

# PREDICTING TCP/IP NETWORK TRAFFIC USING TIME SERIES FORECASTING

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## TCP/IP networks

- telecommunication networks (e.g. WANs)
- internet: collection of networks
- crucial part of today's infrastructure
- various applications depend on it (e.g. banking, ...)

→ important to understand and forecast behaviour

## Internet Service Provider (ISP)

- optimize resources
- improve quality of service

## Network Security

- detecting anomalies in network traffic
- examples: DDoS attacks, spam floods
- compare observed with expected traffic
- early detection

## Part of the Time Series Data Library

- large collection of time series datasets
- by Rob Hyndman

## Data from private european ISP

- traffic passing through transatlantic link

## Key Characteristics

- three different resolutions (5 minutes, hourly, and daily)
- collected between June 7th and July 31th 2005

## Time Series Plots (???)

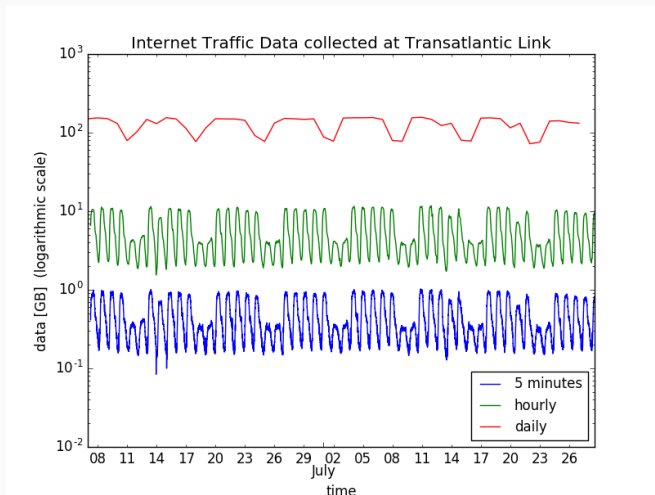
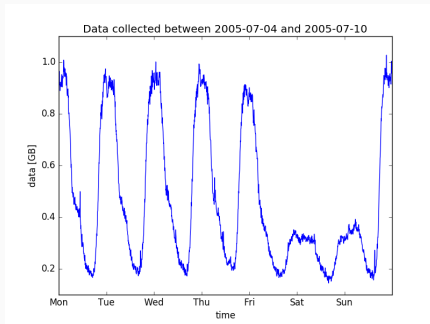
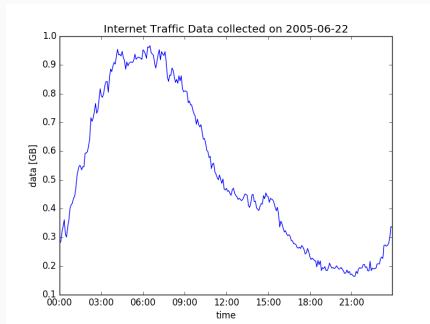


Figure 1: Time series plots with three different resolutions.

## Weekly and Daily Patterns

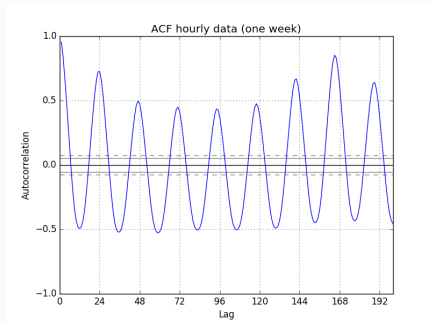


**Figure 2:** Typical pattern of a single week.

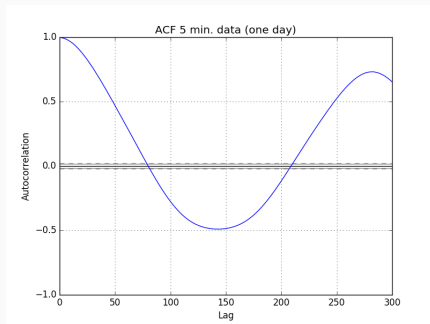


**Figure 3:** Typical pattern of a single day.

## Autocorrelation Plots



**Figure 4:** ACF which shows daily and weekly patterns based on hourly data.



**Figure 5:** ACF which shows daily pattern using the 5 minute data.

QUESTIONS?