# SPARQL 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

MATCH (sensor) <- [:`http://qweb.cs.aau.dk/airbase/schema/sensor`]- (obs) - [:`http://qweb.cs.aau.dk/airbase/schema/station`] -> (sta),

(obs) - [:`http://qweb.cs.aau.dk/airbase/schema/year`] -> (Year)

WHERE obs. `http://qweb.cs.aau.dk/airbase/schema/SO2` is not null

RETURN sensor, sta, Year, obs.`http://qweb.cs.aau.dk/airbase/schema/SO2` ;

--2

MATCH (component) <-[:`http://qweb.cs.aau.dk/airbase/schema/measures`]- (sensor) <- [:`http://qweb.cs.aau.dk/airbase/schema/sensor`]- (obs) - [:`http://qweb.cs.aau.dk/airbase/schema/station`] -> (sta),

(obs) - [:`http://qweb.cs.aau.dk/airbase/schema/year`] -> (Year)

WHERE obs. `http://qweb.cs.aau.dk/airbase/schema/SO2` is not null

RETURN component, sta, Year, avg(obs.`http://qweb.cs.aau.dk/airbase/schema/SO2`);

--3

MATCH (sensor) <- [:`http://qweb.cs.aau.dk/airbase/schema/sensor`]- (obs) - [:`http://qweb.cs.aau.dk/airbase/schema/station`] -> (sta)

WHERE obs. `http://qweb.cs.aau.dk/airbase/schema/SO2` is not null

RETURN sensor, sta, avg(obs.`http://qweb.cs.aau.dk/airbase/schema/SO2`);

--4

MATCH (component) <-[:`http://qweb.cs.aau.dk/airbase/schema/measures`]- (sensor) <- [:`http://qweb.cs.aau.dk/airbase/schema/sensor`]- (obs) - [:`http://qweb.cs.aau.dk/airbase/schema/station`] -> (sta)

WHERE obs. `http://qweb.cs.aau.dk/airbase/schema/SO2` is not null

RETURN component, sta, avg(obs.`http://qweb.cs.aau.dk/airbase/schema/SO2`);

--5

MATCH (obs) - [:`http://qweb.cs.aau.dk/airbase/schema/station`] -> (sta)

WHERE obs. `http://qweb.cs.aau.dk/airbase/schema/SO2` is not null

RETURN sta, avg(obs.`http://qweb.cs.aau.dk/airbase/schema/SO2`);

--6

MATCH (component) <-[:`http://qweb.cs.aau.dk/airbase/schema/measures`]- (sensor) <- [:`http://qweb.cs.aau.dk/airbase/schema/sensor`]- (obs) - [:`http://qweb.cs.aau.dk/airbase/schema/station`] -> (sta) - [:`http://qweb.cs.aau.dk/airbase/schema/inCity`] -> (city)

WHERE obs. `http://qweb.cs.aau.dk/airbase/schema/SO2` is not null

RETURN city, component, avg(obs.`http://qweb.cs.aau.dk/airbase/schema/SO2`) AS avgSO2City;

--7

MATCH (obs) - [:`http://qweb.cs.aau.dk/airbase/schema/station`] -> (sta) - [:`http://qweb.cs.aau.dk/airbase/schema/inCity`] -> (city)

WHERE obs. `http://qweb.cs.aau.dk/airbase/schema/SO2` is not null

RETURN city, avg(obs.`http://qweb.cs.aau.dk/airbase/schema/SO2`);

--8

MATCH (component) <-[:`http://qweb.cs.aau.dk/airbase/schema/measures`]- (sensor) <- [:`http://qweb.cs.aau.dk/airbase/schema/sensor`]- (obs) - [:`http://qweb.cs.aau.dk/airbase/schema/station`] -> (sta) - [:`http://qweb.cs.aau.dk/airbase/schema/inCity`] -> (city) - [:`http://qweb.cs.aau.dk/airbase/schema/locatedIn`] -> (Country)

WHERE obs. `http://qweb.cs.aau.dk/airbase/schema/SO2` is not null

RETURN Country, component, avg(obs.`http://qweb.cs.aau.dk/airbase/schema/SO2`);

--9

MATCH (obs) - [:`http://qweb.cs.aau.dk/airbase/schema/station`] -> (sta) - [:`http://qweb.cs.aau.dk/airbase/schema/inCity`] -> (city) - [:`http://qweb.cs.aau.dk/airbase/schema/locatedIn`] -> (Country)

WHERE obs. `http://qweb.cs.aau.dk/airbase/schema/SO2` is not null

RETURN Country, avg(obs.`http://qweb.cs.aau.dk/airbase/schema/SO2`) ;

--10

MATCH (sensor) <- [:`http://qweb.cs.aau.dk/airbase/schema/sensor`]- (obs) - [:`http://qweb.cs.aau.dk/airbase/schema/station`] -> (sta),

(obs) - [:`http://qweb.cs.aau.dk/airbase/schema/year`] -> (Year)

WHERE obs. `http://qweb.cs.aau.dk/airbase/schema/SO2` is not null

RETURN AVG(obs.`http://qweb.cs.aau.dk/airbase/schema/SO2`) ;

--11

MATCH (city)<-[:`http://qweb.cs.aau.dk/airbase/schema/inCity`]-(sta) <- [:`http://qweb.cs.aau.dk/airbase/schema/station`]- (obs) - [:`http://qweb.cs.aau.dk/airbase/schema/year`] -> (year)

WHERE obs. `http://qweb.cs.aau.dk/airbase/schema/SO2` is not null

RETURN city, year, avg(obs.`http://qweb.cs.aau.dk/airbase/schema/SO2`) ;

--12

MATCH (Country)<-[:`http://qweb.cs.aau.dk/airbase/schema/locatedIn`]-(city)<-[:`http://qweb.cs.aau.dk/airbase/schema/inCity`]-(sta) <- [:`http://qweb.cs.aau.dk/airbase/schema/station`]- (obs) - [:`http://qweb.cs.aau.dk/airbase/schema/year`] -> (year)

WHERE obs. `http://qweb.cs.aau.dk/airbase/schema/SO2` is not null

RETURN Country, year, avg(obs.`http://qweb.cs.aau.dk/airbase/schema/SO2`) ;

--14

MATCH (obs) - [:`http://qweb.cs.aau.dk/airbase/schema/station`] -> (sta)

where sta.uri="http://qweb.cs.aau.dk/airbase/data/station/GB0690A\_SCUN/"

RETURN sta.uri, obs.`http://qweb.cs.aau.dk/airbase/schema/SO2`;

--15

MATCH (obs) - [:`http://qweb.cs.aau.dk/airbase/schema/station`] -> (sta)

where sta.uri 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/\"]

RETURN sta.uri, avg(obs.`http://qweb.cs.aau.dk/airbase/schema/SO2`)";

--16

MATCH (obs) - [:`http://qweb.cs.aau.dk/airbase/schema/station`] -> (sta) - [:`http://qweb.cs.aau.dk/airbase/schema/inCity`] -> (city)

WHERE obs.`http://qweb.cs.aau.dk/airbase/schema/SO2` is not null

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

RETURN city, avg(obs.`http://qweb.cs.aau.dk/airbase/schema/SO2`)";

--17

MATCH (obs) - [:`http://qweb.cs.aau.dk/airbase/schema/station`] -> (sta) - [:`http://qweb.cs.aau.dk/airbase/schema/inCity`] -> (city) - [:`http://qweb.cs.aau.dk/airbase/schema/locatedIn`] -> (Country)

WHERE obs.`http://qweb.cs.aau.dk/airbase/schema/SO2` is not null

AND Country.uri=\"http://qweb.cs.aau.dk/airbase/data/country/United\_Kingdom/\"

RETURN Country, avg(obs.`http://qweb.cs.aau.dk/airbase/schema/SO2`)";

--18

MATCH (city)<-[:`http://qweb.cs.aau.dk/airbase/schema/inCity`]-(sta) <- [:`http://qweb.cs.aau.dk/airbase/schema/station`]- (obs) - [:`http://qweb.cs.aau.dk/airbase/schema/year`] -> (year)

WHERE obs. `http://qweb.cs.aau.dk/airbase/schema/SO2` is not null

AND year.uri=\"http://qweb.cs.aau.dk/airbase/data/year/2010/\"

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

RETURN city, year, avg(obs.`http://qweb.cs.aau.dk/airbase/schema/SO2`)";

--19

MATCH (city)<-[:`http://qweb.cs.aau.dk/airbase/schema/inCity`]-(sta) <- [:`http://qweb.cs.aau.dk/airbase/schema/station`]- (obs) - [:`http://qweb.cs.aau.dk/airbase/schema/year`] -> (year)

WHERE obs. `http://qweb.cs.aau.dk/airbase/schema/SO2` is not null

AND year.uri in [\"http://qweb.cs.aau.dk/airbase/data/year/2010/\",\"http://qweb.cs.aau.dk/airbase/data/year/2006/\",\"http://qweb.cs.aau.dk/airbase/data/year/2007/\",\"http://qweb.cs.aau.dk/airbase/data/year/2008/\",\"http://qweb.cs.aau.dk/airbase/data/year/2009/\"]

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

RETURN city, year, avg(obs.`http://qweb.cs.aau.dk/airbase/schema/SO2`)";

--20

MATCH (city)<-[:`http://qweb.cs.aau.dk/airbase/schema/inCity`]-(sta) <- [:`http://qweb.cs.aau.dk/airbase/schema/station`]- (obs) - [:`http://qweb.cs.aau.dk/airbase/schema/year`] -> (year)

WHERE obs. `http://qweb.cs.aau.dk/airbase/schema/SO2` is not null

AND year.uri=\"http://qweb.cs.aau.dk/airbase/data/year/2010/\"

AND city.uri=\"http://qweb.cs.aau.dk/airbase/data/city/LONDON/\"

RETURN city, avg(obs.`http://qweb.cs.aau.dk/airbase/schema/SO2`)";

--21

MATCH (component) <-[:`http://qweb.cs.aau.dk/airbase/schema/measures`]- (sensor) <- [:`http://qweb.cs.aau.dk/airbase/schema/sensor`]- (obs) - [:`http://qweb.cs.aau.dk/airbase/schema/station`] -> (sta),

"(obs) - [:`http://qweb.cs.aau.dk/airbase/schema/year`] -> (Year)

WHERE obs. `http://qweb.cs.aau.dk/airbase/schema/SO2` is not null

AND sta.uri=\"http://qweb.cs.aau.dk/airbase/data/station/GB0690A\_SCUN/\"

AND Year.uri=\"http://qweb.cs.aau.dk/airbase/data/year/2004/\"

AND component.uri=\"http://qweb.cs.aau.dk/airbase/data/component/1/\"

RETURN component, sta, Year, avg(obs.`http://qweb.cs.aau.dk/airbase/schema/SO2`)";

--22

MATCH (city)<-[:`http://qweb.cs.aau.dk/airbase/schema/inCity`]-(sta) <- [:`http://qweb.cs.aau.dk/airbase/schema/station`]- (obs) - [:`http://qweb.cs.aau.dk/airbase/schema/year`] -> (year)

WHERE obs. `http://qweb.cs.aau.dk/airbase/schema/SO2` is not null

"WITH city, year, avg(obs.`http://qweb.cs.aau.dk/airbase/schema/SO2`) as average

WHERE average>150

RETURN city, year,average";

-23

MATCH (obs) - [:`http://qweb.cs.aau.dk/airbase/schema/station`] -> (sta) - [:`http://qweb.cs.aau.dk/airbase/schema/inCity`] -> (city)

WHERE obs. `http://qweb.cs.aau.dk/airbase/schema/SO2` is not null

AND city.uri 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/\"]

"WITH city, avg(obs.`http://qweb.cs.aau.dk/airbase/schema/SO2`) as average

WHERE average>150

RETURN city,average\n";

--24

MATCH (obs) - [:`http://qweb.cs.aau.dk/airbase/schema/station`] -> (sta) - [:`http://qweb.cs.aau.dk/airbase/schema/inCity`] -> (city)

WHERE city.uri 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/\"]

"WITH city, avg(obs.`http://qweb.cs.aau.dk/airbase/schema/SO2`) as averageSO2,avg(obs.`http://qweb.cs.aau.dk/airbase/schema/NO2`) as averageNO2

WHERE averageNO2>100

RETURN city,averageSO2;

# Queries for aggregated data

## Aggreates creation

//1. Average SO2 by station, sensor and year

//Nothing

//2. Average SO2 by station, component and year

MATCH (component) <-[:`http://qweb.cs.aau.dk/airbase/schema/measures`]- (sensor) <- [:`http://qweb.cs.aau.dk/airbase/schema/sensor`]- (obs) - [:`http://qweb.cs.aau.dk/airbase/schema/station`] -> (sta),

(obs) - [:`http://qweb.cs.aau.dk/airbase/schema/year`] -> (Year)

WHERE obs. `http://qweb.cs.aau.dk/airbase/schema/SO2` is not null

WITH component, sta, Year, avg(obs.`http://qweb.cs.aau.dk/airbase/schema/SO2`) AS avgSO2City

CREATE (component) <- [rSensor :`http://qweb.cs.aau.dk/airbase/schema/aggregate` {analysisAxis : 'http://qweb.cs.aau.dk/airbase/schema/sensor'}] -(newObs :`http://purl.org/linked-data/cube#Observation` {`http://qweb.cs.aau.dk/airbase/schema/SO2` : avgSO2City, `http://qweb.cs.aau.dk/airbase/schema/station`:'Station', `http://qweb.cs.aau.dk/airbase/schema/sensor`:'Component', `http://qweb.cs.aau.dk/airbase/schema/year`:'Year'}) - [r :`http://qweb.cs.aau.dk/airbase/schema/aggregate` {analysisAxis : 'http://qweb.cs.aau.dk/airbase/schema/station'}] -> (sta),

(newObs) - [rYear :`http://qweb.cs.aau.dk/airbase/schema/aggregate` {analysisAxis : 'http://qweb.cs.aau.dk/airbase/schema/year'}] -> (Year)

;

//MATCH (component)<-[rSensor :`http://qweb.cs.aau.dk/airbase/schema/aggregate` {analysisAxis : 'http://qweb.cs.aau.dk/airbase/schema/sensor'}]-(obs {`http://qweb.cs.aau.dk/airbase/schema/station`:'Station', `http://qweb.cs.aau.dk/airbase/schema/sensor`:'Component', `http://qweb.cs.aau.dk/airbase/schema/year`:'Year'})-[r :`http://qweb.cs.aau.dk/airbase/schema/aggregate` {analysisAxis : 'http://qweb.cs.aau.dk/airbase/schema/station'}]->(sta),

//(obs {`http://qweb.cs.aau.dk/airbase/schema/station`:'Station', `http://qweb.cs.aau.dk/airbase/schema/sensor`:'Component', `http://qweb.cs.aau.dk/airbase/schema/year`:'Year'})-[rYear :`http://qweb.cs.aau.dk/airbase/schema/aggregate` {analysisAxis : 'http://qweb.cs.aau.dk/airbase/schema/year'}]->(Year)

//WITH obs,component, sta, Year

//MATCH (component)<-[:`http://qweb.cs.aau.dk/airbase/schema/measures`]-(sensor)<-[:`http://qweb.cs.aau.dk/airbase/schema/sensor`]-(ancientobs)-[:`http://qweb.cs.aau.dk/airbase/schema/station`]->(sta),

//(ancientobs)-[:`http://qweb.cs.aau.dk/airbase/schema/year`]->(Year)

//CREATE (ancientobs)-[:`http://qweb.cs.aau.dk/airbase/schema/nextObervation`]->(obs)

//3. Average SO2 by station and sensor

MATCH (sensor) <- [:`http://qweb.cs.aau.dk/airbase/schema/sensor`]- (obs) - [:`http://qweb.cs.aau.dk/airbase/schema/station`] -> (sta)

WHERE obs. `http://qweb.cs.aau.dk/airbase/schema/SO2` is not null

WITH sensor, sta, avg(obs.`http://qweb.cs.aau.dk/airbase/schema/SO2`) AS avgSO2City

CREATE (sensor) <- [rSensor :`http://qweb.cs.aau.dk/airbase/schema/aggregate` {analysisAxis : 'http://qweb.cs.aau.dk/airbase/schema/sensor'}] -(newObs :`http://purl.org/linked-data/cube#Observation` {`http://qweb.cs.aau.dk/airbase/schema/SO2` : avgSO2City, `http://qweb.cs.aau.dk/airbase/schema/station`:'Station', `http://qweb.cs.aau.dk/airbase/schema/sensor`:'Sensor', `http://qweb.cs.aau.dk/airbase/schema/year`:'ALL'}) - [r :`http://qweb.cs.aau.dk/airbase/schema/aggregate` {analysisAxis : 'http://qweb.cs.aau.dk/airbase/schema/station'}] -> (sta)

;

//MATCH (sensor) <- [r: `http://qweb.cs.aau.dk/airbase/schema/aggregate` {analysisAxis : 'http://qweb.cs.aau.dk/airbase/schema/sensor'}] -(obs {`http://qweb.cs.aau.dk/airbase/schema/station`:'Station', `http://qweb.cs.aau.dk/airbase/schema/sensor`:'Sensor', `http://qweb.cs.aau.dk/airbase/schema/year`:'ALL'}) - [rBis : `http://qweb.cs.aau.dk/airbase/schema/aggregate` {analysisAxis : 'http://qweb.cs.aau.dk/airbase/schema/station'}] -> (sta)

//WITH obs,sensor, sta

//MATCH (sensor) <- [:`http://qweb.cs.aau.dk/airbase/schema/sensor`]- (ancientobs) - [:`http://qweb.cs.aau.dk/airbase/schema/station`] -> (sta)

//CREATE (ancientobs)-[:`http://qweb.cs.aau.dk/airbase/schema/nextObervation`]->(obs)

//4. Average SO2 by station and component

MATCH (component) <-[:`http://qweb.cs.aau.dk/airbase/schema/measures`]- (sensor) <- [:`http://qweb.cs.aau.dk/airbase/schema/sensor`]- (obs) - [:`http://qweb.cs.aau.dk/airbase/schema/station`] -> (sta)

WHERE obs. `http://qweb.cs.aau.dk/airbase/schema/SO2` is not null

WITH component, sta, avg(obs.`http://qweb.cs.aau.dk/airbase/schema/SO2`) AS avgSO2City

CREATE (component) <- [rComp :`http://qweb.cs.aau.dk/airbase/schema/aggregate` {analysisAxis : 'http://qweb.cs.aau.dk/airbase/schema/sensor'}] -(newObs :`http://purl.org/linked-data/cube#Observation` {`http://qweb.cs.aau.dk/airbase/schema/SO2` : avgSO2City, `http://qweb.cs.aau.dk/airbase/schema/station`:'Station', `http://qweb.cs.aau.dk/airbase/schema/sensor`:'Component', `http://qweb.cs.aau.dk/airbase/schema/year`:'ALL'}) - [r :`http://qweb.cs.aau.dk/airbase/schema/aggregate` {analysisAxis : 'http://qweb.cs.aau.dk/airbase/schema/station'}] -> (sta)

;

//MATCH (component) <- [r: `http://qweb.cs.aau.dk/airbase/schema/aggregate` {analysisAxis : 'http://qweb.cs.aau.dk/airbase/schema/sensor'}] -(obs {`http://qweb.cs.aau.dk/airbase/schema/station`:'Station', `http://qweb.cs.aau.dk/airbase/schema/sensor`:'Component', `http://qweb.cs.aau.dk/airbase/schema/year`:'ALL'}) - [rBis :`http://qweb.cs.aau.dk/airbase/schema/aggregate` {analysisAxis : 'http://qweb.cs.aau.dk/airbase/schema/station'}] -> (sta)

//WITH component, sta, obs

//MATCH (component) <-[:`http://qweb.cs.aau.dk/airbase/schema/measures`]- (sensor) <- [:`http://qweb.cs.aau.dk/airbase/schema/sensor`]- (ancientobs) - [:`http://qweb.cs.aau.dk/airbase/schema/station`] -> (sta)

//CREATE (ancientobs)-[:`http://qweb.cs.aau.dk/airbase/schema/nextObervation`]->(obs)

//5 Average SO2 by station

MATCH (obs) - [:`http://qweb.cs.aau.dk/airbase/schema/station`] -> (sta)

WHERE obs. `http://qweb.cs.aau.dk/airbase/schema/SO2` is not null

WITH sta, avg(obs.`http://qweb.cs.aau.dk/airbase/schema/SO2`) AS avgSO2City

CREATE (newObs :`http://purl.org/linked-data/cube#Observation` {`http://qweb.cs.aau.dk/airbase/schema/SO2` : avgSO2City, `http://qweb.cs.aau.dk/airbase/schema/station`:'Station', `http://qweb.cs.aau.dk/airbase/schema/sensor`:'ALL', `http://qweb.cs.aau.dk/airbase/schema/year`:'ALL'}) - [r :`http://qweb.cs.aau.dk/airbase/schema/aggregate` {analysisAxis : 'http://qweb.cs.aau.dk/airbase/schema/station'}] -> (sta)

;

//MATCH (obs {`http://qweb.cs.aau.dk/airbase/schema/station`:'Station', `http://qweb.cs.aau.dk/airbase/schema/sensor`:'ALL', `http://qweb.cs.aau.dk/airbase/schema/year`:'ALL'}) - [r: `http://qweb.cs.aau.dk/airbase/schema/aggregate` {analysisAxis : 'http://qweb.cs.aau.dk/airbase/schema/station'}] -> (sta)

//WITH sta, obs

//MATCH (ancientobs) - [:`http://qweb.cs.aau.dk/airbase/schema/station`] -> (sta)

//CREATE (ancientobs)-[:`http://qweb.cs.aau.dk/airbase/schema/nextObervation`]->(obs)

//6 Average SO2 by city and component

MATCH (component) <-[:`http://qweb.cs.aau.dk/airbase/schema/measures`]- (sensor) <- [:`http://qweb.cs.aau.dk/airbase/schema/sensor`]- (obs) - [:`http://qweb.cs.aau.dk/airbase/schema/station`] -> (sta) - [:`http://qweb.cs.aau.dk/airbase/schema/inCity`] -> (city)

WHERE obs. `http://qweb.cs.aau.dk/airbase/schema/SO2` is not null

WITH city, component, avg(obs.`http://qweb.cs.aau.dk/airbase/schema/SO2`) AS avgSO2City

CREATE (component) <- [rComp :`http://qweb.cs.aau.dk/airbase/schema/aggregate` {analysisAxis : 'http://qweb.cs.aau.dk/airbase/schema/sensor'}] - (newObs :`http://purl.org/linked-data/cube#Observation` {`http://qweb.cs.aau.dk/airbase/schema/SO2` : avgSO2City, `http://qweb.cs.aau.dk/airbase/schema/station`:'City', `http://qweb.cs.aau.dk/airbase/schema/sensor`:'Component', `http://qweb.cs.aau.dk/airbase/schema/year`:'ALL'}) -

[r :`http://qweb.cs.aau.dk/airbase/schema/aggregate` {analysisAxis : 'http://qweb.cs.aau.dk/airbase/schema/station'}] -> (city)

;

//MATCH (component) <- [rComp :`http://qweb.cs.aau.dk/airbase/schema/aggregate` {analysisAxis : 'http://qweb.cs.aau.dk/airbase/schema/sensor'}] - (obs {`http://qweb.cs.aau.dk/airbase/schema/station`:'City', `http://qweb.cs.aau.dk/airbase/schema/sensor`:'Component', `http://qweb.cs.aau.dk/airbase/schema/year`:'ALL'}) -

// [r :`http://qweb.cs.aau.dk/airbase/schema/aggregate` {analysisAxis : 'http://qweb.cs.aau.dk/airbase/schema/station'}] -> (city)

//WITH city, component, obs

//MATCH (component) <-[:`http://qweb.cs.aau.dk/airbase/schema/measures`]- (sensor) <- [:`http://qweb.cs.aau.dk/airbase/schema/sensor`]- (ancientobs) - [:`http://qweb.cs.aau.dk/airbase/schema/station`] -> (sta) - [:`http://qweb.cs.aau.dk/airbase/schema/inCity`] -> (city)

//CREATE (ancientobs)-[:`http://qweb.cs.aau.dk/airbase/schema/nextObervation`]->(obs)

//7. Average SO2 by city

MATCH (obs) - [:`http://qweb.cs.aau.dk/airbase/schema/station`] -> (sta) - [:`http://qweb.cs.aau.dk/airbase/schema/inCity`] -> (city)

WHERE obs. `http://qweb.cs.aau.dk/airbase/schema/SO2` is not null

WITH city, avg(obs.`http://qweb.cs.aau.dk/airbase/schema/SO2`) AS avgSO2City

CREATE (newObs :`http://purl.org/linked-data/cube#Observation` {`http://qweb.cs.aau.dk/airbase/schema/SO2` : avgSO2City, `http://qweb.cs.aau.dk/airbase/schema/station`:'City',

`http://qweb.cs.aau.dk/airbase/schema/sensor`:'ALL', `http://qweb.cs.aau.dk/airbase/schema/year`:'ALL'}) -

[r :`http://qweb.cs.aau.dk/airbase/schema/aggregate` {analysisAxis : 'http://qweb.cs.aau.dk/airbase/schema/station'}] -> (city)

;

//MATCH (obs {`http://qweb.cs.aau.dk/airbase/schema/station`:'City',

// `http://qweb.cs.aau.dk/airbase/schema/sensor`:'ALL', `http://qweb.cs.aau.dk/airbase/schema/year`:'ALL'}) -

// [r :`http://qweb.cs.aau.dk/airbase/schema/aggregate` {analysisAxis : 'http://qweb.cs.aau.dk/airbase/schema/station'}] -> (city)

//WITH city, obs

//MATCH (ancientobs) - [:`http://qweb.cs.aau.dk/airbase/schema/station`] -> (sta) - [:`http://qweb.cs.aau.dk/airbase/schema/inCity`] -> (city)

//CREATE (ancientobs)-[:`http://qweb.cs.aau.dk/airbase/schema/nextObervation`]->(obs)

//8 Average SO2 by country and component

MATCH (component) <-[:`http://qweb.cs.aau.dk/airbase/schema/measures`]- (sensor) <- [:`http://qweb.cs.aau.dk/airbase/schema/sensor`]- (obs) - [:`http://qweb.cs.aau.dk/airbase/schema/station`] -> (sta) - [:`http://qweb.cs.aau.dk/airbase/schema/inCity`] -> (city) - [:`http://qweb.cs.aau.dk/airbase/schema/locatedIn`] -> (Country)

WHERE obs. `http://qweb.cs.aau.dk/airbase/schema/SO2` is not null

WITH Country, component, avg(obs.`http://qweb.cs.aau.dk/airbase/schema/SO2`) AS avgSO2Country

CREATE (component) <- [rComp :`http://qweb.cs.aau.dk/airbase/schema/aggregate` {analysisAxis : 'http://qweb.cs.aau.dk/airbase/schema/sensor'}] - (newObs :`http://purl.org/linked-data/cube#Observation` {`http://qweb.cs.aau.dk/airbase/schema/SO2` : avgSO2Country, `http://qweb.cs.aau.dk/airbase/schema/station`:'Country', `http://qweb.cs.aau.dk/airbase/schema/sensor`:'Component', `http://qweb.cs.aau.dk/airbase/schema/year`:'ALL'}) - [r :`http://qweb.cs.aau.dk/airbase/schema/aggregate` {analysisAxis : 'http://qweb.cs.aau.dk/airbase/schema/station'}] -> (Country)

;

//MATCH (component) <- [rComp :`http://qweb.cs.aau.dk/airbase/schema/aggregate` {analysisAxis : 'http://qweb.cs.aau.dk/airbase/schema/sensor'}] - (obs {`http://qweb.cs.aau.dk/airbase/schema/station`:'Country', `http://qweb.cs.aau.dk/airbase/schema/sensor`:'Component', `http://qweb.cs.aau.dk/airbase/schema/year`:'ALL'}) - [r :`http://qweb.cs.aau.dk/airbase/schema/aggregate` {analysisAxis : 'http://qweb.cs.aau.dk/airbase/schema/station'}] -> (Country)

//WITH Country, component, obs

//MATCH (component) <-[:`http://qweb.cs.aau.dk/airbase/schema/measures`]- (sensor) <- [:`http://qweb.cs.aau.dk/airbase/schema/sensor`]- (ancientobs) - [:`http://qweb.cs.aau.dk/airbase/schema/station`] -> (sta) - [:`http://qweb.cs.aau.dk/airbase/schema/inCity`] -> (city) - [:`http://qweb.cs.aau.dk/airbase/schema/locatedIn`] -> (Country)

//CREATE (ancientobs)-[:`http://qweb.cs.aau.dk/airbase/schema/nextObervation`]->(obs)

//9. Average SO2 by country

MATCH (obs) - [:`http://qweb.cs.aau.dk/airbase/schema/station`] -> (sta) - [:`http://qweb.cs.aau.dk/airbase/schema/inCity`] -> (city) - [:`http://qweb.cs.aau.dk/airbase/schema/locatedIn`] -> (Country)

WHERE obs. `http://qweb.cs.aau.dk/airbase/schema/SO2` is not null

WITH Country, avg(obs.`http://qweb.cs.aau.dk/airbase/schema/SO2`) AS avgSO2Country

CREATE (newObs :`http://purl.org/linked-data/cube#Observation` {`http://qweb.cs.aau.dk/airbase/schema/SO2` : avgSO2Country, `http://qweb.cs.aau.dk/airbase/schema/station`:'Country', `http://qweb.cs.aau.dk/airbase/schema/sensor`:'ALL', `http://qweb.cs.aau.dk/airbase/schema/year`:'ALL'}) - [r :`http://qweb.cs.aau.dk/airbase/schema/aggregate` {analysisAxis : 'http://qweb.cs.aau.dk/airbase/schema/station'}] -> (Country)

;

//MATCH (obs {`http://qweb.cs.aau.dk/airbase/schema/station`:'Country', `http://qweb.cs.aau.dk/airbase/schema/sensor`:'ALL', `http://qweb.cs.aau.dk/airbase/schema/year`:'ALL'}) - [r :`http://qweb.cs.aau.dk/airbase/schema/aggregate` {analysisAxis : 'http://qweb.cs.aau.dk/airbase/schema/station'}] -> (Country)

//WITH Country, obs

//MATCH (ancientobs) - [:`http://qweb.cs.aau.dk/airbase/schema/station`] -> (sta) - [:`http://qweb.cs.aau.dk/airbase/schema/inCity`] -> (city) - [:`http://qweb.cs.aau.dk/airbase/schema/locatedIn`] -> (Country)

//CREATE (ancientobs)-[:`http://qweb.cs.aau.dk/airbase/schema/nextObervation`]->(obs)

//10 Average SO2

MATCH (sensor) <- [:`http://qweb.cs.aau.dk/airbase/schema/sensor`]- (obs) - [:`http://qweb.cs.aau.dk/airbase/schema/station`] -> (sta),

(obs) - [:`http://qweb.cs.aau.dk/airbase/schema/year`] -> (Year)

WHERE obs. `http://qweb.cs.aau.dk/airbase/schema/SO2` is not null

WITH AVG(obs.`http://qweb.cs.aau.dk/airbase/schema/SO2`) AS avgSO2ALL

CREATE (newObs :`http://purl.org/linked-data/cube#Observation` {`http://qweb.cs.aau.dk/airbase/schema/SO2` : avgSO2ALL, `http://qweb.cs.aau.dk/airbase/schema/station`:'ALL', `http://qweb.cs.aau.dk/airbase/schema/sensor`:'ALL', `http://qweb.cs.aau.dk/airbase/schema/year`:'ALL'}) - [r :`http://qweb.cs.aau.dk/airbase/schema/aggregate` {analysisAxis : 'ALL'}] -> (n:ALLDIM:DIMENSION )

;

//MATCH (obs {`http://qweb.cs.aau.dk/airbase/schema/station`:'ALL', `http://qweb.cs.aau.dk/airbase/schema/sensor`:'ALL', `http://qweb.cs.aau.dk/airbase/schema/year`:'ALL'}) - [r :`http://qweb.cs.aau.dk/airbase/schema/aggregate` {analysisAxis : 'ALL'}] -> (n:ALLDIM:DIMENSION )

//WITH obs

//MATCH (sensor) <- [:`http://qweb.cs.aau.dk/airbase/schema/sensor`]- (ancientobs) - [:`http://qweb.cs.aau.dk/airbase/schema/station`] -> (sta),

// (ancientobs) - [:`http://qweb.cs.aau.dk/airbase/schema/year`] -> (Year)

//CREATE (ancientobs)-[:`http://qweb.cs.aau.dk/airbase/schema/nextObervation`]->(obs)

//11 Average SO2 by city and year

MATCH (city) <- [:`http://qweb.cs.aau.dk/airbase/schema/inCity`] - (sta) <- [:`http://qweb.cs.aau.dk/airbase/schema/station`] - (obs) - [:`http://qweb.cs.aau.dk/airbase/schema/year`] -> (year)

WHERE obs. `http://qweb.cs.aau.dk/airbase/schema/SO2` is not null

WITH city, year, avg(obs.`http://qweb.cs.aau.dk/airbase/schema/SO2`) AS avgSO2City

CREATE (city) <- [rSensor :`http://qweb.cs.aau.dk/airbase/schema/aggregate` {analysisAxis : 'http://qweb.cs.aau.dk/airbase/schema/station'}] -(newObs :`http://purl.org/linked-data/cube#Observation` {`http://qweb.cs.aau.dk/airbase/schema/SO2` : avgSO2City, `http://qweb.cs.aau.dk/airbase/schema/station`:'City', `http://qweb.cs.aau.dk/airbase/schema/sensor`:'ALL', `http://qweb.cs.aau.dk/airbase/schema/year`:'Year'}) - [r :`http://qweb.cs.aau.dk/airbase/schema/aggregate` {analysisAxis : 'http://qweb.cs.aau.dk/airbase/schema/year'}] -> (year)

;

//MATCH (sensor) <- [rSensor :`http://qweb.cs.aau.dk/airbase/schema/aggregate` {analysisAxis : 'http://qweb.cs.aau.dk/airbase/schema/sensor'}] -(obs {`http://qweb.cs.aau.dk/airbase/schema/station`:'ALL', `http://qweb.cs.aau.dk/airbase/schema/sensor`:'Sensor', `http://qweb.cs.aau.dk/airbase/schema/year`:'Year'}) - [r :`http://qweb.cs.aau.dk/airbase/schema/aggregate` {analysisAxis : 'http://qweb.cs.aau.dk/airbase/schema/year'}] -> (year)

//WITH sensor, year, obs

//MATCH (city) <- [:`http://qweb.cs.aau.dk/airbase/schema/inCity`] - (sta) <- [:`http://qweb.cs.aau.dk/airbase/schema/station`] - (ancientobs) - [:`http://qweb.cs.aau.dk/airbase/schema/year`] -> (year)

//CREATE (ancientobs)-[:`http://qweb.cs.aau.dk/airbase/schema/nextObervation`]->(obs)

//12 Average SO2 by country and year

MATCH (country) <- [:`http://qweb.cs.aau.dk/airbase/schema/locatedIn`] -(city) <- [:`http://qweb.cs.aau.dk/airbase/schema/inCity`] - (sta) <- [:`http://qweb.cs.aau.dk/airbase/schema/station`] - (obs) - [:`http://qweb.cs.aau.dk/airbase/schema/year`] -> (year)

WHERE obs. `http://qweb.cs.aau.dk/airbase/schema/SO2` is not null

WITH country, year, avg(obs.`http://qweb.cs.aau.dk/airbase/schema/SO2`) AS avgSO2City

CREATE (country) <- [rSensor :`http://qweb.cs.aau.dk/airbase/schema/aggregate` {analysisAxis : 'http://qweb.cs.aau.dk/airbase/schema/station'}] -(newObs :`http://purl.org/linked-data/cube#Observation` {`http://qweb.cs.aau.dk/airbase/schema/SO2` : avgSO2City, `http://qweb.cs.aau.dk/airbase/schema/station`:'Country', `http://qweb.cs.aau.dk/airbase/schema/sensor`:'ALL', `http://qweb.cs.aau.dk/airbase/schema/year`:'Year'}) - [r :`http://qweb.cs.aau.dk/airbase/schema/aggregate` {analysisAxis : 'http://qweb.cs.aau.dk/airbase/schema/year'}] -> (year)

;

//match (country) <- [rSensor :`http://qweb.cs.aau.dk/airbase/schema/aggregate` {analysisAxis : 'http://qweb.cs.aau.dk/airbase/schema/station'}] -(newObs :`http://purl.org/linked-data/cube#Observation` {`http://qweb.cs.aau.dk/airbase/schema/station`:'Country', `http://qweb.cs.aau.dk/airbase/schema/sensor`:'ALL', `http://qweb.cs.aau.dk/airbase/schema/year`:'Year'}) - [r :`http://qweb.cs.aau.dk/airbase/schema/aggregate` {analysisAxis : 'http://qweb.cs.aau.dk/airbase/schema/year'}] -> (year)

//WITH country, year, newObs

//MATCH (country) <- [:`http://qweb.cs.aau.dk/airbase/schema/locatedIn`] -(city) <- [:`http://qweb.cs.aau.dk/airbase/schema/inCity`] - (sta) <- [:`http://qweb.cs.aau.dk/airbase/schema/station`] - (ancientobs) - [:`http://qweb.cs.aau.dk/airbase/schema/year`] -> (year)

//CREATE (ancientobs)-[:`http://qweb.cs.aau.dk/airbase/schema/nextObervation`]->(newObs)

## Querying Aggreates

// 1

MATCH (sensor) <- [:`http://qweb.cs.aau.dk/airbase/schema/sensor`]- (obs) - [:`http://qweb.cs.aau.dk/airbase/schema/station`] -> (sta),

(obs) - [:`http://qweb.cs.aau.dk/airbase/schema/year`] -> (Year)

RETURN sensor, sta, Year, obs.`http://qweb.cs.aau.dk/airbase/schema/SO2`

// 2

MATCH (component) <- [rSensor :`http://qweb.cs.aau.dk/airbase/schema/aggregate` {analysisAxis : 'http://qweb.cs.aau.dk/airbase/schema/sensor'}] -(obs {`http://qweb.cs.aau.dk/airbase/schema/station`:'Station', `http://qweb.cs.aau.dk/airbase/schema/sensor`:'Component', `http://qweb.cs.aau.dk/airbase/schema/year`:'Year'}) - [r :`http://qweb.cs.aau.dk/airbase/schema/aggregate` {analysisAxis : 'http://qweb.cs.aau.dk/airbase/schema/station'}] -> (sta),

(obs {`http://qweb.cs.aau.dk/airbase/schema/station`:'Station', `http://qweb.cs.aau.dk/airbase/schema/sensor`:'Component', `http://qweb.cs.aau.dk/airbase/schema/year`:'Year'}) - [rYear :`http://qweb.cs.aau.dk/airbase/schema/aggregate` {analysisAxis : 'http://qweb.cs.aau.dk/airbase/schema/year'}] -> (Year)

RETURN component, sta, Year, obs.`http://qweb.cs.aau.dk/airbase/schema/SO2`

// 3

MATCH (sensor) <- [r: `http://qweb.cs.aau.dk/airbase/schema/aggregate` {analysisAxis : 'http://qweb.cs.aau.dk/airbase/schema/sensor'}] -(obs {`http://qweb.cs.aau.dk/airbase/schema/station`:'Station', `http://qweb.cs.aau.dk/airbase/schema/sensor`:'Sensor', `http://qweb.cs.aau.dk/airbase/schema/year`:'ALL'}) - [rBis : `http://qweb.cs.aau.dk/airbase/schema/aggregate` {analysisAxis : 'http://qweb.cs.aau.dk/airbase/schema/station'}] -> (sta)

RETURN sensor, sta, obs.`http://qweb.cs.aau.dk/airbase/schema/SO2`

// 4

MATCH (component) <- [r: `http://qweb.cs.aau.dk/airbase/schema/aggregate` {analysisAxis : 'http://qweb.cs.aau.dk/airbase/schema/sensor'}] -(obs {`http://qweb.cs.aau.dk/airbase/schema/station`:'Station', `http://qweb.cs.aau.dk/airbase/schema/sensor`:'Component', `http://qweb.cs.aau.dk/airbase/schema/year`:'ALL'}) - [rBis :`http://qweb.cs.aau.dk/airbase/schema/aggregate` {analysisAxis : 'http://qweb.cs.aau.dk/airbase/schema/station'}] -> (sta)

RETURN component, sta, obs.`http://qweb.cs.aau.dk/airbase/schema/SO2`

// 5

MATCH (obs {`http://qweb.cs.aau.dk/airbase/schema/station`:'Station', `http://qweb.cs.aau.dk/airbase/schema/sensor`:'ALL', `http://qweb.cs.aau.dk/airbase/schema/year`:'ALL'}) - [r:`http://qweb.cs.aau.dk/airbase/schema/aggregate` {analysisAxis : 'http://qweb.cs.aau.dk/airbase/schema/station'}] -> (sta)

RETURN sta, obs.`http://qweb.cs.aau.dk/airbase/schema/SO2`

// 6

MATCH (component) <- [rComp :`http://qweb.cs.aau.dk/airbase/schema/aggregate` {analysisAxis : 'http://qweb.cs.aau.dk/airbase/schema/sensor'}] - (obs {`http://qweb.cs.aau.dk/airbase/schema/station`:'City', `http://qweb.cs.aau.dk/airbase/schema/sensor`:'Component', `http://qweb.cs.aau.dk/airbase/schema/year`:'ALL'}) -

[r :`http://qweb.cs.aau.dk/airbase/schema/aggregate` {analysisAxis : 'http://qweb.cs.aau.dk/airbase/schema/station'}] -> (city)

RETURN city, component, obs.`http://qweb.cs.aau.dk/airbase/schema/SO2`

// 7

MATCH (obs {`http://qweb.cs.aau.dk/airbase/schema/station`:'City',

`http://qweb.cs.aau.dk/airbase/schema/sensor`:'ALL', `http://qweb.cs.aau.dk/airbase/schema/year`:'ALL'}) -

[r :`http://qweb.cs.aau.dk/airbase/schema/aggregate` {analysisAxis : 'http://qweb.cs.aau.dk/airbase/schema/station'}] -> (city)

RETURN city, obs.`http://qweb.cs.aau.dk/airbase/schema/SO2`

// 8

MATCH (component) <- [rComp :`http://qweb.cs.aau.dk/airbase/schema/aggregate` {analysisAxis : 'http://qweb.cs.aau.dk/airbase/schema/sensor'}] - (obs {`http://qweb.cs.aau.dk/airbase/schema/station`:'Country', `http://qweb.cs.aau.dk/airbase/schema/sensor`:'Component', `http://qweb.cs.aau.dk/airbase/schema/year`:'ALL'}) - [r :`http://qweb.cs.aau.dk/airbase/schema/aggregate` {analysisAxis : 'http://qweb.cs.aau.dk/airbase/schema/station'}] -> (Country)

RETURN Country, component, obs.`http://qweb.cs.aau.dk/airbase/schema/SO2`

// 9

MATCH (obs {`http://qweb.cs.aau.dk/airbase/schema/station`:'Country', `http://qweb.cs.aau.dk/airbase/schema/sensor`:'ALL', `http://qweb.cs.aau.dk/airbase/schema/year`:'ALL'}) - [r :`http://qweb.cs.aau.dk/airbase/schema/aggregate` {analysisAxis : 'http://qweb.cs.aau.dk/airbase/schema/station'}] -> (Country)

RETURN Country, obs.`http://qweb.cs.aau.dk/airbase/schema/SO2`

// 10

MATCH (obs {`http://qweb.cs.aau.dk/airbase/schema/station`:'ALL', `http://qweb.cs.aau.dk/airbase/schema/sensor`:'ALL', `http://qweb.cs.aau.dk/airbase/schema/year`:'ALL'}) - [r :`http://qweb.cs.aau.dk/airbase/schema/aggregate` {analysisAxis : 'ALL'}] -> (n:ALLDIM:DIMENSION )

RETURN obs.`http://qweb.cs.aau.dk/airbase/schema/SO2`

// 11

match (city) <- [rSensor :`http://qweb.cs.aau.dk/airbase/schema/aggregate` {analysisAxis : 'http://qweb.cs.aau.dk/airbase/schema/station'}] -(obs :`http://purl.org/linked-data/cube#Observation` {`http://qweb.cs.aau.dk/airbase/schema/station`:'City', `http://qweb.cs.aau.dk/airbase/schema/sensor`:'ALL', `http://qweb.cs.aau.dk/airbase/schema/year`:'Year'}) - [r :`http://qweb.cs.aau.dk/airbase/schema/aggregate` {analysisAxis : 'http://qweb.cs.aau.dk/airbase/schema/year'}] -> (year)

RETURN city, year, obs.`http://qweb.cs.aau.dk/airbase/schema/SO2`

;

// 12

MATCH (country) <- [rSensor :`http://qweb.cs.aau.dk/airbase/schema/aggregate` {analysisAxis :'http://qweb.cs.aau.dk/airbase/schema/station'}] - (obs :`http://purl.org/linked-data/cube#Observation` {`http://qweb.cs.aau.dk/airbase/schema/station`:'Country', `http://qweb.cs.aau.dk/airbase/schema/sensor`:'ALL', `http://qweb.cs.aau.dk/airbase/schema/year`:'Year'}) - [r :`http://qweb.cs.aau.dk/airbase/schema/aggregate` {analysisAxis : 'http://qweb.cs.aau.dk/airbase/schema/year'}] -> (year)

RETURN country, year, obs.`http://qweb.cs.aau.dk/airbase/schema/SO2`

// 13

MATCH (sensor) <- [:`http://qweb.cs.aau.dk/airbase/schema/sensor`]- (obs) - [:`http://qweb.cs.aau.dk/airbase/schema/station`] -> (sta),

(obs) - [:`http://qweb.cs.aau.dk/airbase/schema/year`] -> (year)

WHERE obs. `http://qweb.cs.aau.dk/airbase/schema/SO2` is not null

AND year.uri in [`http://qweb.cs.aau.dk/airbase/data/year/2010/`,`http://qweb.cs.aau.dk/airbase/data/year/2006/`,`http://qweb.cs.aau.dk/airbase/data/year/2007/`,`http://qweb.cs.aau.dk/airbase/data/year/2008/`,`http://qweb.cs.aau.dk/airbase/data/year/2009/`]

RETURN sensor, sta, year, obs.`http://qweb.cs.aau.dk/airbase/schema/SO2`

// 14

MATCH (obs {`http://qweb.cs.aau.dk/airbase/schema/station`:'Station', `http://qweb.cs.aau.dk/airbase/schema/sensor`:'ALL', `http://qweb.cs.aau.dk/airbase/schema/year`:'ALL'}) - [r:`http://qweb.cs.aau.dk/airbase/schema/aggregate` {analysisAxis : 'http://qweb.cs.aau.dk/airbase/schema/station'}] -> (sta)

WHERE sta.uri="http://qweb.cs.aau.dk/airbase/data/station/GB0690A\_SCUN/"

RETURN sta, obs.`http://qweb.cs.aau.dk/airbase/schema/SO2`

// 15

MATCH (obs {`http://qweb.cs.aau.dk/airbase/schema/station`:'Station', `http://qweb.cs.aau.dk/airbase/schema/sensor`:'ALL', `http://qweb.cs.aau.dk/airbase/schema/year`:'ALL'}) - [r:`http://qweb.cs.aau.dk/airbase/schema/aggregate` {analysisAxis : 'http://qweb.cs.aau.dk/airbase/schema/station'}] -> (sta)

WHERE sta.uri 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/"]

RETURN sta, obs.`http://qweb.cs.aau.dk/airbase/schema/SO2`

// 16

MATCH (obs {`http://qweb.cs.aau.dk/airbase/schema/station`:'City', `http://qweb.cs.aau.dk/airbase/schema/sensor`:'ALL', `http://qweb.cs.aau.dk/airbase/schema/year`:'ALL'}) - [r :`http://qweb.cs.aau.dk/airbase/schema/aggregate` {analysisAxis : 'http://qweb.cs.aau.dk/airbase/schema/station'}] -> (city)

WHERE city.uri="http://qweb.cs.aau.dk/airbase/data/city/LONDON/"

RETURN city, obs.`http://qweb.cs.aau.dk/airbase/schema/SO2`

// 17

MATCH (obs {`http://qweb.cs.aau.dk/airbase/schema/station`:'Country', `http://qweb.cs.aau.dk/airbase/schema/sensor`:'ALL', `http://qweb.cs.aau.dk/airbase/schema/year`:'ALL'}) - [r :`http://qweb.cs.aau.dk/airbase/schema/aggregate` {analysisAxis : 'http://qweb.cs.aau.dk/airbase/schema/station'}] -> (Country)

WHERE Country.uri="http://qweb.cs.aau.dk/airbase/data/country/United\_Kingdom/"

RETURN Country, obs.`http://qweb.cs.aau.dk/airbase/schema/SO2`

// 18

match (city) <- [rSensor :`http://qweb.cs.aau.dk/airbase/schema/aggregate` {analysisAxis : 'http://qweb.cs.aau.dk/airbase/schema/station'}] -(obs :`http://purl.org/linked-data/cube#Observation` {`http://qweb.cs.aau.dk/airbase/schema/station`:'City', `http://qweb.cs.aau.dk/airbase/schema/sensor`:'ALL', `http://qweb.cs.aau.dk/airbase/schema/year`:'Year'}) - [r :`http://qweb.cs.aau.dk/airbase/schema/aggregate` {analysisAxis : 'http://qweb.cs.aau.dk/airbase/schema/year'}] -> (year)

WHERE year.uri="http://qweb.cs.aau.dk/airbase/data/year/2010/"

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

RETURN city, year, obs.`http://qweb.cs.aau.dk/airbase/schema/SO2`

// 19

match (city) <- [rSensor :`http://qweb.cs.aau.dk/airbase/schema/aggregate` {analysisAxis : 'http://qweb.cs.aau.dk/airbase/schema/station'}] -(obs :`http://purl.org/linked-data/cube#Observation` {`http://qweb.cs.aau.dk/airbase/schema/station`:'City', `http://qweb.cs.aau.dk/airbase/schema/sensor`:'ALL', `http://qweb.cs.aau.dk/airbase/schema/year`:'Year'}) - [r :`http://qweb.cs.aau.dk/airbase/schema/aggregate` {analysisAxis : 'http://qweb.cs.aau.dk/airbase/schema/year'}] -> (year)

WHERE obs. `http://qweb.cs.aau.dk/airbase/schema/SO2` is not null

AND year.uri in ["http://qweb.cs.aau.dk/airbase/data/year/2010/","http://qweb.cs.aau.dk/airbase/data/year/2006/","http://qweb.cs.aau.dk/airbase/data/year/2007/","http://qweb.cs.aau.dk/airbase/data/year/2008/","http://qweb.cs.aau.dk/airbase/data/year/2009/"]

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

RETURN city, year, obs.`http://qweb.cs.aau.dk/airbase/schema/SO2`

// 20

match (city) <- [rSensor :`http://qweb.cs.aau.dk/airbase/schema/aggregate` {analysisAxis : 'http://qweb.cs.aau.dk/airbase/schema/station'}] -(obs :`http://purl.org/linked-data/cube#Observation` {`http://qweb.cs.aau.dk/airbase/schema/station`:'City', `http://qweb.cs.aau.dk/airbase/schema/sensor`:'ALL', `http://qweb.cs.aau.dk/airbase/schema/year`:'Year'}) - [r :`http://qweb.cs.aau.dk/airbase/schema/aggregate` {analysisAxis : 'http://qweb.cs.aau.dk/airbase/schema/year'}] -> (year)

WHERE year.uri="http://qweb.cs.aau.dk/airbase/data/year/2010/"

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

RETURN city, obs.`http://qweb.cs.aau.dk/airbase/schema/SO2`

// 21

MATCH (component) <- [rSensor :`http://qweb.cs.aau.dk/airbase/schema/aggregate` {analysisAxis : 'http://qweb.cs.aau.dk/airbase/schema/sensor'}] -(obs {`http://qweb.cs.aau.dk/airbase/schema/station`:'Station', `http://qweb.cs.aau.dk/airbase/schema/sensor`:'Component', `http://qweb.cs.aau.dk/airbase/schema/year`:'Year'}) - [r :`http://qweb.cs.aau.dk/airbase/schema/aggregate` {analysisAxis : 'http://qweb.cs.aau.dk/airbase/schema/station'}] -> (sta),

(obs {`http://qweb.cs.aau.dk/airbase/schema/station`:'Station', `http://qweb.cs.aau.dk/airbase/schema/sensor`:'Component', `http://qweb.cs.aau.dk/airbase/schema/year`:'Year'}) - [rYear :`http://qweb.cs.aau.dk/airbase/schema/aggregate` {analysisAxis : 'http://qweb.cs.aau.dk/airbase/schema/year'}] -> (Year)

WHERE sta.uri="http://qweb.cs.aau.dk/airbase/data/station/GB0690A\_SCUN/"

AND Year.uri="http://qweb.cs.aau.dk/airbase/data/year/2004/"

AND component.uri="http://qweb.cs.aau.dk/airbase/data/component/1/"

RETURN component, sta, Year, obs.`http://qweb.cs.aau.dk/airbase/schema/SO2`

// 22

match (city) <- [rSensor :`http://qweb.cs.aau.dk/airbase/schema/aggregate` {analysisAxis : 'http://qweb.cs.aau.dk/airbase/schema/station'}] -(obs :`http://purl.org/linked-data/cube#Observation` {`http://qweb.cs.aau.dk/airbase/schema/station`:'City', `http://qweb.cs.aau.dk/airbase/schema/sensor`:'ALL', `http://qweb.cs.aau.dk/airbase/schema/year`:'Year'}) - [r :`http://qweb.cs.aau.dk/airbase/schema/aggregate` {analysisAxis : 'http://qweb.cs.aau.dk/airbase/schema/year'}] -> (year)

WHERE obs.`http://qweb.cs.aau.dk/airbase/schema/SO2`>150

RETURN city, year, obs.`http://qweb.cs.aau.dk/airbase/schema/SO2`

// 23

MATCH (obs {`http://qweb.cs.aau.dk/airbase/schema/station`:'City',`http://qweb.cs.aau.dk/airbase/schema/sensor`:'ALL', `http://qweb.cs.aau.dk/airbase/schema/year`:'ALL'}) - [r :`http://qweb.cs.aau.dk/airbase/schema/aggregate` {analysisAxis : 'http://qweb.cs.aau.dk/airbase/schema/station'}] -> (city)

WHERE city.uri 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/"]

and obs.`http://qweb.cs.aau.dk/airbase/schema/SO2`>100

RETURN city, obs.`http://qweb.cs.aau.dk/airbase/schema/SO2`

// 24

MATCH (obs {`http://qweb.cs.aau.dk/airbase/schema/station`:'City',`http://qweb.cs.aau.dk/airbase/schema/sensor`:'ALL', `http://qweb.cs.aau.dk/airbase/schema/year`:'ALL'}) - [r :`http://qweb.cs.aau.dk/airbase/schema/aggregate` {analysisAxis : 'http://qweb.cs.aau.dk/airbase/schema/station'}] -> (city)

WHERE city.uri 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/"]

and obs.`http://qweb.cs.aau.dk/airbase/schema/NO2`>100

RETURN city, obs.`http://qweb.cs.aau.dk/airbase/schema/SO2`