

Azure Arc enabled data services

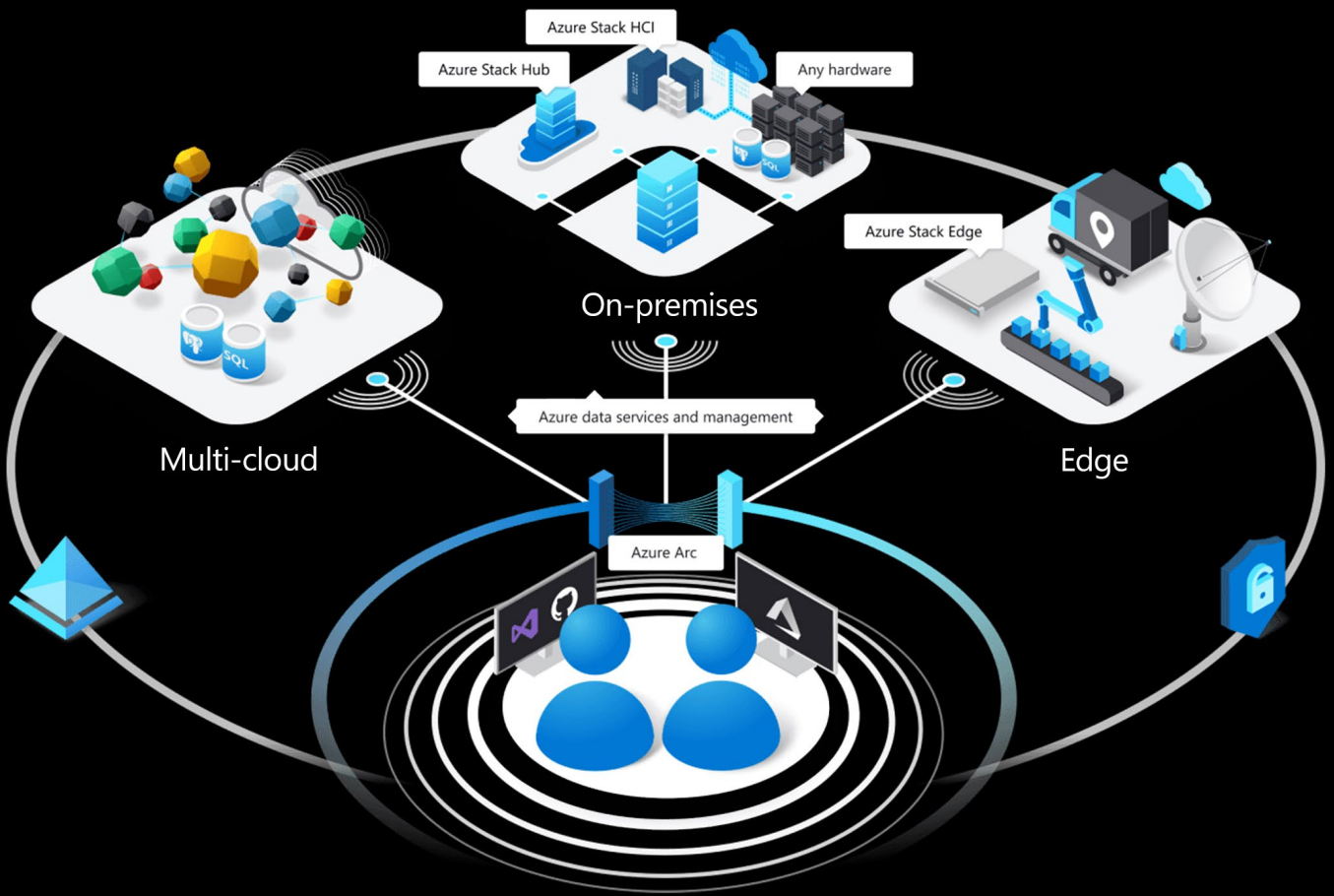


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Learn more about Azure Arc



Overview

- 1. What is Azure Arc?**

Azure Arc is a set of technologies that enables Azure data services, such as database products and analytics tools, and extends management across clouds, on-premises datacenters, and edge. It enables customers to run Azure data services anywhere, extend Azure management across customer environment, adopt cloud practices, and implement Azure security anywhere.
- 2. What is the benefit of using Azure Arc?**

Azure Arc provides a unified management experience across your entire data estate, whether that includes a hybrid mix of on-premises data centers and public cloud, or multiple public clouds such as AWS, Azure, Google Cloud Platform, or other private clouds.
- 3. What services from Azure data services are in preview on Azure Arc now?**

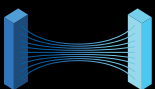
Azure SQL Database and Azure Database for PostgreSQL Hyperscale are now available on Azure Arc for private preview. Over time, we will bring other Azure data services to Azure Arc.
- 4. What management capabilities do I get with running Azure data services on my infrastructure?**

Azure Arc automates database management tasks for management at scale. Fast provisioning, patching, setting up high availability, backup-restore, and on-demand elastic scale are available out of the box. Azure Arc also enables you to extend Advanced Data Security, Azure Backup, Monitoring, role-based access control, and Azure policies for databases running in your environment. Please download the infographic [here](#).
- 5. What does Azure data services cost when it is running on my infrastructure?**

We will bring a cloud billing model to Azure data services running in hybrid environments. Additionally, SQL Server customers will be able to leverage their existing licensing investments to adopt Azure SQL Database on Azure Arc. Detailed information on pricing and the purchase model is not available during private preview.
- 6. What is the key difference between Azure data services on Azure Arc and those data services (PaaS) in Azure?**

Azure data services (PaaS) in Azure are fully managed by Microsoft and come with financially backed SLAs. Microsoft controls the infrastructure to meet all compliance certification criteria for those PaaS services. Azure Arc is a software-only solution and Microsoft will provide support through Unified Support like other software products, and the compliance certification is dependent on customers' fulfilling the process and requirements. We will provide detailed feature and capability comparison information later.
- 7. Is Azure Arc a replacement for Azure Stack?**

No, Azure Arc and Azure Stack work together. Azure Stack is an integrated solution that includes both hardware and software, to enable a consistent cloud model that's deployable on premises. This is ideal for customers who want a fully packaged, appliance-like solution. Azure Arc is a software-based solution that empowers you to extend Azure management and data services onto any underlying infrastructure, including an on-premises data centers, public clouds, and Azure Stack.



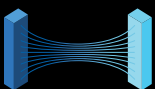
8. **Are there any backup services with Azure Arc?**
Yes, Azure Arc provides automated backup services on a configurable schedule.
9. **What kind of support is included with Azure Arc?**
Similar to Azure data services, there are support options available to help with software-related issues. We will provide support for Azure Arc issues with Kubernetes clusters. If there is an issue with a Kubernetes cluster that is outside the scope of Azure Arc, you can work with your Kubernetes service provider. If the underlying hardware you're using is Azure Stack, then Microsoft can provide support. If you're using hardware from another provider, or using IaaS from a service provider like Google or AWS, you can reach out to those partners for support.
10. **How can I leave feedback about Azure Arc?**
We are still evaluating Azure Arc and welcome your feedback during this private preview. Please join the preview [here](#) where you can leave comments.



Azure SQL Database and Azure Database for PostgreSQL

11. **What version(s) of SQL Server/PostgreSQL will Azure data services running on Azure Arc support?**
With Azure Arc, we are bringing Azure SQL Database, which is an evergreen SQL engine, to run on your infrastructure. It provides you the latest innovations and updates with no end of support. An evergreen SQL engine ensures you are always on the latest version of SQL. While you will have control over when these automatic updates to SQL are applied, if you repeatedly delay or disable the updating, you will eventually fall out of support and compliance.

We are also bringing the Hyperscale deployment option of Azure Database for PostgreSQL, which is fully compatible with community PostgreSQL. Currently in limited preview, we will provide support for Hyperscale using Postgres 11.
12. **Does the release of Azure Arc mean SQL Server 2019 is the last release of SQL Server?**
No. SQL Server has been the flagship database for enterprises around the world. SQL Server 2019 presents a breakthrough release that brings OLTP, big data analytics, and machine learning into a single offering. We remain committed to bringing new innovations to future releases of SQL Server.
13. **Can I move my existing SQL Server instances to Azure SQL Database – Azure Arc? What is compatible?**
Yes. Because Azure SQL Database on Azure Arc is built on the same codebase as SQL Server, there is a high level of compatibility. You can backup/restore, detach/attach your databases from SQL Server to Azure SQL DB-Azure Arc. We will provide detailed migration information later.

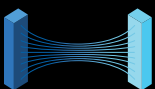


- 14. Can I move Azure SQL Database – Azure Arc to SQL DB (PaaS) in Azure?**
Yes. You can use the same database migration tools and services to move your Azure SQL Database – Azure Arc from your environment to Azure.
- 15. What can I expect in terms of high availability and disaster recovery?**
For SQL, multiple instances are deployed and automatically wired up into an always-on availability group. A Kubernetes operator can monitor the availability of the instances and perform failover functions if needed, including updating the Kubernetes service that routes the read-only and read-write traffic to the right instances depending on which instance is the primary versus secondary. For PostgreSQL, a solution is in early stages of design and development.



Getting started

- 16. How do I get started with Azure data services on Azure Arc?**
You need to install pre-requisite Azure Arc management software in your environment before provisioning Azure data services and using management capabilities. Please join the preview here.
- 17. Does Azure Arc install with administrative control?**
Because Azure Arc is not a service fabric, the Azure Arc data controller needs to have permissions in Kubernetes to perform common tasks like provisioning stateful sets and persistent volumes. Kubernetes, however, does not require the administrator role permissions for these tasks. If the Kubernetes administrator deploys the Azure Arc data controller, then the deployment process can grant the data controller the role bindings it needs at deployment. As a customer-managed environment in Azure, you will be able to see this resource in Azure portal.
- 18. How can I scale up/down/out in Azure Arc?**
You can scale the infrastructure/Kubernetes layer in Azure Arc, and you can scale the individual data services. For the infrastructure/Kubernetes layer, you can add additional hardware such as compute nodes or local and remote storage as needed, and then deploy additional Kubernetes nodes on top of that hardware. Or you can create new persistent volumes on the storage. For data services, the compute or memory for each individual database instance you've deployed can be scaled up and down. You can also scale out by increasing the number of instances, replicas, or shards, but this depends on the type of database engine you have and how its scale-out works. For now, scaling is an automated process that is triggered by a call to an API, which a user could initiate with the CLI or GUI, or you can automate the scaling using a script. Currently, scaling is not automated based on the actual or predicted load, but this could change if there is enough interest.





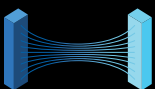
Networking and connectivity

19. **Do I need a continuous connection to Azure to run Azure data services in my environment?**
You can run Azure data services in your environment with intermittent or continuous connection to Azure. While Azure Arc can run when it's not connected to Azure, it will have a delayed enforcement of policy and role-based access control, and is therefore not recommended. Azure Arc for databases can run indefinitely without connectivity because it has a local control plane. We are using the private preview to learn customer requirements and will evaluate the need for other connection conditions in customer environments.
20. **How is connectivity to Azure established?**
There will likely be multiple options to establish connectivity to Azure, including ExpressRoute, public internet with SSL, etc. More information on this will be provided later.
21. **How does the networking work for Azure Arc?**
Azure Arc uses an internal network and internal DNS that routes traffic around inside Kubernetes clusters. Controller API endpoint or the SQL endpoint are exposed to the external network using a service. DNS on the external network is sometimes handled automatically, such as in a managed Kubernetes service like Azure Kubernetes Service, Amazon Elastic Kubernetes Service, Google Kubernetes Engine, or Google Anthos. Otherwise, DNS entries pointing to the IP address of the service can be created manually. Container network interface plug-in architecture also allows you to bring networking solutions into an extensible architecture. Learn more about Kubernetes networking [here](#) and [here](#).



Kubernetes

22. **What are the system requirements to run Azure data services on my infrastructure?**
Azure data services on Azure Arc requires you to have a Kubernetes cluster as the orchestrating fabric in your environment to run Azure data services on the hardware of your choice. We will work with major Kubernetes distributions, such as open source Kubernetes, Red Hat OpenShift, Azure Kubernetes Services, and additional third-party cloud vendors as supported options.
23. **Is there an automated way to install Kubernetes in the proper configuration?**
The proper configuration is highly dependent on the underlying hardware and the Kubernetes service. For example, deploying Red Hat OpenShift on Core OS on OpenStack with Dell EMC storage area network will be significantly different than deploying Project Pacific on vSphere with physical servers and local storage. We can provide guidance on automated deployments for managed or semi-managed environments like Amazon Elastic Kubernetes Service, Google Kubernetes Engine or Azure Kubernetes Service on Azure Stack. See this [example](#) for big data clusters, which is a single script that will deploy an Azure Kubernetes Service cluster in Azure and then deploy a big data cluster onto it. This scenario is similar to an automated deployment for Azure Kubernetes Service on Azure Arc.

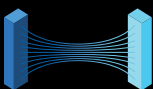


- 24. Is Azure Arc connected to the hypervisor on Windows?**
No, Azure data services on Azure Arc run on Linux containers on Kubernetes nodes on Linux hosts. Those Linux hosts could be VMs running on Hyper-V on Windows, but that is just one of many possible combinations. The Linux hosts could also be physical servers, Linux VMs on VSphere, Project Pacific from VMWare, a managed Kubernetes service like Azure Kubernetes Service, Amazon Elastic Kubernetes Service, Google Kubernetes Engine, or Google Anthos. Kubernetes provides the abstraction over the underlying virtualization and hardware infrastructure.
- 25. Where can I see host or Kubernetes errors in Azure Arc?**
Once logs are collected in a local ElasticSearch instance in the data controller, you can start log visualization and analytics using Kibana. You can also forward the logs to Azure Monitor and analyze them there. Health state will be viewable in the CLI and GUI in Azure Data Studio.
- 26. How can I update the Kubernetes host kernel?**
To update the Kubernetes host kernel, first drain the pods from that node, then remove it from the cluster, upgrade it, and add it back to cluster. Find more information about upgrading Kubernetes here.



Underlying hardware

- 27. What are the hardware requirements to run Azure data services on my infrastructure? Do I need to purchase specific hardware certified by Microsoft?**
With Azure Arc, you can run Azure data services on any hardware, including Azure Stack, OEM hardware, and in third-party clouds. We will work with partners on reference architectures but will not require hardware to be certified by Microsoft.
- 28. How can I upgrade host hardware?**
For Azure SQL Database – Azure Arc, which has Always-on Availability Groups for SQL where the data is replicated across multiple persistent volumes, you can upgrade your hardware in a manner where at least one instance is in the Always-on Availability Group during the hardware upgrade (i.e. one hardware node at a time will ensure that at least two replicas are always available). Downtime is not required, provided there is some form of connection retry logic in the application.



Learn more about Azure Arc



Blogs

[Bring Azure data services to your infrastructure with Azure Arc](#)
[Azure Arc: Extending Azure management to any infrastructure](#)



Videos

[Azure Arc for data services, including SQL and PostgreSQL](#)
[Azure Arc: Bring Azure data services to on-premises multi-cloud and edge](#)
[Organize all your servers outside of Azure with Azure Arc](#)
[Managing K8 clusters outside of Azure with Azure Arc](#)
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