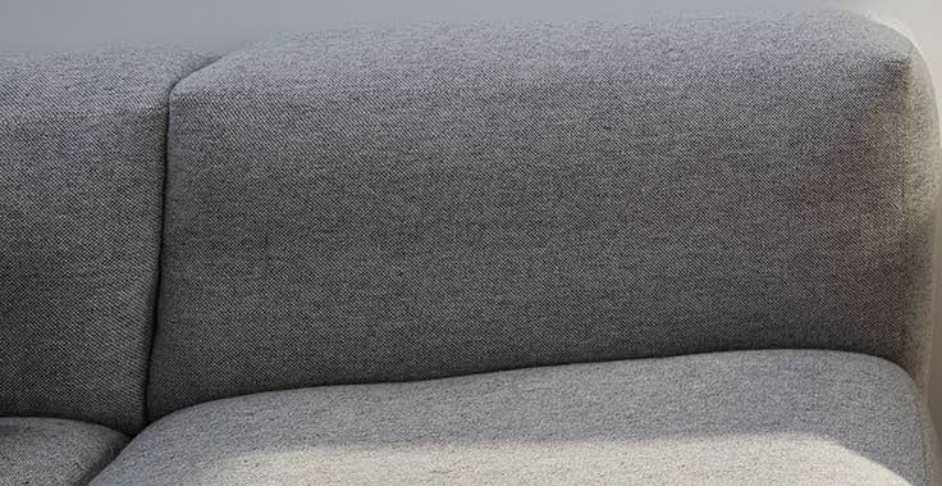




INFRASTRUCTURE OPTIMIZATION

Customer: Contoso



Terminology



“**Lift & Shift**”, also known as “rehosting”, is the process of migrating an exact copy of a workload from on-premises to the cloud without taking performance counters into account.



“**Right Sizing**”, now we are taking the collected performance data into account to assign the best fitting profiles for compute and storage.



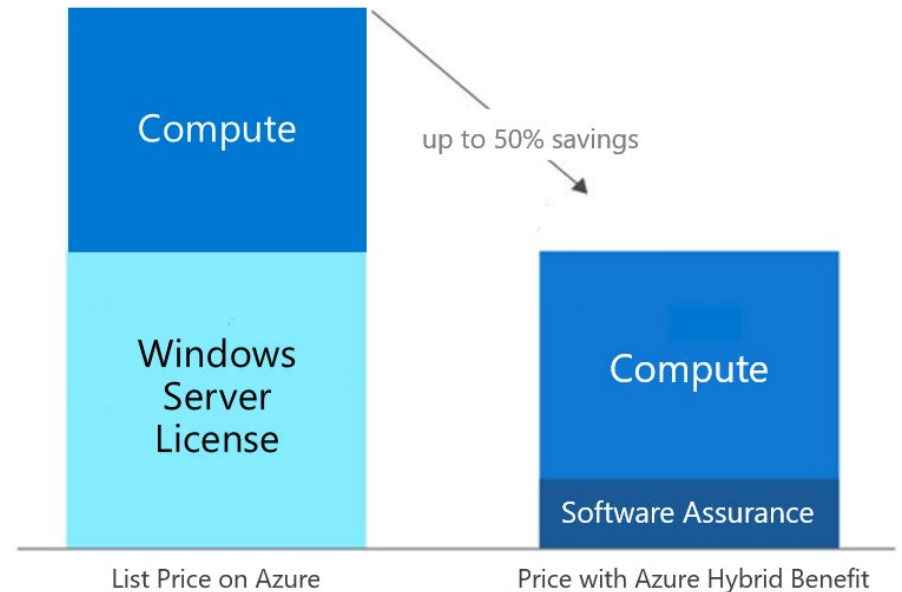
“**Reserved Instances (RIs)**”, saving costs with reserving specific Azure profiles for one or three years. Can be changed or canceled, instance size flexibility, monthly payment. Usage of Azure Hybrid Benefit (AHB).



“**Azure Hybrid Benefit (AHB)**”, customers who have licenses with Software Assurance (SA) can save up to 50% for compute and up to 55% for Azure SQL products.

You can use unused Windows Server Std Licenses on Azure – you only pay Compute and Storage.

Dual use: you can use your Windows Server DC Licenses with SA on Azure AND on-Premise – you only pay Compute and Storage.



Hybrid Benefits | Current Licenses



| | Core Licenses with Active SA | Core Licenses usable on Azure | Max count of VM's, can be used in Azure* |
|-------------------------|------------------------------|-------------------------------|------------------------------------------|
| Windows Standard Core | 244 | 244 | 30 |
| Windows Datacenter Core | 192 | 192 | 24 |



| | Core Licenses with Active SA | Core Licenses usable on Azure | Max number of SQL VMs you can be used in Azure** |
|---------------------|------------------------------|-------------------------------|--------------------------------------------------|
| SQL Standard Core | 10 | 10 | 2 |
| SQL Enterprise Core | 0 | 0 | 0 |

*8 core minimum per VM

**4 core minimum per VM

Source: <https://www.microsoft.com/licensing/terms/welcome/welcomepage>

These figures are for discussion purposes only and do not represent a licensing agreement. Please consult your Microsoft licensing agreement for a definitive number.

1

Management Summary

Scope of Assessment:

Collection & Assessment across Contoso infrastructure to identify key optimization potentials, and to generate a dataset to support a migration strategy for Contoso Datacenter.

| | |
|------------------------|----------|
| Data collection Start: | - |
| Data collection End: | - |
| Servers in Scope: | 204 |
| Datacenter: | 1 |
| Azure Region: | EU West |
| Used Currency: | EURO - € |
| Solution Specialist: | - |
| Technical Support: | - |
| Analysis: | - |

215

Total Server

215

Windows Server

0

Linux Server

4.77%

Ø CPU Utilization

(Benchmark 5.60 %)

28.54%

Ø RAM Utilization

(Benchmark 36.98 %)

124 TB

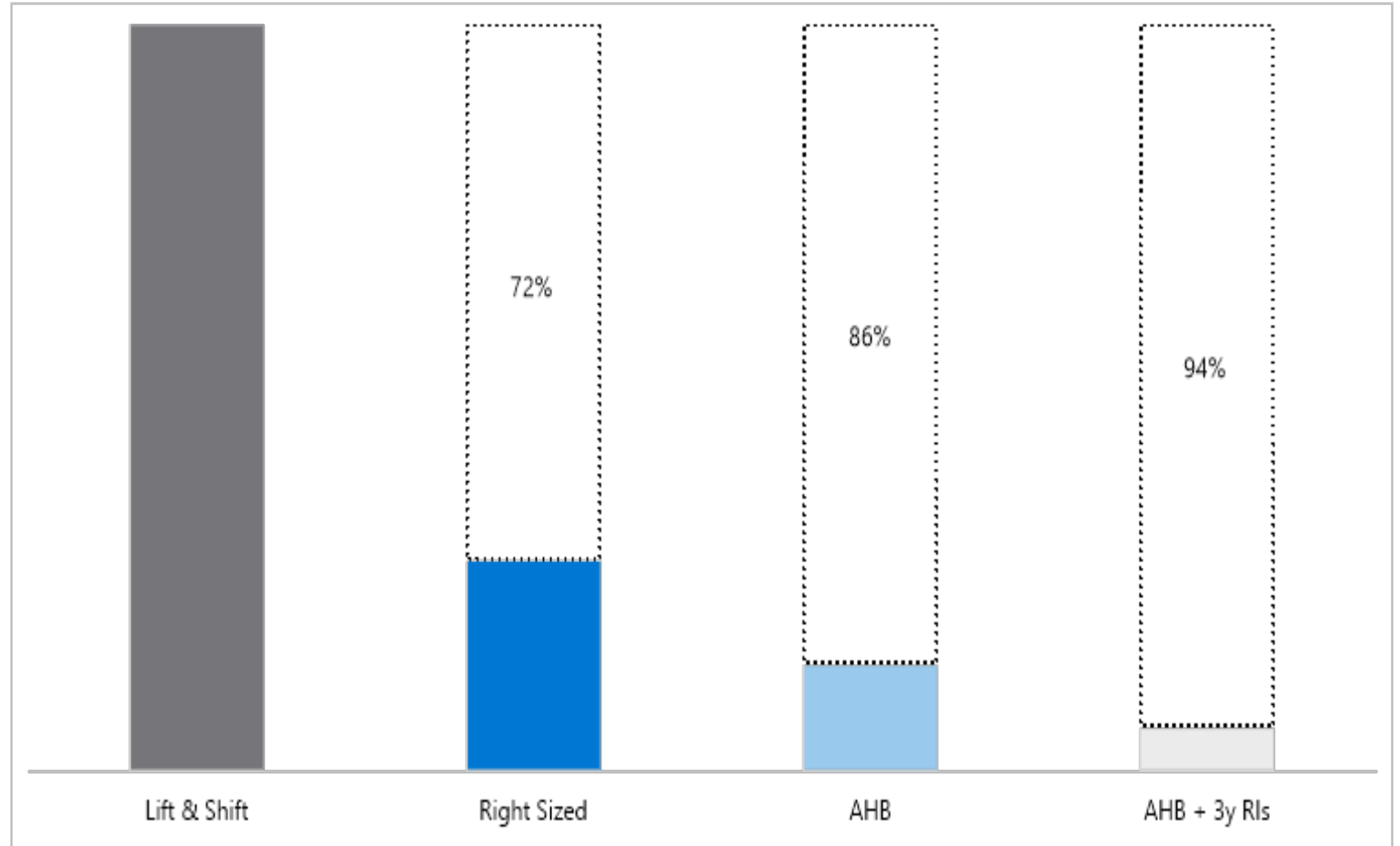
47% Used
Total Storage(TB)

(Benchmark 29,626 %)

Active Directory Scan without User! Rescan file definition out of AD Scan.
Existing File & Backup Server are not included in the VM pricing. Backup & File are calculated with blob-storage & Azure Backup Services

Azure Economic Modeling

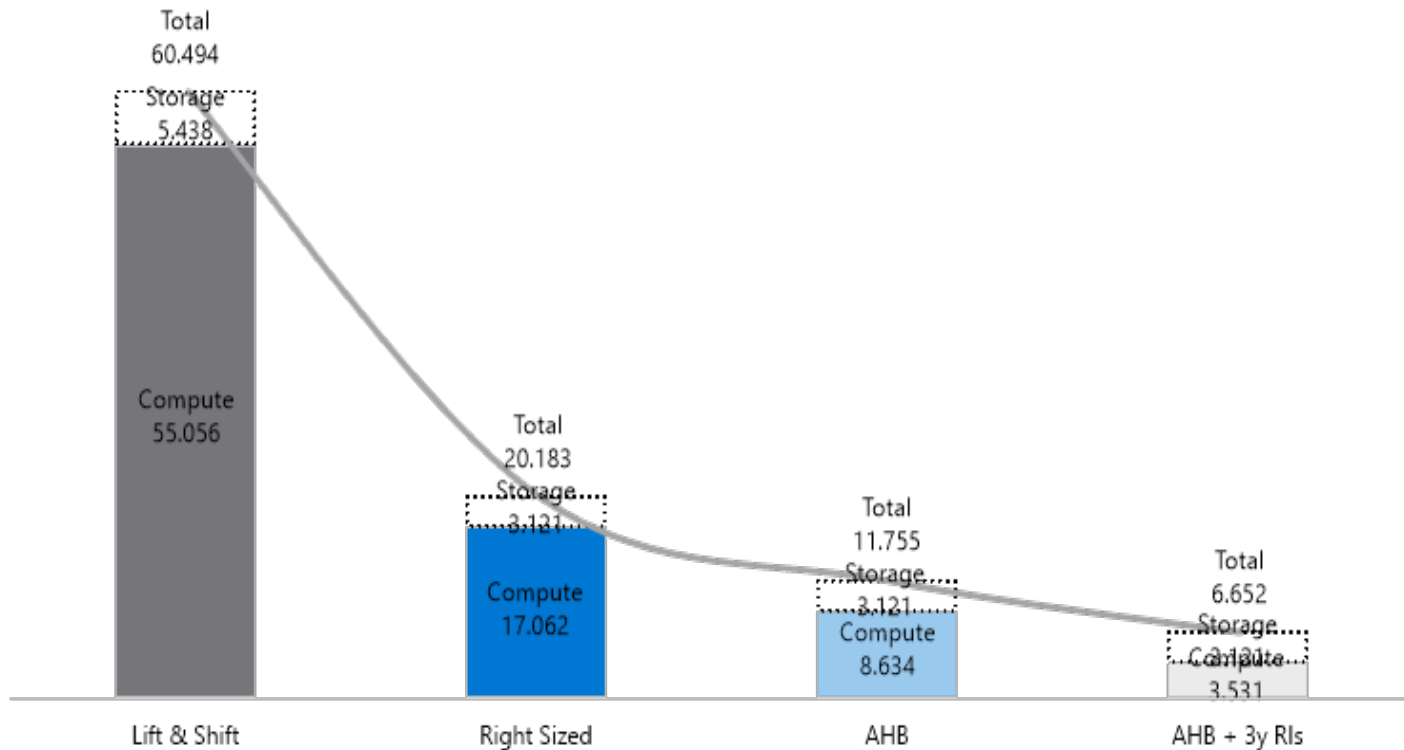
- The accompanying **Azure Pricing Estimates workbook** provides granular Azure billing options and pricing by workload.
- Strategic, data-driven purchasing often results in significant reductions in total Azure costs.
- **Compare costs for:**
 - Lift & Shift Profiles*
 - Right-Sized Profiles**
 - Azure Hybrid usage (AHB)
 - Reserved Instance usage (RIs)



* This does not reflect the current On-premise cost, but the current Inventory based VMs when you move those to Azure

** Calculation is Inventory + Performance Based

Azure Cost Comparison | Production Servers



Assumptions:

Azure Datacenter: „ EU West“

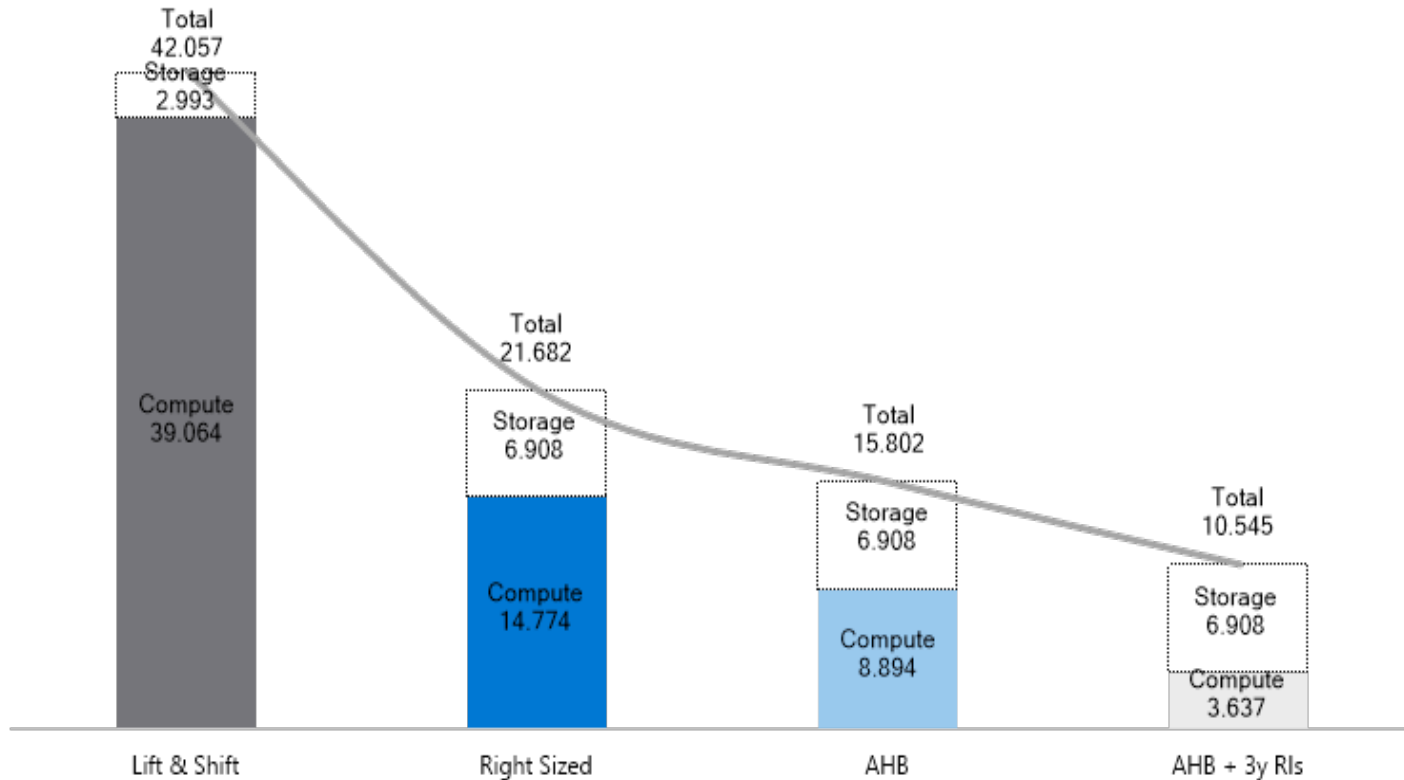
Explanations:

- Lift & Shift: 1:1 settlement to the current infrastructure
- Right Sized: Based on the current consumption with a statistic assumption of 95 percentile
- AHB: Azure Hybrid Benefit
- 3y RIs: Three years reserved instance

Note: This is a summary estimate, not a quote, it only compares 1to1 compute and storage costs based on 24/7 availability.

Figures are based on monthly payment in **EURO - €**. For up-to-date pricing information please visit <https://azure.microsoft.com/pricing/calculator/>

Azure Cost Comparison | Production SQL Servers



Assumptions:

Azure Datacenter: „ EU West“

Explanations:

- Lift & Shift: 1:1 settlement to the current infrastructure
- Right Sized: Based on the current consumption with a statistic assumption of 95 percentile
- AHB: Azure Hybrid Benefit
- 3y RIs: Three years reserved instance

Note: This is a summary estimate, not a quote, it only compares 1to1 compute and storage costs based on 24/7 availability.

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Production Environments | Rightsized - Total



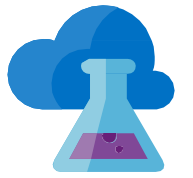
Azure VM Estimate based on the performance metrics you have gathered

| Monthly | Servers in Scope | Pay as you go | Azure Hybrid Benefit | 3 Year Reserved Instance + Azure Hybrid Benefit | Storage |
|---------|------------------|---------------|----------------------|-------------------------------------------------|---------|
| VMs | 144 | 17,062 | 8,634 | 3,531 | 2,526 |
| SQL VMs | 52 | 14,774 | 8,894 | 3,637 | 6,908 |
| Total | 196 | 31,836 | 17,528 | 7,168 | 9,434 |

| Annually | Servers in Scope | Pay as you go | Azure Hybrid Benefit | 3 Year Reserved Instance + Azure Hybrid Benefit | Storage |
|------------|------------------|---------------|----------------------|-------------------------------------------------|---------|
| Production | 196 | 382,032 | 210,336 | 86,016 | 113,208 |

Bring your own license model.
Compute Cost only

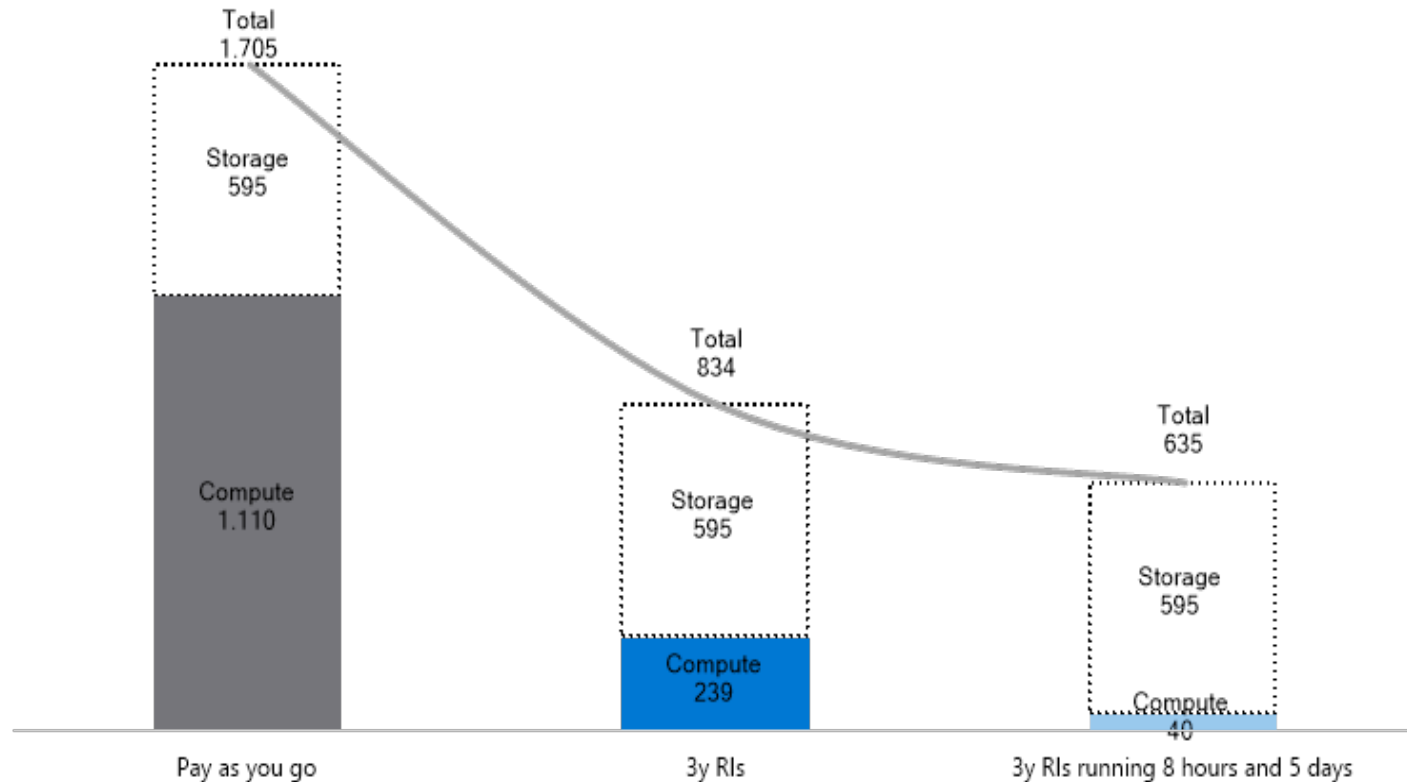
Note: This is a summary estimate, not a quote, it only compares 1to1 compute and storage costs based on 24/7 availability. Figures are based on **EURO - €**. For up-to-date pricing information please visit <https://azure.microsoft.com/pricing/calculator/>



Non-Production Environments! Rightsized - Total

Migrate 8 Test and/or Dev Servers

- The noncritical nature of a test and/or dev environment makes it an ideal first migration project for Azure
- As compute cost are calculated by the second in Azure, an alternative approach is limiting the hours of operation
- MSDN License Cost not included



Note: This is a summary estimate, not a quote.

Figures are based on monthly payment in **EURO - €**. For up-to-date pricing information please visit <https://azure.microsoft.com/pricing/calculator/>



- Storage
- Backup
- Disaster Recovery
- Data Estate

Data Storage Options on Microsoft Azure

Blob Blobs

- Object storage
- File
- Archive
- Documents
- Video, pictures..
- Unstructured text
- Binary data

HOT 32TiB = 543€*
COOL 32TiB = 276€*
ARCHIVE 32 TiB = 49€*

Files

- Full managed file share
- Access via SMB
- Sharing between Apps

HOT 32TiB = 750€*
COOL 32TiB = 416€*

Data Lake

- Hadoop compatible
- Integrated hierarchical namespace
- Massive scalable

HOT 32TiB = 541€*
COOL 32TiB = 276€*
ARCHIVE 32TiB = 49€*

Managed Disk

- Secured disk
- Up to 99.9999% availability
- Low latency
- High throughput
- Premium SSD (P)
- SSD (E)
- HDD (S)

P80 – Premium SSD
32TiB = 3.343€

Price



Azure Backup



A cost-effective, one-click backup solution, Azure Backup simplifies data recovery and is easier to enable than other cloud backup services.

Azure and on-premises backup

Back up Azure Virtual Machines, SQL workloads, and [on-premises](#) machines without additional infrastructure.

Application consistency

Restore data with application consistency using VSS snapshot (Windows) and fsfreeze (Linux).

Security of backup cloud data

Encrypt data and keep it for extended periods, even after legitimate deletion, through multifactor authentication.

Cloud backup management

Manage resources and activity from the Azure central backup management portal

- ✓ 100% scalable
- ✓ No infrastructure
 - ✓ No Tape
 - ✓ Simple
 - ✓ Cost Effective
- ✓ Keep your data safe from ransomware (and humans)

Azure Site Recovery - The Complete Migration & Disaster Recovery



Reduce infrastructure costs

Reduce the cost of deploying, monitoring, patching, and maintaining on-premises disaster recovery infrastructure by eliminating the need for building or maintaining a costly secondary datacenter. Plus, you pay only for the compute resources you need to support your applications in Azure

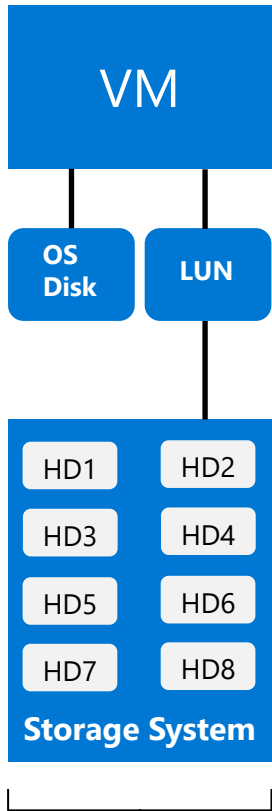
Azure Site Recovery offers ease of deployment, cost effectiveness, and dependability. Deploy replication, failover, and recovery processes through Site Recovery to help keep your applications running during planned and unplanned outages.

Site Recovery is a native [disaster recovery as a service](#) (DRaaS), and Microsoft has been recognized as a leader in DRaaS based on completeness of vision and ability to execute by Gartner in the 2018 Magic Quadrant for Disaster Recovery as a Service.

- ✓ 100% scalable
- ✓ No DR infrastructure
- ✓ Automated protection and replication
 - ✓ Best in class RPO and RTO
 - ✓ No-impact DR Drill
- ✓ Centralized Monitoring & Alerting
- ✓ Orchestrated recovery plans for application DR
 - ✓ Failback support



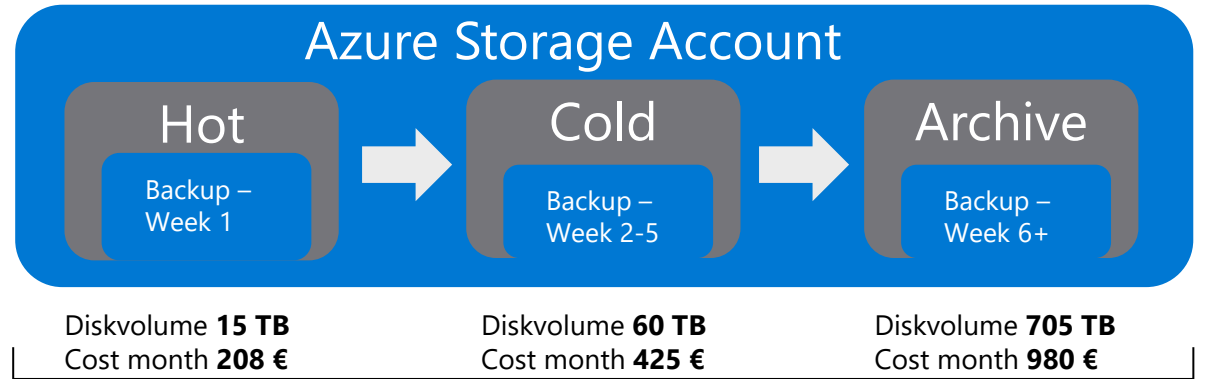
Technology Change | Storage to Blob Storage



| | |
|---------------------------|-------|
| Full Backup / Week | 15 TB |
| Incremental Backup / Week | 0 TB |
| Total Backup / Week | 15 TB |

Backup Managed Disk

Needed Disk Space: **780 TB** $\hat{=}$ **76,200€** / month
(24 * P80 – 1-Year Reserved)



| | | |
|----------------------------------------------------|----------------------------------------------------|-----------------------------------------------------|
| Diskvolume 15 TB Cost month 208 € | Diskvolume 60 TB Cost month 425 € | Diskvolume 705 TB Cost month 980 € |
|----------------------------------------------------|----------------------------------------------------|-----------------------------------------------------|

Total Cost Blob Storage: 1,614€ / month
3 Year Reserved

| Hot Tier | Cool Tier | Archive Tier |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> • Availability 99,9% LRS, 99,99% GRS • Optimized for storing data that is accessed frequently • Single-digit milliseconds latency | <ul style="list-style-type: none"> • Availability 99% LRS, 99,9% GRS • Optimized for storing data that is infrequently accessed and stored for at least 30 days • Millisecond's latency | <ul style="list-style-type: none"> • Availability Offline • Optimized for storing data that is rarely accessed and stored for at least 180 days with flexible latency requirements (on the order of hours) |

Block Blob Storage as reserved capacity, savings up to 30%

Note: This is an example, based on provided information. The example prices does not include any backup software. Figures are based on monthly payment in **EURO - €**. This graphic should only show the difference between managed disk a blob storage. For up-to-date pricing information please visit <https://azure.microsoft.com/en-us/pricing/details/backup>

Backup with "Azure Backup" | Cost Estimate



| Azure Service | Quantity | Annual Cost |
|----------------------------------------|----------|---------------|
| Backup Instance < or = 50GB | 0 | |
| Backup Instance > 50GB for each 500 GB | 381 | 38,542 |
| Storage (see slide „Technology Change) | | 19,363 |
| Total Annual Cost Estimate | | 57,905 |

Note: This is an example, based on provided information. The example prices does include backup software. Figures are based on annual payment in **EURO - €**. For Blob-Storage retention time, please see slide before. For up-to-date pricing information please visit <https://azure.microsoft.com/en-us/pricing/details/backup>

Modernize | SQL Managed Instance

Managed Instance is fully Platform as a Service database offer. High availability, automated backups, point-in-time restore, automatic plan correction, threat detection, vulnerability assessment, and other intelligent features are built-in into service without any additional charge.

- ✓ 95 percent compatibility with on premise SQL.
- ✓ Easily scale up and down.



SQL in Azure VMs

| Patching | Customer Responsibility |
|----------------------------|-----------------------------------|
| Backup | Customer Responsibility |
| Disaster Recovery | Customer Responsibility |
| Database Upgrades | Customer Responsibility |
| SLA | 99.9% |
| Disk | HDD, SSD, PSSD |
| AHUB licensing Requirement | Windows Std core and SQL Ent Core |



SQL Managed Instance

| Patching | Microsoft Responsibility |
|----------------------------|--------------------------|
| Backup | Microsoft Responsibility |
| Disaster Recovery | Microsoft Responsibility |
| Database Upgrades | Microsoft Responsibility |
| SLA | 99.99% |
| Disk | Azure Premium Disk |
| AHUB licensing Requirement | SQL Ent Core |

Modernize | SQL Managed Instance

Managed Instance is fully Platform as a Service database offer. High availability, automated backups, point-in-time restore, automatic plan correction, threat detection, vulnerability assessment, and other intelligent features are built-in into service without any additional charge.

- ✓ 95 percent compatibility with on premise SQL.
- ✓ Easily scale up and down.



SQL in Azure VMs

| SQL in Azure VMs | |
|-------------------------------------------------------------|--------|
| 8 Patches per Year (+50% outside business hours) | 16 h |
| Backup Support per Year | 12 h |
| Disaster Recovery | - |
| Database Upgrades (every 2 years) | 8 h |
| Key User Test – 2 Key User (+50% outside business hours) | 36 h |
| Total Hours per Year and Server | 72 h |
| Labor Cost per Server (Hour approx. 41€) | 2,952€ |



SQL Managed Instance

| SQL Managed Instance | |
|----------------------|--------------------------|
| Patching | Microsoft Responsibility |
| Backup | Microsoft Responsibility |
| Disaster Recovery | Microsoft Responsibility |
| Database Upgrades | Microsoft Responsibility |
| Key User Test | N.A. |
| Total Hours | N.A. |
| Labor Cost | N.A. |

Modernize | SQL Managed Instance

- ✓ Consolidate your SQL instances with the benefit of reducing SQL licensing costs.
- ✓ Bring your own license for even greater savings (AHUB).



SQL in Azure VMs

52 Servers
with 193 cores
1012 GB RAM,
896 Databases
deployed

| | Quantity | 3Y RI+ AHUB |
|-----------------------------------|----------|----------------|
| SQL VMs | 52 | 43,644 |
| Storage | 87 TB | 82,896 |
| DR / ASR | | 59,840 |
| Backup | | 2,323 |
| Total Annual Cost Estimate | | 188,704 |



SQL Managed Instance

4 MI, 128 V Core
652 GB RAM

| | Quantity | 3YRI + AHUB |
|-----------------------------------|----------|----------------|
| Gen 5 | 4 | 71,970 |
| Storage | 87 TB | 118,260 |
| DR / ASR | | included |
| Backup | | included |
| Total Annual Cost Estimate | | 190,230 |

Note: This is an example, based on Inventory. The example prices is based on "Managed Instance General Purpose MI + Storage. Figures are based on annual payment in **EURO - €**. For up-to-date pricing information please visit <https://azure.microsoft.com/pricing/calculator/> - Please see details for calculated SQL system in the Workbook – Tag 'SQL'.






3

Azure Cost Summary

Azure Cost Summary | Lift and Shift Rightsized

Scenario where:

- All VMs are rightsized as per the performance metrics gathered
- This includes 196 servers in the production environment and 8 Dev or Test servers
- Contoso can utilize their own license for Windows and SQL (AHB)
- Costs based on 3 Year Reserved Instance with AHB purchased
- Excludes possible Contoso Bank Discounts
- Includes Backup Software & Backup Storage Cost on Azure






| Azure Service | Quantity | Annual Cost | Description |
|-----------------------------------------------------------------------------------------------------------------|----------|----------------|---------------------------------------------------|
|  Azure VMs | 152 | 45,240 | Azure VMs (Windows, Linux, Test and Dev) |
|  SQL VMs | 52 | 43,644 | SQL VMs |
|  VM & SQL Storage | | 120,348 | Combination of Standard and Premium Disk |
|  Backup Storage + Azure Backup | | 57,905 | |
|  Extended Support | 9 | Included | Security updates for 2008 / R2 until January 2023 |
| Total Annual Cost Estimate | | 267,137 | |

Note: This is a summary estimate, not a quote, it only compares 1to1 compute and storage costs based on 24/7 availability. Figures are based on monthly payment in **EURO - €**. Figures are based on annual payment in **EURO - €**. For up-to-date pricing information please visit <https://azure.microsoft.com/pricing/calculator/>

Azure Cost Summary | Optimized

Scenario where:

- All VMs are rightsized as per the performance metrics gathered
- This includes 144 servers in the production environment and 8 Dev or Test servers and SQL as 4 Managed Instances
- Contoso can utilize their own license for Windows and SQL (AHB)
- Costs based on 3 Year Reserved Instance with AHB purchased
- Contoso Bank Discounts
- Includes Backup Software & Backup Storage Cost on Azure

| Azure Service | Quantity | Annual Cost | Description |
|----------------------------------------------------------------------------------------------------------------------|----------|----------------|-----------------------------------------------|
|  Azure VMs | 152 | 45,240 | Azure VMs (Windows, Linux, Test and Dev) |
|  SQL Managed Instance incl. Storage | 4 | 190,230 | SQL Managed Instances |
|  VM Storage | | 37,452 | Combination of Standard and Premium Disk |
|  Backup Storage + Azure Backup | | 37,821 | |
|  Extended Support | 9 | Included | Three years of security updates for 2008 / R2 |
| Total Annual Cost Estimate | | 310,744 | |

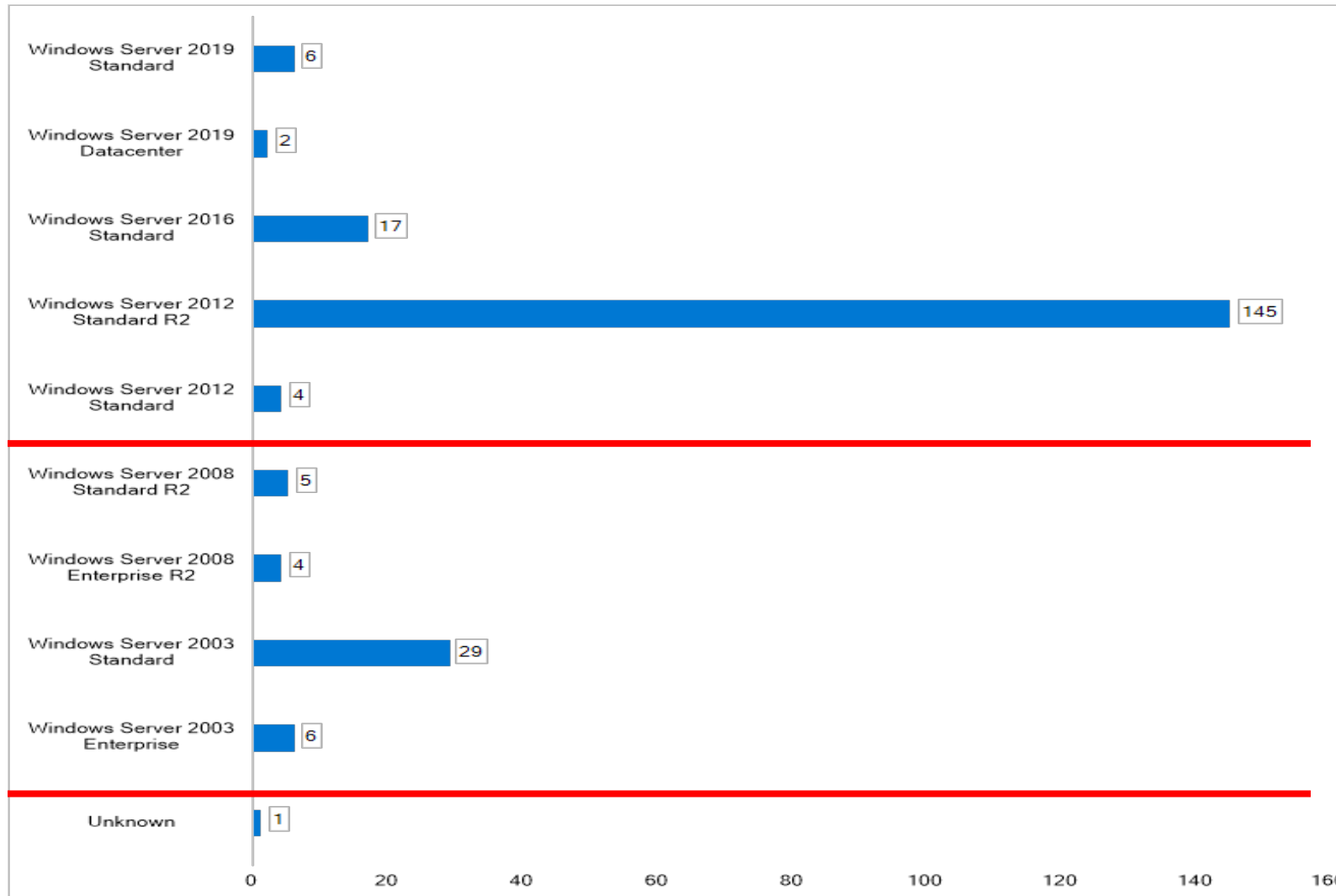
Note: This is a summary estimate, not a quote, it only compares 1to1 compute and storage costs based on 24/7 availability. Figures are based on monthly payment in **EURO - €**. Figures are based on annual payment in **EURO - €**. For up-to-date pricing information please visit <https://azure.microsoft.com/pricing/calculator/>

4

More Details

Data Collection

Operating Systems – Overview – Unsupported Systems



Recommendations:

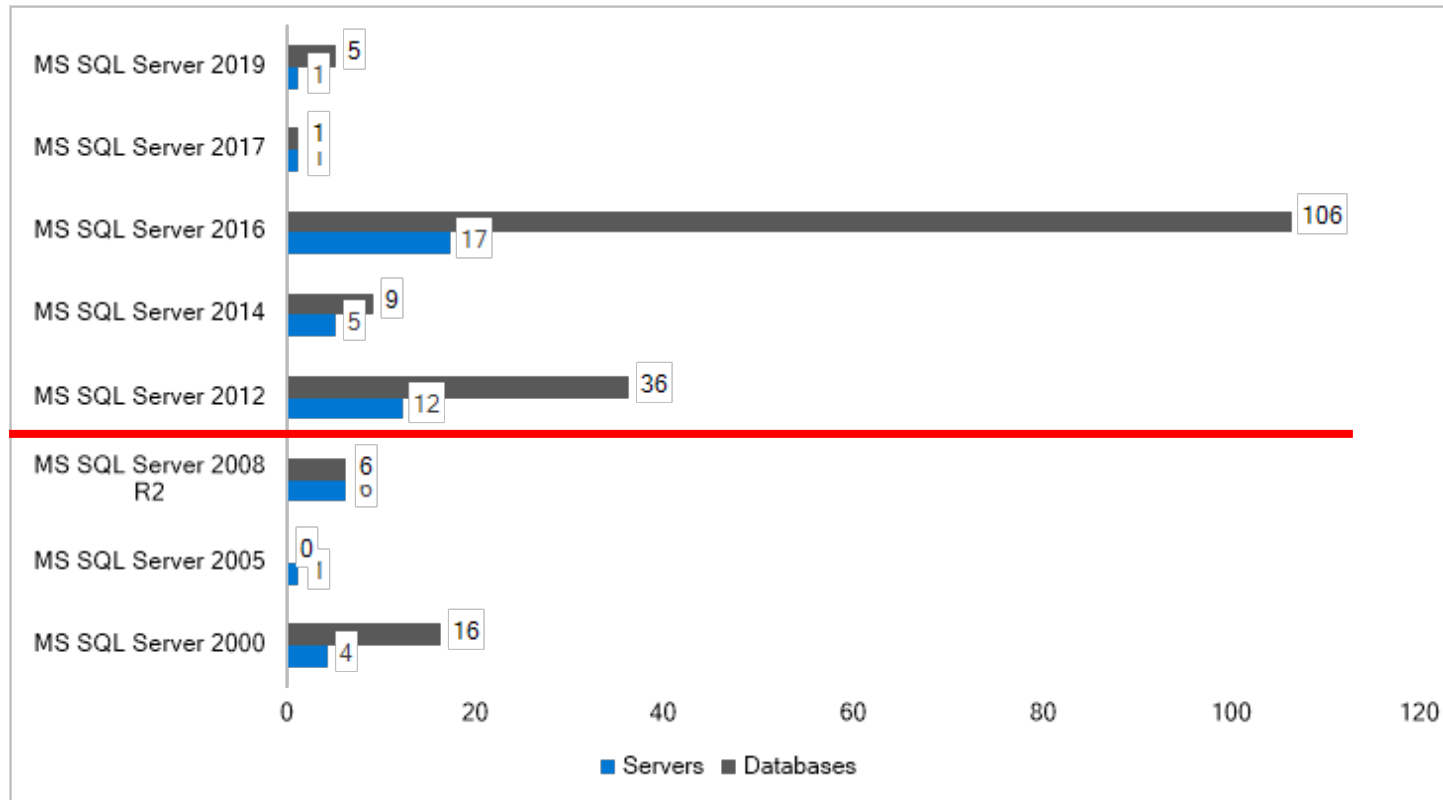
- **Pre-2008:** These systems are unsupported and represent **security risk**. Prioritize review for decommission, upgrade, or migration.

- **2012-Current:** Consolidate these workloads to existing datacenter capacity to **minimize cost** and **offboard old hardware**.

- **2008/R2:** Prioritize **upgrade to modern OS** wherever possible. Migration to Azure provides three years Extended Security

Data Collection

SQL Server

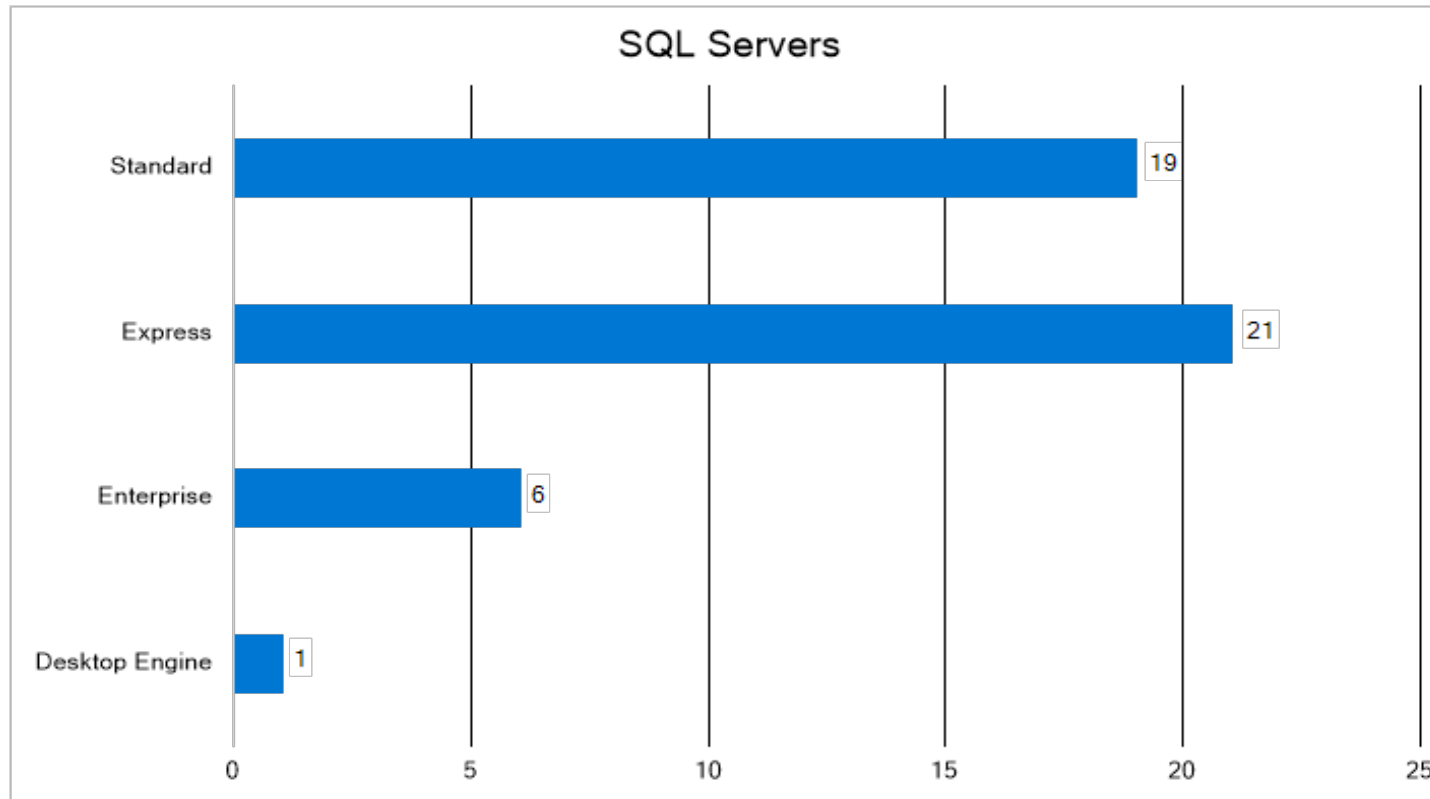


Recommendations:

- **Several SQL Server** versions that are not **supported** by the manufacturer are still in use (2005, 2008, 2008 R2)
- **For SQL Server 2012/R2**, vendor support ends July 12, 2022, and for the 2014 release ends July 9, 2024
- For those systems it is recommended to **draw up a migration plan** now
- Check applications if they are ready for Azure SQL Services to **mitigate update and administration issues**

Data Collection

SQL Server - Editions

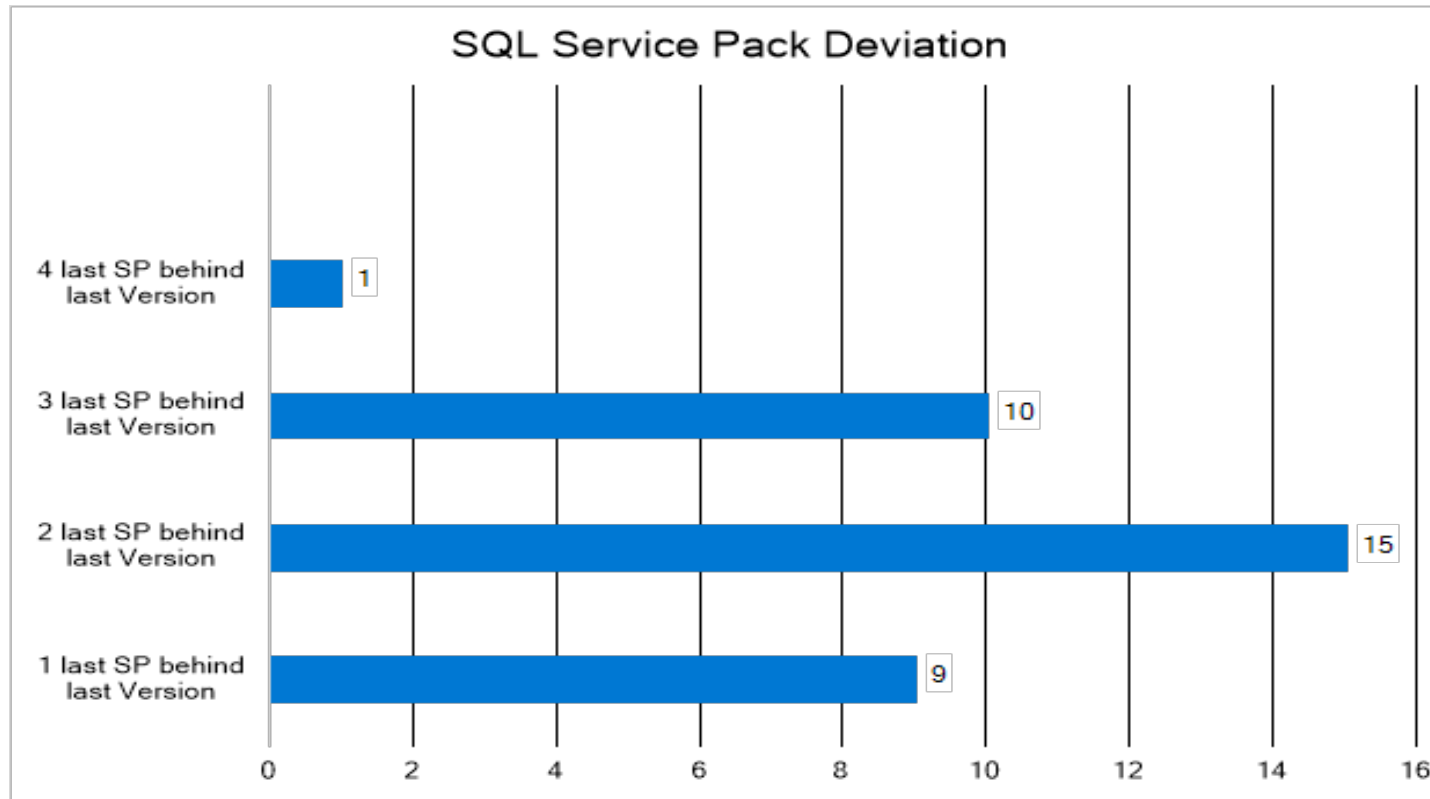


Recommendations:

- **Check** possible migration to Azure SQL Services:
 - Fully managed business continuity
 - Industry highest availability SLA of 99.995%
 - Industry only business continuity SLA with 5 second RPO and 30 second RTO
 - Price-performance leader for the mission-critical workloads
- **Possible** consolidation of SQL Servers and usage of SQL Server on Azure VM:
 - Free Extended Security Updates for SQL Server 2008/R2
 - Automated Backups and Security Updates
 - Point in Time Restore with Azure Backup
 - Accelerate storage performance with Azure Blob Caching

Data Collection

SQL Server - Service Pack Deviation

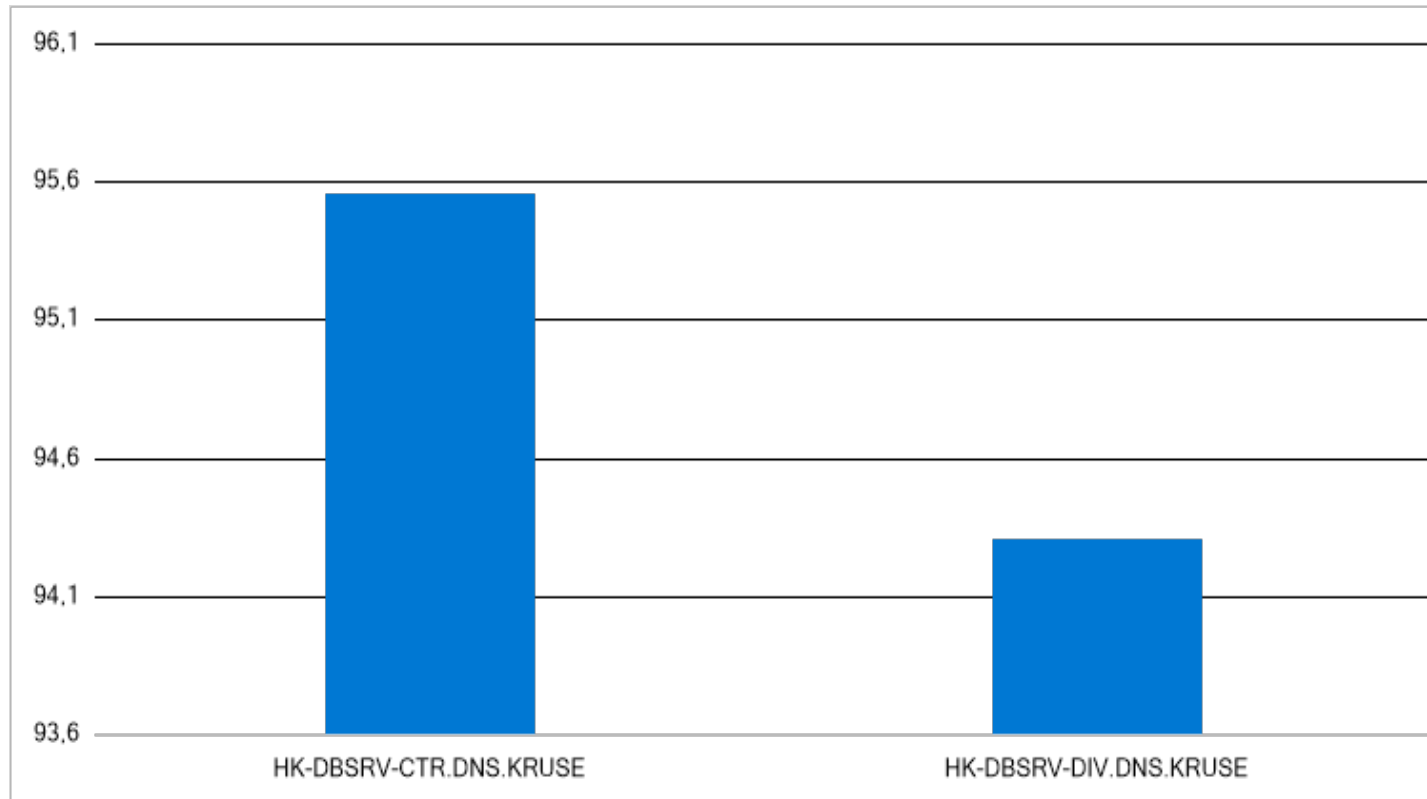


- **Recommendations:**

- **Update** SQL Servers at least to with the last available service pack

Data Collection

Systems with continuous High RAM Load over 90% Average



- **Recommendations:**

- **Review** of the affected systems

- 
- A large, bold, blue number '5' is positioned on the left side of the slide, partially cut off by the edge.
- Recommendation Summary
 - Next Steps

Recommendation Summary

Development & Test

- Empower your team to quickly provision dev/test and pre-production environments to deliver quality products, applications, and services. Use purpose-built, managed developer services like Azure DevTest Labs, GitHub Codespaces, and Windows Virtual Desktop to easily manage and optimize dev/test environments, tenants, and subscriptions, without sacrificing governance, cost controls, or security.

➔ Move your existing Development & Test environment to Azure. We identified 8 Development & Test server(s) in your environment.

Extended Support

- Move your Windows Server 2008, 2008 R2 VMs or SQL 2008 R2 to Azure, they're automatically enabled for Extended Security Updates. You don't need to configure anything, and there's no additional charge for using Extended Security Updates with Azure VMs. Extended Security Updates are automatically delivered to Azure VMs and SQL if they're configured to receive updates.

➔ Move your 9 Windows 2008 or Windows 2008 R2 server(s) and 47 SQL 2008 R2 system(s) to Azure.

Zombie VM

- A zombie VM is a virtual machine that is created, often for a particular purpose, and is forgotten when it is no longer needed for that purpose.
 - As result, the VM continues to consume resources while performing no useful work.
- ➔ Identify Zombie VMs. Use the performance counters of the workbook to encircle the possible candidates.
- Delete all Zombie VMs.

Note: All details about possible candidates are shown in the workbook. You can select those with the tagging option in the workbook.



Thank you