SQL PL i Mainframe
- till vilket pris?

Christer Johansson
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SQL PL

- Är ett subset av SQL PSM
- Ett enkelt språk som skall underlätta skrivandet av Stored Proceduters
- Finns med i DB2 / UDB på alla platformer
  - zSeries och iSeries skiljer sig från LUW platformen
  - zSeries
    - Översätts SQL PL koden till C kod via ett precompile steg
    - Har en begränsad instruktions repertuar
      - CALL
      - CASE
      - GET DIAGNOSTICS
      - GOTO
      - IF
      - LEAVE
      - LOOP
      - REPETE
      - SET
      - WHILE

Exempel på SQL PL, program SPS12

- Exekverades drygt 300.000 gånger på ett dygn vecka 02 2005
- Eller 3,5 gånger per sekund i snitt
- Huvudsaklig uppgift är att göra INSERT av logg post
  - Beroende på status i styrtabell avgörs i vilken tabell insert skall göras
  - Om det är “fel på tabellen” skall insert göras i feltabell
- Detta är en av sex Stored Procedure, som tillsammans i peek beräknas köras ca 600 gånger per sekund

```
CREATE PROCEDURE &schema.SPS12 (,,) ...
P1: BEGIN
   DECLARE SQLCODE INTEGER;
   DECLARE SQLCODE_ERR INTEGER DEFAULT 0;
   DECLARE TEMP_SQLCODE_ERR INTEGER DEFAULT 0;
   DECLARE V_PART_NO CHAR(2) DEFAULT '00';
   DECLARE V_TABLE_STATUS CHAR(1) DEFAULT ' ';
   DECLARE V_ADDITIONAL_DATAX VARCHAR(32000);
   DECLARE V_DATA_TYPE CHAR(4) DEFAULT ' ';

   DECLARE C1 CURSOR  FOR
    SELECT TABLE_STATUS
    FROM I3LFW900
    WHERE TABLE_NAME = 'T3LFW200'
     AND CURRENT_TIMESTAMP BETWEEN START_TIMESTAMP AND  END_TIMESTAMP
     WITH UR
    ;
   DECLARE CONTINUE HANDLER FOR SQLEXCEPTION SET SQLCODE_ERR = SQLCODE;

   SET OUT1 = 0;
   SET OUT2 = 0;
```

```
SET V_END_USER_ID = STRIP(V_END_USER_ID,BOTH,' ');

  IF LENGTH(V_END_USER_ID) >= 4 THEN
     SET V_PART_NO =  SUBSTR(V_END_USER_ID,(LENGTH(V_END_USER_ID)-3),2) ;
  ELSE
     SET V_PART_NO = '00' ;
  END IF ;

  IF SUBSTR(V_PART_NO,1,1)  NOT IN ('1','2','3','4','5','6','7','8','9','0') THEN
      SET V_PART_NO = '00';
  ELSE
     IF SUBSTR(V_PART_NO,2,1)  NOT IN ('1','2','3','4','5','6','7','8','9','0') THEN
        SET V_PART_NO = '00';
     END IF;
  END IF;

  IF LENGTH(V_ADDITIONAL_DATA) > 2500 THEN
     SET V_ADDITIONAL_DATAX = V_ADDITIONAL_DATA;
     SET V_ADDITIONAL_DATA  = NULL;
     SET V_DATA_TYPE        = 'CLOB';
  END IF;
```

```
OPEN C1;
  IF SQLCODE_ERR = 0 THEN
     FETCH C1 INTO V_TABLE_STATUS;
     CLOSE C1;
  END IF;

  IF V_TABLE_STATUS = 'A' THEN
        INSERT INTO I3LFW20I (....) VALUES(....);
  END IF;

  SET TEMP_SQLCODE_ERR = SQLCODE_ERR;
  IF TEMP_SQLCODE_ERR < 0 THEN
     SET OUT1 = TEMP_SQLCODE_ERR;
  END IF;
  SET SQLCODE_ERR = 0;

  IF TEMP_SQLCODE_ERR < 0 OR V_TABLE_STATUS <> 'A'  THEN
      INSERT INTO I3LFW21I (....) VAUES(....);
  END IF;
  IF SQLCODE_ERR < 0 THEN
     SET OUT2 = SQLCODE_ERR;
  END IF;
```

```
 IF V_DATA_TYPE = 'CLOB' THEN
   IF V_TABLE_STATUS = 'A' THEN
      INSERT INTO I3LFW500 (....) VALUES(....);
 END IF;

SET TEMP_SQLCODE_ERR = SQLCODE_ERR;
IF TEMP_SQLCODE_ERR < 0 THEN
    SET OUT1 = TEMP_SQLCODE_ERR;
END IF;
SET SQLCODE_ERR = 0;

 IF TEMP_SQLCODE_ERR < 0 OR V_TABLE_STATUS <> 'A'  THEN
    INSERT INTO I3LFW510 (....) VALUES(....);
 END IF;
 IF SQLCODE_ERR < 0 THEN
    SET OUT2 = SQLCODE_ERR;
 END IF;
END IF;

END P1
```

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Ur SYSIBM.SYSPACKSTMT

```
 461 SELECT 0 INTO :SQLCODE FROM SYSIBM.SYSDUMMY1 WITH UR

 477 DECLARE C1 CURSOR FOR SELECT TABLE_STATUS FROM I3LFW900 ....
 677 OPEN C1
 700 FETCH C1 INTO :P1.V_TABLE_STATUS :P1.SQLP_I19
 715 CLOSE C1

 747 INSERT INTO I3LFW20I (...) VALUES(...);
 854 INSERT INTO I3LFW21I (...) VALUES(...);
 941 INSERT INTO I3LFW500 (...) VALUES(...);
1041 INSERT INTO I3LFW510 (...) VALUES(...);

1140 SET :P1.V_DATA_TYPE :P1.SQLP_I21 = SYSIBM.CHAR ( ' ', 4 )

1150 SET :SQLRoutine.V_END_USER_ID :SQLRoutine.SQLP_I1 =   STRIP ( :SQLRoutine.V_END_USER_ID :SQLRoutine.SQLP_I1, BOTH, ' ' )

1161 SELECT 1 INTO :SQLP_INT_VAR FROM SYSIBM.SYSDUMMY1 WHERE  LENGTH ( :SQLRoutine.V_END_USER_ID :SQLRoutine.SQLP_I1 ) >= 4 WITH UR

1184 SET :P1.V_PART_NO :P1.SQLP_I18 = SUBSTR (  :SQLRoutine.V_END_USER_ID :SQLRoutine.SQLP_I1, ( LENGTH ( :SQLRoutine.V_END_USER_ID :SQLRoutine.SQLP_I1 ) - 3 ), 2 )

1196 SELECT 1 INTO :SQLP_INT_VAR FROM SYSIBM.SYSDUMMY1 WHERE   SUBSTR ( :P1.V_PART_NO :P1.SQLP_I18, 1, 1 ) NOT IN ( '1', '2', '3',  '4', '5', '6', '7', '8', '9', '0' ) WITH UR

1220 SELECT 1 INTO :SQLP_INT_VAR FROM SYSIBM.SYSDUMMY1 WHERE   SUBSTR ( :P1.V_PART_NO :P1.SQLP_I18, 2, 1 ) NOT IN ( '1', '2', '3',  '4', '5', '6', '7', '8', '9', '0' ) WITH UR

1244 SELECT 1 INTO :SQLP_INT_VAR FROM SYSIBM.SYSDUMMY1 WHERE  LENGTH ( :SQLRoutine.V_ADDITIONAL_DATA :SQLRoutine.SQLP_I12 ) >  2500 WITH UR

1,268 SET :P1.V_ADDITIONAL_DATAX :P1.SQLP_I20 =   :SQLRoutine.V_ADDITIONAL_DATA :SQLRoutine.SQLP_I12

1,279 SELECT 1 INTO :SQLP_INT_VAR FROM SYSIBM.SYSDUMMY1 WHERE    :P1.TEMP_SQLCODE_ERR :P1.SQLP_I17 < 0 OR :P1.V_TABLE_STATUS  :P1.SQLP_I19 <> 'A' WITH UR

1303 SELECT 1 INTO :SQLP_INT_VAR FROM SYSIBM.SYSDUMMY1 WHERE    :P1.TEMP_SQLCODE_ERR :P1.SQLP_I17 < 0 OR :P1.V_TABLE_STATUS   :P1.SQLP_I19 <> 'A' WITH UR
```

Statement 461

```
461 SELECT 0 INTO :SQLCODE FROM SYSIBM.SYSDUMMY1 WITH UR
```

Dummy statement

0 %

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Statement 477, 677, 700 och 715

```
477 DECLARE C1 CURSOR FOR SELECT TABLE_STATUS FROM I3LFW900 ....
677 OPEN C1
700 FETCH C1 INTO :P1.V_TABLE_STATUS :P1.SQLP_I19
715 CLOSE C1
```

```
DECLARE C1 CURSOR  FOR
   SELECT TABLE_STATUS
   FROM I3LFW900
   WHERE TABLE_NAME = 'T3LFW200'
    AND CURRENT_TIMESTAMP BETWEEN
          START_TIMESTAMP AND END_TIMESTAMP
    WITH UR
   ;
```

```
OPEN C1;
 IF SQLCODE_ERR = 0 THEN
    FETCH C1 INTO V_TABLE_STATUS;
    CLOSE C1;
 END IF;
```

1 + 5 + 1 = 7 %

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Statement 747, 854, 941 och 1041

747 INSERT INTO I3LFW20I (...) VALUES(...);

854 INSERT INTO I3LFW21I (...) VALUES(...);

941 INSERT INTO I3LFW500 (...) VALUES(...);

1041 INSERT INTO I3LFW510 (...) VALUES(...);

INSERT INTO I3LFW20I (....) VALUES(....);

INSERT INTO I3LFW20I (....) VALUES(....);

INSERT INTO I3LFW20I (....) VALUES(....);

INSERT INTO I3LFW20I (....) VALUES(....);

27+0+10+11 = 48 %

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Statement 1140

1140 SET :P1,140 SET :P1.V_DATA_TYPE :P1.SQLP_I21 = SYSIBM.CHAR (' ', 4)

DECLARE V_DATA_TYPE CHAR(4) DEFAULT ' ';

6 %

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Statement 1150

```
1150 SET :SQLRoutine.V_END_USER_ID :SQLRoutine.SQLP_I1 =
     STRIP ( :SQLRoutine.V_END_USER_ID :SQLRoutine.SQLP_I1, BOTH, ' ' )
```

```
SET V_END_USER_ID = STRIP(V_END_USER_ID,BOTH,' ');
```


1 %

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Statement 1161

```
1161 SELECT 1 INTO :SQLP_INT_VAR FROM SYSIBM.SYSDUMMY1 WHERE
     LENGTH ( :SQLRoutine.V_END_USER_ID :SQLRoutine.SQLP_I1 ) >= 4 WITH UR
```

```
IF LENGTH(V_END_USER_ID) >= 4 THEN
```

6 %

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Statement 1184

```
1184 SET :P1.V_PART_NO :P1.SQLP_I18 = SUBSTR (
     :SQLRoutine.V_END_USER_ID :SQLRoutine.SQLP_I1, ( LENGTH (
     :SQLRoutine.V_END_USER_ID :SQLRoutine.SQLP_I1 ) - 3 ), 2 )
```

```
SET V_PART_NO =  SUBSTR ( V_END_USER_ID , ( LENGTH ( V_END_USER_ID ) - 3 ) , 2  ) ;
```


1 %

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Statement 1196

```
1196 SELECT 1 INTO :SQLP_INT_VAR FROM SYSIBM.SYSDUMMY1 WHERE
       SUBSTR ( :P1.V_PART_NO :P1.SQLP_I18, 1, 1 ) NOT IN ( '1', '2', '3',
                                                            '4', '5', '6', '7', '8', '9', '0' ) WITH UR
```

```
IF SUBSTR ( V_PART_NO , 1 , 1 )  NOT IN  ( '1‘ , '2‘ , '3‘ , '4‘ , '5‘ , '6‘ , '7‘ , '8‘ , '9‘ , '0‘ )
```


3 %

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Statement 1220

```
1220 SELECT 1 INTO :SQLP_INT_VAR FROM SYSIBM.SYSDUMMY1 WHERE
        SUBSTR ( :P1.V_PART_NO :P1.SQLP_I18, 2, 1 ) NOT IN ( '1', '2', '3',
                                                             '4', '5', '6', '7', '8', '9', '0' ) WITH UR
```

```
IF SUBSTR ( V_PART_NO , 2 , 1 )  NOT IN ( '1‘ , '2‘ , '3‘ , '4‘ , '5‘ , '6‘ , '7‘ , '8‘ , '9‘ , '0‘ )
```


3 %

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Statement 1244

```
1244 SELECT 1 INTO :SQLP_INT_VAR FROM SYSIBM.SYSDUMMY1 WHERE
        LENGTH ( :SQLRoutine.V_ADDITIONAL_DATA :SQLRoutine.SQLP_I12 ) > 2500
                                                                WITH UR
```

```
IF LENGTH ( V_ADDITIONAL_DATA )  >  2500  THEN
```

10 %

Statement 1268

1268 SET :P1.V_ADDITIONAL_DATAX :P1.SQLP_I20 =
:SQLRoutine.V_ADDITIONAL_DATA :SQLRoutine.SQLP_I12

```
SET V_ADDITIONAL_DATAX = V_ADDITIONAL_DATA;
```


10 %

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Statement 1279

```
1279 SELECT 1 INTO :SQLP_INT_VAR FROM SYSIBM.SYSDUMMY1
        WHERE  :P1.TEMP_SQLCODE_ERR :P1.SQLP_I17 < 0 OR
                  :P1.V_TABLE_STATUS       :P1.SQLP_I19 <> 'A' WITH UR
```

```
IF TEMP_SQLCODE_ERR  <  0  OR  V_TABLE_STATUS  <>  'A'  THEN
```


3 %

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Statement 1303

```
1303 SELECT 1 INTO :SQLP_INT_VAR FROM SYSIBM.SYSDUMMY1
        WHERE  :P1.TEMP_SQLCODE_ERR :P1.SQLP_I17 < 0 OR
                  :P1.V_TABLE_STATUS       :P1.SQLP_I19 <> 'A' WITH UR
```

```
IF TEMP_SQLCODE_ERR  <  0  OR  V_TABLE_STATUS  <>  'A'  THEN
```


2 %

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Procentuellt CPU uttag ur DB2 per statement & statement typ

STMTNO	ANT	ELSEC	CPUSEC	CPU %	
00677	308116	15.90	10.82	.92	
00700	308115	82.20	60.44	5.29	
00715	308108	5.61	4.29	.41	6.62
00747	308116	760.74	318.92	27.50	
00941	221267	168.70	116.46	10.34	
01041	220859	169.54	118.37	10.66	48.50
01140	308092	101.91	71.24	6.21	
01150	308100	13.69	10.04	.86	
01161	308112	94.00	64.73	5.69	
01184	279482	17.60	12.26	1.04	
01196	308115	45.33	33.23	2.83	
01220	302615	43.58	31.54	2.69	
01244	308114	206.99	122.38	10.26	
01268	221267	222.14	107.27	9.66	
01279	308116	55.29	39.80	3.44	
01303	221267	32.42	24.58	2.20	44.88

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Hur många DB2 SQL statements resulterade Jonas procedur-exempel i?

Rätt svar är ?

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Hur många DB2 SQL statements resulterade Jonas proceduren exempel i?

Rätt svar är två.

```
SELECT 0 INTO :SQLCODE FROM SYSIBM.SYSDUMMY1 WITH UR
```

```
SET : SQLRoutine.GREETING:SQLRoutine.SQLP_I2 =
                'Hello ' !!  :SQLRoutine.NAME  :SQLRoutine.SQLP_I1 !! '!'
```