The Rise of NoSQL

- NoSQL = Not only SQL
- A fundamental shift or alternative to storing data which does not conform to the relational format
- Features
  - Schema Agnostic
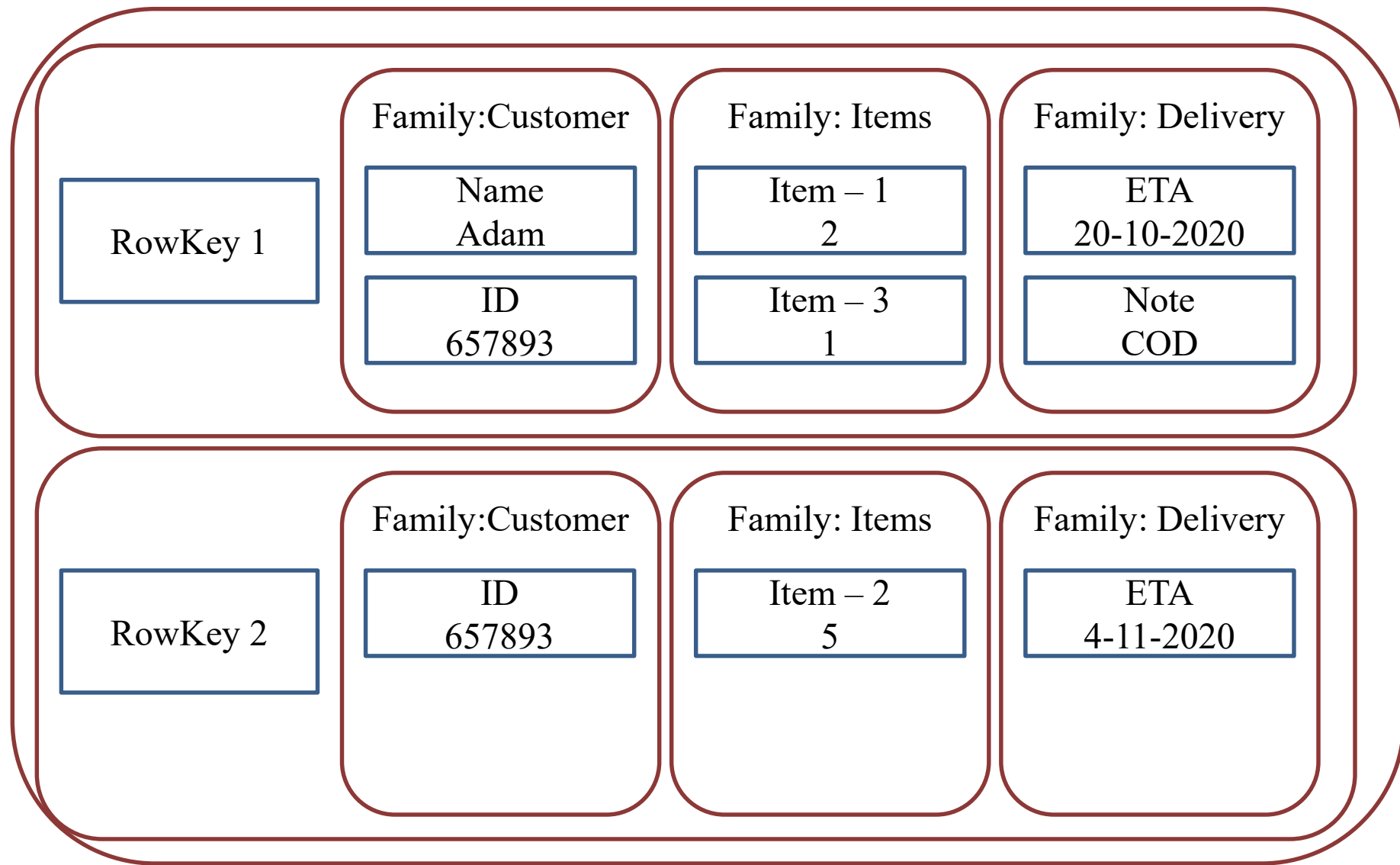 - Non relational
  - Highly distributable

Four Core NoSQL Varieties

- Columnar
- Key-Value
- Triple
- Document

Columnar Databases

- Similar to relational model – concept of rows and columns still exist
- Optimized and designed for faster column access
- Ideal for running aggregate functions or for looking up records that match multiple columns
- A single record may consist of an ID field and multiple column families
- Each one of these column families consists of several fields. One of these column families may have multiple "rows"

Columnar Databases

RowKey 1	Family:Customer	Family: Items	Family: Delivery
	Name Adam	Item – 1 2	ETA 20-10-2020
	ID 657893	Item – 3 1	Note COD

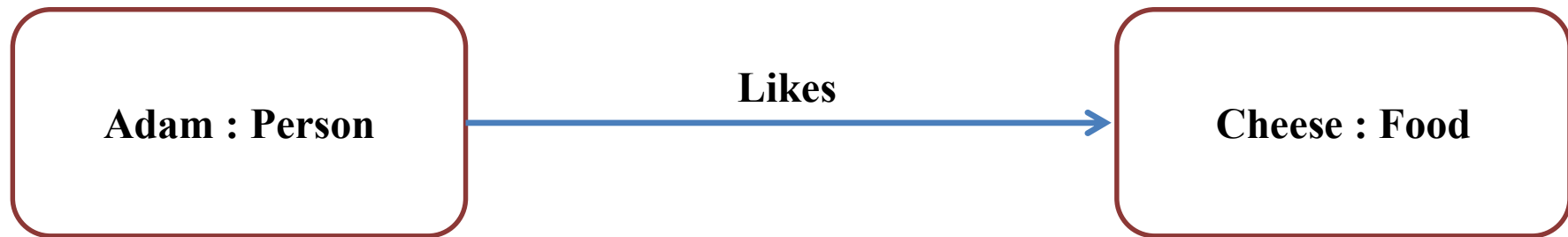| RowKey 2	Family:Customer	Family: Items	Family: Delivery
	ID 657893	Item – 2 5	ETA 4-11-2020

Key – Value Stores

- An ID field — the key in key-value stores — and a set of data

- Some key-value stores support typing (such as integers, strings, and Booleans) and more complex structures for values (such as maps and lists)

- Key-value stores are optimized for speed of ingestion and retrieval

Triple

- Every *fact* or assertion is described as a triple of subject, predicate, and object:
  - A *subject* is the thing you're describing. It may also have a type, which could be a physical object (like a person) or a concept (like a meeting).
  - A *predicate* is the property or relationship belonging to the subject.
  - An *object* is the intrinsic value of a property (such as integer or Boolean, text).

Triple

- Three points of information
  - Adam is a person
  - Cheese is a food item
  - Adam likes cheese

Document Stores

- Hold documents that combine information in a single logical unit
- Retrieving all information from a single document is easier with a database and is more logical for applications
- A document is any unstructured or tree-structured piece of information.
  - It could be a recipe, financial services trade, PowerPoint file, PDF, plain text, or JSON or XML document.

Examples of NoSQL Products

- **Columnar:** DataStax, Apache Cassandra, HBase, Apache Accumulo, Hypertable

- **Key-value:** Basho Riak, Redis, Voldemort, Aerospike, Oracle NoSQL

- **Triple/graph:** Neo4j, Ontotext's GraphDB (formerly OWLIM), MarkLogic, OrientDB, AllegroGraph, YarcData

- **Document:** MongoDB, MarkLogic, CouchDB, FoundationDB, IBM Cloudant, Couchbase