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Blast to The Future: Accelerating Legacy SSIS Migrations with Azure SQL and ADF

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Agenda

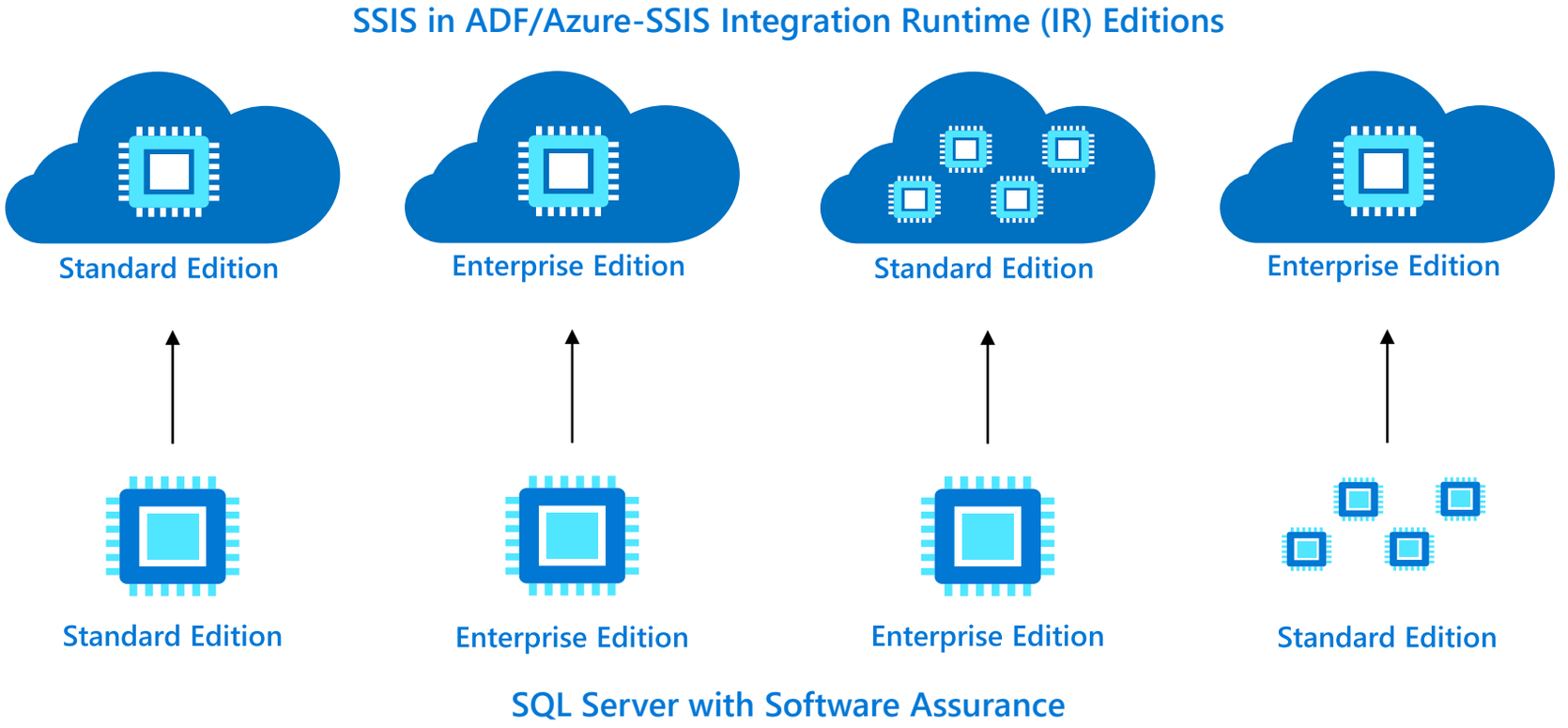
- Azure SQL and SSIS in ADF Better Together
- SSIS On-Premises-to-Cloud Evolution
- Secure Data Access from SSIS in ADF
- Demos: Provisioning, Monitoring, Assessing, Testing, Migrating
- Resources

Azure SQL and SSIS in ADF Better Together

Azure SQL and SSIS in ADF Better Together

- Azure SQL and SSIS in ADF have come a long way together as an all-PaaS solution for SQL Server migration:
  - Hosting SSIS catalog database (SSISDB) in Azure SQL DB/MI
  - SSIS IR Package Store on top of SQL Server database (MSDB) hosted by Azure SQL MI
  - Scheduling SSIS executions on SSIS IR using Azure SQL MI Agent
  - Joint BCDR solution w/ dual standby SSIS IR pair to support Azure SQL DB/MI failover
  - Accessing Azure SQL DB/MI from SSIS IR using AAD authentication w/ ADF managed identity
  - Accessing Azure SQL DB/MI that are configured w/ a private endpoint/VNet service endpoint/IP firewall rule or inside a VNet from SSIS IR

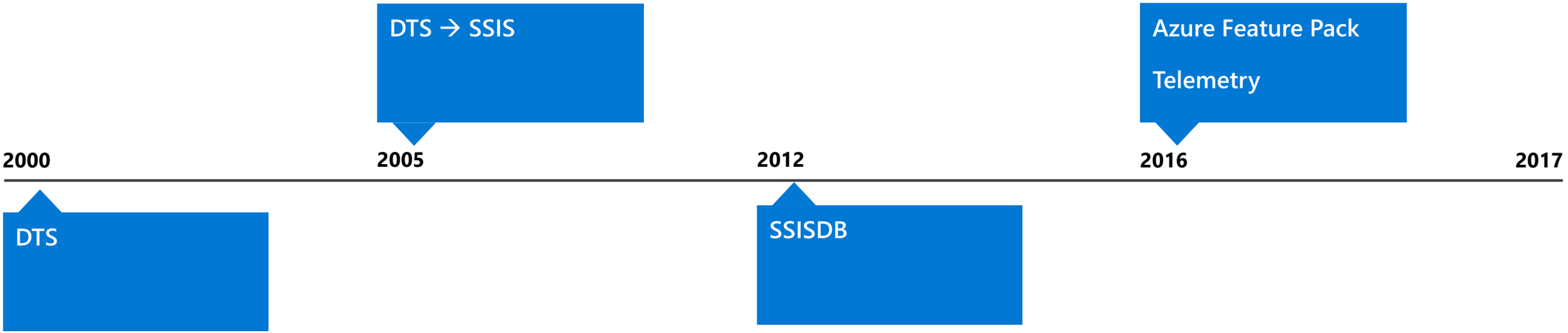
Azure SQL and SSIS in ADF Better Together



- With the all-PaaS solution, you can Bring Your Own License (BYOL) to get Azure Hybrid Benefit (AHB):
  - Maximize the value of on-premises SQL Server license investments by migrating to the all-PaaS solution of Azure SQL DB/MI + SSIS in ADF

SSIS On-Premises-to-Cloud Evolution

SSIS On-Premises-to-Cloud Evolution



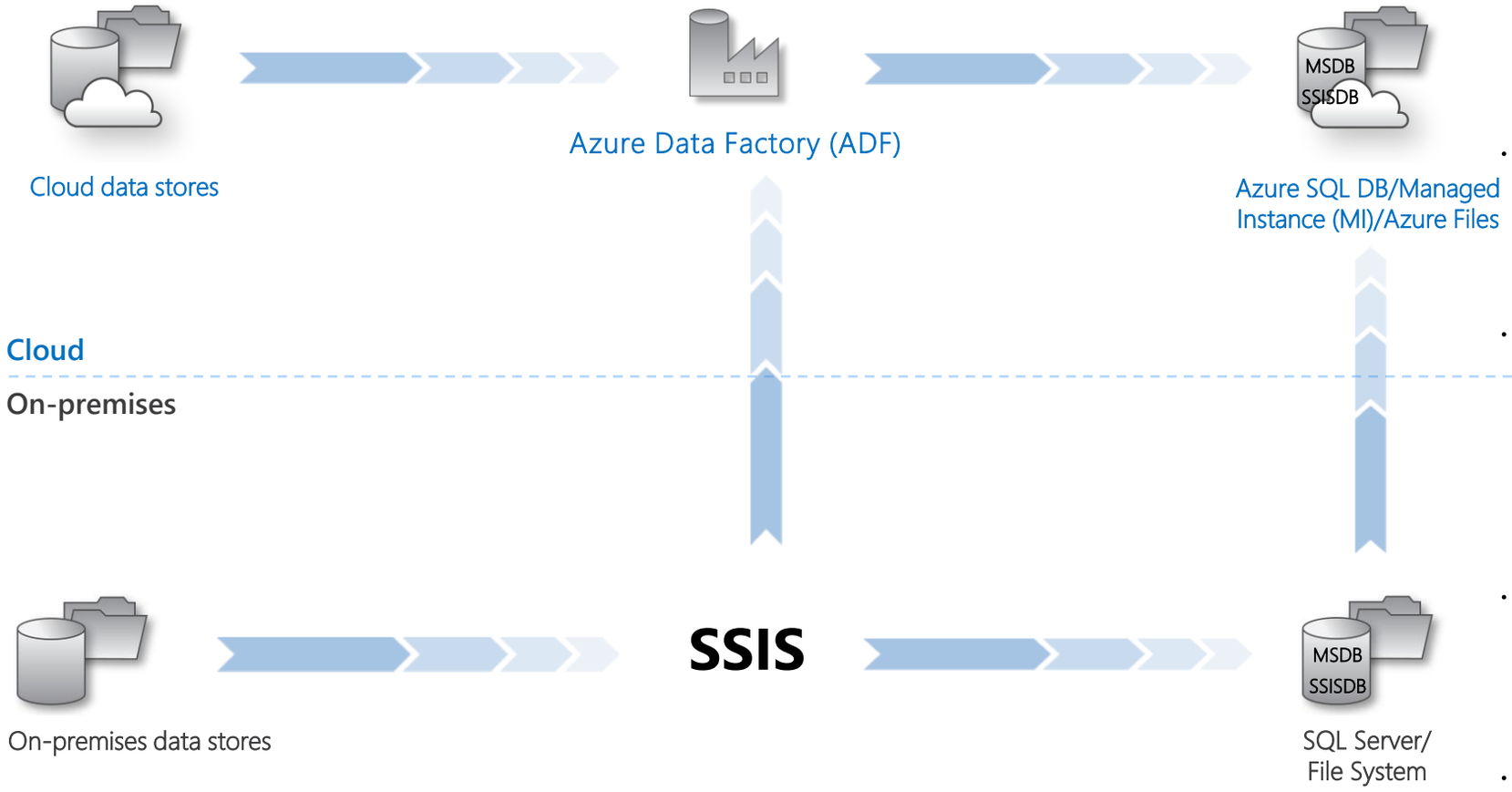
SSIS On-Premises-to-Cloud Evolution

Cloud

On-premises

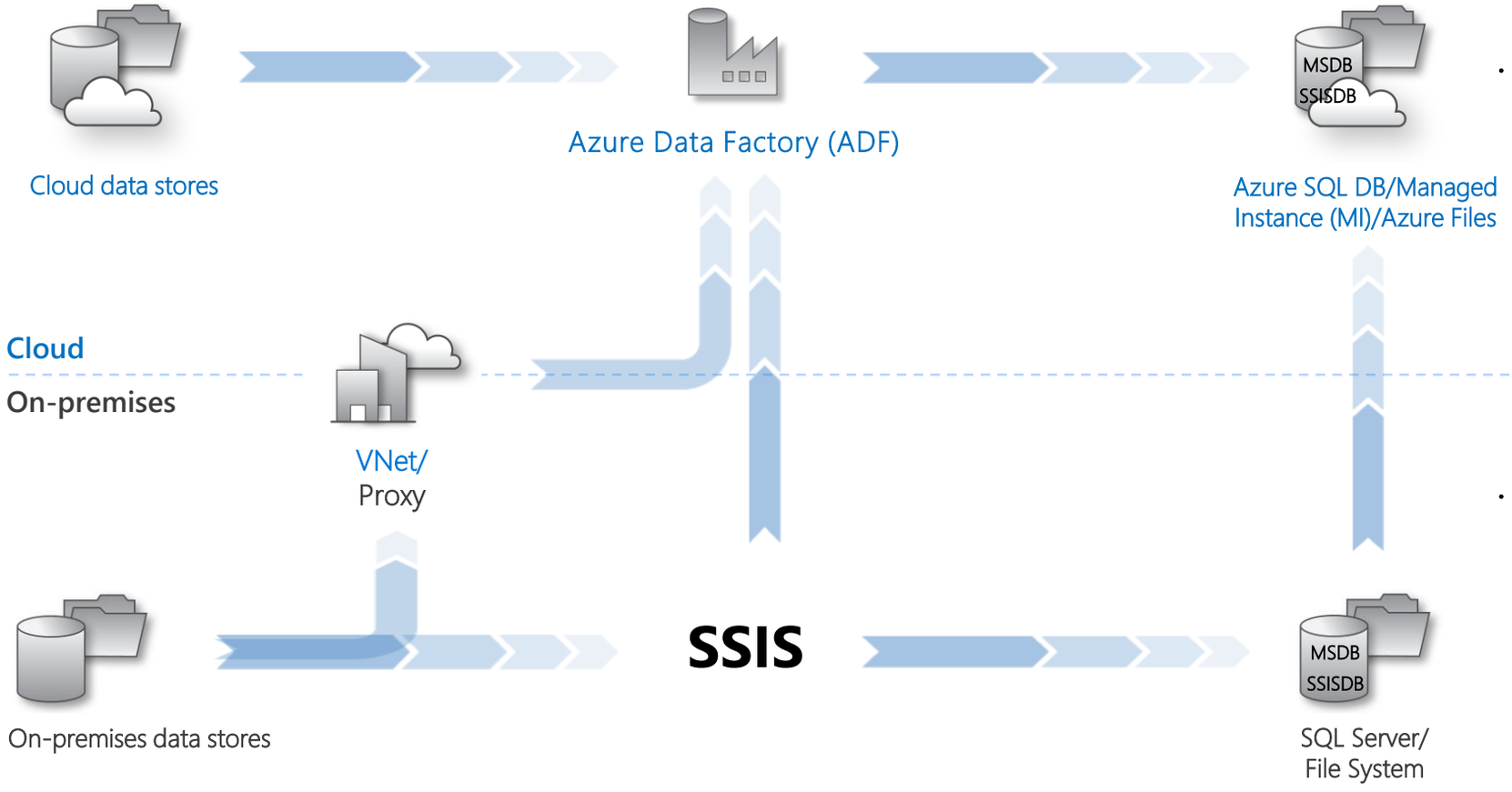
- Running SSIS on premises:
  - OS: Windows/**Linux**
  - SCALE: **Scale-Out** feature
  - TOOLS: Use SSDT/SSMS and dtutil/dtexec command prompt utilities to design/deploy/configure/execute/monitor packages
  - EXTEND: ISVs can build components/extensions on SSIS
  - PRICE: Bundled w/ on-prem SQL Server

SSIS On-Premises-to-Cloud Evolution



- Running SSIS in the cloud:
  - REHOST: Separate storage from compute and support **Project + Package Deployment Models** – Store your packages in SSISDB hosted by Azure SQL DB/MI, MSDB hosted by Azure SQL MI, **Azure Files**, or file system
  - SCALE: Use ADF to provision a managed cluster of Azure VMs dedicated to run your packages – Azure-SSIS Integration Runtime (**SSIS IR**)
  - TOOLS: Use **Azure-enabled SSDT**/**SSMS** and **dtutil**/**dtexec** command prompt utilities, as well as ADF UI to design/deploy/configure/execute/monitor packages (activities), use **Azure SQL MI Agent** to orchestrate package executions on SSIS IR in ADF
  - EXTEND: ISVs can adapt or build their components/extensions/SaaS on SSIS in ADF via **custom setups** + 3rd party **licensing**
  - PRICE: Pay per hour + Bring Your Own License (**BYOL**) to get Azure Hybrid Benefit (**AHB**), see here

SSIS On-Premises-to-Cloud Evolution



- Running SSIS in the cloud:
  - HYBRID: Join SSIS IR to a **VNet** connected to your on-prem network/use Self-Hosted IR as a **proxy** for SSIS IR to access on-prem data, see here
  - ENHANCE: Connect using **Windows** authentication feature/Azure Key Vault (**AKV**)/Azure Active Directory (**AAD**) authentication with the managed identity of ADF as a trusted service, orchestrate **first-class** SSIS activities in ADF pipelines, **chain/group** them w/ other complementary native ADF activities, view metrics/query logs/create alerts w/ **Azure Monitor**, and view data lineage w/ / **Azure Purview Data Catalog**
  - READY: General Availability (**GA**) since Jun 2018 w/ 24/7 live-site support

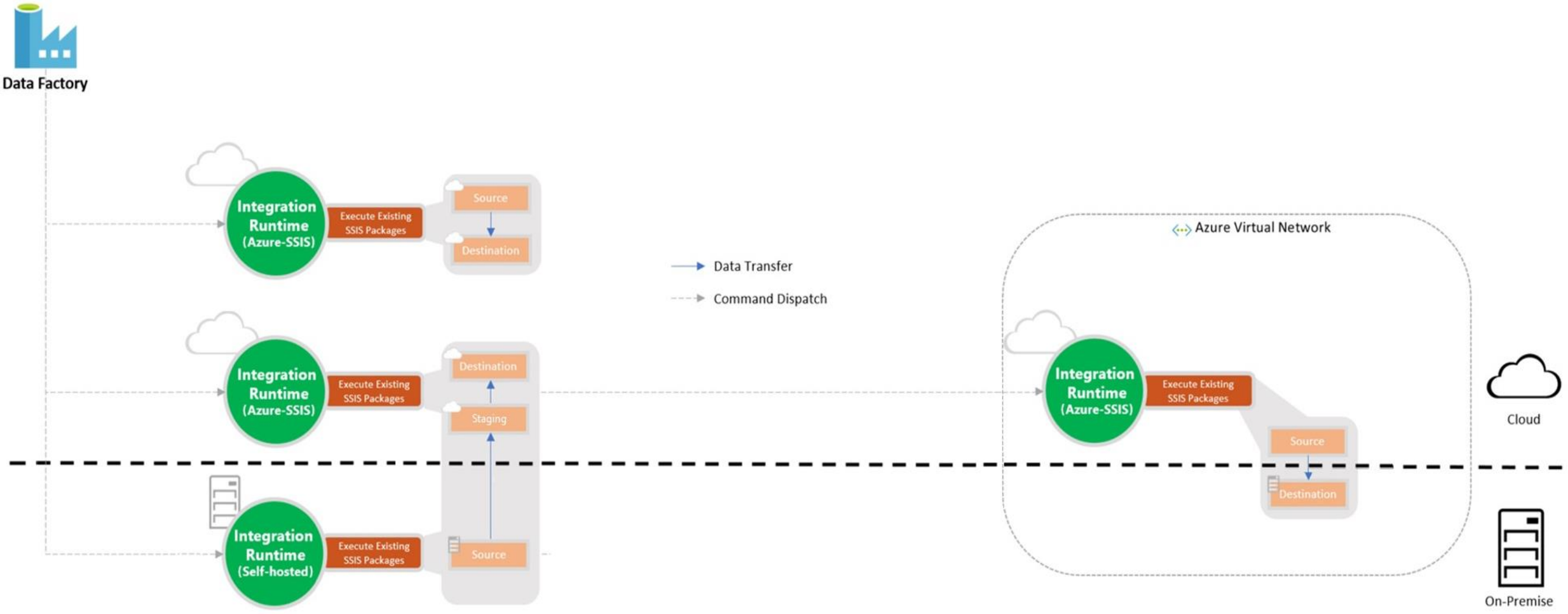
Secure Data Access from SSIS in ADF

Secure Data Access from SSIS in ADF

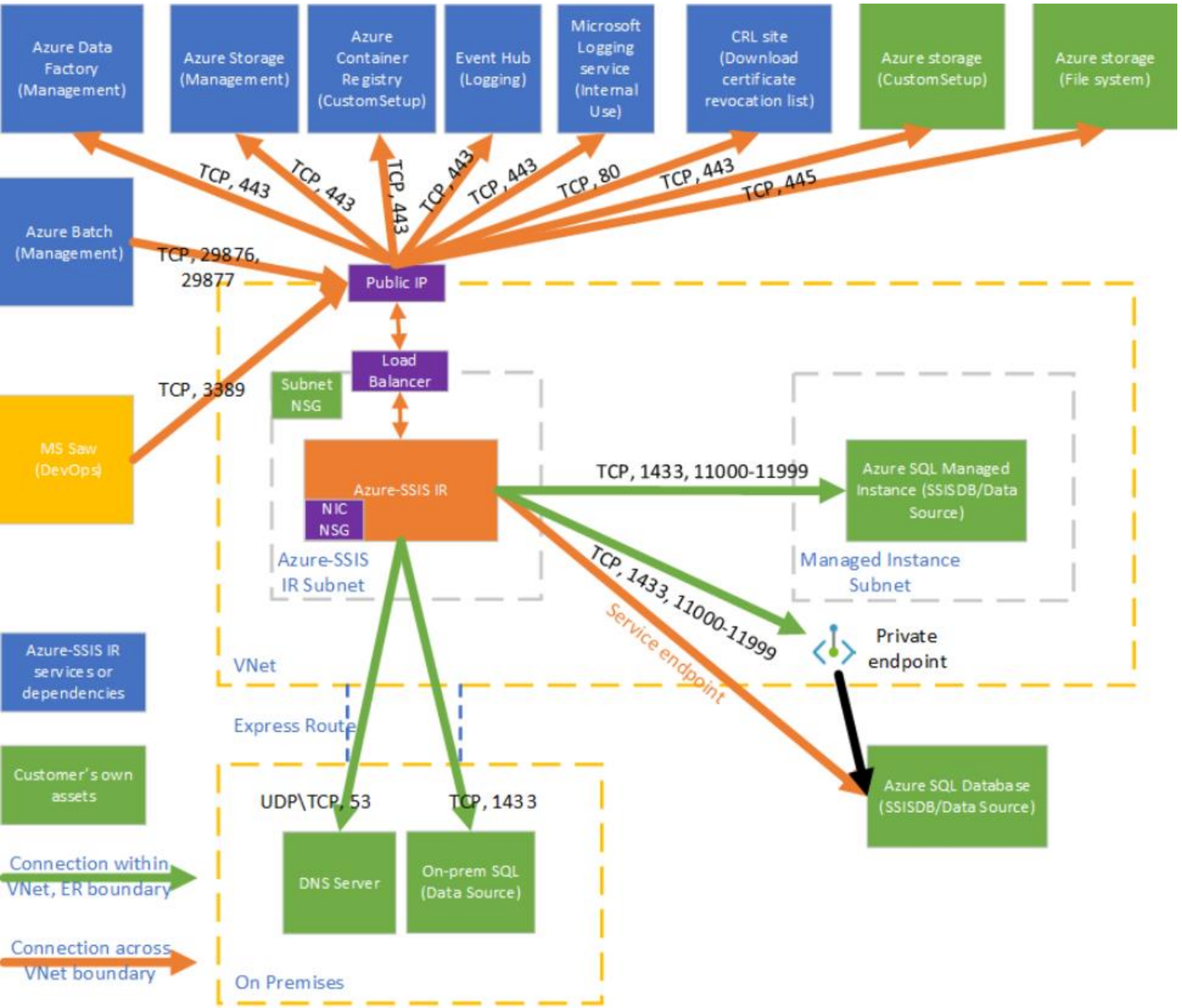
- Secure data access from SSIS on premises can be ensured by placing SSIS and data stores in the same location behind a corporate firewall

- Secure data access from SSIS in ADF can be ensured with the following features:
  - Virtual Network (VNet) injection of SSIS IR
  - Self-Hosted IR (SHIR) as a proxy for SSIS IR
  - AKV integration and AAD authentication with ADF managed identity
  - Bring Your Own static public IP addresses (BYOIP) for SSIS IR or set up VNet NAT

Alternative Methods to Access On-Prem Data

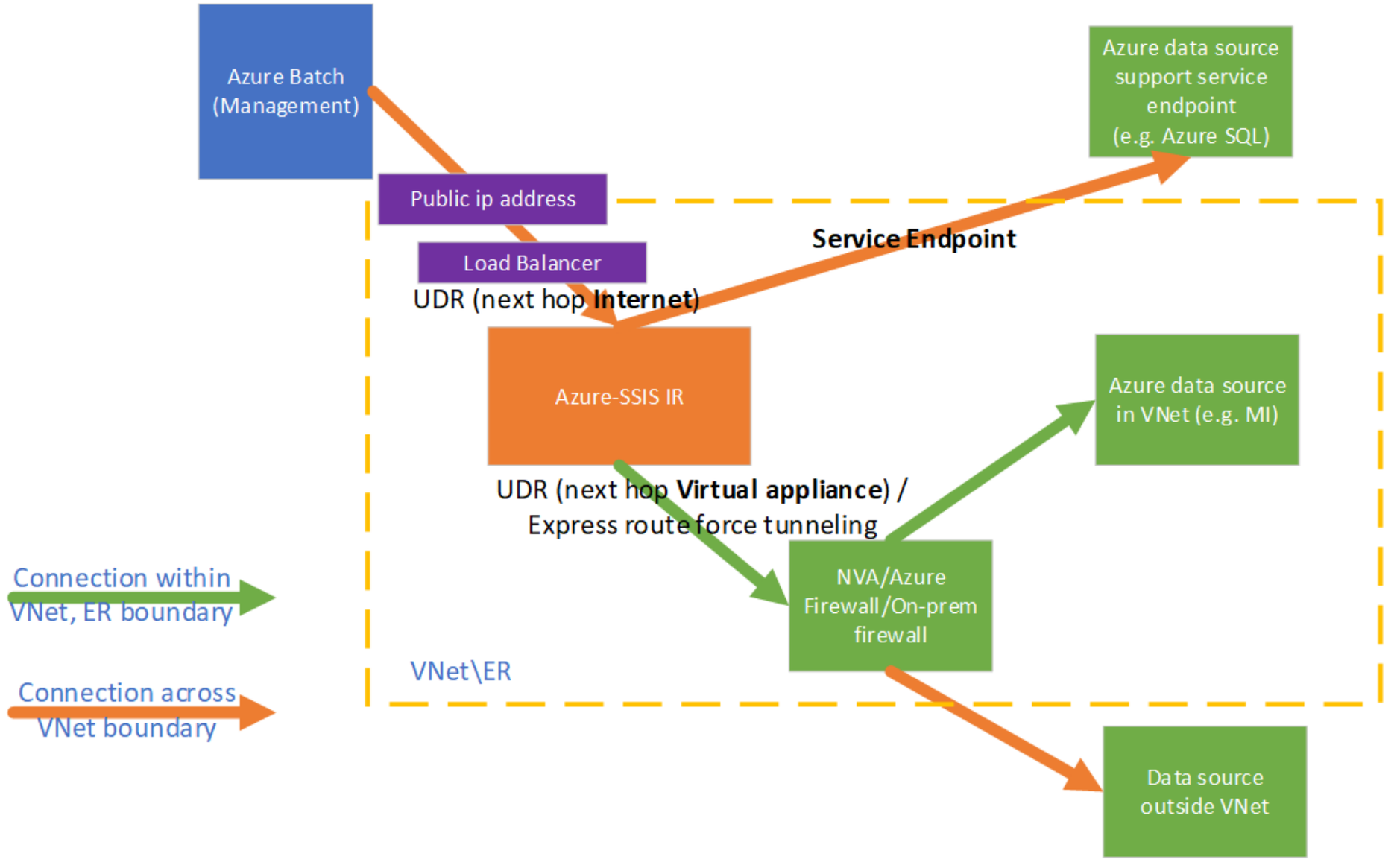


Joining SSIS IR to a VNet Connected to On-Prem Network



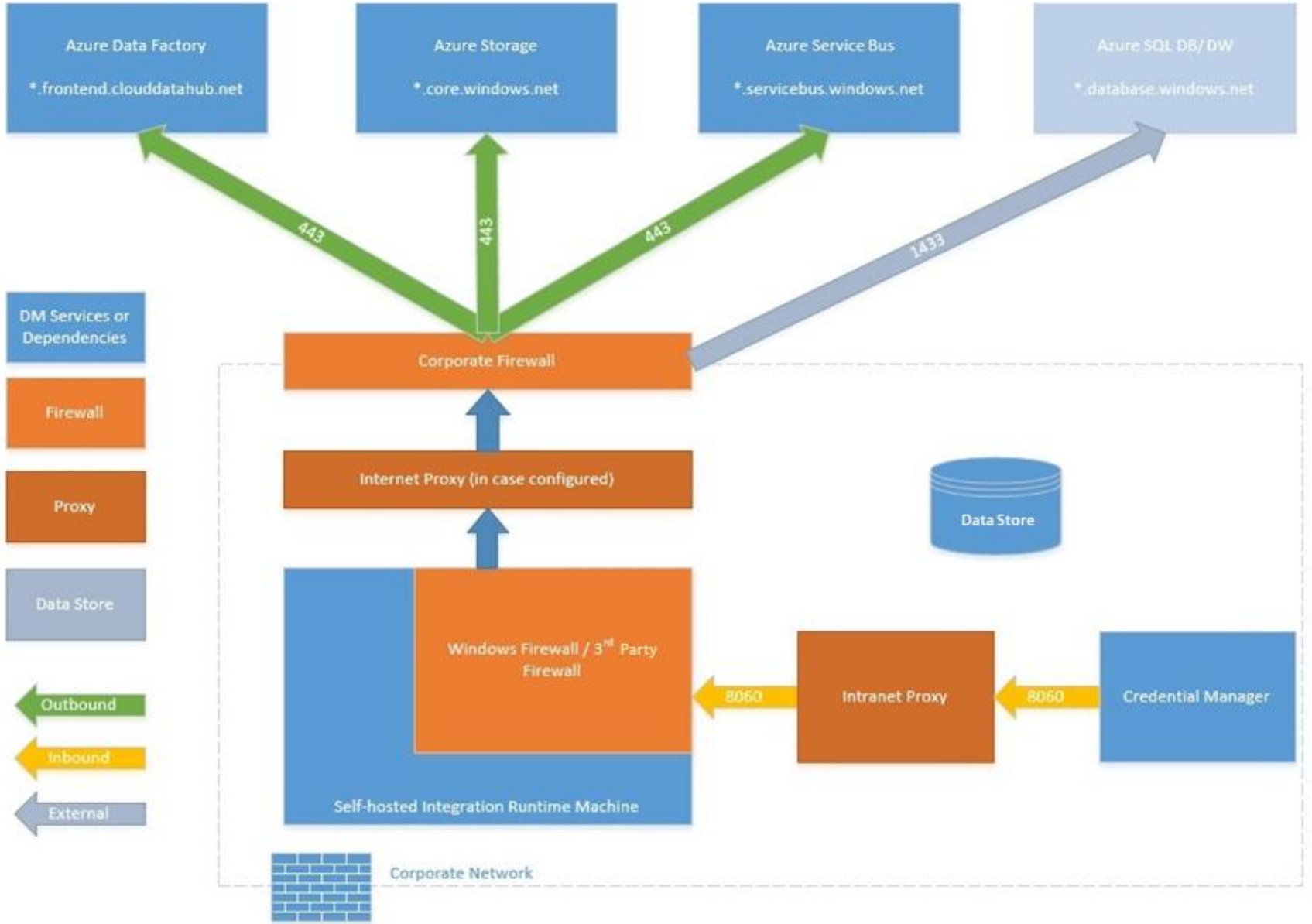
- Pros:
  - Managed infra
  - Full connectivity
    - Support all connectors
  - Direct data movements
- Cons:
  - Dependent on SSIS IR regional availability
  - Complex configuration with many requirements to consider:
    - Network Contributor/custom roles
    - Subnet IP address ranges
    - Custom/Azure DNS servers
    - Subnet/NIC –level NSGs
    - Forced tunneling w/ UDR
    - Resource group locks/policies
  - May require some/more exemptions from company-specific network policies
  - On-premises-to-cloud data transfers via ExpressRoute/SMB may not meet company-specific encryption requirements

Forced Tunneling for Outbound Traffic Inspection



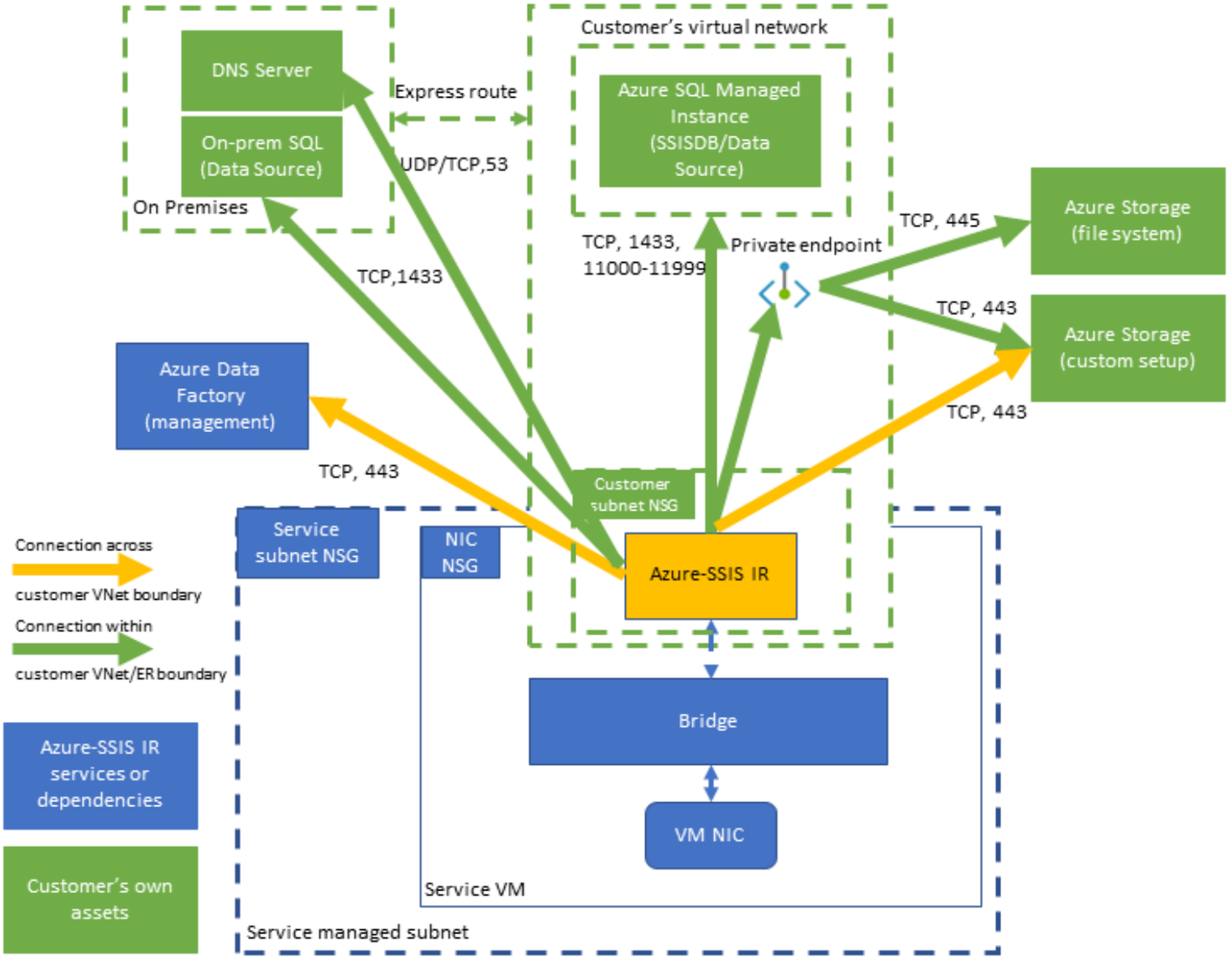
- Inspect outbound traffic via Network Virtual Appliance (NVA)/Azure Firewall/on-prem firewall:
  - Exclude traffic between Azure Batch Management and SSIS IR via UDR
  - Allow outbound traffic required by SSIS IR via firewall rules

Configuring Self-Hosted IR as a Proxy for SSIS IR



- Pros:
  - Independent of SSIS IR regional availability
  - Simple installation and configuration
    - ConnectByProxy property
    - Reuse Azure Blob Storage Linked Service
  - Requires no/less exemption(s) from company-specific network policies
  - On-premises-to-cloud data transfers via HTTPS are more likely to meet company-specific encryption requirements
- Cons:
  - Unmanaged infra
  - Limited connectivity
    - Supports only some data flow components for now
  - Indirect/staged data movements

Express VNet Injection for SSIS IR (Preview)



	Standard virtual network injection	Express virtual network injection
Azure-SSIS IR starting duration	Around 30 minutes.	Around 5 minutes.
Azure subscription & resource group settings	*Microsoft.Batch* must be registered as a resource provider in the virtual network subscription. Resource lock isn't allowed in the virtual network resource group. Creation of a public IP address, load balancer, and network security group (NSG) must be allowed in the virtual network resource group.	*Microsoft.Batch* must be registered as a resource provider in the virtual network subscription.
Static public IP addresses	Bring your own static public IP addresses (BYOIP) for Azure-SSIS IR.	Configure virtual network network address translation (NAT) to set up a static public IP address for Azure-SSIS IR.
Inbound traffic	Port 29876, 29877 must be open for TCP traffic with *BatchNodeManagement* service tag as source.	Not required.
Outbound traffic	Port 443 must be open for TCP traffic with *AzureCloud* service tag as destination.	Port 443 must be open for TCP traffic with *DataFactoryManagement* service tag as destination.
Virtual network global peering	Supported.	Not supported.
Azure-SSIS IRs per virtual network	Unlimited.	Only one.

Demos: Provisioning, Monitoring, Assessing, Testing, Migrating

Demos

- Provisioning SSIS IR via ADF UI
  - With(out) SSISDB
  - With(out) Custom Setup/VNet/Self-Hosted IR as Proxy
- Monitoring SSIS IR via ADF UI
- Assessing, Testing, and Migrating SSIS Packages from SSDT
  - With(out) Express Provisioning SSIS IR

Resources

Contacts

- My email: sawinark@microsoft.com

- SSIS Team Blog: https://techcommunity.microsoft.com/t5/SQL-Server-Integration-Services/bg-p/SSIS

Documentations

- Deep-Dive Presentation: https://www.slideshare.net/SandyWinarko/paasport-to-paradise-back-to-the-future-with-ssis-in-azure-data-factory-239345112

Provisioning Azure-SSIS IR	Using UI: https://docs.microsoft.com/azure/data-factory/tutorial-deploy-ssis-packages-azure Using PSH: https://docs.microsoft.com/azure/data-factory/tutorial-deploy-ssis-packages-azure-powershell Using ARM template: https://docs.microsoft.com/azure/data-factory/create-azure-ssis-integration-runtime#azure-resource-manager-template
Provisioning Azure-SSIS IR using Azure SQL DB/Managed Instance w/ VNet service endpoint/private endpoint to host SSISDB	Using UI/PSH: https://docs.microsoft.com/azure/data-factory/create-azure-ssis-integration-runtime Joining a VNet: https://docs.microsoft.com/azure/data-factory/join-azure-ssis-integration-runtime-virtual-network
Provisioning Azure-SSIS IR using AAD Auth w/ ADF managed identity	Using UI/PSH: https://docs.microsoft.com/azure/data-factory/create-azure-ssis-integration-runtime Enabling AAD Auth: https://docs.microsoft.com/azure/data-factory/enable-aad-authentication-azure-ssis-ir
Provisioning Azure-SSIS IR to access data on premises	Using UI/PSH: https://docs.microsoft.com/azure/data-factory/create-azure-ssis-integration-runtime Joining a VNet: https://docs.microsoft.com/azure/data-factory/join-azure-ssis-integration-runtime-virtual-network Using Self-Hosted IR as a proxy: https://docs.microsoft.com/azure/data-factory/self-hosted-integration-runtime-proxy-ssis
Monitoring Azure-SSIS IR	Using UI/PSH: https://docs.microsoft.com/azure/data-factory/monitor-integration-runtime#azure-ssis-integration-runtime Using Azure Monitor: https://docs.microsoft.com/azure/data-factory/monitor-using-azure-monitor#monitor-ssis-operations-with-azure-monitor

Documentations

Configuring Azure-SSIS IR	Using UI/PSH: https://docs.microsoft.com/azure/data-factory/manage-azure-ssis-integration-runtime
Configuring Azure-SSIS IR to use Enterprise Edition	Using UI/PSH: https://docs.microsoft.com/azure/data-factory/how-to-configure-azure-ssis-ir-enterprise-edition
Configuring Azure-SSIS IR to use custom setups	Using UI/PSH: https://docs.microsoft.com/azure/data-factory/how-to-configure-azure-ssis-ir-custom-setup
Configuring Azure-SSIS IR for high performance	Using UI/PSH: https://docs.microsoft.com/azure/data-factory/configure-azure-ssis-integration-runtime-performance
Configuring Azure-SSIS IR for disaster recovery	Using UI/PSH: https://docs.microsoft.com/azure/data-factory/configure-bcdr-azure-ssis-integration-runtime
Deploying projects/packages to run on Azure-SSIS IR	Connecting SSMS to SSISDB: https://docs.microsoft.com/sql/integration-services/lift-shift/ssis-azure-connect-to-catalog-database?view=sql-server-2017 Using UI/PSH: https://docs.microsoft.com/sql/integration-services/lift-shift/ssis-azure-deploy-run-monitor-tutorial?view=sql-server-2017 Using dtutil: https://docs.microsoft.com/azure/data-factory/azure-ssis-integration-runtime-package-store#deploying-multiple-packages-with-dtutil

Documentations

Connecting to data stores using Win Auth on Azure-SSIS IR	Using 4 methods: https://docs.microsoft.com/sql/integration-services/lift-shift/ssis-azure-connect-with-windows-auth?view=sql-server-2017
Connecting to data stores using AAD Auth w/ ADF managed identity on Azure-SSIS IR	Using Azure Storage connections: https://docs.microsoft.com/sql/integration-services/connection-manager/azure-storage-connection-manager#managed-identities-for-azure-resources-authentication Using ADO.NET connections: https://docs.microsoft.com/sql/integration-services/connection-manager/ado-net-connection-manager#managed-identities-for-azure-resources-authentication Using OLEDB connections: https://docs.microsoft.com/sql/integration-services/connection-manager/ole-db-connection-manager#managed-identities-for-azure-resources-authentication
Connecting to file shares and processing files on Azure-SSIS IR	Using local file system/file shares: https://docs.microsoft.com/sql/integration-services/lift-shift/ssis-azure-files-file-shares?view=sql-server-2017 Using Win Auth: https://docs.microsoft.com/sql/integration-services/lift-shift/ssis-azure-connect-with-windows-auth?view=sql-server-2017
Running packages on Azure-SSIS IR	From SSDT: https://docs.microsoft.com/azure/data-factory/how-to-invoke-ssis-package-ssdt Using SSMS/stored procedures/scripts/code: https://docs.microsoft.com/sql/integration-services/lift-shift/ssis-azure-run-packages?view=sql-server-2017 Using AzureDTExec: https://docs.microsoft.com/azure/data-factory/how-to-invoke-ssis-package-azure-enabled-dtexec As Execute SSIS Package activities in ADF pipelines: https://docs.microsoft.com/azure/data-factory/how-to-invoke-ssis-package-ssis-activity As Stored Procedure activities in ADF pipelines: https://docs.microsoft.com/azure/data-factory/how-to-invoke-ssis-package-stored-procedure-activity

Documentations

Scheduling package executions on Azure-SSIS IR	Using SSMS/ADF/other methods: https://docs.microsoft.com/sql/integration-services/lift-shift/ssis-azure-schedule-packages?view=sql-server-2017 Using SSMS: https://docs.microsoft.com/sql/integration-services/lift-shift/ssis-azure-schedule-packages-ssms?view=sql-server-2017 As Execute SSIS Package activities in ADF pipelines: https://docs.microsoft.com/azure/data-factory/how-to-invoke-ssis-package-ssis-activity Using Azure SQL MI Agent: https://docs.microsoft.com/azure/data-factory/how-to-invoke-ssis-package-managed-instance-agent
Scheduling Azure-SSIS IR provisioning on demand/just in time	Using Web activities: https://docs.microsoft.com/azure/data-factory/how-to-schedule-azure-ssis-integration-runtime
Cleaning up package execution logs in SSISDB	Using Elastic Jobs: https://docs.microsoft.com/azure/data-factory/how-to-clean-up-ssisdb-logs-with-elastic-jobs
Assessing SSIS packages for migration	Using DMA: https://docs.microsoft.com/sql/dma/dma-assess-ssis?view=sql-server-ver15 Using SSDT: https://docs.microsoft.com/azure/data-factory/how-to-invoke-ssis-package-ssdt#assess-ssis-projectpackages-for-executions-in-azure
Migrating SSIS packages	SSIS Migration Playbook: https://docs.microsoft.com/azure/data-factory/scenario-ssis-migration-overview Using DMS: https://docs.microsoft.com/azure/dms/how-to-migrate-ssis-packages-managed-instance
Practicing SSIS CI/CD	Using Azure DevOps: https://docs.microsoft.com/sql/integration-services/devops/ssis-devops-overview?view=sql-server-ver15
Developing premium/licensed components for Azure-SSIS IR	Using Cluster ID: https://docs.microsoft.com/azure/data-factory/how-to-develop-azure-ssis-ir-licensed-components
Procuring 3rd party components for Azure-SSIS IR	Partner list: https://techcommunity.microsoft.com/t5/SQL-Server-Integration-Services/Enterprise-Edition-Custom-Setup-and-3rd-Party-Extensibility-for/ba-p/388360

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Thank you!