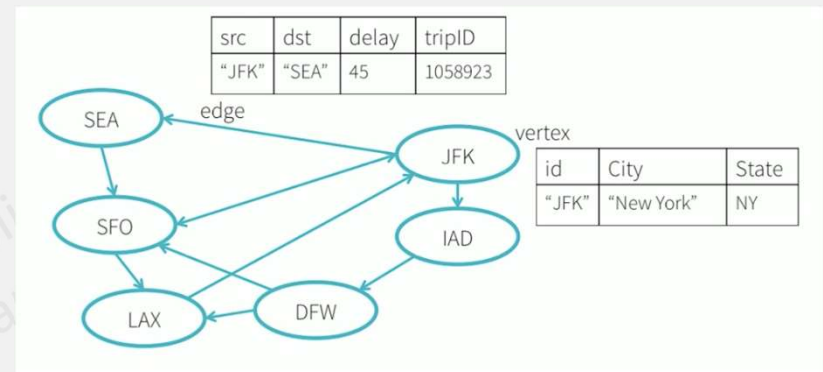# CLOUD COMPUTING APPLICATIONS
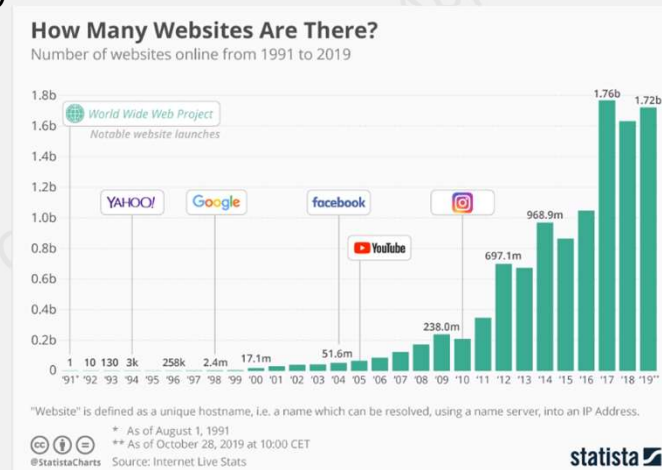
Graphs: Basics

Prof. Reza Farivar

Graphs: Overview

- Graph Data Structure
- Relations between vertices and edges
  - Properties: Properties are pertinent information that relate to nodes or edges
- Nodes represent entities (people, businesses, accounts…)
- Edges interconnect nodes to nodes or nodes to properties and they represent the relationship between the two
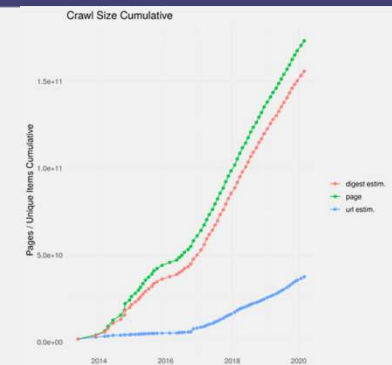
- Many domains are a natural fit

Scale of Real-World Graphs

Web Scale ...

- ~2 billion vertices (websites), ~20 billion edges
  - ~10% active
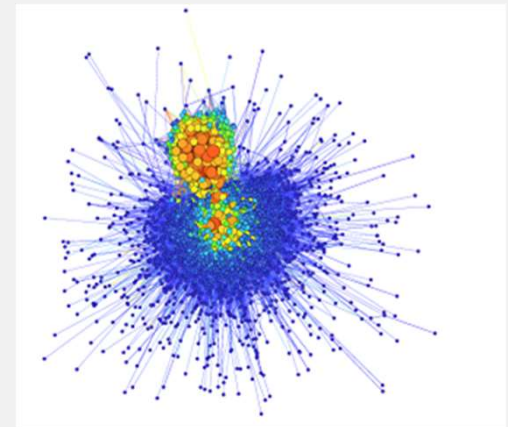 - Webpages estimated at ~60B
- 200 GB adjacency list

https://www.worldwidewebsize.com

Scale of Real-World Graphs

Social scale ...

- 1 billion vertices, 100 billion edges
- 2.92 TB adjacency list

Twitter graph from Gephi data set (http://www.gephi.org)
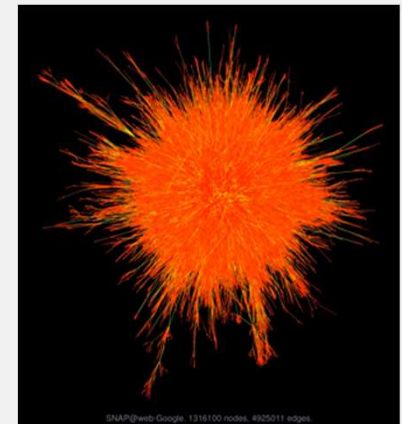
Scale of Real-World Graphs

Web scale ...

- 50 billion vertices, 1 trillion edges
- 29.5 TB adjacency list

Web graph from the SNAP database (http://snap.stanford.edu/data)
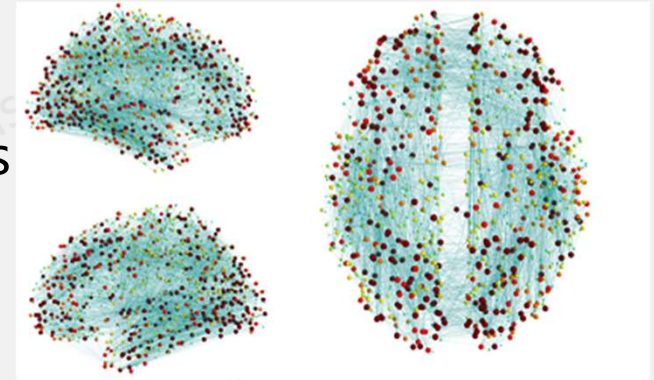
Scale of Real-World Graphs

Brain scale …

- 100 billion vertices, 100 trillion edges
- 2.84 PB adjacency list

Human connectome. Gerhard et al., Frontiers in Neuroinformatics 5(3), 2011