

# **Analysis of Traffic for Adaptive Resource Allocation in 5G networks**

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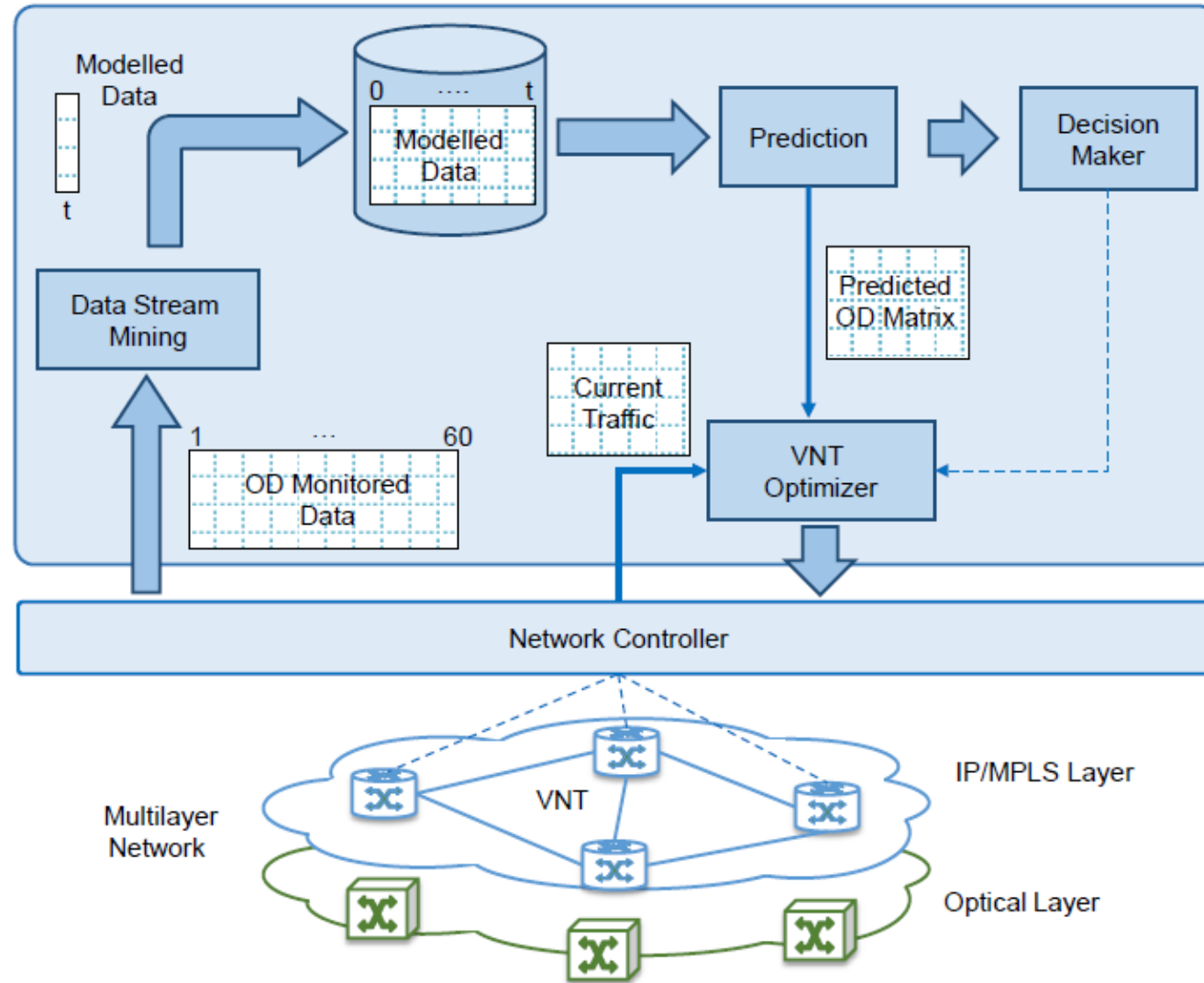
# Analytics: Why useful in 5G?

- IoT

- Scaling of Data

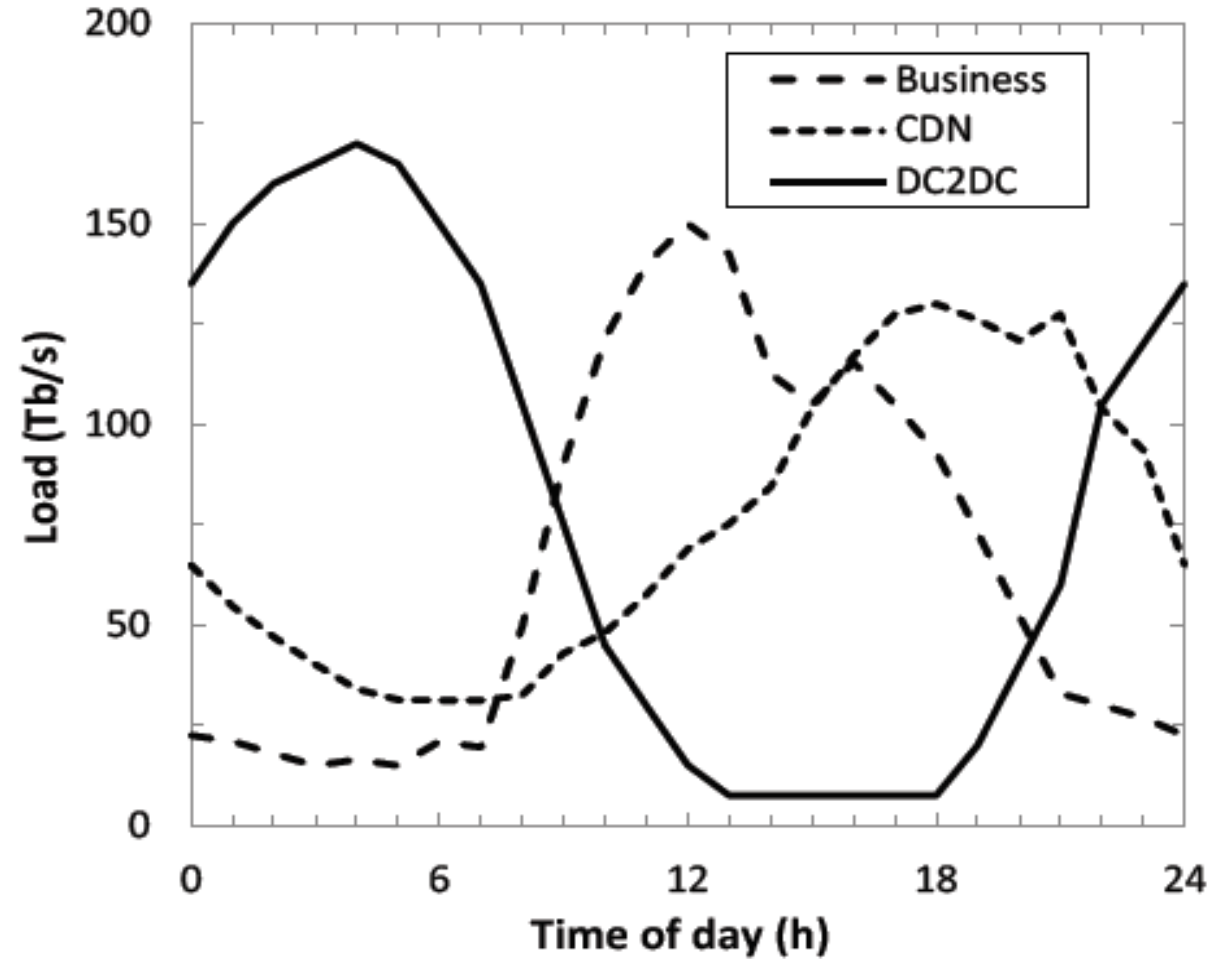
- Computation at edge

# Analytics: Core network



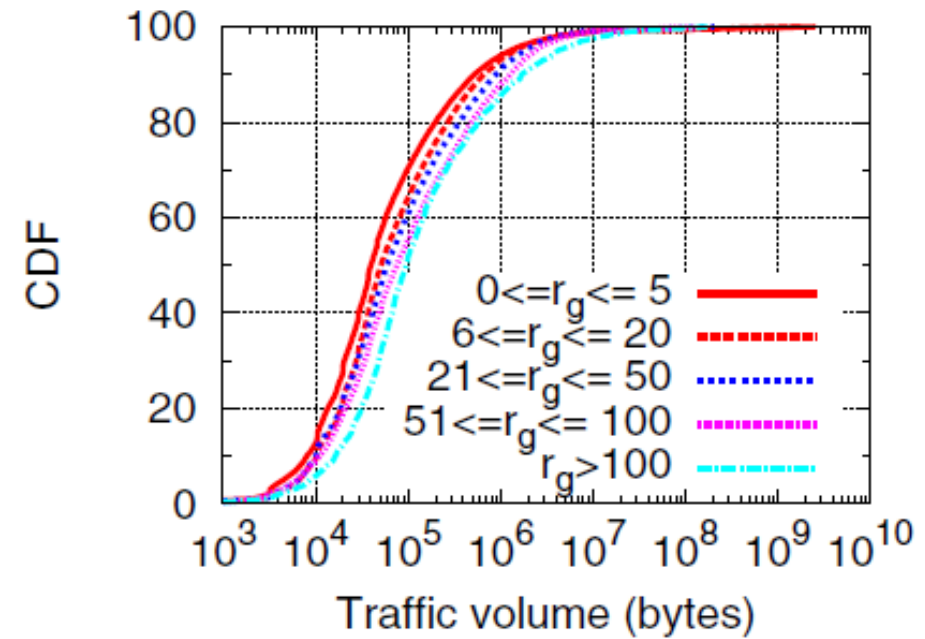
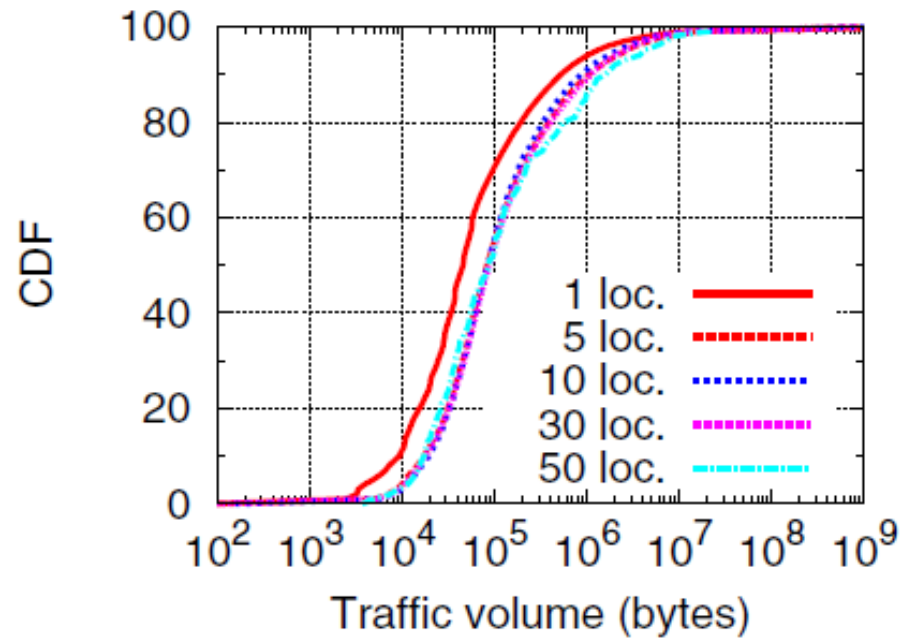
# Traffic Profile: Core Network

Experiment was run across Telefonica's 30-node national network



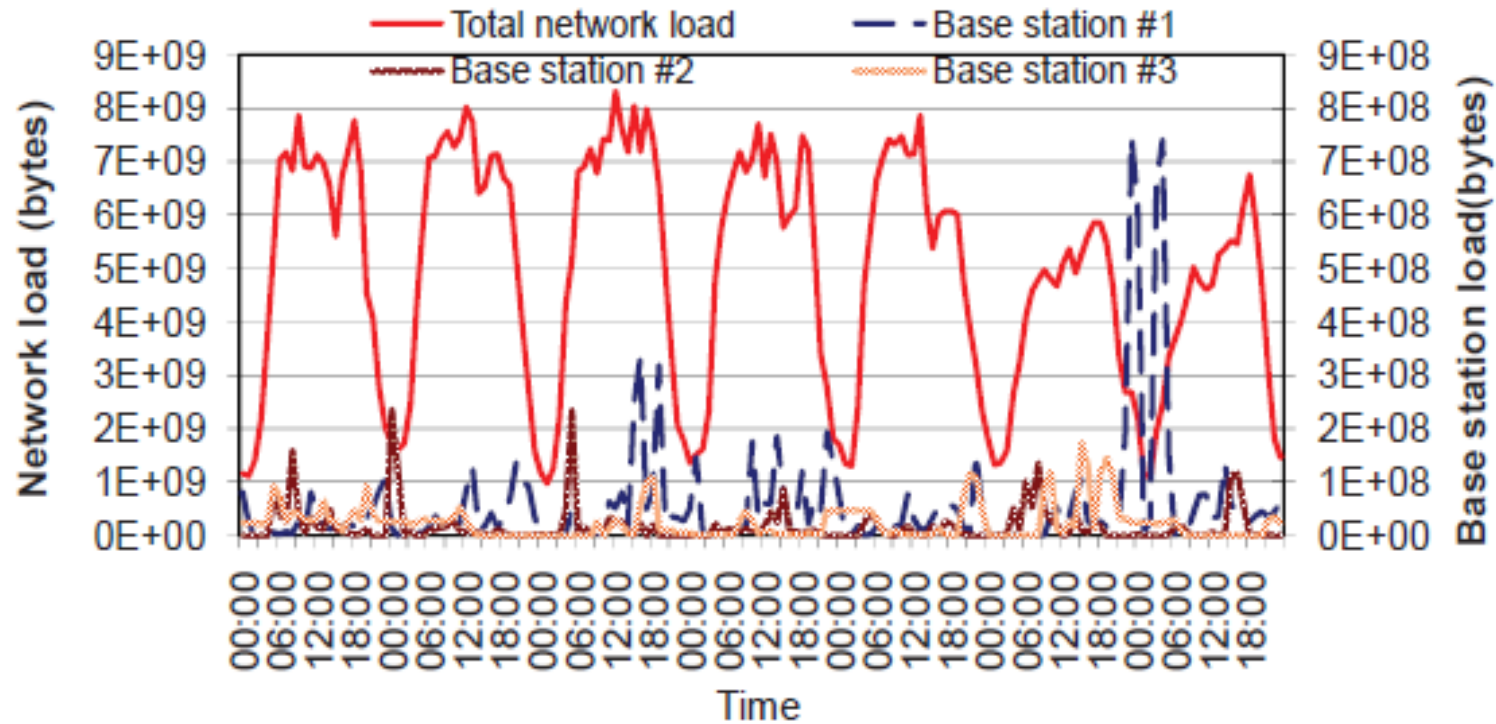
# Features of Cellular Data Traffic

- More mobile users generate more traffic



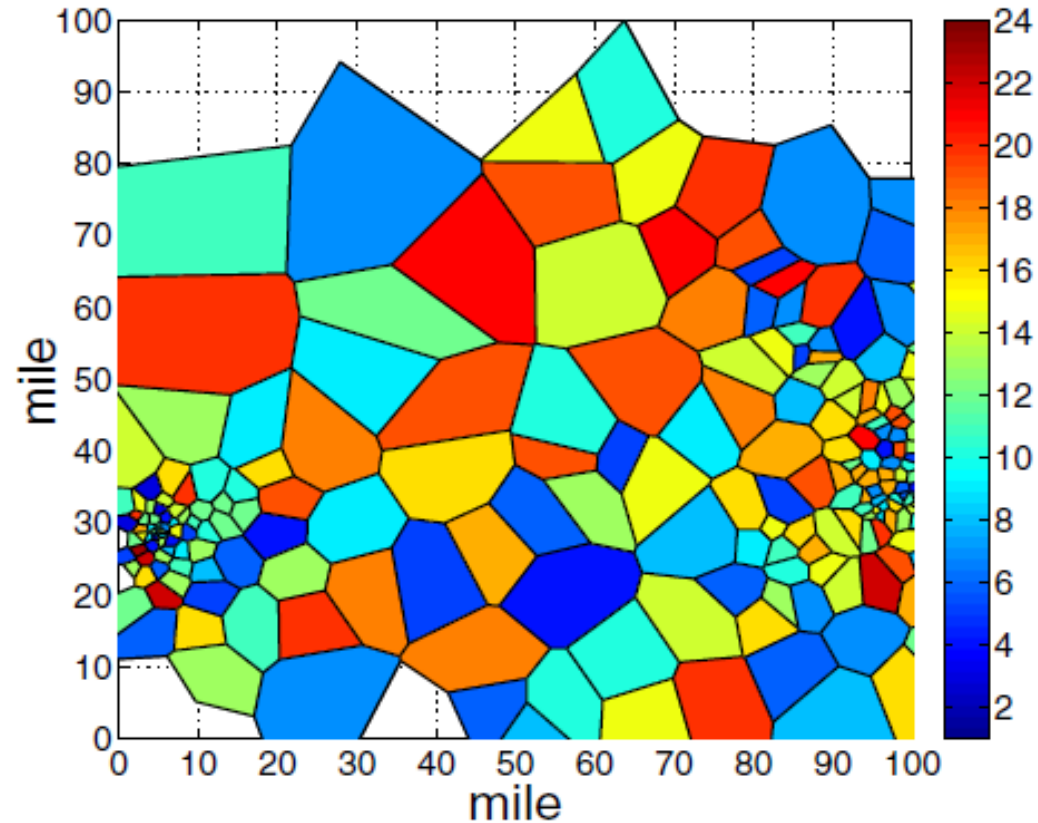
# Features of Cellular Data Traffic

- ❑ Aggregate traffic periodic
- ❑ Traffic per base station is not



# Features of Cellular Data Traffic

- ❑ Temporal correlation is not significant between adjacent cells



# Research Ideas

- ❑ Traffic prediction from partial Information
  - Measurement facility may not be in all small cells
  - Partial information about traffic may be available

Granger Causality!!



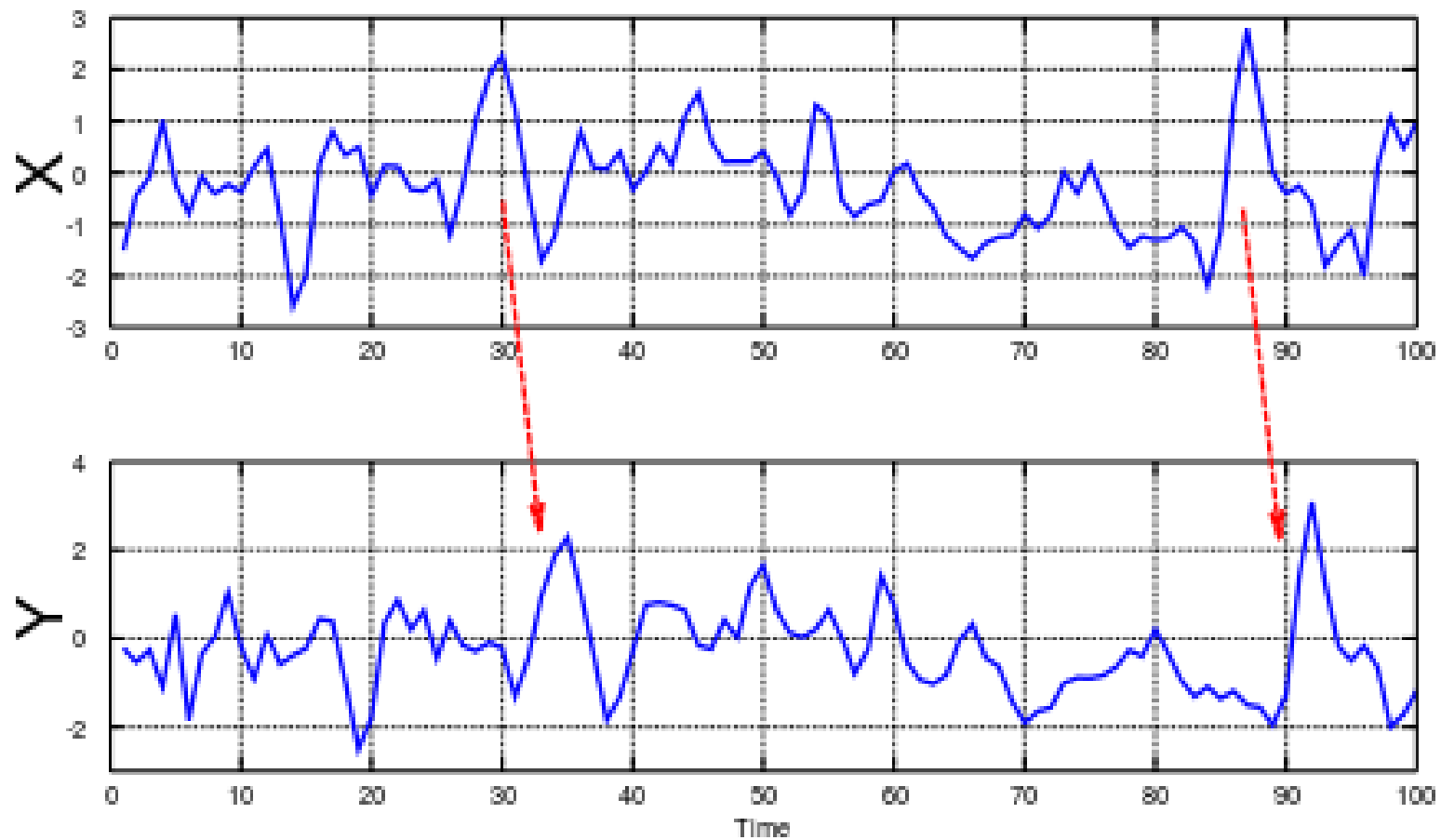
# Granger Causality

Granger defined the causality relationship based on two principles:

- ❑ The cause happens prior to its effect.
- ❑ The cause has unique information about the future values of its effect.

$$\mathbb{P}[Y(t+1) \in A \mid \mathcal{I}(t)] \neq \mathbb{P}[Y(t+1) \in A \mid \mathcal{I}_{-X}(t)],$$

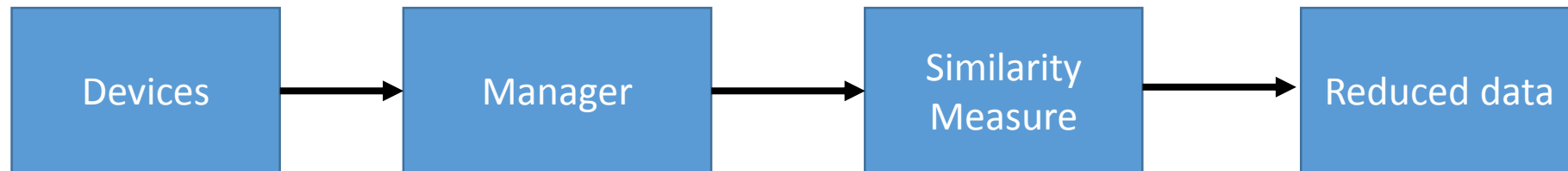
# Granger Causality



# Research Ideas

## ❑ Information Scaling

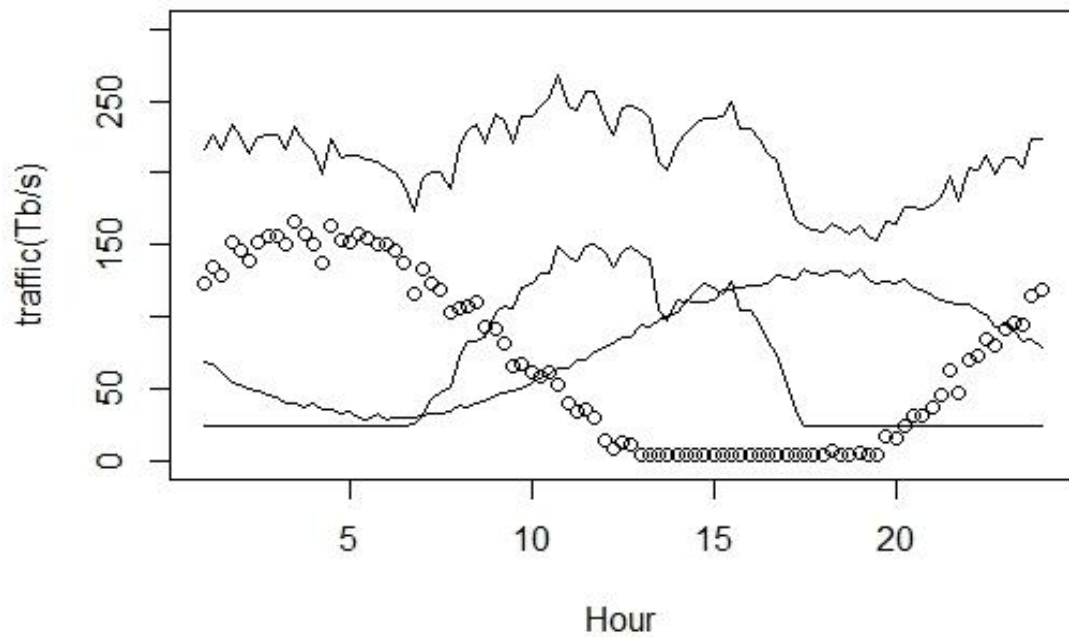
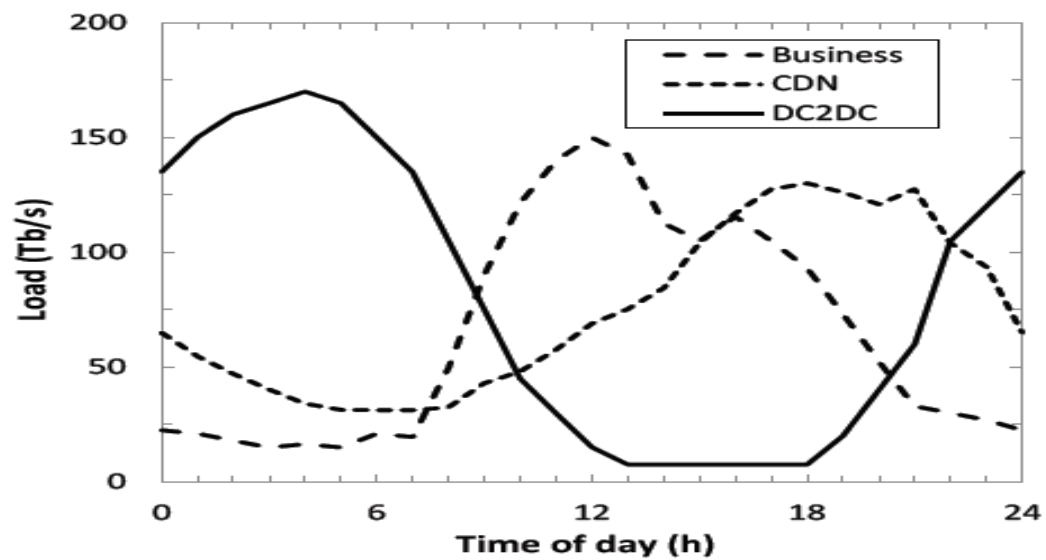
- IoT is an important aspect of 5G
- Big data analytics can be useful in scaling down the data



# One Scenario

- There may be huge amount of traffic on the road during office hours
- Data feed from traffic cameras, usage pattern of users
- Similar data
- Eliminate redundant information: provide better routes

# Result



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