

Cloud Computing Administration

by Aleksandar Kushlev

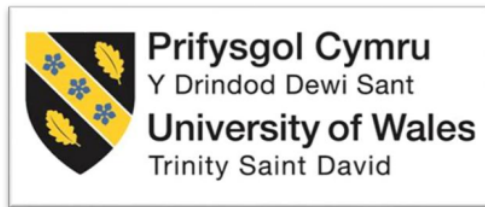
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Level 6 Assessment

2 Cloud Computing Administration

Module Code:

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Assignment Title:

Aspire Retailers Cloud Management with Azure

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Introduction

Aspire Retailers is a growing retailer which currently utilises on-site premises for storage, management, and hosting of its IT operations. Since the company is looking forward to developing into new markets, the management decides to pursue a cloud-based solution for their IT services. The need for that decision arises due to the advantages of having computer services and capabilities immediately available for application development, updates, scaling up/down horizontally/vertically with no disruptions or downtime. Another reason for considering moving to the cloud is that the IT administrator will be focused on essential IT operations instead of being involved in the procurement of hardware installation/maintenance, deployment, and configuration of software.

Task A: Guide the Aspire Retailers about moving to the Cloud.

Describe features of load balancing

By moving to the cloud the company will avoid the time- and capital-consuming challenges which are associated with having on-site premises. Aspire Retailers can harness the following benefits by adopting a cloud-based IT environment for its operations:

- Increased Scalability
- Increased Availability and Reliability
- Reduced Capital Expenditure

Increased Scalability¹

By providing pools of IT resources along with tools and technologies designed to leverage them collectively, clouds can instantaneously and dynamically allocate IT resources to cloud consumers based on their direct configuration or on demand. This enables cloud users to automatically or manually scale their cloud-based IT resources to accommodate processing fluctuations and peaks. As processing demands decrease, cloud-based IT resources can be released (automatically or manually).

In the case of Aspire Retailers, increased scalability will prove to be a very important benefit from moving to the cloud as this will allow the organization to utilise flexible resources based on their needs.

Increased Availability and Reliability²

There is a direct correlation between the availability and dependability of IT resources and tangible business benefits. Outages restrict the amount of time a company's IT resources can be "open for business" to its clients, thereby reducing their utility and revenue-generating potential. Runtime failures that are not promptly resolved can have a greater impact during periods of high usage volume. In addition to being unable to respond to customer requests, the IT resource's unanticipated failure can reduce overall customer confidence.

As a growing business seeking to attract more clients, especially through its website, it cannot risk to have long periods of downtime which is more probable in the case of using on-site premises.

Reduced Capital Expenditure³

One of the most important reasons for Aspire Retailers to move to the cloud is the elimination of expenditures on hardware/software purchases and maintenance. Moving to the cloud allows the organization to access powerful IT infrastructure without the need to own it. The benefits that the company will harness when moving to the cloud include:

- On-demand access to pay-as-you-go computing resources on a short-term basis (such as hourly processors) and the ability to discharge these computing resources when they are no longer required.
- The perception that computing resources are unlimited and available on demand, reducing the need for provisioning preparation.
- The ability to add or remove IT resources at granular levels, such as modifying available storage disc space in increments of one gigabyte.
- Abstraction of the infrastructure so that applications are not tethered to specific devices or locations and can be simply relocated as necessary

The above advantages of using a cloud-based platform are essential to making the decision to move to the cloud and Aspire Retailers' plans to expand its business correspond very well with that decision.

⁹

² Erl, T., Mahmood, Z., Puttini, R., "Cloud Computing: Concepts, Technology & Architecture", Massachusetts, Prentice Hall, 2013, p. 75

³ Erl, T., Mahmood, Z., Puttini, R., "Cloud Computing: Concepts, Technology & Architecture", Massachusetts, Prentice Hall, 2013, p. 72

Load Balancing Features

Load balancing is another advantage that Aspire Retailers will benefit from as compared to continuing to use its on-site premises. With on-site premises, when a server experiences higher loads, this can affect network performance, efficiency, and latency,

Load balancing is the distribution of computational duties across multiple computers. Load balancing is frequently used to distribute network traffic across multiple servers on the Internet. This reduces the load on each server and increases server efficiency, thereby accelerating performance and decreasing latency. Load balancing is essential for the correct operation of the majority of Internet applications.⁴

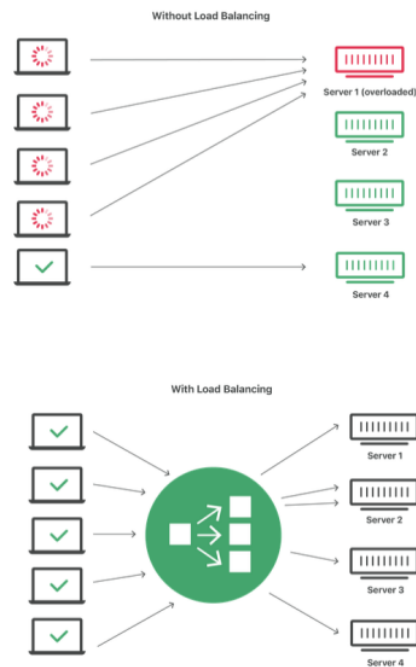


Figure 1: Network with and without load balancing

Source: Cloudflare.com

Load balancing is the simplest form of partition-based scalability. It randomly assigns customers to participating servers in order to distribute the total burden. Static partitions are also possible. A system may, for instance, partition consumers based on their geographical location and route them to regional servers.⁵

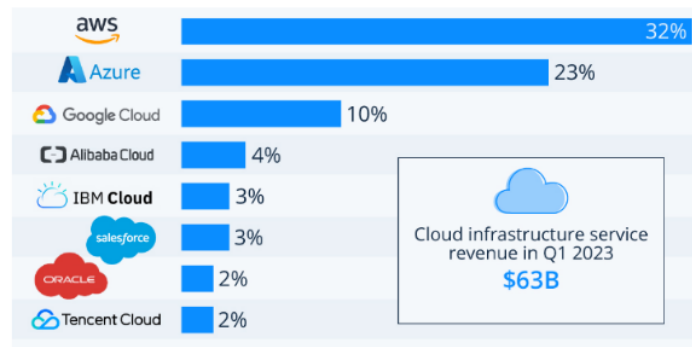
⁴ ¹² "What is load balancing? How load balancers work?", Cloudflare.com, URL: <https://www.cloudflare.com/en-gb/learn/performance/what-is-load-balancing/> [Accessed on: 18/07/2023]

⁵ Bai, H., "Zen of Cloud: Learning Cloud Computing by Examples", 2nd ed., Boca Raton, FL, CRC Press, 2019, p. 49

Task B: Cloud Service Providers Comparison and Analysis

For an organization like Aspire Retailers which is considering using cloud-based services for the first time, the platforms that offer cost-efficiency, reliability and best range of cloud services are AWS (Amazon Web Services), GCP (Google Cloud Platform), and Microsoft Azure.

Each of the above major cloud service providers has its strengths and unique features which attract their respective users needing a specific service. Nowadays, companies using a variety of cloud services within their IT operations might choose two or more providers depending on the services needed.



Graph 1: Worldwide market share of leading cloud infrastructure service providers in Q1'2023

Source: Statista.com

As can be noticed from Graph 1 above, AWS is the absolute leader providing cloud services and the primary strength of the market leader, is the breadth and depth of its platform spanning across more than 175 services within compute, storage, database, analytics, networking, mobile, developer tools, management tools, IoT, security, and enterprise applications, as of the most recent count.⁶

AWS (Amazon Web Services)

Amazon AWS provides almost everything in terms of Distributed computation. AWS is dominant in a number of areas, including design and monitoring. AWS is generally preferred in the business sector due to its extensive and vast contributions, project-friendly administrations, global reach, and open and adaptable features.⁷

⁶ S. Carey, "AWS vs Azure vs Google Cloud: What's the best platform for enterprise?", Computerworld.com, URL: <https://www.computerworld.com/article/3429365/aws-vs-azure-vs-google-whats-the-best-cloud-platform-for-enterprise.html>, (Accessed: 20/07/2023)

⁷ Kamal, M., Hafiz, R., et al., "Highlight the features of AWS, GCP, and Microsoft Azure that Have an Impact when Choosing a Cloud Service Provider", International Journal of Recent Technology and Engineering (IJRTE), Volume-8 Issue-5, pp.4127-4128, January 2020

Microsoft Azure⁸

Azure offers a comprehensive range of services and solutions for individuals and organisations relating to foundation, process capacity, storage, organisation, etc. A significant advantage of Microsoft Azure is its registering capability. Microsoft enables the sending and management of virtual machines on a scale that can accommodate any required limit within minutes. It is unique compared to Amazon and Google. Microsoft Azure additionally enables seamless integration with Microsoft tools, offers open-source support, and hybrid cloud services.

GCP (Google Cloud Platform)⁹

The specific knowledge of Google as well as its industry-leading technologies for deep learning and automated reasoning. For engineers, Google Cloud provides a selection of cloud administrations. Open-source support, shifting flexibility, savings, and flexible contracts are all provided by Google Cloud. The DevOps expertise of Google Cloud is specifically geared toward cloud-based enterprises. Given that Google's foundation is analytical, GCP offers more advantages and adaptability to research and scientific tools.

Pricing¹⁰

Amazon prices are the most competitive of all cloud providers. Amazon provides hourly instalments for the highlights function. Amazon also offers a free service with limited storage and registration, which could be useful for individuals and new businesses prior to a purchase. AWS offers four pricing models: pay-as-you-go, pay less by using more, save when you reserve, free usage tier.

Microsoft's evaluation varies based on the types of components employed by the development team. Microsoft provides Pay-in-advance and recurring payments at a rate per minute of use. Microsoft's adaptability should be self-evident, and it is valued based on demand for temporary responsibilities.

Google Cloud has a very competitive pricing among the three specialist companies. GCP has a pay-as-you-go pricing model that charges per minute or per second of use.

⁸ Kamal, M., Hafiz, R., et al., "Highlight the features of AWS, GCP, and Microsoft Azure that Have an Impact when Choosing a Cloud Service Provider", International Journal of Recent Technology and Engineering (IJRTE), Volume-8 Issue-5, pp. 4127-4128, January 2020

⁹ Kamal, M., Hafiz, R., et al., "Highlight the features of AWS, GCP, and Microsoft Azure that Have an Impact when Choosing a Cloud Service Provider", International Journal of Recent Technology and Engineering (IJRTE), Volume-8 Issue-5, pp. 4127-4128, January 2020

¹⁰ Kamal, M., Hafiz, R., et al., "Highlight the features of AWS, GCP, and Microsoft Azure that Have an Impact when Choosing a Cloud Service Provider", International Journal of Recent Technology and Engineering (IJRTE), Volume-8 Issue-5, p. 4127

Summary¹¹

²⁹ Amazon has been in the Cloud advertising industry for approximately 14 years, and its developers and architects are the most skilled and experienced in the world. Amazon Web services provide fierce competition to its rivals. However, AWS infrastructure pricing can be difficult to comprehend. This expertise makes Amazon the most endeavour-generous cloud specialist cooperative, enabling anyone to utilise AWS without difficulty.

¹⁵ Microsoft Azure is the earliest cloud service currently available. It is suitable for large-scale business development due to its high computing capacity and its integration of other Microsoft features into a single framework and procedure, which provides more power. Microsoft Azure is another formidable rival to AWS. Microsoft Azure has a Windows-supporting effort foundation. It strives to achieve interoperability with them and the integration of Office365 offers a very attractive package for enterprises.

⁷ GCP provides one of the industry's best cloud security. It offers a different level of cloud security than its competitors and has more than 500 security engineers working on it. For activities requiring the highest level of security, such as banking, finance, and defence applications, GCP will be the best option.

³ Cloud Service Provider	Benefits	Limitations
Amazon Web Services	• Breadth and depth of its services • Developer functionality • Economic benefits for customers • Gold standard for reliability and security • Control market position • Sizeable , develop fully offerings • Help for huge organisations • Worldwide reach	• Cost prohibitive • Usage is not facile • Stewardship of price • Overcoming • Technical support fee
Microsoft Azure	• Adjustable billing • Platform-as- Service (PaaS) is a well-defended suit of Microsoft • Accuracy and expandable. • High level availability • Price-effective differentiate to the competition • After the first biggest	• Consequences with documentation • Imperfect management devices • Comparatively hard to use

¹¹ Kamal, M., Hafiz, R., et al., "Highlight the features of AWS, GCP, and Microsoft Azure that Have an Impact when Choosing a Cloud Service Provider", International Journal of Recent Technology and Engineering (IJRTE), Volume-8 Issue-5, p.4127

	3 provider • Combination with Microsoft devices and software • Integrated public and private cloud • Help for open source	3 • Expensive • Data transfer cost • Require platform expertise
3 Google Cloud Platform	• Deep expertise technology • Current innovation, well-authorise in cloud computing • Adjustable pricing model • Advance costing than Competitors • Live Migration of Virtual Machines • Delegation to • Continued	• Safety and privacy • Bounded control and flexibility • Vendor pin- down • Insufficient characters or services • Historically not as enterprise focused

Table 1: Comparison chart of cloud service providers: Amazon Web Services (AWS), Microsoft Azure and Google Cloud Platform

19
Source: Mufti, T., Mittal, P., Bulbul, G., "A Review on Amazon Web Service (AWS), Microsoft Azure & Google Cloud Platform (GCP) Services", New Delhi, Department of Computer Science and Engineering

Task C: Azure Pricing Calculator & TCO

Cloud providers transfer development costs from the capital expense (CapEx) of constructing and maintaining infrastructure and facilities to the operational expense (OpEx) of renting infrastructure as customers require it, including computing, storage, and networking.

There are 6 main factors influencing the cost of a cloud service:

- **Resource Type** - Costs are resource-specific and depend on the type of resource used
- **Services** - Azure rate for usage and types of billing can vary between CSP, Web Direct, and Enterprise customers
- **Azure Hybrid Use benefit** - it allows users to use their on-premise license on Azure at a reduced cost
- **Location** - The Azure infrastructure is distributed globally and usage costs will vary between regions
- **Bandwidth** - this is the sum of inbound and outbound data transfers and Azure pricing depends on the amount of bandwidth. Some inbound data transfers are free.
- **Reserved Instances** - the user can use Azure Reservations and 30 commit to purchasing a 1-year or a 3-year plan which can significantly reduce the cost (up to 72%) compared to the pay-as-you-go price

The **Pricing Calculator** displays categories of Azure products. The user can add these categories to their estimate and configure them per user's needs. They will then receive a consolidated cost estimate with a comprehensive summary of the costs associated with each resource added to the solution. The user can export, share, or save this estimate for later use.¹²

The **TCO Calculator** enables the user to estimate the cost savings associated with operating their solution on Azure as opposed to on-premises. The user will input the details of their on-premises workloads into the **TCO Calculator**. Then, they can examine the suggested industry-average cost (which can be altered) for operational costs associated with their business. Included in these expenses are electricity, network maintenance, and IT labor. The report is then displayed side-by-side. Using the report, the user can compare these costs to those of identical Azure workloads.¹³

Azure Pricing Calculator

Microsoft Azure Estimate						
Your Estimate						
Service category	Service type	Custom name	Region	Description	Estimated monthly cost	Estimated upfront cost
Compute	Virtual Machines		UK West	1A4 (8 Cores, 14 GB RAM) x 730 Hours (Pay as you go), Linux, (Pay as you go), 0 managed disks - S4, Inter Region transfer type, 5 GB outbound data transfer from UK West to East Asia	\$385.44	\$0.00
Compute	Virtual Machines		UK South	1D4a v4 (4 vCPUs, 16 GB RAM) x 730 Hours (Pay as you go), Windows (License included), OS Only, 0 managed disks - S4, Inter Region transfer type, 5 GB outbound data transfer from UK South to East Asia	\$296.38	\$0.00
Compute	Virtual Machines		UK South	1D8a v4 (8 vCPUs, 32 GB RAM) x 730 Hours (Pay as you go), Linux, (Pay as you go), 0 managed disks - S4, Inter Region transfer type, 5 GB outbound data transfer from UK South to East Asia	\$324.12	\$0.00
Compute	Virtual Machines		East US	1D14 (16 vCPUs, 112 GB RAM) x 730 Hours (Pay as you go), Windows (License included), OS Only, 0 managed disks - S4, Inter Region transfer type, 5 GB outbound data transfer from East US to East Asia	\$1,541.03	\$0.00
Compute	Virtual Machines		UK South	1E64-32as v4 (32 vCPUs, 512 GB RAM) x 730 Hours (Pay as you go), Windows (License included), OS Only, 0 managed disks - S4, Inter Region transfer type, 5 GB outbound data transfer from UK South to East Asia	\$5,606.40	\$0.00
Storage	Storage Accounts		UK South	File Storage, Cool Performance Tier, General Purpose V2, LRS Redundancy, 1,000 GB of Data at-rest, 1,000 GB Snapshots, (Three Year Reserved), 1,000 GB of Metadata at-rest, 1x 10,000 Write Transactions, 1x 10,000 List Transactions, 1x 10,000 Read Transactions, 1x 10,000 Other Operations, 1,000 GB of Data Retrieval, 0 Additional Sync	\$145.42	\$0.00
Databases	Azure SQL Database		UK South	Single Database, vCore, General Purpose, Provisioned, Standard-series (Gen 5), Locally Redundant, 1-2 vCore Database(s) x 730 Hours, 32 GB Storage, RA-GRS Backup Storage Redundancy, 0 GB Point-in-Time Restore, 0 x 5 GB Long Term Retention	\$423.25	\$0.00
Storage	Storage Accounts		UK South	Managed Disks, Standard SSD, LRS Redundancy, E40 Disk Type 1 Disk; Pay as you go	\$163.16	\$0.00
Storage	Storage Accounts		UK South	Managed Disks, Standard SSD, LRS Redundancy, E20 Disk Type 2 Disk; Pay as you go	\$84.68	\$0.00
Support			Support	Microsoft Customer Agreement (MCA)	0 \$0.00	
			Licensing Program			
			Billing Account			
			Billing Profile			
			Total		\$0,981.88	\$0.00
Disclaimer						
All prices shown are in United States - Dollar (USD). This is a summary estimate, not a quote. For up to date pricing information, please visit https://azure.microsoft.com/pricing/calculator/						

Resources included: 5x VMs (according to assignment specifications), 1x Azure SQL Database, 2x SSD + 1x HDD Storage

¹² "Purchase Azure Services", Microsoft.com, URL: <https://learn.microsoft.com/en-us/training/modules/plan-manage-azure-costs/4-purchase-azure-services> (Accessed on: 20/07/2023)

¹³ "Compare costs by using the Total Cost of Ownership Calculator", Microsoft.com, URL: [Compare costs by using the Total Cost of Ownership Calculator - Training | Microsoft Learn](#) (Accessed on 20/07/2023)

TCO - Total Cost of Ownership Calculation

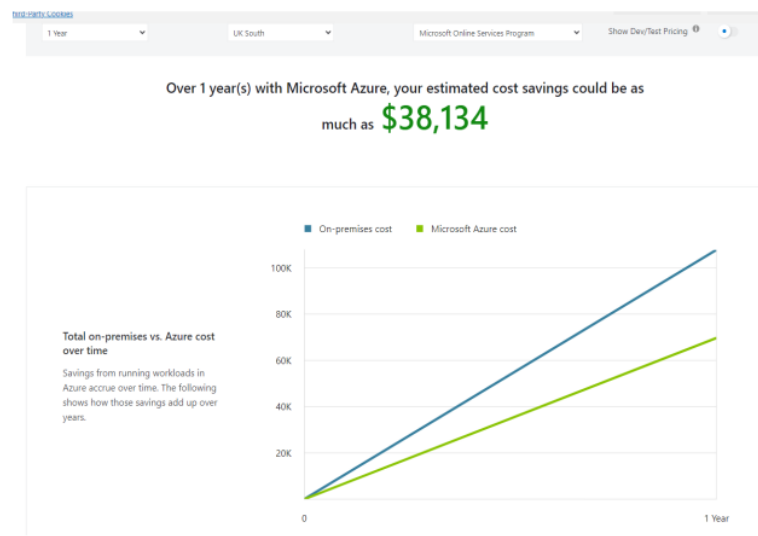
Assumptions:

5 VMs (according to assignment specifications)

1 Microsoft SQL database

4 TB HDD storage + 2 TB backup and archive

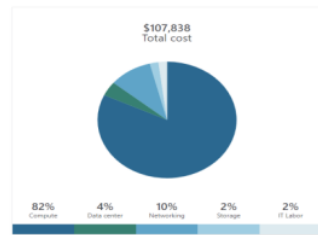
2 TB SSD storage + 1 TB backup and archive



1-year cost savings on using Azure vs on-premises: 38,134 USD

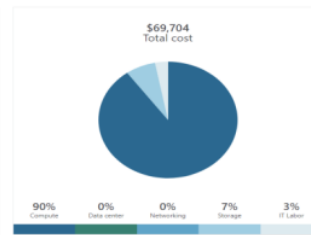
Total on-premises over 1 year(s)

TCO of on-premises environments tends to be driven by compute and data center costs.



Total Azure cost over 1 year(s)

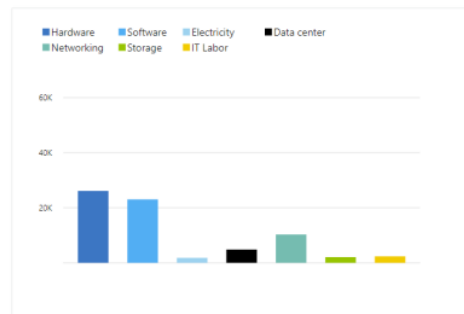
In Azure, certain cost categories decrease or go away completely.



Cost comparison

Total on-premises cost breakdown

In Azure, several of the cost categories from the on-premises environment are consolidated and decrease with the efficiency that comes with the cloud.

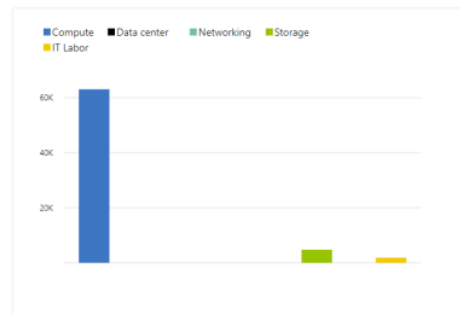


\$107,838

Cost over 1 year(s)

Total Azure cost breakdown

In Azure, several of the cost categories from the on-premises environment are consolidated and decrease with the efficiency that comes with the cloud.



\$69,704

Cost over 1 year(s)

Cost breakdown

On-premises cost breakdown summary		Azure cost breakdown summary	
Category	Cost	Category	Cost
Compute	\$88,175.37	Compute	\$62,995.32
Hardware	\$26,101.20	Data Center	\$0.00
Software	\$23,081.25	Networking	\$0.00
Electricity	\$1,797.22	Storage	\$4,792.30
Virtualization	\$1,591.20	IT Labor	\$1,916.59
Database	\$35,604.00		
Data Center	\$4,836.32		
Networking	\$10,327.18		
Storage	\$2,122.24		
IT Labor	\$2,376.59		
Total	\$107,838.00	Total	\$69,704.00

Cost breakdown summary

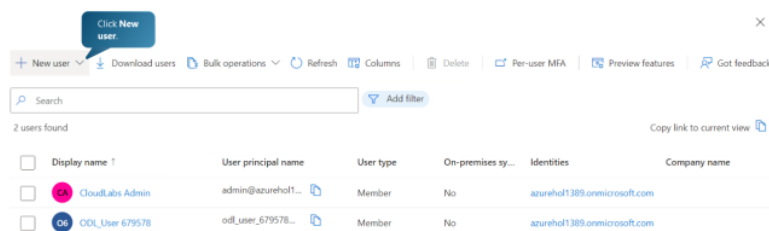
Estimated on-premises cost (1 year(s))		Estimated Azure cost (1 year(s))	
 Compute cost		Azure compute cost	
 Data center cost		Azure data center cost	
 Networking cost		Azure networking cost	
 Storage cost		Azure storage cost	
 IT labor cost		Azure IT labor cost	
Total on-premises cost over one year(s)		\$107,838.00	Total Azure cost over one year(s)
			\$69,704.00
		A total savings of \$38,134.00 with Microsoft Azure	

As can be seen from the image above, cost savings from moving to Azure from on-premise would save the company approximately **38000 USD / year**.

2 Task D: Explain the uses of Azure AD to configure different accounts and demonstrate with screenshots

26 Azure AD is a cloud-based identity and access management service and serves as a central point of control for managing user accounts, groups, tenants, and access to different resources within the Azure environment. The primary uses of Azure AD for configuring user accounts are as follows:

- *Centralized User Management*: add, delete or edit user accounts and their features such as names, contact details, group memberships.
- *Collaboration* with external users such as vendors or partners by granting them limited access
- Manage access to cloud-based applications
- RBAC (Role-based Access Control): administrators can assign users to roles based on their position in the organization and grant them permissions within the cloud
- MFA (Multi-factor authentication): adding another level of security by prompting users to add additional authentication factor (fingerprint, phone number etc)
- SSO (Single sign-on): enables users to access multiple applications and resources with a single log in



The screenshot shows the 'Users' page in the Azure AD portal. At the top, there's a 'Click New user' button. Below it, a toolbar contains options like 'New user', 'Download users', 'Bulk operations', 'Refresh', 'Columns', 'Delete', 'Per-user MFA', 'Preview features', and 'Got feedback?'. A search bar and 'Add filter' button are also present. The table below shows 2 users found. The columns are: Display name, User principal name, User type, On-premises sync, Identities, and Company name.

Display name	User principal name	User type	On-premises sync	Identities	Company name
CloudLabs Admin	admin@azurehol1...	Member	No	azurehol1389.onmicrosoft.com	
ODL_User 679578	odl_user_679578...	Member	No	azurehol1389.onmicrosoft.com	

New user

Adatum Corporation

[Got feedback?](#)

i Bulk invite and create are now located under the 'Bulk operations' menu item on the 'All users' view. [View all users](#)

Select template

☒ **Create user**

Create a new user in your organization.

☐ **Invite user**

Invite a new guest user to collaborate with your organization. The user will be emailed an invitation they can accept in order to begin collaborating.

[Help me decide](#)

Identity

User name *

Example: chris @ azurehd1389.onmicrosoft... 
The domain name I need isn't shown here

Name *

Example: 'Chris Green'

Create

Creating new user in Azure AD

New user

Adatum Corporation

[Got feedback?](#)

Identity

User name *

User1 ✓ @ azurehd1389.onmicrosoft... 
The domain name I need isn't shown here

Name *

User1 ✓

First name

Last name

Password

☐ Auto-generate password

☒ Let me create the password

Initial password *

*****  ✓

Creating new user in Azure AD

New user

Adatum Corporation

[Got feedback?](#)

Roles: [User](#)

Settings

Block sign in: Yes No

Usage location: United States

Job info

Job title: Cloud Administrator

Department: IT

Company name:

Manager: No manager selected

[Click Create.](#)

[Create](#)

Providing User job Information – Job title is Cloud Administrator in IT department. For a user to become a Global user, the user must be assigned a role Global Reader.

+ New user | Download users | Bulk operations | Refresh | Columns | Delete | Per-user MFA | Preview features | Got feedback?

Search [Add filter](#)

3 users found [Copy link to current view](#)

☐	Display name	User principal name	User type	On-premises sy...	Identities	Company name
☐	CloudLabs Admin	admin@azureho1...	User icon	Member	No	azureho1389.onmicrosoft.com
☐	ODL_User 679578	odl_user_679578...	User icon	Member	No	azureho1389.onmicrosoft.com
☐	User1	User1@azureho1...	User icon	Member	No	azureho1389.onmicrosoft.com

Refreshing users list and clicking on the new user account

Home > Adatum Corporation > Users > User1

User1 | Assigned roles

[Search \(Ctrl+F\)](#) [+ Add assignments](#) [X Remove assignments](#)

[Overview](#) [Audit logs](#) [Sign-in logs](#) [Diagnose and solve problems](#)

Manage

- [Assigned roles](#)
- [Administrative units](#)
- [Groups](#)
- [Applications](#)
- [Licenses](#)
- [Devices](#)
- [Azure role assignments](#)

Directory roles

[Sort](#)

[To assign custom roles to a user, your organization needs Azure AD Premium P1 or P2.](#)

Choose admin roles that you want to assign to this user. [Learn more](#)

[Search by name or description](#) [Add filters](#)

☐ External ID user flow administrator Can create and manage all aspects of user flows.

☐ External ID user flow attribute administrator Can create and manage the attribute schema available to all user flows.

☐ Privileged authentication administrator Allowed to view, set and reset authentication method information for any user (admin or non-admin).

☒ User administrator Can manage all aspects of users and groups, including resetting passwords for limited admins.

Assigning User Administrator Role to the new user account

Administrative roles

Administrative roles can be used to grant access to Azure AD and other Microsoft services. [Learn more](#)

Search by name or description		Add filters			
Role	Description	Resource Name	Resource Type	Assignment Path	Type
☐ User administrator	Can manage all aspects of users and groups, inclu...	Directory	Organization	Direct	Built-in

User Administrator role assignment to the new user

Microsoft Azure

Sign in
to continue to Microsoft Azure

[No account? Create one!](#)

[Can't access your account?](#)

Click Next.

Next

Sign in with GitHub

Sign-in options

Logging in to Azure Portal in a new browser window

Microsoft Azure

← user1@azurehol1389.onmicrosoft.com

Enter password

[Forgot my password](#)

Sign in

Microsoft Azure

Microsoft

user1@azurehol1389.onmicrosoft.com

Update your password

You need to update your password because this is the first time you are signing in, or because your password has expired.

.....

.....

.....

Sign in

Signing in to the azure account portal with the new user account, changing the password to a secure password.

g options.



Manage Azure Active Directory

services, Manage access, set smart policies, and enhance security with Azure Active Directory.

View

Learn more 

Click View.

Choosing the view option on the Manage Azure Active Directory

Adatum Corporation | User settings Azure Active Directory

Save Discard Got feedback?

- Enterprise applications
- Devices
- App registrations Click to scroll
- Identity Governance
- Application proxy
- Custom security attributes (Preview)
- Licenses
- Azure AD Connect
- Custom domain names
- Mobility (MDM and MAM)
- Password reset
- Company branding
- User settings**
- Properties
- Security

Enterprise applications
Manage how end users launch and view their applications

App registrations
Users can register applications ?
☐ Yes ☐ No

Administration portal
Restrict access to Azure AD administration portal ?
☐ Yes ☐ No

LinkedIn account connections
Allow users to connect their work or school account with LinkedIn.
Data sharing between Microsoft and LinkedIn is not enabled until users consent to connect their Microsoft work or school account with their LinkedIn account.
[Learn more about LinkedIn account connections](#) ?
☐ Yes ☒ Selected group ☐ No

User1 does not have permission to modify any options on the user settings

New user Adatum Corporation

Got feedback?

Identity

User name * ☒ The domain name I need isn't shown here

Name * ☒

First name

Last name

Password

☐ Auto-generate password

☒ Let me create the password

Initial password * ☐ ☒

Groups and roles

New user Adatum Corporation

Got feedback?

Roles

Settings

Block sign in ☐ Yes ☒ No

Usage location

Job info

Job title ☒

Department ☒

Company name

Manager

Click Create.

Creating a new user – User2 with Job title System Administrator in IT department

☐	Display name ↑	User principal name	User type	On-premises sy...	Identities	Company name
☐	 CloudLabs Admin	admin@azurehol1...	 Member	No	azurehol1389.onmicrosoft.com	
☐	 ODL_User 679578	odl_user_679578...	 Member	No	azurehol1389.onmicrosoft.com	
☐	 User1	User1@azurehol1...	 Member	No	azurehol1389.onmicrosoft.com	
☐	 User2	User2@azurehol1...	 Member	No	azurehol1389.onmicrosoft.com	

New user created

Home > Adatum Corporation > Licenses

Licenses | All products

Adatum Corporation - Azure Active Directory

Overview

Diagnose and solve problems

Manage

Licensed features

All products

Self-service sign up products

Activity

Audit logs

Troubleshooting + Support

New support request

+ Try / Buy

+ Assign

Bills

Columns

Got feedback?

☐	Name	Total
☐	Dynamics 365 Customer Service Enterprise vTrial	10000
☐	Microsoft Power Apps Plan 2 Trial	10000
☐	Microsoft Power Automate Free	10000
☐	Microsoft Stream Trial	1000000
☐	Power Virtual Agents Viral Trial	10000

Activate

Browse available plans and features

ENTERPRISE MOBILITY + SECURITY E5

Enterprise Mobility + Security E5 is the comprehensive cloud solution to address your consumerization of IT, BYOD, and SaaS challenges. In addition to Azure Active Directory Premium P2 the suite includes Microsoft Intune and Azure Rights Management.

Free trial

Azure AD Premium P2

With Azure Active Directory Premium P2 you can gain access to advanced security features, richer reports and rule based assignments to applications. Your end users will benefit from self-service capabilities and customized branding.

Free trial

Azure Active Directory Premium P2 enhances your directory with additional features that include multifactor authentication, policy-driven management and end-user self-service. [Learn more about features](#)

The trial includes 100 licenses and will be active for 30 days beginning on the activation date. If you wish to upgrade to a paid version, you will need to purchase Azure Active Directory Premium P2. [Learn more about pricing](#)

Azure Active Directory Premium P2 is licensed separately from Azure Services. By affirming this activation you agree to the [Microsoft Online Subscription Agreement](#) and the [Privacy Statement](#).

Click Activate

Activate

Activating Azure AD Premium P2

Licenses | All products

Adatum Corporation - Azure Active Directory

Overview

Diagnose and solve problems

Manage

Licensed features

All products

Self-service sign up products

Activity

Audit logs

Troubleshooting + Support

New support request

+ Try / Buy

+ Assign

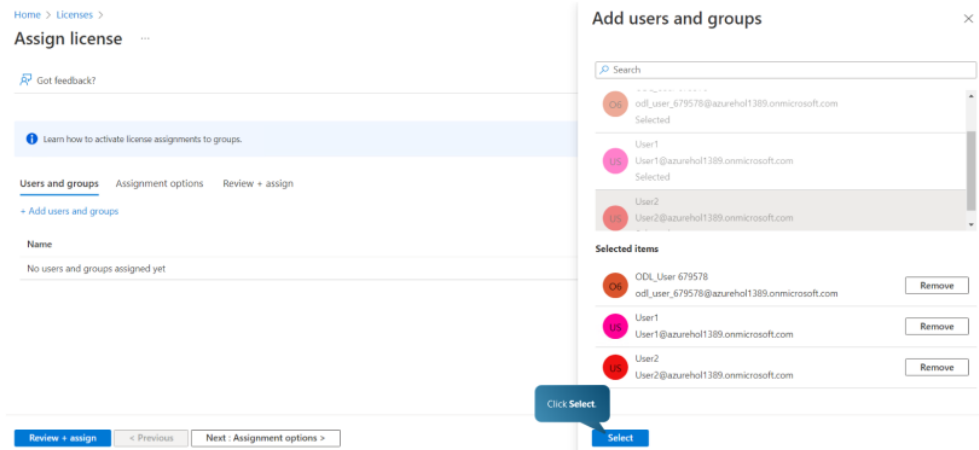
Bills

Columns

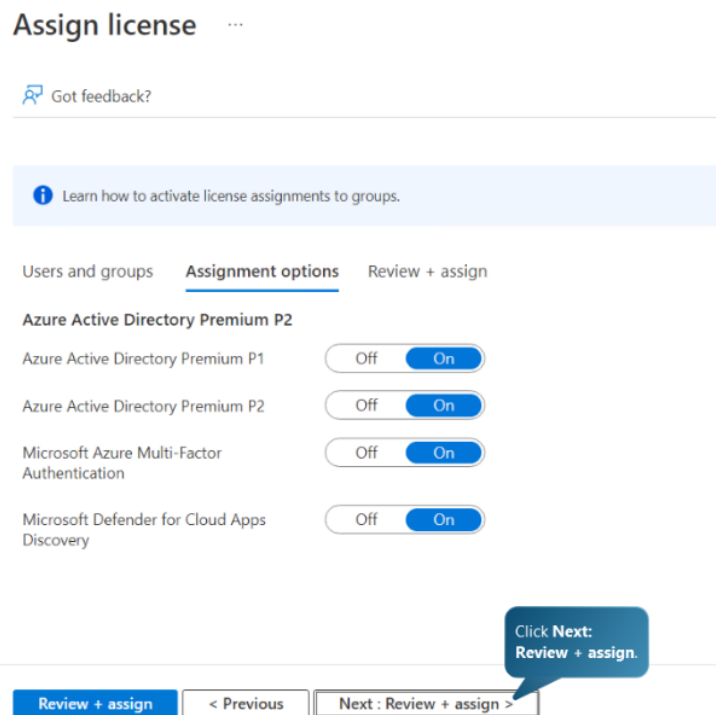
Got feedback?

☒	Name	Total	Assigned	Available	Expiring soon
☒	Azure Active Directory Premium P2	100	0	100	0
☐	Dynamics 365 Customer Service Enterprise vTrial	10000	0	10000	0
☐	Microsoft Power Apps Plan 2 Trial	10000	0	10000	0
☐	Microsoft Power Automate Free	10000	0	10000	0
☐	Microsoft Stream Trial	1000000	0	1000000	0
☐	Power Virtual Agents Viral Trial	10000	0	10000	0

Click Assign



Assigning license options to original user account and newly created User1 and User2 accounts



Choosing license assignment options

Assign license ...

 Got feedback?

 Learn how to activate license assignments to groups.

Users and groups Assignment options Review + assign

Users and groups

Assign license to 3 users selected

Assignment options

Azure Active Directory Premium P2 4 out of 4 enabled

Click **Assign**.

Assign

< Previous

Next : >

Assigning license to users

New Group ...

 Got feedback?

Group type * 
Security

Group name * 
IT Cloud Administrators ✓

Group description 
Adatum IT cloud administrators ✓

Azure AD roles can be assigned to the group 
☐ Yes ☒ No

Membership type * 
Dynamic User

Owners
No owners selected

Dynamic user members * 
[Add dynamic query](#)



Click **Add dynamic query**.

Creating a new group: IT Cloud Administrators and adding a dynamic query

Dynamic membership rules ...

Save Discard Got feedback?

Configure dynamic Rules (Preview)

You can use the rule builder or rule syntax text box to create or edit a dynamic membership rule. [Learn more](#)

And/Or	Property	Operator	Value
	jobTitle	Equals	Cloud Administrator

+ Add expression + Get custom extension properties

Rule syntax [Edit](#)

```
(user.jobTitle=eq "Cloud Administrator")
```

Crating a group dynamic membership rule which requires the job title to match “Cloud Administrator” for all users that will be added to the group. In the case of Aspire Retailers, a new group “Marketing Department” can be created with a dynamic rule which includes all users matching a job title with value “Marketing”.

Groups | All groups (Preview) [Click New group.](#)

Adatum Corporation - Azure Active Directory

New group Download groups Refresh Columns Delete Got feedback?

All groups (Preview) Deleted groups Diagnose and solve problems

Settings

- General
- Expiration
- Naming policy

Search

Search mode Contains

1 group found

Name	Object Id	Group type	Membership type
IT Cloud Administrators	Sbd6417d-7655-4b3b-a46b-186c0301ecdc	Security	Dynamic

New group created and listed in Group after refreshing

New Group ...

Got feedback?

Group type *

Group name *

Group description

Azure AD roles can be assigned to the group ☒ Yes ☐ No

Membership type *

Owners

No owners selected

Dynamic user members * [Add dynamic query](#)

Create [Click Add dynamic query.](#)

Creating “IT System Administrators” group and adding a dynamic query/rule.

Dynamic membership rules ✕

Save ✕ Discard | Got feedback?

Configure **Click Save** | Edit Rules (Preview)

You can use the rule builder or rule syntax text box to create or edit a dynamic membership rule. [Learn more](#)

And/Or	Property	Operator	Value
▼	jobTitle	Equals	System Administrator

+ Add expression + Get custom extension properties

Rule syntax [Edit](#)

```
user.jobTitle -eq "System Administrator"
```

Adding a dynamic membership rule with the value "System Administrator" in the job title.

Microsoft Azure Search resources, services, and docs (G+)

Home > Adatum Corporation > Groups >

New Group ✕

Got feedback?

Group type * Security

Group name * IT Lab Administrators ✓

Group description Contoso IT lab administrators ✓

Azure AD roles can be assigned to the group Yes No

Membership type Assigned

Owners No owners selected

Members No members selected

Create

Add members ✕

Search IT

IT Cloud Administrators Selected

IT System Administrators Selected

Selected items

IT Cloud Administrators Remove

IT System Administrators Remove

Click Select. Select

Creating a group "IT Lab Administrators" and adding users from IT Cloud Administrators and IT System Administrators groups.

Groups | All groups (Preview) ✕

Adatum Corporation - Azure Active Directory

All groups (Preview) Deleted groups Diagnose and solve problems

Settings General Expiration Naming policy Activity Privileged access groups (Preview) Access reviews

New group Download groups Refresh Columns Delete | Got feedback?

Search Add filter

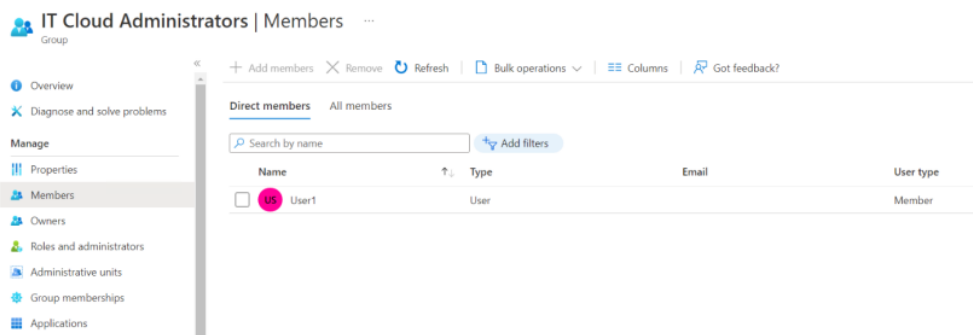
Search mode Contains

3 groups found

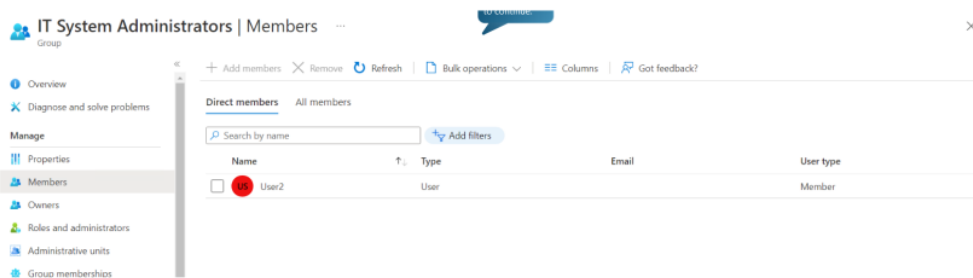
Name	Object Id	Group type	Membership type
IT Cloud Administrators	5bd6417d-7655-4b3b-a46b-186c0301ecd	Security	Dynamic
IT Lab Administrators	2f66ade5-715b-4f38-bfd1-0bd3eda686b2	Security	Assigned
IT System Administrators	5b97f55c-62d7-45ca-9af2-799da74f3c7b	Security	Dynamic

Click IT Cloud Administrators

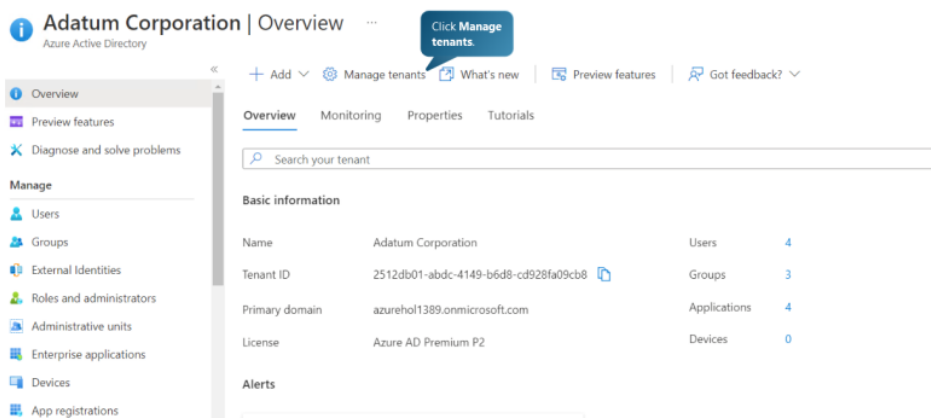
The three groups have been created and listed in the Groups list



Verifying that User1 has been added to the IT Cloud Administrators Group as a result of the dynamic membership rule setting for the value of the job title



Verifying that User1 has been added to the IT System Administrators Group as a result of the dynamic membership rule setting for the value of job title



Creating a new tenant in Azure AD

Create a tenant

Azure Active Directory

[* Basics](#) [* Configuration](#) [Review + create](#)

Azure Active Directory and Azure Active Directory (B2C) enable users to access applications published by your organization, and share same administration experiences. [Learn more](#)

Tenant type

Select a tenant type *

- ☒ Azure Active Directory
☐ Azure Active Directory (B2C)

[Help me choose...](#)

Create a tenant

Azure Active Directory

[* Basics](#) [* Configuration](#) [Review + create](#)

Directory details

Configure your new directory

Organization name *	Adatum Lab	✓
Initial domain name *	adatumlab679578	.onmicrosoft.com
Country/Region *	United States	▼
✓ Datacenter location - United States		

Datacenter location is based on the country/region selected above.

[Review + create](#) [< Previous](#) [Next: Review + create >](#)

Click Next:
Review + create.

Create a tenant

Azure Active Directory

✓ Validation passed.

[* Basics](#) [* Configuration](#) [Review + create](#)

Summary

Basics

Tenant type Azure Active Directory

Configuration

Organization name	Adatum Lab
Initial domain name	adatumlab679578.onmicrosoft.com
Country/Region	United States
Datacenter	United States

Click Create.

[Create](#) [< Previous](#) [Next >](#)

Creating a new tenant Adatum Lab. In the case of Aspire Retailers, a new tenant can be created as “Marketing Department” so that the department’s employees/users have their own AD settings and permissions within the organization.

Adatum Lab | Overview

Azure Active Directory

Overview

Preview features

Diagnose and solve problems

Manage

Users

Groups

External Identities

Roles and administrators

Administrative units

Enterprise applications

Devices

App registrations

Identity Governance

Application proxy

Custom security attributes (Preview)

Overview

Monitoring

Properties

Tutorials

Search your tenant

Basic information

Name

Adatum Lab

Users

1

Tenant ID

8b8c8e06-13c6-4be3-bdb6-8f4459a051eb

Groups

0

Primary domain

adatumlab679578.onmicrosoft.com

Applications

0

License

Azure AD Free

Devices

0

Alerts

Upcoming TLS 1.0, 1.1 and 3DES deprecation

Please enable support for TLS 1.2 on clients(applications/platform) to avoid any service impact.

Learn more

New tenant has been created

Home > Adatum Lab >

Users

Search (Ctrl+F)

+ New user

Download users

Bulk operations

Refresh

Columns

Delete

Per-user MFA

Preview features

Got feedback?

Search

Add filter

1 user found

Copy link to current view

☐

Display name

☐

User principal name

☐

User type

☐

On-premises sy...

☐

Identities

☐

Company name

☐

odf_user_679578@azurehol138...

odf_user_679578_...

Member

No

ExternalAzureAD

Creating a new user under the newly created tenant

New user

Adatum Lab

Got feedback?

Identity

User name * @ LabUser1 @ adatumlab679578.onmicr... The domain name I need isn't shown here

Name * LabUser1

First name

Last name

Password

Auto-generate password

Let me create the password

Initial password * *****

Groups and roles

Create

Creating a new user – LabUser1 under the Adatum Lab tenant

New user

Adatum Lab

[Got feedback?](#)

Roles User

Settings

Block sign in Yes No

Usage location United States

Job info

Job title System Administrator

Department IT

Company name

Manager No manager selected

Click Create.

Create

Setting the job title of the new user as System Administrator in IT department

Home > Adatum Lab > Users

Search (Ctrl+F) « + New user Download users Bulk operations Refresh Columns Delete Per-user MFA Preview features Got feedback?

All users (preview) Audit logs Sign-in logs Diagnose and solve problems

Manage Deleted users (preview) Password reset User settings

Search Add filter

2 users found Copy link to current view

	Display name	User principal name	User type	On-premises sy...	Identities	Company name
☐	LabUser1	LabUser1@adatumlab679578.onmicrosoft.com	Member	No	adatumlab679578.onmicrosoft.com	
☐	odl_user_679578@azureho138...	odl_user_679578...	Member	No	ExternalAzureAD	

New user listed under the new tenant.

LabUser1

User

Search (Ctrl+F) « Delete Refresh Reset password Revoke sessions Got feedback?

Overview Audit logs Sign-in logs Diagnose and solve problems

Manage Assigned roles Administrative units Groups Applications Licenses Devices Azure role assignments Authentication methods Troubleshooting + Support

Overview Monitoring Properties

Basic info

User principal name	LabUser1@adatumlab679578.onmicrosoft.com	Group member...	0
Object ID	98153508-d831-45b5-9c2c-fa20282283ed	Applications	0
Created date time	Jul 8, 2022, 9:14 PM	Assigned roles	0
User type	Member	Assigned licenses	0
Identities	adatumlab679578.onmicrosoft.com		

My Feed

Account status

Enabled

Edit

B2B collaboration

Convert this internal user to be a B2B user.

Manage (resend invitation / reset status)

Copying user principal name to the clipboard

Portal settings | Directories + subscriptions

Search menu

Directories + subscriptions

Appearance + startup views

Language + region

My information

Signing out + notifications

Useful links
Learn more about settings of
Safelist URLs of
Microsoft partner network
Privacy Statement of
More Azure resources
Provide feedback

All services and resources across the Azure portal will inherit the selection from basic filtering. Your selection will also be saved and reloaded the next time you sign in or reload the Azure portal.

Default subscription filter

No subscriptions in Adatum Lab directory - Switch to another directory.

Advanced filters

Directories

Switching directories will reload the portal. The directory you choose will impact the subscription, resource group, and region filters that are available in the portal. [Learn more about directories.](#)

Current directory : Adatum Lab

Startup directory : Last visited ([change](#))

Favorites All Directories

Search

Directory name	Domain	Directory ID
Adatum Lab	Current	adatumlab679578.onmicrosoft.com
Adatum Corporation	Switch	azurehol1389.onmicrosoft.com

Click Switch

Switching back to the default Azure AD tenant

Home > Adatum Corporation >

Users

Search (Ctrl+F)

+ New user Download users Bulk operations Refresh Columns Delete Per-user MFA Preview features Got feedback

+ Create new user

+ Invite external user

Click Invite external user.

Display name	User principal name	User type	On-premises sy...	Identities	Company name
CloudLabs Admin	admin@azurehol1...	Member	No	azurehol1389.onmicrosoft.com	
ODL_User_679578	odl_user_679578...	Member	No	azurehol1389.onmicrosoft.com	
User1	User1@azurehol1...	Member	No	azurehol1389.onmicrosoft.com	
User2	User2@azurehol1...	Member	No	azurehol1389.onmicrosoft.com	

Copy link to current view

Adding new user under the default tenant by selecting the option to Invite external user.

Home > Adatum Corporation > Users >

New user

Adatum Corporation

Got feedback?

Identity

Name

Email address

First name

Last name

Personal message

Invite

Click to scroll.

Completing profile for guest user

New user

Adatum Corporation

[Got feedback?](#)

Roles User

Settings

Block sign in Yes No

Usage location United States

Job info

Job title Lab Administrator

Department IT

Company name

Manager No manager selected

Click Invite.

Invite

Completing profile and inviting new user under the default tenant

+ New user ▾ | Download users | Bulk operations ▾ | Refresh | Columns | Delete | Per-user MFA | Preview features |

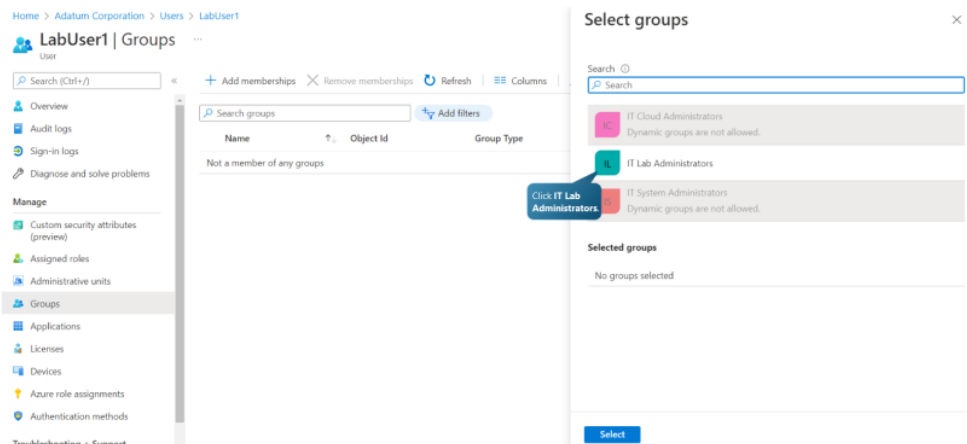
Search Add filter

5 users found Copy link to clipboard

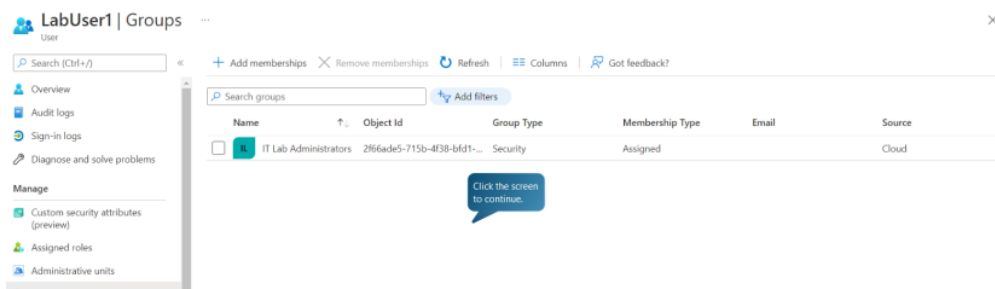
☐	Display name ↑	User principal name	User type	On-premises sy...	Identities	Compi
☐	 CloudLabs Admin	admin@azurehol1...	Member	No	azurehol1389.onmicrosoft.com	
☐	 LabUser1	LabUser1_adatum...	Guest	No	azurehol1389.onmicrosoft.com	
☐	 ODL_Us...	odl_user_679578...	Member	No	azurehol1389.onmicrosoft.com	
☐	 User1	User1@azurehol1...	Member	No	azurehol1389.onmicrosoft.com	
☐	 User2	User2@azurehol1...	Member	No	azurehol1389.onmicrosoft.com	

Click LabUser1.

Guest user account added to default tenant users list



Adding LabUser1 to the IT Lab Administrators group under the default tenant Adatum Corporation



User added to the IT Lab Administrators group

For a user to become a Global user, the user must be assigned a role Global Reader

Task E: Cloud Governance Strategy and Policy

² What cloud governance strategy is and analyse how Microsoft Azure can help Aspire Retailer to secure access of cloud resources?¹⁴

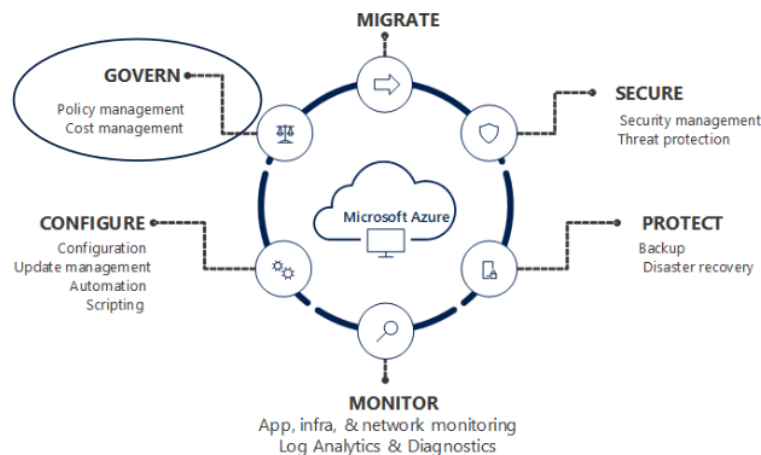


Figure 2: Areas of cloud management required to maintain an application or resource
Source: Microsoft.com

Governance offers mechanisms and protocols for controlling organization's Azure applications and resources. It entails organising initiatives and establishing strategic priorities. Governance in Azure is implemented predominantly through two services. Azure Policy enables the creation, assignment, and management of policy definitions to enforce norms for resources. This feature ensures that these resources adhere to your organization's standards. Azure Cost Management enables the organization to monitor cloud consumption and expenses for Azure and other cloud providers.

Azure Policy⁸ facilitates the enforcement of organisational standards and compliance assessment at scale. Through its compliance dashboard, it provides an aggregated view to evaluate the environment's overall state, with the ability to filter down to the per-resource, per-policy level. In addition, it helps bring resources into conformance through remediation in bulk for existing resources and remediation on demand for new resources. Implementing governance for resource consistency, regulatory compliance, security, cost, and administration are typical use cases for Azure Policy.

Specifically, the organization can enforce the following governance actions with Azure Policy:²³

- Ensuring that your team only deploys Azure resources to permitted regions
- Enforcing the consistent use of tax³³ mic identifiers
- Demanding that diagnostic logs be sent to a Log Analytics workspace

¹⁶
¹⁴ "What are the Azure Management areas?", Microsoft.com, URL: <https://learn.microsoft.com/en-us/azure/governance/azure-management> (Accessed on: 18/07/2023)

Adatum Corporation | Properties

Search DOK

Enterprise applications

Devices

App registrations

Identity Governance

Application proxy

Custom security attributes (Preview)

Licenses

Azure AD Connect

Custom domain names

Mobility (MDM and MAM)

Password reset

Company branding

User settings

Properties

Security

Monitoring

Save Discard Got feedback?

Location

United States datacenters

Notification language

English

Tenant ID

90b64958-b13c-4f0e-93a8-24e0fef32766

Technical contact

amit@cloudlabs.ai

Global privacy contact

Privacy statement URL

Access management for Azure resources

ODL_User 681358 (odl_user_681358@azurehol1394.onmicrosoft.com) can manage access to all Azure subscriptions and management groups in this tenant. [Learn more](#)

Yes No

[Manage security defaults](#)

Activating Access Management for Azure Resources for a tenant

Management groups

Adatum Corporation

Search (Ctrl+F)

Overview

Get started

Settings

Use management groups to group subscriptions. Click on an existing group to drill in, view details and govern resources. Right-click on any subscription or management group to launch quick actions. Click the "Get Started" tab to learn more.

No management groups to display

Organize your subscriptions into groups called "management groups" to help you manage access, policy and compliance across your subscriptions. Management groups give you enterprise-grade management at a large scale no matter what type of subscriptions you might have. [Learn more](#)

Start using management groups

Click Start using management groups

Using management groups

Home >

Management groups

Adatum Corporation

Search (Ctrl+/)

«

+ Create

+ Add subscription

Use management groups to group subscriptions. Click the "Get Started" tab to learn more.

Search by name or ID

Showing 1 subscriptions in 1 groups

↑↓ Name

▼ Tenant Root Group

Azure HOL 1394

Create management group

Create a new management group to be a child of 'Tenant Root Group'

Management group ID (Cannot be updated after creation) *

az104-02-mg1

Management group display name

az104-02-mg1

Click Submit.

Submit

Cancel

Creating a new management group

Home > Management groups > az104-02-mg1

az104-02-mg1 | Subscriptions

Management group

Search (Ctrl+/)

«

+ Add

Refresh

Feedback

Search by name or ID

Showing 0 out of 0 subscriptions

□

Name

Add subscription

Move an existing subscription to be a child of 'az104-02-mg1'

Subscription *

Azure HOL 1394 (5f4e4c5a-3646-44f4-6b6f-f66d1b7ff6d)

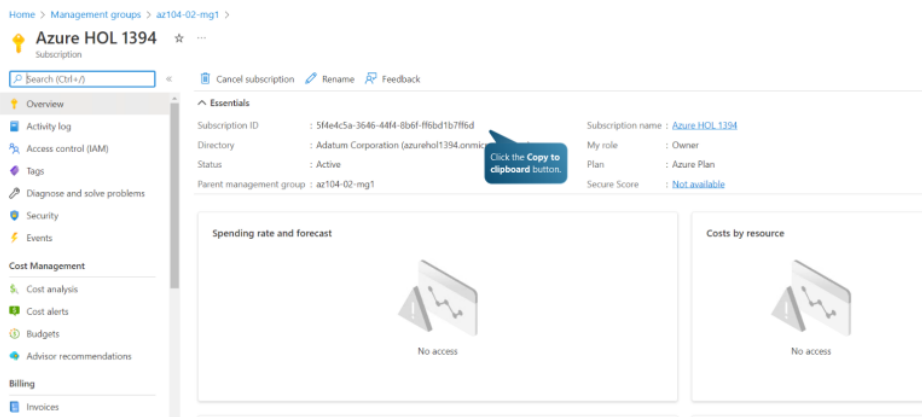
Moving a management group or subscription to be under a different management group may change policies that are applied.

Click Save.

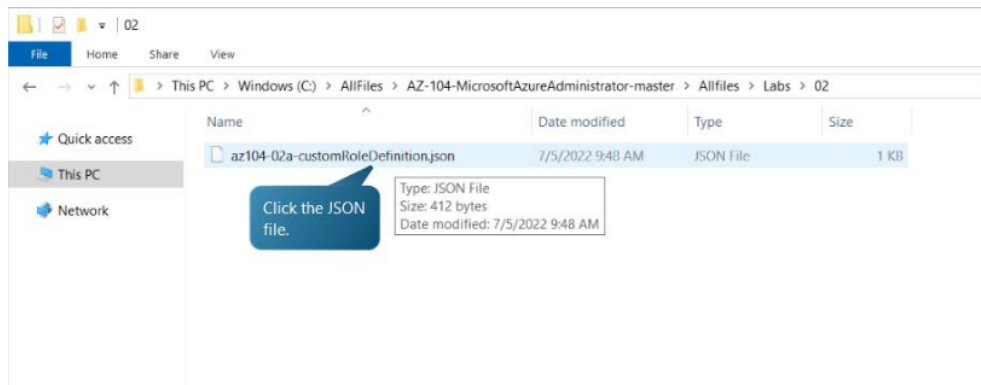
Save

Cancel

Adding a subscription to a new management group



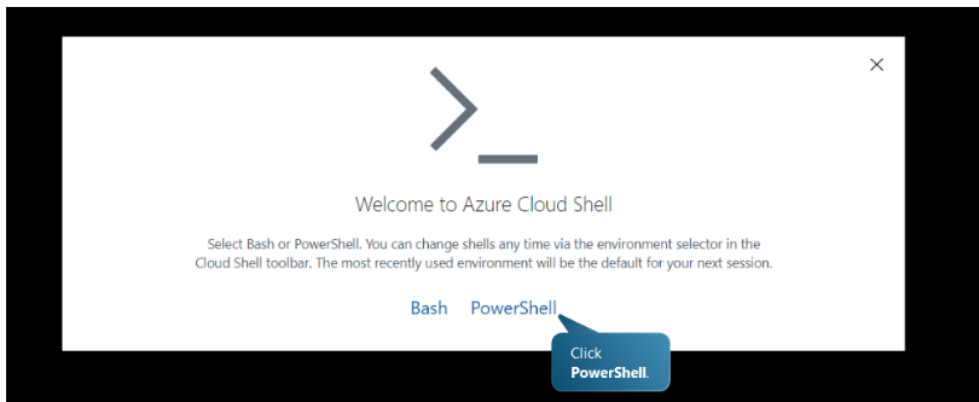
Copying the subscription ID of the subscription in the new management group



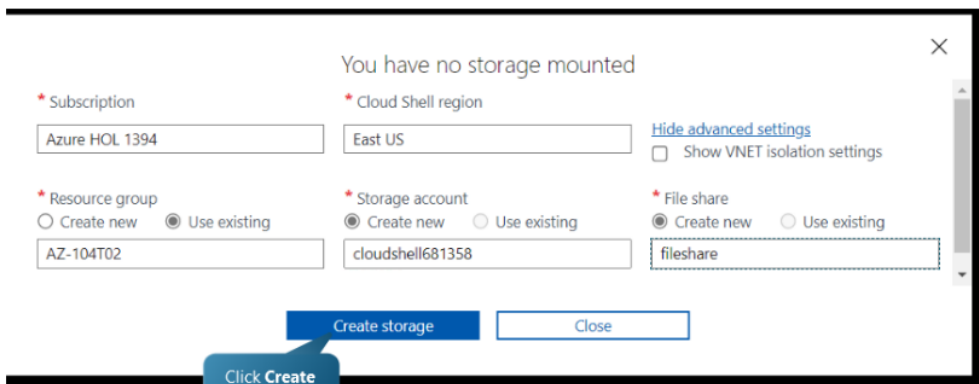
Opening a role definition JSON file in notepad



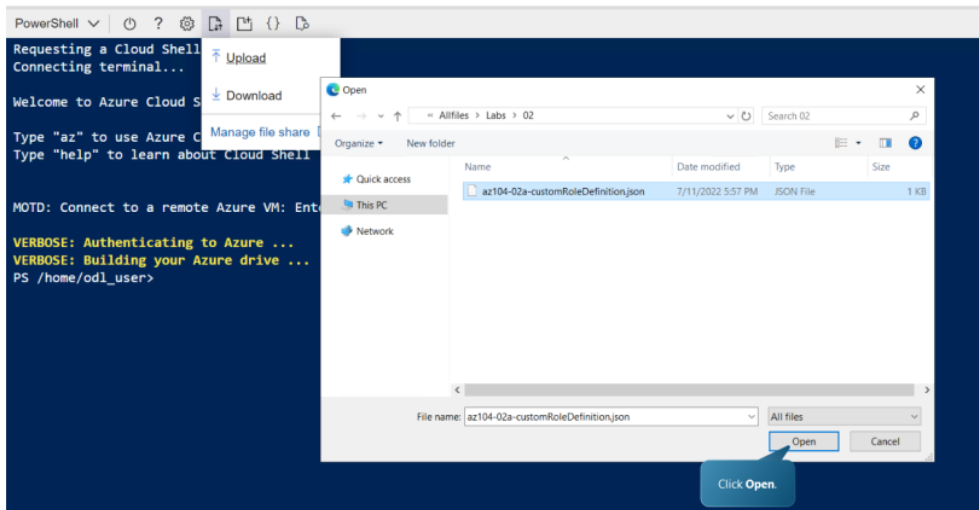
Replacing the subscription ID placeholder with the subscription ID copied previously and saving the file



Opening Azure Cloud Shell and selecting the PowerShell option



Creating storage since there is no storage mounted



Opening the JSON file with the newly saved subscription ID in PowerShell

```
MOTD: Connect to a remote Azure VM: Enter-AzVM

VERBOSE: Authenticating to Azure ...
VERBOSE: Building your Azure drive ...
PS /home/odl_user> New-AzRoleDefinition -InputFile $HOME/az104-02a-customRoleDefinition.json

Name           : Support Request Contributor (Custom)
Id             : 5b6a8dd7-01d5-4fc6-a824-c9392c5b4295
IsCustom       : True
Description    : Allows to create support requests
Actions        : {Microsoft.Resources/subscriptions/resourceGroups/read, Microsoft.Support/*}
NotActions     : {}
DataActions    : {}
NotDataActions : {}
AssignableScopes : {/providers/Microsoft.Management/managementGroups/az104-02-mg1, /subscriptions/5f4e4c5a-3646-44f4-8b6f-ff6bd1b7ff6d}

PS /home/odl_user>
```

Running a command to create the custom role definition

Assigning RBAC (Role-Based Access Control) roles

New user

Adatum Corporation

Got feedback?

Identity

User name *

User1 ✓

@ azurehol1394.onmicrosof...

The domain name I need isn't shown here

Name *

User1 ✓

First name

Last name

Password

☐ Auto-generate password

☒ Let me create the password

Initial password *

***** ✓

Groups

Click Create.

Create

Creating a new user

User1

User

Delete

Refresh

Reset password

Revoke sessions

Got feedback?

Overview

Audit logs

Sign-in logs

Diagnose and solve problems

Manage

Custom security attributes (preview)

Assigned roles

Administrative units

Groups

Applications

Licenses

Devices

Azure role assignments

Authentication methods

Overview

Monitoring

Properties

Basic info

User principal name

User1@azurehol1394.onmicrosoft.com

Group member...

0

Object ID

4f90d793-2160-4e90-b25e-a2b6eea9672d

Applications

0

Created date time

Jul 11, 2022, 6:27 PM

Assigned roles

0

User type

Member

Assigned licens...

0

Identities

azurehol1394.onmicrosoft.com

My Feed

Account status

Enabled

Edit

Sign-ins

Last sign-in: -- --

See all sign-ins

Copying the user principal name

Management groups

Adatum Corporation

Create

Add subscription

Refresh

Expand / Collapse all

Export to CSV

Feedback

Overview

Get started

Settings

Use management groups to group subscriptions. Click on an existing group to drill in, view details and govern resources. Right-click on any subscription or management group to launch quick actions. Click the "Get Started" tab to learn more.

Showing 1 subscriptions in 2 groups

Name	ID	Total subscriptions
Tenant Root Group	90b64958-b13c-4f0e-93a6-24e0ef32766	1
az104-02-mg1	az104-02-mg1	1

Selecting the previously created management group

az104-02-mg1 Management group

Search (Ctrl+/) Create Add subscription Refresh Rename group Delete Move Expand / Collapse all Feedback

Overview Subscriptions Resource Groups Resources Activity Log Access control (IAM)

Click Access control (IAM).

Essentials

Name : az104-02-mg1
ID : az104-02-mg1
Access Level : Owner
Path : Tenant Root Group / az104-02-mg1

Parent management group : Tenant Root Group
Child management groups : 0
Total subscriptions : 1

Showing 1 subscriptions in 1 groups

Name	ID	Total subscriptions
az104-02-mg1	az104-02-mg1	1
Azure HOL 1394	5f4e4c5a-3646-44f4-8b6f-f6bd1b7ff6d	

Selecting Access Control (IAM)

az104-02-mg1 | Access control (IAM) Management group

Search (Ctrl+/) Add Download role assignments Edit columns Refresh Remove Got feedback?

Overview Subscriptions Resource Groups Resources Activity Log Access control (IAM)

Click Add role assignment.

Add role assignment
Add co-administrator
Add custom role

View my level of access to this resource.
View my access

Check access
Review the level of access a user, group, service principal, or managed identity has to this resource. Learn more

Find
☒ User, group, or service principal
☐ Managed identity

Search by name or email address

Grant access to this resource
Grant access to resources by assigning a role.
Add role assignment Learn more

View access to this resource
View the role assignments that grant access to this and other resources.
View Learn more

View deny assignments

Selecting Add Role Assignment

Add role assignment

[Got feedback?](#)

[Role](#) [Members](#) [Review + assign](#)

A role definition is a collection of permissions. You can use the built-in roles or you can create your own custom roles. [Learn more](#)

Support

Type: All

Category: All

Showing 4 of 345 roles

Name	Description	Type	Category	Details
Quota Request Operator	Read and create quota requests, get quota request status, and create support tickets.	BuiltInRole	Management + Gover...	View
Resource Policy Contributor	Users with rights to create/modify resource policy, create support ticket and read resources/hierarchy.	BuiltInRole	Management + Gover...	View
Support Request Contributor	Lets you create and manage Support requests	BuiltInRole	Management + Gover...	View
Support Request Contributor (Custom)	Allows to create support requests	CustomRole	None	View

Click Support Request Contributor (Custom).

Searching and selecting the Support Request Contributor Custom Role which allows to create support requests

[Home](#) > [Management groups](#) > [az104-02-mgt1](#) >

Add role assignment

[Got feedback?](#)

[Role](#) [Members](#) [Review + assign](#)

Selected role Support Request Contributor (Custom)

Assign access to ☒ User, group, or service principal ☐ Managed identity

Members [+ Select members](#)

Name	Object ID	Type
No members selected		

Description Optional

[Review + assign](#) [Previous](#) [Next](#)

Select members

Select

User1@azurehd1394.onmicrosoft.com

User1
User1@azurehd1394.onmicrosoft.com

Click User 1.

Selected members:
No members selected. Search for and add one or more members you want to assign to the role for this resource.

[Learn more about RBAC](#)

[Select](#) [Close](#)

Searching for and selecting the newly created user

Add role assignment ...

 Got feedback?

Role Members Review + assign

Role Support Request Contributor (Custom)

Scope /providers/Microsoft.Management/managementGroups/az104-02-mg1

Members	Name	Object ID	Type
	User1	4f90d793-2160-4e90-b25e-a2b6eea9672d	User

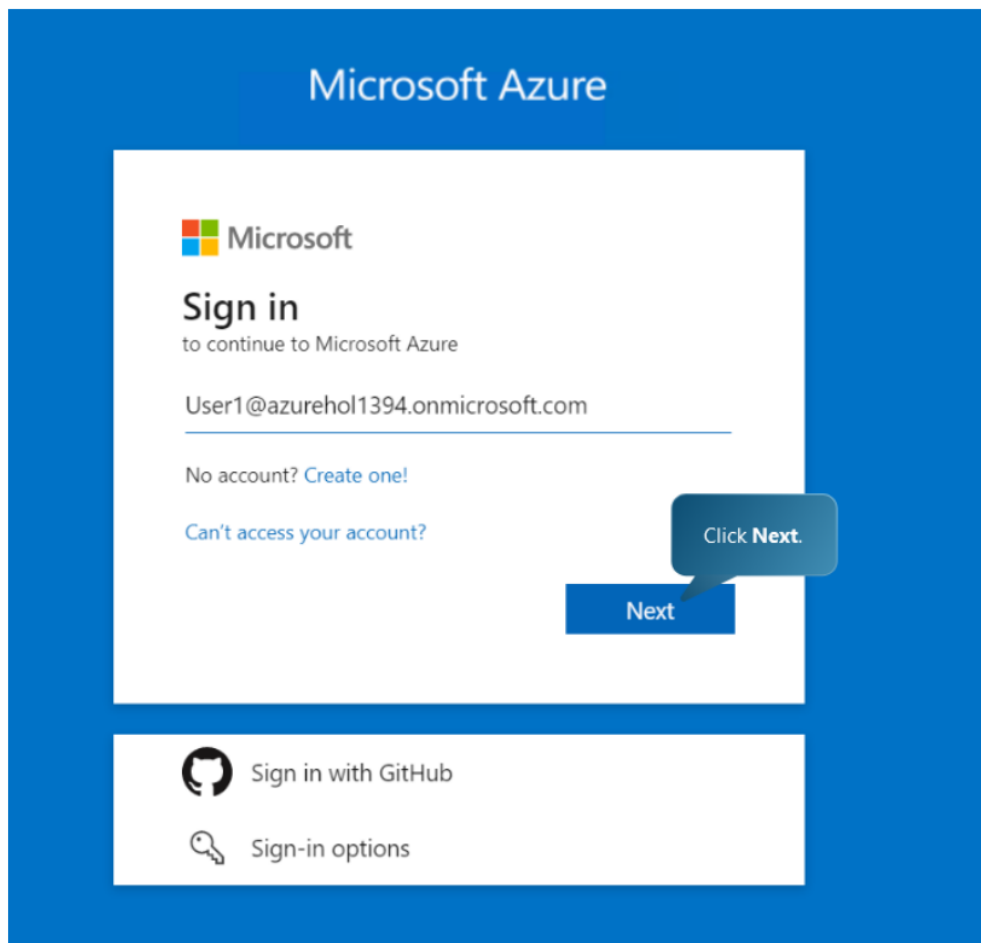
Description No description

Click Review + assign.

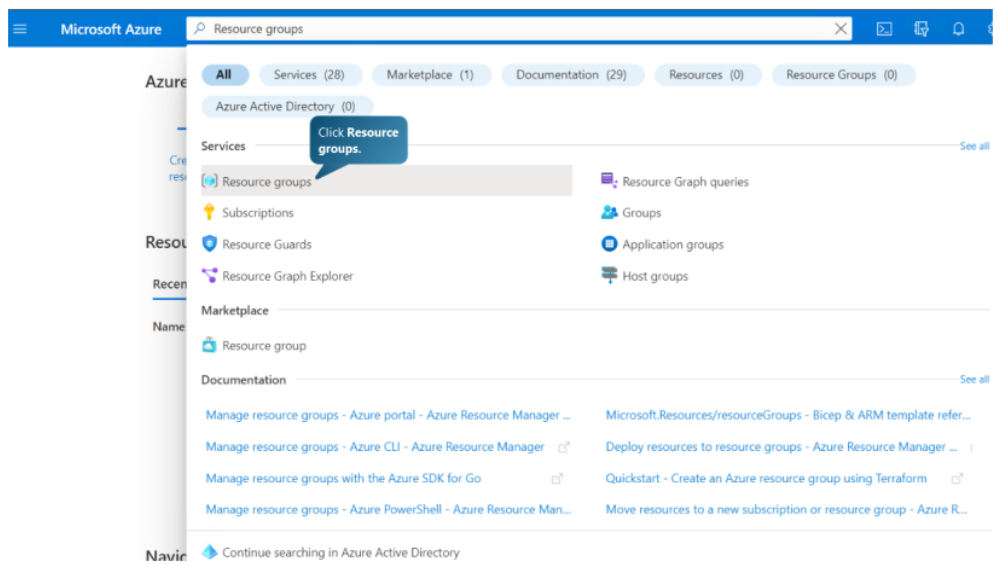
Review + assign

Previous

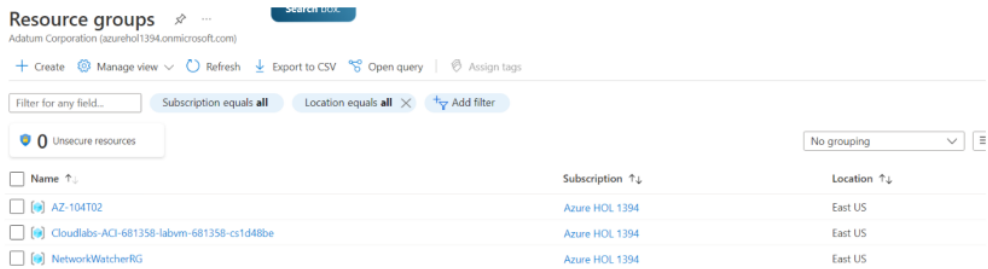
Reviewing and assigning the new role to the user account



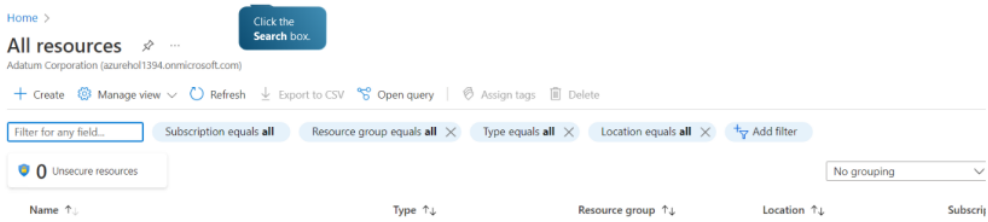
Signing into Azure Portal with the newly created principal ID



Selecting Resource Groups



The user is able to see all Resource Groups



The user cannot see any Resources

Home >

Help + support

Search (Ctrl+/) <<

Overview

Support

- All support requests
- Support Plans
- Service Health
- Advisor

Create a support request Choose the right support plan

Click Create a support request.

Service health

No Azure service issue detected. [View service health](#)

Have an issue with your resource?

Select Troubleshoot to get targeted solutions for your recently visited resource.

Name	Type	Last viewed
No recently visited resources		

Recent support requests

Title	ID	Created	Subscription	Resource Ty...	Updated	Status
No recent support requests						

Navigating to Help + Support and selecting to Create a support request

New support request

1. Problem description 2. Recommended solution 3. Additional details 4. Review + create

Tell us your issue, and we'll help you resolve it.

Provide information about your billing, subscription, quota management, or technical issue (including requests for technical advice).

Summary *	Service and description limits ✓
Issue type *	Service and subscription limits (quotas) ▼
Subscription *	Azure HOL 1394 (5f4e4c5a-3646-44f4-8b6f-ff6bd1b7ff6d) ▼ Can't find your subscription? Show more ⓘ
Quota type *	Active Directory ▼

The user is able to create a Subscription specific support request

Suggest at least one policy to assist the Aspire Retailers¹⁵

For security reasons, Aspire Retailers can apply a lock on Azure subscription, resource group, or resource so that they are protected against modification or deletion by accident.

Administrators can restrict a subscription, resource group, or resource to prevent accidental deletions or modifications. The safeguard supersedes any user privileges.

The administrator can establish barriers to prevent deletions or modifications. These restrictions are labelled Delete and Read-only in the portal. These restrictions are referred to in the command line as *CanNotDelete* and *Readonly*.

CanNotDelete indicates that authorised users may read and modify a resource but cannot eliminate it.

ReadOnly indicates that authorised users can view a resource but cannot modify or delete it. This restriction is analogous to restricting all authorised users to the permissions provided by the Reader role.

Management locks, unlike role-based access control (RBAC), impose a restriction to all users and roles.

When a lock is applied to a parent scope, all child resources inherit the same lock. Even additional resources inherit the same parent lock. The inheritance's most restrictive lock takes precedence.

If there is a Delete lock on a resource and there is an attempt to delete its resource group, the entire delete operation is blocked. Even if the resource group or other resources within it are released, the resource is not deleted. There is no partial deletion.

When a subscription is terminated in Azure:

- A resource restriction does not prevent cancellation of a subscription.
- Azure preserves the resources by deactivating them rather than deleting them immediately.
- Azure only irrevocably deletes the resources after a waiting period.

¹⁰ "Lock your resources to protect your infrastructure", Microsoft.com, URL: <https://learn.microsoft.com/en-us/azure/azure-resource-manager/management/lock-resources?tabs=json> (Accessed on 18/07/2023)

¹⁵ "Lock your resources to protect your infrastructure", Microsoft.com, URL: <https://learn.microsoft.com/en-us/azure/azure-resource-manager/management/lock-resources?tabs=json> (Accessed on 18/07/2023)

Task F: Disaster Recovery Plan

Disaster Recovery is a set of procedures, ²⁸ policies, and tools in place to assure business continuity in the event of a power outage, cyberattack, natural disaster, or infrastructure failure. Any cause of system failure can result in data loss and a negative end-user experience.

Recommended Disaster Strategy for Aspire Retailers can include the following actions:

- Identify important systems
- Determine RTO and RPO values for each system.
- Determine potential hazards to each system or system group.
- Develop a preventive measure
- Formulate a response plan
- People involvement
- Evaluate the target site or premises
- Describe the essential requirements

RPO

A **recovery point objective** is intended to serve as a goal. The RPO is the utmost period of time that data (transactions) may ³¹ be lost from an IT service as a result of a major incident. The RPO is the utmost acceptable data loss duration during a disaster. With an hourly database backup or file server application, the RPO is sixty minutes.

²⁰ **RTO**

The **recovery time objective** (RTO) is the duration of time and service level within which a business process must be restored following a disaster. For instance, if the RTO is unavailable ¹⁴ for more than 30 minutes, the application ¹⁴ must be restored to a running state within 30 minutes of the onset of a calamity. In the event of a low RTO, we must have a standby operating a DR site to prevent any outages.

Conclusion

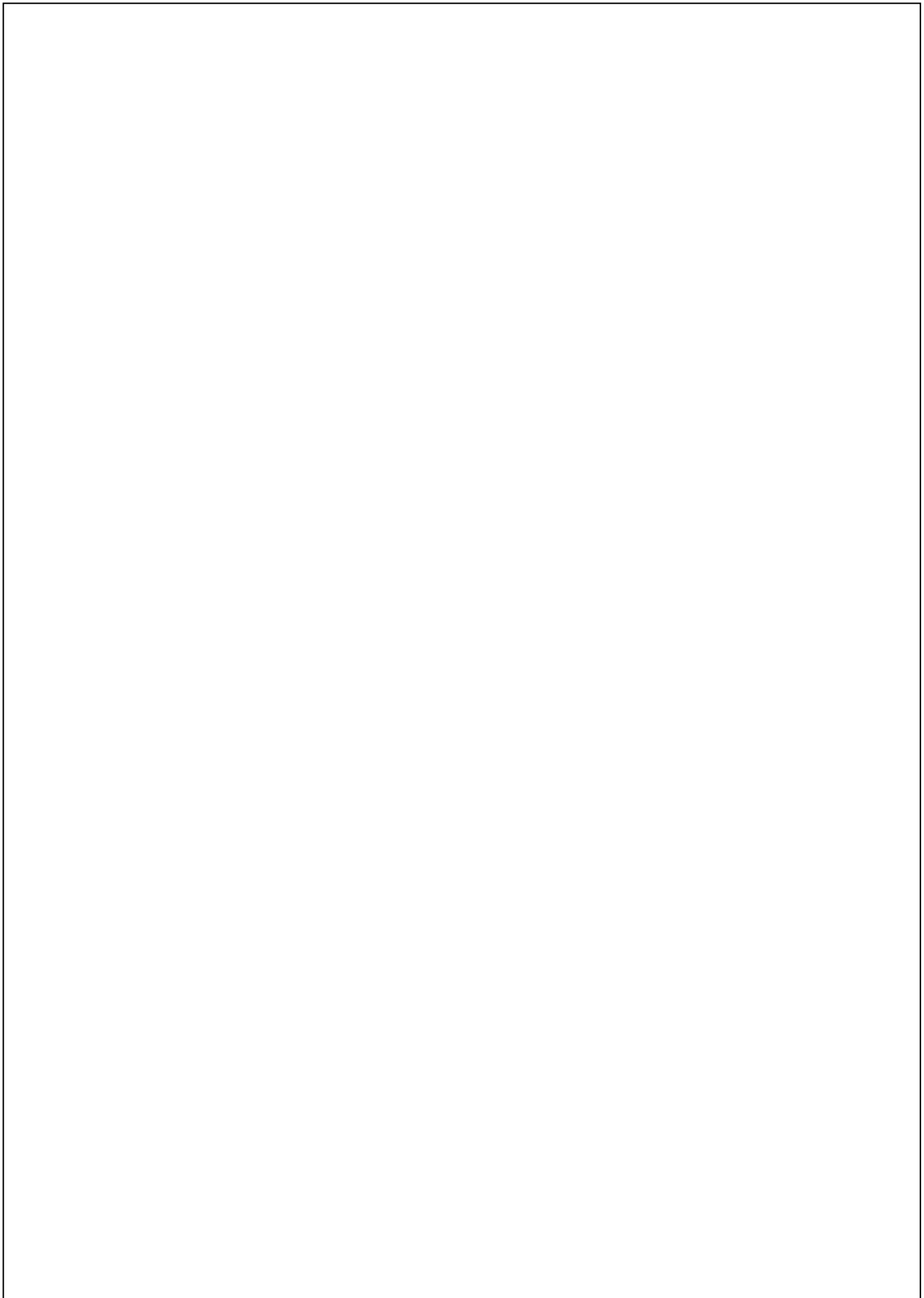
Aspire Retailers has decided to move to the cloud due to the wide variety of benefits that the cloud platforms offer. In addition to cost of ownership reduction, the cloud services present a very convenient platform for organizations to optimize their IT processes by using the scalability and elasticity of the cloud.

As this report has shown, using the Azure cloud services has proven to be more affordable than using on-site premises for IT infrastructure. Moreover, the Azure governance (and especially the RBAC) capabilities of the cloud allow organizations to manage the users of the cloud and set boundaries of access for different roles.

Last but not least, it is important for every organization using cloud services to adopt a Disaster Recovery Strategy in case of an unexpected event.

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