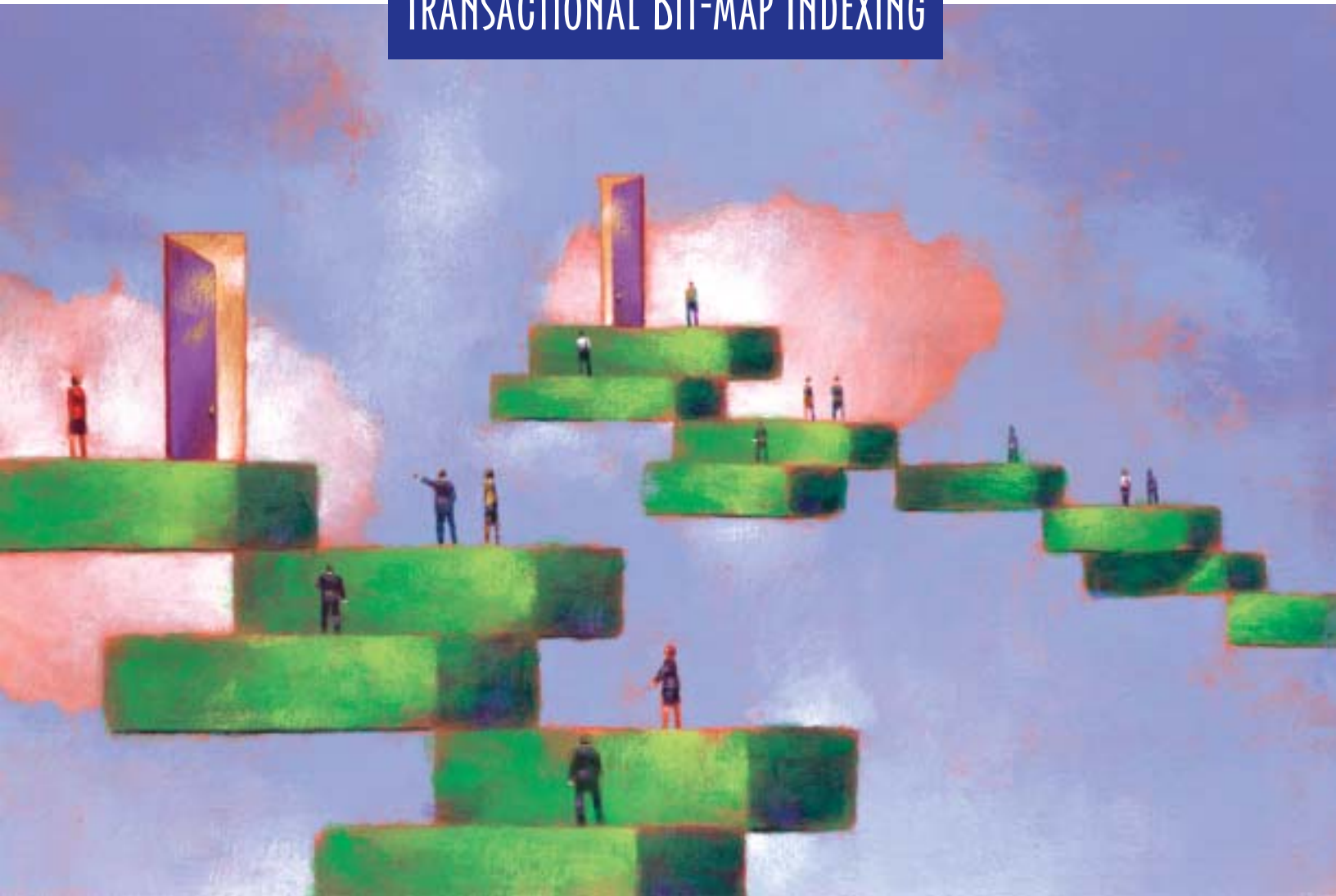


C A C H É   G O M P O N E N T S

# TRANSACTIONAL BIT-MAP INDEXING



**Caché is the first database with bit-map indexing designed to work effectively with transactional data. Transactional bit-map indexing enables real-time data analytics. It opens the door to a new breed of applications that include business intelligence functionality utilizing "live" data.**

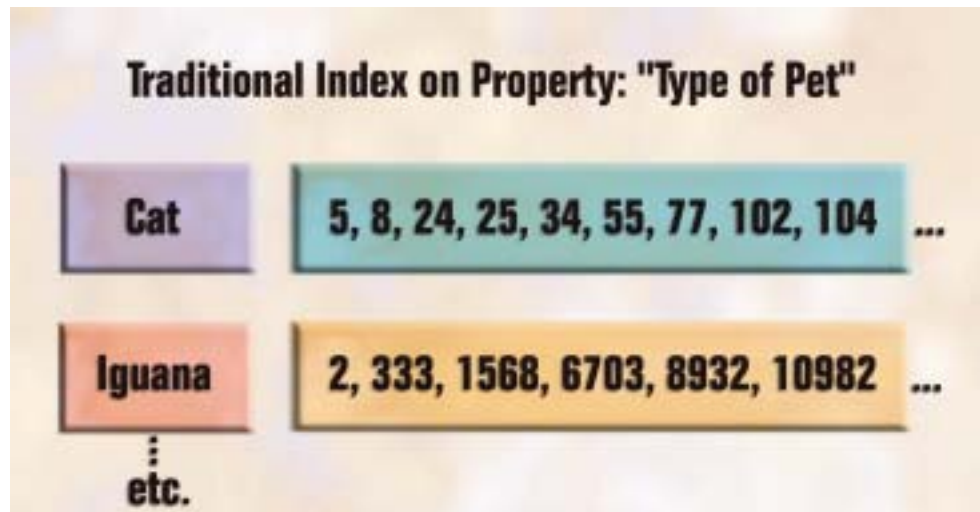
# TRANSACTIONAL BIT-MAP INDEXING

## Using Indexes to Boost Performance

One way to increase application performance is to create indexes on properties that are frequently used as criteria for searching the database. Caché gives developers the option of building both traditional, and bit-map, indexes.

### Index Types

In a traditional index, a property of a class (column of a table) is described by lists of record IDs: for each property value there is a list of record IDs (row IDs in the table, object IDs of the class) for which the indexed property matches that value.



In a bit-map index, a property of a class (column of a table) is described by a string of bits: for each property value there is a string of bits representing each object in the class (row in the table). The bit is "1" if the object has that property value, "0" if it does not.



## Bringing Bit-Maps Into The Transactional Arena

The advantage of bit map indexes is that complex queries can be processed by performing Boolean operations (AND, OR) on the indexes – efficiently determining exactly which instances (rows) fit the query conditions, without searching through the entire database. For complex queries, bit-map indexes can boost response times by more than a factor of 100.

With other database products, bit-map indexes are difficult to update if existing data is changed or deleted frequently. That is why they have traditionally only been used in situations with static, read-only data – such as performing business intelligence on a data warehouse. Bit-map indexes can also require large amounts of disk space, because every possible value in the index contains a bit (either 1 or 0) for every instance of the class.



InterSystems designed Caché's bit-map technology with transaction processing in mind. Efficient multidimensional data structures and sophisticated compression techniques combine to make Caché's bit-map indexes both smaller and much quicker to update than those offered by other database vendors. With Caché, bit-map indexes take no longer to update than traditional indexes, making them suitable for using with rapidly changing data.

Transactional bit-map indexing gives developers the capability to add complex queries – and functionality usually associated with business intelligence applications – to applications working with "live" data.

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