Achieving Flexibility in Wireless Network Simulation Data Processing by Logging and Using SQL

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Introduction

- Export simulation data into a simple tabular format
- Use SQL to process and filter the data

Background

- SQL is a language for asking questions about data stored in tables
- A schema is a collection of table definitions

Background: Example

Here is the schema:

- CREATE TABLE students (student_id, name, birthyear, gender)
- CREATE TABLE classes (class_id, name)
- CREATE TABLE grades (student_id, class_id, points)

Background: Example

Here is the data:

students:

student_id	name	birthyear	gender
1	Kadjo	1979	M
2	Baird	1981	M
3	Goober	1800	M

classes:

class_id	name
ECON490	IT Economics
EE231	Digital Electronics

grades:

student_id	class_id	points
1	ECON490	1.0
2	ECON490	2.0
2	EE231	3.0
3	EE231	4.0

Background: Example

Here are some queries:

```
SELECT c.name,
       SUM(g.points)/COUNT(g.points)
    FROM grades AS g,
         classes AS c
    WHERE g.class_id = c.class_id
    GROUP BY c.class_id;
```

class_name	average_points
IT Economics	1.5
Digital Electronics	3.5

```
SELECT s.name,
       SUM(g.points)/COUNT(g.points)
    FROM grades AS g,
         students AS s
    WHERE g.student_id = s.student_id
    GROUP BY s.student_id;
```

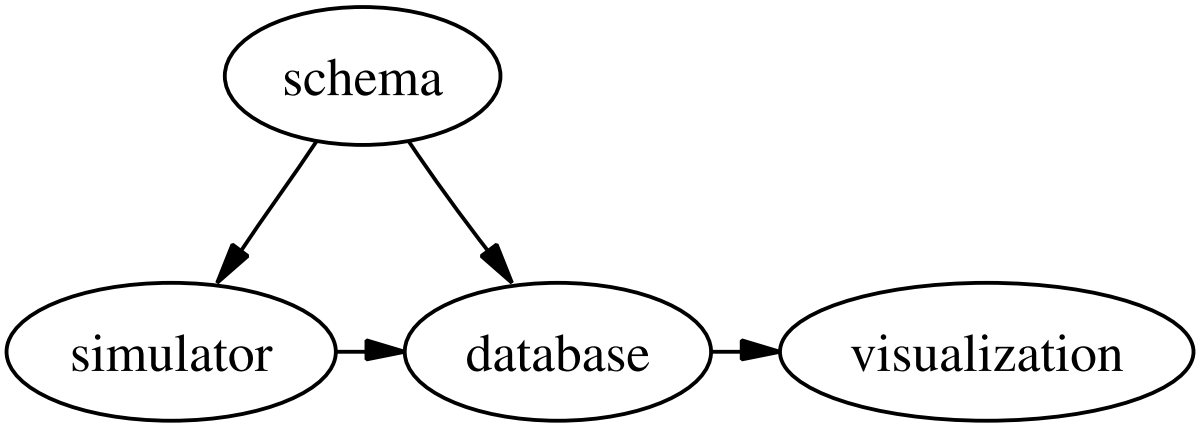
student_name	average_points
Kadjo	1
Baird	2.5
Goober	4

Motivation

- Simplification of data formats
- Convenient access
- Separation of concerns: writing a simulation and processing the data are separate problems

Procedure

1. Define a schema
2. Export data from simulation into tables
3. Import data into SQL database
4. Use queries to extract useful information



Future Work

- Apply these concepts to SPICE simulations

Conclusion

- By following a simple set of rules, simulations can be easier to run and the data can be eaiser to analyze.
- SQL is good at filtering, relating, and processing data.