

# Roadmap

## 2019-2020 Technical Roadmap

### Fedora 6.0.0

The next major version of Fedora will focus on the following requirements:

1. Replace the ModeShape persistence layer with a different technology that implements the [Oxford Common File Layout](#)
2. Add a synchronous [query service](#)
3. Improve the [fixity service](#)
4. Address known performance and scale issues
5. Support migrations from earlier versions of Fedora (3.x, 4.x, and 5.x)

Further details can be found on the [design page](#).

Fedora 6 development is expected to take place over the course of [monthly code sprints](#) throughout 2020.

### Why the Oxford Common File Layout?

The OCFL provides the following benefits:

1. **Parsability**, both by humans and machines, to ensure content can be understood in the absence of original software
2. **Robustness** against errors, corruption, and migration between storage technologies
3. **Versioning**, so repositories can make changes to objects allowing its history to persist
4. **Storage diversity**, to ensure content can be stored on diverse storage infrastructures including cloud object stores
5. **Completeness**, so that a repository can be rebuilt from the files it stores

These benefits supplement the [digital preservation features](#) already provided by Fedora, including:

1. **Fixity**: Checksums can be calculated, stored and compared on demand
2. **Versioning**: Objects and files can be versioned and restored on demand
3. **Import/Export**: Objects and files can be exported on demand to facilitate their use in other elements of a digital preservation workflow
4. **Audit**: Preservation metadata can be generated by repository events and indexed in a triplestore for querying

The combined functionality of Fedora with OCFL persistence will better support an overall digital preservation strategy.

## 2017-2018 Technical Roadmap

### Formalize the core Fedora services Application Programming Interface (API)

This priority is to clearly define the core services that Fedora promises as a standards-based RESTful API, accompany this API with any necessary domain-specific ontologies, and provide a compatibility test suite. Outstanding issues can be found on [GitHub](#).

### Align the current Fedora implementation with the API specification

Once the API specification is complete, the current Fedora implementation will need to be updated to fully align with the specification. This work will result in a 5.x Fedora release based on our [move to semantic versioning](#).

### Support alternate Fedora implementations

One of the goals of the API specification is to allow the community to experiment with different back-end Fedora implementations to address different use cases. We will support and encourage community members as they experiment along these lines.

## 2016-2017 Technical Roadmap

1. [Formalize the core Fedora services Application Programming Interface \(API\)](#)

This priority is to clearly define the core services that Fedora promises as a standards-based RESTful API, accompany this API with any necessary domain-specific ontologies, and provide a Technology Compatibility Kit (TCK) for each service.

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The Fedora services are:

a. [Create/Read/Update/Delete on repository resources](#)

- i. Standard: Linked Data Platform
- ii. Include Import and Export of RDF, and option for RDF serialization to disk

iii. type key summary assignee reporter priority status resolution created updated dt

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b. [Versioning](#)

- i. Standard (partial, only retrieval): [Memento](#)

ii. type key summary assignee reporter priority status resolution created updated dt

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c. [Atomic Batch Operations](#)

- i. Standard: TBD

ii. key summary type created updated due assignee reporter priority status resoluti

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d. [Fixity](#)

- i. Standard (partial, on ingest): <http://tools.ietf.org/html/rfc3230#section-4.3.2>

ii. key summary type created updated due assignee reporter priority status resoluti

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e. [Authorization](#)

- i. Standard: [WebAC](#)

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2. Formalize the core Fedora Service Provider Interfaces (SPIs)

- a. [Messaging SPI](#)
  - i. Defining the interface that a Fedora repository implementation should implement to publish repository events
- 3. Runtime configurability
  - a. Enable the update of configuration settings at runtime, e.g. changing hostname published in repository events
  - b. Enable pluggability of extension modules, e.g. adding an OAI-PMH module at runtime
- 4. Performance and Scale
  - a. Establish metrics for repository limits, including:
    - i. number of resources
    - ii. number of bytes
    - iii. See: [Performance and Scalability Test Plans](#)

iv. type	key	summary	assignee	reporter	priority	status	resolution	created	updated	di
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- b. Establish guidelines for storage options based on usage patterns

**Note:** Items 1 and 2 define priorities related to "Fedora as a specification", whereas Items 3 and 4 relate to "Fedora as an implementation".

## 2015-2016 Technical Roadmap

- 1. Formalize the core Fedora services Application Programming Interface (API)  
This priority is to clearly define the core services that Fedora promises as a standards-based RESTful API, accompany this API with any necessary domain-specific ontologies, and provide a Technology Compatibility Kit (TCK) for each service.

type	key	summary	assignee	reporter	priority	status	resolution	created	updated	due
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The Fedora services are:

- a. Create/Read/Update/Delete on repository resources
  - i. Standard: Linked Data Platform
  - ii. Include Import and Export of RDF, and option for RDF serialization to disk

iii. type	key	summary	assignee	reporter	priority	status	resolution	created	updated	di
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- b. Versioning
  - i. Standard (partial, only retrieval): Memento

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- c. Transactions
  - i. Standard: TBD
- d. Fixity

- i. Standard (partial, on ingest): <http://tools.ietf.org/html/rfc3230#section-4.3.2>
- e. Authorization
  - i. Standard: WebAC

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- 2. Formalize the core Fedora Service Provider Interfaces (SPIs)
  - a. Eventing SPI
    - i. Defining the interface that a Fedora repository implementation should implement to publish repository events
- 3. Runtime configurability
  - a. Enable the update of configuration settings at runtime, e.g. changing hostname published in repository events
  - b. Enable pluggability of extension modules, e.g. adding an OAI-PMH module at runtime
- 4. Performance and Scale
  - a. Establish metrics for repository limits, including:
    - i. number of resources
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- b. Establish guidelines for storage options based on usage patterns

**Note:** Items 1 and 2 define priorities related to "Fedora as a specification", whereas Items 3 and 4 relate to "Fedora as a reference implementation".

## Previous Technical Roadmap Items

Currently Supported Features	Design	Core	Non-core	4.0	Use Cases
<a href="#">AuthN/Z</a>	<a href="#">design</a>		x	✓	<ul style="list-style-type: none"> <li><a href="#">Hydra Authorization Use Case</a></li> <li><a href="#">Yale University - Fedora managing access conditions</a></li> <li><a href="#">University of Virginia - Repository generated-mediated derivatives</a></li> </ul>
<a href="#">Backup</a>	<a href="#">design</a>	x		✓	<ul style="list-style-type: none"> <li><a href="#">Backups / Disaster Recovery</a></li> </ul>
<a href="#">Clustering</a>		x		⚠	<ul style="list-style-type: none"> <li>Consistent deployment</li> <li>REST-API support against master node</li> </ul>
<a href="#">Content Modeling - Structural</a>		x		⚠	<b>Content by label</b> There is no content with the specified labels
<a href="#">Managed External Datastreams</a>			x	✓	<ul style="list-style-type: none"> <li><a href="#">Ingesting large files into the repository</a></li> </ul>
<a href="#">Store/Deliver Large Files</a>	<a href="#">design</a>	x		✓	<ul style="list-style-type: none"> <li><a href="#">Ingesting large files into the repository</a></li> <li><a href="#">Research Data</a></li> </ul>
<a href="#">Search</a>	<a href="#">design</a>		x	✓	<ul style="list-style-type: none"> <li><a href="#">University of Virginia - Applications can be easily built to work against fedora</a></li> </ul>

Transactions		x		✓	<ul style="list-style-type: none"> <li>Islandora CLAW Transaction Use Case</li> <li>University of Virginia - Applications can be easily built to work against fedora</li> </ul>
Triplestore	design		x	✓	<ul style="list-style-type: none"> <li>University of Virginia - Live querying of object graph</li> <li>Using the resources of the Semantic Web to describe repository contents</li> </ul>
Versioning		x		✓	<ul style="list-style-type: none"> <li>Structure - Automated Retention of All changes to Items</li> <li>Structure - Manual Edit of Existing Items</li> <li>Structure - Manual Creation of "New Editions" of an Item</li> <li>Structure - Generated provenance for all added bitstreams</li> </ul>
Non-Functional: Easy Deployment				✓	
Non-Functional: Performance - Single-node				⚠	<ul style="list-style-type: none"> <li>Improve Performance</li> <li>University of North Carolina at Chapel Hill - High Volume of Concurrent Ingests</li> </ul>
<b>Post-4.0 Priority 1 Features</b>	<b>Design</b>	<b>Core</b>	<b>Non-core</b>	<b>4.0</b>	<b>Use Cases</b>
3 to 4 Upgrade	design		x		<b>Content by label</b> There is no content with the specified labels
Audit Service	design	x			<ul style="list-style-type: none"> <li>University of New South Wales - Viewing-exporting usage statistics about fedora records</li> <li>More Functional AUDIT Datastream</li> <li>Reporting Functionality</li> </ul>
Managed External Datastreams - Indexing			x		
Asynchronous storage API	design	x			<ul style="list-style-type: none"> <li>Support for Hierarchical Storage Management-like systems</li> <li>Scalability for Asynchronous Ingest, Access and Audit</li> <li>Leverage Cloud Storage</li> <li>Repository supports Amazon Glacier, or other asynchronous storage services</li> <li>Hybrid Use Case</li> </ul>
Asynchronous storage Implementation		x			<ul style="list-style-type: none"> <li>Support for Hierarchical Storage Management-like systems</li> <li>Scalability for Asynchronous Ingest, Access and Audit</li> <li>Leverage Cloud Storage</li> <li>Repository supports Amazon Glacier, or other asynchronous storage services</li> <li>Hybrid Use Case</li> </ul>
LDP-Paging		x			
Web Access Control			x		
API Partitioning		x			
<b>Post-4.0 Priority 2 Features</b>	<b>Design</b>	<b>Core</b>	<b>Non-core</b>	<b>4.0</b>	
Batch Operations		x			<ul style="list-style-type: none"> <li>Yale University - Fedora managing access conditions</li> <li>Hybrid Use Case (Metadata Services)</li> </ul>
CMIS			x		

Content Modeling - Services and Validation					<ul style="list-style-type: none"> <li>Use case: transform application workflow</li> <li>Modeling content in concert with the wider world</li> <li>Art Institute of Chicago Use Case - Structural Validation - Properties</li> <li>Art Institute of Chicago Use Case - Structural Validation</li> </ul>
Disseminator-like Functionality			x		<ul style="list-style-type: none"> <li>University of Virginia - Repository-level metadata transformations-mapping</li> <li>University of Virginia - Repository generated-mediated derivatives</li> <li>Objects can be associated with a descriptive metadata service</li> </ul>
Human-readable Filesystem Storage			x		
Metrics		x			<ul style="list-style-type: none"> <li>University of New South Wales - Viewing-exporting usage statistics about fedora records</li> <li>More Functional AUDIT Datastream</li> <li>Reporting Functionality</li> </ul>
Multi-tenancy		x			<ul style="list-style-type: none"> <li>Multi-tenancy Single Fedora Instance</li> </ul>
OAI-PMH	design		x		
ORCID Support			x		
Policy-driven Storage	design	x			<ul style="list-style-type: none"> <li>Policy-controlled storage</li> <li>Hybrid Use Case</li> </ul>
Relationships API		x			
Self-healing Storage			x		
WebDAV			x		
Non-Functional: Performance - Clustered					<ul style="list-style-type: none"> <li>Mass Object Creation</li> <li>Repository subsystems can scale horizontally</li> <li>Scale for High Volume Read Access</li> <li>University of North Carolina at Chapel Hill - High Volume of Concurrent Ingests</li> </ul>
Previously Un-prioritized Features	Design	Core	Non-core	4.0	Use Cases
Admin UI			x	✓	<ul style="list-style-type: none"> <li>Tufts University - Reasonable curators administrative interface</li> </ul>
Content API		x		✓	<ul style="list-style-type: none"> <li>Yale University - Fedora managing access conditions</li> <li>University of Virginia - Applications can be easily built to work against fedora</li> </ul>
Identifiers		x		✓	<ul style="list-style-type: none"> <li>Hybrid Use Case (Metadata Services)</li> <li>UUID's: Object Mobility and Merging Stores</li> </ul>
Large-Scale Content		x		⚠	<ul style="list-style-type: none"> <li>Archive of digitised newspapers</li> </ul>