
AWS
re:Invent
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STG402

How to improve your database agility with Amazon FSx

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Agenda

1. Data growth
2. Amazon RDS/self-managed
3. Why Amazon FSx file systems for databases?
4. Demo
5. Q&A throughout!

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Data growth

175 ZB by 2025

1. RPO/RTO
2. Backup windows
3. Access for development
4. Testing/patching
5. Analytics access
6. Cost/copy data management



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Amazon RDS/self-managed

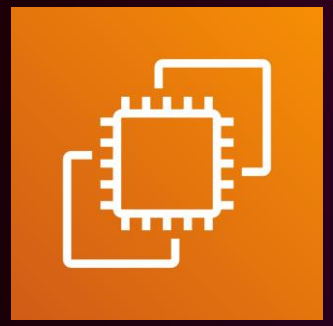
WHY DO SOME CUSTOMERS SELF-MANAGE?

Managed



Amazon RDS

Self-managed



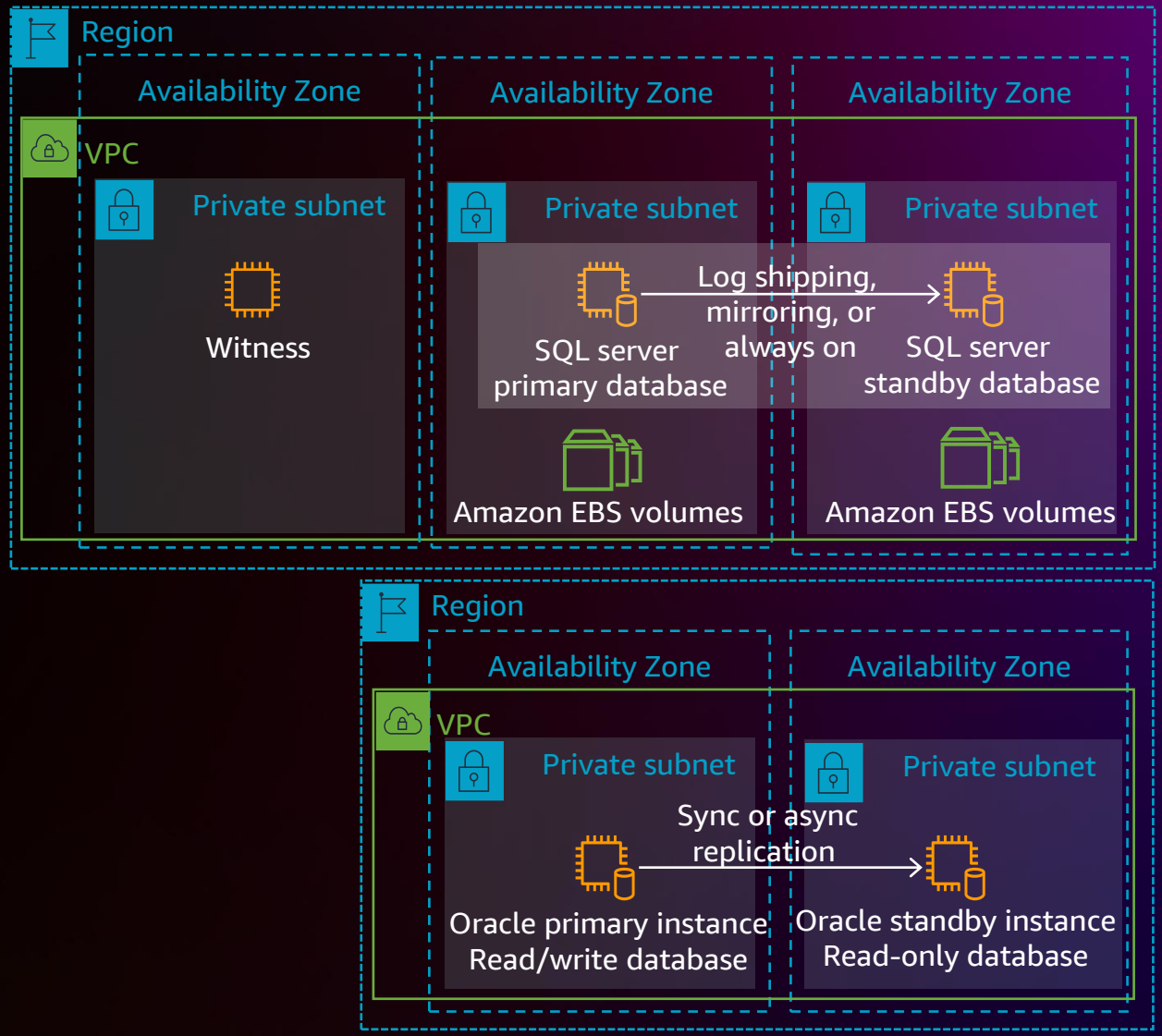
Amazon EC2

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Amazon RDS/self-managed

WHY DO SOME CUSTOMERS SELF-MANAGE?

- License implications
- Traditional application
- Simplified failover
- Lift and shift
- If the database size and performance needs exceed Amazon RDS
- Specific database version
- Need full control over the database

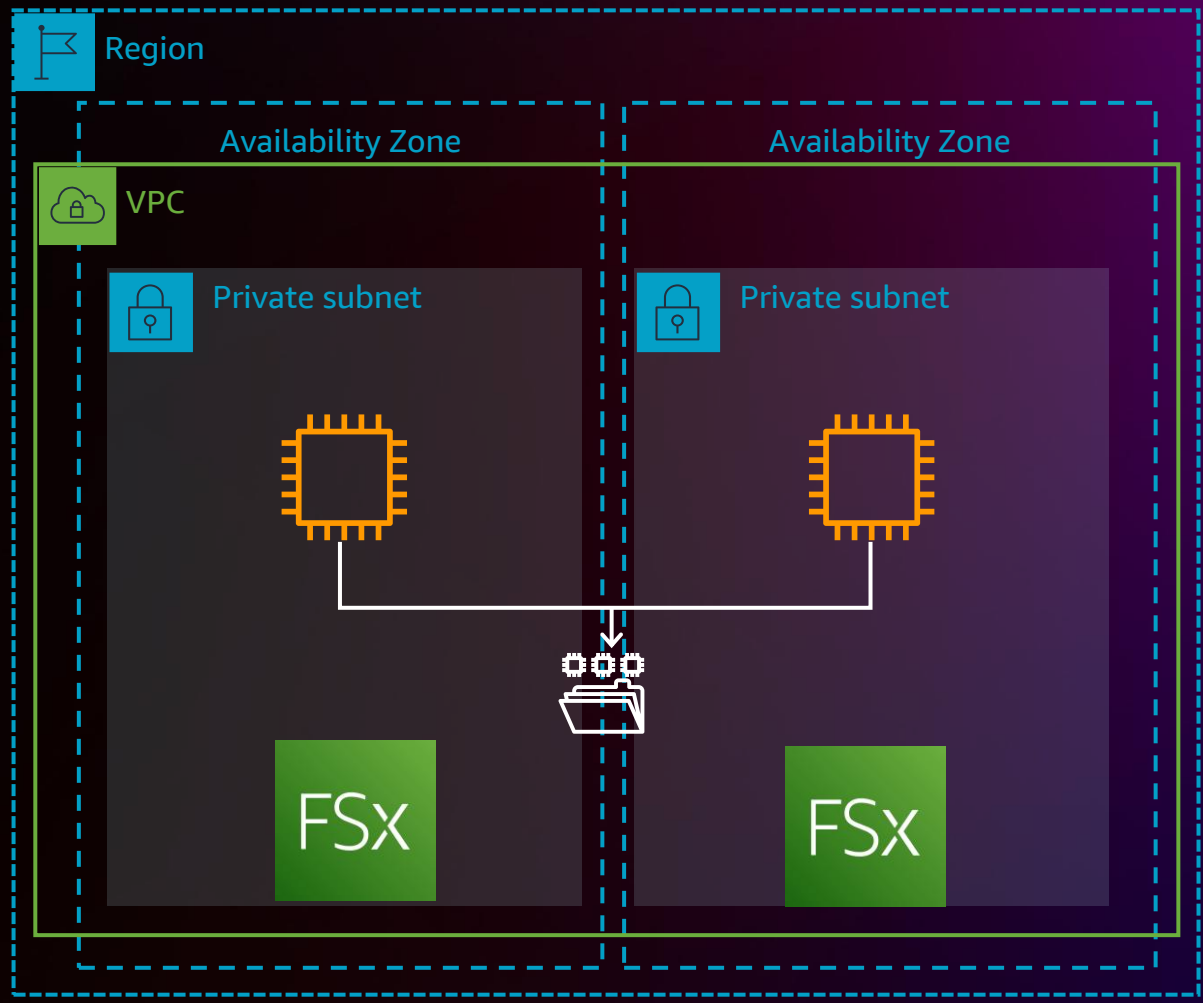


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Amazon FSx for SQL

WHY AMAZON FSx?

- **Instance-level protection versus database-level protection**
- **License cost efficiency**: you need the Enterprise Edition license of SQL Server to run AGs, whereas you only need the Standard Edition license to run FCIs
- **DTC feature support**
- https://go.aws/3FNyUHQ



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Amazon FSx for NetApp ONTAP

THE ONLY COMPLETE, FULLY MANAGED NETAPP FILE SYSTEM IN THE CLOUD



Amazon FSx for NetApp ONTAP



Delivers the easiest path to migrate or extend existing NetApp deployments to the cloud



Leverages ONTAP’s data management capabilities and multi-protocol support



Optimize data efficiently with ONTAP snapshots, cloning, and built-in data compression and deduplication and optimize costs with automatic tiering

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Amazon FSx for OpenZFS

DELIVERS THE EASIEST PATH TO MIGRATE EXISTING LINUX FILE SERVER SETUPS



Amazon FSx for OpenZFS



Migrate ZFS and other Linux-based file servers



Up to 1 million IOPS at latencies of just a few hundred microseconds



Leverage ZFS snapshots and cloning to run data-intensive workloads like ML and financial analytics

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Pearson reduced RTO/RPO from hours to minutes

"As a fully managed service, FSx for NetApp ONTAP removed the operational overhead of our physical IT infrastructure freeing us to focus more on our application data and drive more value for our customers. With FSx for ONTAP, we **refreshed our data 10x faster**. We also **increased financial and HR job performance by 3x**."

Norm Nadeau
VP of Site Reliability Engineering, Pearson

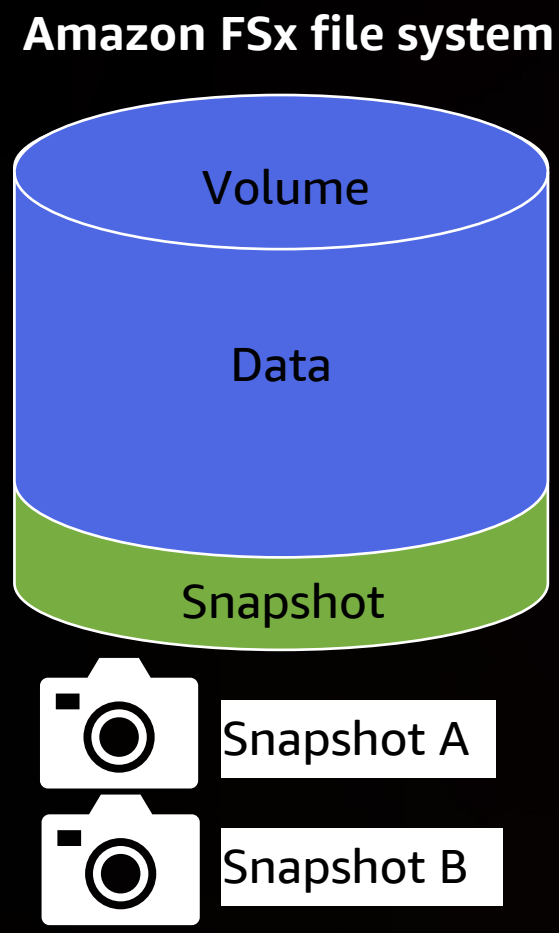


Pearson Education

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Data protection: Volume snapshots



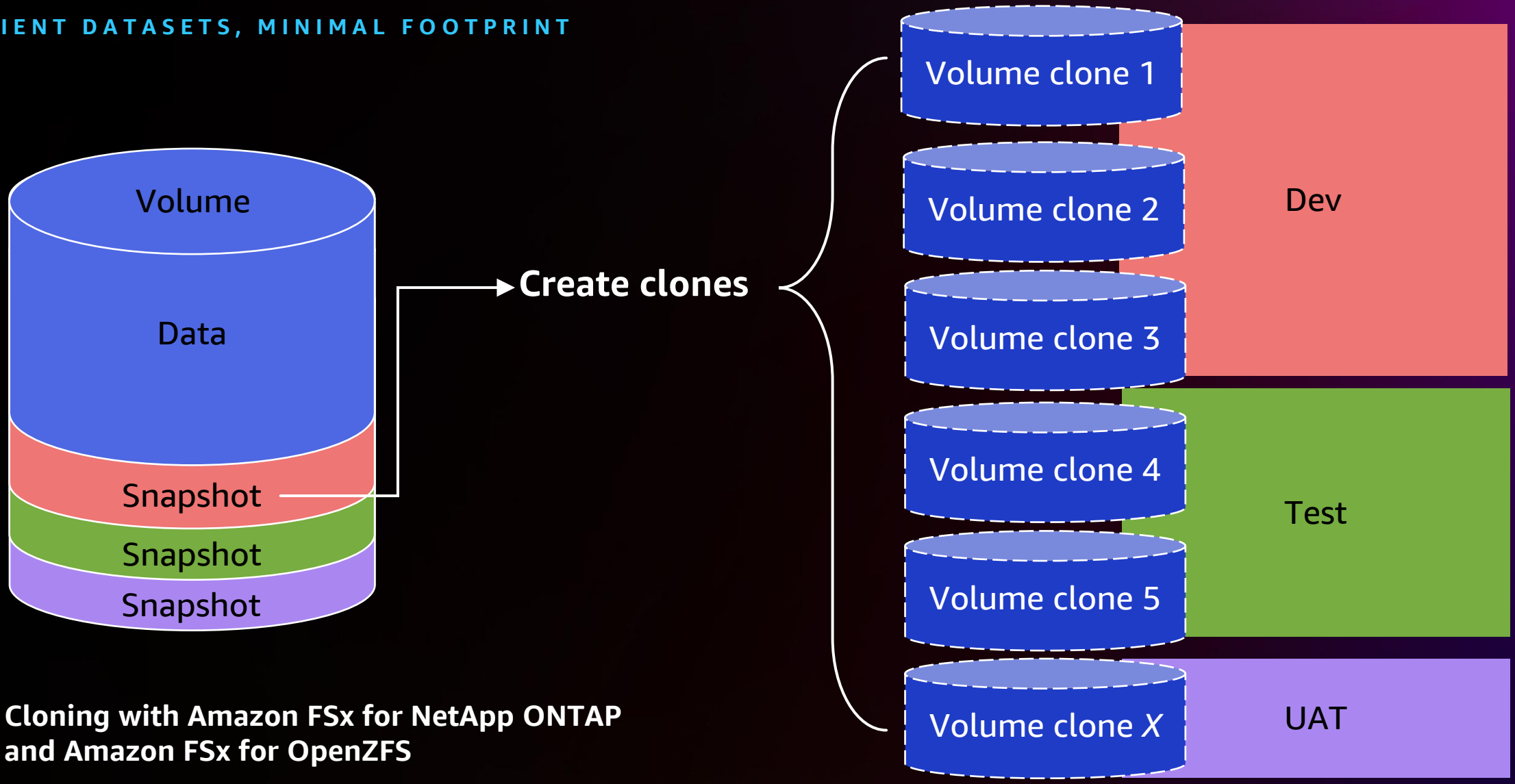
Snapshots

- Fast to create
- Shorter-term recovery
- Internal, stored on file system volume
- Built-in, automatic or user-scheduled snapshots
- Individual file or entire volume restore
- Crash-consistent and incremental

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Volume cloning with Amazon FSx

EFFICIENT DATASETS, MINIMAL FOOTPRINT

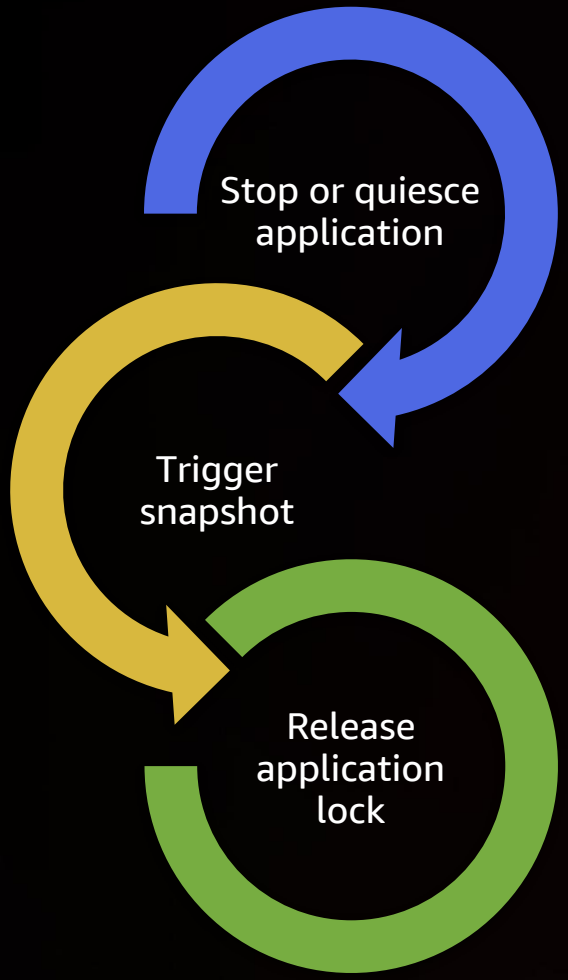


Cloning with Amazon FSx for NetApp ONTAP and Amazon FSx for OpenZFS

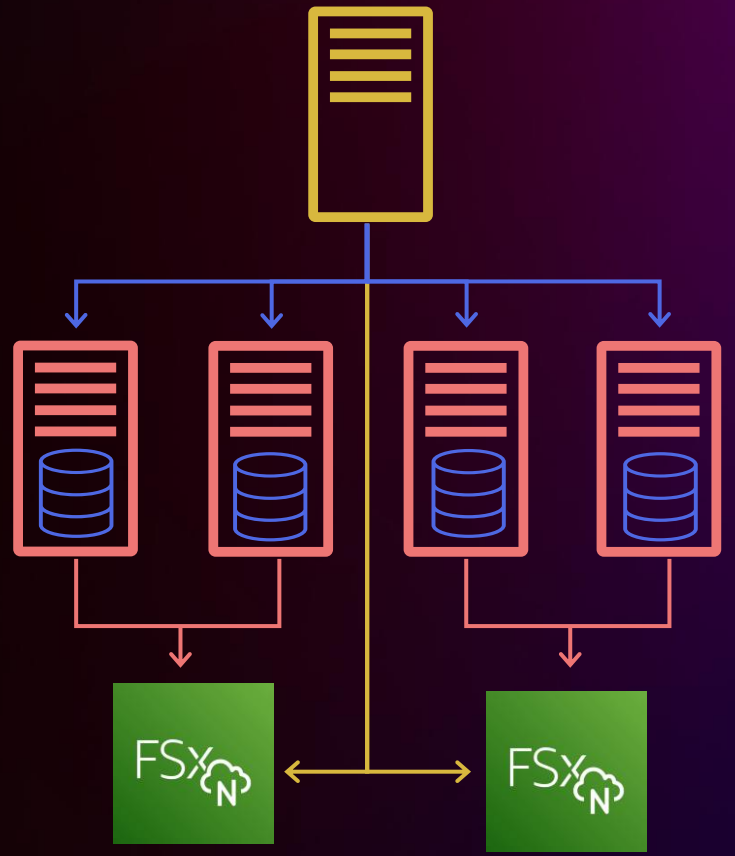
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Ensuring an application consistent snapshot

SCRIPTED VS SNAPCENTER



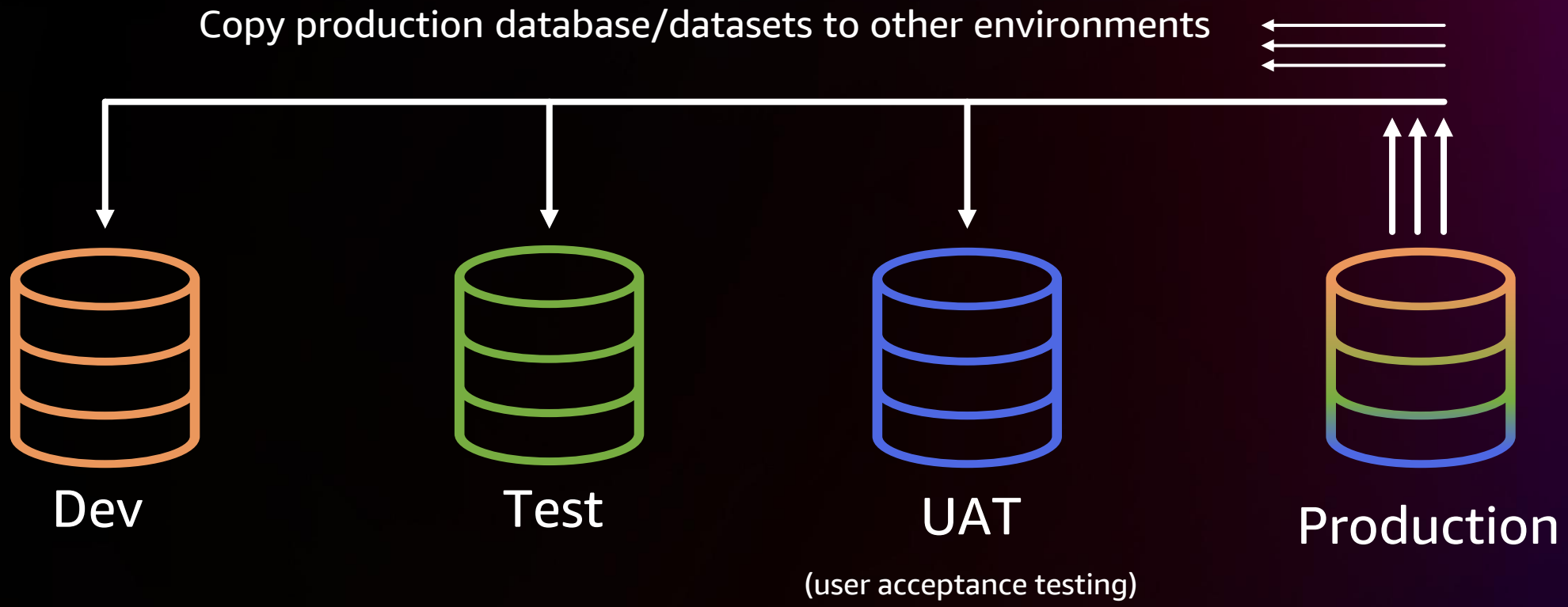
NetApp SnapCenter



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Refreshing development environments



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The process burden

We want to maintain more versions. We want to copy, sync, dump, transfer, custom scripts; we are always waiting on others.

App/DB/development/test teams

But we have network saturation, performance issues, backup window conflicts, storage capacity, server/compute limitations.

Infrastructure teams

The process can take hours, days, weekends to refresh

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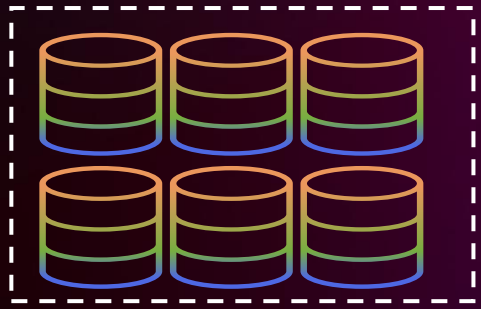
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Volume cloning benefits

ACCESS MORE DATA MORE OFTEN

- Create multiple space-efficient, minimal-footprint copies of your datasets
- Writable, point-in-time copies of a volume
- Share data blocks with parent volume
- Consume no storage until changes are made
- Fast – created almost instantly
- You can then split a clone into its own independent volume

Multiple datasets (without cloning)



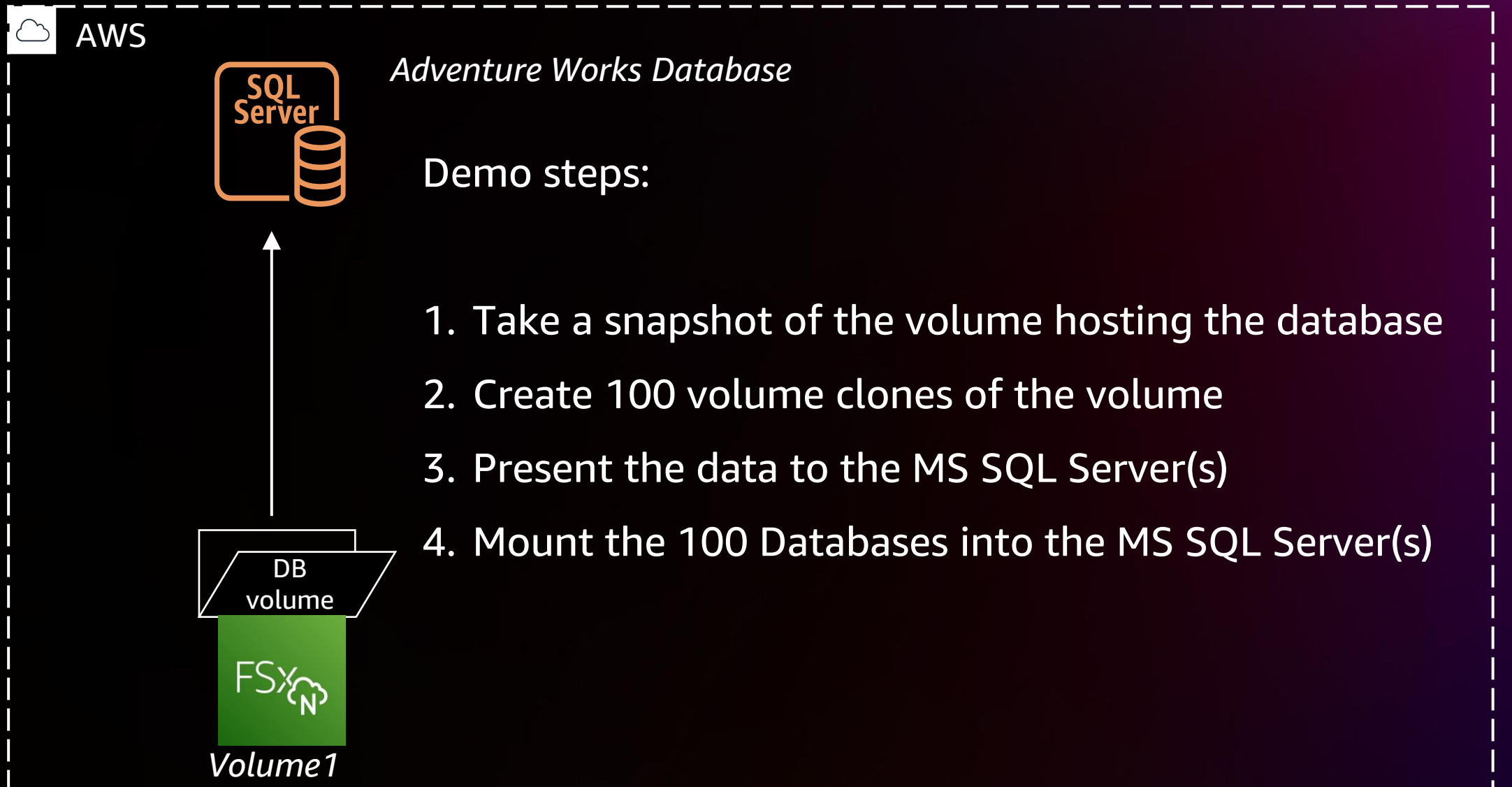
Multiple datasets (with clones)



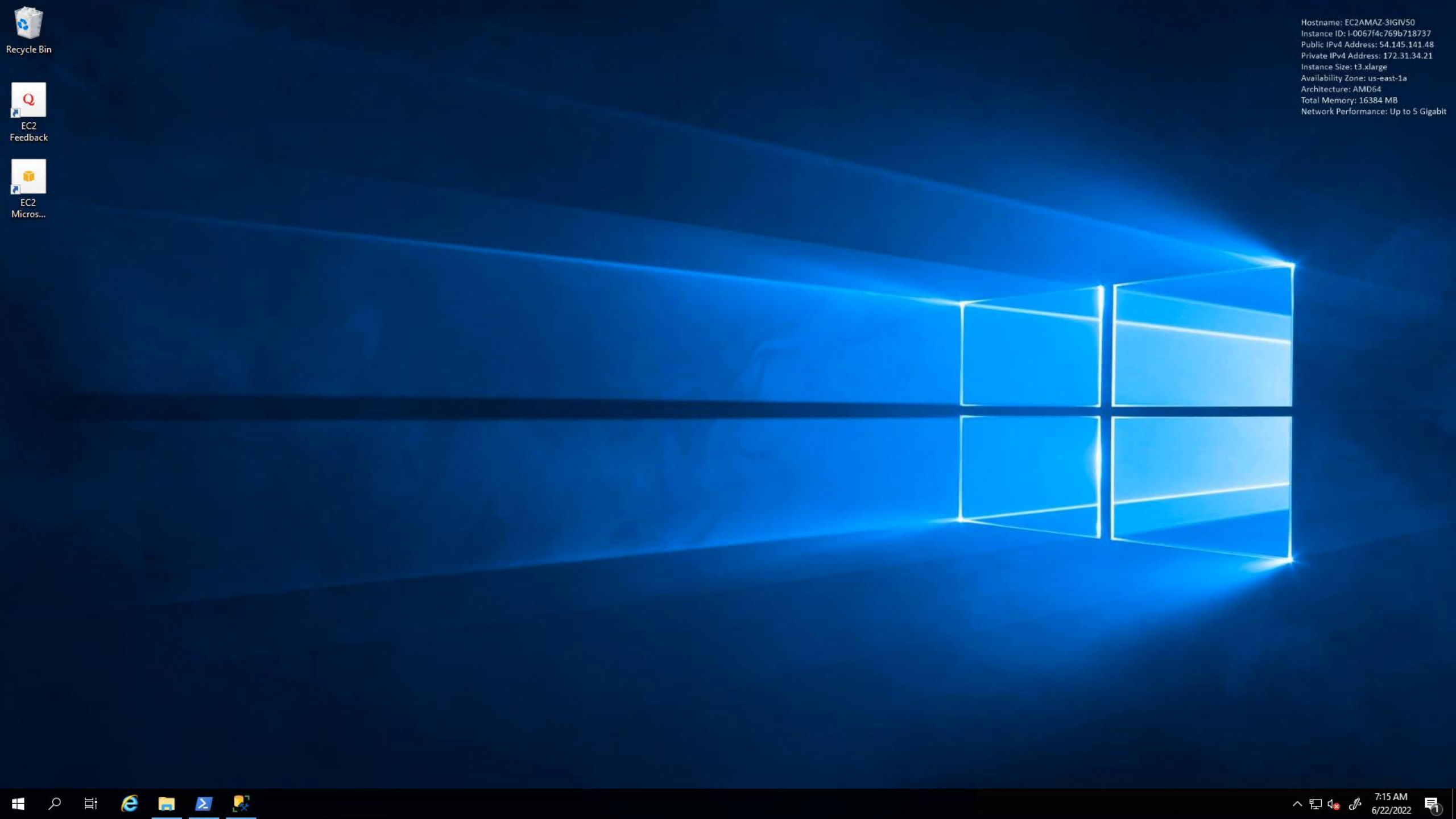
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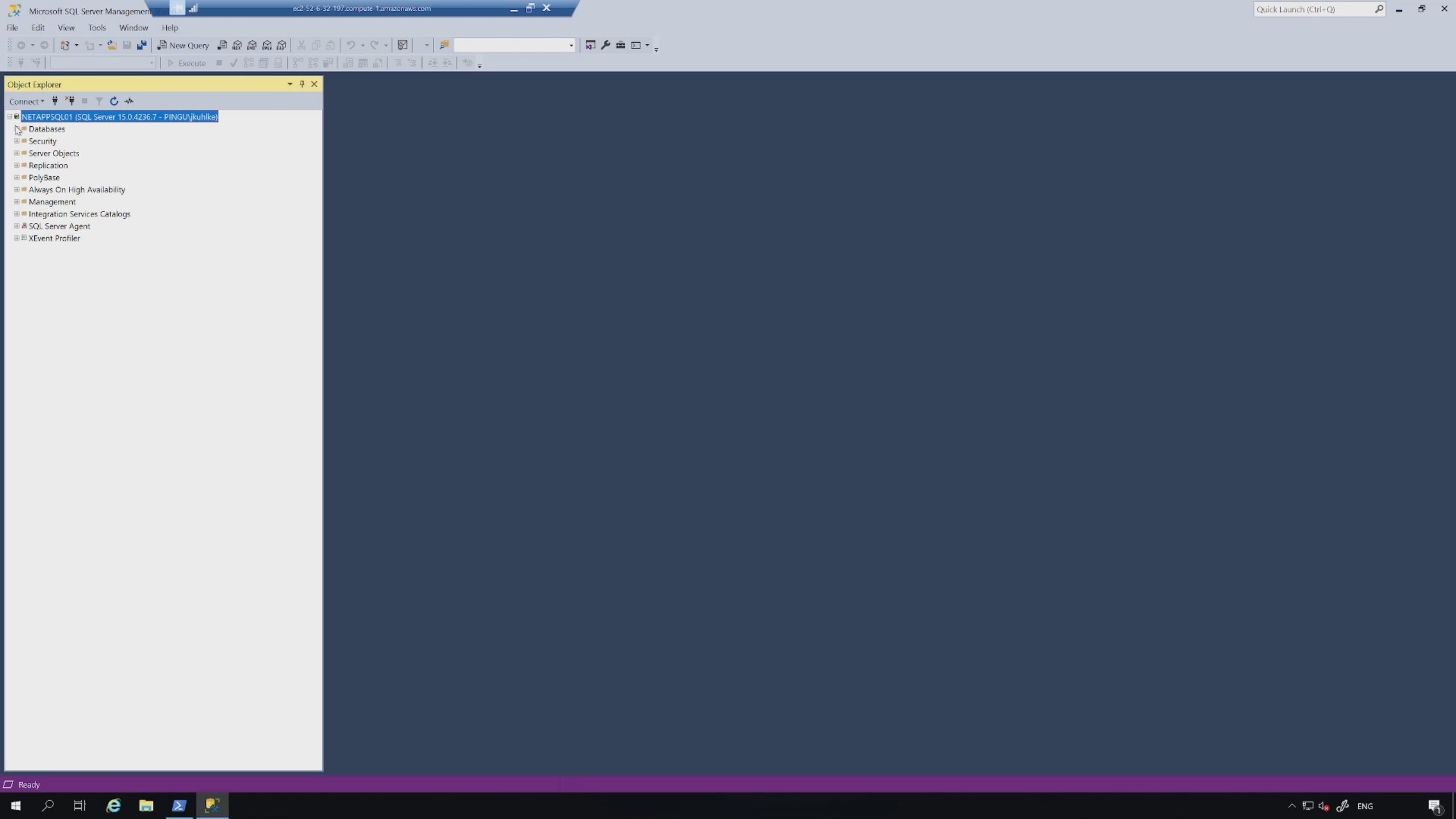
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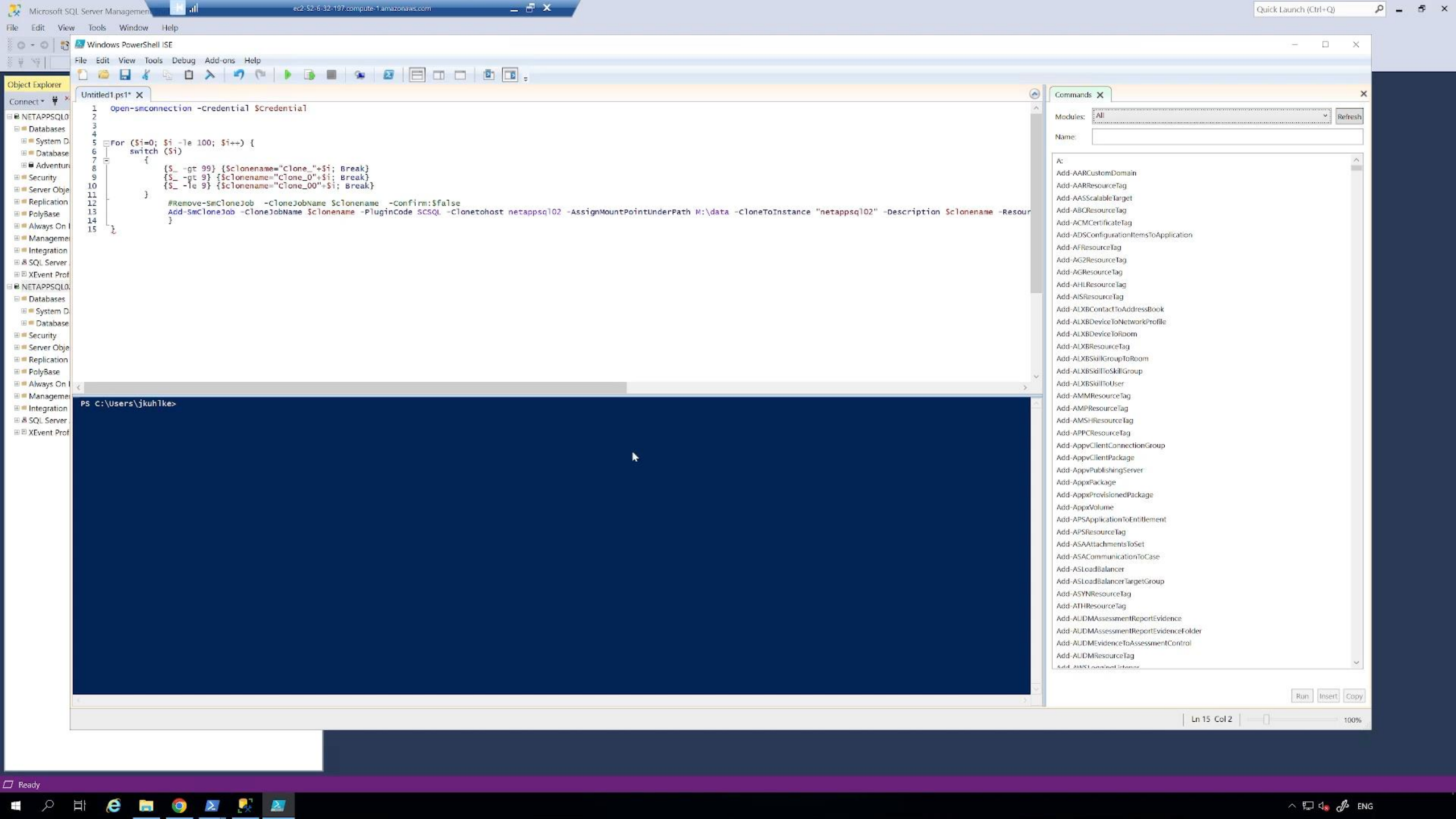
Demo

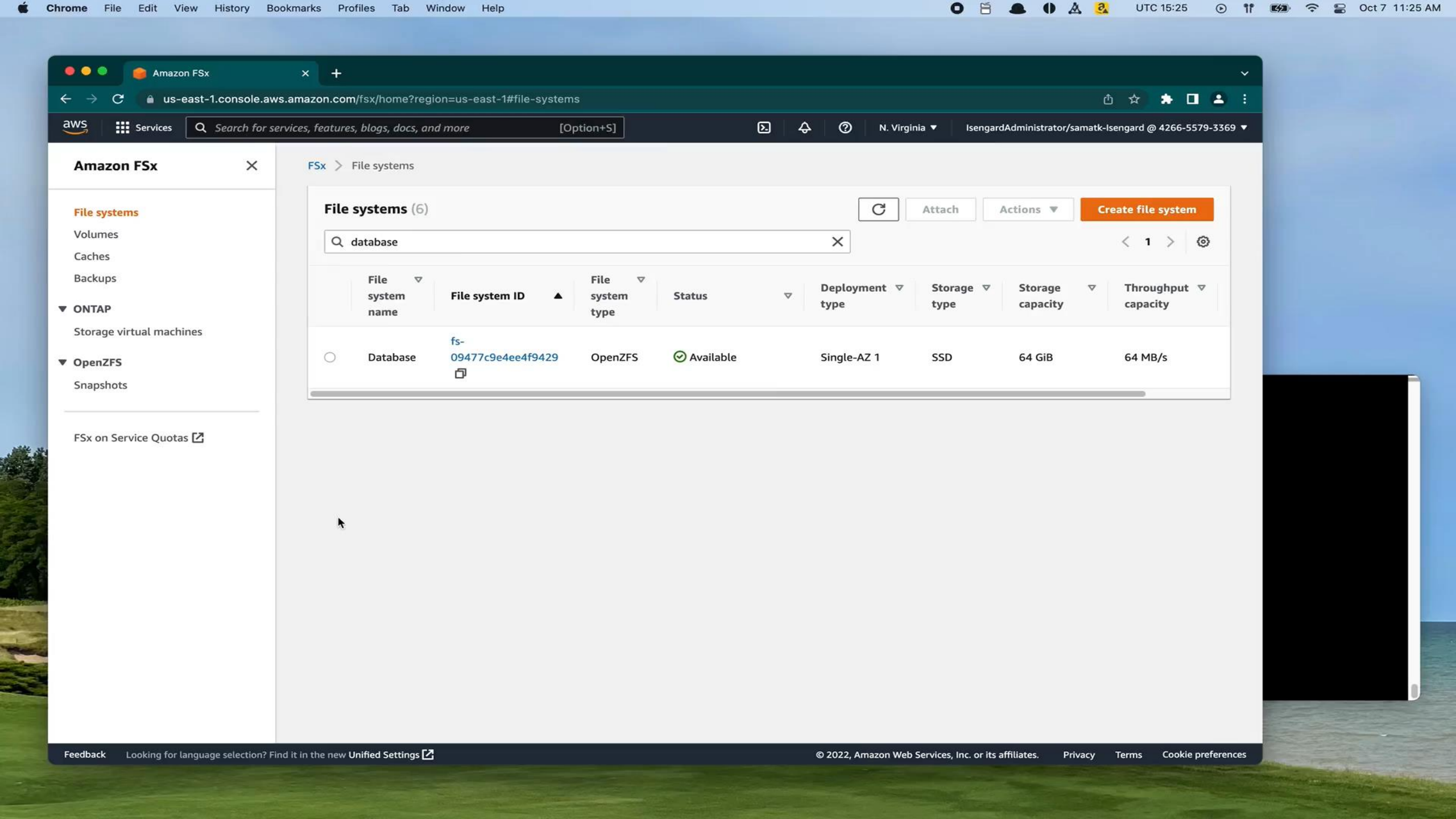


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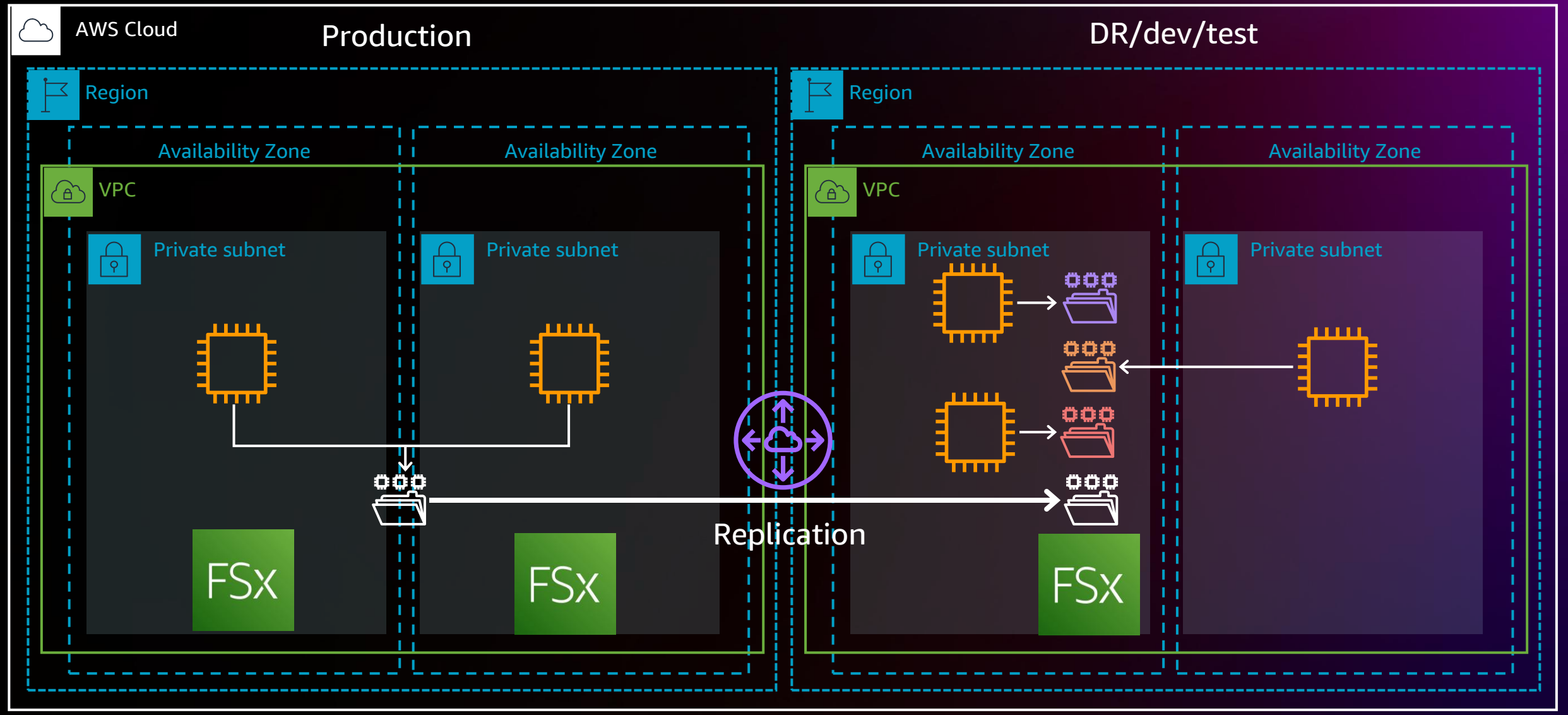

Recycle Bin
EC2 Feedback
EC2 Micros...
Hostname: EC2AMAZ-3IGIV50
Instance ID: i-0067f4c769b718737
Public IPv4 Address: 54.145.141.48
Private IPv4 Address: 172.31.34.21
Instance Size: t3.xlarge
Availability Zone: us-east-1a
Architecture: AMD64
Total Memory: 16384 MB
Network Performance: Up to 5 Gigabit
7:15 AM
6/22/2022


Microsoft SQL Server Management Studio
ec2-52-6-32-197.compute-1.amazonaws.com
Quick Launch (Ctrl+Q)
File
Edit
View
Tools
Window
Help
New Query
Execute
Object Explorer
Connect
NETAPPSQL01 (SQL Server 15.0.4236.7 - PINGU\jkuhlke)
Databases
Security
Server Objects
Replication
PolyBase
Always On High Availability
Management
Integration Services Catalogs
SQL Server Agent
XEvent Profiler
Ready
ENG


Microsoft SQL Server Management
ec2-52-6-32-197.compute-1.amazonaws.com
Quick Launch (Ctrl+Q)
File Edit View Tools Window Help
Windows PowerShell ISE
File Edit View Tools Debug Add-ons Help
Object Explorer
Connect
Untitled1.ps1*
1 Open-smconnection -Credential $Credential
2
3
4
5 For ($i=0; $i -le 100; $i++) {
6 switch ($i)
7 {
8 {$_ -gt 99} {$clonename="Clone_"+$i; Break}
9 {$_ -gt 9} {$clonename="Clone_0"+$i; Break}
10 {$_ -le 9} {$clonename="Clone_00"+$i; Break}
11 }
12 #Remove-SmCloneJob -CloneJobName $clonename -Confirm:$false
13 Add-SmCloneJob -CloneJobName $clonename -PluginCode SCSQL -Clonetohost netappsql02 -AssignMountPointUnderPath M:\data -CloneToInstance "netappsql02" -Description $clonename -Resour
14 }
15 }
PS C:\Users\jkuhlke>
Commands
Modules: All
Refresh
Name:
A:
Add-AARCustomDomain
Add-AARResourceTag
Add-AASScalableTarget
Add-ABCResourceTag
Add-ACMCertificateTag
Add-ADSConfigurationItemsToApplication
Add-AFResourceTag
Add-AG2ResourceTag
Add-AGResourceTag
Add-AHLResourceTag
Add-AISResourceTag
Add-ALXBContactToAddressBook
Add-ALXBDeviceToNetworkProfile
Add-ALXBDeviceToRoom
Add-ALXBResourceTag
Add-ALXBSkillGroupToRoom
Add-ALXBSkillToSkillGroup
Add-ALXBSkillToUser
Add-AMMResourceTag
Add-AMPResourceTag
Add-AMSHResourceTag
Add-APPCResourceTag
Add-AppvClientConnectionGroup
Add-AppvClientPackage
Add-AppvPublishingServer
Add-AppxPackage
Add-AppxProvisionedPackage
Add-AppxVolume
Add-APSApplicationToEntitlement
Add-APSResourceTag
Add-ASAAttachmentsToSet
Add-ASACommunicationToCase
Add-ASLoadBalancer
Add-ASLoadBalancerTargetGroup
Add-ASYNResourceTag
Add-ATHResourceTag
Add-AUDMAssessmentReportEvidence
Add-AUDMAssessmentReportEvidenceFolder
Add-AUDMEvidenceToAssessmentControl
Add-AUDMResourceTag
Run
Insert
Copy
Ln 15 Col 2
100%
Ready
ENG


Chrome File Edit View History Bookmarks Profiles Tab Window Help
UTC 15:25
Oct 7 11:25 AM
Amazon FSx
us-east-1.console.aws.amazon.com/fsx/home?region=us-east-1#file-systems
aws
Services
Search for services, features, blogs, docs, and more [Option+S]
N. Virginia
IsengardAdministrator/samatk-Isengard @ 4266-5579-3369
Amazon FSx
File systems
Volumes
Caches
Backups
ONTAP
Storage virtual machines
OpenZFS
Snapshots
FSx on Service Quotas
FSx > File systems
File systems (6)
Attach
Actions
Create file system
database
1
File system name
File system ID
File system type
Status
Deployment type
Storage type
Storage capacity
Throughput capacity
Database
fs-09477c9e4ee4f9429
OpenZFS
Available
Single-AZ 1
SSD
64 GiB
64 MB/s
Feedback
Looking for language selection? Find it in the new Unified Settings
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Privacy
Terms
Cookie preferences

Mirror and clones



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Session summary

- Challenges of maintaining and refreshing dataset environments
- You can reduce operational complexity, improve agility, and lower costs by using the in-built features to clone your datasets with Amazon FSx for NetApp ONTAP and Amazon FSx for OpenZFS file systems
- Accelerate **test and development refresh cycles**
- Use snapshots and clones to address **point-in-time checkpoints (snapshots)** and for presentation of **efficient read/write datasets for dev/test/UAT (clones) – go try it out!**
- If you enjoyed this, other sessions that may be of interest include
  - STG217 – Best practices for selecting the right file system
  - PRT230 – Achieve enterprise greatness with Amazon FSx for NetApp ONTAP
  - STG342 – Protect unstructured data with Amazon file solutions

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Thank you!

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