

Oracle Database Management REST API

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At a Glance

- Manage & Monitor your Oracle Database
- Supports 11gR2, 12, 18, & 19c
- REST Endpoints backed by ORDS
- General, Data Dictionary, Monitoring, Performance, & PDB Lifecycle Management
- Database User Authentication via REST Enabled Schemas



Getting Started

- Install ORDS 19.1 or higher and configure your database
- Enable the DB API

```
<entry key="database.api.enabled">true</entry>
```

- REST Enable an ADMIN Schema w/DBA (11g) or PDB_DBA (12c+) role
- OpenAPI {Swagger/JSON} doc available at
/ords/hr/_/db-api/latest/metadata-catalog/openapi.json

Configuring User for DB API

Option #1, Mid Tier User:

```
c:\ORDS\19.1-GA>java -jar ords.war user jeff "SQL Administrator"  
Enter a password for user jeff:  
Confirm password for user jeff:  
Apr 23, 2019 9:38:54 AM oracle.dbtools.standalone.ModifyUser execute  
INFO: Created user: jeff in file: C:\ORDS\config\ords\credentials
```

Option #2, DB User:

```
1 BEGIN -- block to be executed as HR  
2   ords.enable_schema (  
3     p_enabled      => true,  
4     p_schema       => 'HR',  
5     p_url_mapping_type => 'BASE_PATH',  
6     p_url_mapping_pattern => 'hr',  
7     p_auto_rest_auth => true  
8   );  
9  
10  COMMIT;  
11 END;  
12 /  
13  
14 GRANT dba TO hr; -- or PDB_DBA for 12c+
```

API Docs

The screenshot shows the Oracle Help Center page for "REST APIs for Oracle Database". The main heading is "Data Dictionary REST Endpoints". Below the heading, there are several sections for different operations, each with a "GET" method and a specific path. The operations listed are:

- Get a database link**: Method: GET, Path: /database/dw_links/{owner}, {dw_link}
- Get a partition**: Method: GET, Path: /database/objects/partitions/{table_owner}, {table_name}, {partition_name}
- Get a procedure that is defined in package**: Method: GET, Path: /database/objects/packages/procedures/{object_id}, {subprogram_id}
- Get a specific column**: Method: GET, Path: /database/objects/columns/{owner}, {table_name}, {column_name}
- Get a specific foreign keys**: Method: GET, Path: /database/objects/foreign_keys/{owner}, {constraint_name}

[Oracle Docs](#)

The screenshot shows a Swagger UI interface for a REST API. The URL is localhost:8080/ords/hr/_/db-api/latest/metadata-catalog/openapi.json. The Swagger JSON is displayed in a code editor, showing the API's metadata, including the title "ORDS Database API", version "19.1.0", and a list of endpoints. The endpoints are categorized by path, such as /database/components and /database/dw_links. The Swagger UI also shows a "Try it out" button and a "Request body" field.

Swagger.JSON Mounted to API

Example: All Invalid Objects - Docs

- Find the right end point
- Try it out

The screenshot displays the Oracle REST API Explorer interface. On the left, a 'Tasks' sidebar lists various database-related endpoints, with 'Get all database objects' highlighted. The main panel shows the details for the endpoint `/database/objects/`. It includes a 'GET' method, a description 'Returns all records from DBA_OBJECTS.', and a 'Request' section with 'Supported Media Types' set to `application/json`. The 'Query Parameters' section lists `limit(optional): integer(int32)` (The maximum number of records to return) and `q(optional): string` (Filtering is the process of limiting a collection resource by using a per-request dynamic filter definition across multiple page resources, where each page contains a subset of items found in the complete collection. Filtering enables efficient traversal of large collections.). Below this is the 'Response' section, also with 'Supported Media Types' set to `application/json`. The '200 Response' section describes the response as 'All database objects in the database. Returns all records from DBA_OBJECTS.' and shows the 'Body (ItemsCollection)' structure with fields: `count(optional): integer`, `hasMore(optional): boolean`, `items(optional): array items`, and `limit(optional): integer`. A 'Show Source' link is visible next to the response body.

Example: All Invalid Objects – Method + URL

```
GET http://localhost:8080/ords/hr/_/db-api/latest/database/objects/
```

- ORDS is running Standalone `localhost:8080/ords`
- HR is the REST Enable Schema with DBA `/hr`
- DB API mounted to `_/db-api`
- Version of API `/latest`
 - `/latest` or `/stable` => current version
 - `/19.1.0` => specific version
- Objects URI `/database/objects/`

Example: All Invalid Objects - Response

```
{
  "items": [
    {
      "owner": "SYS",
      "object_name": "I_FILE#_BLOCK#",
      "subobject_name": null,
      "object_id": 9,
      "data_object_id": 9,
      "object_type": "INDEX",
      "created": "2017-01-26T18:52:53Z",
      "last_ddl_time": "2017-01-26T18:52:53Z",
      "timestamp": "2017-01-26:13:52:53",
      "status": "VALID",
      "temporary": "N",
      "generated": "N",
      "secondary": "N",
      "namespace": 4,
      "edition_name": null,
      "sharing": "NONE",
      "editionable": null,
      "oracle_maintained": "Y",
      "application": "N",
      "default_collation": null,
      "duplicated": "N",
      "sharded": "N",
      "created_appid": null,
      "created_vsnid": null,
      "modified_appid": null,
      "modified_vsnid": null,
      "links": [
        {
          "rel": "self",
          "href": "http://localhost:8080/ords/hr/_/db-api/19.1.0/database/objects/SYS,I_FILE%23_BLOCK%23"
        }
      ]
    }
  ]
}
```

OWNER	OBJECT_NAME	SUBOBJECT_NAME	OBJECT_ID	DATA_OBJECT_ID	OBJECT_TYPE	CREATED	LAST_DDL_TIME
SYS	I_FILE#_BLOCK#	(null)	9	9	INDEX	26-JAN-17 13:52:53	26-JAN-17 13:52:53
SYS	I_OBJ3	(null)	38	38	INDEX	26-JAN-17 13:52:53	26-JAN-17 13:52:53
SYS	I_TS1	(null)	45	45	INDEX	26-JAN-17 13:52:53	26-JAN-17 13:52:53
SYS	I_CON1	(null)	51	51	INDEX	26-JAN-17 13:52:53	26-JAN-17 13:52:53
SYS	IND\$	(null)	19	2	TABLE	26-JAN-17 13:52:53	26-JAN-17 13:52:53
SYS	CDEF\$	(null)	31	29	TABLE	26-JAN-17 13:52:53	26-JAN-17 13:52:53
SYS	C_TS#	(null)	6	6	CLUSTER	26-JAN-17 13:52:53	26-JAN-17 13:52:53
SYS	I_CCOL2	(null)	58	58	INDEX	26-JAN-17 13:52:53	26-JAN-17 13:52:53
SYS	I_PROXY_DATA\$	(null)	24	24	INDEX	26-JAN-17 13:52:53	26-JAN-17 13:52:53
SYS	I_CDEF4	(null)	56	56	INDEX	26-JAN-17 13:52:53	26-JAN-17 13:52:53
SYS	I_TAB1	(null)	33	33	INDEX	26-JAN-17 13:52:53	26-JAN-17 13:52:53
SYS	CLU\$	(null)	5	2	TABLE	26-JAN-17 13:52:53	26-JAN-17 13:52:53
SYS	I_PROXY_ROLE_DATA\$ 1	(null)	26	26	INDEX	26-JAN-17 13:52:53	26-JAN-17 13:52:53

DBA_OBJECTS in {JSON} with links to individual objects

Example: All Invalid Objects - Paging

```
"hasMore": true,
"limit": 25,
"offset": 0,
"count": 25,
"links": [
  {
    "rel": "self",
    "href": "http://localhost:8080/ords/hr/_/db-api/19.1.0/database/objects/"
  },
  {
    "rel": "describedby",
    "href": "http://localhost:8080/ords/hr/_/db-api/19.1.0/metadata-catalog/"
  },
  {
    "rel": "first",
    "href": "http://localhost:8080/ords/hr/_/db-api/19.1.0/database/objects/"
  },
  {
    "rel": "next",
    "href": "http://localhost:8080/ords/hr/_/db-api/19.1.0/database/objects/?offset=25"
  }
]
}
```

Paged Results (default pagesize 25)

Example: All Invalid Objects - Filtering

Getting ONLY Invalid Objects

Query Parameters on the URI

```
/ords/hr/_/db-api/19.1.0/database/objects/?q={"$eq":{"status":"INVALID"}}
```

```
/database/objects/?q={"$eq":{"status":"INVALID"}} Send 200 OK TIME 313 ms SIZE
```

```
ocs
Preview
Header 4
Cookie
67
68   }
69 ]
70 },
71 {
72   "owner": "PUBLIC",
73   "object_name": "HTMLDB_APP
74   "subobject_name": null,
75   "object_id": 76851,
76   "data_object_id": null,
77   "object_type": "SYNONYM",
78   "created": "2017-03-02T02:
79   "last_ddl_time": "2017-03-
80   "timestamp": "2017-03-01:2
81   "status": "INVALID",
82   "temporary": "N",
83   "generated": "N",
84   "secondary": "N",
85   "namespace": 1,
86   "edition_name": null,
```

New query is now

```
SELECT *
FROM DBA_OBJECTS
WHERE STATUS = 'INVALID';
```

[Query Filtering Docs](#)

Example: Data Pump

POST /database/datapump/export Create an export data pump job

Create a Data Pump export job with the specified parameters and start it. Refer to Oracle Data Pump documentation for a more detailed explanation of parameters. Export operation only permitted in this implementation version.

Parameters Try it out

No parameters

Request body required application/json

Example Value | Schema

```
{
  "datapump_dir": "string",
  "filter": "string",
  "job_mode": "SCHEMA",
  "threads": 0
}
```

- Inputs
 - What directory?
 - What type of export?
 - How many threads?
 - What are we exporting?
- Response
 - Links to get status/log

Example: Data Pump – Export 2 Tables in Local Schema (HR)

POST http://localhost:8080/ords/hr/_/db-api/latest/database/datapump/export

POST BODY

```
{
  "datapump_dir": "DATA_PUMP_DIR",
  "filter": "HOCKEY_STATS, UNTAPPD",
  "job_mode": "TABLE",
  "threads": 2
}
```

Response

```
201 Created  TIME 4.73 s  SIZE 711 B  ⌵
Preview ▾  Header 5  Cookie  Timeline
1 - {
2   "job_name": "DATAPUMP_REST_EXPORT_20190105140710",
3   "owner_name": "HR",
4   "operation": "EXPORT",
5   "job_mode": "TABLE",
6   "state": "EXECUTING",
7   "degree": 2,
8   "attached_sessions": 0,
9   "datapump_sessions": 2,
10  "job_state": "EXECUTING",
11  "links": [
12    {
13      "rel": "collection",
14      "href": "http://localhost:8080/ords/hr/_/db-api/19.1.0/database/datapump/jobs/"
15    },
16    {
17      "rel": "describedby",
18      "href": "http://localhost:8080/ords/hr/_/db-api/19.1.0/metadata-catalog/"
19    },
20    {
21      "rel": "related",
22      "href": "http://localhost:8080/ords/hr/_/db-api/19.1.0/database/datapump/jobs/HR,DATAPUMP_REST_EXPORT_20190105140710/EXPDAT-2019-05-01-14_07_11.LOG"
23    },
24    {
25      "rel": "self",
26      "href": "http://localhost:8080/ords/hr/_/db-api/19.1.0/database/datapump/jobs/HR,DATAPUMP_REST_EXPORT_20190105140710/"
27    }
28  ]
29 }
```

Example: Data Pump – Resources Created

```
"links": [  
  {  
    "rel": "related",  
    "href": "http://localhost:8080/ords/hr/_/db-api/19.1.0/database/datapump/jobs/HR, DATAPUMP_REST_EXPORT_20190105140710/EXPDAT-2019-05-01-14_07_11.LOG"  
  },  
  {  
    "rel": "self",  
    "href": "http://localhost:8080/ords/hr/_/db-api/19.1.0/database/datapump/jobs/HR, DATAPUMP_REST_EXPORT_20190105140710/"  
  }  
]
```

Job Log File

The Job and its metadata

Example: Data Pump – Log File

```
localhost:8080/ords/hr/_db-api/ x +
localhost:8080/ords/hr/_db-api/19.1.0/database/datapump/jobs/HR,DATAPUMP_REST_EXPORT_20190105140710/EXPDAT-2019-05-01-14_07_11.LOG

Starting "HR"."DATAPUMP_REST_EXPORT_20190105140710":
;;; Data Pump EXPORT created through Oracle REST Data Services Database API.
Processing object type TABLE_EXPORT/TABLE/STATISTICS/TABLE_STATISTICS
Processing object type TABLE_EXPORT/TABLE/TABLE_DATA
. estimated "HR"."HOCKEY_STATS":"SYS_P681"          2.181 MB
. estimated "HR"."HOCKEY_STATS":"SYS_P683"          2.078 MB
. estimated "HR"."HOCKEY_STATS":"P2"                1.636 MB
. estimated "HR"."HOCKEY_STATS":"P1"                1.236 MB
. estimated "HR"."HOCKEY_STATS":"SYS_P682"          956.6 KB
. estimated "HR"."UNTAPPD"                          635.5 KB
Processing object type TABLE_EXPORT/TABLE/TABLE
Processing object type TABLE_EXPORT/TABLE/STATISTICS/MARKER
Processing object type TABLE_EXPORT/TABLE/COMMENT
. . exported "HR"."HOCKEY_STATS":"SYS_P681"          2.194 MB    9513 rows
. . exported "HR"."HOCKEY_STATS":"SYS_P683"          2.115 MB    9174 rows
. . exported "HR"."HOCKEY_STATS":"P2"                1.656 MB    7132 rows
. . exported "HR"."HOCKEY_STATS":"P1"                1.252 MB    5332 rows
. . exported "HR"."HOCKEY_STATS":"SYS_P682"          975.0 KB    4065 rows
. . exported "HR"."UNTAPPD"                          646.2 KB    1836 rows
Master table "HR"."DATAPUMP_REST_EXPORT_20190105140710" successfully loaded/unloaded
*****
Dump file set for HR.DATAPUMP_REST_EXPORT_20190105140710 is:
/u01/app/oracle/admin/orcl12c/dpdump/49B6C41A4C152576E0530100007FEDA7/EXPDAT012019-05-01-14_07_11.DMP
/u01/app/oracle/admin/orcl12c/dpdump/49B6C41A4C152576E0530100007FEDA7/EXPDAT022019-05-01-14_07_11.DMP
Job "HR"."DATAPUMP_REST_EXPORT_20190105140710" successfully completed at Wed May 1 14:07:40 2019 elapsed 0 00:00:29
```

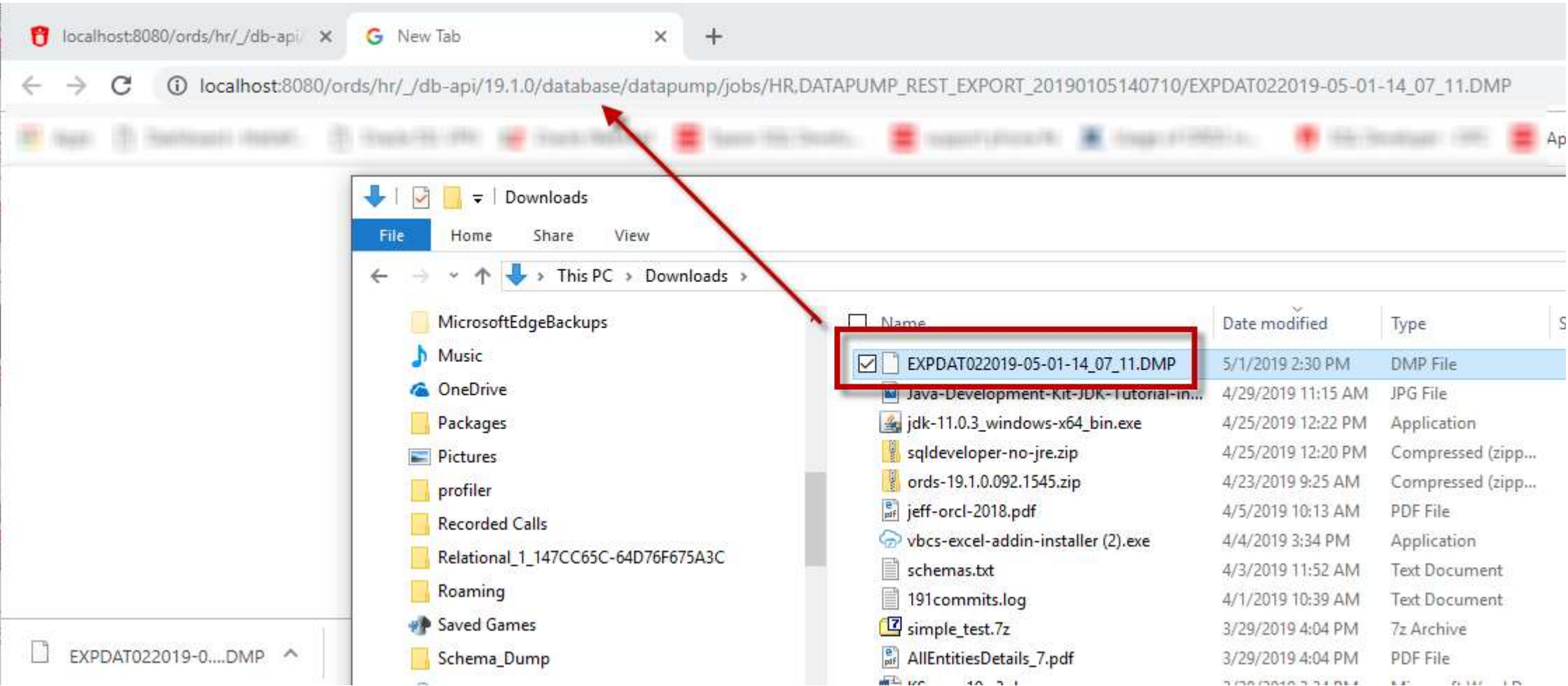


Example: Data Pump – Job Details

```
localhost:8080/ords/hr/_db-api/ x +
localhost:8080/ords/hr/_db-api/19.1.0/database/datapump/jobs/HR.DATAPUMP_REST_EXPORT_20190105140710/

{
  "job_name": "DATAPUMP_REST_EXPORT_20190105140710",
  "owner_name": "HR",
  "operation": "EXPORT",
  "job_mode": "TABLE",
  "state": "NOT RUNNING",
  "degree": 0,
  "attached_sessions": 0,
  "datapump_sessions": 0,
  "job_state": "COMPLETED",
  "job_comment": "Job \"HR\".\"DATAPUMP_REST_EXPORT_20190105140710\" successfully completed at Wed May 1 14:07:40 2019 elapsed 0 00:00:29",
  "links": [
    {
      "rel": "collection",
      "href": "http://localhost:8080/ords/hr/_db-api/19.1.0/database/datapump/jobs/"
    },
    {
      "rel": "describedby",
      "href": "http://localhost:8080/ords/hr/_db-api/19.1.0/metadata-catalog/"
    },
    {
      "rel": "enclosure",
      "href": "http://localhost:8080/ords/hr/_db-api/19.1.0/database/datapump/jobs/HR,DATAPUMP_REST_EXPORT_20190105140710/EXPDAT012019-05-01-14_07_11.DMP"
    },
    {
      "rel": "enclosure",
      "href": "http://localhost:8080/ords/hr/_db-api/19.1.0/database/datapump/jobs/HR,DATAPUMP_REST_EXPORT_20190105140710/EXPDAT022019-05-01-14_07_11.DMP"
    },
    {
      "rel": "related",
      "href": "http://localhost:8080/ords/hr/_db-api/19.1.0/database/datapump/jobs/HR,DATAPUMP_REST_EXPORT_20190105140710/EXPDAT-2019-05-01-14_07_11.LOG"
    },
    {
      "rel": "self",
      "href": "http://localhost:8080/ords/hr/_db-api/19.1.0/database/datapump/jobs/HR,DATAPUMP_REST_EXPORT_20190105140710/"
    }
  ]
}
```

Example: Data Pump – Download the DMP!



Example: Data Pump – What it looks like in the database

The screenshot displays the Oracle SQL Developer interface. The top window shows the job status for 'HR.DATAPUMP_REST_EXPORT_20190105140710'. The job is in a 'NOT RUNNING' state. Below this, the 'LOG FILES' window shows the execution log for the job, detailing the processing of various objects and the successful completion of the master table export.

OWNER_NAME	JOB_NAME	JOB_MODE	STATE	DEGREE	ATTACHED_SESSIONS	DATAPUMP_SESSIONS
HR	DATAPUMP_REST_EXPORT_20190105140710	TABLE	... NOT RUNNING	0	0	0

```
18
19 Starting "HR"."DATAPUMP_REST_EXPORT_20190105140710":
20 ;;; Data Pump EXPORT created through Oracle REST Data Services Database API.
21 Processing object type TABLE_EXPORT/TABLE/STATISTICS/TABLE_STATISTICS
22 Processing object type TABLE_EXPORT/TABLE/TABLE_DATA
23 . estimated "HR"."HOCKEY_STATS":"SYS_P681"          2.181 MB
24 . estimated "HR"."HOCKEY_STATS":"SYS_P683"          2.078 MB
25 . estimated "HR"."HOCKEY_STATS":"P2"                1.636 MB
26 . estimated "HR"."HOCKEY_STATS":"P1"                1.236 MB
27 . estimated "HR"."HOCKEY_STATS":"SYS_P682"          956.6 KB
28 . estimated "HR"."UNTAPPD"                          635.5 KB
29 Processing object type TABLE_EXPORT/TABLE/TABLE
30 Processing object type TABLE_EXPORT/TABLE/STATISTICS/MARKER
31 Processing object type TABLE_EXPORT/TABLE/COMMENT
32 . . exported "HR"."HOCKEY_STATS":"SYS_P681"          2.194 MB    9513 rows
33 . . exported "HR"."HOCKEY_STATS":"SYS_P683"          2.115 MB    9174 rows
34 . . exported "HR"."HOCKEY_STATS":"P2"                1.656 MB    7132 rows
35 . . exported "HR"."HOCKEY_STATS":"P1"                1.252 MB    5332 rows
36 . . exported "HR"."HOCKEY_STATS":"SYS_P682"          975.0 KB    4065 rows
37 . . exported "HR"."UNTAPPD"                          646.2 KB    1836 rows
38 Master table "HR"."DATAPUMP_REST_EXPORT_20190105140710" successfully
39 loaded/unloaded
```

What's Next?

Features Planned for CY2019

- OS Monitoring Endpoints (CPU, DISK, MEMORY, PROCESSES)
- DBCA
- Data Pump (complete)