TECH
mahindra

Simplify Hybrid and Multi Cloud Management with Azure Arc

Abstract

Most organizations are adapting to the cloud. Each organization has its own strategy and pace towards moving to the cloud. Some of them are moving few sets of workloads to public clouds, according to their business priorities, while keeping some workloads on-premises. Organizations are also using multiple public clouds for various purposes. This creates hybrid and multi cloud scenarios along with management, security, and governance challenges. This whitepaper addresses how Azure Arc solution can address these challenges with its unique capabilities and provide flexibility to manage, secure, and innovate anywhere.

Key Takeaways

Azure Arc helps achieving hybrid and multi cloud management with following benefits:

01

Unified View - Azure Arc provides Unified single pane of glass view to manage various resources across different environments.

02

Simplified Management and Flexibility - Azure Arc brings lot of flexibility to deploy and manage Azure fully managed services across hybrid and multi cloud environments using native tools.

03

Organized Resources – Azure Arc organize resources across distributed locations and provides ease of inventory management with searching, indexing capabilities.

04

Standard Security, Governance, and Compliance – Azure Arc ensures standard security, consistent governance and compliance to meet regulatory requirements, across the entire organization.

05

Extend Cloud Benefits Everywhere – Azure Arc extends Azure services and cloud benefits such as scalability, fast deployment, and always up-to-date cloud innovation to existing on-premises infrastructure and other clouds.

06

Edge Computing Management – Achieve consistency in development, management, and security across Azure Stack HCI platform solutions and Azure IoT devices.

Introduction

Azure Arc solution extends management capabilities of Azure outside of Azure, across multiple public clouds, on-premises data centers, and edge locations. Using Azure Arc, IT administrators can register resources outside of Azure and manage them centrally using Azure Resource Management. This capability is delivered through Azure Arc enabled servers and Azure Arc enabled Kubernetes. With Azure Arc enabled data services, Azure PaaS services capabilities are extended to various cloud environments.

Azure Arc enables IT administrators to centrally deploy and manage servers, services, and applications to any environment which are enabled for Azure Arc solution. Azure native tools, technologies, operations are extended to discrete environments, with limited or no network connectivity scenarios. Azure application development and innovations are also available for different environments outside of Azure.

Azure Arc extends the platform to help build applications and services to run on edge platforms. This makes the cloud-edge ecosystem simple, secure, and flexible to operate. Azure Arc can run on on-premises data center servers with Windows, VMware operating systems, Azure Stack HCI, Kubernetes platforms and internet of things devices.

Key Business Challenges

Many large organizations have different types of applications running in various environments. These applications could be running on premises datacenters, various public cloud environments and edge locations. There are also different tools, languages, frameworks, and devOps technologies being used. The key business challenges in these scenarios are:

- ▶ Lack of **visibility** for enterprise workloads spread across on premises, multiple clouds, and edge locations - How to operate across disparate existing environments?

- ▶ Challenge of **inventory management** and organize resources spanned across multiple environments - How to organize resources spread across various cloud environments?

- ▶ Complexity to apply **standard security** policies across different environments - How to ensure security across the entire organization?

- ▶ Address regulatory requirements for **governance and compliance** on distributed workloads - How to meet regulatory requirements and overcome technical hurdles?

- ▶ Complexity of application and data **development** on various cloud platforms. Each cloud environment has own set of **management tools and operations** hence difficult to manage - How to best enable innovation and developer agility with a unique tool?

Industry Landscape

Although most organization has Azure and Windows assets, many of their assets also run on other platforms as well. organizations have a hybrid infrastructure with half of the workloads on-premises and half in the cloud. The IT operations team manages a large quantity of servers with varied configurations. These include cloud, on-premises, physical, and virtual workloads. Most of these servers run Windows and Linux operating systems. There are also multiple cloud vendors, as part of a multi-cloud strategy.

Organizations struggle to centralize and control the operational lifecycles and security of their distributed infrastructure resources. They are looking for solutions that would save their IT operations teams' time, accelerate initiatives to modernize to the cloud, and improve the security of critical systems.

Azure Arc provides a consistent operations, development, and security model for applications and infrastructure. IT operation teams can save considerable amounts of time on infrastructure management. The organizations can also extend services like Microsoft Defender for cloud and Microsoft Sentinel to cover these assets, improving security. This helps in addressing governance, security, and compliance challenges.

Reference Customer Scenario

A large organization with thousands of servers deployed in multiple locations. The servers are spread across multiple public clouds such as Azure, AWS and GCP, private clouds such as VMware, Azure Stack HCI, VMM Managed Hyper-V Hosts and edge computing IoT devices. The organization has multiple stores and in-store applications. The applications are using containers running on Kubernetes clusters. They need to apply security, governance, monitor theses clusters as well as integrate devOps practices.

Let's understand, how Azure Arc solution deployment would help achieving hybrid and multi cloud management in these scenario.

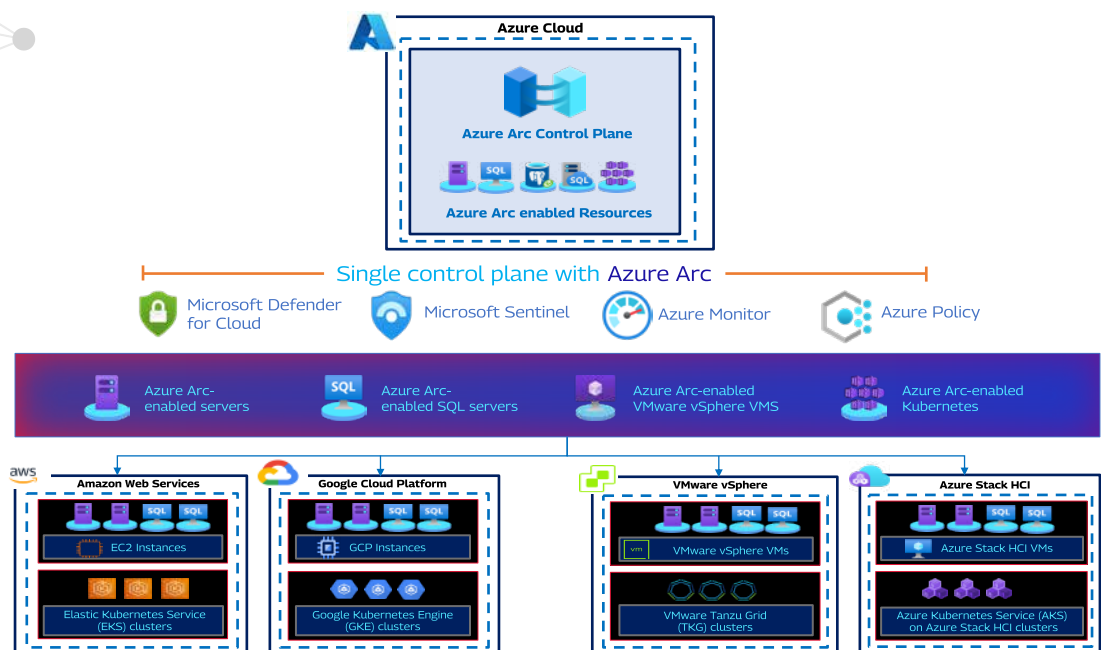## Azure Arc Solution Reference Architecture

Figure1: Azure Arc Solution Reference Architecture

Azure Arc Solution Overview

Azure Arc simplifies complex and distributed environments by extending Azure management across clouds datacenters and edge locations as well as enabling the deployment of Azure services to any infrastructure. With a single control plane using Azure Arc, resources are projected within Azure environments, as resources in Azure and have a consistent way to manage Azure and non-Azure resources. It is possible to enforce policies to different cloud environments and makes it easier to implement standard cloud security and governance.

Azure Arc-Enabled Servers

Azure Arc enabled servers allows management of Windows, Linux operating systems, physical and virtual machines outside of Azure. These servers can be hosted on the on-premises datacenter on corporate network or public cloud environments. Azure connected machine agent installed on each server to become Azure hybrid connected machine on Azure. When any server outside of Azure registered as Azure Arc enabled servers Azure following some of the operational functions can be performed:

- ▶ Monitor operating system performance and discover application components to monitor processes and dependencies with other resources using VM insights.

- ▶ Collect other log data, such as performance data and events, from the operating system or workloads running on the machine with the log analytics agent.

- ▶ Use update management to manage operating system updates for your Windows and Linux servers.

- ▶ Use Azure automation for frequent and time-consuming management tasks using PowerShell and Python runbooks.

- ▶ Perform post-deployment configuration and automation tasks using supported Arc-enabled servers VM extensions for your non-Azure Windows or Linux machine.

- ▶ Protect non-Azure servers with Microsoft Defender for Endpoint, included through Microsoft Defender for cloud.

- ▶ Use Microsoft Sentinel to collect security-related events and correlate them with other data sources.

Azure Arc-enabled Kubernetes

Azure Arc enabled Kubernetes to form the foundation for building modern cloud native apps anywhere. The Kubernetes clusters running anywhere can be attached to Azure as Azure Arc-enabled Kubernetes.

When the Azure Arc agents are deployed to the cluster, it can be managed and configured in Azure. Once clusters are connected to Azure, they show up as resource in Azure Resource manager and following functionalities can be achieved.

- ▶ View all connected Kubernetes clusters running outside of Azure for inventory, grouping, and tagging, along with Azure Kubernetes Service (AKS) clusters.

- ▶ Configure clusters and deploy applications using GitOps-based configuration management.

- ▶ View and monitor your clusters using Azure Monitor for containers.

- ▶ Enforce threat protection using Microsoft Defender for Kubernetes.

- ▶ Ensure governance through applying policies with Azure Policy for Kubernetes.

- ▶ Grant access and connect to your Kubernetes clusters from anywhere and manage access by using Azure role-based access control (RBAC) on your cluster.

- ▶ Deploy machine learning workloads using Azure machine learning for Kubernetes clusters.
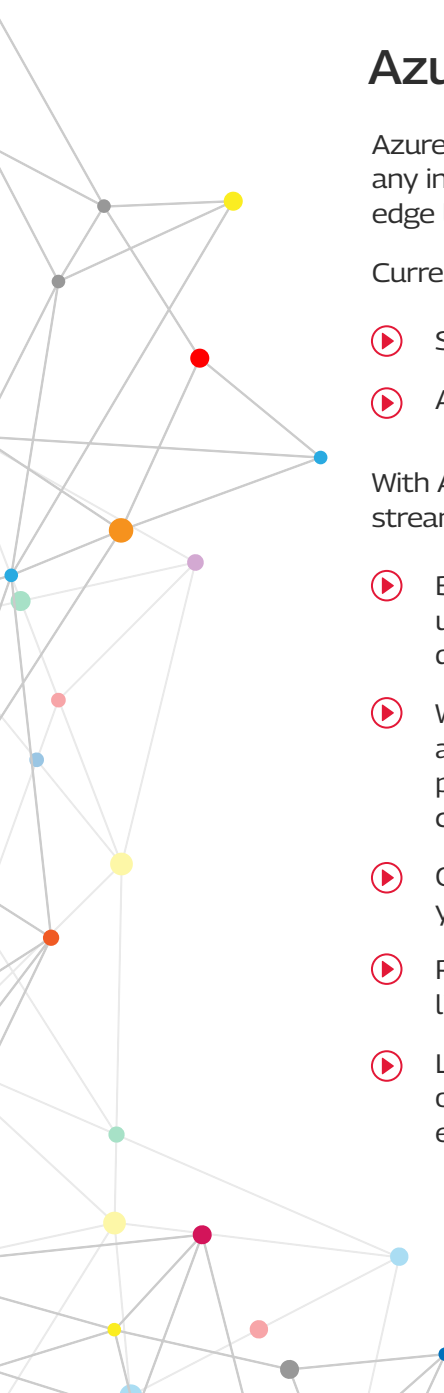
Azure Arc-enabled data services

Azure Arc enabled data services brings the Azure data management capabilities to any infrastructure. The workloads could be at on-premises or public clouds or edge locations.

Currently, the following Azure Arc-enabled data services are available:

- ▶ SQL Managed Instance

- ▶ Azure Arc-enabled PostgreSQL (preview)

With Azure Arc enabled data services it is possible to achieve following Azure streamlined experience across data workloads

- ▶ Benefits from SQL environment with the newest features and automated updates without downtime. An always up to date experience without downtime to maximize efficiencies and minimize disruptions

- ▶ With comprehensive encryption including transparent database encryption and always encrypted feature, as well as Azure role-based access control and policy, data is protected by powerful on-premises and Azure security capabilities.

- ▶ Optimize the performance of applications by scale up and down based on your application need, no downtime required.

- ▶ Realize cost efficiencies by paying for only what you use and eliminate licenses that are often based on peak expected usage.

- ▶ Leverage Azure familiar tools, simplified dev/Ops experience by reducing overhead. Gain a unified view into query performance, storage capacity and error logs using dashboards directly from the built-in monitoring

Azure Arc VM management on Azure Stack HCI (preview)

Azure Stack HCI is a hyperconverged infrastructure (HCI) cluster solution that hosts virtualized Windows and Linux workloads and their storage in a hybrid environment that combines on-premises infrastructure with Azure cloud services. To enable virtual machine (VM) provisioning through the Azure portal on Azure Stack HCI, Azure Arc Resource Bridge is required. Using Azure Arc VM management, following operations are achievable:

- ▶ Azure portal to provision and manage Windows and Linux virtual machines hosted in an on-premises Azure Stack HCI environment.

- ▶ Delegate permissions and roles to app owners and devOps teams to enable self-service VM management for their Azure Stack HCI clusters.

- ▶ Using Azure management tools, including Azure portal, Azure CLI, Azure PowerShell, and ARM templates

- ▶ Using Azure Resource Manager templates can automate VM provisioning in a secure cloud environment.

- ▶ Perform various operations from the Azure portal including create and delete a VM, start, stop, restart a VM, Control access, add Azure tags, add, and remove virtual disks and network interfaces, update memory, and virtual CPUs for the VM

Azure Arc-enabled VMware vSphere (preview)

Azure Arc-enabled VMware vSphere (preview) simplifies management of workloads hosted on VMWare VSphere and Azure. Azure Management capabilities such as governance and security are extended to VMware vSphere infrastructure. Arc-enabled VMware vSphere (preview) allows following capabilities:

- ▶ Discover VMware vSphere estate (VMs, templates, networks, datastores, clusters/hosts/resource pools) and register resources with Arc at scale.

- ▶ Perform various virtual machine (VM) operations directly from Azure, such as create, resize, delete, and power cycle operations such as start/stop/restart on VMware VMs consistently with Azure.

- ▶ Empower developers and application teams to self-serve VM operations on-demand using Azure role-based access control (RBAC).

- ▶ Install the Arc-connected machine agent at scale on VMware VMs to govern, protect, configure, and monitor them.

- ▶ Browse your VMware vSphere resources (VMs, templates, networks, and storage) in Azure, providing you with a single pane view for your infrastructure across both environments.

Azure Arc-enabled System Center Virtual Machine Manager (preview)

Existing system center virtual machine manager customers can integrate with Azure using Azure Arc-enabled system center virtual machine manager (SCVMM) capability. Azure control plane can be extended to SCVMM managed infrastructure. Azure management capabilities along with security and Governance can be enabled. Using Azure Arc-enabled system center virtual machine manager following capabilities are allowed:

- Perform various VM lifecycle operations such as start, stop, pause, and delete VMs on SCVMM managed VMs directly from Azure.

- Empower developers and application teams to self-serve VM operations on demand using Azure role-based access control (RBAC).

- Browse your VMM resources (VMs, templates, VM networks, and storage) in Azure, providing you a single pane view for your infrastructure across both environments.

- Discover and onboard existing SCVMM managed VMs to Azure.

- Install the Arc-connected machine agents at scale on SCVMM VMs to govern, protect, configure, and monitor them.

Conclusion

Organizations are using public cloud platforms to modernize their IT workloads. While embarking on cloud adoption journey, they realize that some workloads are not suitable for public clouds. Taking a hybrid approach makes the most sense for these organizations.

Organizations are also facing a growing sprawl of resources spread across multiple datacenters, clouds, and edge locations. They are looking for a way to inventory, organize, and govern their IT resources wherever they are, from a central place. Azure Arc simplifies management of complex and distributed environments by extending Azure capabilities across on premises datacenters, various public clouds and edge locations as well as enabling the deployment of Azure Services, build applications to any infrastructure. Running hybrid or multi cloud environments is reality and not a temporary state. Azure Arc solution offers simplified management, standard security, and governance for workloads that are spanned across multiple environments.

Authors

Milind Dhuri

Principal Solution Architect, Azure Cloud Services

Milind Dhuri is Principal Solution Architect at Tech Mahindra. He has an overall experience of about two decades in public, private and hybrid cloud solutions. His experience includes enterprise cloud strategy, presales, architecture design, consultancy. At Tech Mahindra as part of Azure Cloud Practice and Solutions team, his role involves Azure cloud infrastructure solutions, hybrid and multi cloud management solutions, data protection solutions, tools, and product evaluations including third party/ cloud native solutions. He comes from a multi/hybrid cloud background, which helps customers to provide pointed solutions and work with OEMs and partners on joint solutions offerings.

Guru Prasad C P

Group Practice Head, Azure Cloud Services

Guru Prasad C P has an experience of over 22 years with over 8 years specifically in the public cloud working in Asia, ANZ, Europe, and the US. His experience includes, setting up practice teams aligned to industry verticals and horizontals, analyst interactions for positioning the offerings, hiring the right talent, involving in strategic exercise mergers and acquisitions, organization building, creating frameworks and IP's. At Tech Mahindra he is responsible for practice and competency development which includes alignment with OEMs for solutions, offerings and adoption of new technologies, customer interfacing where he acts as a trusted advisor in providing unbiased views/opinions and aligning with organization goals at the same time, value creation, developing practice areas deal making, solution support for large deals, and carve out deals from azure and hybrid cloud perspective.

TECH mahindra

2023 Brand Finance® Awards
TOP 10 STRONGEST IT SERVICES BRAND

2023 Brand Finance® Awards
FASTEST-GROWING IT SERVICES BRAND IN BRAND VALUE RANK