Slide 1

Constraints

Slide 2

Primary Key Constraint

- It is derived from the entity UID or created as surrogate key.
- Uniqueness is enforced by an index:
  - Index is not defined in Oracle Designer
- All columns in key are mandatory.
- It should not be updatable.
- Every table should have one!

Slide 3

Unique Key Constraint

- Derived from secondary entity UIDs
  - Can include NULL columns
  - Are optional
  - Recommended where a surrogate key is used for PK

Slide 4

Foreign Key Constraint

- Derived from relationships
- Can reference either a primary or a unique key:
  - But avoid referencing unique keys!
- Must not be partly NULL
- Can reference its own table
- Cannot reference tables on other databases

Slide 5

Foreign Key Rules

- Server handles RESTRICT and CASCADE Delete only

Slide 6

Defining Foreign Key Rules

- Cascades
- Defaults
- Nullifies
- Restricted

- Avoid using any update rule:
  - PKs should not be updatable

Slide 7

Check Constraint

CHECK (position = 'TECHNICAL' AND salary BETWEEN 3000 AND 4000)
OR (position IS 'TECHNICAL')

Slide 8

Foreign Keys in Arcs

CHECK (FK_A IS NOT NULL AND FK_B IS NULL)
OR (FK_B IS NOT NULL AND FK_A IS NULL)

Slide 9

Implementing Subtypes

GAME and MOVIE subtypes in TITLES

CHECK (TI_TYPE = 'GA'
AND GAME_CATEGORY IS NOT NULL
AND MEDIUM IS NOT NULL
AND MOVIE_CATEGORY IS NULL
AND AGE_RATING IS NULL)

Slide 10

More Uses for Check Constraints

- START_DATE < END_DATE
- Positive numeric column values > 0
- IS NOT NULL

- Can only check columns within the same row; use triggers for more complex checks
Defining a Check Constraint

- Specify the Where/Validation condition

Where Are Constraints Validated?

- At the client, the server or both
- Considerations:
  - Database integrity
  - Interactive response
  - Network traffic
  - Overall system performance

Specifying Location of Validation

- Validation:
  - Validate in:
    - Client
    - Server
    - Both
    - None

Server Validation

- Guaranteed integrity
- Minimal network traffic
- No immediate feedback

Server and Client Validation

- Guaranteed integrity
- Immediate feedback
- Network traffic for every check

Client Validation

- Immediate feedback
- No guaranteed integrity
- Network traffic for every check and again for DML or commit

Guidelines for Choosing Where to Validate

- Server validation:
  - Guaranteed data integrity
  - Client and server validation:
    - Check constraints
    - Lookup foreign keys
  - Case-by-case basis:
    - Other foreign keys
    - Unique keys

Controlling When to Enforce

- Typical transactions:
  - Oracle validates each DML statement.
- Complex transactions:
  - Oracle8 server can defer validation until COMMIT.

Specifying When Validation Occurs

- When to enforce:
  - INITIALLY DEFERRED
  - INITIALLY IMMEDIATE
  - NOT DEFERRED

Summary

- Constraints enforce data integrity:
  - Entity integrity
  - Referential integrity
  - Arcs, subtypes, and simple business rules
- Validation can be carried out:
  - Server and client
  - Deferred