

ORACLE®

# Oracle Database 12c for SAP

Advanced Compression and Hybrid Columnar Compression

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# Oracle Database 12c for SAP Certification Roadmap



**Base Certification**  
(Q1 2015)



Oracle Database  
In-Memory  
(Q2 2015)



**ACO ILM Features,  
Hybrid Columnar  
Compression**  
(Q3 2015)



Oracle Multitenant  
(Q1 2016)

# Oracle Database 12c Advanced Compression

Features Included in Base Certification

# Oracle Advanced Compression

## Feature Overview

### Oracle Database 11g

- OLTP Table Compression (structured data)
- SecureFiles Compression (unstructured data)
- Data Guard Redo Compression
- Recovery Manager (RMAN) Compression

### Oracle Database 12c

- 255-column limit lifted
- Advanced Index Compression
- Client/Server Network Compression
- ILM Automatization
  - Heat Map
  - Automatic Data Optimization (ADO)

# Oracle Advanced Compression

## Support for Tables with More Than 255 Columns

- Oracle Database 11g:
  - OLTP table compression not supported for use with tables having > 255 columns
- Oracle Database 12c:
  - 255-columns limit lifted
- Benefits:
  - Can now compress standard tables having > 255 columns
  - Can support SAP application optimizations that require declustering of certain SAP cluster tables without substantial increase of disk space
    - See SAP Note 1835008

# Oracle Advanced Compression

## Advanced Index Compression

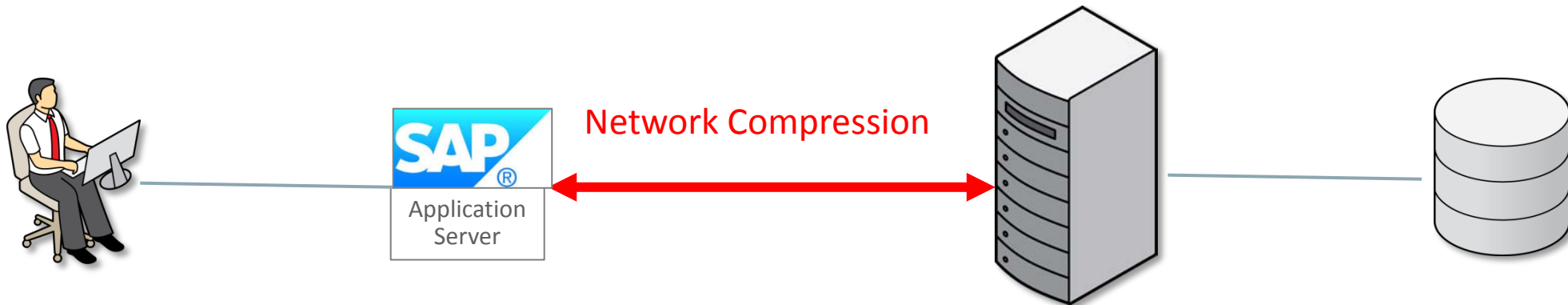
- Supported for unique and non-unique indexes
  - Not supported for bitmap indexes or index organized tables
  - Cannot be specified on a single-column unique index
- Works at block level
- Benefits:
  - Automatic prefix computation
  - Partitioned index: compression can be activated on a partition by partition basis
  - Average compression ratio: 2x to 3x



# Oracle Advanced Compression

## Client-Server Network Compression

- Compress the network data to be transmitted at the sending side
- Uncompress data at the receiving side
- Benefits:
  - Increased effective network throughput
  - Reduced bandwidth utilization



# Oracle Database 12c Advanced Compression

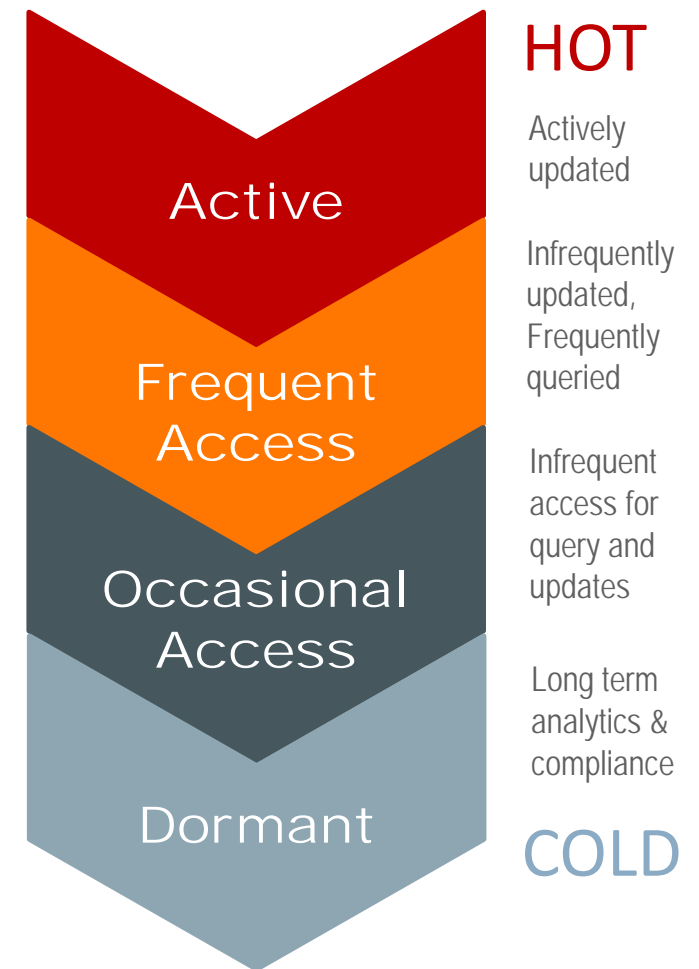
## Information Lifecycle Management Features

# Oracle Database for SAP: ILM Support

	Oracle Database 11g	Oracle Database 12c
Partitioning	Certified	Certified
Basic Table & Index Compression	Certified	Certified
Hybrid Columnar Compression	Not Certified	<b>Certified</b> (Prerequisite: ADO)
Tool Support for Identifying Relevant Objects	None	<b>Heat Map</b> (requires ACO)
Tool Support for Storage/Compression Tiering	None	<b>Automatic Data Optimization</b> (= ADO; requires ACO)

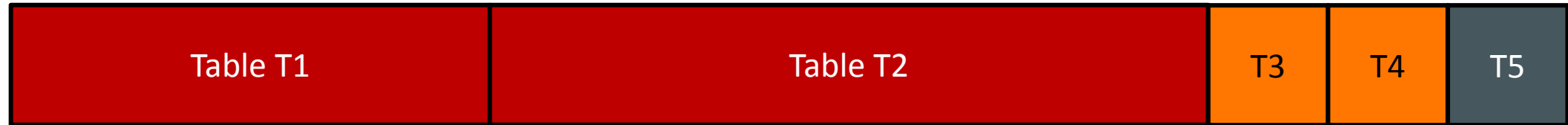
# What is Information Lifecycle Management?

- Access analysis
  - Temperature metaphor
- Data storage depending on access patterns
  - Storage tiering
    - Provide different types (levels) of storage
    - Move data to cheaper storage, when they get "colder"
  - Compression tiering
    - Use different types (levels) of compression
    - Apply stronger compression, when data get "colder"

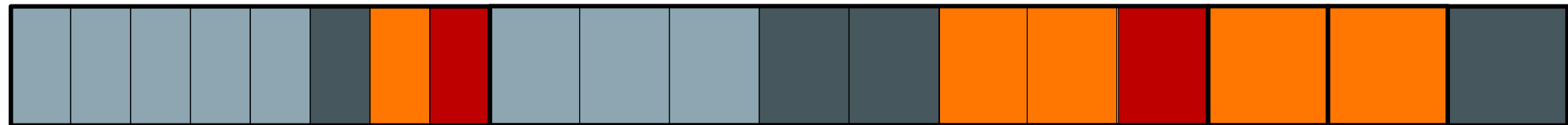


# Oracle Database 12c ILM: Access Tracking Levels

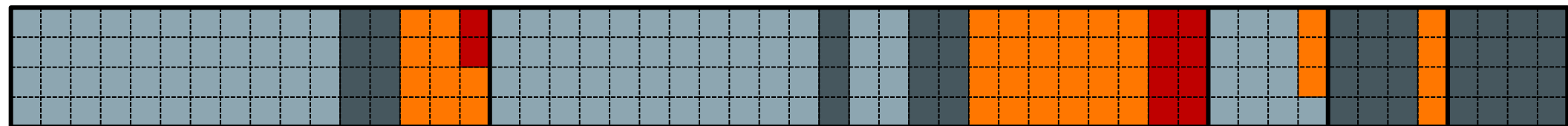
DB Object Level



DB Partition Level



DB Block Level



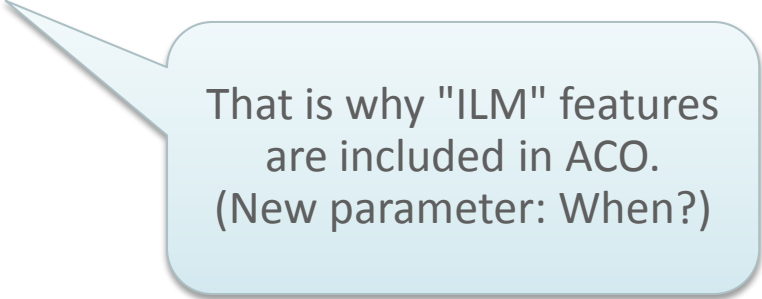
# Oracle Database 12c ILM: Policy Definition

```
SQL> ALTER TABLE ORDERS ILM ADD POLICY  
ROW STORE COMPRESS ADVANCED ROW  
AFTER 3 DAYS OF NO MODIFICATION;
```

```
SQL> ALTER TABLE ORDERS ILM ADD POLICY  
TIER TO DATA2 READ ONLY  
AFTER 180 DAYS OF NO MODIFICATION;
```

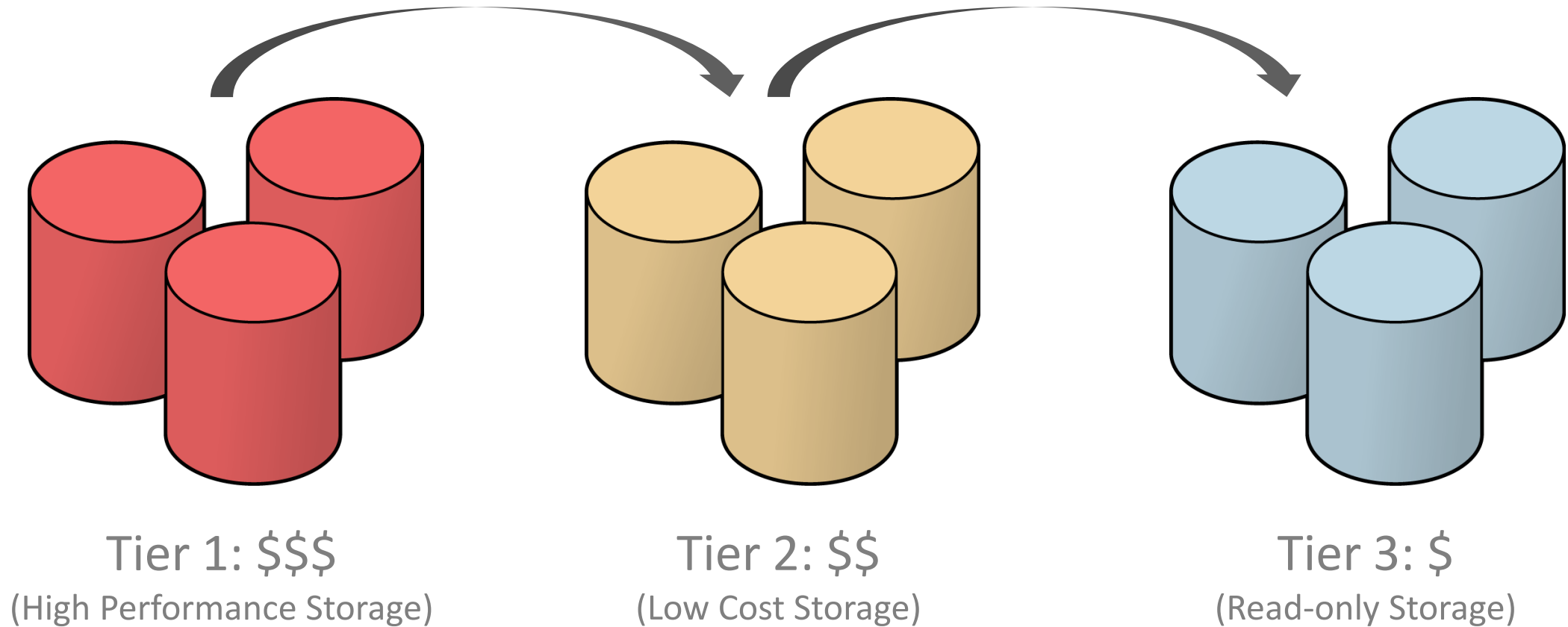
# Deferred Table/Partition Compression

- Problem:
  - Immediate compression can slow down insert/update operations seriously
  - Example: SAP BW tables used for data load
- Solution:
  - Load data uncompressed
  - Use ADO for later automatic compression



That is why "ILM" features are included in ACO.  
(New parameter: When?)

# Information Lifecycle Management: Storage Tiering





# Information Lifecycle Management: Compression Tiering

## Hot Data

```
10101010111010100110101110
00010100010110111010101001
01001001000010001010101101
00101101001110000101001001
01000010010000100010101011
10011010
-----
0100100111110010
0100001000101010
1101000
```

**3X**

Advanced Row Compression

## Warm Data

```
1010101011101010011010111000010100010110111
0101010010100100100001000101010110100101101
0011100001010010010100001001000010001010101
11001101110011000111010
-----
0100100101000010
0100001000101010
1101001
```

**10X**

Columnar Query Compression

## Archive Data

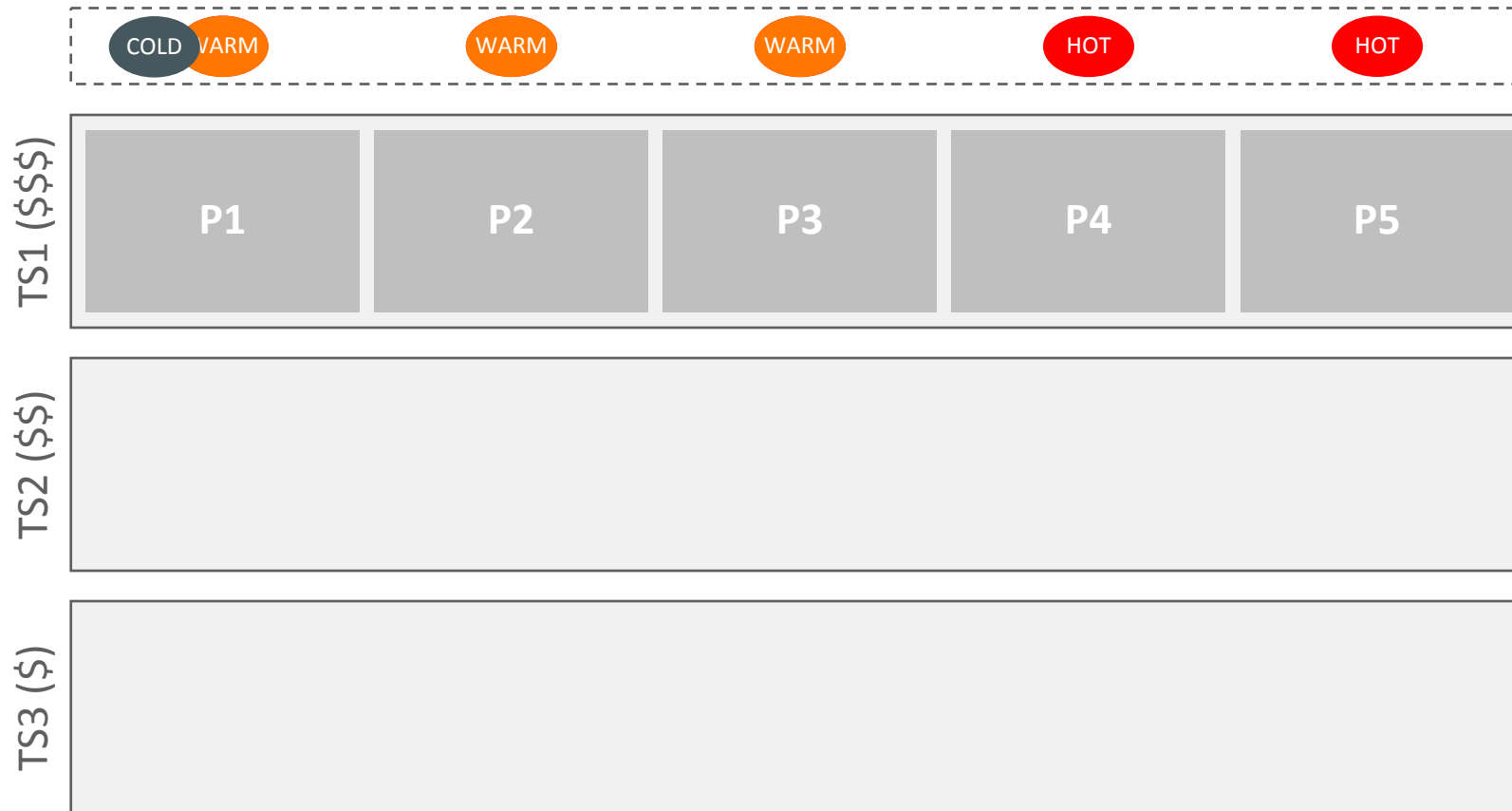
```
1010101011101010011010111000010100010110111010101
0010100100100001000101010110100101101001110000101
0010010100001001000010001010101110011011100
-----
0100100101000010
0100001000101010
1101001
```

**15X**

Columnar Archive Compression



# Automated Information Lifecycle Management



Heat Map automatically keeps track of data access patterns

ADO Rule 1: After 30 days of no modification automatically move partition to tablespace TS2 and compress data using standard compression.

ADO Rule 2: After 90 days of no modification automatically move partition to tablespace TS3 and compress data using Hybrid Columnar Compression.

# Oracle Engineered Systems

**Hybrid Columnar Compression with Row-level Locking**

# Information Lifecycle Management: Compression Tiering

## Hot Data

```
10101010111010100110101110
00010100010110111010101001
01001001000010001010101101
00101101001110000101001001
01000010010000100010101011
10011010
-----
0100100111110010
0100001000101010
1101000
```

**3X**

Advanced Row Compression

## Warm Data

```
1010101011101010011010111000010100010110111
0101010010100100100001000101010110100101101
0011100001010010010100001001000010001010101
11001101110011000111010
-----
0100100101000010
0100001000101010
1101001
```

**10X**

Columnar Query Compression

## Archive Data

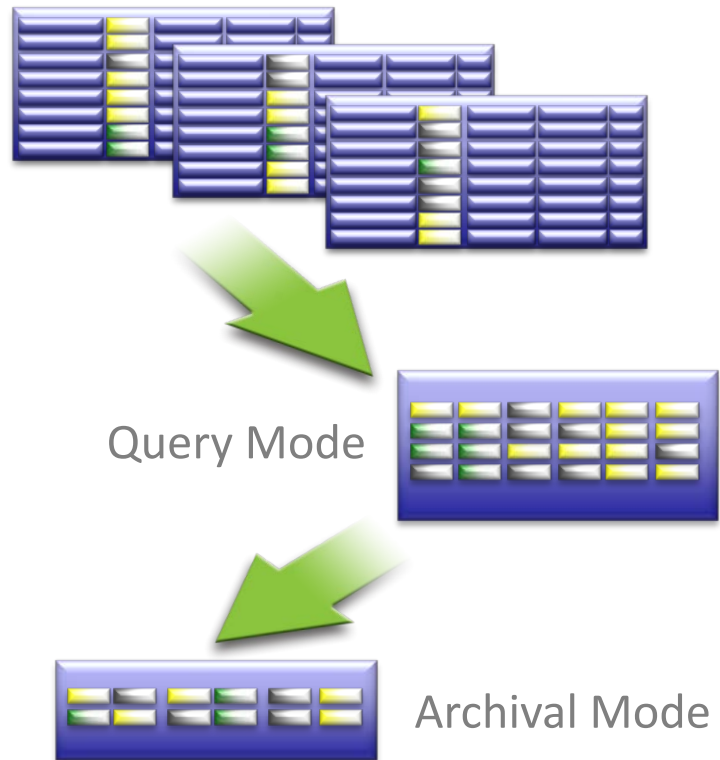
```
1010101011101010011010111000010100010110111010101
0010100100100001000101010110100101101001110000101
0010010100001001000010001010101110011011100
-----
0100100101000010
0100001000101010
1101001
```

**15X**

Columnar Archive Compression



# Related technology: Hybrid Columnar Compression (HCC)



- Data stored by column, then compressed
- Useful for data that is bulk loaded or moved
- Modes:
  - **Query mode** for data warehousing
  - **Archival mode** for old data
- Engineered Systems only
- Supported in SAP environments?
  - Oracle DB 11g: No
  - Oracle DB 12c: Planned

# Row-level Locking

- Oracle DB 11g:
  - not available
- Oracle DB 12c:
  - available, but not required
  - SAP environments: required
- Use of HCC row-level locking requires Oracle Advanced Compression

# More Information

# More Information

- SAP on Oracle (SAP Community Network)
  - <http://scn.sap.com/community/oracle>
  - See in particular:  
[SAP on Oracle Development Update](https://scn.sap.com/docs/DOC-15887)  
(<https://scn.sap.com/docs/DOC-15887>)
- Oracle Database and IT Infrastructure for SAP
  - <http://www.oracle.com/sap>
  - See in particular:  
[Oracle Database 12c for SAP–Roadmap and Base Certification Features](http://www.oracle.com/us/solutions/sap/oradb12c-sap-certification-roadmap-2506113.pdf)  
(<http://www.oracle.com/us/solutions/sap/oradb12c-sap-certification-roadmap-2506113.pdf>)



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