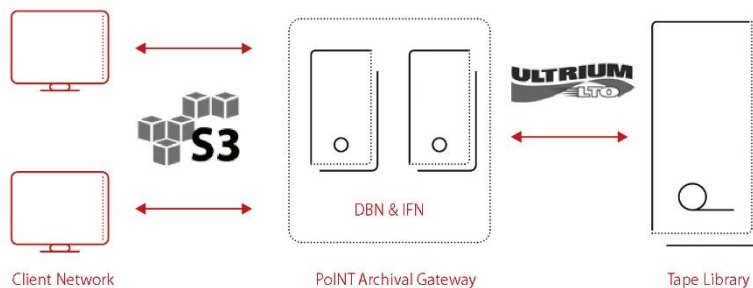


PoINT Archival Gateway

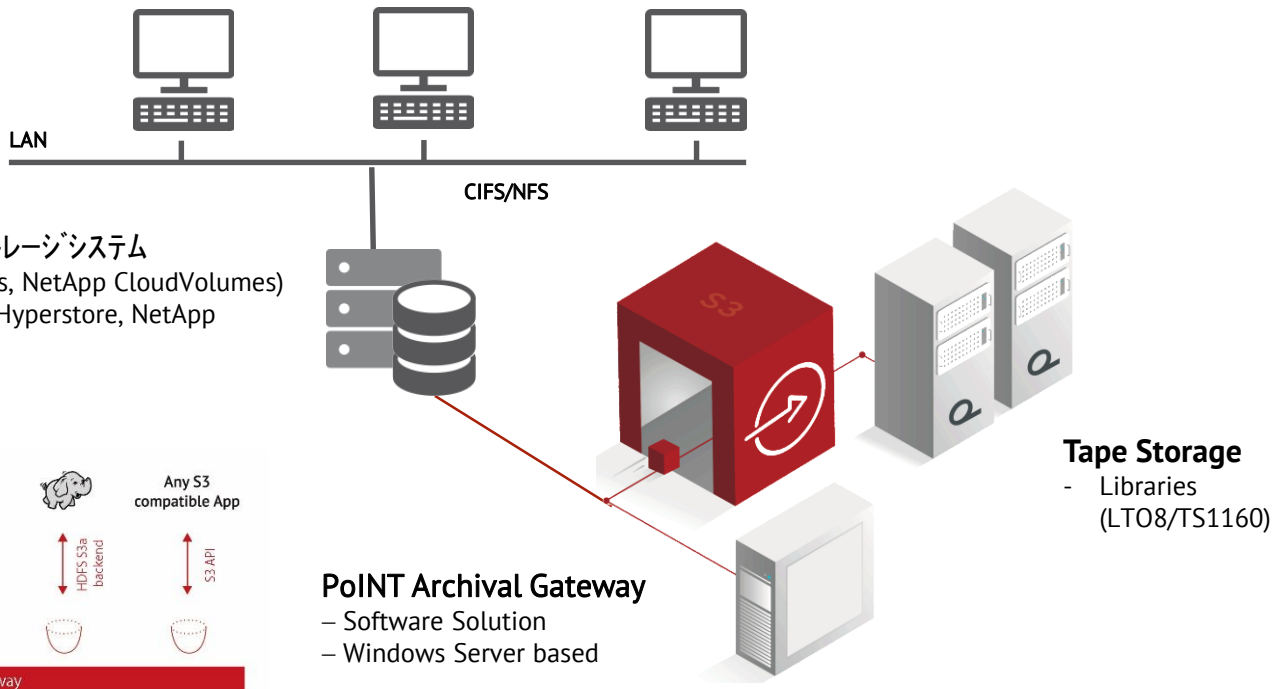
S3 Gateway for Tape



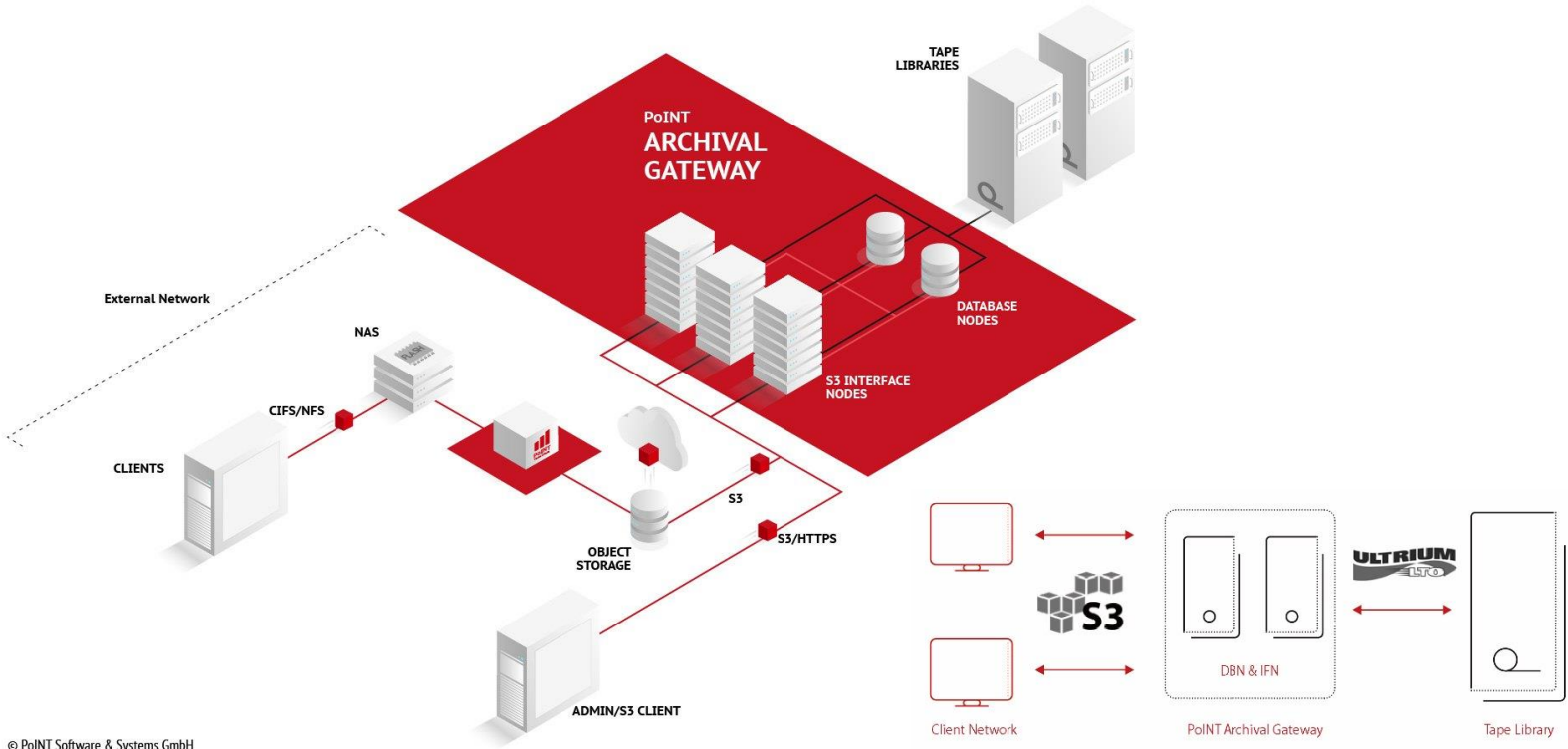
Solution Overview

PoINT Archival Gateway

Configuration Overview



PoINT Archival Gateway

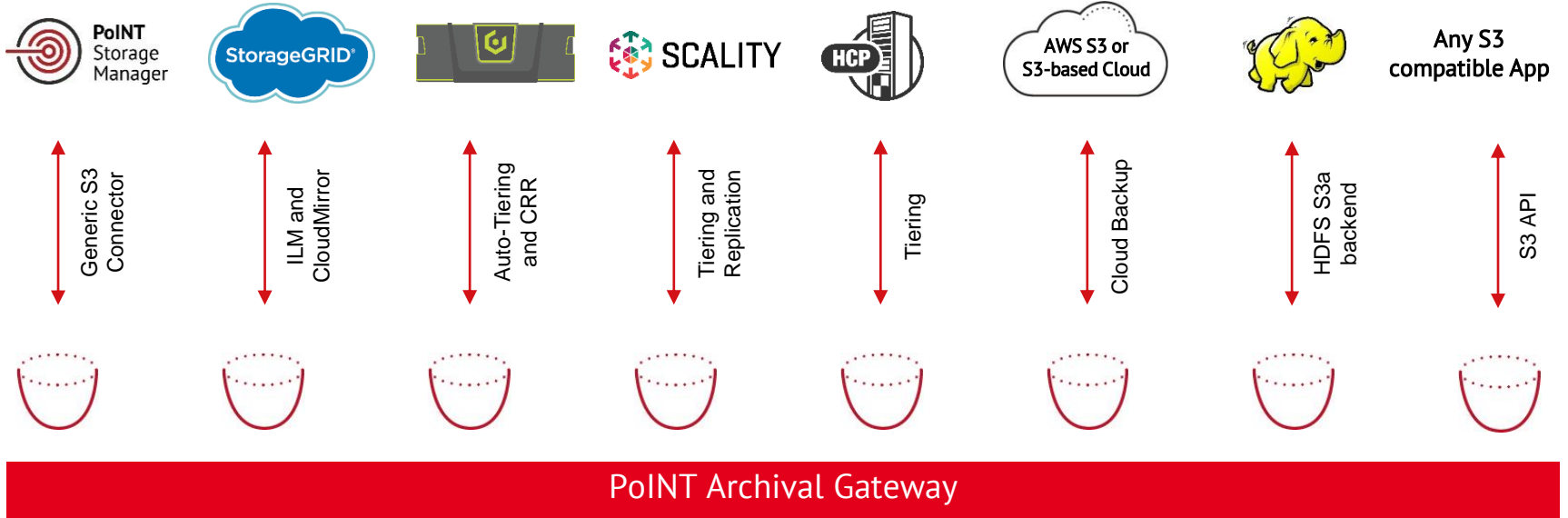


© PoINT Software & Systems GmbH

PoINT Archival Gateway

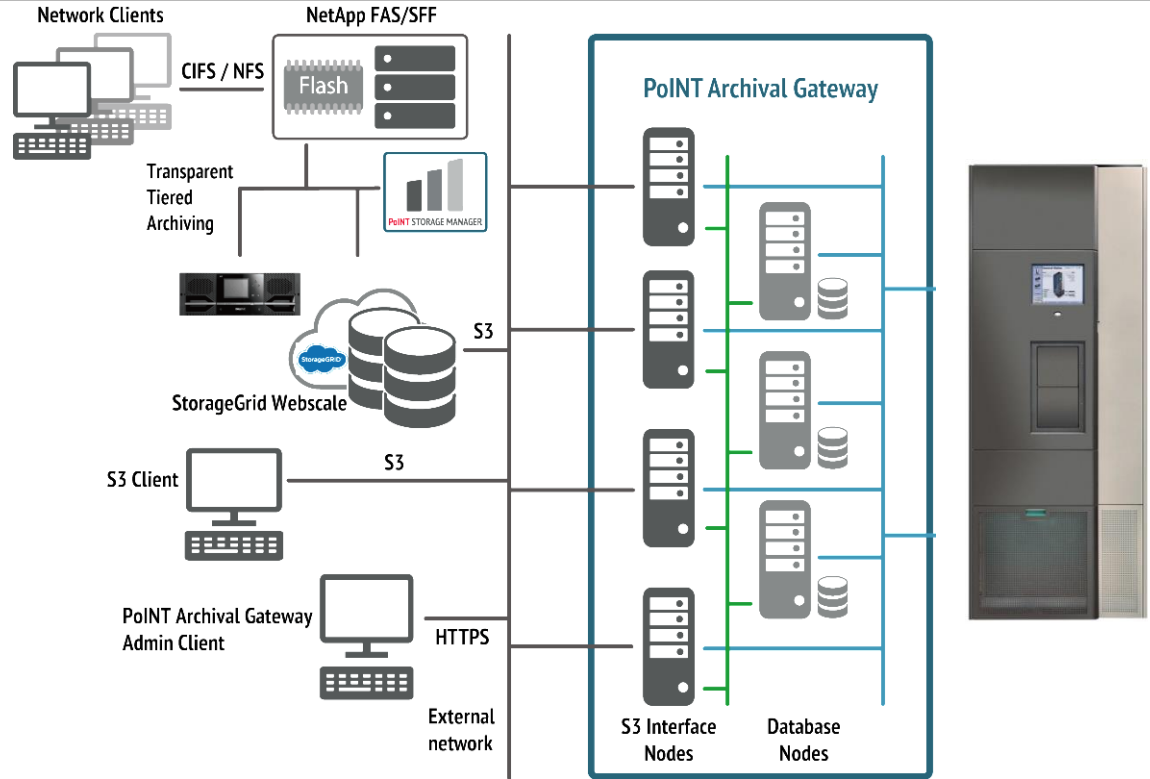
High Performance S3 Gateway for Tape Storage

Use Cases



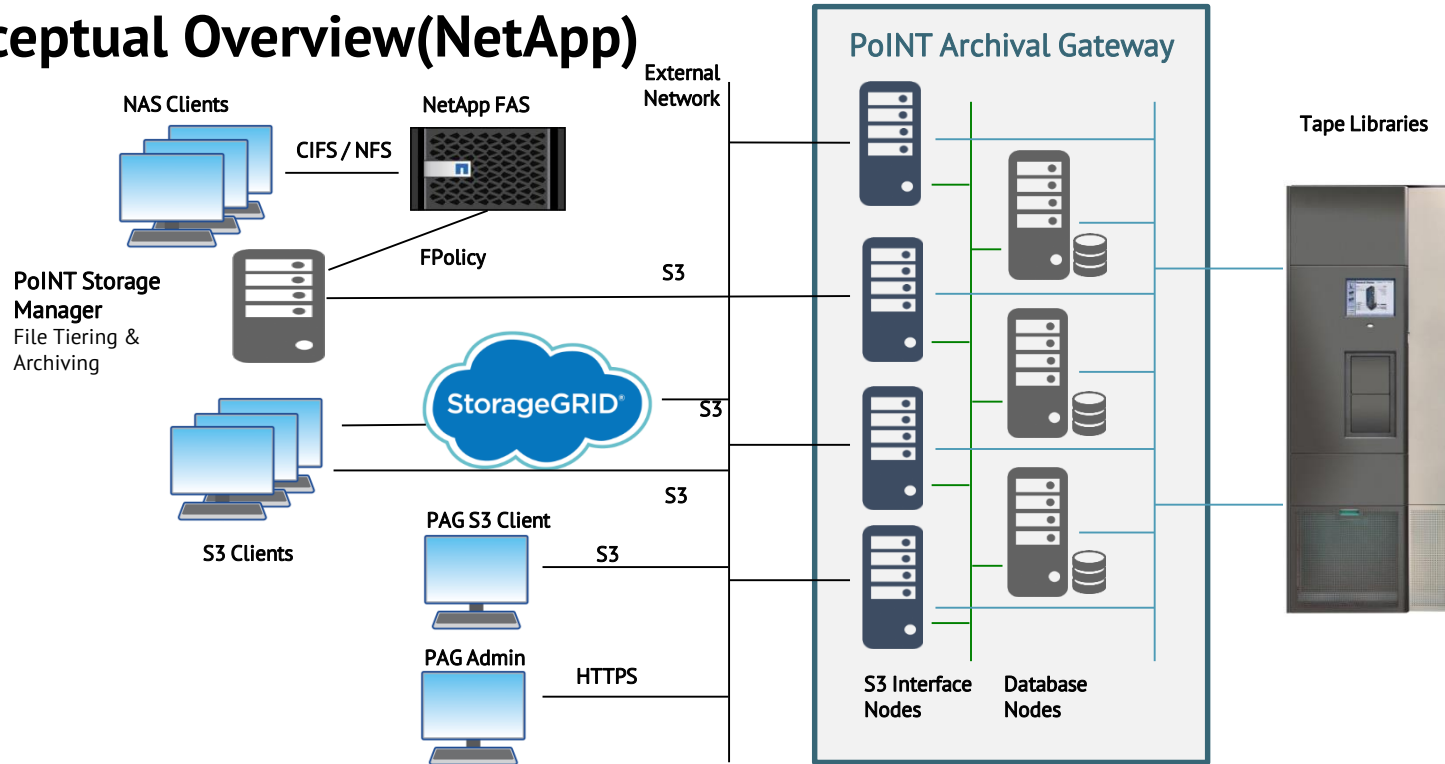
PoINT Archival Gateway

Configuration Overview 2 All NetApp



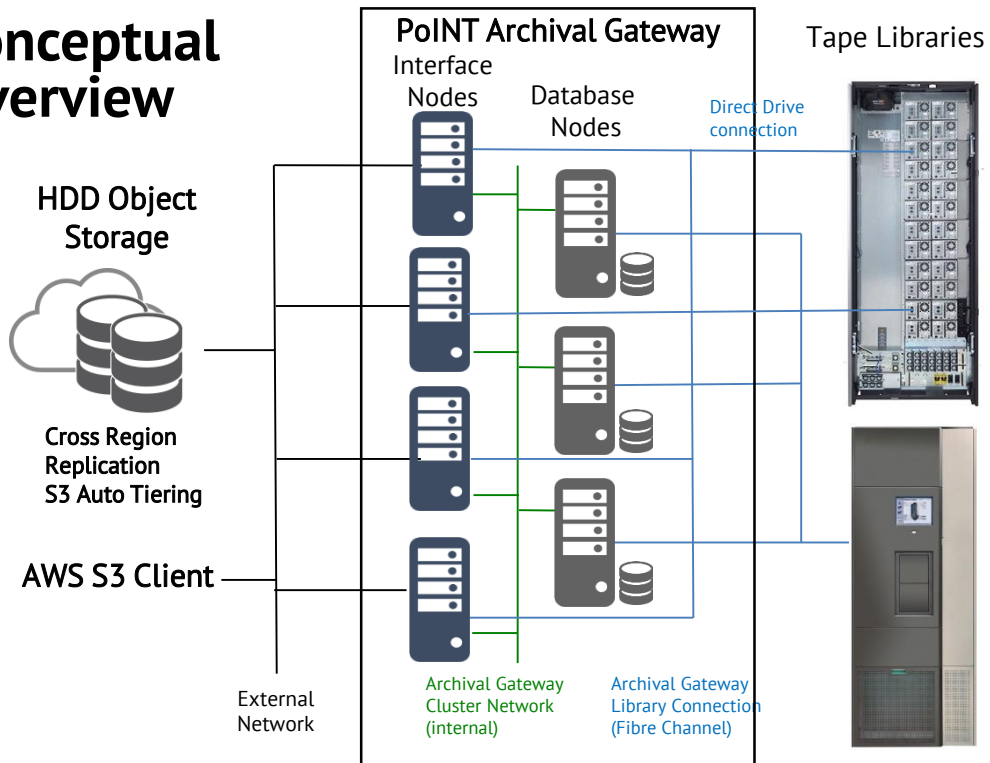
PoINT Archival Gateway

Conceptual Overview(NetApp)



PoINT Archival Gateway

Conceptual Overview



Interface Node

- Webサービス機能 (i.e. S3 REST API, Load Balancer)
- AWS S3 MPU(Multi-Part-Upload)にスケーラブルに対応
- データキャッシュ機能 (i.e. リードと先読みキャッシュ)
- データエンコード機能 (イレージャーコーディング, Hash演算, 暗号化)
- ドライブ管理機能 (LTOドライブを直接制御 read/write)
- メタデータキャッシュ機能 (e.g. object metadataの先読み)
- データベースノードとの通信機能 (メタデータの共有)
- MultiPart Uploadの要件に応じてクラスター構成が可能

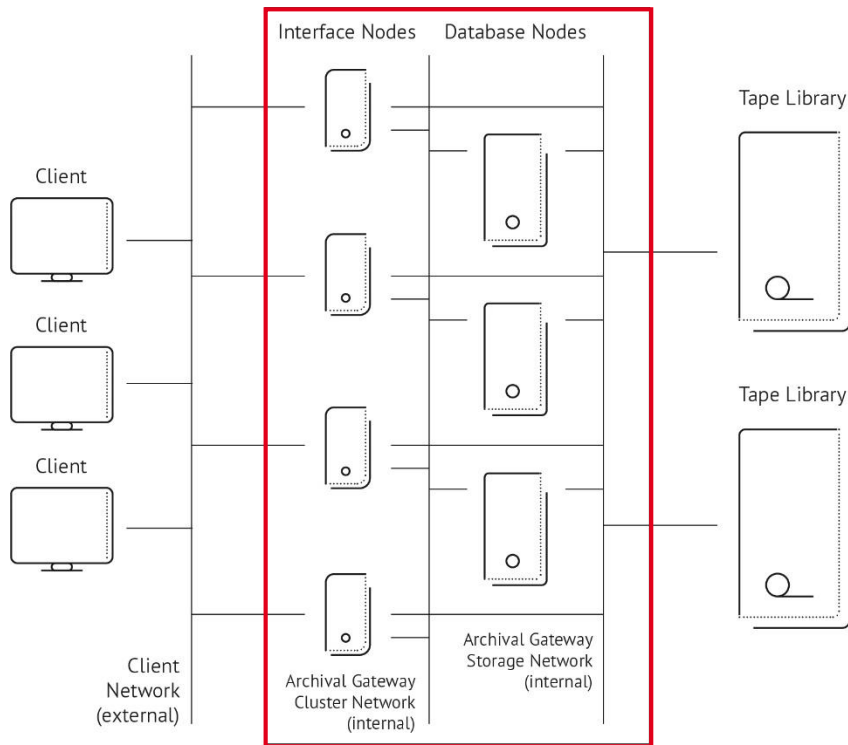
Database Node

- データベース管理機能
 - オブジェクトとメタデータのサービス
 - 動作設定のデータベース
 - Includes synchronous replication, backup and caching
- ライブラリー管理機能
 - ライブラリーのメディア移動の管理
- システム動作の監視と管理
- システム動作設定の管理(管理用Webサーバー)

PoINT Archival Gateway

High Performance S3 Gateway for Tape Storage

System Components



Interface Nodes (IFN)

- S3 REST API
- Library Drives Control
- 1ノードで8台のドライブ
- Multiple active nodes

Database Nodes (DBN)

- Databases and Logs
- HTML admin interface
- Library Robotics Control
- 最大で4ノード
- Up to 100 billion objects per S3 bucket

PoINT Archival Gateway

High Performance S3 Gateway for Tape Storage

Software Solution

テープベースの
Object Storage



High Availability



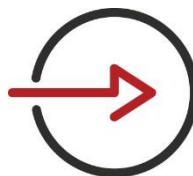
Native S3 API



Erasure Coding
for tape storage



オブジェクトの
Versioning



PoINT
Archival
Gateway

High Performance S3 Gateway
for Tape Storage



ノード単位で拡張



S3のバケット当り
1000億オブジェクト
を管理可能



データ転送速度
230 GB/s

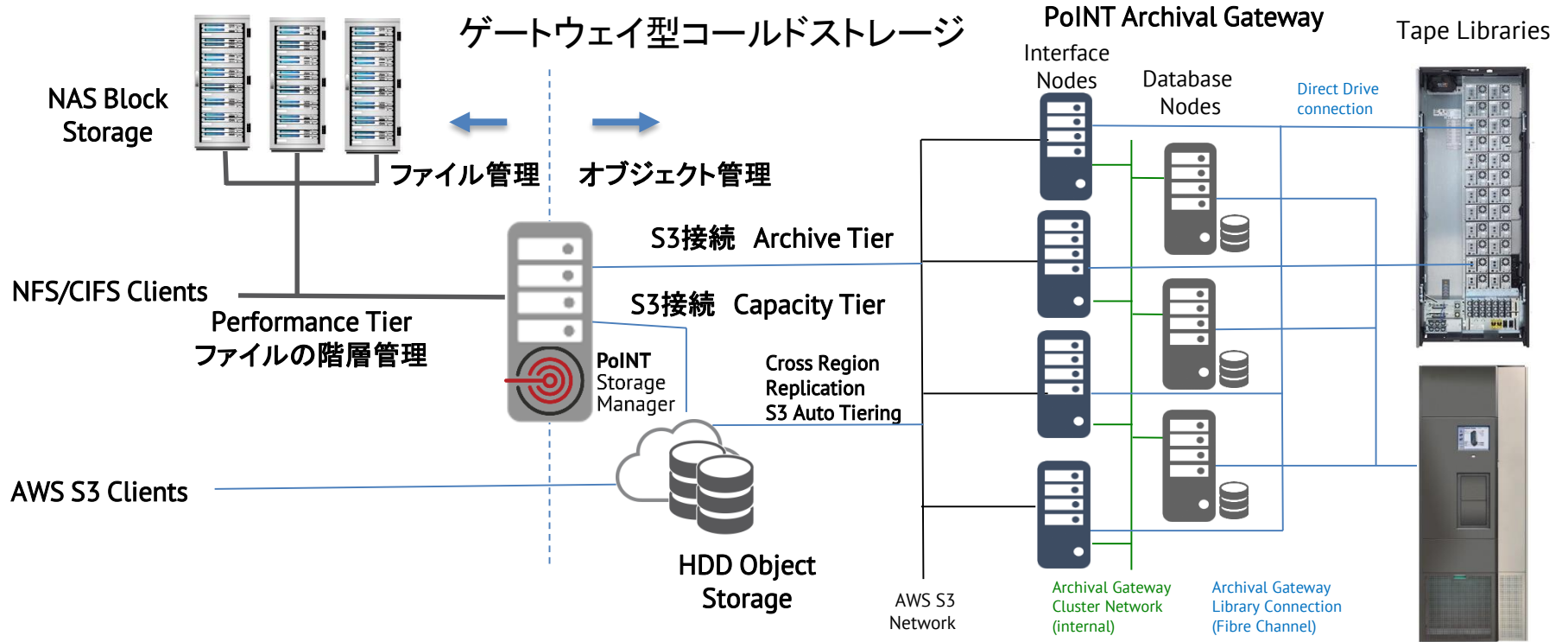


最大で256台の
テープドライブ

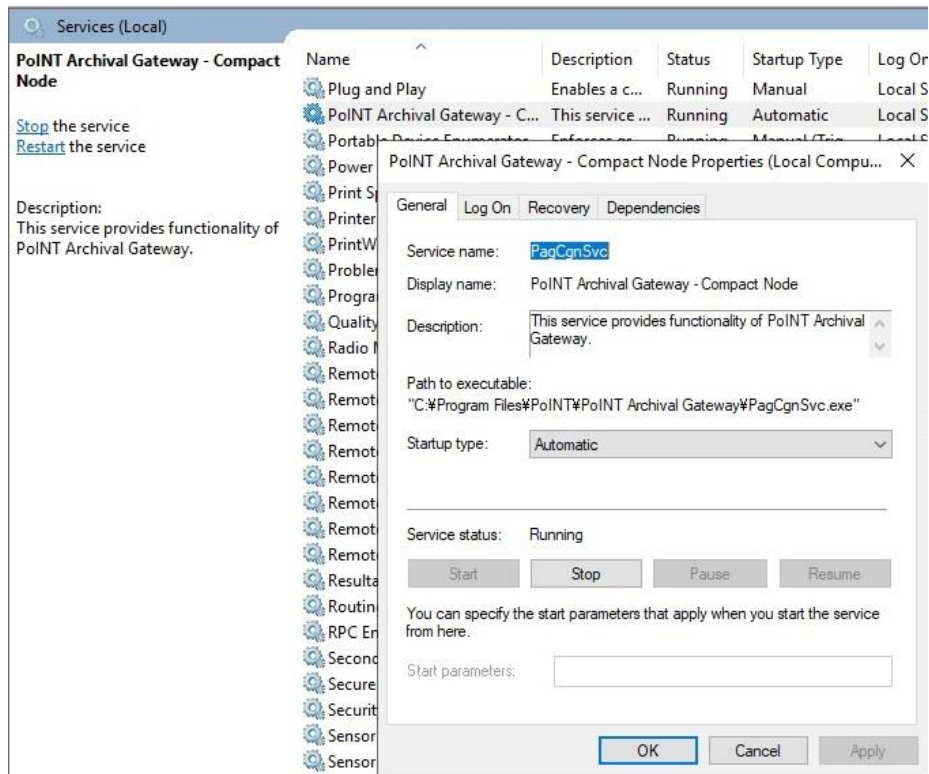


最大で8台の
テープライブラリー

PoINT Archival Gateway



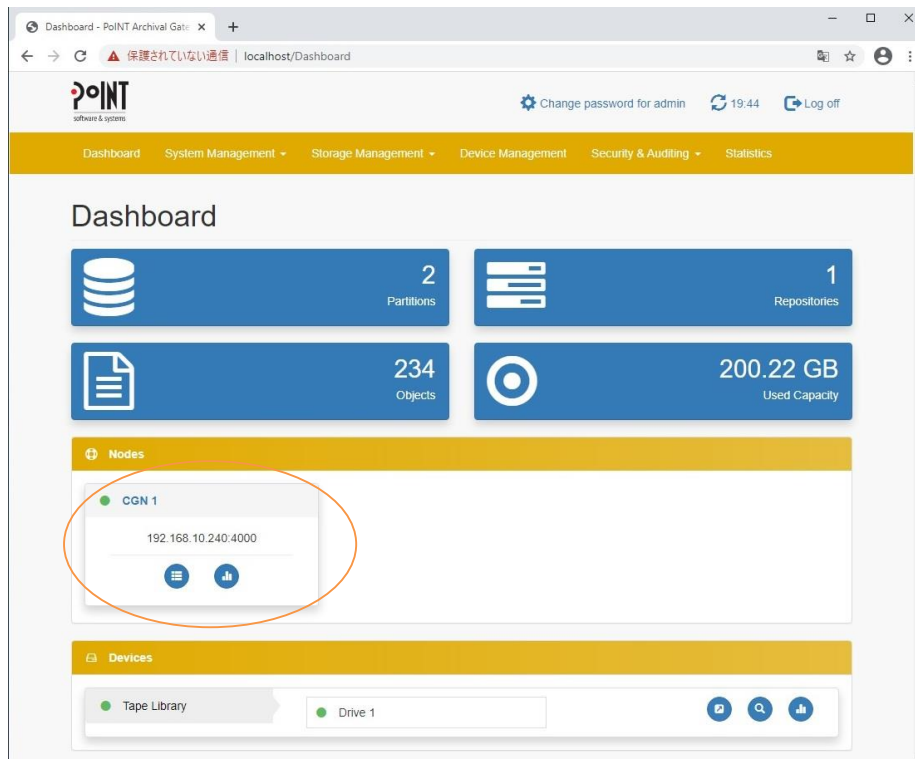
Interfaceノードとdatabaseノードは
サービスとして稼働します。
最小構成として、1台のサーバーで1つ
のサービスとして稼働します。



管理Webのスクリーンショット

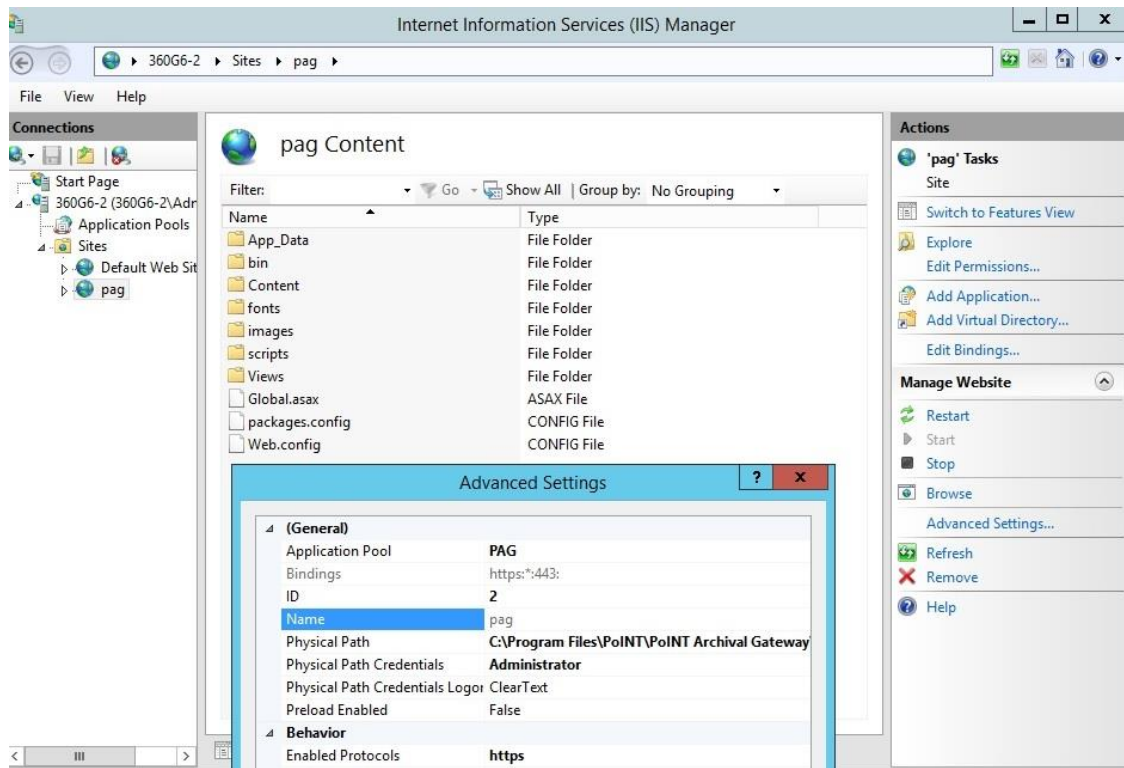
The screenshot displays the PoINT Archival Gateway dashboard in a web browser. The browser address bar shows 'localhost/Dashboard'. The dashboard features a navigation menu with 'Dashboard', 'System Management', 'Storage Management', 'Device Management', 'Security & Auditing', and 'Statistics'. The main content area is titled 'Dashboard' and contains four summary cards: '2 Partitions', '1 Repositories', '234 Objects', and '200.22 GB Used Capacity'. Below these are sections for 'Nodes' and 'Devices'. The 'Nodes' section shows 'CGN 1' with IP '192.168.10.240:4000'. The 'Devices' section shows 'Tape Library' and 'Drive 1'. The PoINT logo and 'Change password for admin' link are visible in the top right.

管理Webのスクリーンショット
2つのノードを統合して稼動した場合の例

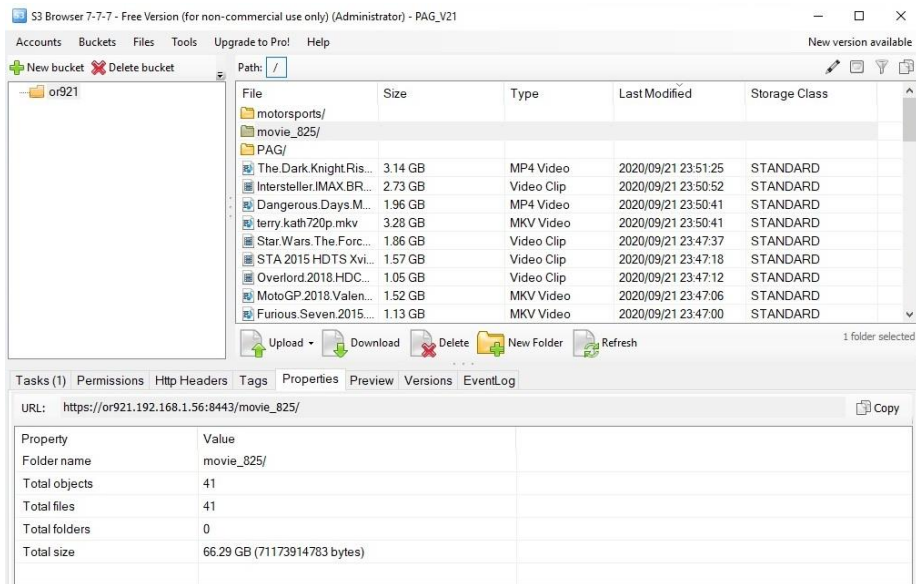


PoINT Archival Gateway

管理WebはIISのアプリケーションとして稼動します。



S3クライアントからPAG/INTノードへの接続 S3 Browserでの接続



S3 Browser 7-7-7 - Free Version (for non-commercial use only) (Administrator) - PAG_V21

Accounts Buckets Files Tools Upgrade to Pro! Help New version available

Path: /

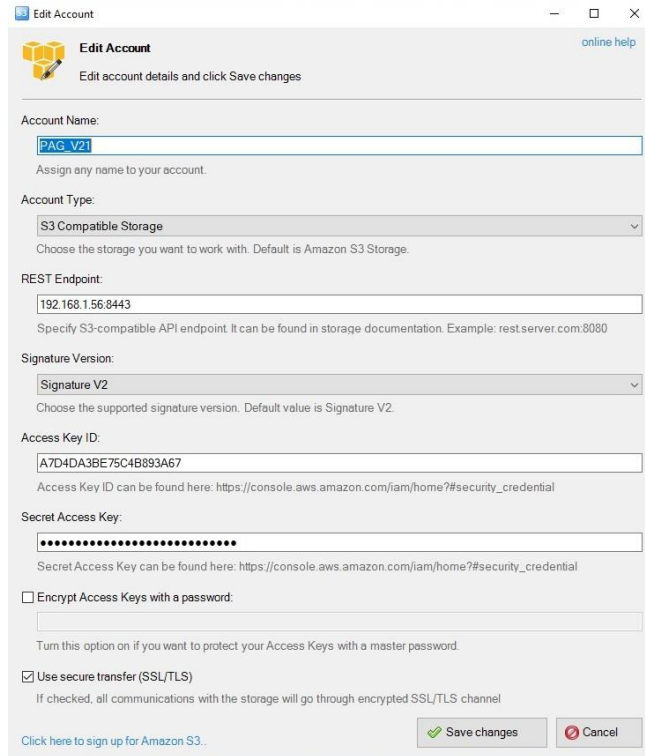
File	Size	Type	Last Modified	Storage Class
motorsports/				
movie_825/				
PAG/				
The.Dark.Knight.Ris...	3.14 GB	MP4 Video	2020/09/21 23:51:25	STANDARD
Interstellar.IMAX.BR...	2.73 GB	Video Clip	2020/09/21 23:50:52	STANDARD
Dangerous.Days.M...	1.96 GB	MP4 Video	2020/09/21 23:50:41	STANDARD
terry.kath720p.mkv	3.28 GB	MKV Video	2020/09/21 23:50:41	STANDARD
Star.Wars.The.Forc...	1.86 GB	Video Clip	2020/09/21 23:47:37	STANDARD
STA 2015 HDTS Xvi...	1.57 GB	Video Clip	2020/09/21 23:47:18	STANDARD
Overlord.2018.HDC...	1.05 GB	Video Clip	2020/09/21 23:47:12	STANDARD
MotoGP.2018.Valen...	1.52 GB	MKV Video	2020/09/21 23:47:06	STANDARD
Furious.Seven.2015...	1.13 GB	MKV Video	2020/09/21 23:47:00	STANDARD

Upload Download Delete New Folder Refresh 1 folder selected

Tasks (1) Permissions Http Headers Tags Properties Preview Versions EventLog

URL: https://or921.192.168.1.56:8443/movie_825/ Copy

Property	Value
Folder name	movie_825/
Total objects	41
Total files	41
Total folders	0
Total size	66.29 GB (71173914783 bytes)



Edit Account online help

Edit account details and click Save changes

Account Name: PAG_V21

Assign any name to your account.

Account Type: S3 Compatible Storage

Choose the storage you want to work with. Default is Amazon S3 Storage.

REST Endpoint: 192.168.1.56:8443

Specify S3-compatible API endpoint. It can be found in storage documentation. Example: rest.server.com:8080

Signature Version: Signature V2

Choose the supported signature version. Default value is Signature V2.

Access Key ID: A7D4DA3BE75C4B893A67

Access Key ID can be found here: https://console.aws.amazon.com/iam/home?#security_credential

Secret Access Key: [Redacted]

Secret Access Key can be found here: https://console.aws.amazon.com/iam/home?#security_credential

Encrypt Access Keys with a password:

Turn this option on if you want to protect your Access Keys with a master password.

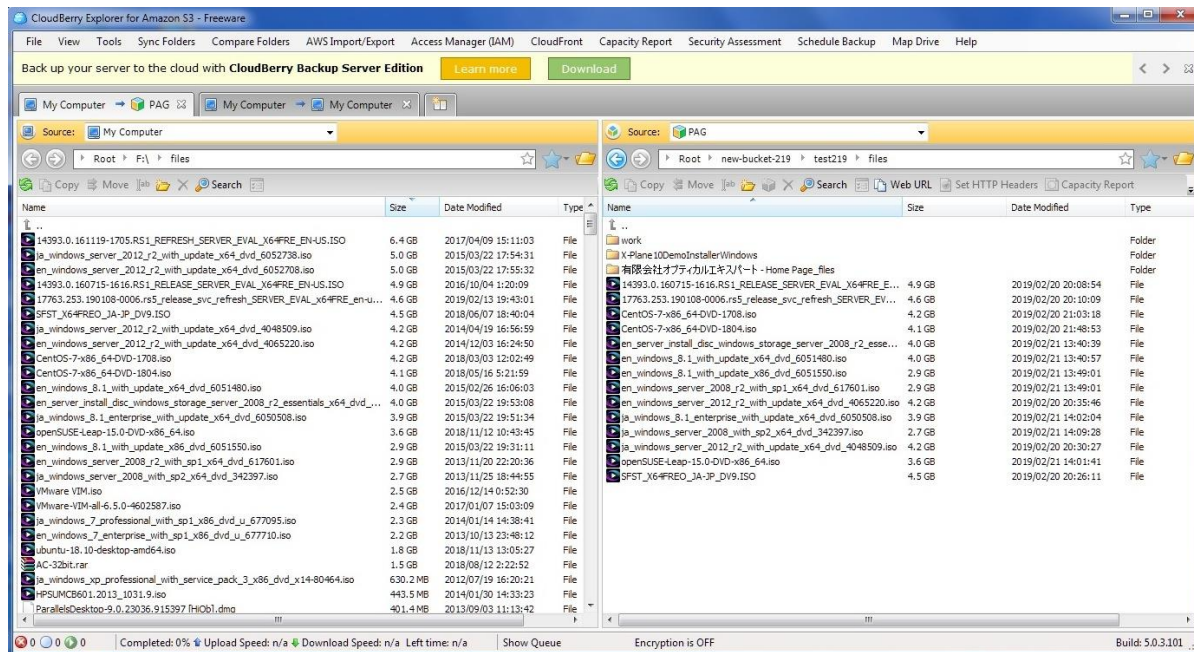
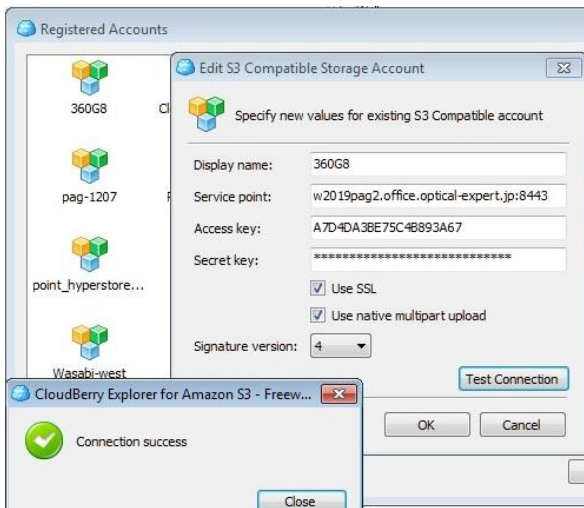
Use secure transfer (SSL/TLS)

If checked, all communications with the storage will go through encrypted SSL/TLS channel

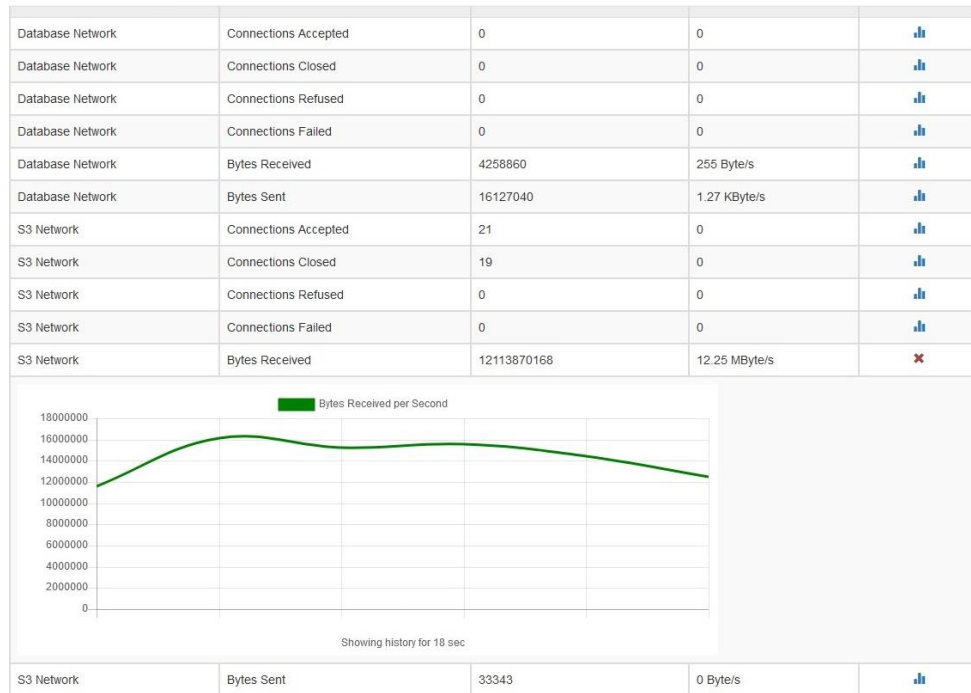
Save changes Cancel

[Click here to sign up for Amazon S3.](#)

S3クライアント(CloudBerry)からPAG/INTノードへの接続



システムの稼動状況はリアルタイムで表示



PAG管理Webから User情報と作成

Dashboard System Management ▾ Storage Management ▾ Device Management Security & Auditing ▾ Statistics

Users / testuser1

Properties

User Name: [Reset password...](#)

Enabled:

Lockout Enabled:

Failed Login Limit:

Allow S3 Access:

S3 Access Key: A7D4DA3BE75C4B893A67

S3 Access Secret: Not displayed, [click here to create new!](#)

Default Partition: 921_1 [Change partition...](#)

Password Expiration: 2020/12/13 18:12:47

Last Successful Login:

Failed Logins: 0

Locked Until:

PoINT Archival Gateway

Object StorageからのS3 Tiering 接続

Clouddian HyperStore7.1.3

Add New Bucket Lifecycle Rule

RULE NAME: tier_pag OBJECT PREFIX: ENABLE TIERING EXPIRE OBJECTS

OBJECT TIERING

SCHEDULE

CURRENT VERSION
 0 DAYS AFTER LAST ACCESS DATE/TIME AFTER DATE: Feb-23-2019 12:32 PM
 PREVIOUS VERSION

OBJECT TIERING BUCKET LEVEL SETTING

DESTINATION TIERING CREDENTIAL Retain Local Copy

Tier to AWS S3 Endpoint: http://s3-pag.office.optical-expert.jp:8080 Days before removing local copy: 0
 Tier to AWS GLACIER
 Tier to Google
 Tier to Azure Access Key: BA77AEB536660C61; Secret Key: 5G0tVlgVD81Px4Zkf
 Tier to Spectra
 Tier to Custom Endpoint Bucket Name: new-bucket-219

LIFECYCLE RULE BUCKET LEVEL SETTING

Use Creation Date/Time Use Last Access Time

NetApp StorageGRID11.2 Cloud Storage Pool

NetApp® StorageGRID® Help | Root | Sign

Dashboard Alarms Nodes Tenants ILM Configuration Maintenance Support

Storage Pools

A storage pool is a logical group of Storage Nodes or Archive Nodes and is used in ILM rules to determine where object data is stored.

Pool Name	Archive Nodes	Storage Nodes	Used in ILM Rule	Used in EC Profile
All Storage Nodes	0	3	<input checked="" type="checkbox"/>	

Displaying 1 pool.

Viewing Storage Pool - All Storage Nodes

Site Name	Archive Nodes	Storage Nodes
All Sites	0	3

Cloud Storage Pools

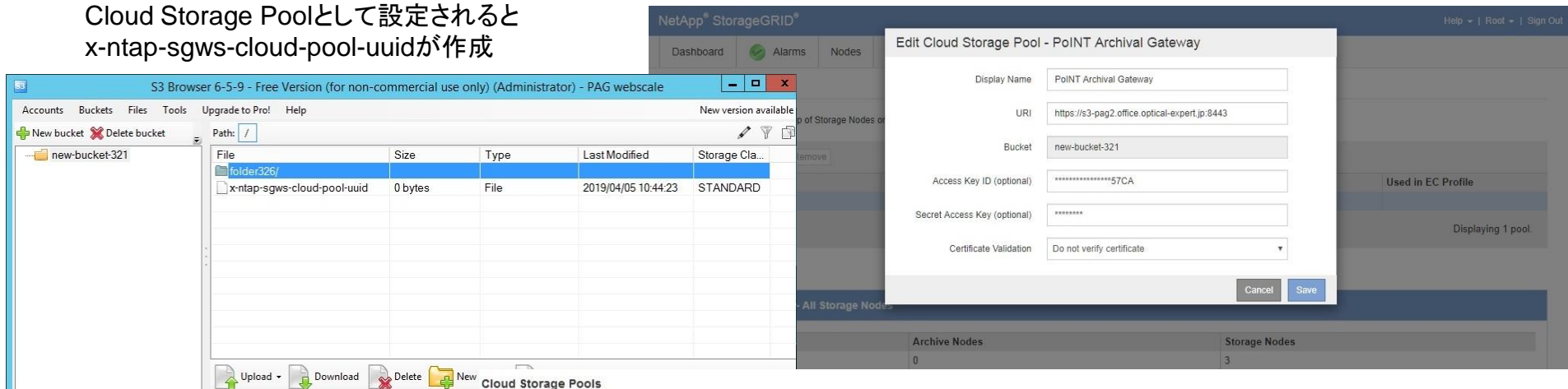
You can add Cloud Storage Pools to ILM rules to store objects outside of the StorageGRID system. A Cloud Storage Pool defines how to access an external bucket where objects will be stored.

Pool Name	URI	Bucket	Access Key ID	Used in ILM Rule
PoINT Archival Gateway	https://s3-pag2.office.optical-expert.jp/8443	new-bucket-321	*****57CA	<input checked="" type="checkbox"/>

Displaying 1 pool.

StorageGRID11.2/3 Cloud Storage Poolとして稼働

Cloud Storage Poolとして設定されると
x-ntap-sgws-cloud-pool-uuidが作成



You can add Cloud Storage Pools to ILM rules to store objects outside of the StorageGRID system. A Cloud Storage Pool defines how to access the external bucket or container where objects will be stored.

StorageGrid11.3 Cloud Storage Pool



Pool Name	URI	Pool Type	Container	Used in ILM Rule	Last Error
PAG	https://w2019rx300.office.optical-expert.jp:8443	s3	bucket1207		

StorageGRID11.3 ILM Rule設定

Create ILM Rule Step 2 of 3: Define Placements

Configure placement instructions to specify how you want objects matched by this rule to be stored.

copy to PAG
copy all files to PAG

Reference Time:

Placements Sort by start day

From day: store: Add Remove

Type: Location: Add Pool Copies: + -

Retention Diagram Refresh

Trigger: Day 0

All Storage Nodes

Duration: Forever

Cancel Back Next

StorageGRID11.3 ILM Policy設定 -1

Configure ILM Policy

Create a proposed policy by selecting and arranging rules. Then, save the policy and edit it later as required. Click Simulate to verify a saved policy using test objects. When you are ready, click Activate to make this policy the active ILM policy for the grid.

Name

Reason for change

Rules

Select the rules you want to add to the policy. Drag and drop rows to reorder the rules. Rules are evaluated in order, starting at the top.

+ Select Rules

	Default	Rule Name	Tenant Account	Actions
⬇	<input type="radio"/>	copy to PAG	point (05912549202616796614)	✕
⬆	<input checked="" type="radio"/>	Make 2 Copies	Ignore	✕

Cancel

Save

StorageGRID11.3 ILM Policy設定 -2

[+ Create Proposed Policy](#)
[📄 Clone](#)
[✎ Edit](#)
[✖ Remove](#)

Policy Name	Policy State	Start Date	End Date
<input checked="" type="radio"/> copy to PAG	Proposed		
<input type="radio"/> Baseline 2 Copies Policy	Active	2019-11-30 01:12:31 JST	

Viewing Proposed Policy - copy to PAG

Errors in an ILM policy can cause irreparable data loss. Review and simulate the policy carefully before activating.

Review the rules in this policy. If this is a proposed policy, click Simulate to verify the policy and then click Activate to make the policy active.

Reason for change: copy to PAG

Rules are evaluated in order, starting from the top.

Rule Name	Default	Tenant Account
copy to PAG 🔗		point (05912549202616796614)
Make 2 Copies 🔗	✓	Ignore

[Simulate](#) [Activate](#)

Simulate ILM Policy - copy to PAG

Simulates the active ILM policy or, if there is a proposed ILM policy, simulates the proposed ILM policy. Use this simulation to test the current configuration of ILM rules and determine whether ILM rules copy and place object data as intended.

Object [Simulate](#)

Simulation Results [?](#)

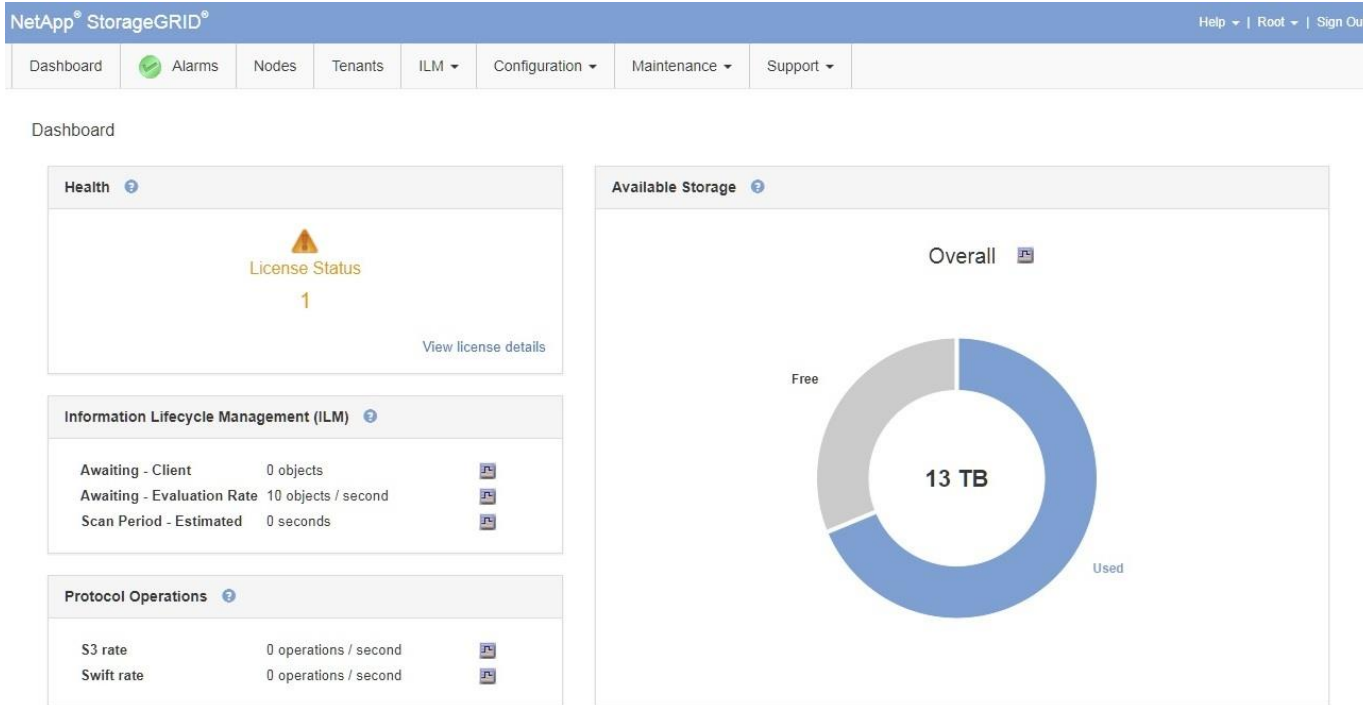
Object	Rule Matched	Previous Match
bucket1130/PoINT-GosObj-01D5AC0047EC0059-CC9B3D537D5E79E5117FC65B529B236878CA805A	copy to PAG 🔗	✖

[Finish](#)

Policy Simulation結果

PoINT Archival Gateway

StorageGRID11.2 Grid Manager



記録データの暗号化とリテンション(保管期限)の管理機能

Partitions / PT1

[+ Create Object Repository](#) [🔍 Show Protected Volume Arrays](#)

General Properties

Name:

Creation Time: 2019/03/02 10:37:22

Modification Time: 2019/04/05 12:09:42

Last Access Time: 2019/04/05 12:09:42

Data Encryption Mode: ▼
No encryption
Encrypt using System Key
Encrypt using Private Key

リテンションは、バケット単位で設定

Partitions / PT1 / bucket307 / Retention Policy

Properties

Creation Time:

Modification Time:

Absolute:

Retention Period: ▼
Days
Weeks
Months
Years

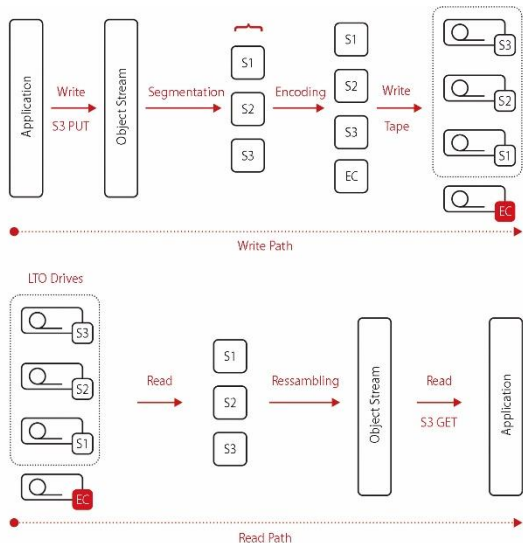
Auto Destruction:

PoINT Archival Gateway Tape Support

- Drives, Loaders, Libraries
 - Native support
 - IBM, HP, Overland, Tandberg, Quantum, Spectra Logic,
 - カートリッジのオフライン管理
- フォーマット
 - 独自仕様のテープフォーマット
 - 最初のBlock0にECMA13 volume labelを記録し開始
 - 異なったサイズのメタデータと元データを保存可能
 - ブロック単位のエラーコード

Storage Element	Barcode of Tray	Volume State	Archival Storage Partition
4096	000002L5	Formatted ▾	test1
4097	000004L5	Unknown ▾	
4098	000005L5	Unknown ▾	
4099	000010L5	Unknown ▾	
4100	000008L5	Unknown ▾	
4108	000006L5	Unknown ▾	
4109	000009L5	Unknown ▾	
4110	000007L5	Unknown ▾	
4111	000001L5	Unknown ▾	

Erasure Codingで平行に 複数ドライブでデータ記録 3/4では、3データ、1パリティ



Device Related Properties

Device Type: Tape Library

Erasure Code Rate: 1/1 1/1 1/2 2/2 1/3 2/3 3/3 1/4 2/4 3/4 4/4

Media Allocation Strategy: ing

Media Pre-Allocation Threshold: medium medium

Media Parallelism: medium

Device Allocation Source Priority: medium

Device Allocation Source Limit: medium

<No Limit>

Tape Library

Apply

ライブラリーとカートリッジの管理単位

•Archival Storage Partition / ASP

テープライブラリーのスロットをストレージの管理単位として割り当てる。

さらに、サイズ、イレージャーコーディング(EC)のレベル、暗号化、自動拡張、リード/ライトの優先権を設定

•Protected Volume Array / PVA

テープカートリッジが入っているライブラリーへのスロットの割り当てやデータの保護レベルを割り当て

•Object Repository / OR(Bucket)

AWS S3サーバーでのBucketに相当する。使用するArchival Storage Partitionの指定

オブジェクトのリテンション(保管期限)の設定、ユーザアクセス設定(User, Group, Read Only,,)

Partition / Object Repositories / Protected Volume Arrays

Partitions / 1213_1

+ Create Object Repository 🔍 Show Protected Volume Arrays

General Properties

Name:

Creation Time: 2019/12/13 12:21:48

Modification Time: 2020/01/19 0:03:43

Last Access Time: 2020/02/13 15:13:13

Data Encryption Mode:

Device Related Properties

Device Class:

Erasure Code Rate:

Media Allocation Strategy:

Media Pre-Allocation Threshold:

Media Parallelism:

Media Allocation Order:

Media Allocation Restriction:

Object Repositories

Filter:

Name	Delete
bucket1220-mda0nze0mdixntc2ode0mtg1mzu2	<input type="button" value="🗑"/>
hp1220	<input type="button" value="🗑"/>
pag_lto5	<input type="button" value="🗑"/>

Partitions / 1213_1 / Protected Volume Arrays

Filter:

PVA	Device	Storage Element	Barcode	Volume State
1+	Tape Library	0	000004L5	Formatted

Code Rate: 1/1
Encryption: Off

システムの稼働状況の表示

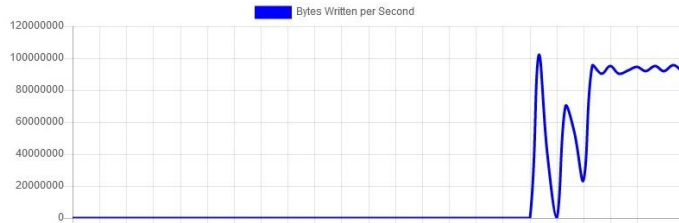
Statistics Information

Select Source:

[Expand All](#)

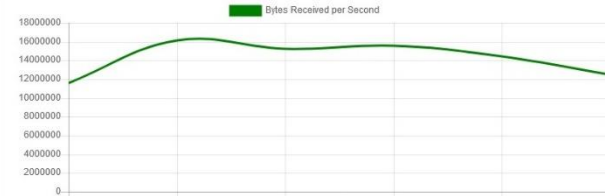
Filter:

Source	Type	Current Count	Units/Sec	Chart
Drive 1	Objects Read	0	0	
Drive 1	Objects Written	1	0	
Drive 1	Bytes Read	131072	0 Byte/s	
Drive 1	Bytes Written	4225630208	88.38 MByte/s	



Showing history for 3 min 27 sec

Database Network	Connections Accepted	0	0	
Database Network	Connections Closed	0	0	
Database Network	Connections Refused	0	0	
Database Network	Connections Failed	0	0	
Database Network	Bytes Received	4258860	255 Byte/s	
Database Network	Bytes Sent	16127040	1.27 KByte/s	
S3 Network	Connections Accepted	21	0	
S3 Network	Connections Closed	19	0	
S3 Network	Connections Refused	0	0	
S3 Network	Connections Failed	0	0	
S3 Network	Bytes Received	12113870168	12.25 MByte/s	



Showing history for 18 sec

S3 Network	Bytes Sent	33343	0 Byte/s	
------------	------------	-------	----------	--

System Cluster Nodes / Log for IFN 1

Download (111.19 KB/fe)

↑ Line ↑ Page ↑ Top

↓ Line ↓ Page ↓ End ↻

2019/04/09 14:02:02:988	Number of logical CPUs: 16
2019/04/09 14:02:03:117	Starting data communication services ...
2019/04/09 14:02:03:120	Database communication client is connected to 192.168.1.230:4000
2019/04/09 14:02:03:120	-----
2019/04/09 14:02:03:120	PoINT Archival Gateway services are running.
2019/04/09 14:02:03:120	-----
2019/04/09 14:02:03:120	Data communication services are running.
2019/04/09 14:02:03:204	Interface communication server failed to listen to 192.168.1.230:4000, network address is
2019/04/09 14:02:03:303	Starting device control services ...
2019/04/09 14:02:03:474	Device control services are running.
2019/04/09 14:02:03:474	Starting metadata caching services ...
2019/04/09 14:02:03:474	Metadata caching services are running.
2019/04/09 14:02:03:474	Starting S3 REST API services ...
2019/04/09 14:02:03:475	S3 REST API is using FQDN "s3-pag2.office.optical-expert.jp"
2019/04/09 14:02:03:480	Drives: IBM ULT3580-HH5 revision F991 connected
2019/04/09 14:02:03:480	Device: IBM 3573-TL serial number 00X2U78Z0863_LL0 (1/23 drive/volume groups) is oper
2019/04/09 14:02:03:516	S3 REST API service is listening to 192.168.1.231:9080
2019/04/09 14:02:03:516	S3 REST API service is listening to 192.168.1.231:8443
2019/04/09 14:02:03:519	S3 REST API services are running.
2019/04/09 14:02:03:707	Device: IBM 3573-TL serial number 00X2U78Z0863_LL0: Drive group 1: ready and operabl

↑ Line ↑ Page ↑ Top

↓ Line ↓ Page ↓ End ↻

System Cluster Nodes / Log for DBN 1

Download (219.11 KB/fe)

↑ Line ↑ Page ↑ Top

↓ Line ↓ Page ↓ End ↻

Display 20 lines per page

2019/04/09 13:58:13:015	-----
2019/04/09 13:58:13:015	PoINT Archival Gateway services are running.
2019/04/09 13:58:13:015	-----
2019/04/09 13:58:13:015	Adding shares for database directories ...
2019/04/09 13:58:13:017	Shares for database directories have successfully been added.
2019/04/09 13:58:13:043	Current license grants temporary use until 2019/04/21.
2019/04/09 13:58:13:043	Starting user management services ...
2019/04/09 13:58:13:044	Database 'C:\Database\HDD\pag-users.db' has been opened.
2019/04/09 13:58:13:047	User management services are running.
2019/04/09 13:58:13:047	Starting metadata caching services ...
2019/04/09 13:58:13:048	Database 'C:\Database\HDD\pag-asp.db' has been opened.
2019/04/09 13:58:13:189	Metadata caching services are running.
2019/04/09 13:58:13:189	Starting device control services ...
2019/04/09 13:58:13:191	Database 'C:\Database\HDD\pag-devices.db' has been opened.
2019/04/09 13:58:13:193	Device control services are running.
2019/04/09 13:58:13:193	Devices: scanning for connected and supported media changer devices ...
2019/04/09 13:58:13:472	Devices: IBM 3573-TL revision F.11 serial number 00X2U78Z0863_LL0 has been detected and updated
2019/04/09 13:58:13:472	Devices: Scan process has successfully been completed.
2019/04/09 13:58:13:473	Database 'C:\Database\HDD\pag-tape-mo.db' has been opened.
2019/04/09 13:58:13:754	Devices: IBM 3573-TL revision F.11 serial number 00X2U78Z0863_LL0 has successfully been started

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ライセンスは、使用するLTOライブラリーのスロット数

- LTOドライブは4台単位
 - メディアのミラーリング
 - メディアのオフライン管理
 - ユーザー管理、DB自動バック機能
- ライセンスの単位
 - 12スロット
 - 32スロット
 - 48スロット
 - 96スロット
 - 280スロット
 - 560スロット

Software License	
Serial Number:	7000100006180503
Configuration Key:	AVKBR-H6X3K-1BTAX
Product Key:	c4e3c02a-e715
License Key:	<input type="text" value="C48Y-CE9A-15XB-7"/> <input type="button" value="Apply"/>
License Period:	Expires on 2019/04/22 8:59:59
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