Collaborative Authoring Support for the Next Generation

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WebDAV: Extending HTTP

- WebDAV is a major extension to HTTP
  - WebDAV adds properties and collections to HTTP resource data model
- WebDAV provides facilities for
  - Properties - list, add, remove
  - Namespace Operations - move, copy
  - Overwrite prevention - lock, unlock
  - Collections - mkcol, hierarchy operations
Limitations in HTTP for Collaborative Authoring

- WebDAV exposed weaknesses in HTTP’s support for collaborative authoring in the following areas:
  - Parameter marshalling
  - Support for multi-resource operations
  - Support for operating on hierarchies of resources
  - Status reporting
  - Built-in locking support
Parameter Marshalling

- HTTP marshals parameters in headers and request body
- Headers were insufficient due to:
  - Poor i18n support (would require awkward encoding)
  - Limited length (WebDAV properties can be of unlimited length)
  - Extensibility (difficult to add new information into the syntax of headers)
Requirements for Parameter Marshalling

- Internationalizable marshalling
  - It must be possible to marshal data encoded in any ISO 10646 character set encoding.

- Unlimited length marshalling
  - It must be possible to marshal data of any length.

- Extensible marshalling syntax
  - It must be possible to add new data items to a marshaled data stream without affecting existing applications.
Multi-Resource Operations

- WebDAV supports operations like MOVE, COPY, which have a source and a destination.
- Raises problems with HTTP 1.x
  - Which resource is affected by headers like If-[None]-Match, the source or destination?
  - Would like to specify preconditions for source, or destination, or both
    - WebDAV “If” header provides this capability
  - Some headers affect source, others affect destination
    - WebDAV Overwrite header affects destination
Requirements for Multi-Resource Operations

- Multi-resource operations
  - It must be possible to support operations which affect two or more resources. It must be possible to specify pairings of individual parameters to individual resources.

- Multi-resource preconditions
  - It must be possible to specify operation preconditions which operate over several resources.
Operations on Resource Hierarchies

- As an efficiency optimization, WebDAV supports hierarchy operations
  - COPY tree A to B
- WebDAV uses a method propagation model which replicates method invocation messages to children of a collection
  - But, can’t changes headers for a particular resource
  - This makes resource-specific preconditions impossible using HTTP If-[None]-Match (WebDAV “If” supports them)
Hierarchy Operation Requirements

- Hierarchy support:
  - It must be possible to support operations which operate over a hierarchy of resources.

- Marshalling support for hierarchies
  - It must be possible to support parameter to hierarchy mappings, and parameter to resource mappings.

- Hierarchy preconditions
  - It must be possible to specify preconditions which affect an entire hierarchy.
Status Reporting

- Due to extending the HTTP data model with properties and collections, and
- By supporting operations with a source and a destination, and
- By supporting operations which operate on an hierarchy of resources,
- WebDAV exposed several shortcomings in HTTP's support for status reporting, which assumes one status response for one single resource.
Requirements for Status Reporting

- Property status
  - It must be possible to report status with a single property scope.

- Hierarchy status
  - It must be possible to report status from a hierarchy operation where the results of multiple individual operations are collected into a single response.
More Status Reporting Requirements

- Combined scope
  - It must be possible to report property-scoped and resource-scoped status in a single and hierarchy response.

- Precedence rules
  - There must be rules for determining which status message to report in cases where multiple simultaneous status messages apply.
Integral Locking Support

- HTTP defined a non-lock aware write operation (PUT) before locking was defined in WebDAV.
- As a result, it is possible to have overwrite conflicts between a non-lock aware HTTP client and a lock-aware DAV client.
  - Many mitigation strategies exist (see DAV spec.)
Locking Requirements

- Core overwrite prevention
  - Facilities for the prevention of overwrite conflicts must be an integral part of the protocol. All authoring clients must make use of the overwrite prevention facilities.
End of Presentation