Amazon S3 on Outposts

Object storage in your on-premises environments

Meena Vembusubramanian, Product Manager, AWS
Paul Reed, Product Manager, AWS

October 21, 2020

What we are focusing on today

Amazon S3 on Outposts

- What it is
- What it does
- How to use it

What is Amazon S3 on Outposts?

AWS Global Infrastructure

AWS provides a more extensive global footprint than any other cloud provider

Region & Number of Availability Zones (AZs)

GovCloud (US)
US-East (3), US-West (3)

US West
Oregon (4)
Northern California (3)

US East
N. Virginia (6), Ohio (3)

Canada
Central (3)

South America
São Paulo (3)

Africa
Cape Town (3)

Europe
Frankfurt (3), Paris (3),
Ireland (3), Stockholm (3),
London (3), Milan (3)

Middle East
Bahrain (3)

Asia Pacific
Singapore (3), Sydney (3),
Tokyo (4), Osaka-Local (1)*
Seoul (4), Mumbai (3),
Hong Kong (3)

China
Beijing (2), Ningxia (3)

Announced Regions

Three Regions and 6 AZs in Indonesia, Japan, and Spain

* Available to select AWS customers who request access. Customers wishing to use the Asia Pacific (Osaka) Local Region should speak with their sales representative.

Application continuum: ease of migration to cloud

AWS Regions

Web and enterprise apps

Most web and enterprise applications, such as email, collaboration, and intranet applications are easily migrated to AWS Regions

AWS Regions *or* customer premises

Residency

Regulations and contracts dictate that data and infrastructure reside in specific countries

Customer premises

Local data processing

Large datasets that can't be easily moved

Transcoding, filtering, caching, and alerting applied at the edge

Low latency

Equipment and processes sensitive to compute latency

Complex workloads that span a variety of host and storage systems

Easier — Move to public cloud — *Harder*

aws

Customers want the same experience across their premises, the edge, and the cloud

Same reliable, secure, and high performance infrastructure

Same operational consistency

Same services and APIs

Same tools for automation, deployments, and security controls

Same pace of innovation as in the cloud

aws

Introducing AWS Outposts

Industry standard 42U rack

Fully assembled, ready to be rolled into final position

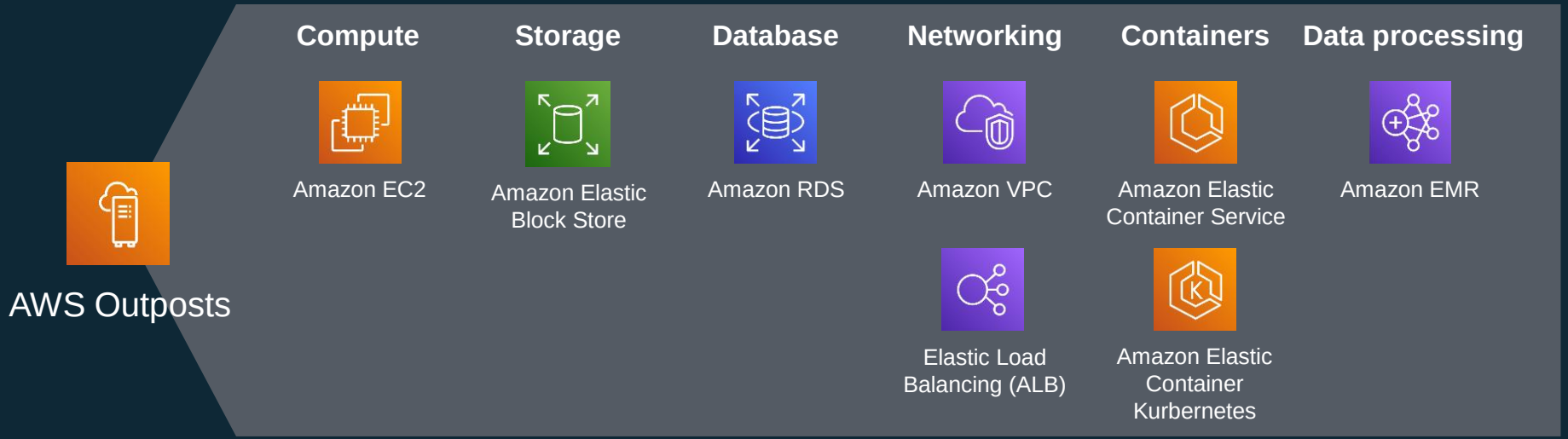
Installed by AWS, simply plugged into power and network

Centralized redundant power conversion unit and DC distribution system for higher reliability, energy efficiency, easier serviceability

Redundant active components including top of rack switches and hot spare hosts

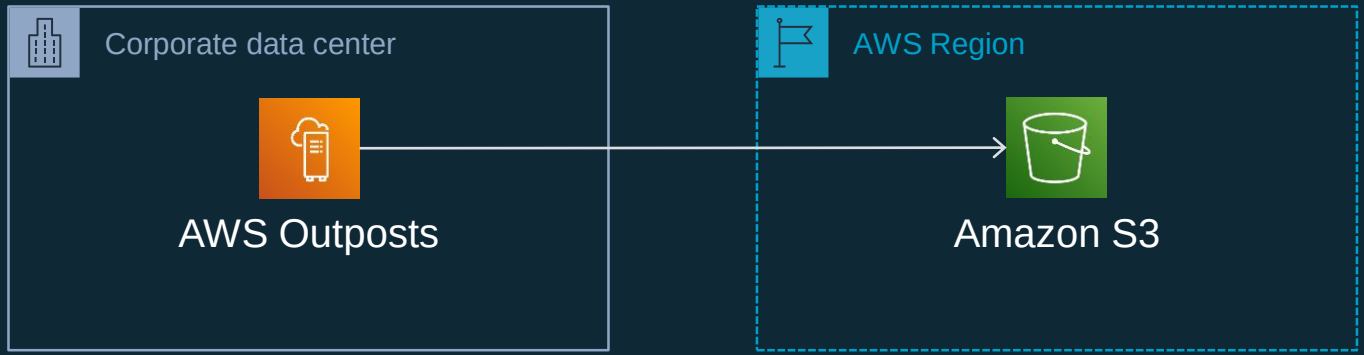
Outposts lets you run AWS services locally

Customers use AWS services on Outposts for a broad spectrum of workloads that require access to on-premises systems, data processing, or data storage



Outposts also lets you access services in AWS Regions

For applications on Outposts that require object storage, you can access Amazon S3 in AWS Regions over your network



But … this doesn’t solve all use cases

There are applications that need local object storage to access and process data locally or to reduce data transfer to AWS Regions

Manufacturing processes

Hospitals and healthcare facilities

Medical research

Autonomous vehicle development

aws

S3 on Outposts: Bringing Amazon S3 to your premises

Consistent experience using the same S3 APIs, automation, and tools on Outposts and in AWS Regions

48 TB or 96 TB of S3 storage per Outpost

Up to 100 local buckets

New storage class for objects on Outposts

Data stored durably across multiple devices and servers

aws

Amazon S3 on Outposts helps customers …

Meet data residency requirements

Perform local data processing

Stage and validate applications for cloud migration

Meet data residency requirements with S3 on Outposts

Meet data residency requirements

Store data within a geography or other regulated location where there is not an AWS Region today

Build applications on Outposts that use the S3 API, and meet local data residency requirements

Perform local data processing with S3 on Outposts

Perform local data processing

Applications such as medical imaging in hospitals, autonomous vehicle data capture, and manufacturing processes require local storage

Local storage minimizes data transfers and buffers from network variations

aws

Stage and validate applications with S3 on Outposts

Stage and validate applications for cloud migration

Build and test applications on premises that may eventually move to an AWS Region, and minimize the changes required

Provides an intermediate step in your cloud migration journey

S3 on Outposts regional availability

Available in all locations where Outposts is supported, except GovCloud (US) regions

aws

S3 on Outposts pricing

Priced on S3 storage capacity ordered for your Outpost

- 48 TB and 96 TB SKUs

3-year term with partial/all/no upfront options

- $176,947 for 48 TB or $353,894 for 96 TB over 3-year term
- No request pricing
- Effective price $0.10/GB-month

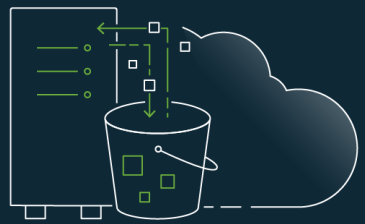
S3 can be added to existing Outposts

- No additional hardware needed if you're using less than 11 TB of EBS

aws

Features of S3 on Outposts

Same S3 APIs and familiar features as in the cloud



- Integrated S3 API experience
- New storage class
- Encryption by default
- S3 security and access control features
- Object and bucket tagging
- S3 Lifecycle expiration actions
- CloudTrail logs and CloudWatch metrics

aws

Integrated S3 API experience

AWS Tools and SDKs

AWS Command Line Interface

Fully support by the latest AWS SDKs and CLI

Syntactical and semantic compatibility with the S3 API so applications function without modification

New SDK (*s3outposts*) for endpoint management

aws

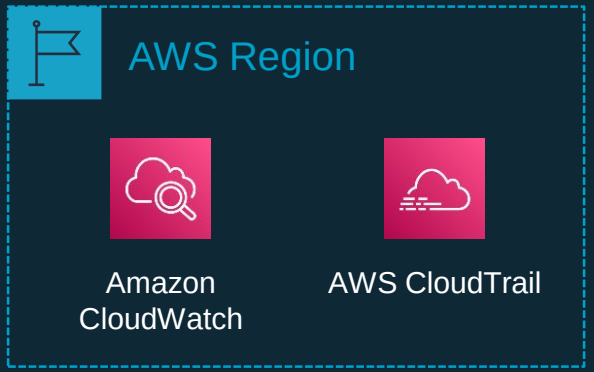
Where’s my data stored?

Data is always stored on the Outpost

- Object data
- Object system and user metadata
- Object tags

Buckets are created and managed in the Outposts home region

Telemetry is available in the home region



A new storage class for S3 on-premises

S3 Outposts

Single storage class at GA – Amazon S3 Outposts

Designed to durably and redundantly stores data across multiple devices and servers on your Outposts

Stored data is always encrypted using SSE-S3

Same eventual consistency model as other S3 storage classes

Support for S3 Lifecycle expiration actions

aws

Same S3 security and access control features

IAM policies

Block Public Access
(always enabled)

S3 Access Points
(VPC restricted)

S3 Object Ownership
(always enabled)

aws

IAM policies: controlling access to your data

Support for both bucket and access point policies

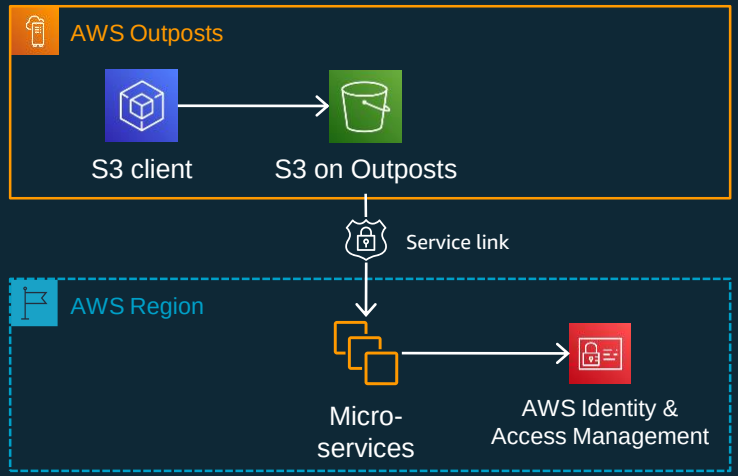
Policies use the s3-outposts:* namespace (vs. s3:*)

- Distinct control for data stored on your Outpost

S3 APIs are authenticated using IAM in the AWS Region via the service link

Access to objects will be denied if S3 cannot connect to IAM

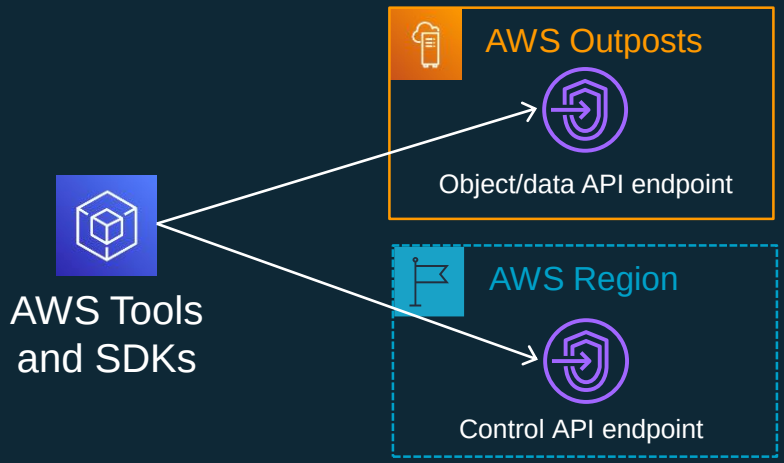
- Data remains stored on the Outposts



S3 on Outposts endpoints for control and data APIs

Bucket name endpoint replaced by dedicated control/data endpoints

- S3 client makes API request
- SDK/CLI determines endpoint based on request and attributes



Outposts endpoint in customer VPC for access to objects in bucket

Regional endpoint for management and control of buckets

API endpoints: details

Hostnames defined in an AWS-owned public hosted zone

s3-outposts.{region}.amazonaws.com

{accessPointName}-{accountId}.{outpostId}.s3-outposts.{region}.amazonaws.com

Hostnames can be resolved through private VPC DNS

Request must originate requests from IPs resident in the VPC CIDR

aws

Using S3 on Outposts

S3 for Outposts “Hello World”

Create a bucket on your S3 on Outposts storage capacity

Create an S3 access point restricted to a VPC on your Outposts

Create an endpoint in a subnet on your Outposts

Store an object on your Outposts

aws

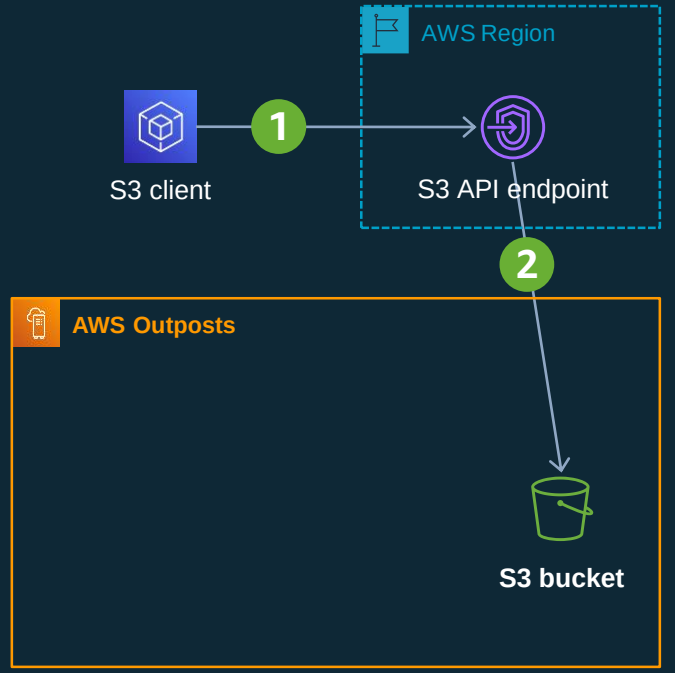
Create bucket on Outpost

```
$ aws s3control create-bucket … --outposts-id {outpostsId}
```

Request includes ID of the Outposts on which to store the bucket

1. SDK sees the Outpost ID and routes request to regional endpoint
2. Service asynchronously creates bucket on specified Outpost

Response contains ARN of the bucket



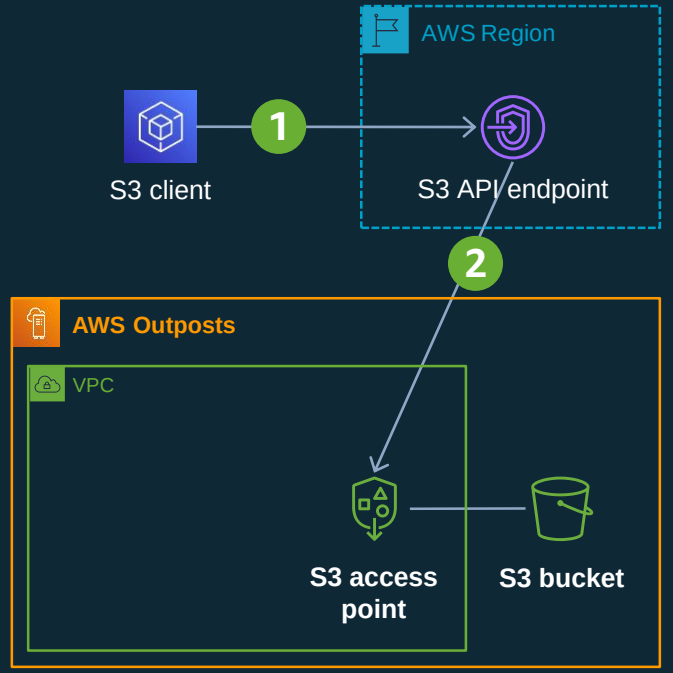
Create access point on Outpost

```
$ aws s3control create-access-point … --bucket {bucketArn} \
    --vpc-configuration …
```

Request must include VPC configuration to restrict access

1. SDK uses routes request to the regional endpoint for S3 on Outposts
2. Service asynchronously creates access point for bucket

Response contains ARN of the access point



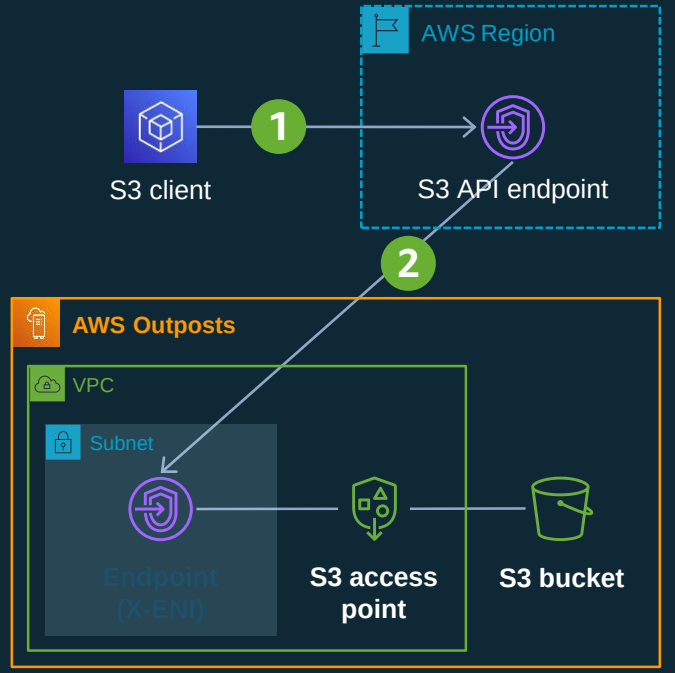
Create endpoint on Outpost

```
$ aws s3outposts create-endpoint … --subnet-id … \
    --security-group-id …
```

Request includes subnet and security group for endpoint on the Outpost

1. SDK routes *s3outposts* request to the regional endpoint
2. Service asynchronously creates endpoint (X-ENIs) in the specified subnet

Response contains ARN of the endpoint

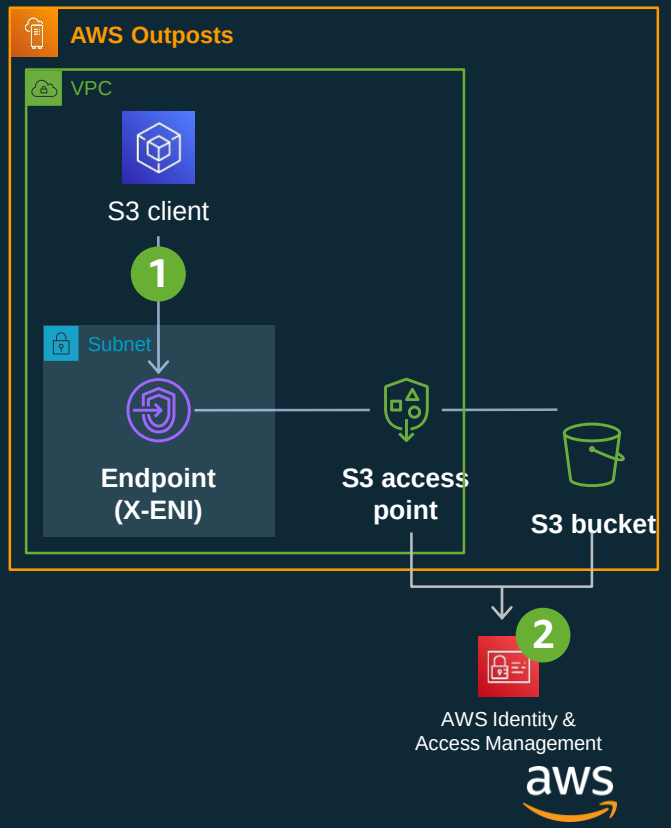


Store an object

```
$ aws s3api put-object … --key … --bucket {accessPointArn}
```

Request uses the ARN of the access point as the bucket name

1. SDK uses access point ARN to route request the endpoint on the Outpost
2. Request is authenticated and authorized against access point and bucket policies



What happens when I run out of storage?

Storage capacity on Outposts is finite based on SKU ordered

On running out of storage, the S3 API response is HTTP 507 InsufficientCapacity

Granular capacity metrics available in CloudWatch

- Use alarms and notifications to monitor utilization

Free up space by deleting objects or setting a lifecycle expiration policy

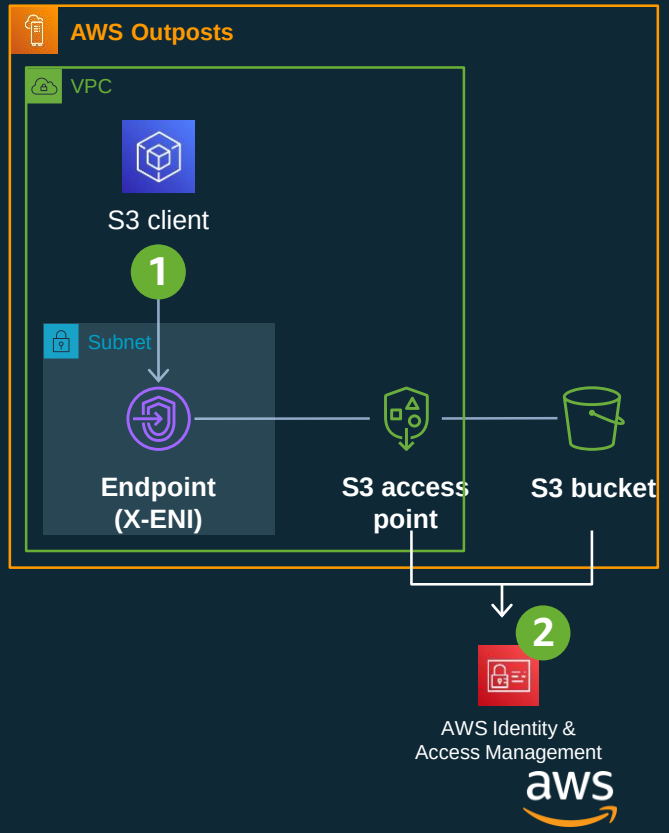
aws

Retrieve an object

```
$ aws s3api get-object … --key … --bucket {accessPointArn}
```

Request uses the ARN of the access point as the bucket name

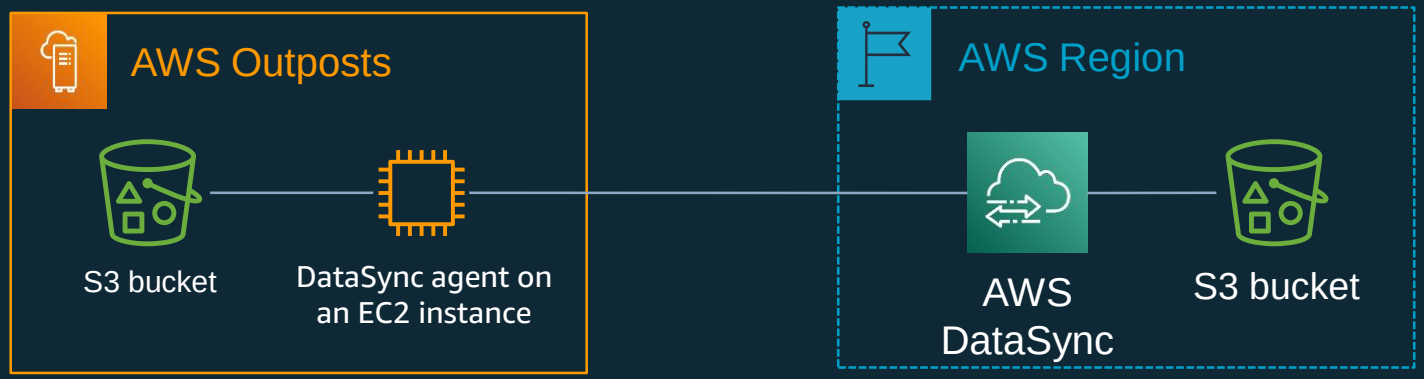
1. SDK uses access point ARN to route request the endpoint on the Outpost
2. Request is authenticated and authorized against access point and bucket policies



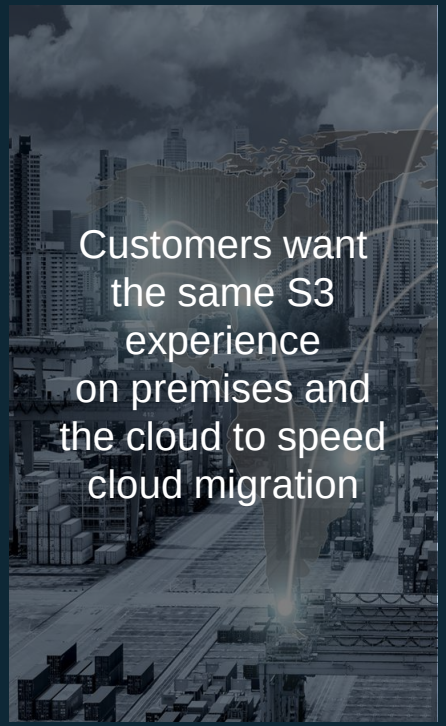
Data transfer to and from AWS Regions

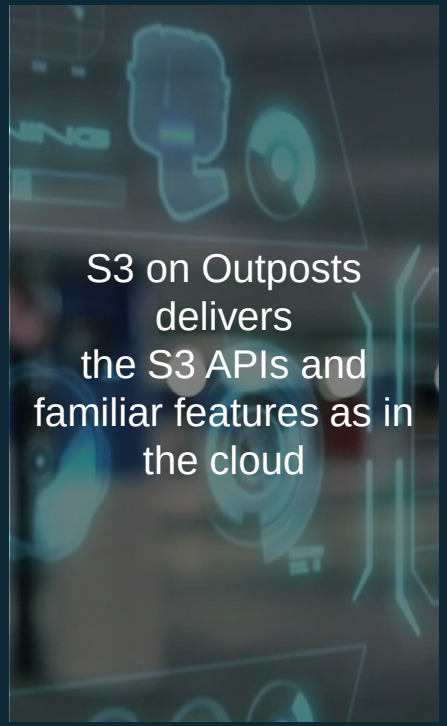
AWS DataSync can securely and efficiently transfer hundreds of terabytes and millions of objects between S3 buckets on Outpost and in AWS Regions

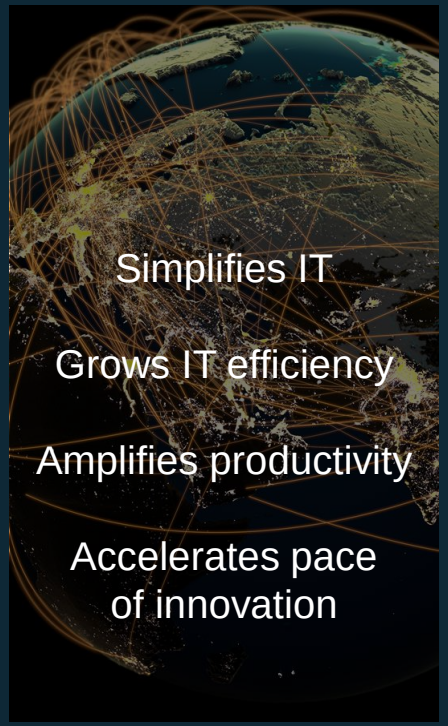
Use for data protection in AWS Regions or bringing data to your Outposts for local processing



Amazon S3 on Outposts: Bringing S3 on premises







Thank you!

Meena Vembusubramanian,
Senior Product Manager

Paul Reed,
Principal Product Manager