

Database Resources aka Table-Driven Resources aka External Databases

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Database Resources

- Preliminary Code in 2.4.1
- Initial Version in 2.5
- Foundation Layer
- Continuing Development to Support Multiple Projects



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What Can iRODS Add? Capabilities to Leverage



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What Can iRODS Add? Capabilities to Leverage

- Management of Large Sets of Files
- Access Control
- Rules/Micro-services
- Preservation
- Meta-data
 - System and User-defined
- Open Source



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Terminology

Database Resource (DBR)

A special type of iRODS resource

Database: queries and updates

Not storage

Database Object (DBO)

A special type of iRODS data-object (file)

Contents is SQL

Can be executed on a DBR

DBO Results file (DBOR)

Results from executing a DBO on DBR

XML-like or CSV format

Or streamed back to client

idbo

New icommand to execute DBOs

Also iput, ichmod, iadmin, isysmeta



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Setup

DBR setup by Admin

- creates DBR with iadmin

- establishes access on the DBR host

- gives write/read access to users

- null default

- DBR and DBR-admin page on irods.org

Users create DBOs

- Store SQL into iRODS file

- Set its type 'database object'

- See 'isysmeta -h'



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Access Control

Users with 'write' access to DBR can execute DBOs

Users with 'read' access to DBR can execute some DBOs

DBO is writable only by users with write access to DBR

DBO execution parameters

Input parameters are supplied to DBOs with SQL that require them.

DBR-Write user can define controlled SQL for DBRs

DBR-write user needs to ensure the SQL is safe

Access control to DBOs & DBORs like regular iRODS files



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Four Classes of DBR Users

- Full Access: Admin or DBR-Write
 - 'ichmod -R' to set write
- Execute DBOs Defined by Others
- Access Results (DBORs)
- No Access



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DBOR Format

- XML-Like
- Format Statement
- CSV Comma Separated Values
 - Common
 - Simple
 - Can be imported into DBMS



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Example 1

```
$ cat dbo9
```

```
select * from test_table;
```

```
$ iput dbo9
```

```
$ isysmeta mod dbo9 datatype 'database object'
```

```
$ idbo exec dbr2 dbo9
```

```
<dbr>dbr2</dbr>
```

```
<sql>select * from test_table;</sql>
```

```
<column_descriptions>
```

```
id1|user_name|user_type|
```

```
<\column_descriptions>
```

```
<rows>
```

```
1|user1|type1|
```

```
2|user2|type2|
```

```
<\rows>
```



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Example 2

```
$ cat dbo9c
```

```
select * from test_table;
```

```
CSV
```

```
$ iput dbo9c
```

```
$ isysmeta mod dbo9c datatype 'database object'
```

```
$ idbo exec dbr2 dbo9c
```

```
id1,user_name,user_type
```

```
1,user1,type1
```

```
2,user2,type2
```



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Example 3

```
$ cat dbo10
```

```
select * from test_table where id1=?;
```

```
$ idbo exec dbr2 dbo10 2
```

```
<dbr>dbr2</dbr>
```

```
<sql>select * from test_table where id1=?;</sql>
```

```
<arg>2</arg>
```

```
<column_descriptions>
```

```
id1|user_name|user_type|
```

```
<\column_descriptions>
```

```
<rows>
```

```
2|user2|type2|
```

```
<\rows>
```

```
$
```



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```
$ idbo
idbo>output dbor
'exec' results will be stored in /newZone/home/rods/dbor
idbo>exec dbr2 ltc.pg
Output written to /newZone/home/rods/dbor
idbo>quit
$ iget dbor
$ more dbor
Schema,Name,Type,Owner
public,cadc_config_archive_case,table,schroeder
public,cadc_config_compression,table,schroeder
public,cadc_config_format,table,schroeder
public,r_coll_main,table,schroeder
[...]
$ ils -l dbor
rods      0 demoResc  1327 2011-02-09.07:52 & dbor
```



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DBO Execution

- 'idbo'
 - Exec
 - Output
 - Also open/close/commit/rollback
 - Is
- 'msiDboExec'
 - Also msiDbrCommit/Rollback
 - Would need Open/Close
 - 'msiDboExec' does it all



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Summary

- Solid Foundation (intended)
- Building on:
 - Data-object Management
 - Access Control
 - Rules/Micro-services
 - ICAT software
- Will Evolve for Specific Project Needs



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Additional Information

- DBR and DBO Pages on irods.org
- 'idbo -h'
- Other i-command help, iadmin, etc



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