Azure Automation

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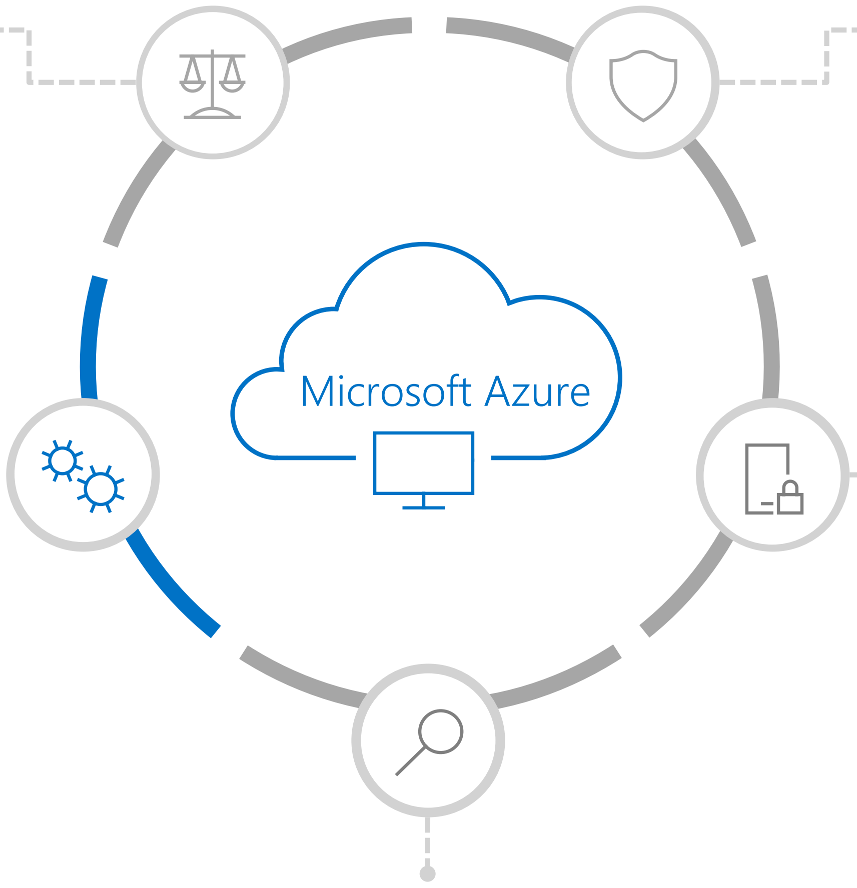
Agenda

- Azure PowerShell Module(s)
- Cloud Shell
- ARM Templates
- Inventory
- Change Tracking
- Process Automation
- Desired State

Azure cloud management platform



GOVERN
Policy Management
Cost Management

SECURE
Security Management
Threat Protection

CONFIGURE
Configuration
Update management
Automation
Scripting

PROTECT
Backup
Disaster Recovery

MONITOR
App, Infra, & Network Monitoring
Log Analytics and Diagnostics

ASM → ARM → Az

- Moving to one module for Desktop and .NET Core

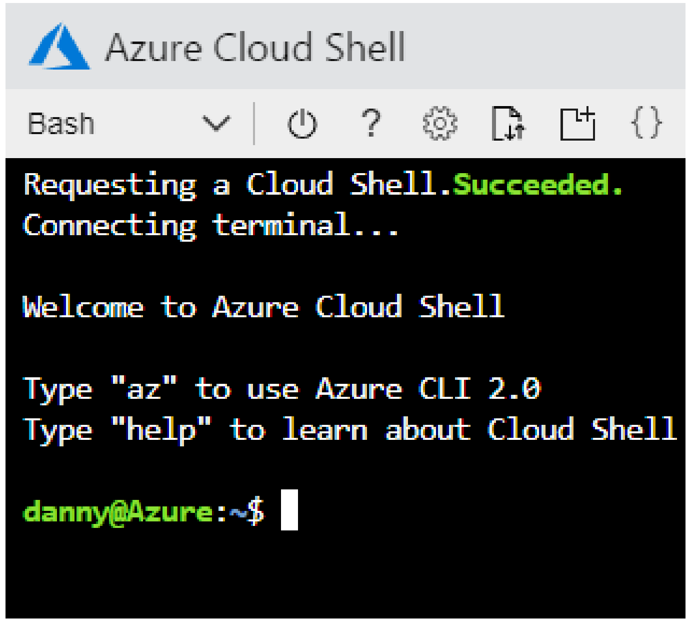
  `Install-Module Az`

- Renaming Cmdlets from **Azure** to **Az**
  - Why? Consistency *(and less typing)*
  - Align naming across Azure tooling
    - Profile => Account
  - No frustrations, we built training wheels!
    - **`Enable-AzureRmAlias`**
    - defaults to session scope

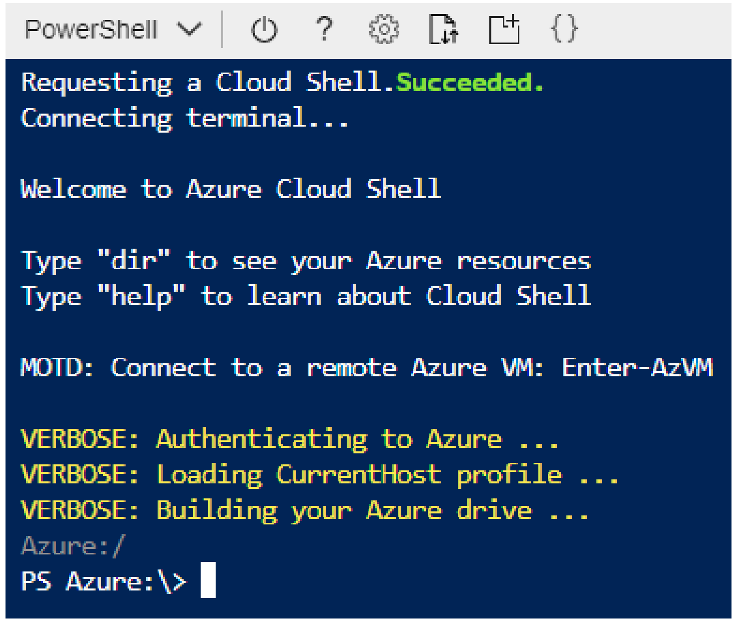
New-AzureRMStorageAccount
New-AzureStorageContainer
=
New-AzStorageAccount
New-AzStorageContainer

Azure Cloud Shell

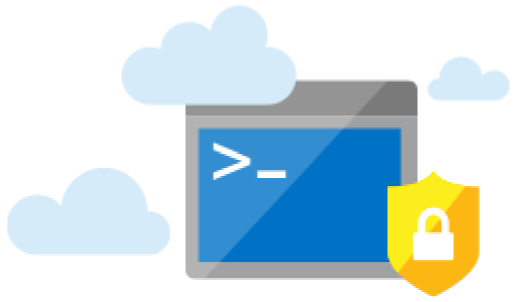
Keeps you updated
Authenticated access
Bash & PowerShell
Private & secure environment
Common languages & tools

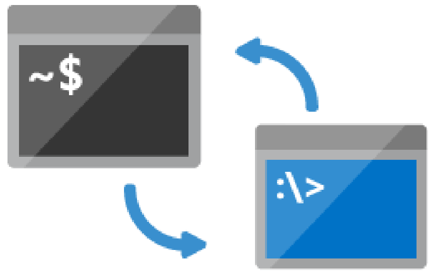


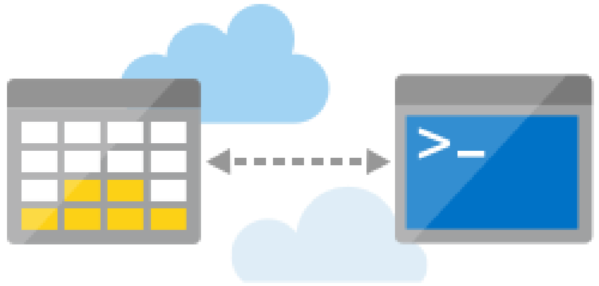
```
Requesting a Cloud Shell.Succeeded.
Connecting terminal...

Welcome to Azure Cloud Shell

Type "az" to use Azure CLI 2.0
Type "help" to learn about Cloud Shell

danny@Azure:~$
```

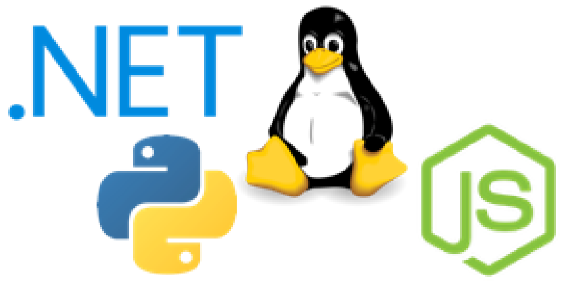


```
Requesting a Cloud Shell.Succeeded.
Connecting terminal...

Welcome to Azure Cloud Shell

Type "dir" to see your Azure resources
Type "help" to learn about Cloud Shell

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

VERBOSE: Authenticating to Azure ...
VERBOSE: Loading CurrentHost profile ...
VERBOSE: Building your Azure drive ...
Azure:/
PS Azure:\>
```



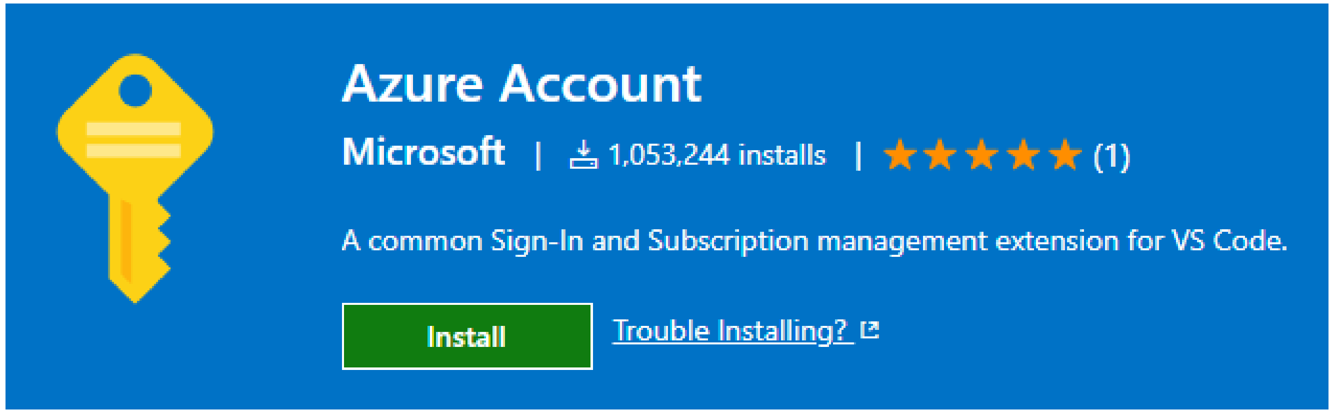






Multiple Experiences

Azure portal
shell.azure.com
Azure Extension in Visual Studio Code
"Try It" integration in docs.microsoft.com
Sandboxes in Microsoft Learn



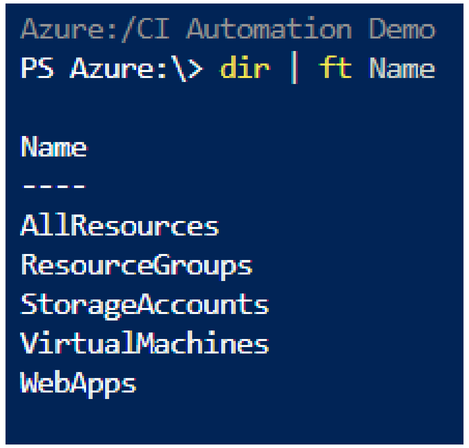
Azure Account

Microsoft | 1,053,244 installs | ★★★★★ (1)

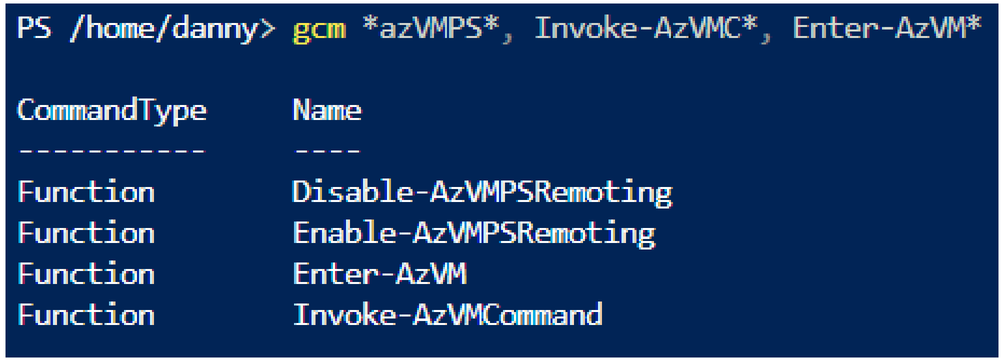
A common Sign-In and Subscription management extension for VS Code.

Demo recap

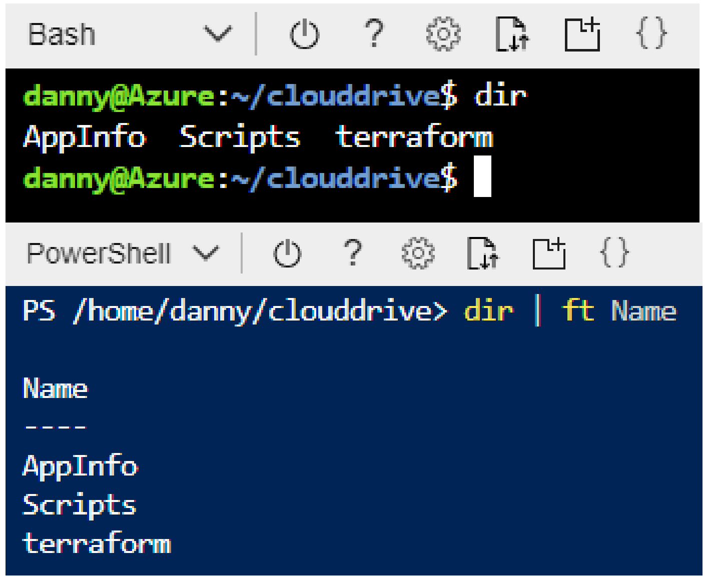
- Persisting Storage
- Azure: Drive
- Cloud Shell Editor
- AzVM remoting cmdlets



```
Azure:/CI Automation Demo
PS Azure:\> dir | ft Name

Name
----
AllResources
ResourceGroups
StorageAccounts
VirtualMachines
WebApps
```

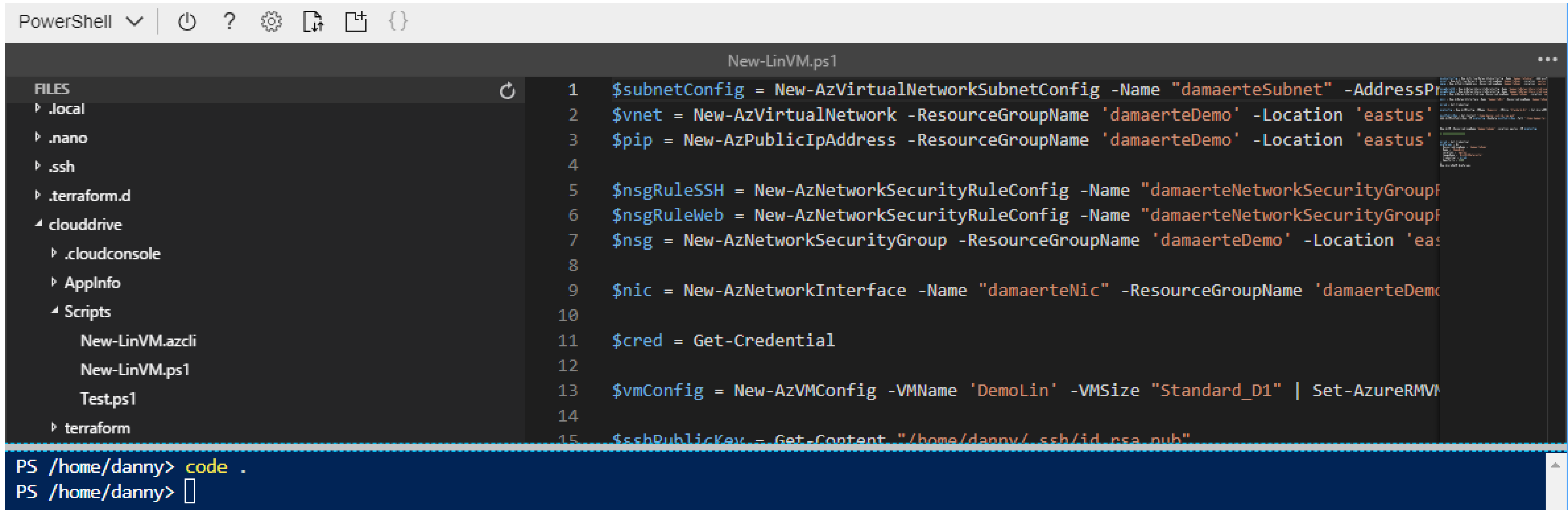


```
PS /home/danny> gcm *azVMPS*, Invoke-AzVMC*, Enter-AzVM*

CommandType     Name
-----------     ----
Function        Disable-AzVMPSRemoting
Function        Enable-AzVMPSRemoting
Function        Enter-AzVM
Function        Invoke-AzVMCommand
```



```
danny@Azure:~/clouddrive$ dir
AppInfo  Scripts  terraform
danny@Azure:~/clouddrive$
```

```
PS /home/danny/clouddrive> dir | ft Name

Name
----
AppInfo
Scripts
terraform
```



```
$subnetConfig = New-AzVirtualNetworkSubnetConfig -Name "damaerteSubnet" -AddressPr
$vnet = New-AzVirtualNetwork -ResourceGroupName 'damaerteDemo' -Location 'eastus'
$pip = New-AzPublicIpAddress -ResourceGroupName 'damaerteDemo' -Location 'eastus'

$nsgRuleSSH = New-AzNetworkSecurityRuleConfig -Name "damaerteNetworkSecurityGroupR
$nsgRuleWeb = New-AzNetworkSecurityRuleConfig -Name "damaerteNetworkSecurityGroupR
$nsg = New-AzNetworkSecurityGroup -ResourceGroupName 'damaerteDemo' -Location 'eas

$nic = New-AzNetworkInterface -Name "damaerteNic" -ResourceGroupName 'damaerteDemo

$cred = Get-Credential

$vmConfig = New-AzVMConfig -VMName 'DemoLin' -VMSize "Standard_D1" | Set-AzureRMVM

$sshPublicKey = Get-Content "/home/danny/.ssh/id_rsa.pub"
```

```
PS /home/danny> code .
PS /home/danny>
```

What are ARM Templates?

Declarative files for creating Azure resources in a reliable, repeatable and auditable way.

Infrastructure as Code

Define Azure resources using text files.

Declarative Syntax

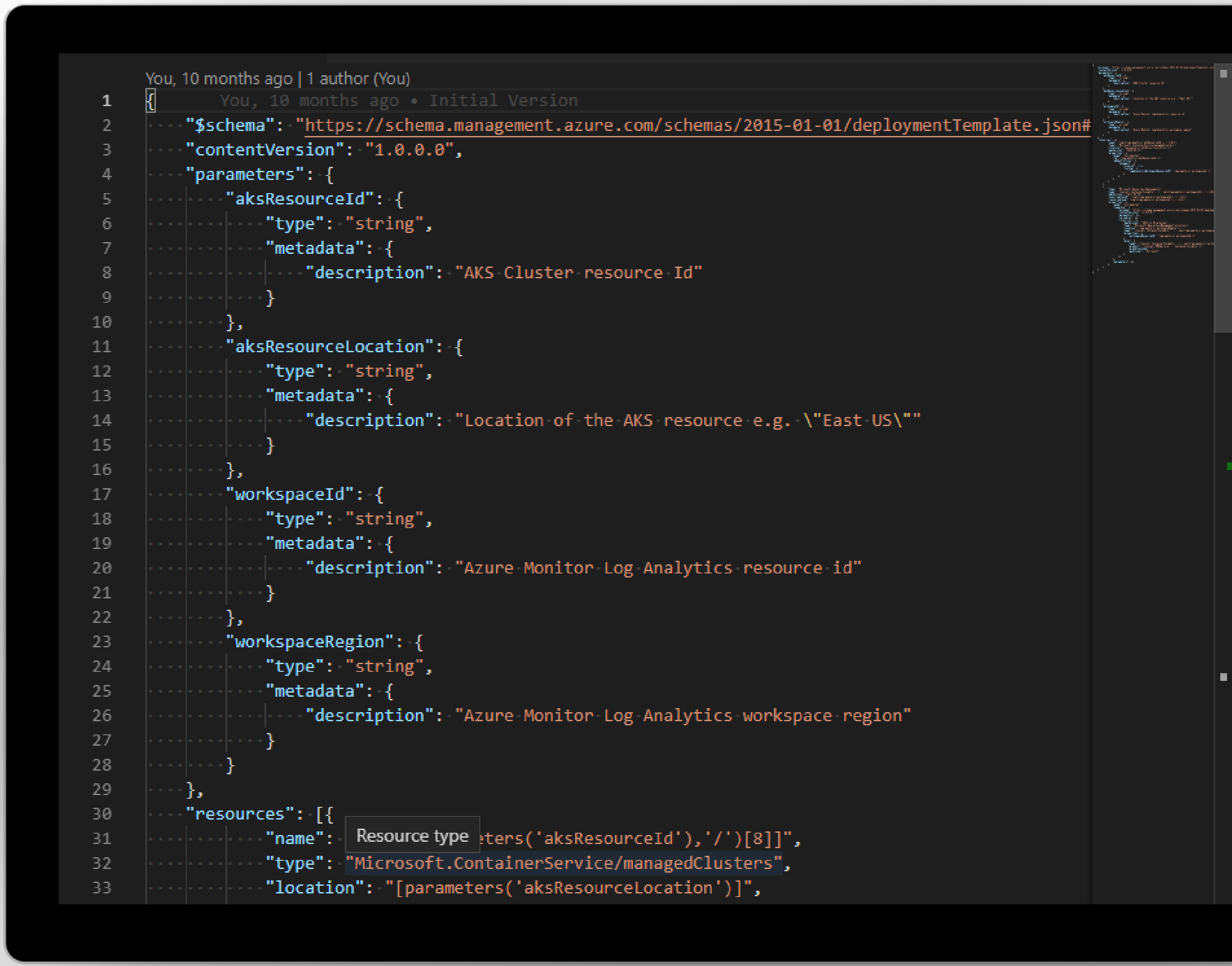
Declare how the resources should be and Azure Resource Manager “makes it so”.

JSON

ARM Templates are JSON format text files. Edit them in Visual Studio Code (or other text editors). Version control them.

Meta-Language

Contains some programming language constructs such as functions and loops.



```
You, 10 months ago | 1 author (You)
{     You, 10 months ago • Initial Version
    "$schema": "https://schema.management.azure.com/schemas/2015-01-01/deploymentTemplate.json#
    "contentVersion": "1.0.0.0",
    "parameters": {
        "aksResourceId": {
            "type": "string",
            "metadata": {
                "description": "AKS Cluster resource Id"
            }
        },
        "aksResourceLocation": {
            "type": "string",
            "metadata": {
                "description": "Location of the AKS resource e.g. \"East US\""
            }
        },
        "workspaceId": {
            "type": "string",
            "metadata": {
                "description": "Azure Monitor Log Analytics resource id"
            }
        },
        "workspaceRegion": {
            "type": "string",
            "metadata": {
                "description": "Azure Monitor Log Analytics workspace region"
            }
        }
    },
    "resources": [{
            "name":  Resource type ters('aksResourceId'),'/')[8]]",
            "type": "Microsoft.ContainerService/managedClusters",
            "location": "[parameters('aksResourceLocation')]",
```

https://docs.microsoft.com/en-us/azure/templates/

Features of ARM Templates

Parameterized

Parameters can be used to configure resource attributes at deployment time. Allows generalization and re-use of ARM Templates.

Modular

Templates can be broken into smaller, re-usable components and **linked** together at deployment time by using **Deployment** resources.

Templates can also be **nested** inside other templates.

Idempotent

Resources will only be changed or created if they have drifted out of state or need to be updated or created.

Testable

Templates can be validated prior to deployment.

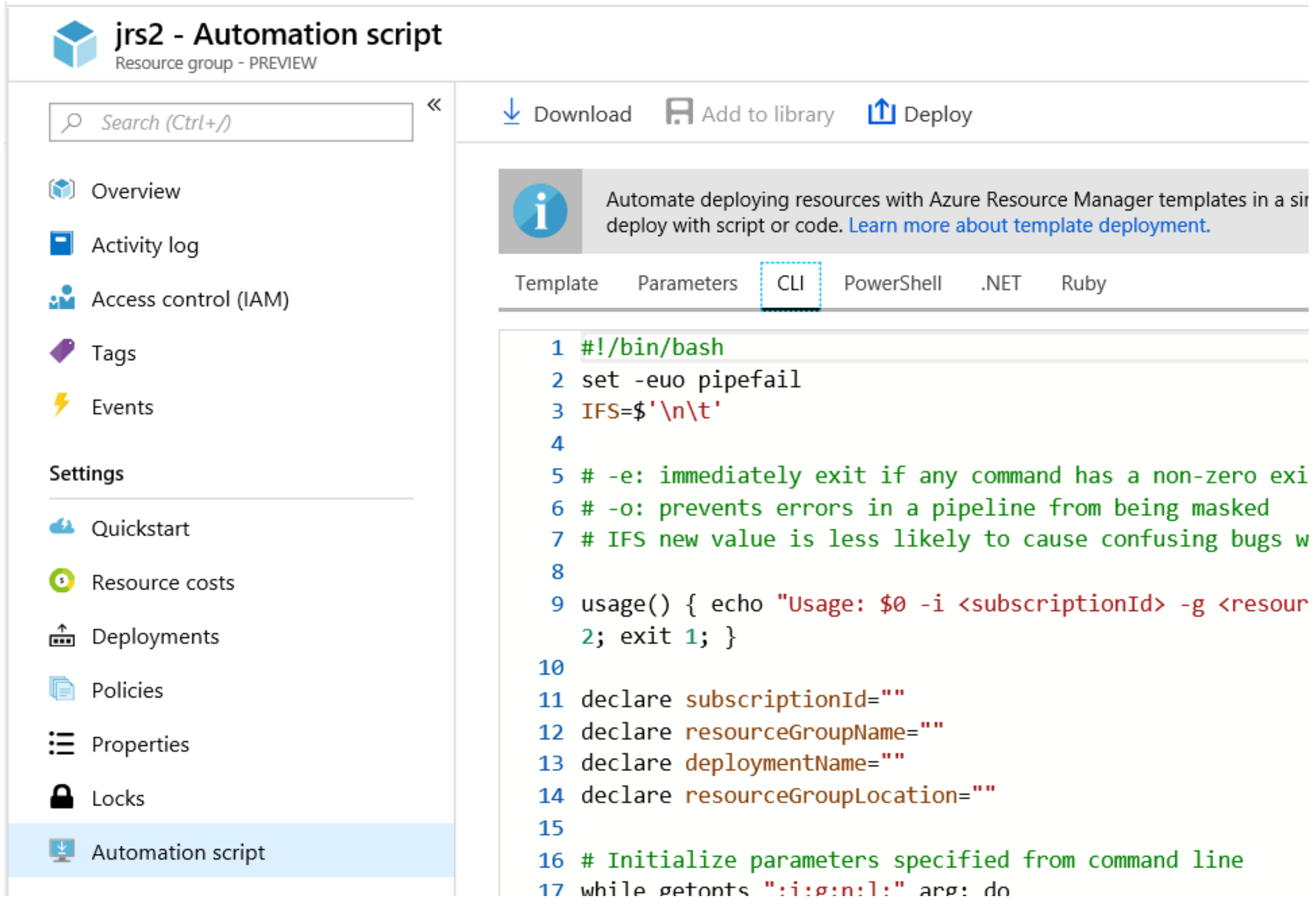
Version Control

Using ARM Templates with version control allows your infrastructure to be reviewable, traceable and auditable.

https://docs.microsoft.com/en-us/azure/azure-resource-manager/template-best-practices

Getting started with ARM Templates

- Automation Script
  - Generates a NEW ARM template
  - Simple, extendable patterns for
    - Azure CLI w/ Bash
    - Azure PowerShell
    - .NET
    - Ruby
  - Not all resource types supported
  - Good starting point for automation exploration
  - Represents the current state of the RG
- Deployments
  - Uses previous ARM template
  - More reliable
  - Does not include changes post-deployment



Automate deploying resources with Azure Resource Manager templates in a si
deploy with script or code. Learn more about template deployment.

```
#!/bin/bash
set -euo pipefail
IFS=$'\n\t'

# -e: immediately exit if any command has a non-zero exi
# -o: prevents errors in a pipeline from being masked
# IFS new value is less likely to cause confusing bugs w

usage() { echo "Usage: $0 -i <subscriptionId> -g <resour
2; exit 1; }

declare subscriptionId=""
declare resourceGroupName=""
declare deploymentName=""
declare resourceGroupLocation=""

# Initialize parameters specified from command line
while getopts ":i:g:n:l:" arg; do
```

The journey of an Azure User

Crawl

Manually create and manage resources in **Azure Portal** or **QuickStart**

Walk

Automate deployment of Azure resources using **Infrastructure as Code**.

E.g. **ARM templates**, PowerShell or Terraform.

Run

Orchestrate deployment of Azure resources using CI/CD tools.

E.g. **Azure DevOps** or Jenkins.

Compliance

What is in my environment?

What is my environment's current state?

What changed in my environment?

- Inventory
- Change Tracking
- State Management

Change Tracking
Detect server changes

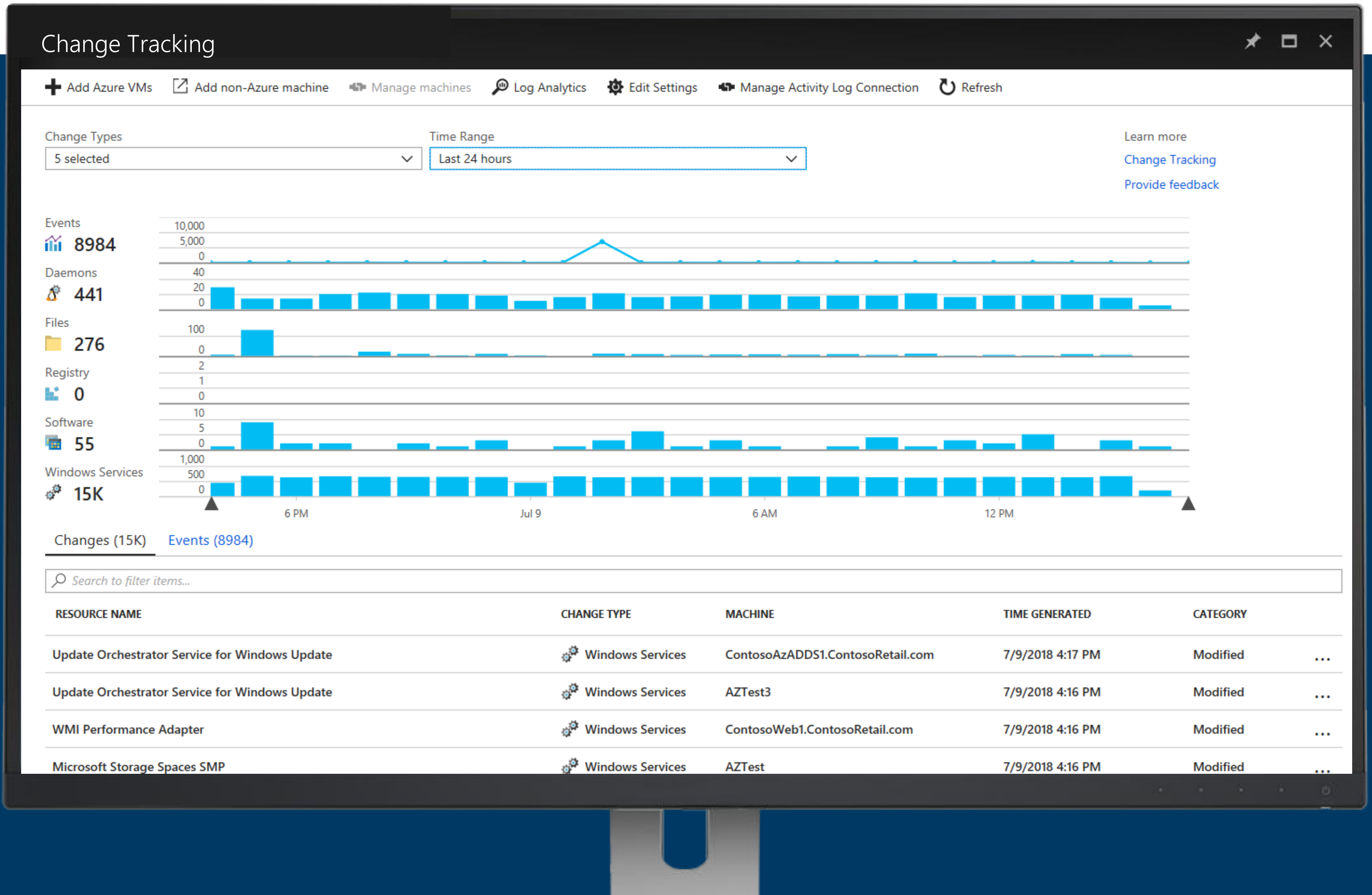
Detect changes to your machines

- Software
- Services/Daemons
- Files
- Registries

View changes when troubleshooting

Alert on critical changes

Difference in Inventory snapshots


Change Tracking

Add Azure VMs | Add non-Azure machine | Manage machines | Log Analytics | Edit Settings | Manage Activity Log Connection | Refresh

Change Types: 5 selected

Time Range: Last 24 hours

Learn more
Change Tracking
Provide feedback

Events 8984
Daemons 441
Files 276
Registry 0
Software 55
Windows Services 15K

Changes (15K) | Events (8984)

Search to filter items...

RESOURCE NAME	CHANGE TYPE	MACHINE	TIME GENERATED	CATEGORY
Update Orchestrator Service for Windows Update	Windows Services	ContosoAzADDS1.ContosoRetail.com	7/9/2018 4:17 PM	Modified
Update Orchestrator Service for Windows Update	Windows Services	AZTest3	7/9/2018 4:16 PM	Modified
WMI Performance Adapter	Windows Services	ContosoWeb1.ContosoRetail.com	7/9/2018 4:16 PM	Modified
Microsoft Storage Spaces SMP	Windows Services	AZTest	7/9/2018 4:16 PM	Modified

Processes Automation
Automate redundant, error-prone processes

Orchestrate tasks for your environment

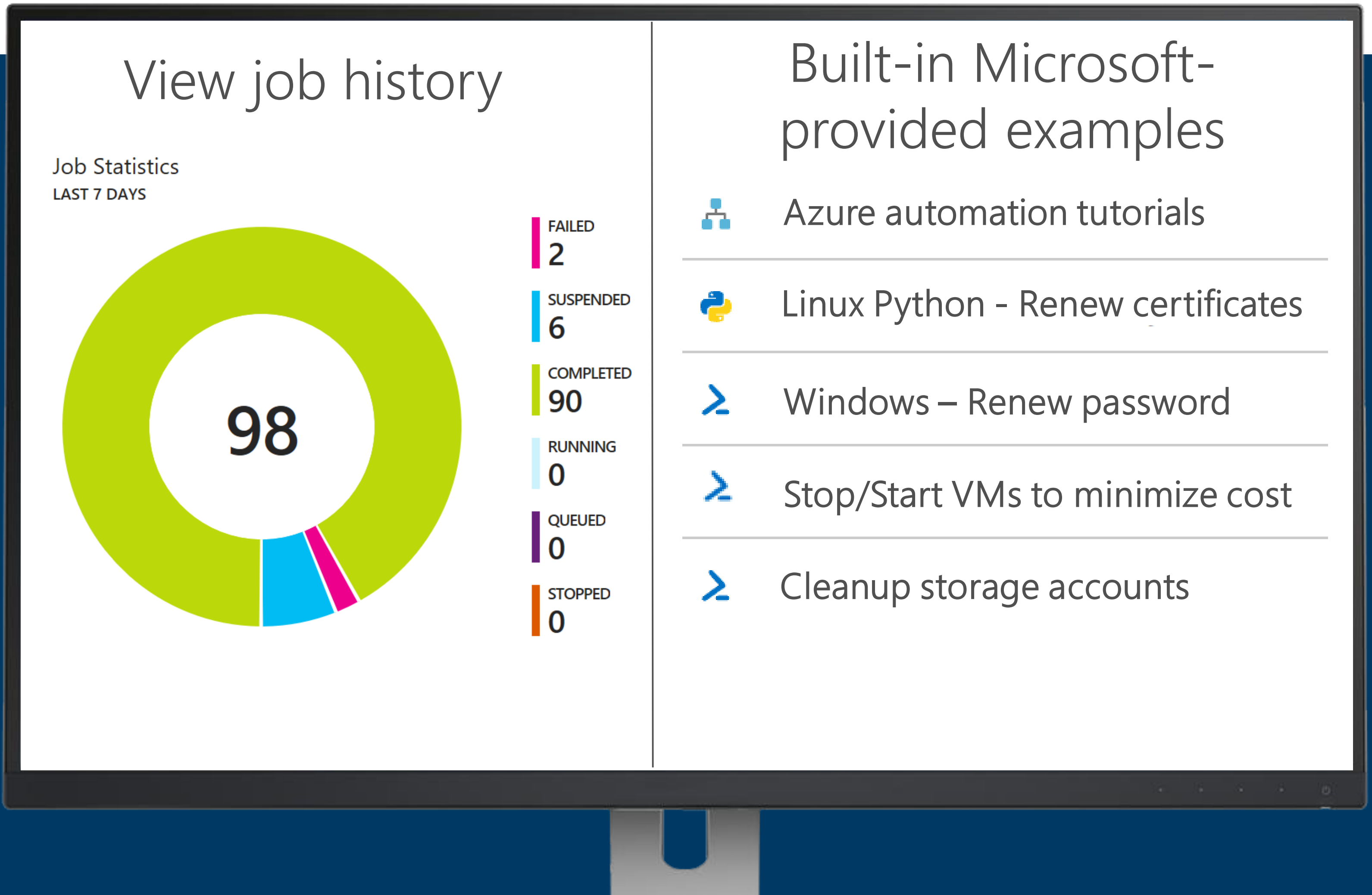
- Optimize consumption (Stop/Start VMs)
- Cleanup and maintenance tasks

Runtime environment

- Azure - using the automation service
- On-prem - using on-prem machines

Deploy Python2 and PowerShell jobs

- Deploy from the Azure portal, REST API, PowerShell Cmdlets, schedules, a webhook URL, Azure alerts, and more



View job history

Job Statistics
LAST 7 DAYS

98

FAILED	2
SUSPENDED	6
COMPLETED	90
RUNNING	0
QUEUED	0
STOPPED	0

Built-in Microsoft-provided examples

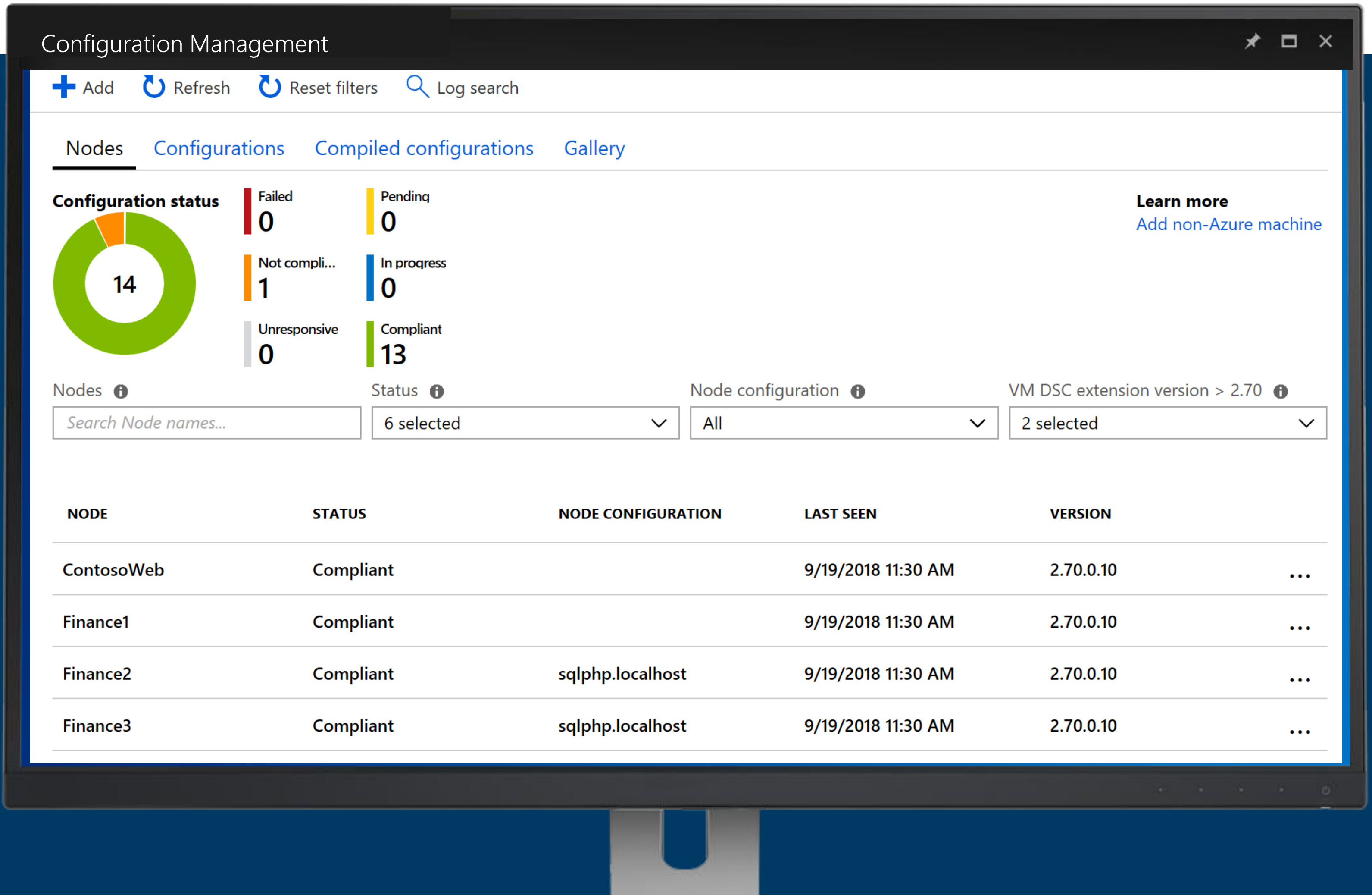
- Azure automation tutorials
- Linux Python - Renew certificates
- Windows – Renew password
- Stop/Start VMs to minimize cost
- Cleanup storage accounts

Configuration Management (DSC)
Set and control your configuration as code

Manage the configuration of your operating system and application settings

View compliance reports at scale from across your environment

Centrally store configurations and dependent modules



Failed	0	Pending	0
Not compli...	1	In progress	0
Unresponsive	0	Compliant	13

Nodes: Search Node names...
Status: 6 selected
Node configuration: All
VM DSC extension version > 2.70: 2 selected

NODE	STATUS	NODE CONFIGURATION	LAST SEEN	VERSION	
ContosoWeb	Compliant		9/19/2018 11:30 AM	2.70.0.10	...
Finance1	Compliant		9/19/2018 11:30 AM	2.70.0.10	...
Finance2	Compliant	sqlphp.localhost	9/19/2018 11:30 AM	2.70.0.10	...
Finance3	Compliant	sqlphp.localhost	9/19/2018 11:30 AM	2.70.0.10	...

References

Azure Cloud Shell

https://shell.azure.com/

Features & tools for Azure Cloud Shell

https://docs.microsoft.com/en-us/azure/cloud-shell/features

Cloud Shell from docs.microsoft.com

https://docs.microsoft.com/en-us/powershell/azure/azureps-vm-tutorial?view=azps-2.2.0

Microsoft Learn (Sandboxes and Cloud Shell)

https://docs.microsoft.com/en-us/learn/

Microsoft

Thank you