

DEFINITION — HOW DATA IS DESCRIBED

API INTERFACES 5

- ODCS** BITOL @ LF
- OpenAPI** LF
- AsyncAPI** LF
- GraphQL** LF
- gRPC** CNCF

DATA PRODUCTS 4

- ODPS** BITOL @ LF
- ODPSpec** LF
- DPDS** ODM
- DPROD** OMG

SCHEMA 5

- XML Schema** W3C
- JSON Schema** IETF
- SQL DDL** ISO/IEC
- AVRO Schema** ASF
- Protobuf** GOOGLE

SEMANTICS 6

- OSI OSI INITIATIVE**
- RDF/OWL** W3C
- DCAT** W3C
- SKOS** W3C
- SHACL** W3C
- JSON-LD** W3C

STORAGE — WHERE DATA LIVES

FILE FORMATS 6

- CSV** IETF
- JSON** IETF
- XML** W3C
- PARQUET** ASF
- AVRO** ASF
- ORC** ASF

OPEN TABLE FORMATS 3

- Iceberg** ASF
- Delta** LF
- Hudi** ASF

STORAGE SYSTEMS 2

- S3** AWS
- HDFS** ASF

MOVEMENT — HOW DATA FLOWS BETWEEN SYSTEMS

DATABASE CONNECTIVITY 3

- JDBC** JCP
- ODBC** ISO/IEC
- ADBC** ASF

INTERCONNECTION 2

- HTTP** IETF
- FTP / SFTP** IETF

MESSAGING 4

- Kafka** ASF
- AMQP** OASIS
- MQTT** OASIS
- CloudEvents** CNCF

TRANSFORMATION — HOW DATA IS PROCESSED AND RESHAPED

IN-MEMORY FORMAT 2

- Apache Arrow** ASF
- DataFrame API** DATA-APIS

PROCESSING 4

- dbt** DBT LABS
- Spark** ASF
- Pandas** NUMFOCUS
- Ibis** IBIS

DISCOVERY — HOW DATA IS FOUND AND TRACED

CATALOG APIS 5

- Iceberg Catalog** ASF
- Unity Catalog** LF
- Hive Metastore** ASF
- DuckLake** DUCKDB LABS
- Schema Registry** CONFLUENT

LINEAGE 1

- OpenLineage** LF

OPERATIONS — HOW DATA IS QUERIED, OBSERVED, GOVERNED

QUERY 2

- SQL** ISO/IEC
- SPARQL** W3C

DATA QUALITY 3

- dbt** DBT LABS
- Great Expectations** GX LABS
- SodaCL** SODA

OBSERVABILITY 2

- Open Telemetry** CNCF
- OORS** BITOL @ LF

POLICIES 1

- OPA** CNCF

AI INTERFACES 2

- MCP** LF
- A2A** LF

Open standard Highlighted by Entropy Data — the ones to bet on today Emerging / draft Single-vendor — muted