

ISO/IEC TR 10032:2003-11 (E)

Information technology - Reference Model of Data Management

Contents		Page
Foreword		vi
Introduction		vii
1	Scope	1
2	Terms and definitions	1
3	Symbols and abbreviations	7
3.1	Symbols	7
3.1.1	Persistent data	7
3.1.2	Communications linkage	7
3.1.3	Processing linkage	7
3.1.4	Process class	7
3.1.5	Processor class	8
3.1.6	Processor class with service interface	8
3.1.7	Class names	8
3.2	Abbreviations	8
4	Data Management Requirements	9
4.1	Purpose	9
4.2	Information systems	9
4.2.1	Context of Data Management in an Information System	9
4.3	Database and schema	10
4.4	Data Modelling Facility	11
4.5	Data independence	11
4.6	Data management services	11
4.7	Processors and interfaces	12
4.8	Access control	12
4.8.1	Definition and modification of access control privileges	12
4.8.2	Enforcement of access control	12
4.8.3	Security external to data management	13
4.9	Operational requirements to support data management	13
4.9.1	Information systems life cycle support	13
4.9.2	Configuration management, version control and variants	14
4.9.3	Concurrent processing	14
4.9.4	Database transaction management	14
4.9.5	Performance engineering	15
4.9.6	Referencing data	15
4.9.7	Extensible Data Modelling Facility	15
4.9.8	Support for different Data Modelling Facilities at user interface	15
4.9.9	Audit trails	15
4.9.10	Recovery	15
4.9.11	Logical data restructuring	15
4.9.12	Physical storage reorganization	16
4.10	Additional operational requirements to support data management in a distributed information system	16
4.10.1	Distribution control	17
4.10.2	Database transaction management	18
4.10.3	Communications	18
4.10.4	Export/import	18
4.10.5	Distribution independence	18

4.10.6	System autonomy	18
4.10.7	Recovery of a distributed database	18
4.11	Dictionary systems	18
5	Concepts for data level pairs and related processes	19
5.1	Purpose	19
5.2	Level pairs	19
5.2.1	Interlocking level pairs	19
5.2.2	Recursive use of level pairs	20
5.2.3	Operations on level pairs	21
5.3	Dependence of level pairs on a Data Modelling Facility	21
5.3.1	Level pairs and data structuring rules	21
5.3.2	Level pairs and data manipulation rules	21
5.4	Level pairs and associated processes	22
5.5	Access control for level pairs	24
5.6	Schema modification	24
6	Architectural model	24
6.1	Purpose	24
6.2	Modelling concepts	24
6.2.1	Characteristics of Reference Model processors	25
6.2.2	Levels of abstraction	25
6.2.3	Notation for processors	25
6.3	The generic model of data management	26
6.3.1	Generic Database Controller	27
6.3.2	User Processor	27
6.3.3	User	28
6.4	Specialization of the model in different environments	28
6.5	Database environment	28
6.6	Distributed data management	29
6.6.1	Distribution Controller	31
6.6.2	Role of Distribution Controller and level pairs	31
6.7	Export/Import model	31
6.8	Access Control for Data Management	32
7	Objectives and principles for data management standardization	33
7.1	Purpose	33
7.2	Technical objectives associated with data management standardization	34
7.2.1	Support for all distributed scenarios	34
7.2.2	Location independence	34
7.2.3	Standardized database transaction management	35
7.2.4	Export and import of databases	35
7.2.5	Reduced complexity of handling data	36
7.2.6	Overall performance in distributed scenarios	36
7.2.7	Data independence	36
7.2.8	Application portability	36
7.2.9	Extensible Data Modelling Facility	36
7.2.10	Flexible presentation of data to users	36
7.3	Means of achieving objectives	36
7.3.1	Same data modelling facility for each level pair	37
7.3.2	Same interchange mechanism for all level pairs	37
7.3.3	Same processors usable for all level pairs	37
7.3.4	Standardized services at Database Controller interface	38
7.3.5	Standardized approach to access control	38
7.3.6	Standardized representation of data needed to facilitate interoperability	38
7.3.7	Support data fragmentation	38
7.3.8	Separation of logical and physical structures	38
7.3.9	Access to schema during execution	38
7.3.10	User data modelling facility different from interchange data modelling facility	39
7.4	Aspects of data management standards	39
7.4.1	Categories of data management standard	39
7.4.2	Role of a data modelling facility in standardization	40

7.4.3 Standardization styles 40

Annex A (informative) Related International Standards 41

**Annex B (informative) Relationship of existing and developing database standards to the
architecture of the Reference Model of Data Management 42**