

# Performance

The Fedora community has conducted a number of performance tests. The details of each test, including testing parameters and results, are included in the following sections.

A number of factors influence Fedora 4 performance, such as:

- Server hardware (CPU, disk, memory, network bandwidth)
- Repository configuration (storage, indexing and sequencers configured)
- Data (number of child [resources](#))

For best performance, we recommend:

- Configure Java to have a large heap size, e.g., `-Xmx2048m`
- Limit the number of children under a single [resource](#) – ideally to 1,000 or less. Consider using a hierarchy to organize resources, e.g., storing the resource with ID 12345678 at the path `/12/34/56/78`. Automatically-generated identifiers will use this pattern.
- Particularly when working with files larger than available memory, use Infinispan file storage (e.g. `-Dfcrepo.modeshape.configuration=config/single-file/repository.json`) or [filesystem federation](#). Federation avoids having to transfer files using HTTP – and with larger file sizes (or with larger numbers of files being processed), this can improve performance significantly.

## Single Node Performance Testing

### Ingest Testing

Ingesting content into Fedora 4 is generally faster than ingesting into Fedora 3 on the same hardware (tested up to 10,000 [containers](#) with 50MB [binaries](#)).

- See [Ingest Test Matrix](#).

### Create/Read/Update/Delete Testing

Updating content in Fedora 4 is generally faster than in Fedora 3.

- See [Create/Read/Update/Delete Test Results](#).

## Large File Ingest and Retrieval

Arbitrarily-large files can be ingested (or projected into the repository using [filesystem federation](#)) and downloaded via the REST API (tested up to 1TB). The only apparent limitations are disk space available to store the files, and a sufficiently large Java heap size (tested with `-Xmx2048m`).

- See [Large File Ingest and Retrieval](#).

## Clustered Performance Testing

Ingest and read/update/delete testing on multiple servers configured as a cluster.

- See [Response Time Comparison of Single Fedora VS Cluster on a Single machine](#).

CRUD testing on multiple servers configured as a cluster with a load balancer.

- See [Response Time Comparison of Single Fedora VS Cluster in AWS](#)

## Case Studies

Reports of real-world ingest and performance testing.

- See [Stanford SALT Collection](#)