



# Introduction to Azure Arc for Data Services on Lenovo ThinkAgile MX Series

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Presents a SQL Server use  
case for Lenovo ThinkAgile  
MX Series

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Describes Azure Arc and the  
data services currently  
available through it

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Describes the option to run  
Azure SQL Managed Instance  
SaaS on ThinkAgile MX with  
Lenovo TruScale

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Provides instructions for setting  
up Azure SQL MI on Azure  
Kubernetes Service on  
ThinkAgile MX

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# 1 Introduction

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Microsoft Azure Arc for data services provides you with a set of technologies to run Azure database services on your on-premises infrastructure as opposed to running them on public cloud. This white paper describes the use case for running Azure arc for data services; specifically, SQL Server Managed Instance Azure Service on Lenovo ThinkAgile MX. The target audience is IT professionals, sales and account teams and end customers interested in a hybrid cloud solution in their data center. The audience is expected to be familiar with Hyper converged infrastructure (HCI) technology in general, Lenovo ThinkAgile MX and Azure public cloud and services. The paper also walks you through the steps required to set up and run Azure SQL database service on Lenovo ThinkAgile MX for Azure Stack HCI.

Lenovo TruScale Infrastructure Services gives an option to customers to acquire ThinkAgile MX through a pay-as-you-go business model. A customer can buy both ThinkAgile MX hardware and Azure services like SQL Server Managed Instance, use Azure Arc to manage both from a single pane of glass and receive one bill for these services.

## 2 Business problem and business value

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The following section provides a summary of the business problems that this white paper is intended to help address, and the value that the listed solutions can provide.

### 2.1 Business problem

As an organization you need to ensure your data stays safe and secure, your workloads and applications keep running while incorporating the latest updates and innovations, and the costs remain manageable. An organization is always looking for better management and policy enforcement on their infrastructure systems.

### 2.2 Business value

When you invest in a Lenovo ThinkAgile MX solution for Microsoft Azure Stack HCI to meet your hybrid cloud needs, there are several options available to keep your data safe and secure along with built-in capabilities in a multi-node high availability solution.

Azure Arc for data services from Microsoft provides you the ability to take advantage of Azure SQL innovation in the cloud by running the SQL Server Managed Instance (SQL MI) service using Azure Kubernetes Service (AKS) on Lenovo ThinkAgile MX for Azure Stack HCI.

Azure Arc for data services lets you run the popular Azure SQL MI service on premises in the data center or at the edge, and in multi-cloud environments on reliable ThinkAgile MX infrastructure solutions from Lenovo. You can benefit from the bursting feature with elastic scale, built-in high availability feature, unified management for data workloads, and other innovations in Azure with or without a direct Azure connection. TruScale can be used for unified billing and accounting purposes.

## 3 Azure Arc for data services

### 3.1 Azure data services available currently

Two data services are available currently through Azure Arc. The general-purpose tier of Azure Arc-enabled SQL Managed Instance became generally available on July 30, 2021. Azure Arc-enabled PostgreSQL Hyperscale service is available in public preview. This paper focuses on Azure SQL management instance on Azure Kubernetes Service on Lenovo ThinkAgile MX for Azure Stack HCI.

### 3.2 Azure SQL MI implementation on Lenovo ThinkAgile MX

There are several approaches to having a working Azure SQL Managed Instance and we have focused on having it run on the local, on-premises infrastructure. This approach can comply with certain regulatory requirements and provide a cost competitive option.

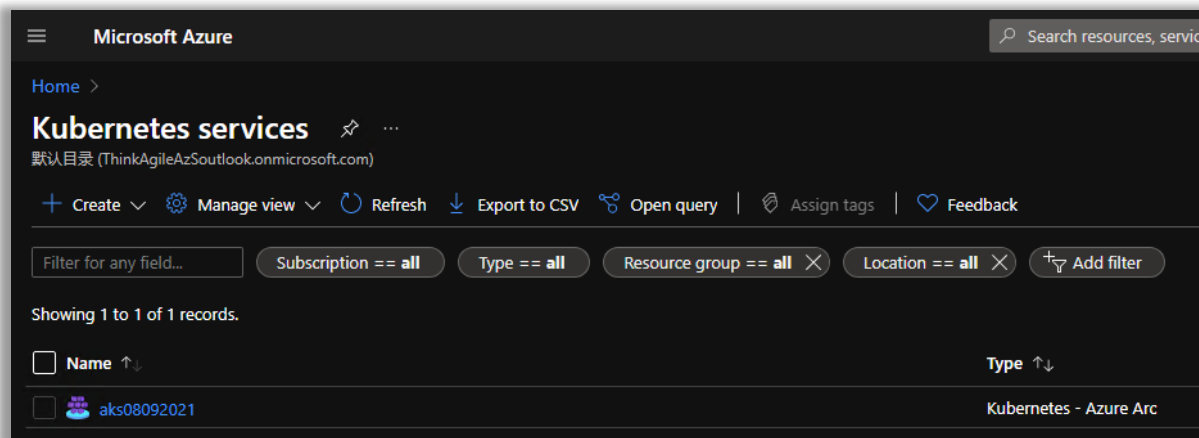
The main prerequisites for having Azure SQL Managed Instance running are the following:

- A working Azure Stack HCI cluster
- Azure Kubernetes Services enabled on the Azure Stack HCI cluster
- A Kubernetes cluster with Azure Arc enabled deployed on Azure Kubernetes Services
- An Azure Data Controller deployed on the Kubernetes cluster

In this paper, we're going to focus on setting up the Azure Data Controller and enabling Azure SQL MI.

### 3.3 Azure Arc Data Controller deployment

From the Azure portal select *Kubernetes Services* and once this is selected the cluster should be visible:



**Figure 1** Kubernetes cluster

This should be the same cluster that is visible from Windows Admin Center, Azure Kubernetes Service section:

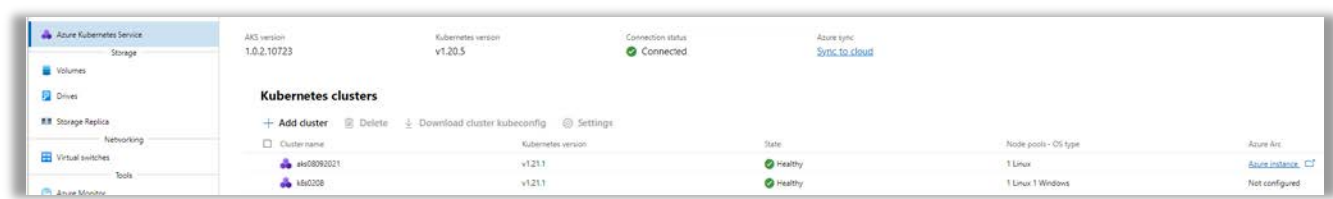


Figure 2 AKS in WAC

The next step would be to select the cluster from Azure portal and go to the *Extensions* section:

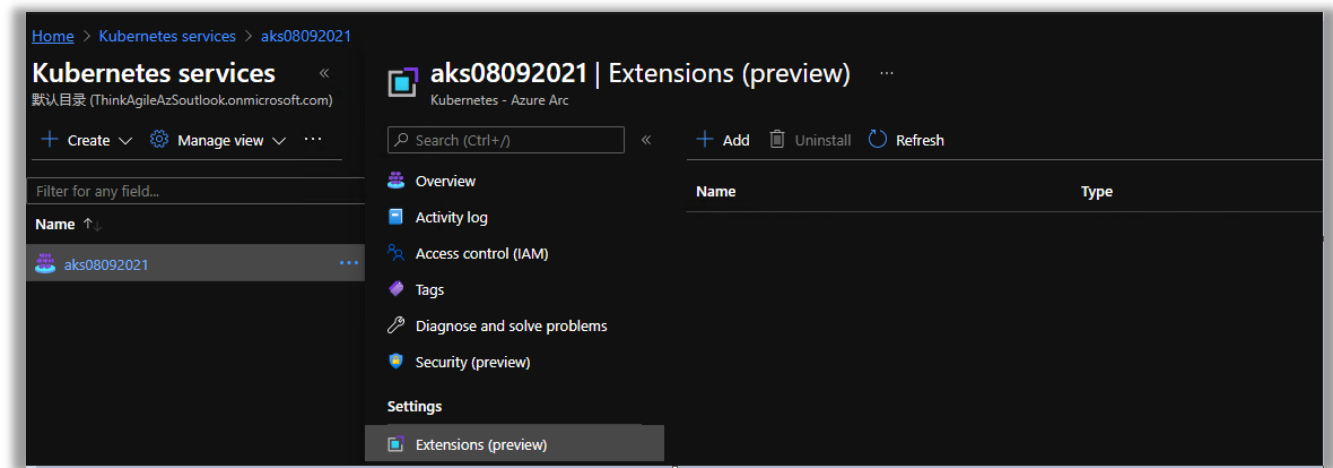


Figure 3 Extensions

Here, select *Add* and pick the *Azure Arc data controller* resource:

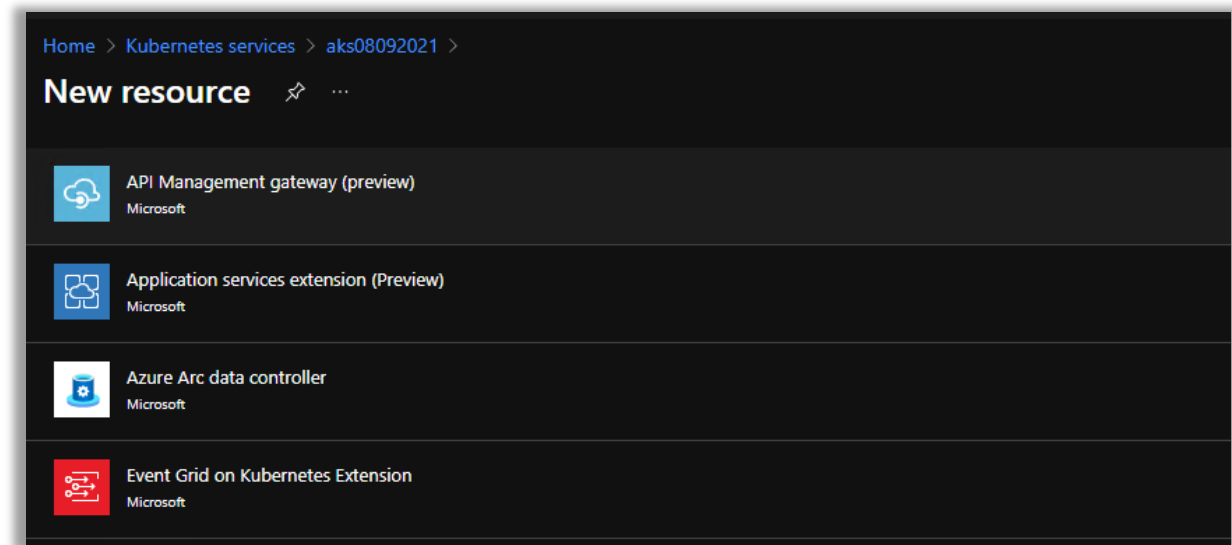


Figure 4 Azure Arc data controller resource

In the following information screen select *Create* and additional information regarding the Data Controller will be required:

Create an Azure Arc data controller to enable Azure data services in the Kubernetes environment of your choice.

### Project details

Select the subscription to manage deployed resources and costs. Use resource groups like folders to organize and manage all your resources.

Subscription \* ⓘ Microsoft Azure Enterprise - Azure Stack Solutions Developmnet ✓

Resource group \* ⓘ aks08092021 ✓

### Data controller details

Provide a name to identify your data controller for remote management and monitoring.

**i** This data controller will be installed in direct connectivity mode to an existing Azure Arc-enabled Kubernetes cluster. This connectivity mode will allow you to create and manage Arc-enabled data services, such as Arc-enabled SQL Managed Instance and Arc-enabled PostgreSQL Hyperscale, directly from the Azure portal.

Data controller name \* datacontroller2009 ✓

### Custom location

A custom location is an Azure resource that represents the namespace on your Kubernetes cluster where the data controller will be hosted. [Learn more about custom locations](#)

Custom location \* ⓘ  ✓

[Create new](#)

**i** Only custom locations for cluster 'aks08092021'

### Create new custom location

Name \* customlocation2009 ✓

Namespace \* default ✓

Create Cancel

### Kubernetes configuration

Select a template appropriate for your cluster

Kubernetes configuration template \* ⓘ  ✓

### Administrator account

Data controller login \* ⓘ

**Figure 5 Data controller settings**

For the *Data controller name* field any name compliant with the requirements should be ok and on the *Custom location* field we chose the *default* namespace.

From the other options available, special care should be taken to select *azure-arc-aks-hci* on the *Kubernetes configuration template* and a service principal should be available to enter its data:

**Kubernetes configuration**

Select a template appropriate for your cluster configuration.

Kubernetes configuration template \* ⓘ **azure-arc-aks-hci** ✓

Infrastructure **onpremises** ✓

Data storage class \* ⓘ **default** ✓

Log storage class \* ⓘ **default** ✓

Service type \*

- ☒ **Node port:** Exposes the service on each node's IP at a static port.
- ☐ **Load balancer:** Exposes the service externally through a load balancer.

**Administrator account**

Data controller login \* ⓘ **administrator** ✓

Password \* ⓘ ..... ✓

Confirm password \* ..... ✓

**Upload Service Principal**

Service Principal \* ⓘ **Manually enter service principal information** ✓

Client Id \* ⓘ **5c81952a-24fc-478d-97ff-7e6a42dbdf16** ✓

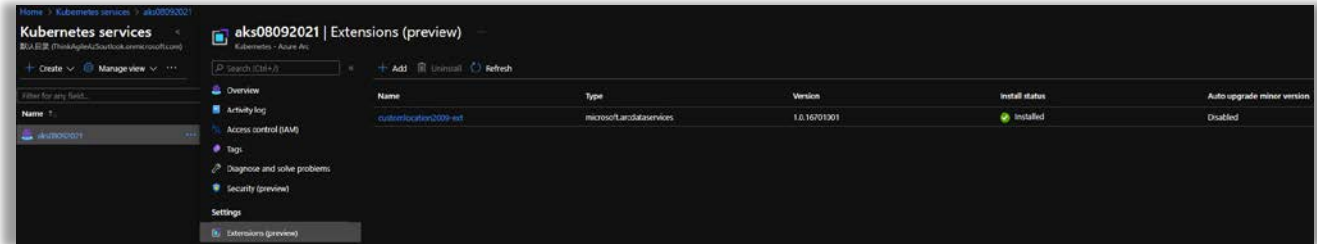
Client Secret \* ⓘ

< Previous **Next : Additional Settings >**

**Figure 6 Data Controller settings**

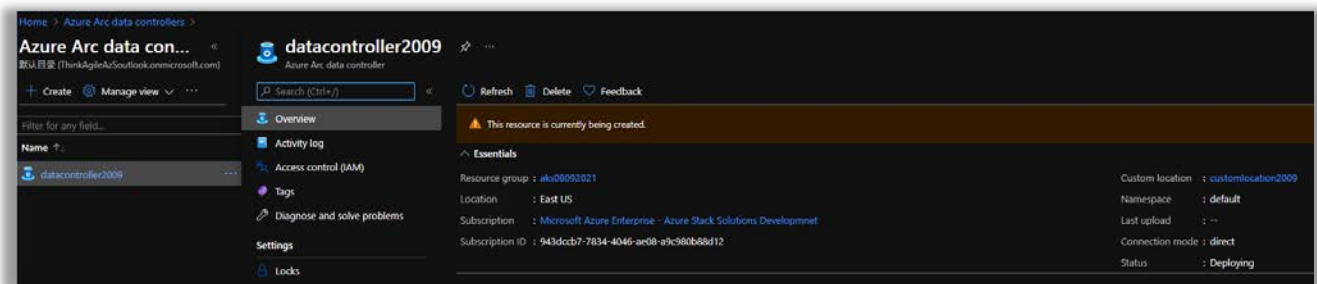


Once all the data has been provided navigate thru the menus and start the deployment. Once it is done the status can be checked in the *Extensions* section:



**Figure 7 Data Controller status**

Also, going into *Azure Arc data controllers* we can check the status of the data controller:



**Figure 8 Data Controller resource**

Once the deployment is complete the next step is to deploy the Azure SQL Managed instance.

## 3.4 Creating the Azure SQL managed instance on Azure Arc

As the SQL MI is going to be created over cli with Azure CLI it is required to have the following tools installed locally on the host that will be used for management:

- Azure CLI (the guide for the installation can be found on Microsoft's page: <https://docs.microsoft.com/en-us/cli/azure/install-azure-cli> )
- Arcdata Azure CLI extension (the instructions can be found here: <https://docs.microsoft.com/en-us/azure/azure-arc/data/install-arcdata-extension> )
- The following extensions for Azure CLI connectedk8s, k8s-extension, customlocation (the instructions for the installation can be found here: <https://docs.microsoft.com/en-us/azure/azure-arc/kubernetes/custom-locations#prerequisites> )

Once the prerequisites have been installed the installation can be initiated by running the following command in a powershell instance:

```
az sql mi-arc create -n sqldemo --k8s-namespace default --use-k8s
```

where sqldemo is the name that we chose and default is the namespace used.

# Resources

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For more information about the topics that are described in this document, see the following resources:

- Lenovo ThinkAgile MX solution:  
<https://www.lenovo.com/us/en/data-center/software-defined-infrastructure/ThinkAgile-MX-Certified-Node/p/WMD00000377>
- Microsoft Azure Stack HCI:  
<https://azure.microsoft.com/en-us/products/azure-stack/hci/>
- Azure Arc for data services  
<https://azure.microsoft.com/en-us/services/azure-arc/hybrid-data-services/#overview>

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