

# External Content

This feature is disabled by default, and requires configuration in order to enable it. See the [allowed list configuration section](#) below.

When referencing content hosted outside of the repository, you can create an empty binary to act as a placeholder for the external content, specifying the URL of the external content.

Instead of supplying the binary in the body of the request, you provide a Link header which uses the `rel="http://fedora.info/definitions/fcrepo#ExternalContent"` and specifies where to get the resource and how to handle it.

```
Link: <http://example.org/some/content>; rel="http://fedora.info/definitions/fcrepo#ExternalContent"; handling="proxy"; type="image/tiff"
```

The [Fedora API specifies](#) 3 methods of handling external content, all of which are supported.

1. copy - Copy the binary from the provided URI and then treat it as a normal internal LDP-NR.
2. redirect - On requests for the LDP-NR provide a redirect (302 Found or 307 Temporary Redirect) to the external URI.
3. proxy - On requests for the LDP-NR proxy the request through the Fedora server the client with the same interaction as an internally stored LDP-NR.

If you provide a `type=` parameter to the Link header this content type will be used, however if `type=` is omitted, then the server attempts to determine the Content-Type.

If the external URI has a file prefix (ie. local disk storage) then `application/octet-stream` is returned.

If the external URI has a `http` prefix then a HEAD request is made to the URI provided in the Link header to retrieve the Content-type header, if this header is not returned the resource cannot be added to the repository.

The URI of the external content must be absolute. Relative paths and paths using relative path modifiers (`../`) will result in the operation failing with a 400 status code.

## Examples:

### Proxying a file on the local server.

Creating the proxy LDP-NR

```
> curl -i -H"Link: <file:///local/file/storage/wonderful.tiff>; rel=\"http://fedora.info/definitions/fcrepo#ExternalContent\"; handling=\"proxy\"; type=\"image/tiff\"" -XPUT -ufedoraAdmin:fedoraAdmin http://localhost:8080/rest/test_proxy_local_file
HTTP/1.1 201 Created
Date: Fri, 29 Jun 2018 14:15:54 GMT
Set-Cookie: JSESSIONID=aedg7ilmx9zxugi8x9em7l8h;Path=/
Expires: Thu, 01 Jan 1970 00:00:00 GMT
Set-Cookie: rememberMe=deleteMe; Path=/; Max-Age=0; Expires=Thu, 28-Jun-2018 14:15:54 GMT
ETag: "0e409de61b53a864ad3a87f4faf884d88cf041ff"
Last-Modified: Fri, 29 Jun 2018 14:15:55 GMT
Link: <http://localhost:8080/rest/test_proxy_local_file/fcr:metadata>; rel="describedby"; anchor="http://localhost:8080/rest/test_proxy_local_file"
Link: <http://localhost:8080/static/constraints/NonRDFSsourceConstraints.rdf>; rel="http://www.w3.org/ns/ldp#constrainedBy"
Content-Location: file:/local/file/storage/wonderful.tiff
Link: <http://localhost:8080/rest/test_proxy_local_file/fcr:acl>; rel="acl"
Location: http://localhost:8080/rest/test_proxy_local_file
Content-Type: text/plain
Content-Length: 48
Server: Jetty(9.3.1.v20150714)

http://localhost:8080/rest/test_proxy_local_file
```

Results of a request

```
> curl -i http://localhost:8080/rest/test_proxy_local_file -ufedoraAdmin:fedoraAdmin
HTTP/1.1 200 OK
Date: Fri, 29 Jun 2018 16:40:48 GMT
Set-Cookie: JSESSIONID=zhy7150ie8vo1bsc9ycb1ghu1;Path=/
Expires: Thu, 01 Jan 1970 00:00:00 GMT
Set-Cookie: rememberMe=deleteMe; Path=/; Max-Age=0; Expires=Thu, 28-Jun-2018 16:40:48 GMT
ETag: "0e409de61b53a864ad3a87f4faf884d88cf041fff"
Last-Modified: Fri, 29 Jun 2018 14:15:55 GMT
Content-Type: image/tiff
Accept-Ranges: bytes
Content-Disposition: attachment; filename=""; creation-date="Fri, 29 Jun 2018 14:15:55 GMT"; modification-date="
Fri, 29 Jun 2018 14:15:55 GMT"; size=14761236
Link: <http://www.w3.org/ns/ldp#Resource>;rel="type"
Link: <http://www.w3.org/ns/ldp#NonRDFSResource>;rel="type"
Link: <http://localhost:8080/rest/test_proxy_local_file/fcr:acl>; rel="acl"
Content-Location: file:/Users/whikloj/Desktop/wonderful.tiff
Link: <http://localhost:8080/rest/test_proxy_local_file/fcr:metadata>; rel="describedby"
Link: <http://localhost:8080/static/constraints/NonRDFSResourceConstraints.rdf>; rel="http://www.w3.org/ns
/ldp#constrainedBy"
Accept-External-Content-Handling: copy,redirect,proxy
Allow: DELETE,HEAD,GET,PUT,OPTIONS
Cache-Control: no-transform, must-revalidate, max-age=0
Content-Length: 14761236
Server: Jetty(9.3.1.v20150714)

...<BODY CONTENT>...
```

## Redirect to an external URI

Creating the redirect LDP-NR

```
> curl -i -H"Link: <http://localhost:8111/wonderful.jp2>; rel=\"http://fedora.info/definitions
/fcrepo#ExternalContent\"; handling=\"redirect\"; type=\"image/jp2\"" -XPUT -ufedoraAdmin:fedoraAdmin
http://localhost:8080/rest/test_redirect_remote_file
HTTP/1.1 201 Created
Date: Fri, 29 Jun 2018 16:11:16 GMT
Set-Cookie: JSESSIONID=1rv3ytcylpb093ra1mhznx9dp;Path=/
Expires: Thu, 01 Jan 1970 00:00:00 GMT
Set-Cookie: rememberMe=deleteMe; Path=/; Max-Age=0; Expires=Thu, 28-Jun-2018 16:11:16 GMT
ETag: "009b79832d68313dd45ca6aab0528b34f9054713"
Last-Modified: Fri, 29 Jun 2018 16:11:16 GMT
Link: <http://localhost:8080/rest/test_redirect_remote_file/fcr:metadata>; rel="describedby"; anchor="
http://localhost:8080/rest/test_redirect_remote_file"
Link: <http://localhost:8080/static/constraints/NonRDFSResourceConstraints.rdf>; rel="http://www.w3.org/ns
/ldp#constrainedBy"
Content-Location: http://localhost:8111/wonderful.jp2
Link: <http://localhost:8080/rest/test_redirect_remote_file/fcr:acl>; rel="acl"
Location: http://localhost:8080/rest/test_redirect_remote_file
Content-Type: text/plain
Content-Length: 52
Server: Jetty(9.3.1.v20150714)

http://localhost:8080/rest/test_redirect_remote_file
```

Results of a request

```
> curl -i http://localhost:8080/rest/test_redirect_remote_file -ufedoraAdmin:fedoraAdmin -L
HTTP/1.1 307 Temporary Redirect
Date: Fri, 29 Jun 2018 16:11:59 GMT
Set-Cookie: JSESSIONID=cg9yt3o4whnmxe9vllwerdz;Path=/
Expires: Thu, 01 Jan 1970 00:00:00 GMT
Set-Cookie: rememberMe=deleteMe; Path=/; Max-Age=0; Expires=Thu, 28-Jun-2018 16:11:59 GMT
ETag: "009b79832d68313dd45ca6aab0528b34f9054713"
Last-Modified: Fri, 29 Jun 2018 16:11:16 GMT
Content-Type: image/jp2
Accept-Ranges: bytes
Content-Disposition: attachment; filename=""; creation-date="Fri, 29 Jun 2018 16:11:16 GMT"; modification-date="Fri, 29 Jun 2018 16:11:16 GMT"; size=305517
Link: <http://www.w3.org/ns/ldp#Resource>;rel="type"
Link: <http://www.w3.org/ns/ldp#NonRDFSSource>;rel="type"
Link: <http://localhost:8080/rest/test_redirect_remote_file/fcr:acl>; rel="acl"
Content-Location: http://localhost:8111/wonderful.jp2
Link: <http://localhost:8080/rest/test_redirect_remote_file/fcr:metadata>; rel="describedby"
Link: <http://localhost:8080/static/constraints/NonRDFSSourceConstraints.rdf>; rel="http://www.w3.org/ns/ldp#constrainedBy"
Accept-External-Content-Handling: copy,redirect,proxy
Allow: DELETE,HEAD,GET,PUT,OPTIONS
Location: http://localhost:8111/wonderful.jp2
Content-Length: 305517
Server: Jetty(9.3.1.v20150714)

HTTP/1.1 200 OK
Date: Fri, 29 Jun 2018 16:12:59 GMT
Server: Apache/2.4.29 (Unix) PHP/7.2.4
Last-Modified: Fri, 29 Jun 2018 16:09:29 GMT
ETag: "4a96d-56fca128f2040"
Accept-Ranges: bytes
Content-Length: 305517

...<BODY CONTENT>...
```

## Copy a remote resource

Create the LDP-NR using external content

```
> curl -i -H"Link: <http://localhost:8111/wonderful.jp2>; rel=\"http://fedora.info/definitions/fcrepo#ExternalContent\"; handling=\"copy\"; type=\"image/jp2\"" -XPUT -ufedoraAdmin:fedoraAdmin http://localhost:8080/rest/test_copy_remote_file
HTTP/1.1 201 Created
Date: Fri, 29 Jun 2018 16:19:45 GMT
Set-Cookie: JSESSIONID=1hmgas7f6q5hh1td785dghsjfh;Path=/
Expires: Thu, 01 Jan 1970 00:00:00 GMT
Set-Cookie: rememberMe=deleteMe; Path=/; Max-Age=0; Expires=Thu, 28-Jun-2018 16:19:45 GMT
ETag: "d9cc4f3b266a19f0c225356a5caabb9080d680b4"
Last-Modified: Fri, 29 Jun 2018 16:19:45 GMT
Link: <http://localhost:8080/rest/test_copy_remote_file/fcr:metadata>; rel="describedby"; anchor="http://localhost:8080/rest/test_copy_remote_file"
Link: <http://localhost:8080/static/constraints/NonRDFSSourceConstraints.rdf>; rel="http://www.w3.org/ns/ldp#constrainedBy"
Link: <http://localhost:8080/rest/test_copy_remote_file/fcr:acl>; rel="acl"
Location: http://localhost:8080/rest/test_copy_remote_file
Content-Type: text/plain
Content-Length: 48
Server: Jetty(9.3.1.v20150714)

http://localhost:8080/rest/test_copy_remote_file
```

Results of a request

```
> curl -i http://localhost:8080/rest/test_copy_remote_file -ufedoraAdmin:fedoraAdmin
HTTP/1.1 200 OK
Date: Fri, 29 Jun 2018 16:39:56 GMT
Set-Cookie: JSESSIONID=h0ywas10h63p1340ajakqp1vy;Path=/
Expires: Thu, 01 Jan 1970 00:00:00 GMT
Set-Cookie: rememberMe=deleteMe; Path=/; Max-Age=0; Expires=Thu, 28-Jun-2018 16:39:56 GMT
ETag: "d9cc4f3b266a19f0c225356a5caabb9080d680b4"
Last-Modified: Fri, 29 Jun 2018 16:19:45 GMT
Content-Type: image/jp2
Accept-Ranges: bytes
Content-Disposition: attachment; filename=""; creation-date="Fri, 29 Jun 2018 16:19:45 GMT"; modification-date="
Fri, 29 Jun 2018 16:19:45 GMT"; size=305517
Link: <http://www.w3.org/ns/ldp#Resource>;rel="type"
Link: <http://www.w3.org/ns/ldp#NonRDFSource>;rel="type"
Link: <http://localhost:8080/rest/test_copy_remote_file/fcr:acl>; rel="acl"
Link: <http://localhost:8080/rest/test_copy_remote_file/fcr:metadata>; rel="describedby"
Link: <http://localhost:8080/static/constraints/NonRDFSourceConstraints.rdf>; rel="http://www.w3.org/ns
/ldp#constrainedBy"
Accept-External-Content-Handling: copy,redirect,proxy
Allow: DELETE,HEAD,GET,PUT,OPTIONS
Cache-Control: no-transform, must-revalidate, max-age=0
Content-Length: 305517
Server: Jetty(9.3.1.v20150714)

...<BODY CONTENT>...
```

## Allowed External Paths Configuration

In order to enable external content, administrators must provide a configuration file stating a set of allowed external paths from which Fedora may provide binary content. This list is provided to the application by using the **fcrepo.external.content.allowed** startup parameter as follows:

```
-Dfcrepo.external.content.allowed=/path/to/allow.txt
```

By default, if this configuration is present at startup time Fedora will reload the configuration file any time it is modified.

## Configuration Format

Each line within the file defines a single path from which allowed resources will be allowed. The entries are subject to the following rules:

- Paths must start with their protocol.
- If a path ends with a '/' character, all sub-paths within that path are allowed.
- If a path does not end with a '/', then only the exact path listed is allowed.
- Relative paths are disallowed.
- File paths must resolve to existing locations.

### Example allow list file

```
file:///allowed/path/
file:/another/allowed/path/
file:///exact/match/file.txt
https://example.com/
http://example.com/
```

This example allows external content references to local files at any path within */allowed/path/* and */another/allowed/path/*, as well as the specific file */exact/match/file.txt*.

It also allows external content from any HTTP URIs within <https://example.com/> and <http://example.com/>

For security reasons, it is recommended to configure the minimum set of trusted external content sources/protocols that meet your use cases. By allowing for external content, you are assuming the risks inherent to providing a proxy to open web or file system resources. These resources may change outside of the management by the repository with the potential to introduce vulnerabilities, provide access to unintended files, or place undesirable burdens of system resources.

