

数据库 SQL 实验二

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实验平台

Linux 3.1.0-4-ARCH, DB2 9.7.0.4.

实验内容

1.创建数据库

```
CREATE TABLE Dept (  
  Deptno INT NOT NULL,  
  Dname VARCHAR(10),  
  Dmgrno INT,  
  
  CONSTRAINT pk PRIMARY KEY (Deptno)  
);  
  
CREATE TABLE Emp (  
  Empno INT NOT NULL,  
  Ename VARCHAR(10),  
  Birtday DATE,  
  Addr VARCHAR(20),  
  Sal INT,  
  Mgrno INT,  
  Deptno INT ,  
  
  CONSTRAINT pk PRIMARY KEY (Empno),  
  
  CONSTRAINT fk_dept  
  FOREIGN KEY (Deptno)  
  REFERENCES Dept (Deptno)  
    ON UPDATE RESTRICT  
    ON DELETE RESTRICT,  
  
  CONSTRAINT fk_mgrno  
  FOREIGN key (Mgrno)  
  REFERENCES Emp (Empno)  
    ON UPDATE RESTRICT  
    ON DELETE SET NULL  
);  
  
CREATE TABLE Proj (  
  Projno INT NOT NULL,  
  Pname VARCHAR(10),  
  City VARCHAR(10),  
  Deptno INT,  
  
  CONSTRAINT pk PRIMARY KEY (Projno),
```

```
CONSTRAINT fk_deptno
FOREIGN key (Deptno)
REFERENCES Dept (Deptno)
    ON UPDATE RESTRICT
    ON DELETE RESTRICT
);

CREATE TABLE Job (
Empno INT,
Projno INT,
Worktime INT,

CONSTRAINT fk_empno
FOREIGN key (Empno)
REFERENCES Emp (Empno)
    ON UPDATE RESTRICT
    ON DELETE CASCADE,

CONSTRAINT fk_projno
FOREIGN key (Projno)
REFERENCES Proj (Projno)
    ON UPDATE RESTRICT
    ON DELETE SET NULL
);

CREATE TABLE Family (
Empno INT,
Fname VARCHAR(10),
Fsex CHAR,

CONSTRAINT fk_empno
FOREIGN key (Empno)
REFERENCES Emp (Empno)
    ON UPDATE RESTRICT
    ON DELETE CASCADE
);
```

2. 加入样本数据

```
INSERT INTO Dept VALUES
(1, 'Depart1', 4),
(2, 'Depart2', 3);

INSERT INTO Emp VALUES
(1, 'Li', '1980-03-04', 'Nanjing', 3000, 4, 1),
(2, 'Wang', '1978-11-23', 'Beijing', 5000, 4, 1),
(3, 'Zhou', '1973-05-08', 'Shanghai', 6000, null, 2),
(4, 'Liu', '1975-09-15', 'Nanjing', 8000, null, 1),
(5, 'Gao', '1977-07-16', 'Shanghai', 3000, 3, 2);

INSERT INTO Proj VALUES
(1, 'Project1', 'Nanjing', 1),
```

```
(2, 'Project2', 'Beijing', 1),
(3, 'Project3', 'Shenzhen', 2),
(4, 'Project4', 'Shanghai', 2);
```

```
INSERT INTO Job VALUES
```

```
(1, 1, 10),
(2, 1, 10),
(3, 3, 8),
(4, 2, 8),
(5, 4, 10);
```

```
INSERT INTO Family VALUES
```

```
(1, 'Sun', 'F'),
(2, 'Wu', 'M'),
(3, 'Chen', 'M'),
(4, 'Wei', 'F'),
(5, 'Yang', 'F');
```

3. 执行违反数据约束的操作

1) 对表 Emp.Empno 进行修改, 执行命令:

```
UPDATE Emp SET Empno = 9 WHERE Ename = 'Li';
```

结果如图:

```
[db2inst1@love ~]$ db2 "update emp set empno = 9 where ename = 'Li' "
DB21034E The command was processed as an SQL statement because it was not a
valid Command Line Processor command. During SQL processing it returned:
SQL0531N The parent key in a parent row of relationship
"DB2INST1.JOB.FK_EMPNO" cannot be updated. SQLSTATE=23001
```

这是由于 DB2 不支持级联更新操作, 而 Emp.Empno 为 Job 的外键, 故修改操作失败。

2) 同样, 对于表 Dept.Deptno 进行修改, 也会失败:

```
UPDATE Dept SET Deptno = 3 WHERE Dname = 'Depart1';
```

结果如图:

```
[db2inst1@love ~]$ db2 "update dept set deptno = 3 where dname = 'Depart1' "
DB21034E The command was processed as an SQL statement because it was not a
valid Command Line Processor command. During SQL processing it returned:
SQL0531N The parent key in a parent row of relationship
"DB2INST1.EMP.FK_DEPT" cannot be updated. SQLSTATE=23001
```

3) 表 Family 的外键为表 Emp 中的 Empno, 初始情况如下:

```
[db2inst1@love ~]$ db2 "select * from family"
```

EMPNO	FNAME	FSEX
1	Sun	F
2	Wu	M
3	Chen	M
4	Wei	F
5	Yang	F

```
5 record(s) selected.
```

若是删除表 Emp 中某项:

```
DELETE FROM Emp WHERE Empno = 1;
```

则表 Emp 变为:

```
[db2inst1@love ~]$ db2 "select * from emp "
```

EMPNO	ENAME	BIRDAY	ADDR	SAL	MGRNO	DEPTNO
2	Wang	11/23/1978	Beijing	5000	4	1
3	Zhou	05/08/1973	Shanghai	6000	-	2
4	Liu	09/15/1975	Nanjing	8000	-	1
5	Gao	07/16/1977	Shanghai	3000	3	2

4 record(s) selected.

表 Family 则如下, 可见相关记录被级联删除:

```
[db2inst1@love ~]$ db2 "select * from family"
```

EMPNO	FNAME	FSEX
2	Wu	M
3	Chen	M
4	Wei	F
5	Yang	F

4 record(s) selected.

4. 创建触发器

触发器如下:

```
CREATE TRIGGER update_sal
BEFORE UPDATE ON Job
REFERENCING OLD AS old NEW AS new
FOR EACH ROW
WHEN (new.Projno <> old.Projno)
BEGIN
    UPDATE Emp SET Sal = Sal * 1.02 WHERE Emp.Empno = new.Empno;
END;
```

初始表 Job:

```
[db2inst1@love ~]$ db2 'select * from job'
```

EMPNO	PROJNO	WORKTIME
1	1	10
2	1	10
3	3	8
4	2	8
5	4	10

5 record(s) selected.

初始表 Emp:

数据库 SQL 实验

```
[db2inst1@love ~]$ db2 'select * from emp'
```

EMPNO	ENAME	BIRDAY	ADDR	SAL	MGRNO	DEPTNO
1	Li	03/04/1980	Nanjing	3000	4	1
2	Wang	11/23/1978	Beijing	5000	4	1
3	Zhou	05/08/1973	Shanghai	6000	-	2
4	Liu	09/15/1975	Nanjing	8000	-	1
5	Gao	07/16/1977	Shanghai	3000	3	2

5 record(s) selected.

对表 Job 执行操作，将 2 号职工加入到新项目中：

```
[db2inst1@love ~]$ db2 'update job set projno = 2 where empno = 2'
```

```
DB20000I The SQL command completed successfully.
```

```
[db2inst1@love ~]$ db2 'select * from emp'
```

EMPNO	ENAME	BIRDAY	ADDR	SAL	MGRNO	DEPTNO
1	Li	03/04/1980	Nanjing	3000	4	1
2	Wang	11/23/1978	Beijing	5100	4	1
3	Zhou	05/08/1973	Shanghai	6000	-	2
4	Liu	09/15/1975	Nanjing	8000	-	1
5	Gao	07/16/1977	Shanghai	3000	3	2

5 record(s) selected.

由图可见，2 号职工薪水增加了 2%。

5. 创建新用户并授权

DB2 中增加用户只能通过操作系统：

```
# useradd new_user
```

授予其查询权限：

```
GRANT SELECT ON Job TO new_user;
```