ZERO12
a vargroup company

Learn Quickly & Think Well

Stefano Dindo

OUR MISSION

We want to be the best consultant

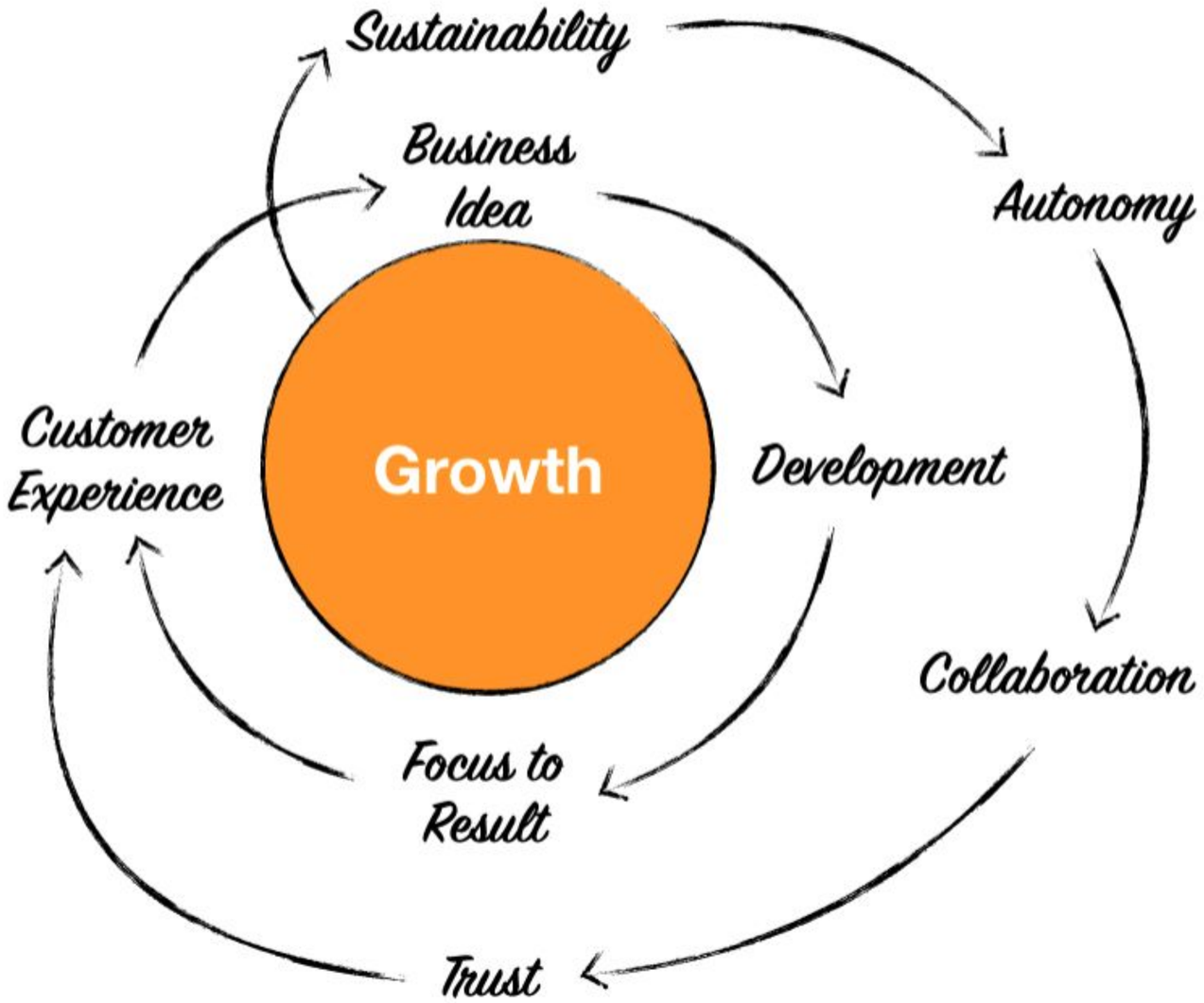
company in the world.

We want to sell value to our customer

OUR COMMITMENT

“Life is too short for bad software”

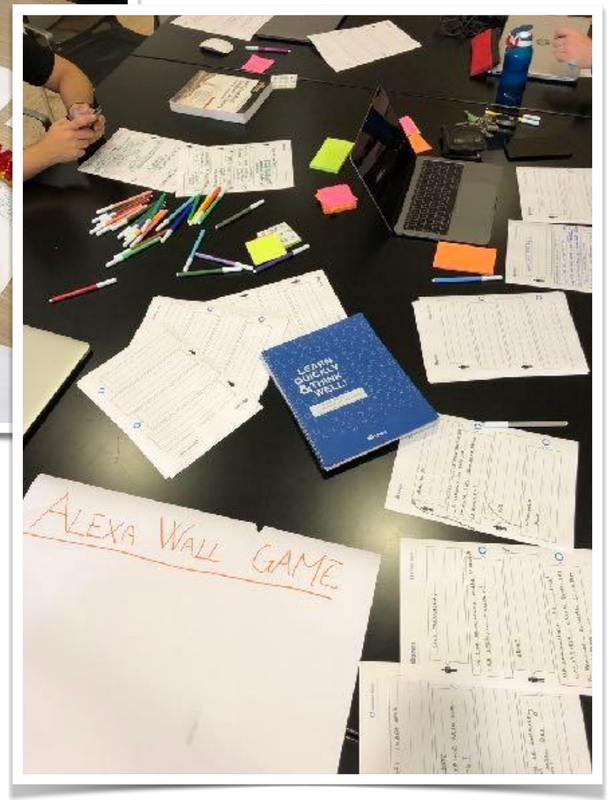
zero12 ’s Growth Flywheel



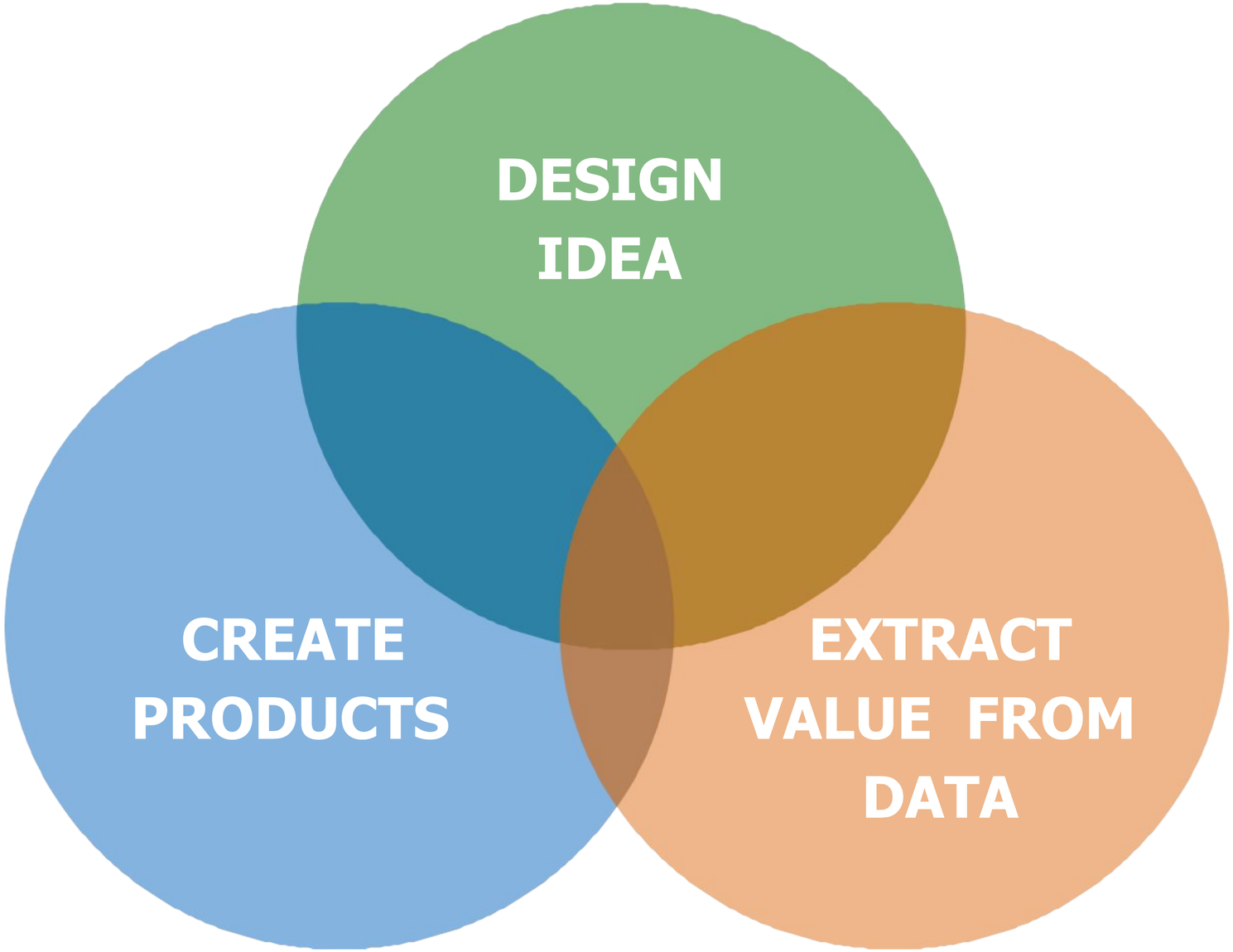
- Sustainability
- Autonomy
- Trust
- Collaboration

“All with the game, nothing for play“

Cit. Robert Baden Powell

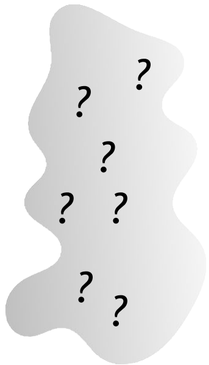


WE HELP OUR CUSTOMERS TO



OUR APPROACH

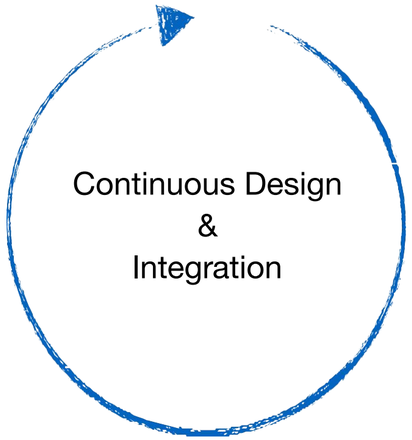
Discover



Customer & zero12
collaboration meeting
(CanvUX)

Experiment

Idea



Delivery

MVP

MVP

MVP

MVP

Users

Customer feedback

Our practice

ZERO12
a vargroup company

RECOGNIZED FOR

- 2 AWS Competencies
- 2 Partner Programs
- 4 AWS Service Validations
- 20+ AWS Certifications
- 50+ AWS Customer Launc...

ADVANCED CONSULTING PARTNER

SERVICE DELIVERY:

- Amazon EC2 for Windows server
- Amazon API Gateway
- Amazon DynamoDB
- AWS Lambda

COMPETENCY:

- SAAS consulting
- Migration consulting

STORAGE PRACTICE

6 storage-focused and solution architects

Expertise areas:

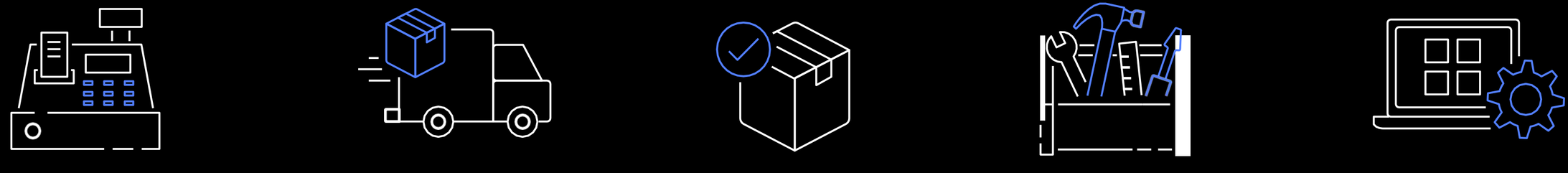
- Extension of data center storage into AWS
- Storage Advisory Services focused on migration
- Backup and recovery to AWS
- Business continuity/disaster recovery to AWS
- Primary storage options in AWS

Vertical department focused on storage.
Partnership with:

veeAM
COMMVAULT
NetApp™

AWS Storage solutions

Pain with managing on-premises storage arrays

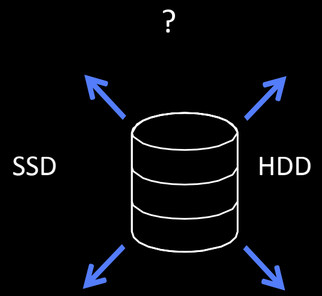


Procurement **Implementation**

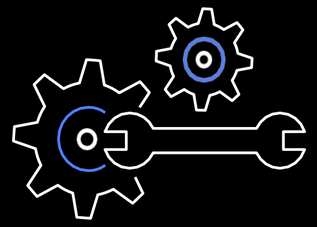
Time

Pain with managing on-premises storage arrays

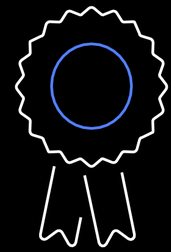
Capex



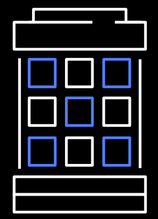
Provisioning



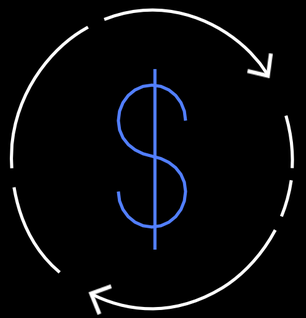
Software & maintenance



Maintenance renewals

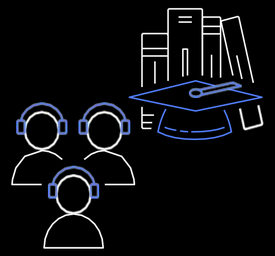


Physical



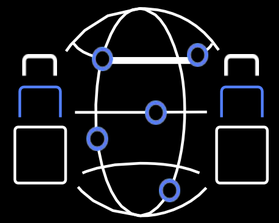
Cost

Pain with managing on-premises storage arrays

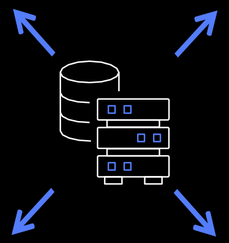


Expertise

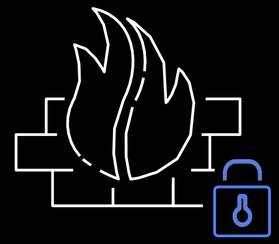
Availability



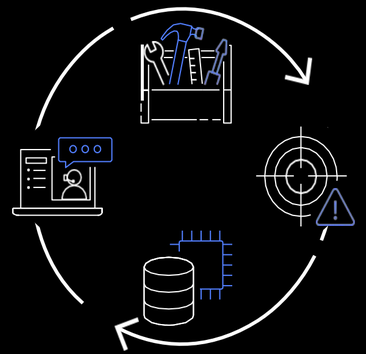
Backup & DR



Scalability



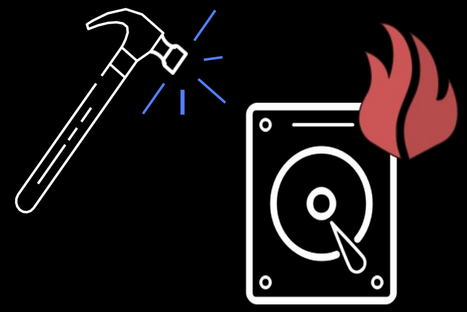
Security & compliance

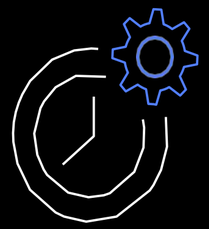


Complexity

Pain with managing on-premises storage arrays

Hardware failure?





More time

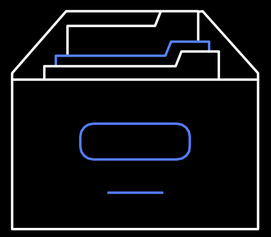
More cost

More complexity

Migration order trends

Backup / DR

High availability, backup, DR

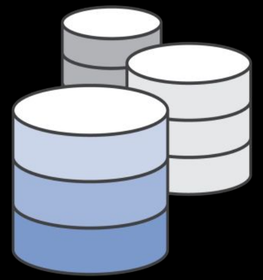


Application storage (file)

Shared application storage, media workflows (rendering, transcoding, vfx), backups, dev workflows

Home directories

User shares Office files, engineering files, etc.



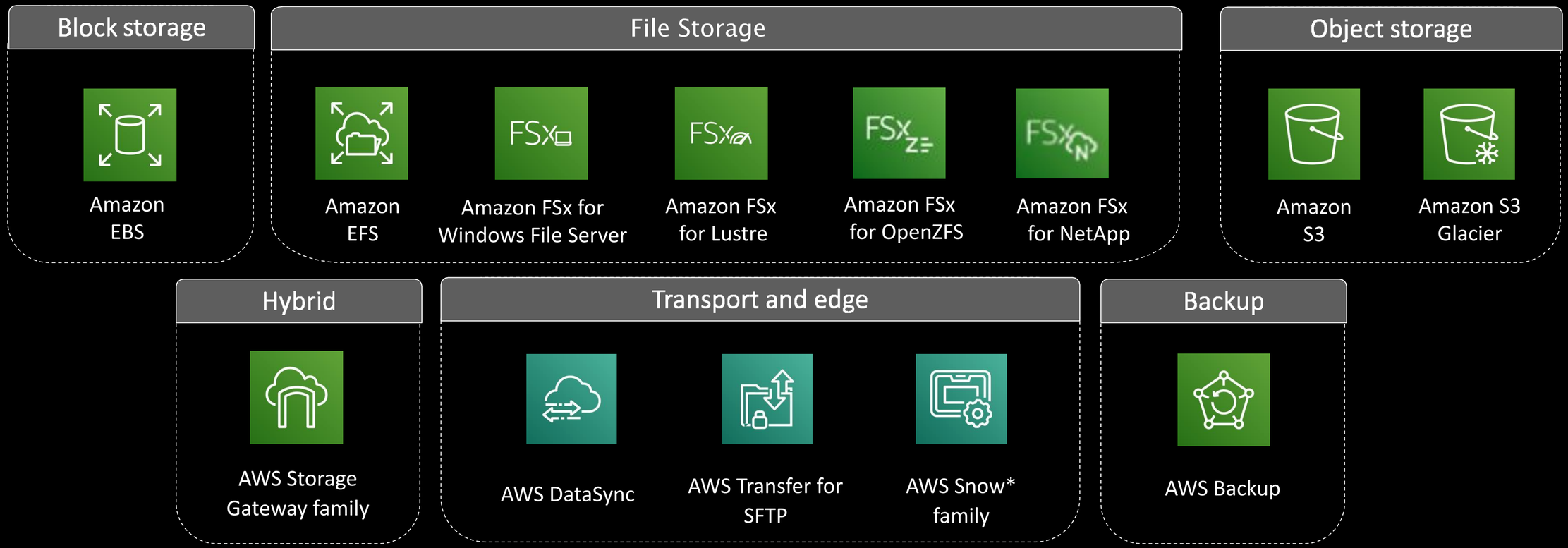
Databases

SQL, MySQL, Oracle, SAP, PostgreSQL, Cassandra, Mongo

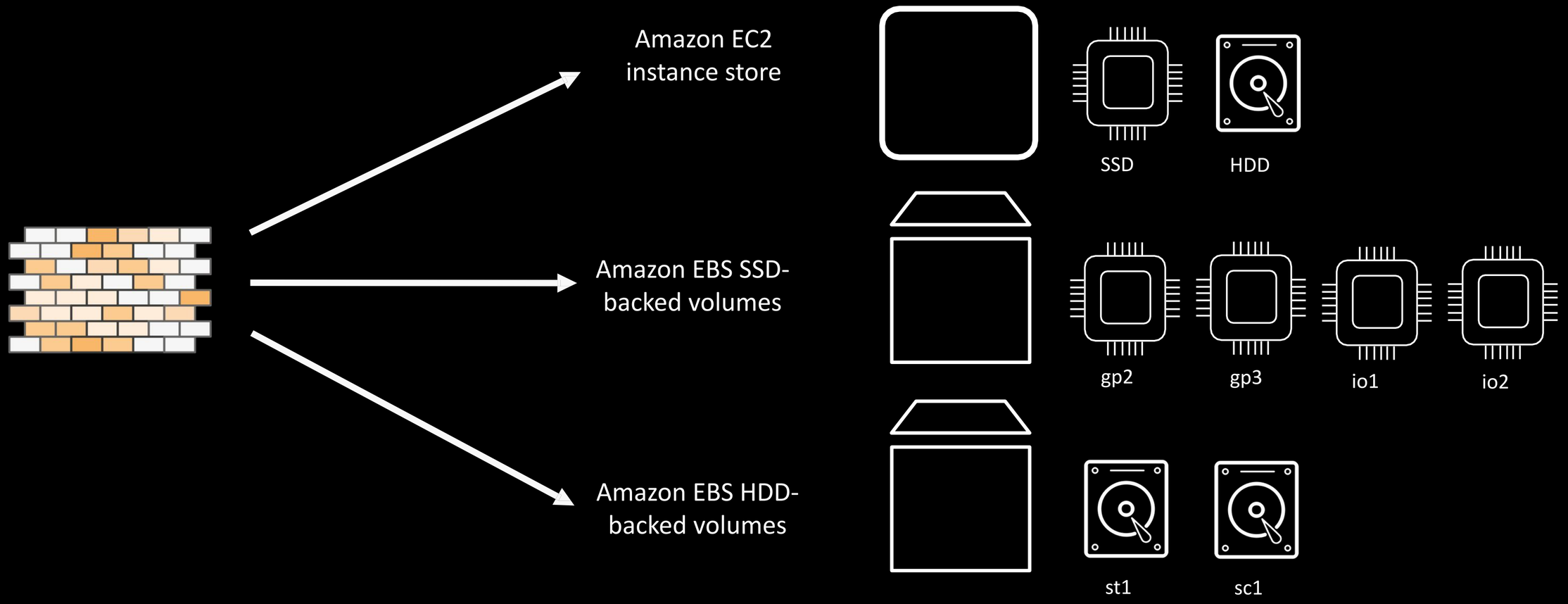
Analytics

Big data (Hadoop, Kafka, Splunk,) machine learning, HPC

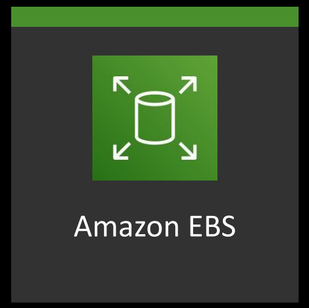
AWS storage solutions



AWS block storage offerings



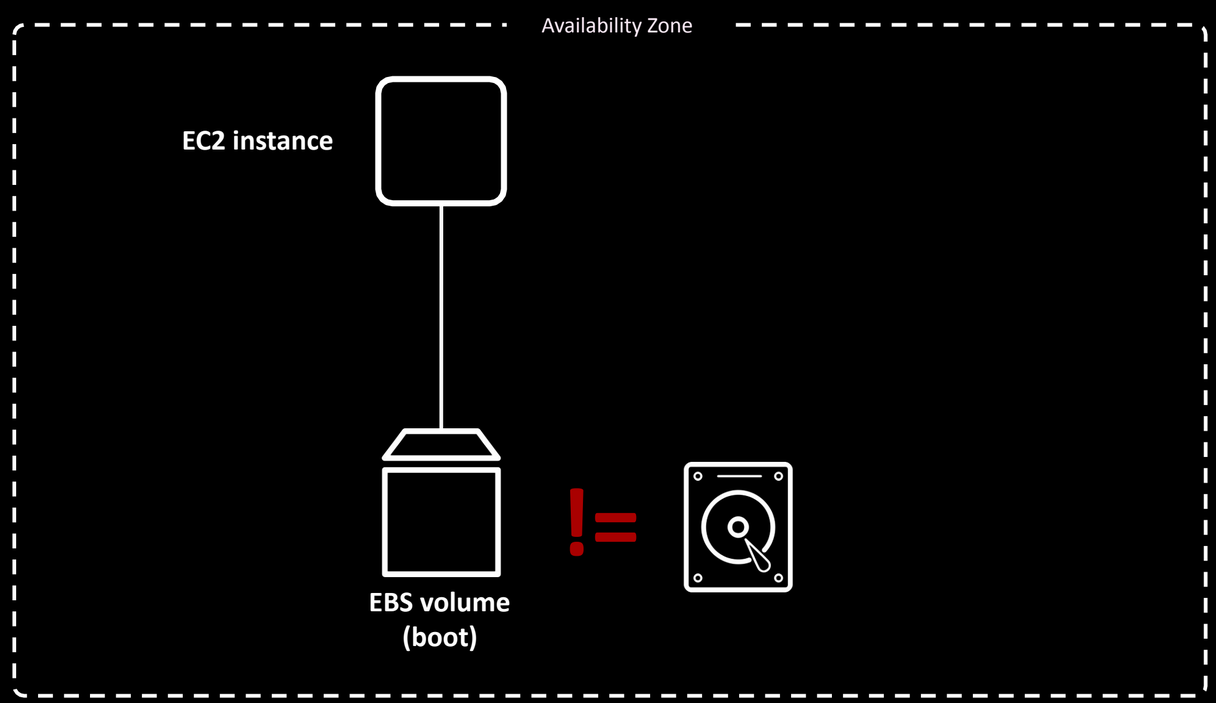
BLOCK STORAGE SOLUTION



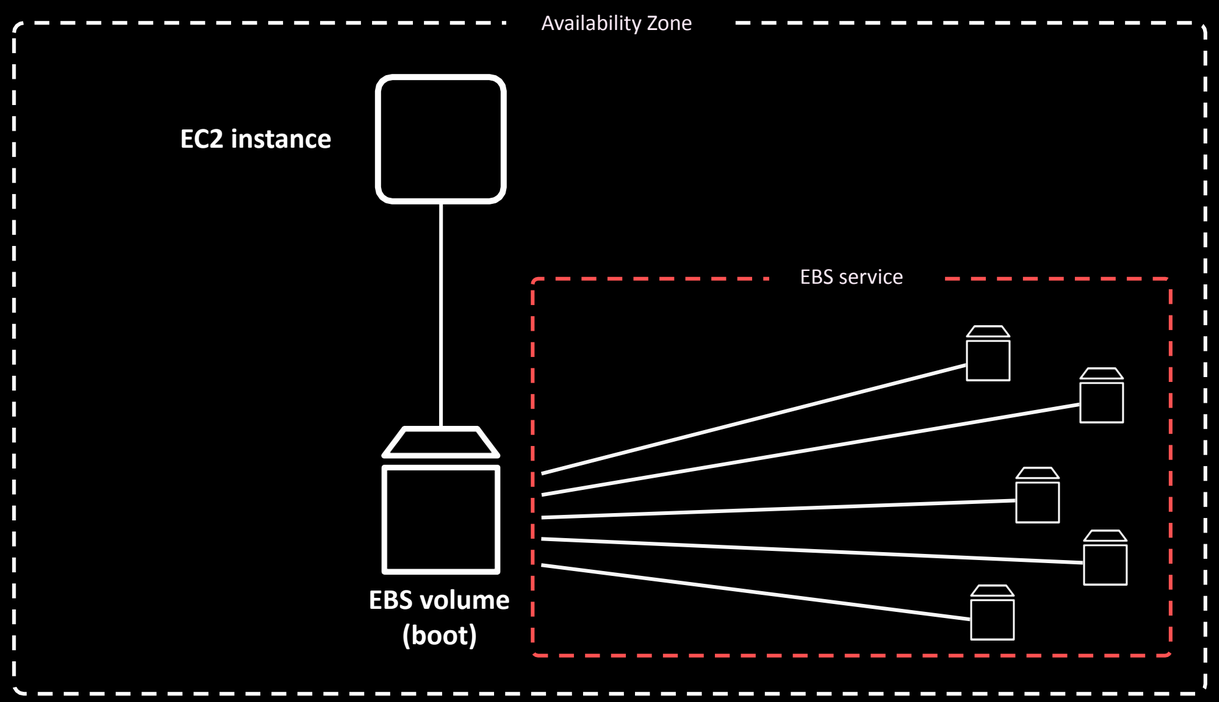
What is Amazon EBS?

- Block storage as a service
- Create, attach, manage volumes through an API
- Service accessed over the network
- SSD or HDD
- Encryption support
- Point-in-time snapshot support
- up to 99.999% durability
- 0.1 – 0.2% annual failure rate (AFR)
  (0.001% AFR for io2)

What is Amazon EBS?



What is Amazon EBS?



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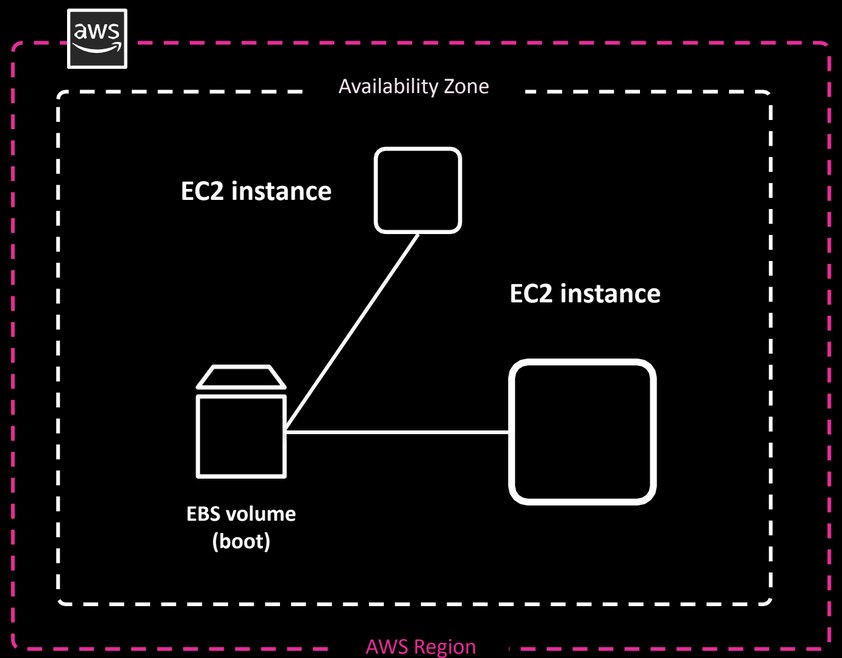
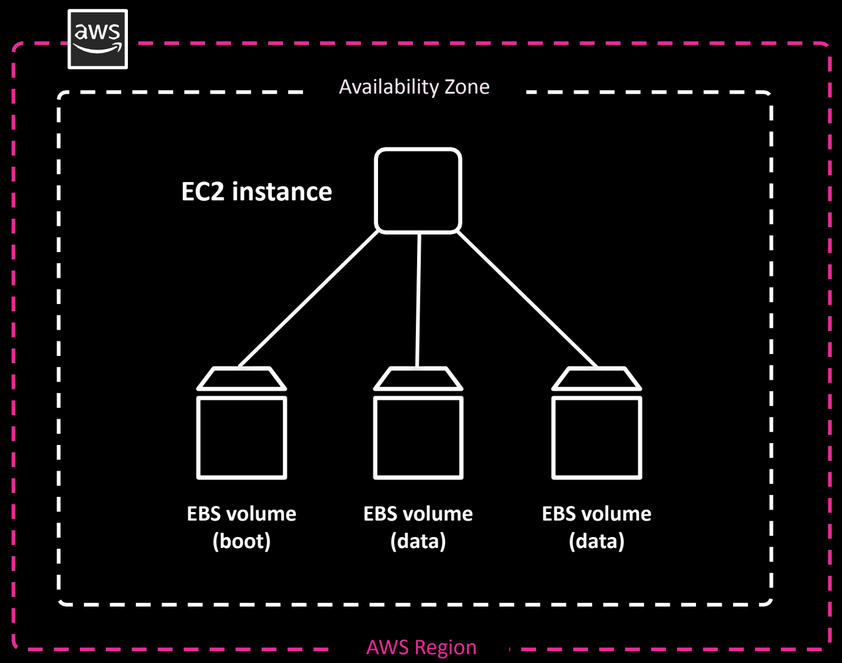


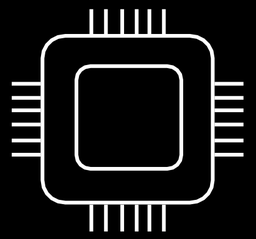
- Volumes persist independent of Amazon EC2
- Select storage and compute based on your workload
- Detach and attach between instances within the same Availability Zone

What is Amazon EBS?

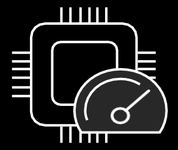


- One instance can have many volumes attached
- Volumes attach to one instance
- Best practice – separate boot and data volumes

Amazon EBS - Volume types and performance



SSD-based

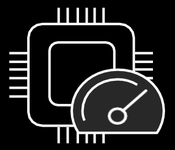


io1

$0.125/GiB*
$0.065/IOP*

Highest performance SSD volume designed for critical and I/O intensive workloads requiring
99.9% consistent performance

Up to 64K IOPS and 1,000 MB/sec



io2

$0.125/GiB*

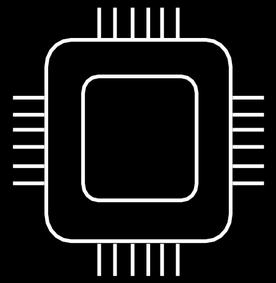
$0.065/IOPS up to 32,000 *
$0.046/IOPS-mo f32,001 -64,000*
$0.032/IOPS-mo for greater than 64,000 IOPS*

Highest performance and durability SSD volume designed for latency sensitive transactions requiring
99.999% consistent performance

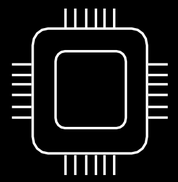
Up to 64K IOPS and 1,000 MB/sec

*per GB month of provisioned storage (us-east-1)

Amazon EBS - Volume types and performance



SSD-based

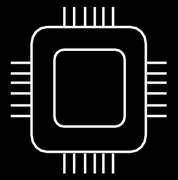


gp2

$0.10/GiB*

General purpose SSD volume that balances price and performance for a wide variety of workloads with predictable baseline and burst

Up to 16K IOPS and 250 MB/sec



gp3

$0.08/GiB*

3,000 IOPS free
$0.005/IOPS-mo over 3,000*
125 MB/s free and
$0.04/MB/s-mo over 125*

General purpose SSD with the lowest cost that balance price performance for a wide variety of transactions with predictable baseline and burst

Up to 16K IOPS and 1000 MB/sec

*per GB month of provisioned storage (us-east-1)

Amazon EBS - Volume types and performance

HDD-based

st1

$0.045/GiB*

Low-cost HDD volume designed for frequently accessed, throughput intensive sequential workloads

Up to 500 IOPS and 500 MB/sec

sc1

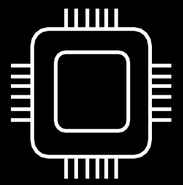
$0.025/GiB*

Lowest cost HDD volume designed for less frequently accessed sequential workloads

Up to 250 IOPS and 250 MB/sec

*per GB month of provisioned storage (us-east-1)

Amazon EBS use cases



Solid state drive (SSD)

Hard disk drive (HDD)

Relational Databases

Relational – MySQL, PostgreSQL, SQL, Oracle, SAP

NoSQL Databases

Cassandra, MongoDB, CouchDB, Aerospike

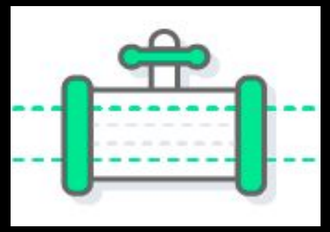
Big Data

Hadoop/EMR, Logs, Stream Processing, Data Warehousing

Media

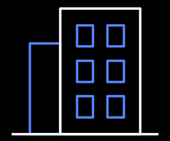
Transcoding, Encoding, Rendering, File

Amazon EBS use cases

Hadoop	Data Warehouse	Streaming	NoSQL	MySQL
				
Amazon EMR	Amazon Redshift	Amazon Kinesis	Amazon DynamoDB	Amazon RDS/Aurora
Cloudera Hortonworks MapR	Vertica Teradata	Kafka Tibco EMS	MongoDB Cassandra	MySQL on EC2/EBS

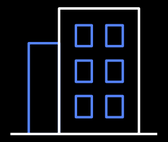
Amazon EBS use cases

Enterprise Applications



Relational Databases

Development and test



Business Continuity

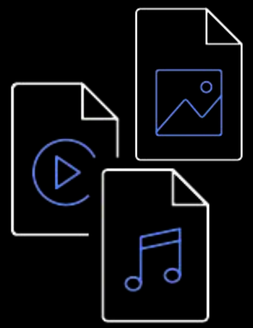
NoSQL Databases

Everyone has files

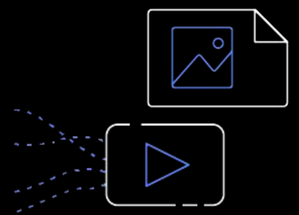
Always growing…
never shrinking

File data = unstructured data

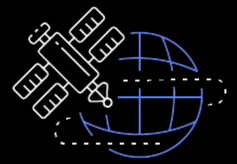
Home Directories
Word processing
Spreadsheets
Presentations



Media Files
Digital photos
Audio files
Video files



Digital Security
Surveillance photos
Surveillance videos

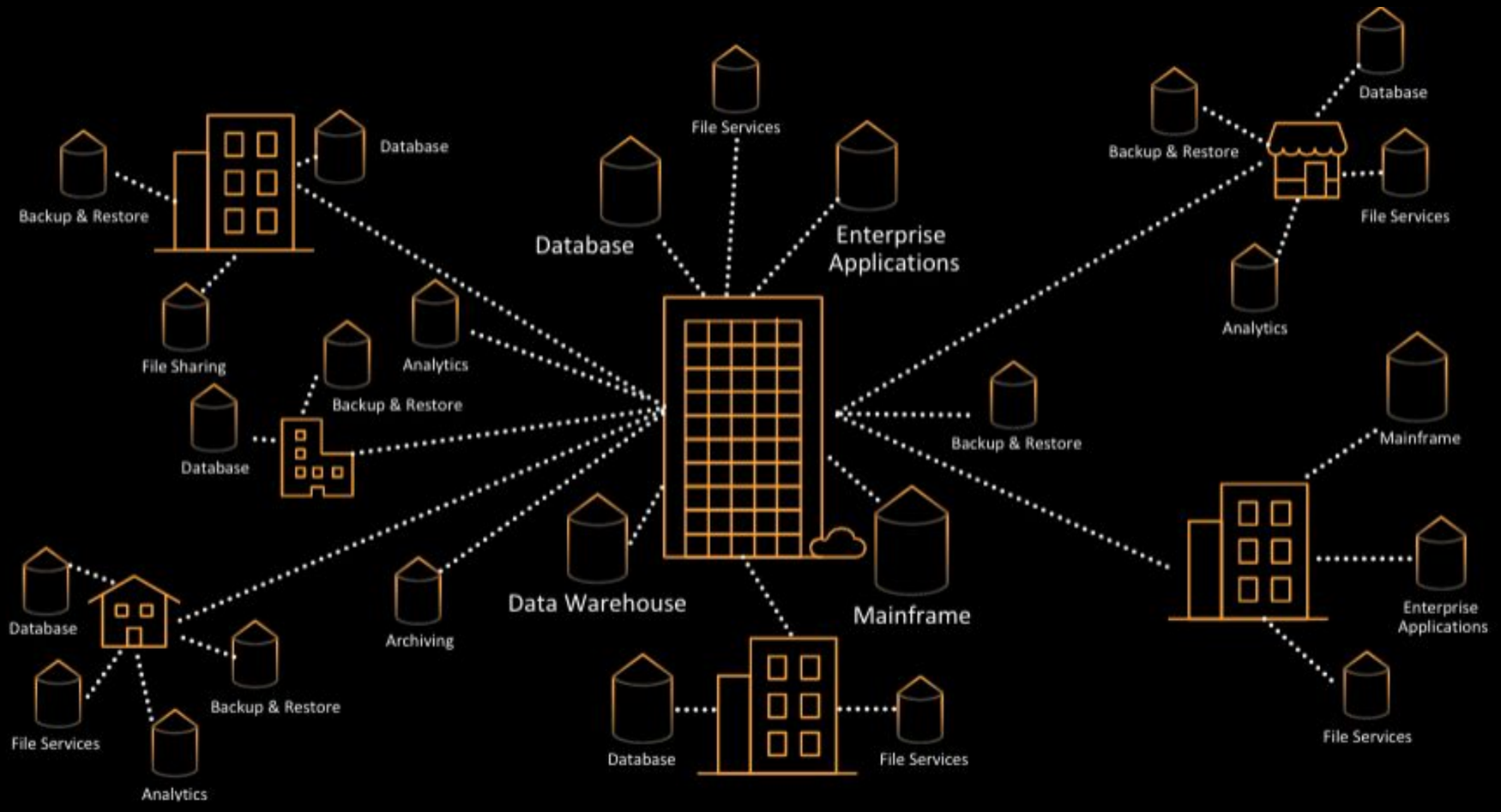


Machine Generated Satellite images Weather data Seismic imagery Atmospheric data

Sensor Data
Oceanographic
Weather
Traffic

Development Data Code with CI/CD Log files

Enterprise data in silos



FILE SYSTEM SOLUTIONS

AWS file system

Amazon EFS

Amazon FSx for Windows File Server

Amazon FSx for Lustre

Amazon FSx for OpenZFS

Amazon FSx for NetApp ONTAP

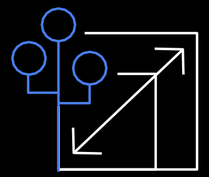
AMAZON EFS

Fully managed cloud-native file system
for Linux-based applications

LINUX-BASED WORKLOAD

Amazon EFS

Scalable, elastic, cloud-native Linux file system

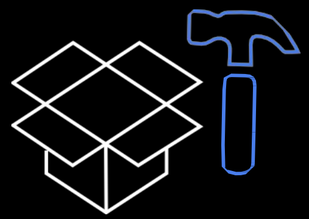


Elastic and scalable

Performance

Storage classes

Shared access

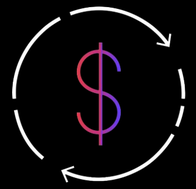


Highly durable and available

Secure and compliant

Amazon EFS Infrequent Access

No changes to existing applications using Amazon EFS



Cost savings up to 85%

Automated lifecycle management

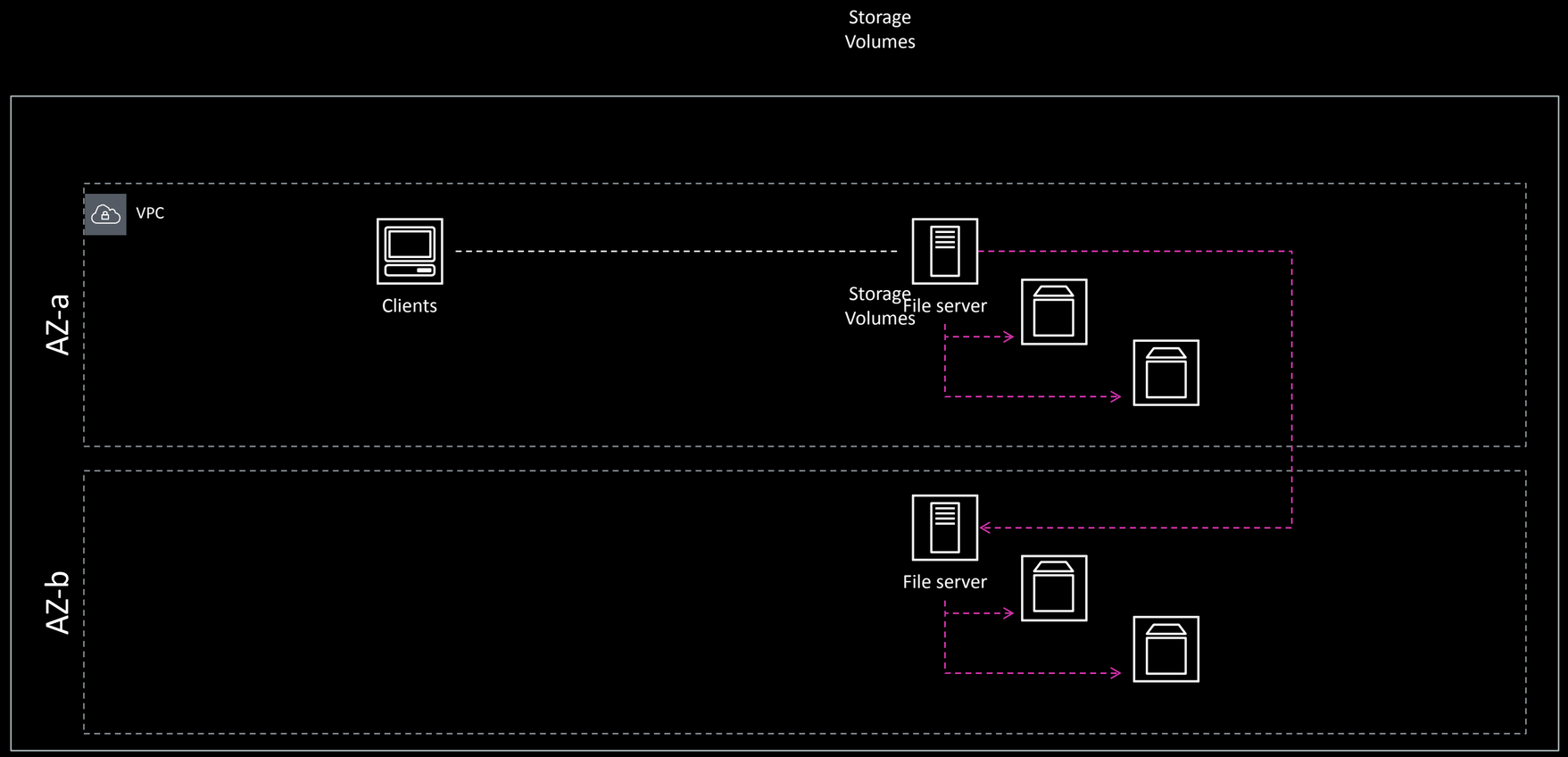
Amazon EFS Infrequent Access - How it works

Create your file system

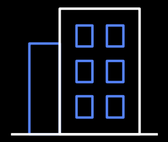
Enable lifecycle management

Files added and not accessed for 30 days are moved to EFS IA

Before Amazon EFS… DIY shared file storage



Amazon EFS use cases



Lift-and-shift enterprise applications

Web serving and content management

Application testing & development

Media workflows

Big data analytics

Fully managed cloud file systems

	Amazon FSx for NetApp ONTAP	Amazon FSx for Open ZFS	Amazon FSx for Windows File Server	Amazon FSx for Lustre
On-premises storage	NetApp, commodity NAS	ZFS, commodity NAS	Windows file servers	Scale-out file storage (Lustre, GPFS, Isilon)
Unique Features	Multi-protocol, replication, cloning, intelligent tiering, file access auditing, snapshots, compression, deduplication	Lowest latency, scale-up NFS storage built on Graviton, compression, snapshots	Native Windows file sharing, file access auditing, snapshots, deduplication, AWS native on-premises caching	Scale-out performance, compression, S3 data processing capabilities
Use Cases	Enterprise IT, databases, line-of-business apps, test/dev, backup and DR (NetApp)	Enterprise IT, databases, line-of-business apps using NFS	Windows based user and group shares, Windows applications, SQL Server with HA	Machine Learning, HPC, media processing, data analytics, compute intensive applications

AMAZON FSx for Windows File Server

Fully managed shared storage
for Windows Server-based applications

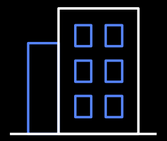
WINDOWS SERVER-BASED WORKLOAD

Amazon FSx for Windows File Server

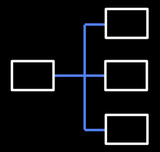
Lift and shift your Windows file storage with fully managed windows file servers

Native Windows compatibility

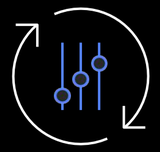
Fast and flexible performance



Enterprise-ready

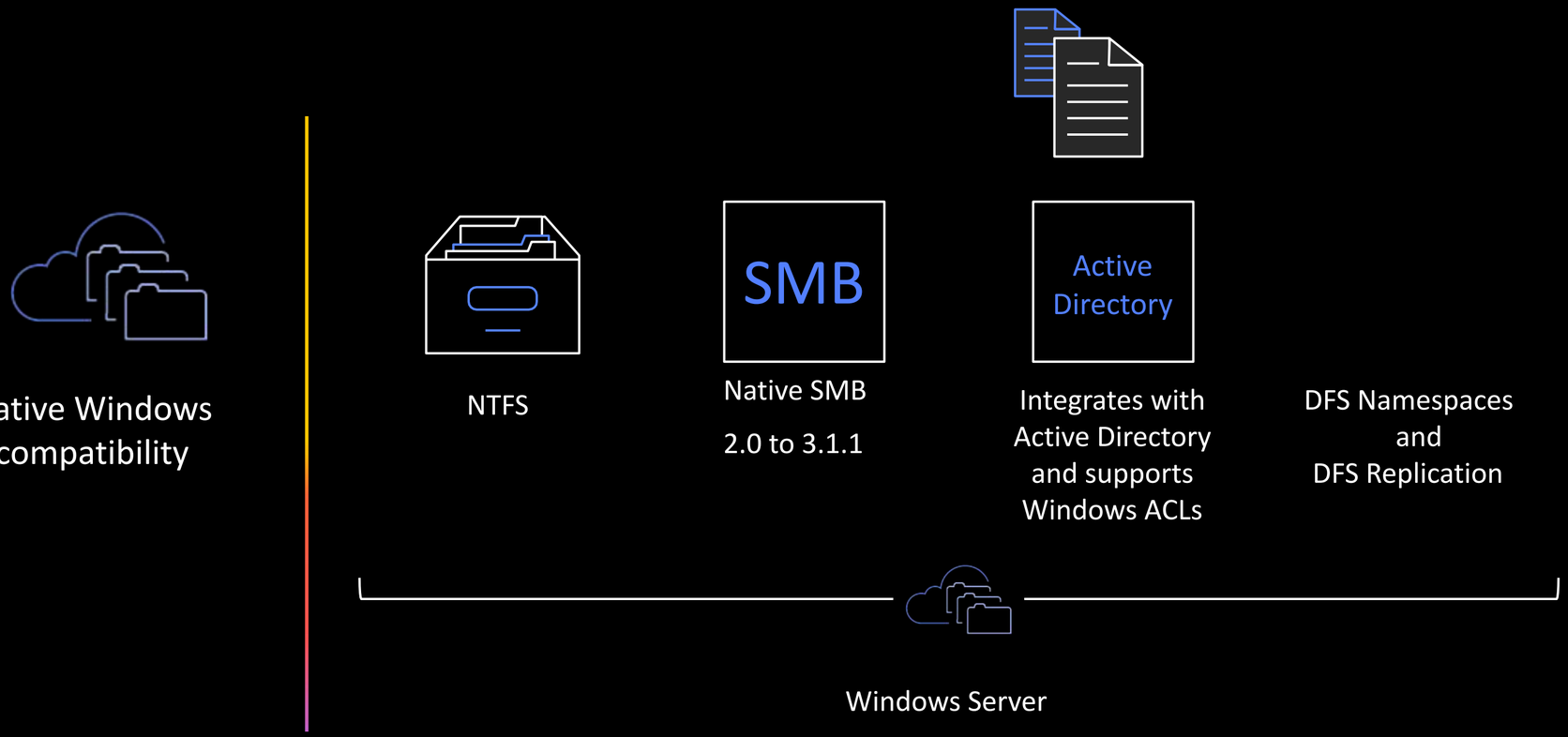


Broad accessibility



Fully managed

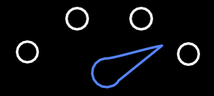
Amazon FSx for Windows File Server - Native Windows compatibility and features



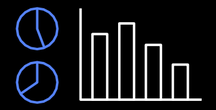
Amazon FSx for Windows File Server - Fast and flexible performance

Fast and flexible performance

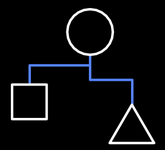
Built on SSD storage



High throughput



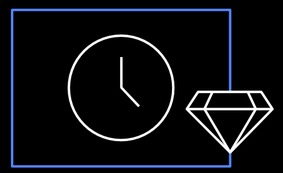
High IOPS



Choose throughput independent of storage

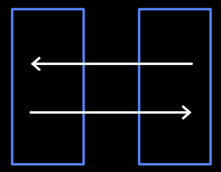
Consistent sub-millisecond latencies

Amazon FSx for Windows File Server - Enterprise-ready



Highly available and durable

Continually monitors and addresses hardware failures



Replicates data within Availability Zone

Backups are stored in Amazon S3

Supports Multi-AZ deployments using DFS Namespaces and DFS Replication

Amazon FSx for Windows File Server- Enterprise-ready

Secure and Compliant

Data encrypted at-rest and in-transit

Integrates with Active Directory and supports Windows ACLs

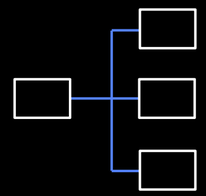
Network traffic access control using Amazon VPC security groups

Admin API access control using AWS IAM

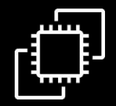
Monitor and log API calls using AWS CloudTrail

PCI-DSS + ISO- compliant and HIPAA eligible

Amazon FSx for Windows File Server - Broad accessibility: What's supported?



Broad accessibility



Amazon EC2

VMware Cloud on AWS

Amazon WorkSpaces

Amazon AppStream 2.0

Microsoft Windows Server 2008+

Windows 7+

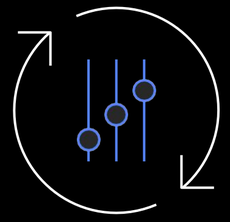
Linux (Samba client)

SMB

2.0–3.1.1

Windows Server

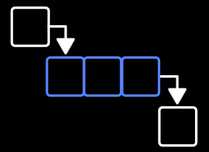
Amazon FSx for Windows File Server - Fully managed



Fully managed

Provisions and manages file servers and storage

Automated Windows patch updates



Daily automatic backups

Amazon FSx for Windows File Server – use cases

Home directories

Line-of-business applications

Web serving and content management

Software development environments

Media workflows

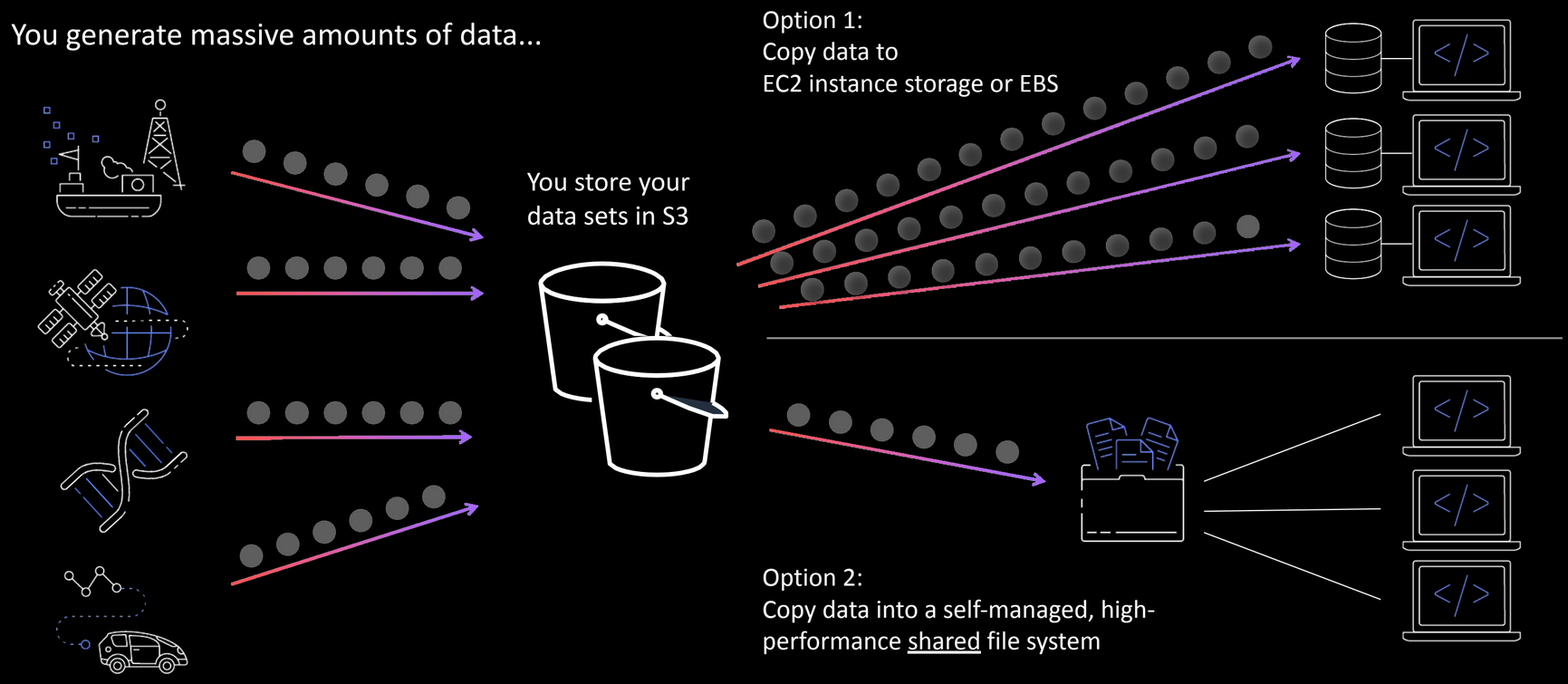
Analytics

AMAZON FSX for Lustre

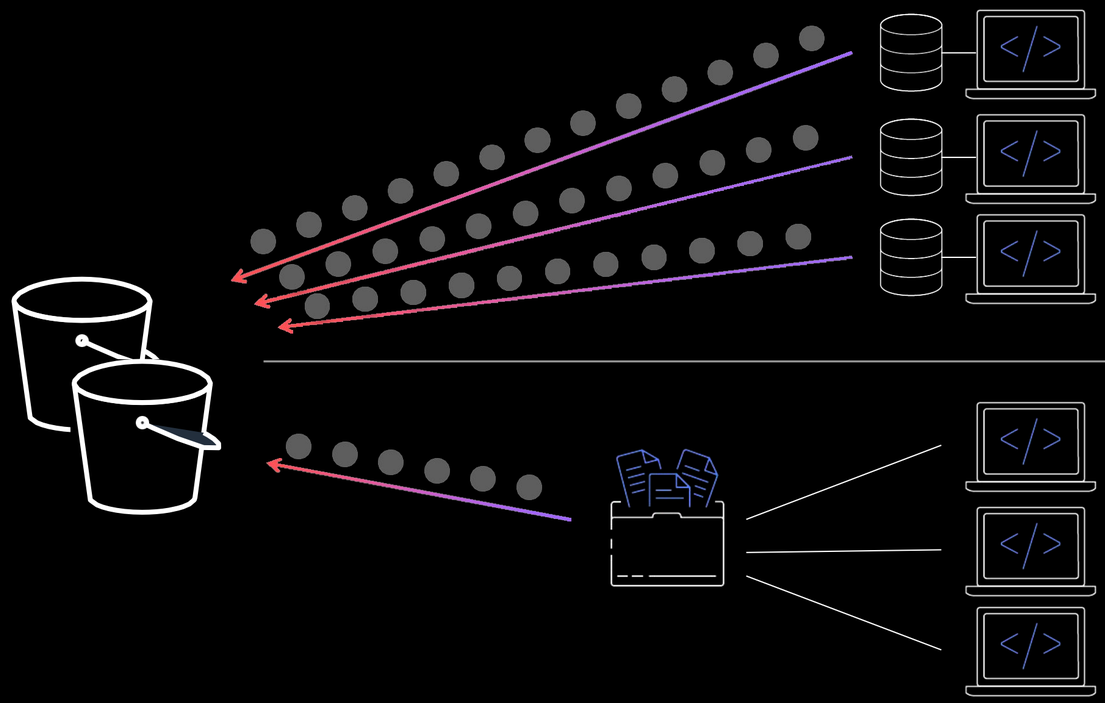
Fully managed shared storage built on the world's most popular high-performance file system.

COMPUTE INTENSIVE WORKLOAD

Amazon FSx for Lustre - What does a compute-intensive workload look like?



Amazon FSx for Lustre - Once your workload is complete…



Amazon FSx for Lustre - Simple and fully managed

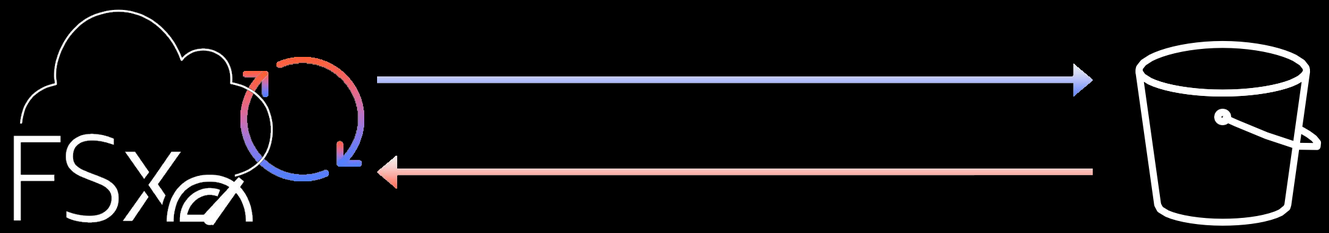
Simple and fully managed

Provisions and sets up file servers and storage volumes

Configures and maintains Lustre software

Manages the movement of data in/out of Amazon S3

Amazon FSx for Lustre - High-performance file system for processing Amazon S3 or on-premises data



Amazon FSx for Lustre - Compatible with your applications

POSIX

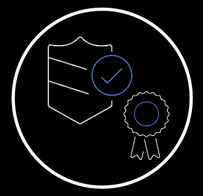
Works as any file system does with your Linux OS

No changes needed to your applications

Read after write/close consistency

Supports file locking

Amazon FSx for Lustre - Secure and compliant



Secure and compliant

Data encrypted at-rest

PCI-DSS and ISO compliant, HIPAA eligible

Network traffic access control using Amazon VPC security groups

Admin API access control using AWS IAM

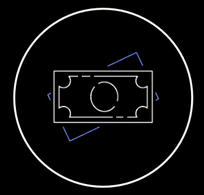
Monitor and log API calls using AWS CloudTrail

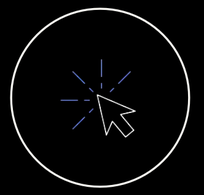
Amazon FSx for Lustre - Cost-optimized

Cost-effective

Non-replicated file systems

Long-term data stored in Amazon S3 or on-premises





Launch and delete files systems in minutes

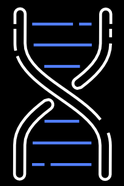
Pay only for the resources you use

FSx for Lustre pricing (SSD):

$0.14 per GB-month
($0.20 per TB-hour)

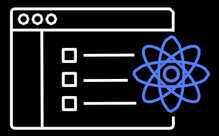
Amazon FSx for Lustre – use cases

Machine learning



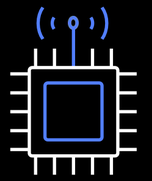
High performance computing (HPC)

Media processing and transcoding



Big data analytics

Autonomous vehicles



Electronic Design Automation (EDA)

Amazon FSx for OpenZFS

Fully managed shared storage built on the
popular OpenZFS file system

OPENZFS BASED WORKLOAD

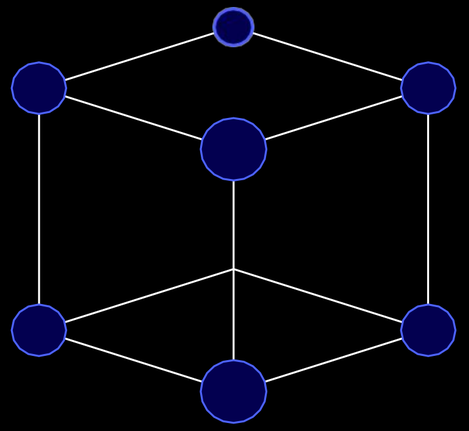
Amazon FSx for OpenZFS - Fully managed cloud file systems

Introducing Amazon FSx for OpenZFS

Simple and powerful shared file storage that delivers **ultra-high speeds at a low cost**, accessible via NFS

Built on the **AWS Graviton** family of processors and the popular open-source **OpenZFS** file system

Amazon FSx for OpenZFS



Advanced, powerful file system that is purpose-built for

high performance and scale

- Copy-on-write architecture
- Integrated data resiliency
- Dedicated and efficient caching

Amazon FSx for OpenZFS - Things you might have heard about the ZFS file system

It’s **complicated** to set up and configure

It’s **difficult to tune** for the best performance
It’s **hard to maintain** and operate on an ongoing basis

You **need to be a ZFS expert** to even get started

Amazon FSx for OpenZFS - All of the power of ZFS without the complexity

~~complicated~~

~~difficult to tune~~

~~hard to maintain~~

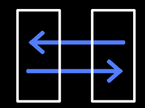
~~need to be a ZFS expert~~

Launch and scale a ZFS file system in minutes that provides . . .

Pre-tuned configurations

Performance scaling on demand

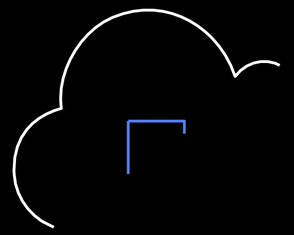
Automatic backups and maintenance



Automatic replication and recovery

A simple, fully managed, highly-available NFS endpoint

Amazon FSx for OpenZFS - Amazon FSx for OpenZFS is designed to help you with two objectives

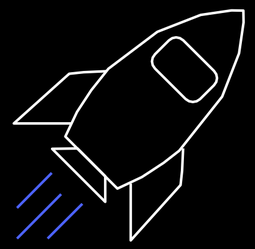


Moving or extending existing apps and storage to the cloud

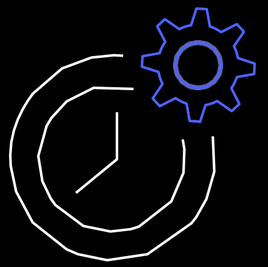
Building data-intensive workloads

Amazon FSx for OpenZFS - What does that mean for you?

With familiar capabilities and the same or better performance you get on-premises today

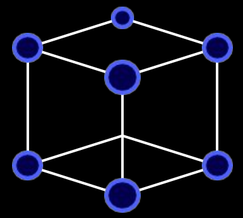


Migrate to AWS **without changing your applications** or how you manage data

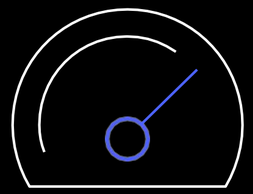


Eliminate the need to re-architect
apps, processes, or workflows

With high-performance storage that provides advanced capabilities for working with data

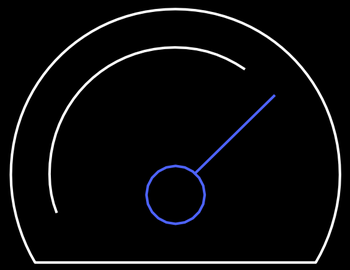


Test and **build new data-intensive applications faster**

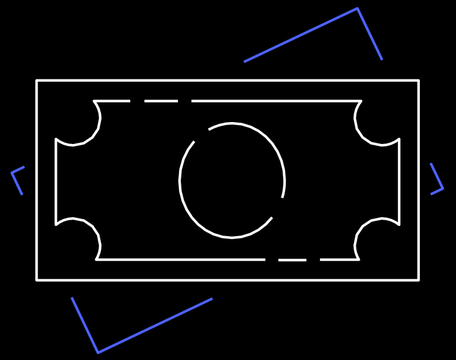


Power your **latency-sensitive and IOPS-intensive workloads** without worrying about managing storage

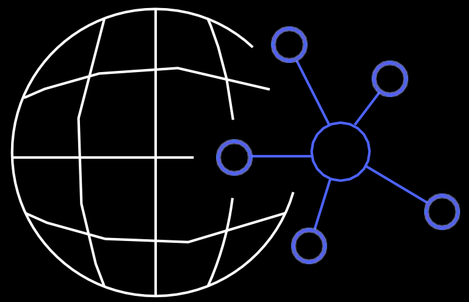
Amazon FSx for OpenZFS - Deep dive into four core aspects



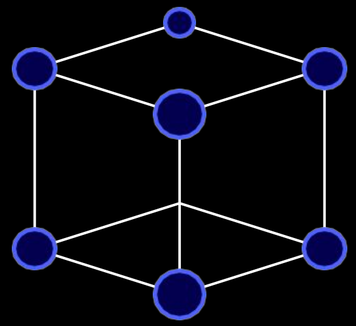
Ultra-high speeds



Low cost



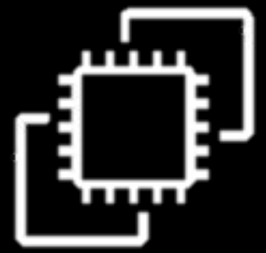
Flexible and secure access



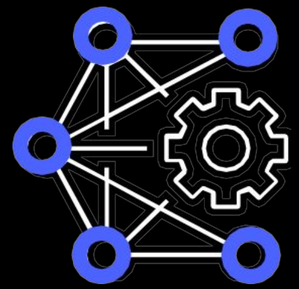
Advanced ZFS capabilities for working with data

Amazon FSx for OpenZFS - High-performance storage powered by the latest AWS technologies

AWS Graviton processors

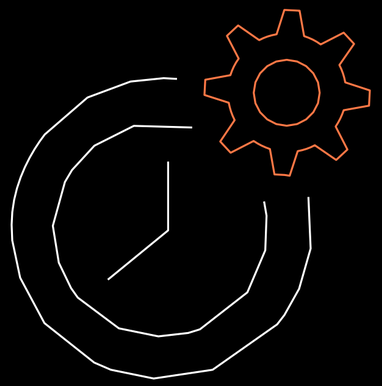


AWS Nitro system



Scalable Reliable Datagram

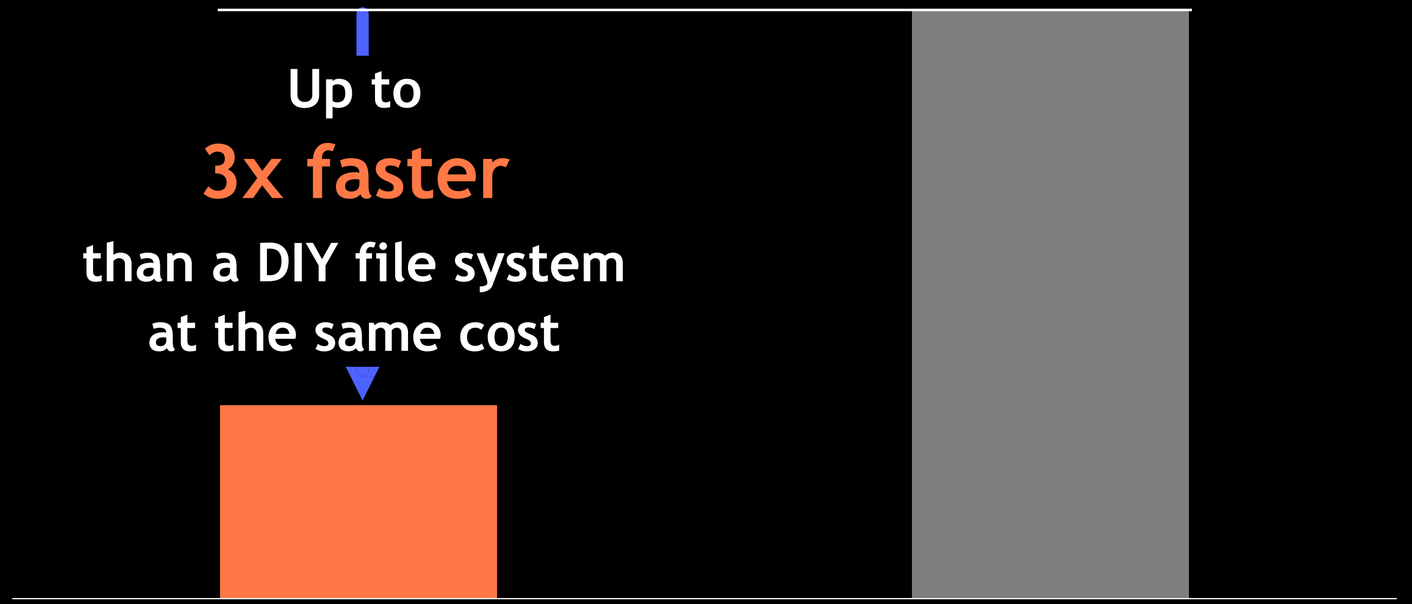
Amazon FSx for OpenZFS - Deliver results faster with ultra-low latencies



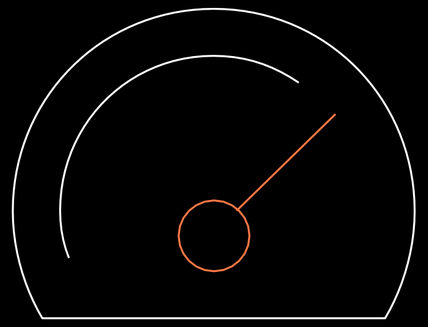
Latencies of a

few hundred microseconds

Time required to untar the latest Linux kernel



Amazon FSx for OpenZFS - Scalable IOPS and throughput

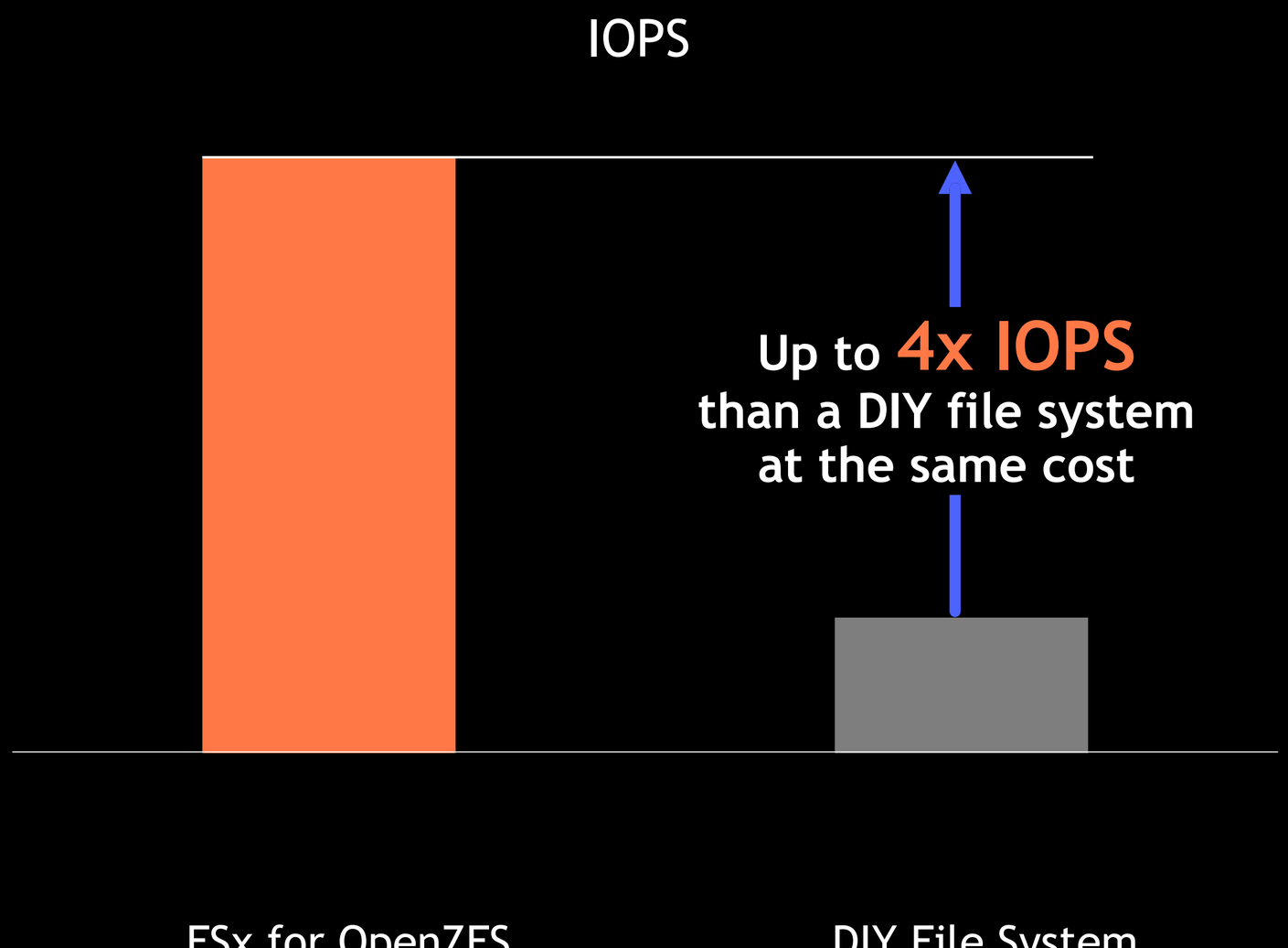


Up to

1M IOPS and

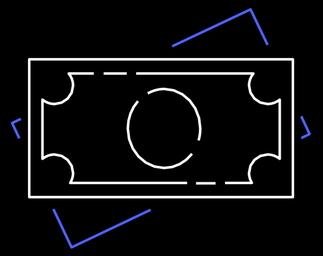
12.5 GB/s

throughput



Amazon FSx for OpenZFS - Do more with less and adapt faster to changing business needs

Performance scaling with the click of a button



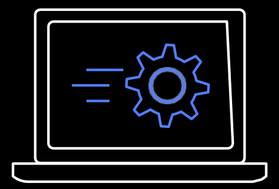
Z Standard compression enabled by default (reduce storage usage by up to ~50%)

SSD storage
$0.045/GB-mo
(Effective pricing w/ compression*)

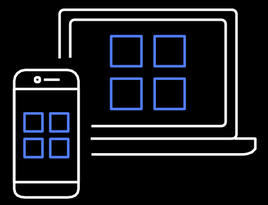
Throughput
$0.13/MBps-mo
(Effective pricing w/ compression*)

*Effective pricing assumes average compression savings of ~50%. Pricing w/o compression: $0.09/GB-mo SSD storage, $0.26/MBps-mo throughput

Amazon FSx for OpenZFS - Access your data with familiar protocols and from virtually any environment

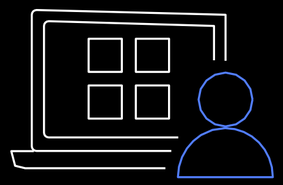


NFS v3



NFS v4, v4.1, v4.2

Protocol



Microsoft Windows
Linux
macOS

Operating System

Amazon EC2

Amazon WorkSpaces

Amazon ECS

Amazon AppStream 2.0

Amazon EKS

VMware Cloud

Compute instance

In-VPC access, VPC Peering, and Transit Gateway

Direct Connect

VPN

Network configuration

Amazon FSx for OpenZFS - Protect your applications and data with robust security features

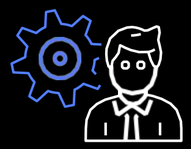
Automatic data encryption at rest and in transit

Automatic backups and maintenance

Automatic replication and recovery

Admin API access control & monitoring
(IAM, CloudTrail)

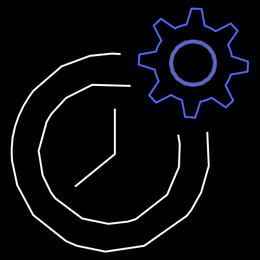
Network traffic access control
(VPC security groups)



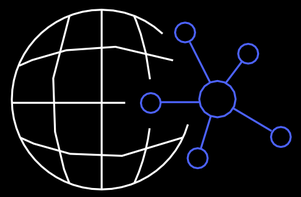
File-level permissions
(POSIX permissions and ACLs)

Industry-standard compliances
(PCI-DSS, ISO, SOC, IRAP, HIPAA)

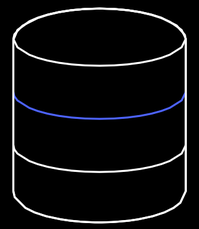
Amazon FSx for OpenZFS - Leverage powerful ZFS capabilities for working with data



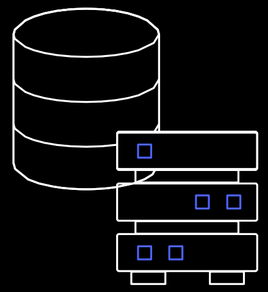
Instant point-in-time snapshots



In-place data cloning



Multiple independent data containers per file system



Thin provisioning and usage quotas

Example use cases

Rapid testing of new features and changes

Efficient multi-tenant SaaS applications

Parallel isolated experiments on a common dataset

Amazon FSx for OpenZFS use cases

Migrate your workloads to AWS seamlessly

Move workloads running on ZFS or other Linux-based servers to AWS without modifying application code or how you manage data.

Increase dev/test velocity

Test changes efficiently by cloning application data in seconds, and reduce build times with fast storage for repositories and DevOps solutions like Git, Bitbucket, and Jenkins

Deliver insights faster for data analytics workloads

Power machine learning (ML), financial analytics, and other data-intensive applications with high-IOPS storage.

Accelerate content management

Deliver the low latency needed to scale file-based web serving and content management applications like WordPress, Drupal, and Magento

FSX for NetApp ONTAP

Fully managed shared storage built on
NetApp’s popular ONTAP file system.

ONTAP BASED WORKLOAD

What is Amazon FSx for NetApp ONTAP?

Complete NetApp ONTAP
file systems

With the simplicity,
agility, and scalability
of an AWS service

Set up and manage Amazon FSx for NetApp ONTAP data

AWS management tools

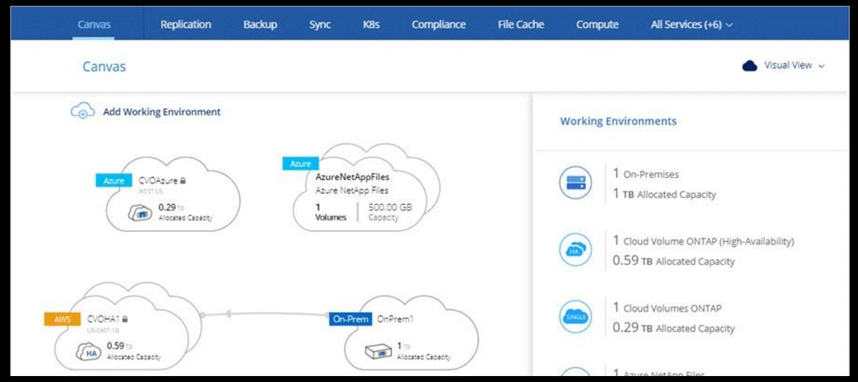
AWS Management Console

AWS CLI

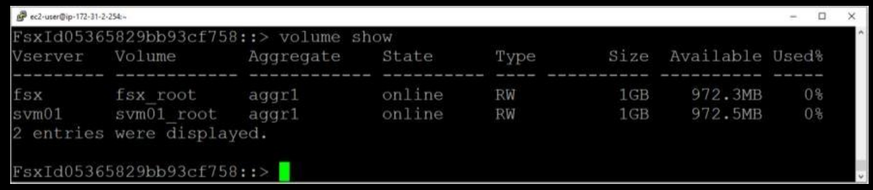
Amazon FSx API/SDK

NetApp management tools

NetApp Cloud Manager

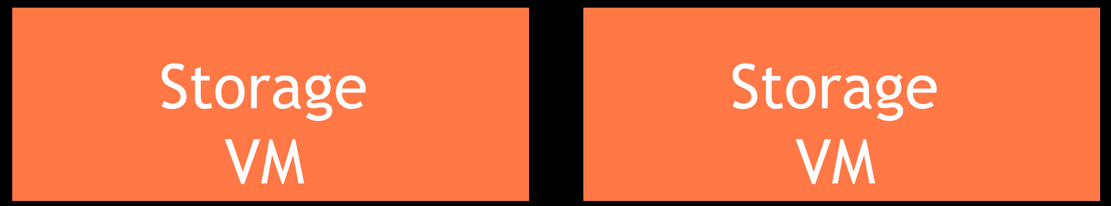


ONTAP CLI and API

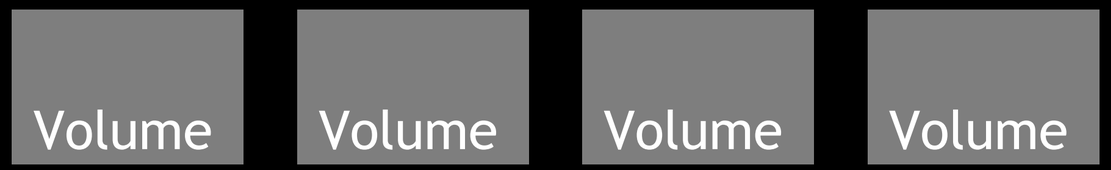


Amazon FSx for NetApp ONTAP resources

The infrastructure and ONTAP software that hosts your data



Virtual file servers that serve data on your network



Data containers for your files and directories

Amazon FSx for NetApp ONTAP Multi-protocol access

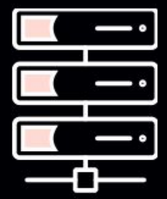
Network file system (NFSv3, NFSv4, NFSv4.1)

Server Message Block (2.0 to 3.1.1)

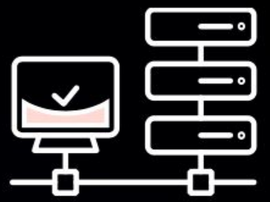
Internet Small Computer Systems Interface

Amazon FSx for NetApp ONTAP - Data protection

Backups



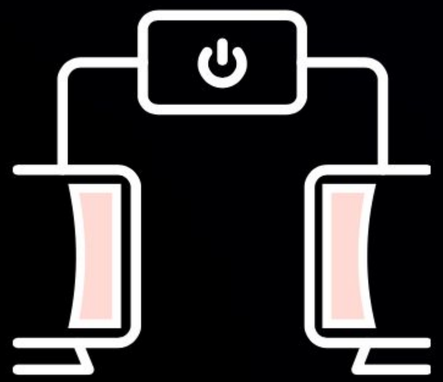
Snapshots



SnapVault

SnapMirror

Amazon FSx for NetApp ONTAP - FlexClone

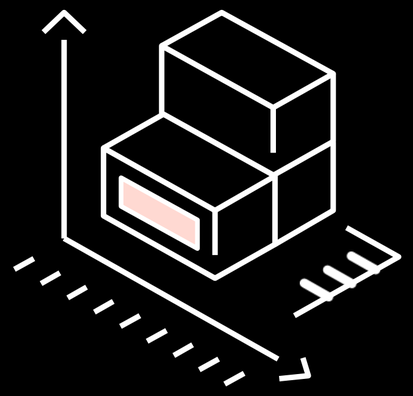


Point-in-time, writable copy of a volume

Shared data blocks with parent volume consumes no storage

Created instantaneously

Amazon FSx for NetApp ONTAP - Storage efficiency



Compression – compress data blocks
Deduplication – eliminate duplicate data blocks

Compaction – aggregate multiple small operations

Amazon FSx for NetApp ONTAP - Elastic tiering

Optimize costs by enabling tiering policies to move hot or cold data between storage tiers

STORAGE GATEWAY SOLUTIONS

What is AWS Storage gateway?

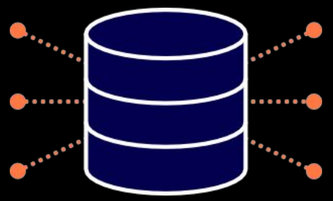
- Object Storage as a service
- Web accessible through API or HTTPS
- High durability (99,999999999%)
- Limitless scalable
- Multiple tiers
- Data lifecycle rules

Amazon AWS Storage Gateway use cases

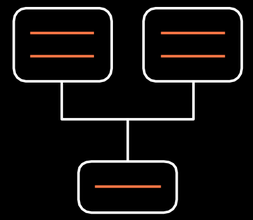
Migration

Modernization

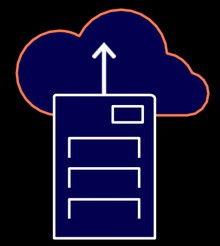
Continuous reinvention



Backup and archive data to AWS



Shift on-premises network attached storage to cloud-backed file shares



Access and share cloud data across edge locations

Amazon AWS Storage Gateway types

Amazon S3 File Gateway

Native file access to Amazon S3 for backups, archives, and ingest for data lakes

Amazon FSx File Gateway

Native access to Amazon FSx for Windows File Server for on-premises group file shares and home directories

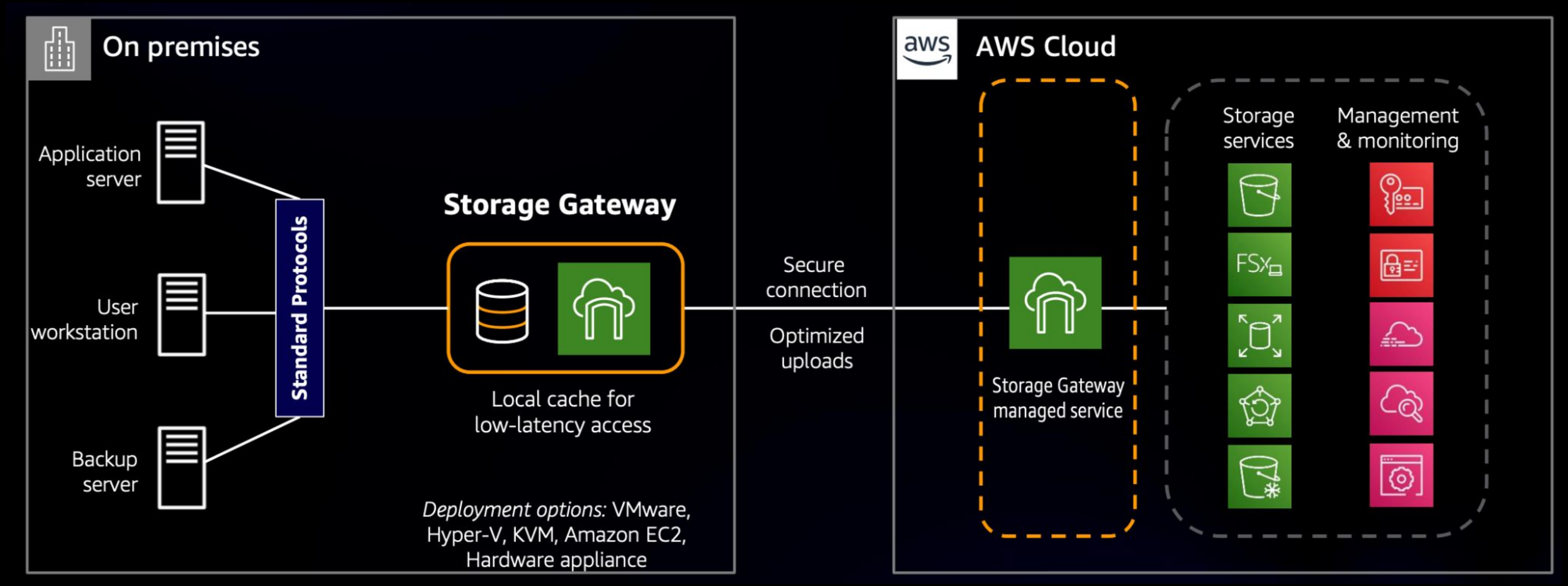
Tape Gateway

Replace physical tape infrastructure leveraging Amazon S3 archive tiers for long-term retention

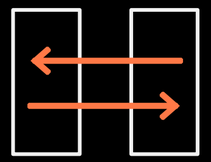
Volume Gateway

Block-level backups of volumes with Amazon EBS snapshots, AWS Backup integration, and cloud recovery

Amazon AWS Storage Gateway architecture



Amazon AWS Storage Gateway benefits

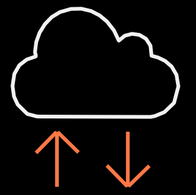


Multiple protocols

No changes to existing apps

Local caching

Low-latency access to frequently used data



Optimized data transfers

Minimized network traffic

Designed to be secure and compliant

FIPS, HIPAA, PCI, SOC*, ISO**, and encryption

*SOC (1, 2, 3) **ISO (9001, 27001, 27017, 27018)

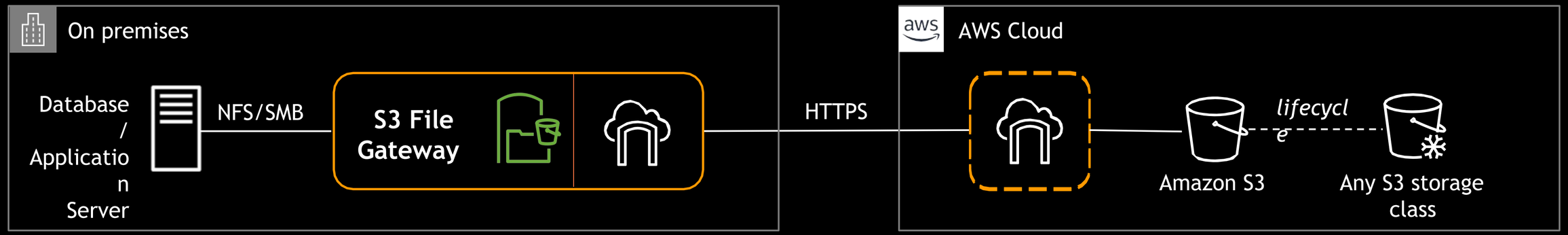
Cost-effective

Pay-as-you-go pricing

AWS integrated

Management, monitoring, and in-cloud workloads

Amazon S3 File Gateway for backups



Features

NFS/SMB protocol support, mount shares directly on database and application servers

Files stored durably in Amazon S3, lifecycle to any S3 storage class

Local cache for accessing recent backups

Windows ACL support to control access to backup files

Bandwidth-optimized, only changes are transferred

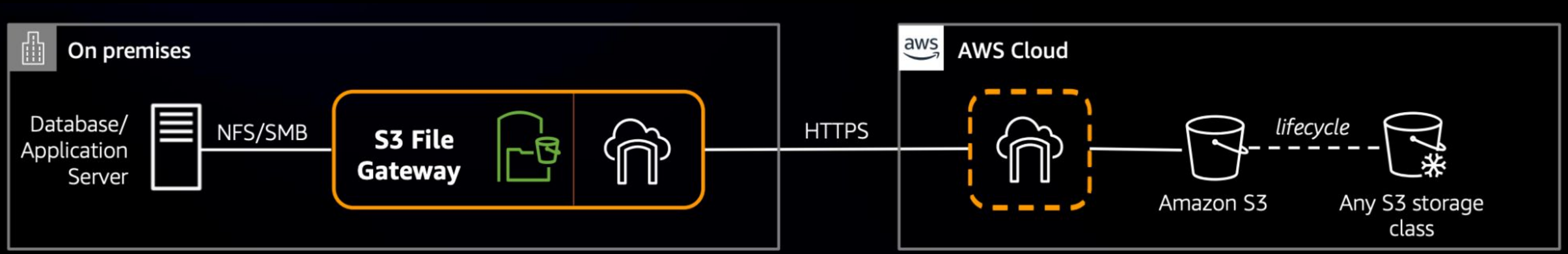
Benefits

Reduce on-premises storage for backups

Easily integrates with SAP, SQL Server, Oracle, HDFS, and other applications

Restore backups on-premises or in the cloud on EC2 or RDS

Amazon S3 File Gateway for archives



Features

NFS/SMB protocol support, mount shares directly on client systems

Files stored durably in Amazon S3, lifecycle to any S3 storage class

Local cache for recently accessed files

Windows ACL support to control access to archive files

Bandwidth-optimized, only changes are transferred

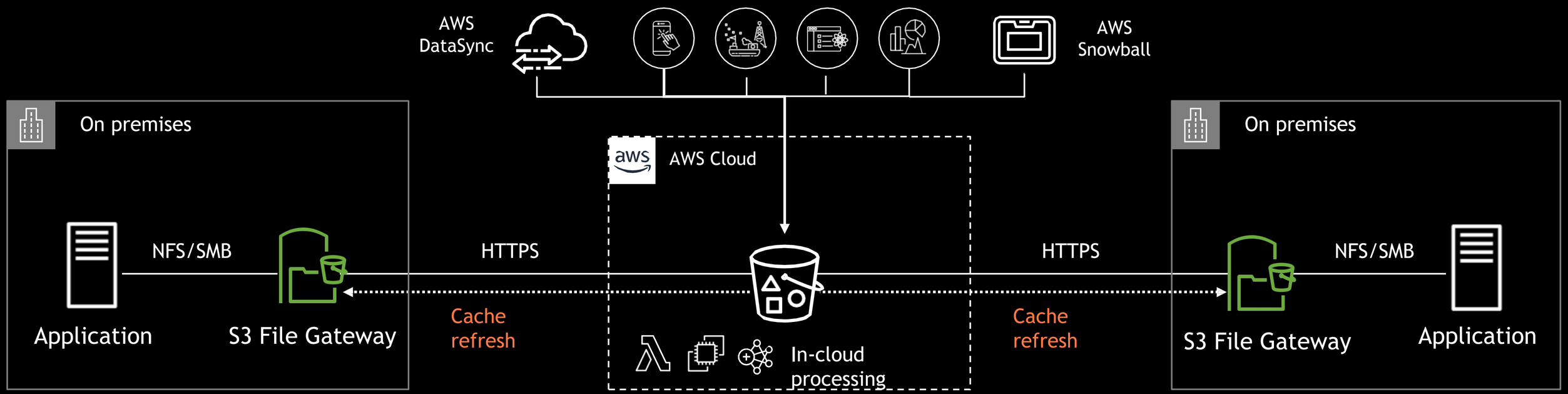
Benefits

Cost optimization

Reducing on-premises capacity

Data protection with S3 Versioning. S3 Object Lock and S3 Replication

Amazon S3 File Gateway for data lakes



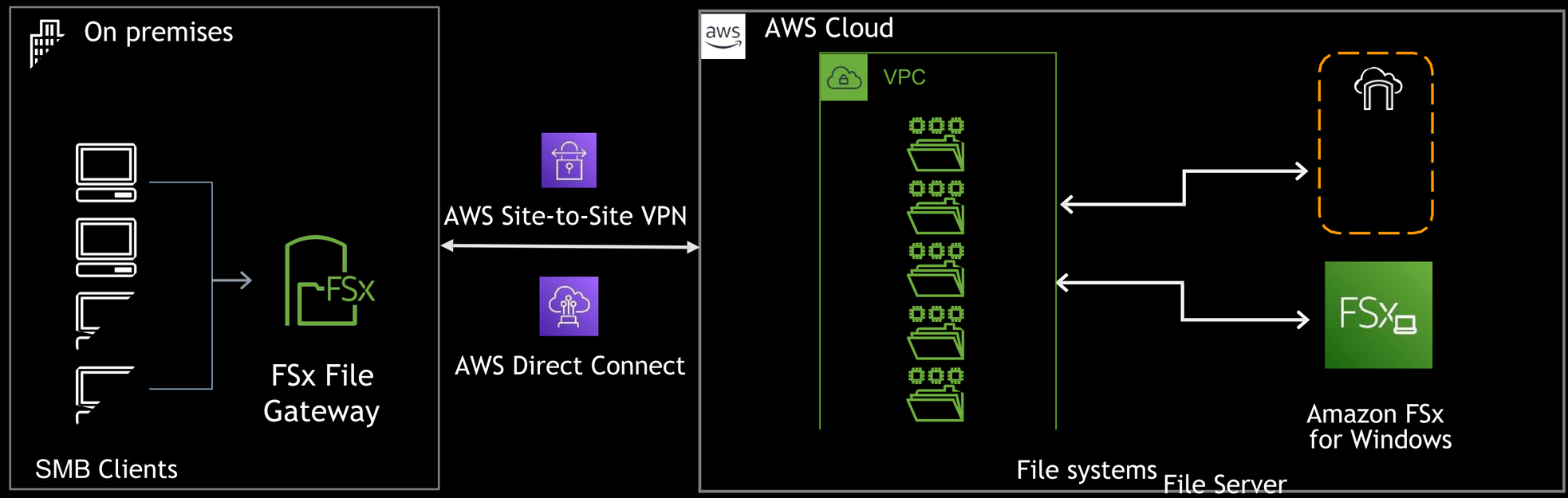
Features

- Generate data in cloud or ingest from on premises
- Fully-managed gateway cache provides low-latency access to data
- Up to 64 TB of cache per gateway and automated cache refresh at 5 minute intervals
- Option to access files using the S3 API

Benefits

- Access cloud storage from any on-premises location
- Process data in the cloud and refresh gateway cache for up-to-date results
- Data stored cost-effectively and centrally in the cloud

Amazon FSx File Gateway for group shares, home directories



Features

On-premises cache of commonly accessed files backed by Amazon FSx for Windows File Server

Deploy multiple FSx File Gateways in offices or remote sites with full-sized Windows ACLs

Up to 64TB cache and 500 active clients per gateway

High availability with on-premises cache on VMware

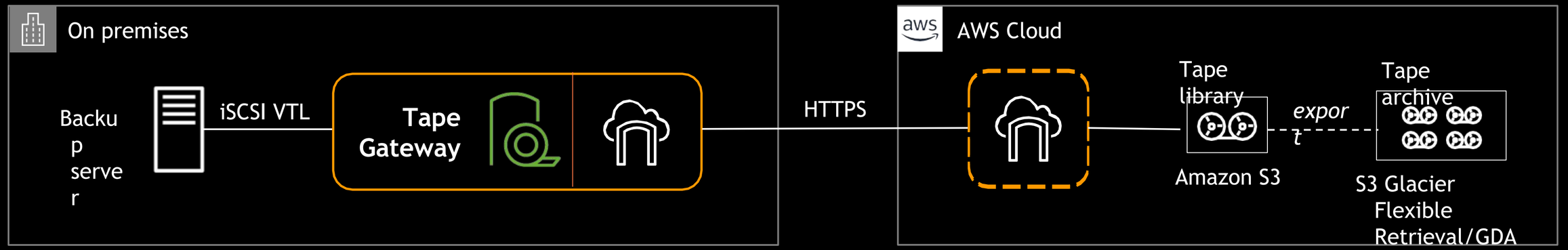
Benefits

Fast and efficient access

Maintain on-premises user experience

Reduce infrastructure management

Amazon Tape Gateway for tape backups



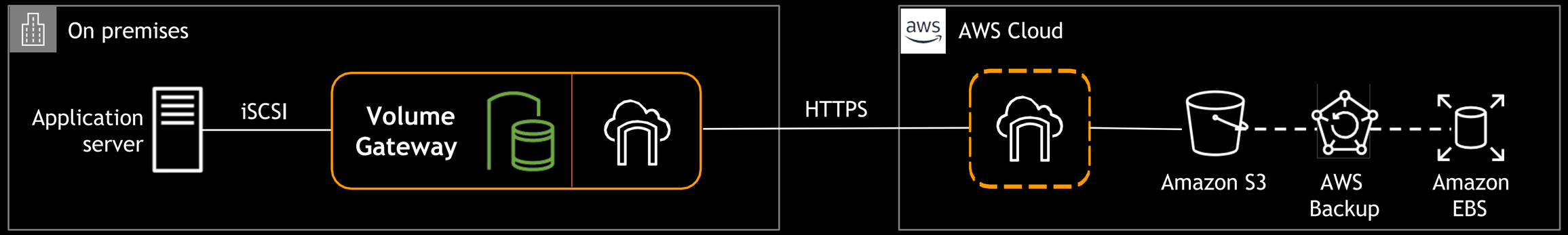
Features

- iSCSI VTL interface compatible with leading backup applications
- Active tapes stored in Amazon S3
- Exported tapes stored in Amazon S3 Glacier Flexible Retrieval or S3 Glacier Deep Archive
- Data compressed and encrypted, in-transit and at-rest
- WORM and Tape Retention Lock

Benefits

- Drop-in replacement for tape libraries, tape media, and archiving services
- Maintain existing backup workflows
- Eliminate the hassles of physical tape
- Store archived tapes durably and reliably in Amazon S3 Glacier Deep Archive for $1/TB/month
- Protect backup archives from internal and external threats

Amazon Volume Gateway for on-premises backup



Features

- Present cloud-based iSCSI block storage volumes to on-premises applications
- On-premises cache of recently accessed data
- Backup volumes as EBS snapshots
- Integrates with AWS Backup to coordinate volume backup and retention

Benefits

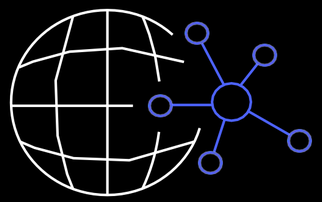
- Store volume backups securely and reliably
- Restore backups on-premises or in the cloud as EBS volumes
- Fast volume recovery

OBJECT STORAGE SOLUTIONS

What is Amazon S3?

- Object Storage as a service
- Web accessible through API or HTTPS
- High durability (99,999999999%)
- Limitless scalable
- Multiple tiers
- Data lifecycle rules

Amazon S3 - How it works



COLLECT

Move Data via API, HTTPS,SDK

Multiple Encryption Options
Automated cost reduction tools

STORE

Designed for 99.999999999% durability

Parallel I/O for Max Speed

Replication options across regions

ANALYZE

On-demand analytics

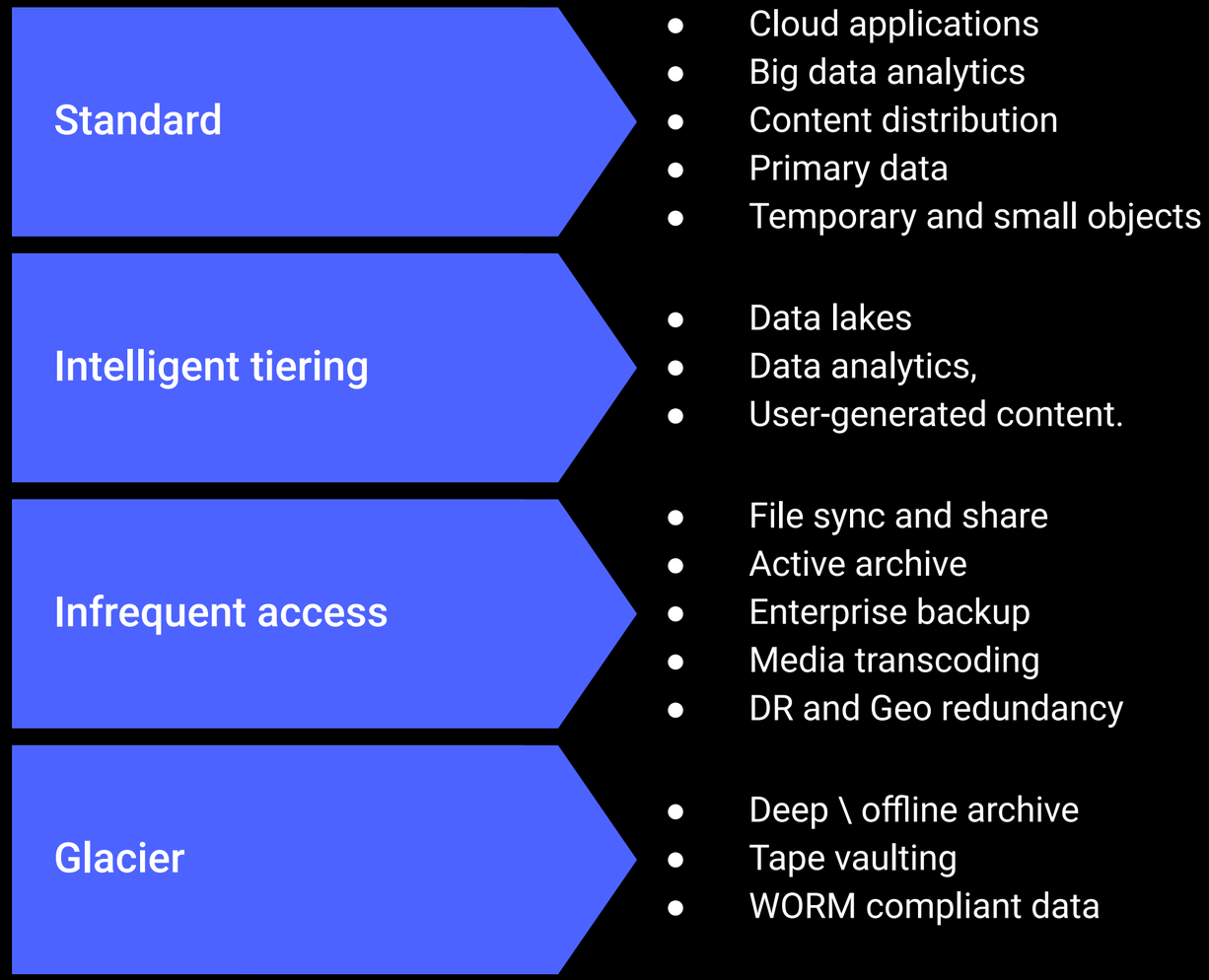
Built-in support for SQL expressions with S3 Select

Detailed data on usage patterns and access

Amazon S3 - Object storage classes

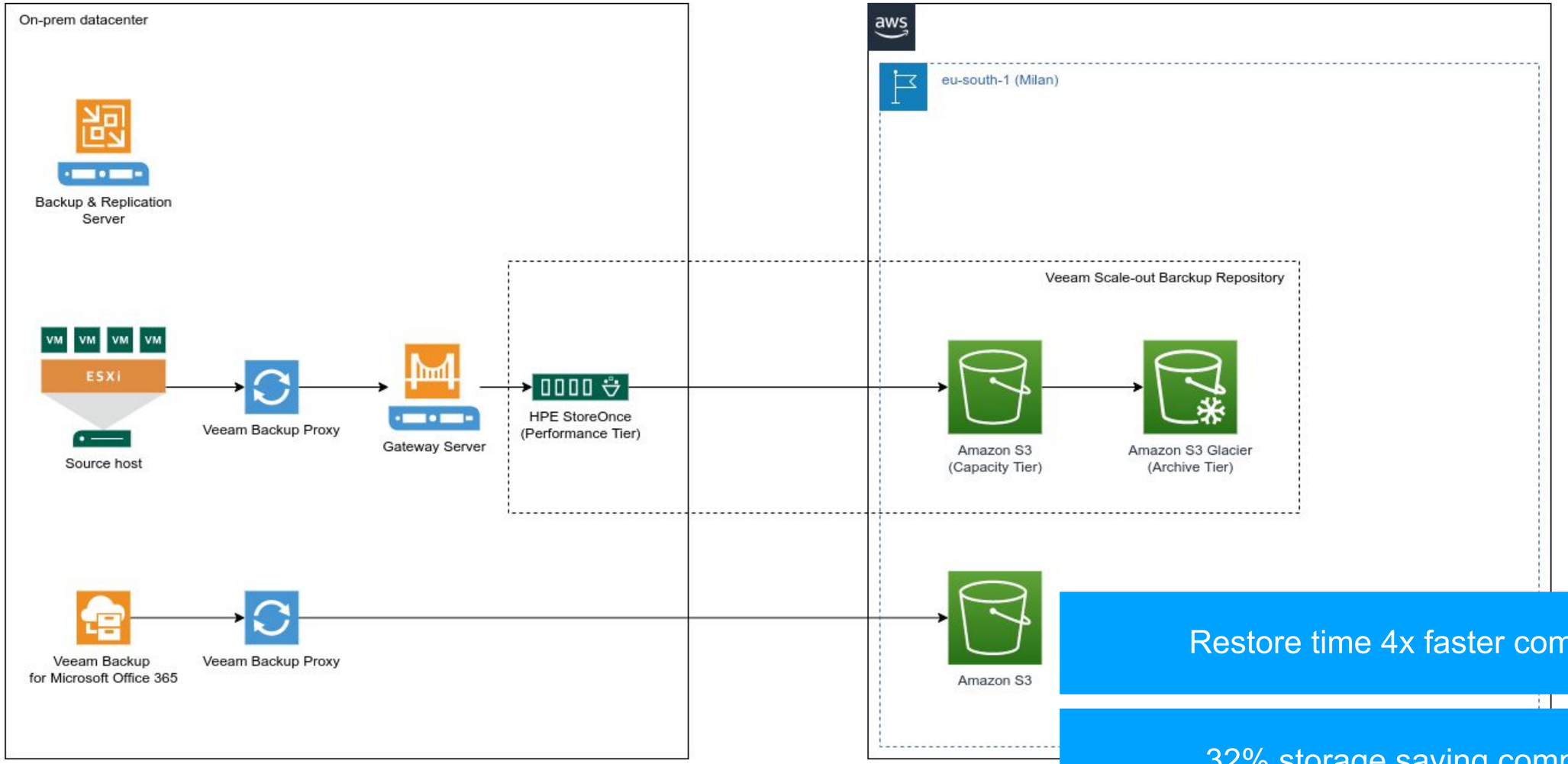
	S3 Standard	S3 Intelligent-Tiering*	S3 Standard-IA	S3 One Zone-IA	S3 Glacier Instant Retrieval	S3 Glacier Flexible Retrieval	S3 Glacier Deep Archive
Availability Zones	≥3	≥3	≥3	1	≥3	≥3	≥3
Minimum capacity charge per object	N/A	N/A	128 KB	128 KB	128 KB	40 KB	40 KB
Minimum storage duration charge	N/A	N/A	30 days	30 days	90 days	90 days	180 days
Retrieval charge	N/A	N/A	per GB retrieved	per GB retrieved	per GB retrieved	per GB retrieved	per GB retrieved
First byte latency	milliseconds	milliseconds	milliseconds	milliseconds	milliseconds	minutes or hours	hours
Storage type	Object	Object	Object	Object	Object	Object	Object
Lifecycle transitions	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Object storage use cases



CASE STUDIES

AMF S.p.a. - Backup on AWS using Veeam



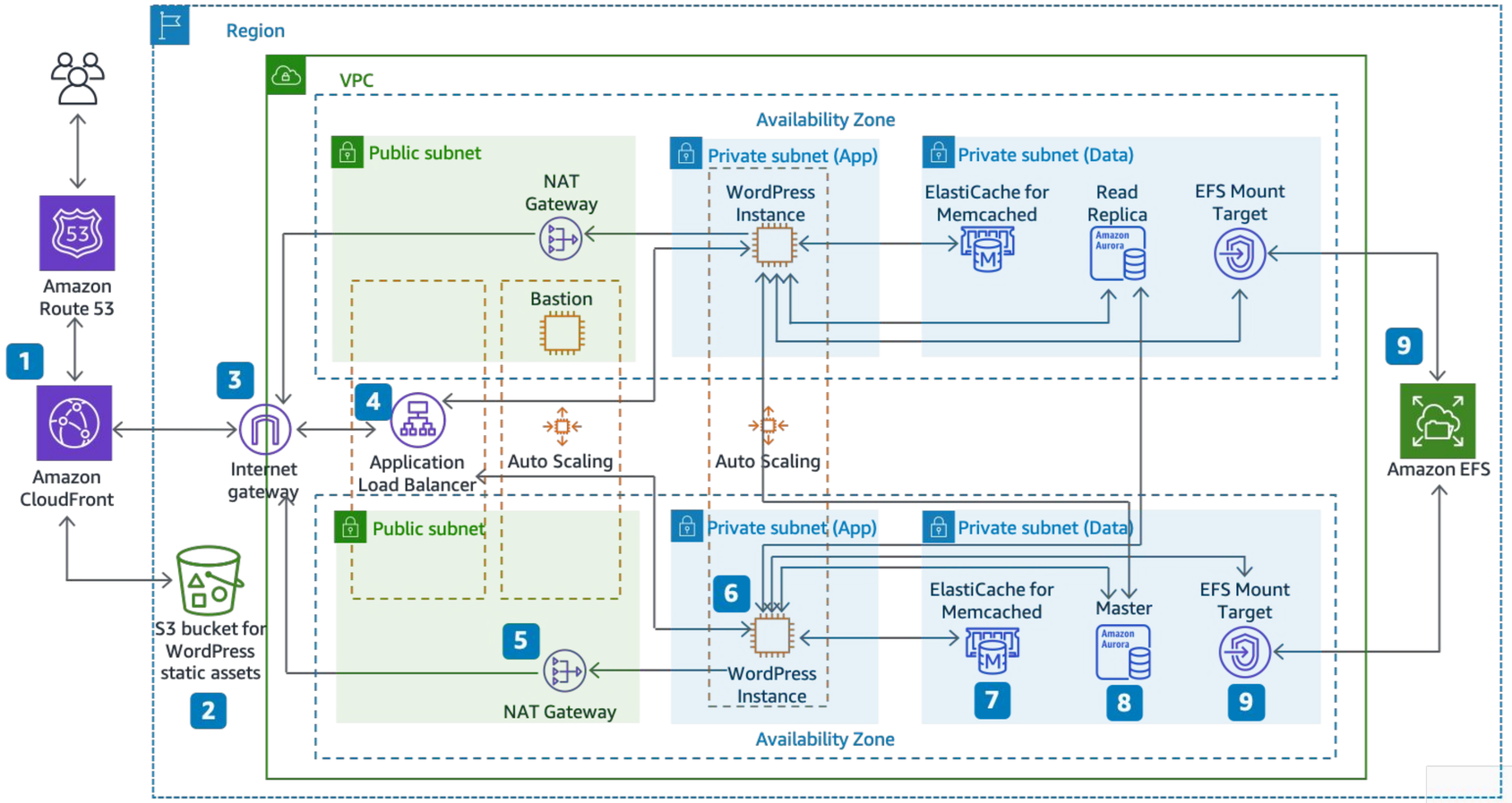
Benefits:

Restore time 4x faster compared to on-prem

32% storage saving compared to on-prem

36% cost saving compared to on-prem

II Post - WordPress infrastructure on AWS

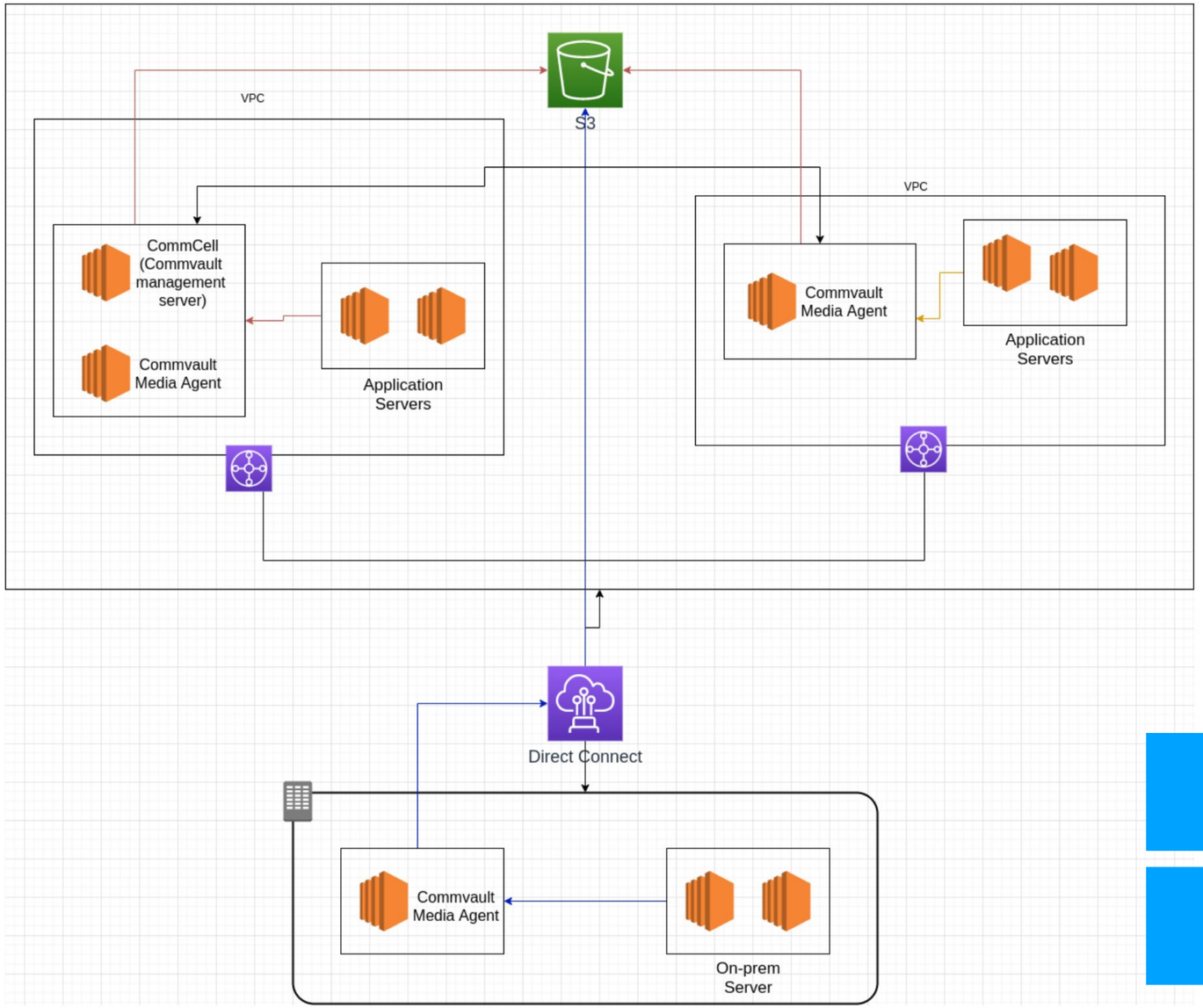


Benefits:

High availability services

20% saving cost compared to on prem

Miroglio - CommVault backup center

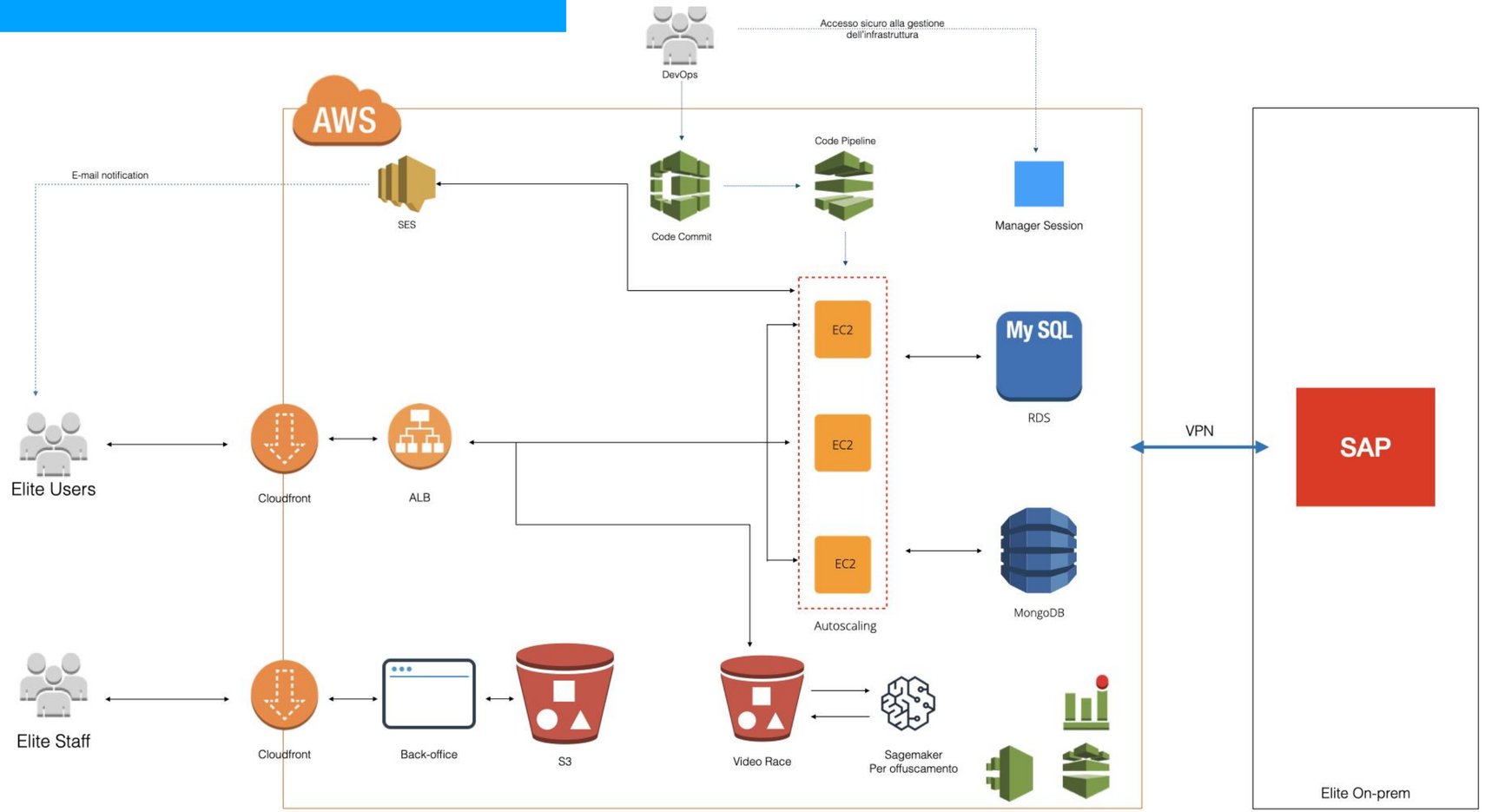


Benefits:

One software to manage on-prem & cloud backup

10% saving cost respect previews solution

Elite - Storage & scalable infrastructure



Benefits:

Scalable storage resources

32% storage saving compared to on-prem

LIGHT HERO SUPPORT

Support Light Hero

Description	SLH
Technical Account Manager	V
Technical Onboarding Manager	V
Automation system	V
EC2 OS Management	3 volte anno
Quarterly account review (cost, aws service review)	V
Backup system	V
Security Monitoring	V
Support infrastructure	9 - 18 5x7gg (1)
Software Monitoring	V
Support by Phone	Requests must be opened via the zero12 portal. Zero12 staff will contact the customer in case of need
Service Level Agreement	Blocking issues taken in charge within 2 hours of notification Non-blocking issues taken in charge within 48 hours of reporting

Pricing model provides a monthly cost and a variable monthly fee based on the volumes of cloud services.
The model provides for an unlimited number of tickets.

ZERO12
a vargroup company

This is us … Thank you