



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



if $\frac{\text{read-only queries}}{\text{update queries}} \ll 1$ Replication is advantageous, otherwise replication may cause problems

Degree of Fragmentation



Desired Properties of Fragmentation

| Completeness

- Decomposition of relation R into fragments R_1, R_2, \dots, 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 R_1, R_2, \dots, R_n , then there should exist some relational operator ∇ such that
 - $R = \nabla_{1 \leq i \leq n} R_i$

| Disjointness

- If relation R is decomposed into fragments R_1, R_2, \dots, 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?

$$F_1 = \sigma_{\text{sal} < 10} E ; \quad F_2 = \sigma_{\text{sal} \geq 10} E$$