

Date's 12 Rules for DDB's

In 1987 one of the 'gurus' of relational database theory, C. J. Date, stated 12 goals which, he stated, designers should strive to achieve in their DDB's and with the associated DDBMS's

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- **Rule 0. Fundamental Principle**

- To the user, a distributed system should look exactly like a non-distributed system

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- **Rule1. Local site independence:**

- Each site in the DDB should act independently with respect to vital DataBase Management functions -
 - Security
 - Concurrency Control
 - Backup
 - Recovery

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- **Rule 2. Central site independence:**
 - Each site in the DDB should act independently with respect to
 - The central site
 - All other remote sites
 - Note: All sites should have the same capabilities, even though some sites may not necessarily exercise all these capabilities at a given point in time

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- **Rule 3. Failure independence:**
 - The DDBMS should be unaffected by the failure of a node or nodes;
 - the rest of the nodes, and the DDBMS as a whole, should continue to work
 - Note: Similarly, the DDBMS should continue to work if new nodes are added

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- **Rule 4. Location transparency:**
 - Users should not have to know the location of any data item in order to retrieve it
- **Rule 5. Fragmentation transparency:**
 - The user should be unaffected by, and not even notice, any fragmentation of the DDB
 - The user can retrieve data without regard to the fragmentation of the DDB

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- **Rule 6. Replication transparency:**
 - The user should be able to use the DDB without being concerned in any way with any replication of the data in the DDB

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- **Rule 7. Distributed query processing:**
 - A query should be capable of being executed at any node in the DDBMS that contains data relevant to the query
 - Many nodes may participate in the response to the user's query without the user being aware of any such participation

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- **Rule 8. Distributed transaction processing:**
 - A transaction may access and modify data at several different sites in the DDB without the user being aware that multiple sites are participating in the transaction

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- **Rule 9. Hardware independence:**

- The DDB and its associated DDBMS should be capable of being implemented on any suitable platform
 - i.e., on any computer with appropriate hardware resources regardless of what company manufactured the computer
- Note: Many current DDBMS's often fail to achieve this goal

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- **Rule 10. Operating system independence:**

- The DDB and its associated DDBMS should be capable of being implemented on any suitable operating system
 - i.e., on any operating system capable of handling multiple users
- Note: At present this means Windows NT/2000, and the various varieties of Unix including Linux

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- **Rule 11. Network independence:**

- The DDB and its associated DDBMS should be capable of being implemented on any suitable network platform
- Note: At present, this goal means that the DDBMS should be able to run on Windows NT/2000, on any variant of Unix, and on Novell Networks

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- **Rule 12. Database independence:**
 - The design of the DDB should render it capable of being supported by suitable DDBMS from any vendor
 - i.e., of sufficient power and sophistication
 - Note: In terms of logical design, this goal is currently often achieved, even though actual implementations rarely use more than one or two DDBMS's

Summary

- Date's 12 Rules emphasize the following goals:
- **Rules 1-3**
 - Independence of individual sites within the system from other sites and
 - non-dependence of the system on any one site (independence of the system internally)
- **Rules 4-6**
 - Transparency, to users, of the operations of the system and the distribution of the data

Summary

- **Rules 7-8**
 - Distributed nature of query and transaction processing
- **Rules 9-12**
 - Independence of the system with respect to hardware, operating systems, network software, and particular database-management systems (independence of the system with respect to its external environment)
