*** Create a basic little table

```
SQL> CREATE TABLE index_some_stuff (id number, status varchar2(20), description varchar2(50));

Table created.
```

*** Populate it with all STATUS values set to "PROCESSED"

```
SQL> INSERT INTO index_some_stuff SELECT rownum, 'PROCESSED', 'NOT REALLY INTERESTED WITH THIS ROW'
FROM DUAL CONNECT BY LEVEL <= 1000000;

Table created.
```

*** But set one row to have a STAUS of "BOWIE"

```
SQL> UPDATE index_some_stuff SET status = 'BOWIE', description = 'ROW OF INTEREST' WHERE id =
424242;

1 row updated.

SQL> COMMIT;

Commit complete.
```

*** So we have lots and lots of STATUS values that we're not really intertested in and a "few" that we are ...

```
SQL> SELECT status, count(*) FROM index_some_stuff GROUP BY status;

STATUS      COUNT(*)
--------- ----------
PROCESSED     999999
BOWIE              1
```

*** Let's create a normal index on the STATUS column

```
SQL> CREATE INDEX index_some_stuff_i_1 ON index_some_stuff(status);

Index created.
```

*** Let's collect stats on the table

```
SQL> exec dbms_stats.gather_table_stats(ownname=>'BOWIE', tabname=> 'INDEX_SOME_STUFF',
estimate_percent=> null, method_opt=>'FOR ALL COLUMNS SIZE 1', cascade=> true);

PL/SQL procedure successfully completed.
```

*** Let's search for those rows with a status of "BOWIE"

```
SQL> SELECT * FROM index_some_stuff WHERE status = 'BOWIE';

        ID STATUS              DESCRIPTION
---------- ------------------- --------------------
    424242 BOWIE               ROW OF INTEREST

1 row selected.
```

```
Execution Plan
----------------------------------------------------------
Plan hash value: 290213492

-------------------------------------------------------------------------------------------
| Id  | Operation         | Name             | Rows  | Bytes | Cost (%CPU)| Time     |
-------------------------------------------------------------------------------------------
|   0 | SELECT STATEMENT  |                  |   500K|    24M|  1717   (2)| 00:00:21 |
|*  1 |  TABLE ACCESS FULL| INDEX_SOME_STUFF |   500K|    24M|  1717   (2)| 00:00:21 |
-------------------------------------------------------------------------------------------


Predicate Information (identified by operation id):
---------------------------------------------------

   1 - filter("STATUS"='BOWIE')
```

```
Statistics
----------------------------------------------------------
          0  recursive calls
          0  db block gets
       7765  consistent gets
       7754  physical reads
          0  redo size
        546  bytes sent via SQL*Net to client
        396  bytes received via SQL*Net from client
          2  SQL*Net roundtrips to/from client
          0  sorts (memory)
          0  sorts (disk)
          1  rows processed

*** add a histogram on the STATUS column

SQL> exec dbms_stats.gather_table_stats(ownname=>'BOWIE', tabname=> 'INDEX_SOME_STUFF',
estimate_percent=> null, method_opt=>'FOR COLUMNS STATUS SIZE 5');

PL/SQL procedure successfully completed.


*** Let's search again for those rows with a status of "BOWIE"


SQL> SELECT * FROM index_some_stuff WHERE status = 'BOWIE';

        ID STATUS               DESCRIPTION
---------- -------------------- --------------------
    424242 BOWIE                ROW OF INTEREST

1 row selected.


Execution Plan
----------------------------------------------------------
Plan hash value: 3846250962

-------------------------------------------------------------------------------------------------------------
| Id  | Operation                    | Name                | Rows  | Bytes | Cost (%CPU)| Time     |
-------------------------------------------------------------------------------------------------------------
|   0 | SELECT STATEMENT             |                     |     1 |    51 |     4   (0)| 00:00:01 |
|   1 |  TABLE ACCESS BY INDEX ROWID| INDEX_SOME_STUFF     |     1 |    51 |     4   (0)| 00:00:01 |
|*  2 |   INDEX RANGE SCAN           | INDEX_SOME_STUFF_I_1 |     1 |       |     3   (0)| 00:00:01 |
-------------------------------------------------------------------------------------------------------------


Predicate Information (identified by operation id):
---------------------------------------------------

   2 - access("STATUS"='BOWIE')


Statistics
----------------------------------------------------------
          0  recursive calls
          0  db block gets
          5  consistent gets
          0  physical reads
          0  redo size
        546  bytes sent via SQL*Net to client
        396  bytes received via SQL*Net from client
          2  SQL*Net roundtrips to/from client
          0  sorts (memory)
          0  sorts (disk)
          1  rows processed



*** And as expected, we have used our index.

*** But note that the index is predominately made up of "PROCESSED" values.

*** Perhaps we can improve on the 5 Consistent Reads we required for this index access ...



*** Let's create a function-based index that only stores the "BOWIE" STATUS values
```

```
SQL> CREATE INDEX index_some_stuff_i_2 ON index_some_stuff(DECODE(status, 'BOWIE', 'BOWIE', NULL))
COMPUTE STATISTICS;

Index created.


*** and create stats for the virtual column

SQL> exec dbms_stats.gather_table_stats(ownname=>'BOWIE', tabname=> 'INDEX_SOME_STUFF',
estimate_percent=> null, method_opt=>'FOR ALL HIDDEN COLUMNS SIZE 1', cascade=> true);

PL/SQL procedure successfully completed.


*** Let's compare some stats on these two indexes

SQL> SELECT index_name, blevel, leaf_blocks, distinct_keys, num_rows FROM dba_indexes WHERE
owner='BOWIE' AND table_name='INDEX_SOME_STUFF';

INDEX_NAME                      BLEVEL LEAF_BLOCKS DISTINCT_KEYS   NUM_ROWS
------------------------------ ---------- ----------- ------------- ----------
INDEX_SOME_STUFF_I_1                    2        2924             2    1000000
INDEX_SOME_STUFF_I_2                    0           1             1          1


*** Note that the "normal" index has a BLEVEL of 2 and 2924 leaf blocks

*** Note however the function-based index has a blevel of 0 and just the 1 leaf block ...



*** Let's run the same query now


SQL> SELECT * FROM bowie.index_some_stuff WHERE(DECODE(status, 'BOWIE', 'BOWIE', null)) = 'BOWIE';

1 row selected.


Execution Plan
----------------------------------------------------------
Plan hash value: 2019748526

-------------------------------------------------------------------------------------------------------
| Id  | Operation                    | Name                | Rows  | Bytes | Cost (%CPU)| Time     |
-------------------------------------------------------------------------------------------------------
|   0 | SELECT STATEMENT             |                     |     1 |    51 |     2   (0)| 00:00:01 |
|   1 |  TABLE ACCESS BY INDEX ROWID| INDEX_SOME_STUFF     |     1 |    51 |     2   (0)| 00:00:01 |
|*  2 |   INDEX RANGE SCAN           | INDEX_SOME_STUFF_I_2 |     1 |       |     1   (0)| 00:00:01 |
-------------------------------------------------------------------------------------------------------


Predicate Information (identified by operation id):
---------------------------------------------------

   2 - access(DECODE("STATUS",'BOWIE','BOWIE',NULL)='BOWIE')


Statistics
----------------------------------------------------------
          0  recursive calls
          0  db block gets
          2  consistent gets
          0  physical reads
          0  redo size
        546  bytes sent via SQL*Net to client
        396  bytes received via SQL*Net from client
          2  SQL*Net roundtrips to/from client
          0  sorts (memory)
          0  sorts (disk)
          1  rows processed


*** and we note consistent reads have dropped from 5 down to just 2 ...
```