Introduction to UCDW Star Schemas and Data Marts Live Demonstration

Data Infrastructure IRAP Training

4/12/2017
Agenda

- Schemas of Interest
- Facts and Dimensions in UCDW
- Time Dimensions
- Dimensions Keys
- Fact Keys
- Materialized Query Tables (MQT)
  - UCDW MQT Examples
- Views
  - UCDW Regular View Examples
- Difference Between MQT and Views
- Q&A
UCDW Schemas of Interest

- Payroll/Personnel
  - DSS_BI
- Graduate Admissions
  - GAD_STG
  - GAD_BASE
  - GAD_BI
- Contracts and Grants
  - SP_STG
  - SP_BASE
  - SP_BI
- Student & Course Enrollment, Degree and Financial Aid
  - STUD_STG
  - STUD_BASE
  - STUD_BI
- Undergraduate Admissions
  - UAD_STG
  - UAD_BASE
  - UAD_BI
- Data Marts
  - IRAP_BI
Facts and Dimension Tables

- **Student Enrollment Facts**
  - ENROLLMENT_F
  - SUMMER_ENROLLMENT_F

- **Student Enrollment Dimensions**
  - ACADEMIC_SUB_TERM_D
  - AGE_BAND_D
  - CAMPUS_COLLEGE_MAJOR_D
  - CAMPUS_LOCATION_D
  - COUNTRY_STATE_COUNTY_D
  - ENROLLMENT_STATUS_D
  - IPEDS_ETHNIC_CODE_D
  - STUDENT_D
  - STUDENT_ETHNIC_CODE_D
  - STUDENT_LEVEL_D
  - UC_ETHNIC_CODE_LEVEL_1_D
  - UC_ETHNIC_CODE_LEVEL_2_D
Time Dimensions

- Payroll/Personnel
  - CALENDAR_D
  - CALENDAR_YEAR_D
- Financial Aid
  - FILE_CYCLE_D
- Undergraduate & Graduate Admissions
  - TERM_D
- Student & Course Enrollment
  - ACADEMIC_SUB_TERM_D
- Degree
  - ACADEMIC_TERM_D
Dimension Key

- One primary Key
- System-Generated – Surrogate Keys – No Business Context
  - Examples of Surrogate Keys:
    - STUDENT_D.STUD_KEY
    - COURSE_D.CRSE_KEY
    - AGE_BAND.AGE_BAND_KEY
    - ENROLLMENT_STATUS_D.ENRL_STAT_KEY
- Natural Key – Have Business Context
  - Examples of Natural Keys
    - CMP_CG_MAJ_CD_CIP_CD
    - CMP_LOC_LOC1_CD
    - CRSE_SECT_ID
    - STUD_ID

Columns with _KEY are surrogate keys

Columns with _CD or _ID are natural keys
Fact Keys

- Primary key is a combination of all connected dimension keys as composite key
- No fact specific surrogate key
  - Example STUD_BI.ENROLLMENT_F has the following keys:
    - ACAD_SUB_T_KEY link to ACADEMIC_SUB_TERM_D
    - STUD_KEY link to STUDENT_D
    - STUD_LVL_KEY link to STUDENT_LEVEL_D
    - ENRL_STAT_KEY link to ENROLLMENT_STATUS_D
    - CMP_CG_MAJ_CD_KEY link to CAMPUS_COLLEGE_MAJOR_CODE_D
    - ACAD_DGR_KEY link to ACADEMIC_DEGREE_D
    - AGE_BAND_KEY link to AGE_BAND_D
Materialized Query Tables (MQT)

- Physical/Materialized View
- Created for Simplicity
- Created for Join Avoidance
- Identical to a Query
- Stores Query Results as Data
UCDW MQT Examples

- STUD_BI Schema
  - DEGREE_HEAD_COUNT_M
  - ENROLLMENT_HEAD_COUNT_M
  - STUDENT_IPEDS_ETHNIC_CODE_M
  - STUDENT_UC_ETHNIC_CODE_LEVEL_1_M
  - STUDENT_UC_ETHNIC_CODE_LEVEL_2_M
  - SUMMER_ENROLLMENT_HEAD_COUNT_M

Tables with _M are MQTs
Views

- Created Dynamically
- Created for Simplicity
- Created for Join Avoidance
- Definition Based on a Query
- Query Runs When View is Referenced

Characteristics

- One or more source tables make up a view
- Query follows “SELECT STATEMENT” format
- Views generally read-only
- Views don’t require additional storage
UCDW View Examples

- STUD_BI Schema
  - ETHNIC_CODE_V
  - FIRST_ENROLLED_V
  - IPEDS_ETHNIC_CODE_V
  - UC_ETHNIC_CODE_LEVEL_1_V
  - UC_ETHNIC_CODE_LEVEL_2_V

Tables with _V are views
MQTs or View – Differences

- **Physical**
  - Stored as physical object in database
  - Indexes can be created on MQT
  - Faster performance
  - Needs to be updated or refreshed

- **Dynamic**
  - Stored as query against base table(s)
  - Indexes on base tables must be used
  - No real performance improvement
  - No update required

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Materialized Query Table  |  Regular View