



Using DB2 and ODBC in CA-ADS

VG-ADS Precompiler Overview

VEGASOFT



Contents



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Overview

- ◆ Enables CA-ADS applications to access and update
 - CA-IDMS/DB
 - IBM DB2
 - ODBC-compliant databases (via VG-ODBC Server)
- ◆ CA-IDD is, as usual, the repository of cross-referenced application components



Overview

- ◆ Precompiler supports embedded SQL
- ◆ Input module is read from CA-IDD
- ◆ Precompiled module will be added to the dictionary
- ◆ There are no changes in dialog definition or generation

Input and output

◆ Input

- module <m> language db2process/sqlprocess

◆ Output

- module <m> language process
- Db2 – out - <m>

◆ Output for (DB2) static SQL

- module <m> language cobol
- Db2 – inp - <m>
- program <p>



Multi-SQL Access

- ◆ If CA - IDMS/DB SQL Option is used, it is easy to access both CA-IDMS/DB using SQL and other SQL DBMS from the same process
- ◆ Just change the SQL keyword recognized by the VG-ADS Precompiler to
 - e.g. 'DB2' or 'ODBC'

Multi-SQL Access

- ◆ This statement will access CA-IDMS

```
EXEC SQL
```

```
    SELECT LASTNAME INTO :LASTNAME FROM IDMS.EMP
```

```
    WHERE EMPID = :EMPID
```

```
END-EXEC.
```

This statement will access ODBC

```
EXEC ODBC
```

```
    SELECT LASTNAME INTO :LASTNAME FROM
```

```
ODBC.EMP
```

```
    WHERE EMPID = :EMPID
```

```
END-ODBC.
```

Development Cycle

- ◆ The following steps are needed to build CA-ADS dialogs to access DB2 and/or ODBC

- ① Copy the target table structure to a CA-IDD record structure (use TDEF)
2. Optionally, paint a map
3. Write a process with embedded target DBMS SQL (and CA - IDMS DML and/or SQL) statements
- ④ Precompile the process
5. Define and generate the dialog
6. Run the dialog against the target DBMS (and CA-IDMS/DB if needed)

Only steps 1 and 4 are new.
This means minimum learning curve!



DB2 Access Modes

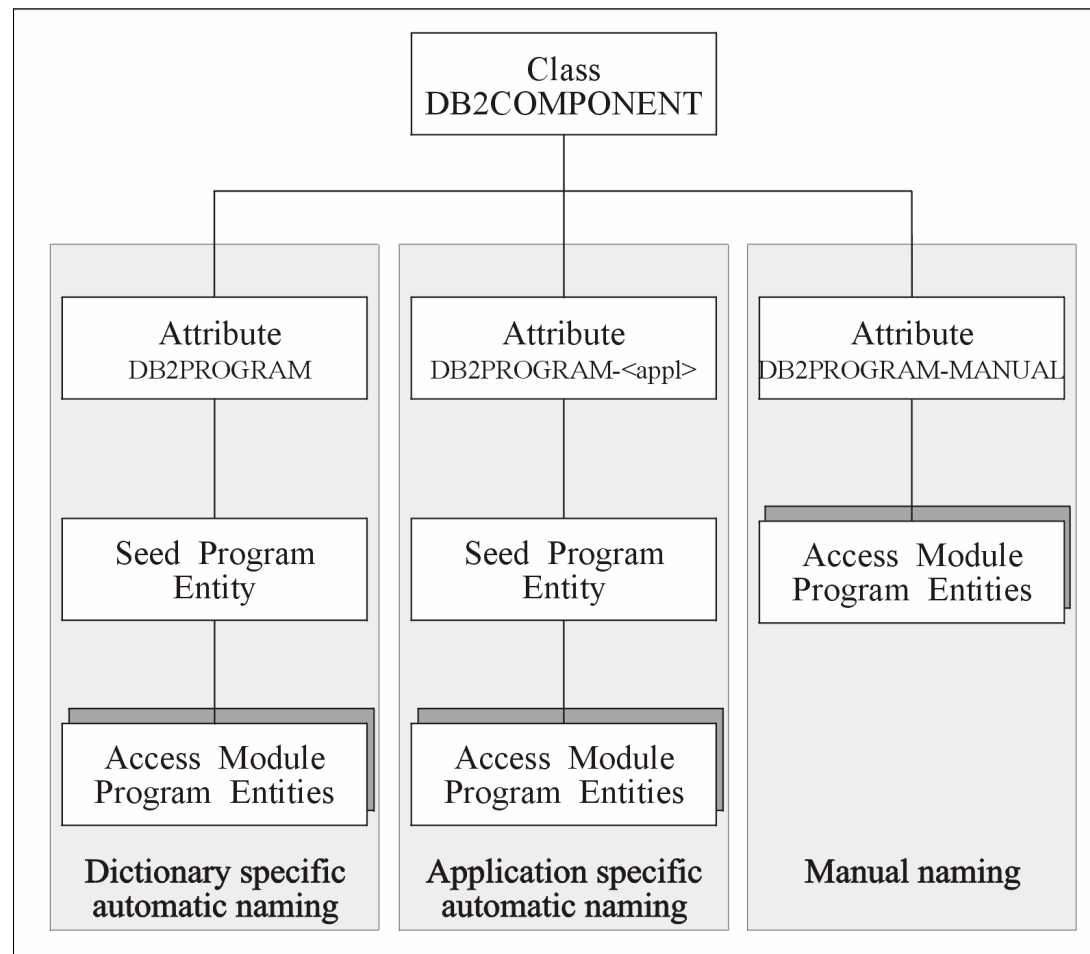
- ◆ Selected in the precompiler menu
- ◆ Dynamic SQL
 - for development and testing
- ◆ Static SQL
 - for production
 - generates COBOL access program
 - in DC - COBOL or in CICS COBOL
- ◆ Access mode is transparent to applications



Naming DB2 Access Programs

- ◆ Program ids must be unique at least within each CA - IDD dictionary
- ◆ Alternatives to name access programs
 - (1) dictionary specific automatic naming
 - (2) application specific automatic naming
(within dictionary)
 - (3) manual naming (within dictionary)

Access Module Programs



Submitting batch jobs

- ◆ Write printer to SYSOUT line
- ◆ SYSOUT line
- ◆ Startup JCL
- ◆ Printer class used in Write printer
 - Options table keyword
 - JOB – SUBMIT – PRINTER - CLASS
 - Prototype JCL module override
 - PCLS=nn (First card columns 73-79)

SYSOUT line

```
ADD LINE SYSOUTL
ENABLED NOCOMPACT
PROTOCOL IS DEFRESP
TYPE IS SYSOUTL
DDNAME IS JCL.
ADD PTERM JCL
ENABLED
IN LINE SYSOUTL
READBUFFER
TYPE IS SYSOUTT
PAGE LENGTH IS 1
PAGE WIDTH IS 80.
ADD LTERM JCL
ENABLED
PRINTER NOBANNER CLASS IS (64) CHECKPOINT IS SYSTEM
PRIORITY IS 0
PTERM IS JCL
UPPER.
```

IDMS startup JCL

```
//*-----  
//*      DD FOR MVS INTERNAL READER      -  
//*-----  
//JCL    DD SYSOUT=(A,INTRDR),  
//      DCB=(RECFM=FB,LRECL=80,BLKSIZE=80)
```




JCL prototype modules

- ◆ IDMS environment
 - XDB2 – IDMS – COBOL - JCL
 - XDB2 – IDMS – COBOL – JCL - <user>
- ◆ CICS environment
 - XDB2 – COBOL - JCL
 - XDB2 – COBOL – JCL - <user>



ODBC Access Mode

- ◆ Dynamic SQL
- ◆ ODBC stored procedures are supported
 - no return parameters
 - only a single resultset

Using the Precompiler

```
V222 ENTER NEXT TASK CODE:
```

```
vega
```

VG-ADS Precompiler runs under CA-IDMS-DC/UCF TCF and it is completely menu driven.

Also non-TCF and line mode versions can be used.

The task code VEGA displays the main menu.

Using the Precompiler

```
(C) Vegasoft Oy          VEGA          V2R6.0 Tape V90101
                          MAIN MENU

-----

      ***      Please select a Response      ***      Note CA-IDMS release
                                                    0.21/12.0 only

      SERV          (PF2)      Let's check the precompile process
                               selection.
      ISQL          Interactive SQL
      SQLP          Precompile Process
      TDEF          Table Definition to Record
      EXPL          Explain SQLCODE
      IDD           Switch to IDD
      CONTROL      Control Menu
      10.20        Tools for S1020x Users
      MQS          MQSeries Menu
      MENU          (PF3)      Previous Menu
      QUIT         (PA2)      Exit Application
      HELP         (PF1)      Valid responses
      WINDOW      Free ADS/WINDOW Demo

-----

Response: ISQL          Data:
```

Using the Precompiler

(C) Vegasoft Oy

VEGA
MAIN MENU

V2R6.0 Tape V90101

*** Please select a Response ***

Note CA-IDMS release
10.21/12.0 only

—	SERV	(PF2)	Server Selection
—	ISQL		Interactive SQL
/	DB2P		Precompile Process
—	TDEF		Table Definition to Record
—	EXPL		Explain SQLCODE
—	IDD		Switch to IDD
—	CONTROL		Control Menu
—	10.20		Tools for S1020x Users
—	MQS		MQSeries Menu
—	MENU	(PF3)	Previous Menu
—	QUIT	(PA2)	Exit Application
—	HELP	(PF1)	Valid responses
—	WINDOW		Free ADS/WINDOW Demo

Response: ISQL

Data:

Using the Precompiler

```
(C) VEGASOFT OY          VG-ADS PRECOMPILER          V2R6
                          PROCESS COMPILATION
-----
SERVER : CAF          PASSWORD :          DICTNAME: DICTSD52  DICTNODE:
ACT:   Enter the name of your data source Server as
       defined in the Server Control Table.  ST/PRINT/QUIT/SET/(F)SUB/SUS/SWI XXXX/UPD
PROCESS :          VERSION:          1

STORED OPTIONS:          APPLICATION:
GENERATE ACCESS MODULE : Y          Y = YES,  N = NO          NAME:
LINK NOSAVE              : N          Y = YES,  N = NO          ENVIRONMENT: IDMS
GENERATE COMMITS         : N          Y = YES,  N = NO
ISOLATION LEVEL         : CS        CS = CURSOR STABILITY, RR = REPEATABLE READ
SQL KEYWORD  DB2SQL      N          Y = YES,  N = NO

PROCESSING OPTIONS:
COMPILE ACCESS MODULE   : N          Y = YES,  N = NO
EXPLAIN ACCESS PLAN     : N          Y = YES,  N = NO

PROFILE: 1  STRING DELIMITER : '  DP: .  DATE: 01.01.1992  TIME: 01.01.01
-----
ENTER = EXECUTE, PF2 = HISTORY  PF3 = RETURN, PF4 = ADSC,  CLEAR = NEW PROCESS
```

Using the Precompiler

```
(C) VEGASOFT OY          VG-ADS PRECOMPILER          V2R6
                          PROCESS COMPILATION
-----
SERVER   : CAF          PASSWORD :          DICTNAME: DICTSD52  DICTNODE:
ACTION  : COMP          QUIT/SET/(F)SUB/SUS/SWI XXXX/UPD
PROCESS :          Enter your password (invisible), if
                          it is required by the target server.  VERSION:      1

STORED OPTIONS:
GENERATE ACCESS MODULE : Y      Y = YES,  N = NO
LINK NOSAVE             : N      Y = YES,  N = NO
GENERATE COMMITS        : N      Y = YES,  N = NO
ISOLATION LEVEL         : CS    CS = CURSOR STABILITY, RR = REPEATABLE READ
SQL KEYWORD  DB2SQL     : N      Y = YES,  N = NO
APPLICATION:
NAME:
ENVIRONMENT: IDMS

PROCESSING OPTIONS:
COMPILE ACCESS MODULE  : N      Y = YES,  N = NO
EXPLAIN ACCESS PLAN    : N      Y = YES,  N = NO
PROFILE: 1  STRING DELIMITER : '  DP: .    DATE: 01.01.1992  TIME: 01.01.01
-----
ENTER = EXECUTE, PF2 = HISTORY  PF3 = RETURN, PF4 = ADSC,  CLEAR = NEW PROCESS
```

Using the Precompiler

```
(C) VEGASOFT OY          VG-ADS PRECOMPILER          V2R6
                          PROCESS COMPILATION
-----
SERVER   : CAF          PASSWORD :          DICTNAME: DICTSD52  DICTNODE:
ACTION  : COMP        (F)COMP/DIS Your CA-IDD dictionary name and node.  US/SWI XXXX/UPD
PROCESS :                               VERSION:      1

STORED OPTIONS:
GENERATE ACCESS MODULE : Y      Y = YES,  N = NO
LINK NOSAVE             : N      Y = YES,  N = NO
GENERATE COMMITS        : N      Y = YES,  N = NO
ISOLATION LEVEL        : CS     CS = CURSOR STABILITY, RR = REPEATABLE READ
SQL KEYWORD  DB2SQL     N      Y = YES,  N = NO
PROCESSING OPTIONS:
COMPILE ACCESS MODULE  : N      Y = YES,  N = NO
EXPLAIN ACCESS PLAN    : N      Y = YES,  N = NO
PROFILE: 1  STRING DELIMITER : '  DP: .    DATE: 01.01.1992  TIME: 01.01.01
-----
ENTER = EXECUTE, PF2 = HISTORY  PF3 = RETURN, PF4 = ADSC,  CLEAR = NEW PROCESS
```

Using the Precompiler

```
(C) VEGASOFT OY          VG-ADS PRECOMPILER          V2R6
                          PROCESS COMPILATION
-----
SERVER   : CAF          PASSWORD :          DICTNAME: DICTSD52  DICTNODE:
ACTION  : COMP          (F)COMP/DISP/LIST/PRINT/QUIT/SET/(F)SUB/SUS/SWI XXXX/UPD
PF1 The action data field tells the precompiler what to do.          VERSION: 1

STORED OPTIONS:
GENERATE ACCESS MODULE : Y      Y = YES, N = NO
LINK NOSAVE             : N      Y = YES, N = NO
GENERATE COMMITS        : N      Y = YES, N = NO
ISOLATION LEVEL         : CS    CS = CURSOR STABILITY, RR = REPEATABLE READ
SQL KEYWORD DB2SQL      : N      Y = YES, N = NO
APPLICATION:
NAME:
ENVIRONMENT: IDMS

PROCESSING OPTIONS:
COMPILE ACCESS MODULE  : N      Y = YES, N = NO
EXPLAIN ACCESS PLAN    : N      Y = YES, N = NO
PROFILE: 1  STRING DELIMITER : '  DP: .  DATE: 01.01.1992  TIME: 01.01.01
-----
ENTER = EXECUTE, PF2 = HISTORY  PF3 = RETURN, PF4 = ADSC,  CLEAR = NEW PROCESS
```

Using the Precompiler

```
(C) VEGASOFT OY          VG-ADS PRECOMPILER          V2R6
                          PROCESS COMPILATION
-----
SERVER   : CAF          PASSWORD :          DICTNAME: DICTSD52  DICTNODE:
ACTION   : COMP        (F) COMP DISP/LIST/PRINT/QUIT/SET/(F)SUB/SUS/SWI XXXX/UPD
PROCESS  :              Retrieve the process and
                          allow option changes before
                          the precompilation.          VERSION:      1
STORED OPTIONS:
GENERATE ACCE           YES,  N = NO          APPLICATION:
LINK NOSAVE            YES,  N = NO          NAME:
GENERATE COM           YES,  N = NO          ENVIRONMENT: IDMS
ISOLATION LEVEL       : CS  CS = CURSOR STABILITY, RR = REPEATABLE READ
SQL KEYWORD  DB2SQL    N    Y = YES,  N = NO
PROCESSING OPTIONS:
COMPILE ACCESS MODULE : N    Y = YES,  N = NO
EXPLAIN ACCESS PLAN   : N    Y = YES,  N = NO
PROFILE: 1  STRING DELIMITER : '  DP: .    DATE: 01.01.1992  TIME: 01.01.01
-----
ENTER = EXECUTE, PF2 = HISTORY  PF3 = RETURN, PF4 = ADSC,  CLEAR = NEW PROCESS
```

Using the Precompiler

```
(C) VEGASOFT OY          VG-ADS PRECOMPILER          V2R6
                          PROCESS COMPILATION
-----
SERVER   : CAF          PASSWORD :          DICTNAME: DICTSD52  DICTNODE:
ACTION   : COMP        (F)COMP(DISP)LIST/PRINT/QUIT/SET/(F)SUB/SUS/SWI XXXX/UPD
PROCESS  :              Retrieve the process and display process options.

STORED OPTIONS:
GENERATE ACCESS MODULE : Y      Y = YES,  N = NO
LINK NOSAVE             : N      Y = YES,  N = NO
GENERATE COMMITS        : N      Y = YES,  N = NO
ISOLATION LEVEL        : CS     CS = CURSOR STABILITY, RR = REPEATABLE READ
SQL KEYWORD  DB2SQL     : N      Y = YES,  N = NO
APPLICATION:
NAME:
ENVIRONMENT: IDMS

PROCESSING OPTIONS:
COMPILE ACCESS MODULE  : N      Y = YES,  N = NO
EXPLAIN ACCESS PLAN    : N      Y = YES,  N = NO
PROFILE: 1  STRING DELIMITER : '  DP: .    DATE: 01.01.1992  TIME: 01.01.01
-----
ENTER = EXECUTE, PF2 = HISTORY  PF3 = RETURN, PF4 = ADSC,  CLEAR = NEW PROCESS
```

Using the Precompiler

```
(C) VEGASOFT OY          VG-ADS PRECOMPILER          V2R6
                          PROCESS COMPILATION
-----
SERVER   : CAF          PASSWORD :          DICTNAME: DICTSD52  DICTNODE:
ACTION  : COMP          (F)COMP/DISP/(LIST)/PRINT/QUIT/SET/(F)SUB/SUS/SWI XXXX/UPD
PROCESS :
        Show the precompiler output.          1
STORED OPTIONS:
  GENERATE ACCESS MODULE
  LINK NOSAVE
  GENERATE COMMITS
  ISOLATION LEVEL      : CS  CS = CURSOR STABILITY, RR = REPEATABLE READ
  SQL KEYWORD  DB2SQL  : N   Y = YES,  N = NO
PROCESSING OPTIONS:
  COMPILE ACCESS MODULE : N   Y = YES,  N = NO
  EXPLAIN ACCESS PLAN  : N   Y = YES,  N = NO
PROFILE: 1  STRING DELIMITER : '  DP: .  DATE: 01.01.1992  TIME: 01.01.01
-----
ENTER = EXECUTE, PF2 = HISTORY  PF3 = RETURN, PF4 = ADSC,  CLEAR = NEW PROCESS
```

LIST ERR shows the condensed error list.

LIST SQL shows SQL lines only.

APPLICATION:
NAME:
ENVIRONMENT: IDMS

Using the Precompiler

```
(C) VEGASOFT OY          VG-ADS PRECOMPILER          V2R6
                          PROCESS COMPILATION
-----
SERVER   : CAF          PASSWORD :          DICTNAME: DICTSD52  DICTNODE:
ACTION  : COMP          (F)COMP/DISP/LIST/PRINT/QUIT/SET/(F)SUB/SUS/SWI XXXX/UPD
PROCESS :
                                     Print the precompiler output.

STORED OPTIONS:
GENERATE ACCESS MODULE : Y      Y = YES,  N = NO
LINK NOSAVE             : N      Y = YES,  N = NO
GENERATE COMMITS        : N      Y = YES,  N = NO
ISOLATION LEVEL         : CS    CS = CURSOR STABILITY, RR = REPEATABLE READ
SQL KEYWORD  DB2SQL     : N      Y = YES,  N = NO
APPLICATION:
NAME:
ENVIRONMENT: IDMS

PROCESSING OPTIONS:
COMPILE ACCESS MODULE  : N      Y = YES,  N = NO
EXPLAIN ACCESS PLAN    : N      Y = YES,  N = NO
PROFILE: 1  STRING DELIMITER : '  DP: .    DATE: 01.01.1992  TIME: 01.01.01
-----
ENTER = EXECUTE, PF2 = HISTORY  PF3 = RETURN, PF4 = ADSC,  CLEAR = NEW PROCESS
```

Using the Precompiler

```
(C) VEGASOFT OY          VG-ADS PRECOMPILER          V2R6
                          PROCESS COMPILATION
-----
SERVER   : CAF          PASSWORD :          DICTNAME: DICTSD52  DICTNODE:
ACTION  : COMP          (F)COMP/DISP/LIST/PRINT/QUIT/SET/(F)SUB/SUS/SWI XXXX/UPD
PROCESS :
                                     End the session and free the resources.

STORED OPTIONS:
GENERATE ACCESS MODULE : Y      Y = YES,  N = NO
LINK NOSAVE             : N      Y = YES,  N = NO
GENERATE COMMITS        : N      Y = YES,  N = NO
ISOLATION LEVEL        : CS     CS = CURSOR STABILITY, RR = REPEATABLE READ
SQL KEYWORD  DB2SQL     : N      Y = YES,  N = NO
APPLICATION:
NAME:
ENVIRONMENT: IDMS

PROCESSING OPTIONS:
COMPILE ACCESS MODULE  : N      Y = YES,  N = NO
EXPLAIN ACCESS PLAN    : N      Y = YES,  N = NO
PROFILE: 1  STRING DELIMITER : '  DP: .    DATE: 01.01.1992  TIME: 01.01.01
-----
ENTER = EXECUTE, PF2 = HISTORY  PF3 = RETURN, PF4 = ADSC,   CLEAR = NEW PROCESS
```

Using the Precompiler

```
(C) VEGASOFT OY          VG-ADS PRECOMPILER          V2R6
                          PROCESS COMPILATION
-----
SERVER   : CAF          PASSWORD :          DICTNAME: DICTSD52  DICTNODE:
ACTION  : COMP          (F)COMP/DISP/LIST/PRINT/QUIT(SET)(F)SUB/SUS/SWI XXXX/UPD
PROCESS :          VERSIO
STORED OPTIONS:
GENERATE ACCESS MODULE : Y      Y = YES,  N = NO
LINK NOSAVE             : N      Y = YES,  N = NO          ENVIRONMENT: IDMS
GENERATE COMMITS        : N      Y = YES,  N = NO
ISOLATION LEVEL        : CS     CS = CURSOR STABILITY, RR = REPEATABLE READ
SQL KEYWORD  DB2SQL     N      Y = YES,  N = NO
PROCESSING OPTIONS:
COMPILE ACCESS MODULE  : N      Y = YES,  N = NO
EXPLAIN ACCESS PLAN    : N      Y = YES,  N = NO
PROFILE: 1  STRING DELIMITER : '  DP: .    DATE: 01.01.1992  TIME: 01.01.01
-----
ENTER = EXECUTE, PF2 = HISTORY  PF3 = RETURN, PF4 = ADSC,   CLEAR = NEW PROCESS
```

Use SET NAME to manually
set the access module name.
The APPLICATION field will
be set to MANUAL.

Using the Precompiler

```
(C) VEGASOFT OY          VG-ADS PRECOMPILER          V2R6
                          PROCESS COMPILATION
-----
SERVER   : CAF          PASSWORD :          DICTNAME: DICTSD52  DICTNODE:
ACTION  : COMP          (F)COMP/DISP/LIST/PRINT/QUIT/SET/((F)SUB)/SUS/SWI XXXX/UPD
PROCESS :
        DB2 only:
        Send a batch job to compile, link edit and
        bind the generated access module.
        FSUB action immediately sends the batch job.
STORED OPTIONS:
GENERATE ACCESS MODULES : N          Y = YES, N = NO
LINK NOSAVE
GENERATE COMMITS        : N          Y = YES, N = NO
ISOLATION LEVEL         : CS        CS = CURSOR STABILITY, RR = REPEATABLE READ
SQL KEYWORD DB2SQL      : N          Y = YES, N = NO
PROCESSING OPTIONS:
COMPILE ACCESS MODULE   : N          Y = YES, N = NO
EXPLAIN ACCESS PLAN     : N          Y = YES, N = NO
PROFILE: 1  STRING DELIMITER : '    DP: .    DATE: 01.01.1992  TIME: 01.01.01
-----
ENTER = EXECUTE, PF2 = HISTORY  PF3 = RETURN, PF4 = ADSC,  CLEAR = NEW PROCESS
```

Using the Precompiler

```
(C) VEGASOFT OY          VG-ADS PRECOMPILER          V2R6
                        PROCESS COMPILATION
-----
SERVER   : CAF          PASSWORD   :          DICTNAME: DICTSD52  DICTNODE:
ACTION  : COMP          (F)COMP/DISP/LIST/PRINT/QUIT/SET/(F)SUB(SUS)SWI XXXX/UPD
PROCESS :                Suspend the session and save work areas.

STORED OPTIONS:
GENERATE ACCESS MODULE : Y      Y = YES,  N = NO
LINK NOSAVE             : N      Y = YES,  N = NO
GENERATE COMMITS        : N      Y = YES,  N = NO
ISOLATION LEVEL         : CS    CS = CURSOR STABILITY, RR = REPEATABLE READ
SQL KEYWORD  DB2SQL     : N      Y = YES,  N = NO
APPLICATION:
NAME:
ENVIRONMENT: IDMS

PROCESSING OPTIONS:
COMPILE ACCESS MODULE  : N      Y = YES,  N = NO
EXPLAIN ACCESS PLAN    : N      Y = YES,  N = NO
PROFILE: 1  STRING DELIMITER : '  DP: .    DATE: 01.01.1992  TIME: 01.01.01
-----
ENTER = EXECUTE, PF2 = HISTORY  PF3 = RETURN, PF4 = ADSC,  CLEAR = NEW PROCESS
```

Using the Precompiler

```
(C) VEGASOFT OY          VG-ADS PRECOMPILER          V2R6
                          PROCESS COMPILATION
-----
SERVER   : CAF          PASSWORD :          DICTNAME: DICTSD52  DICTNODE:
ACTION  : COMP          (F)COMP/DISP/LIST/PRINT/QUIT/SET/(F)SUB/SUS(SWI XXXX)UPD
PROCESS :          VERSION Switch to another TCF tool.

STORED OPTIONS:
GENERATE ACCESS MODULE : Y      Y = YES, N = NO
LINK NOSAVE             : N      Y = YES, N = NO
GENERATE COMMITS        : N      Y = YES, N = NO
ISOLATION LEVEL         : CS    CS = CURSOR STABILITY, RR = REPEATABLE READ
SQL KEYWORD DB2SQL      : N      Y = YES, N = NO
APPLICATION:
NAME:
ENVIRONMENT: IDMS

PROCESSING OPTIONS:
COMPILE ACCESS MODULE  : N      Y = YES, N = NO
EXPLAIN ACCESS PLAN    : N      Y = YES, N = NO
PROFILE: 1  STRING DELIMITER : '  DP: .  DATE: 01.01.1992  TIME: 01.01.01
-----
ENTER = EXECUTE, PF2 = HISTORY  PF3 = RETURN, PF4 = ADSC,  CLEAR = NEW PROCESS
```

Using the Precompiler

```
(C) VEGASOFT OY          VG-ADS PRECOMPILER          V2R6
                          PROCESS COMPILATION
-----
SERVER   : CAF          PASSWORD :          DICTNAME: DICTSD52  DICTNODE:
ACTION  : COMP          (F)COMP/DISP/LIST/PRINT/QUIT/SET/(F)SUB/SUS/SWI XXXX/UPD
PROCESS :          VER Switch to CA-IDD to update the process.

STORED OPTIONS:
GENERATE ACCESS MODULE : Y      Y = YES, N = NO
LINK NOSAVE             : N      Y = YES, N = NO
GENERATE COMMITS        : N      Y = YES, N = NO
ISOLATION LEVEL         : CS     CS = CURSOR STABILITY, RR = REPEATABLE READ
SQL KEYWORD DB2SQL      : N      Y = YES, N = NO
APPLICATION:
NAME:
ENVIRONMENT: IDMS

PROCESSING OPTIONS:
COMPILE ACCESS MODULE  : N      Y = YES, N = NO
EXPLAIN ACCESS PLAN    : N      Y = YES, N = NO
PROFILE: 1  STRING DELIMITER : '  DP: .  DATE: 01.01.1992  TIME: 01.01.01
-----
ENTER = EXECUTE, PF2 = HISTORY  PF3 = RETURN, PF4 = ADSC,  CLEAR = NEW PROCESS
```

Using the Precompiler

```
(C) VEGASOFT OY          VG-ADS PRECOMPILER          V2R6
                          PROCESS COMPILATION
-----
SERVER   : CAF          PASSWORD :          DICTNAME: DICTSD52  DICTNODE:
ACTION   : update      (F)COMP/DISP/LIST/PRINT/QUIT/SET/(F)SUB/SUS/SWI XXXX/UPD
PROCESS  : dempdpt1-pre
                          Let's go to process source first.

STORED OPTIONS:
GENERATE ACCESS MODULE : Y      Y = YES,  N = NO
LINK NOSAVE            : N      Y = YES,  N = NO
GENERATE COMMITS       : N      Y = YES,  N = NO
ISOLATION LEVEL       : CS     CS = CURSOR STABILITY, RR = REPEATABLE READ
SQL KEYWORD   DB2SQL   : N      Y = YES,  N = NO
APPLICATION:
NAME:
ENVIRONMENT: IDMS

PROCESSING OPTIONS:
COMPILE ACCESS MODULE : N      Y = YES,  N = NO
EXPLAIN ACCESS PLAN   : N      Y = YES,  N = NO
PROFILE: 1  STRING DELIMITER : '  DP: .    DATE: 01.01.1992  TIME: 01.01.01
-----
ENTER = EXECUTE, PF2 = HISTORY  PF3 = RETURN, PF4 = ADSC,  CLEAR = NEW PROCESS
```

Using the Precompiler

```
                IDD 12.0 ONLINE          NO ERRORS          DICT=DICTSD52          1/55
SIG DICT 'DICTSD52' NODE '          ' USA UPD.
DIS MOD  'DEMPDPT1-PRE          ' VER    1 LANGUAGE DB2PROCESS
WITH MOD SOU VERB MODIFY AS SYN.
  MODIFY
  MODULE NAME IS DEMPDPT1-PRE VERSION
    LANGUAGE IS SQLPROCESS
      TEXT IS 'NYN
    MODULE SOURCE FOLLOWS
MOVE 0 TO IND.
MOVE 0 TO WERR-SQLCODE.
EXEC SQL WHENEVER SQLERROR
  CALL SQLERROR
END-EXEC.
EXEC SQL BEGIN DECLARE SECTION
  DSN8220-EMP DSN8220-DEPT
EXEC SQL END  DECLARE SECTION
EXEC SQL DECLARE EMP CURSOR          FOR
  SELECT XXX_EMPNO, FIRSTNME, LASTNAME, DEPTNAME, DEPTNO FROM
    DSN8220.EMP, DSN8220.DEPT
  WHERE LASTNAME >  :LASTNAME
    AND WORKDEPT =  DEPTNO
  ORDER BY LASTNAME, FIRSTNME
END-EXEC.
```

We use here the CA-IDD command mode.

Using the Precompiler

```

                                IDD 12.0 ONLINE      NO ERRORS      DICT=DICTSD52      1/55
SIG DICT 'DICTSD52' NODE '      ' USA UPD.
DIS MOD  'DEMPDPT1-PRE      ' VER    1 LANGUAGE DB2PROCESS
WITH MOD SOU VERB MODIFY AS SYN.
      MODIFY
      MODULE NAME IS DEMPDPT1-PRE VERSION
      LANGUAGE IS SQLPROCESS
      TEXT IS 'NYN
      MODULE SOURCE FOLLOWS
MOVE 0 TO IND.
MOVE 0 TO WERR-SQLCODE.
EXEC SQL WHENEVER SQLERROR
      CALL SQLERROR
END-EXEC.
EXEC SQL BEGIN DECLARE SECTION
      DSN8220-EMP DSN8220-DEPT
EXEC SQL END   DECLARE SECTION
exec sql declare emp cursor      for
      select xxx_empno,firstnme,lastname,deptname,deptno  from
      dsn8220.emp, dsn8220.dept
      where lastname >  :lastname
      and workdept =  deptno
      order by lastname, firstnme
end-exec.
```

The VG-ADS Precompiler also supports process source written in lower-case characters.

Using the Precompiler

```
                IDD 12.0 ONLINE          NO ERRORS          DICT=DICTSD52          1/55
SIG DICT 'DICTSD52' NODE '          ' USA UPD.
DIS MOD  'DEMPDPT1-PRE          ' VER    1 LANGUAGE DB2PROCESS
WITH MOD SOU VERB MODIFY AS SYN.
  MODIFY
  MODULE NAME IS DEMPDPT1-PRE VERSION
    LANGUAGE IS SQLPROCESS
    TEXT IS 'NYN
    MODULE SOURCE FOLLOWS
MOVE 0 TO IND.
MOVE 0 TO WERR-SQLCODE.
EXEC SQL WHENEVER SQLERROR
  CALL SQLERROR
END-EXEC.
EXEC SQL BEGIN DECLARE SECTION
  DSN8220-EMP DSN8220-DEPT
EXEC SQL END  DECLARE SECTION
EXEC SQL DECLARE EMP CURSOR          FOR
  SELECT XXX_EMPNO, FIRSTNME, LASTNAME, DEPTNAME, DEPTNO FROM
  DSN8220.EMP, DSN8220.DEPT
  WHERE LASTNAME >  :LASTNAME
  AND WORKDEPT =  DEPTNO
  ORDER BY LASTNAME, FIRSTNME
END-EXEC.
```

The language is SQLPROCESS
(DB2PROCESS is also supported).

Using the Precompiler

```
(C) VEGASOFT OY          VG-ADS PRECOMPILER          V2R6
-----
SERVER                   ISOLATION
-----
ACTION                   DICTNAME: DICTSD52  DICTNODE:
-----
PROCESS                   ST/PRINT/QUIT/SET/(F)SUB/SUS/SWI XXXX/UPD
-----
                           VERSION:      1
-----
STORED OPTIONS:          APPLICATION:
GENERATE ACCESS MODULE  : N      Y = YES,  N = NO          NAME:
LINK NOSAVE             : N      Y = YES,  N = NO          ENVIRONMENT: IDMS
GENERATE COMMITS        : N      Y = YES,  N = NO
ISOLATION LEVEL        : CS     CS = CURSOR STABILITY, RR = REPEATABLE READ
SQL KEYWORD  DB2SQL     : N      Y = YES,  N = NO
PROCESSING OPTIONS:
  COMPILE ACCESS MODULE : N      Y = YES,  N = NO
  EXPLAIN ACCESS PLAN   : N      Y = YES,  N = NO
PROFILE: 1  STRING DELIMITER : '  DP: .  DATE: 01.01.1992  TIME: 01.01.01
-----
ENTER = EXECUTE, PF2 = HISTORY  PF3 = RETURN, PF4 = ADSC,  CLEAR = NEW PROCESS
```

Before precompiling you can set/change stored precompiler options.

These options will be saved with the process into CA-IDD for use in subsequent precompilations.

STORED OPTIONS:

Using the Precompiler

```
(C) VEGASOFT OY          VG-ADS PRECOMPILER          V2R6
                          PROCESS COMPILATION
-----
SERVER   : CAF          PASSWORD :          DICTNAME: DICTSD52  DICTNODE:
ACTION  : COMP          (F)COMP/DISP/LIST/PRINT/QUIT/SET/(F)SUB/SUS/SWI XXXX/UPD
PROCESS :          VERSION:      1

STORED OPTIONS:
GENERATE ACCESS MODULE : N
LINK NOSAVE             : N
GENERATE COMMITS        : N
ISOLATION LEVEL         : CS
SQL KEYWORD DB2SQL      : N
PROCESSING OPTIONS:
COMPILE ACCESS MODULE   : N
EXPLAIN ACCESS PLAN     : N
PROFILE: 1  STRING DELIMITER : '  DP: .  DATE: 01.01.1992  TIME: 01.01.01
-----
ENTER = EXECUTE, PF2 = HISTORY  PF3 = RETURN, PF4 = ADSC,  CLEAR = NEW PROCESS
```

APPLICATION:

Static SQL

If application specific access module naming is used, the application name is shown in this field.

This field is not used in ODBC.

Using the Precompiler

```
(C) VEGASOFT OY          VG-ADS PRECOMPILER          V2R6
                          PROCESS COMPILATION
-----
SERVER   : CAF          PASSWORD :          DICTNAME: DICTSD52  DICTNODE:
ACTION  : COMP          (F)COMP/DISP/LIST/PRINT/QUIT/SET/(F)SUB/SUS/SWI XXXX/UPD
PROCESS :          VERSION:      1

STORED OPTIONS:
GENERATE ACCESS MODULE : N      Y = YES,  N = NO          APPLICATION:
LINK NOSAVE             :          NAME:
GENERATE COMMITS       :
ISOLATION LEVEL        :
SQL KEYWORD DB2SQL     :
PROCESSING OPTIONS:
COMPILE ACCESS MODULE  : Y      The process will use static SQL to access DB2.
EXPLAIN ACCESS PLAN    :          The precompiler generates a COBOL access program
                             :          for the selected ENVIRONMENT (IDMS or CICS).
PROFILE: 1  STRING DELIMITER :
-----
ENTER = EXECUTE, PF2 = HISTORY  PF3 = RETURN, PF4 = ADSC,  CLEAR = NEW PROCESS
```

Value	Explanation
N	The process will use dynamic SQL (default). This is the only option for ODBC.
Y	The process will use static SQL to access DB2. The precompiler generates a COBOL access program for the selected ENVIRONMENT (IDMS or CICS).

Using the Precompiler

```
(C) VEGASOFT OY          VG-ADS PRECOMPILER          V2R6
                          PROCESS COMPILATION
-----
SERVER   : CAF          PASSWORD :          DICTNAME: DICTSD52  DICTNODE:
ACTION  : COMP          (F)COMP/DISP/LIST/PRINT/QUIT/SET/(F)SUB/SUS/SWI XXXX/UPD
PROCESS :          VERSION:      1

STORED OPTIONS:
GENERATE ACCESS MODULE : N      Y = YES,  N = NO
LINK NOSAVE             : N      Y = YES,  N = NO
GENERATE COMMITS        : N
ISOLATION LEVEL         : CS
SQL KEYWORD  DB2SQL     : N
PROCESSING OPTIONS:
COMPILE ACCESS MODULE   : N
EXPLAIN ACCESS PLAN    : N
PROFILE: 1  STRING DELIMITER : '  DP: .    DATE: 01.01.1992  TIME: 01.01.01
-----
ENTER = EXECUTE, PF2 = HISTORY  PF3 = RETURN, PF4 = ADSC,  CLEAR = NEW PROCESS
```

APPLICATION:

NAME:

ENVIRONMENT: IDMS

Static SQL

This field shows the name of the generated access module after a successful precompilation or after retrieving an existing SQL process.

This field is not used in ODBC.

Using the Precompiler

```
(C) VEGASOFT OY          VG-ADS PRECOMPILER          V2R6
                          PROCESS COMPILATION
-----
SERVER   : CAF          PASSWORD :          DICTNAME: DICTSD52  DICTNODE:
ACTION  : COMP          (F)COMP/DISP/LIST/PRINT/QUIT/SET/(F)SUB/SUS/SWI XXXX/UPD
PROCESS :          VERSION:      1

STORED OPTIONS:          APPLICATION:
  GENERATE ACCESS MODULE : N      Y = YES,  N = NO          NAME:
  LINK NOSAVE             :
  GENERATE COMMITS       :
  ISOLATION LEVEL       :
  SQL KEYWORD DB2SQL     :
PROCESSING OPTIONS:
  COMPILE ACCESS MODULE  :
  EXPLAIN ACCESS PLAN   : N      Y = YES,  N = NO
PROFILE: 1  STRING DELIMITER : '  DP: .    DATE: 01.01.1992  TIME: 01.01.01
-----
ENTER = EXECUTE, PF2 = HISTORY  PF3 = RETURN, PF4 = ADSC,  CLEAR = NEW PROCESS
```

<u>Value</u>	<u>Explanation</u>
Y	The precompiler creates LINKs to the Client with NOSAVE option (default).
N	The precompiler creates LINKs to the Client without NOSAVE option (default).

Using the Precompiler

```
(C) VEGASOFT OY          VG-ADS PRECOMPILER          V2R6
                          PROCESS COMPILATION
-----
SERVER   : CAF          PASSWORD :          DICTNAME: DICTSD52  DICTNODE:
ACTION  : COMP          (F)COMP/DISP/LIST/PRINT/QUIT/SET/(F)SUB/SUS/SWI XXXX/UPD
PROCESS :          VERSION:      1

STORED OPTIONS:
GENERATE ACCESS MODULE : N      Y = YES,  N = NO
LINK NOSAVE             : N      Y = YES,  N = NO
GENERATE COMMITS        : N      Y = YES,  N = NO
ISOLATION LEVEL        :
SQL KEYWORD  DB2SQL
PROCESSING OPTIONS:
COMPILE ACCESS MODULE  :
EXPLAIN ACCESS PLAN   :
PROFILE: 1  STRING DELIMITER :
-----
ENTER = EXECUTE, PF2 = HISTORY PF3 = RETURN, PF4 = ADSC,  CLEAR = NEW PROCESS
```

Static SQL
The generated access module runs under CICS or IDMS.
Enter 'CICS' for APPC/SVC and 'IDMS' for CAF communication.
This field is not used in ODBC.

Using the Precompiler

DB2 This option is only used when generating the access module. In dynamic SQL mode the isolation level is always CS.

Cursor Stability (CS)
DB2 holds a page lock only while the cursor is positioned on that page.

Repeatable Read (RR)
DB2 holds page locks until the next commit point.

Uncommitted Read (UR)
If the result set is read-only:

- any row can be changed by other applications
- any row changed by other applications can be read

ODBC The isolation level depends on how the current ODBC driver is implemented.
Please check the `SQL_DEFAULT_TXN_ISOLATION` value displayed in the Server Information screen.

```
ISOLATION LEVEL      : CS  CS = CURSOR STABILITY, RR = REPEATABLE READ
SQL KEYWORD  DB2SQL  N   Y = YES,  N = NO
PROCESSING OPTIONS:
  COMPILE ACCESS MODULE : N   Y = YES,  N = NO
  EXPLAIN ACCESS PLAN   : N   Y = YES,  N = NO
PROFILE: 1  STRING DELIMITER : '  DP: .  DATE: 01.01.1992  TIME: 01.01.01
-----
ENTER = EXECUTE, PF2 = HISTORY  PF3 = RETURN, PF4 = ADSC,  CLEAR = NEW PROCESS
```

Using the Precompiler

```
(C) VEGASOFT OY          VG-ADS PRECOMPILER          V2R6
                          PROCESS COMPILATION
-----
SERVER   : CAF          PASSWORD :          DICTNAME: DICTSD52  DICTNODE:
ACTION   : COMP        (F)COMP/DISP/LIST/PRINT/QUIT/SET/(F)SUB/SUS/SWI XXXX/UPD
PROCESS  :              VERSION:      1

STORED OPTIONS:
GENERATE ACCESS MODULE : N      Y = YES,  N = NO
LINK NOSAVE             : N      Y = YES,  N = NO
GENERATE COMMITS        : N      Y = YES,  N = NO
ISOLATION LEVEL         : CS    CS = CURSOR STABILITY, RR = REPEATABLE READ
SQL KEYWORD DB2SQL      : Y      Y = YES,  N = NO

PROCESSING OPTIONS:
COMPILE
EXPIRE
PROFILE: 1
-----
ENTER = EXEC
```

If the keyword in EXEC statement is set to something else than 'SQL' in the Options Table, this line is visible. We call this '**mixed SQL**'.

In this example the precompiler will recognize the following as a valid (DB2) SQL statement:

```
EXEC DB2SQL
  DELETE FROM DSN8410.EMP
END-DB2SQL.
```

.01

ESS

Using the Precompiler

```
(C) VEGASOFT OY          VG-ADS PRECOMPILER          V2R6
                          PROCESS COMPILATION
-----
SERVER   : CAF          PASSWORD :          DICTNAME: DICTSD52  DICTNODE:
ACTION  : COMP          (F)COMP/DISP/LIST/PRINT/QUIT/SET/(F)SUB/SUS/SWI XXXX/UPD
PROCESS :          VERSION:      1

STORED OPTIONS:
GENERATE ACCESS MODULE : N      Y = YES,  N = NO
LINK NOSAVE             : N      Y = YES,  N = NO
GENERATE COMMITS        : N      Y = YES,  N = NO
ISOLATION LEVEL        : CS     CS = CURSOR STABILITY, RR = REPEATABLE READ
SQL KEYWORD  DB2SQL     : N      Y = YES,  N = NO

PROCESSING OPTIONS:
COMPILE ACCESS MODULE  :
EXPLAIN ACCESS PLAN   :
PROFILE: 1  STRING DELIMITER :
-----
ENTER = EXECUTE, PF2 = HISTORY
```

If you do not use mixed SQL, the precompiler will recognize and process the following:

```
EXEC SQL
DELETE FROM DSN8410.EMP
END-EXEC.
```

01
ESS

Using the Precompiler

```
(C) VEGASOFT OY          VG-ADS PRECOMPILER          V2R6
                          PROCESS COMPILATION
-----
SERVER   : CAF          PASSWORD :          DICTNAME: DICTSD52  DICTNODE:
ACTION  : COMP          (F)COMP/DISP/LIST/PRINT/QUIT/SET/(F)SUB/SUS/SWI XXXX/UPD
PROCESS :          VERSION:      1

STORED OPTIONS:
GENERATE ACCESS MODULE : N      Y = YES,  N = NO
LINK NOSAVE             : N      Y = YES,  N = NO
GENERATE COMMITS        : N      Y = YES,  N = NO
ISOLATION LEVEL        : CS     CS = CURSOR STABILITY, RR = REPEATABLE READ
SQL KEYWORD DB2SQL     : N      Y = YES,  N = NO
APPLICATION:
NAME:
ENVIRONMENT: IDMS

PROCESSING OPTIONS:
COMPILE
EXPLAIN
PROFILE: 1
-----
ENTER = EXECUTE, PF2 = HISTORY  PF3 = RETURN, PF4 = ADSC,  CLEAR = NEW PROCESS
```

Processing options control precompilation. These options are not stored into CA-IDD. They are relevant only when generating an access module for DB2.

TIME: 01.01.01

Using the Precompiler

```

(C) VEGASOFT OY          VG-ADS PRECOMPILER          V2R6
                        PROCESS COMPILATION
-----
SERVER   : CAF          PASSWORD   :          DICTNAME: DICTSD52  DICTNODE:
ACTION  : COMP          (F)COMP/DISP/LIST/PRINT/QUIT/SET/(F)SUB/SUS/SWI XXXX/UPD
PROCESS :              VERSION:    1

STORED OPTIONS:
GENERATE ACCESS MODULE : N      Y = YES,  N = NO
LINK NOSAVE             : N      Y = YES,  N = NO
GENERATE COMMITS        : N      Y = YES,  N = NO
ISOLATION LEVEL         : CS    CS = CURSOR STABILITY, RR = REPEATABLE READ
SQL KEYWORD  DB2SQL     : N      Y = YES,  N = NO
APPLICATION:
NAME:
ENVIRONMENT: IDMS

PROCESSING OPTIONS:
COMPILE ACCESS MODULE  : N      Y = YES,  N = NO
EXPLAIN ACCESS PLAN   : N      Y = YES,  N = NO
  
```

<u>Value</u>	<u>Explanation</u>
--------------	--------------------

- | | |
|---|---|
| Y | The precompiler automatically submits a batch job to compile, link edit and bind the access module after successful precompilation. |
| N | Use the SUBmit action to send a batch job to compile, link edit and bind the access module after successful precompilation (default). |

Using the Precompiler

```
(C) VEGASOFT OY          VG-ADS PRECOMPILER          V2R6
                          PROCESS COMPILATION
-----
SERVER   : CAF          PASSWORD :          DICTNAME: DICTSD52  DICTNODE:
ACTION  : COMP          (F)COMP/DISP/LIST/PRINT/QUIT/SET/(F)SUB/SUS/SWI XXXX/UPD
PROCESS :                VERSION:          1

STORED OPTIONS:
GENERATE ACCESS MODULE : N      Y = YES,  N = NO
LINK NOSAVE              : N      Y = YES,  N = NO
GENERATE COMMITS         : N      Y = YES,  N = NO
ISOLATION LEVEL         : CS    CS = CURSOR STABILITY, RR = REPEATABLE READ
SQL KEYWORD  DB2SQL      : N      Y = YES,  N = NO
APPLICATION:
NAME:
ENVIRONMENT: IDMS

PROCESSING OPTIONS:
COMPILE ACCESS MODULE   : N      Y = YES,  N = NO
EXPLAIN ACCESS PLAN    : N      Y = YES,  N = NO
PROFILE 1              : 1      DATE: 01 01 1992  TIME: 01 01 01
```

<u>Value</u>	<u>Explanation</u>
Y	The precompiler inserts EXPLAIN(YES) clause in the DB2 bind step of the generated access module.
N	The precompiler DOES NOT insert EXPLAIN(YES) clause in the DB2 bind step of the generated access module (default).

Using the Precompiler

```
(C) VEGASOFT OY          VG-ADS PRECOMPILER          V2R6
                          PROCESS COMPILATION
-----
SERVER : CAF          PASSWORD :          DICTNAME: DICTSD52  DICTNODE:

ACTION : COMP        (F)COMP/DISP/LIST/PRINT/QUIT/SET/(F)SUB/SUS/SWI XXXX/UPD

PRO These fields show the Options Table values for the Server.  SION:      1

STORED OPTIONS:
GENERATE ACCESS MODULE : N      Y = YES,  N = NO
LINK NOSAVE             : N      Y = YES,  N = NO
GENERATE COMMITS       : N      Y = YES,  N = NO
ISOLATION LEVEL        : CS     CS = CURSOR STABILITY, RR = REPEATABLE READ
SQL KEYWORD DB2SQL     : N      Y = YES,  N = NO
APPLICATION:
NAME:
ENVIRONMENT: IDMS

PROCESSING OPTIONS:
COMPILE ACCESS MODULE  : N      Y = YES,  N = NO
EXPLAIN ACCESS PLAN   : N      Y = YES,  N = NO
PROFILE: 1            STRING DELIMITER: ' DP: .    DATE: 01.01.1992  TIME: 01.01.01
-----
ENTER = EXECUTE, PF2 = HISTORY  PF3 = RETURN, PF4 = ADSC,  CLEAR = NEW PROCESS
```

Using the Precompiler

```
(C) VEGASOFT OY          VG-ADS PRECOMPILER          V2R6
                          PROCESS COMPILATION
-----
SERVER   : CAF          PASSWORD :          DICTNAME: DICTSD52  DICTNODE:
ACTION   : COMP        ( Let's hit ENTER to precompile the process. ) SUB/SUS/SWI XXXX/UPD
PROCESS  : dempdpt1-pre          VERSION:      1

STORED OPTIONS:
GENERATE ACCESS MODULE : N      Y = YES,  N = NO
LINK NOSAVE             : N      Y = YES,  N = NO
GENERATE COMMITS        : N      Y = YES,  N = NO
ISOLATION LEVEL        : CS     CS = CURSOR STABILITY, RR = REPEATABLE READ
SQL KEYWORD  DB2SQL     N      Y = YES,  N = NO
APPLICATION:
NAME:
ENVIRONMENT: IDMS

PROCESSING OPTIONS:
COMPILE ACCESS MODULE  : N      Y = YES,  N = NO
EXPLAIN ACCESS PLAN    : N      Y = YES,  N = NO
PROFILE: 1  STRING DELIMITER : '  DP: .    DATE: 01.01.1992  TIME: 01.01.01
-----
ENTER = EXECUTE, PF2 = HISTORY  PF3 = RETURN, PF4 = ADSC,  CLEAR = NEW PROCESS
```

Using the Precompiler

```
(C) VEGASOFT OY          VG-ADS PRECOMPILER          V2R6
                          PROCESS COMPILATION
-----
SERVER   : CAF          PASSWO
ACTION   : list err (F) COM
PROCESS  : DEMPDPT1-PRE

STORED OPTIONS:
GENERATE ACCESS MODULE : N      Y = YES,  N = NO
LINK NOSAVE             : N      Y = YES,  N = NO
GENERATE COMMITS        : N      Y = YES,  N = NO
ISOLATION LEVEL        : CS     CS = CURSOR STABILITY, RR = REPEATABLE READ
SQL KEYWORD DB2SQL     : N      Y = YES,  N = NO

PROCESSING OPTIONS:
COMPILE ACCESS MODULE  : N      Y = YES,  N = NO
EXPLAIN ACCESS PLAN    : N      Y = YES,  N = NO

PROFILE: 1  STRING DELIMITER : '  DP: .  DATE: 01.01.1992  TIME: 01.01.01
-----
ENTER = EXECUTE, PF2 = HISTORY  PF3 = RETURN, PF4 = ADSC,  CLEAR = NEW PROCESS
VG003216 V222 COMPILATION WAS UNSUCCESSFUL;  ERRORS:      1  WARNINGS:      0
```

Oops! There is an error. Let's find out what it is with
LIST ERR action set by the precompiler.

You may also select other actions:
LIST shows the precompiler output.
LIST SQL shows SQL lines only.

Using the Precompiler

```
--- VG-ADS PRECOMPILED ERROR LISTING ---
!EXEC SQL DECLARE EMP CURSOR          FOR                      SQL0003
!   SELECT XXX_EMPNO, FIRSTNME, LASTNAME, DEPTNAME, DEPTNO FROM
!       DSN8220.EMP, DSN8220.DEPT
!       WHERE LASTNAME > :LASTNAME
!       AND WORKDEPT = DEPTNO
!       ORDER BY LASTNAME, FIRSTNME
!END-EXEC.                                                    SQL0003
VG003501 V222 * ERROR 1: SQL COMPILE ERROR. SEE DB2 MESSAGE(S) BELOW
DSNT408I SQLCODE = -206, ERROR: XXX_EMPNO IS NOT A COLUMN OF AN INSE
RTED TABLE, UPDATED TABLE, OR ANY TABLE IDENTIFIED IN A FROM CLAUSE
```

These two lines contain the original DB2 or ODBC error message!

Using the Precompiler

```
(C) VEGASOFT OY          VG-ADS PRECOMPILER          V2R6
                          PROCESS COMPILATION
-----
SERVER   : CAF          PASSWORD :          DICTNAME: DICTSD52  DICTNODE:
ACTION   : update      (F)COM      XXXX/UPD
PROCESS  : DEMPDP1-PRE          VERSION:      1

STORED OPTIONS:
GENERATE ACCESS MODULE : N      Y = YES,  N = NO
LINK NOSAVE             : N      Y = YES,  N = NO
GENERATE COMMITS        : N      Y = YES,  N = NO
ISOLATION LEVEL         : CS    CS = CURSOR STABILITY, RR = REPEATABLE READ
SQL KEYWORD  DB2SQL     N      Y = YES,  N = NO

PROCESSING OPTIONS:
COMPILE ACCESS MODULE  : N      Y = YES,  N = NO
EXPLAIN ACCESS PLAN    : N      Y = YES,  N = NO

PROFILE: 1  STRING DELIMITER : '  DP: .  DATE: 01.01.1992  TIME: 01.01.01
-----
ENTER = EXECUTE, PF2 = HISTORY  PF3 = RETURN, PF4 = ADSC,  CLEAR = NEW PROCESS
VG003202 V222 OLD SESSION
```

Now we select the UPDATE action to correct the error.

Using the Precompiler

```
                                IDD 12.0 ONLINE          NO ERRORS          DICT=DICTSD52          1/55

MODIFY
MODULE NAME IS DEMPDP1-PRE VERSION
  LANGUAGE IS SQLPROCESS
  TEXT IS 'NYN
  MODULE SOURCE FOLLOWS
MOVE 0 TO IND.
MOVE 0 TO WERR-SQLCODE.
EXEC SQL WHENEVER SQLERROR
  CALL SQLERROR
END-EXEC.
EXEC SQL BEGIN DECLARE SECTION
  DSN8220-EMP DSN8220-DEPT
EXEC SQL END  DECLARE SECTION
EXEC SQL DECLARE EMP CURSOR          FOR
  SELECT      EMPNO, FIRSTNME, LASTNAME, DEPTNAME, DEPTNO  FROM
  DSN8220.EMP, DSN8220.DEPT
  WHERE LASTNAME >  :LASTNAME
  AND WORKDEPT =  DEPTNO
  ORDER BY LASTNAME, FIRSTNME
END-EXEC.
```

We have now changed the column name in error from XXX_EMPNO to EMPNO.

Let's save the module and return back to the precompiler.

Using the Precompiler

```
(C) VEGASOFT OY          VG-ADS PRECOMPILER          V2R6
                          PROCESS COMPILATION
-----
SERVER   : CAF          PASSWORD :          DICTNAME: DICTSD52  DICTNODE:
ACTION  : COMP          (F)COMP/DISP/LIST/PRINT/QUIT/SET/(F)SUB/SUS/SWI XXXX/UPD
PROCESS : DEMPDP1-PRE          VERSION:          1

STORED OPTIONS:
GENERATE ACCESS MODULE : N
LINK NOSAVE             : N   Y = YES, N = NO   ENVIRONMENT: IDMS
GENERATE COMMITS        : N   Y = YES, N = NO
ISOLATION LEVEL        : CS  CS = CURSOR STABILITY, RR = REPEATABLE READ
SQL KEYWORD DB2SQL      : N   Y = YES, N = NO

PROCESSING OPTIONS:
COMPILE ACCESS MODULE  : N   Y = YES, N = NO
EXPLAIN ACCESS PLAN    : N   Y = YES, N = NO

PROFILE: 1  STRING DELIMITER : '  DP: .  DATE: 01.01.1992  TIME: 01.01.01
-----
ENTER = EXECUTE, PF2 = HISTORY  PF3 = RETURN, PF4 = ADSC,  CLEAR = NEW PROCESS
VG003202 V222 OLD SESSION
```

Now we hit ENTER to restart the precompiler.

Using the Precompiler

```
(C) VEGASOFT OY          VG-ADS PRECOMPILER          V2R6
                          PROCESS COMPILATION
-----
SERVER   : CAF          PASSWORD :          DICTNAME: DICTSD52  DICTNODE:
ACTION   : COMP        (F) COMP
PROCESS  : DEMPDP1-PRE

STORED OPTIONS:
GENERATE ACCESS MODULE
LINK NOSAVE
GENERATE COMMITS
ISOLATION LEVEL          : CS  CS = CURSOR STABILITY, RR = REPEATABLE READ
SQL KEYWORD  DB2SQL      N    Y = YES,  N = NO
PROCESSING OPTIONS:
COMPILE ACCESS MODULE   : N    Y = YES,  N = NO
EXPLAIN ACCESS PLAN     : N    Y = YES,  N = NO
PROFILE: 1  STRING DELIMITER : '  DP: .    DATE: 01.01.1992  TIME: 01.01.01
-----
ENTER = EXECUTE, PF2 = HISTORY  PF3 = RETURN, PF4 = ADSC,  CLEAR = NEW PROCESS
VG003213 V222 COMPILATION EXECUTED; NO ERRORS FOUND; UPDATING IDD...
```

The precompiler saves the following components into CA-IDD:

- Precompiled process (same name and version as in the source module, LANGUAGE PROCESS)
- Work record definitions used in Client/Server communication
- If requested, the generated DB2 access module (same name and version as in the source module, LANGUAGE COBOL) and the program entity

Using the Precompiler

```
(C) VEGASOFT OY          VG-ADS PRECOMPILER          V2R6
                        PROCESS COMPILATION
-----
SERVER   : CAF          PASSWORD :          DICTNAME: DICTSD52  DICTNODE:
ACTION   : COMP        (F)COMP/D
PROCESS  : DEMPDP1-PRE

STORED OPTIONS:
GENERATE ACCESS MODULE : N      Y = YES,  N = NO
LINK NOSAVE             : N      Y = YES,  N = NO
GENERATE COMMITS        : N      Y = YES,  N = NO
ISOLATION LEVEL        : CS     CS = CURSOR STABILITY, RR = REPEATABLE READ
SQL KEYWORD  DB2SQL     N      Y = YES,  N = NO
APPLICATION:
NAME:
ENVIRONMENT: IDMS

PROCESSING OPTIONS:
COMPILE ACCESS MODULE  : N      Y = YES,  N = NO
EXPLAIN ACCESS PLAN    : N      Y = YES,  N = NO
PROFILE: 1  STRING DELIMITER : '  DP: .    DATE: 01.01.1992  TIME: 01.01.01
-----
ENTER = EXECUTE, PF2 = HISTORY  PF3 = RETURN, PF4 = ADSC,   CLEAR = NEW PROCESS
VG003213 V222 COMPILATION EXECUTED; NO ERRORS FOUND; UPDATING IDD...
```

By the way, you may use PF2 to open a window containing last 10 processes precompiled. You can select a process by pointing with cursor.

Using the Precompiler

```
(C) VEGASOFT OY          VG-ADS PRECOMPILER          V2R6
                          PROCESS COMPILATION
-----
SERVER   : CAF          PASSWORD :          DICTNAME: DICTSD52  DICTNODE:
ACTION   : COMP        (F)COMP/DISP/LIST/PRINT/QUIT/SET/(F)SUB/SUS/SWI XXXX/UPD
PROCESS  +-----+
          | DEMPDPT1-PRE                                     | 1 |
          +-----+
STORED OP |
GE        |
LI        |
GE        |
IS        |
SQ        |
PROCESSIN|
CO        |
EX+-----+
PROFILE:  | VG003207 V222 PLEASE SELECT A PROCESS          | 992  TIME: 01.01.01
-----
ENTER = EXECUTE, PF2 = HISTORY  PF3 = RETURN, PF4 = ADSC,   CLEAR = NEW PROCESS
VG003202 V222 OLD SESSION
```

Using the Precompiler

```
(C) VEGASOFT OY          VG-ADS PRECOMPILER          V2R6
                        PROCESS COMPILATION
-----
SERVER   : CAF          PASSWORD   :          DICTNAME: DICTSD52  DICTNODE:
ACTION   : COMP        (F) COMP
PROCESS  : DEMPDP1-PRE

STORED OPTIONS:
GENERATE ACCESS MODULE : N      Y = YES,  N = NO
LINK NOSAVE             : N      Y = YES,  N = NO
GENERATE COMMITS       : N      Y = YES,  N = NO
ISOLATION LEVEL        : CS     CS = CURSOR STABILITY, RR = REPEATABLE READ
SQL KEYWORD  DB2SQL     N      Y = YES,  N = NO
PROCESSING OPTIONS:
COMPILE ACCESS MODULE  : N      Y = YES,  N = NO
EXPLAIN ACCESS PLAN   : N      Y = YES,  N = NO
PROFILE: 1  STRING DELIMITER : '  DP: .    DATE: 01.01.1992  TIME: 01.01.01
-----
ENTER = EXECUTE, PF2 = HISTORY  PF3 = RETURN, PF4 = ADSC,   CLEAR = NEW PROCESS
VG003202 V222 OLD SESSION
```

Now we are ready to SWItch (PF4) over to ADSC.

In CA-IDMS R10.2x, PF4 invokes ADSC.

Using the Precompiler

```
(C) VEGASOFT OY          VG-ADS PRECOMPILER          V2R6
                          PROCESS COMPILATION
-----
SERVER   : CAF          PASSWORD :          DICTNAME: DICTSD52  DICTNODE:

ACTION   : swi adsc (F)COMP/DISP/LIST/PRINT/QUIT/SET/(F)SUB/SUS/SWI XXXX/UPD

PROCESS  : DEMPDP1-PRE          VERSION:      1

STORED OPTIONS:
GENERATE ACCESS MODULE : N      Y = YES,  N = NO
LINK NOSAVE            : N      Y = YES,  N = NO
GENERATE COMMITS       : N      Y = YES,  N = NO
ISOLATION LEVEL       : CS     CS = CURSOR STABILITY, RR = REPEATABLE READ
SQL KEYWORD  DB2SQL    : N      Y = YES,  N = NO
APPLICATION:
NAME:
ENVIRONMENT: IDMS

PROCESSING OPTIONS:
COMPILE ACCESS MODULE : N      Y = YES,  N = NO
EXPLAIN ACCESS PLAN   : N      Y = YES,  N = NO
PROFILE: 1  STRING DELIMITER : '  DP: .    DATE: 01.01.1992  TIME: 01.01.01
-----
ENTER = EXECUTE, PF2 = HISTORY  PF3 = RETURN, PF4 = ADSC,  CLEAR = NEW PROCESS
VG003202 V222 OLD SESSION
```

Defining the dialog

```
Add Modify Compile Delete Display Switch
.
!
! Copy from dialog ! CA-ADS Online Dialog Compiler
! Name           !
! Version       !puter Associates International, Inc.
!-----!
! F3=Exit       !
!-----!
Dialog name . . . . . dempdpt1
Dialog version . . . . . 1
Dictionary name . . . . . DICTSD52
Dictionary node . . . . .
Screen . . . . . 1 1. General options
                    2. Assign maps
                    3. Assign database
                    4. Assign records and tables
                    5. Assign process modules

DC498104 Dialog does not exist. Use the ADD action to create or copy the dialog.

Command ==>
Enter F1=Help F3=Exit F10=Action
```

Defining the dialog

Add Modify Compile Delete Display Switch

.....

CA-ADS Online Dialog Compiler

Computer Associates International, Inc.

Dialog name DEMPDPT1
Dialog version 1
Dictionary name DICTSD52
Dictionary node _____

Screen 1 1. General options
2. Assign maps
3. Assign database
4. Assign records and tables
5. Assign process modules

DC498110 Dialog DEMPDPT1 version 1 has been ADDED

Command ==>

Enter F1=Help F3=Exit F10=Action

Defining the dialog

Map Specifications

Dialog DEMPDP1 Version 1

```
Map name . . . . empdpt1 ! Input map . . . . . _____
Version . . . . . 1 ! Version . . . . . _____
! Label . . . . . _____
Paging options 2 1. Wait !
                2. No Wait ! Output map . . . . . _____
                3. Return ! Version . . . . . _____
! Label . . . . . _____
Paging mode . . . / Update !
                  / Backpage ! Suspense file label _____
                  / Auto display !
```

We have already painted the map.

Enter F1=Help F3=Exit F4=Prev F5=Next F6=Switch Protection

Defining the dialog

Records and Tables

Page 1 of 1

Dialog DEMPDP1 Version 1

Name	Version	Work	New copy	Drop
1. wempdpt1	1	/	—	—
2. wdb2ctl	1	/	—	—
3. wdb2inp	1	/	—	—
4. db2-out-dempdpt1-pre	1	/	—	—

We define the following work records:

1. An application specific work record.
2. VEGA Client/Server control record.
3. VEGA Client/Server input record. This record contains the SQL statement.
4. The last work record is generated by the precompiler. It contains host variables received from data source. The name of the record is the process name prefixed with 'DB2-OUT-'.

Enter F1=Help F3=Exit F4=Prev F5=Next F7=Bkwd F8=Fwd

Defining the dialog

```
Process Modules                                     Page 1 of 1

Dialog DEMPDP1T1  Version 1

Name dempdpt1-pre                                     2 Type
Version 1                                             _ Execute on errors
Key _____ Value _____                      _ Drop

Name dempdpt1-enter                                   3 Type
Version 1                                             _ Execute on errors
Key enter Value _____                          _ Drop

Name _____                                       _ Type
Version _____                                       _ Execute on errors
Key _____ Value _____                          _ Drop

The dialog has two processes.

1. Premap process contains our SQL.
2. Response process only contains DISPLAY CONTINUE.

Name _____                                       _ Type
Version _____                                       _ Execute on errors
Key _____ Value _____                          _ Drop

* Type : 1=Declaration 2=Premap 3=Response 4=Default Response

Enter F1=Help F3=Exit F4=Prev F5=Next F7=Bkwd F8=Fwd
```

Defining the dialog

Add Modify Compile Delete Display Switch

```
•-----•  
!                                     !  
! 1 1. Compile                       ! Dialog Compiler  
!   2. View messages                 !  
!-----!es International, Inc.  
! F3=Exit                             !  
!_____!
```

```
Dialog name . . . . . DEMPDPT1  
Dialog version . . . . . 1  
Dictionary name . . . . . DICTSD52  
Dictionary node . . . . . _____
```

Now we are ready to compile the dialog.

```
Screen . . . . . 3 1. General options  
                2. Assign maps  
                3. Assign database  
                4. Assign records and tables  
                5. Assign process modules
```

Command ==>

Enter F1=Help F3=Exit F10=Action

Defining the dialog

Add Modify Compile Delete Display Switch

.....

CA-ADS Online Dialog Compiler

Computer Associates International, Inc.

Dialog name DEMPDPT1
Dialog version 1
Dictionary name DICTSD52
Dictionary node _____

Now we are ready to run the dialog.

Screen 1 1. General options
2. Assign maps
3. Assign database
4. Assign records and tables
5. Assign process modules

DC498140 Dialog DEMPDPT1 version 1 has been successfully compiled.

Command ==>

Enter F1=Help F3=Exit F10=Action

Defining the dialog

```
V222  ENTER NEXT TASK CODE:  
ads dempdept
```

An existing main line dialog DEMPDEPT will **TRANSFER** control to our DB2 dialog.
Now, let's start the application.

Defining the dialog

```
VEGASOFT OY      JOINING EMP AND DEPT  USING CURSOR
```

```
SQLCODE  +00000000
```

EMPNO	FIRSTNAME	LASTNAME	DEPTNAME	DEPTNO
000150	BRUCE	ADAMSON	MANUFACTURING SYSTEMS	D11
000200	DAVID	BROWN	MANUFACTURING SYSTEMS	D11
000050	JOHN	GEYER	SUPPORT SERVICES	E01
000340	JASON	GOUNOT	SOFTWARE SUPPORT	E21
000090	EILEEN	HENDERSON	OPERATIONS	E11
000230	JAMES	JEFFERSON	ADMINISTRATION SYSTEMS	D21

The real application shows multiple screens.

PARTIAL LIST. HIT ENTER TO GET MORE



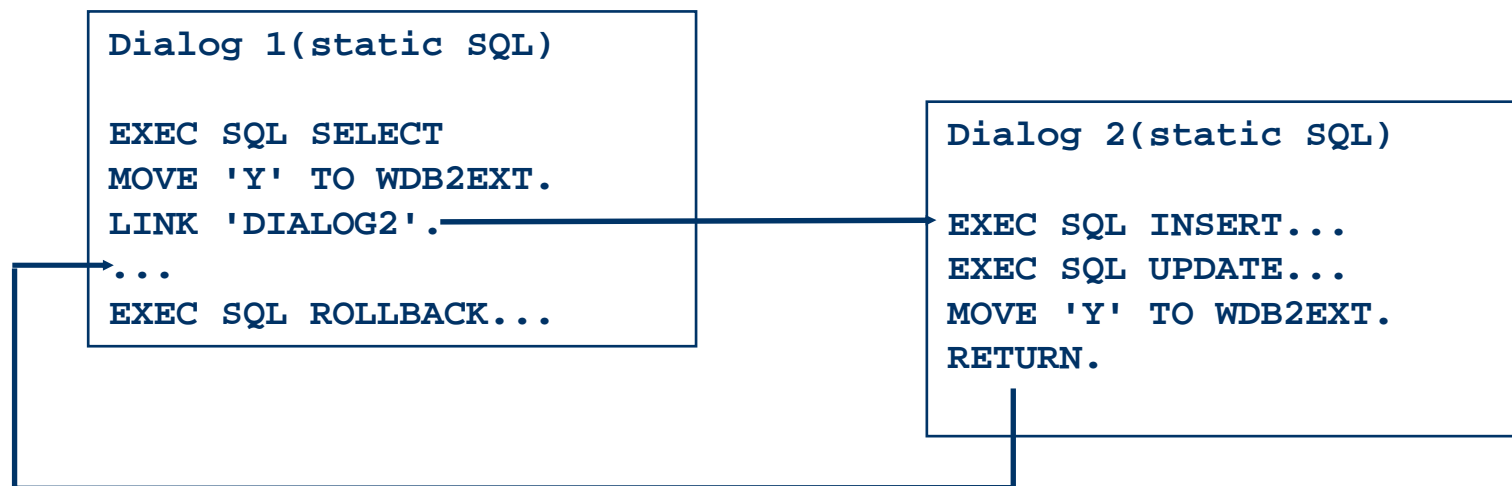
DB2 Extended Unit of Work

- ◆ All CA - ADS control commands except LINK terminate the DB2 Unit of Work
- ◆ To extend the DB2 Unit of Work over other control commands, precede the control command with
 - MOVE 'Y' TO WDB2EXT

DB2 Extended Unit of Work

◆ Example

- ROLLBACK in DIALOG1 reverts also changes made in DIALOG2



DB2 Extended Unit of Work

- ◆ How to bind the plans
 - if all process use Dynamic SQL, no extra steps are needed
 - if at least one process use Static SQL
 - all DB2 request modules involved should be bound in the same plan
 - bind statements must be stored in a CA-IDD module with LANGUAGE DB2BIND

DB2 Extended Unit of Work

◆ Bind Module example

```
ADD
MODULE NAME IS PROCESS1 VERSION IS 1
LANGUAGE IS DB2BIND MODULE SOURCE FOLLOWS
BIND PLAN(PGMR0001) MEMBER(PGMR0001,PGMR0002) -
ACT(REP) ISO(CS) EXPLAIN(NO) VALIDATE(BIND) RETAIN
END      MSEND.
```

```
ADD
MODULE NAME IS PROCESS2 VERSION IS 1
LANGUAGE IS DB2BIND MODULE SOURCE FOLLOWS
BIND PLAN(PGMR0001) MEMBER(PGMR0001,PGMR0002) -
ACT(REP) ISO(CS) EXPLAIN(NO) VALIDATE(BIND) RETAIN
END      MSEND.
```



Optimization of CA-IDD Updates

- ◆ The update of work records uses much resources
- ◆ CA - IDD Store Optimize feature only stores changed work records
- ◆ `IDD_STORE_OPTIMIZE` keyword in the Options Tables enables this feature

Optimization of CA-IDD Updates

- ◆ Precompiler action LIST STT displays optimize statistics

--- VG-ADS PRECOMPILER IDD UPDATE STATISTICS ---			
RECORD TYPE	GENERATED	COMPARED	EQUAL
DB2-INP-<PROCESS>	7	7	4
DB2-OUT-<PROCESS>	10	10	6



Line mode precompilation

- ◆ Can be invoked using CLISTs and UCFBATCH
 - SQLPL FCOMP,<process name>,<version>

CA-IDD User Exit

- ◆ **MDB2UEXT** exit disallows the DDDL statements:
 - **DISPLAY/MODIFY/REPLACE PROCESS**
<module>
 - if an associated **DB2/SQLPROCESS** module exists
- ◆ **Change always the DB2/SQLPROCESS module and then run the precompiler!**



Migration Utility

- ◆ Migrates all generated source components to another dictionary
- ◆ Migration criteria (Dialog/Process name)
- ◆ Selectable component migration
 - DB2/SQLPROCESS modules
 - process modules generated by the precompiler
 - non SQL process modules defined in a dialog
 - record definitions generated by the precompiler
 - COBOL access modules and program entities generated by the precompiler



System Requirements



- ◆ CA-ADS 10.2x or later
- ◆ To access DB2
 - VG-IDMS/DB2 Server (for CAF)
 - VG-IDMS CICS Server (for SVC/APPC)
 - IBM DB2 V2R2 or later
 - optionally COBOL compiler (for static SQL)



System Requirements



- ◆ To access ODBC
 - ODBC-compliant DBMS System
 - 32bit ODBC driver
 - VG-ODBC Server
 - If TCP/IP is used
 - VG-IDMS Gateway TCP/IP Option
 - TCP/IP Systems software for OS/390 MVS (IBM or CA-NetworkIT TCPAccess)
 - If APPC is used
 - CA-IDMS-DC 10.2x or later
 - MS SNA Server 2.11 or later



End of Presentation

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