# SQL Queries

First, we list the different queries of the benchmark. Second, we present the queries applied on non-aggregated data. Finally, we present the queries used to define the aggregates and the analysis queries applied on these aggregates.

# Queries of the Benchmark



# Queries for non aggregated data

-- 1

select M.sensorId,M.stationId,M.yearId,avg(so2)

from sensor,station,year,MESURE M

where M.stationId=station.stationId

and M.sensorId=sensor.sensorId

and M.yearId=year.yearId

and so2 is not null

group by M.sensorId,M.stationId,M.yearId;

-- 2

select component.componentId as component,station.stationId as station,year.yearId as year,avg(so2)

from sensor,station,year,MESURE M,component

where M.stationId=station.stationId

and M.sensorId=sensor.sensorId

and M.yearId=year.yearId

AND so2 is not null

and component.componentId=sensor.measures

group by component.componentId,sensor.sensorId,station.stationId,year.yearId;

-- 3

select sensor.sensorId as sensor,station.stationId as station,avg(so2)

from sensor,station,MESURE M

where M.stationId=station.stationId

and M.sensorId=sensor.sensorId

and so2 is not null

group by sensor.sensorId,station.stationId;

-- 4

select component.componentId as component,station.stationId as station,avg(so2)

from sensor,station,MESURE M,component

where M.stationId=station.stationId

and M.sensorId=sensor.sensorId

and so2 is not null

and sensor.measures=component.componentId

group by component.componentId,station.stationId;

-- 5

select station.stationId as station,avg(so2)

from station,MESURE M

where M.stationId=station.stationId

and so2 is not null

group by station.stationId;

-- 6

select component.componentId as component,city.cityId as city,avg(so2)

from sensor,station,MESURE M,component,city

where M.stationId=station.stationId

and M.sensorId=sensor.sensorId

and sensor.measures=component.componentId

and station.inCity=city.cityId

and so2 is not null

group by component.componentId,city.cityId;

-- 7

select city.cityId as city,avg(so2)

from station,MESURE M,component,city

where M.stationId=station.stationId

and so2 is not null

and station.inCity=city.cityId

group by city.cityId;

-- 8

select component.componentId as component,country.countryId as country,avg(so2)

from sensor,station,MESURE M,component,city,country

where M.stationId=station.stationId

and M.sensorId=sensor.sensorId

and sensor.measures=component.componentId

and station.inCity=city.cityId

and so2 is not null

and city.locatedIn=country.countryId

group by component.componentId,country.countryId;

-- 9

select country.countryId as country,avg(so2)

from station,MESURE M,city,country

where M.stationId=station.stationId

and station.inCity=city.cityId

and so2 is not null

and city.locatedIn=country.countryId

group by country.countryId;

-- 10

select avg(so2)

from MESURE

where so2 is not null;

-- 11

select city.cityId as city,year.yearId as year,avg(so2)

from station,MESURE M,component,city,year

where M.stationId=station.stationId

and station.inCity=city.cityId

and M.yearId=year.yearId

and so2 is not null

group by city.cityId,year.yearId;

-- 12

select country.countryId as country,year.yearId as year,avg(so2)

from station,MESURE M,city,country,year

where M.stationId=station.stationId

and station.inCity=city.cityId

and city.locatedIn=country.countryId

and year.yearId=M.yearId

and so2 is not null

group by country.countryId,year.yearId;

-- 13

select sensor.sensorId as sensor,station.stationId as station,year.yearId as year,avg(so2)

from sensor,station,year,MESURE M

where M.stationId=station.stationId

and M.sensorId=sensor.sensorId

and M.yearId=year.yearId

and year.yearNum between 2006 and 2010

and so2 is not null

group by sensor.sensorId,station.stationId,year.yearId;

-- 14

select station.stationId as station,avg(so2)

from station,MESURE M

where M.stationId=station.stationId

and station.stationId="http://qweb.cs.aau.dk/airbase/data/station/GB0690A\_SCUN/"

and so2 is not null

group by station.stationId;

-- 15

select station.stationId as station,avg(so2)

from station,MESURE M

where M.stationId=station.stationId

and so2 is not null

and station.stationId in ("http://qweb.cs.aau.dk/airbase/data/station/GB0690A\_SCUN/","http://qweb.cs.aau.dk/airbase/data/station/GB0917A\_STEW/","http://qweb.cs.aau.dk/airbase/data/station/GB0037R\_LB/")

group by station.stationId;

-- 16

select city.cityId as city,avg(so2)

from station,MESURE M,city

where M.stationId=station.stationId

and station.inCity=city.cityId

and so2 is not null

and city.cityId="http://qweb.cs.aau.dk/airbase/data/city/LONDON/"

group by city.cityId;

-- 17

select country.countryId as country,avg(so2)

from station,MESURE M,city,country

where M.stationId=station.stationId

and station.inCity=city.cityId

and country.countryId=city.locatedIn

and so2 is not null

and country.countryId="http://qweb.cs.aau.dk/airbase/data/country/United\_Kingdom/"

group by country.countryId;

-- 18

select city.cityId as city,year.yearId as year,avg(so2)

from station,MESURE M,city,year

where M.stationId=station.stationId

and station.inCity=city.cityId

and year.yearId=M.yearId

and year.yearNum=2010

and so2 is not null

and city.cityId="http://qweb.cs.aau.dk/airbase/data/city/LONDON/"

group by city.cityId,year.yearId;

-- 19

select city.cityId as city,year.yearId as year,avg(so2)

from station,MESURE M,city,year

where M.stationId=station.stationId

and station.inCity=city.cityId

and year.yearId=M.yearId

and year.yearNum between 2006 and 2010

and so2 is not null

and city.cityId="http://qweb.cs.aau.dk/airbase/data/city/LONDON/"

group by city.cityId,year.yearId;

-- 20

select city.cityId as city,avg(so2)

from station,MESURE M,city,year

where M.stationId=station.stationId

and station.inCity=city.cityId

and year.yearId=M.yearId

and year.yearNum=2010

and so2 is not null

and city.cityId="http://qweb.cs.aau.dk/airbase/data/city/LONDON/"

group by city.cityId;

-- 21

select station.stationId as station,year.yearId as year,component.componentId as component,avg(so2)

from station,MESURE M,year,component,sensor

where M.stationId=station.stationId

and year.yearId=M.yearId

and M.sensorId=sensor.sensorId

and sensor.measures=component.componentId

and year.yearNum=2004

and so2 is not null

and station.stationId="http://qweb.cs.aau.dk/airbase/data/station/GB0841A\_SCN2/"

and component.componentId="http://qweb.cs.aau.dk/airbase/data/component/1/"

group by station.stationId,year.yearId,component.componentId;

-- 22

select city.cityId as city,year.yearId as year,avg(so2)

from station,MESURE M,city,year

where M.stationId=station.stationId

and station.inCity=city.cityId

and so2 is not null

and year.yearId=M.yearId

group by city.cityId,year.yearId

HAVING avg(so2)>150;

-- 23

select city.cityId as city,avg(so2)

from station,MESURE M,city

where M.stationId=station.stationId

and station.inCity=city.cityId

and so2 is not null

and city.cityId in ("http://qweb.cs.aau.dk/airbase/data/city/LONDON/","http://qweb.cs.aau.dk/airbase/data/city/RUGELEY/","http://qweb.cs.aau.dk/airbase/data/city/BELFAST/")

group by city.cityId

having avg(so2)>150;

-- 24

select city.cityId as city,avg(so2)

from station,MESURE M,city

where M.stationId=station.stationId

and station.inCity=city.cityId

and so2 is not null

and city.cityId in (

select distinct city.cityId

from station,MESURE M,city

where M.stationId=station.stationId

and station.inCity=city.cityId

and city.cityId in ("http://qweb.cs.aau.dk/airbase/data/city/LONDON/","http://qweb.cs.aau.dk/airbase/data/city/RUGELEY/","http://qweb.cs.aau.dk/airbase/data/city/BELFAST/")

group by city.cityId

having avg(no2)>150

)

group by city.cityId;

# Queries for aggregated data

## Aggreates creation

DROP materialized VIEW IF EXISTS mVue\_sensor\_station\_year;

create materialized view mVue\_sensor\_station\_year as

select M.sensorId,M.stationId,M.yearId,avg(so2)

from sensor,station,year,MESURE M

where M.stationId=station.stationId

and M.sensorId=sensor.sensorId

and M.yearId=year.yearId

and so2 is not null

group by M.sensorId,M.stationId,M.yearId;

DROP materialized VIEW IF EXISTS mVue\_component\_station\_year;

create materialized view mVue\_component\_station\_year as

select component.componentId as component,station.stationId as station,year.yearId as year,avg(so2)

from sensor,station,year,MESURE M,component

where M.stationId=station.stationId

and M.sensorId=sensor.sensorId

and M.yearId=year.yearId

AND so2 is not null

and component.componentId=sensor.measures

group by component.componentId,station.stationId,year.yearId;

DROP materialized VIEW IF EXISTS mVue\_sensor\_station;

create materialized view mVue\_sensor\_station as

select sensor.sensorId as sensor,station.stationId as station,avg(so2)

from sensor,station,MESURE M

where M.stationId=station.stationId

and M.sensorId=sensor.sensorId

and so2 is not null

group by sensor.sensorId,station.stationId;

DROP materialized VIEW IF EXISTS mVue\_component\_station;

create materialized view mVue\_component\_station as

select component.componentId as component,station.stationId as station,avg(so2)

from sensor,station,MESURE M,component

where M.stationId=station.stationId

and M.sensorId=sensor.sensorId

and so2 is not null

and sensor.measures=component.componentId

group by component.componentId,station.stationId;

DROP materialized VIEW IF EXISTS mVue\_station;

create materialized view mVue\_station as

select station.stationId as station,avg(so2)

from station,MESURE M

where M.stationId=station.stationId

and so2 is not null

group by station.stationId;

DROP materialized VIEW IF EXISTS mVue\_component\_city;

create materialized view mVue\_component\_city as

select component.componentId as component,city.cityId as city,avg(so2)

from sensor,station,MESURE M,component,city

where M.stationId=station.stationId

and M.sensorId=sensor.sensorId

and sensor.measures=component.componentId

and station.inCity=city.cityId

and so2 is not null

group by component.componentId,city.cityId;

DROP materialized VIEW IF EXISTS mVue\_city;

create materialized view mVue\_city as

select city.cityId as city,avg(so2)

from station,MESURE M,component,city

where M.stationId=station.stationId

and so2 is not null

and station.inCity=city.cityId

group by city.cityId;

DROP materialized VIEW IF EXISTS mVue\_component\_country;

create materialized view mVue\_component\_country as

select component.componentId as component,country.countryId as country,avg(so2)

from sensor,station,MESURE M,component,city,country

where M.stationId=station.stationId

and M.sensorId=sensor.sensorId

and sensor.measures=component.componentId

and station.inCity=city.cityId

and so2 is not null

and city.locatedIn=country.countryId

group by component.componentId,country.countryId;

DROP materialized VIEW IF EXISTS mVue\_country;

create materialized view mVue\_country as

select country.countryId as country,avg(so2)

from station,MESURE M,city,country

where M.stationId=station.stationId

and station.inCity=city.cityId

and so2 is not null

and city.locatedIn=country.countryId

group by country.countryId;

DROP materialized VIEW IF EXISTS mVue\_all;

create materialized view mVue\_all as

select avg(so2)

from MESURE

where so2 is not null;

DROP materialized VIEW IF EXISTS mVue\_city\_year;

create materialized view mVue\_city\_year as

select city.cityId as city,year.yearId as year,avg(so2)

from station,MESURE M,component,city,year

where M.stationId=station.stationId

and station.inCity=city.cityId

and M.yearId=year.yearId

and so2 is not null

group by city.cityId,year.yearId;

DROP materialized VIEW IF EXISTS mVue\_country\_year;

create materialized view mVue\_country\_year as

select country.countryId as country,year.yearId as year,avg(so2)

from station,MESURE M,city,country,year

where M.stationId=station.stationId

and station.inCity=city.cityId

and city.locatedIn=country.countryId

and year.yearId=M.yearId

and so2 is not null

group by country.countryId,year.yearId;

DROP materialized VIEW IF EXISTS mVue\_sensor\_station\_year2;

create materialized view mVue\_sensor\_station\_year2 as

select sensor.sensorId as sensor,station.stationId as station,year.yearId as year,avg(so2)

from sensor,station,year,MESURE M

where M.stationId=station.stationId

and M.sensorId=sensor.sensorId

and M.yearId=year.yearId

and year.yearNum between 2006 and 2010

and so2 is not null

group by sensor.sensorId,station.stationId,year.yearId;

DROP materialized VIEW IF EXISTS mVue\_station2;

create materialized view mVue\_station2 as

select station.stationId as station,avg(so2)

from station,MESURE M

where M.stationId=station.stationId

and station.stationId='http://qweb.cs.aau.dk/airbase/data/station/GB0690A\_SCUN/'

and so2 is not null

group by station.stationId;

DROP materialized VIEW IF EXISTS mVue\_station3;

create materialized view mVue\_station3 as

select station.stationId as station,avg(so2)

from station,MESURE M

where M.stationId=station.stationId

and so2 is not null

and station.stationId in ('http://qweb.cs.aau.dk/airbase/data/station/GB0690A\_SCUN/','http://qweb.cs.aau.dk/airbase/data/station/GB0917A\_STEW/','http://qweb.cs.aau.dk/airbase/data/station/GB0037R\_LB/')

group by station.stationId;

DROP materialized VIEW IF EXISTS mVue\_city2;

create materialized view mVue\_city2 as

select city.cityId as city,avg(so2)

from station,MESURE M,city

where M.stationId=station.stationId

and station.inCity=city.cityId

and so2 is not null

and city.cityId='http://qweb.cs.aau.dk/airbase/data/city/LONDON/'

group by city.cityId;

DROP materialized VIEW IF EXISTS mVue\_country2;

create materialized view mVue\_country2 as

select country.countryId as country,avg(so2)

from station,MESURE M,city,country

where M.stationId=station.stationId

and station.inCity=city.cityId

and country.countryId=city.locatedIn

and so2 is not null

and country.countryId='http://qweb.cs.aau.dk/airbase/data/country/United\_Kingdom/'

group by country.countryId;

DROP materialized VIEW IF EXISTS mVue\_city\_year2;

create materialized view mVue\_city\_year2 as

select city.cityId as city,year.yearId as year,avg(so2)

from station,MESURE M,city,year

where M.stationId=station.stationId

and station.inCity=city.cityId

and year.yearId=M.yearId

and year.yearNum=2010

and so2 is not null

and city.cityId='http://qweb.cs.aau.dk/airbase/data/city/LONDON/'

group by city.cityId,year.yearId;

DROP materialized VIEW IF EXISTS mVue\_city\_year3;

create materialized view mVue\_city\_year3 as

select city.cityId as city,year.yearId as year,avg(so2)

from station,MESURE M,city,year

where M.stationId=station.stationId

and station.inCity=city.cityId

and year.yearId=M.yearId

and year.yearNum between 2006 and 2010

and so2 is not null

and city.cityId='http://qweb.cs.aau.dk/airbase/data/city/LONDON/'

group by city.cityId,year.yearId;

DROP materialized VIEW IF EXISTS mVue\_city3;

create materialized view mVue\_city3 as

select city.cityId as city,avg(so2)

from station,MESURE M,city,year

where M.stationId=station.stationId

and station.inCity=city.cityId

and year.yearId=M.yearId

and year.yearNum=2010

and so2 is not null

and city.cityId='http://qweb.cs.aau.dk/airbase/data/city/LONDON/'

group by city.cityId;

DROP materialized VIEW IF EXISTS mVue\_component\_station2;

create materialized view mVue\_component\_station2 as

select station.stationId as station,year.yearId as year,component.componentId as component,avg(so2)

from station,MESURE M,year,component,sensor

where M.stationId=station.stationId

and year.yearId=M.yearId

and M.sensorId=sensor.sensorId

and sensor.measures=component.componentId

and year.yearNum=2004

and so2 is not null

and station.stationId='http://qweb.cs.aau.dk/airbase/data/station/GB0841A\_SCN2/'

and component.componentId='http://qweb.cs.aau.dk/airbase/data/component/1/'

group by station.stationId,year.yearId,component.componentId;

DROP materialized VIEW IF EXISTS mVue\_city\_year4;

create materialized view mVue\_city\_year4 as

select city.cityId as city,year.yearId as year,avg(so2)

from station,MESURE M,city,year

where M.stationId=station.stationId

and station.inCity=city.cityId

and so2 is not null

and year.yearId=M.yearId

group by city.cityId,year.yearId

HAVING avg(so2)>150;

DROP materialized VIEW IF EXISTS mVue\_city\_year22;

create materialized view mVue\_city\_year22 as

select city.cityId as city,avg(so2)

from station,MESURE M,city

where M.stationId=station.stationId

and station.inCity=city.cityId

and so2 is not null

and city.cityId in ('http://qweb.cs.aau.dk/airbase/data/city/LONDON/','http://qweb.cs.aau.dk/airbase/data/city/RUGELEY/','http://qweb.cs.aau.dk/airbase/data/city/BELFAST/')

group by city.cityId

having avg(so2)>150;

DROP materialized VIEW IF EXISTS mVue\_city\_year6;

create materialized view mVue\_city\_year6 as

select city.cityId as city,avg(so2)

from station,MESURE M,city

where M.stationId=station.stationId

and station.inCity=city.cityId

and so2 is not null

and city.cityId in (

select distinct city.cityId

from station,MESURE M,city

where M.stationId=station.stationId

and station.inCity=city.cityId

and city.cityId in ('http://qweb.cs.aau.dk/airbase/data/city/LONDON/','http://qweb.cs.aau.dk/airbase/data/city/RUGELEY/','http://qweb.cs.aau.dk/airbase/data/city/BELFAST/')

group by city.cityId

having avg(no2)>150

)

group by city.cityId;

## Queries on aggregated data

select \* from mVue\_sensor\_station\_year;

select \* from mVue\_component\_station\_year;

select \* from mVue\_sensor\_station;

select \* from mVue\_component\_station;

select \* from mVue\_station;

select \* from mVue\_component\_city;

select \* from mVue\_city;

select \* from mVue\_component\_country;

select \* from mVue\_country;

select \* from mVue\_all;

select \* from mVue\_city\_year;

select \* from mVue\_country\_year;

select \* from mVue\_sensor\_station\_year2;

select \* from mVue\_station2;

select \* from mVue\_station3;

select \* from mVue\_city2;

select \* from mVue\_country2;

select \* from mVue\_city\_year2;

select \* from mVue\_city\_year3;

select \* from mVue\_city3;

select \* from mVue\_component\_station2;

select \* from mVue\_city\_year4;

select \* from mVue\_city\_year22;

select \* from mVue\_city\_year6;