Microsoft

Whitepaper

Introducing Power Virtual Agents

A Guide for Technology Leaders

Understanding Power Virtual Agents

Artificial intelligence (AI) is making our world better in many ways. Among the most important of these is the rise of conversational AI, the ability for us to interact with software using natural language. Rather than relying on traditional graphical interfaces, we can now communicate with applications using ordinary sentences, much like talking with a person.

A chatbot interacts with users through a natural language interface.

A service that provides this kind of conversational interface is commonly referred to as a chatbot. Because chatbots are so simple to interact with, they can help people get tasks done more easily. A website might provide chatbots to answer common customer questions, for example, while your organization's human resources group might provide a chatbot that lets employees schedule vacation days.

Yet chatbots are complex applications. Creating and updating them has traditionally required a team of skilled professional developers, people who are both scarce and expensive. Useful as chatbots are, this complexity has limited their usefulness in many organizations.

Power Virtual Agents is a SaaS solution that enables anyone to create and update chatbots.

Microsoft Power Virtual Agents changes this. This Software as a Service (SaaS) solution enables anyone to create and update chatbots on their own. By democratizing conversational AI, Power Virtual Agents can help you make chatbots a widespread solution in your organization.

This paper takes a big-picture look at Power Virtual Agents. It describes what this technology does, explains its benefits, and shows how it relates to other Microsoft chatbot technologies. The goal is to help you understand how you can use Power Virtual Agents to improve your organization.

A note on terminology: Different analysts and vendors describe and categorize chatbots in various ways. For example, variations in chatbot functionality are often assigned different names, such as virtual assistant, virtual agent, and others. Power Virtual Agents can be used to create any of these, and so to keep things simple, this article uses chatbot as an umbrella term for all of them.

What is a chatbot?

Microsoft believes that the defining characteristic of a chatbot is its conversational interface. Whether you communicate with it through typing or speaking, you and the chatbot interact in natural language. Figure 1 shows a simple example of a chatbot user interface.

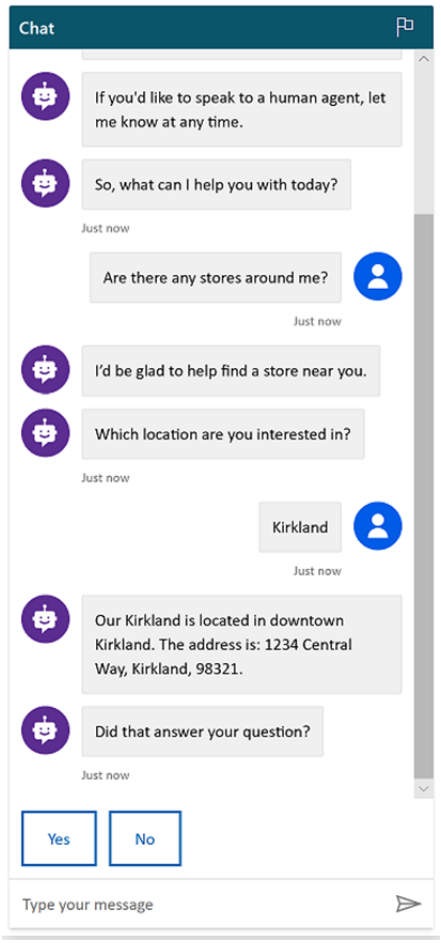

Figure 1: A chatbot interacts with users through a conversational interface, much like a person would.

As this example suggests, chatbots offer two major benefits:

Chatbots can reduce costs and improve customer satisfaction.

- They reduce costs by providing automated responses to common requests. For example, a chatbot might let users schedule an appointment, update an order, or do other tasks. This frees up the time of human agents to handle higher-value concerns, such as those that can't or shouldn't be automated.
- They improve customer satisfaction by letting your customers resolve issues on their own around the clock.

Done well, chatbots can save your organization money while simultaneously making your customers and employees happier.

Creating and maintaining chatbots has traditionally been difficult.

Yet doing chatbots well has been hard: it's traditionally required professional software developers. Just as important, updating chatbots has also commonly required pro developers. Since the topics a chatbot understands and the answers it should return can change frequently, requiring every update to go through your IT people can result in an out-of-date chatbot.

Integrating chatbots with backend systems and data has also been difficult. Yet letting chatbots answer questions well often requires this. For example, a chatbot that answers HR questions might need access to employee-specific information from other systems to address questions like "How many days of vacation time do I have?" Providing this integration has usually required going through IT, adding more expense and delay.

Because Power Virtual Agents lets all kinds of people create, update, and integrate chatbots, it addresses all these barriers.

Power Virtual Agents is a self-contained service for creating and running chatbots.

Making chatbots easy

Power Virtual Agents is a SaaS service. This means that you can use it directly—there's no need for a subscription to Office 365 or Azure—and that it provides a self-contained world for creating and running chatbots. Figure 2 shows how this looks.

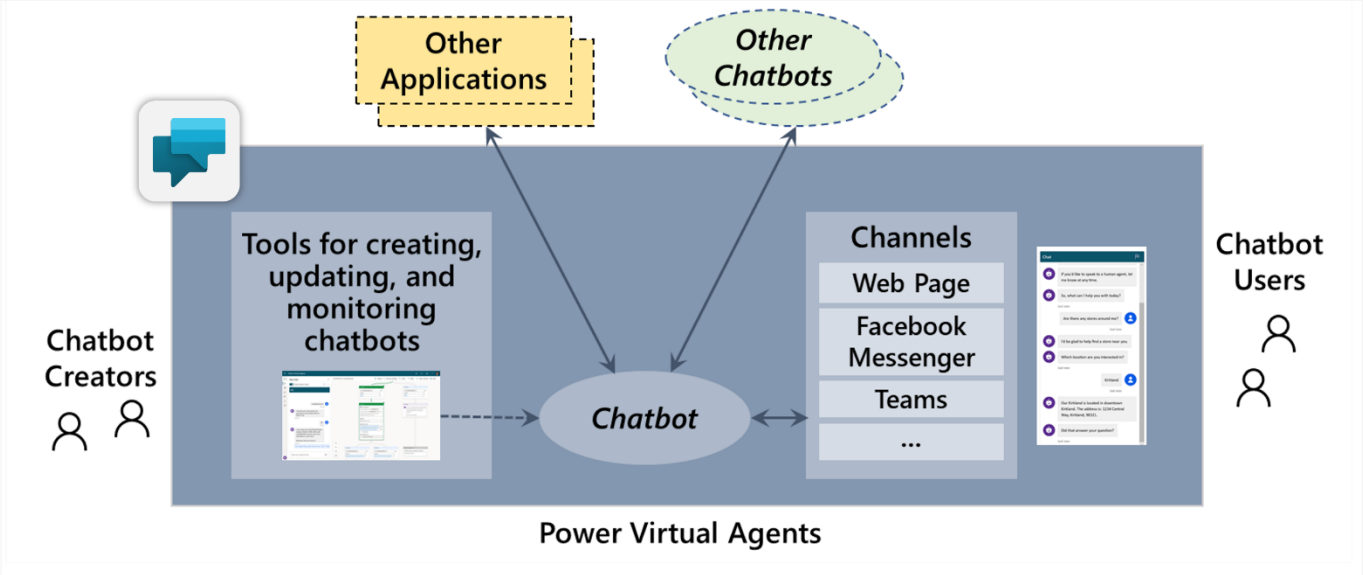

Figure 2: Power Virtual Agents provides business-oriented tools for building chatbots, infrastructure for running those chatbots, and ways to connect with other software.

Power Virtual Agents addresses all three of the traditional barriers described earlier:

Power Virtual Agents addresses the historical barriers to doing chatbots well.

Power Virtual Agents addresses all three of the traditional barriers described earlier:

- ***Anyone can create chatbots.*** Power Virtual Agents provides graphical tools for creating chatbots. These tools are designed for anyone, not just pro developers, so even business users can create chatbots quickly and easily without writing code.
- ***Anyone can update chatbots.*** Rather than waiting for IT, chatbot authors can make changes as required. This helps chatbots stay up to date, since the people who know what should be changed can immediately make those updates.
- ***Bots can integrate with backend systems.*** Using graphical tools, Power Virtual Agents chatbots can access connectors to hundreds of existing services, including SharePoint, Office 365, Dynamics 365, Salesforce, and many more. Chatbots built using Power Virtual Agents can also access chatbots created using other technologies, whether from Microsoft or other vendors.

It's important to understand that, even though anyone can create and update their own chatbots, IT still has an important role to play. For example, chatbots created with Power Virtual Agents are subject to IT governance. You should also expect to work with IT in at least some integration scenarios. And as described later, pro developers can create reusable services that people creating chatbots with Power Virtual Agents can build on.

As Figure 2 shows, Power Virtual Agents supports multiple channels, letting your chatbots interact with users through ordinary web pages, Facebook Messenger, Microsoft Teams, and other communication technologies. And just as you wouldn't hire a customer service person without monitoring their performance, you also need to keep an eye on your chatbots. To allow this, Power Virtual Agents provides chatbot monitoring tools.

Using Power Virtual Agents

Each chatbot implements one or more topics.

Building a chatbot with Power Virtual Agents is straightforward. You start by assigning your new chatbot a name, then clicking a Create button. Next, you create a set of topics for this chatbot. Each topic defines a particular conversation path, that is, a subject on which your chatbot can interact with a user.

For example, the conversation shown earlier in Figure 1 uses a topic concerned with finding a store location. This same chatbot might also implement other topics concerning store hours, what departments each store has, and more.

To determine what conversation a user wants to have, you define *trigger phrases* for each of your chatbot's topics, words that tell the chatbot what its user wants to talk about. For example, the topic shown in Figure 1 might be associated with trigger phrases like "stores around me", "check store location", and others. Figure 3 illustrates how you can specify these in Power Virtual Agents.

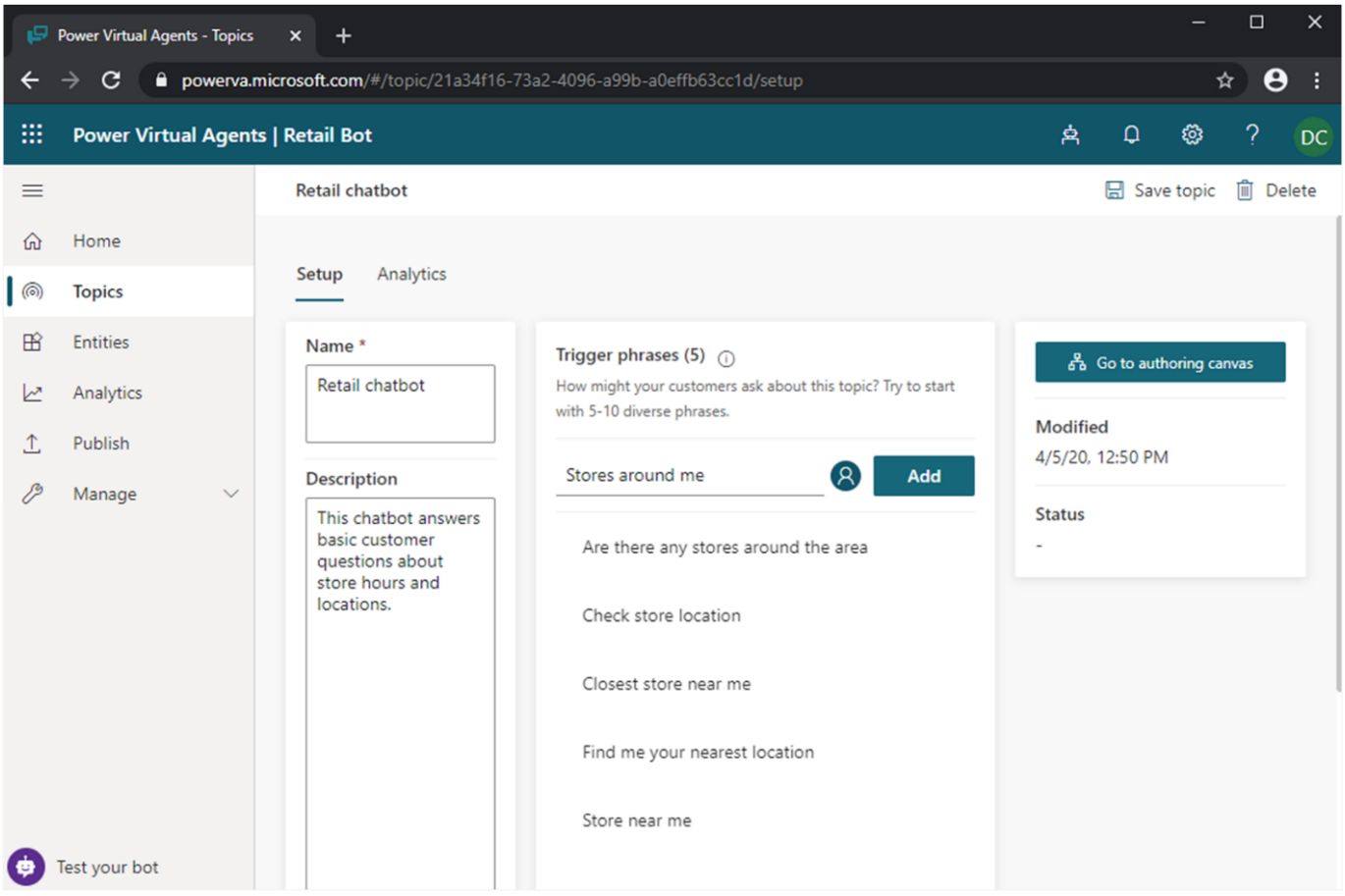

Figure 3: A chatbot implements topics, each of which has associated trigger phrases defined by the bot's creator.

Trigger phrases entered by the user determine when each topic executes.

As this example shows, you can specify whatever trigger phrases you want for a topic. The chatbot then uses these to determine which topic, and thus which conversation, it should execute during each user interaction.

Creating topics that recognize and respond to trigger phrases is a simple idea, but the chatbots you create with Power Virtual Agents can do much more.

Your chatbots can also do things such as:

- Assign values to variables, then use those variables in conditions. For instance, our example retail chatbot could ask its user for their location, store the answer, then use this information in later responses, such as determining which store it provides information about.
- Acquire multiple values from a single user sentence, then assign those values to specific variables. Sometimes called *slot filling*, this approach lets the chatbot prompt only for missing information rather than mechanically requiring the user to answer a repetitive list of questions.
- Create topics directly from existing web pages, such as FAQs. This helps you create useful chatbots more quickly from information you already have available.
- Escalate to a live human agent if the chatbot doesn't recognize any trigger phrases in the user's input. The chatbot can also default to a defined Fallback topic in this situation.
- Connect to backend systems and other chatbots as needed. As with everything else in Power Virtual Agents, this is done with graphical tools—professional developers aren't necessarily required.

Power Virtual Agents provides built-in analytics for your chatbots.

Once your chatbot is ready, you can determine the channels it will use to communicate with people. As mentioned earlier, the options include web pages, Facebook Messenger, Microsoft Teams, and many more, including mobile apps, Slack, and Skype. You then publish your chatbot with a single click, making it available to users.

Now that your chatbot is running, the next step is to monitor it. Power Virtual Agents provides detailed reporting on your bot's usage and performance.

Figure 4 shows an example.

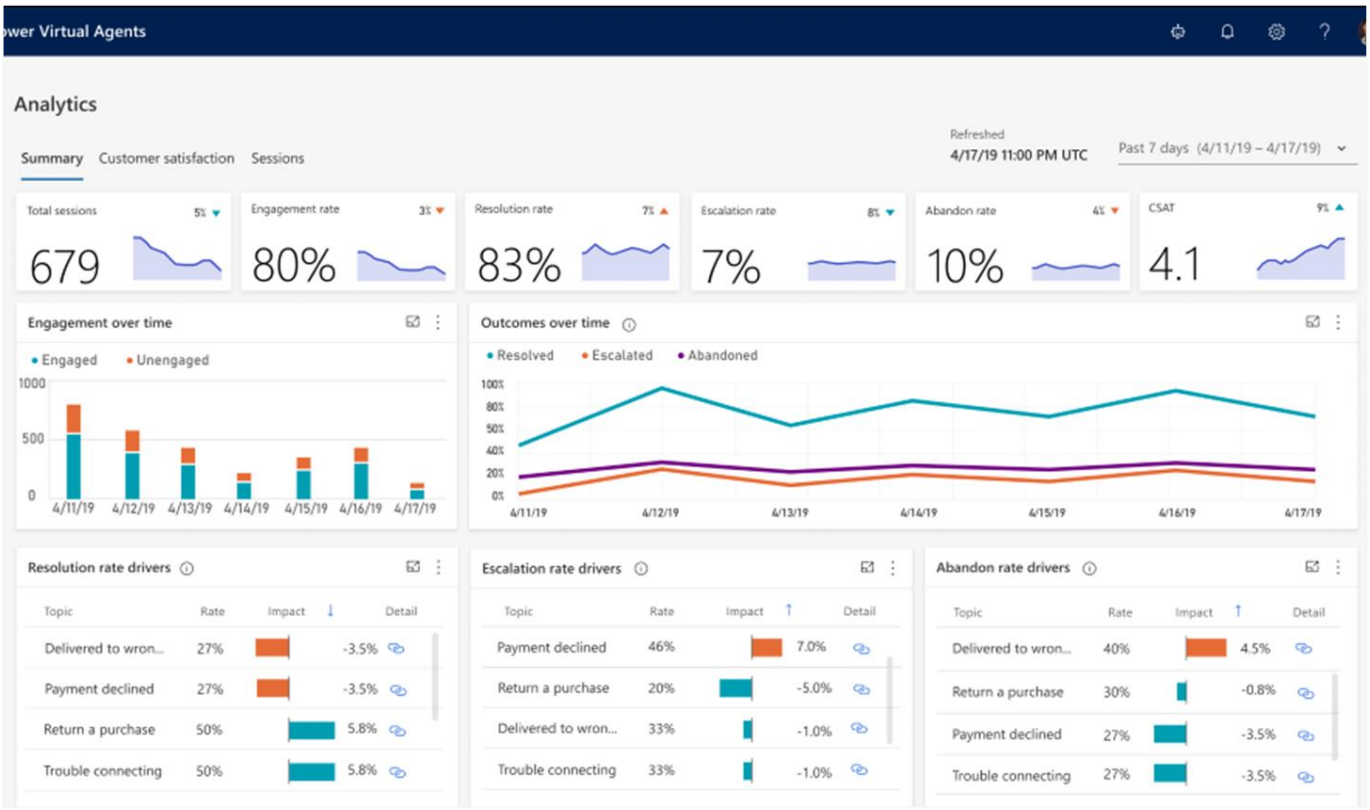

Figure 4: Power Virtual Agents provides real-time reporting on how your bot is used.

As this screenshot illustrates, Power Virtual Agents gives you a real-time view of data such as:

- How many people interact with your chatbot over time.
- The percentage of those interactions that end successfully.
- The percentage of those interactions that result in escalation to a human agent or are abandoned.
- Which topics are executed most often.
- What requests users make that your chatbot is unable to address.

These chatbot analytics help you improve the experience of the people using your chatbot. You can learn, for example, where you need to add new trigger phrases or wholly new topics to more fully address the needs of your users.

One more important aspect of a chatbot's lifecycle is keeping it up to date. As the world changes, the topics your chatbot implements will also need to change. As already described, your subject matter experts can make these changes themselves using the graphical tools

provided by Power Virtual Agents. It's hard to overstate how important this is; good chatbots are updated frequently, and waiting for professional developers to do this isn't feasible in many situations.

For more on building chatbots with Power Virtual Agents, take a look at these short videos:

- How to get topic suggestions from webpages
- How to create topics and test your bot
- How to use slot-filling and built-in entities to save authoring time
- How to publish your bot to a website
- How to use analytics to improve the performance of your bot

Applying Power Virtual Agents: Some scenarios

Power Virtual Agents chatbots can access other software.

The simplest way to use Power Virtual Agents is also among the most common: just build and use chatbots. New software almost always exists in the context of existing software, however, so it's useful to look at how Power Virtual Agents chatbots can connect to other technologies. This section walks through some of these scenarios.

Using Power Virtual Agents with Power Automate

Power Virtual Agents is part of Microsoft's Power Platform, a suite of low-code/no-code technologies. Another member of this suite, Power Automate, lets you create automated workflows using graphical tools. Like everything else in the Power Platform, these workflows—commonly called just *flows*—are designed to be created by anyone within an organization. When required, a flow can use *connectors* to interact with other systems. The Power Platform includes hundreds of connectors, providing links to SQL Server, Dynamics 365, Office 365, SharePoint, Salesforce.com, Twitter, and many other services.

Why does this matter for chatbots created with Power Virtual Agents? The answer is that a chatbot can call a flow, which in turn can use a connector to interact with this diverse set of services. Figure 5 shows how this looks.

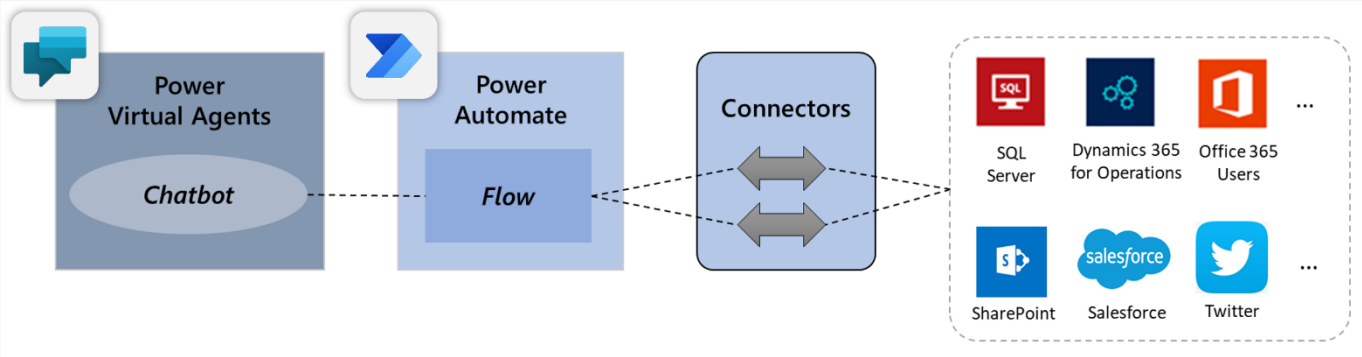

Figure 5: A Power Virtual Agents chatbot can call a Power Automate flow, which offers connectors to many other services.

Once again, you connect a Power Virtual Agents chatbot to a Power Automate flow using graphical tools—no code is required. And since flows themselves are also defined graphically, it's straightforward for business users to create chatbots that connect with backend systems.

What is the Power Platform?

The Power Platform is a set of interconnected technologies, all designed primarily for business users rather than pro developers. Those technologies are:

- Power BI for creating data-driven insights.
- Power Apps for building no-code applications.
- Power Automate for automating processes, including Robotic Process Automation (RPA).
- Power Virtual Agents for creating chatbots.

The Power Platform also provides shared infrastructure used across its technologies. Storage is provided by Dataverse, for example, while Power Platform environments provide a way to group running applications. Power Virtual Agents uses this infrastructure, storing each topic's data in Dataverse and running chatbots inside environments.

Using Power Virtual Agents with Microsoft's other chatbot offerings

Power Virtual Agents isn't Microsoft's only chatbot offering today; several others have preceded it. Those technologies include:

Power Virtual Agents is built on other Microsoft chatbot technologies.

- ***Microsoft Bot Framework,*** a software development kit (SDK) that pro developers can use to build chatbots of any type. This framework underlies all of Microsoft's chatbot offerings.
- ***Azure Bot Service,*** a platform as a service (PaaS) offering for creating and running chatbots built on Bot Framework.

Power Virtual Agents uses both of these, as Figure 6 shows.

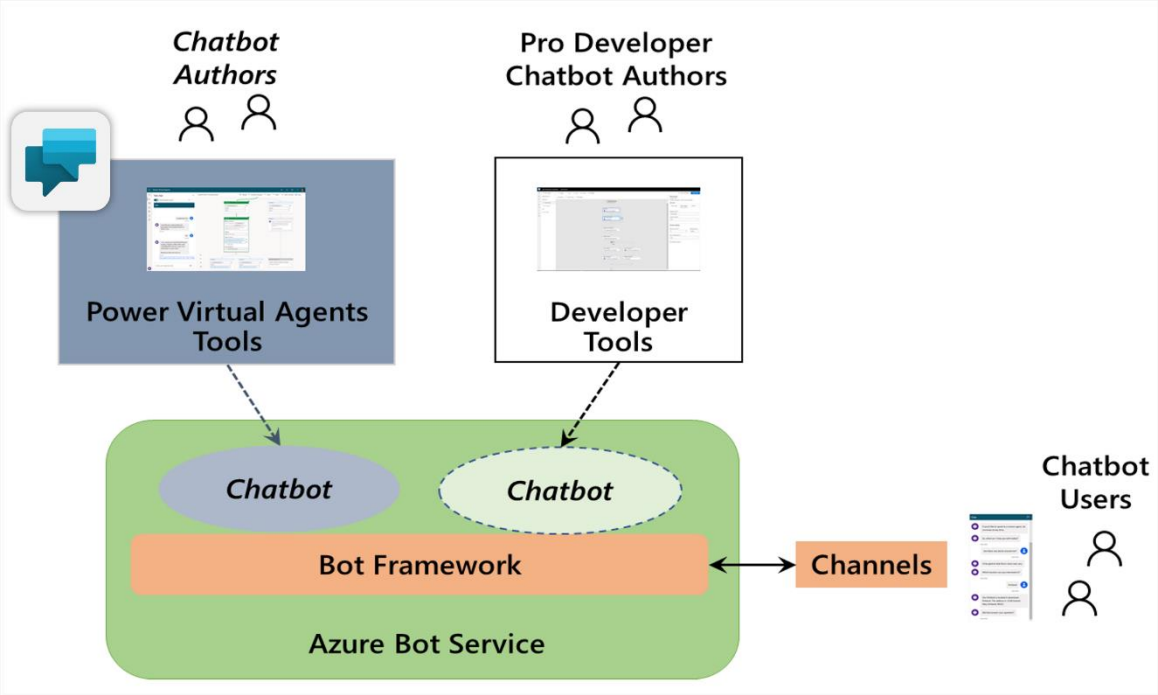

Figure 6: Power Virtual Agents chatbots use other Microsoft bot technologies.

Power Virtual Agents are the front door to Microsoft chatbot technologies.

Power Virtual Agents provides graphical tools that let anybody author chatbots. Under the covers, those chatbots use Bot Framework, as the figure shows, and they run in the Azure Bot Service. Pro developers are free to create chatbots in code using the PaaS approach of Azure Bot Service, while anyone can use the SaaS solution provided by Power Virtual Agents.

However they're created, these chatbots use Bot Framework and can run in the Azure Bot Service as the figure shows.

Microsoft recommends that you view Power Virtual Agents as the front door for creating chatbots. This SaaS technology means that you don't have to maintain infrastructure, and it also makes updates easy, removing one of the key blockers to using chatbots today. There are some situations, however, where you might need to build a chatbot on Bot Framework directly. One example of this stems from how chatbots do natural language processing.

It's fairly common today to create different language models for different kinds of chatbots. A chatbot focused on answering HR questions might need to understand different terminology than one designed to help shoppers, for example, and so the creators of each kind of chatbot might create their own customer language model for each area. Yet creating these language

models requires AI expertise—it's not simple—and Microsoft has found that a universal language model works well in most situations. Accordingly, Power Virtual Agents provides its own universal model, freeing you from the need to create your own.

But what if you need to create your own? Maybe the terminology your chatbot must handle is so specialized that the universal language model isn't good enough. To handle situations like these, Microsoft provides LUIS, an Azure service for creating custom language models. This service isn't directly accessible from Power Virtual Agents, but it is accessible from a chatbot created using Bot Framework directly. If your chatbot needs are this specialized, you might choose to work with pro developers rather than use Power Virtual Agents.

Connecting to a chatbot created with Bot Framework

It's possible to use chatbots created with Power Virtual Agents together with those built directly on Bot Framework. To do this, a Power Virtual Agents chatbot can just call a Bot Framework chatbot. Figure 7 shows how this looks.

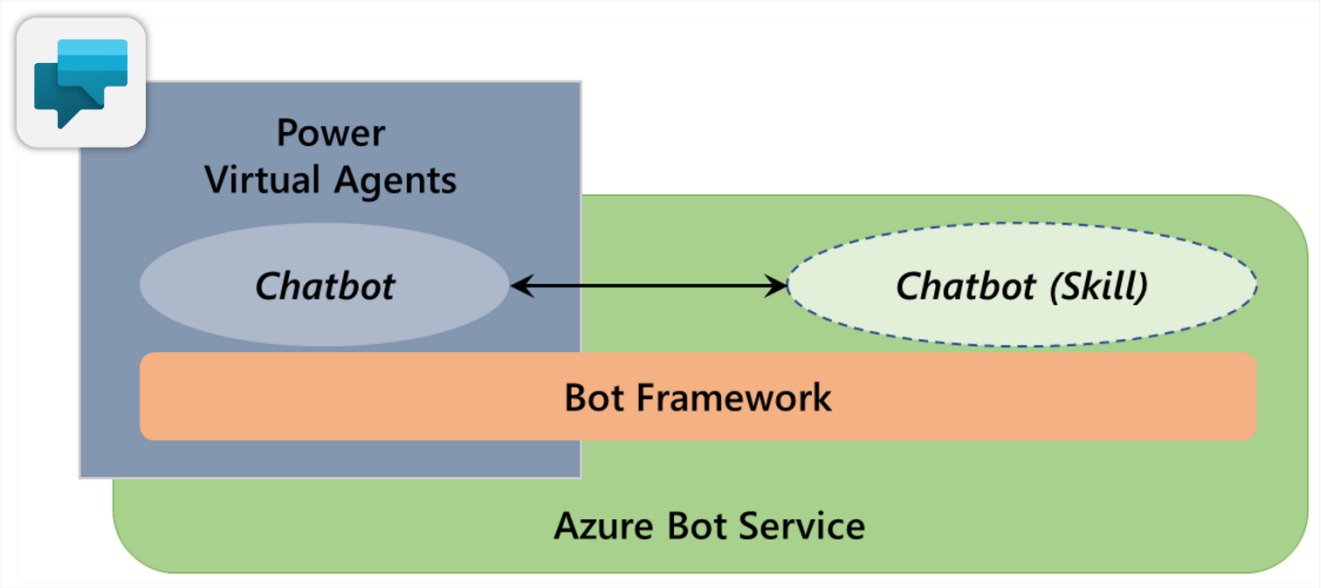

Figure 7: A Power Virtual Agents chatbot can connect with a chatbot created directly using Bot Framework.

A Power Virtual Agents chatbot can connect to chatbots created directly on Bot Framework.

When a chatbot created directly on Bot Framework is called by something else, that chatbot is referred to as a *skill*. For example, suppose you create a chatbot using Power Virtual Agents, but find that you need a custom language model. Your organization could create a skill, i.e., a Bot Framework chatbot built by pro developers, that has its own LUIS-based language model.

The Power Virtual Agents chatbot could then invoke that skill as needed, perhaps using this chatbot's Fallback topic. Or suppose you're creating a Power Virtual Agents chatbot to handle all aspects of travel requests in your company, but someone has already created a Bot Framework chatbot that knows how to do a specific thing, such as booking flights. Your new chatbot might invoke the existing flight booking chatbot as a skill. And as always, Power Virtual Agents lets you make this connection graphically; you don't need to write code.

Connecting to a chatbot created with QnA Maker

A Power Virtual Agents chatbot can connect to chatbots created with QnA Maker.

Along with the chatbot technologies described so far, Microsoft also offers a tool called QnA Maker. As its name suggests, this cloud service helps you create chatbots that provide answers to questions. By pointing the tool at existing FAQs and other data, you can automatically create this kind of chatbot. (As mentioned earlier, Power Virtual Agents also provides this functionality.)

Chatbots created with QnA Maker use Bot Framework, and they run by default on Azure Bot Service. If your organization has existing QnA Maker chatbots, you can also access them from chatbots created with Power Virtual Agents, as Figure 8 shows.

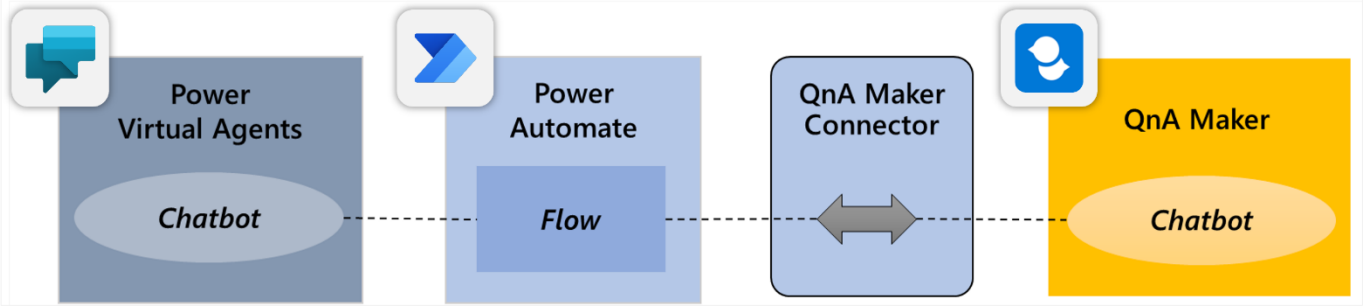

Figure 8: A Power Virtual Agents chatbot can access a chatbot created with QnA Maker by using a Power Automate flow and a connector.

Rather than accessing a QnA Maker chatbot as a skill, the simplest way to connect to it from a Power Virtual Agents chatbot is by invoking a Power Automate flow. Power Platform includes a connector to QnA Maker chatbots, which makes it simple to use these existing chatbots from new ones created using Power Virtual Agents.

In general, if it's possible to connect to something—a chatbot, a backend application, or anything else—through a flow and connector, this is probably the simplest approach. Doing this lets you stay entirely within the Power Platform world. If you need to invoke a skill, however, i.e., another chatbot built on Bot Framework, this option is also available.

What to do now

Whether you use them with your customers or your employees, chatbots can have real business value. And because Power Virtual Agents lets all kinds of people build, update, and integrate chatbots, it's likely to be your best choice for creating most chatbots today.

Microsoft uniquely empowers both non-developers and developers to create chatbots.

Yet Microsoft uniquely empowers both non-developers and developers to create chatbots. If you need functionality beyond what Power Virtual Agents can provide, such as a custom language model, you're free to use Bot Framework and Azure Bot Service directly. These chatbot technologies are complements, not competitors.

To see how easy it is to use Power Virtual Agents, go to https://powervirtualagents.microsoft.com now and get started. Your first chatbot will be running in less than five minutes!