

# CAS 781: Data Center Design Assignment 5

Baran Kaya, 400284996

## Question 2 (Zhi)

- Cassandra uses order preserving hash function because:
- It needs to produce different values for each object/row. Also, hash function's calculations are fast thus, database operations (write/read) don't take too much time.
- It is better for searching within partitions.
- It needs to separate data for partition. It can store same row data in one partition. In slides she used BMW, Audi and Mercedes for partitions' separation values (row id). The other example was using number intervals. For example, database uses partitions with 1-11-21-31-... intervals so, in this DB the objects with id=12 and 16 are in the same partition but 24 isn't.

## Question 5 (Songyi)

- Software Defined Networks consists of 3 layers and these are data plane, control plane and management plane.
- SDN separates data plane (hardware-routers/switches) from control plane (routing-logic) and breaks vertical integration of the network architectures. With that separation, network engineers can easily manage and configure networks on control plane without touching the data plane.
- Also, Data Plane's Southbound Interface gets rid of hardware dependant operations and configurations and adds abstraction.

## Question 4 (Tianhao)

- **Infrastructure as a Service (IaaS)**
- Enterprises control OS, storage data and applications.
- **Platform as a Service (PaaS)**

- Enterprises control applications and has a limited control for host environment configurations.
  - **Software as a Service (SaaS)**
  - Enterprises control limited user application settings.
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- Up to some point, in all models service providers have to ensure the security of the system (Insider threat or system vulnerabilities).
  - In IaaS model, enterprises responsible for data security.
  - In PaaS model, service providers manage system security.
  - In SaaS model, data is secure in the cloud.

Baran Kaya, 400284996, [kayab@mcmaster.ca](mailto:kayab@mcmaster.ca)