



Absorbing Logical Quotas into the iRODS Server

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- What is a logical quota?
- Isn't there already a plugin?
- How does this work?
- Demo!
- Future Plans

What is a logical quota?

It's a quota for a logical path.

Can limit bytes or data objects on logical paths.

e.g. /tempZone/home/alice can have at most 10,000 bytes and 3 data objects.

Isn't there already a plugin?

Yes, there is a rule engine plugin.

This new system aims to fill a different space and has some notable differences.

Most notable change: this is a passive system, similar to physical quotas.

- Passive system means totals are calculated manually
 - Recalculation will not slow down regular operations that need to run through the PEPs
- New code is a bespoke system with its own code paths
 - The plugin relies on other systems (rules/PEPs, metadata) so it necessarily traverses more code paths
 - Therefore, the new system should be faster!

- Testing environment:
 - Docker container, built from tip-of-main (pre-5.1.0)
 - 100 nested collections, each with their own quota (20000 bytes)
 - Top level collection has a quota of 10000 bytes
 - "setup.sh" scripts set up the quotas
 - \$a environment variable is just the innermost collection

Timing Tests: Logical Quotas Plugin

```
$ time bash setup_logical_quotas_plugin.sh
```

```
real    3m7.483s
user    0m16.011s
sys     0m4.763s
```

```
$ time iput testfile1 $a/testfile1
```

```
real    0m39.538s
user    0m0.056s
sys     0m0.017s
```

```
$ time iput testfile1 $a/testfile2
```

```
real    0m39.780s
user    0m0.062s
sys     0m0.017s
```

```
$ time iput testfile1 $a/testfile3
```

```
remote addresses: 172.19.0.3 ERROR: putUtil: put error for
/tempZone/home/rods/0/1/2/3/4/5/6/7/8/9/10/11/12/13/14/15/16/17/18/19/20/21/22/23/
24/25/26/27/28/29/30/31/32/33/34/35/36/37/38/39/40/41/42/43/44/45/46/47/48/49/50/5
1/52/53/54/55/56/57/58/59/60/61/62/63/64/65/66/67/68/69/70/71/72/73/74/75/76/77/78
/79/80/81/82/83/84/85/86/87/88/89/90/91/92/93/94/95/96/97/98/99/100/testfile3,
status = -169000 status = -169000 SYS_NOT_ALLOWED
Level 0: Logical Quotas Policy Violation: Adding object exceeds maximum data size
in bytes limit
```

```
real    0m1.570s
user    0m0.060s
sys     0m0.019s
```

About 20x faster...

command	duration
<code>bash setup_built_in_logical_quotas.sh</code>	51.561s
<code>iput testfile1 \$a/testfile1</code>	1.853s
<code>iadmin calculate_logical_usage</code>	0.235s
<code>iput testfile1 \$a/testfile2</code>	1.875s
<code>iadmin calculate_logical_usage</code>	0.246s
<code>iput testfile1 \$a/testfile3</code>	1.848s
<code>iadmin calculate_logical_usage</code>	0.230s

Timing Tests: Built-in Logical Quotas

```
$ time iput testfile1 $a/testfile4
remote addresses: 172.19.0.3 ERROR: putUtil: put error for
/tempZone/home/rods/0/1/2/3/4/5/6/7/8/9/10/11/12/13/14/15/16/
17/18/19/20/21/22/23/24/25/26/27/28/29/30/31/32/33/34/35/36/3
7/38/39/40/41/42/43/44/45/46/47/48/49/50/51/52/53/54/55/56/57
/58/59/60/61/62/63/64/65/66/67/68/69/70/71/72/73/74/75/76/77/
78/79/80/81/82/83/84/85/86/87/88/89/90/91/92/93/94/95/96/97/9
8/99/100/testfile4, status = -186000 status = -186000
LOGICAL_QUOTA_EXCEEDED
real      0m1.022s
user      0m0.057s
sys       0m0.018s
```

Other Timing Tests: Built-in Logical Quotas

More testing shows roughly linear performance for recalculating totals.

Time to recalculate 1 million data objects: ~2s

Time to recalculate 11.3 million data objects: ~27s

- Passive system means totals are (re)calculated manually
- Therefore, calculated totals can drift from real totals
 - Depends on recalculation frequency

The built-in system has 3 main operations:

- Modify/create (set) a quota
 - API endpoint: (rs/rc)GeneralAdmin
- Get quotas applied to a collection
 - API endpoint: (rs/rc)_get_logical_quota
- Recalculate totals
 - API endpoint: (rs/rc)GeneralAdmin

Set and recalculate also have microservices available to admin rules.

- Enable enforcement through R_GRID_CONFIGURATION:

```
$ iadmin set_grid_configuration logical_quotas enabled 1
```

- Enforcement happens here:
 - rsDataObjOpen: catches most operations like **icp**, **iput**
 - rsDataObjRename: **imv**
 - rsRegDataObj: **ireg**



- Automatic recalculation after certain operations?
- More active or preemptive enforcement?
- Is the plugin still needed?
 - Current plan is to discontinue development

Please use the new system. We want to know pain points.

Thank you!

Questions?