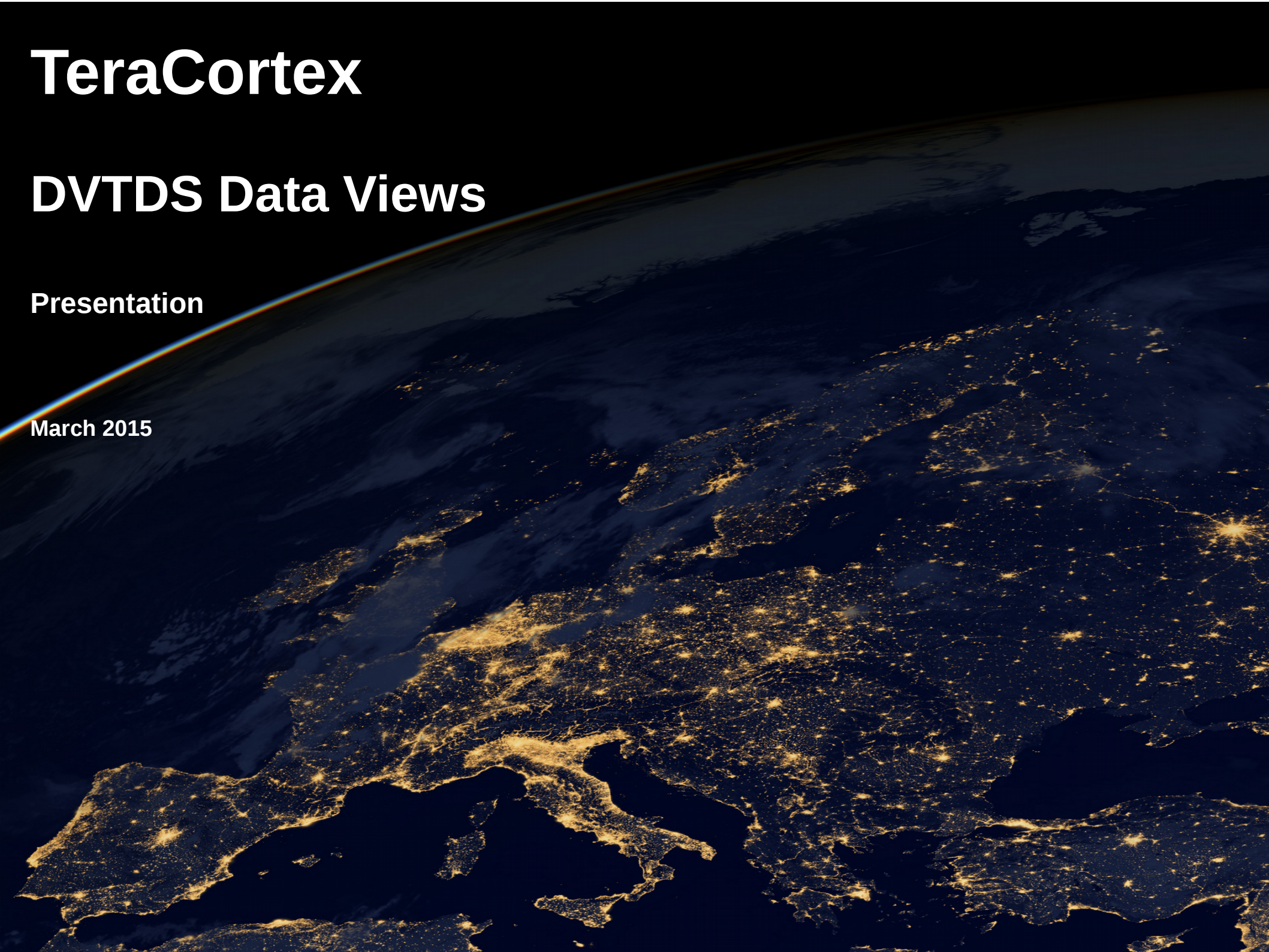
TeraCortex

DVTDS Data Views

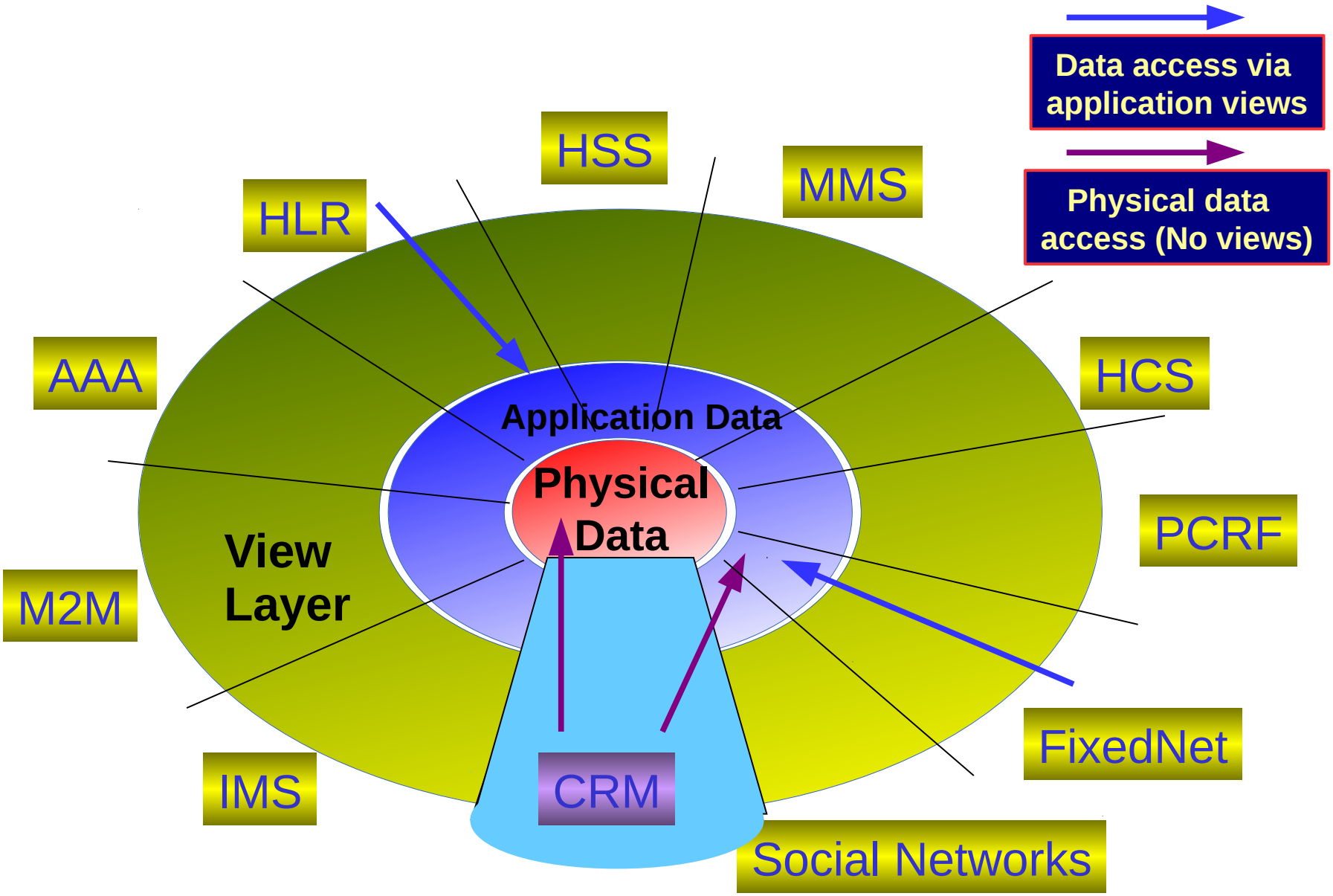
Presentation

March 2015



Part I: Applications and Data Models

Data Layers of Telco Applications



Application Properties

Example applications from Telco networks

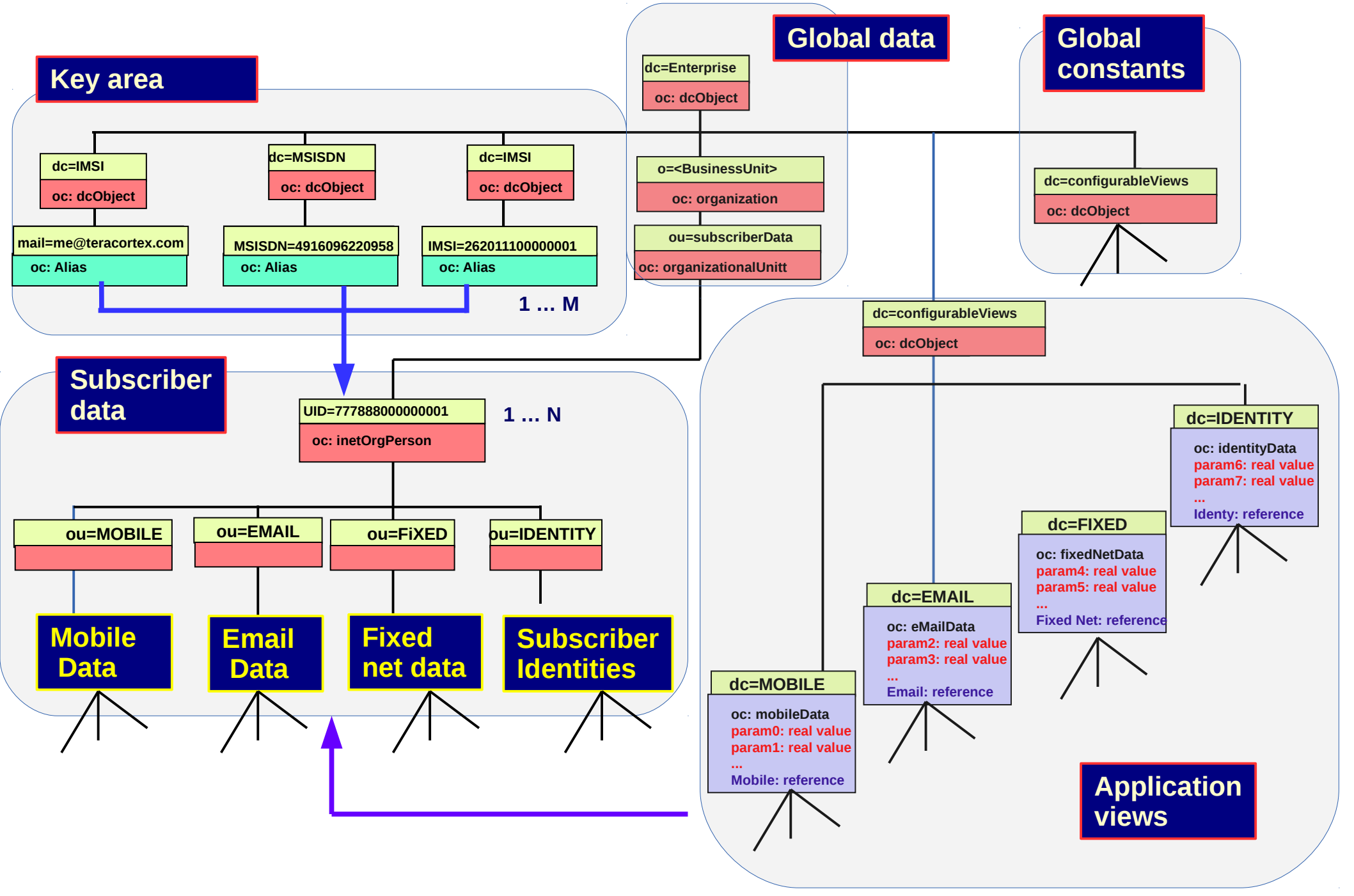
Each one has it’s own data view

Each one may have private data

Access to shared data through conversion layer

Concurrent access synchronized

Example Physical Data Model



Physical Data Model Properties

Subscribers have a unique identifier

Alternative keys to access subscriber data

Shared data only stored once

Millions of subscriber sub trees

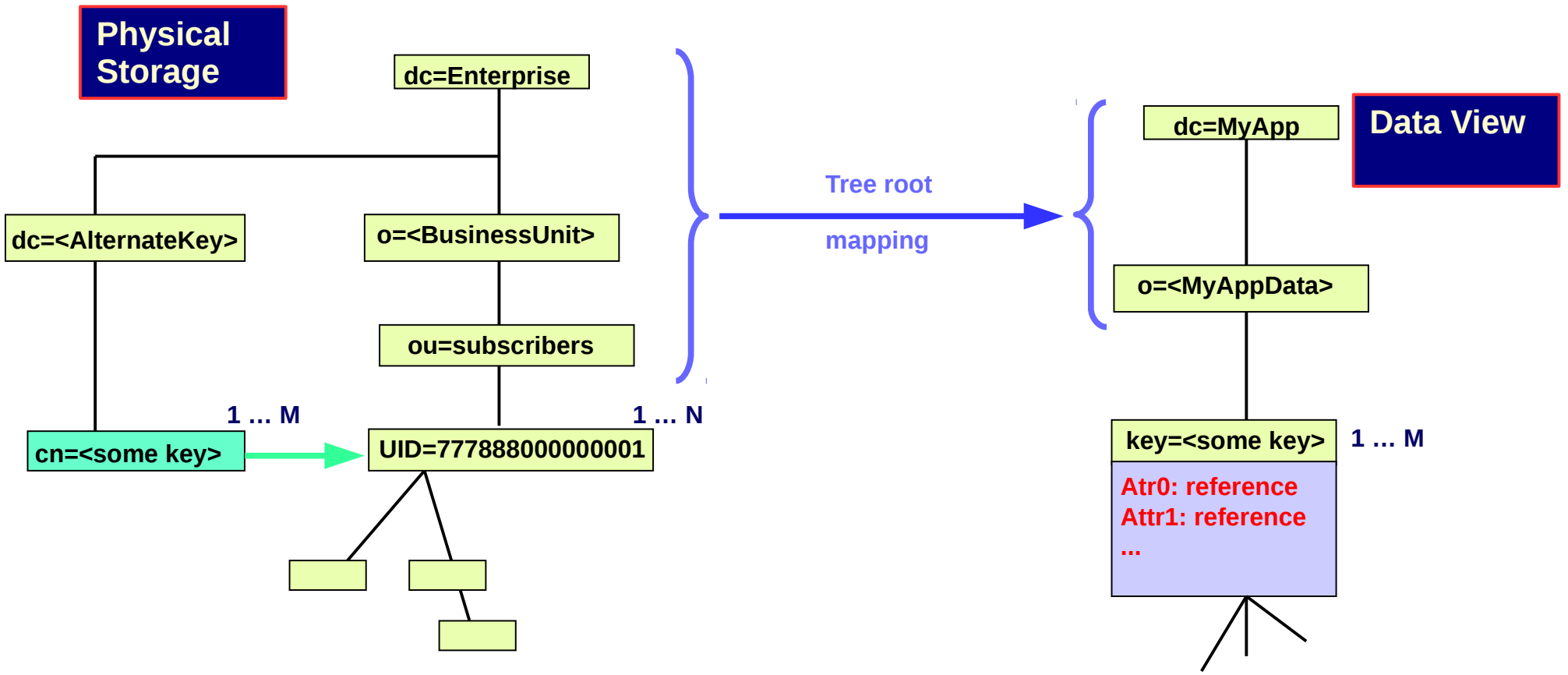
Several alternative keys per subscriber

View Data Model Properties

- Data view configuration aside of subscriber tree
- One data view configuration per application
- Client data view selected by bind DN matching
- Online view configuration via GUI or LDAP
- No service interruption due to schema changes

Part II: Conversion Techniques

Conversion of Tree Root



N subscribers held below ou=subscribers

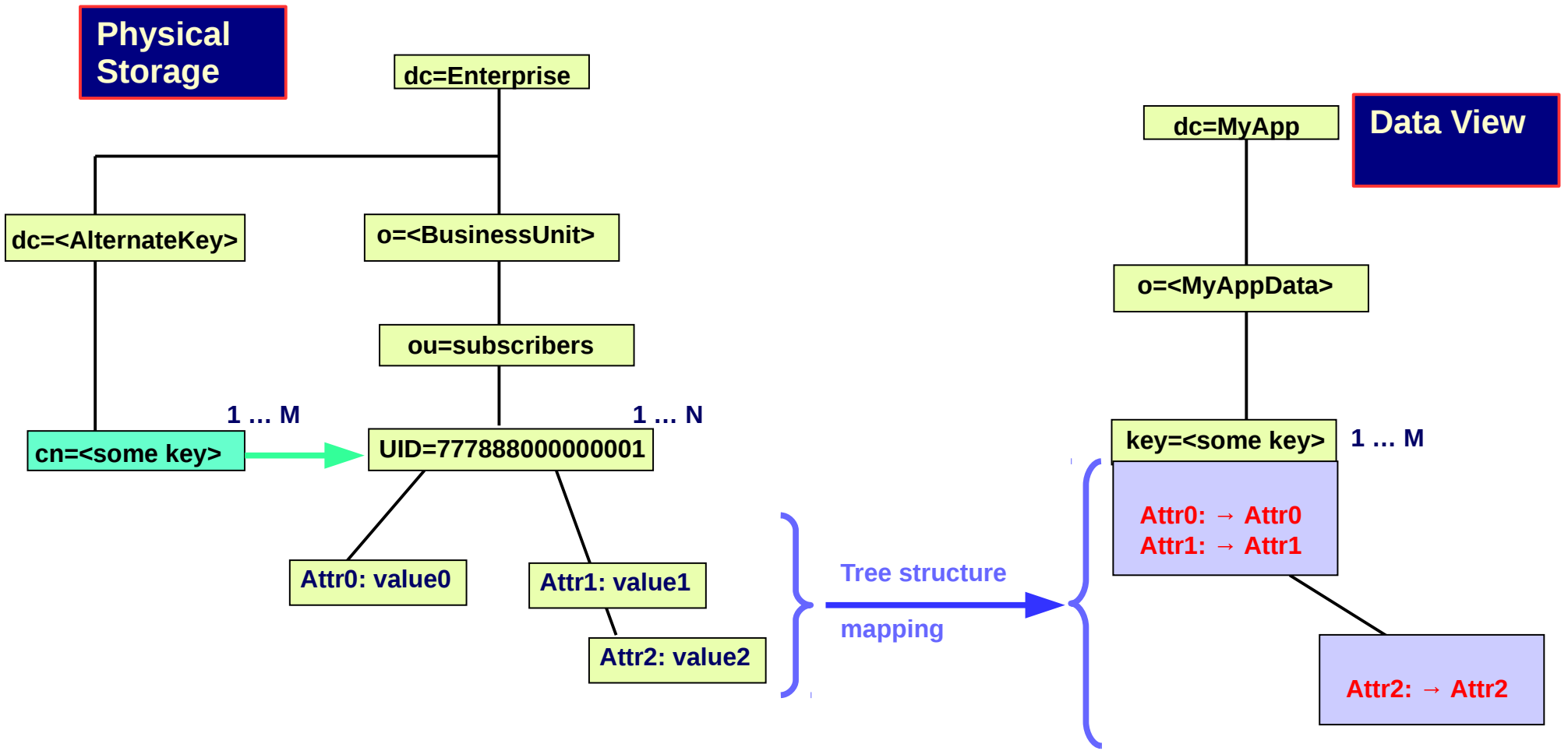
M alternate keys pointing there

M virtual objects in application specific tree

Application tree root differs from physical tree root

Mapping directive needed to convert access root

Object Level: Conversion of Structure



Physical subscriber holds three sub objects

Virtual subscriber holds just two objects

Different attribute assignments to objects

Any to any structure mappings possible

Properties of structural Conversion

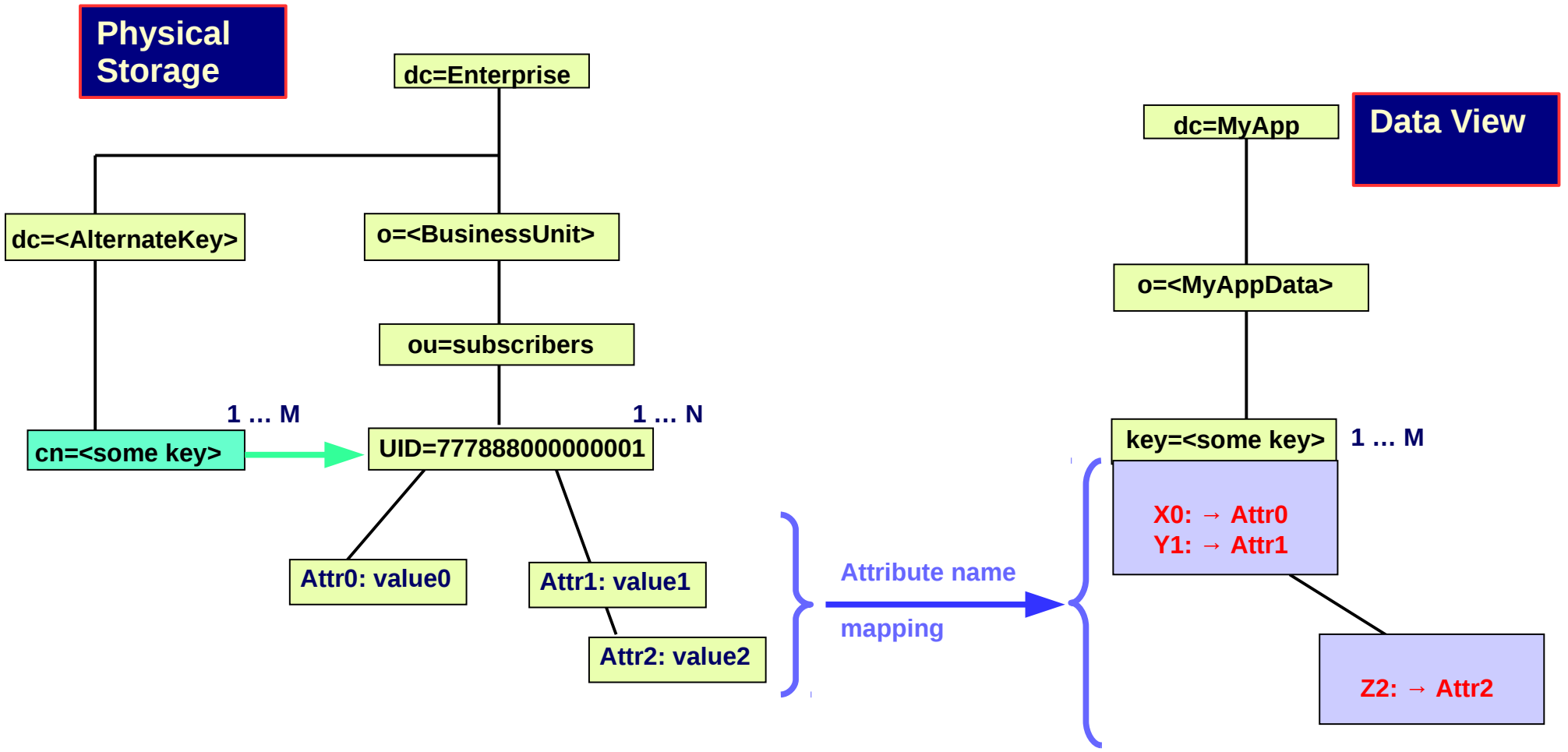
Structured tree to flat table

Flat table to structured tree

Structured tree to differently structured tree

Variable attribute assignments to objects

Attribute Level: Conversion of Names

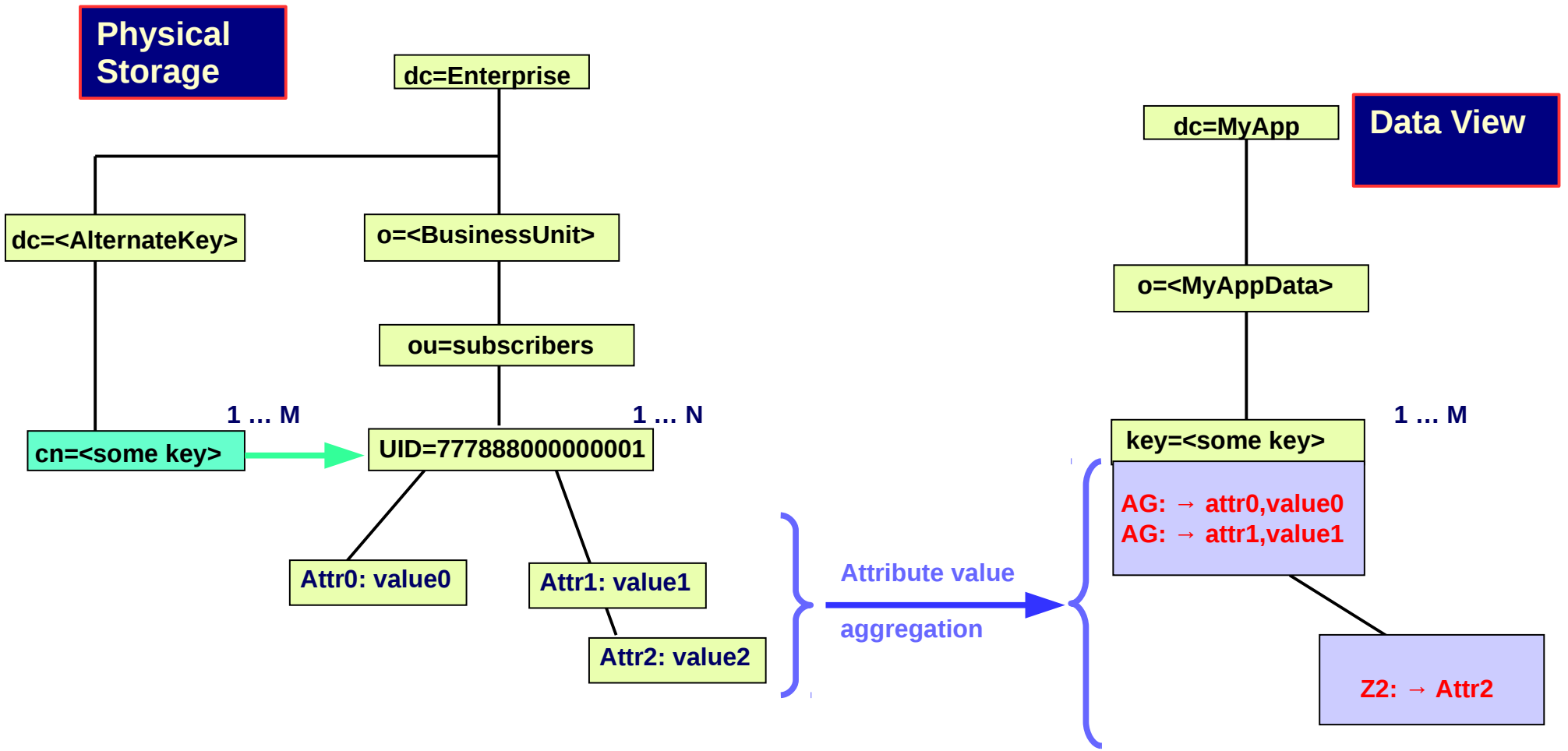


Physical subscriber holds attributes Attr0 … 2

Virtual subscriber holds attributes X0, Y1 and Z2

Client application sees only X0, Y1 and Z2

Attribute Level: Aggregation



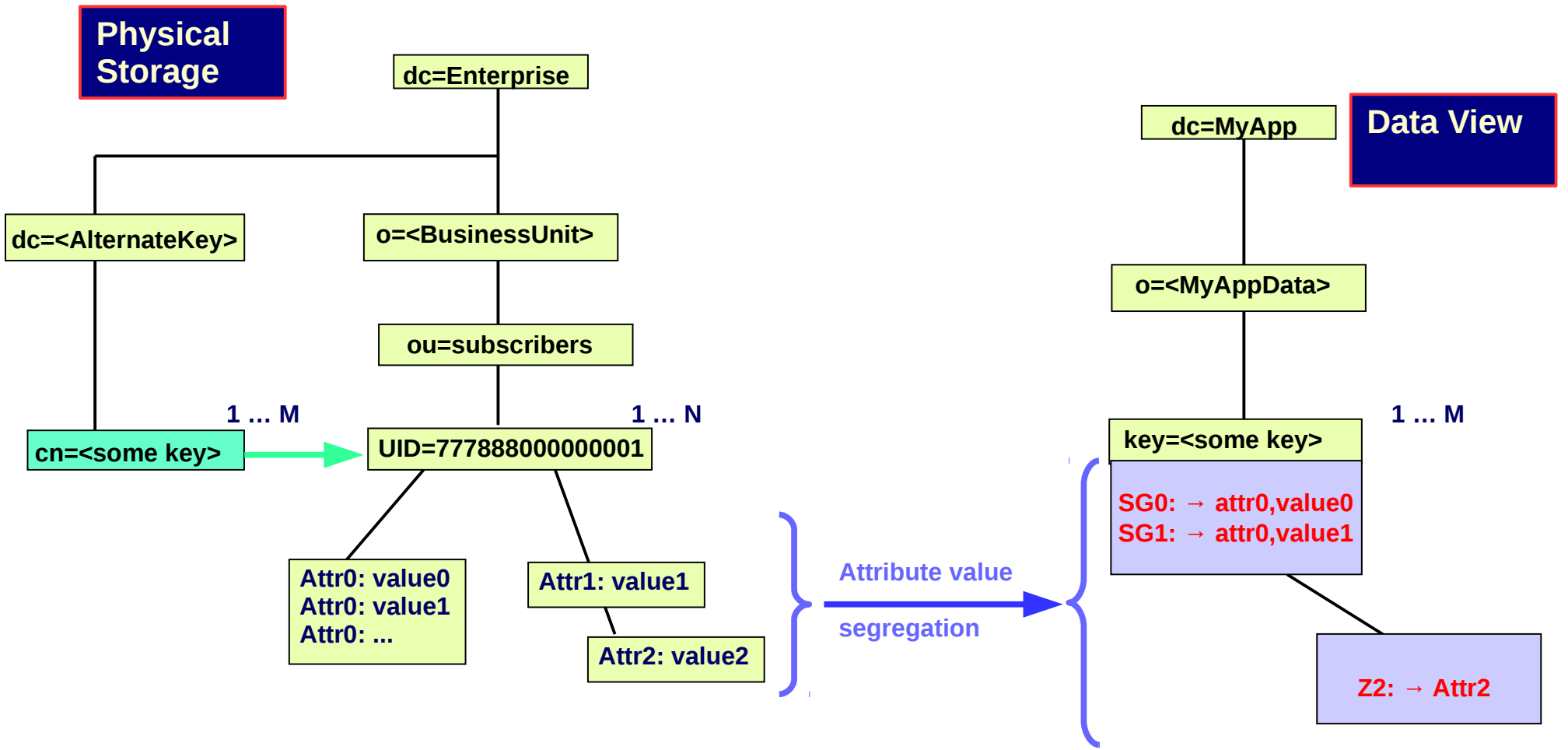
Physical subscriber holds attributes attr 0 … 2

Virtual subscriber holds attributes AG and Z2

AG is multi valued

AG holds the values from Attr0 and Attr1

Attribute Level: Segregation



Physical subscriber holds attributes Attr 0 … 2

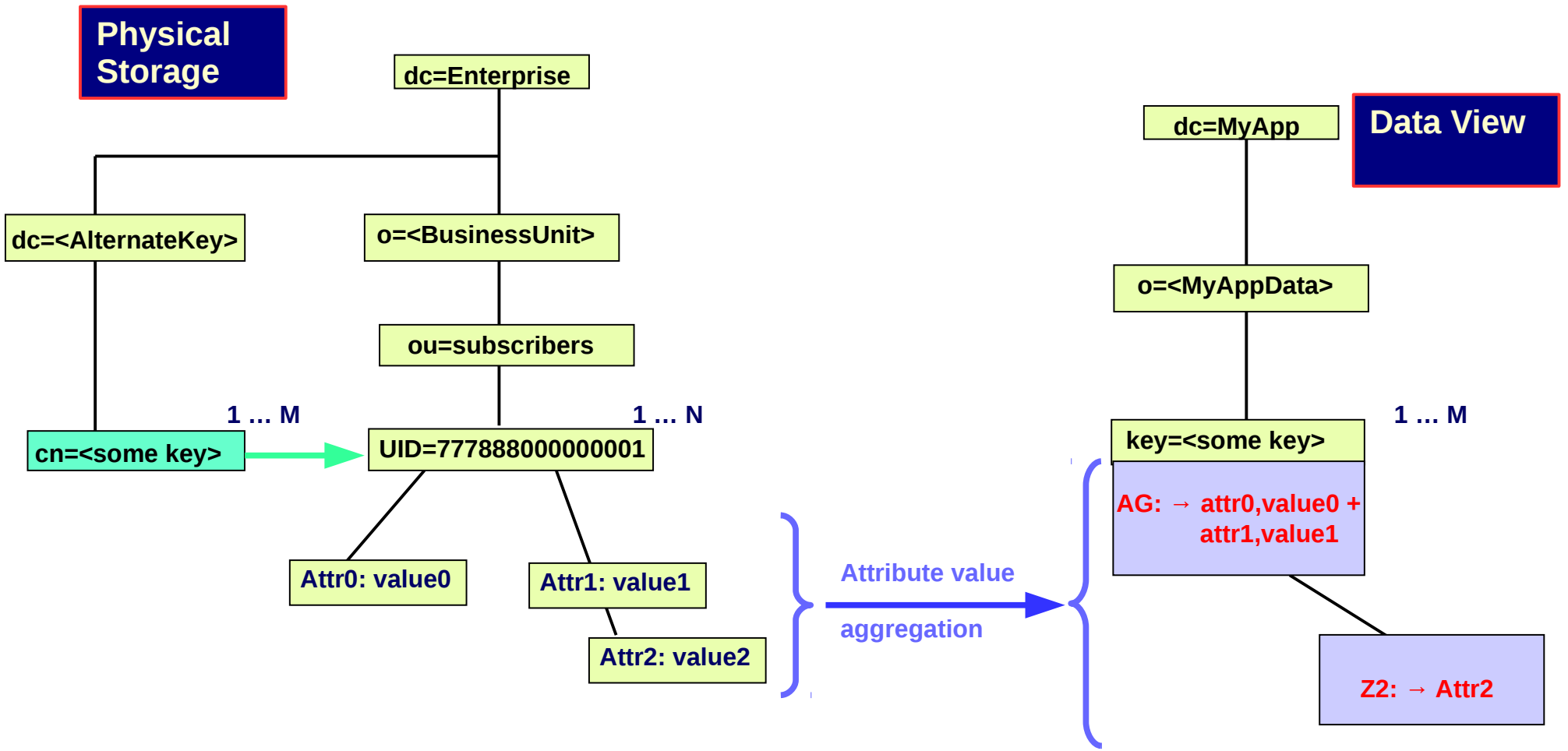
Attr0 is multi valued

Virtual subscriber holds attributes SG0, SG1 and Z2

SG0 holds a sub set of the values of Attr0

SG1 holds a different sub set of the values of Attr0

Value Level: Aggregation



Physical subscriber holds attributes Attr 0 … 2

Virtual subscriber holds attributes AG and Z2

Value of AG concatenated from values of attr0 / attr1

Any part from any value can be merged into AG value

Operational Properties

Updates to data view objects are ACID compliant

All referenced objects are changed or none

Read request consistency by object level locking

Client access control on view objects

View objects may contain real attributes

Real attribute are global (not subscriber specific)

Ressources and Performance

View objects instantiated once per application

Negligible storage consumption

No external traffic to resolve view references

~ 100 µs response time (complex view)

~ 35 µs response time (simple view)

Scalability

- Up to 30000 synchronous TPS per CPU core
- Up to 70000 asynchronous TPS per CPU core
- Linear scaling with number of CPU cores
- Linear scaling with number of DB nodes