
AWS
re:Invent
NOV. 28 – DEC. 2, 2022 | LAS VEGAS, NV

STG320

Gain insights into your storage usage at scale with Amazon S3 Storage Lens

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AWS

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Agenda

Amazon S3 insights portfolio

Amazon S3 Storage Lens recap

Introducing new metrics and use cases in S3 Storage Lens **New**

Dive deep into new use cases

Key takeaways

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Amazon S3 insights portfolio

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If you can’t see it,
you can’t change it

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Common storage insights questions

“What are my largest buckets?”

“Are all of my objects encrypted?”

“How is my data distributed across storage classes/accounts/Regions?”

“How fast is my S3 data growing?”

“What are my fastest-growing buckets?”

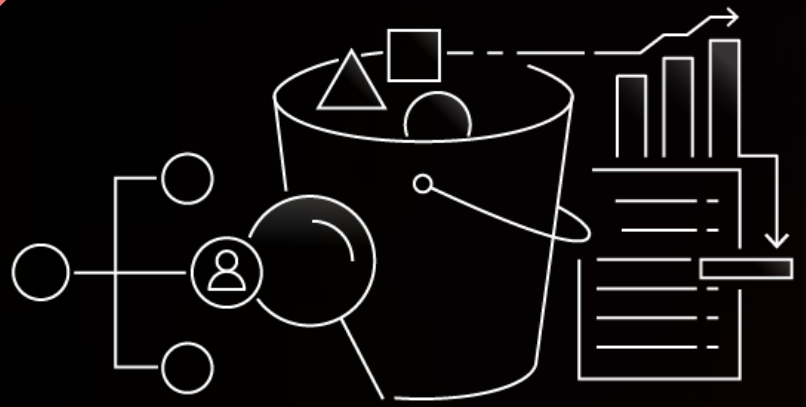
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S3 insights portfolio

Recommended

S3 Storage Lens



Organization-wide visibility into
pre-aggregated usage & activity metrics

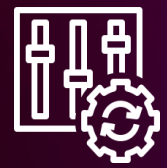
Free and paid versions available

S3 Inventory



Object-level metadata

S3 storage class analysis



Access patterns
by bucket

Amazon CloudWatch metrics for S3



Monitoring and alarms

S3 server access logs



Detailed request
logging

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Insights portfolio comparisons

	Granularity level	Updating frequency	Price
S3 Storage Lens	Organization Account Bucket Prefix	Daily	$0.20/mil objects/month
Storage class analysis	Bucket Prefix Tags	Daily	$0.10/mil objects/month
Amazon CloudWatch metrics for S3	Bucket Prefix Tags	1 minute to 1 day*	$0.30 per metric/month and goes down to $0.02/metrics/month CloudWatch metrics are billed at the same rate as the Amazon CloudWatch custom metrics
S3 Inventory	Object	Daily/weekly	$0.0025/mil objects
Server access logs	Request	Hourly*	No charges

*Server access log records/CloudWatch metrics are delivered on a best-effort basis; most log records/CloudWatch metrics are delivered within a few hours/minutes of the time that they are recorded, but some might not appear in a delivered server log/CloudWatch metrics

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S3 Storage Lens recap

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On average, customers using S3 Storage Lens advanced metrics obtain cost savings

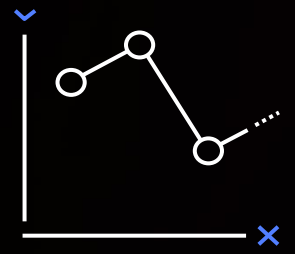
6x greater

than the S3 Storage Lens cost in the first 6 months of using it

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Source: Internal AWS causal impact study, covering 2K+ customers between Dec. 2020 and Aug. 2022

Origins of S3 Storage Lens



Visibility



Granularity

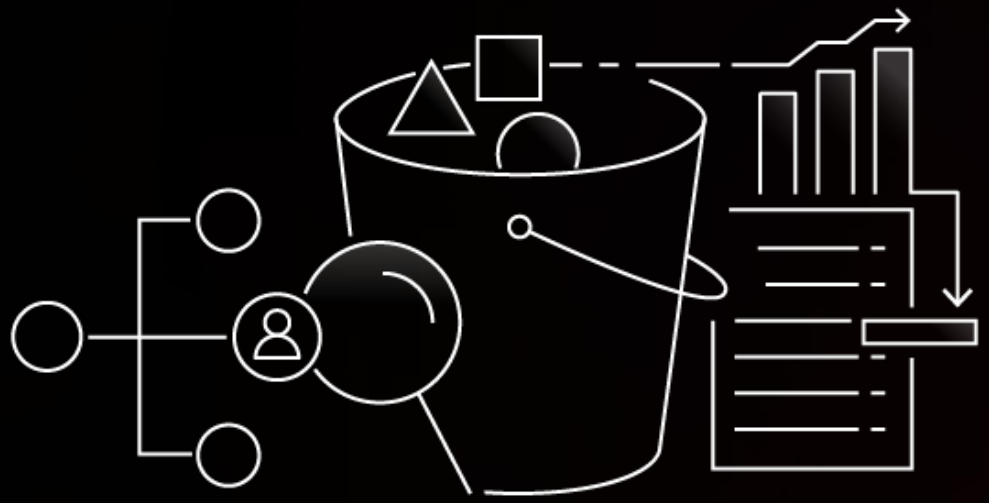


Actionability

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S3 Storage Lens

A storage analytics service that provides organization-wide visibility into storage usage and activity to improve cost efficiency and data protection



1. An interactive dashboard experience in the S3 console – included for all Amazon S3 customers
2. Organization-wide visibility
3. Drill down by Region, storage class, bucket, and prefix
4. Multiple ways to access S3 Storage Lens data
5. Granular usage and activity metrics

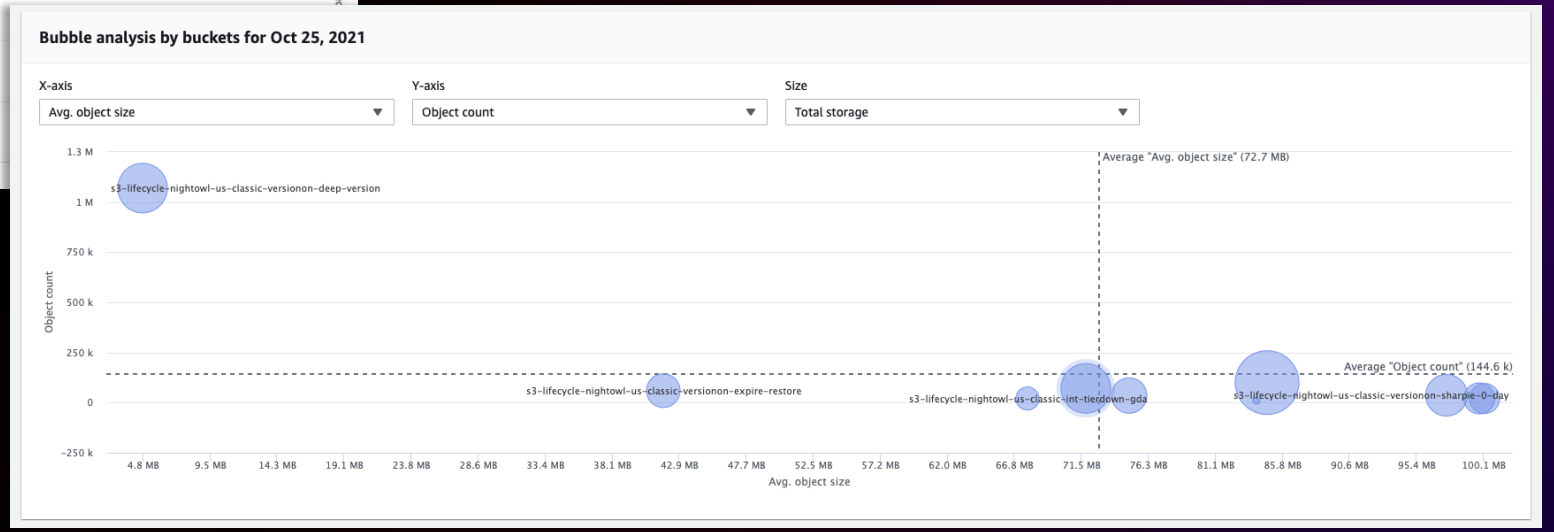
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Interactive dashboard experience

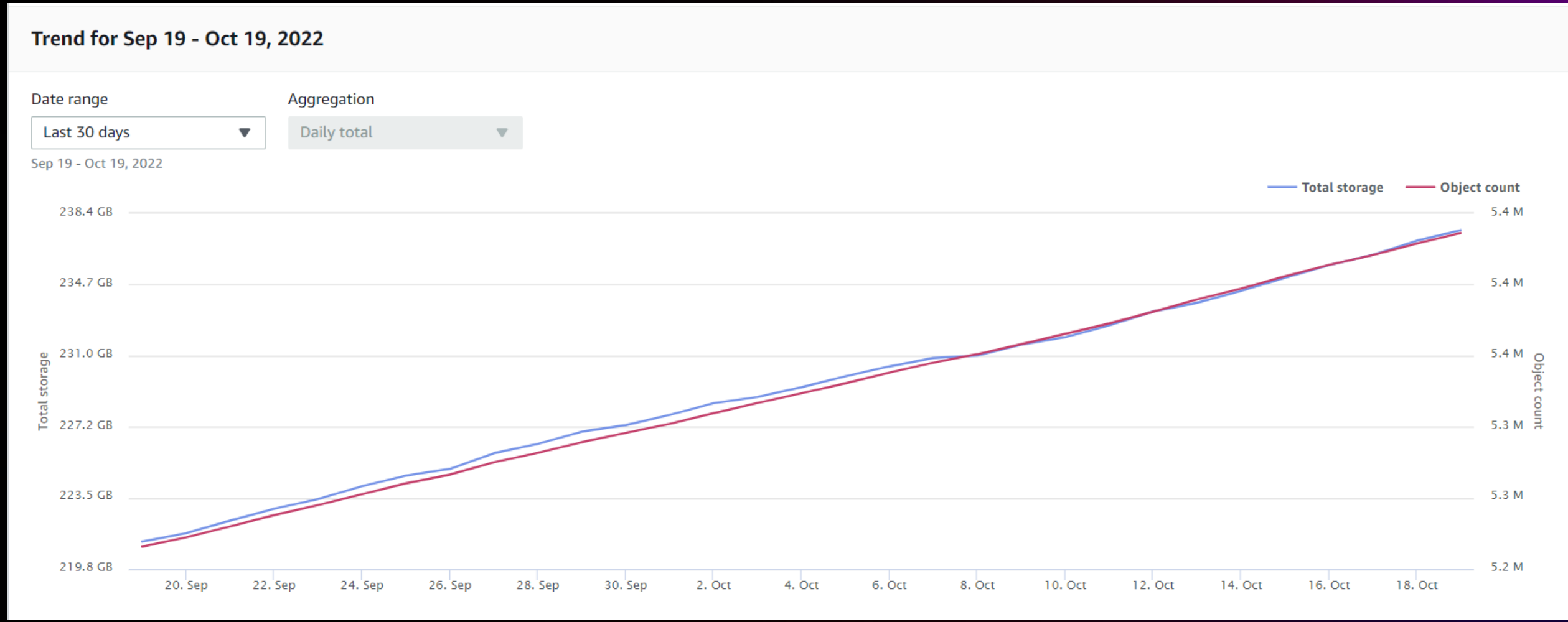
Auto-configured dashboards with interactive charting





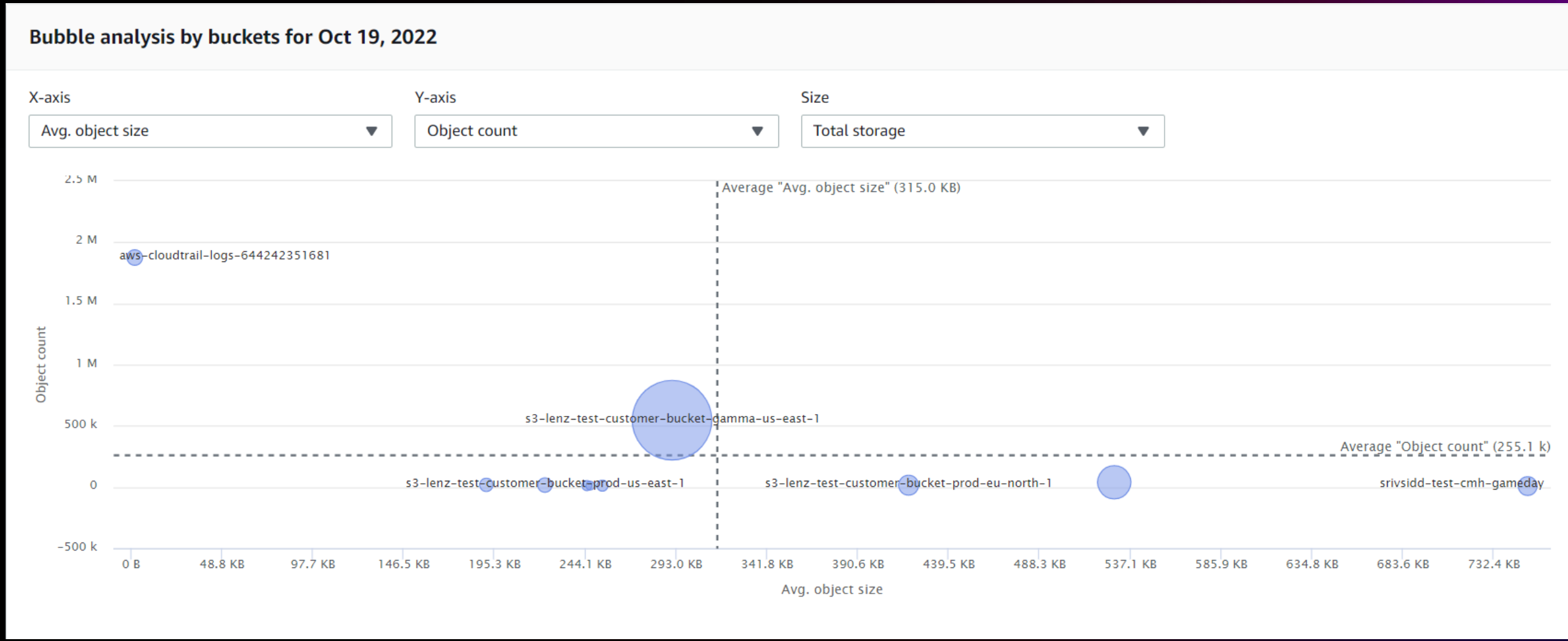
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“How is my total storage/object count trending over the last 30 days?”



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Using bubble analysis to understand object size and count by bucket



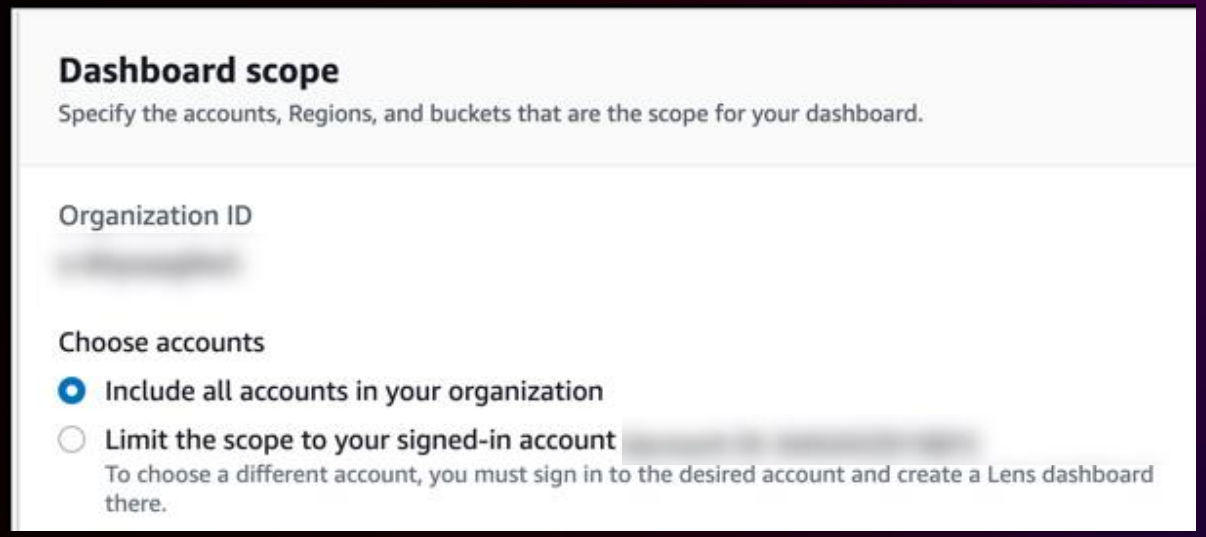
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Organization-wide visibility

S3 Storage Lens provides a consolidated view of storage across tens or hundreds of accounts, or a single account

AWS Organizations-level dashboard

Account-level dashboard



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Understand storage footprint at the organization level

181.5 PB	61.5 G	3.2 MB	40	4	2.9 G
Total storage	Object count	Average object size	Active buckets	Accounts	All requests

Metrics categories

Choose metrics categories

Summary ✕ Cost optimization ✕ Data protection ✕

% change comparison

Day/day | Week/week | Month/month

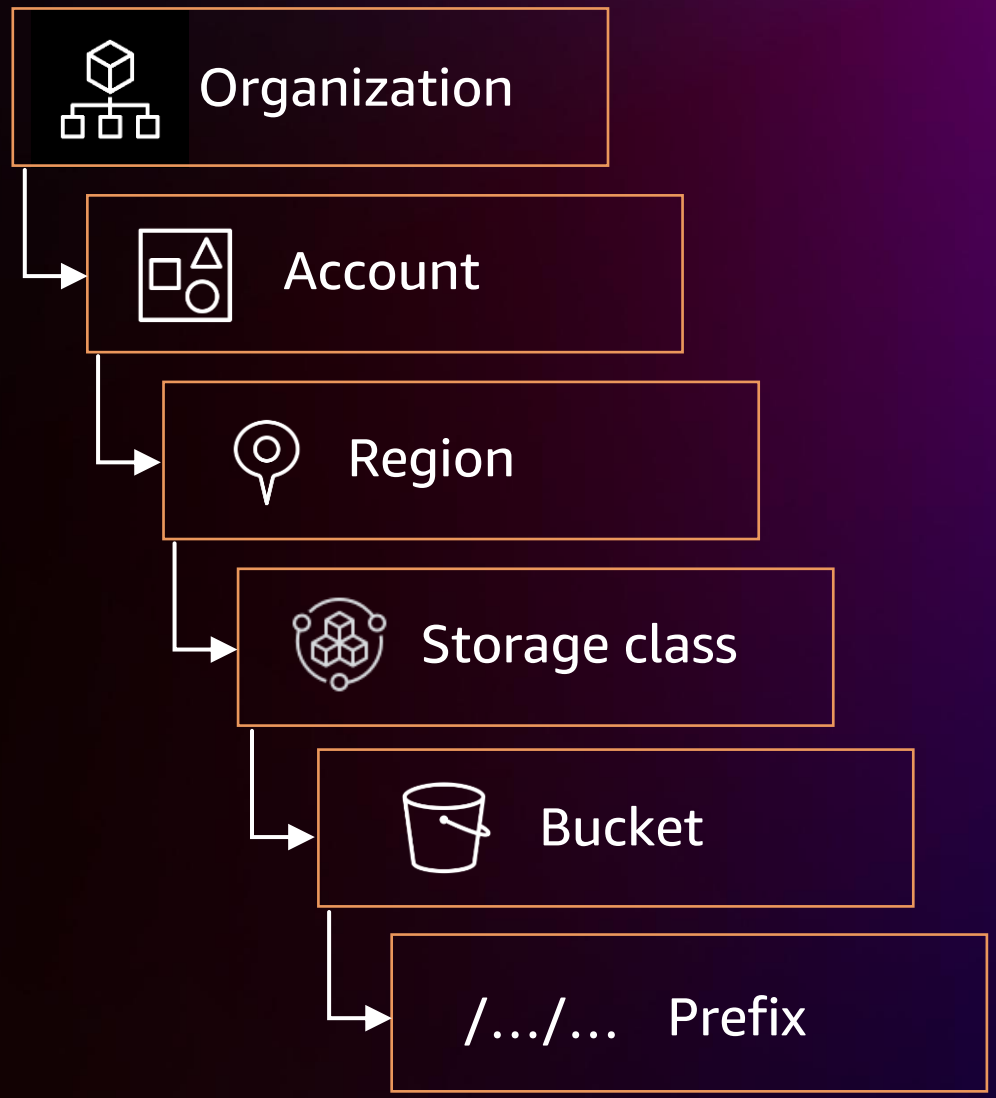
Metric name	Metric category	Total for Nov 29, 2021	% change	30-day trend
Total storage	Summary	181.5 PB	-0.19%	
Object count	Summary	61.5 G	-0.09%	
Average object size	Summary	3.2 MB	-0.10%	
Active buckets	Summary	40	0%	
Accounts	Summary	4	0%	
Buckets	Summary	40	0%	
% current version bytes	Data protection	85.47%	0.20%	
% encrypted bytes	Data protection	41.09%	0.08%	
% replicated bytes source	Data protection	-	-	
% Object Lock bytes	Data protection	0.00%	0%	
% noncurrent version bytes	Cost optimization	14.53%	-0.20%	
Delete marker object count	Cost optimization	401 M	1.41%	
Incomplete multipart upload bytes greater than 7 days old	Cost optimization	-	-	

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Drill-down dimensions

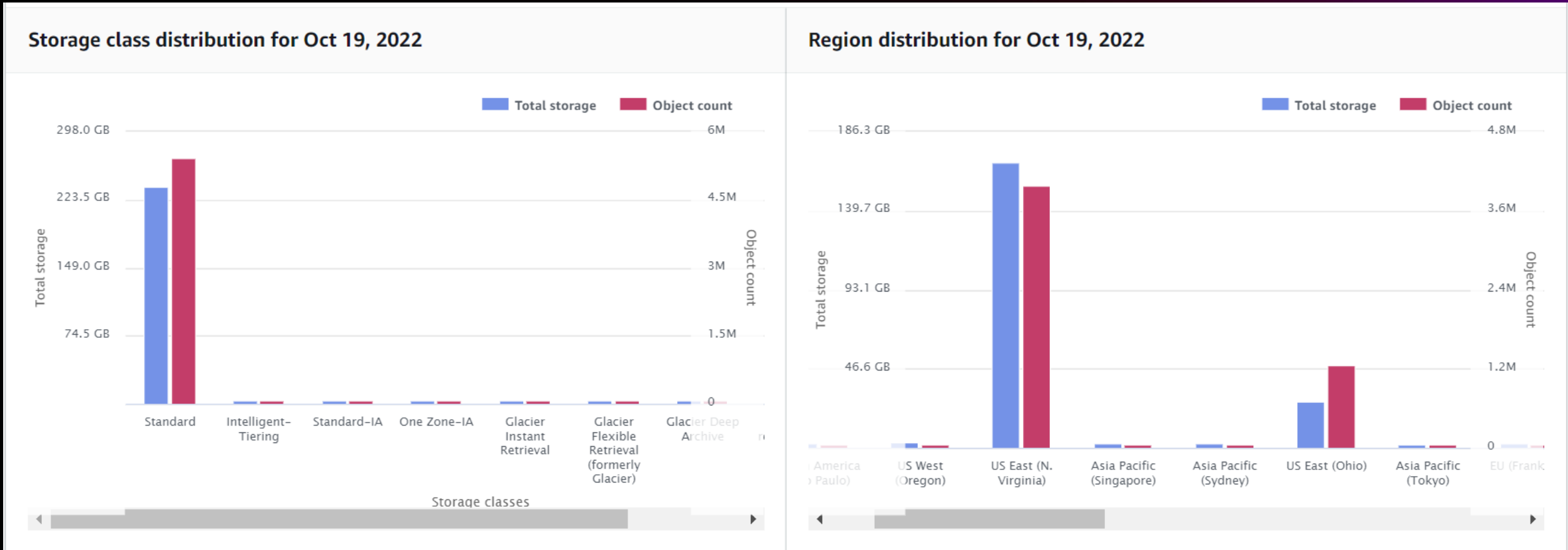
- Drill down from organization or account level to more granular details
- S3's first and only prefix-level reporting
- Registering delegated administrators when using AWS Organizations



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Drill-down dimensions

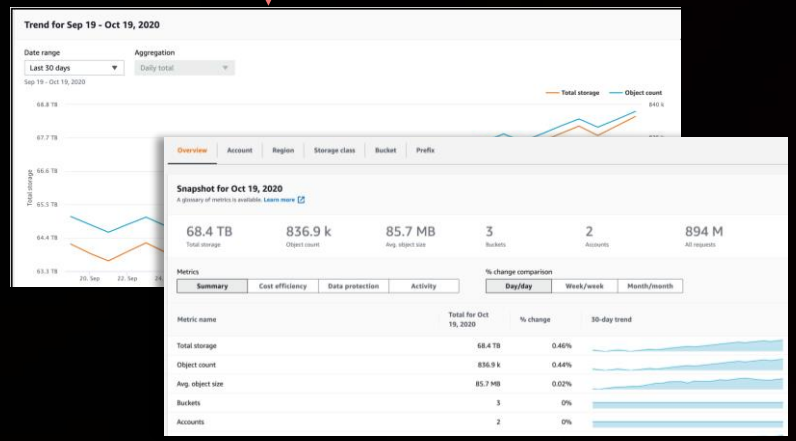
How is my data distributed across storage classes and Regions?



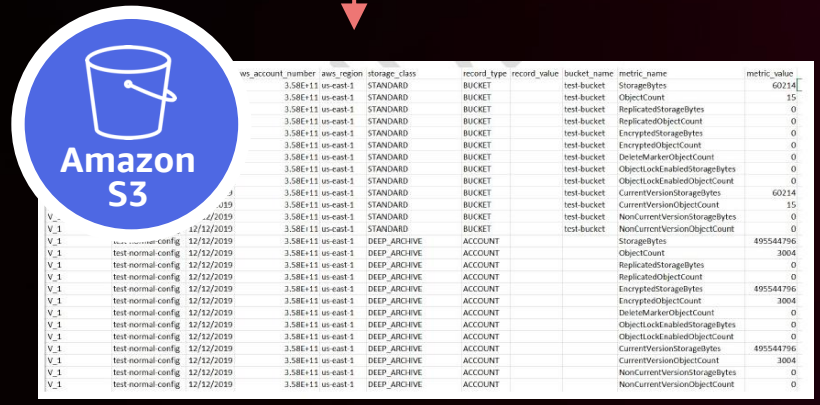
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Multiple ways to access S3 Storage Lens

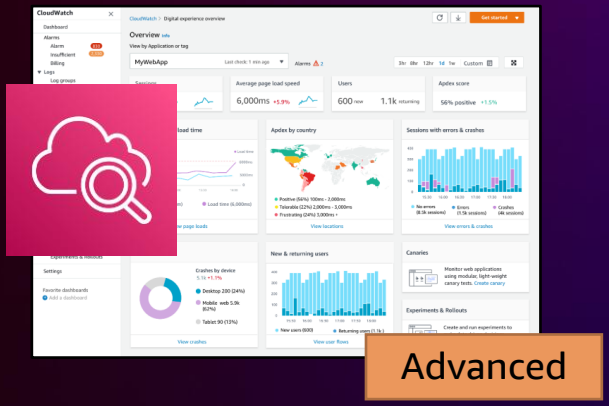
S3 Storage Lens



Integrated dashboard
(S3 console)



Metrics export
(daily to S3 bucket)

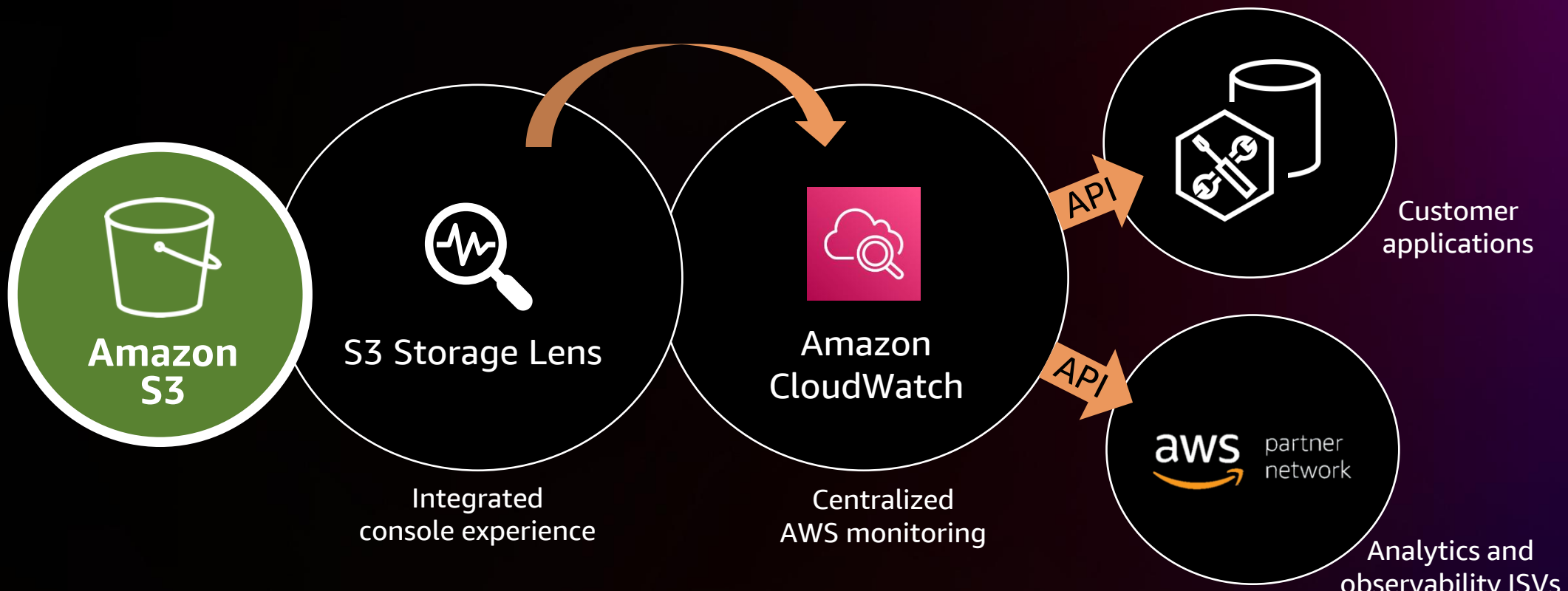


Amazon CloudWatch
(dashboards, API)

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Multiple ways to access S3 Storage Lens data

Publishing S3 Storage Lens data to Amazon CloudWatch



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Use case 1: Centralized dashboards

Create unified, cross-service dashboards; shareable to any user



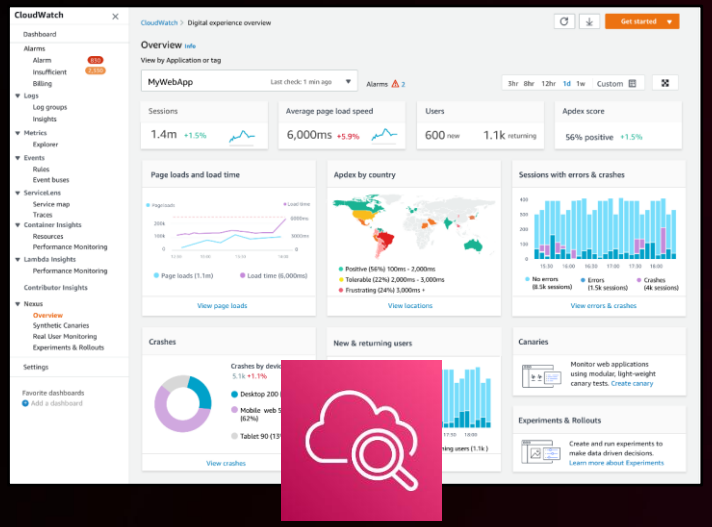
Amazon S3



Amazon EMR



Amazon EC2



Amazon CloudWatch



- IAM users
- By email address
- Public

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Use case 2: Alarms and anomaly detection

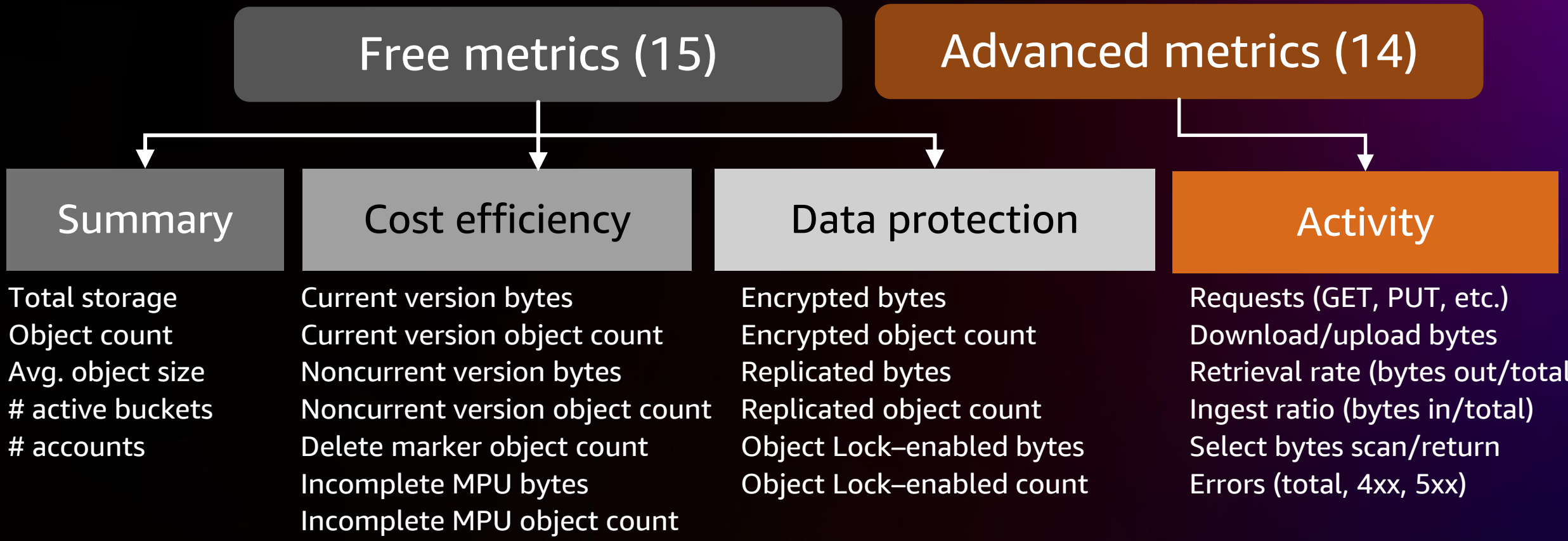
- Receive proactive notifications for critical S3 Storage Lens metrics
- Use machine learning to detect when there are anomalous storage patterns



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Granular metrics

29 metrics in total, offering a detailed view into your storage footprint



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New

Introducing S3 Storage Lens for new use cases with more metrics!

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Introducing new S3 Storage Lens metrics

New

29 → 60+

More than doubling the existing metrics count,
with 34 additional metrics (13 free, 21 advanced)

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Introducing new S3 Storage Lens metrics

New

New concept

Bucket property metrics such as rule and bucket count



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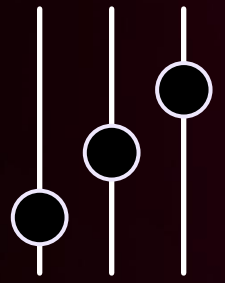
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Introducing new S3 Storage Lens use cases

New

- Advanced cost optimization
- Advanced data protection
- Access management
- Detailed status codes
- Performance
- Events







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. . . the addition of 34 new metrics . . .

Free (13)

Cost optimization
- Delete marker storage bytes
- Incomplete MPU bytes and object count >7 days old

Data protection
- Replicated bytes and object count source
- Versioning-enabled buckets
- MFA-enabled buckets
- AWS KMS enabled buckets

Access management
Object owner enforced, preferred, and writer buckets

Performance
Transfer Accelerate enabled buckets

Events
Event Notification enabled buckets

Advanced (21)

Cost optimization
- Transition and expiration lifecycle rule count
- Noncurrent transition and expiration lifecycle rule count
- Abort incomplete multipart upload lifecycle rule count
- Expired object delete marker lifecycle rule count

Data protection
- Same and cross-Region replication rule count
- Same and cross-account replication rule count
- Invalid replication rule count

Status code metrics
- 200, 206 status counts
- 400, 403, 406 errors
- 500, 503 errors

Activity metrics
- Unsupported signature version requests
- Unsupported TLS requests
- AWS KMS requests



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Pricing and configuration

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S3 Storage Lens pricing

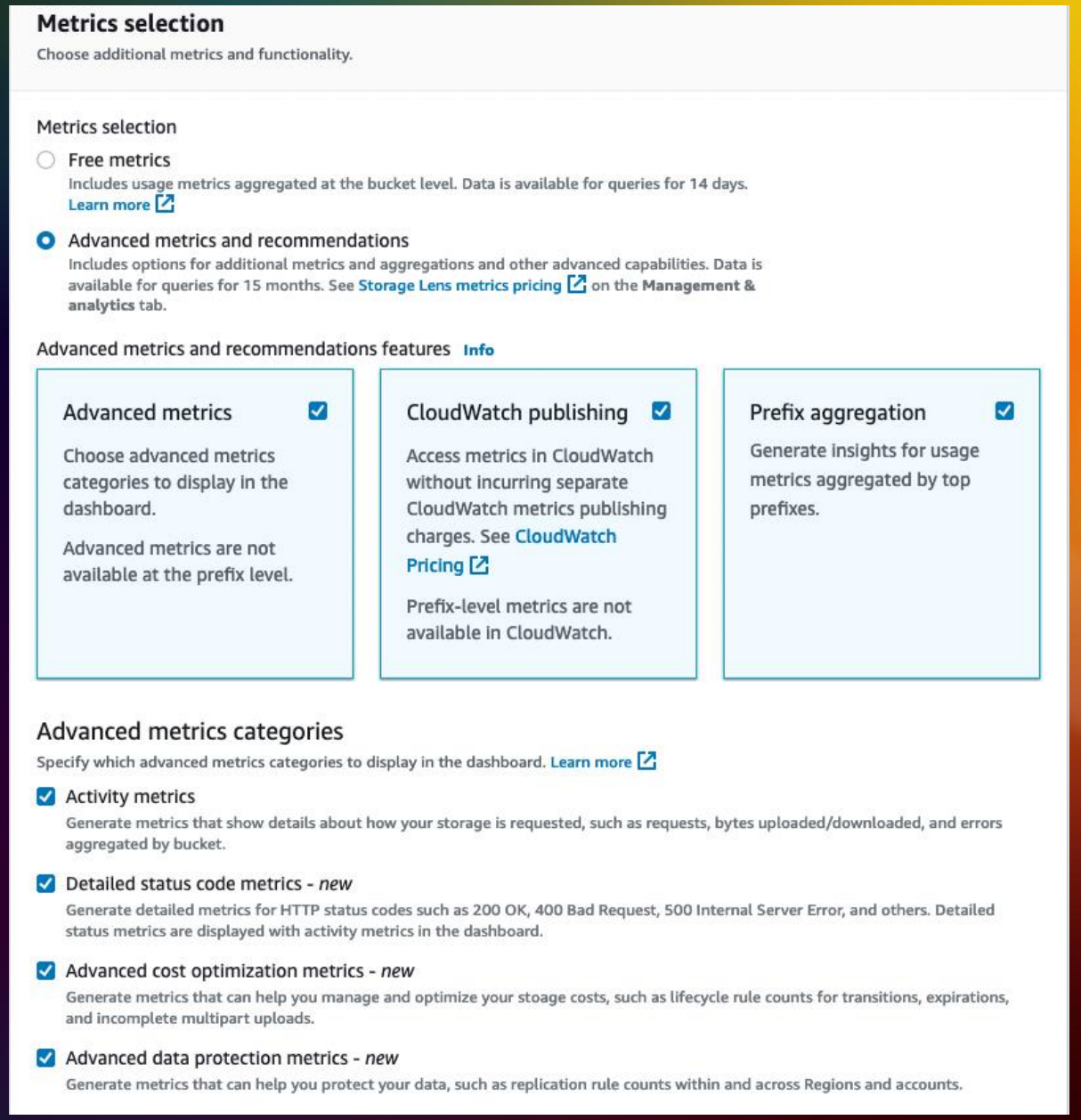
- 13 new metrics are included in the free tier; 21 new metrics are included in the advanced tier
- No change to existing pricing tiers

	Free metrics	Advanced metrics
New **Metrics**	15 + **13** (28)	29 + **34** (63)
Granularity	Lowest level = bucket	Lowest level = prefix
Historical data	14 days	15 months
CloudWatch publishing	N/A	Included (metrics only)
Pricing	**FREE**	**$0.20 per mil. objects/mo**

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Enablement for new metrics



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Use cases

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New storage insights questions

"How many buckets are still allowing **use of ACLs**?"

"How do I **optimize my storage spend** using lifecycle policies?"

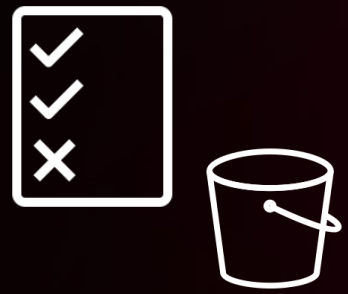
"Is my **data protected** from accidental deletes and overwrites?"

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Access management auditing

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Multiple mechanisms for access management

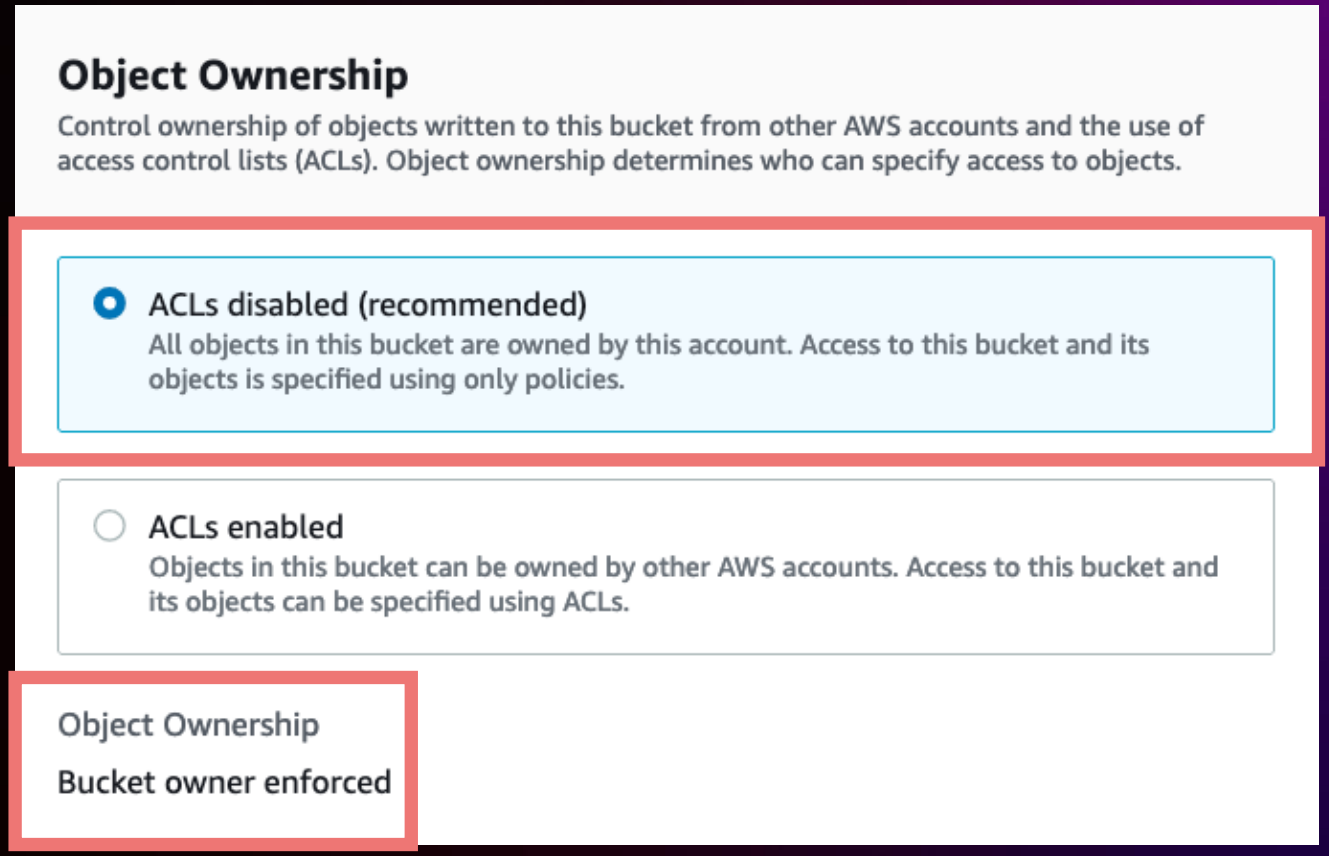
AWS Identity and Access Management (IAM)	Amazon S3	Amazon S3
		
IAM policy	Bucket policy	Access Control List (ACL)
Applies to: IAM identity	S3 bucket	S3 bucket S3 object

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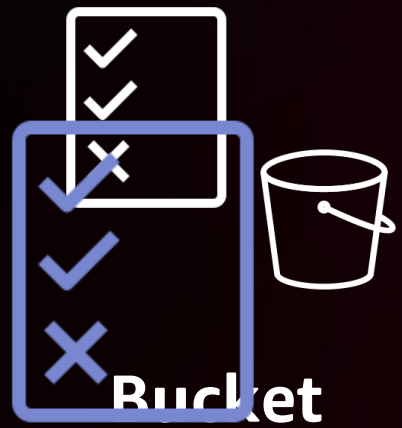
“What is Amazon S3 Object Ownership?”

- ACLs are disabled
- All objects are now owned by the bucket owner
- Access management happens via policies
- Only PUT requests with no ACLs or bucket-owner-full-control canned ACL accepted



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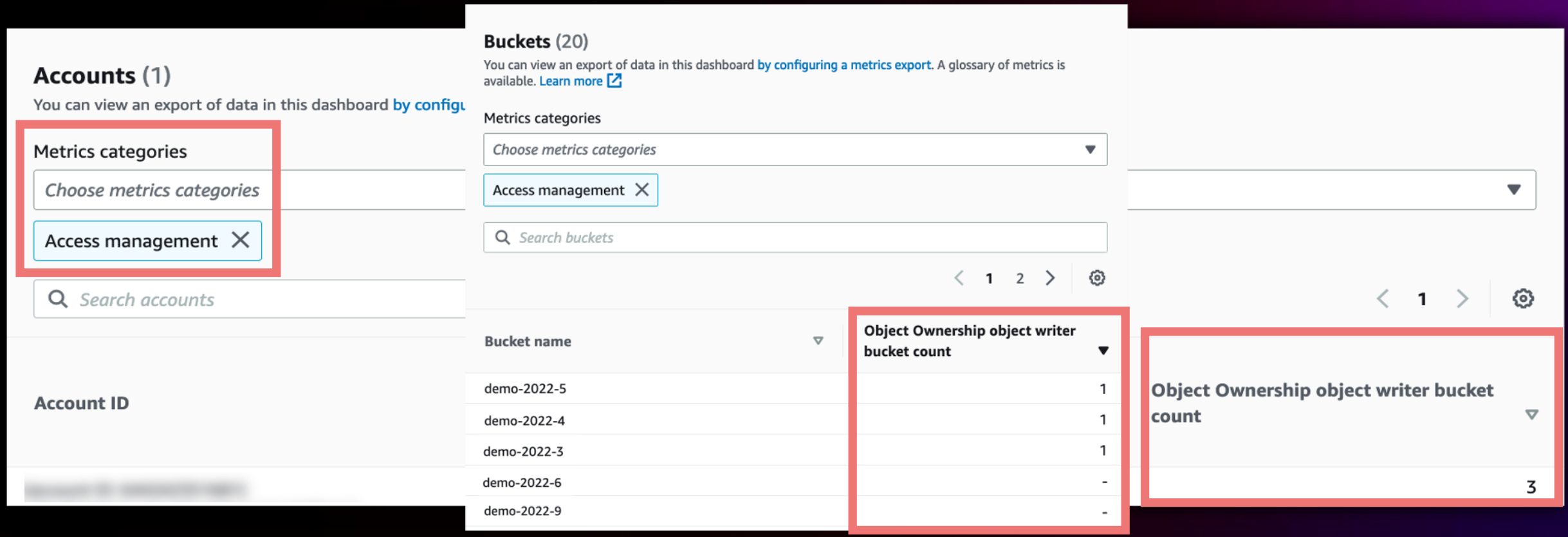
Simplifying access control

AWS Identity and Access Management (IAM)	All access control defined using policies	Amazon S3
		
IAM policy	Bucket policy	Access Control List (ACL)
Applies to: IAM identity	S3 bucket S3 ARN	S3 bucket object

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“How many buckets are still allowing use of ACLs?”

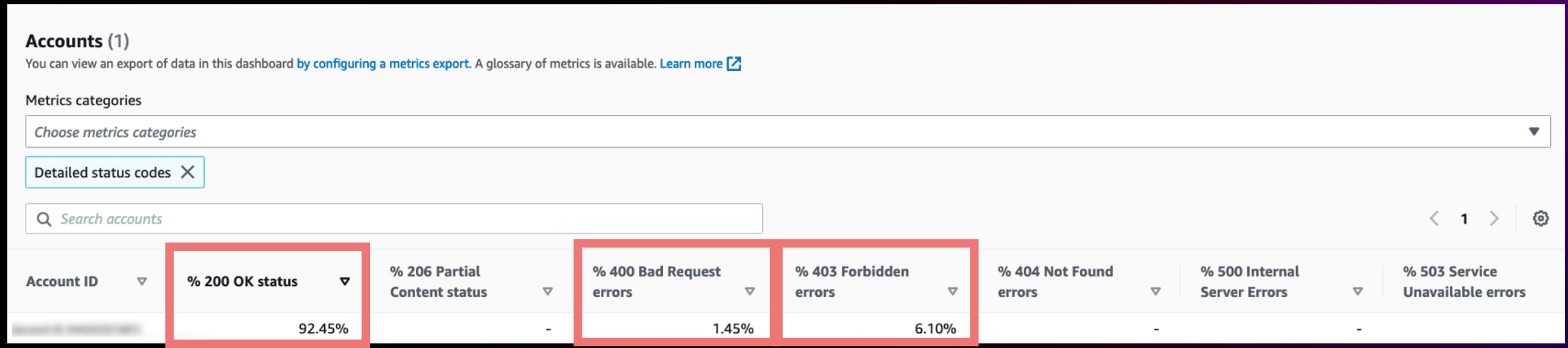


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Detailed status code auditing

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“What’s causing my requests to fail?“



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“Have I configured my permissions correctly?“

Top 10 buckets

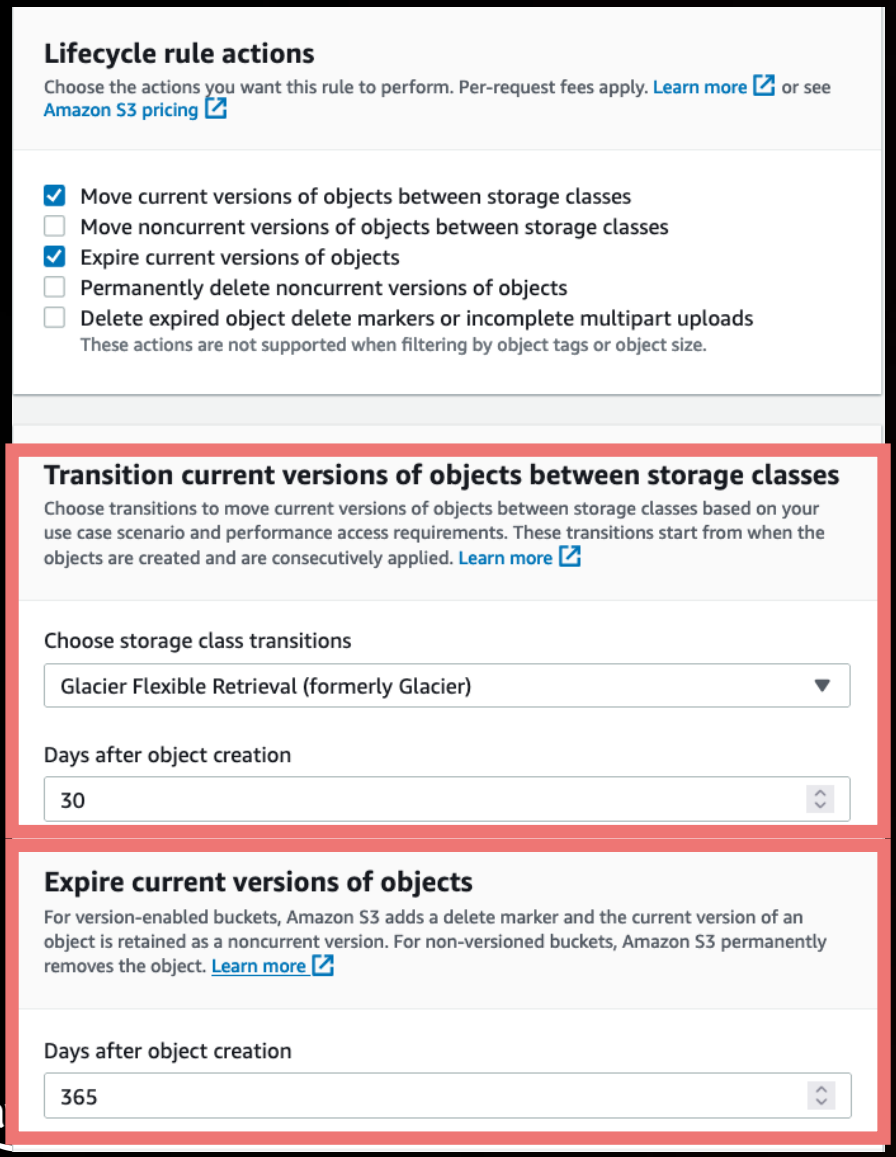
Bucket	403 Forbidden error count	% of total	% change	Trend from Sep 30 - Oct 30, 2022
demo-2022-6	57	15.41%	14.00%	
demo-2022-9	54	14.59%	45.95%	
demo-2022-4	47	12.70%	2.08%	
demo-2022-3	19	5.14%	-46.15%	
demo-2022-5	19	5.14%	-72.73%	
demo-2022-21	18	4.86%	-12.50%	
demo-2022-22	17	4.59%	-21.43%	
demo-2022-8	15	4.05%	-21.05%	
demo-2022-7	14	3.78%	-30.00%	
demo-2022-2	14	3.78%	-33.33%	

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Cost optimization auditing

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“What is Amazon S3 Lifecycle Policy?”

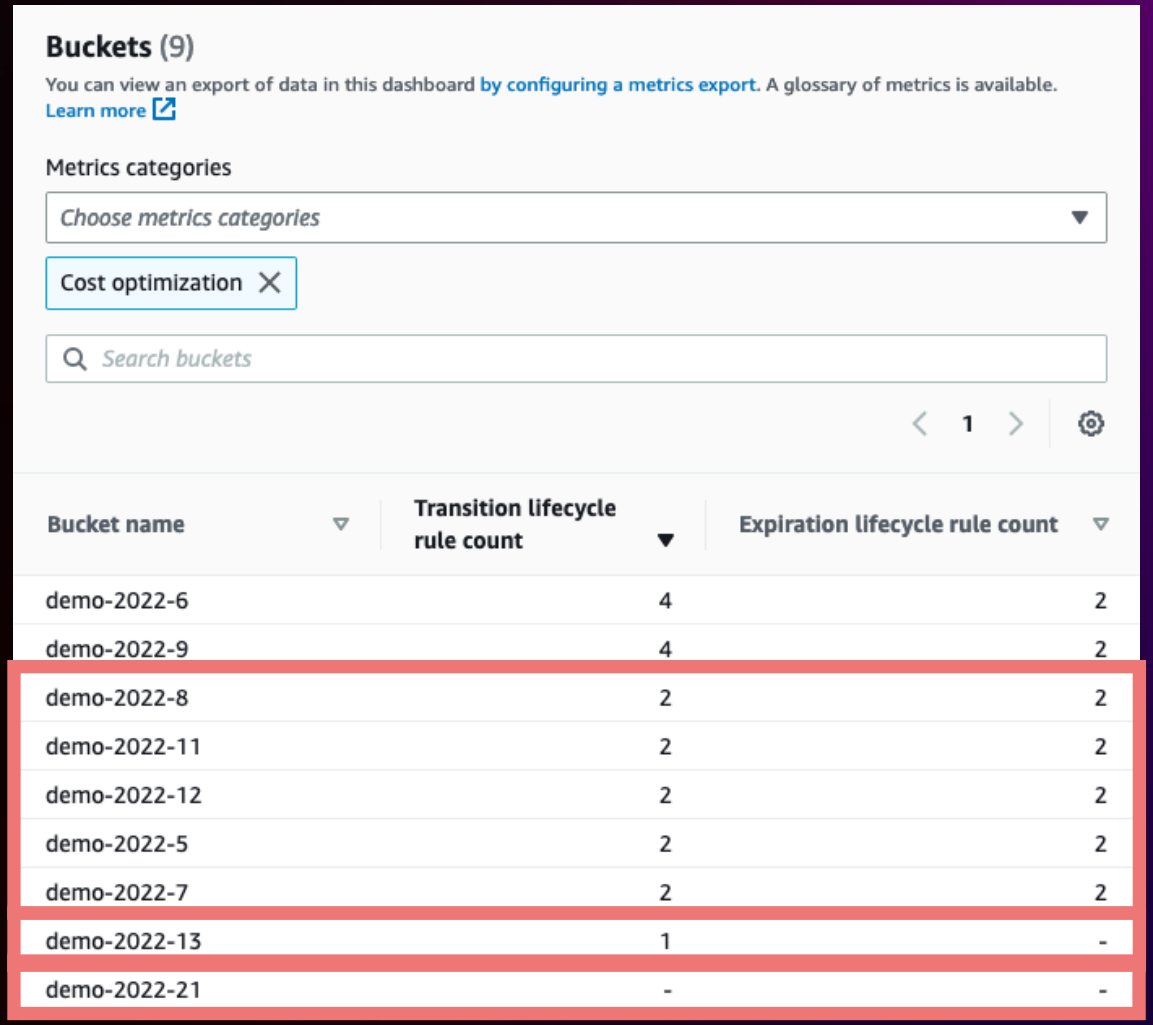


Transition actions: Define when objects transition to other Amazon S3 storage classes as they age

Expiration actions: Define when objects expire; Amazon S3 deletes expired objects on your behalf

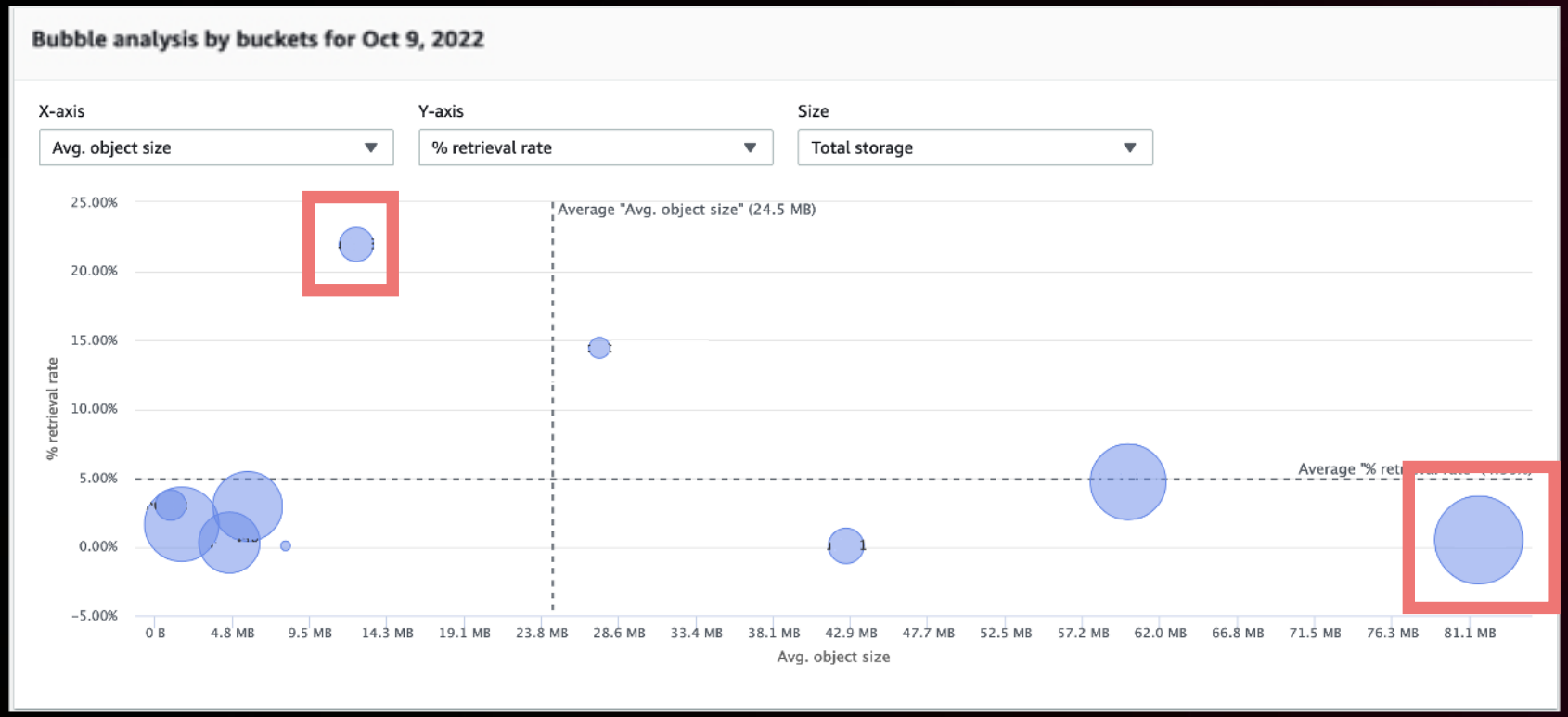
“Which buckets are missing lifecycle configuration?”

- Buckets with 2 transition and expiration lifecycle rule count
- Bucket deviates from other buckets in account
- Bucket where lifecycle configuration was missed



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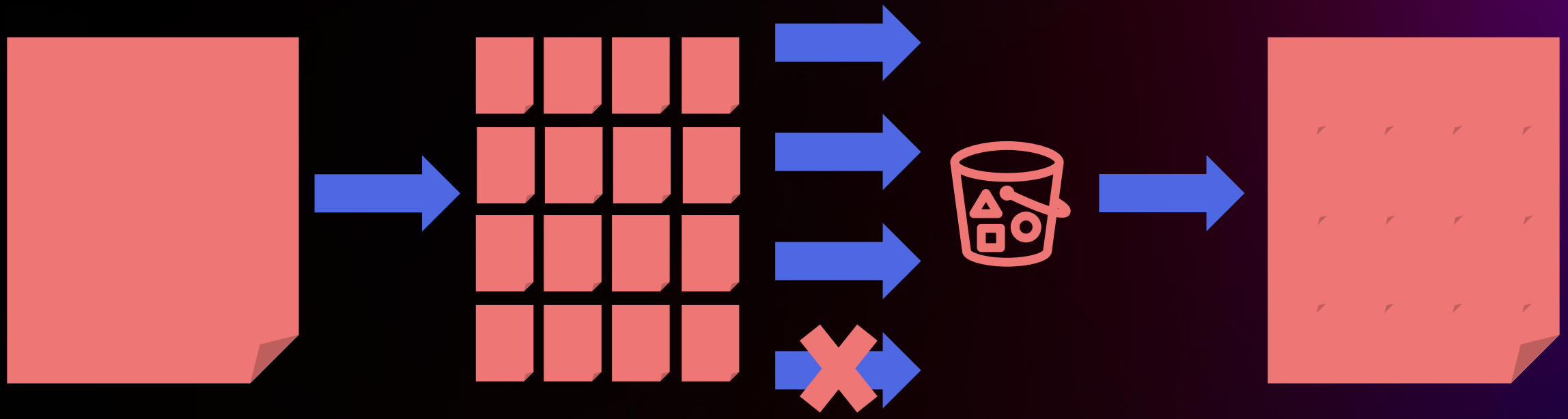
“How do I optimize my storage spend using lifecycle policies?”



- Bucket with low retrieval rate and large average object size
- Bucket with very high retrieval rate, low average object size

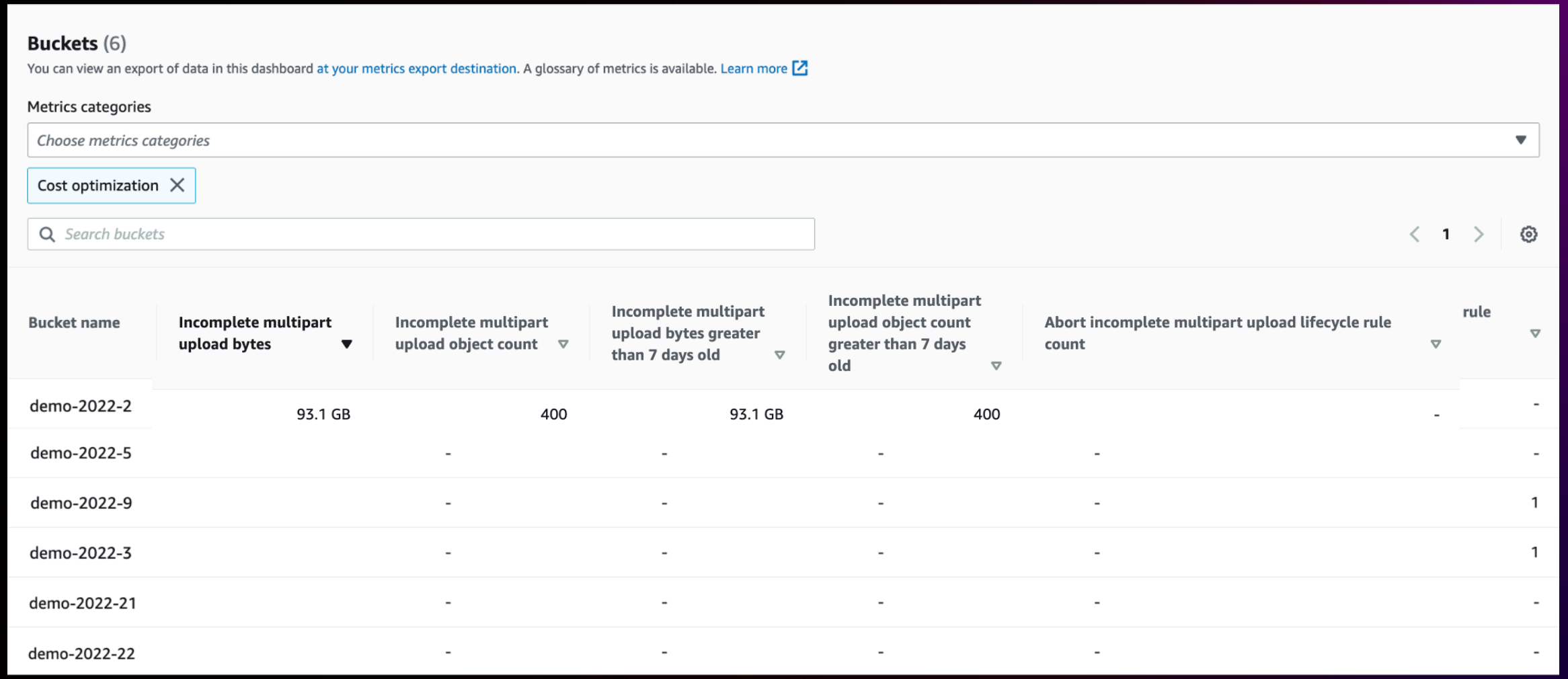
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“What is Multipart Upload (MPU)?”



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“Am I overspending on incomplete MPUs?“



Buckets (6)

You can view an export of data in this dashboard at your metrics export destination. A glossary of metrics is available. Learn more

Metrics categories

Choose metrics categories

Cost optimization

Search buckets

1

Bucket name	Incomplete multipart upload bytes	Incomplete multipart upload object count	Incomplete multipart upload bytes greater than 7 days old	Incomplete multipart upload object count greater than 7 days old	Abort incomplete multipart upload lifecycle rule count	rule
demo-2022-2	93.1 GB	400	93.1 GB	400	-	-
demo-2022-5	-	-	-	-		-
demo-2022-9	-	-	-	-		1
demo-2022-3	-	-	-	-		1
demo-2022-21	-	-	-	-		-
demo-2022-22	-	-	-	-		-

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Data protection auditing

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Data protection auditing

- DP1 – Versioning and Multi Factor Authentication (MFA) Delete auditing
- DP2 – Replication auditing
- DP3 – Encryption auditing

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DP1: Versioning and multi-factor authentication (MFA) delete auditing

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DP1: “What is Amazon S3 Versioning?”

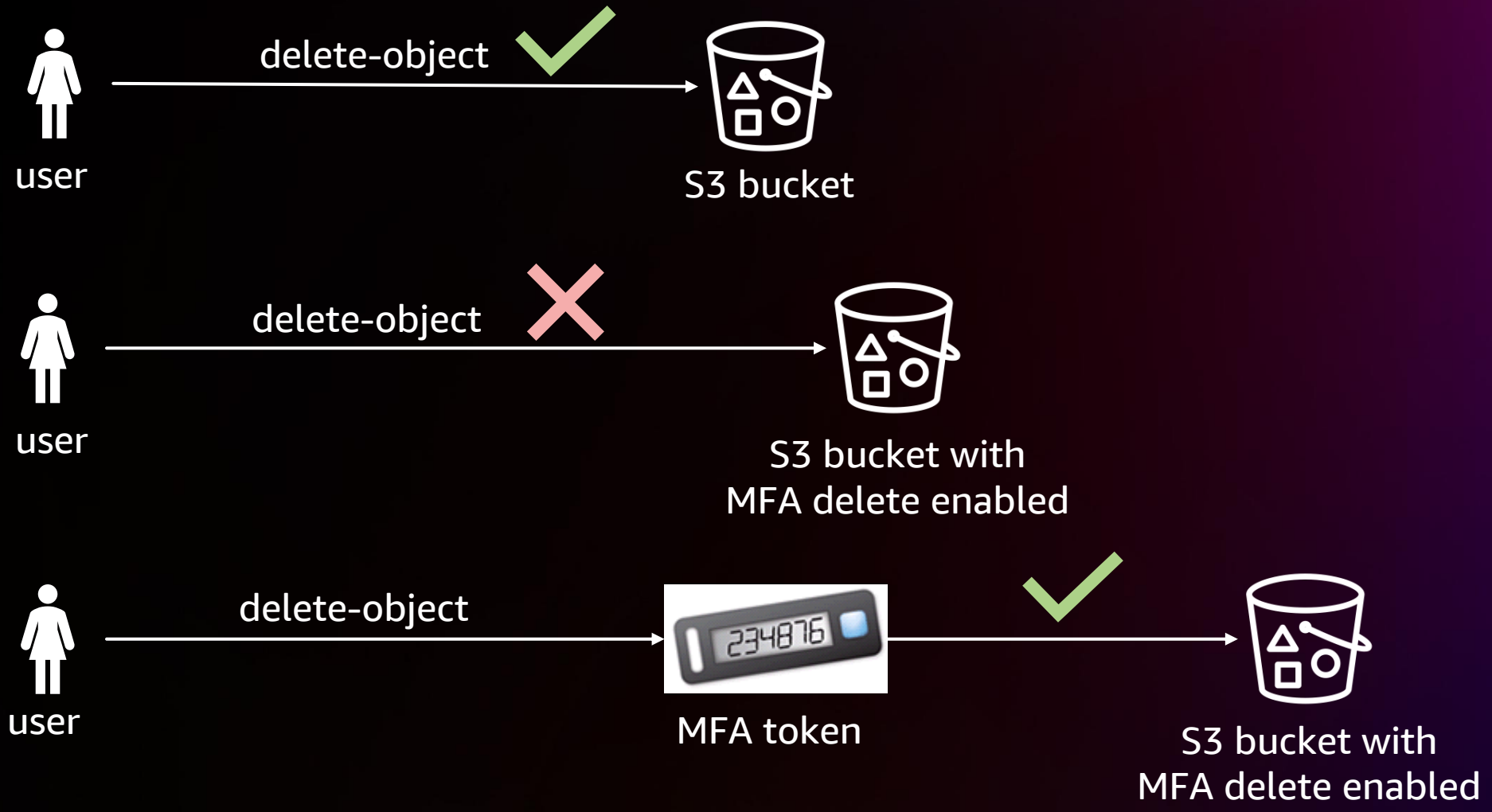
DOC-EXAMPLE-BUCKET1 Version c
DOC-EXAMPLE-BUCKET2 Version b
DOC-EXAMPLE-BUCKET3 Version a



Deleting without a version ID

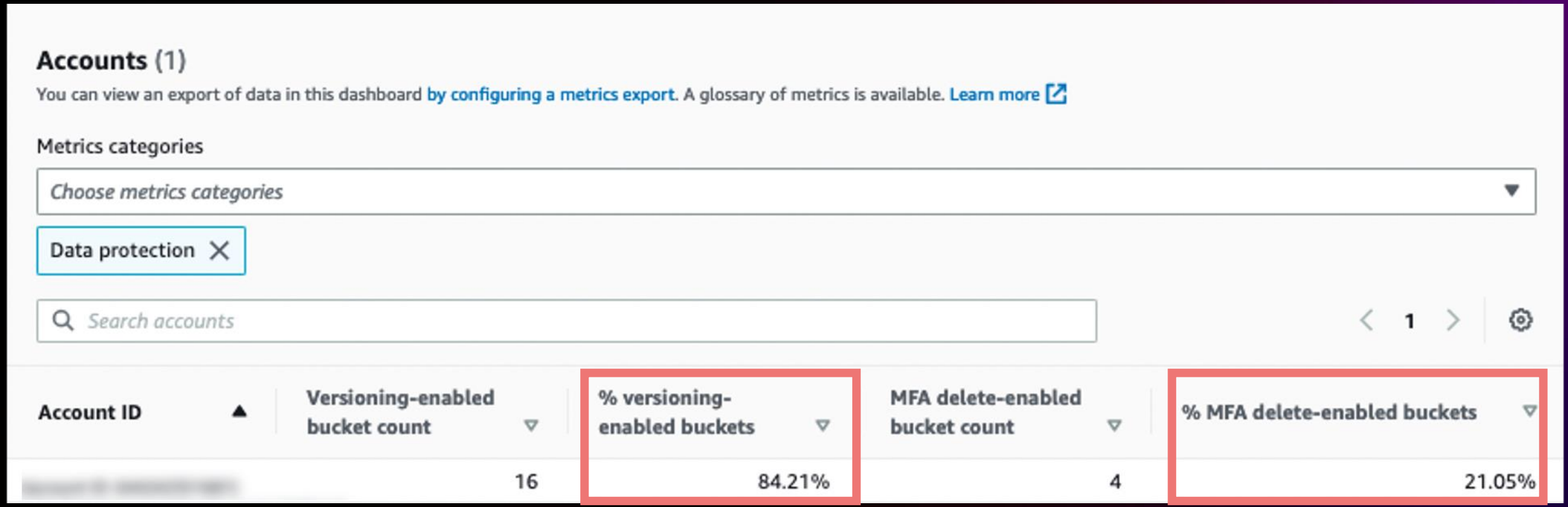
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DP1: “What is MFA delete?”



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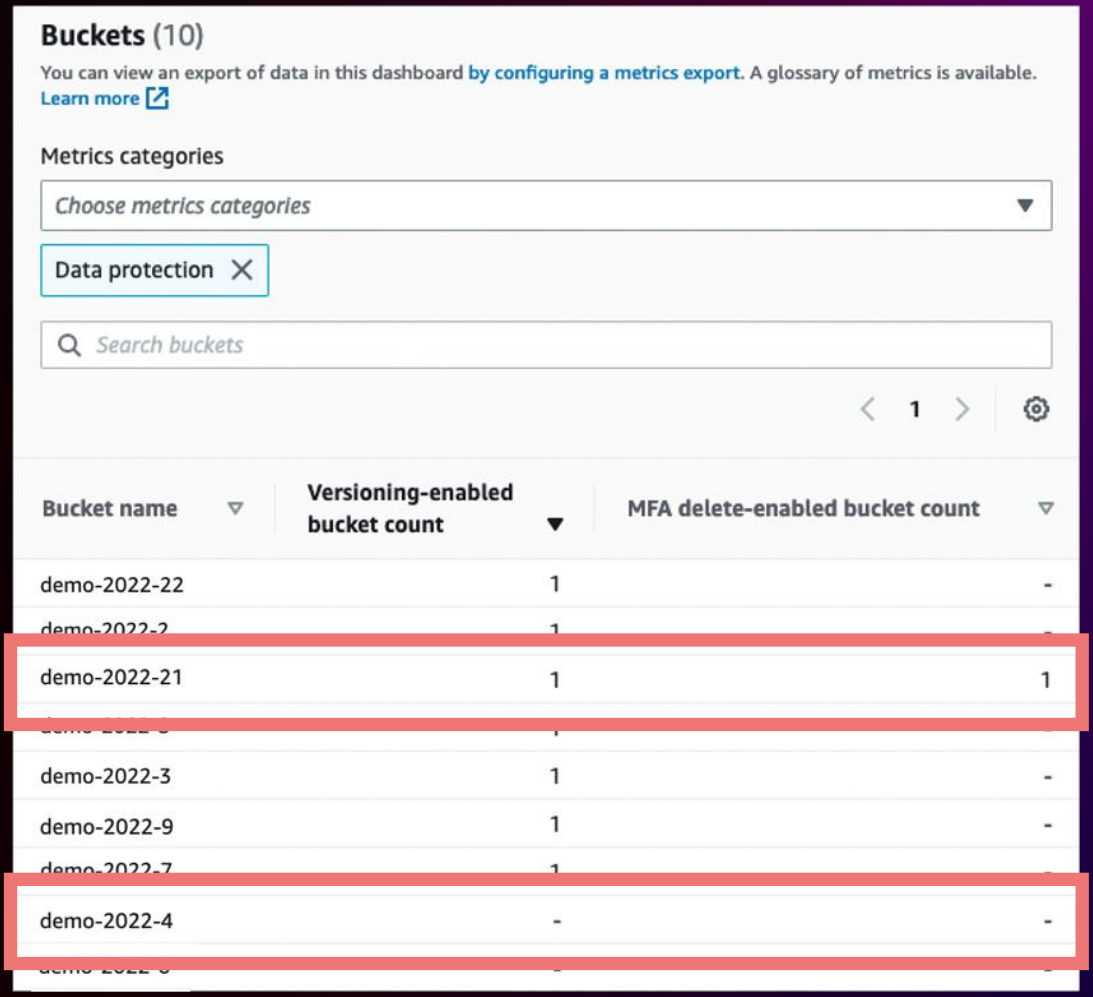
DP1: “Is my data protected from accidental deletes and overwrites?”



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DP1: “Is my data protected from accidental deletes and overwrites?”

- Bucket with both settings enabled
- Bucket with both settings disabled



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DP1: “How can I ensure that my versions aren’t growing endlessly?”

Buckets (6)

You can view an export of data in this dashboard at your metrics export destination. A glossary of metrics is available. Learn more

Metrics categories

Choose metrics categories

Cost optimization

Search buckets

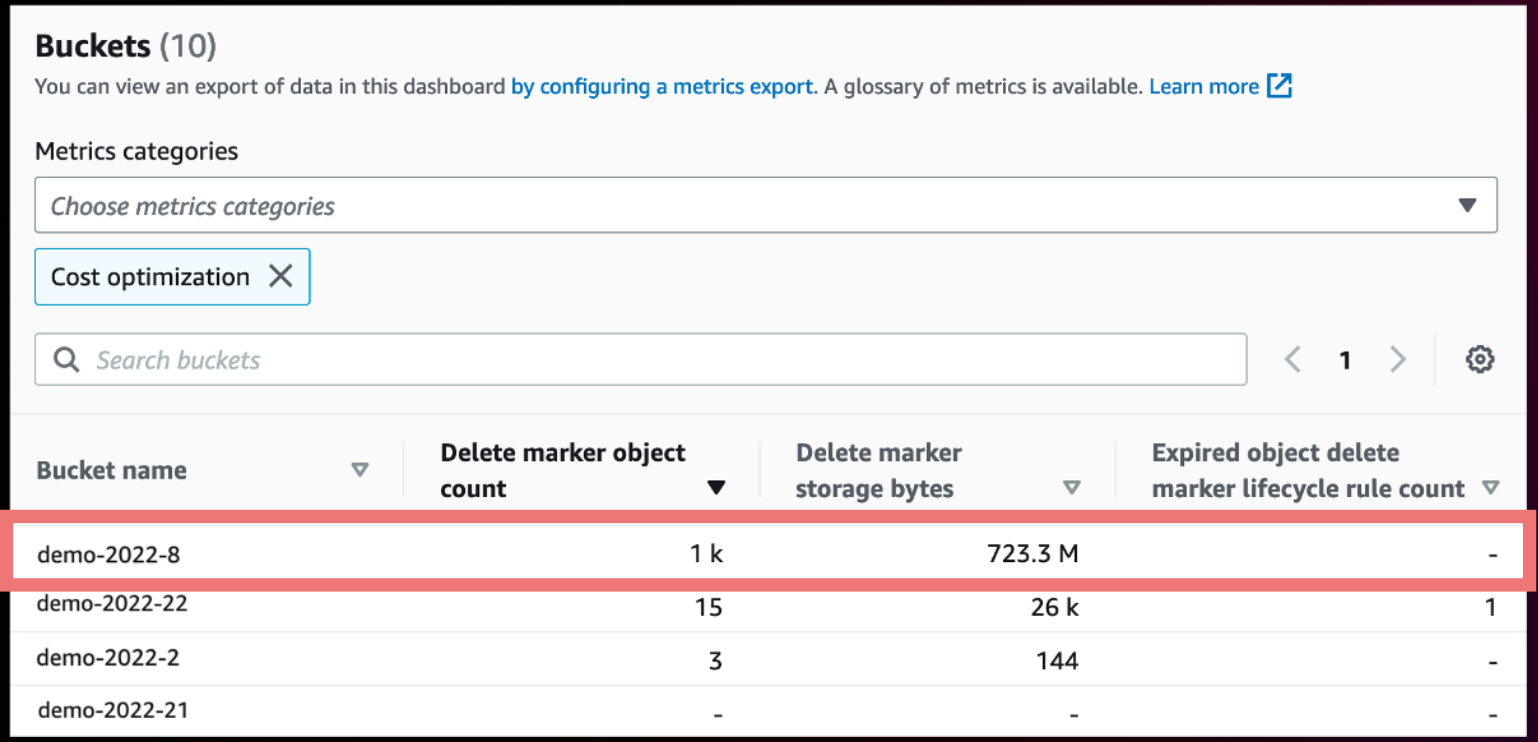
1

Bucket name	Noncurrent version bytes	% noncurrent version bytes	Noncurrent version object count	% noncurrent version objects	Noncurrent version transition lifecycle rule count	Noncurrent version expiration lifecycle rule count	version fecycle
demo-2022-5	884.8 GB	95.00%	1.9 k	95.00%	-	-	-
demo-2022-2	-	-	-	-	-	-	-
demo-2022-7	-	-	-	-	-	-	1
demo-2022-21	-	-	-	-	-	-	-
demo-2022-22	-	-	-	-	-	-	-
demo-2022-8	-	-	-	-	-	-	1

aws

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DP1: “Am I overspending on delete markers?”



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DP2: Replication auditing

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DP2: “What is Amazon S3 Replication?”



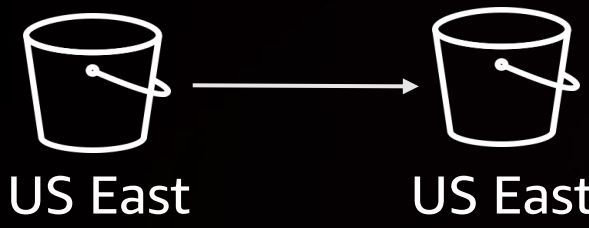
Elastic, fully managed, low-cost feature that allows you to replicate objects between buckets

Flexibility to configure where and how to replicate

Automatic replication of objects and metadata from the source bucket to destination bucket

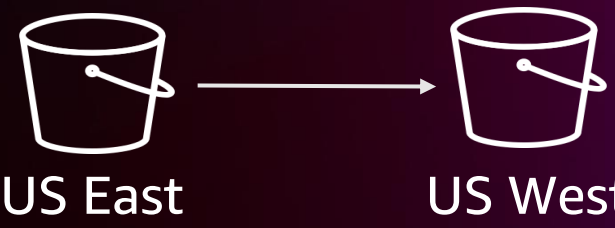
aws
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DP2: “What use cases are supported by Replication?”



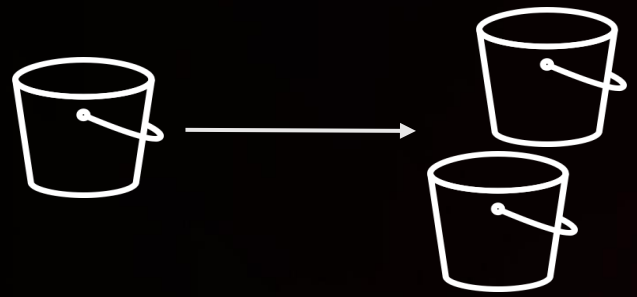
Same Region

Replicate within the same AWS Region



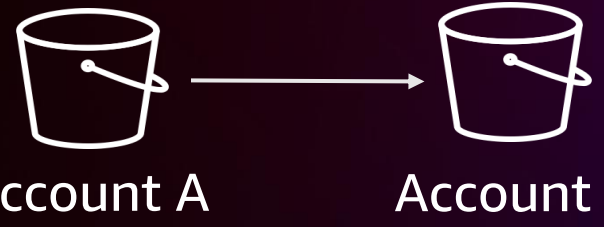
Cross-Region

Replicate to a different AWS Region



Multiple destinations

Replicate to multiple destination buckets



Cross-account

Replicate across different AWS accounts

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DP2: “Are there buckets with misconfigured replication rules?”

Buckets (10)

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Metrics categories

Choose metrics categories

Data protection

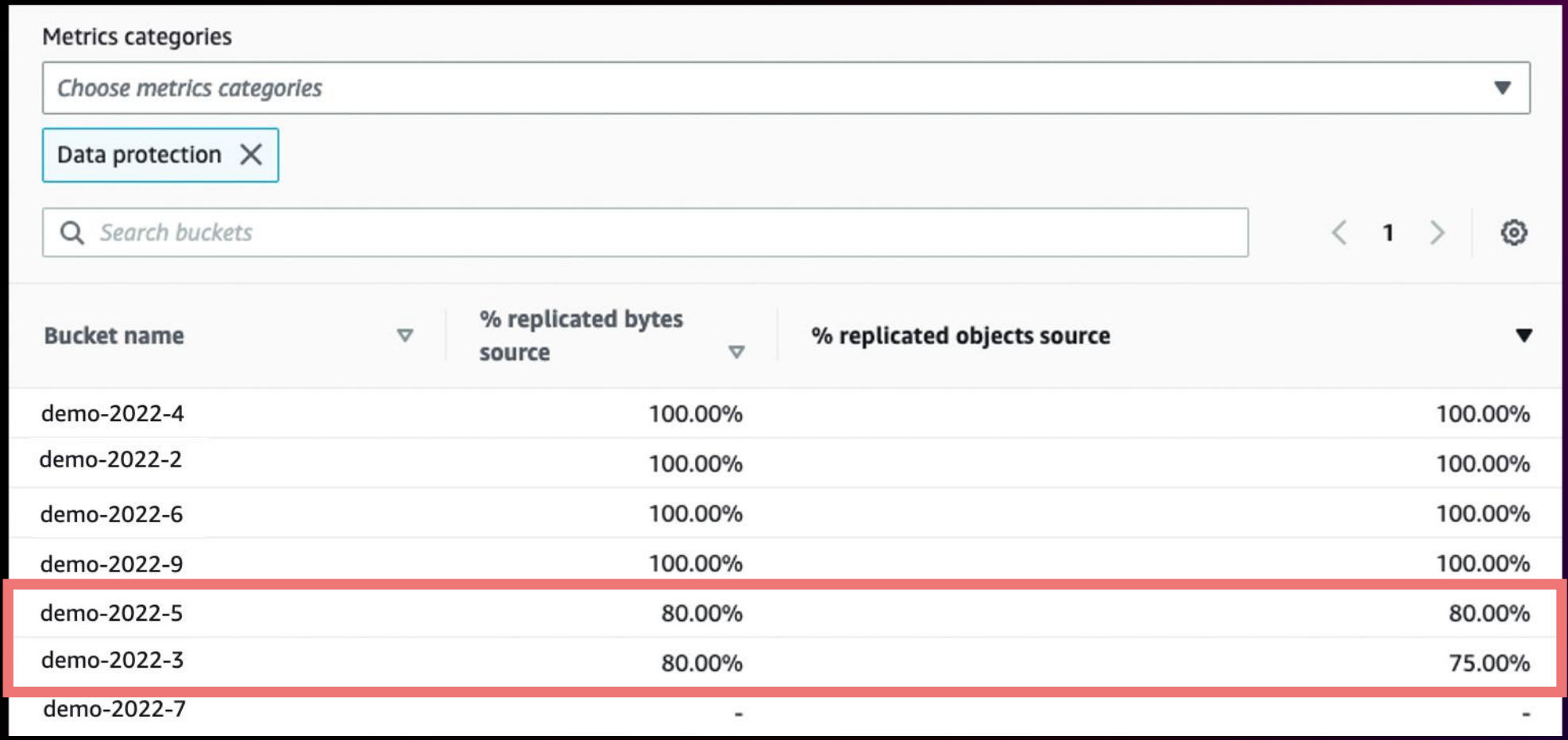
Search buckets

1

Bucket name	Same-Region Replication rule count	Cross-Region Replication rule count	Same-account replication rule count	Cross-account replication rule count	Invalid destination replication rule count
demo-2022-2	1	-	1	-	-
demo-2022-3	1	-	1	-	-
demo-2022-4	1	-	1	-	-
demo-2022-6	-	1	1	-	-
demo-2022-9	-	1	-	1	-
demo-2022-22	-	-	-	-	-
demo-2022-7	-	-	-	-	1
demo-2022-8	-	-	-	-	1

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DP2: “Are all my objects being replicated?”

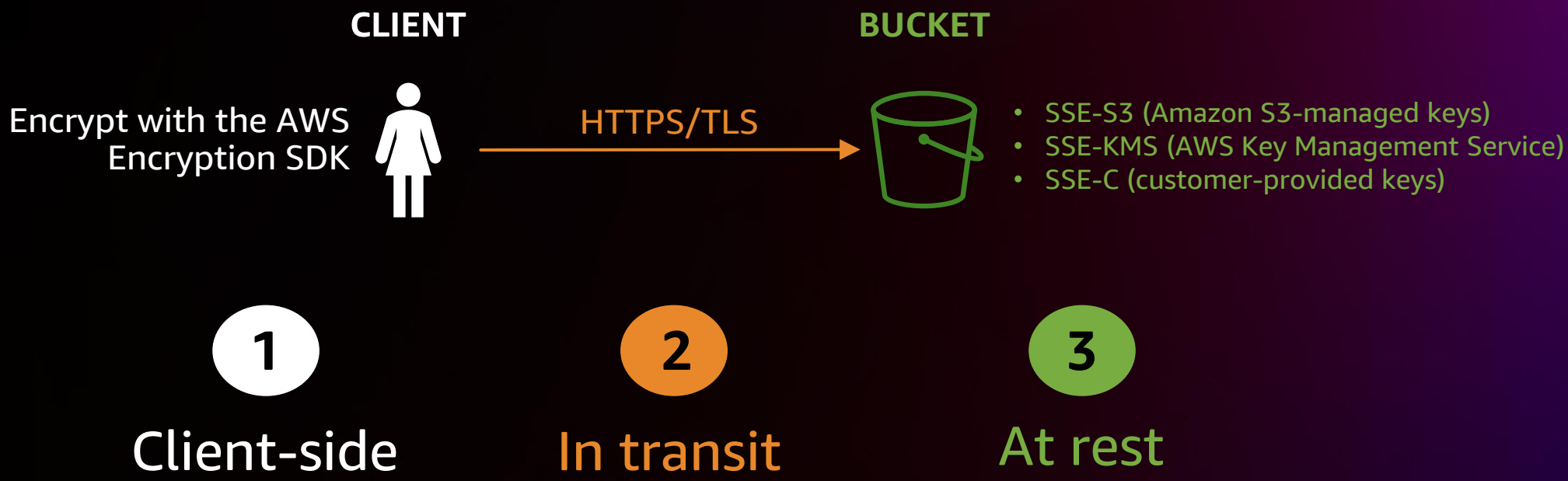


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DP3: Encryption auditing

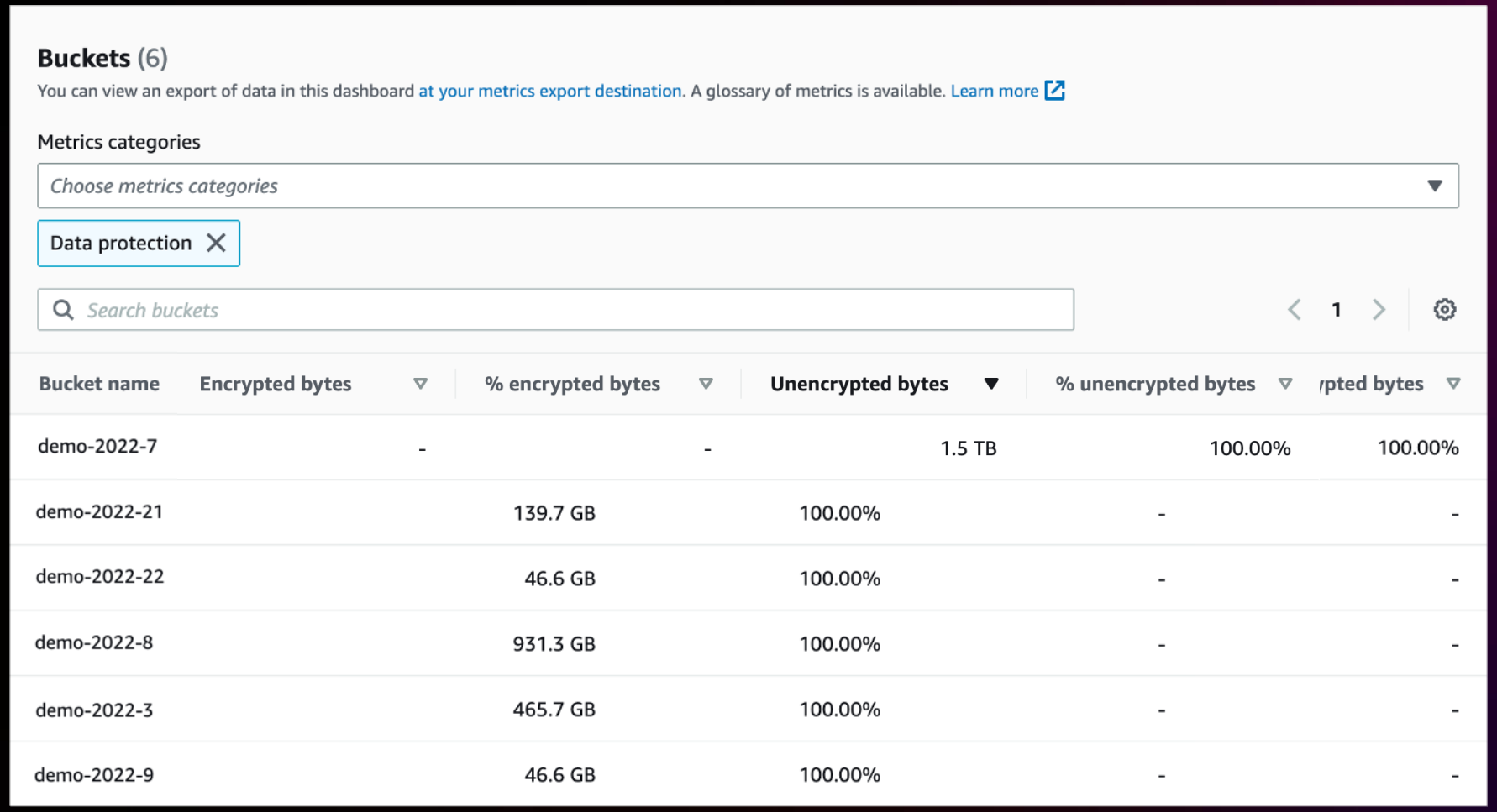
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DP3: “What are the types of encryption?”



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DP3: “Which buckets have the highest number of unencrypted objects?”



Buckets (6)

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Metrics categories

Choose metrics categories

Data protection

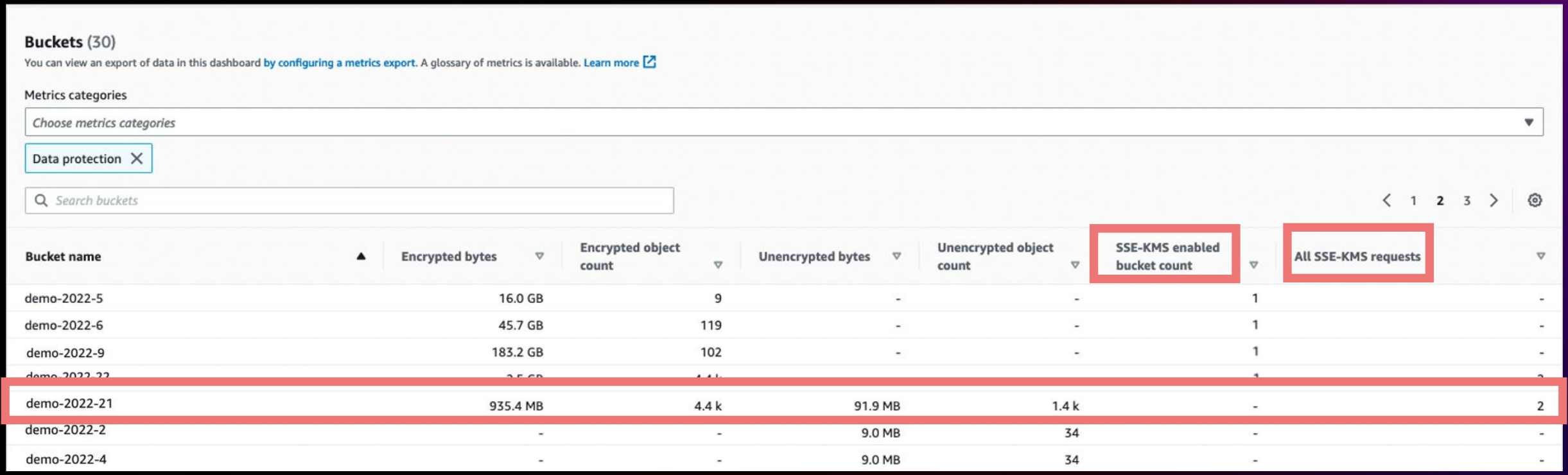
Search buckets

1

Bucket name	Encrypted bytes	% encrypted bytes	Unencrypted bytes	% unencrypted bytes	/pted bytes
demo-2022-7	-	-	1.5 TB	100.00%	100.00%
demo-2022-21	139.7 GB	100.00%	-	-	
demo-2022-22	46.6 GB	100.00%	-	-	
demo-2022-8	931.3 GB	100.00%	-	-	
demo-2022-3	465.7 GB	100.00%	-	-	
demo-2022-9	46.6 GB	100.00%	-	-	

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DP3: “How can I identify discrepancies in encryption configuration?”



Buckets (30)

You can view an export of data in this dashboard by configuring a metrics export. A glossary of metrics is available. Learn more

Metrics categories

Choose metrics categories

Data protection

Search buckets

1 2 3

Bucket name	Encrypted bytes	Encrypted object count	Unencrypted bytes	Unencrypted object count	SSE-KMS enabled bucket count	All SSE-KMS requests
demo-2022-5	16.0 GB	9	-	-	1	-
demo-2022-6	45.7 GB	119	-	-	1	-
demo-2022-9	183.2 GB	102	-	-	1	-
demo-2022-22						
demo-2022-21	935.4 MB	4.4 k	91.9 MB	1.4 k	-	2
demo-2022-2	-	-	9.0 MB	34	-	-
demo-2022-4	-	-	9.0 MB	34	-	-

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Key takeaways

- S3 offers **multiple tools to generate insights** across different granularity levels
- **S3 Storage Lens is recommended as first stop** in gaining visibility into your storage
- **New metrics** with S3 Storage Lens
- Unlock **additional optimization use cases** with S3 Storage Lens
- **No new pricing tiers** for new metrics as they are spread across existing Lens tiers

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Thank you!

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