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EUROPEAN COMMISSION STATISTICAL OFFICE OF THE EUROPEAN COMMUNITIES (EUROSTAT)

ORGANIZATION FOR ECONOMIC COOPERATION AND DEVELOPMENT (OECD) STATISTICS DIRECTORATE

Joint UNECE/Eurostat/OECD Seminar on the Management of Statistical Information Systems (MSIS)
Sofia, Bulgaria, 21-23 June 2006

Special Session: Presentations of developing information systems in the Bulgarian National Statistical Institute

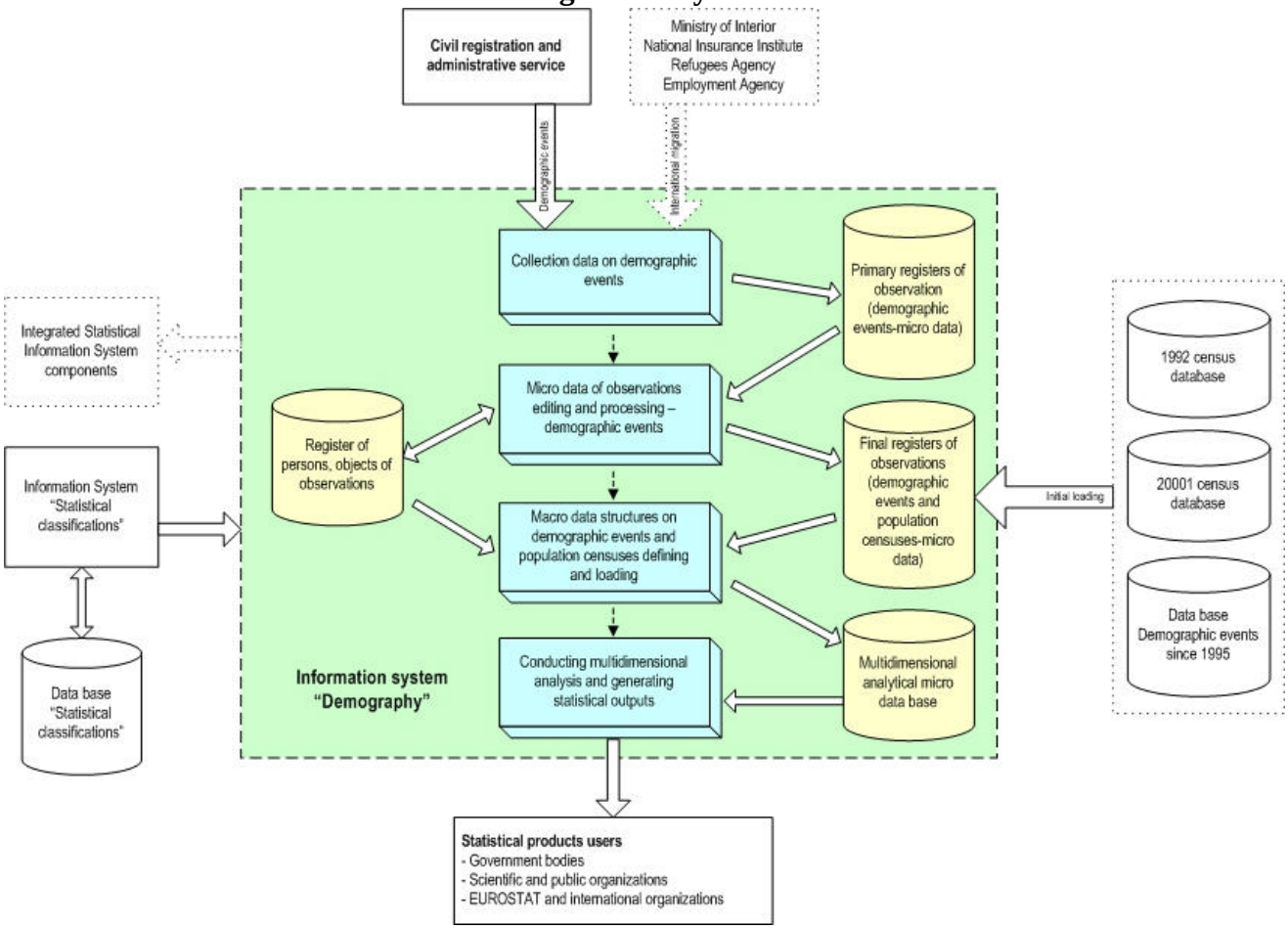
PRESENTATION OF THE INFORMATION SYSTEM "DEMOGRAHY"

Invited Paper prepared by Yordan Kalchev, National Statistical Institute of Bulgaria

STATISTICAL AREA

- Exhaustive censuses on population, buildings and dwellings:
    - Population
    - Households
    - Families
    - Dwelling fund: buildings and dwellings
- Current demographic statistics:
    - Births
    - Deaths
    - Marriages
    - Divorces
    - Migration
    - Citizenship

Coverage of the system



Components

IS “Demography” realize and covers functions of three statistical information system components:

- Data collection – activities on data collection, data entry and building up Registers of observations (micro data);
- Data editing – data editing and building up Final registers of observations (final micro data);
- Data processing – building up and maintenance of Data Bases Micro data and integration in Data Warehouse for dissemination of statistical products and services. Usage of data analyses technologies (On-Line Analytical Processing – OLAP).

Information system “Demography” ensures programming and technological tools for building up, maintenance and use of:

- Warehouse of raw and processed micro data and of aggregated micro data (Data Warehouse) on demographic events, population number and structures and demographic processes;
- Statistical register of persons, objects of surveys;
- Programme tools package, oriented to usage of technologies for analytical processing of demographic and population data (OLAP).

IS ”Demography” sources of data

Data sources for 1992 and 2001 census results are:

- Data set 1992 census
- Data set 2001 census

Data source for demographic events (except international migration) is:

- Information system USCRASP (Unified system for civil registration and administrative services of population)

Data sources for international migrations are:

- Information system of Ministry of Interior
- Informat6ional system USCRASP[1]
- Information system of National Insurance Institute
- Other information systems

[1] Unified system for civil registration and administrative services of population. Local (municipality) administration and Ministry of Regional Development and Public Works maintain the system.

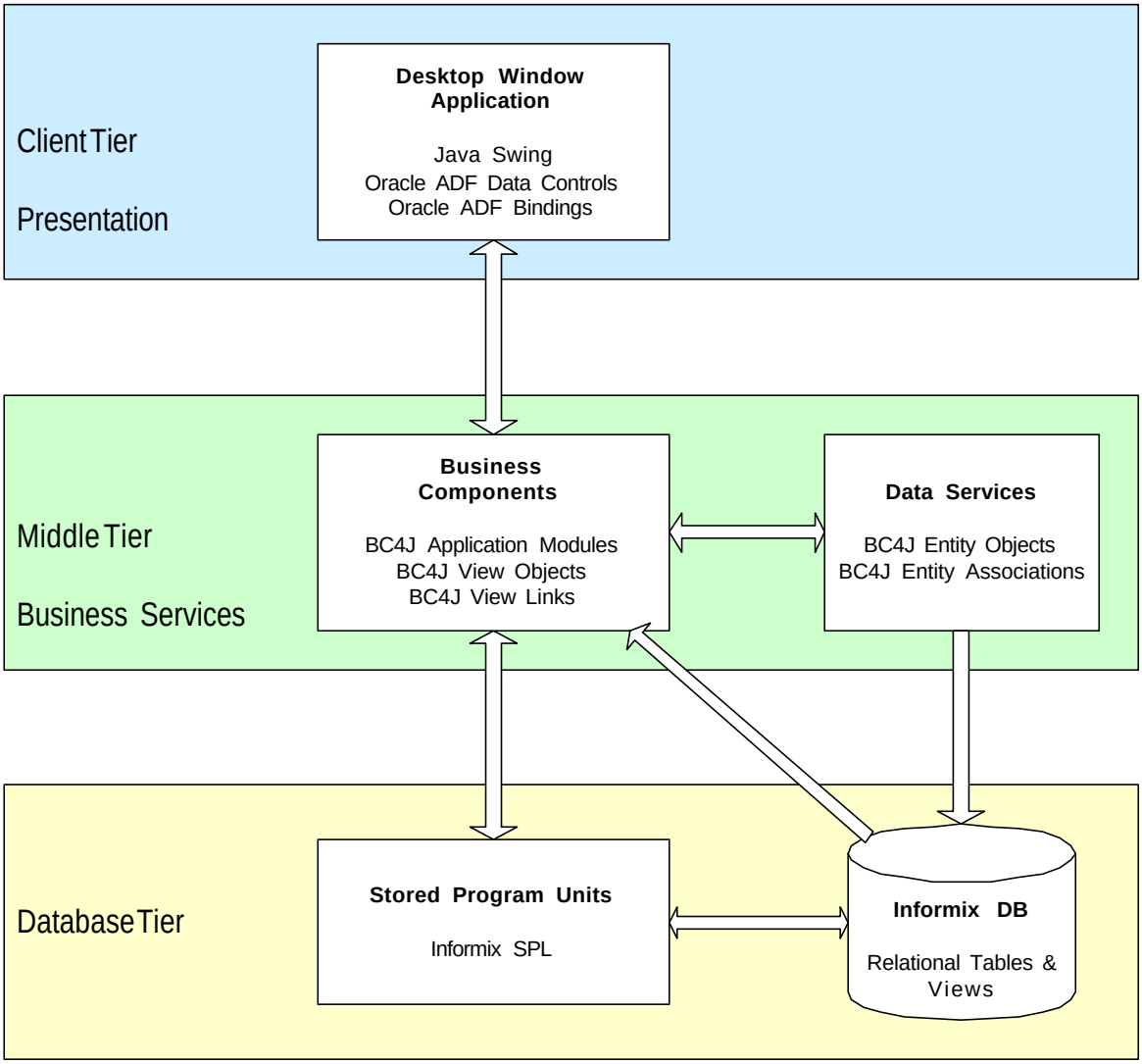
System functionality

1) Maintenance of Register of persons, objects of surveys:
    - Automatic updating of data on persons;
    - Data entry and data editing by hand.
2) Loading and processing of primary notifications:
    - Loading data by USCRASP;
    - Processing of primary notifications.
3) Micro data processing:
    - Micro data deflation;
    - Micro data extracting, loading and aggregation;
    - Multi-dimensional analysis of macro data;
    - Generating of analytical references on macro data.
4) Maintenance and usage of statistical classifications:
    - Maintenance of statistical classifications copies;
    - Usage of statistical classifications;
    - Updating of objects observed in case of changes of statistical classifications.
5) Office functionality for administration and configuration:
    - Maintenance of general system information;
    - Administration of relational and multidimensional DB;
    - Administration of users;
    - Archiving and recovering of damaged DB;
    - Loading/exporting data-structures in DB.

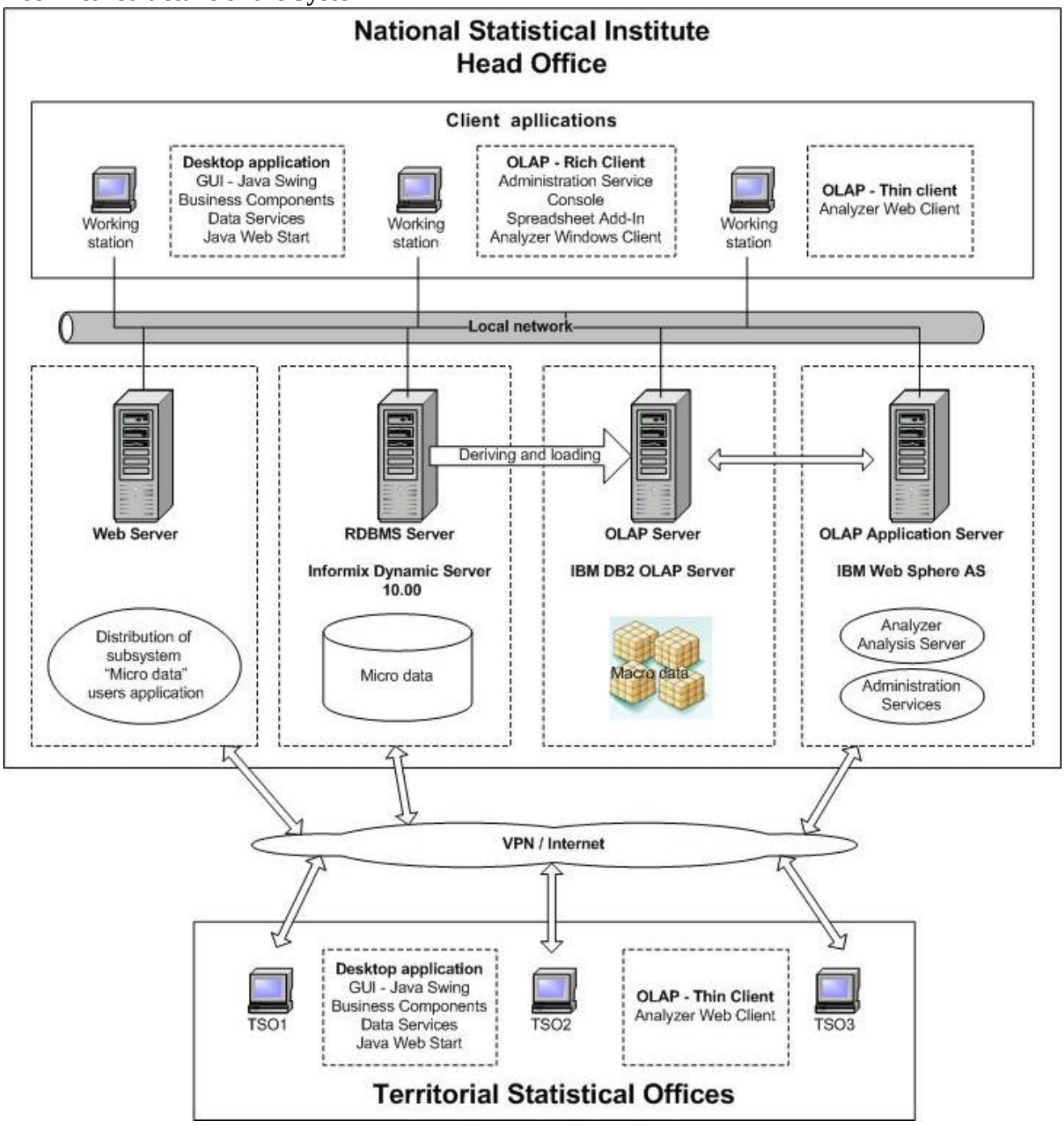
Module architecture of the System

Subsystem "Micro data"	Subsystem "Macro data"
Unites functionality for: ▪ Maintenance of Register of persons ▪ Loading, editing and processing demographic events; ▪ Maintenance of Primary and Final observation registers – micro data; ▪ Maintenance and usage of statistical classifications; ▪ Maintenance of general system information;	Unites functionality for: ▪ Macro data defining; ▪ Macro data deriving, loading and aggregating; ▪ Conducting multidimensional analysis on macro data; ▪ Generating analytical references on macro data; ▪ Administration of groups and users in multidimensional DB.
Basic modules: ▪ Module"Data loading"; ▪ Module"Logic control and processing"; ▪ Module "Register of persons"; ▪ Module "Primary registers of observations"; ▪ Module "Final registers of observations"; ▪ Module "Statistical classifications"; ▪ Administrative module.	Basic modules: ▪ Module "Administration of macro data"; ▪ Module"Analyses and references"; ▪ Administrative module.

Software structure of the System



Technical structure of the System

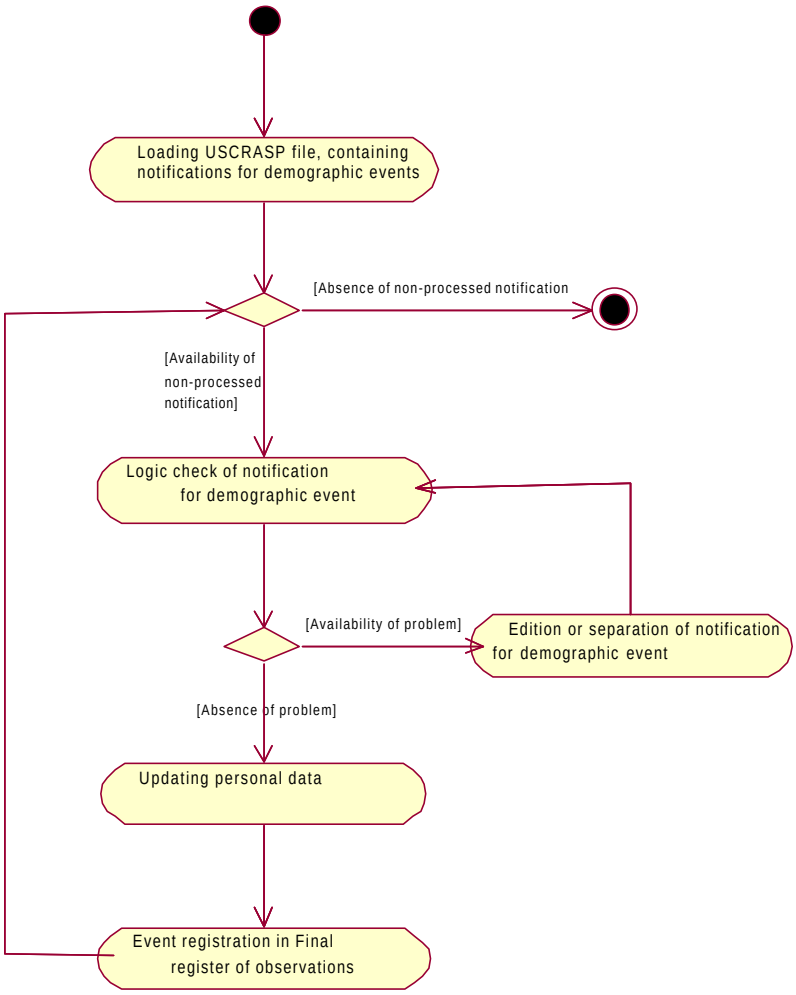


NSI organizational units, using the system

Maintenance, servicing and usage of IS “Demography” is done by:

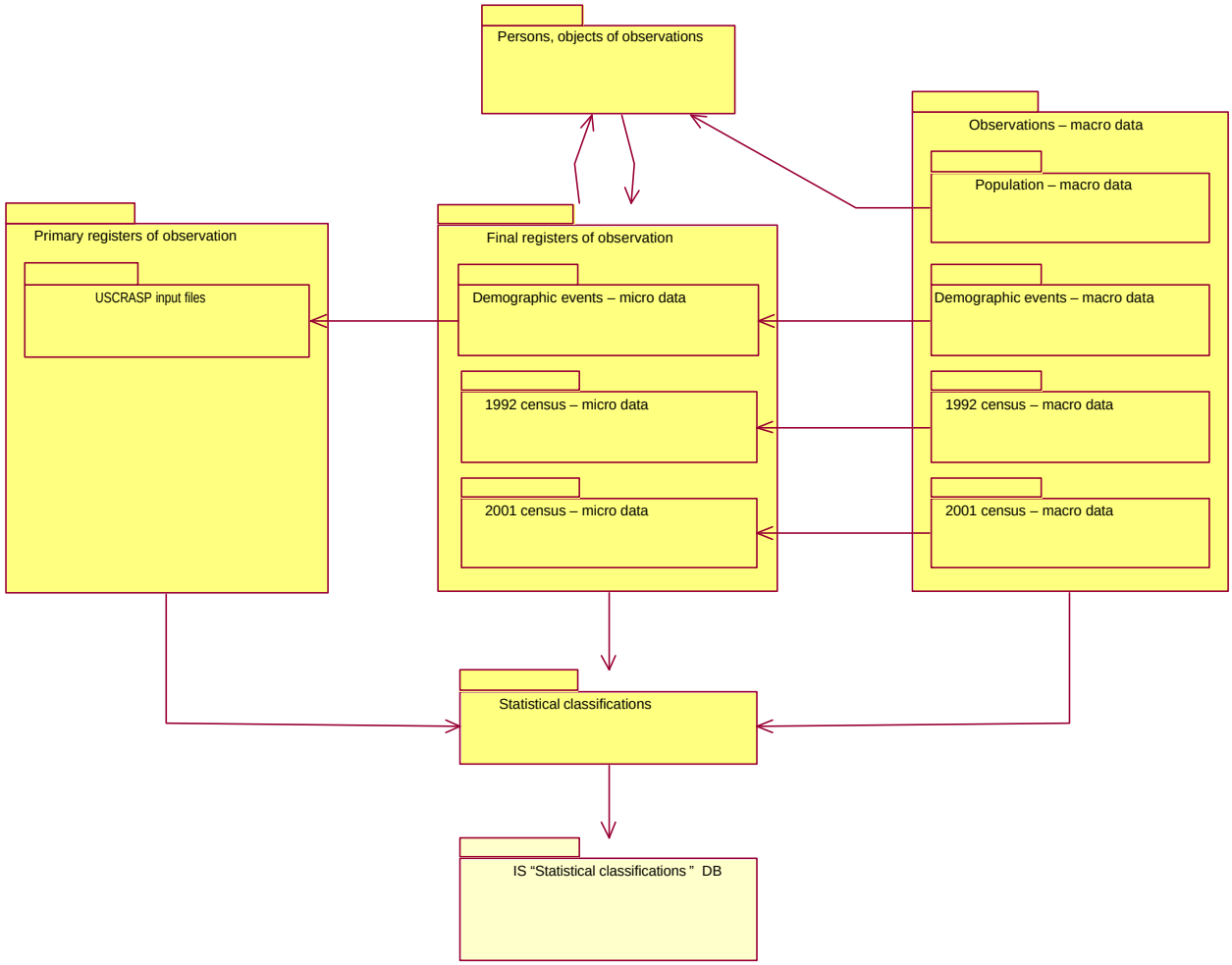
- Department “Demographic and social statistics”
  Division “Population statistics”
  Division “Computer processing”
- Territorial Statistical Offices
- Other NSI, specialized departments and divisions

Sequence of processing demographic events



Data stored and processed by the System

Information objects, operated by IS “Demography” are separated into the following logical packages:



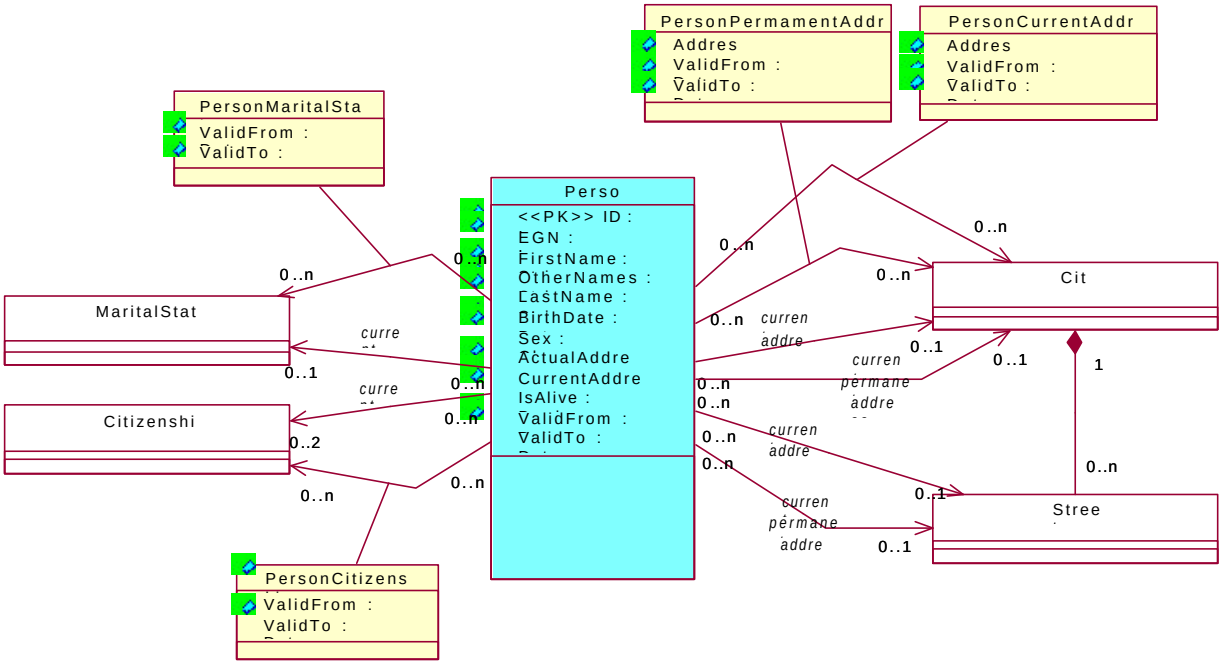
Data sets covered by the System

***Note**: Dotted lines show a dependency between data sets not information flows between them.*

Register of persons, objects of surveys

Register of persons, objects of surveys are maintained in the System database. The register contains list of persons, objects of surveys.
Data from the Register of persons are used for:

- Calculation Bulgarian population at a given date;
- Referent objects, to which micro data from the Final registers of objects (micro data on demographic events, population censuses and others) are associated;
- Generating samples of persons for the purposes of sample surveys.

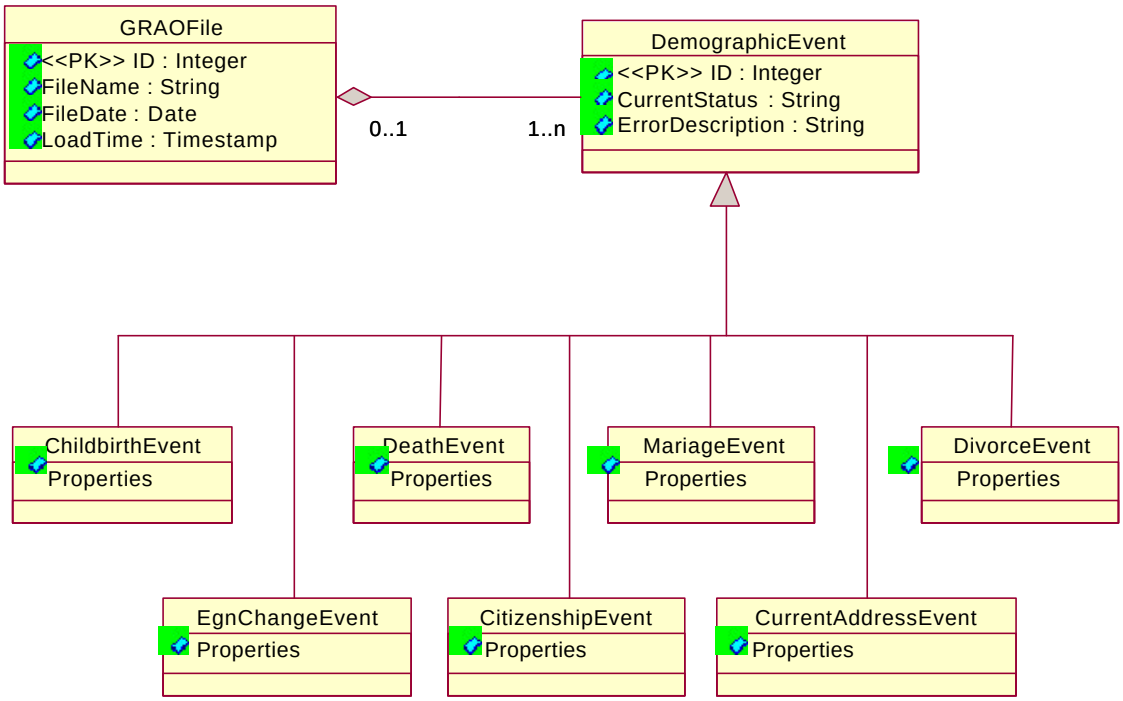


Register of persons, objects of surveys

Primary registers of observations

Primary registers of observations are demographic events and connected to them:

- Births;
- Deaths;
- Marriages;
- Divorces;
- Internal migration (changes of current address);
- Changes of citizenship;
- Changes of PIN (Personal Identification Number).



Demographic events notifications, coming from USCRASP

Final registers of observations

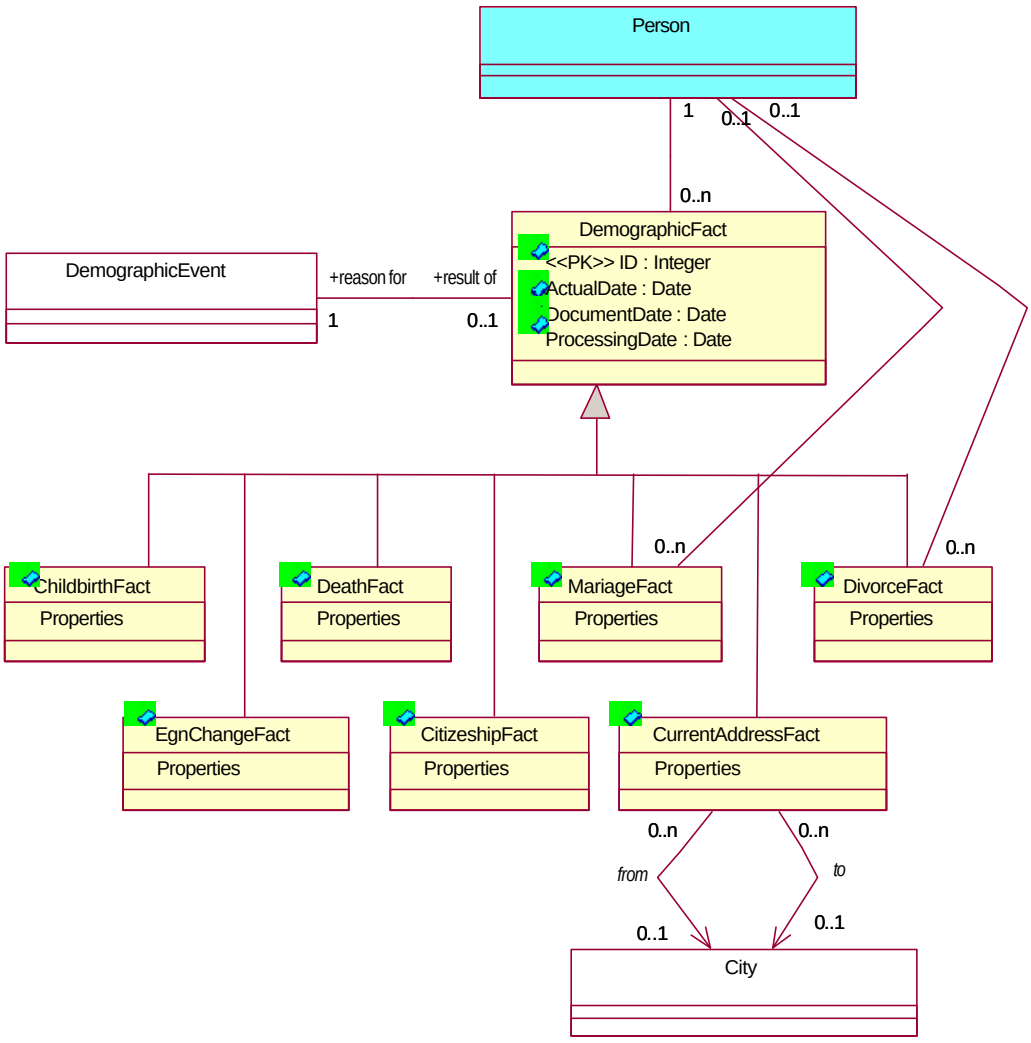
Final registers of observations are data-structures within the database, where cleaned micro data from successfully processed observations are stored.
The following observations, for which the System maintains Final registers of observations are covered by IS “Demography”:

3.1.Demographic and connected to them events:
- Births;
- Deaths;
- Marriages;
- Divorces;
- Internal migration (changes of current address);
- Changes of citizenship;
- Changes of PIN (Personal Identification Number).

3.2. 1992 census:
- Dwellings;
- Counted persons;

3.3. 2001 census:
- Buildings;
- Dwellings;
- Households;
- Families;
- Counted persons;

3.1. Demographic events – microdata

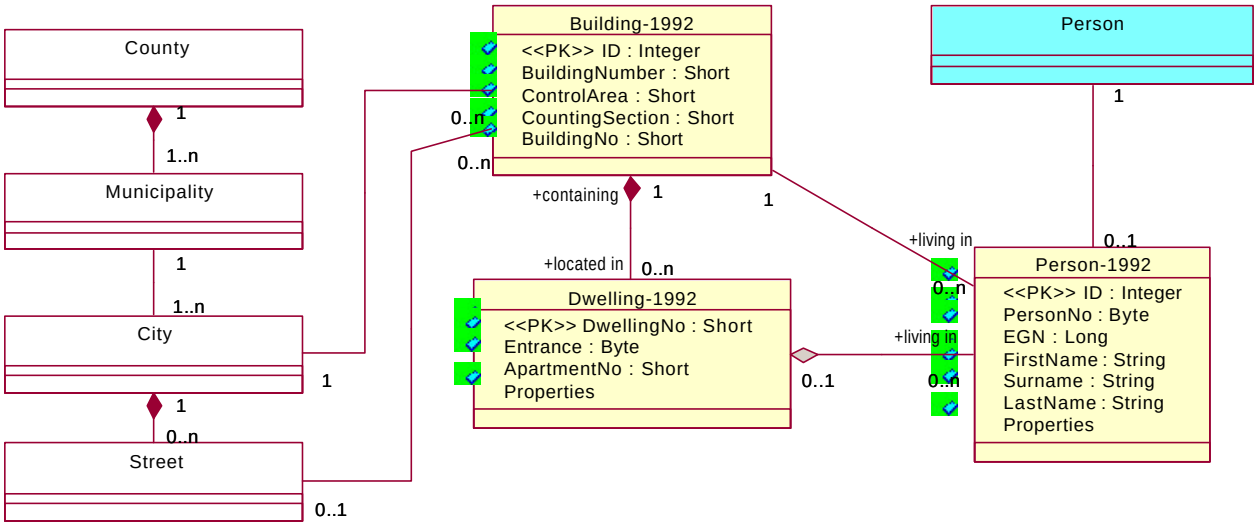


Final registers of observations – demographic events

IS “Demography” processes notifications for demographic events (registered at the Primary registers of observations) and adds automatically data on new demographic events to the Final registers of observations.

Final registers of observations are used for calculation of multidimensional data-cubes on demographic events and for generation of analytical references based on these cubes.

3.2. 1992 census – microdata

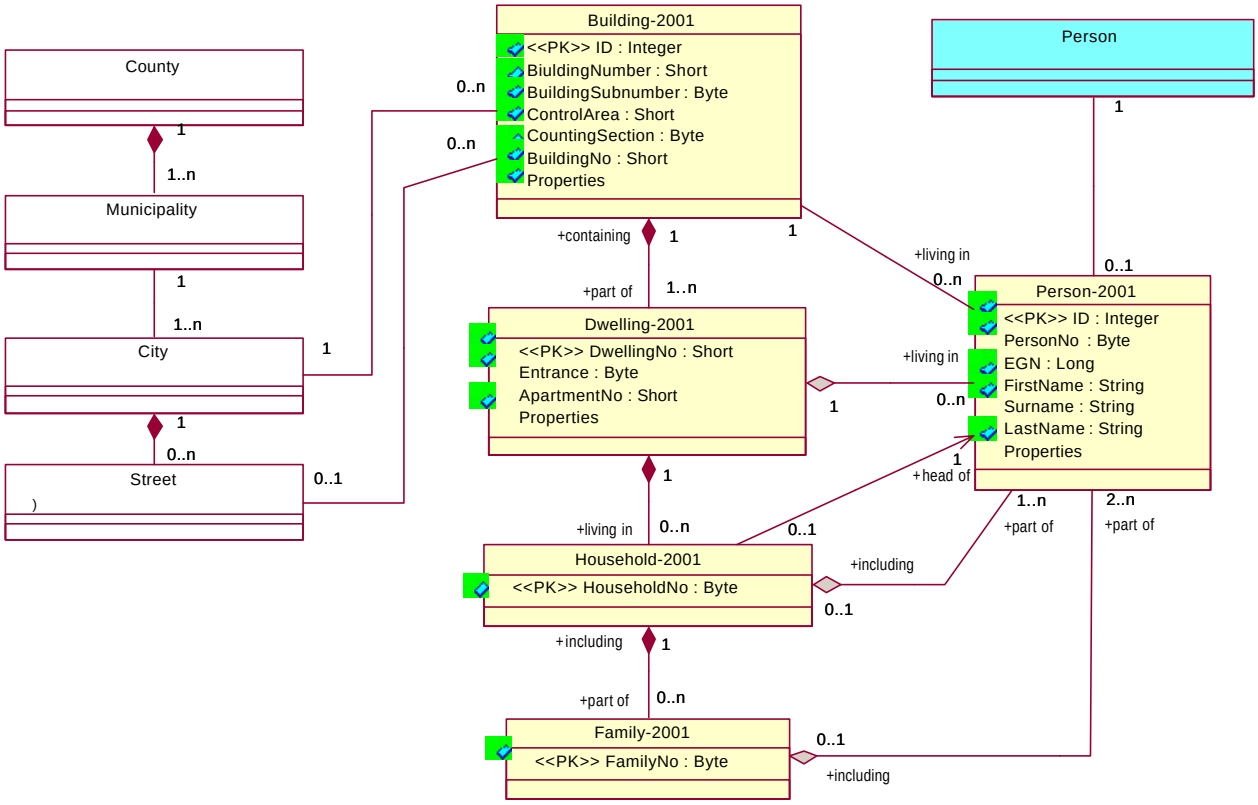


Final registers of observations –1992 census

Processed micro data on dwellings and persons counted during the 1992-population census are loaded in Final 1992 census registers of observations.

Final 1992 census registers of observations are used for calculation multidimensional data-cubes and for generation of analytical references based on them.

3.3. 2001 census – microdata



Final registers of observations - 2001 census

Processed micro data on buildings, dwellings, households, families and persons counted during the 2001-population census are loaded in Final 2001 census registers of observations.

Final 2001 census registers of observations are used for calculation multidimensional data-cubes and for generation of analytical references based on them.

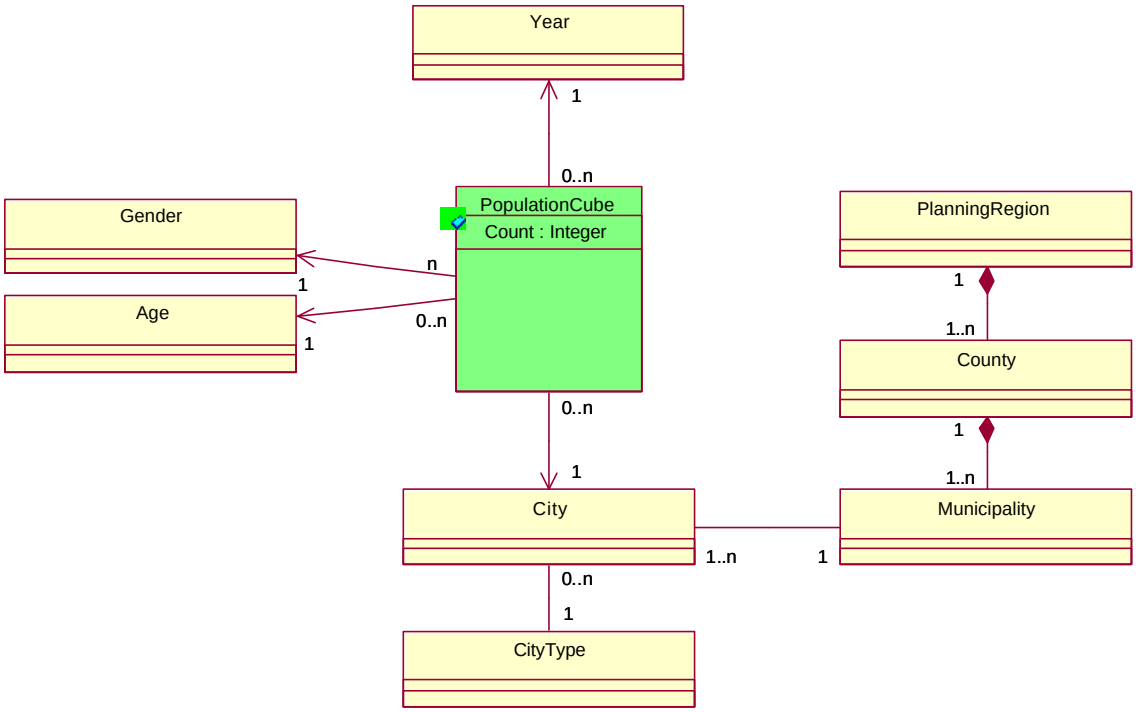
4. Observations – macrodata

Macro data from observations represent multidimensional aggregated data-cubes of data from Register of persons and Final registers of observations within the IS "Demography".

OLAP-tool, integrated within the IS "Demography", allows defining data-cubes containing aggregated information based on data from Register of persons and the available Final registers of observations.

(*Note. Examples of data-cubes are presented in this part for: population, demographic events: births and deaths, 2001 census).*

4.1. Population – macro data

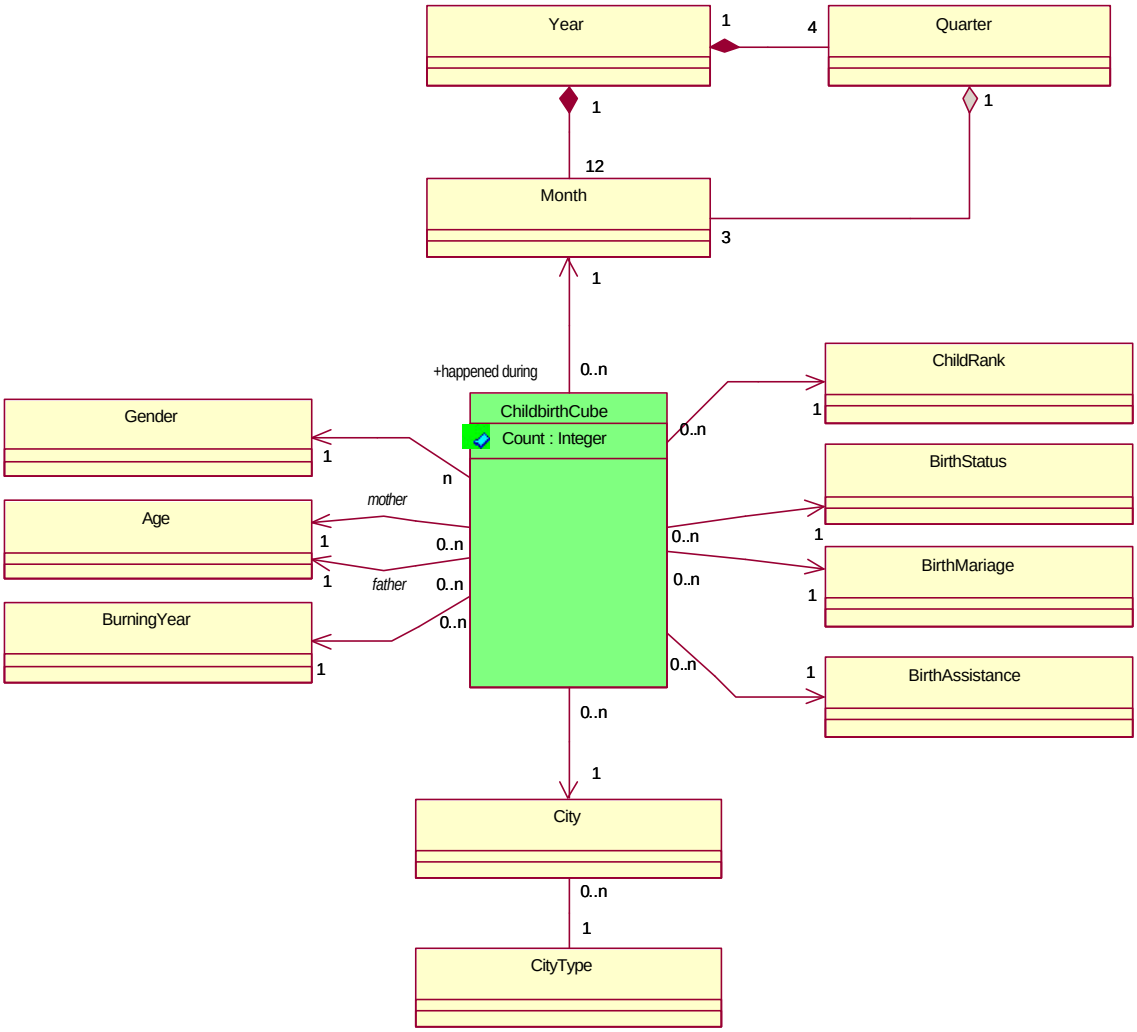


Multidimensional data-cube on population structure and number

Multidimensional data-cube containing population number according to:

- years;
- sex;
- age;
- settlements / municipalities / districts / planning regions.

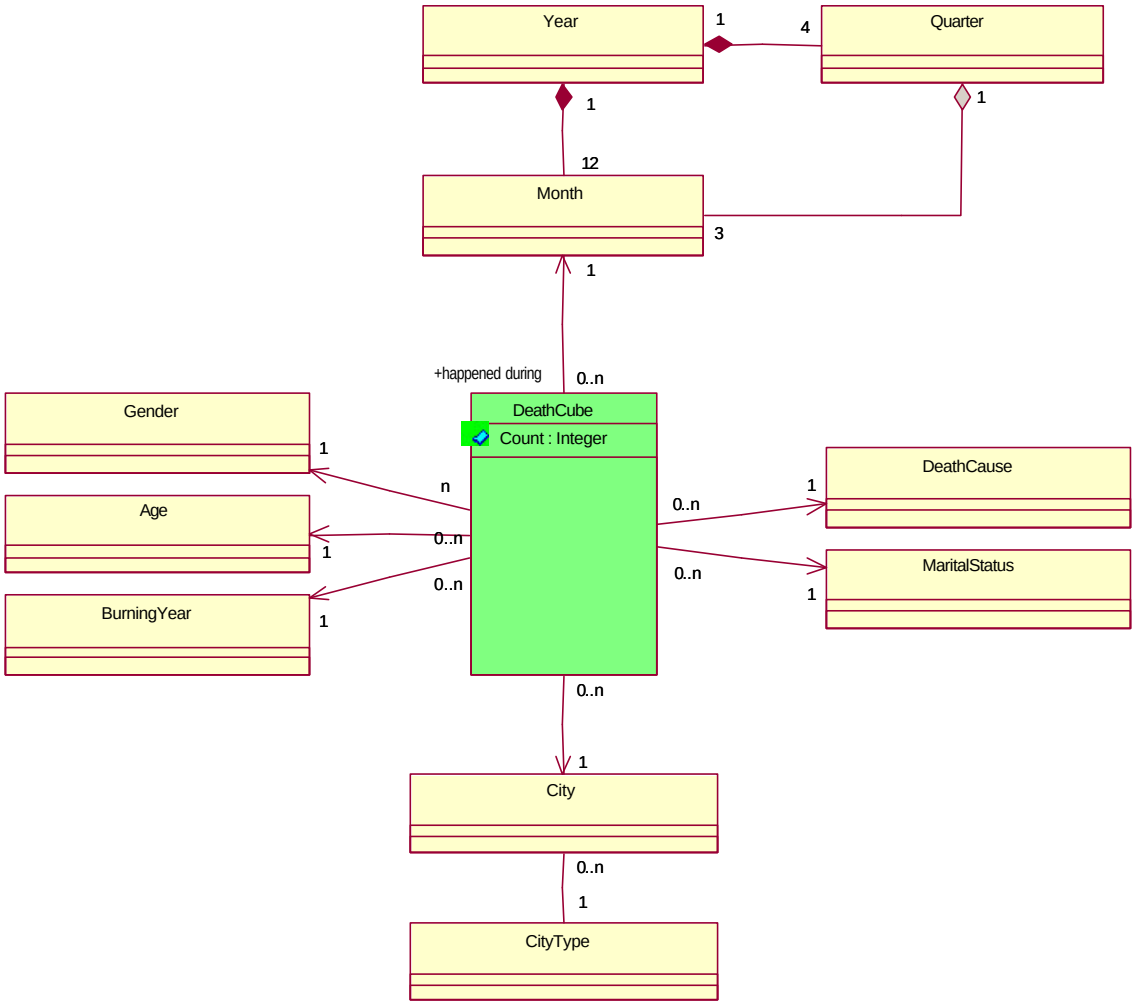
4.2. Demographic events – macrodata



Data-cube – Births

Multidimensional data-cube, containing number of births by:

- month / quarter / year of birth;
- settlement / municipality / district / planning region;
- sex;
- mother age at birth;
- father age at birth;
- order of birth for mother;
- live birth / still birth;
- marital / extra marital births;
- place and assistance at birth .

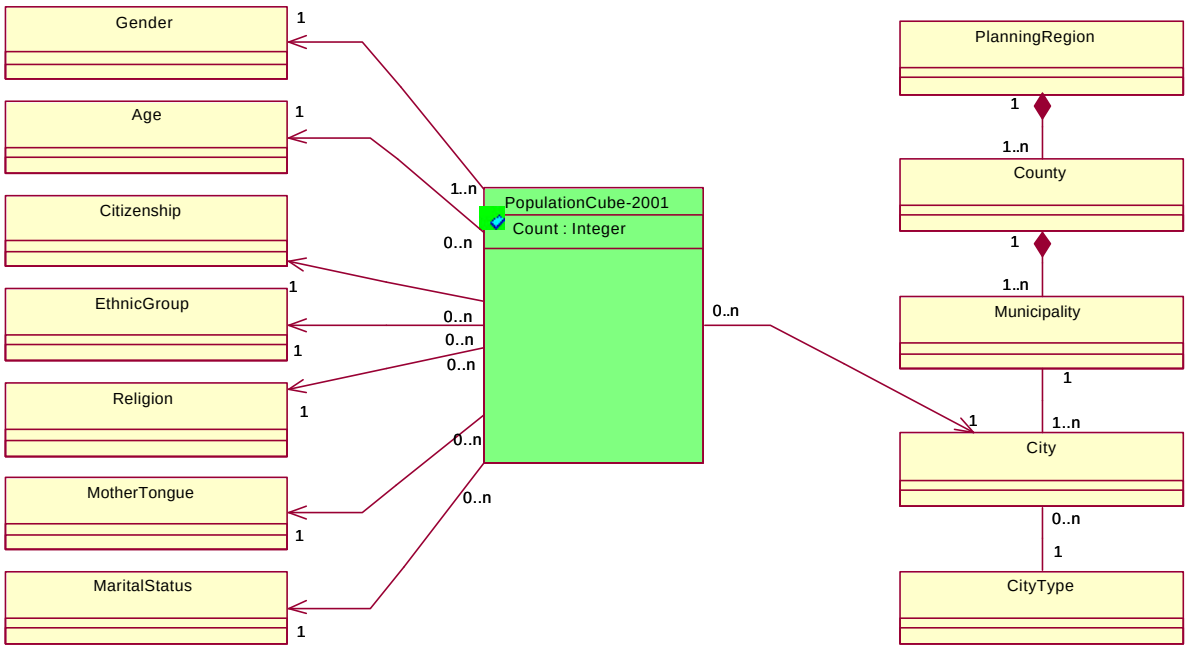


Data-cube – Deaths

Multidimensional data-cube, containing number of deaths by:

- months / quarters / years;
- settlements / municipalities / districts / planning regions;
- sex;
- age;
- year of birth;
- cause of death;
- marital status.

4.3. 2001 census – macrodata



Multidimensional data-cube, containing number of persons counted during 2001 census by:

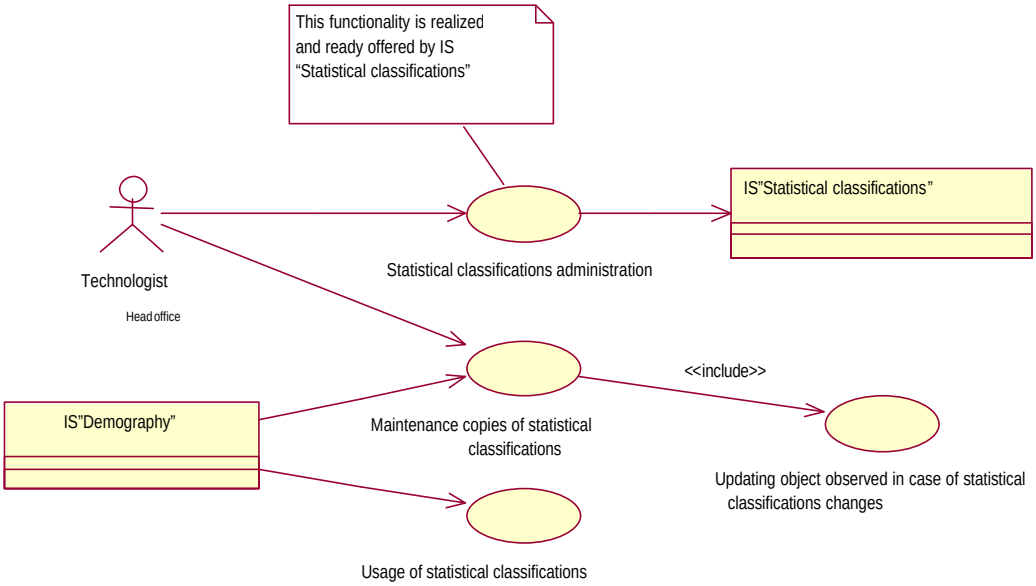
- sex;
- age;
- citizenship;
- ethnic group;
- religion;
- mother tongue;
- marital status;
- economic activity;
- settlement / municipality / district / planning region.

Statistical classifications

Basic statistical classifications used by IS “Demography”:

- Unified Classificator of Administrative-territorial and Territorial Units (UCATTE);
- Addresses classificator;
- Roads classificator;
- Classification of diseases and causes for death (WHO);
- Classificator of economic activities;
- Classificator of occupations;
- Classificator of states;
- Types of settlements;
- Sex (male / female);
- Age;
- Year of birth;
- Citizenship;
- Mother tongue;
- Ethnic groups;
- Religion;
- Level of education;
- Marital status;
- Economic status;
- Economic activity;
- Duration of marriage;
- Order of marriage;
- Reason for divorce;
- Cases of multi-foetal births;
- Types of births (marital, extramarital);
- Status of newly born child (live birth and still-birth);
- Age of child under 1 years of age;
- Order of child;
- Reason for migration.

Statistical classifications maintenance and usage



Statistical classifications maintenance and usage

System quantitative characteristics

Storage and processing of data with the pointed volume and periodicity are ensured by the system:

Information source	Frequency of processing	Number of records
Register of persons, objects of observation	Initial loading	about 10 000 000 persons
	Monthly	about 60 000 changes
Input files from USCRASP	Monthly	about 60 000
Data from 1992 population census	Initial loading	about 8 500 000
Data from 2001 population census	Initial loading	about 8 500 000
Loading into the analytical multidimensional DB macro data – population censuses	Initial loading	
Loading into the analytical multidimensional DB macro data – demographic events	Monthly loading	

- Simultaneous competitive work of 50 users on processing and editing data on demographic events is ensured by the System;

- Simultaneous competitive work of 50 users for conducting multidimensional analysis and generation of statistical references is ensured by the System.

System confidence and safety requirements

System should realize complex of measures and solutions for data confidence and safety, including:

1. Data integrity at multi-user regime of work to be ensured;
2. Access to the System only to be allowed after successful identification of the user;
3. All unsuccessful attempts for access to the System to be registered;
4. Levels of access to be ensured and controlled at level users groups (roles);
5. Levels of access to be ensured and controlled to the system resources at level separate user;
6. Registration of information about users activities at registration, change and/or data deletion to be ensured;
7. History of changes of micro data to be stored.

System documentation

1. Users manual
2. Administrator manual
3. System technical specification
