Fundamental Concepts in Data Insight:

Demo: NoSQL & Non-Relational Data

Fundamentals for a General Audience

What is a Key-Value model?

The Basic Idea

```
keyvalue = {
    "metadata/tag1": "value1",
    "metadata/tag2": "value2",
}
```

```
keyvalue["metadata/tag1"]
```

```
'value1'
```

Example

```
imagestore = {
    "c3VzcGVjdHM" : "suspects/images/uk/london/sw1_1aa/img_110101.j
pg",
    "AxMDEuanBn"  : "suspects/images/uk/london/sw1_1aa/img_110102.j
pg",
}
```

```
imagestore["AxMDEuanBn"]
```

```
'suspects/images/uk/london/sw1_1aa/img_110102.jpg'
```

What is a Document model?

The Basic Idea

```
document = {
    "key11": {
        "key21": {
            "key31": "value1",
            "key32": "value2"
        },
    "key12": "value3"
    }
}
```

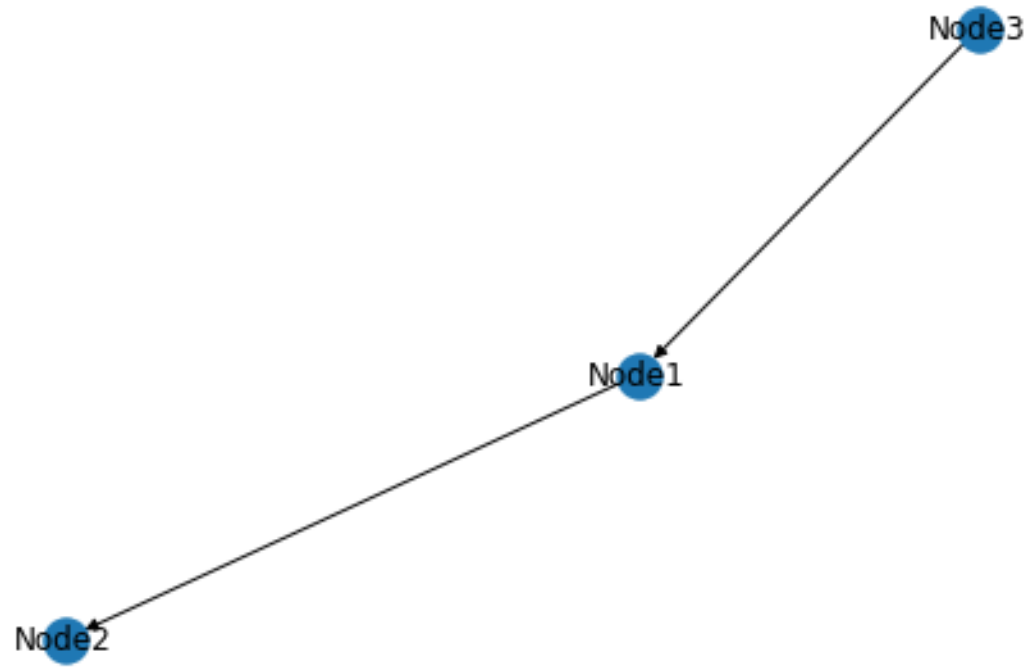
```
document["key11"]["key21"]
```

```
{'key31': 'value1', 'key32': 'value2'}
```

What is a Graph Data Model?

```
edgelist = [
    ("Node1", "Node2", {"key": "value1"}),
    ("Node3", "Node1", {"key": "value2"}),
]
```

```
nx.draw(nx.from_edgelist(edgelist, nx.DiGraph), with_labels=True)
```



What is a Columar Model?

A relation is a set of rows,

```
relation = {
    (1, "Michael", "London"),
    (2, "Alice", "Leeds"),
    (3, "Eve", "London"),
}
```

A columnar table, dataframe, bigtable, column store... is a set of columns,

```
columnar = {
    (1, 2, 3),
    ("Michael", "Alice", "Eve"),
    ("London", "Leeds", "London")
}
```

Columnar systems can be more easily compressed, as duplication more often occurs down-column, and many queries do not need access to all columns.

Appendix

Hashes and Encodings

```
hash(b"suspects/images/uk/london/sw1_1aa/img_110101.jpg")
```

```
8807323760798134093
```

```
from base64 import b64encode as enc64
enc64(b"suspects/images/uk/london/sw1_1aa/img_110101.jpg")
```

```
b'c3VzcGVjdHMvaW1hZ2VzL3VrL2xvbmRvbi9zdzFfMWFhL2ltZ18xMTAxMDEuanBn'
```