



# **Disasters and Mitigation Approaches in Urban Areas**

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- ▶ Disasters in urban areas
- ▶ Sources of disasters
- ▶ Approaches for mitigation
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# Disasters in Urban Areas





# Sources of Disasters

- ▶ Global warming
  - Water rising
  - Irregular heavy rains
  - Storms
- ▶ Human related activities
  - In efficient wastewater managements /city management
  - Too many private transport means
  - The economy growing too hot
  - Etc.



# Approaches for Mitigation

- ▶ Applying traditional methods
  - Building bridges, roads, dams, etc.
  - Expensive
- ▶ Implementation of state-of-the-art technologies
  - Internet of Things
    - Sensors for collecting data & monitoring
  - Big Data
    - Data analysis, prediction, forecast, finding solutions
  - Smart devices
    - Mobile phones, tablets, etc.



# Examples Solutions



# Systems for Environment Monitoring

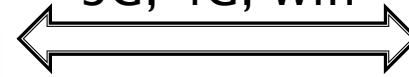
Server



Smart phones, Tablets



3G, 4G, Wifi



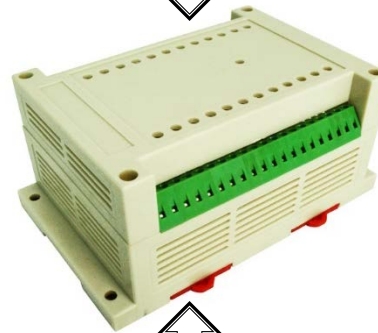
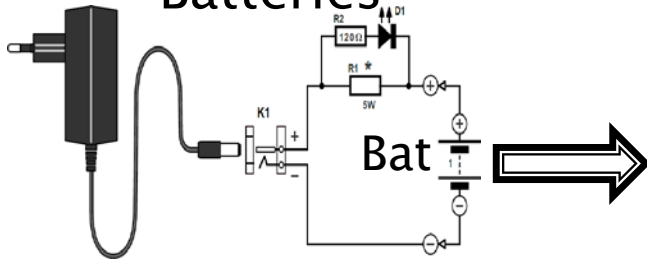
LCD Monitor



GPRS



Charger & Backup Batteries



Sensors



# Smart Traffic Systems

## Data Collection

### GPS from Smart devcies



### Public transport



### Traffic Cameras

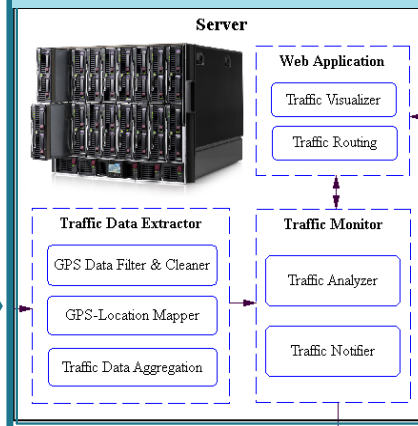


### Radio broadcasting



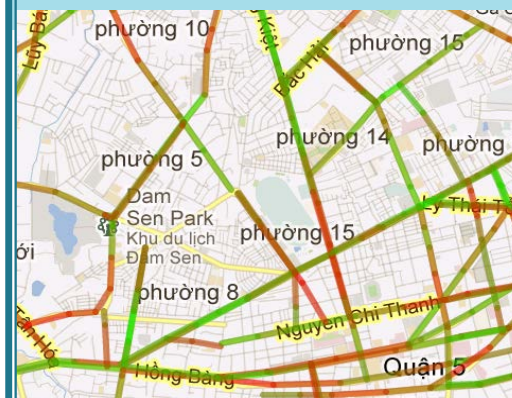
## Storage and Analytics

### Data integration and analytics



## Monitor, Forecasting, and Navigating, etc.

### Traffic informations



### City navigations







# Traffic Information Map

A screenshot of a web browser displaying a traffic information map of Ho Chi Minh City. The browser window shows the URL 'traffic.hcmut.edu.vn/webapp/'. The map is titled 'Smart BK TRAFFIC' and shows a color-coded traffic flow map of the city. A legend in the top right corner indicates traffic speed in km/h, ranging from 0 (red) to 50 (blue). The map shows various districts and roads, with a color gradient from red to blue indicating traffic density. A control panel on the right allows users to toggle traffic information, select a date and time, and adjust the map's zoom level. The bottom of the browser window shows a dock with various application icons.

Safari File Edit View History Bookmarks Window Help

Traffic Info

traffic.hcmut.edu.vn/webapp/

Apple iCloud Facebook Twitter Wikipedia Yahoo News Popular

**Smart BK TRAFFIC** OFF

Chậm 0 5 10 30 50 Nhanh (km/h)

Hiện thị giao thông X

Giao thông hiện tại

Giao thông quá khứ

Thứ Hai, 10:00, 29/09/2014

Chọn ngày S M T W T F S

Chọn giờ 8 12 16 20

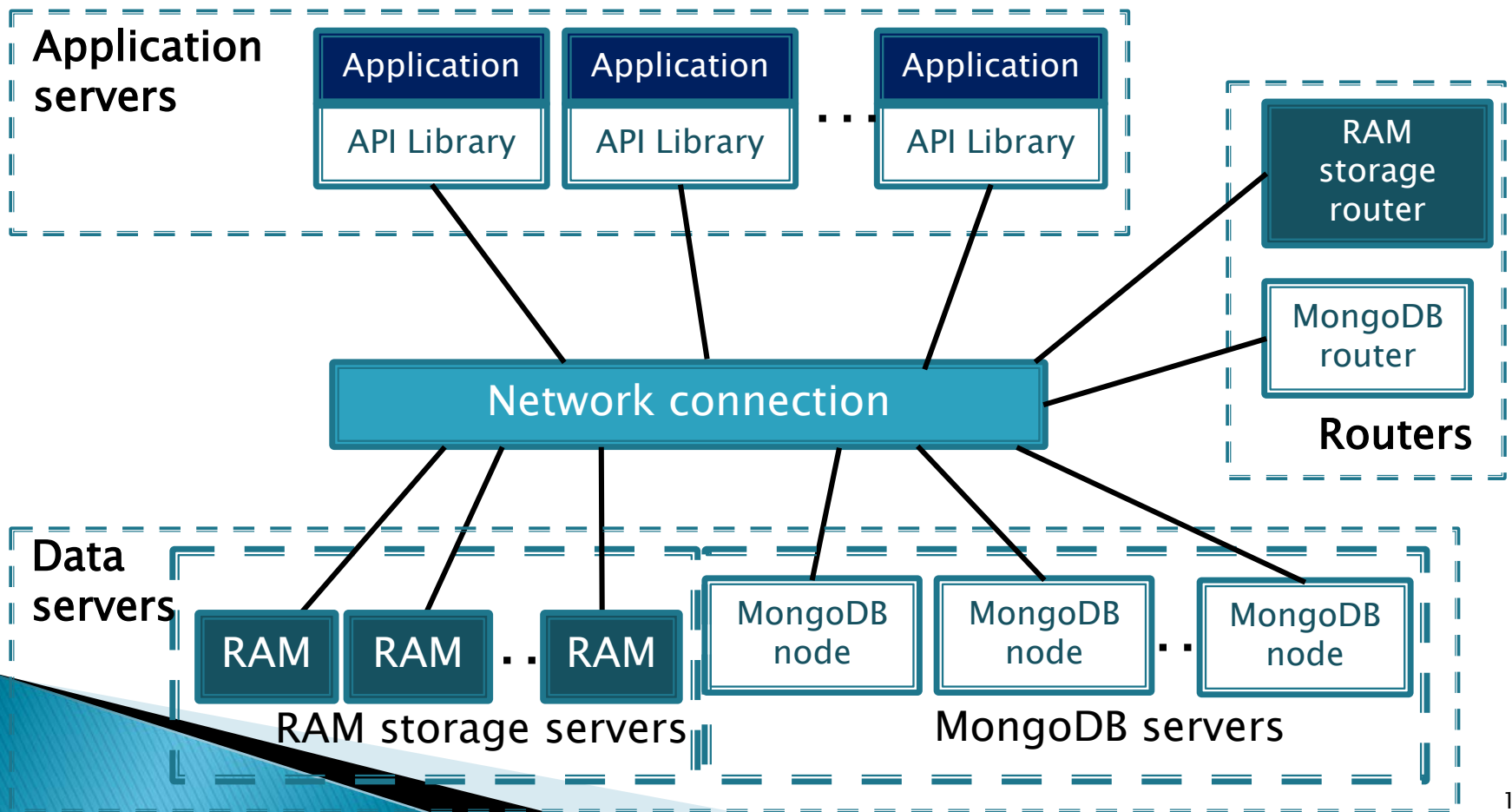
HỒ CHÍ MINH CITY (THÀNH PHỐ HỒ CHÍ MINH)

Saigon River (Sông Sài Gòn)

Leaflet | Website © 2013 ITS BK Project . Map data © 2011 OpenStreetMap contributors



# Storage Systems for IoT Applications





# Conclusions

- ▶ Human related disasters are getting common in big cities
  - Can affect lives of millions of people
  - Cost sometimes as big as natural disasters
- ▶ They could be mitigated with the help of state-of-the-art technologies like IoT, Big Data, etc.



**Thank you!**