Principles of Distributed and Parallel Database Systems Allocation Alternatives



Objectives



Objective

Understand data fragmentation & replication models

Allocation Alternatives

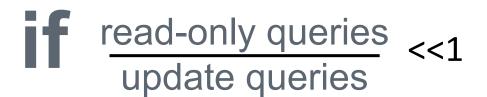
Non-replicated

partitioned : each fragment resides at only one site

Replicated

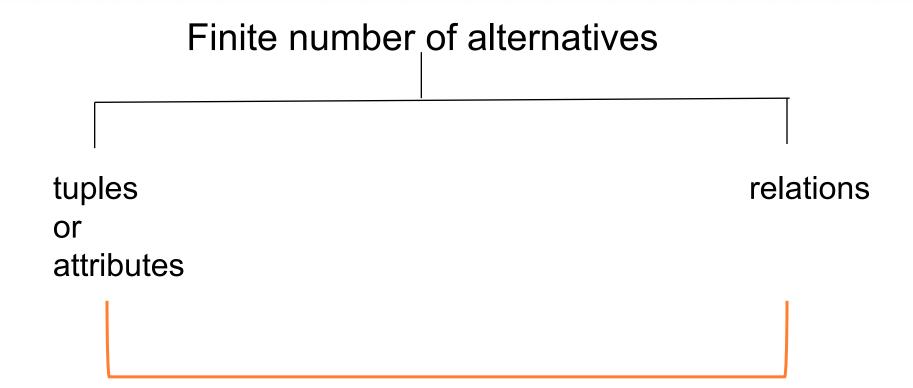
- fully replicated : each fragment at each site
- partially replicated : each
 fragment at some of the sites

Rule of Thumb: Replication



Replication is advantageous, otherwise replication may cause problems

Degree of Fragmentation



Desired Properties of Fragmentation

Completeness

Decomposition of relation R into fragments R₁, R₂, ..., R_n is complete if and only if each data item in R can also be found in some R_i

Reconstruction

- If relation R is decomposed into fragments R₁, R₂, ...,
 Rₙ, then there should exist some relational operator ∇ such that
 - $R = \nabla_{1 < i < n} R_i$

Disjointness

- If relation R is decomposed into fragments R_1 , R_2 , ..., R_n , and data item d_i is in R_j , then d_i should not be in any other fragment R_k ($k \neq j$).

Manual Checking

How do you get completeness and disjointness?

$$F_1 = \mathbf{O}_{sal < 10} E$$
; $F_2 = \mathbf{O}_{sal \ge 10} E$