1ο ΠΡΟΤΖΕΚΤ ΣΤΟ ΜΑΘΗΜΑ Σ.Δ.Α.Δ

ΤΣΙΝΤΖΟΣ ΙΩΑΝΝΗΣ p3200211

Πριν τρέξουμε query

Για να ειμαστε πιο αντικειμενικοί στις απαντήσεις μας χρησιμοποιούμε σε ολα τα query τις παρακατω εντολες.

- Καθαρίζουμε την buffer cache

```
CHECKPOINT;
DBCC DROPCLEANBUFFERS;
DBCC FREESYSTEMCACHE('ALL');
```

- Ενεργοποιούμε τα STATISTICS

```
SET STATISTICS IO ON;
```

ΖΗΤΗΜΑ 1

ΧΩΡΙΣ ΕΥΡΕΤΗΡΙΟ

```
(53995 rows affected)
Table 'customers'. Scan count 9, logical reads 2685, physical reads 2, page server reads 0, read-ahead reads 2562,
Table 'orders'. Scan count 9, logical reads 16961, physical reads 1, page server reads 0, read-ahead reads 16732, p
Table 'lineitem'. Scan count 9, logical reads 60387, physical reads 1, page server reads 0, read-ahead reads 59313,
Table 'Worktable'. Scan count 0, logical reads 0, physical reads 0, page server reads 0, read-ahead reads 0, page s
Table 'Worktable'. Scan count 0, logical reads 0, physical reads 0, page server reads 0, read-ahead reads 0, page s

Completion time: 2023-05-16T21:06:51.7018238+03:00
```

ΜΕ ΕΥΡΕΤΗΡΙΟ

```
CREATE NONCLUSTERED INDEX idx_order_orderdate
ON orders (orderdate)
INCLUDE (custkey)

CREATE INDEX idx_lineitem_shipdate
ON lineitem (shipdate)
INCLUDE (price)
```

```
(53995 rows affected)
Table 'customers'. Scan count 9, logical reads 2685, physical reads 3, page server reads 0, read-ahead reads 2554,
Table 'orders'. Scan count 9, logical reads 1014, physical reads 4, page server reads 0, read-ahead reads 961, page
Table 'lineitem'. Scan count 9, logical reads 428, physical reads 3, page server reads 0, read-ahead reads 404, pag
Table 'Worktable'. Scan count 0, logical reads 0, physical reads 0, page server reads 0, read-ahead reads 0, page s
Table 'Worktable'. Scan count 0, logical reads 0, physical reads 0, page server reads 0, read-ahead reads 0, page s

(1 row affected)
```

	WITH INDEX	WITHOUT INDEX
LOGICAL READS	4127	80033
PHYSICAL READS	10	4
READ AHEAD READS	3919	78607

ΖΗΤΗΜΑ 2

ΧΩΡΙΣ ΕΥΡΕΤΗΡΙΟ

```
(8 rows affected)
Table 'suppliers'. Scan count 1, logical reads 408, physical reads 1, page server reads 0, read-ahead reads 168,
Table 'nations'. Scan count 1, logical reads 170, physical reads 1, page server reads 0, read-ahead reads 0, page
Table 'regions'. Scan count 1, logical reads 170, physical reads 1, page server reads 0, read-ahead reads 0, page
Table 'Worktable'. Scan count 0, logical reads 0, physical reads 0, page server reads 0, read-ahead reads 0, page
Table 'partsupp'. Scan count 29, logical reads 108, physical reads 29, page server reads 0, read-ahead reads 0, p
Table 'parts'. Scan count 1, logical reads 2795, physical reads 2, page server reads 0, read-ahead reads 2798, pa

Completion time: 2023-05-16T19:20:45.1866961+03:00
```

ΜΕ ΕΥΡΕΤΗΡΙΟ

```
CREATE INDEX idx_parts_ptype ON parts (ptype);

CREATE INDEX idx_parts_psize ON parts (psize);
```

```
(8 rows affected)
Table 'suppliers'. Scan count 1, logical reads 430, physical reads 1, page server reads 0, read-ahead reads 168,
Table 'parts'. Scan count 2, logical reads 132, physical reads 1, page server reads 0, read-ahead reads 182, pag
Table 'nations'. Scan count 1, logical reads 170, physical reads 1, page server reads 0, read-ahead reads 0, pag
Table 'regions'. Scan count 1, logical reads 170, physical reads 0, page server reads 0, read-ahead reads 0, pag
Table 'Worktable'. Scan count 0, logical reads 0, physical reads 0, page server reads 0, read-ahead reads 0, pag
Table 'partsupp'. Scan count 29, logical reads 108, physical reads 29, page server reads 0, read-ahead reads 0, p

Completion time: 2023-05-16T19:23:23.5458527+03:00
```

	WITH INDEX	WITHOUT INDEX
LOGICAL READS	1010	3651
PHYSICAL READS	32	34
READ AHEAD READS	350	2966

ΖΗΤΗΜΑ 3

ΧΩΡΙΣ ΕΥΡΕΤΗΡΙΟ

```
(5 rows affected)
Table 'customers'. Scan count 9, logical reads 2685, physical reads 2, page server reads 0, read-ahead reads 2562,
Table 'orders'. Scan count 9, logical reads 16961, physical reads 1, page server reads 0, read-ahead reads 16729,
Table 'Worktable'. Scan count 0, logical reads 0, physical reads 0, page server reads 0, read-ahead reads 0, page
Table 'Worktable'. Scan count 0, logical reads 0, physical reads 0, page server reads 0, read-ahead reads 0, page

Completion time: 2023-05-15T14:14:42.0325833+03:00
```

ΜΕ ΕΥΡΕΤΗΡΙΟ

```
CREATE NONCLUSTERED INDEX IDX_ORDERS_ORDERDATE
ON orders (orderdate)
INCLUDE (custkey,totalprice)
```

ΚΑΙ ΧΡΗΣΗ ΕΝΑΛΛΑΚΤΙΚΟΥ ΕΠΕΡΩΤΗΜΑΤΟΣ

```
SET STATISTICS IO ON;

SELECT market_segment, SUM(totalprice)
FROM customers
JOIN orders ON customers.custkey = orders.custkey
WHERE orders.orderdate >= '1996-01-01' AND orders.orderdate < '1997-01-01'
GROUP BY market_segment;
```

```
(5 rows affected)
Table 'customers'. Scan count 9, logical reads 2685, physical reads 0, page server reads 0, read-ahead reads 0,
Table 'orders'. Scan count 9, logical reads 663, physical reads 0, page server reads 0, read-ahead reads 10, pa
Table 'Worktable'. Scan count 0, logical reads 0, physical reads 0, page server reads 0, read-ahead reads 0, pa
Table 'Worktable'. Scan count 0, logical reads 0, physical reads 0, page server reads 0, read-ahead reads 0, pa

(1 row affected)

Completion time: 2023-05-15T14:23:26.0088069+03:00
```

	WITH INDEX	WITHOUT INDEX
LOGICAL READS	3348	19652
PHYSICAL READS	0	3
READ AHEAD READS	10	19291

ΖΗΤΗΜΑ 4

1)

ΠΡΩΤΟ ΕΡΩΤΗΜΑ

ΧΩΡΙΣ ΕΥΡΕΤΗΡΙΟ

```
(40178 rows affected)
Table 'parts'. Scan count 1, logical reads 2795, physical reads 2, page server reads 0, read-ahead reads 2798,

(1 row affected)

Completion time: 2023-05-15T14:43:25.6351799+03:00
```

ΜΕ ΕΥΡΕΤΗΡΙΟ

```
create index Q4_idx1 on parts(brand) include (pname)
```

```
(40178 rows affected)
Table 'parts'. Scan count 1, logical reads 2795, physical reads 2, page server reads 0, read-ahead reads 2798,

(1 row affected)

Completion time: 2023-05-16T19:32:06.9318511+03:00
```

ΜΕ ΕΥΡΕΤΗΡΙΟ

```
create index Q4_idx2 on parts(manufacturer) include (pname)
```

```
(40178 rows affected)
Table 'parts'. Scan count 2, logical reads 346, physical reads 8, page server reads 0, read-ahead reads 336,

(1 row affected)

Completion time: 2023-05-16T19:32:55.8932734+03:00
```

Παρατηρουμε ότι το 1^{ο} ευρετηριο δεν βελτιωνει την επιδοση

Ωστοσο η χρηση του ευρετηριου Q4_idx2 ριχνει τα logical reads από 2795 σε 346 καθως και τα read ahead reads από 2798 σε 336

ΔΕΥΤΕΡΟ ΕΡΩΤΗΜΑ

ΧΩΡΙΣ ΕΥΡΕΤΗΡΙΟ

```
(8096 rows affected)
Table 'parts'. Scan count 2, logical reads 5590, physical reads 1440, page server reads 0, read-ahead reads 2792,

Completion time: 2023-05-16T19:45:45.3960636+03:00
```

ΜΕ ΕΥΡΕΤΗΡΙΟ

```
create index Q4_idx1 on parts(brand) include (pname)
```

```
(8096 rows affected)
Table 'parts'. Scan count 2, logical reads 2856, physical reads 2663, page server reads 0, read-ahead reads 2847, page server read-ahead reads 0,

Completion time: 2023-05-16T20:00:35.6866297+03:00
```

Με τη χρηση του ευρετηριου q4_idx1 βλεπουμε οτι βελτιωνονται τα logical reads

ΜΕ ΕΥΡΕΤΗΡΙΟ

```
create index Q4_idx2 on parts(manufacturer) include (pname)
```

```
(8096 rows affected)
Table 'parts'. Scan count 2, logical reads 347, physical reads 7, page server reads 0, read-ahead reads 271,

Completion time: 2023-05-16T20:10:11.9553037+03:00
```

Με τη χρηση του ευρετηριου Q4_idx2 μειωνονται χαρακτηριστικα τα logical reads,physical reads,read ahead reads

2)

ΠΡΩΤΟ ΕΡΩΤΗΜΑ

ΕΝΑΛΛΑΚΤΙΚΟ ΕΡΩΤΗΜΑ

```
SET STATISTICS IO ON;

-- Επιλογή προϊόντων μιας συγκεκριμένης μάρκας
SELECT partkey, pname
FROM parts
WHERE brand = 'Origin'
UNION
-- Επιλογή προϊόντων ενός συγκεκριμένου κατασκευαστή
SELECT partkey, pname
FROM parts
WHERE manufacturer = 'Domkapa';
```

```
(40178 rows affected)
Table 'parts'. Scan count 2, logical reads 346, physical reads 1, page server reads 0, read-ahead reads 0,

Completion time: 2023-05-16T20:24:39.5671029+03:00
```

Βελτιωνει χαρακτηριστικα τα read ahead reads από 336 σε 0

ΔΕΥΤΕΡΟ ΕΡΩΤΗΜΑ

```
SET STATISTICS IO ON;

SELECT p1.partkey, p1.pname
FROM parts p1
JOIN parts p2 ON p1.partkey = p2.partkey
WHERE p1.brand = 'Origin' AND p2.manufacturer = 'Domkapa';
```

```
(8096 rows affected)
Table 'parts'. Scan count 2, logical reads 347, physical reads 5, page server reads 0, read-ahead reads 1,

Completion time: 2023-05-16T20:34:15.4224570+03:00
```

Βελτιωνει χαρακτηριστικα τα read ahead reads από 271 σε 1

ΖΗΤΗΜΑ 5

ΕΡΩΤΗΜΑ 1

ΠΟΣΑ ΠΡΟΙΟΝΤΑ ΕΧΟΥΝ ΠΩΛΗΘΕΙ ΑΠΟ ΚΑΘΕ ΠΡΟΜΗΘΕΥΤΗ?

```
SET STATISTICS IO ON;

SELECT s.suppkey, COUNT(l.partkey) AS total_products
FROM SUPPLIERS s
JOIN PARTSUPP ps ON s.suppkey = ps.suppkey
JOIN LINEITEM l ON ps.partkey = l.partkey
GROUP BY s.suppkey;
```

ΧΩΡΙΣ ΕΥΡΕΤΗΡΙΟ

```
(10000 rows affected)
Table 'partsupp'. Scan count 9, logical reads 16336, physical reads 2, page server reads 0, read-ahead reads 15537,
Table 'lineitem'. Scan count 9, logical reads 60387, physical reads 1, page server reads 0, read-ahead reads 55758,
Table 'suppliers'. Scan count 9, logical reads 55, physical reads 1, page server reads 0, read-ahead reads 32, page
Table 'Worktable'. Scan count 0, logical reads 0, physical reads 0, page server reads 0, read-ahead reads 0, page se
Table 'Worktable'. Scan count 0, logical reads 0, physical reads 0, page server reads 0, read-ahead reads 0, page se

Completion time: 2023-05-15T16:15:08.6804228+03:00
```

ΜΕ ΕΥΡΕΤΗΡΙΟ

```
CREATE INDEX idx_lineitem_partkey ON LINEITEM (partkey);
CREATE INDEX idx_partsupp_part_supp ON PARTSUPP (partkey, suppkey);
```

```
(10000 rows affected)
Table 'partsupp'. Scan count 9, logical reads 1470, physical reads 0, page server reads 0, read-ahead reads 154, p
Table 'lineitem'. Scan count 9, logical reads 10017, physical reads 0, page server reads 0, read-ahead reads 6510,
Table 'suppliers'. Scan count 9, logical reads 55, physical reads 1, page server reads 0, read-ahead reads 18, pag
Table 'Worktable'. Scan count 0, logical reads 0, physical reads 0, page server reads 0, read-ahead reads 0, page
Table 'Worktable'. Scan count 0, logical reads 0, physical reads 0, page server reads 0, read-ahead reads 0, page

Completion time: 2023-05-15T16:16:10.5596444+03:00
```

	WITH INDEX	WITHOUT INDEX
LOGICAL READS	11542	76778
PHYSICAL READS	1	3
READ AHEAD READS	6682	71327

ΕΡΩΤΗΜΑ 2

ΠΟΙΟΙ ΠΕΛΑΤΕΣ ΕΧΟΥΝ ΤΟ ΥΨΗΛΟΤΕΡΟ ΥΠΟΛΟΙΠΟ ΛΟΓΑΡΙΑΣΜΟΥ ΑΝΑ ΕΜΠΟΡΙΚΟ ΤΟΜΕΑ?

```
SET STATISTICS IO ON;

SELECT market_segment, MAX(c_acctbal) AS max_acctbal
FROM CUSTOMERS
GROUP BY market_segment;
```

```
(5 rows affected)
Table 'customers'. Scan count 1, logical reads 2558, physical reads 2318, page server reads 0, read-ahead reads 2554,

Completion time: 2023-05-16T18:57:13.3890691+03:00
```

ΜΕ ΕΥΡΕΤΗΡΙΟ

```
CREATE INDEX idx_customers_market_segment ON CUSTOMERS (market_segment);
```

```
(5 rows affected)
Table 'customers'. Scan count 1, logical reads 2558, physical reads 2, page server reads 0, read-ahead reads 2562,

Completion time: 2023-05-16T19:02:50.8907346+03:00
```

Βελτιώνει σε μεγάλο βαθμό τα physical reads

	WITH INDEX	WITHOUT INDEX
LOGICAL READS	2558	2558
PHYSICAL READS	2	2318
READ AHEAD READS	2562	2554