Getting Started with CA IDMS SQL and CA IDMS Server

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Abstract

With the advent of Portfolio Simplification, all customers are now entitled to use CA IDMS SQL and CA IDMS Server. CA IDMS SQL enables SQL access to existing CA IDMS databases, with no need for migration or replication. CA IDMS Server provides industry standard ODBC and JDBC interfaces that enable access to CA IDMS databases and applications from Java and Windows. Come to this session to learn how to configure and use these powerful features to leverage and extend your CA IDMS systems.

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Agenda

1	PORTFOLIO SIMPLIFICATION
2	CA IDMS SQL
3	ACCESSING NETWORK DATA USING SQL
4	CA IDMS SERVER
5	INSTALLATION & CONFIGURATION
6	DEMO
7	QUESTIONS AND ANSWERS

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Portfolio Simplification

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May 7-11, 2018

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Portfolio Simplification

- Provides all IDMS/DB users access to:
  - CA IDMS SQL Option
  - CA IDMS Server
  - Other good stuff
- Long awaited feature!
- Enabling technologies
  - Allow users to access their IDMS data from other platforms
- Enhance rather than Replace

CA IDMS SQL

CA IDMS SQL Capabilities

- Enabling Feature
- Define new SQL databases
- Access existing network databases
  - No conversion needed
- Compiled SQL
  - Generated by pre-compilers/generators
- Dynamic SQL
  - Client/server and web service access
- Procedure Support

Non-SQL data can be accessed from anywhere SQL DML can be issued

CA IDMS SQL Components

- Catalog to hold SQL entities
- Command Facility
  - OCF
  - BCF
- Pre-compilers
  - COBOL
  - PL/I
  - ADS/Online
- SQL Optimizer
- Runtime Engine

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SQL Catalog

- Contains SQL entity definitions
- Dictionary database areas
  - DDLCAT
    - Schemas
    - Tables
    - Views
    - Security Definitions
  - DDLCATX
    - Indexes on DDLCAT entities
  - DDLCATLOD
    - Access modules
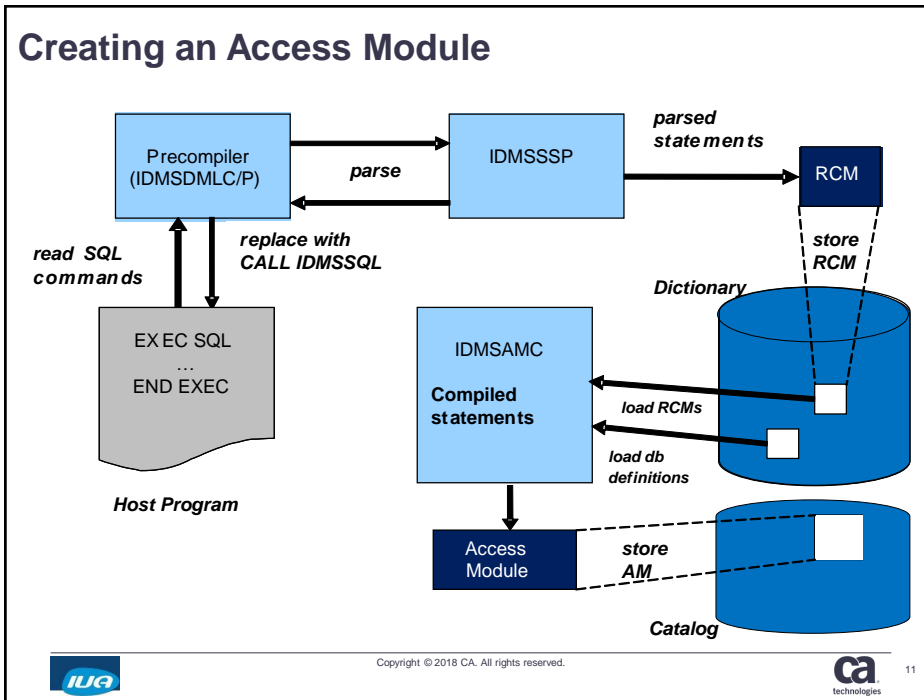   - DMCL

Access Module

- Created by access module compiler, under:
  - OCF
  - BCF
- Contains:
  - Compiled versions of all SQL commands (RCMs)
    - RCM = Relational Command Module
  - Optimized access strategy for each command
- Is stored in the Catalog Load Area (DDLCATLOD)
- Loaded at runtime and used during program execution
- Static SQL

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Creating an Access Module

Precompiler (IDMSDMLC/P) — *parse* → IDMSSSP — *parsed statements* → RCM

store RCM

read SQL commands

replace with CALL IDMSSQL

EXEC SQL
…
END EXEC

Host Program

Dictionary

IDMSAMC

Compiled statements ← *load RCMs*

← *load db definitions*

Access Module — *store AM*

Catalog

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Dynamic SQL

- SQL statements are compiled and executed immediately on the fly

- Used in:
  - Command Facilities
    - OCF
    - BCF
  - ODBC
    - CA IDMS Visual DBA
  - JDBC
    - JCF (Java Command Facility)

- Overhead of AM compilation can be mitigated using SQL Statement Caching

Dynamic SQL Caching

- For dynamical SQL statements, the result of compilation is saved in the cache

- Avoid recompilation when same SQL statement executed

- Particularly useful for Web-Based (ODBC/JDBC) applications

- Access Module generation can be costly

- Controlled in SYSGEN:

  ADD SQL CACHE

     FOR 100 STATEMENTS

     DEFAULT CACHING IS ON

     EXCEPT CONNECT TO ( ).

  – Controlled locally for individual session using SET SESSION
  – Local Batch jobs can use SQL_CACHE_ENTRIES in SYSIDMS

Procedure Support

- Procedures allow you to associate a program with a Table definition

- Two Types
  – SQL Procedures
  – Table Procedures

- Can be used to overcome problems accessing Network Databases using SQL

- Procedure programs can issue both Network DML and SQL statements

Procedure Support

- SQL Procedures
  - Invoked using 'CALL' or 'SELECT'
  - Generally return 0 or 1 row
  - Can be written in COBOL, PL/I, Assembler, SQL Procedure Language, ADS/Online

- Table Procedures
  - Invoked using 'SELECT', 'INSERT', 'UPDATE', or 'DELETE'
  - Can return an entire result set
  - Can be written in COBOL, PL/I, Assembler
  - Can be generated (in COBOL) using SQL Quick Bridge

Accessing Network Data Using SQL

Access to Network Records
In One Easy Step!

- Within one of the Command Facilities:

```
CREATE SCHEMA EMPSQL
FOR NONSQL SCHEMA
SYSDICT.EMPSCHM VERSION 100
DBNAME EMPDEMO;
```

- Schema definition (only) stored in SQL Catalog

- And now…

```
SELECT * FROM EMPSQL.EMPLOYEE;
```

Access to Network Records
Voila!

```
          OCF 19.0 IDMS   NO ERRORS                    1/400 TECHDC60

SELECT * FROM EMPSQL.EMPLOYEE;

*+

*+ EMP_ID_0415  EMP_FIRST_NAME_0415  EMP_LAST_NAME_0415  EMP_STREET_0415

*+ ----------   -------------------  ------------------  --------------

*+         23  DAVE                 HEARN               12 EAST SPEEN ST

*+        329  PHINEAS              FINN                79 HIGH ST

*+         48  NANCY                TERNER              14 TYPO TERR

*+        371  BETH                 CLOUD               3456 PINKY LN

*+         20  CAROL                JACOBI              555 JAKAS DR

*+         81  TOM                  FITZHUGH            450 THRUWAY ST
```

CA IDMS SQL Relational to Network Mapping

SQL		Network	
Table	• Identically named	Record	• Via SCHEMA
Row	• Equivalent	Record occurrence	• Equivalent
Column	• Automatically renamed	Element	• Except ODO, redefines, …
Referential constraint	• Partial mapping	Set	• Lack of foreign keys

No Need to Create a new Database

• Every network record automatically appears as a table

```
EMPLOYEE
415   F    120  CALC
EMP-ID-0415
EMP-DEMO-REGION
```

OBTAIN CALC becomes

```
SELECT * FROM
EMPSQL.EMPLOYEE
WHERE "EMP_ID_0415" = 9771;
```

Database Navigation
Network Model

Database Navigation
Relational Model

Department Table

DEPT_ID	DEPT_NAME
1001	SALES
1010	HUMAN RES
1050	ACCOUNTING
1090	PAYROLL

Employee Table

EMP_ID	E_LNAME	E_FNAME	JOB	DEPT
12345	CLEMENS	SAMUEL	J200	1010
21343	MCGEE	AGNES	J001	1001
31254	GIBSON	JOHN	J010	1050
43251	SCOTT	WESTON	J410	1050

PRIMARY KEY

FOREIGN KEY

SQL Access to Non-SQL Data
Where Set-Name

- Use the Set Specification as part of the WHERE clause

- Causes Set to be Navigated to Facilitate Join of Tables

- Improves the Efficiency of Join Operations

- CA IDMS Extension to the SQL Standard

- Example:
  ```
  SELECT * FROM EMPSQL.DEPARTMENT,
  EMPSQL.EMPLOYEE
  WHERE "DEPT-EMPLOYEE"
  ```

CA IDMS Server

CA IDMS Server

- Comprised of an:
  - ODBC Driver
  - JDBC Driver
- CA IDMS as a Server
- Access to CA IDMS databases
  - Windows
  - Any Java Platform
- Dynamic SQL

CA IDMS Server Architecture

ODBC Driver	JDBC Driver
SQL Client Interface	

SQL Engine
Network DBMS
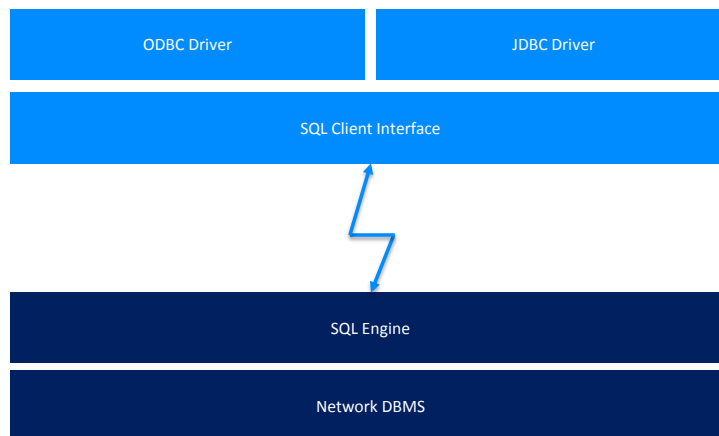
ODBC

- Call Level Interface (CLI)
- Dynamic SQL
  - Interoperability
- Microsoft Windows
- ODBC.NET
- ODBC 3.5
- Wire protocol communications
- 32 and 64-bit drivers

ODBC Architecture

Windows

- ODBC Application
- ODBC Driver Manager
- ODBC Driver | ODBC Driver
- Data Source | Data Source

ODBC Application Program Interface

ODBC Service Provider Interface

Network and DBMS

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JDBC Driver Types

JDBC	JDBC	JDBC	JDBC
ODBC	Native		

Type 1   Type 2   Type 3   Type 4

(Middleware — Type 3)

DBMS   DBMS   DBMS   DBMS
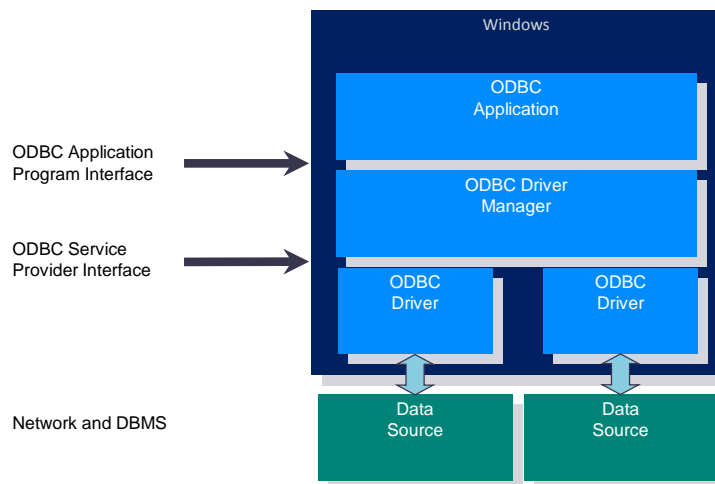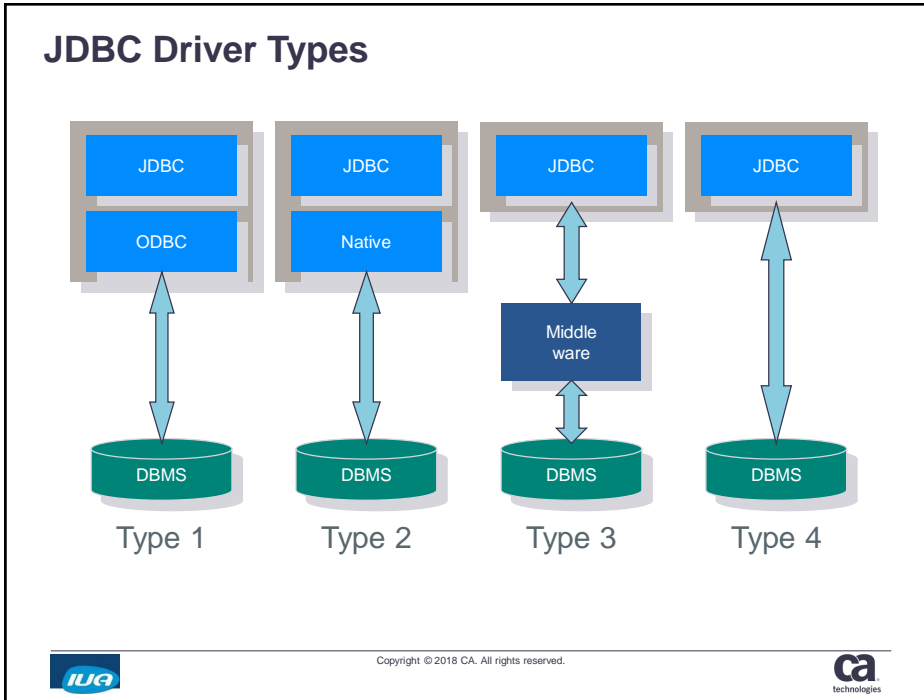
CA IDMS JDBC Driver

- Call Level Interface (CLI)
- JDBC 4.0
- "Universal" driver
  - Types 2, 3, 4
- Type 2 Driver
  - 32-BIT & 64 BIT
- Type 3 Driver
  - Middleware runs on Windows or USS
- Type 4 JDBC Driver
  - Direct connection from JDBC driver to CV
- Distributed XA transactions

JDBC Architecture

Java VM

Java Application

Driver
Interface

| Driver | Driver | Driver Manager |

Network
and DBMS

| URL | URL |

Backend Architecture

TCPIP Line Driver

Generic Listener

'IDMSJSRV' Task

SQL Client

SQL Engine

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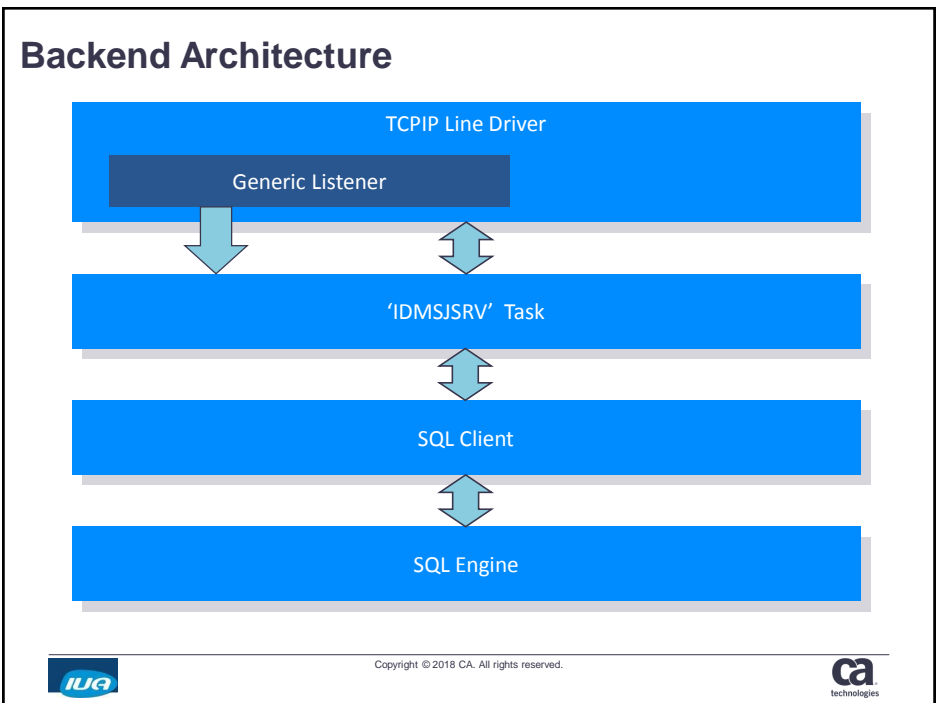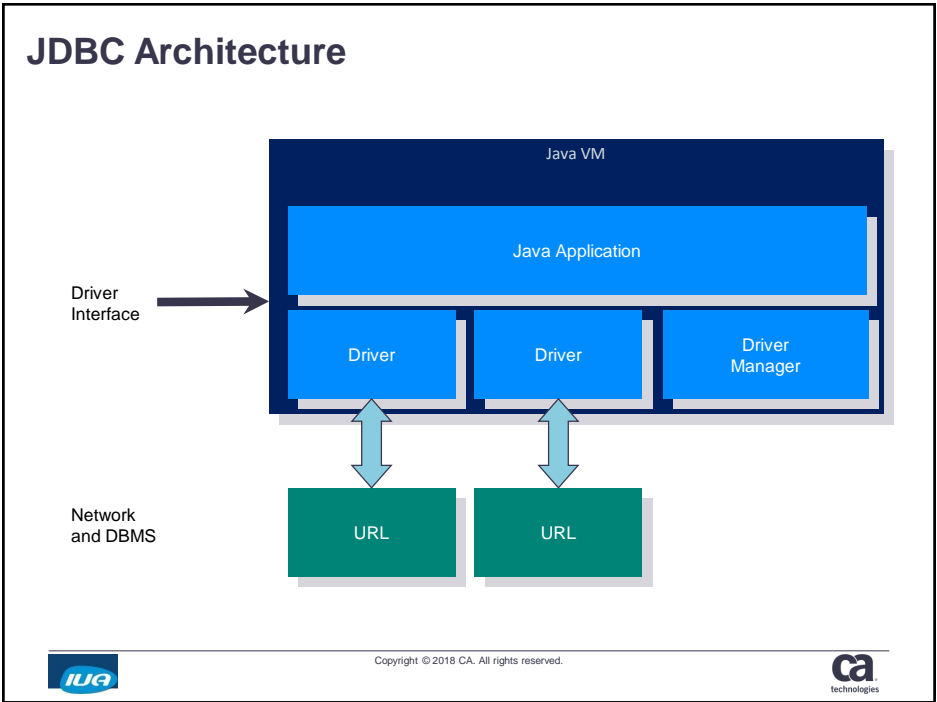
Secure Communications
TLS Support

ODBC Driver	JDBC Driver
OpenSSL	JSSE

Encrypted Data Stream

AT/TLS   AT/TLS

CA IDMS TCP/IP Driver
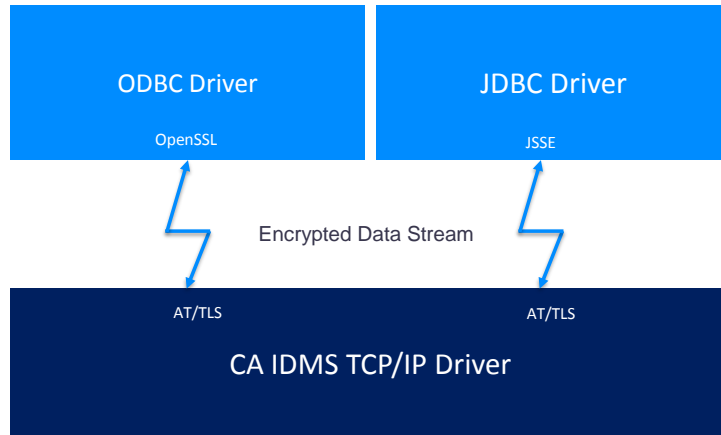
Installation & Configuration

Mainframe Software Installation

• CA IDMS installs all code with base software

• LMP Key Processing Remains the same
  – Customers will need to contact support to obtain required keys
  – CA IDMS 19.0 enhancement RO96807 enables all new options

• CA IDMS Server Client software downloads from CSO

• Update your PINT module (RHDCPINT)

Installing CA IDMS SQL

• Catalog Creation
  • May already be there if either:
    • CA IDMS Visual DBA already in use
    • SQL Web Connect installed

• May also want to install SQL Demo Database

• Can perform 'Add-On' install using either:
  • CAISAG - Standard IDMS Install Program
  • CSM - Chorus Software Manager (GUI Tool)

Add-On Install using CAISAG

- To Designate an Add-on Install:
    - Set ADDPROD parameter to 'YES'
    - Set CA-IDMS/DB-SQL parameter to 'INSTALL'

- To Direct the Updating of the RHDCPINT module
    - Specify 'YES' for 'CA IDMS SQL Option'
    - Specify 'YES' for 'CA IDMS Server'

- New Variables:
    - ADDSYSQL – Governs creation of System Catalog
    - ADDQDEMO – Governs creation of SQL Demo DB
    - BEGINMEM – Governs member name prefix

Add-On Install using CAISAG

- SQL Jobstreams Created:
    - SQL05 - Allocates SQL catalog and Demo DB files
    - SQL08 - Builds the new SQL catalog
    - SQL10 - Formats and populates the SQL catalog
    - SQL15 - Builds, formats & populates SQL Demo DB

- See Docops Topics:
    - "Installing the CA IDMS SQL Component"
    - "SQL Usage"

Add-On Install using CSM
Chorus Software Manager

- Same options/parms as described in CAISAG

- Documented within the GUI

- 'Add-On installation' is referred-to as an 'Update installation'

- Automatically updates your:
  - Global DMCL
  - Database Name Table (DBTB)

CA IDMS Server
Mainframe Configuration

- SYSGEN 'Listener' Definition

```
ADD PTERM TCPJSRV
    TYPE IS LISTENER
    PORT IS 3760
    TASK IS RHDCNP3J
    IN LINE TCPIP
    PARM IS 'TASK=IDMSJSRV'.

ADD LTERM TCLJSRV
    PTERM IS TCPJSRV.
```

CA IDMS Server
Client Software Acquisition and Installation

- "Download Center" page on CA Support Online:
  - https://support.ca.com/
  - Filter on Product "CA IDMS Server Option MVS"
  - Select Item:
    "IDMS SRVR CD ZIP FILE ESD ONLY"   (Release 17.0)
- Perform "Typical" Install
  - 32-bit ODBC Driver
  - 64-bit ODBC Driver

Client Configuration

CA IDMS Server ODBC Administrator ? ×

Data Source | Server | Log Options | SSL | International | JDBC Server | About

Options

Data Source: My Data Source   Test

Dictionary: SYSDICT

Server: My IDMS CV

Default Schema:

Program Name: IDMSODBC

Advanced Options

Current   System

OK   Cancel   Apply   Help

Client Configuration

CA IDMS Server ODBC Administrator   ?   ×

| Data Source | Server | Log Options | SSL | International | JDBC Server | About |

Options

Name: My IDMS CV   [Delete]

Node Name: [   ]

Connection Options

Communications Protocol: ⦿ IDMS ◯ CCI   SSL: ☐

Host Name: USILCA31

Port: 3760   Wait Timeout: 30

Advanced Options

[Current]   [System]

[OK]   [Cancel]   [Apply]   [Help]

Demo

Demo

- Create SQL Schema
- Test Access to Network Data using OCF
- Define ODBC Data Source
- Test Connection & Test SELECT issued above
- Test JDBC Access using JCF

Summary

- Portfolio Simplification gives you the tools you need
- Simple Installation
- Simple Configuration
- Easy to provide Web access to your CA IDMS Network Databases

Questions & Answers

Please Complete a Session Evaluation Form

- The number for this session is **A01**

- After completing your session evaluation form, place it in the envelope at the front of the room