



Confluent verification

NetApp Solutions

NetApp
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Confluent verification

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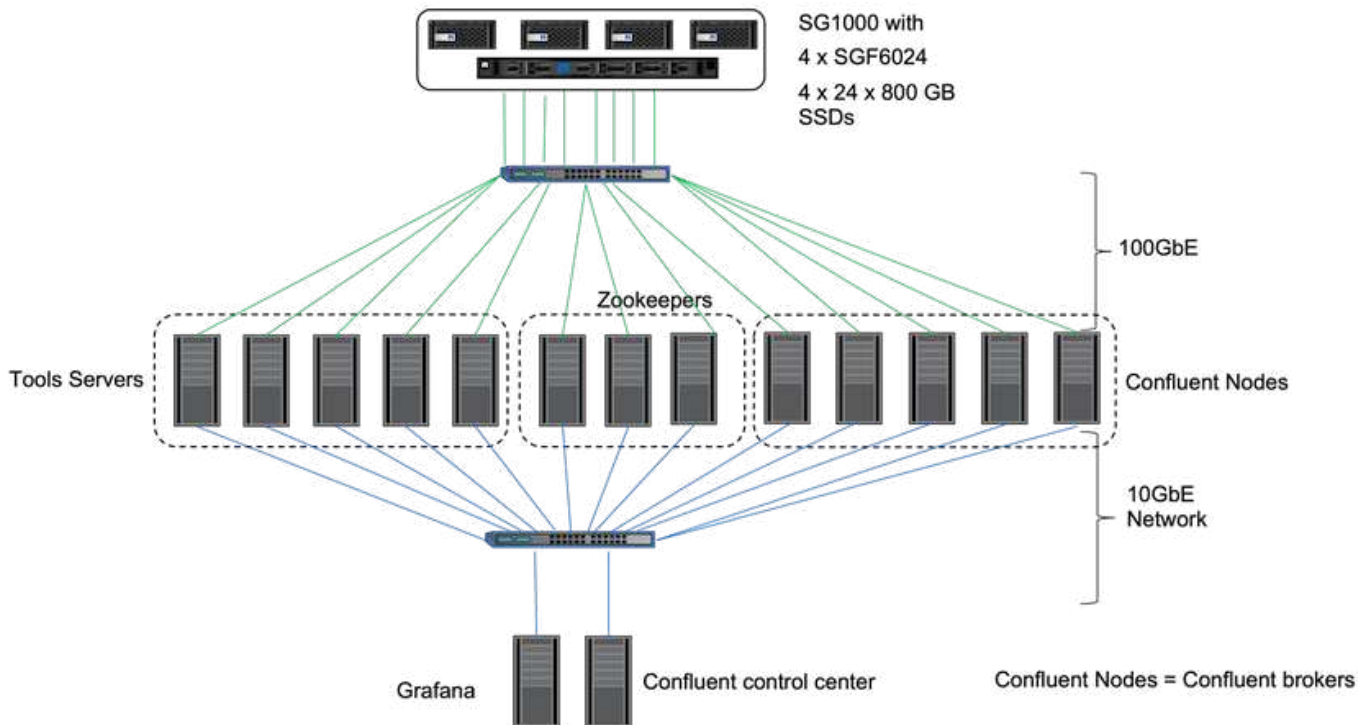
We performed verification with Confluent Platform 6.2 Tiered Storage in NetApp StorageGRID. The NetApp and Confluent teams worked on this verification together and ran the test cases required for verification.

Confluent Platform setup

We used the following setup for verification.

For verification, we used three zookeepers, five brokers, five test-script executing servers, named tools servers with 256GB RAM, and 16 CPUs. For NetApp storage, we used StorageGRID with an SG1000 load balancer with four SGF6024s. The storage and brokers were connected via 100GbE connections.

The following figure shows the network topology of configuration used for Confluent verification.



The tools servers act as application clients that send requests to Confluent nodes.

Confluent tiered storage configuration

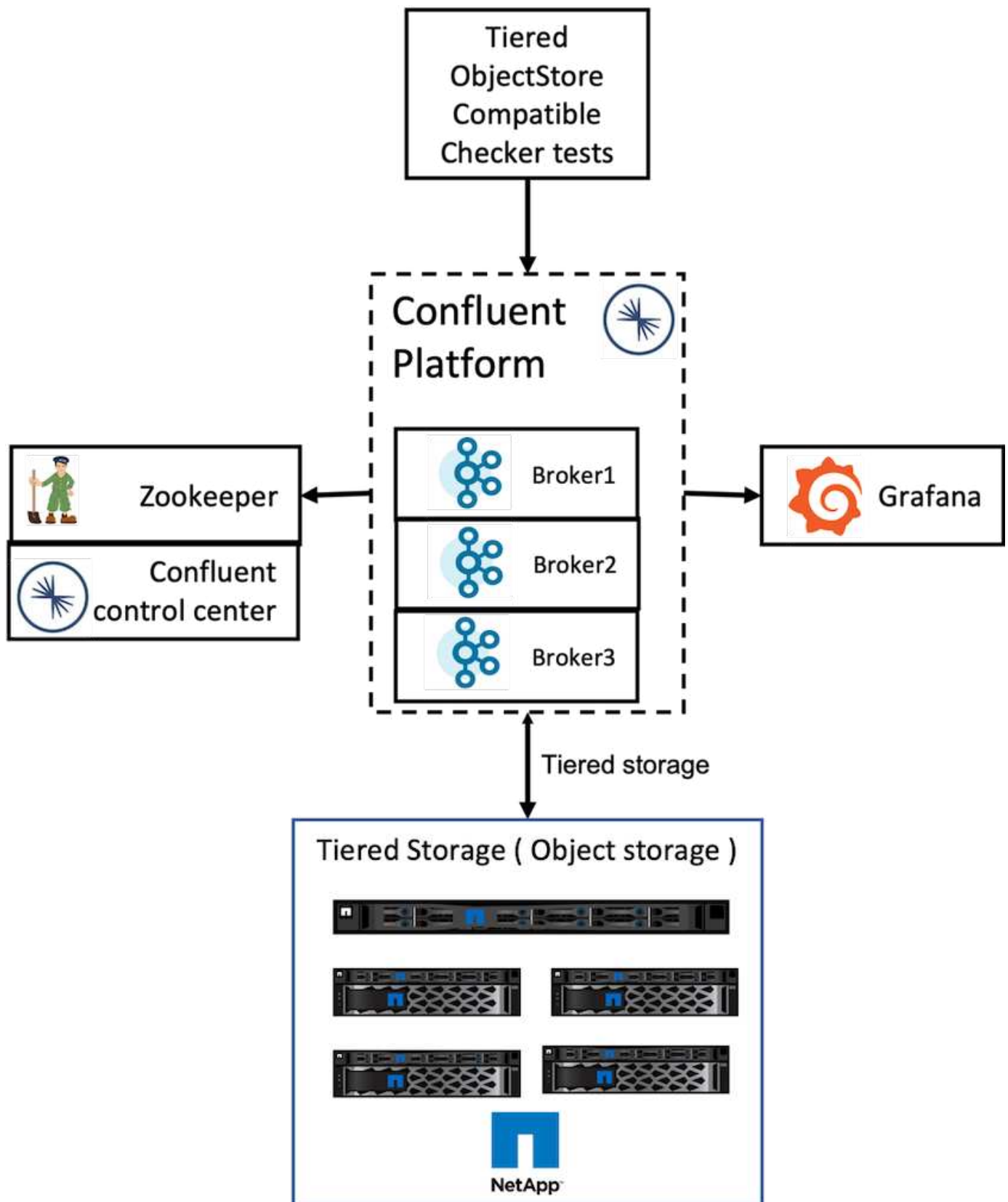
The tiered storage configuration requires the following parameters in Kafka:

```
Confluent.tier.archiver.num.threads=16
confluent.tier.fetcher.num.threads=32
confluent.tier.enable=true
confluent.tier.feature=true
confluent.tier.backend=S3
confluent.tier.s3.bucket=kafkasgdbucket1-2
confluent.tier.s3.region=us-west-2
confluent.tier.s3.cred.file.path=/data/kafka/.ssh/credentials
confluent.tier.s3.aws.endpoint.override=http://kafkasgd.rtppe.netapp.com:
10444/
confluent.tier.s3.force.path.style.access=true
```

For verification, we used StorageGRID with the HTTP protocol, but HTTPS also works. The access key and secret key are stored in the file name provided in the `confluent.tier.s3.cred.file.path` parameter.

NetApp object storage - StorageGRID

We configured single-site configuration in StorageGRID for verification.



Verification tests

We completed the following five test cases for the verification. These tests are executed on the Trogdor framework. The first two were functionality tests and the remaining three were performance tests.

Object store correctness test

This test determines whether all basic operations (for example, get/put/delete) on the object store API work well according to the needs of tiered storage. It is a basic test that every object store service should expect to pass ahead of the following tests. It is an assertive test that either passes or fails.

Tiering functionality correctness test

This test determines if end-to-end tiered storage functionality works well with an assertive test that either passes or fails. The test creates a test topic that by default is configured with tiering enabled and highly a reduced hotset size. It produces an event stream to the newly created test topic, it waits for the brokers to archive the segments to the object store, and it then consumes the event stream and validates that the consumed stream matches the produced stream. The number of messages produced to the event stream is configurable, which lets the user generate a sufficiently large workload according to the needs of testing. The reduced hotset size ensures that the consumer fetches outside the active segment are served only from the object store; this helps test the correctness of the object store for reads. We have performed this test with and without an object-store fault injection. We simulated node failure by stopping the service manager service in one of the nodes in StorageGRID and validating that the end-to-end functionality works with object storage.

Tier fetch benchmark

This test validated the read performance of the tiered object storage and checked the range fetch read requests under heavy load from segments generated by the benchmark. In this benchmark, Confluent developed custom clients to serve the tier fetch requests.

Produce-consume workload benchmark

This test indirectly generated write workload on the object store through the archival of segments. The read workload (segments read) was generated from object storage when consumer groups fetched the segments. This workload was generated by the test script. This test checked the performance of read and write on the object storage in parallel threads. We tested with and without object store fault injection as we did for the tiering functionality correctness test.

Retention workload benchmark

This test checked the deletion performance of an object store under a heavy topic-retention workload. The retention workload was generated using a test script that produces many messages in parallel to a test topic. The test topic was configuring with an aggressive size-based and time-based retention setting that caused the event stream to be continuously purged from the object store. The segments were then archived. This led to a large number of deletions in the object storage by the broker and collection of the performance of the object-store delete operations.

[Next: Performance tests with scalability.](#)

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