DDL or DDS?

- A comparison of tools used to define data on the System i.
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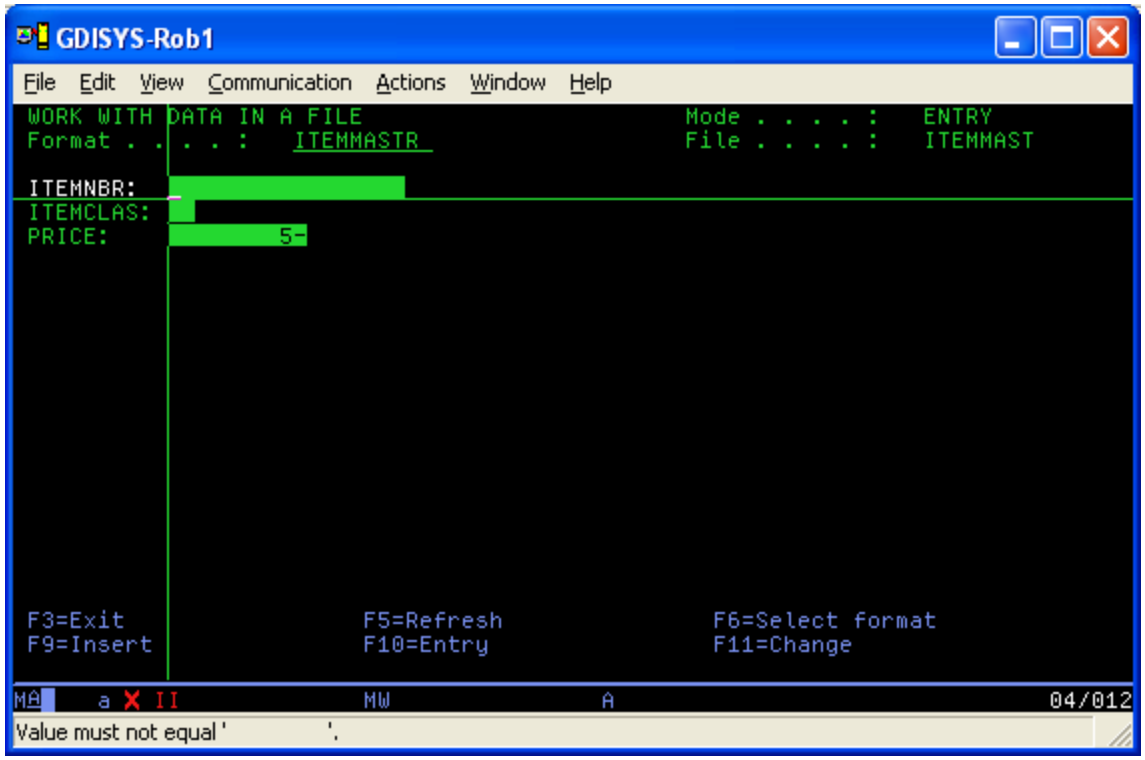
Data Definition Specifications

```
                                        UNIQUE
R ITEMMASTR
   ITEMNBR          17A                 COMP(NE ' ')
   ITEMCLAS          2A                 COMP(NE ' ')
   PRICE             9P 2               COMP(GT 0)
K ITEMNBR
```

UPDDTA on DDS file



SQL against DDS file

INSERT INTO ROB/ITEMMAST VALUES(' ', ' ', -5)

1 rows inserted in ITEMMAST in ROB.

iNav against DDS file

DDL defined file

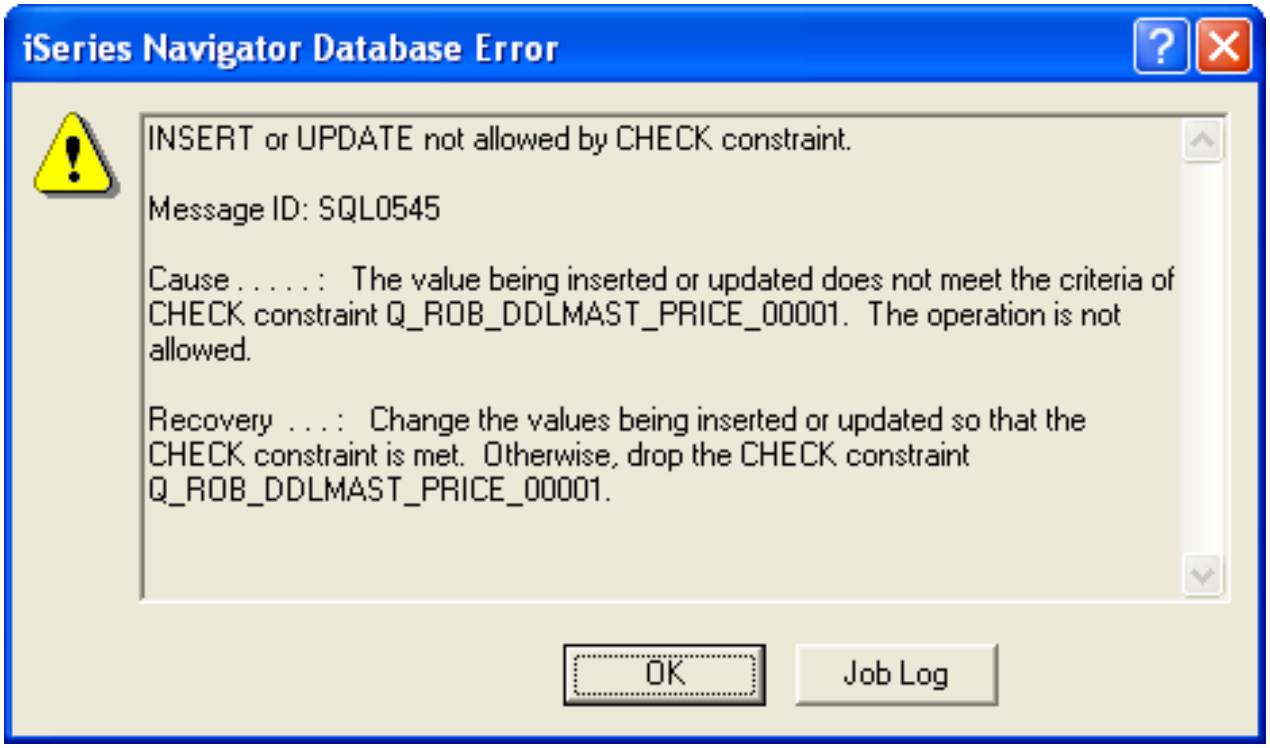
```
CREATE TABLE ROB/DDLMAST
(ITEMNBR CHAR (17 ) NOT NULL WITH DEFAULT,
  PRIMARY KEY (ITEMNBR),
  CHECK (ITEMNBR<>' ' ),
 ITEMCLAS CHAR (2 ) NOT NULL WITH DEFAULT,
  CHECK (ITEMCLAS<>' ' ),
 PRICE DECIMAL (9 , 2) NOT NULL WITH DEFAULT,
  CHECK (PRICE>0 ))
RCDFMT DDLMASTR
```

SQL against DDL file

INSERT INTO ROB/DDLMAST VALUES(' ', ' ', -5)

INSERT or UPDATE not allowed by CHECK constraint.

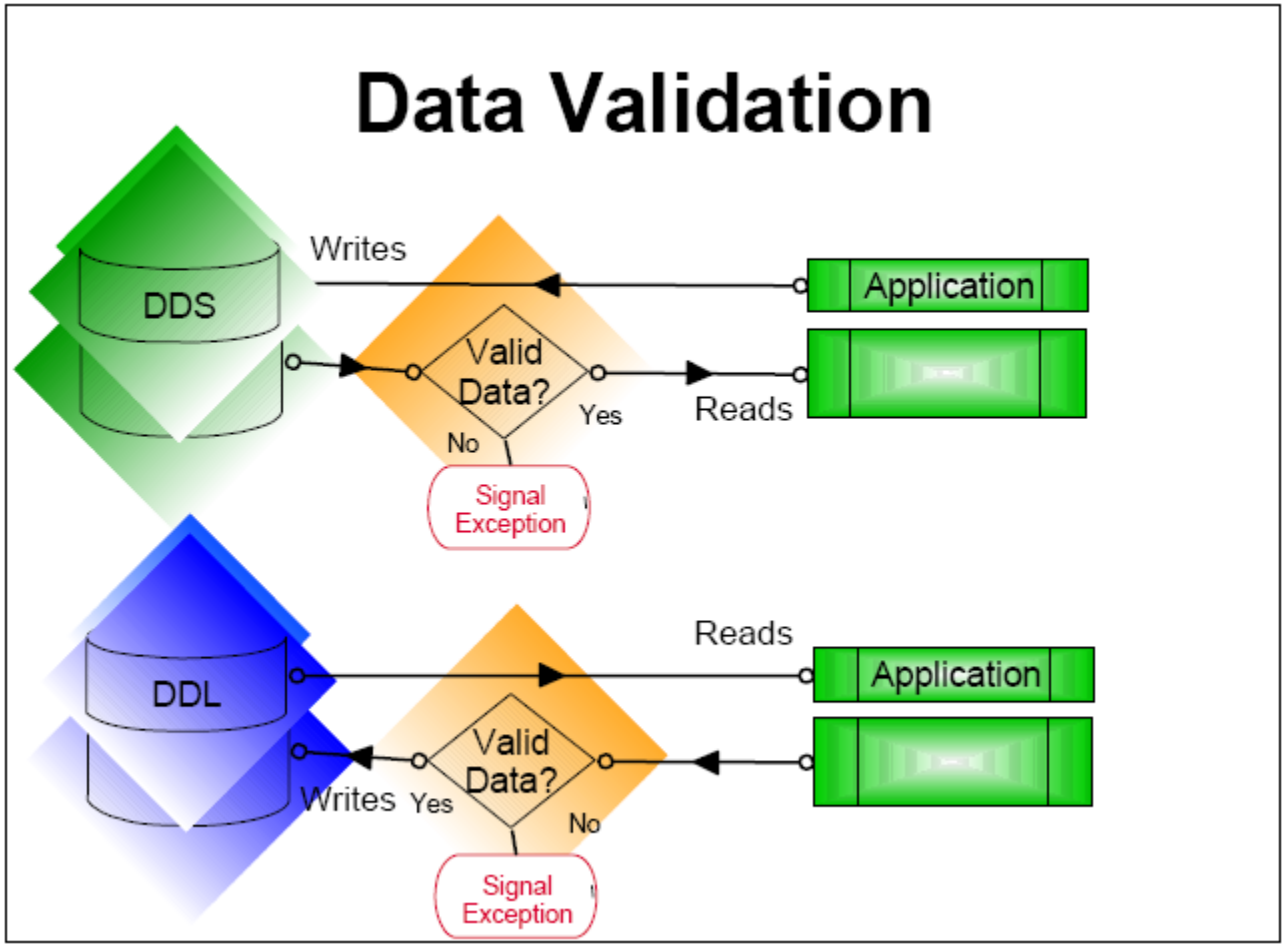
iNav against DDL file



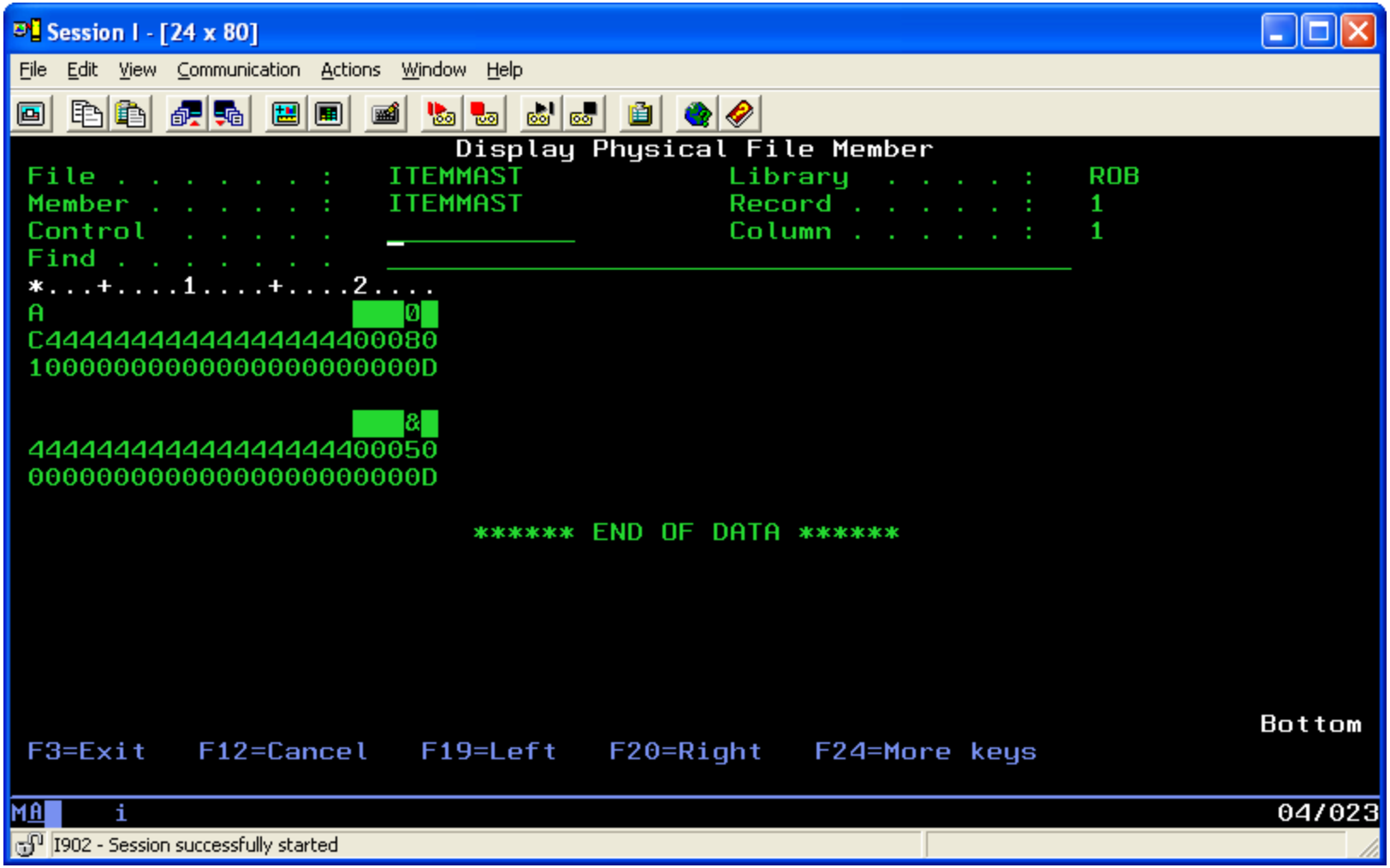
SQL and DDS Data Validation Differences

The major difference between these two types of physical database objects is the process that determines when the data is validated. For DDS, the data is validated as data is read through the open cursor. For SQL, data is validated as it is written through the open cursor.

SQL and DDS Data Validation Differences



DSPPFM of DDS file



DDS: No check on write

```
CRTPF BADDATA RCDLEN(24)

*...+....1....+....2....
XXXXXXXXXXXXXXXXXXXXXXXX

CPYF FROMFILE(BADDATA) TOFILE(ITEMMAST)
     MBROPT(*ADD) FMTOPT(*NOCHK)
```

DDS: Now has bad data

```
....+....1....+....2....+....3....+....4..
ITEMNBR                 ITEMCLAS          PRICE
A                                          8.00-
                                           5.00-
XXXXXXXXXXXXXXXXX       XX          ++++++++++++
```

Not on DDL file

```
CPYF FROMFILE(BADDATA) TOFILE(ddlMAST)
     MBROPT(*ADD) FMTOPT(*NOCHK)
Data mapping error on member DDLMAST.
Data mapping error on member DDLMAST.
C
Cancel reply received for message CPF5029.
Error writing to member DDLMAST in file
DDLMAST.
0 records copied to DDLMAST in ROB.
```

Performance enhancements

- Many applications have an average of 25 reads to every write. If you move the validity checking to write time, performance will be better.

- DDL defaults to REUSEDLT, or “reuse deleted records”. Allows “concurrent write” support.

Performance enhancements (cont)

- DDL defined files will have a 64K page size vs 8-32K page size from DDS.

Source?

Store in QDDSSRC, “compile” with RUNSQLSTM

What about column headings?

```
                                  UNIQUE
R ITEMMASTR
   ITEMNBR          17A           COMP(NE ' ')
                                  COLHDG('Item' 'Number')
   ITEMCLAS          2A           COMP(NE ' ')
                                  COLHDG('Item' 'Class')
   PRICE             9P 2         COMP(GT 0)
                                  COLHDG(' ' 'Price')
K ITEMNBR
```

Column headings in SQL

```
CREATE TABLE ROB/DDLMAST
(ITEMNBR CHAR (17 ) NOT NULL WITH DEFAULT,
  PRIMARY KEY (ITEMNBR),
  CHECK (ITEMNBR<>' ' ),
 ITEMCLAS CHAR (2 ) NOT NULL WITH DEFAULT,
  CHECK (ITEMCLAS<>' ' ),
 PRICE DECIMAL (9 , 2) NOT NULL WITH
DEFAULT,
  CHECK (PRICE>0 ))
RCDFMT DDLMASTR;
```

Column headings

```
LABEL ON COLUMN ITEMNBR
 IS 'Item Number';
LABEL ON COLUMN ITEMCLAS
 IS 'Item                    Class';
LABEL ON COLUMN PRICE
 IS 'Price';
```

Field Reference File

CREATE TABLE EMPLOYEE AS
(SELECT EMPLOYEE_ID, NAME, etc.
FROM FIELDREF)
WITH NO DATA

Yes, it does bring the column headings along.
No, it does not bring the constraints along.

Constraints

```
ITEMCLAS CHAR (2 ) NOT NULL WITH DEFAULT,
 CHECK (ITEMCLAS<>' ' ),
 FOREIGN KEY (ITEMCLAS)
  REFERENCES IIC (ICLAS)
  ON DELETE NO ACTION
  ON UPDATE NO ACTION,
```

RCDFMT clause

In older releases of i5/os SQL did not support the RCDFMT clause. Commonly what one did was CREATE TABLE and then rename it.

Embedding UDF's

```
CREATE VIEW wPricing
  AS SELECT LPROD, LQORD, LCUST, LRDTE,

  pricing(lprod, lqord, lcust, lrdte) as PRICE
  FROM ordline
```

Multi member files

Partitioned tables

Foreign key constraints

Identity columns

```
CREATE TABLE ROB/ORDMAST
(ORDNBR INTEGER GENERATED ALWAYS AS IDENTITY,
 CUSTNBR INTEGER,
 ITEMNBR CHAR (17));

INSERT INTO ROB/ORDMAST
 (CUSTNBR, ITEMNBR) VALUES(5, 'A');

SELECT * FROM ORDMAST;
ORDNBR          CUSTNBR   ITEMNBR
     1                5   A
```

Identity value

```
Exec sql
VALUES IDENTITY_VAL_LOCAL() INTO  :IVAR;

Dump using dummy file SYSDUMMY1 and use
VALUES

6.1 also supports:
select ordnbr from final table (
INSERT INTO ROB/ORDMAST
 (CUSTNBR, ITEMNBR) VALUES(7, 'C'))
```

ADDPFCST trick

You can use ADDPFCST to add a key to a “*OUTFILE”

6.1 HIDDEN & ROW CHANGE TIMESTAMP

```
CREATE TABLE tickets(
ticket_ord INTEGER,
ticket_qty INTEGER,
ticket_event VARCHAR(10),
ticket_ts TIMESTAMP NOT NULL
IMPLICITLY HIDDEN
FOR EACH ROW ON UPDATE AS ROW
CHANGE TIMESTAMP);
INSERT INTO tickets
VALUES(1,11,'mvGAME1');
```

NOTE: Only 3 column values passed on INSERT

6.1 HIDDEN & ROW CHANGE TIMESTAMP

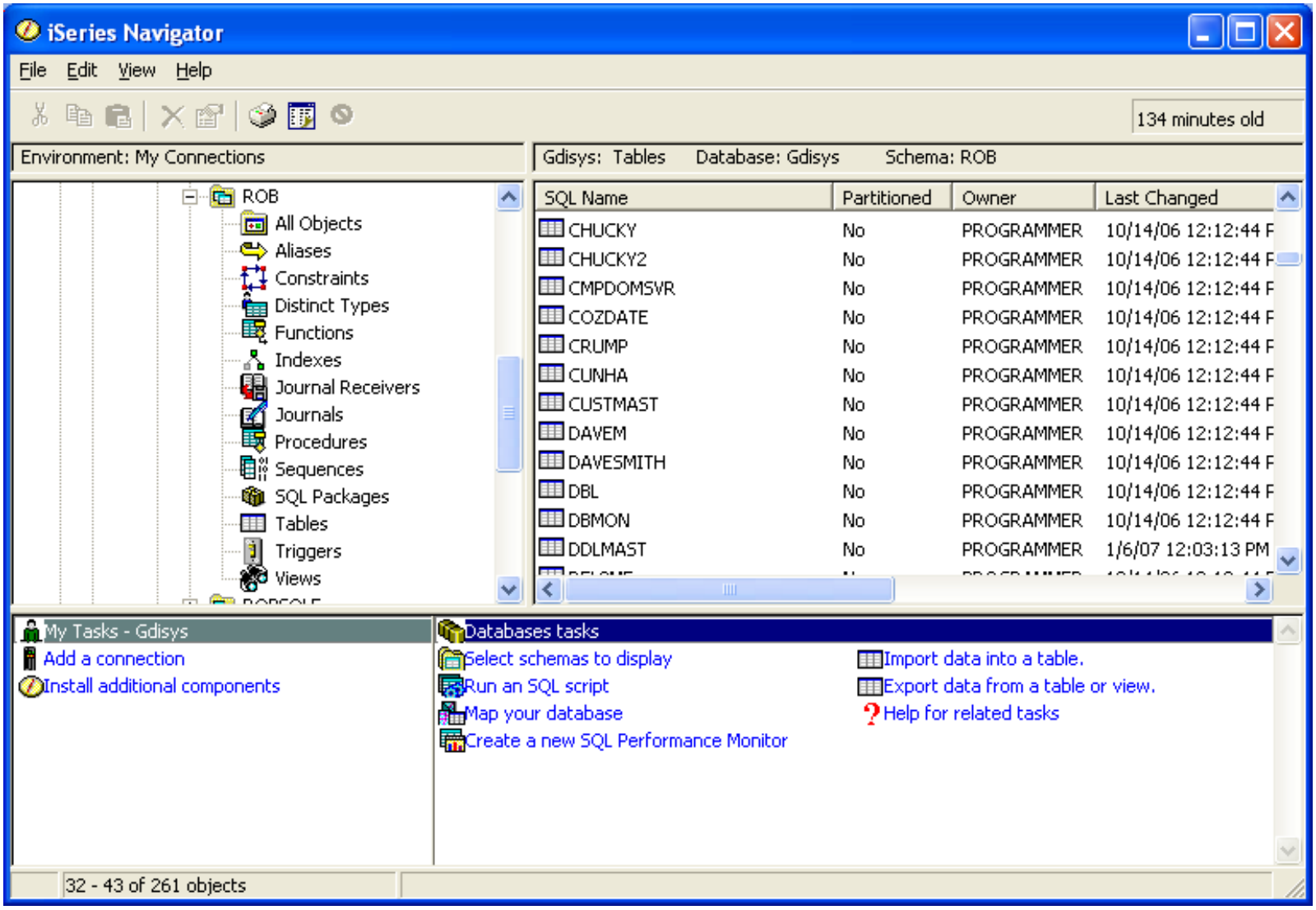
```
SELECT * FROM TICKETS
TICKET_ORD      TICKET_QTY    TICKET_EVENT
           1              11     mvGAME1
SELECT TICKET_ORD, TICKET_TS FROM TICKETS
TICKET_ORD   TICKET_TS
           1   2009-04-19-22.25.57.106071
```

6.1 LF's for RLA

```
CREATE INDEX ROB/IIML01R ON IIM (IPROD)
WHERE IID='IM'
RCDFMT IIML01RR
ADD IPROD, IDESC, ICLAS
```

System reference tables

Select * from QSYS2/SYSCOLUMNS


iSeries Navigator
File Edit View Help
134 minutes old
Environment: My Connections
Gdisys: Tables Database: Gdisys Schema: ROB
ROB
All Objects
Aliases
Constraints
Distinct Types
Functions
Indexes
Journal Receivers
Journals
Procedures
Sequences
SQL Packages
Tables
Triggers
Views
SQL Name Partitioned Owner Last Changed
CHUCKY No PROGRAMMER 10/14/06 12:12:44 F
CHUCKY2 No PROGRAMMER 10/14/06 12:12:44 F
CMPDOMSVR No PROGRAMMER 10/14/06 12:12:44 F
COZDATE No PROGRAMMER 10/14/06 12:12:44 F
CRUMP No PROGRAMMER 10/14/06 12:12:44 F
CUNHA No PROGRAMMER 10/14/06 12:12:44 F
CUSTMAST No PROGRAMMER 10/14/06 12:12:44 F
DAVEM No PROGRAMMER 10/14/06 12:12:44 F
DAVESMITH No PROGRAMMER 10/14/06 12:12:44 F
DBL No PROGRAMMER 10/14/06 12:12:44 F
DBMON No PROGRAMMER 10/14/06 12:12:44 F
DDLMAST No PROGRAMMER 1/6/07 12:03:13 PM
My Tasks - Gdisys
Add a connection
Install additional components
Databases tasks
Select schemas to display
Run an SQL script
Map your database
Create a new SQL Performance Monitor
Import data into a table.
Export data from a table or view.
Help for related tasks
32 - 43 of 261 objects

Bibliography

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http://faq.midrange.com/data/cache/462.html

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http://www.redbooks.ibm.com/abstracts/sg246654.html?Open

Modernizing IBM eServer iSeries Application Data Access - A Roadmap
Cornerstone
http://www.redbooks.ibm.com/abstracts/sg246393.html?Open

Preparing for and Tuning the SQL Query Engine on DB2 for i5/OS
http://www.redbooks.ibm.com/abstracts/sg246598.html?Open

Database performance and query optimization
http://publib.boulder.ibm.com/infocenter/iseries/v5r4/topic/rzajq/rzajq.pdf

DB2 Universal Database for iSeries Administration: The Graphical Way on V5R3
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Mastering SQL Performance with Visual Explain - V5R3 Update
http://www-03.ibm.com/servers/enable/site/education/abstracts/2dc6_abs.html

Analyzing DB2 for i5/OS Performance with the V5R4 SQL Plan Cache & Visual Explain

http://www-03.ibm.com/servers/enable/site/education/abstracts/e526_abs.html