

实验 11（选做） 数据库查询性能实验

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一、 实验目的

简单了解使用数据库提供的命令查看执行计划。执行计划(execution plan, 也叫查询计划或者解释计划)是数据库执行 SQL 语句的具体步骤。

二、 实验内容

(1) 使用数据库提供的命令查看执行计划（其它数据库用的是 Explain）

(1)

```
use school
SET Statistics PROFILE on;
select CHOICES.SID from CHOICES, COURSES where CHOICES.CID=COURSES.CID and
COURSES.CNAME='database';
SET Statistics PROFILE off;
```

(2)

```
use school;
Go
set showplan_text on;
GO
select CHOICES.SID from CHOICES, COURSES where CHOICES.CID=COURSES.CID and
COURSES.CNAME='database';
Go
set showplan_text off;
GO
```

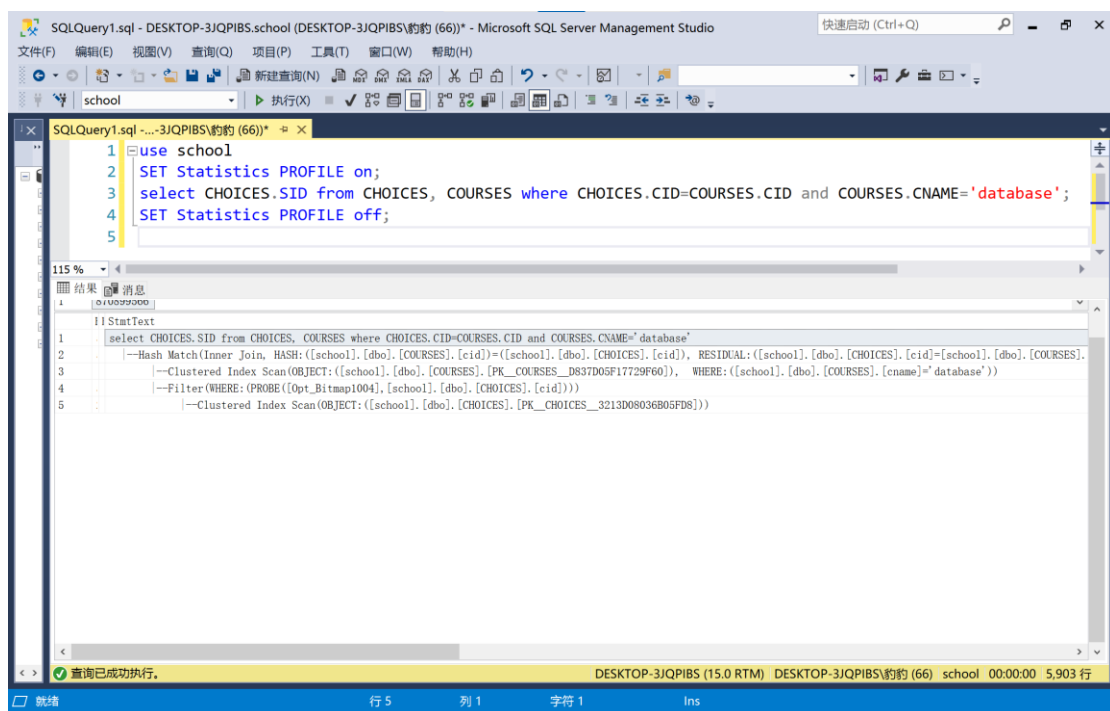
(3)

```
use school;
Go
SET SHOWPLAN_ALL ON;
GO
select CHOICES.SID from CHOICES, COURSES where CHOICES.CID=COURSES.CID and
COURSES.CNAME='database';
Go
SET SHOWPLAN_ALL OFF;
GO
```

(2) 利用索引，优化查询性能。对 COURSES.CNAME 建立索引，查看两种执行计划有何异同。

三、 实验结果

(1) 执行结果如下：



SQLQuery1.sql - DESKTOP-3JQPIBS.school (DESKTOP-3JQPIBS\約豹 (66))* - Microsoft SQL Server Management Studio

文件(F) 编辑(E) 视图(V) 查询(Q) 项目(P) 工具(T) 窗口(W) 帮助(H)

SQLQuery1.sql -...-3JQPIBS\約豹 (66))*

```
1 use school;
2 Go
3 set showplan_text on;
4 GO
5 select CHOICES.SID from CHOICES, COURSES where CHOICES.CID=COURSES.CID and COURSES.CNAME='database';
6 Go
7 set showplan_text off;
8 GO
9
```

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结果 消息

1 StmtText
select CHOICES.SID from CHOICES, COURSES where CHOICES.CID=COURSES.CID and COURSES.CNAME='database';

1 StmtText
1 --Hash Match(Inner Join, HASH: ([school].[dbo].[COURSES].[cid])=([school].[dbo].[CHOICES].[cid]), RESIDUAL: ([school].[dbo].[CHOICES].[cid]=[school].[dbo].[COURSES].[cid])
2 --Clustered Index Scan(OBJECT: ([school].[dbo].[COURSES].[PK_COURSES__D837D05F17729F60]), WHERE: ([school].[dbo].[COURSES].[cname]='database'))
3 --Filter(WHERE: (PROBE([Opt_Bitmap1004], [school].[dbo].[CHOICES].[cid])))
4 --Clustered Index Scan(OBJECT: ([school].[dbo].[CHOICES].[PK_CHOICES__3213D08036B05FD8]))

查询已成功执行。 DESKTOP-3JQPIBS (15.0 RTM) DESKTOP-3JQPIBS\約豹 (66) school 00:00:00 4 行

就绪 第1行 第1列 Ins

SQLQuery1.sql - DESKTOP-3JQPIBS.school (DESKTOP-3JQPIBS\約豹 (66))* - Microsoft SQL Server Management Studio

文件(F) 编辑(E) 视图(V) 查询(Q) 项目(P) 工具(T) 窗口(W) 帮助(H)

SQLQuery1.sql -...-3JQPIBS\約豹 (66))*

```
1 use school;
2 Go
3 SET SHOWPLAN_ALL ON;
4 GO
5 select CHOICES.SID from CHOICES, COURSES where CHOICES.CID=COURSES.CID and COURSES.CNAME='database';
6 Go
7 SET SHOWPLAN_ALL OFF;
8 GO
9 Z
```

115 %

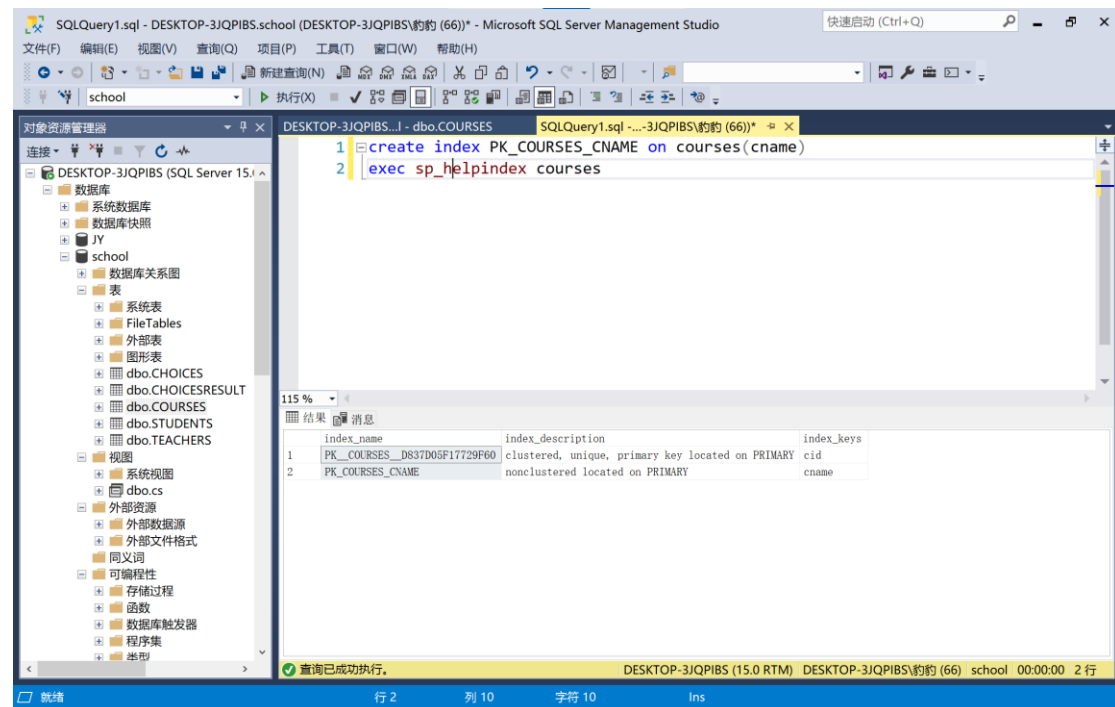
结果 消息

StmtText	StmtId	NodeId	Parent	PhysicalOp	LogicalOp	Argument	De
1 select CHOICES.SID from CHOICES, COURSES where ...	1	1	0	NULL	NULL	1	NU
2 --Hash Match(Inner Join, HASH: ([school].[dbo].[COURSES].[cid])=([school]...	1	2	1	Hash Match	Inner Join	HASH: ([school].[dbo].[COURSES].[cid])=([school]...	[0
3 --Clustered Index Scan(OBJECT: ([school].[dbo].[COURSES].[PK_COURSES__...	1	3	2	Clustered Index Scan	Clustered Index Scan	OBJECT: ([school].[dbo].[COURSES].[PK_COURSES__...	[s
4 --Filter(WHERE: (PROBE([Opt_Bitmap1004], [school].[dbo].[CHOICES].[cid]))	1	4	2	Filter	Filter	WHERE: (PROBE([Opt_Bitmap1004], [school].[dbo].[C... NU	
5 --Clustered Index Scan(OBJECT: ([sc... 1	1	5	4	Clustered Index Scan	Clustered Index Scan	OBJECT: ([school].[dbo].[CHOICES].[PK_CHOICES__...	[s

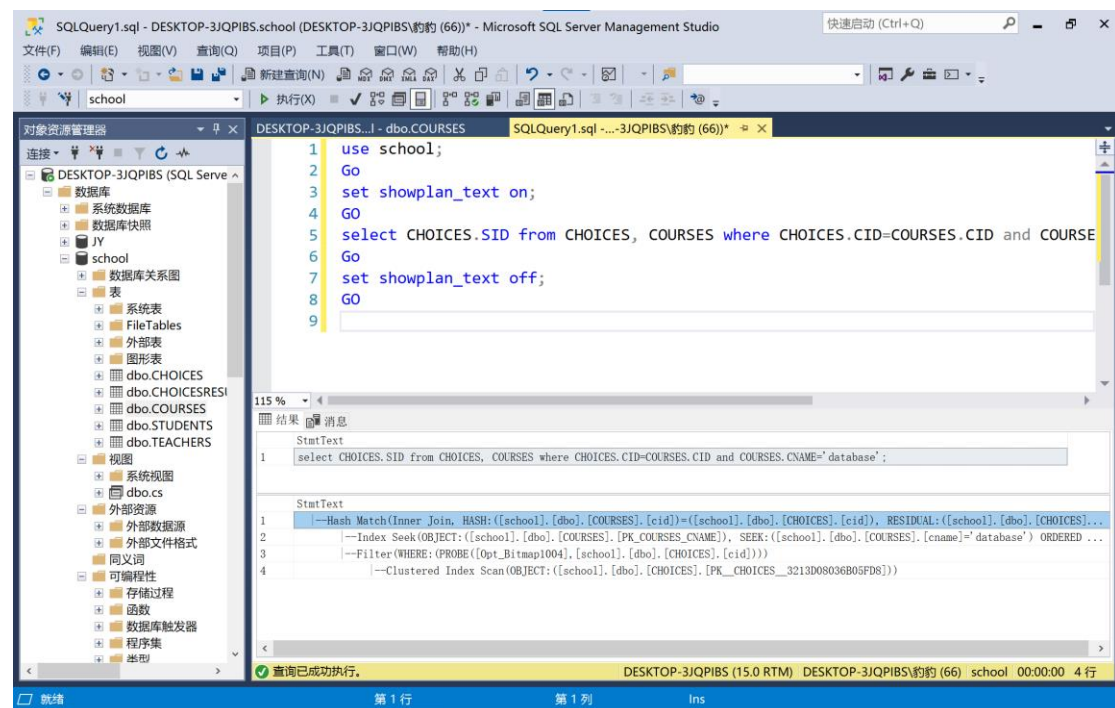
查询已成功执行。 DESKTOP-3JQPIBS (15.0 RTM) DESKTOP-3JQPIBS\約豹 (66) school 00:00:00 5 行

就绪 行9 列2 字符2 Ins

(2) 用代码创建索引:



再次执行之前的命令，可以看到之前的 index scan 变成了 index seek:



可见，在创建了索引之后，SQL Server 会根据索引的值对相应的列进行查找，而不是简单地遍历整个表，性能会有所提高。