionals. Azure is the only public cloud that empowers users with limitless performance scale and insights. Analytics in Azure are simply unmatched. We can't wait to see how our customers use Synapse to digitally transform themselves.

Back to you Satya.

SATYA NADELLA: Thank you so much, Rohan. As Rohan was describing, not only do you need to build this limitless data estate, you need to make sure that you can do AI compute close to that data.

Our goal has been to democratize AI by building out the best infrastructure in Azure for doing AI, creating your own AI solutions, providing you the best and most productive

framework and tools with Azure ML, as well prepackaged AI capabilities with cognitive services for speech and language understanding, computer vision.

We continue to push the frontiers of this. It's great to see the customer traction. In fact, one of the things that I check every day is to think about and see the customers deploying this in real-world solutions.

You see Spotify, for example, using cognitive services to change how they do podcasts, the fact that you can edit a podcast by just editing the text because of the text-to-speech capabilities.

You have *The Atlantic* taking 160 years' worth of their content, using Azure Search, and turning it into a knowledge base.

You have Nationwide Insurance using the bot framework to build their customer-facing conversational agents.

ASOS, the fashion retailer and fashion brand, is using the decision system in Azure ML to build their recommendation engine that is improving their yield.

So, it's great use cases, and this is one of the most exciting areas of what's happening with application development in Azure.

I want to talk about three areas where we're pushing the boundaries of where computing is going.

I want to start with autonomous systems. When we think about autonomous systems, the first place we go to is autonomous cars, but in fact, wherever there is a control loop today, you can think about AI-driven autonomy.

In fact, that's our goal with autonomous systems, across industries, to build out, whether it's industrial applications, whether it's energy, whether it's robotics, how do we create that autonomy.

It's a couple of key elements. First, it's to really to push the boundaries of reinforcement learning so that you can build an AI engine that's capable of driving autonomy.

But one of the things that's important to us is to take engineers who today build these control systems and turn them into AI engineers by really helping them to teach machines, so that we have a new paradigm for machine teaching, where the engineers are teaching the AI engine by putting in constraints, even giving it safety bounds, so that you can now have autonomous systems that are driven by engineers' domain knowledge.

Of course, you have a simulation environment where you generate all of this synthetic data, and these machine teaching labels, in order to be able to train these models, and then ultimately to be able to pick the right model to drive the autonomy.

Recently, DARPA had a challenge, a subterranean challenge, and Carnegie Mellon University, along with Oregon State, were the ones who won this championship, using the Azure autonomous system, and that's pretty fascinating.

There was a mine in Pennsylvania where you had to have this autonomous system go and find objects. In fact, they won because they found two times the number of objects, compared to their competition, and they were able to find objects within a 20-cm distance of where they were located, right? So, completely autonomously.

It's fantastic to see that type of project. And what we're really excited about is to see, first of all, even the partnerships we have with MathWorks, where they're bringing simulation engines into Azure to, in fact, enable more of this simulation-driven autonomy, as well as, really, the application across many, many different industries.

I wanted to give you a feel, by rolling a video, of some of those use cases. Let's roll the video.

(Video segment.)

SATYA NADELLA: The next area we want to talk about is storage, again, a core part of compute. One of the things that we're thinking about is how do we change the game, again, in storage?

We were inspired by the use case from Warner Bros. Now, Warner Bros. stores some of the most iconic movies of our time, *Superman*, *The Wizard of Oz*, in storage systems like the one you see in the picture behind me.

Now, of course, it's all in film, it's in a temperature-controlled room, but that means it's fragile. If there was any kind of drop in temperature, or if there is any kind of other issues, you'd lose, in fact, the original of *Superman*. Now, that would be tragedy.

Now, we said, "OK, what if we rethought this," what if we can take a piece of glass, and this is just a regular quartz glass, and using sensor lasers, we were able to etch into this glass, the entire *Superman* movie?

Now, what is fascinating about doing that is, first of all, you encode it in a multi-dimensional space, inside of the glass, and so therefore you need to be able to read it, using machine learning and algorithms. So, we built this entire system that's fully capable of essentially a new cold storage system.

The interesting thing, of course, is the reliability of this piece glass, and so we've really put it through the wringer. We boiled it. We baked it. We shook it around. We tried to scratch it with wool, but we still have the *Superman* movie, and so that's the frontier of new storage systems.

We're really, really excited about working, here, with Warner Bros., in bringing new innovations to even cold storage systems, going forward.

Now, the last area, around pushing the frontiers of computing, I want to talk about, is quantum. We have always been very focused on trying to build a general purpose quantum computing environment because, today, with all the capacity we have around computing, we still have many unsolved problems, right? Whether it's around food safety, climate change or energy transitions, these are big challenges that need more computing.

But we need general purpose quantum. This requires a different type of approach. It requires a platform approach, and today I'm very, very excited to announce Azure Quantum, which has three elements to it.

First, it is about open hardware. We are very excited to have partners, two ion trap partners, is IONIQ and Honeywell. They make machines that trap ions, and then our superconductor partner, QCI joins us with, in fact, our own quantum effort with topological qubits, which is also superconducting machines.

So, we have a variety of hardware solutions that are going to be all open in Azure. Now, of course, if you have a variety of hardware, the first thing you wanted to do was build an open software ecosystem on top of it, and so we have built that Q#, which is open source, and QDK, that's open source.

Today, we're also pleased to announce 1Qbit also joining with their simulation machine learning capabilities on Azure, and so to build a complete toolkit for software developers to get started on building quantum computers and quantum algorithms.

One of the most interesting things about quantum is that you can get started with quantum algorithms on top of classical, and it's because of the simulation capabilities that we have.

Now, we've seen, in fact, many use cases already, across healthcare, across finance, and the electrical grid, as well. But, one example that stands out is what Case Western Reserve University, along with the Cleveland Clinic, have been doing. I want to roll the video to give you a feel for how you can do quantum-inspired work on classical computers.

(Video segment.)

(Applause.)

SATYA NADELLA: Now, as we build out all these tech capabilities, one of the most important considerations for all of us is trust. This is something we're very focused on, as a platform provider, trust across privacy. We have to enshrine privacy as a human right in the systems we build.

We have to consider the ethics of AI. The models we deploy into production have to ensure that there is no bias built into it. We have to improve the state of the art of the development processes with things like machine learning ops and data lineage, so that we really ensure that AI is safe.

What I want to talk about today is cyber and security, and simply because of this number. Just last year, the total amount of cost of cyberattacks was $1 trillion. The sad part of this is that the people who are most impacted by this are the small-to-medium businesses, all over the world, and consumers.

Therefore, it is our collective responsibility to do our best work to ensure the most vulnerable of these populations are protected.

That's why we've focused on this end-to-end security architecture, from identity, to devices, to cloud applications, to information and data, to infrastructure. How do we have one integrated architecture, opening it up, in fact, for all third parties using the security graph to participate, as well, because we need the ecosystem's support, or to have that consistency in architecture.

Now, especially with the management control planes now. One of the most exciting announcements of Ignite is going to be the Microsoft Endpoint Manager that brings together the comprehensive management control planes for all endpoints. In Azure Arc, you know can really deploy the security policies.

Not only can you find the vulnerabilities, but you can deploy the remediation, to all end points, all infrastructure and all data. That's what we mean by the end-to-end architecture.

There are a couple of use cases. There was an attack on 10 smaller pharma companies. This was a phishing attack. It was a social engineering attack. First of all, in most cases, 95% of the time, the ATP capabilities in Office 365 were able to catch it, and even if it went to the endpoint, the Microsoft Defender was able to catch it. That ability to have defensive depths is so important when end-to-end architecture is so important.

Rapid Deploy is a company that builds mission-critical software to handle emergency 9-1-1 calls. Each municipality deploys their software, but unfortunately, some of these deployments have been attacked, especially with one recently in North Carolina, which was attacked by ransomware, and now Rapid Deploy is using Azure Sentinel.

It's continuously monitoring all of the deployments, ensuring the security of their entire estate. It's great, again, to see how this end-to-end architecture, with the ability to proactively mitigate on cyberattacks, is being used.

Now, I want to move up from infrastructure and trust to the next layer, developers. This is obviously close and near and dear to everyone at Microsoft because this is how we, as a company, got started in building developer tools.

But one of the most interesting things that's happening out there is, today, when you look at the software engineering jobs, 61% of the openings are outside of what is considered the tech industry.

In fact, the crossover, the tipping point was 2017, and therefore our mission, that we got started in 1975, is even more important. This is to build the best toolchain, the most complete toolchain, for developers.

With Visual Studio and Visual Studio Code, we have the best ideas out there for doing language innovation like pipe scripts. We have Azure DevOps to help you with all of your build and deployment needs.

And, of course, GitHub is the home for 40 million-plus open source developers in collaboration and community. Bringing all of that, that's what our goal is. In fact, the use cases, some of these innovations that you'll see, I'm really thrilled about.

The first one is Visual Studio Online. I mean, you should check this out. Even just last night I was going in and playing with it. I signed up for it. It's a gamechanger for anyone who struggles on weekends to create your own dev environment.

This is a godsend because you now can go to Visual Studio Online. You can get your entire environment provisioned for you, with all its dependencies, right there, just on a browser, on any machine.

Another one is IntelliCode. We're using AI, learning from all of the open source code out there, on GitHub, and then bringing that intelligence to your editor. As you type your code, it's doing all of the completion so that you can build on the shoulders of the giants, and that drives productivity.

Another one is Live Share. Now, imagine what it can do for a young developer who joins a team and wants to have some code reviewed, or goes to consult with a mentor, Live Share changes the dynamic because no development project is a solo sport; it's always a team sport. It's really bringing that next level of innovation with GitHub and Live Share, which changes the dynamic and culture of organizations.

We see a fantastic adoption of this toolchain from companies like Stripes, to the Veterans Affairs, to Cargill, to Comcast, and to give you a flavor for how cultural dev organizations are changing, using these tools, let's roll the video from Comcast.

(Video segment.)

SATYA NADELLA: As we talk about developers, it's not just the professional developers who are building applications. One of the phenomenon you see is citizen developers getting involved in a very deep way. In fact, it's motivated by the fact that we are going to have 500 million applications that are going to get created, new, by 2023.

Just to put that in perspective, that's more than all of the applications that were created in the last 40 years. And so that means we need to empower citizen developers with tools that are low-code/no-code tools so that they can build out these applications, and that's what Power Platform is all about. In fact, there are already 2.5 million citizen developers using Power Platform, and it's great to see this community.

One of the things that inspires me to listen to their stories, it's that feeling if empowerment, of making a difference, and building that digital capability in an organization, which perhaps most truly comes through from this community. Let's roll the video to hear from them.

(Video segment.)

SATYA NADELLA: All right, so it's a really awesome time to hear those voices because I think that what this community is doing is perhaps going to build the most digital capability, helping to democratize digital technology all over the world.

Today, I'm really thrilled to take the next big step forward in terms of the tools that will be at the disposal of all of the people who use Power Platform. Today, I'm really pleased to announce two new members of the Power family: Power Automate and Power Virtual Agents.

Power Automate brings full robotics process automation to the Power Platform, along with a lot of other capabilities. Power Virtual Agents bring language understanding, using the bot framework, with now full language understanding and conversational capabilities to the Power Platform so that you can build these virtual agents.

To show you both of these, let me it throw it out to the show floorr, Charles, to show you Power Automate as well as Virtual Agents.

CHARLES LAMANNA: Thank you Satya. For over 40 years, TruGreen has helped homeowners create beautiful and healthy lawns. One of the most important ways they engage their customers is with the TruGreen websites.

In the past, if a customer wanted to schedule an appointment for a TruGreen agent to come out their homes, they had to call the 1-800 number during business hours, a very lengthy and painful process.

However, with Power Virtual Agents, TruGreen has been able to completely transform how they engage their customers. Their customers can now just walk up and report the actual issue that they're facing, and this will go use Power Virtual Agents on the backend

to identify the common issues that can be causing that problem. It even integrates with the TruGreen knowledge base so that it can pull back all of the relevant information for that particular problem.

On top of that, with all of that additional information, I can even go and start to schedule an appointment. Just by providing my email address, it will actually go to the TruGreen backend, cull their scheduling APIs, and find the next spot, the best time for me to have an appointment. Just like that, I'm able to go and book a TruGreen agent to come out to my home, something that used to take hours, but now just takes a couple of minutes.

But what is really special about it is how they built it. TruGreen used Power Virtual Agents, the newest addition to the Power Platform, which makes it possible for everyone in the world to go create chatbots without having to write any code.

The way that Power Virtual Agents works, as you can see on the right-hand side of the screen, there's a visual designer that captures the entire chatbot experience, as well as the AI that backs it, and on the left-hand side there is something called tracing, which makes it easy for you to actually watch how your customer interacts with that chatbot.

So, if I go and run through the same set of steps as I was doing before, we can see that on the right-hand side of the screen the Power Virtual Agents chatbot will automatically start showing all of the different steps, as they run through. If I zoom in here, we can see all the different user responses that I offered, and if I go back out, you can see that this is exactly what the customer sees in their chat experience, as well.

This just continues to advance through, using all kinds of great AI capabilities, without requiring code or data science. Now, if I want to go and schedule an appointment, that requires pulling out for the TruGreen backend system. To do that, I used Power Automate.

Power Automate has over 275 different connectors which make it possible to connect all your different business applications, right out of the box. So, when I provide my email address, that is actually going to that backend system, and looking up the next-best time for me to have an appointment to send a TruGreen agent out.

For this next part, when I confirm that I want to have this appointment, you can see that it's using Power Automate, again. However, the system I want to interact with is a contact management system which is legacy and Win 32 app which doesn't have any APIs. The only way I can talk to it is through the UI, and that's where the brand new UI flows capability of Power Automate comes into play.

This makes it possible for me to just record a series of steps on my desktop which will then run in the background as part of my standard Power Automate workflows. Just to show how easy that is, I can launch the TruGreen contact management application. I can go take an input from the virtual agent, or the email for the user, paste that in there, and I

can then go and click "search" after I do that, and that will actually make it so that I can go search that particular record, in that contact management system.

So, I switch over to the "save the activities" tab, and then what I want to do is, I want to capture all of the outputs from that chat experience because that information will be useful for the TruGreen agent when they go out to the home. That makes it possible for the customer to have a complete end-to-end experience with TruGreen, all integrated and highly automated.

When I click "done" then I can switch back to Power Automate. You can see, inside that same web-based Power Automate visual designer, all of the steps I just recorded are visible. If I expand each of these individual steps, we can see the search box, the text command, and all of that information is captured, in a truly automated way, allowing me to very easily record this information in a contact management system.

Now, I'm switching back to Power Virtual Agent. Once I confirm this appointment, it's actually going to go and trigger that UI flow that I just filled. What this is going to do is, it's going to capture all of this information I was just entering inside the chat box, opening up that Win 32 application, simulating all the same keyboard inputs and mouse clicks that I just did.
This uses three different types of rules in AI to make sure that I've selected exactly the right controls in that UI automation, making this incredibly robust and durable.

(Applause.)

And this is a great example of how, when you use the Power Platform, you can do two really amazing things. The first is without writing any code. Anyone can be a developer, completely transforming how your business operates. The second is that you can do all of this without replacing your back office software or systems.

Between data connectors and UI flows, we can connect to anything in your business, making it easy and actually affordable, completely transforming your company in a very short period of time.

To show another great example of this in action, we're going to roll a great video from the American Red Cross.

(Video segment.)

(Applause.)

SATYA NADELLA: It's great to see all of that innovation in Power Platform. But, most importantly, and as I said before, it's great to see how it's democratizing how applications and technology is being built everywhere, by domain experts, citizen developers, the people who are closest to solving some of the hard challenges.

Now, going up one level in the stack, business process. One of the things that is going to define the competitiveness of every business going forward is going to be how well do you harness the power of all of the data that is there in your enterprise to drive the transformational outcomes for your company.

It's not about other people using your data; it's about how good are you at driving your business process using the data you have. That's core to what we are trying to do with Dynamics 365.

In fact, today, when you think about the amount of data there is, one of the sad facts is 73% of the data is not analyzed. That means you're not able to drive that next level of automation, creating that next level of predictive power or analytical power, because that's going to define competitive advantage.

And our goal with Dynamics 365 is to build out that world-connected business cloud so that you can harness all of your data to drive the productivity of your business process. That means you want to create these digital feedback loops across all of the key elements -- people, operations, products, customers; all of that has to come together. In fact, an AI-first company is a company that knows how to take data from one system and change the outcome of another system. And that's what we endeavor to do with Dynamics 365.

In fact, a great example of this is the Customer Data Platform and Customer Insights. This is all new innovation in Dynamics, and it typifies this change in paradigm from being reactive to data to being proactive with data. How do you take all of the data that you have in the enterprise and bring it together with all sources? In fact, we built the data platform -- in this case, Customer Data Platform and Customer Insights -- on top of Azure Synapse, so it builds up all that rich platform capability. That means all of your enterprise data can be brought in.

And then, on top of that, you can operationalize AI at scale. So, you can build these customer segments to drive the next level of experience. But those customer segments are not being created by just using data in a CRM system. It's using all of your data, so if you want to target someone for sustainability efforts, you want to be able to take your supply chain data and bring it into your segment creation. Of course, it has to be extensible, and all of the Power Platform capabilities come together.

And you also want to bridge. One of the things that we're very excited about is how business processes are changing by bridging what is physical and what is virtual.

And AEP Energy is, in fact, using Customer Insights to just do that, and it's a great use case of how all of the data can be brought to bear in changing the customer experience. And to show you that, let me throw it out to Dina on the show floor.

(Music.)

DINA APOSTOLOU: Thank you, Satya. AEP Energy, a retail electricity and a natural gas supplier to more than 400,000 residential and business customers, is transforming their business model from buying and selling electrons, which have become commoditized, to consulting with customers to help them make the best energy decisions that are efficient and sustainable.

The challenge is that they don't have a holistic view of their customers because data is residing in disparate sources. The foundation to deliver an exceptional customer experience lies in the ability to have a unified view of your customer. AEP is using Dynamics 365 Customer Insights to create a 360 degree view of their customers and reimagine how they're servicing them by infusing the insights into their business processes. Let's go take a look.

Today, energy managers are unable to provide real-time recommendations to their customers. With Customer Insights, the new customer data platform solution from Microsoft, we've enabled AEP to create that master profile that comes together with customer and real-time product usage data, and to discover high value segments based on solar propensity.

They were able to create that consolidated profile without the need for complex integrations using our prebuilt connectors. They brought together Dynamics 365, utility usage from regional transmission organizations, and weather data. This aggregated dataset lands in Azure, meaning you have full control of your data while being backed by security and compliance from Microsoft cloud services. And with this data sitting in Azure, you can run powerful analytics with Synapse.

With the AI and machine learning capabilities of Customer Insights, AEP can now precisely identify customer segments to target with energy recommendations, like this one here: high energy consumers. This data and insight can be translated in real time to influence how AEP employees better sell and service their customer.

For instance, AEP can proactively dispatch an energy manager to go onsite. The energy manager can see all the specific device details for that anomaly with their behind-the-scenes meter or a generator. And looking here, they can see that this customer is in the high energy use category, and an alert indicates that they can benefit from alternative energy options.

When looking at this customer detail further, I see all that rich information from Customer Insights -- the full contact information, a timeline of activities. But the thing that I see most here at the top is the spike in energy use on hot days that exceeds the network capacity. The intelligent recommendations are telling me that the customer could benefit from solar as a way to reduce their energy consumption by 35% and fix energy as a way to limit the expected rising costs.

Now, seeing is believing, and I want to make sure that the customer has confidence in their purchase decision. With Dynamics 365, and the Product Visualize, and the power of mixed reality, I can help they customer explore solar panels right here in person.

Now, solar panels can be extremely complex and technical, but seeing them taken apart makes it far easier to understand. Instead of videos and brochures, Product Visualize allows the energy managers to help the customer to better understand the product, creating a more confident purchasing experience at the real world scale of using mixed reality. This notation feature allows us to quickly highlight in context with data, as well as existing marketing materials, like this note here about polycrystalline wafer, which, when compared to monocrystalline, absorbs sunlight better in partially cloud climates like Columbus.

Now, all of this information is linked in the Common Data Service, so that allows us to use predictive data modeling to get an accurate estimate of the customers' cost savings over the next five to 10 years.

What makes AEP unique is their consultative approach to helping customers make the best energy decision. Microsoft and AEP are partnering together to bring data, AI and mixed reality to create that 360 degree view of their customer so they can personalize every customer experience. Together with their customers, AEP is redefining the future of energy and developing innovative solutions that power communities and improve lives.

Now back to you, Satya.

(Music.)

SATYA NADELLA: Thank you, Dina. I'm here at the Modern Work portal to talk about the next layer of our stack with Microsoft 365, and empowering the knowledge workers and the firstline workers. In fact, the two stacks that motivate all of our work here is 25 and 40%. It takes 25 minutes to get back on task when you're multitasking, and you lose something like 40%of your productivity.

And so, with all this abundance of computing around us, what is scarce is human attention. And that's why we are building the world's productivity cloud with Microsoft 365, to help you focus on things that matter the most to you. And the way we're doing this is by starting by putting people at the center of it all. It means we've got to really think about how they express themselves, how they communicate, how they collaborate, how they create knowledge inside of the organization. That's what drives all the innovation across Microsoft 365.

But it starts with device innovation. Devices are the most personal things in our lives, and we want to make sure that we are bringing the best in class innovation, starting from the silicon to new form factors. We just recently had the Surface launch where we really pushed the envelope of creation of new categories and new types of devices. And right

behind is the wall of all devices from Surface and all of the innovation in our OEM partners and ecosystem. It's great to see this come to life.

Now, ultimately, we want to drive new experiences that take advantage of these new devices. We want to infuse AI into every experience out there. We're infusing AI into PowerPoint; presentation are more persuasive. Data is more actionable in Excel. Videos are more searchable, and stream and emails are more acceptable through Cortana.

Microsoft Teams has been a breakout experience. It brings together for the very first time in one user experience scaffolding, chat, meetings, collaboration, as well as business process. And 350 organizations with over 10,000 users are using Teams already, so it's really amazing to see the momentum around Teams.

And today, at Ignite, we're taking that even a step further. Some of the features that you all have been waiting for -- our private channels are now generally available, multiwindow chats to pop out chats and meetings into separate windows, new integrations into Yammer and Outlook. It's fantastic to see all of this come together.

Now, the next step forward for us in M365, or Microsoft 365, is knowledge. If you look at it, you're using your devices. You're using these applications. You're creating perhaps the most valuable data about your people, their relationship to other people, the expertise, the artifacts of work; all this today is raw data. We want to convert that into knowledge that accrues on a continuous basis. This is, again, putting your data to work for you.

And so, I'm really thrilled to announce Project Cortex. (Cheers.) And Project Cortex takes what is data today inside of your organization and converts it into knowledge. You now have AI-driven topics, so essentially you have AI creating topic wikis inside the enterprise. You have the ability now in the context of any document or any mail.

For example, if you get an email with an acronym, you can look up what that acronym means because AI, again, has gone to work. It can work that data into knowledge. But more interestingly, you can find the experts who know something about that acronym, and you can really integrate and interact with them.

You can also interrogate a document. You can have a conversation with document. Say you're looking at a contract. You can ask the contract, "When is the first payment due?" That's, again, converting data into knowledge.

To show you all of this and a lot more, let me throw it out to Melissa and Sonia to show you all the innovation across Microsoft 365.

(Music.)

MELISSA GRANT: Hi, I'm Melissa.

SONIA DARA: Hi, I'm Sonia.

MELISSA GRANT: Today, we're going to show you the top 12 innovations we're most excited about across Microsoft 365 and Surface. Think of this as the holiday wish list to help you unlock products across your entire organization. Let's start with the newest service in Microsoft 365, Project Context.

As Satya just shared, Project Context bring together the power of the Microsoft Graph with AI, people, content and apps into an interactive knowledge repository. It sounds complex, but we've made it incredibly simple to use. I'll show you.

Here in this message, I see a reference to a code name that I'm not familiar with, but Project Cortex has recognized it as a known topic within my organization and proactively highlighted it for me. When I hover over it, I get a topic card. Clicking in brings me to an AI-generated knowledge network that pulls together experts on the topic, as well as content, like presentations, videos and conversations, all curated for me in this pattern map. This is a great way to ramp up new team members or share knowledge across an organization.

Here in my knowledge network, I notice a stream video from an expert in the field.

(Video.)

MELISSA GRANT: Understandably, there's a lot of background noise when you're onsite. However, Microsoft Stream's new voice enhancement feature uses AI to drop out that background noise so I can focus just on what's being said. Let's listen to the difference with this feature on.

(Video.)

MELISSA GRANT: That's so much better. And you may have noticed I've been doing all of this on the brand new Surface Pro X, our thinnest two-in-one ever. It's always ready with my new Surface Slim Pen ready at my fingertips because it charges while docked right here in our new signature keyboard. So, I can jump right in to a brainstorm using the Whiteboard app and inking.

Hello, Sonia. Looks like you're already in here.

SONIA DARA: Yup. I'm in the same Whiteboard experience here on the Surface Hub 2 S, which is perfect for team collaboration and also, now, mobile. Using the new templates in Whiteboard, we're able to easily organize our thoughts, assigns tasks, and it even sums up ideas that you agree with.

But here, let me show you one of my favorite features. So here's an image of a floor plan. I'm going to select it, hit the "ink grab" tool, and using AI, it's going to convert this into digital ink. So, I can come in and edit it as if I had drawn this directly into the Whiteboard myself. Pretty cool, right?

But we know Teams are going remote, so we want to showcase a few AI-powered experiences that will help create more personal connections in meetings. So here, you can see all of my teammates looking sharp on this 4K+ resolution screen.

You know how, oftentimes, people look disconnected when you're in a video call because they're looking down at their screen as opposed to up at the camera? Well, this person's using the Surface Pro X, which supports new EyeGaze technology. The AI corrects the direction of her gaze so it's looking as though she's looking directly at me. Also, nice office background you've got going on over there.

But we know not every conference room has a Surface Hub yet. We have some teammates who are joining on a call in a conference room with a physical white board, so we're not really able to easily follow along with their notes. But fortunately, they're in a Teams room with a dedicated Whiteboard camera. Using AI, the camera detects the edges of the white board and zooms in. But the real magic is that it also detects him and makes him transparent, so when he walks in front to write something on the board, all of us online are able to see right through him to the content.

All right, Melissa. What's next on our list?

MELISSA GRANT: Let's bring AI and voice into the mix with Outlook. Show me emails from Jordan with attachments. Using Microsoft Search with natural language, Outlook gives me just the emails from my colleague, Jordan, where he shared a PowerPoint attachment with me. This is such a more natural and easy way to search.

I also like to use my phone to capture images of information I know I'll need later. So, I'm going to use image-to-table in the new Office app to take a photo of this dataset here. The Office AI will recognize it and analyze it, and convert it into a real Excel table for me. I don't have to manually enter the data or format the cells. It's all done right here. And now that it's a real Excel table, I can easily continue to work with it or share it with my team. And this is so important because, as you know, we're collaborating with more teams than ever before around the globe.

At Build, we announced a new collaboration platform called Fluid Framework. Fluid works by breaking down documents into component parts that can be collaborated on in real time across different applications. Fluid previews in just four weeks, so I'm super excited to show it to you in action today.

Here we are in a Teams chat where you can see different folks form the group collaborating on a document together. Jump on in, Sonia.

SONIA DARA: Sure. So, I'm here in Outlook. I was sent the same table in the body of an email. I'm able to see your edits coming in from Teams, and you should be able to see mine coming in from Outlook. I can also use this data to create a pie chart and it'll all be

connected on the backend, just like how it is here on this PowerPoint slide on my brand new Surface Laptop 3.

MELISSA GRANT: I love Fluid because I can continue to collaborate even while on the go. Here, we see the same table on my mobile phone. Now, notice there's the missing data here. I'm going to add that in. Now look at the PowerPoint and watch as it is instantly updated. Fluid is truly breaking down the barriers between applications. I know you're going to love it.

SONIA DARA: All right, that was a whirlwind tour of 12 AI and hardware experiences. But we have two more to show you for next year's wish list. A few weeks ago, we announced our vision for a new category of dual-screen devices: Surface Neo with two nine-inch screens running Windows 10X, and Surface Duo with two 5.6 inch screens running Android, both available holiday 2020. We're so excited for you to start using these amazing innovations from Microsoft 365 and Surface.

Now, let's head over to Dr. Balshi from the St. Luke's University Health Network.

(Music.)

DR. BALSHI: Hi, good morning. St. Luke's University Health Network is a non-profit with 10 hospitals, 300 ambulatory sites, a medical school, a nursing school and 15,000 employees. We have a mission, an unwavering commitment to excellence, delivering care to our community, educating our physicians and nurses, and improving access to care for our patients.

For me, it's personal. I was born at St. Luke's, and I, like many of my colleagues, have spent my entire career there, often caring for each other's families. Working with Microsoft, our physicians, our nurses and our technologists have started to manage the overwhelming tsunami of healthcare information that inundates us every day. Microsoft 365, and in particular, Microsoft Teams, is allowing us to reduce our administrative tasks, to organize our patient care, and to collaborate with teleconferencing and file sharing, secure text messaging.

The Microsoft employees who work with us at St. Luke's have become like family. They understand our culture, our work ethic, and our priorities. They've helped to empower and move our organization forward in digital transformation, and that's something we're really excited about at St. Luke's.

Now, I'll turn it over to my friend, Yousaf Saijid, who's going to tell you some great things about Teams.

(Music.)

YOUSAF DAIJID: Thanks, Dr. Balshi. Today, I'm going to show three scenarios on how St. Luke's uses Teams and Microsoft 365. Care teams needs to be in constant, and at

times, urgent communication with each other, but that can be especially challenging when you have 15,000 people spread across 10 different hospitals, like they are at St. Luke's.

But with Microsoft Teams, they can stay connected through chat, audio clips or even video calls right from their phones. They can easily use a smart camera to take a photo of something like a patient's skin condition. They can mark up the image right in Teams so the Care Team knows exactly what to follow up on.

Next, they can flag the message as urgent so that the right specialist who might be miles away at a different hospital can respond at the right time. Now, the best part is that the image is not stored on their personal device; rather, it's saved on the secure M365 cloud, which enables the Care Team's HIPAA compliance.

Now, in addition to improving internal communication, St. Luke's has looked for ways to transform clinical processes to better patient care outcomes. To ensure doctors are continuously improving and providing the most empathetic care to patients, St. Luke's used Power Apps to develop their own patient experience app. The app helps to gather and provide feedback to doctors during their rounds. Right from their phones, clinicians can select the doctor they're shadowing, and then, right in the app, they can score the patient and provider interactions. They can even put qualitative feedback around topics like provider duties. Once they're done, they can hit review and get an individual summary of the feedback that was shared, and an overall score.

Now, the data from this assessment and across all the assessments are flowed into a Power BI dashboard using Power Automate. Here the leads of each specialty can review individual performance data, realize any performance trends and approve quality across the entire network of hospitals.

Now, a core part of St. Luke's mission to improve patient care is ensuring that the full context of the patients' care history, including those notes outside the health records, naturally follows them to every interaction they have, regardless of the clinician they're seeing that day. Microsoft Teams integrates electronic health record systems via a FHIR extensible interface. This healthcare interoperability standard enables data interoperability in Teams. Now, what this means is that providers like St. Luke's can bring in relevant medical information from their systems of record into one central hub meant for collaboration.

Here, all the providers in surgical oncology can get a list view of the patients they care for. They can then click on a patient and get up-to-date information from the EHR, like medication. They can then improve those critical patient data hand-offs by inputting notes around care logistics, in this case, a patient needing to fast prior to procedure in the morning. They could even dynamically collaborate around this information like through video in a team huddle, while knowing that they're on a secure platform.

It's been incredible to see all the ways that St. Luke's is using Microsoft 365 to improve patient care, but now I want to show you something new. Today, we're announcing Virtual Consult, a feature in Teams that will be available to customers across all industries. And in healthcare, this type of patient provider video collaboration can help networks like St. Luke's reach even more people.

Here, an administrator can access a scheduling view of clinicians in the Care Team. They can book a consultation by inputting relevant notes, like leading notes and consult-type. Once done, they just click "send." At that point, the patient receives an email with a customization and Teams meeting link to join. The best thing is that they don't even need a Teams account to participate. They just need a web browser and they can join in one click.

So before the meeting, the doctor can turn on a customized background so they can hide any sensitive patient information behind them. And once they're in the meeting, they can engage with a patient, who may be at home, or they may be at a different hospital quite all together.

Hey, Travis. We're going to begin by sharing your test results.

This was a quick glimpse as to how Teams is transforming healthcare, but Teams is a hub that adapts to any industry. Whether you're in retail, manufacturing or financial services, it unifies everything your organization needs to communicate, collaborate and move your business forward.

Back to you, Satya.

SATYA NADELLA: Thank you so much, Melissa, Sonia, Yousaf and Dr. Balshi. It's great to see all of innovation across Microsoft 365.

So the last piece of innovation we want to talk about is the web. When you think about what's our usage of the web, in fact, 60% of our time on PCs does get spent in the browser. But we still have some very big questions. The real question is can we expect more. Is our data safe, and private, and protected? Why can't we find the information inside our organization like we do on the web? And why doesn't the web work with all of the productivity tools that we use every day?

And to try and take a step forward and find answers to these questions, we are going to innovate across both our browser in Edge, as well as Bing and Search. And to show you all this innovation, let me throw it out to Yusuf on the show floor.

(Music.)

YUSUF MEHDI: Thank you, Satya. Here at Microsoft, we think the time is right to expect more from the web. And we hear this from everyone -- IT professionals, developers, every day people. So today, we're going to unlock a whole new wave of

innovation to empower you on the web. I'm going to start by focusing today on people in business, and our goal is to bring, really, the best browsing capability and search capability to deliver you the best experience on the web.

Now before I get in and show you all the cool things that are going on, let me address the elephant in the room. Some of you out there might be thinking, hey Microsoft, what's changed over the last 10 years in browse and search that will make you be really competitive?

Well, I would like to welcome you to the new Microsoft Edge. Today, we released a new browser update that is going to address three big things that we've been wanting to do to get in there and be super competitive. First is we now release separate from the operating system, so we ship at internet scale every four to six weeks we're doing innovation. Second is we're going to run now on all platforms that you have in your company -- iOS, Android, Mac, Win 7.

And last and most importantly is, about a year ago, we moved to the Chromium browser. What that has allowed us to do is now deliver for you world-class performance and compatibility. These are the two key things.

Let's start with performance. Here on the left side of the screen, you'll see the old Edge, and on the right, you see the new Microsoft Edge. We are over twice as fast. We now rival Chrome in terms of performance for rendering web pages. Second, on compatibility, as you would imagine, we are now perfect matched compat our websites, so now you can rest assured you've got world-class tools.

Now, with those things, we can start to do some things that go beyond and innovate on that and push the boundaries. I'll start first on one on performance and one on compat.

Let's start with performance. What I wanted to introduce for you today now is the first personalized homepage that is unique for everyone that speeds you to what you want to get done. What's going on under the covers here is I'm logged into my Azure Directory, so the system knows about me and it knows about the Microsoft Graph. So, I get specialized links and data for me, so the speed to get to action from the page is dramatic, and only we can do this on Microsoft because of the Graph and Azure.

Secondly, what we do is we're going to push the boundary forward on compatibility. You can believe that you can even be more than 100% compat, because today, 75% of Fortune 500 companies run more than one browser. They run Internet Explorer and a modern browser, like Chrome or Edge.

Let me show you this. This is an IE legacy site that we actually run at Microsoft for time reporting, and when I click on it, I get a separate IE instance. But what you see is it's actually inside of Edge. So now, you only have to have one browser to manage your entire estate. That's a massive time savings, massive management savings.

All right, second thing is privacy and security. This is a top concern for all of us. If you're an IT professional, you already know that we're world class at managing and securing your data state. But today, I want to show you show you some things we're doing to empower us all as individuals. And I want to focus on privacy and security.

Let's go ahead and start first with some of the privacy. So today, when we all surf the web, behind the scenes, we don't really realize it, but a lot of tackers and cookies get dropped on the machine. So in this slide, for example, I'd go to weather.com. And what you'll see is that over 66 trackers are loaded onto my IT piece for this site from average surfing. But what you see below is we've blocked 62 of them, and part of that is because we are taking a new, more protected stance to help you on the web.

So what you see here is this is the configuration page, which you don't have to go to, but we give you three options now: Basic, which is how the web works; Strict, which is we really control all tracking and we reduce personalization; or Balance. Balance is what we do by default. This is more protection than you get from any other browser. So if you want to really have your data and your privacy secure, you're going to want to go with Microsoft Edge.

The other example of what I want to show you is Incognito. So if you search today and you use Chrome, Chrome's got a great feature called Incognito that keeps your browsing safe and private. But what you don't know is you can be accidentally logged in if you're on Gmail, and your search is on private.

Let me show you the new capabilities now with Microsoft Edge and Bing. I go into InPrivate, but look at this. When I start to navigate to a page, we will actually prevent you from being accidentally logged in, right? We keep you InPrivate, and when you type in searches, all those searches are kept just on the machine. They don't go back to the server. So if you want the most private way to search and browse on the web, you're going to want to go with Edge and Bing.

All right, the last big pillar of work, I have two things I want to show you: How you can start to get more knowledge out of the web, as Satya talked about it. Today, the web is this incredible research tool, but it's hard to collaborate.

So let me give you an example. I'm an IT professional and I'm looking to put together a set of recommendations on PCs to buy. So today, what we do is you'd send around links.

But now, look at this: I can create a separate Collections page on the right. And what I'm able to do now is, as I surf, I can kind of drag and drop things over. I can add whole pages. It's kind of like a scratchpad. And so, here I go to Amazon, I go to Best Buy, and I pull in the computers I'm looking to see. Not only do those pictures come over, but all the metadata comes over.

So now, you've got it in one place. You don't have to email these things around in links. And then, when I want to share it, with one click, I can come in and I can just share that,

and now I can share with people. If you're doing a personal example, I can share with my family.

And here's some pretty magical stuff. Watch this. I can say, "Export to Excel," and in the back and automatically, we gather all the data from those web pages and drop it into Excel. (Applause.) Yeah, how cool is that? Look at that. This is all live data. You've got reviews. You've got ratings. You've got prices.

These are powerful tools to harness knowledge out of the web.

All right, last but not least, I'm going to save the best for last here. We want to really now do a big thing forward that we can only I think uniquely do a Microsoft. We want to unite the internet with the intranet, the ease of use of how you surf the web with the power of your own data, right?

So let's take an example. Today on the web, the web is magical. You can find hundreds of millions of documents in sub-second time, but how many of you have had that problem where you can't find the document you want inside of the company? Everyone here travels. You want the travel site so that you can do your booking. Does anyone know the SharePoint travel site? I don't.

But watch this, now. Within my own browser, within my own search engine in Bing, I can start to type in "T." I get web results, but look at this. I also get the links inside my company, and with one click, I get taken right to the Microsoft -- in this case, my travel site -- and there's the SharePoint URL. Take a look at that green URL. I'd have never remembered it.

Today, we go one step further, though. So 76% of the information in companies is in unstructured data, but we now can read that data just like you can read on the web. So if you've ever used Bing to say, "Hey, how tall is the Empire State Building," or "What's the weather today?" and we answer at the top, what if you could do that within Bing today? Watch this.

Let's say I want to find out how many days can I take off for jury duty. I can just type that in, and as I type that in, up will come not just the website but the actual answer, 10 days at Microsoft, and you can see it. So, we can read the web semantically and pull it out.

Here's another one. I've got two dogs I love. I want to know can I bring my dogs to work. I can just type in, can I bring my dog to work, and we will go in and find this thing, which is very obscure inside the company, and what we'll see here is not only does it give you the pet policy, which is unfortunate, I can't bring them in unless they're a service animal, but we didn't even have dog show up, it had pet policy. And that's because we have an understanding of the semantic web.

So, imagine now being able to query all of your intranet and just use basic English to answer the question.

Here's my favorite, Power BI is a new way to run companies and get access to your data. Now when I'm looking for sales of the new Surface laptops we launched a few weeks ago, I can say, give me the Power BI for multi-sales overview and I get it right there. I don't know the URL, I get the link. And if I want to look at all of the other data around there, I have one-click link and now I can pull up all the Power BI dashboards.

So, that's what's great for intranet-searching. Now let me show you people search at the next level.

So, I'm going to do a trip to England and I want to meet with Sophia. I type in Sophia and I get this real beautiful contact card.

Now, what you don't sort of know that happened is in the background the Graph knew, oh, Sophia is probably most relevant for me because of emails we've exchanged. So, you would each get a different Sophia in your company.

But what I want to do now is I want to do something more complex. I know I'm meeting with Sophia, who's in engineering. So, I can just add to my query, hey, Sophia in engineering, and then I get the Sophia in engineering.

But I'm actually traveling to London, so I want the Sophia that's in London. So, I can just use natural language and it will find the Sophia that's most relevant to me. This is Sophia Morta. She's in London. That's the person I want to meet with.

And now look at that contact card. I can get access to all this great data to go out there and meet with her.

So, for example, I want to come out and find out where her office is. All those office maps that are in your corporate service, you can now get one link and I can turn around and find out where we're going to meet and it will help me save time as I get to London.

And I can also use that on my phone. So, with your Azure Active Directory you're logged into your iPhone or Android phone, you can now get access to all those company resources right off your phone.

And best of all, if I want to prepare for the meeting, I can come in and look at the file that she's shared with me, so I don't have to go and search my emails to say, hey, what were those files? They're all right there with one click of a button.

And if you look closely, the files aren't just from Microsoft sites, there's one there from Box, and that's because today we're making a bunch of announcements to create new connectors, so you can not only search the intranet but you can search all of your other content in there like Box and SAP and Salesforce and ServiceNow.

In fact, today, I'm pleased to announce that over 100 connectors are coming online that will help you be able to get access to all of this great content, and they're coming empowered by some of our ecosystem partners who are providing these: Accenture, BA Insights, and Ration.

So, what you'll see today is if you want the best browsing and search experience, today we are announcing the release candidate, the final release candidate for Microsoft Edge is available. Go up and download it now if you want to have the best and most private browsing experience. Our final version is coming January 15th in over 90 languages.

And for IT professionals we're going to put this into the Fast Track program, so we're going to help you make all the deployments easy, and there will be sessions later today to talk to you about it.

And all your sites will automatically work, including your legacy sites in IE11, they'll work automatically. But if they don't, you let us know and we'll fix them for free with the new App Assure.

So, we think it's time to expect more out of the web. We're excited to unleash whole waves of innovation. Today's a big step forward for business. You'll hear more about what we're doing for developers and for everyday people coming next spring.

With that, back to you, Satya. Thank you very much.

(Applause.)

SATYA NADELLA: Thank you so much, Yusuf. We're very, very excited about all the innovation across Edge and Bing.

So, I want to close where I started, with our mission to empower every person and every organization on the planet to achieve more, it’s all about creating that tech intensity, that tech capability inside of every organization.

And we started the day with Stranger Things, which typified in some sense tech intensity. I want to end by talking about another fun experience, Minecraft Earth.

We started the launch of Minecraft Earth around the world and, in fact, tomorrow it will launch in the U.K., but we wanted to give you a demo of playing Minecraft Earth, which brings together some of the core capabilities of the cloud with this iconic game and turns the real-world into a playing field. So, let's have Saxs and Neena show us Minecraft Earth.

SAXS PERSSON: Thank you, Satya.

We're excited to be here today to talk about Minecraft Earth, a brand new Minecraft in augmented reality.

We've been wanting to bring Minecraft to the real world for some time now, but the problem is like how can we give players the same experience no matter where they are or what they do, and doing that at scale is a pretty hard problem.

NEENA KAMATH: This is where Azure's spatial anchors come in. If you want to find your way to the park, GPS can get you there. But if you want to find the mushroom under the tree at the park, you're going to need something a lot more precise than what GPS can do for you. Today, onstage we're going to show you all of this in action.

SAXS PERSSON: So, for the past couple of months, we've been populating the planet with Minecraft Adventures. Adventures are life-sized holograms. They're a little bit of Minecraft sprinkled all over every neighborhood and it's where you go to get blocks, it's where you go to quest, fight mobs and grab the best loot.

Why don't we take a look at the game?

So, Minecraft Earth starts on the map. Everything you see on the map, this is right around here in the convention center. Every little 3D icon is an experience we can have. I can click this little graph icon and get like quick resources, jump a rabbit, carrots. That's useful. Or if I want a fully immersive experience, we can go into one of the Adventures.

NEENA KAMATH: While Saxs joins this Adventure, well, I've already gotten started. I started here, and there's a spatial anchor that I've joined. Saxs can join the exact same one so that we can play the game together in the exact same spot.

SATYA NADELLA: Can I play?

NEENA KAMATH: You'll get to play in just a second.

SATYA NADELLA: OK. (Laughter.)

SAXS PERSSON: So, here we see like an anchor that we made a couple of days ago, and here onstage like wherever I go, I get directed back to where the shared experience is going to be right there. So, why don't we place it and invite Satya in here?

NEENA KAMATH: All right. I'll set up a game for you as well. It has all the things on the hot bar that you need.

SATYA NADELLA: Thank you.

NEENA KAMATH: And if you join me right over here --

SAXS PERSSON: You guys look great.

NEENA KAMATH: -- we can get started.

SAXS PERSSON: Let me put in a rabbit. If you guys get your carrots ready --

SATYA NADELLA: Oh man, I want a rabbit.

SAXS PERSSON: Uh-oh. Satya, it's coming for you.

SATYA NADELLA: Is it?

NEENA KAMATH: Oh, you have some carrots in your hand.

SATYA NADELLA: There you go. Those are the carrots.

NEENA KAMATH: I'm going to put some carrots in mine and see if I can get the rabbit to like me more, but apparently not. I think you've got more carrots than me.

SAXS PERSSON: Satya, if you take a pickaxe and then break a hole in the ground, this is one of our puzzle-based adventures, and there should be a lot of stuff hidden down there. If you just hit the play part --

SATYA NADELLA: Oh, I'm going to hit the rabbit.

NEENA KAMATH: Oh!

SAXS PERSSON: Oh! That didn't end well. (Laughter.)

I promise that wasn't on purpose.

So, if we look down here, like we see a mine cart with a chicken, mine cart tracks. It looks broken. Maybe if you guys mine the track up here on the surface, we can repair the track and send the chicken home.

NEENA KAMATH: All right, let's grab this track that's up here.

SAXS PERSSON: And again because we're in a shared experience, like everybody's exactly where they're supposed to be and we can play like a multiplayer game but just real scale.

Are you guys repairing it or do you need help?

NEENA KAMATH: I think we can repair it ourselves. Satya looks like he's started already.

SAXS PERSSON: Uh-oh. We need to break this one and get it flat again. There you go.

NEENA KAMATH: All right, perfect. I'll add this one here.

SAXS PERSSON: There you go.

NEENA KAMATH: Looks all fixed. Thank you for helping.

SAXS PERSSON: I sent the chicken home.

NEENA KAMATH: All right, so I'm going to go ahead and push this button so the chicken can go home.

SATYA NADELLA: This is scary. I'm going to jump into this.

SAXS PERSSON: All right, this sounds like a skeleton.

NEENA KAMATH: Uh-oh.

SAXS PERSSON: Get your bows out.

SATYA NADELLA: Oh, bows.

NEENA KAMATH: All right, I might need some help. I'm really bad at getting the skeletons.

SAXS PERSSON: Trying to shoot you. Maybe if you move over here, Satya, we can see you.

NEENA KAMATH: There you go.

SAXS PERSSON: I don't even see him.

SATYA NADELLA: I just bring my axe out.

SAXS PERSSON: Start breaking some stuff.

NEENA KAMATH: All right, that's good, he seems to have gone home.

SATYA NADELLA: He's wrong.

NEENA KAMATH: But we see here that we were at least able to solve this Adventure and send the chicken home.

SATYA NADELLA: That's fantastic.

NEENA KAMATH: They're probably hanging out together.

SATYA NADELLA: That's fantastic. This is fun. We can play all day.

NEENA KAMATH: Well, unfortunately, we don't have all day for this. I think you've got some other things on your calendar.

SATYA NADELLA: That's right.

So, what's next?

NEENA KAMATH: So, as you can see here, with Azure Spatial Anchors we were able to set up this common anchor and jump in and play. Azure Spatial Anchors is in public preview and it creates a real world canvas for your business, whether it's in enterprise or gaming.

SAXS PERSSON: That little bit of tech magic was what we needed to make Minecraft Earth special. And Minecraft Earth is out in a few select countries in early access and it's going to be coming to the rest of the world very, very soon.

SATYA NADELLA: Fantastic. Thank you all very, very much. Have a fantastic Ignite. Cheers!

(Applause.)

END