

How to reorganize – and why?

DOAG
Conference + Exhibition 2015
17.11.2015, Nuremberg
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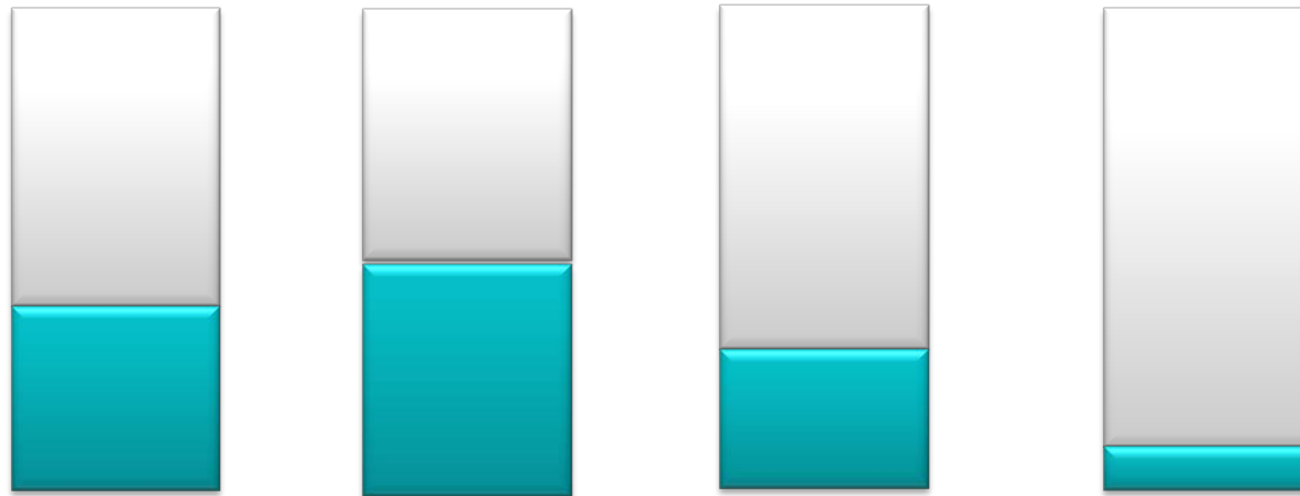
- Reorganizing tables
 - Why reorganize and use workarounds
 - How to reorganize
- Reorganizing indexes
 - Why reorganize and use workarounds
 - How to reorganize
- Conclusions

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High water mark level

Reorganizing tables

- The less free space there is in a block, the more records can be moved around with one I/O event.



- Workaround:
Use ASSM or increase PCTUSED

High water mark (HWM)

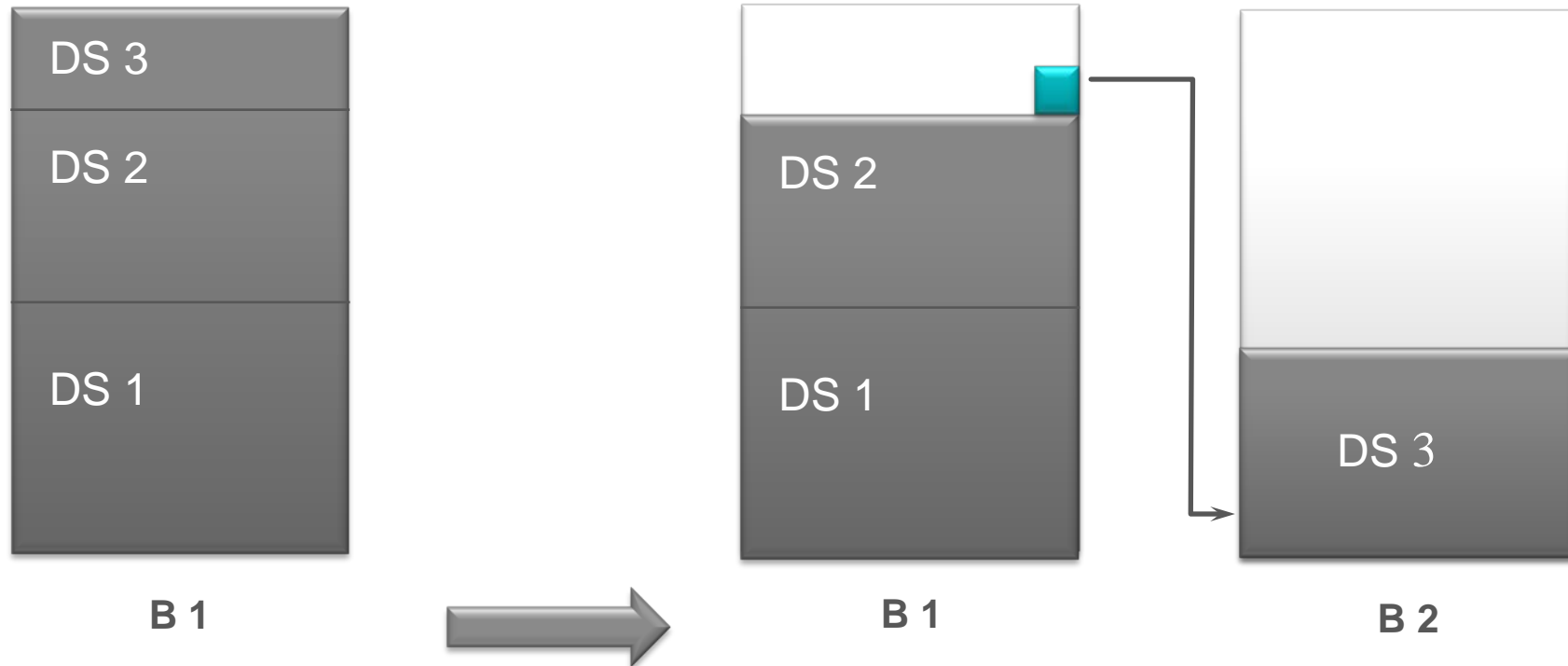
Reorganizing tables

- The higher the number of allocated blocks per segment, the higher the HWM
- A full table scan always reads up to the HWM
- Can be found in the `BLOCKS` column of the `DBA_TABLES`



Fragmentation and ROW MIGRATING

Reorganizing tables

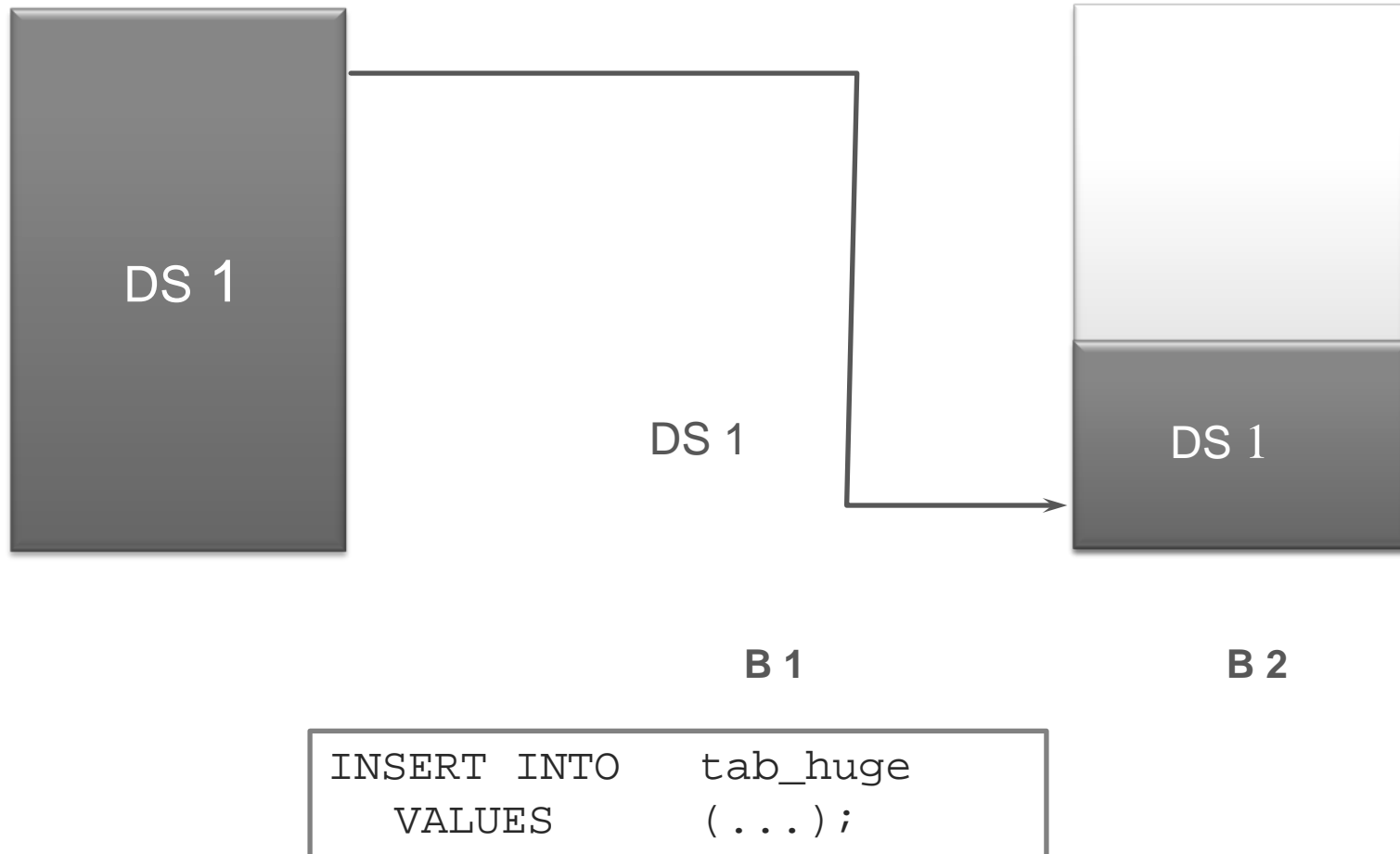


```
UPDATE table
SET    name = 'John-Doe'
WHERE  id = DS3
```

Workaround: Increase PCTFREE

Fragmentation and ROW CHAINING

Reorganizing tables



Workarounds

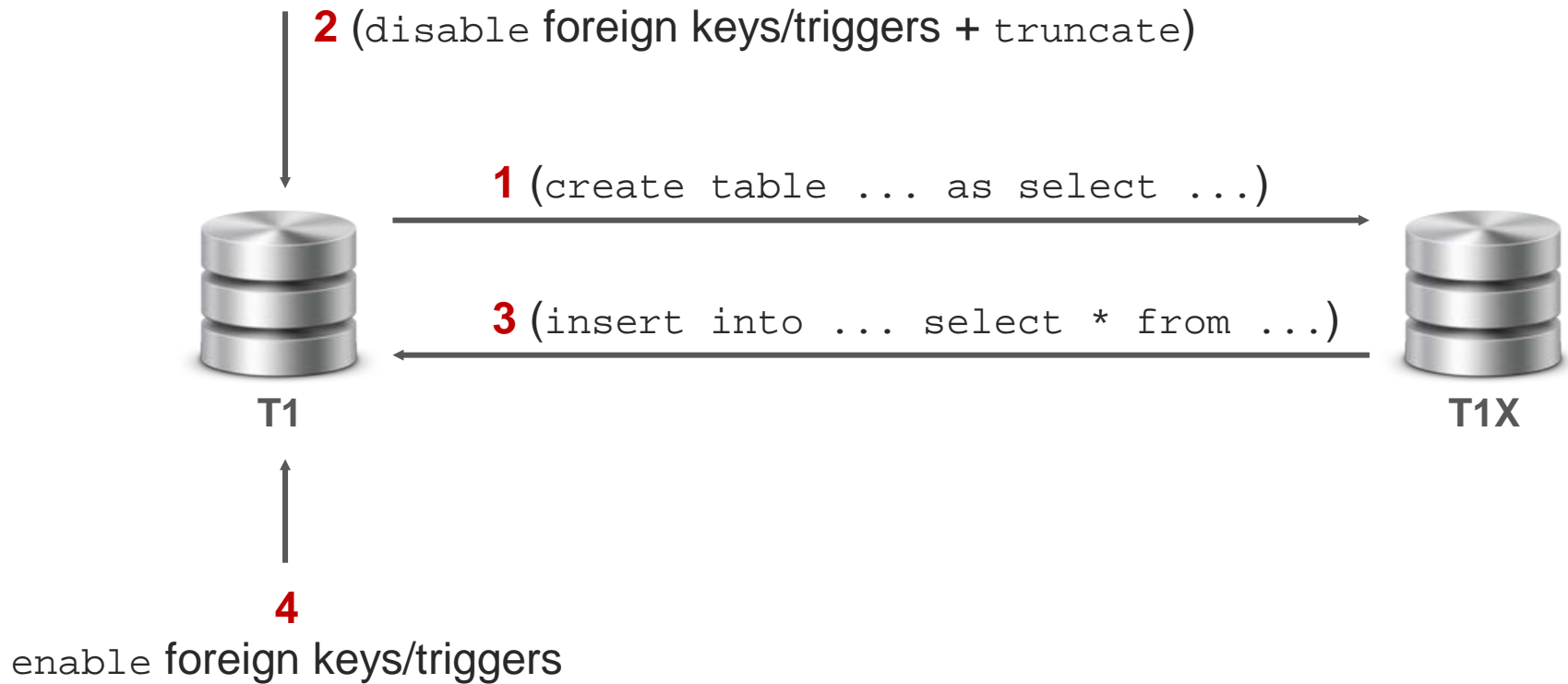
Reorganizing tables

- High water mark (HWM)
 - Using ASSM
 - Increasing `PCTUSED`
- Migrated rows
 - Increasing `PCTFREE`
- Chained rows
 - Tablespaces with non-standard block size
 - Using `ALTER TABLE ADD with DEFAULT`

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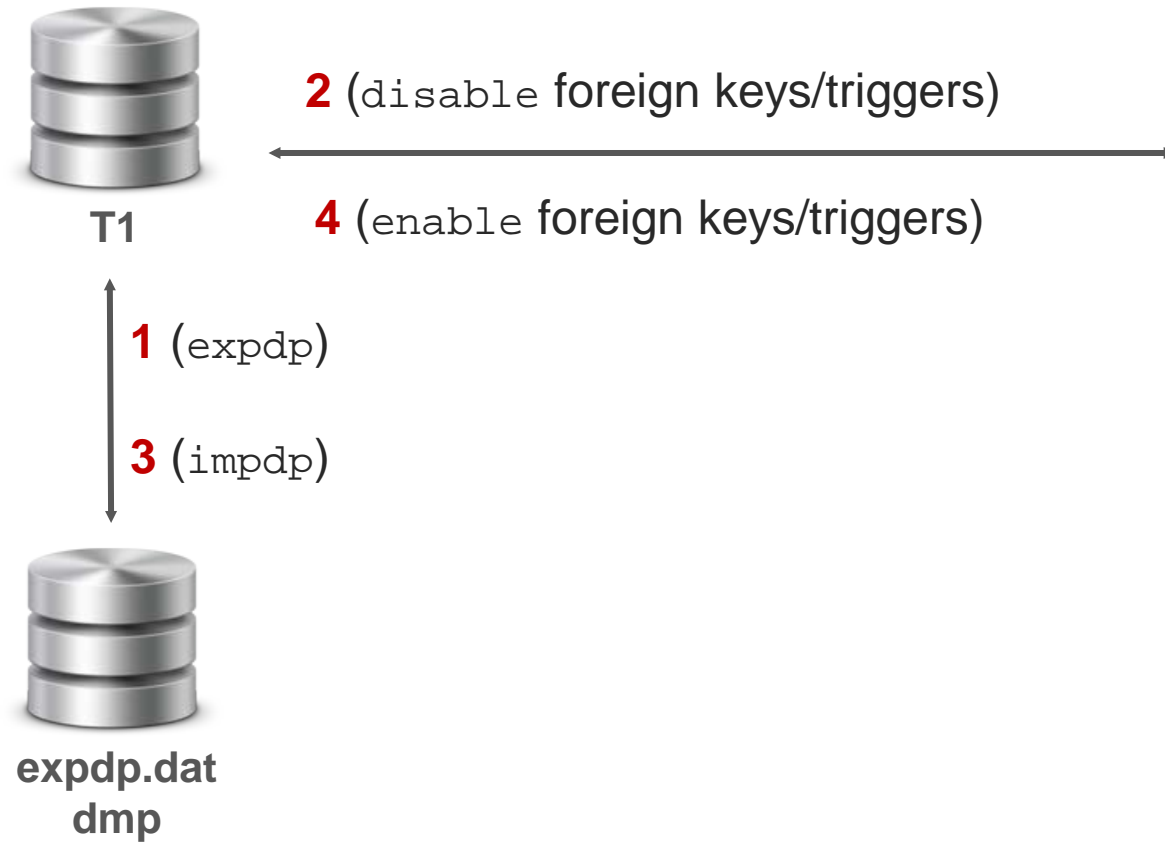
create table ... as select ...

How to reorganize



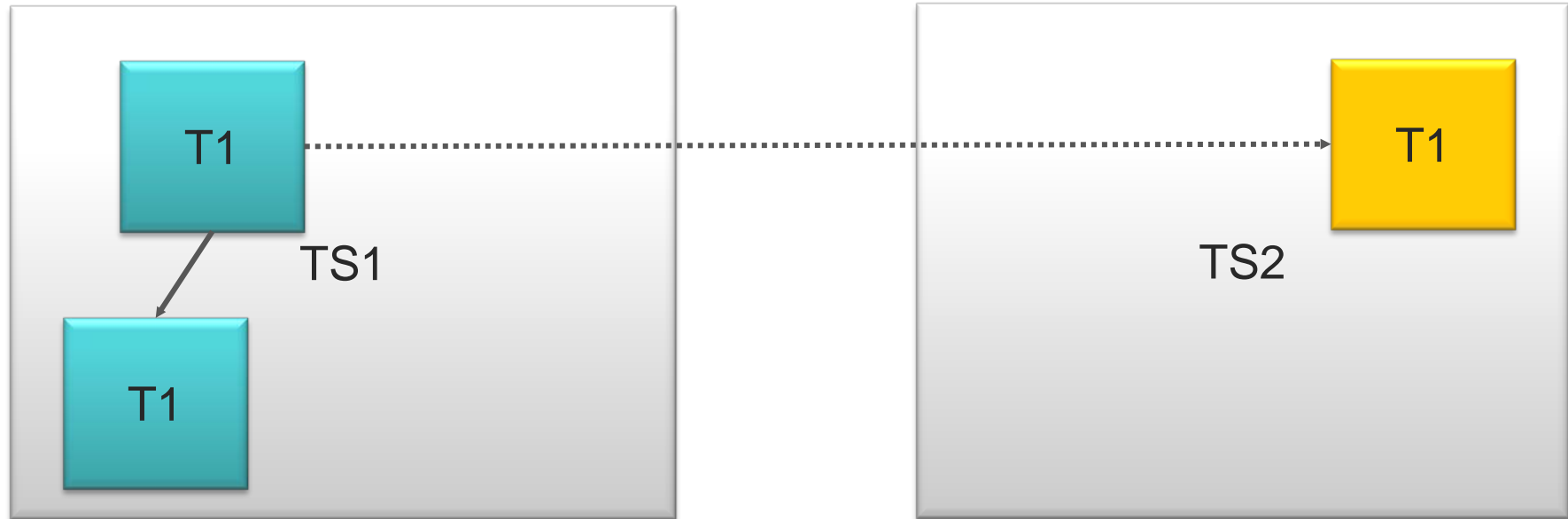
expdp/impdp

How to reorganize



alter table ... move (tablespace)

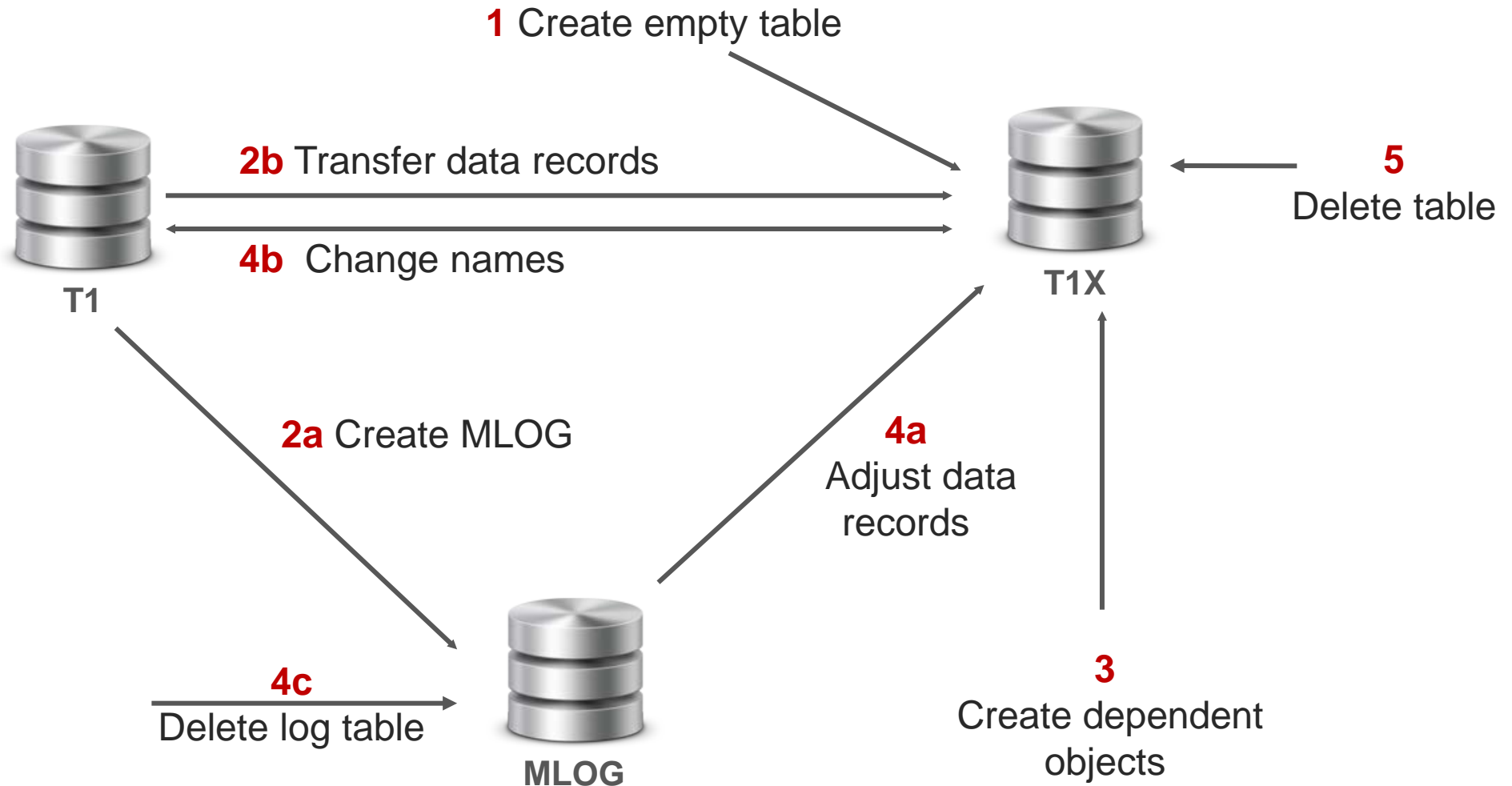
How to reorganize



then rebuild all indexes for the table

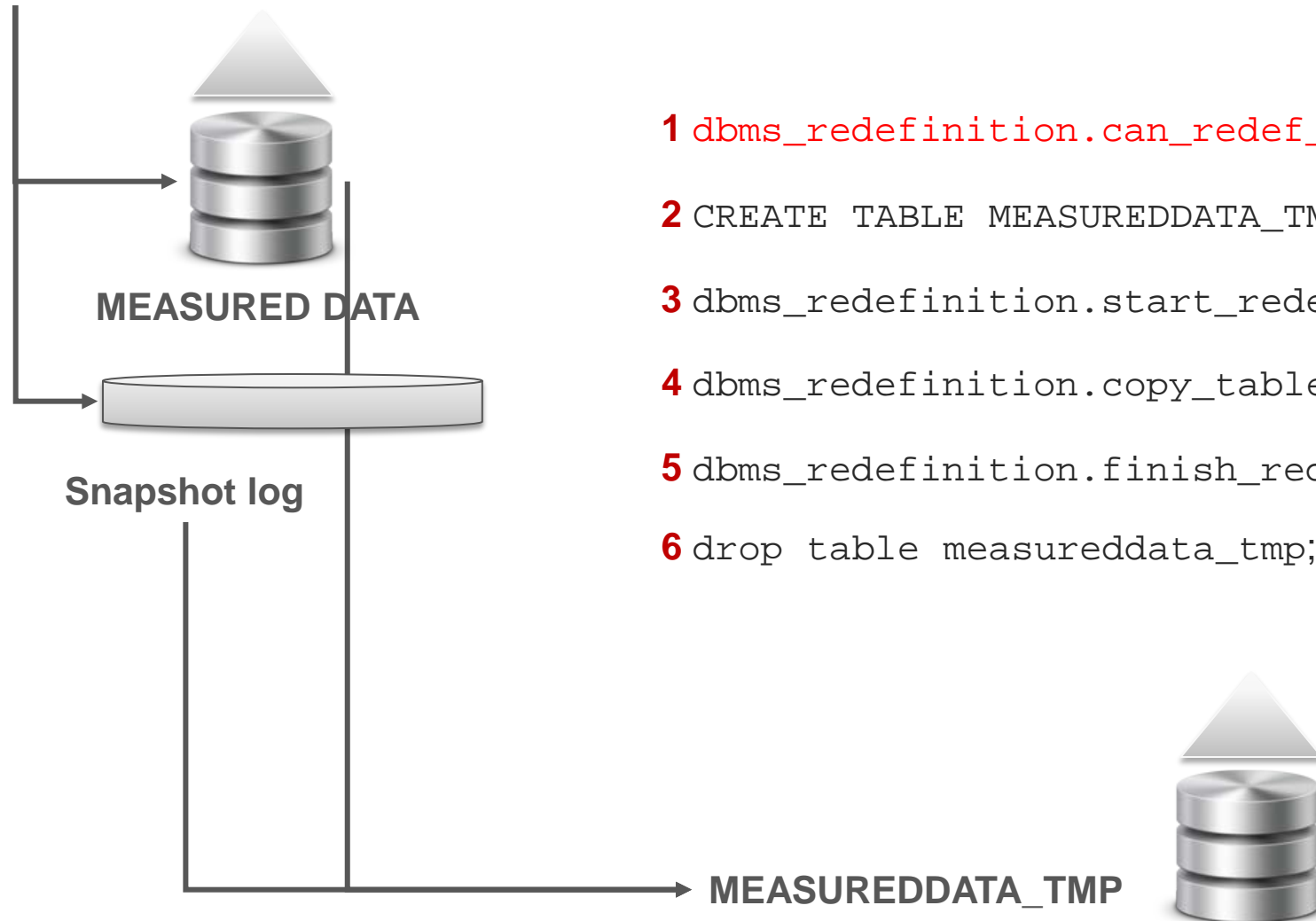
dbms_redefinition

How to reorganize



dbms_redefinition – procedures

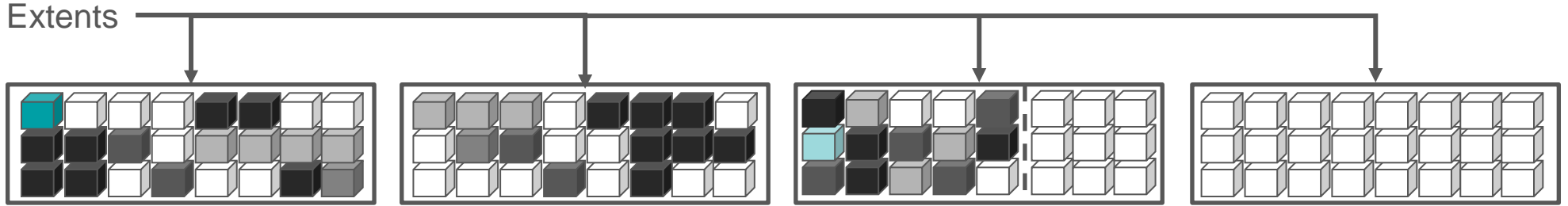
How to reorganize



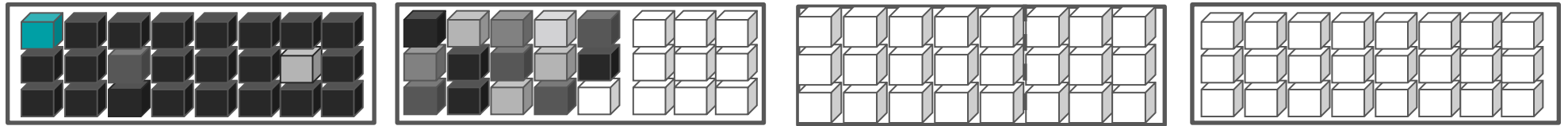
- 1 `dbms_redefinition.can_redef_table(...`
- 2 `CREATE TABLE MEASUREDDATA_TMP(...`
- 3 `dbms_redefinition.start_redef_table(...`
- 4 `dbms_redefinition.copy_table_dependents(...`
- 5 `dbms_redefinition.finish_redef_table(...`
- 6 `drop table measureddata_tmp;`

Segment shrink

How to reorganize



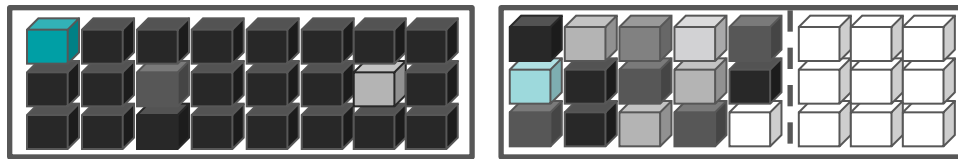
Shrink compact










HWM

HWM

Shrink cascade



HWM

-  Segment header
-  Empty block
-  <25%
-  <50%
-  <75%
-  <100%
-  =100%

Segment shrink

How to reorganize

- Data is compacted – high water mark is adjusted to appropriate location
- Requirements
 - Enable ASSM to determine amount of free space
 - ROW MOVEMENT ENABLED
- Not possible with IOT / LONG / LOB / Cluster / MV
- Indexes will remain “usable“
- Triggers are not fired
- Online reorganization

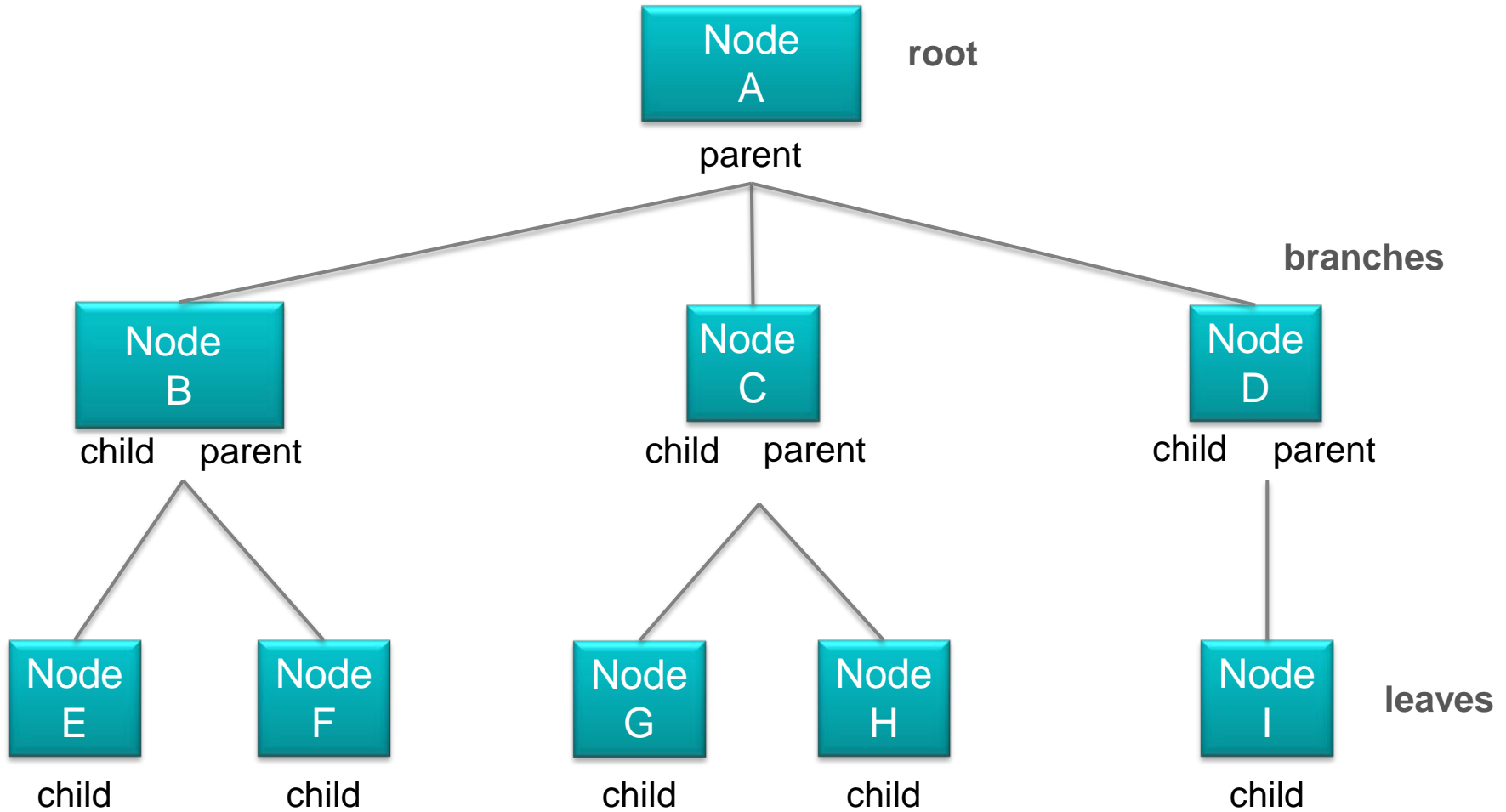
```
ALTER TABLE tab SHRINK SPACE COMPACT;
```

```
ALTER TABLE tab SHRINK SPACE CASCADE;
```


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B*-tree index

Reorganizing indexes



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Why reorganize and how to analyze

- The tree is “unbalanced”
 - The index is sequence-generated
 - New data records are only added to the right-hand side
- High water mark
 - Poor use of block space due to DELETE or UPDATE
 - Poor IO rate
- Analyze by using:
 - `analyze index ... validate structure`



Reorganizing indexes can be counterproductive.

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How to organize

- Rebuilding indexes
 - Completely rebuilding the tree
 - `ALTER INDEX IND1 REBUILD ONLINE;`

- Coalescing indexes
 - Coalescing the leave block level
 - `ALTER INDEX IND1 COALESCE;`

- Shrinking indexes
 - Shrinking the leaf block level
 - `ALTER INDEX IND1 SHRINK;`

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Conclusions

- Implementing a monitoring system
- Automating reorganization
- Weighing up the pros and cons of index reorganization
- Using the (mock) maintenance window for reorganization
- Benefiting from the opportunities offered by the licenced Oracle edition



**Vielen Dank für
Ihre Aufmerksamkeit!**

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