



# Implementing SQL Security for CA IDMS™ SQL

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## Abstract

Turning on SQL security is more than Granting and Revoking privileges on tables. (That's the easy part.) This session provides insight into the implementation steps used at our site. We will touch on: changes to the RHDCSRTT load module, the many database components that now have to be managed, using GROUPS, Granting privileges using wildcards, and the dictionary and catalogs where the privileges are held. There will also be a few tips on how IDMS internal security works.

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## Biography

Mr. McRoberts has been using CA IDMS since release 4.5. During his career, he has touched almost all aspects of the CA IDMS support including: programming, application DBA support, CA IDMS system administration, performance and tuning, security configuration, software installation and maintenance. Most recently, the CA IDMS SQL components are being thoroughly used to send, receive, and manage XML transactions.

## Agenda

- What are the Requirements?
- RHDCSRTT / Resource Type DB
- Before you Start
- Enabling DB Security
- Managing the Privileges
- Testing
- General Updates
- Q&A

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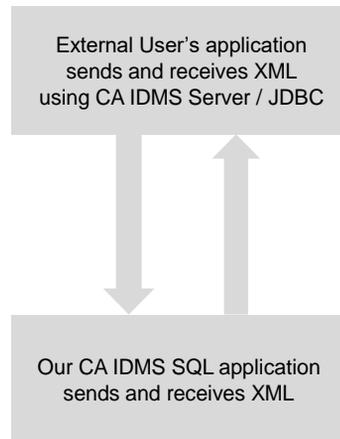
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## What are the Requirements?



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## What are the Requirements?



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## What are the Requirements?

- What are the requirements?
  - Make sure an external user can only access what is needed
  - Cannot browse the database
- What entities need to be secured or what is allowed?
  - Every SQL DDL, DML, and DCL command
  - SELECT to run three SQL procedures
- Who needs access?
  - The external user through CA IDMS Server with JDBC
  - Everyone that uses anything in the secured system

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## What are the Requirements?

- External application - execute three SQL procedures
  - One to send us data
  - A second to retrieve/pull data
  - the third to acknowledge their successful processing of the retrieve
- Our application and users
  - Execute online and batch programs
  - Internal website

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## RHDCSRTT

*Resource Type DB*

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## RHDCSRTT

Resource type DB

- RHDCSRTT – Load module
  - Assembled and linked using #SECR TT macro
  - TYPE=ENTRY
  - TYPE=OCCURRENCE
- Sample #SECR TT to enable database security
  - \* DATABASE
 

```
#SECR TT TYPE=ENTRY,           X
          RESTYPE=DB,             X
          SECBY=INTERNAL
```
- That one macro secures EVERYTHING
  - All I wanted to do was manage three SQL commands!

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## RHDCSRTT

Resource type DB

- Database
- DBADMIN privilege
- Access Module
- Area
- Run Unit
- SQL-defined schema
- Non-SQL-defined schema
- **Table** - this is all I wanted to control

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# Before you Start



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## Before you Start

- CA IDMS Security Administration Guide
- Get the source for the current RHDCSRTT
  - Decompile if needed
- You need your own system or do the work off hours
- You need to be able start, shutdown, and occasionally cancel the CV
- Use the DCMT Vary NUCLEUS RHDCSRTT NC and the DCMT V NUCLEUS RELOAD

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## Before you Start

- You will need multiple IDs:
  - One with all authority (SYSADMIN). To GRANT and REVOKE privileges.
    - Remember that SYSADMIN does not give you all privileges. It provides the authority to GRANT/REVOKE any privilege.
    - The ID that created the SQL entity (table, view, etc.) automatically has all privileges
  - One with the authority you can change to test the security controls (Emulate the end users)
  - One to emulate developers that use the secured dictionary
  - Your complexity may require more IDs

## Before you Start

- Use Wildcards whenever possible
- Wildcards don't override a more restrictive resource definition
  - `GRANT SELECT ON TABLE ESB.ACKNOWLEDGE TO ESB_TRANSACTIONS;`
  - `GRANT SELECT ON TABLE ESB.* TO PUBLIC;`

# Enabling DB Security



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## Enabling DB Security

- Additional entries for the RHDCSRTT assembly using wildcards
- \* ENABLE SECURITY FOR ALL SEGMENTS AND DBNAMES THAT BEGIN WITH "DICT"
- \* DATABASE SECURITY - DICT
 

#SECR TT TYPE=OCCURRENCE,	X
RESTYPE=DB,	X
RESNAME='DICT', <- this is a wild card	X
SECBY=INTERNAL	
- \* 5/6/16 ENABLE SECURITY
- \* DATABASE SECURITY - SYSSQL CATALOG
 

#SECR TT TYPE=OCCURRENCE,	X
RESTYPE=DB,	X
RESNAME='SYSSQL', <- this is a wild card	X
SECBY=INTERNAL	

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## Enabling DB Security

- **DICTIONARY** = DDLML + Catalog are now secured as one entity
  - SYSTEM Dictionary = SYSTEM segment + CATSYS segment
  - DICTAPPL Dictionary = DICTAPPL segment + SYSSQL segment
- Turning on DB security locks everything database related
  - SQL commands (DDL, DML, and DCL)
  - Access Modules
  - Run Units

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## Managing the Privileges



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## Managing the Privileges

- Global resources (users and groups)
  - DISPLAY ALL USER;
  - DISPLAY ALL GROUP;
    - These DISPLAY commands don't return anything if you are not authorized. No security violation.
  - Give yourself the privilege to create users and groups
    - GRANT DEFINE ON GROUP \* TO "group or user";
    - GRANT DEFINE ON USER \* TO "group or user";

## Managing the Privileges

- A GROUP is a global resource and can be added from any dictionary
- Create a group for the external user
  - CREATE GROUP ESB\_TRANSACTIONS;

## Managing the Privileges

- Security doesn't differentiate the various SQL entities. Everything is a TABLE.
  - Tables, Views, Procedures, Table Procedures, Functions
- Grant access to the SQL "table" in the Application Dictionary
  - `CONNECT TO DICTAPPL;`
  - `GRANT SELECT ON TABLE ESB.ACKNOWLEDGE TO ESB_TRANSACTIONS;`
  - `GRANT SELECT ON TABLE ESB.SEND_DATA TO ESB_TRANSACTIONS;`
  - `GRANT SELECT ON TABLE ESB.RECEIVE_DATA TO ESB_TRANSACTIONS;`

## Managing the Privileges

- The SEND\_DATA SQL procedure also invokes an SQL procedure. That also has to be managed.
  - `GRANT SELECT ON TABLE ESB.PROCESS_INCOMING TO ESB_TRANSACTIONS;`

## Managing the Privileges

- Access Modules are a specific type of load module
- Only created for programs that have embedded SQL commands
- Managed using a RESOURCE CATEGORY
  - One of many SYSTEM RESOURCES
  - Resource names are unique / cannot exist in more than one resource category
  - Changes to resource categories usually require a security system refresh – DCMT command or cycle the system

## Managing the Privileges

- Create the Resources
  - **CONNECT TO SYSTEM;**
  - CREATE RESOURCE CATEGORY ESB\_ACKNOWLEDGE
    - **DICTIONARY.SCHEMA.ACCESS-MODULE**
    - ADD ACCESS MODULE DICTAPPL.ESB.ESBDACKD
    - ADD ACCESS MODULE DICTAPPL.ESB.ESBP0006
    - ADD ACCESS MODULE DICTAPPL.ESB.ESBP0206;
  - CREATE RESOURCE CATEGORY ESB\_SEND\_DATA
    - ADD ACCESS MODULE DICTAPPL.ESB.ESBCXML0;
  - CREATE RESOURCE CATEGORY ESB\_RECEIVE\_DATA
    - ADD ACCESS MODULE DICTAPPL.ESB.ESBP0014;

## Managing the Privileges

- GRANT EXECUTE ON CATEGORY ESB\_ACKNOWLEDGE TO ESB\_TRANSACTIONS;
- GRANT EXECUTE ON CATEGORY ESB\_SEND\_DATA TO ESB\_TRANSACTIONS;
- GRANT EXECUTE ON CATEGORY ESB\_RECEIVE\_DATA TO ESB\_TRANSACTIONS;

## Managing the Privileges

- Access Modules for online users and batch jobs
  - CREATE RESOURCE CATEGORY SQL\_ACCESS\_MODULES  
ADD ACCESS MODULE DICTAPPL.ESB.\* ;
  - GRANT EXECUTE ON CATEGORY SQL\_ACCESS\_MODULES TO ESB\_TRANSACTIONS;
  - GRANT EXECUTE ON CATEGORY SQL\_ACCESS\_MODULES TO BATCH\_JOBS;  
-- IDS used for batch jobs that now use ACCESS MODULES
  - GRANT EXECUTE ON CATEGORY SQL\_ACCESS\_MODULES TO TEST\_TEAM;  
-- An existing group of users of this test system.

## Managing the Privileges

- Database security also enabled RUN UNIT controls
  - ```
CREATE RESOURCE CATEGORY ALLDBS
  -- Rununit name: database.subschema.program
```
  - ```
ADD RUNUNIT ALLDBS.*  -- DBNAME
  ADD RUNUNIT DBAISCHE.* -- The rest are Segments
  ADD RUNUNIT ESBTSEGM.*
  ADD RUNUNIT MENUSCHE.*
  ADD RUNUNIT SYSMSG.*
  ;
```
  - ```
GRANT EXECUTE ON CATEGORY ALLDBS TO BATCH_JOBS;
```
  - ```
GRANT EXECUTE ON CATEGORY ALLDBS TO TEST_TEAM;
```

## Testing

## Testing

- Down stream fallout
  - Application developers now need access to the tables
- As the OWNER of the schema, tables, views, etc.
  - I automatically have all rights
  - What if others need to manage the tables
- Either GRANTS to a user or group
- My preference is TRANSFER OWNERSHIP to a group

## Testing

- IDMS Internal security uses multiple locations depending on the resource type
  - SYSTEM.DDLDMML
  - CATSYS.DDLDCAT
  - SYSSQL.DDLDCAT
- Error Status 1410
  - When the run unit definitions are incomplete or the privileges haven't been granted
- SQL Security messages DB005520 & DB005521
  - Now write to the IDMS log (RO98684)

## Testing

- Privileges mysteriously vanish
  - GRANT SELECT ON TABLE ESB.ACKNOWLEDGE TO ESB\_TRANSACTIONS;
  - DROP VIEW ESB.ACKNOWLEDGE;
    - The GRANT is removed when the resource name matches an SQL entity.
  - CREATE VIEW ESB.ACKNOWLEDGE ...
  - GRANT SELECT ON TABLE ESB.ACKNOWLEDGE TO ESB\_TRANSACTIONS;
    - OR
  - GRANT SELECT ON TABLE **ESB.ACKNOWLEDGE\*** TO ESB\_TRANSACTIONS;
    - The GRANT is NOT removed because of the wild card.

## Testing

- Use SQL to help understand where security definitions are stored
  - CONNECT TO SYSTEM;
  - CREATE SCHEMA IDMSSECS  
FOR NONSQL SCHEMA SYSDIRL.IDMSSECS VERSION 1;
  - SELECT AUTHID  
FROM IDMSSECS.RESGROUPAUTH  
WHERE RESOURCENAME = 'SQL\_ACCESS\_MODULES';  
\*+ AUTHID  
\*+ -----  
\*+ ESB\_TRANSACTIONS  
\*+ BATCH\_JOBS  
\*+ TEST\_TEAM  
\*+ 3 rows processed

## Testing

- SQL security definitions are defined and maintained in the catalog where the SQL table definitions reside
- IDMSBCF in LOCAL
  - Run DISPLAY commands to see the definitions
  - Under SYSIDMS include
    - LOCAL=ON
    - DMLTRACE=ON
  - SYSLST will tell you where the resources are located

## Summary

- At our site, SQL security is working exactly as intended
  - We have only configured and used it in our first test environment
  - There could be changes and additions as we move forward
- The ID450 class included a Security Supplement
  - It is more of a "cookbook" to help get all things security started
- RHDCSRTT decompiler
  - The IUA has a utility that reads the RHDCSRTT load module and writes the macros
  - R19 includes a new DCMT command to decompile / create the source

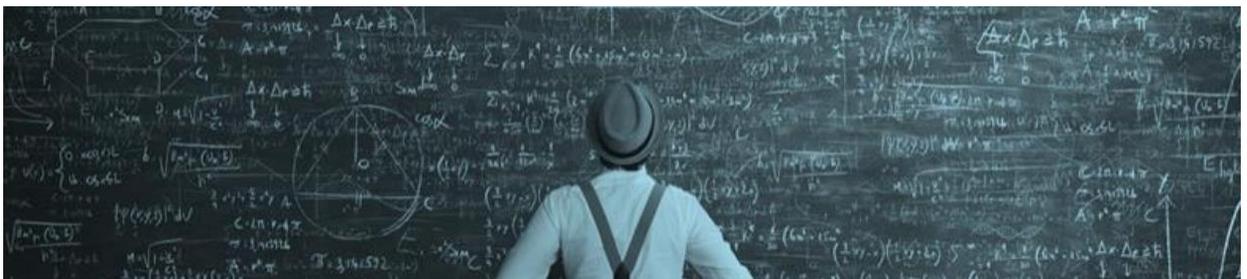


# General Announcements

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## Monthly Database Community Webcasts

- Mark your Calendars!
- Monthly webcasts:
  - CA Datacom 2<sup>nd</sup> Thursday of each month @ 11:00 (ET)
  - CA IDMS 3<sup>rd</sup> Thursday of each month @ 11:00 (ET)
- What topics would you like us to cover?
  - Please indicate within the session survey



## Webcast: "[CA IDMS Roadmap Update](#)"

When: Jun 16, 2021 from 11:00 AM to 12:00 PM (ET)

Associated with [CA IDMS IUA EIU](#)

Join our CA IDMS Product Roadmap Session to get a clear view of what's coming down the road for the product, including details on upcoming product functionality, features, and architectural enhancements.

## Mainframe Technical Exchange October 5-7, 2021

- Save the date to connect with peers and Mainframe technical experts
- Education sessions, product strategy & ideation
- No Registration Fee! Open to all Broadcom customers
- Bookmark the event page for the latest event updates: <http://bit.ly/2021TechExchange>



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Security

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## Questions & Answers



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# Thank You

## Appendix

*Sample RHDCSRTT source*



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## Sample RHDCSRTT source

```

SRTT      TITLE 'IDMS/DC SECURITY RESOURCE TYPE TABLE'
          EJECT
*
*      This SRTT moves ALL TASK security to internal except for
*      the required entries that have to be unsecured here:
*      SIGNON, CASERVER, RHDCNP3S, RHDCNP3J, etc.
*      PHMCROB 2016/5/10
*
*      CHANGED DICTAPPL TO "DICT" TO ENABLE SECURITY FOR
*      FOR DICTAPPL, DICTESBT, AND DICTDBA 2016-05-06
*
* INITIAL
*      #SECR TT TYPE=INITIAL,
*      ENVNAME=ESBTCNVR,
*      SYSPROF=DEFAULT,
*      SVCNUM=174
*
* SIGNON SECURITY
*      #SECR TT TYPE=ENTRY,
*      RESTYPE=SGON,
*      SECBY=EXTERNAL,
*      EXTCLS='SGO',
*      EXTNAME=(RESNAME),
*      SAFSUPP=YES
*
* SYSTEM ACCESS
*      #SECR TT TYPE=ENTRY,
*      RESTYPE=SYST,
*      SECBY=INTERNAL
*
* USER MAINTENANCE
*      #SECR TT TYPE=ENTRY,
*      RESTYPE=USER,
*      SECBY=INTERNAL
*
* GROUP MAINTENANCE
*      #SECR TT TYPE=ENTRY,
*      RESTYPE=GROU,
*      SECBY=INTERNAL
*
* USER PROFILE MAINTENANCE
*      #SECR TT TYPE=ENTRY,
*      RESTYPE=UPRF,
*      SECBY=INTERNAL

```

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## Sample RHDCSRTT source

```

* DCADMIN - DC ADMINISTRATION
*      #SECR TT TYPE=ENTRY,
*      RESTYPE=DCA,
*      SECBY=INTERNAL
*
* SYSADMIN - SYSTEM ADMINISTRATION
*      #SECR TT TYPE=ENTRY,
*      RESTYPE=SYSA,
*      SECBY=INTERNAL
*
* SYSTEM PROFILE MAINTENANCE
*      #SECR TT TYPE=ENTRY,
*      RESTYPE=SPRF,
*      SECBY=INTERNAL
*
* EVERYTHING DATABASE
*      #SECR TT TYPE=ENTRY,
*      RESTYPE=DB,
*      SECBY=OFF
*
* DMCL MAINTENANCE
*      #SECR TT TYPE=ENTRY,
*      RESTYPE=DMCL,
*      SECBY=INTERNAL
*
* DBNAME TABLE MAINTENANCE
*      #SECR TT TYPE=ENTRY,
*      RESTYPE=DBTB,
*      SECBY=INTERNAL
*
* DEFAULT FOR ALL ENTRIES IS OFF
*

```

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## Sample RHDCSRTT source

```

*
* TASK - Lock all tasks
* #SECR TT TYPE=ENTRY, X
*   RESTYPE=TASK, X
*   SECBY=INTERNAL
*
* TASK - UNLOCK the required tasks
* #SECR TT TYPE=OCCURRENCE, X
*   RESTYPE=TASK, X
*   RESNAME='SIGNON', X
*   SECBY=OFF
* #SECR TT TYPE=OCCURRENCE, X
*   RESTYPE=TASK, X
*   RESNAME='CASERVER', X
*   SECBY=OFF
* #SECR TT TYPE=OCCURRENCE, X
*   RESTYPE=TASK, X
*   RESNAME='RHDCNP3S', X
*   SECBY=OFF
* #SECR TT TYPE=OCCURRENCE, X
*   RESTYPE=TASK, X
*   RESNAME='RHDCNP3J', X
*   SECBY=OFF
* #SECR TT TYPE=OCCURRENCE, X
*   RESTYPE=TASK, X
*   RESNAME='IDMSJSRV', X
*   SECBY=OFF
*
* ACTIVITIES
* #SECR TT TYPE=ENTRY, X
*   RESTYPE=ACTI, X
*   SECBY=INTERNAL
*
* CATEGORY
* #SECR TT TYPE=ENTRY, X
*   RESTYPE=CATE, X
*   SECBY=INTERNAL

```

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## Sample RHDCSRTT source

```

*
* DATABASE SECURITY - SYSTEM CATALOG
* #SECR TT TYPE=OCCURRENCE, X
*   RESTYPE=DB, X
*   RESNAME='CATSYS', X
*   SECBY=INTERNAL
*
* DATABASE SECURITY - DBA DATABASE
* #SECR TT TYPE=OCCURRENCE, X
*   RESTYPE=DB, X
*   RESNAME='DBAISCHE', X
*   SECBY=OFF
*
* WILD CARD TO ENABLE SECURITY FOR ALL SEGMENTS AND DBNAMES THAT
* BEGIN WITH "DICT" 2016-05-06
* DATABASE SECURITY - DICT
* #SECR TT TYPE=OCCURRENCE, X
*   RESTYPE=DB, X
*   RESNAME='DICT', X
*   SECBY=INTERNAL
*
* DATABASE SECURITY - DMLO PROFILE DATABASE
* #SECR TT TYPE=OCCURRENCE, X
*   RESTYPE=DB, X
*   RESNAME='DMLO', X
*   SECBY=INTERNAL
*
* This entry is not needed, but I am ready to secure SYSDIRL if needed
*
* DATABASE SECURITY - SYSDIRL DICTIONARY
* #SECR TT TYPE=OCCURRENCE, X
*   RESTYPE=DB, X
*   RESNAME='SYSDIRL', X
*   SECBY=OFF

```

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## Sample RHDCSRTT source

```

*
* DATABASE SECURITY - SYSTEM MESSAGE AREA
#SECR TT TYPE=OCCURRENCE, X
  RESTYPE=DB, X
  RESNAME='SYSMSG', X
  SECBY=OFF
*
* 5/6/16 ENABLE SECURITY
* DATABASE SECURITY - SYSSQL CATALOG
#SECR TT TYPE=OCCURRENCE, X
  RESTYPE=DB, X
  RESNAME='SYSSQL', X
  SECBY=INTERNAL
*
* DATABASE SECURITY - SYSTEM DICTIONARY
#SECR TT TYPE=OCCURRENCE, X
  RESTYPE=DB, X
  RESNAME='SYSTEM', X
  SECBY=INTERNAL
*
* DATABASE SECURITY - SYSUSER DATABASE
#SECR TT TYPE=OCCURRENCE, X
  RESTYPE=DB, X
  RESNAME='SYSUSER', X
  SECBY=INTERNAL
*
* DATABASE SECURITY - TOOLS DICTIONARY
#SECR TT TYPE=OCCURRENCE, X
  RESTYPE=DB, X
  RESNAME='TOOLDICT', X
  SECBY=OFF
*
*
* FINAL
#SECR TT TYPE=FINAL
END

```

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## Questions



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