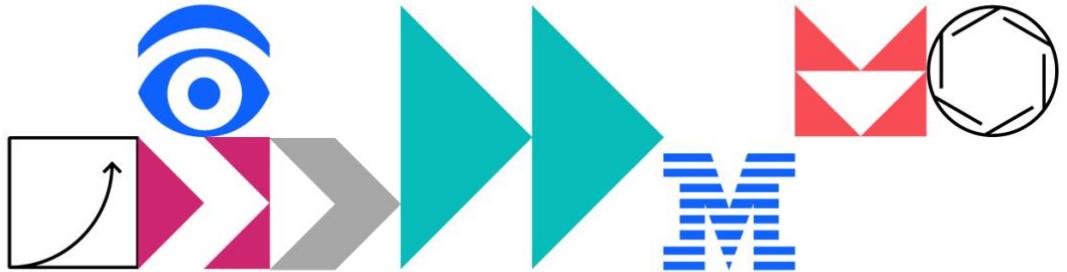




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IBM Storage Fusion Data Protection

Session 1415

Lab Exercise Guide

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1 IBM Storage Fusion Introduction

Organizations must quickly adjust to the changing business and outside influences that are causing rapid change, resulting in a need for business agility and faster business insights. Clients need applications and data to adjust and shift in response to dynamic market demands. They also need diverse and simplified tools and data services to build anywhere, at any pace, and for applications and data to scale dynamically, achieve peak performance, and adhere to security requirements.

Companies need a consistent way to deploy applications across on-premises infrastructure and public clouds, and not all of them are deploying containers to create that portability and consistency between cloud and on-premises environments.

IBM Storage Fusion is a container-native hybrid cloud data platform that offers simplified deployment and data management for Kubernetes applications on Red Hat® OpenShift® Container Platform. IBM Storage Fusion is designed to meet the storage requirements of modern, stateful Kubernetes applications and to make it easy to deploy and manage container-native applications and their data on Red Hat OpenShift Container Platform.

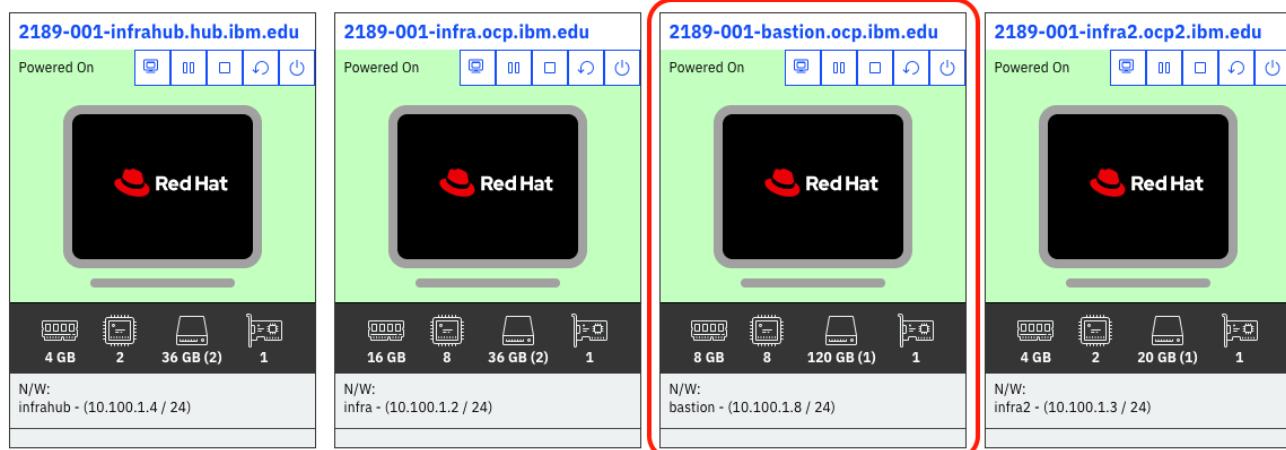
One of the primary functions of IBM Storage Fusion is data protection.

In this hands-on lab you will understand how to install and configure the basic components of IBM Storage Fusion Data Protection on Red Hat OpenShift Container Platform.

1.1 How to start workshop

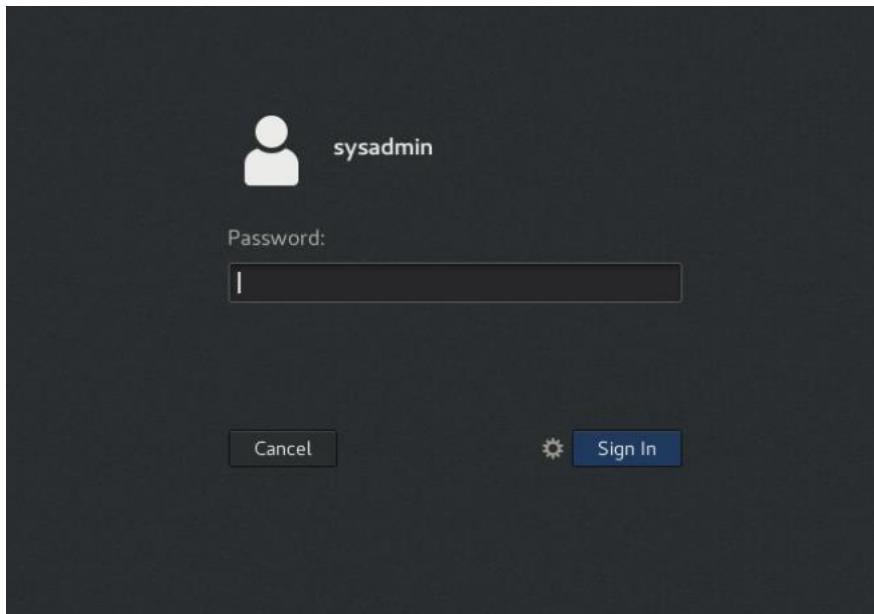
After you have launched this Lab and Lab Guide, start lab by choosing the Bastion (bastion.ocp.ibm.edu). Click in the black area near Red Hat icon.

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Names of machines and order may be different. Make sure to select machine with bastion.ocp.ibm.edu in the name.

Click anywhere in the screen and hit the Enter key. Login with username=sysadmin and password=ibmrhcop.

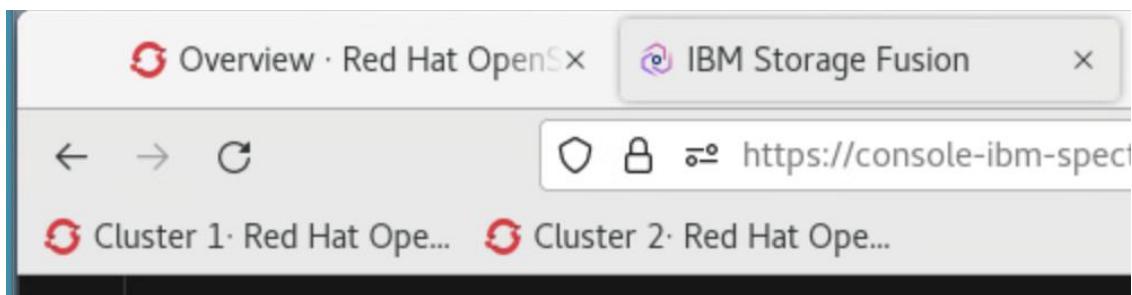


Then open Firefox.

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This lab has two (2) **Red Hat OpenShift Clusters**. There is a bookmark for each cluster in Firefox, open both “Cluster 1” and “Cluster 2”



Login with username=ocadmin and password=ibmrhocp.

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Log in to your account

Username *

ocadmin|

Password *

Log in

Log into both clusters

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The screenshot shows the Red Hat OpenShift web interface. At the top, there are two tabs: "Overview · Red Hat OpenShift" (which is active) and another tab that is partially visible. Below the tabs, the URL is https://console-openshift-console.apps.ocp2.ibm.edu/dashboards. The main navigation bar has a "Red Hat OpenShift" logo and a menu icon. The left sidebar, titled "Administrator", contains links for Home, Operators, Workloads, Networking, and Storage. The main content area is titled "Overview" and has a sub-section titled "Cluster". It includes a "Getting started resources" section with a link to "Set up your cluster" and a brief description: "Finish setting up your cluster with recommended configurations." To the right, there is a partial view of another section starting with "Build with gr...".

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The screenshot shows the Red Hat OpenShift web interface. At the top, there are two tabs: 'Overview · Red Hat OpenShift' (which is active) and 'Overview · Red Hat OpenShift'. Below the tabs, the URL is https://console-openshift-console.apps.ocp2.ibm.edu/dashboards. The main header bar has a 'Red Hat OpenShift' logo and a navigation menu with three horizontal bars. The left sidebar, titled 'Administrator', contains the following items: Home, Operators, Workloads, Networking, and Storage. The 'Home' item is currently selected. The right panel is titled 'Overview' and has a sub-section titled 'Cluster'. Under 'Cluster', there is a 'Getting started resources' section with a link to 'Set up your cluster'. A note says: 'Finish setting up your cluster with recommended configurations.' To the right of this panel, there is a partially visible section titled 'Build with gr...'.

1.2 Configure ODF.

1.2.1 Log into Fusion.

This lab requires storage for the backup service. We will configure ODF (OpenShift Data Foundation) as a data layer for each cluster:

Open The IBM Fusion GUI for each Cluster:

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The screenshot shows the Red Hat OpenShift dashboard. The left sidebar has a dropdown for 'Administrator' and links for 'Home', 'Operators', and 'Workloads'. The main area is titled 'Overview' under 'Cluster'. It includes a 'Getting started resources' section with a 'Setup your cluster' link, and a sidebar with sections for 'Red Hat Applications' (OpenShift Cluster Manager, Red Hat Hybrid Cloud Console) and 'IBM Storage Fusion' (IBM Storage Fusion). The top navigation bar shows tabs for 'Overview · Red Hat OpenShift' and 'Overview · Red Hat OpenShift'.

Select Data Foundation:

The screenshot shows the 'Data Foundation' configuration page for IBM Storage Fusion. The left sidebar has links for 'Quick start', 'Events', 'Applications', 'Data Foundation' (which is selected), 'Services', and 'Settings'. The main area is titled 'Data Foundation' and says 'View the configuration of Data Foundation, capacity utilization and storage nodes.' It features a 'Usable capacity' section showing 0.15 GiB used (1,023.85 GiB available) and 1,024 GiB total, with a legend for Block (purple), File (blue), and Object (green). To the right is a 'Health' section showing 'Storage cluster' and 'Data resiliency' both at 'OK'. Below is a 'Storage nodes' section with a table of three nodes: compute0.ocp.ibm.edu, compute1.ocp.ibm.edu, and compute2.ocp.ibm.edu, all listed as 'Ready'. The table columns are Name, Status, Disks, Disk size (TiB), CPU, and Memory (GB).

Name	Status	Disks	Disk size (TiB)	CPU	Memory (GB)
compute0.ocp.ibm.edu	Ready	1	1.00	24	67.53
compute1.ocp.ibm.edu	Ready	1	1.00	24	67.53
compute2.ocp.ibm.edu	Ready	1	1.00	24	67.53

If you see Data Foundation with nodes and capacity, then this cluster is ready,

If you see “Configure Storage”:

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Quick start

Events

Applications

Data Foundation

Services

Settings

Data Foundation

View the configuration of Data Foundation, capacity utilization and storage nodes.

Storage not configured yet

Configure storage

[View documentation](#)

Then select “Configure storage” and setup ODF:

Configure storage

Select nodes for your local storage configuration.

HDD not recommended SSD storage is recommended for optimal performance and reliability.

Disk size

A discovery process identified nodes that contain disks. The disk size shown below has been pre-selected based upon the nodes found.

1 TiB, HDD

Required!
Must select a minimum of 3 nodes, with an aggregate of at least 24 CPUs and 72 GB memory.

Storage nodes

Name	Disks	Disk size (TiB)	CPU	Memory (GB)
compute0, compute1, compute2	3	1.00	24	47.59

Summary

The following configuration will be created:

Usable capacity	1 TiB
Raw capacity	3.00 TiB
Nodes	3
CPUs	72
Memory	202.58 GB

For Encryption, select “**None**”.

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Configure storage

Specify encryption for the storage configuration.

Encryption settings

Select the location for the encryption key.

Store the encryption key in a secret in the cluster
 Store the encryption key in an external KMS
 None

Summary

The following configuration will be created:

Usable capacity ⓘ **1 TiB**

Raw capacity	3.00 TiB
Nodes	3
CPUs	72
Memory	202.58 GB

Encryption details

Encryption	Disabled
------------	----------

Cancel **Back** **Configure**

Wait for the storage cluster to be configured:

IBM Storage Fusion

Cloud start
Events
Applications
Data Foundation
Services
Settings

Data Foundation

View the configuration of Data Foundation, capacity utilization and storage nodes.

Usable capacity ⓘ **Health**

Retrieving data... Initializing...

Storage nodes

List of nodes used in your storage configuration.

Search Add node

Name	Status	Disks	Disk size (TiB)	CPU	Memory (GB)
compute0.ocp2.ibm.edu	Ready	-	1.00	24	67.53
compute1.ocp2.ibm.edu	Ready	-	1.00	24	67.53
compute2.ocp2.ibm.edu	Ready	-	1.00	24	67.53

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1.3 Configure Backup Hub

IBM Storage Fusion supports a “hub and spoke” model for backup and restore. This means one cluster is setup as the backup server and the rest of the clusters only run a backup agent.

On Cluster 1 we will setup the IBM Fusion Backup software as the “**HUB**”

First we will set the default storage class:

Let's set the default storage class for the cluster to “ocs-storagecluster-cephfs”

Navigate to the storage classes page:

Name	Provisioner	Reclaim policy
ibm-spectrum-fusion-local	kubernetes.io/no-provisioner	Delete
ibm-spectrum-fusion-mgmt-sc	openshift-storage.cephfs.csi.ceph.com	Delete
ocs-storagecluster-cephfs	openshift-storage.cephfs.csi.ceph.com	Delete
ocs-storagecluster-ceph-rbd	openshift-storage.rbd.csi.ceph.com	Delete
ocs-storagecluster-ceph-rgw	openshift-storage.ceph.rook.io/bucket	Delete
openshift-storage.noobaa.io	openshift-storage.noobaa.io/obc	Delete

Select “ocs-storagecluster-cephfs” and edit “annotations”

Name	Provisioner	Reclaim policy
ibm-spectrum-fusion-local	kubernetes.io/no-provisioner	Delete
ibm-spectrum-fusion-mgmt-sc	openshift-storage.cephfs.csi.ceph.com	Delete
ocs-storagecluster-cephfs	openshift-storage.cephfs.csi.ceph.com	Delete
ocs-storagecluster-ceph-rbd	openshift-storage.rbd.csi.ceph.com	Delete
ocs-storagecluster-ceph-rgw	openshift-storage.ceph.rook.io/bucket	Delete
openshift-storage.noobaa.io	openshift-storage.noobaa.io/obc	Delete

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Edit annotations

Key	Value
description	Provides RWO and RWX Filesy ...

[+ Add more](#)

[Cancel](#) [Save](#)

Select “add more”

and add the annotation key: “storageclass.kubernetes.io/is-default-class”

Value: “true”

And “save”

Edit annotations

Key	Value
description	Provides RWO and RWX Filesy ...
ss.kubernetes.io/is-default-class	true

[+ Add more](#)

[Cancel](#) [Save](#)

You will now see the class noted as “default”

StorageClasses

Name	Search by name...
Name	ibm-spectrum-fusion-local
SC	ibm-spectrum-fusion-mgmt-sc
SC	ocs-storagecluster-cephfs - Default
SC	ocs-storagecluster-ceph-rbd
SC	ocs-storagecluster-ceph-rgw
SC	openshift-storage.noobaa.io

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To set the default storage class via the CLI:

```
# oc patch storageclass ocs-storagecluster-cephfs -p '{"metadata": {"annotations": {"storageclass.kubernetes.io/is-default-class": "true"}}}'
```

1.3.1 Install backup server (hub)

Select “Services” on the Fusion GUI and Select the first tile: “**Backup & Restore**”:

The screenshot shows the IBM Storage Fusion interface. The left sidebar has tabs for Quick start, Events, Applications, Data Foundation, Services (which is selected), and Settings. The main area is titled 'Services' with the sub-section 'Installed'. It shows a card for 'Data Foundation v4.12.6' which is 'Healthy'. Below this, under 'Available', there are three cards: 'Backup & Restore' (IBM • Data protection), 'Backup & Restore (Legacy)' (IBM • Backup), and 'Global Data Platform' (IBM • Storage). The 'Backup & Restore' card provides a detailed description of its features.

Cluster 1: Red Hat Ope... Cluster 2: Red Hat Ope...

IBM Storage Fusion

Quick start
Events
Applications
Data Foundation
Services
Settings

Services

Discover and manage available services.

Installed

Data Foundation v4.12.6 • Healthy

Available

Backup & Restore
IBM • Data protection

Provides application-centric backups, using local snapshots for quick recovery and external object storage protection. Enhanced offering with stability and scalability improvements.

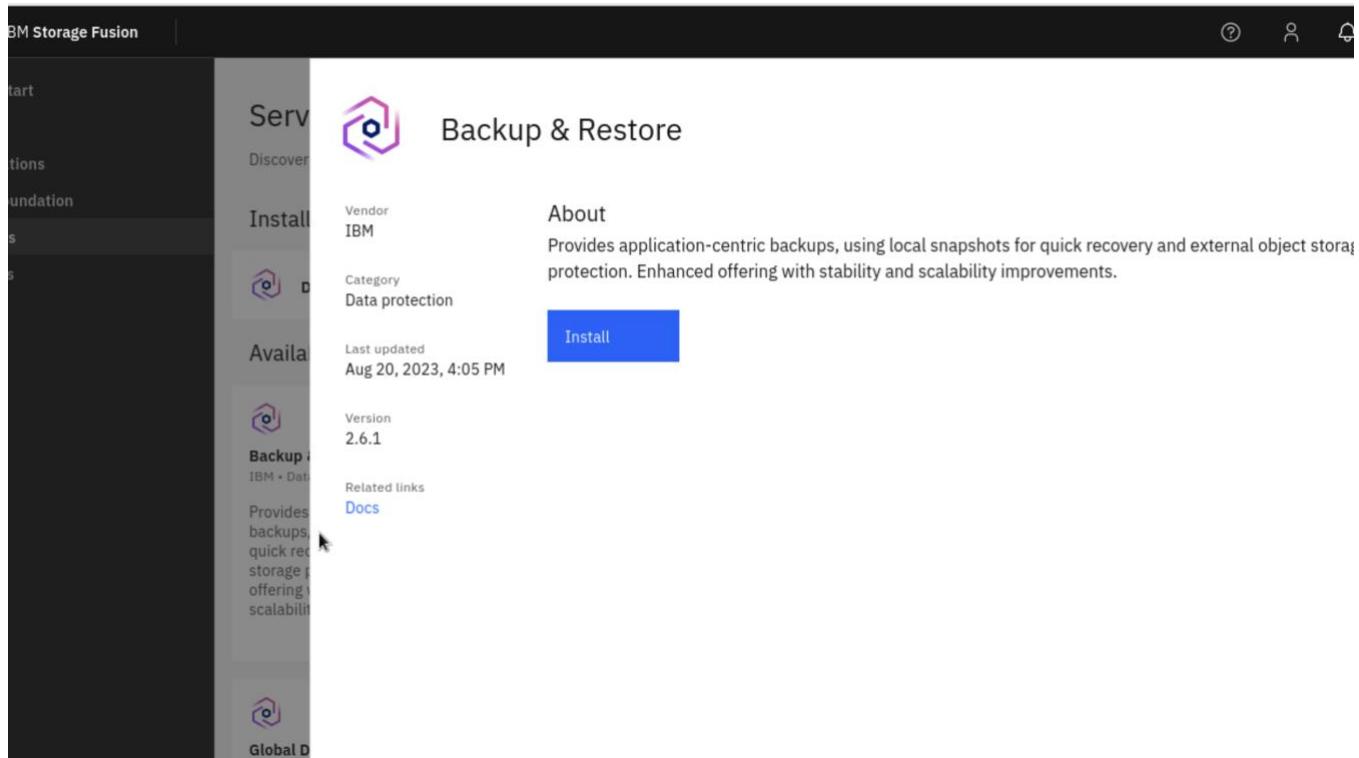
Backup & Restore (Legacy)
IBM • Backup

Protect your data with application-centric backups. Use local snapshots for quick recovery, or transfer backups to external object storage for safe keeping.

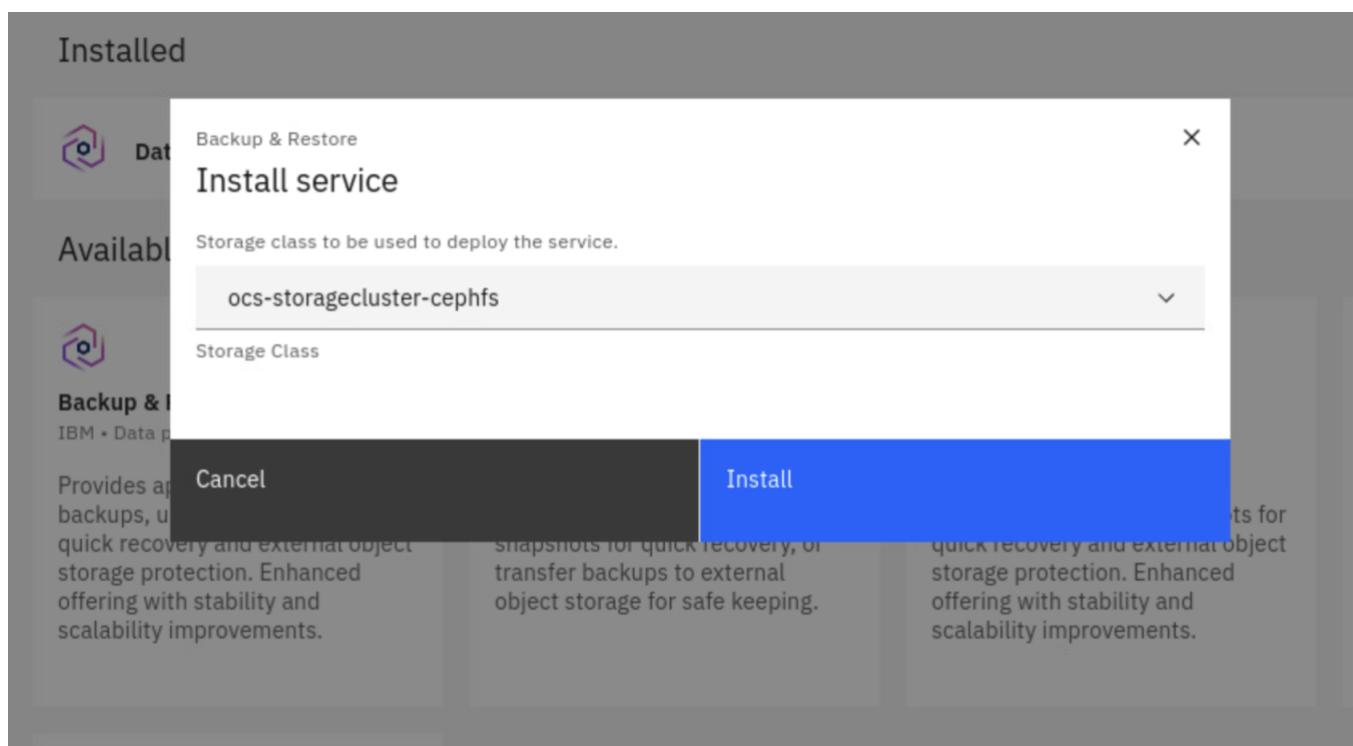
Global Data Platform
IBM • Storage

Backup & Restore Install

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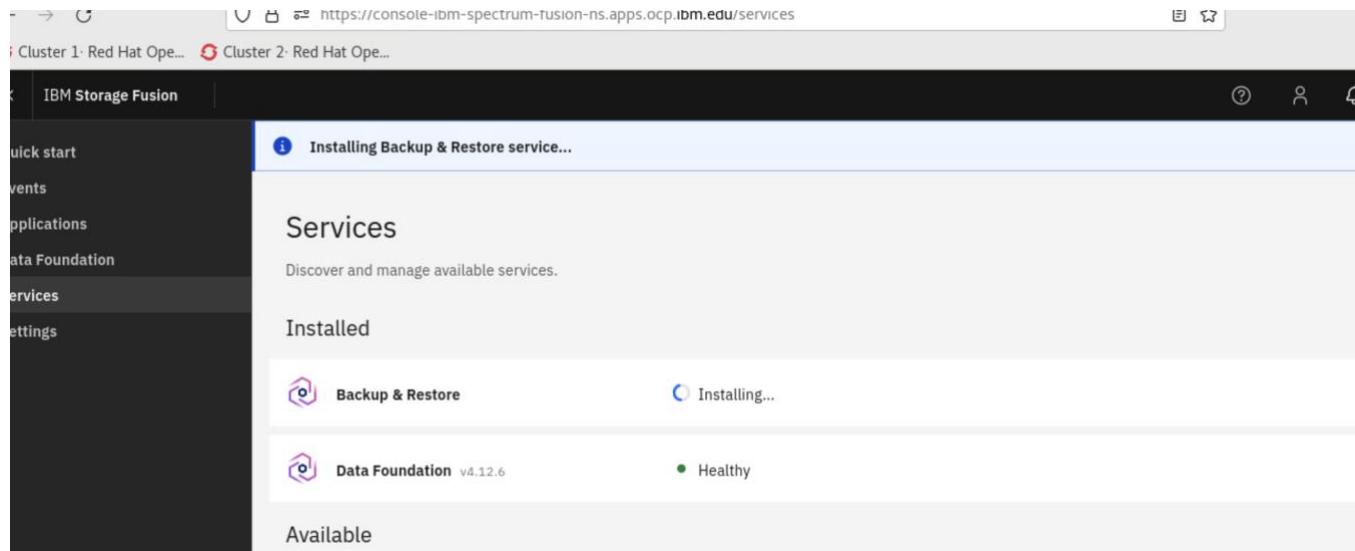


Then Select Storage for the backup Server (ocs-storagecluster-cephfs)

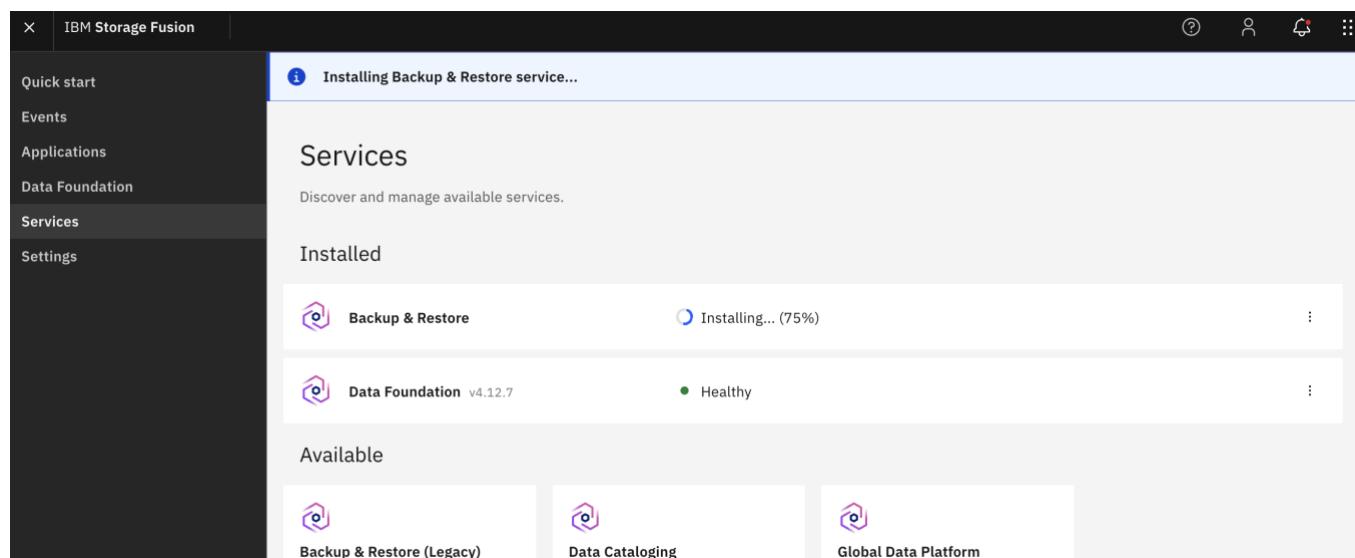


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Then wait for the storage backup service to be installed:



The screenshot shows the IBM Storage Fusion interface. The left sidebar has a dark theme with the following navigation items: Quick start, Events, Applications, Data Foundation, Services (which is selected), and Settings. The main content area has a light background. At the top, there is a status bar with two clusters: Cluster 1: Red Hat Ope... and Cluster 2: Red Hat Ope... Below this is a header bar with the IBM Storage Fusion logo and a search bar. A blue banner at the top right says "Installing Backup & Restore service...". The main section is titled "Services" with the sub-instruction "Discover and manage available services." Below this, there are two tabs: "Installed" and "Available". Under "Installed", there are two entries: "Backup & Restore" (status: "Installing...") and "Data Foundation v4.12.6" (status: "Healthy"). Under "Available", there are three entries: "Backup & Restore (Legacy)", "Data Cataloging", and "Global Data Platform".



This screenshot is identical to the one above, except the progress of the "Backup & Restore" installation has changed. The status now shows "(75%)", indicating the process is nearly complete.

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The screenshot shows the 'Services' section of the IBM Storage Fusion interface. On the left is a sidebar with links like 'Quick start', 'Events', 'Applications', 'Backup & restore', 'Data Foundation', 'Services' (which is selected), and 'Settings'. The main area is titled 'Services' with the sub-instruction 'Discover and manage available services.' Below this is a heading 'Installed' followed by two service entries:

- Backup & Restore v2.6.1** - Status: Healthy
- Data Foundation v4.12.7** - Status: Healthy

Below the installed section is a heading 'Available'.

1.4 configure backup and restore service

Once the Backup & Restore service is installed, we can configure it for use.

1.4.1 setup backup location

Configure a backup location

Navigate to the Back&Restore in the Fusion GUI and select “Locations”

The screenshot shows the 'Locations' section of the IBM Storage Fusion interface. The sidebar includes 'Backup & restore' (selected), 'Locations' (selected), and 'Jobs'. The main area is titled 'Locations' with the instruction 'Backup storage locations are required to set up backup policies. To protect your applications in the event of a cluster failure, consider setting up an additional object storage locations. [Learn more.](#)'. It features filters for 'Status: All' and 'Type: All', a search bar, and a blue 'Add location +' button. Below this is a message 'No backup locations' with the sub-instruction 'To take advantage of IBM Storage Fusion data protection, add a backup location.'

We will need an Object Bucket. Switch to the OpenShift GUI and select Storage → Object Bucket Claims (in the Project “IBM-backup-restore”)

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“create Object Bucket Claim”

The screenshot shows the OpenShift web console interface. On the left, there's a sidebar with various resource types: StatefulSets, Secrets, ConfigMaps, CronJobs, Jobs, DaemonSets, ReplicaSets, ReplicationControllers, HorizontalPodAutoscalers, PodDisruptionBudgets, Networking, Storage, Data Foundation, and PersistentVolumes. The 'Networking' section has a dropdown arrow. The main content area has a blue header bar with the message: "You are logged in as a temporary administrative user. Update the [cluster OAuth configuration](#) to allow others to log in." Below this, it says "Project: ibm-backup-restore". The main title is "Create ObjectBucketClaim". There's a "Edit YAML" link. The form fields are: "ObjectBucketClaim Name" (set to "s3backup"), "StorageClass" (set to "openshift-storage.noobaa.io"), and "BucketClass" (set to "noobaa-default-bucket-class"). At the bottom are "Create" and "Cancel" buttons.

Create a bucket: “s3backup”

StorageClass: “openshift-storage.noobaa.io”

bucketClass: “noobaa-default-bucket-class”

Scroll down and “reveal values”

NOTE: DO NOT USE the EndPoint listed here. That is the internal endpoint.

Use the endpoint from “networking → Routes → S3” in the “Openshift-storage” project.

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The screenshot shows a configuration page for an object bucket claim. It includes fields for Endpoint, Bucket Name, Access Key, and Secret Key, each with a copy icon. A 'Hide Values' button is located in the top right corner.

Object Bucket Claim Data	
Endpoint	s3.openshift-storage.svc:443
Bucket Name	s3backup-537cafe5-bccb-48f4-9404-40778c1f0b34
Access Key	umkZlDPxhJklkvZft63x
Secret Key	WnagRmE63JpDz3tdG87Z951JST0Z8AtYI1GmgSBQ

Then we will fill this into the target for backups:

On the Fusion GUI, Backup&Restore, Locations, “Add Location”

“s3backup”

“s3 Compliant”

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Add a backup location

Backup locations connected to IBM Storage Fusion provide storage for application backups created by backup policies.

Location type

Location name

s3backup

Choose an object storage type

 **Azure**
Microsoft • Object Storage

 **IBM Cloud**
IBM • Object Storage

 **AWS**
Amazon • Object Storage

 **S3 Compliant**
Any • Object Storage

 **Storage Protect**
IBM • Object Storage and Tape

[Cancel](#) [Back](#) [Next](#)

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Add a backup location

Backup locations connected to IBM Storage Fusion provide storage for application backups created by backup policies.

Login credentials

Connect IBM Storage Fusion to your backup location.

Endpoint

Endpoint

Bucket

Bucket

Access key

Secret key

Access key



Secret key



Certificate settings (optional)

SSL secured object storage locations require certificates from authentication.

Create an OpenShift TLS Secret [\[\]](#) in namespace `ibm-spectrum-fusion-ns` the certificate for the backup storage location and provide the secret name here.

Secret name for certificate

Secret name

Fill in:

Endpoint (**use http**, not https)

Bucket

Access key, Secret Key

For the EndPoint , Navigate to the OpenShift GUI, Networking, Routes, S3

And copy the S3 Route, use HTTP, not HTTPS

http://s3-openshift-storage.apps.ocp.ibm.edu

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The screenshot shows the Red Hat OpenShift console interface. The top navigation bar includes links for cloud, Outlook, ibm sales, tools, Fusion, demos, Red Hat OpenShift, Overview - Cloud..., Insights, Career Framework, and Other Bookmarks. A notification bell icon shows 8 notifications. The user is logged in as 'kube:admin'.

The left sidebar has a 'Networking' section with 'Routes' selected. The main content area shows the 'Routes' page for the 'openshift-storage' project. It displays three routes:

Name	Status	Location	Service
RT noobaa-mgmt	Accepted	https://noobaa-mgmt-openshift-storage.apps.ocp-50t6fjkgae-8a65.cloud.techzone.ibm.com	noobaa-mgmt
RT ocs-storagecluster-cephobjectstore	Accepted	http://ocs-storagecluster-cephobjectstore-openshift-storage.apps.ocp-50t6fjkgae-8a65.cloud.techzone.ibm.com	rook-ceph-rgw-ocs-storagecluster-cephobjectstore
RT s3	Accepted	https://s3-openshift-storage.apps.ocp-50t6fjkgae-8a65.cloud.techzone.ibm.com	s3

A 'Create Route' button is located in the top right corner of the main content area.

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Add a backup location

Backup locations connected to IBM Storage Fusion provide storage for application backups created by backup policies.

Login credentials

Connect IBM Storage Fusion to your backup location.

Endpoint

Bucket

Access key

Secret key



Certificate settings (optional)

SSL secured object storage locations require certificates from authentication.

Create an OpenShift TLS Secret [🔗](#) in namespace `ibm-spectrum-fusion-ns` the certificate for the backup storage location and provide the secret name here.

Secret name for certificate

[Cancel](#)

[Back](#)

[Add](#)

You will see

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The screenshot shows the 'Locations' page in the IBM Storage Fusion GUI. On the left, a dark sidebar lists navigation options: Quick start, Events, Applications, Backup & restore (selected), Data Foundation, Services, and Settings. The main content area has a title 'Locations' and a sub-instruction: 'Backup storage locations are required to set up backup policies. To protect your applications in the event of a cluster failure, consider setting up an additional object storage locations. [Learn more](#)'. Below this is a search bar with filters for Status (All) and Type (All). A large card displays a connection to 's3backup' which is 'Connected' and shows 'Used 0 GiB'. At the bottom, there are summary counts: Policies 0, Applications 0, and a small circular icon.

1.5 backup policy

Create a backup policy

Navigate to Fusion GUI, Backup & Restore, Policies

The screenshot shows the 'Policies' page in the IBM Storage Fusion GUI. The sidebar includes options like Overview, Topology, Backed up applications, Policies (selected), Locations, Jobs, Service protection, Data Foundation, Services, and Settings. The main area has a title 'Policies' and a note: 'The following table contains backup policies created on this cluster. Backup policies contain the schedule and backup location IBM Storage Fusion will use to create recurring backups. [Learn more](#)'. It features a search bar for 'Backup location: All' and a 'Search' button. A prominent blue button at the top right says 'Add policy +'. Below is a table with columns: Name, Backup location, Frequency, Time, Retention, and Applications. The first row shows a placeholder icon of a cube.

Add Policy

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Policies

The following table contains backup policies created on this cluster. You can edit or delete existing policies, or create new ones. IBM Storage Fusion will use the backup location and backup location IBM Storage Fusion will use to create recurring backups.

Name	Backup location	Frequency

No backup policies available

To take advantage of IBM Storage Fusion data protection, create a backup policy.

Create a backup policy

Define the backup location, frequency, and retention period for this policy

Policy name

monthly

Frequency

Choose a day

Hourly	1	2	3	4	5	6	7
Daily	8	9	10	11	12	13	14
Weekly	15	16	17	18	19	20	21
Monthly	22	23	24	25	26	27	28
Custom	29	30	31				

Time

12:00 AM ▾ America/New_York ▾

Backup location

Where the backups will be stored.

Location

In place snapshot

Stored in place and not transferred to object storage.

Object storage

Protect your applications in the event of a cluster failure.

Search

Backup locations

Cancel Create policy

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 Search

Backup locations



s3backup

s3



Retention period

How long backups will be maintained.

30

-

+

days



Set name, Schedule, location (choose the bucket you added)

- Quick start
- Events
- Applications
- Backup & restore
- Overview
- Topology
- Backed up applications
- Policies
- Locations
- Jobs

Policies

The following table contains backup policies created on this cluster. Backup policies contain the schedule and backup location IBM Storage Fusion will use to create recurring backups. [Learn more.](#)

Name	Backup location	Frequency	Time	Retention	Applications	⋮
monthly	s3backup	Every 1 of the month	12:00 AM Eastern Standard Time	30 Days	0	⋮

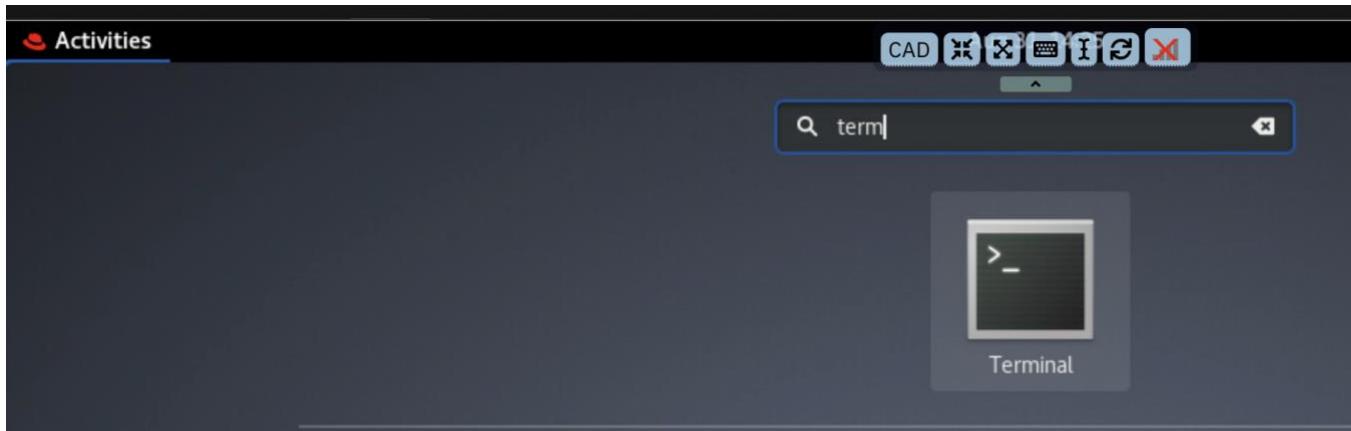
1.6 Backup an application

Create an application.

Open a terminal on the Bastion Host:

IBM TechXchange

Open a terminal for a command line, Click “Activities” and type “term”:



Then type:

```
# git clone https://github.com/jblumert/lab1415
```

A screenshot of a terminal window. The title bar shows "sysadmin@bastion:~/lab1415". The window contains the following text:

```
File Edit View Search Terminal Help
[sysadmin@bastion ~]$ git clone https://github.com/jblumert/lab1415
Cloning into 'lab1415'...
remote: Enumerating objects: 17, done.
remote: Counting objects: 100% (17/17), done.
remote: Compressing objects: 100% (17/17), done.
remote: Total 17 (delta 4), reused 0 (delta 0), pack-reused 0
Receiving objects: 100% (17/17), 5.50 KiB | 5.50 MiB/s, done.
Resolving deltas: 100% (4/4), done.
[sysadmin@bastion ~]$ cd lab1415
[sysadmin@bastion lab1415]$ ls
apply-hook00.sh    authority.json      crsecret.sh
app.yaml          catalog_source.yaml  recipe-hook00.yaml
[sysadmin@bastion lab1415]$ 
```

```
# oc login -u ocadmin -p ibmrhocp --server=https://api.ocp.ibm.edu:6443
```

(note the --server option is 2 dashes)

```
# oc get nodes
```

IBM TechXchange

```
sysadmin@bastion:~/lab1415
File Edit View Search Terminal Help
apply-hook00.sh authority.json crsecret.sh
app.yaml catalog_source.yaml recipe-hook00.yaml
[sysadmin@bastion lab1415]$ oc get nodes
NAME           STATUS   ROLES          AGE   VERSION
compute0.ocp.ibm.edu Ready    worker        80d   v1.25.11+1485cc9
compute1.ocp.ibm.edu Ready    worker        80d   v1.25.11+1485cc9
compute2.ocp.ibm.edu Ready    worker        80d   v1.25.11+1485cc9
control0.ocp.ibm.edu Ready   control-plane,master 80d   v1.25.11+1485cc9
control1.ocp.ibm.edu Ready   control-plane,master 80d   v1.25.11+1485cc9
control2.ocp.ibm.edu Ready   control-plane,master 80d   v1.25.11+1485cc9
[sysadmin@bastion lab1415]$ [sysadmin@bastion lab1415]$
```

IBM TechXchange

2 Run a Backup

2.1 Create a Test Application

On the terminal, on “bastion” node:

```
# ls
```

check for the directory lab1415, if it is not there run:

```
git clone https://github.com/jblumert/lab1415
```

```
# cd lab1415
# oc new-project lab1
# oc apply -f app.yaml
```

```
# oc get pods
```

```
# oc get pvc
```

You will see a running pod and a new pvc (cephfs)

```
sysadmin@bastion:~/lab1414
File Edit View Search Terminal Help
[sysadmin@bastion ~]$ cd lab1414/
[sysadmin@bastion lab1414]$ oc project lab1
Now using project "lab1" on server "https://api.ocp.ibm.edu:6443".
[sysadmin@bastion lab1414]$ oc apply -f app.yaml
Warning: would violate Podsecurity "restricted:v1.24": allowPrivilegeEscalation != false (containers "init", "filebrowser" must set securityContext.owPrivilegeEscalation=false), unrestricted capabilities (containers "init", "filebrowser" must set securityContext.capabilities.drop=["ALL"]), runRoot != true (pod or containers "init", "filebrowser" must set securityContext.runAsNonRoot=true), seccompProfile (pod or containers "init", "file"er" must set securityContext.seccompProfile.type to "RuntimeDefault" or "Localhost")
deployment.apps/filebrowser-deployment created
persistentvolumeclaim/filebrowser-pvc created
service/filebrowser-svc created
route.route.openshift.io/filebrowser-route created
[sysadmin@bastion lab1414]$ oc get pods
NAME           READY   STATUS    RESTARTS   AGE
filebrowser-deployment-85ffd57575-n7j17   1/1     Running   0          94s
[sysadmin@bastion lab1414]$ oc get pvc
NAME      STATUS  VOLUME
filebrowser-pvc  Bound   pvc-8390b393-92bf-464e-82eb-c16f2d4895d2  10Gi    RWO
test1     Bound   pvc-56a87e2f-f5f9-47a3-b76e-eafdc5ed8249  10Gi    RWX
testfs1   Bound   pvc-f1b05448-58e3-4c98-ac84-50d0b3beaf6  12Gi    RWX
[sysadmin@bastion lab1414]$ 
```

Get the application route:

IBM TechXchange

```
# oc get routes
```

(cut and paste into browser)

Or get the route from the “developer” Topology GUI for the project “lab1”

The screenshot shows the Red Hat OpenShift Developer Topology interface. The URL in the address bar is <https://console-openshift-console.apps.ocp.ibm.edu/topology/ns/lab1?view=graph>. The left sidebar has a 'Topology' section selected. The main area displays a single application icon with a blue circle and a red arrow, labeled 'filebr...oyment'. The interface includes standard navigation and search tools.

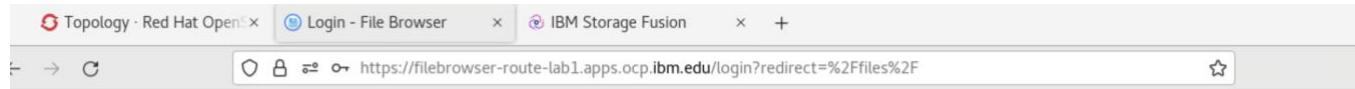
Login to the new application

User: admin

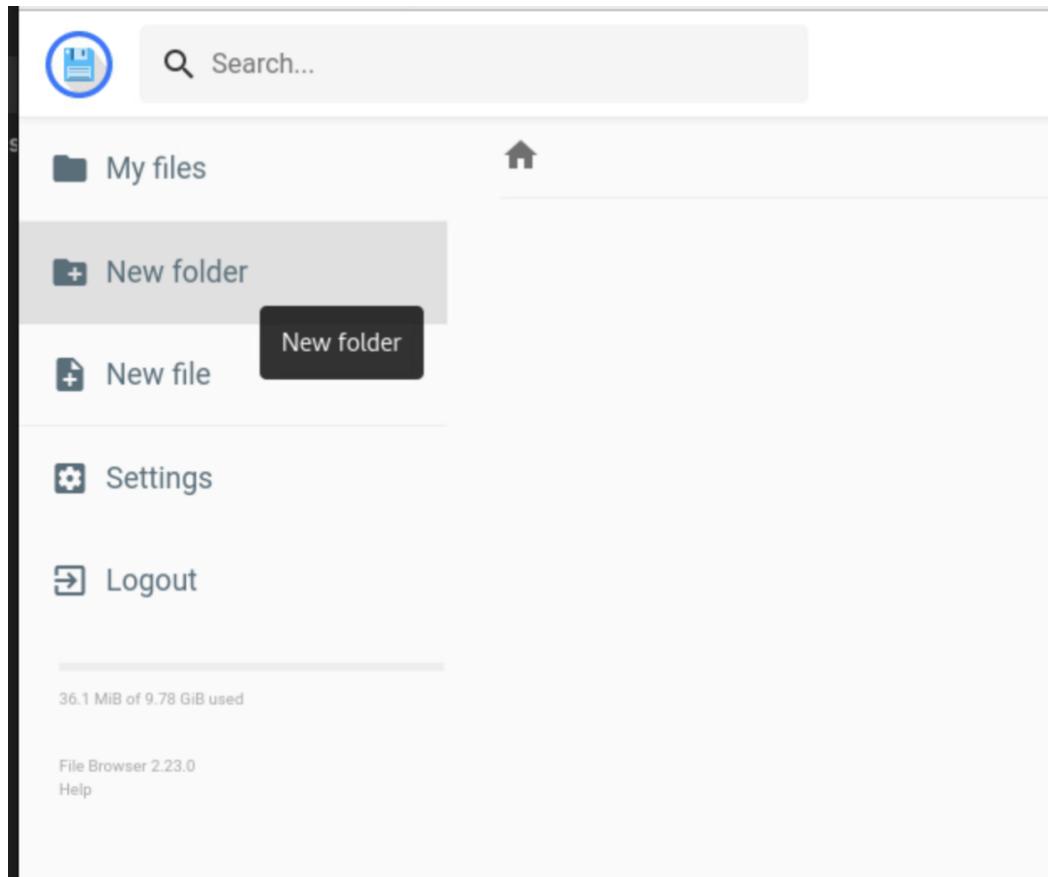
Password: admin

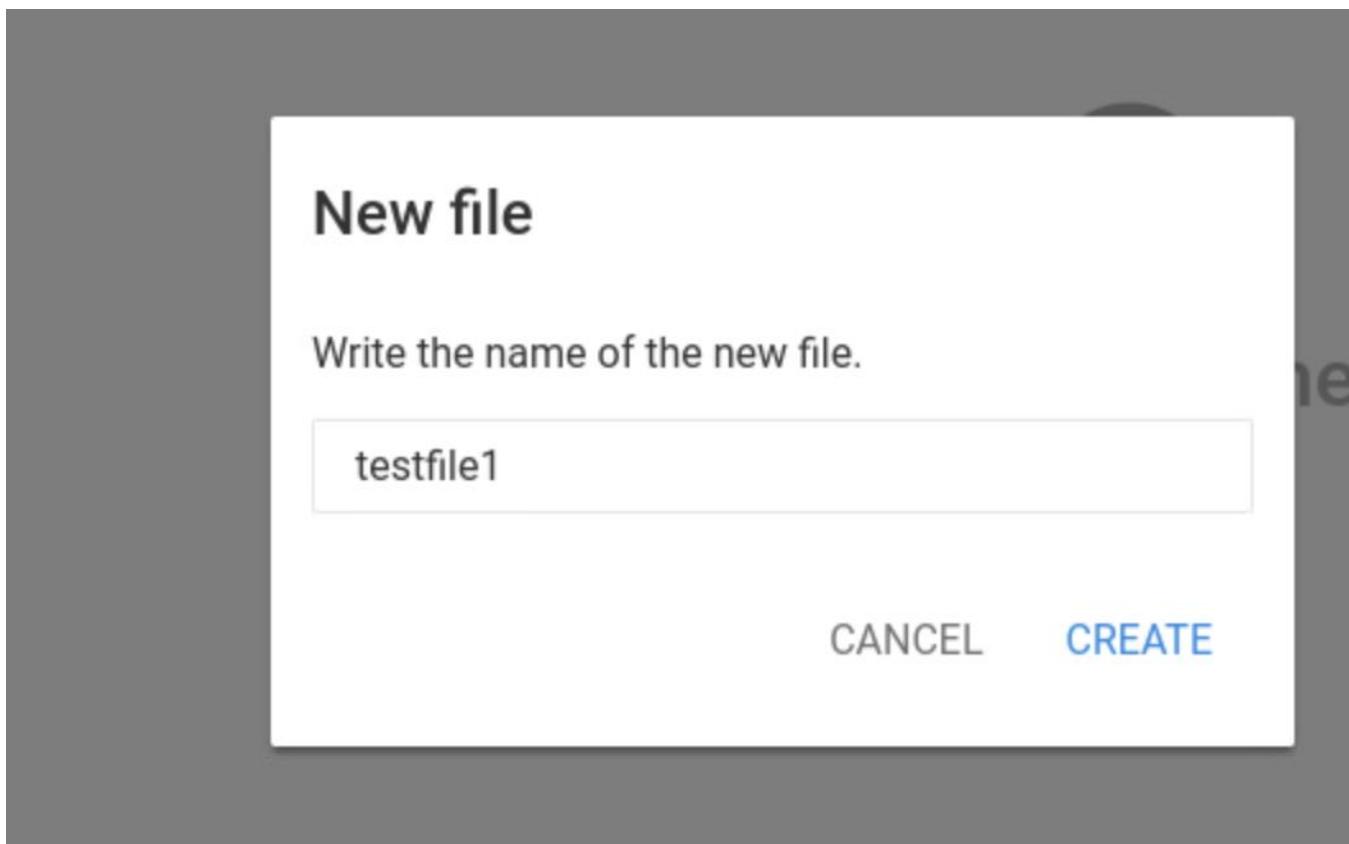
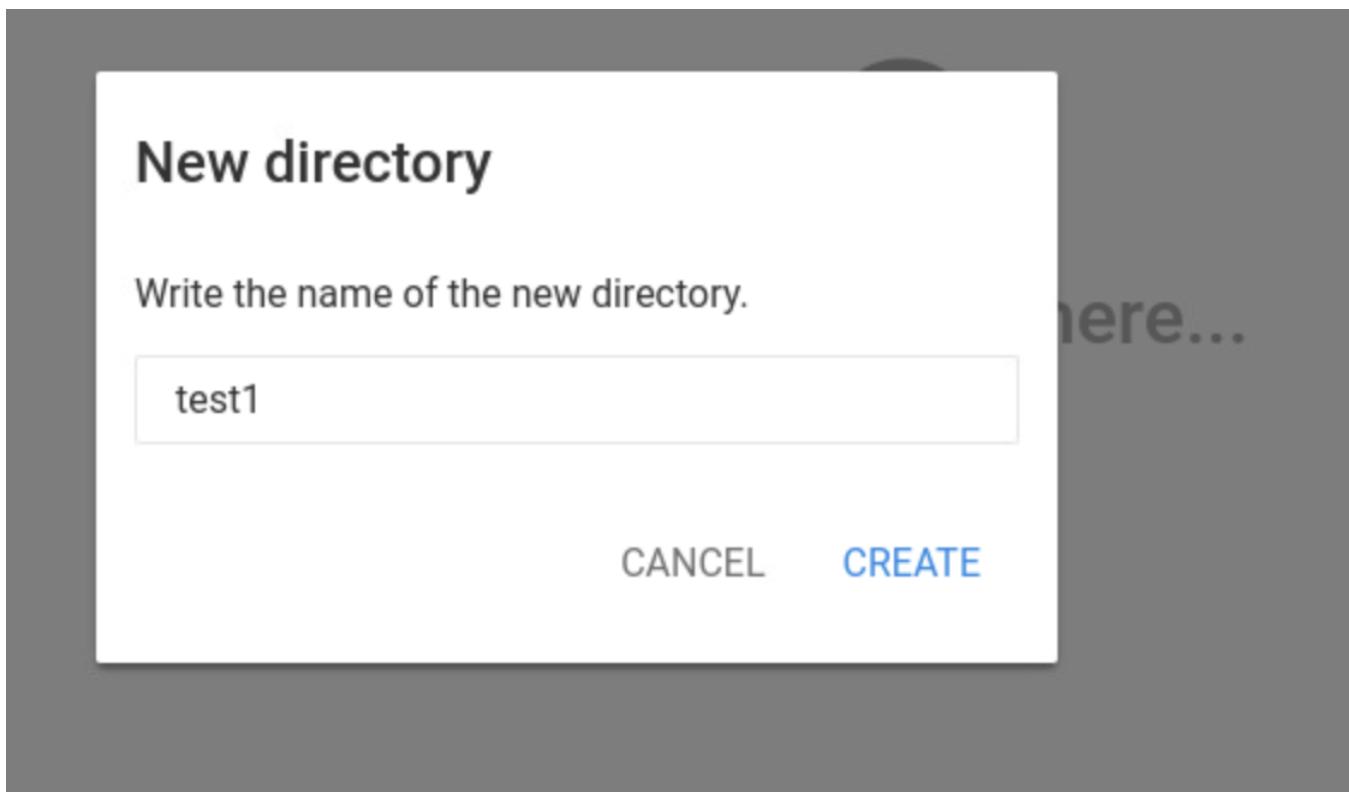
And create folders and files.

IBM TechXchange

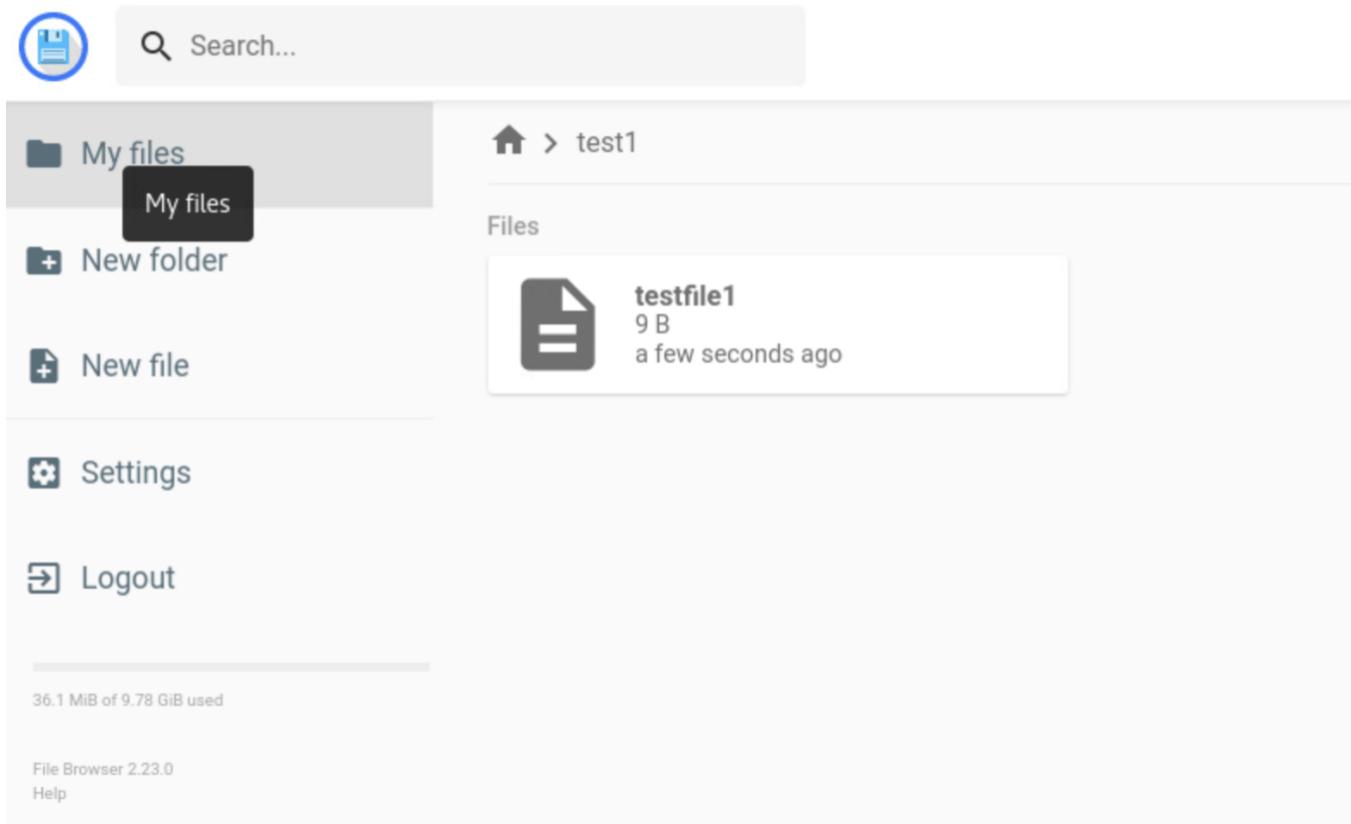


IBM TechXchange





IBM TechXchange



2.2 backup the application

Now run a backup on the application

Navigate to the Fusion GUI -- applications

IBM TechXchange

The screenshot shows the IBM Storage Fusion application window. The left sidebar has a dark theme with white text and includes links for Quick start, Events, Applications (which is selected), Backup & restore, Overview, Topology, Backed up applications, Policies, Locations, Jobs, Service protection, Data Foundation, Services, and Settings. The main content area is titled "Applications" and displays the message "Displaying local applications." It features a central icon of three nodes connected by lines forming a hexagon. Below this is a table with columns: Name, Used (GiB), Capacity (GiB), Backup status, Last backup on, Success rate, and Policies. Two items are listed: "ibm-backup-restore" and "lab1". Both have "No policy" under Backup status and "0/0" under Success rate.

Select “lab1”

This screenshot shows the same interface as above, but with "lab1" selected. A blue bar at the top of the table row indicates it is selected. The table now shows "1 item selected" and "Select all 6 items" buttons. The "Assign backup policy" button is highlighted in blue. The rest of the table structure and data remain the same as in the previous screenshot.

Assign backup policy

Leave “run backup now” checked.

IBM TechXchange

Applications

Displaying local applications.

Select applications to assign data protection capabilities.

1 item selected | Select all 6 items

Name	Used (GiB)	Capacity (GiB)
ibm-backup-restore	0.00	120
<input checked="" type="checkbox"/> lab1	0.00	10
open-cluster-management-addon-observability	0.00	0
open-cluster-management-agent	0.00	0
open-cluster-management-agent-addon	0.00	0
turbo	0.00	0

Items per page: 25 ▾ 1–6 of 6 items

Assign backup policy

Backup policies (1)

Policy	Location	Location type	Retention
monthly	s3backup	s3	30 Days

Frequency: Every 1 of the month

Time: 12:00 AM Eastern Standard Time

Run backup now

Cancel Assign

IBM TechXchange

Applications

Displaying local applications.

Select applications to assign data protection capabilities.



Backup policies

Regularly scheduled backups enable quick recovery from data loss.

[Assign policies](#)

Backup status: Filter... ▾

Q Search



<input type="checkbox"/>	Name	Used (GiB)	Capacity (GiB)	Backup status	Last backup on	Success rate	Policies	⋮
<input type="checkbox"/>	ibm-backup-restore	0.00	120	– No policy		0/0	0	⋮
<input type="checkbox"/>	lab1	0.04	10	– Not backed up		0/0	monthly	⋮

[Open cluster management](#)

Select “lab1”

Select backups

Applications / lab1

Actions... ▾

Overview Storage **Backups** Resources

Usage

Available backups 0 Used capacity 0 GiB

Backup policy [Assign](#) + monthly

Retention 30 Days

Used capacity 0 GiB

Time Policy Status Capacity Location

Sep 5, 2023, 4:58 PM monthly ⏱ Pending 0 GiB s3backup ⋮

Items per page: 25 ▾ 1–1 of 1 item 1 ▾ 1 of 1 page ⏪ ⏩

IBM TechXchange

The screenshot shows the IBM Storage Fusion interface. The top navigation bar includes links for Applications, Storage, Backups, and Resources, with the Backups tab currently selected. The main content area displays the details for the application 'lab1'. A prominent message at the top states 'Backup in progress' with the subtext '0 of 3... Snapshot in progress'. Below this, there's a summary section for 'Usage' showing 'Available backups: 0' and 'Used capacity: 0 GiB'. On the right, a table lists a single backup job entry:

Time	Policy	Status	Capacity	Location
Sep 5, 2023, 4:58 PM	monthly	Snapshot in progress	0 GiB	s3backup

Below the table, there are buttons for 'Assign +' and a dropdown menu labeled 'monthly'. Other settings shown include 'Retention: 30 Days' and 'Used capacity: 0 GiB'.

This screenshot shows the same IBM Storage Fusion interface for the application 'lab1'. The 'Backups' tab is still selected. The top message now reads 'Backup in progress' with the subtext '3 of 3... Transferring data'. The 'Usage' section remains the same. The table below shows the same backup job entry, but the status has changed to 'Transferring data'.

Time	Policy	Status	Capacity	Location
Sep 5, 2023, 4:58 PM	monthly	Transferring data	0 GiB	s3backup

The other settings like retention and used capacity are also present. The left sidebar shows various navigation options under the 'Backup & restore' category.

IBM TechXchange

The screenshot shows the IBM Storage Fusion interface. On the left, a sidebar menu includes 'Quick start', 'Events', 'Applications', 'Backup & restore', 'Overview', 'Topology', 'Backed up applications', 'Policies', 'Locations', 'Jobs', 'Service protection', and 'Data Foundation'. The 'Applications' section is currently selected. In the main area, the path 'Applications / lab1' is shown. The 'Backups' tab is selected. The usage summary shows 'Available backups' as 1 and 'Used capacity' as < 0.01 GiB. A table lists one backup entry: Time (Sep 5, 2023, 5:01 PM), Policy (monthly), Status (Completed), Capacity (< 0.01 GiB), and Location (s3backup). Below the table, it says 'Items per page: 25' and '1-1 of 1 item'. A 'Backup policy' section with 'Assign +' and 'monthly' is also visible.

Now the backup is complete.

Restore the application to a new Project:

Select “restore”

The screenshot shows the same IBM Storage Fusion interface as before, but with a context menu open over the first backup entry in the table. The menu items are 'Details' (which is highlighted with a blue box), 'Restore', and 'Delete backup'.

Restore to current cluster, new project

IBM TechXchange

X

Restore lab1

Restore the application to an earlier state using a previously taken backup. [Learn more](#)

Select a destination

Choose which cluster the application will be restored to.

Restore the application in the current cluster.

Choose a different cluster to restore the application in.

i **No Spoke clusters connected**

In order to choose a different cluster to restore the application to, connected Spoke clusters are required. [Learn More](#)

Project destination

Select the project that the application will be restored into. Restoring to an existing project will erase the contents of the project and replace it with the restored application.

- Use the same project the application is already using
- Existing project
- Create a new project

lab2

Summary

The following changes will be made:

Before restore

OpenShift Project lab1
PVCs 1

After restore

OpenShift Project lab2
PVCs 1

Restore point

Sep 5, 2023, 5:01 PM

Cancel

Back

Next

IBM TechXchange

Restore lab1

Restore the application to an earlier state using a previously taken backup. [Learn more](#)

Missing etcd resources

Restore any etcd resources that are not present in the existing OpenShift project.

Include missing etcd resources

PVCs

By default all PVCs in the backup will be restored. You can select individual PVCs to restore if you only need to restore certain volumes.

 **Info**

The restore will not overwrite existing PVCs. New PVCs will be created with an annotated name. Modify your application deployment to use the new PVCs.

Only restore a subset of selected PVCs

Summary

The following changes will be made:

Before restore

OpenShift Project lab1
PVCs 1

After restore

OpenShift Project lab2
PVCs 1

Restore point

Sep 5, 2023, 5:01 PM

[Cancel](#)

[Back](#)

[Restore](#)

Restore lab1

Confirm restore

This action will restore lab1-monthly-apps.ocp-50t6fjkgae-8a65.cloud.techzone.ibm.com-202309052058 to lab2.

[Cancel](#)

[Restore](#)

IBM TechXchange

Navigate back to applications:

<input type="checkbox"/>	Name	Used (GiB)	Capacity (GiB)	Backup status	Last backup on	Success rate	Policies	
<input type="checkbox"/>	ibm-backup-restore	0.00	120	— No policy		0/0	0	
<input type="checkbox"/>	lab1	0.04	10	Restoring	Sep 5, 2023, 5:01 PM	1/1	monthly	
<input type="checkbox"/>	lab2	0.00	0	— No policy		0/0	0	
<input type="checkbox"/>	open-cluster-management-addon-observability	0.00	0	— No policy		0/0	0	
<input type="checkbox"/>	open-cluster-management-agent	0.00	0	— No policy		0/0	0	
<input type="checkbox"/>	open-cluster-management-addon	0.00	0	— No policy		0/0	0	

Applications / lab1

Restore Actions... ▾

Restore in progress
2 of 3... Restore snapshot in progress [View job details](#)

Overview Storage Backups Resources

Storage A summary of PVC storage and storage classes utilized by this application.

Used Capacity Capacity by storage class

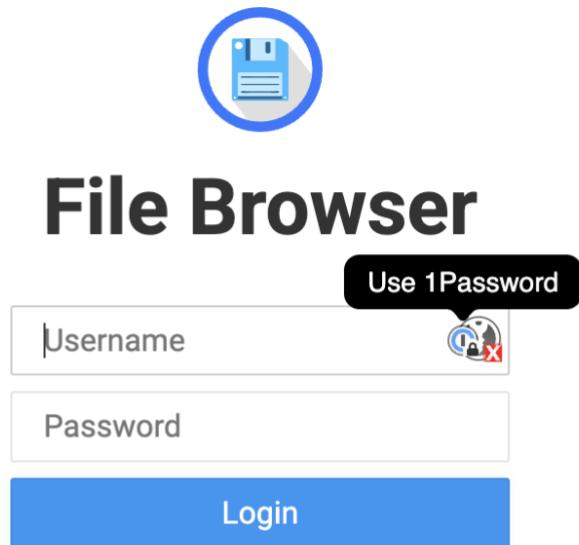
Events View all [Warning](#) Recent

<input type="checkbox"/>	Name	Used (GiB)	Capacity (GiB)	Backup status	Last backup on	Success rate	Policies	
<input type="checkbox"/>	ibm-backup-restore	0.00	120	— No policy		0/0	0	
<input type="checkbox"/>	lab1	0.04	10	Completed	Sep 5, 2023, 5:01 PM	1/1	monthly	
<input type="checkbox"/>	lab2	0.00	10	— No policy		0/0	0	
<input type="checkbox"/>	open-cluster-management-addon-observability	0.00	0	— No policy		0/0	0	
<input type="checkbox"/>	open-cluster-management-agent	0.00	0	— No policy		0/0	0	
<input type="checkbox"/>	open-cluster-management-addon	0.00	0	— No policy		0/0	0	

Test the restored application:

IBM TechXchange

The screenshot shows the Red Hat OpenShift on IBM Techzone developer dashboard. The left sidebar contains navigation links: Topology, Observe, Search, Builds, Helm, Project, ConfigMaps, and Secrets. The main area displays a message: "You are logged in as a temporary administrative user. Update the cluster OAuth configuration". Below this are dropdowns for "Project: lab2" and "Application: All applications". The search bar includes "Display options", "Filter by resource", and "Name" filters, along with a search input field and a refresh icon. A large circular icon with a red arrow and a blue border is centered in the main content area. Below it, a small card shows a "D" icon, the text "filebr...oyment", and a three-dot menu icon.



2.3 Backup Spoke

2.3.1 install backup agent

Note set default storage class if not set.

(Follow same instructions for setting default storage class in first cluster)

On cluster 2, go to the fusion gui:

IBM TechXchange

Services

Backup and Restore Agent

The screenshot shows the 'Services' section of the IBM TechXchange interface. On the left is a dark sidebar. The main area has a light gray header 'Services' and a sub-header 'Discover and manage available services.' Below this is a section titled 'Installed' containing a card for 'Data Foundation v4.12.7' which is marked as 'Healthy'. The main content area is titled 'Available' and contains four service cards:

- Backup & Restore** (IBM • Data protection): Provides application-centric backups, using local snapshots for quick recovery and external object storage protection. Enhanced offering with stability and scalability improvements.
- Backup & Restore (Legacy)** (IBM • Backup): Protect your data with application-centric backups. Use local snapshots for quick recovery, or transfer backups to external object storage for safe keeping.
- Backup & Restore Agent** (IBM • Data protection): Provides application-centric backups, using local snapshots for quick recovery. Enhanced offering with stability and scalability improvements.
- Data Cat** (IBM • Met): Provides discovery, capture, enrichment, and analysis of data across various sources.

IBM TechXchange

The screenshot shows the IBM TechXchange interface. On the left, there's a sidebar with navigation links: Server, Discover, Instant, Available, Backup, IBM + Data, Provide, and backup for quick. The main content area has a purple hexagonal icon and the title "Backup & Restore Agent". To the right of the icon is the title "Backup & Restore Agent". Below it are sections for "Vendor IBM", "Category Data protection", and "Last updated Aug 20, 2023, 4:05 PM". There's also a blue "Install" button. On the far left, there's a vertical sidebar with the same navigation links as the main sidebar.

Get the HUB “snippet”

On Hub Cluster, Fusion GUI, Topology

The screenshot shows the IBM Storage Fusion Fusion GUI. The left sidebar has navigation links: Quick start, Events, Applications, Backup & restore (with Overview, Topology, Backed up applications, Policies, Locations, Jobs, Service protection, Data Foundation, and Services), and Services. The main content area is titled "Topology" and displays a table of clusters. The table has columns: Name, Type, Connection status, Service status, Version, Backed up apps, and Success rate. One row is shown: "apps.ocp-50t6fjkgae-8a65.cloud.techzone.ibm.com" (Type: Hub, Connection status: -, Service status: Healthy, Version: 2.6.1, Backed up apps: 1/2, Success rate: 100.0 %). At the bottom, there are pagination controls: Items per page: 25, 1–1 of 1 item, 1, 1 of 1 page, and navigation arrows.

Connect Cluster

IBM TechXchange

The screenshot shows a table header with columns: Name, Type, Connection status, Service status, and Version. A row is selected with the name "apps.ocp8a65.cloud". A modal dialog is open over the table, titled "Connection method". The dialog contains instructions: "Create connections to the clusters that you will provide backup services for. If you are only backing up applications in this cluster, you can skip this step." Below this, there are two options: "Use Fusion UI" (selected) and "Automate deployment".

Name	Type	Connection status	Service status	Version
apps.ocp8a65.cloud	Connect cluster			X

Items per page

Connection method

Create connections to the clusters that you will provide backup services for. If you are only backing up applications in this cluster, you can skip this step.

Use Fusion UI

If the spoke clusters have IBM Storage Fusion installed, you can generate a Code Snippet that can be used while installing the Backup & Restore Spoke service.

→

Automate deployment

Generate a YAML or oc command that can be used to deploy Backup & Restore Spokes into many clusters using automation.

→

Copy snippet

IBM TechXchange

The screenshot shows a modal window titled "Use the Fusion UI". The content explains how to connect a cluster by providing a "Connection Snippet" during the Backup & Restore service installation. It includes a code snippet and a note about its validity. At the bottom, there are "Back" and "Copy snippet" buttons.

Connect cluster ×

Use the Fusion UI

Go to the cluster that you want to provide backup services for and install the Backup & Restore Spoke service. You will be asked to provide the Connection Snippet, which you can copy from below

During the install of the Backup & Restore service from the Fusion UI, you will be asked to provide the Connection Snippet to establish a secure connection between the spoke and this hub. Copy the Connection Snippet below and paste it into the install form.

Copy Connection Snippet below and paste it into the Spoke cluster.

Connection Snippet

```
{  
  "bootstrapToken": "ZX1KaGJHY2lPaUpTVXpJMU5pSXNJbXRwWkNjNklsbH1NQzF6T0hFM0  
  "apiServer": "aHR0cHM6Ly9hcGkub2NwLTUwdDZmamtnYWUt0GE2NS5jbG91ZC50ZWNoem9  
  "clusterName": "apps.ocp-50t6fjkgae-8a65.cloud.techzone.ibm.com",  
  "hubNs": "ibm-spectrum-fusion-ns"  
}
```

i The token in the Code Snippet is valid for 1 hour.

Back Copy snippet □

IBM TechXchange

Connect cluster X

Use the Fusion UI

Go to the cluster that you want to provide backup services for and install the Backup & Restore Spoke service. You will be asked to provide the Connection Snippet, which you can copy from below

During the install of the Backup & Restore service from the Fusion UI, you will be asked to provide the Connection Snippet to establish a secure connection between the spoke and this hub. Copy the Connection Snippet below and paste it into the install form.

Copy Connection Snippet below and paste it into the Spoke cluster.

Connection Snippet

```
{  
  "bootstrapToken": "ZX1KaGJHY2lPaUpTVXpJMU5pSXNJbXRwWkNjNklsbH1NQzF6T0hFM0  
  "apiServer": "aHR0cHM6Ly9hcGkub2NwLTUwdDZmamtnYWUt0GE2NS5jbG91ZC50ZWNoem9  
  "clusterName": "apps.ocp-50t6fjkgae-8a65.cloud.techzone.ibm.com",  
  "hubNs": "ibm-spectrum-fusion-ns"  
}
```

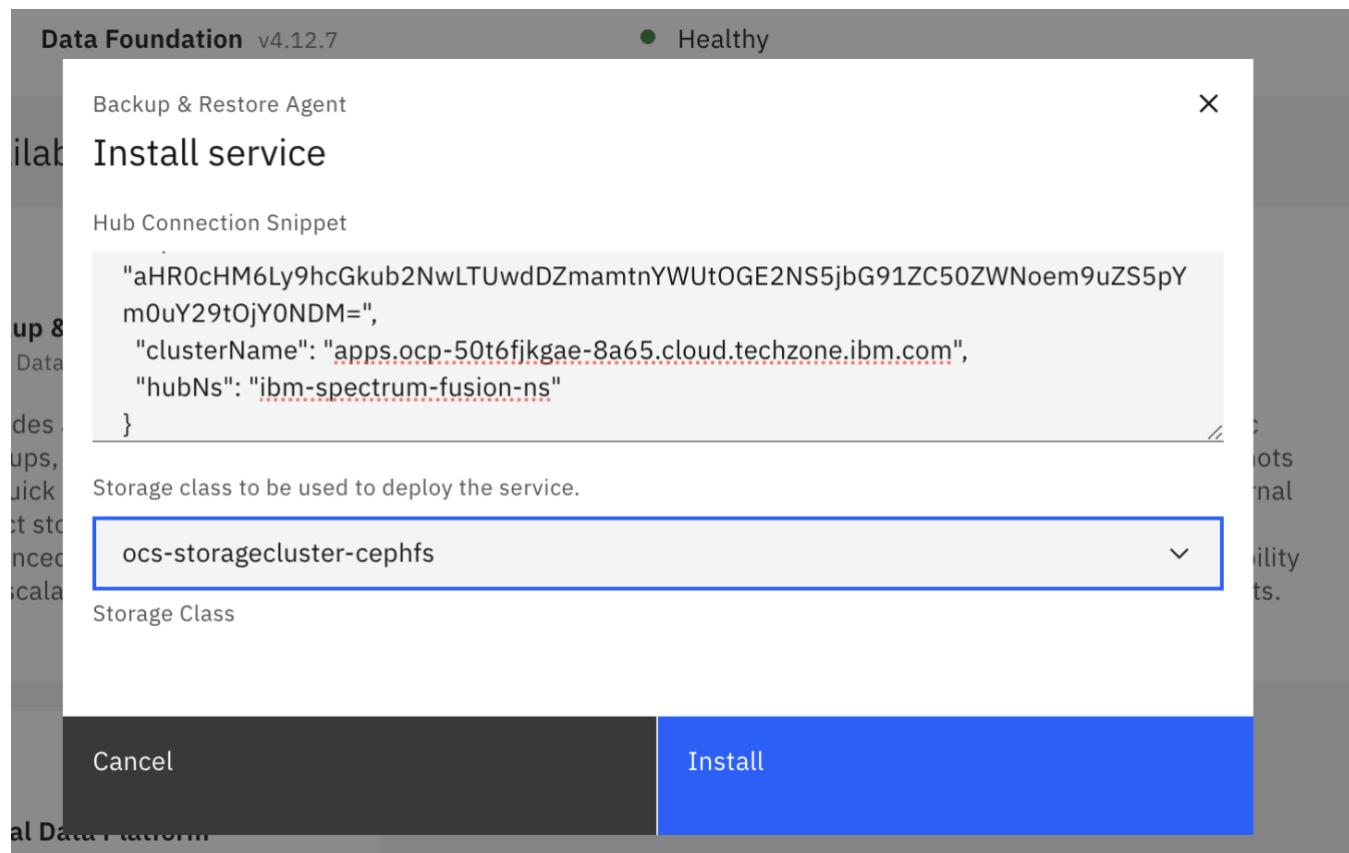
i The token in the Code Snippet is valid for 1 hour.

Back Copied! □

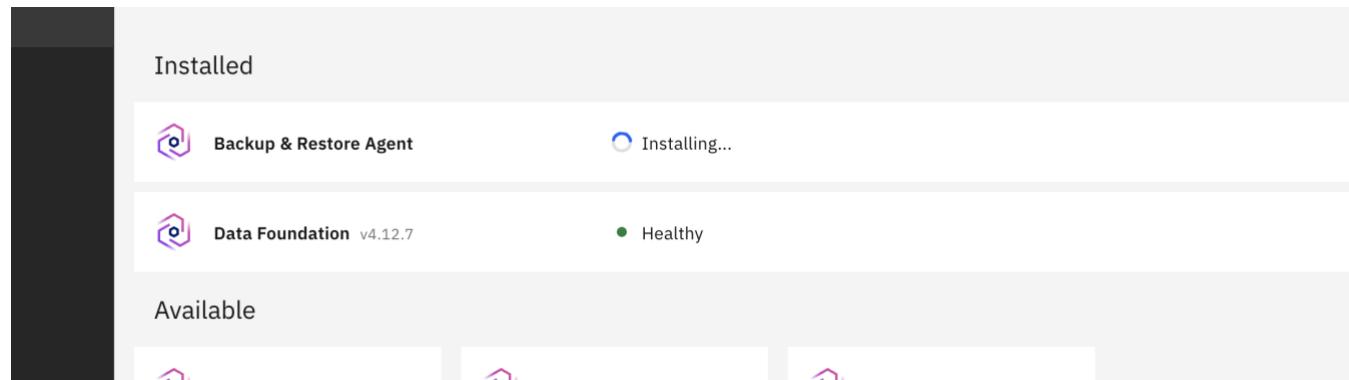
Now Paste in spoke cluster setup

And select storage class “cephfs”

IBM TechXchange



Agent will install



IBM TechXchange

The screenshot shows the 'Services' section of the IBM TechXchange interface. It has three main sections: 'Installed', 'Available', and 'Pending'. In the 'Installed' section, there are two entries: 'Backup & Restore Agent' (v2.6.1) which is 'Installing... (50%)', and 'Data Foundation' (v4.12.7) which is 'Healthy'. A progress bar at the bottom indicates the overall status.

The screenshot shows the 'Services' section after the installation. A green notification box appears in the top right corner stating 'Install complete! Backup & Restore Agent service was installed successfully.' The 'Backup & Restore Agent' entry now shows 'v2.6.1' and 'Healthy' status.

Navigate back to the hub cluster, fusion GUI

View the new Topology

The screenshot shows the 'Topology' section of the IBM TechXchange interface. The left sidebar has a 'Topology' section selected. The main area displays a table of clusters. There are two rows in the table:

Name	Type	Connection status	Service status	Version	Backed up apps	Success rate
apps.ocp-50t6fjkgae-8a65.cloud.techzone.ibm.com	Hub	-	Healthy	2.6.1	1/2	100.0 %
apps.ocp-50t6fjkgae-lub.cloud.techzone.ibm.com	Spoke	Connected	Healthy	2.6.1	0/6	-

At the bottom, there are pagination controls for 'Items per page: 25' and '1-2 of 2 items'.

IBM TechXchange

Select “backed up applications”

The screenshot shows the IBM Cloud Backup & restore interface. The left sidebar has a dark theme with various navigation options: Quick start, Events, Applications, Backup & restore (expanded), Overview, Topology, Backed up applications (selected and highlighted in blue), Policies, Locations, Jobs, Service protection, Data Foundation, Services, and Settings. The main area is titled "Backed up applications" and "Backup status". It displays a summary: "All clusters (2)" with a green circle icon containing "1 Apps" and "100%". To the right is a legend: Completed (green), In progress (blue), Cancelled (grey), and Failed (red). Below this is a table titled "1 item selected" showing one backup entry:

Name	Cluster	Backup status	Last backup on	Success rate	Policies	Backup capacity (GiB)
<input checked="" type="checkbox"/> lab1	apps.ocp-50t6fjkgae-8a65.cloud.techzone.ibm.com	Completed	Sep 5, 2023, 5:01 PM	1/1	monthly	< 0.01

At the bottom of the table, there are dropdowns for "Items per page: 25" and "1–1 of 1 item". To the right of the table is a toolbar with buttons: "Backup now" (disabled), "Manage policies", and a "Restore" button with a "Restore" sub-menu open. The "Restore" menu includes "View details", "Backup now", "Manage policies", and "Restore" (selected).

Select “restore”

Choose different cluster

IBM TechXchange

The screenshot shows the 'Restore lab1' page in the IBM TechXchange interface. It includes sections for 'Select a destination', 'Restore destination', and a 'Summary' table comparing 'Before restore' and 'After restore' states.

Select a destination
Choose which cluster the application will be restored to.

Restore the application in the current cluster.

Choose a different cluster to restore the application in.

Restore destination
Only backups kept in object storage can be restored to a different cluster.

Name	Connection status	Service status
apps.ocp-50t6fjkgae-luib.cloud.techzone.ibm.com	Connected	Healthy

Items per page: 25 ▾ 1–1 of 1 item

Summary
The following changes will be made:

Before restore	After restore
Cluster apps.ocp-50t6fjkgae-8a65.cloud.techzone.ibm.com	Cluster apps.ocp-50t6fjkgae-luib.cloud.techzone.ibm.com
Type Hub	Type Spoke
OpenShift Project lab1	OpenShift Project lab1
PVCs –	PVCs –

Restore point
–

Cancel Back Next

Select a Backup

IBM TechXchange

Restore lab1

Restore the application to an earlier state using a previously taken backup. [Learn more](#)

Select a backup

Backup time	Location	Policy	Status	Size	PVs
Sep 5, 2023, 5:01 PM	s3backup	monthly	Completed	< 0.01 GiB	1

Items per page: 10 ▾ 1–1 of 1 item 1 ▾ 1 of 1 page ▲ ▶

Summary

The following changes will be made:

Before restore

Cluster	apps.ocp-50t6fjkgae-8a65.cloud.techzone.ibm.com
Type	Hub
OpenShift Project	lab1
PVCs	1

After restore

Cluster	apps.ocp-50t6fjkgae-luib.cloud.techzone.ibm.com
Type	Spoke
OpenShift Project	lab1
PVCs	1

Restore point
Sep 5, 2023, 5:01 PM

[Cancel](#) [Back](#) [Next](#)

Restore

IBM TechXchange

X

Restore lab1

Restore the application to an earlier state using a previously taken backup. [Learn more](#)

Missing etcd resources

Restore any etcd resources that are not present in the existing OpenShift project.

Include missing etcd resources

PVCs

By default all PVCs in the backup will be restored. You can select individual PVCs to restore if you only need to restore certain volumes.



The restore will not overwrite existing PVCs. New PVCs will be created with an annotated name. Modify your application deployment to use the new PVCs.

Only restore a subset of selected PVCs

Summary

The following changes will be made:

Before restore

Cluster	apps.ocp-50t6fjkgae-8a65.cloud.techzone.ibm.com
Type	Hub
OpenShift Project	lab1
PVCs	1

After restore

Cluster	apps.ocp-50t6fjkgae-luib.cloud.techzone.ibm.com
Type	Spoke
OpenShift Project	lab1
PVCs	1

Restore point

Sep 5, 2023, 5:01 PM

[Cancel](#)

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[Restore](#)

Confirm

Restore X

Confirm restore

This action will restore lab1-monthly-apps.ocp-50t6fjkgae-8a65.cloud.techzone.ibm.com-202309052058 to .

	Success rate	Policies
Cancel	1/1	monthly
Restore		

1–1 of 1 item

[Go back to the Spoke Cluster – Fusion GUI , Applications](#)

IBM TechXchange

The screenshot shows the 'Applications' section of the IBM TechXchange interface. It displays a list of local applications with columns for Name, Used (GiB), and Capacity (GiB). The applications listed are: ibm-backup-restore, lab1, open-cluster-management-addon-observability, and open-cluster-management-agent. All applications have 0.00 GiB used and 0 GiB capacity.

Name	Used (GiB)	Capacity (GiB)
ibm-backup-restore	0.00	10
lab1	0.00	0
open-cluster-management-addon-observability	0.00	0
open-cluster-management-agent	0.00	0

Backup spoke cluster

Log in to spoke cluster at command line

Get log in string from GUI:

The screenshot shows the OpenShift web console. The user is logged in as 'kube:admin'. A context menu is open for this user, with the option 'Copy login command' highlighted. Other options in the menu include 'User Preferences' and 'Log out'. A large blue 'Create Pod' button is visible at the bottom of the menu.

IBM TechXchange

 cloud  Outlook  ibm sales  tools

Display Token

```
oc login --token=sha256~VV2WDsFUqMrVTz9inQ2XGhexP9akiHed9vyNU4yJcjM --server=https://api.ocp-  
50t6fjkgae-luib.cloud.techzone.ibm.com:6443
```

oc new-project spoke1

oc get pods

cd lab1415

oc apply -f app.yaml

oc get pods

Backup application on Spoke

Go to fusion GUI on HUB

Select “Topology”

IBM TechXchange

The screenshot shows the IBM Storage Fusion interface with the 'Topology' page selected. The left sidebar includes options like 'Quick start', 'Events', 'Applications', 'Backup & restore' (with 'Overview', 'Topology', 'Backed up applications', 'Policies', 'Locations', 'Jobs', 'Service protection', and 'Data Foundation'), and a search bar. The main content area displays a table of clusters with columns: Name, Type, Connection status, Service status, Version, Backed up apps, and Success rate. Two entries are listed: a Hub cluster (apps.ocp-50t6fjkgae-8a65.cloud.techzone.ibm.com) and a Spoke cluster (apps.ocp-50t6fjkgae-luib.cloud.techzone.ibm.com). Both are healthy and version 2.6.1. The interface also includes a search bar, a 'Connect cluster' button, and pagination controls.

Select the spoke → View backed up apps.

This screenshot is similar to the previous one but highlights the 'View backed up apps' button in the bottom right corner of the table's footer. A callout box points to this button, which is highlighted with a blue border. The rest of the interface and data are identical to the first screenshot.

Select “protect apps”

The screenshot shows the 'Protect apps' page. At the top, there is a search bar and a 'Protect apps' button. Below it is a summary section with a large circle indicating '0 Apps'. Further down is a table with columns: Cluster, Backup status, Last backup on, Success rate, Policies, and Backup capacity (GiB). The table has a header row and several data rows. The 'Cluster' column shows a dropdown menu with '1' selected. The 'Backup status' column has a 'Filter...' dropdown. The 'Last backup on' column has an upward arrow. The 'Success rate' column has a downward arrow. The 'Policies' column has a downward arrow. The 'Backup capacity (GiB)' column has a downward arrow. The table also includes a checkbox header and a '+' button at the bottom right.

IBM TechXchange

Select the spoke cluster
And select the new application you just created

Protect applications

The screenshot shows a user interface for selecting applications to protect. On the left, a sidebar has two items: 'Select applications' (selected) and 'Assign policies'. The main area is titled 'Select applications' with the sub-instruction 'Select the applications that you want to protect.' Below this is a 'Cluster' dropdown set to 'apps.ocp-50t6fjkgae-luib.clou...' showing '(9/9) unprotected apps'. A blue header bar indicates '1 item selected | Select all 8 items' and has a 'Cancel' button. The list of applications is grouped by name. Under 'Name', there are checkboxes for: ibm-backup-restore, lab1, lab2, open-cluster-management-addon-observability, open-cluster-management-agent, open-cluster-management-agent-addon, spoke1 (which is checked), and turbo. At the bottom, there are buttons for 'Cancel', 'Back', and a large blue 'Next' button.

Protect applications

Select applications

Assign policies

Assign policies

Select the backup policies you would like to assign.

1 item selected							
	Name	Location	Type	Frequency	Time	Retention	Backup now
<input checked="" type="checkbox"/>	monthly	s3backup	 s3	Every 1 of the month	12:00 AM Eastern Standard Time	30 Days	<input checked="" type="checkbox"/>
Items per page:	25	1–1 of 1 item					
						1	1 of 1 page

[Cancel](#) [Back](#) [Assign](#)

Watch backup

IBM TechXchange

The screenshot shows the IBM Cloud Backup interface for an application named "spoke1". At the top, there's a banner indicating a "Backup in progress" with "0 of 3... Snapshot in progress". Below this, there's a summary section for "Usage" showing "Available backups: 0" and "Used capacity: 0 GiB". On the right, there's a search bar and some filter options. A main table lists backup details: "Time" (Sep 5, 2023, 6:01 PM), "Policy" (monthly), "Status" (Snapshot in progress), "Capacity" (0 GiB), and "Location" (s3backup). Below the table, there are buttons for "Backup policy" (set to monthly) and "Assign +". At the bottom, there are pagination controls for "Items per page: 25" and "1–1 of 1 item".

After the application is restored, open the route to the application and verify the app.