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Quota and Size Properties for DAV Collections
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Abstract

WebDAV servers are frequently deployed with quota (size) limitations. This Internet-Draft discusses the properties and minor behaviors needed for clients to interoperate with quota implementations on WebDAV repositories.

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1. Introduction

1.1 Notational Conventions

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in [[RFC2119](#)].

1.2 Requirement for quotas

WebDAV servers based on [[RFC2518](#)] have been implemented and deployed with quota restrictions on collections and users, so it makes sense to standardize this functionality to improve user experience and client interoperability. This specification requires WebDAV because it requires PROPFIND support and relies on the WebDAV definition of collections and properties, including the definitions for live and protected properties.

The reasons why WebDAV servers frequently have quotas enforced are the same reasons why any storage system comes with quotas.

- o Sometimes the storage service charges according to quota
- o Sometimes the storage service is provided free, but the storage service provider has limited storage space (e.g. [www.example.com](#) and university-provided student accounts)
- o Even in cases where the storage can be upgraded, the storage managers may choose to limit quota in order to encourage users to limit the files they store on the system and to clean up obsolete files. (e.g. IT departments within corporations)

In order to work best with repositories that support quotas, client software should be able to determine and display the quota-available on collections. Further, client software should have some way of fairly reliably determining how much storage space is already counted towards that quota.

In addition to displaying the quota-available and quota-used on collections, this specification does not forbid these properties on any resource.

2. Solution Overview

The approach to meeting the requirements and scenarios outlined above is to define three live properties. This specification can be met on a server by implementing both quota-available and quota-used on

collections only. Implementing both quota-available and quota-used on all resources is RECOMMENDED.

A <DAV:allprop> PROPFIND request SHOULD NOT return any of the properties defined by this document. However, these property names MUST be returned in a <DAV:propname> request for a resource that supports the properties, except in the case of infinite limits which are explained below.

The quota-available and quota-used definitions below borrow heavily from the quota definitions in the NFS [[RFC3010](#)] specification.

3. DAV:quota-available-bytes

Name: quota-available-bytes

Namespace: DAV:

Purpose: Indicates the maximum amount of additional storage available to be allocated to a resource.

DTD: <!ELEMENT quota-available-bytes (#PCDATA) >

The DAV:quota-available-bytes property value is the value in octets representing the amount of additional disk space beyond the current allocation that can be allocated to this file or directory before further allocations will be refused. It is understood that this space may be consumed by allocations to other files or directories.

Support for this property is REQUIRED on collections, and OPTIONAL on other resources. A server SHOULD implement this property for each resource that has the DAV:quota-used-bytes property.

Clients SHOULD expect that as the quota-available on a file or directory approaches 0, further allocations to that file or directory may be refused. A value of 0 indicates that users will probably not be able to perform operations that write additional information (e.g. a PUT inside a collection), but may be able to replace through overwrite an existing resource of equal size.

Note that there may be a number of distinct but overlapping limits, which may even include physical media limits. When reporting quota-available, the server is at liberty to choose any of those limits but SHOULD do so in a repeatable way. The rule may be configured per repository, or may be "choose the smallest number".

If a resource has no quota enforced or unlimited storage ("infinite limits"), the server MAY choose not to return this property (404 Not

Found response in Multi-Status), although this specification RECOMMENDS that servers return some appropriate value (e.g. the amount of free disc space). A client cannot entirely assume that there is no quota enforced on a resource that does not have this property, but might as well act as if there is no quota.

The value of this property is protected. A 403 Forbidden response is RECOMMENDED for attempts to write a protected property.

4. DAV:quota-used-bytes

Name: quota-used-bytes

Namespace: DAV:

Purpose: Contains the amount of storage counted against the quota on a resource.

DTD: <!ELEMENT quota-used-bytes (#PCDATA) >

The DAV:quota-used-bytes value is the value in octets representing the amount of space used by this file or directory and possibly a number of other similar files or directories, where the set of "similar" meets at least the criterion that allocating space to any file or directory in the set will count against the quota-available. It MUST include the total count including usage derived from sub-resources if appropriate. It SHOULD include metadata storage size if metadata storage is counted against the quota-available.

Note that there may be a number of distinct but overlapping sets of files or directories for which a quota-used is maintained (e.g. "all files with a given owner", "all files with a given group owner", etc.). The server is at liberty to choose any of those sets but SHOULD do so in a repeatable way. The rule may be configured per repository.

Support for this property is REQUIRED on collections, and OPTIONAL on other resources. A server SHOULD implement this property for each resource that has the DAV:quota-available-bytes property.

Support for this property enhances the client experience, because together with DAV:quota-available-bytes, the client has a chance of managing its files to avoid running out of allocated storage space. Clients may not be able to calculate the value as accurately on their own, depending on how total space used is calculated by the server.

5. Example PROPFIND request and response

Request:

```
PROPFIND /~milele/public/ HTTP/1.1
Depth: 0
Host: www.example.com
Content-Type: text/xml
Content-Length: xxx

<?xml version="1.0" ?>
<D:propfind xmlns:D="DAV:">
  <D:prop><D:quota-available-bytes><D:quota-used-bytes></D:prop>
</D:propfind>
```

Response:

```
HTTP/1.1 207 Multi-Status
Date: Tue, 16 Oct 2001 22:13:39 GMT
Content-Length: xxx
Content-Type: text/xml; charset=UTF-8

<?xml version="1.0" encoding="utf-8" ?>
<D:multistatus xmlns:D="DAV:">
<D:response>
  <D:href>http://www.example.com/~milele/public/</D:href>
  <D:propstat>
    <D:prop>
      <D:quota-available-bytes>596650</D:quota-available-bytes>
      <D:quota-used-bytes>403350</D:quota-used-bytes>
    </D:prop>
    <D:status>HTTP/1.1 200 OK</D:status>
  </D:propstat>
</D:response>
</D:multistatus>
```

6. Error reporting

WebDAV [[RFC2518](#)] defines the status code 507 (Insufficient Storage). This status code SHOULD be used when a client request (e.g. a PUT, PROPFIND, MKCOL, MOVE or COPY) is forbidden because it would exceed their allotted quota. In order to differentiate the response from other storage problems, the server SHOULD include an XML error body as defined by DeltaV [[RFC3253](#)] with the <DAV:storage-quota-reached/> precondition tag.

Example error response:

```
HTTP/1.1 507 Insufficient Storage
Content-Length: 100
Content-Type: text/xml

<?xml version="1.0">
<error xmlns="DAV:">
  <storage-quota-reached/>
</error>
```

7. Notes

Server implementations store and account for their data in many different ways. Some of the challenges:

- o Some server implementations find it prohibitive to count storage used for metadata, others may choose to do so for better accounting.
- o Older versions of resources may be stored as well.
- o Variants of one resource may exist with different content lengths
- o Content may be dynamically generated.
- o Resource bodies can be compressed
- o Some resources may be stored for "free", not counting against quota.

Since server storage accounting can vary so much, clients should expect the following:

- o The size of a file on the client's file system, or in a PUT message, may not correspond to the amount of storage required by the server to store the resource. Thus, the client cannot predict with 100% accuracy whether a given file will be allowed given the storage quota.
- o Deleting or overwriting a resource may not free up the same amount of storage as indicated by the DAV:getcontentlength property defined in [[RFC2518](#)] for the resource. If deleting a resource does not free up any space, the file may have been moved to a "trash" folder or "recycle bin", or retained as in versioning systems ([[RFC3253](#)]).

- o The total size of a collection, `DAV:quota-used-bytes`, is not necessarily a sum of the `DAV:getcontentlength` properties for resources stored in the collection.
- o On some systems where quota is counted by collection and not by user, a quota on a sub-collection may be larger than the quota on its parent collection that contains it. For example, the quota on `/~milele/` may be 100 MB, but the quota on `/~milele/public/` may be unlimited. This allows the space used by `/~milele/public/` to be as large as the quota on `/~milele/` allows (depending on the other contents of `/~milele/`) even if the quota on `/~milele/` is changed. Thus, even when the quota on a parent collection is changed, it is not necessarily required to change the quota on every child or descendant collection.

8. Security Considerations

A hacker may prefer to store files in collections with a large quota. This isn't strictly a security concern because it doesn't make it any easier to store files. On the other hand, the `DAV:quota-used-bytes` property may make it easier to detect tampering or misuse.

If a server chooses to make the `DAV:quota-assigned-bytes` writable by clients with sufficient authorization, then it is opening up a certain amount of near-administration functionality to clients. However, it is not required for the `DAV:quota-assigned-bytes` property to be writeable by any clients, so a server can easily avoid this consideration.

9. Internationalization Considerations

Quota is counted in Arabic numerals expressed in strings. There are no internationalization considerations.

10. IANA Considerations

There are no IANA considerations.

11. Acknowledgements

Stefan Eissing, Jim Luther, Julian Reschke, and Jim Whitehead and provided valuable comments on this document.

12. References

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