

Re-thinking Fedora's storage layer: A new high-level interface to remove old assumptions and allow novel use cases

Birkland, Aaron; Blekinge, Asger Askov

Traditionally, the pluggable storage interface in Fedora has followed a "low-level" paradigm where objects and datastreams are presented to the storage layer as independent, anonymous blobs of data. This arrangement has proven simple, reliable, and generally flexible. In the past few years however, there has been an increasing need for Fedora to mediate storage in more complex scenarios. Managing large numbers of big datastreams, multiplexing storage between different devices or cloud storage, and archiving content in a transparent manner are tasks that are difficult to achieve through Fedora currently. One reason for difficulty is that all storage, indexing, and transaction logic is essentially hard-coded in Fedora, and storage plugins are limited in what they can deduce from the anonymous blobs they are given. To evolve the current Fedora architecture and address existing storage limitations, we present an alternate "high-level" interface in which implementations are aware of the structural semantics of a Fedora object, and operations are performed on a whole-object basis. Such an architecture pushes the storage logic into external plugins, allowing greater flexibility in adapting to the needs of preservation, performance, cloud, or analysis-oriented use cases. In addition to storage concerns, this layer provides an appropriate extensibility point for data-oriented approaches to indexing (asynchronous or synchronous), caching, messaging, policy enforcement, and locking or transaction strategies. The Fedora committers have agreed that further development of the proposed high-level storage interface is a logical next step in the evolution of Fedora's internal architecture. Besides presenting the current state of design and implementation of the interface, we hope to engage the community at large to solicit feedback for current and future revisions.