SSC Azure Guardrail Implementation Guide

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DOCUMENT APPROVALS

The signing authorities below concur with the conditions and responsibilities specified within this document.

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DOCUMENT HISTORY

History of Changes

Ver. #	Date	Consulted/Reviewers (name of individual & working group consulted)	Brief description of Change	Author of Change
v0.1	2020-02-24	Azure Design Team (CSD)	Initial Release for VDC	
0.21	2020-02-24	Azure Design Team (CSD)	Updated 3.2 with Whitelisting reference	
0.22	2020-04-14	Azure Design Team (CSD)	Updated section 4. Added Annex D.	
0.3	2020-04-17	Azure Design Team (CSD)	Updated section 3- 6	
0.4	2020-04-27	Azure Design Team (CSD)	Peer Review	
0.5	2020-04-28	Azure Design Team (CSD)	Updated Section 3 with controls #	
0.6	2020-04-29	Azure Design Team (CSD)	Updated GR5	
0.7	2020-04-30	Azure Design Team (CSD)	Peer Review	
0.8	2020-04-30	Azure Design Team (CSD)	Updated section 5 for GR10	
0.9	2020-05-11	Azure Design Team (CSD)	Included 163dev feedback	
0.10	2020-05-22	Azure Design Team (CSD)	Included additional 163dev feedback	
0.11	2020-05-27	Azure Design Team (CSD)	Included additional ASC and LAW steps	
0.12	2020-05-29	Azure Design Team (CSD)	Included feedback from GAC	

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1 OVERVIEW

This implementation guide provides the details of the Azure Cloud Guardrails used to meet PBMM compliance within the Microsoft Landing Zone Virtual Data Center (VDC). It includes prescriptive guidance for establishing a secure baseline configuration within Azure in alignment with TBS mandated 30-day guardrails for PBMM compliance. The Guardrail implementation strategy follows an iterative approach to security and governance through a mix of CSP Policy, Infrastructure as Code (IaC), manual configuration, automation, and people/process. This document will be expanded to include security control definitions and implementation details on the 90, and 180-day guardrails defined to meet GC longer term PBMM compliance.

Departments using the GC PBMM contacts through the SSC Cloud Service Broker must complete a series of onboarding checkpoints to prove cloud security controls are in place. The mandatory security controls are required to maintain an Authority to Operate (ATO) and enforce the security architecture required for PBMM. The timeline uses the concept of security overlays as follows:

- ***30 day:*** *High-priority technical security controls are implemented as part of the GC 30-day guardrails to onboard a secure tenant architecture in the cloud to achieve tenant Interim ATO.*

- ***90 day:*** *Security controls to validate additional security mechanisms of the tenant environment (people, processes, policies, procedures, operations, ITSM, physical, personnel, etc.) and achieve tenant ATO.*

- ***180 day:*** *Security controls to secure onboarding and ATO of application workloads and additional low-priority security controls and security control enhancements identified as part of the GC-approved Azure profile with a total of 134 ITSG-33 security controls. This includes the full set of controls required for DevSecOps onboarding of new applications.*

SSC Cloud Operations are only responsible for the evaluation of the 30-day Guardrails. Detailed scope and procedures for validating the 90-day and 180-day Guardrails are still being evaluated within the Government of Canada.

The SSC Azure Landing Zone (LZ) design artifacts implement a Virtual Data Center with many of these security controls built-in to accelerate the Security Assessment and Authorization (SA&A) process. Following the Azure LZ approach will help to avoid duplication of effort for GC departments to get up and running in Azure. The design does not remove the requirement for departments to follow their own SA&A processes, the goal is to leverage a common architecture where possible to minimize the time and cost to achieve PBMM certification. Application design and data classification is out of scope of the Landing Zone initiative.

1.1 PURPOSE

This document provides implementation specifics of the SSC Azure 30-Day Guardrail Implementation for the Azure Virtual Data Center (VDC). It is broken down into five sections that must all be implemented to an Azure Tenant in order be compliant for the 30-Day Guardrail verification. Sections 2 – 5 detail how to implement the different components of the 30-Day Guardrails. Appendix A provides a step-by-step, with examples, of the required evidence for the Azure Active Directory component.

1.2 GC Cloud Governance

A base structure is defined that allows for governance while supporting flexibility to meet departmental business and technical requirements. The following proposal has been developed in discussion with TBS, SSC, CSE, and Vendors:

- **Application of Governance Frameworks:** The implementation and maintenance of the cloud governance framework is dependent on well documented Cloud Guardrail configuration, compliance monitoring and reporting.
- **Azure Blueprints and Policy:** Provide built-in compliance controls on areas like compute, network and various other Azure services.
- **Resource Management:** Quickly find resources associated with specific workloads, environments, ownership groups, or other important information. Resource identification is critical to assigning organizational roles and access permissions for resource management.
- **Automation:** In addition to making resources easier for IT to manage, automation is a key component of deploying and securing the environment.
- **Compliance Reporting:** Tenant owner and security personnel need to be aware of cloud resource compliance.

1.3 Document Reference

GC-Docs Azure Virtual Data Centre project repository (contact CSD Cloud Management Office for read access)

https://gcdocs.gc.ca/ssc-spc/llisapi.dll/open/61082429

The following links reference additional support material used in the development of this design.

Document Title	Description / Link
Signed CSD-Scope Statement Microsoft Landing Zone Prototype & ConOps.pdf	Microsoft Landing Zone (LZ) Project scope https://gcdocs.gc.ca/ssc-spc/llisapi.dll/open/44491286
Azure Governance Framework Draft v0.1.docx (work in progress)	
SSC Naming and Tagging Standard for Azure	https://gcdocs.gc.ca/ssc-spc/llisapi.dll/open/72288894
Azure Whitelisting	https://gcdocs.gc.ca/ssc-spc/llisapi.dll/open/71440075
Government of Canada Cloud Guardrails	https://gcdocs.gc.ca/ssc-spc/llisapi.dll/open/67925334
Azure Emergency Access Procedure template	https://gcdocs.gc.ca/ssc-spc/llisapi.dll/open/72824320
Cloud usage profiles	https://gcdocs.gc.ca/ssc-spc/llisapi.dll/open/72829765
Office 365 Security Baseline Configuration Controls	https://gcdocs.gc.ca/ssc-spc/llisapi.dll/open/70457657
CBS Overview and Installation Instructions	https://gcdocs.gc.ca/ssc-spc/llisapi.dll/open/73032410

Table 1: Document Reference List

1.4 GUARDRAIL MAPPINGS

Guardrail	Location where implemented
Guardrail 1: Protect Root / Global Admins Account	Manual Implementation. See Section 3.1
Guardrail 2: Management of Administrative Privileges	Manual Implementation. See Section 3.2
Guardrail 3: Cloud Console Access	Manual Implementation. See Section 3.3
Guardrail 4: Enterprise Monitoring Accounts	Manual Implementation. See Section 3.4
Guardrail 5: Data Location	Enforced thru implementation of the PBMM policies. See Section 2
Guardrail 6: Protection of Data-at-Rest	Manual Implementation. See Section 2
Guardrail 7: Protection of Data-in-Transit	Manual Implementation. See Section 2
Guardrail 8: Network Segmentation and Separation	As per design in Section 4
Guardrail 9: Network Security Services	As per design in Section 4
Guardrail 10: Cyber Defense Services	Manual Implementation. See Section 5
Guardrail 11: Logging and Monitoring	Manual Implementation. See Section 2.1.1
Guardrail 12: Configuration of Cloud Marketplaces	Enforced thru implementation of the Azure Whitelisting policies. See Section 2.4

Table 2: Map of Guardrails

2 AZURE POLICY IMPLEMENTATION FOR 30-DAY COMPLIANCE

Among other things, Azure Policy is a cloud service that enables implementation, enforcement, and auditing of the departmental cloud governance framework. In the context of the 30-Day Guardrails, policies are used to achieve compliance with the identified PBMM mandatory security controls. This section outlines the policy implementation process within the SSC Azure Landing Zone VDC environment. Three implementation options have been evaluated:

- Manually configuring Azure policy through the portal and code.
- Leveraging the TBS GitHub repository for cloud guardrails @ https://github.com/canada-ca/cloud-guardrails-azure .
- Customizing the Canada Federal PBMM Blueprint provided by Microsoft to align with 30-Day guardrail compliance (***recommended***).

2.1 CANADA FEDERAL PBMM BLUEPRINT

Microsoft, in conjunction with TBS and SSC, have built a baseline blueprint for GC PBMM compliant policy deployment. This blueprint can be applied at either the Management Group or Subscription scopes within the Azure tenant environment. Through the Azure Portal, the Blueprint is created and saved at the appropriate scope. Figure 1 is an example of how SSC has designed their tenant hierarchy.

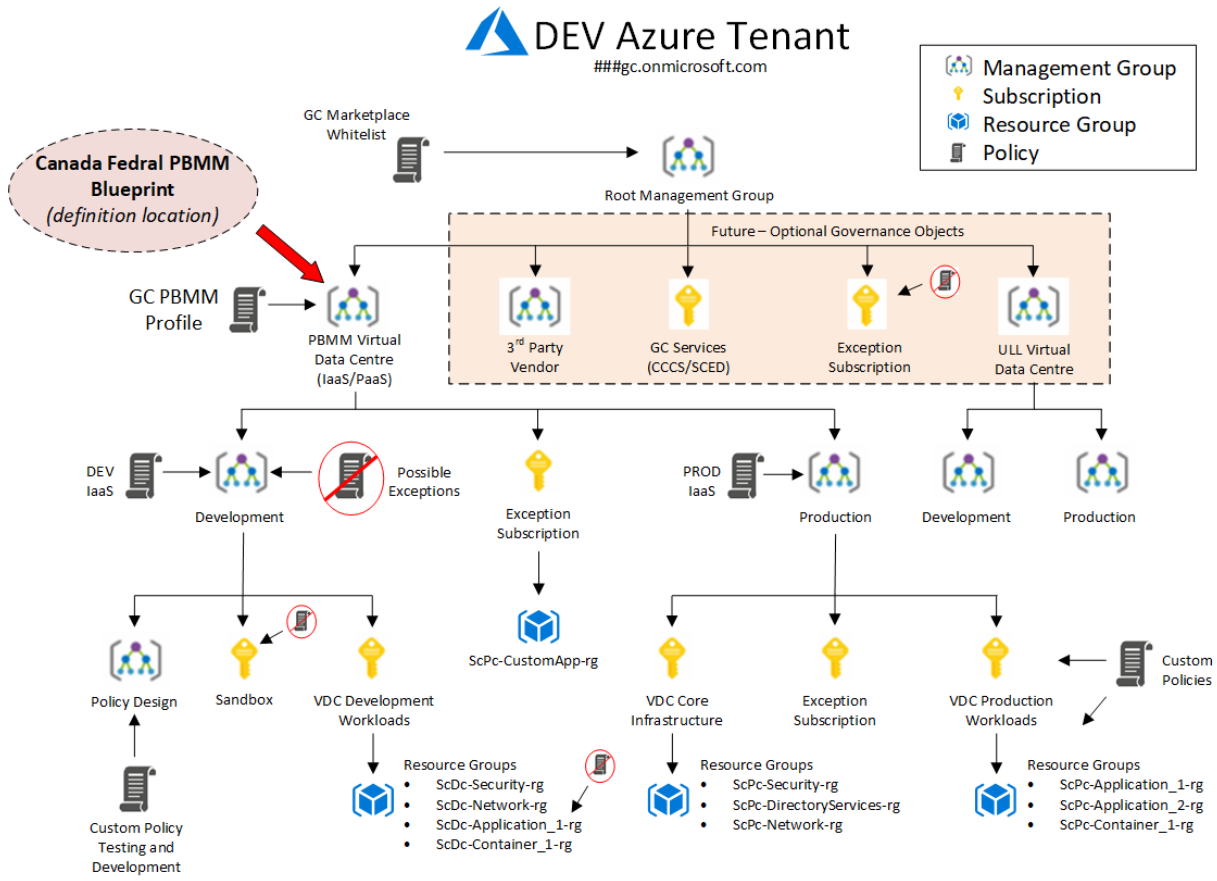


Figure 1: GC PBMM Blueprint Assignment

2.1.1 *IMPLEMENTATION PREREQUISITES*

The implementation process specified in this document leverage the Microsoft managed Canada Federal PBMM Blueprint. The Azure governance strategy and Cloud Adoption Framework is an evolving architecture that undergoes iterative reviews to ensure business requirements and security compliance concerns are addressed. This Azure Policy implementation guide is aligned with the Azure Governance Framework Technical Architecture Document (TAD) that has been developed as part of the Azure Landing Zone Base Cloud Architecture project, refer to the document references in section 1.3 for required artifacts.

Prior to deploying the PBMM Blueprint the following prerequisites are required:

- Azure Naming and Tagging standard for the Tenant.
- Azure Governance Hierarchy design for Management Groups, Subscriptions, and Resource Groups. Create the required governance objects.
- Determine the Blueprint *Definition Location* within the Azure hierarchy. As illustrated in the diagram above, the Blueprint is defined at the Azure Virtual Data Center management group level.
- Review Blueprint artifacts and add/remove polices as required (detailed below).
- Owner level access to the top level VDC Management Group, Global Admin on the Azure Tenant. If implementing the GC Whitelist policy, access is required to the root Management Group.
- A Log Analytics Workspace (LAW) for Security events and Resource Group in accordance with Naming and Tagging convention and the Azure Cloud Governance design.

  Security LAW:
  1) Create a Resource Group for the security monitoring LAW (XXXX-Core_LogAnalytics-rg).
  2) Create an automation account (XXXX-CoreSecurity-LogAnalytics-spn). Select “Create Azure Run As account”
  3) Create LAW (XXXXCLD-CoreSecurity-law)[1], Retention needs to be 2 years.
     1) Workspace summary, add, activity log analytics.
     2) Workspace summary, add, antimalware assessment
     3) Workspace summary, add, keyvault analytics
     4) Usage and estimated costs, Select Pay as you go and extend the retention to 730 days (2 years)
     5) Go to RG. Select the automation account, select update management, select the LAW and enable
     6) In the Azure AD tenant, select diagnostic setting. Click on Add diagnostic setting. Name is XXXX-Core_LogAnalytics-diags Select send to log analytics and select the LAW. Select audit logs, sigint logs

- A Log Analytics Workspace (LAW) for Health events and Resource Group in accordance with Naming and Tagging convention and the Azure Cloud Governance design.

  Health LAW:
  1) Create LAW (XXXXCLD-CoreHealth-law).
     1) Workspace summary, add, Azure Log Analytics Agent Health.
     2) Usage and estimated costs, Select Pay as you go and extend the retention to 90 days.

[1] Where XXXX refers to the 4 character code identifying the partner and the environment. For example ScPc would refer to SSC, Production environment deployed in Canada Central in accordance with the Naming and Tagging Standard

- Create a Policy Assignment/Exclusion table that defines the scope for the Blueprint policies based on the target cloud profile and the governance hierarchy.

Scope	Name	Blueprint/Policy	Type
Subscription	ScPc-PBMM VDC Core	Canada Federal PBMM Blueprint* Azure Security Center (ASC) Policy Initiative	Assignment
Subscription	ScPc-PBMM VDC Production	Canada Federal PBMM Blueprint* Azure Security Center (ASC) Policy Initiative	Assignment
Subscription	ScDc-PBMM VDC DevTest	Canada Federal PBMM Blueprint* Azure Security Center (ASC) Policy Initiative	Assignment
Subscription	ScSc-PBMM VDC Sandbox	Azure Security Center (ASC) Policy Initiative	Assignment
Resource Group	ScPc-VDC_Security_Core_ External-rg	Networks interfaces should not have Assign public IPs	Exception
		…complete table to align with departmental requirements	

Table 2: PBMM Policy Assignment/Exception Table

* Canada Federal PBMM Blueprint with SSC customization

2.1.2 *PBMM BLUEPRINT IMPLEMENTATION*

The PBMM Blueprint is deployed following the implementation steps defined by Microsoft at https://docs.microsoft.com/en-us/azure/governance/blueprints/samples/canada-federal-pbmm/deploy. The current blueprint consists of 14 policy definitions and the *[Preview]: Audit Canada Federal PBMM controls and deploy specific VM Extensions to support audit requirements* policy initiative. The policy initiative includes 68 policy definitions which are fixed but the single entry definitions can be edited. Review the list and customize the blueprint to meet the specific cloud profile as required. The PBMM Blueprint is implemented as defined below.

Follow the Microsoft deployment instructions at the link above with the following parameters:

- Create the blueprint and assign the location based on your VDC architecture.

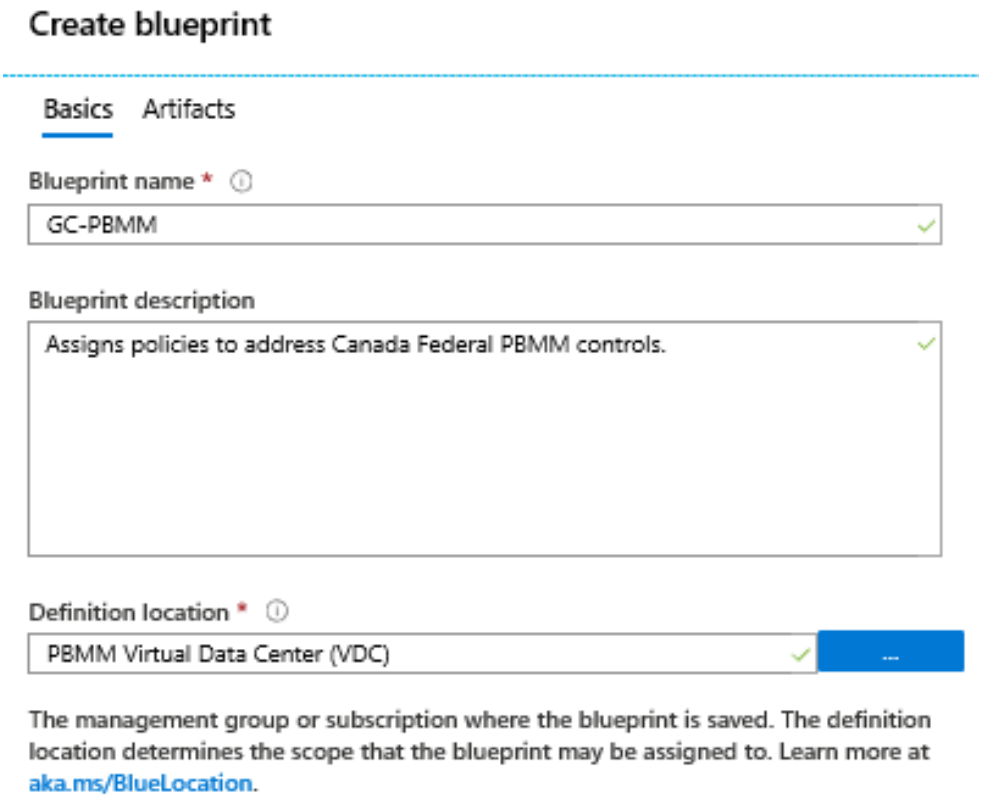


Figure 2: Create Blueprint

- Add or remove artifacts based on the 30-Day policy design. The VDC uses the default blueprint with one additional policy assignments added as illustrated below. Note that the “Audit Canada Federal…” policy assignment is the Microsoft configured ***initiative*** that cannot be edited. It can be removed and specific policy definitions can be cherry picked based on the cloud usage profile.

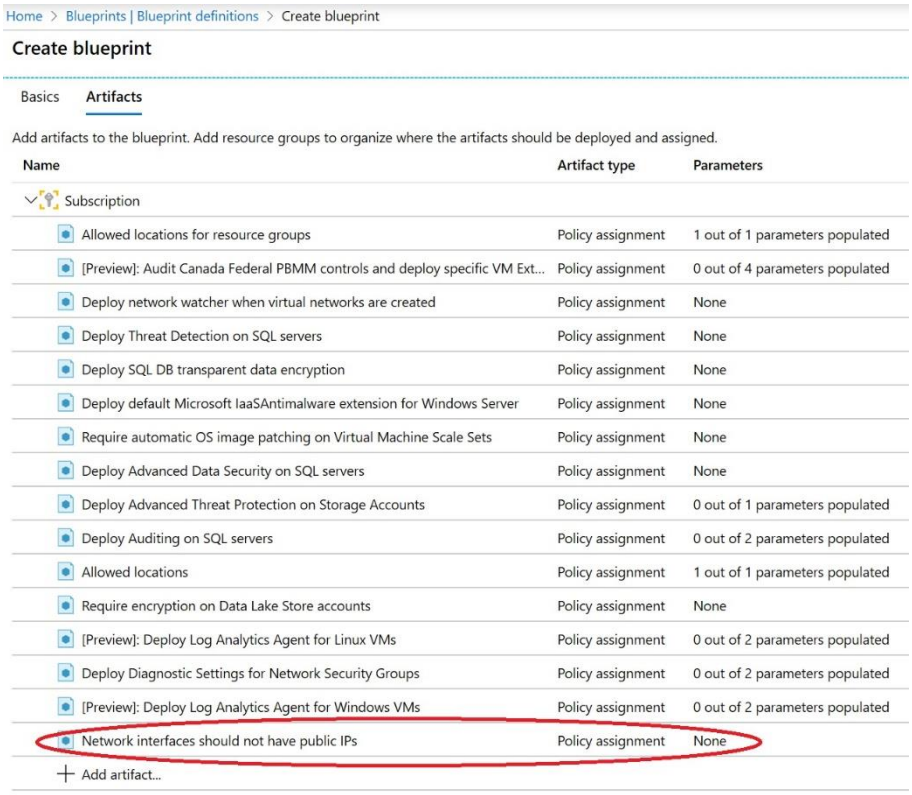


Figure 3: Blueprint Artifact List

- Publish the Blueprint

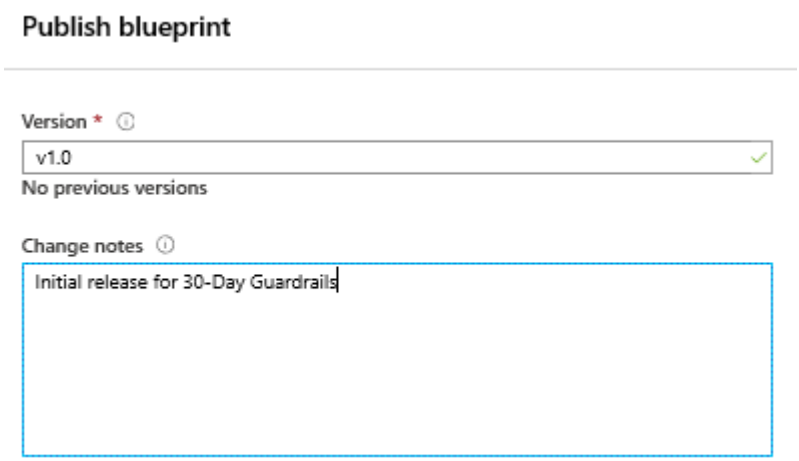
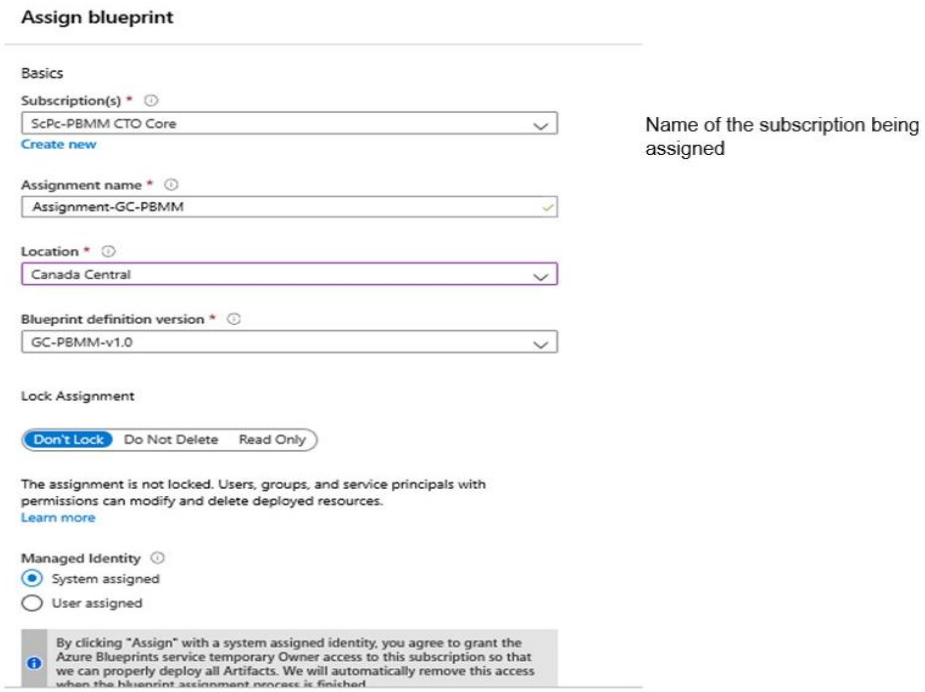


Figure 4: Publish Blueprint

- Assign the Blueprint based on Policy Assignment/Exclusion table created for the Virtual Data Center. Follow steps provided by Microsoft.



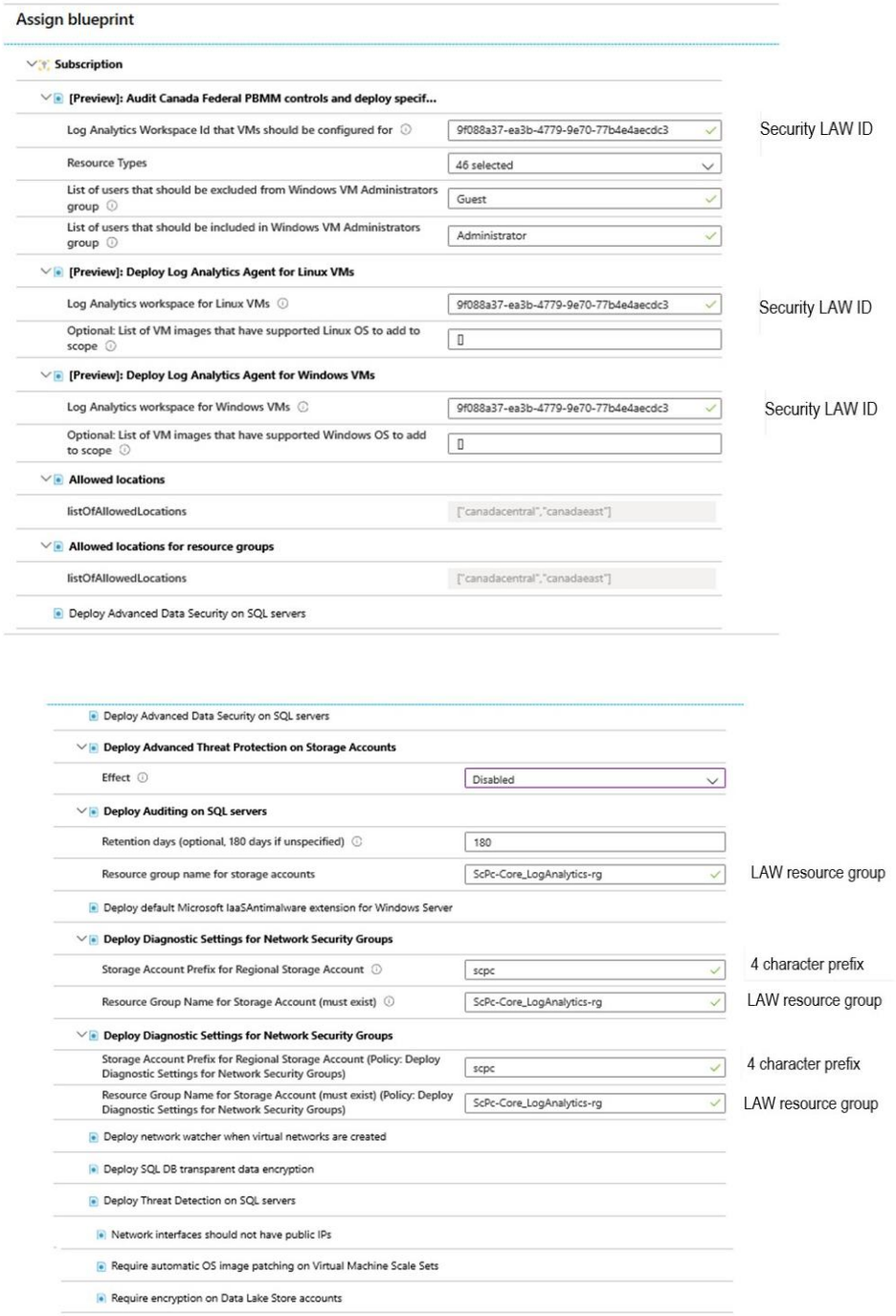


Figure 5: Assign Blueprint

2.2 AZURE LANDING ZONE VDC POLICY DEFINITION

The Canada Federal PBMM Blueprint provides the following Azure Policy to ITSG-33 Control mapping. See https://docs.microsoft.com/en-us/azure/governance/blueprints/samples/canada-federal-pbmm/control-mapping for the latest version of this mapping. The blueprint is created to align with GC Cloud profiles 3, 5, and 6 using the following policy definitions:

GR #	Policy Definition	Effect	ITSG-33	30-Day
9,10	Deploy network watcher when virtual networks are created	DeployIfNotExists	SI-4	Yes
1,2,3,4,9,10	Deploy Advanced Data Security on SQL servers	DeployIfNotExists	AC-7 AU-12 RA-5 SC-28(1) SI-4	Yes
5	Allowed locations for resource groups	Deny		Yes
9,10	Deploy Threat Detection on SQL servers	DeployIfNotExists	SI-4	Yes
10	Require automatic OS image patching on Virtual Machine Scale Sets		SI-2	Yes
9,10,11	[Preview]: Deploy Log Analytics Agent for Windows VMs	DeployIfNotExists	AU-3 AU-6(4) AU-12 SI-4	Yes
	Deploy default Microsoft IaaSAntimalware extension for Windows Server	DeployIfNotExists	SI-3	No
11	Deploy Diagnostic Settings for Network Security Groups	DeployIfNotExists	AU-12	Yes
6	Deploy SQL DB transparent data encryption	DeployIfNotExists	SC-28(1)	Yes
5	Allowed locations	Deny		Yes
9,10	Deploy Advanced Threat Protection on Storage Accounts	DeployIfNotExists	SI-4	Yes
1,2,3,4,9,10	Deploy Auditing on SQL servers	DeployIfNotExists	AU-12 SI-4	Yes
6	Require encryption on Data Lake Store accounts	Deny	SC-28(1)	Yes
1,2,3,4,9,10	[Preview]: Deploy Log Analytics Agent for Linux VMs	DeployIfNotExists	AU-3 AU-6(4) AU-12 SI-4	Yes
11	Activity log should be retained for at least one year	AuditIfNotExists	AU-9 AU-11	Yes
9	Network interfaces should not have public IPs	Deny		Yes
11	Deploy Diagnostic Settings for Network Security Groups	DeployIfNotExists	AU-12	Yes
	[Preview]: Audit Canada Federal PBMM controls and deploy specific VM Extensions to support audit requirements	See Table Below (68 policy definitions)		

Table 3: Canada Federal PBMM Blueprint Policy Definition

GR #	Policy Definition	Effect	ITSG-33	30-Day
1,2,3,4	MFA should be enabled on accounts with owner permissions on your subscription	AuditIfNotExists	IA-2(1) IA-8	Yes
1,2,3,4	MFA should be enabled accounts with write permissions on your subscription	AuditIfNotExists	IA-2(1) IA-8	Yes
10	System updates on virtual machine scale sets should be installed	AuditIfNotExists	SI-2	Yes
8,9	CORS should not allow every resource to access your Web Applications	AuditIfNotExists	AC-4	Yes
1,2,3,4	Deprecated accounts should be removed from your subscription	AuditIfNotExists	AC-2	Yes
1,2,3,4	Deprecated accounts with owner permissions should be removed from your subscription	AuditIfNotExists	AC-2	Yes
1,2,3,4	External accounts with owner permissions should be removed from your subscription	AuditIfNotExists	AC-2	Yes
1,2,3,4	External accounts with read permissions should be removed from your subscription	AuditIfNotExists	AC-2	Yes
8,9	Access through Internet facing endpoint should be restricted	AuditIfNotExists	SC-7	Yes
1,2,3,4	External accounts with write permissions should be removed from your subscription	AuditIfNotExists	AC-2	Yes
7	Function App should only be accessible over HTTPS	Audit	SC-8(1)	Yes
7	Web Application should only be accessible over HTTPS	Audit	SC-8(1)	Yes
7	API App should only be accessible over HTTPS	Audit	SC-8(1)	Yes
9,10,11	[Preview]: Audit Log Analytics Agent Deployment - VM Image (OS) unlisted	AuditIfNotExists	AU-3 AU-6(4) AU-12 SI-4	Yes
9,10,11	[Preview]: Audit Log Analytics Agent Deployment in VMSS - VM Image (OS) unlisted	AuditIfNotExists	AU-3 AU-6(4) AU-12 SI-4	Yes
9,10,11	[Preview]: Audit Log Analytics Workspace for VM - Report Mismatch	Audit	AU-3 AU-6(4) AU-12 SI-4	Yes
1,2,3,4	A maximum of 3 owners should be designated for your subscription	AuditIfNotExists	AC-5 AC-6	Yes
1,2,3,4	There should be more than one owner assigned to your subscription	AuditIfNotExists	AC-5 AC-6	Yes
10	Vulnerabilities in security configuration on your virtual machine scale sets should be remediated	AuditIfNotExists	RA-5 SI-2	Yes
	Remote debugging should be turned off for Function Apps	AuditIfNotExists	AC-17(1)	No
	Remote debugging should be turned off for Web Applications	AuditIfNotExists	AC-17(1)	No
	Remote debugging should be turned off for API Apps	AuditIfNotExists	AC-17(1)	No
9	DDoS Protection Standard should be enabled	AuditIfNotExists	SC-5	Yes
1,2,3,4	[Preview]: Show audit results from Linux VMs that allow remote connections from accounts without passwords	AuditIfNotExists	IA-5(1)	Yes
1,2,3,4	[Preview]: Show audit results from Linux VMs that have accounts without passwords	AuditIfNotExists	IA-5(1)	Yes
1,2,3,4	[Preview]: Show audit results from Linux VMs that do not have the passwd file permissions set to 0644	AuditIfNotExists	IA-5(1)	Yes
1,2,3,4	[Preview]: Show audit results from Windows VMs that allow re-use of the previous 24 passwords	AuditIfNotExists	IA-5(1)	Yes

1,2,3,4	[Preview]: Show audit results from Windows VMs that do not have a maximum password age of 70 days	AuditIfNotExists	IA-5(1)	Yes
1,2,3,4	[Preview]: Show audit results from Windows VMs that do not have a minimum password age of 1 day	AuditIfNotExists	IA-5(1)	Yes
1,2,3,4	[Preview]: Show audit results from Windows VMs that do not have the password complexity setting enabled	AuditIfNotExists	IA-5(1)	Yes
1,2,3,4	[Preview]: Show audit results from Windows VMs that do not restrict the minimum password length to 14 characters	AuditIfNotExists	IA-5(1)	Yes
	Endpoint protection solution should be installed on virtual machine scale sets	AuditIfNotExists	SI-3 SI-3(1)	No
	[Preview]: Deploy prerequisites to audit Linux VMs that allow remote connections from accounts without passwords	DeployIfNotExists	IA-5(1)	No
1,2,3,4	[Preview]: Deploy prerequisites to audit Linux VMs that have accounts without passwords	DeployIfNotExists	IA-5(1)	Yes
1,2,3,4	[Preview]: Deploy prerequisites to audit Linux VMs that do not have the passwd file permissions set to 0644	DeployIfNotExists	IA-5(1)	Yes
1,2,3,4	[Preview]: Deploy prerequisites to audit Windows VMs that allow re-use of the previous 24 passwords	DeployIfNotExists	IA-5(1)	Yes
1,2,3,4	[Preview]: Deploy prerequisites to audit Windows VMs that do not have a maximum password age of 70 days	DeployIfNotExists	IA-5(1)	Yes
1,2,3,4	[Preview]: Deploy prerequisites to audit Windows VMs that do not have a minimum password age of 1 day	DeployIfNotExists	IA-5(1)	Yes
1,2,3,4	[Preview]: Deploy prerequisites to audit Windows VMs that do not have the password complexity setting enabled	DeployIfNotExists	IA-5(1)	Yes
1,2,3,4	[Preview]: Deploy prerequisites to audit Windows VMs that do not restrict the minimum password length to 14 characters	DeployIfNotExists	IA-5(1)	Yes
9	Adaptive Network Hardening recommendations should be applied on internet facing virtual machines	AuditIfNotExists	CM-2 SI-4	Yes
9	Monitor missing Endpoint Protection in Azure Security Center	AuditIfNotExists	SI-3 SI-3(1)	Yes
10	System updates should be installed on your machines	AuditIfNotExists	SI-2	Yes
10	Vulnerabilities in security configuration on your machines should be remediated	AuditIfNotExists	RA-5 SI-2	Yes
	Adaptive Application Controls should be enabled on virtual machines	AuditIfNotExists	CM-7(5) CM-11	No
8	Just-In-Time network access control should be applied on virtual machines	AuditIfNotExists	SC-7(3) SC-7(4)	Yes
10	Vulnerabilities on your SQL databases should be remediated	AuditIfNotExists	RA-5 SI-2	Yes
6	Disk encryption should be applied on virtual machines	AuditIfNotExists	SC-28(1)	Yes
10	Vulnerabilities should be remediated by a Vulnerability Assessment solution	AuditIfNotExists	RA-5 SI-2	Yes
11	Audit diagnostic setting	AuditIfNotExists	AU-5 AU-12	Yes
7	Only secure connections to your Redis Cache should be enabled	Audit	SC-8(1)	Yes
1,2,3,4	An Azure Active Directory administrator should be provisioned for SQL servers	AuditIfNotExists	AC-2(7)	Yes
7	Secure transfer to storage accounts should be enabled	Audit	SC-8(1)	Yes

1,2,3,4,9,10	Advanced data security should be enabled on your SQL managed instances	AuditIfNotExists	AC-7 AU-5 AU-12 RA-5 SC-28(1) SI-4	Yes
	Auditing on SQL server should be enabled	AuditIfNotExists		No
1,2,3,4,9,10	Advanced data security should be enabled on your SQL servers	AuditIfNotExists	AC-7 AU-5 AU-12 RA-5 SC-28(1) SI-4	Yes
1,2,3,4	Show audit results from Windows VMs in which the Administrators group contains any of the specified members	AuditIfNotExists	AC-5 AC-6	Yes
1,2,3,4	Show audit results from Windows VMs in which the Administrators group does not contain all of the specified members	AuditIfNotExists	AC-5 AC-6	Yes
1,2,3,4	Show audit results from Windows web servers that are not using secure communication protocols	AuditIfNotExists	AC-5 AC-6	Yes
6	Transparent Data Encryption on SQL databases should be enabled	AuditIfNotExists	SC-28(1)	Yes
8	Audit unrestricted network access to storage accounts	Audit	AC-17(1) SC-7	Yes
1,2,3,4	Service Fabric clusters should only use Azure Active Directory for client authentication	Audit	AC-2(7)	Yes
	Audit virtual machines without disaster recovery configured	AuditIfNotExists	CP-7	No
1,2,3,4	Deploy prerequisites to audit Windows VMs in which the Administrators group contains any of the specified members	DeployIfNotExists	AC-5 AC-6	Yes
1,2,3,4	Deploy prerequisites to audit Windows VMs in which the Administrators group does not contain all of the specified members	DeployIfNotExists	AC-5 AC-6	Yes
1,2,3,4	Deploy prerequisites to audit Windows web servers that are not using secure communication protocols	DeployIfNotExists	AC-5 AC-6	Yes
	Web ports should be restricted on Network Security Groups associated to your VM	AuditIfNotExists		No
7	Secure transfer to storage accounts should be enabled	Audit	SC-8(1)	Yes

Table 4: Audit Canada Federal PBMM Policy Initiative

2.3 AZURE SECURITY CENTER

Configure for all subscriptions hosting PBMM workloads – possibly exclude sandbox resource groups and resources based on cost and requirement. The standard pricing tier enables threat detection for networks and virtual machines, provides threat intelligence, anomaly detection, and behavior analytics in Azure Security Center.

"Security Centre covers security recommendations to follow when setting various security policies on an Azure Subscription. A security policy defines the set of controls, which are recommended for resources within the specified Azure subscription. Please note that the majority of the recommendations mentioned only produce an alert if a security violation is found. They do not actually enforce security settings by themselves. Alerts should be acted upon and remedied in a timely fashion."

Ref: https://docs.microsoft.com/en-us/azure/security-center/security-center-intro

2.4 GC MARKETPLACE WHITELIST

The SSC Cloud Broker team (CBS) maintains a whitelist of Azure marketplace templates that have been approved for GC consumption. These products have been evaluated through supply chain integrity checks by SSC and CSE. The GC Marketplace Whitelist policy is implemented at the Tenant Root Management Group and must be updated by the tenant owner as new products are approved by CSE. Follow the SSC Cloud Broker instructions to implement the Whitelist policy. [*https://gcdocs.gc.ca/ssc-spc/llisapi.dll/open/71440075*]. This is required for Guardrail 12 compliance.

3 AZURE AD TENANT MANUAL CONFIGURATION FOR 30-DAY COMPLIANCE

This section addresses the manual procedures required for the implementation of the 30-day guardrails to the Azure Active Directory Tenant in order to support IaaS/PaaS.

3.1 GUARDRAIL 1: PROTECT ROOT / GLOBAL ADMINS ACCOUNT

1- Break Glass account: Need a break glass account and procedure. Refer to the template for a break glass emergency account management procedure. Create accounts and amend the proposed procedure in accordance with the guidance from the departmental CIO and CSO.

Requirements

- Must have two break glass accounts using non conspicuous identities
- Must have a written break glass account procedure
- Account must be created in the tenant Azure Active Directory
- Must have P2 or equivalent licensing
- No MFA, controls or conditional access policies applied to these account(s) – can't restrict access in anyway
- Responsibility of break glass accounts must be with someone not-technical, director level or above
- Associate account(s) with a non-technical individual, Director or above and include their phone number and email contact information.
- Change authentication method – same as the non-technical individual as above. The proper account must use a strong password
- Verify that both break glass account are licensed for identity protection. Go to Azure Active Directory, Users and find the break glass accounts. For each of them, click on Licenses and make sure they are licensed for Identity protection (Microsoft 365 E5)

2- Azure AD, Security, conditional access policies

- New policy, XXX-AAD_PrivRoles[2], select Global Admin roles, exclude break glass account, all cloud apps, grant MFA, enable policy, create (AZ-L1-001)
- New policy, XXX-AzureMFAPolicy, all users, exclude break glass account, cloud apps - Microsoft azure management, grant MFA, enable policy, create (AZ-L2-001)

3- Identity Protection is licensed as part of the Azure AD Premium P2 license. (https://docs.microsoft.com/en-us/azure/active-directory/active-directory-identityprotection). (AZ-L1-001) (AZ-L1-076) (AZ-L2-001)

- Browse to Azure Active Directory > Security > Identity Protection > MFA registration policy.
    - Under Assignments i.Users - Choose All users but exclude the break glass account
    - Under Controls i.Ensure the checkbox Require Azure MFA registration is checked and choose Select.
    - Enforce Policy - On
    - Save

[2] First three characters should describe the Department. Change XXX to Department Identification in accordance with Naming and Tagging Standard

- Browse to Azure Active Directory > Security > Identity Protection > Overview.
- Select Configure user risk policy.
    - Under Assignments i.Users - Choose All users but exclude the break glass account
        - Conditions - User risk Microsoft's recommendation is to set this option to High.
    - Under Controls i.Access - Microsoft's recommendation is to Allow access and Require password change.
    - Enforce Policy - On
    - Save - This action will return you to the Overview page.
- Select Configure sign-in risk policy.
    - Under Assignments i.Users - Choose All users but exclude the break glass account
        - Conditions - Sign-in risk Microsoft's recommendation is to set this option to Medium and above.
    - Under Controls i.Access - Microsoft's recommendation is to Allow access and Require multi-factor authentication.
    - Enforce Policy - On
    - Save

4- Other settings

- Password reset notification (AZ-L1-005) (AZ-L2-003)
    - Go to `Azure Active Directory`
    - Go to `Password reset`
    - Go to `Notification`
    - Set `Notify users on password resets?` to `Yes`
    - Set `Notify all admins when other admins reset their passwords?` to `Yes`
- MFA required to join devices (AZ-L1-008)
    - Go to `Azure Active Directory`
        - Go to `Devices`
        - Go to `Device settings`
        - Set `Require Multi-Factor Auth to join devices` to `Yes`
    - Go to `Azure Active Directory` (AZ-L2-002)
        - Go to `Users and group`
        - Go to `All Users`
        - Click on `Multi-Factor Authentication` button on the top bar
        - Click on `service settings`
        - Disable `Allow users to remember multi-factor authentication on devices they trust`
- Enable multi-factor authentication for remote network (cloud) access (AZ-L1-006)
    - Go to `Azure Active Directory`
        - Go to `Users and group`
        - Go to `User settings`
        - Set `Restrict access to Azure AD administration portal` to `Yes`

    - Go to `Azure Active Directory` (AZ-L2-011) (AZ-L2-012)
        - Go to `Users and group`
        - Go to `Group settings`
        - Set `Users can create security groups` to `No`
        - Set `Users who can manage security groups` to `None`

3.2 GUARDRAIL 2: MANAGEMENT OF ADMINISTRATIVE PRIVILEGES

Document a process for managing accounts, access privileges, and access credentials for organizational users, non-organizational users (if required), and processes based on the principles of separation of duties and least privilege (for example, operational procedures and active directory)

Implement a multi-factor authentication mechanism for privileged accounts (for example, username, password and one-time password) and for external facing interfaces. Consult https://intranet.canada.ca/wg-tg/rtua-rafu-eng.asp. It is important to note that SMS is not an acceptable PB 2FA mechanism.

Navigate to Security Center, then under Resource Security Hygiene, click on Identity & Access. Select each policy identified below and make sure that no subscription is identified as unhealthy.

- Remove deprecated accounts
    - Deprecated accounts should be removed from your subscription
    - Deprecated accounts with owner permissions should be removed from your subscription

- Remove External accounts
    - External accounts with owner permissions should be removed from your subscription
    - External accounts with write permissions should be removed from your subscription
    - External accounts with read permissions should be removed from your subscription

- Remove Guest users (AZ-L1-002)
    - Navigate to Azure AD, Users
    - Select “User Type:Guest” as a Filter and delete any account unless it is absolutely required

Azure AD Privileged identity management (AZ-L2-019)

Select Manage - Settings,
Select the Global administrators role, click edit

- lower activation to 1 hr and require approval from director or security director. They both need security identifiers.
- Remove "allow permanent active assignment".
- 1 year for renewal of role

Repeat for the following roles: Security admins, conditional access admins, privileged role admin, authentication admin, password administrator, privileged authentication admin

3.3 GUARDRAIL 3: CLOUD CONSOLE ACCESS

- Limit access to GC IP addresses only(via DCAM access rules)
    - ADFS configuration to restrict access based on source IP
    - Source IP based restrictions at cloud firewall (in front of the RDS farm) for OS console access

- Azure AD, Security,
    - Named location. Create new location(s) that includes the IP addresses ranges of all people that will require Cloud console access
    - conditional access policies
        - New policy, XXX-CloudAccess[3], select All Admin roles, exclude break glass account, all cloud apps, condition-select all trusted locations, grant MFA, enable policy, create

3.4 GUARDRAIL 4: ENTERPRISE MONITORING ACCOUNTS

- Confirm that an Azure AD native account named SSC-CBS-Reporting@###gc.onmicrosoft.com (where ### is your tenant number) has been created as part of the implementation of the Azure Whitelisting . Make the account a member of the CSD-Reader group.

3.5 GUARDRAIL 11: LOGGING AND MONITORING

Azure security center. Select standard tier (AZ-L2-016)

- Select Pricing & settings

For each subscription, repeat the following steps

1) Pricing tier - Select standard
1) Data collection - Set auto provisioning to ON
   Select another workspace and Select the XXXXCLD-CoreSecurity-law
   Select All events
2) Email notification - enter email and phone number (select send email for high severity alerts)
3) Threat detection – enable both options

Sentinel - Connect Azure security center to sentinel. Enable create incidents

- Select hunting to see what's going on
- Go to Azure sentinel and select the LAW and add it to sentinel. Go to data connectors. Add azure activity, office 365 and anything we use

Advanced Threat Protection – Deploy on Storage Accounts

- For some partners, this could be unaffordable to enable across all storage accounts. May need to be considered on a case by case.

[3] First three characters should describe the Department. Change XXX to Department Identification in accordance with Naming and Tagging Standard

4 AZURE NETWORK IMPLEMENTATION FOR 30-DAY COMPLIANCE

Hosting PBMM IaaS/PaaS workloads in the public cloud requires the creation of a Virtual Datacenter (VDC) or Landing Zone (LZ). The Virtual Datacenter provides the network, security management, and other core infrastructure services such as DNS, AD, Remote Access, etc. Compliance with TBS 30-day guardrails 8 and 9 require the deployment of ITSG 22/38 compliant network zoning architecture (VDC).

Microsoft provides different VDC operating models and designs as part of their cloud adoption framework. Working with the cloud network and security teams, design the virtual datacenter to meet departmental business and technical requirements. Partners must develop a target network security design that considers segmentation via network security zones, in alignment with ITSG 22 and ITSG 38.

Ref: https://docs.microsoft.com/en-us/azure/cloud-adoption-framework/reference/networking-vdc

4.1 SSC AZURE LANDING ZONE DESIGN

The SSC Cloud Research and Development team has developed an Azure Landing Zone automated deployment through Infrastructure as Code (IaC) using Terraform (formally called GC Accelerators). The current release deploys the core network and security components for TBS Cloud Profile 3 compliance. Future release will include IaC deployments to support Cloud Usage Profile 6 once SCED is available.

Ref. #	Profile	Characteristics	Cloud Service Model	Connection Type
3	Sensitive (up to PB) cloud-based services	• Cloud-based services hosting sensitive (up to Protected B) information • No direct system to system network interconnections required with GC data centers	IaaS, PaaS, SaaS	Type 1 - EIS/IIS (no SCED)
6	Cloud-based services with External user access and interconnection to GC data centers	• Cloud-based services hosting sensitive (up to Protected B) information • GC cloud-based systems required to interact with systems in GC data centers • Environment accessible for both GC users and External users and services • Solution implemented, managed and operated by a GC department/agency	IaaS, PaaS	Type 3 - CXP (SCED)

Table 5: Cloud Usage Profile

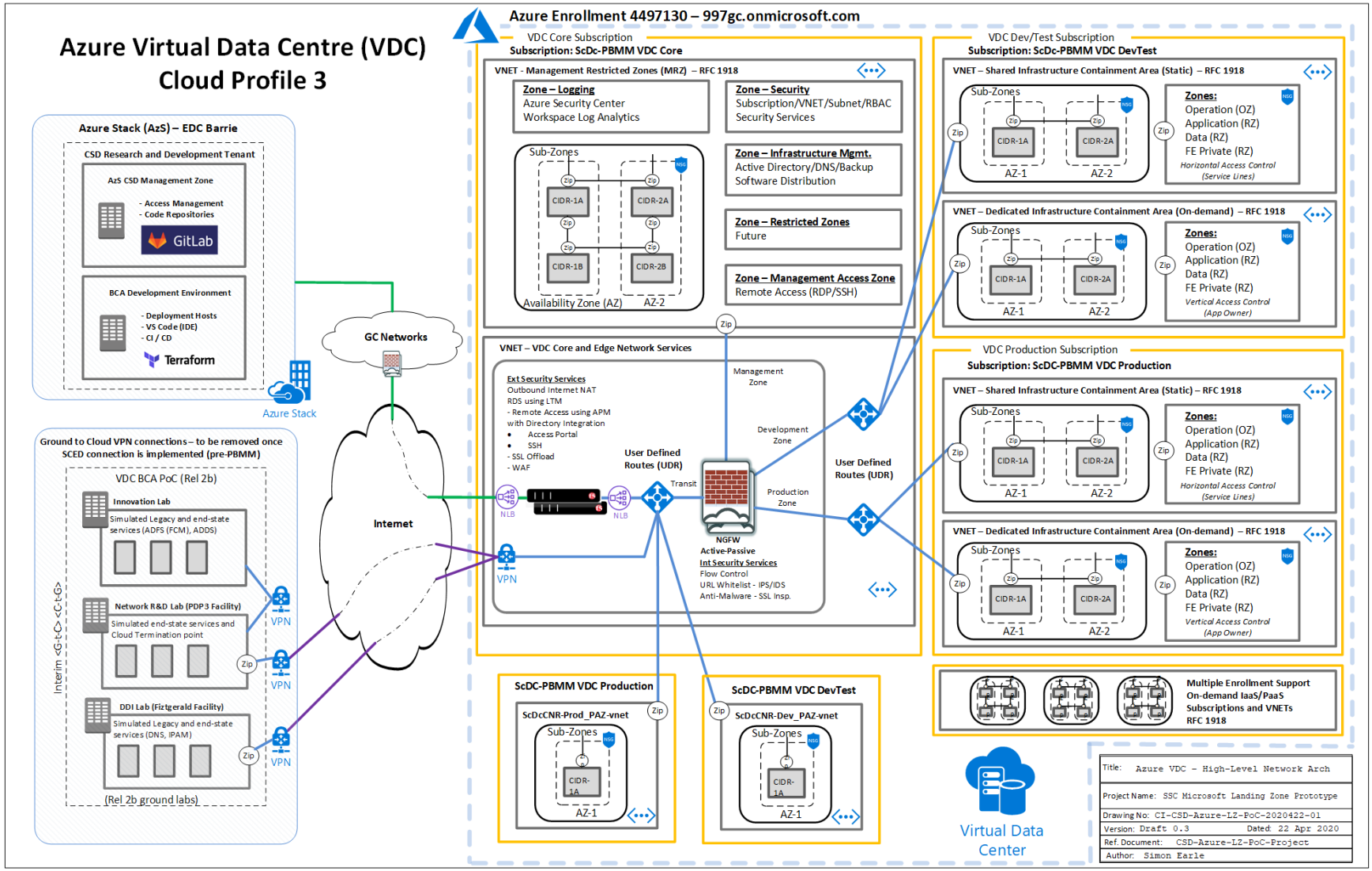


Figure 6: SSC Azure Landing Zone Release

DDOS Protection basic should be enabled on VNets with Public IPs. In addition, partners may implement an alternative solution on the perimeter firewall and load balancer virtual firewalls providing some additional level of protection. Note that enabling DDoS protection on VNets can be expensive based on traffic;

5 CYBER DEFENSE SERVICES

Partners must establish and sign an MOU with CSE (Cyber Centre Security) CCCS for defensive services and threat monitoring protection services. Partners must also implement defensive services including HBS, CBS, and NBS in accordance with CCCS onboarding guidance. Contact CCCS (CDOServiceDeployments@cyber.gc.ca) to initiate engagement.

The CBS onboarding instructions can be found at https://gcdocs.gc.ca/ssc-spc/llisapi.dll/open/73032410

APPENDIX A – MAPPING ITSG-33 SECURITY CONTROLS TO GUARDRAIL IMPLEMENTATION

APPENDIX B – SUGGESTED EVIDENCING OF GUARDRAILS

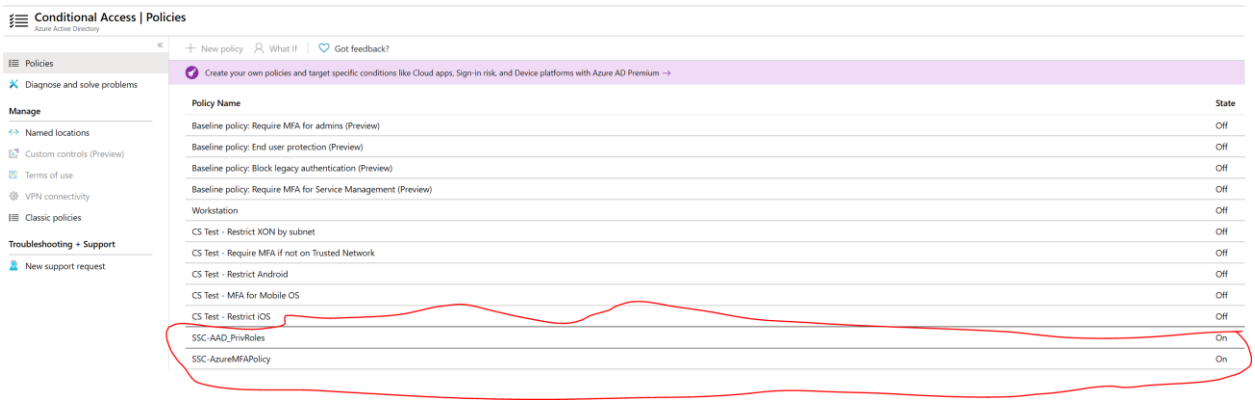
Evidencing

This section describes a set of suggested minimum guardrails evidence required.

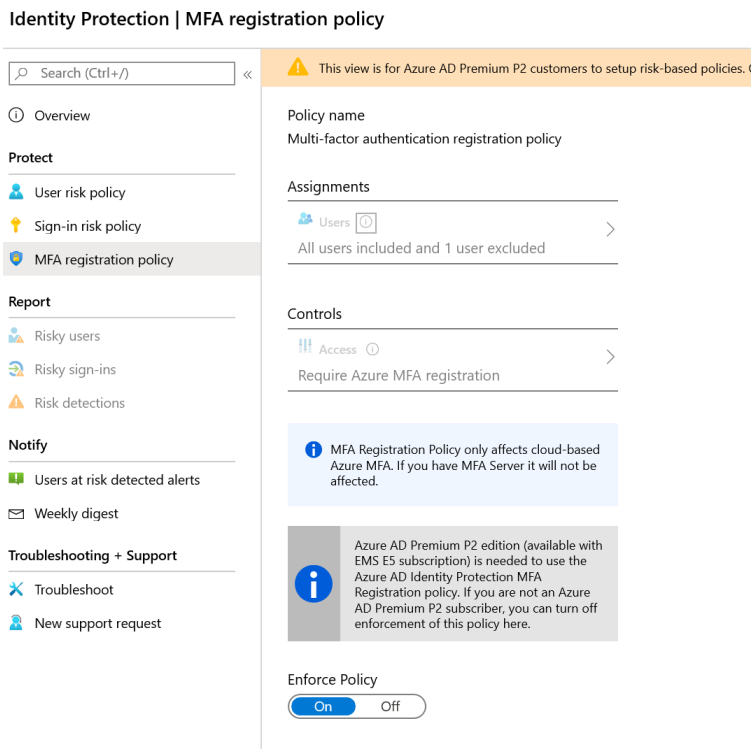
5.1 GUARDRAIL 1: PROTECT ROOT / GLOBAL ADMINS ACCOUNT

1 - Break Glass account: Provide a signed copy of the break glass emergency account management procedure (See template).

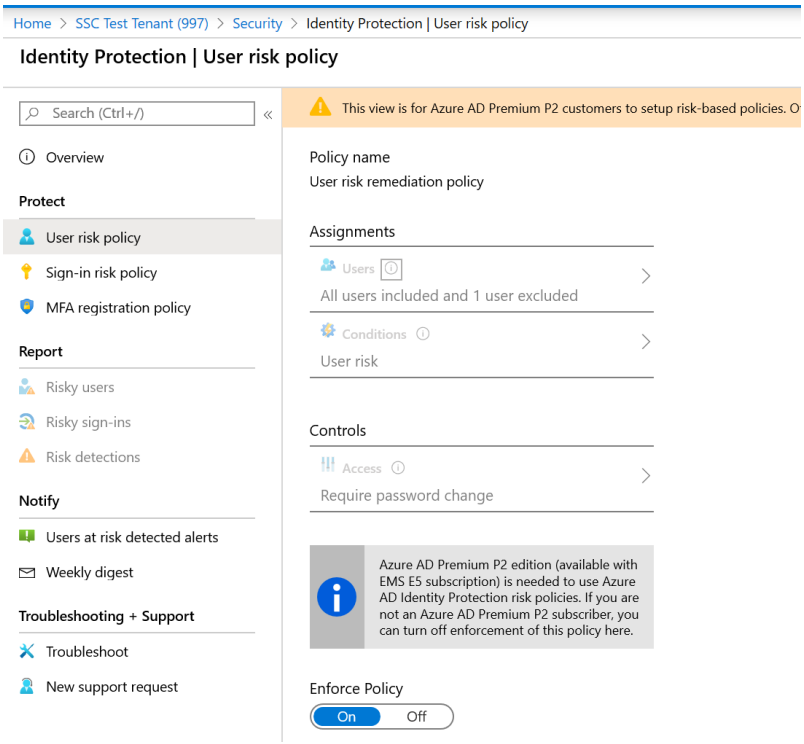
2- Azure AD, Security, conditional access policies



3- Identity Protection.

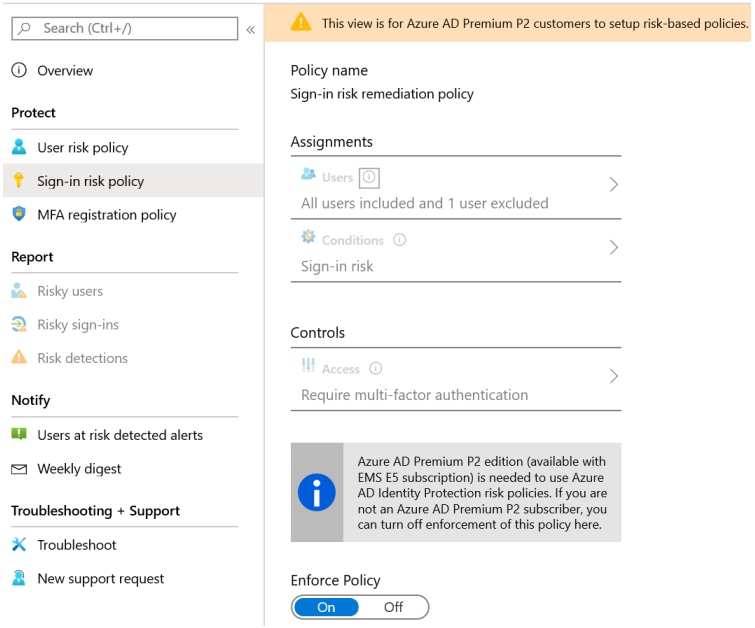


4- Configure user risk policy.



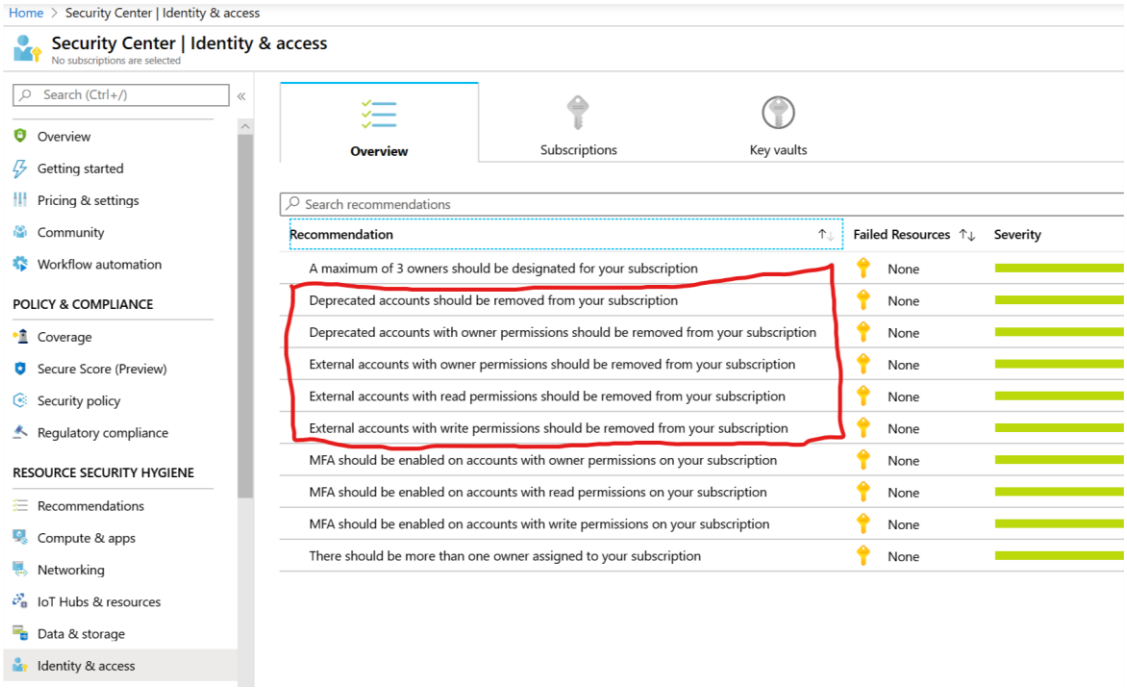
5- Configure sign-in risk policy.

Identity Protection | Sign-in risk policy

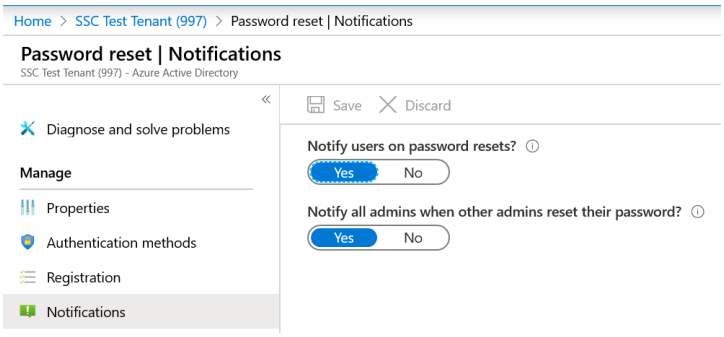


5.2 GUARDRAIL 2: MANAGEMENT OF ADMINISTRATIVE PRIVILEGES

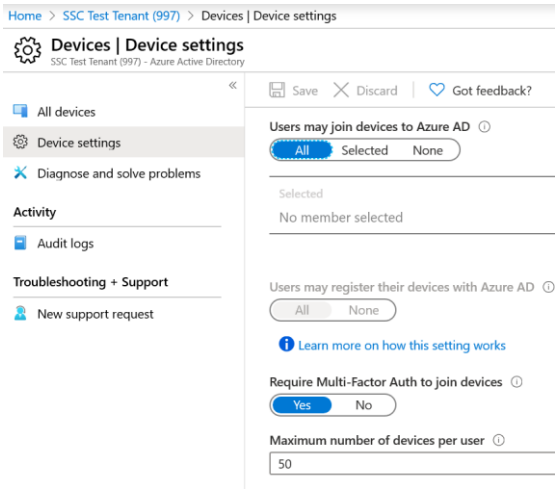
External and deprecated accounts



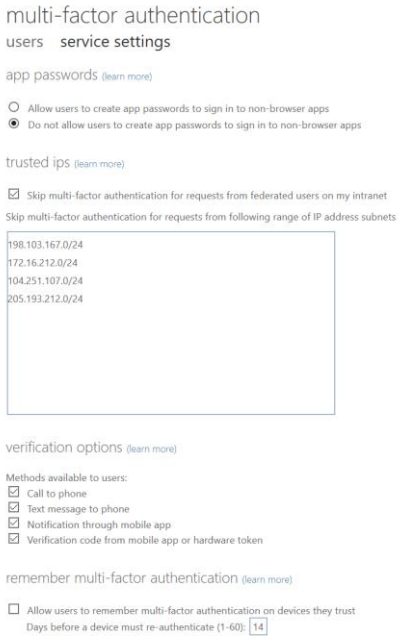
Password reset notification



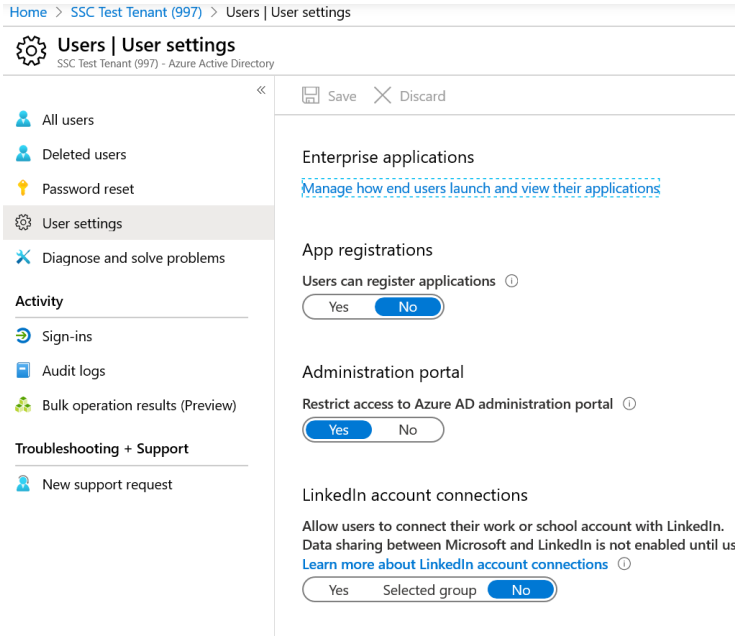
MFA required to join devices



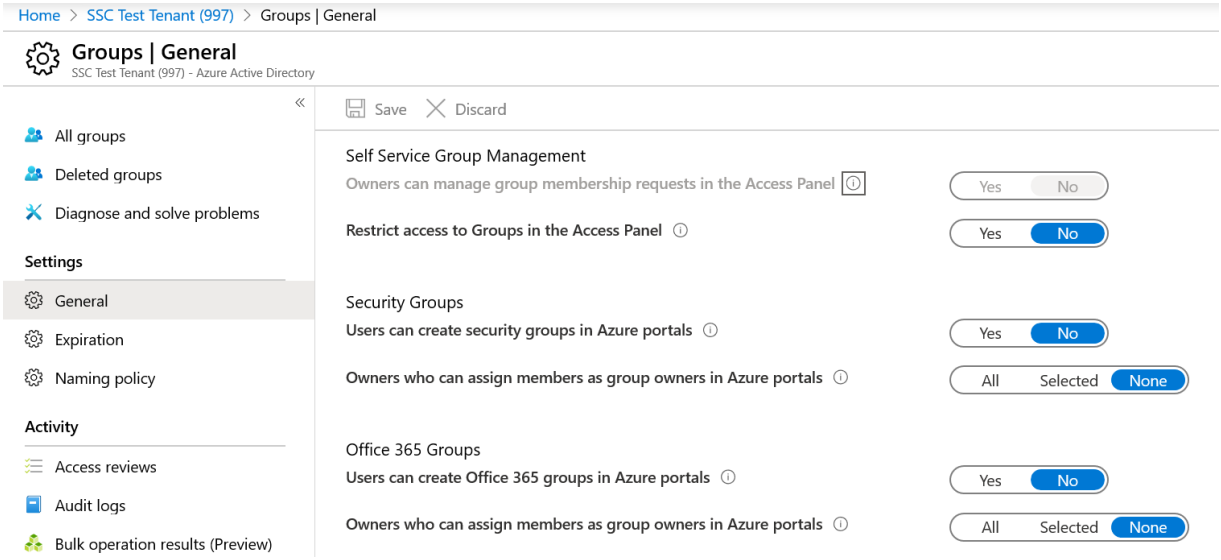
MFA settings



Enable multi-factor authentication for remote network (cloud) access

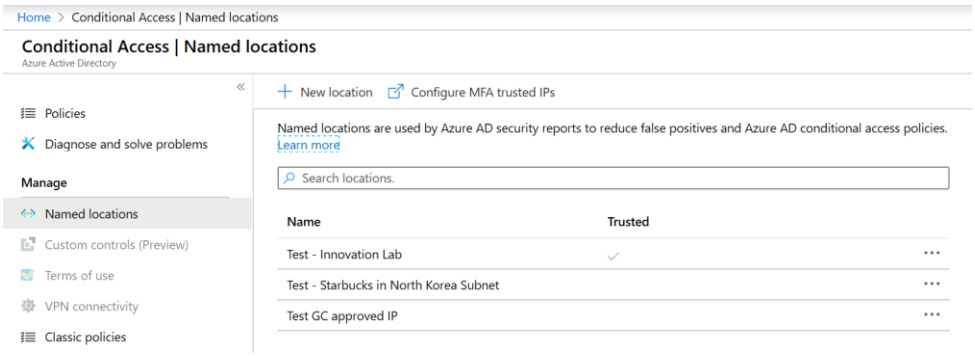


Azure Active Directory Group settings

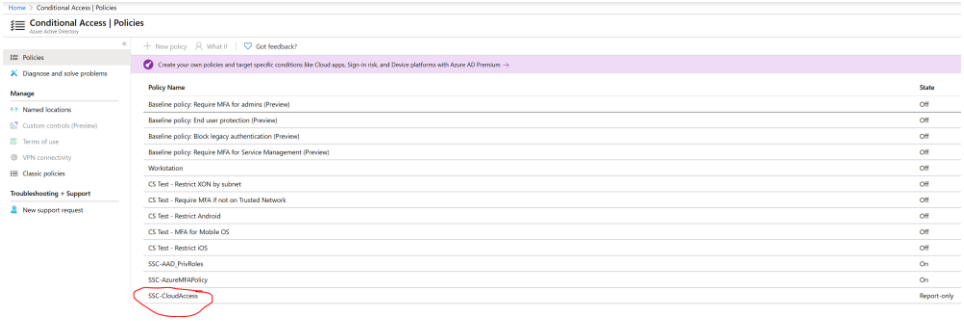


5.3 GUARDRAIL 3: CLOUD CONSOLE ACCESS

- Azure AD, Security, Named location.

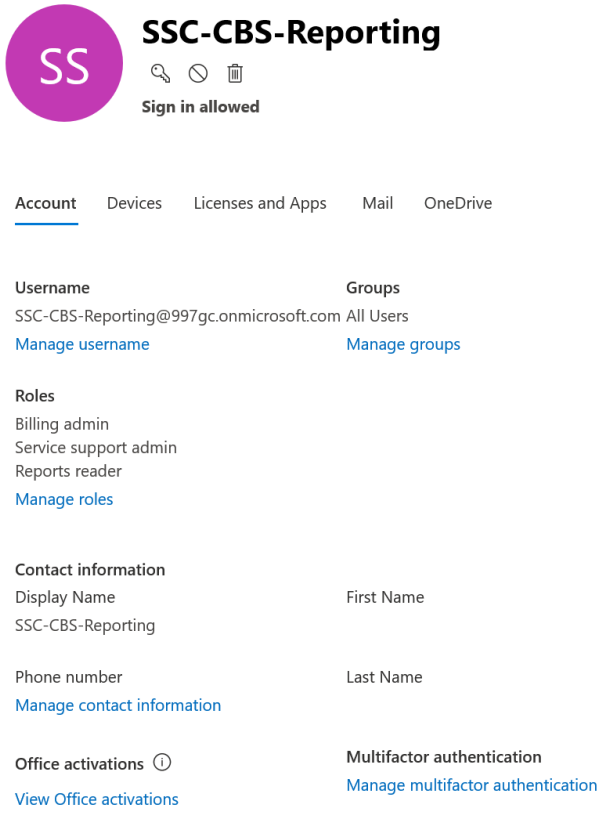


- conditional access policies



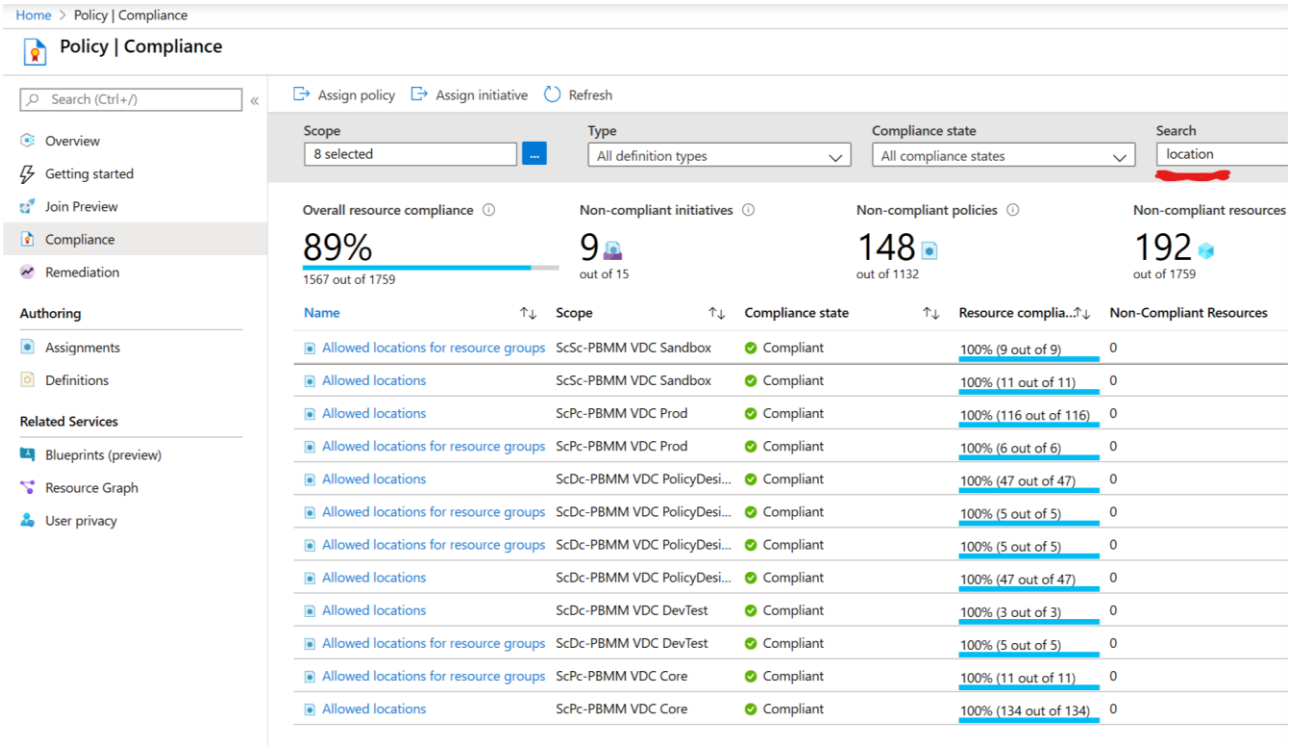
5.4 *GUARDRAIL 4: ENTERPRISE MONITORING ACCOUNTS*

- Confirm an Azure AD native account named SSC-CBS-Reporting@###gc.onmicrosoft.com

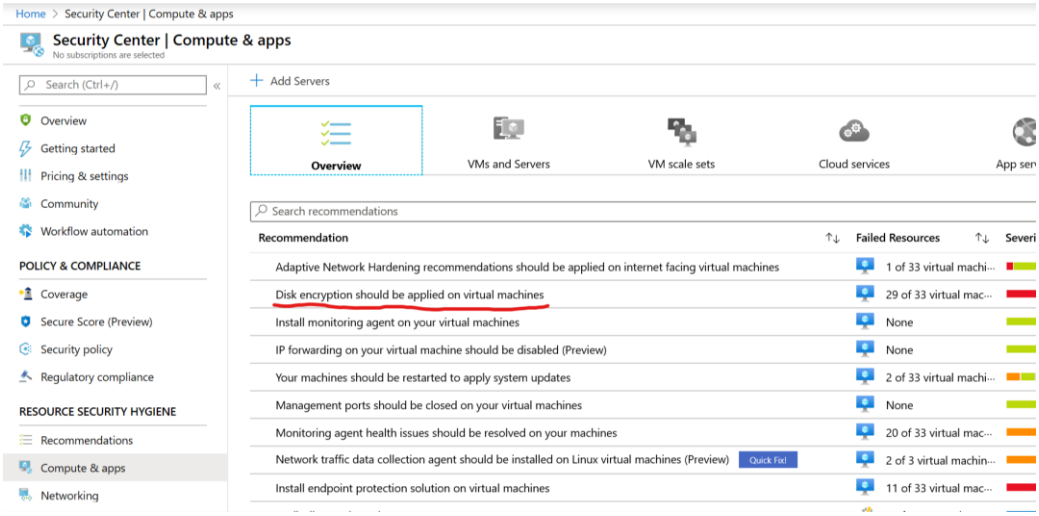


5.5 GUARDRAIL 5: DATA LOCATION

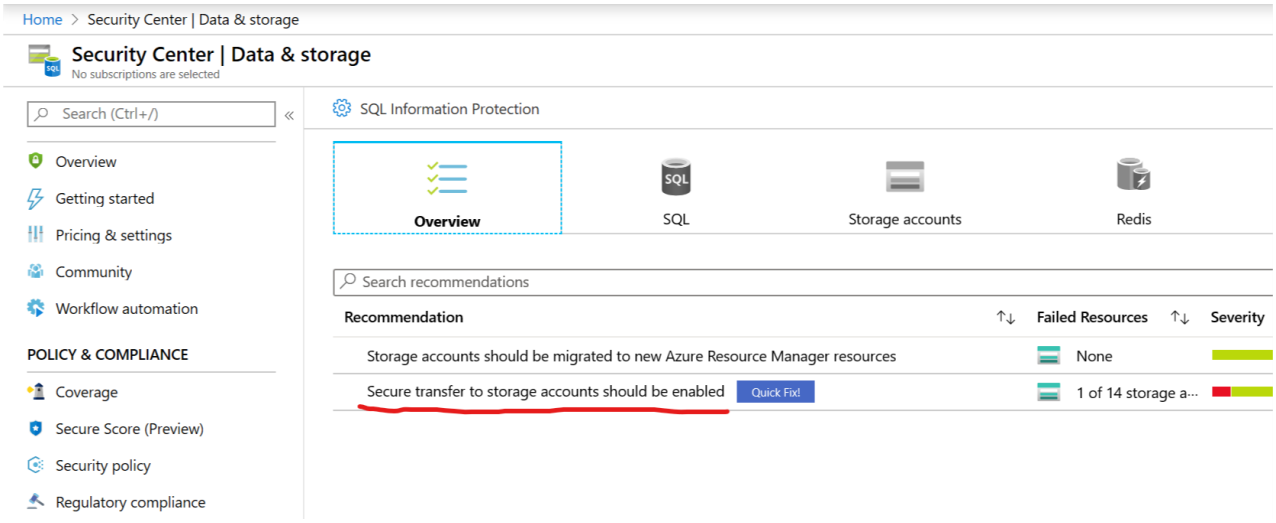
Evidence that PBMM policy has been implemented. In particular the “Allowed locations” and “allowed resource group locations” policies



5.6 GUARDRAIL 6: PROTECTION OF DATA-AT-REST



5.7 GUARDRAIL 7: PROTECTION OF DATA-IN-TRANSIT

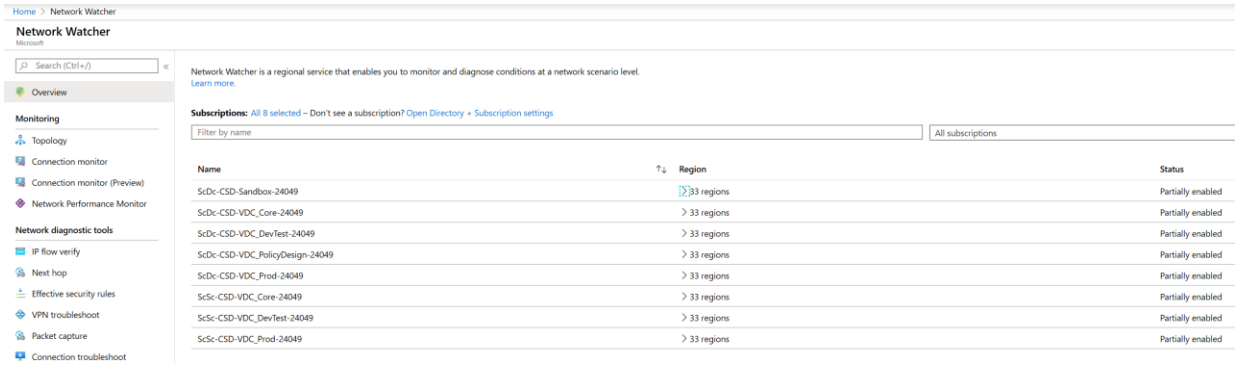


5.8 GUARDRAIL 8: NETWORK SEGMENTATION AND SEPARATION

As per network design

5.9 GUARDRAIL 9: NETWORK SECURITY SERVICES

Network watcher

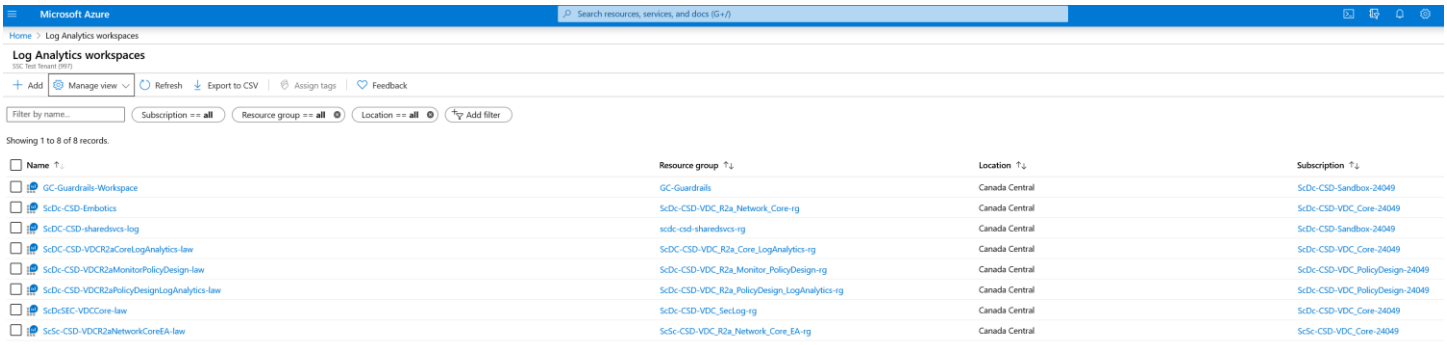


5.10 GUARDRAIL 10: CYBER DEFENSE SERVICES

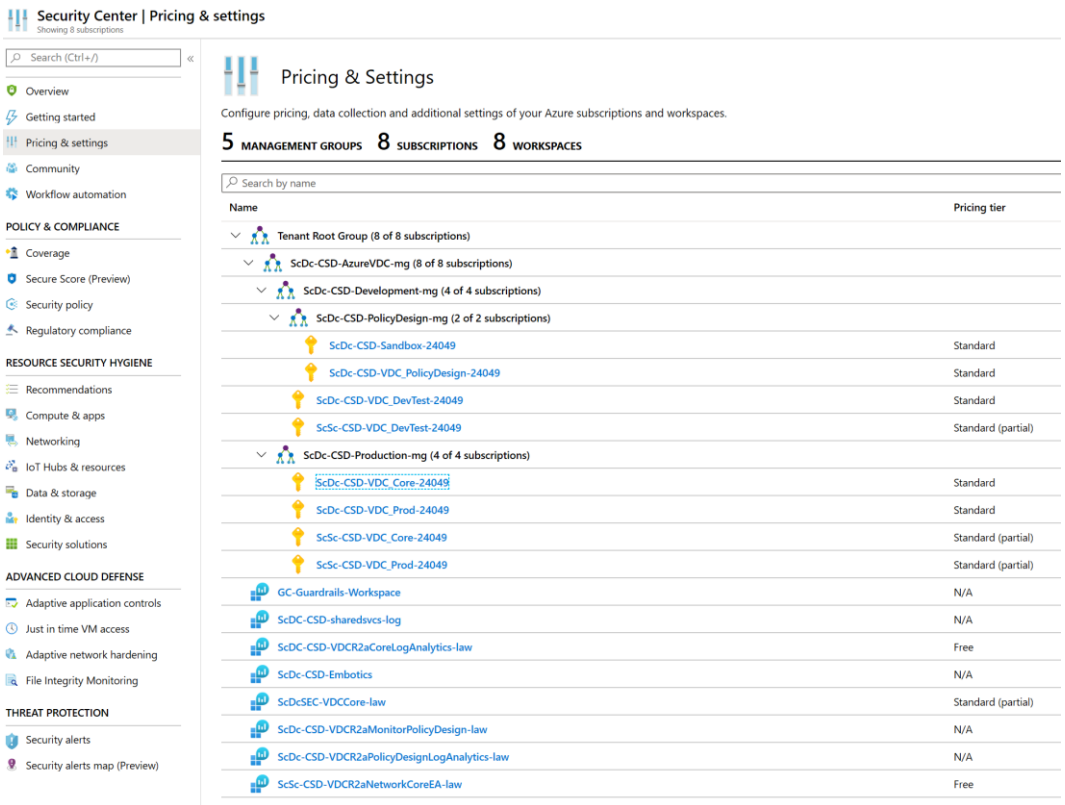
Evidence of MOU with CCCS

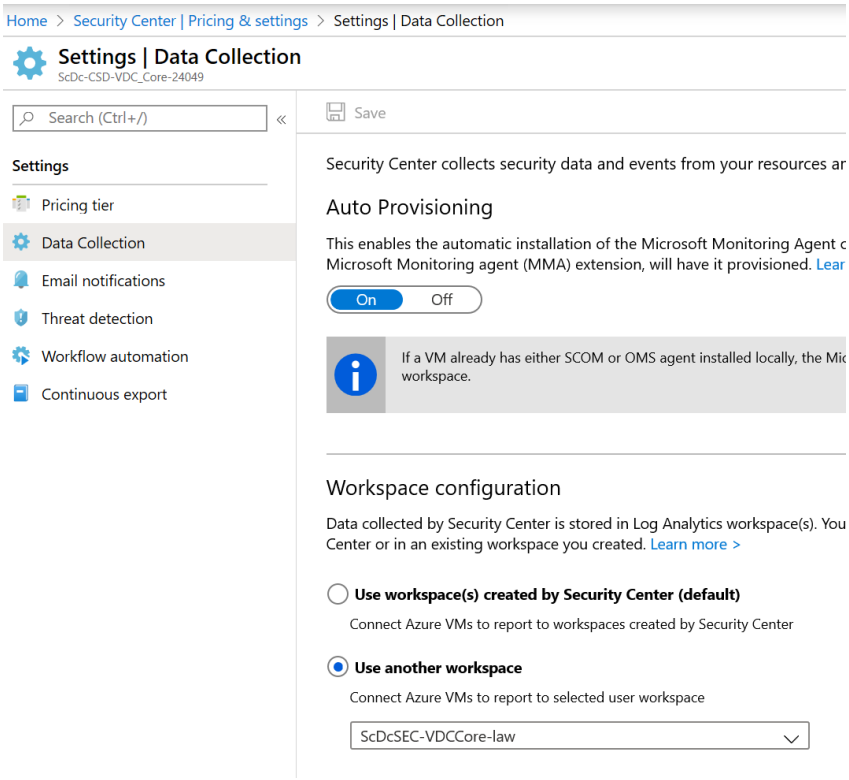
5.11 GUARDRAIL 11: LOGGING AND MONITORING

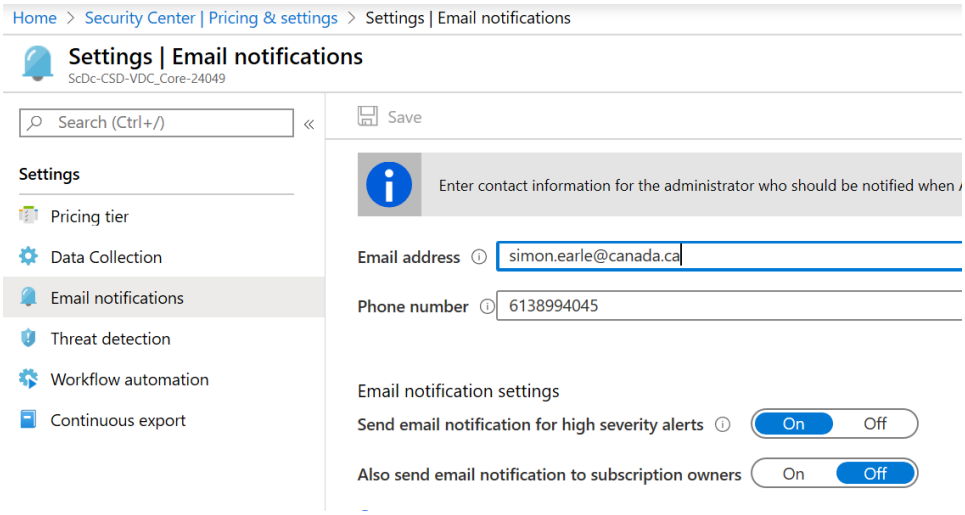
Log Analytic Workspaces

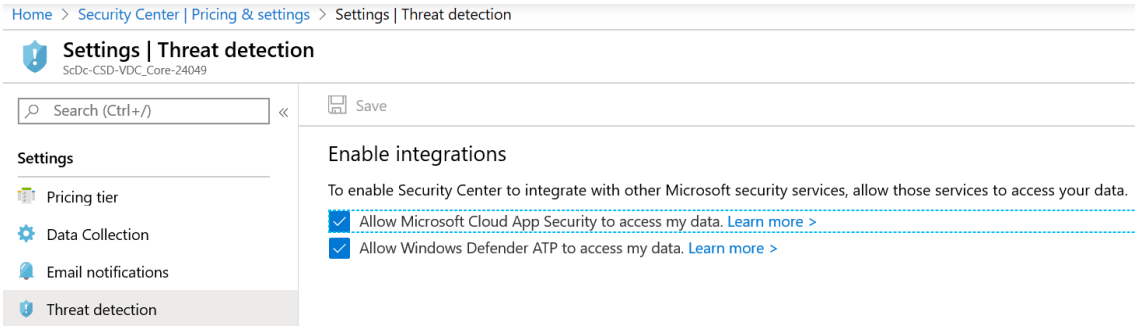


AZURE SECURITY CENTER.

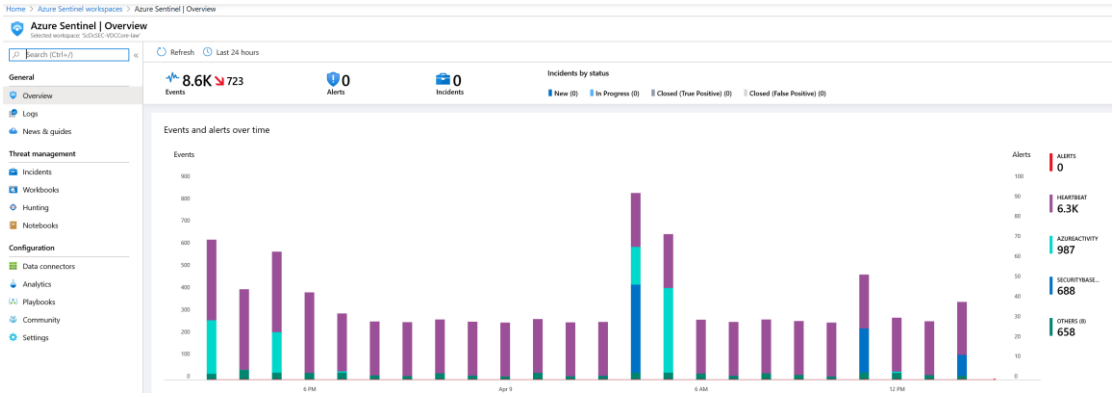



Home > Security Center | Pricing & settings > Settings | Data Collection
Settings | Data Collection
ScDc-CSD-VDC_Core-24049
Search (Ctrl+/)
Save
Settings
Pricing tier
Data Collection
Email notifications
Threat detection
Workflow automation
Continuous export
Security Center collects security data and events from your resources ar
Auto Provisioning
This enables the automatic installation of the Microsoft Monitoring Agent c
Microsoft Monitoring agent (MMA) extension, will have it provisioned. Lear
On
Off
If a VM already has either SCOM or OMS agent installed locally, the Mic
workspace.
Workspace configuration
Data collected by Security Center is stored in Log Analytics workspace(s). You
Center or in an existing workspace you created. Learn more >
Use workspace(s) created by Security Center (default)
Connect Azure VMs to report to workspaces created by Security Center
Use another workspace
Connect Azure VMs to report to selected user workspace
ScDcSEC-VDCCore-law

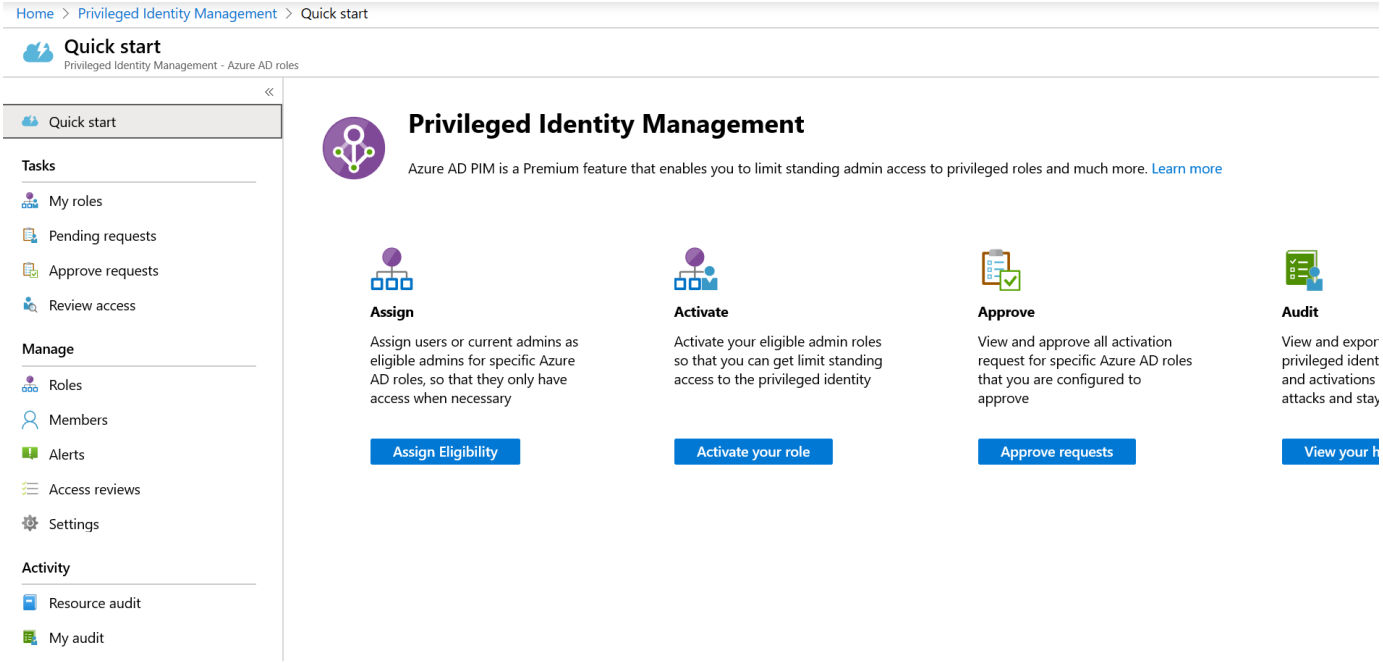

Home > Security Center | Pricing & settings > Settings | Email notifications
Settings | Email notifications
ScDc-CSD-VDC_Core-24049
Search (Ctrl+/)
Save
Settings
Pricing tier
Data Collection
Email notifications
Threat detection
Workflow automation
Continuous export
Enter contact information for the administrator who should be notified when
Email address
simon.earle@canada.ca
Phone number
6138994045
Email notification settings
Send email notification for high severity alerts
On
Off
Also send email notification to subscription owners
On
Off



Sentinel - Connect Azure security center to sentinel. Enable create incidents
- Select hunting to see what's going on



Azure AD Priviledge identity management



5.12 GUARDRAIL 12: CONFIGURATION OF CLOUD MARKETPLACES

Evidence of the implementation of the Azure Whitelisting policies