Accelerate with IBM Storage:

Spectrum Discover v2.0.2 Update

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Session Objectives

Spectrum Discover v2.0.2 Update

- **Spectrum Protect Data Source**
- Single Helm Chart Deployment
- Collection Admin
- Application Catalog
- Spectrum Scale Live Events

Spectrum Protect Data Source

What is supported?

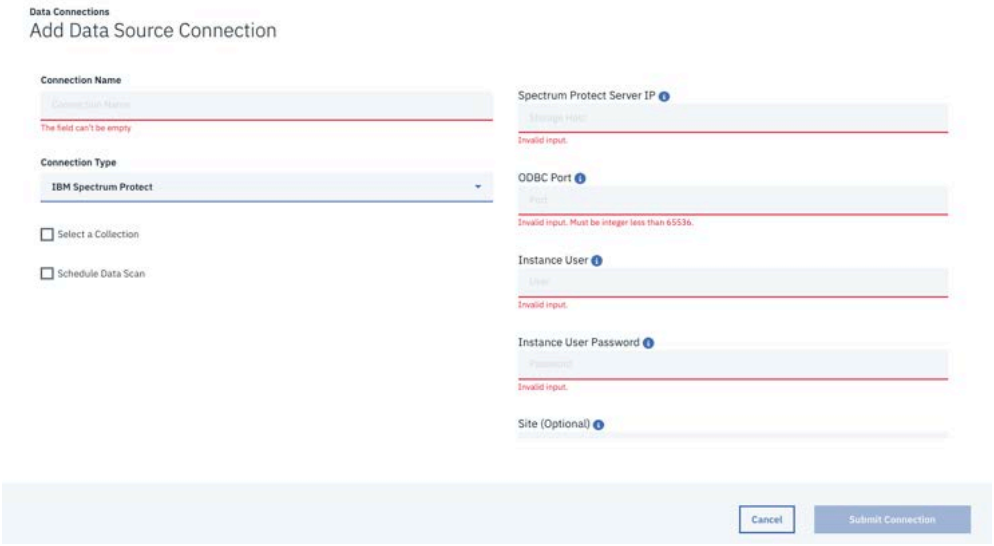
- Spectrum Protect versions 8.X and newer
- Backup/archive client data
- All Spectrum Protect server platforms (e.g. Windows, Linux, AIX, etc)
- Tagging, policies*, collections, searching, reporting

What is not supported?

- Versions 7.X and older**
  - **Test coverage limitation. Can be considered on a case-by-case basis
- Protect-VE (virtual environments)
- Spectrum Protect Plus
- *Content search of backup/archive data

Create a Spectrum Protect Connection

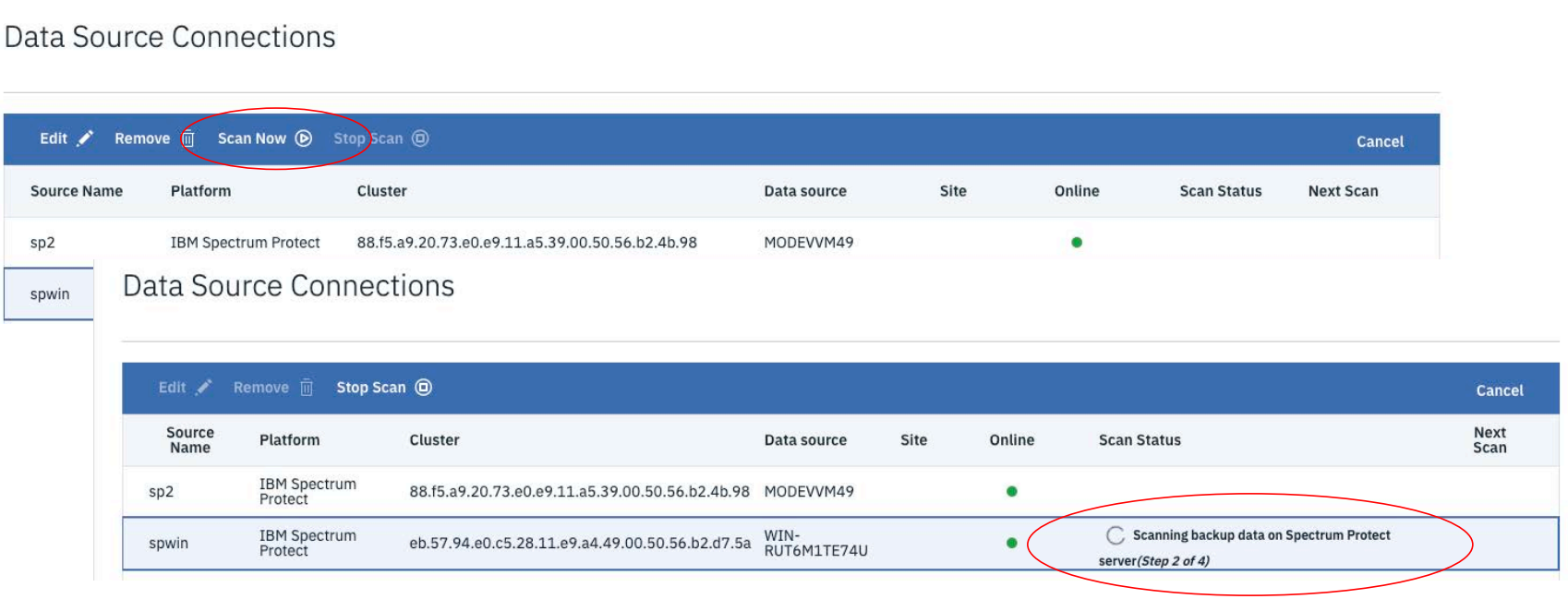
- New connection type ‘IBM Spectrum Protect’
- Required inputs:
  - Connection name
  - Server name/IP
  - ODBC Port (51500 by default)
  - Database instance user (e.g. tsminst1)
  - Database instance user password
- Spectrum Discover uses an ODBC connection to pull information from the DB2 database used by Spectrum Protect



Source Name	Platform	Cluster	Data source	Site	Online	Scan Status
sp2	IBM Spectrum Protect	88.f5.a9.20.73.e0.e9.11.a5.39.00.50.56.b2.4b.98	MODEVVM49		●	

Info harvested from Protect Server

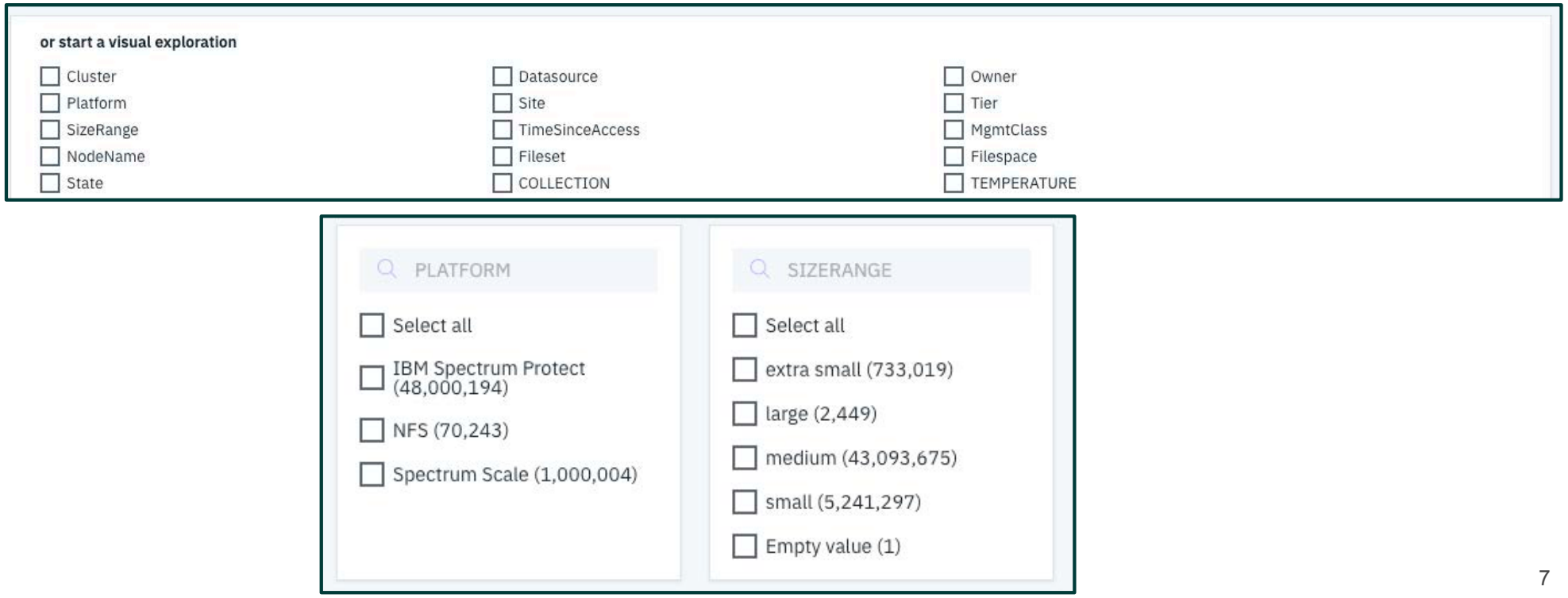
Scan Spectrum Protect Connection



- Protect scans are done in four phases
  - Preparing to scan connection
  - Scanning backup data on Spectrum Protect server
  - Scanning archive data on Spectrum Protect server
  - Indexing new scan data

Searching

- Search experience is largely the same for Spectrum Protect.
- Search results can include both primary and Protect data

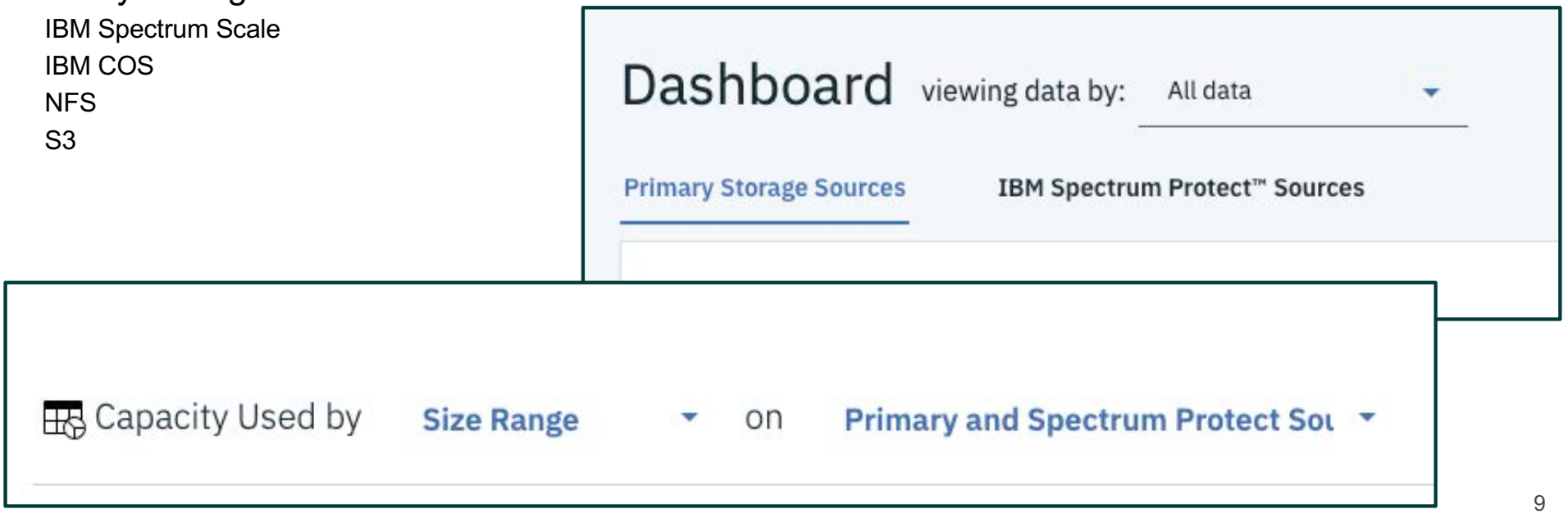


New Spectrum Protect Facets

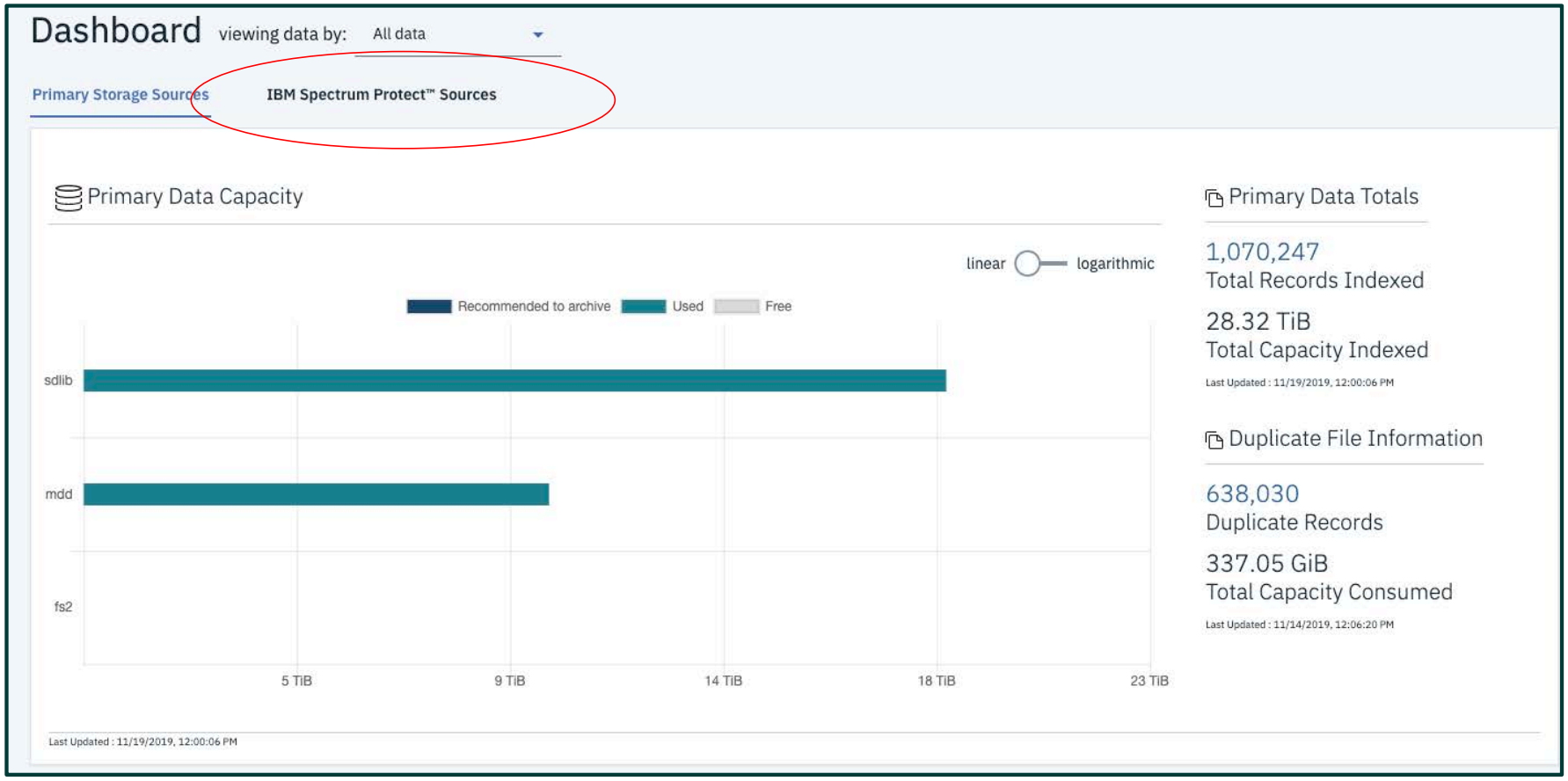
Facet	Description
MgmtClass	Management Class (how many copies to keep, for how long, etc)
NodeName	Name of the client node
FileSpace	File space name for a client node
State	Backup state (e.g. ACTIVE/INACTIVE), Archive

New Dashboard Look

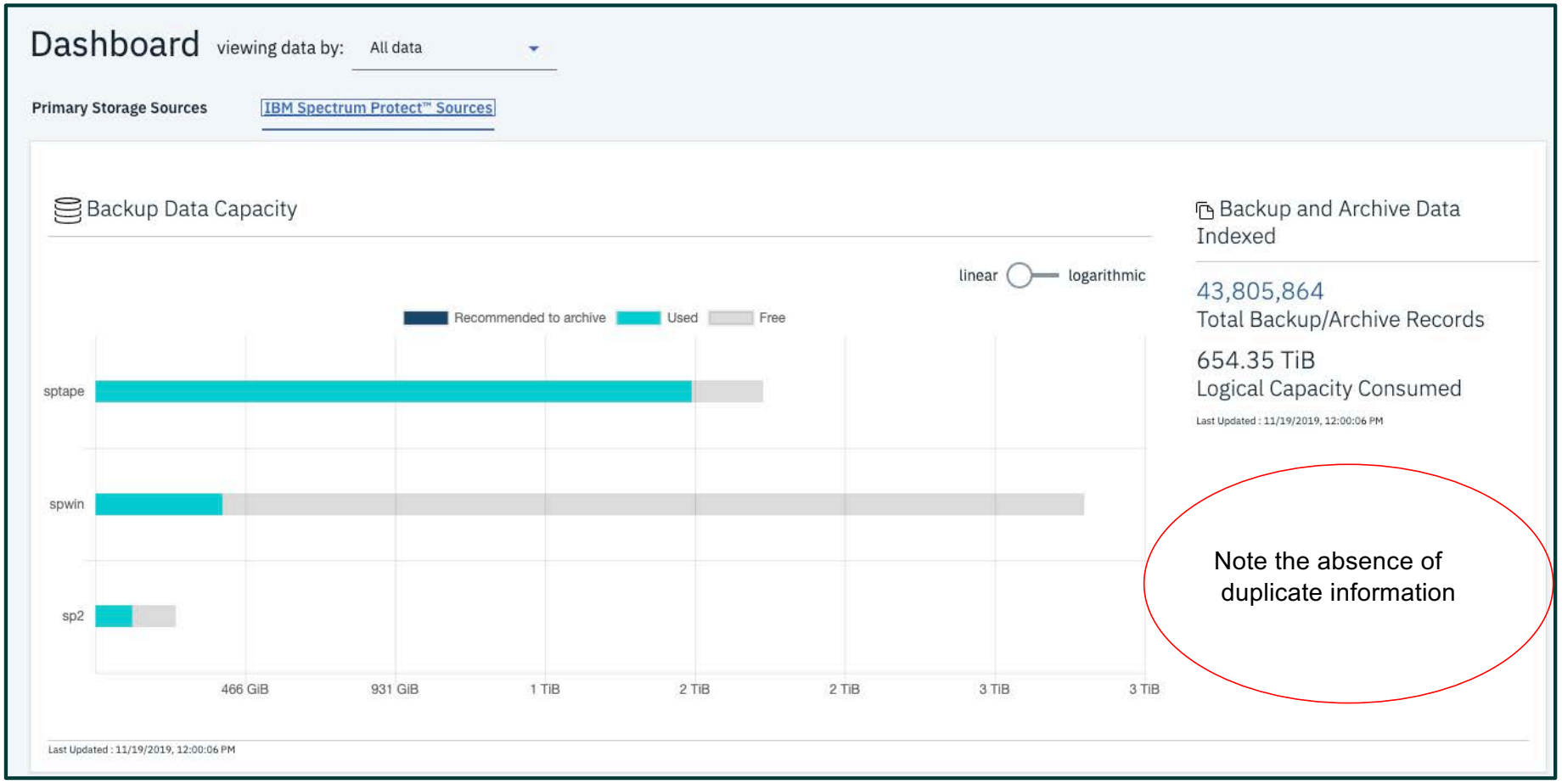
- Spectrum Protect data sources are broken out separately in the visualizations to better organize the experience
- We now have two groupings, Primary Storage Sources and IBM Spectrum Protect Sources
- Primary Storage Sources includes
  - IBM Spectrum Scale
  - IBM COS
  - NFS
  - S3



New Dashboard Look - 1

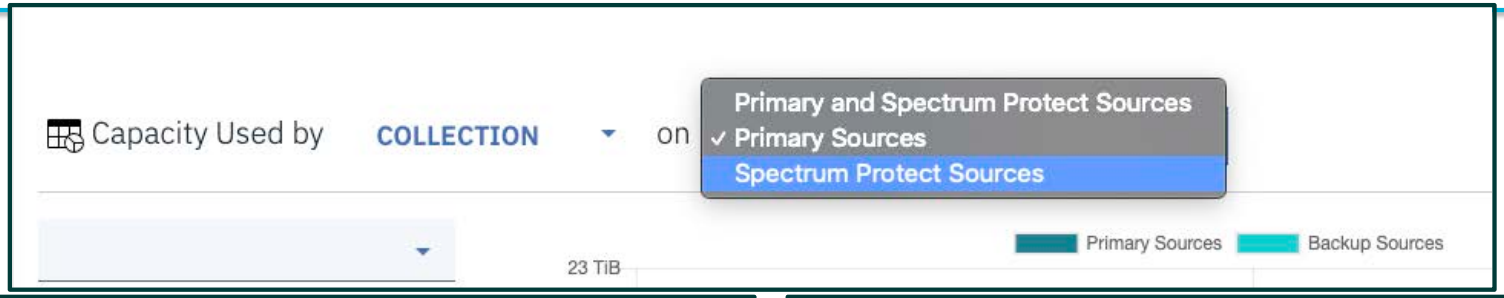


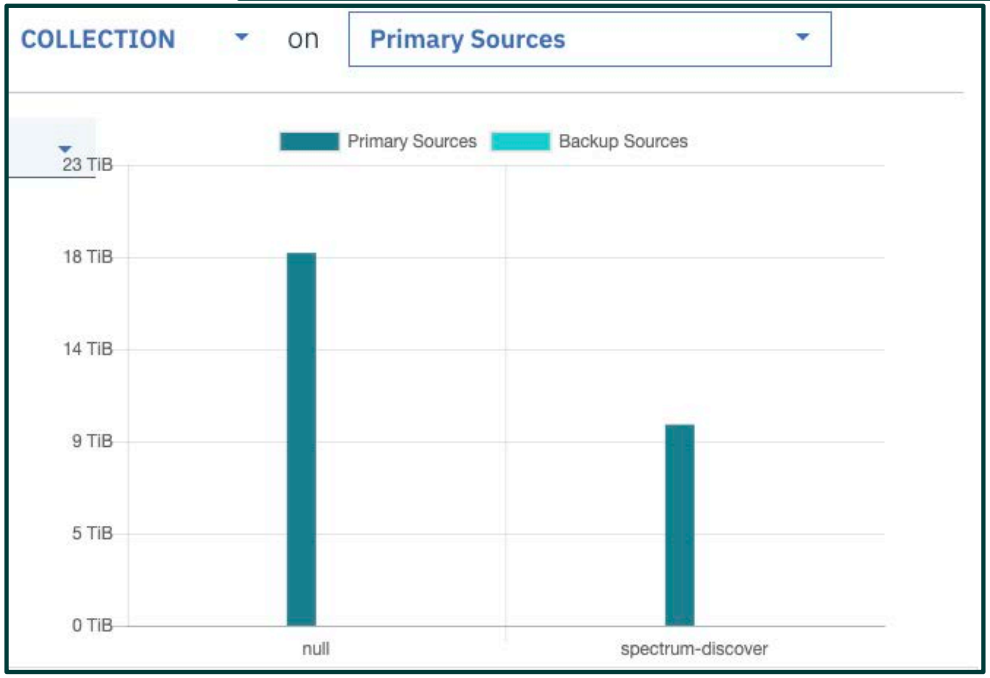
New Dashboard Look - 2

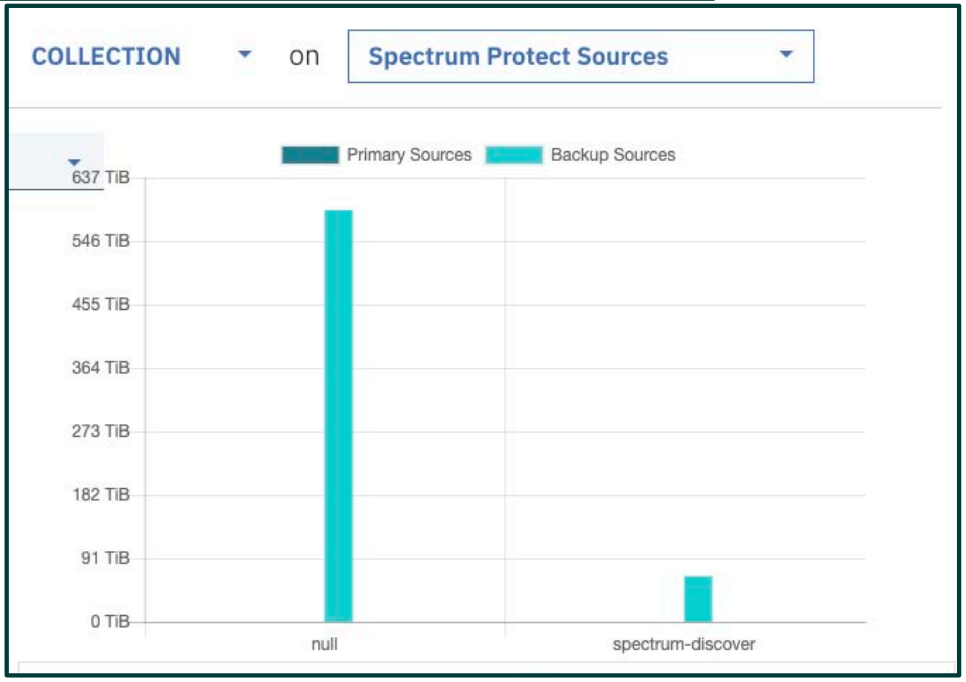


New Dashboard Look - 3

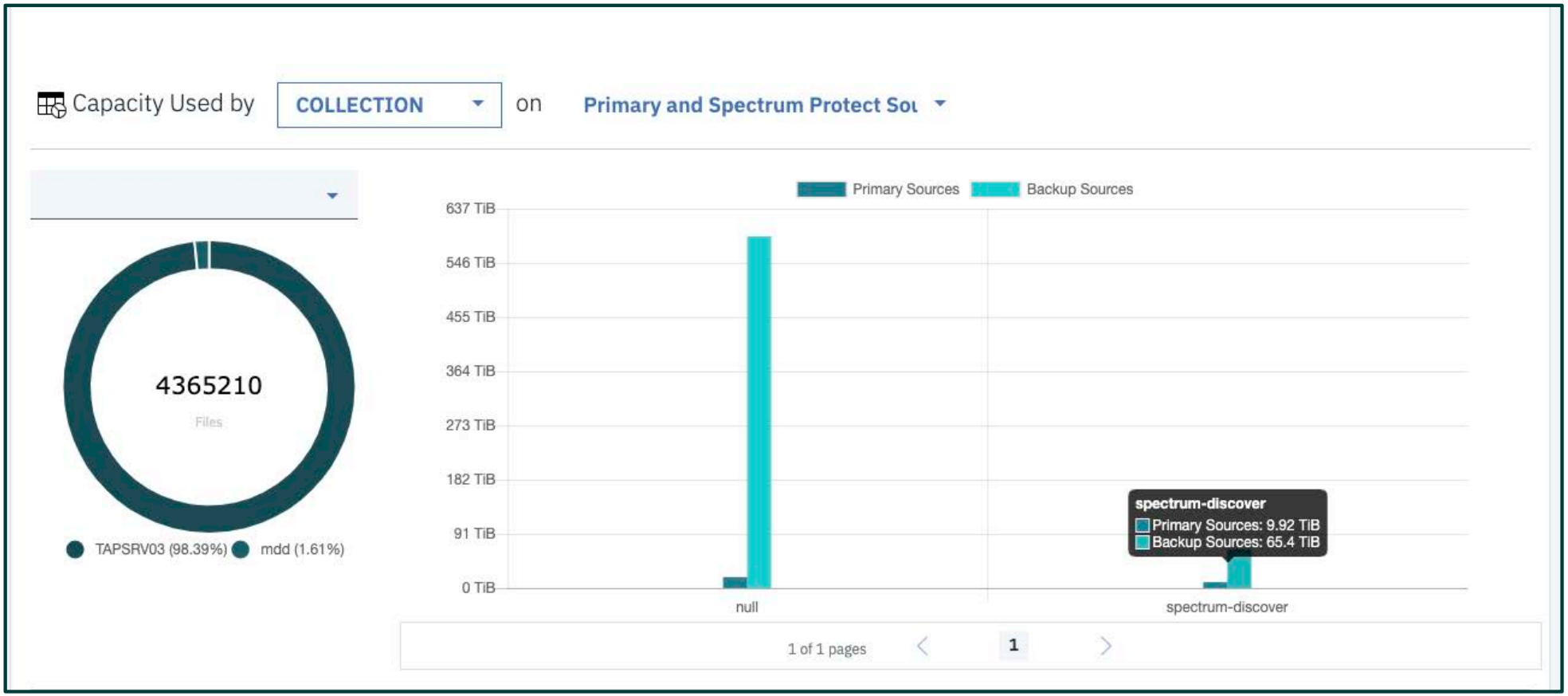
New Dashboard Look - 4







New Dashboard Look - 5



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Single Helm Chart Deployment

Changes

- Single namespace
- Same component naming convention across applications
- All pods have new labels for simpler lookups
- All containers and helm chart re-built at time of OVA build

Previously

1. Separate namespace per application
2. RBAC permissions to access components in other namespaces
3. Service calls using FQDN - <service>.
   - <namespace>.svc.cluster.local
4. Two-step process to access pod logs:
   - kubectl get pods -n policyengine
   - kubectl logs <pod-name> -n policyengine
5. Not always clear which changes were in a build as the changelog may have commits that have not yet been re-built to Artifactory

Now in v2.0.2

1. Single namespace for all of Spectrum Discover
   - spectrum-discover
2. Fewer permissions required
   - Everything is within a single namespace
3. Service calls using just service names
   - <service>
4. Single call to access pod logs
5. All applications re-built at time of OVA build
   - Same time the change log is compiled

Single Helm Chart Deployment Continued…

Additional Benefits

- Simpler Deployment
  - Single Helm install call
- Fewer Kubernetes components
- Simpler RBAC

LISTING ALL SPECTRUM DISCOVER PODS

✓ kubectl get pods -n spectrum-discover

GETTING CONNECTION MANAGEMENT LOGS

✓ kubectl logs -l app=spectrum-discover-connmgr -n spectrum-discover

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Collection Admin

What is a collection?

- A name for a group of records in Spectrum Discover
  - Collection name
- Spectrum Discover can limit a user's visibility to one or more collections
  - Example: Users in one department, only manage the metadata records from their department
- Achieved by Tagging Spectrum Discover records with a collection name
  - Uses special COLLECTION tag
  - Users are assigned roles on collections

Collection Admin Role

- Admin role
  - Manages all users and groups
- Data Admin role
  - Manages all data, collections and user and group access to collections
- Collection Admin
  - Manages data within a list of collections and user and group access to those collections
  - A role between Data Admin and Data User
- Data User
  - Manages data within a set of collections

➢ **Spectrum Discover Supports 2 Role Types:**

- Domain level
  - A role is assigned to the user within the domain
    - Collections do not apply
    - DataAdmin and Admin roles are assigned at this level
- Collection level
  - A role is assigned to a user/group on a collection
    - Role assignment comprises of 3 parts
      - user-id/role-id/collection-id
    - Data User roles and Collection Admin roles are assigned this way

➢ If a user is assigned multiple roles
  ✓ Role with the highest privilege applies

Overview of Roles

Admin Role

- Manage users/groups and access
  - Does not access/manage the data in the system
  - Can edit local users and local groups
    - Details, roles, & groups
  - Can create collections
    - Cannot manage collection policies
  - Can edit an external (LDAP/COS) user/group
    - Can only add roles to these members

Data Admin Role

- Manage all data within the system
- Controls user's access to data on the system
  - Can edit users and groups
  - Roles & collections only
  - Restricted to Collection Admin and Data User roles only
    - Can create
      - Collections
      - Collection policies
      - Can assign collections to connections

Collection Admin Role

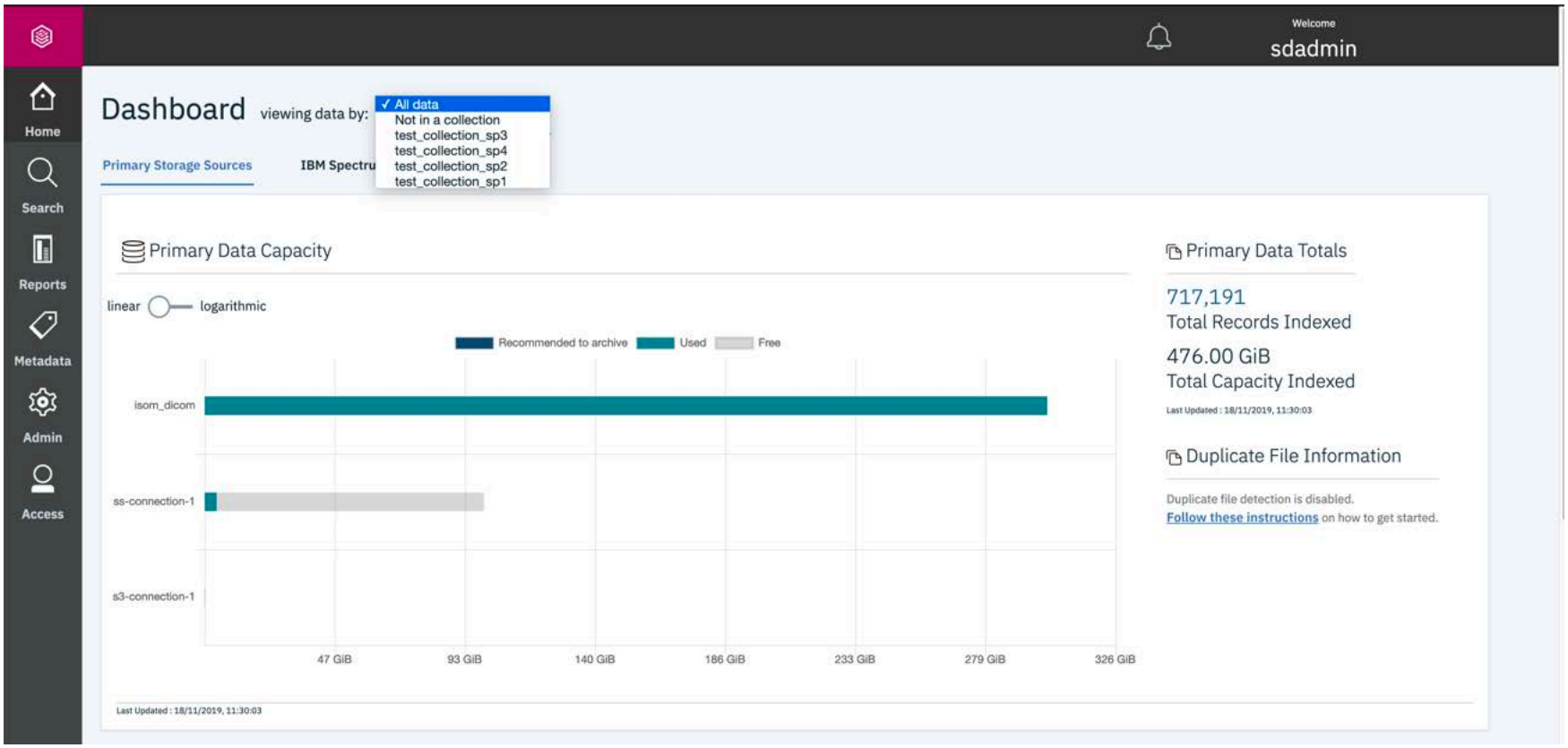
- Manage the Data and Data Users within a set of assigned collections
  - Can edit users and groups
    - Add/remove Data User roles for the collections they administer only
  - Can only see the collections they administer
    - Same applies to users/groups roles
  - Cannot edit a user's groups
  - Does not know of other collections in the group
  - Cannot create collections or collection policies

Data User Role

- Can search & create policies
  - Collections assigned to only
    - Cannot manage users
    - Cannot create or edit collections
    - Can only see collections assigned to

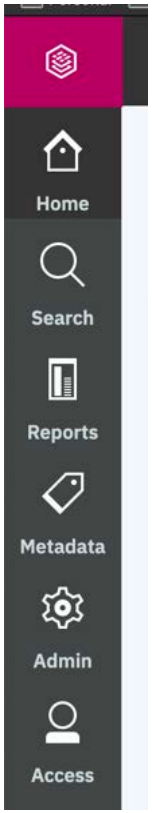
Collection Admin Metadata Management

- Admin user now has dropdown for view by collection

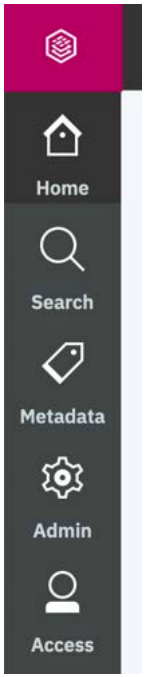


Sidebar Views

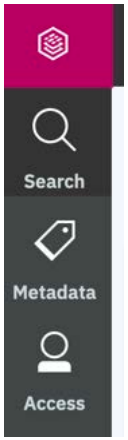
Data Admin



Collection Admin

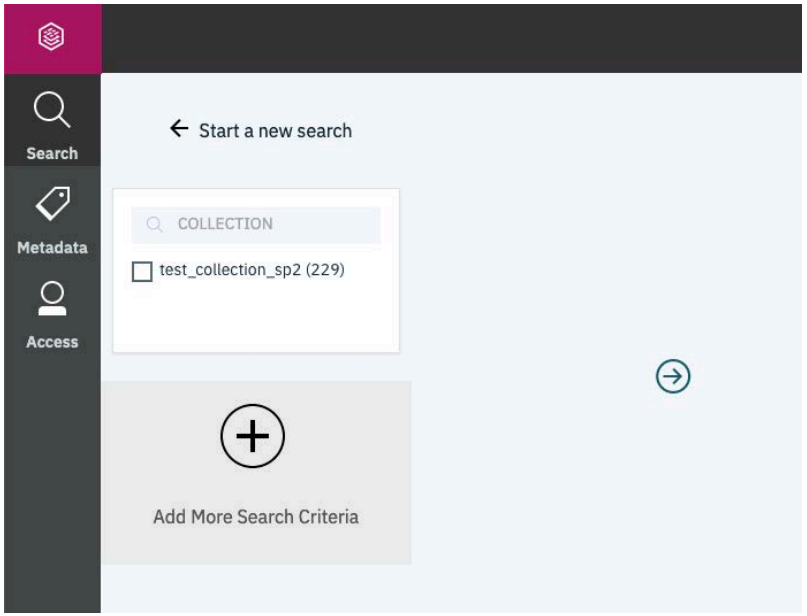


Data User



Metadata Management - Search

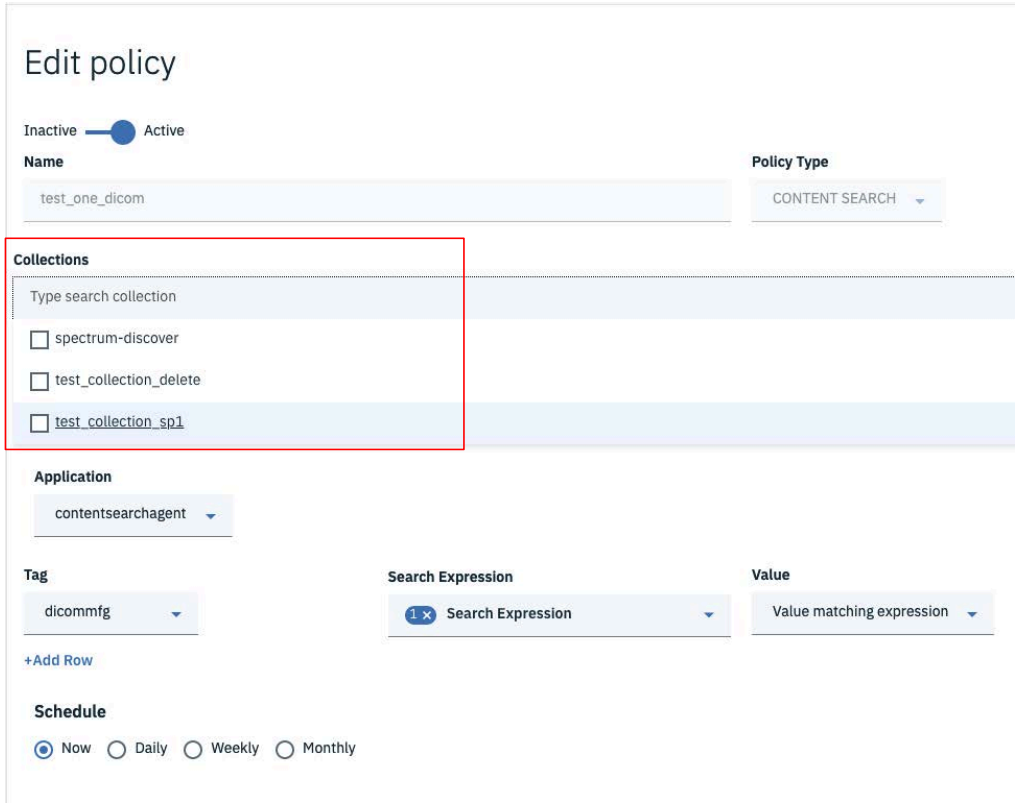
- Data Admin
  - No change
- Collection Admin
  - Results restricted to data within collections assigned
    - Transparent to user
- Data User
  - Results restricted to data within collections assigned
    - Transparent to user



Metadata Management - Policies

- Data Admin
  - Can view edit all policies/tags
- Collection Admin
  - Can view/edit policies that apply to collections assigned
  - Can view/edit policies that is owner of
  - Can view any tag
  - Can only create/modify characteristics tags
- Data User can:
  - Can view/edit policies that is owner of
  - Can view any tag
  - Can only create/modify characteristics tags

✓ There is now a collections dropdown in policy page to manage collections



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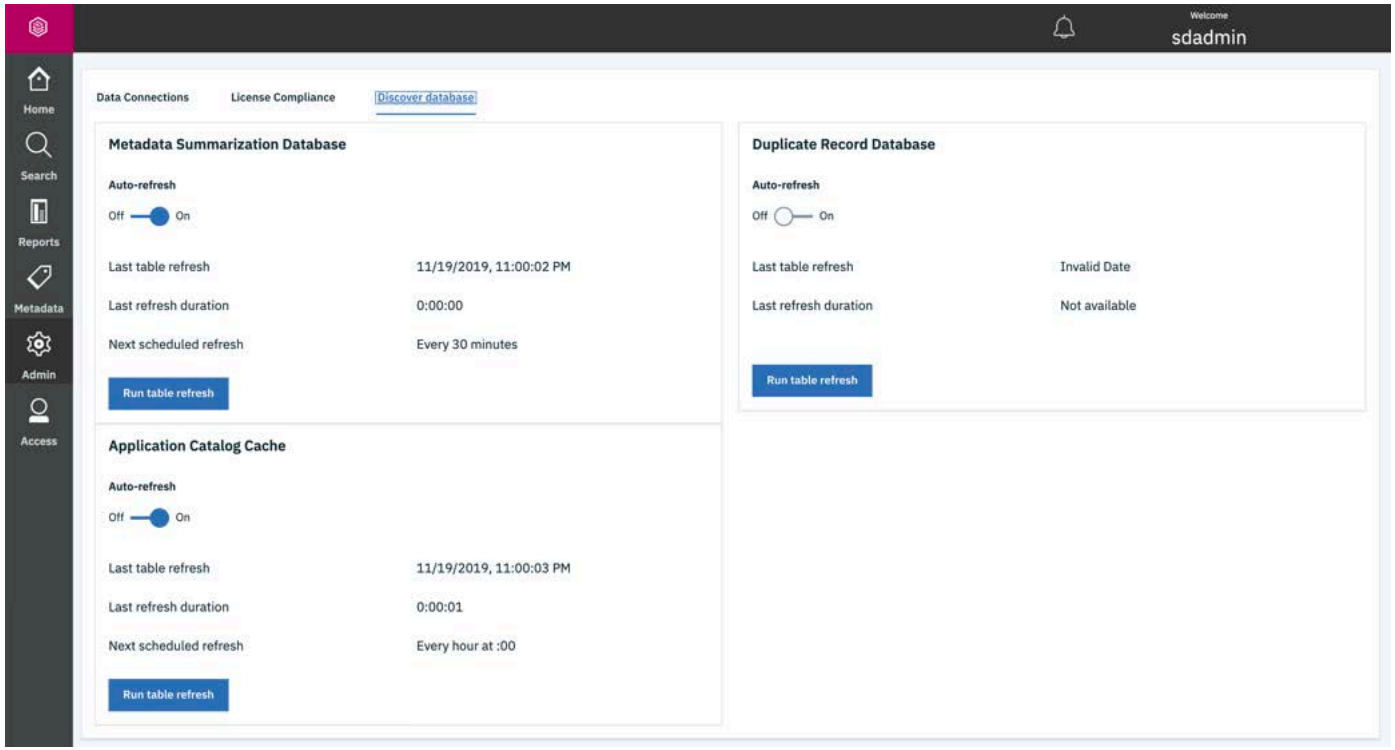
Application Catalog - Overview

- Goal is to allow customers to use existing applications or easily create their own
- Create an ecosystem where customers can use applications not only provided by IBM but also 3rd parties
- Application SDK available on pypi and github
  - https://pypi.org/project/ibm-spectrum-discover-application-sdk
  - https://github.com/IBM/Spectrum_Discover_App_Catalog/application_sdk
- IBM provided applications available on dockerhub and source on github
  - Example Application
    - https://github.com/IBM/Spectrum_Discover_App_Catalog/example_application
    - https://hub.docker.com/r/ibmcom/spectrum-discover-example-application
  - Exif Header Extractor
    - https://github.com/IBM/Spectrum_Discover_App_Catalog/exif_header_extractor
    - https://hub.docker.com/r/ibmcom/spectrum-discover-exif-header-extractor
  - ➢ More coming soon!
    - ✓ spectrum-discover-lidar-metadata-extractor
    - ✓ spectrum-discover-spectrum-scale-get-xattrs
    - ✓ spectrum-discover-cos-get-x-amz-meta
- Code available under MIT license to allow sharing and collaborating for applications

Additions to Existing Endpoints

- Refreshes the database for any new (or deleted applications) from dockerhub
  - Caches to the db2wh for faster lookup times. Refreshes every hour
  - tcurl -X PUT https://localhost/db2whrest/v1/summary_tables/applicationcatalog/start



New Endpoints

- publicregistry – Queries the database for available applications
  - tcurl -X GET https://localhost/api/application/appcatalog/publicregistry | jq
  - tcurl -X GET https://localhost/api/application/appcatalog/publicregistry/ibmcom/spectrum-discover-example-application | jq
- image – Acts upon docker images. Downloads or Deletes to local docker cache
  - tcurl -X POST https://localhost/api/application/appcatalog/image/ibmcom/spectrum-discover-example-application | jq
  - tcurl -X DELETE https://localhost/api/application/appcatalog/image/ibmcom/spectrum-discover-example-application | jq
- helm – Creates/deletes a Kubernetes pod and can scale the replicas
  - tcurl -X GET https://localhost/api/application/appcatalog/helm | jq
  - tcurl_json -X POST https://localhost/api/application/appcatalog/helm -d@example.json | jq
  - tcurl_json -X PATCH https://localhost/api/application/appcatalog/helm/quieting-lambkin-example-application -d@replicas.json | jq
  - tcurl -X DELETE https://localhost/api/application/appcatalog/helm/quieting-lambkin | jq

Examples

```
[moadmin@darthrevan ~]$ tcurl -X GET https://localhost/api/application/appcatalog/publicregistry | jq
  % Total    % Received % Xferd  Average Speed   Time    Time     Time  Current
                                 Dload  Upload   Total   Spent    Left  Speed
100  1159  100  1159    0     0   1824      0 --:--:-- --:--:-- --:--:--  1828
{
  "success": "true",
  "message": "Successfully retrieved all applications.",
  "output": [
    {
      "repo_name": "ibmcom/spectrum-discover-example-application",
      "star_count": 0,
      "pull_count": 2757,
      "created": "2019-11-14T16:46:23.787Z",
      "application_name": "example",
      "company_name": null,
      "company_url": null,
      "description": "Performs a character count on a specified file.",
      "filetypes": "all",
      "icon_url": null,
      "maintainer": null,
      "parameters": null,
      "version": "0.0.1",
      "license": "mit",
      "installed": 0,
      "installed_version": null,
      "instances": null,
      "additional_info": null,
      "update": "2019-11-19T20:07:28.195Z"
    },
    {
      "repo_name": "ibmcom/spectrum-discover-exif-header-extractor",
      "star_count": 0,
      "pull_count": 2735,
      "created": "2019-11-14T16:48:16.224Z",
      "application_name": "exif_header_extractor",
      "company_name": null,
      "company_url": null,
      "description": "Extracts exif header information for jpeg, tiff files",
      "filetypes": "jpg,jpeg,tiff",
      "icon_url": null,
      "maintainer": null,
      "parameters": null,
      "version": "0.0.1",
      "license": "mit",
      "installed": 0,
      "installed_version": null,
      "instances": null,
      "additional_info": null,
      "update": "2019-11-19T20:07:28.209Z"
    }
  ]
}
```

```
[moadmin@darthrevan ~]$ tcurl -X POST https://localhost/api/application/appcatalog/image/ibmcom/spectrum-discover-example-application | jq
  % Total    % Received % Xferd  Average Speed   Time    Time     Time  Current
                                 Dload  Upload   Total   Spent    Left  Speed
100   118  100   118    0     0     31      0  0:00:03  0:00:03 --:--:--    31
{
  "success": "true",
  "message": "Successfully pulled ibmcom/spectrum-discover-example-application application image."
}
```

```
[moadmin@darthrevan ~]$ tcurl -X DELETE  https://localhost/api/application/appcatalog/image/ibmcom/spectrum-discover-example-application | jq
  % Total    % Received % Xferd  Average Speed   Time    Time     Time  Current
                                 Dload  Upload   Total   Spent    Left  Speed
100   119  100   119    0     0    185      0 --:--:-- --:--:-- --:--:--   185
{
  "success": "true",
  "message": "Successfully deleted application image: ibmcom/spectrum-discover-example-application"
}
```

```
[moadmin@darthrevan ~]$ cat example.json
{
        "application_name":"example",
        "version":"0.0.2",
        "description":"description",
        "repo_name":"ibmcom/spectrum-discover-example-application"
}
```

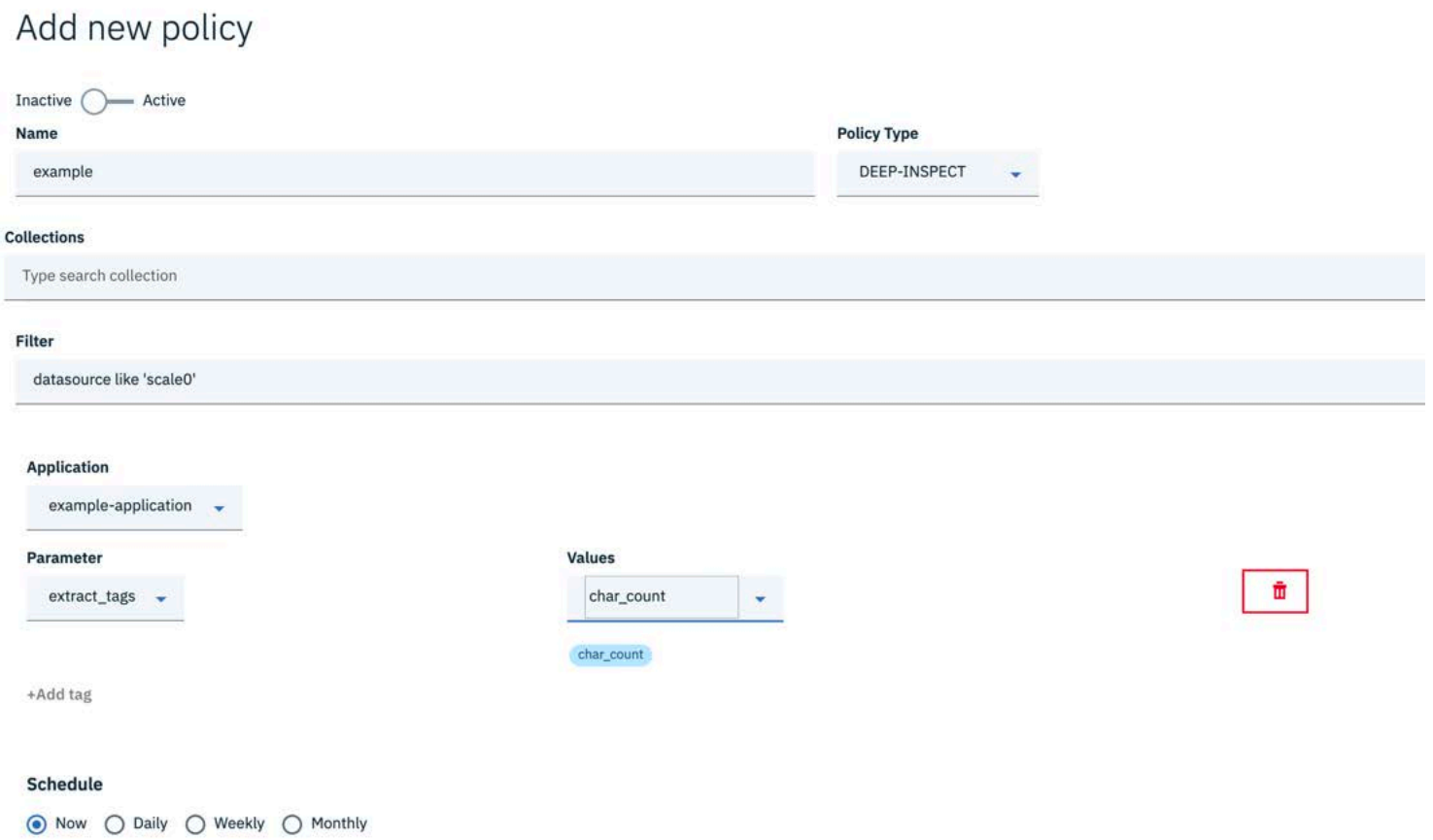
```
[moadmin@darthrevan ~]$ tcurl_json -X POST https://localhost/api/application/appcatalog/helm -d@example.json | jq
  % Total    % Received % Xferd  Average Speed   Time    Time     Time  Current
                                 Dload  Upload   Total   Spent    Left  Speed
100   282  100   143  100   139     47     45  0:00:03  0:00:03 --:--:--    47
{
  "success": "true",
  "message": "Successfully deployed application.",
  "chart_name": "example-application",
  "deployment_name": "running-uakari"
}
```

```
[moadmin@darthrevan ~]$ tcurl -X DELETE https://localhost/api/application/appcatalog/helm/running-uakari | jq
  % Total    % Received % Xferd  Average Speed   Time    Time     Time  Current
                                 Dload  Upload   Total   Spent    Left  Speed
100    71  100    71    0     0     90      0 --:--:-- --:--:-- --:--:--    90
{
  "success": "true",
  "message": "release \"running-uakari\" deleted\n"
}
```

Examples Continued…

```
[moadmin@darthrevan ~]$ cat replicas.json
{
  "replicas": 10
}
[moadmin@darthrevan ~]$ tcurl_json -X PATCH https://localhost/api/application/appcatalog/helm/running-uakari-example-application -d@replicas.json | jq
  % Total    % Received % Xferd  Average Speed   Time    Time     Time  Current
                                 Dload  Upload   Total   Spent    Left  Speed
100   588  100   570  100    18   1965     62 --:--:-- --:--:-- --:--:--  1972
{
  "success": "true",
  "message": "Successfully patched deployment.",
  "output": {
    "kind": "Scale",
    "apiVersion": "autoscaling/v1",
    "metadata": {
      "name": "running-uakari-example-application",
      "namespace": "spectrum-discover",
      "selfLink": "/apis/apps/v1/namespaces/spectrum-discover/deployments/running-uakari-example-application/scale",
      "uid": "d308e2e8-0b0e-11ea-891b-525400e51809",
      "resourceVersion": "5107383",
      "creationTimestamp": "2019-11-19T20:54:48Z"
    },
    "spec": {
      "replicas": 10
    },
    "status": {
      "replicas": 1,
      "selector": "app=example-application,release=running-uakari"
    }
  }
}
```

Creating a policy



Debugging

Much like debugging any other Kubernetes pod or docker container

kubectl describe pod running-uakari-example-application-bcf68949c-2lnrh
kubectl logs running-uakari-example-application-bcf68949c-2lnrh
kubectl exec running-uakari-example-application-bcf68949c-2lnrh -it bash

docker ps | grep running-uakari
docker logs -f 8a0df69547df

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- **Spectrum Scale Live Events**

Spectrum Scale Live Events support

Captures filesystem event notifications, which are delivered to Discover in near real-time using Kafka.

Provides a much more current representation of the state of the datasource/filesystem, reducing the need for scans.

What's new in 2.0.2?

Filesystem activity is captured and delivered using a clustered watch with a secondary sink (Kafka topic). [Spectrum Scale version 5.0.3.1+]

The clustered watch provides a greater level of flexibility and robustness. Previously, events were delivered using a custom application '*tsspectrumdiscover*' running on a single Scale node.

tsspectrumdiscover will no longer be supported starting with 2.0.2. Scale systems running older versions of Scale will need to upgrade to take advantage of live events.

Scale Live event considerations and limitations

Requirements for enabling live events on Spectrum Scale:

Spectrum Scale live events will work starting with Scale 5.0.3.1, but due to a performance issue on the Scale side, Discover officially states beta support for live events starting with Scale version 5.0.4.1. We will recommend users upgrade to this level before enabling live events, especially if they encounter any issues keeping the Scale watch alive.

User must enable watch folder on Scale. A minimum of 3 Scale nodes are required to act as brokers.

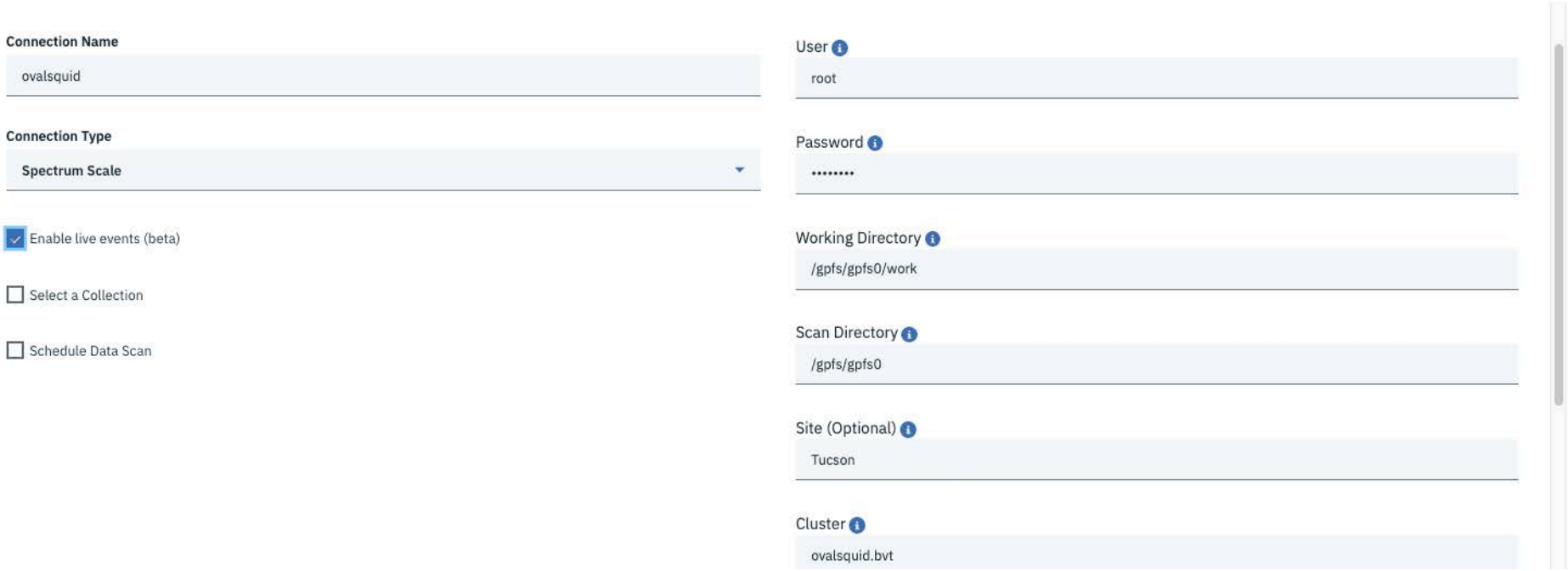
The Scale nodes acting as brokers must meet a minimum local space requirement of 20GB in order to successfully enable the watch with a secondary sink.

When enabling live events using the GUI, the watch will be on the filesystem specified in the datasource connection.

Enabling Scale Live events

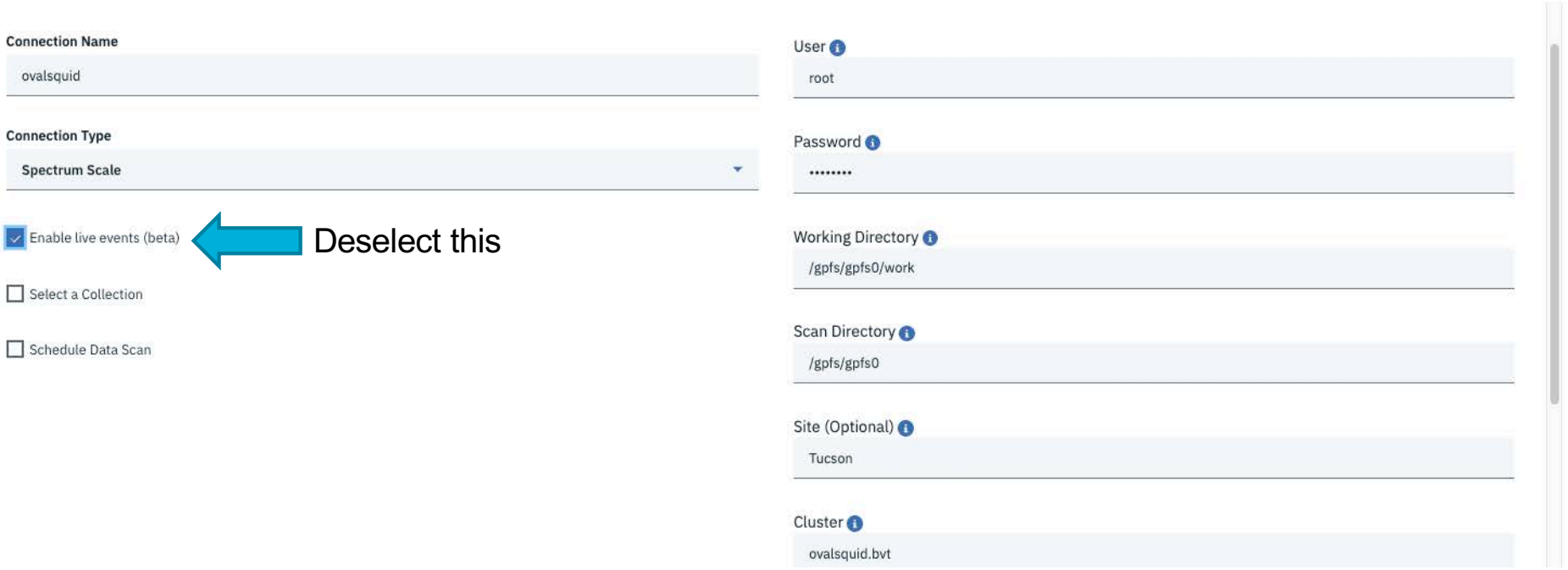
Can be enabled using the GUI or command line on the Scale node.

To enable when creating a Scale data source connection, simply check the box:



Disabling Scale Live events

To disable live events from the GUI, just edit the connection and uncheck the ‘Enable live events (beta)’ option and apply the update.



Manually enabling/disabling live events

1. Create a connection to the SS system.
2. Copy over the Discover Kafka credentials required to establish a connection for the clustered watch external sink to location on Scale system.
    1. Get a token, then use token in command to get TLS cert: https://www.ibm.com/support/knowledgecenter/SSY8AC_2.0.1/com.ibm.spectrum.discover.v2r01.doc/api_agents_gettlscertificate.html
    2. Copy output of PEM file to a directory (example: /home/{yourdir}/kafka_client.pem) on the Scale system
3. To set up Scale live events, the Scale administrator can run the following mmwatch command on the connected Scale system to capture the live events from a specific filesystem into Spectrum Discover.

    ```
    # mmwatch <filesystem> enable --event-handler kafkasink --sink-brokers "Spectrum.Discover.NodeAddress:9093" --sink-topic scale-le-connector-topic --sink-auth-config <auth.file> --events IN_ATTRIB,IN_CLOSE_WRITE,IN_MODIFY,IN_CREATE,IN_DELETE,IN_MOVED_FROM,IN_MOVED_TO
    ```

    where <filesystem> is the filesystem to set the watch for, and <auth.file> is the full path to the configuration file with the settings to connect to the Spectrum Discover Kafka brokers.

```
auth.file contents:
-------------------
SINK_AUTH_TYPE:CERT
CA_CERT_LOCATION:/home/{yourdir}/kafka_client.pem
CLIENT_PEM_CERT_LOCATION:/home/{yourdir}/kafka_client.pem
CLIENT_KEY_FILE_LOCATION:/home/{yourdir}/kafka_client.pem
```

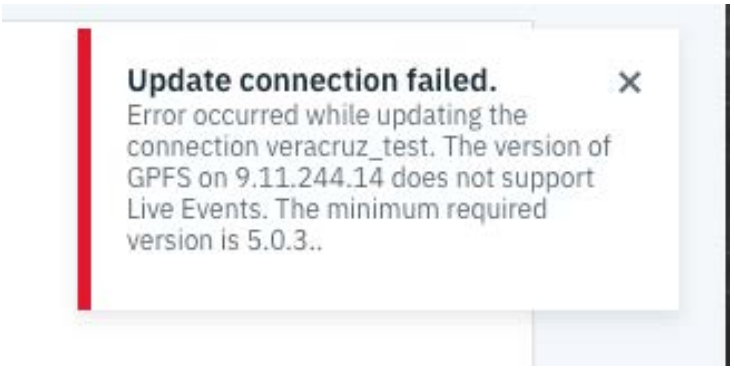
To stop the watch:

```
# mmwatch <filesystem> disable --watch-id <watch-id>
```

where <watch-id> is the ID of the established watch and can be obtained from output of `mmwatch all list`

Possible issues enabling or running live events

Cannot enable live events because Scale is not at the required level.

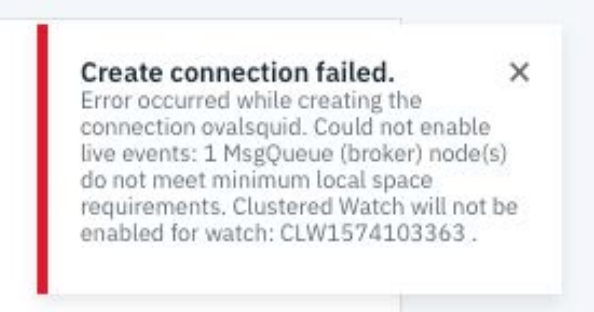


Solution: Have customer upgrade to Scale 5.0.3.1+(5.0.4.1 recommended).

Note that the output from the mmwatch command will be saved in the connection manager log. To view this log, you can use the alias *conlog* on the Discover node.

Possible issues enabling or running live events

Cannot enable live events due to not enough space on the brokers.



More detailed information can be found in the Spectrum Discover connection manager log.

Example:

```
2019-11-18 18:56:01,570 - connmgr - INFO - Live event enable: Starting watch with cmd /usr/lpp/mmfs/bin/mmwatch gpfs0 enable --event-handler kafkasink --sink-brokers "9.11.201.45:9093" --sink-topic scale-le-
connector-topic --sink-auth-config /gpfs/gpfs0/work/kafka/auth.file --events IN_ATTRIB,IN_CLOSE_WRITE,IN_MODIFY,IN_CREATE,IN_DELETE,IN_MOVED_FROM,IN_MOVED_TO.
2019-11-18 18:56:12,217 - connmgr - INFO - [E] Broker node prt001st001 does not meet the minimum amount of local disk space required 20971520KB
2019-11-18 18:56:12,217 - connmgr - INFO - [W] Broker node prt002st001 meets the minimum amount of local disk space required 20971520KB but
2019-11-18 18:56:12,217 - connmgr - INFO -     not the recommended amount of local disk space 41943040KB
2019-11-18 18:56:12,217 - connmgr - INFO - [W] Broker node prt003st001 meets the minimum amount of local disk space required 20971520KB but
2019-11-18 18:56:12,217 - connmgr - INFO -     not the recommended amount of local disk space 41943040KB
2019-11-18 18:56:12,217 - connmgr - INFO - [E] 1 MsgQueue (broker) node(s) do not meet minimum local space requirements.  Clustered Watch will not be enabled for watch: CLW1574103363
2019-11-18 18:56:12,217 - connmgr - INFO -     Increase the amount of local disk space on the identified node(s) to meet the minimum of KB, recommended 41943040KB
2019-11-18 18:56:12,217 - connmgr - INFO -     Or, if degraded performance is acceptable and all of the identified node(s) meet the degraded minimum of 10485760KB,
2019-11-18 18:56:12,217 - connmgr - INFO -     run this command again with the '--degraded' option.
2019-11-18 18:56:12,217 - connmgr - INFO - mmwatch: Command failed. Examine previous error messages to determine cause.
2019-11-18 18:56:12,217 - connmgr - ERROR - Could not enable live events:  1 MsgQueue (broker) node(s) do not meet minimum local space requirements.  Clustered Watch will not be enabled for watch:
CLW1574103363
```

Solution: Customer increases space on Scale nodes, uses different nodes with more space, or manually starts watch folder with ‘degraded’ option.

Running Scale watch folder in degraded mode

Degraded option reduces the minimum required local storage for the Scale brokers to 10GB.

To enable this, a clustered watch must be manually enabled using the command line on one of the Scale nodes.

Here is an example:

```
# mmwatch gpfs0 enable --event-handler kafkasink --sink-brokers "thor.tuc.stglabs.ibm.com:9093" --sink-topic
scale-le-connector-topic --sink-auth-config auth.file --events
IN_ATTRIB,IN_CLOSE_WRITE,IN_MODIFY,IN_CREATE,IN_DELETE,IN_MOVED_FROM,IN_MOVED_TO -degraded
```

Possible issues enabling or running live events

Filesystem activity is not being captured even though live events was successfully enabled.

Currently, errors that occur for a clustered watch initiated for live events are not surfaced to Spectrum Discover. Therefore, the state of the watch will need to be checked on the Scale nodes.

Solution: Check the state of the watch on Scale. Collect logs.

```
# mmwatch all status
Device                    Watch ID                Watch State
delhaize                  CLW1572947931           Active
          Node Name                                    Status
          prt001st001                                  HEALTHY
          prt005st001                                  HEALTHY
          prt006st001                                  HEALTHY

gpfs0                     CLW1574112839           Active
          Node Name                                    Status
          prt001st001                                  DOWN
          prt005st001                                  DOWN
          prt006st001                                  DOWN
```

Log files of interest:

```
/var/adm/ras/mmwfclient.log
/var/adm/ras/mmwatch.log
```

Possible issues enabling or running live events

Filesystem activity is not being captured even though live events was successfully enabled continued…

If the watch is still running:

- Validate the connection info is correct. The filesystem being watched should be the filesystem set in the connection
- Check for activity on scale-le-connector-topic on the Discover node:

```
[moadmin@thor ~]$ queryGroup.sh conn1 |grep scale-le-connector-topic
TOPIC                       PARTITION  CURRENT-OFFSET  LOG-END-OFFSET  LAG             CONSUMER-ID
HOST            CLIENT-ID
scale-le-connector-topic    0          3536241         3536241         0               spectrum-discover-producer-scale-le-75d4f6fd98-
grgtn-7cbf25a4-3d95-4ed0-881e-2c098fe61f09    /10.1.240.144   spectrum-discover-producer-scale-le-75d4f6fd98-grgtn
```

LOG-END_OFFSET should be incrementing. If it is not, then either there is no activity on the filesystem, or the events are not being delivered by the Scale system to Discover.

- If the watch was enabled manually, validate that the authentication credentials and *mmwatch* parameters are correct.

Possible issues enabling or running live events

Scale watch is failed on version <5.0.4.1

There is a known issue affecting the Kafka batch sizes prior to Scale version 5.0.4.1 which could lead to delivery timeouts of notifications from Scale to Discover. If notifications are not being received, and the watch state shows that it is DOWN, it could be due to this issue. To verify, check /var/adm/ras/mmwfclient.log for entries similar to the following:

```
2019-10-21_19:16:02: [E] WF Producer: t: scale-le-connector-topic a: 2 < Delivery timeout of 45 seconds for
acknowledgement of all messages sent has been exceeded. 5692/10000 messages delivered. > b:
modevvm42.tuc.stglabs.ibm.com:9093,modevvm43.tuc.s
2019-10-21_19:16:02: [E] WF Producer: t: scale-le-connector-topic a: 2 < Timeout hit. Elapsed time: 45.000000. > b:
modevvm42.tuc.stglabs.ibm.com:9093,modevvm43.tuc.s
```

Common Scale commands to run

To get the Scale version:

```
# mmdiag
Current GPFS build: "5.0.3.3 ".
Built on Sep  5 2019 at 15:10:38
```

To get list of watches:

```
# mmwatch all list
Filesystem ces has no watchers.
Filesystem delhaize has 1 watcher(s):
  Watcher                                    WatchID/PID     Type       Start Time                Path
  ------------------------------------------------------------------------------------------------------------------
  (cluster) architeuthis1.tuc.stglabs.ibm.com CLW1572947931   filesystem Tue Nov  5 02:59:49 2019  /gpfs/delhaize
Filesystem gpfs0 has 1 watcher(s):
  Watcher                                    WatchID/PID     Type       Start Time                Path
  ------------------------------------------------------------------------------------------------------------------
  (cluster) architeuthis1.tuc.stglabs.ibm.com CLW1574112839   filesystem Mon Nov 18 14:34:55 2019  /ibm/gpfs0
```

Common Scale commands to run, cont

To show state of clustered watch on each node:

```
# mmwatch all status
Device                    Watch ID              Watch State
delhaize                  CLW1572947931         Active
          Node Name                                   Status
          prt001st001                                 HEALTHY
          prt005st001                                 HEALTHY
          prt006st001                                 HEALTHY

gpfs0                     CLW1574112839         Active
          Node Name                                   Status
          prt001st001                                 HEALTHY
          prt005st001                                 HEALTHY
          prt006st001                                 HEALTHY
```

Thank You!

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