

Schema Tags

```
<Field xsi:type="esri:Field">  
  <Name>OBJECTID</Name>  
  <Type>esriFieldTypeOID</Type>  
  <IsNullable>>false</IsNullable>  
  .  
  .  
  .  
</Field>
```

GEOG 482 / 582 : GIS Data Management

Lesson 7: XML Schemas

Overview

Learning Objective Questions:

1. Why use label tags for XML Schema?
2. What are the two components of a workspace document?
3. What composes a RecordSet Document?
4. What composes a Data Changes Document?
5. What is a data element inheritance hierarchy?
6. What is geometry inheritance?

Reading:

http://downloads2.esri.com/support/whitepapers/ao_XML_Schema_of_Geodatabase.pdf

Lesson Preview

Learning objective questions act as the lesson outline.

Questions beg answers.

Basic Concepts of XML Schema

1. Why use label tags for XML Schema?

Schema – description of database elements

Different representations can be used to describe a geodatabase using eXtensible Markup Language (XML) elements.

Label tags are the foundation of XML. Tags are used because of the flexibility of representation.

One way would be to represent a field using one XML attribute for each property of a geodatabase field as below:

```
<Field xsi:type="esri:Field" >                xsi=XML schema ID
  <Name>OBJECTID</Name>
  <Type>esriFieldTypeOID</Type>
  <IsNullable>false</IsNullable>
  .
  .
  .
</Field>
```

Note: a <tag> opens a string and a </tag> closes a string

Key terms

XML

Tags

Each property of the field

Alternatively, each property of the field could be represented using several more XML elements as follows:

```
<Field xsi:type="esri:Field">  
  <Name>OBJECTID</Name>  
  <Type>esriFieldTypeOID</Type>  
  <IsNullable>false</IsNullable>  
  <Length>4</Length>  
  <Precision>0</Precision>  
  <Scale>0</Scale>  
  <Required>true</Required>  
  <Editable>false</Editable>  
  <AliasName>OBJECTID</AliasName>  
  <ModelName>OBJECTID</ModelName>  
</Field>
```

Key terms
Property

Difference between two XML representations

In the first example, one XML tag for each property, but no specific data value tags are used.

In the second example, an XML tag with data values to specify detail is used.

A schema specifies that a field XML element should have a sequence of children elements...
the first called Name (a string),
the second called Type (an enumeration value), and so on.

The geodatabase exchange format uses XML elements to specify the content of the schema definition.

Key terms
Property

Domain and RangeDomain

Types can be derived from other types, most commonly by adding extra attributes to the base type.

Domains are a good example of type inheritance.

Domain has a name, type, and field type.

A RangeDomain is derived from it and adds two more elements, MinValue and MaxValue

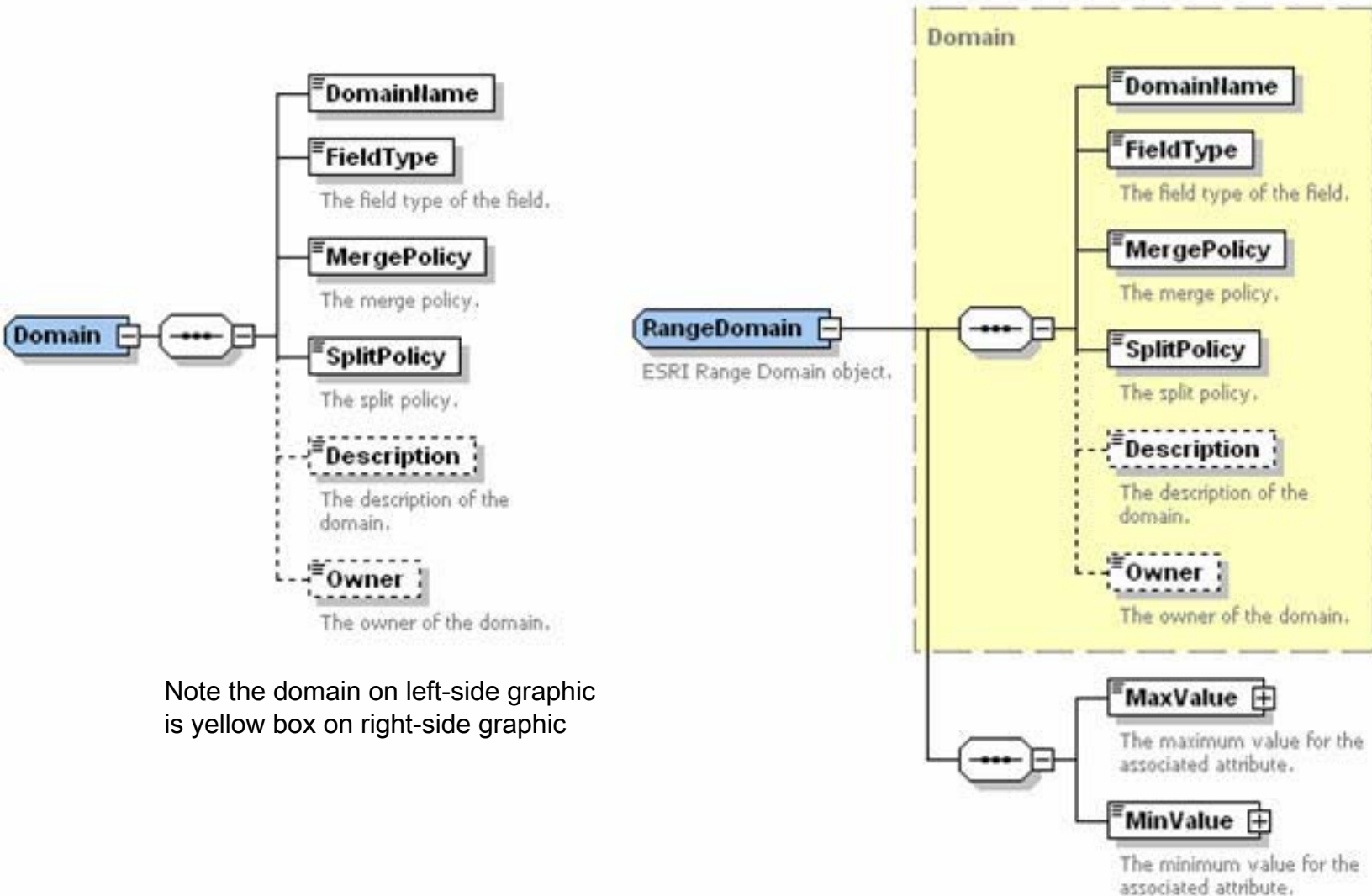
See next slide for graphic

Key terms

Domain

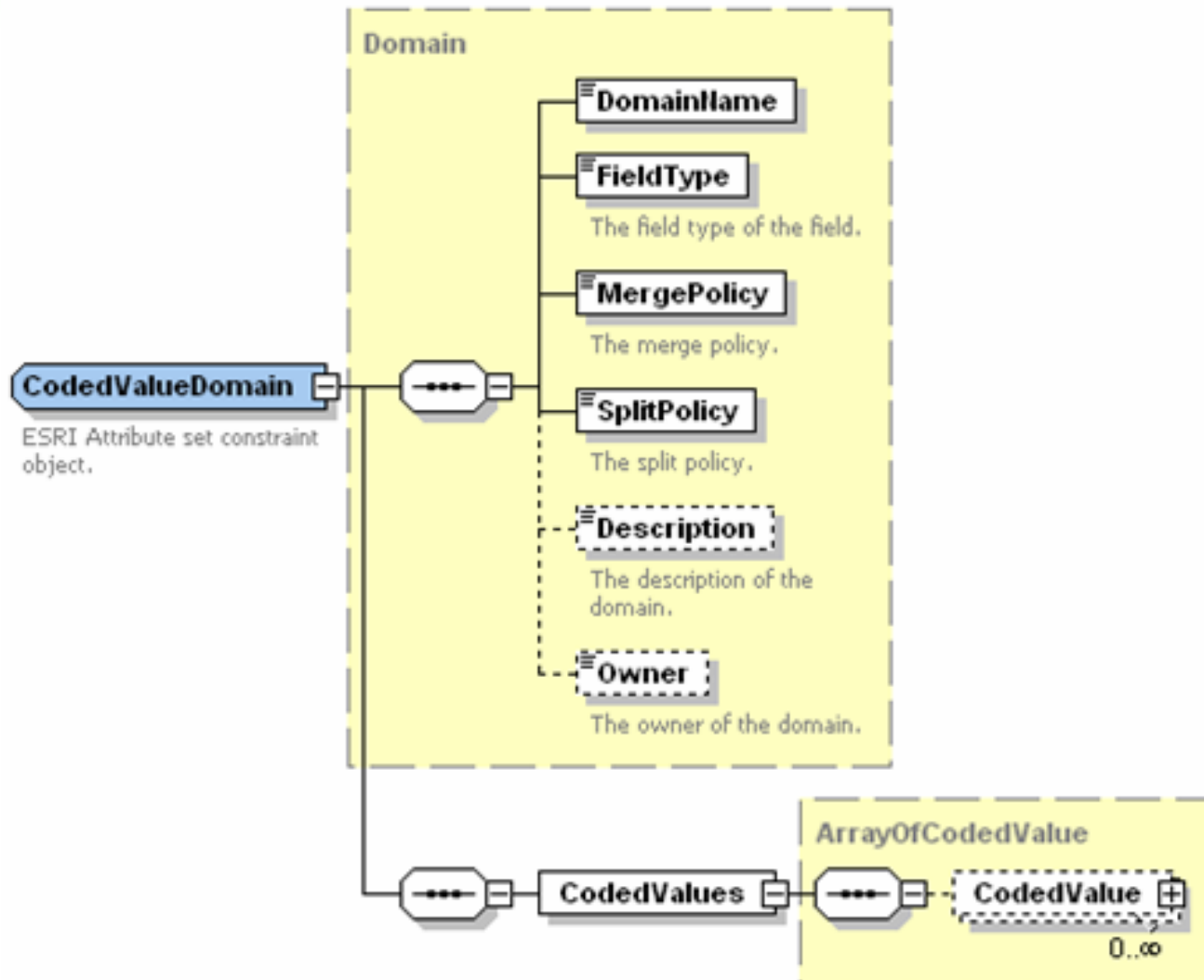
RangeDomain

Domain and RangeDomain



Note the domain on left-side graphic is yellow box on right-side graphic

CodedValueDomain



2. What are the two components of a workspace document?

Exporting a geodatabase to XML generates a **workspace document**.

The XML element Workspace in the XML schema contains two child elements: WorkspaceDefinition and WorkspaceData

WorkspaceDefinition contains workspace type, the version being exported (if the export based on ArcSDE®), an array of domains (zero to many domains), and an array of data elements on slide 10.

- Domain is an abstract type as described before (i.e., range and coded-value domains)
- DataElement is an abstract type whose derived types are used to describe the schema of geodatabase constructs, e.g. tables as slide 11.

Key terms

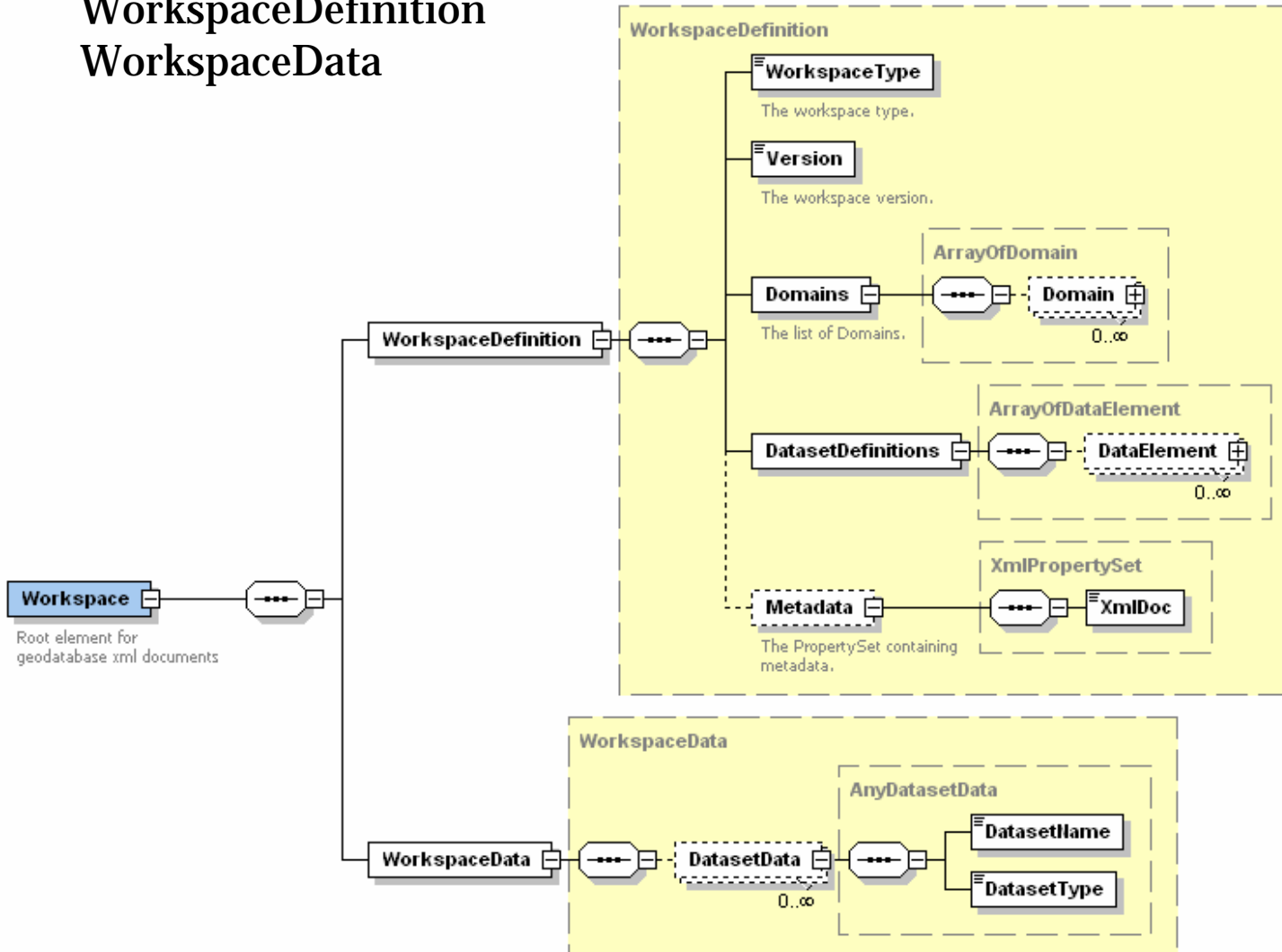
Workspace document
Workspace definition
WorkspaceData

WorkspaceData element may have zero to many child DatasetData elements of type AnyDatasetData.

Two XML types are derived from AnyDatasetData:

- TableData
- RasterDatasetData.

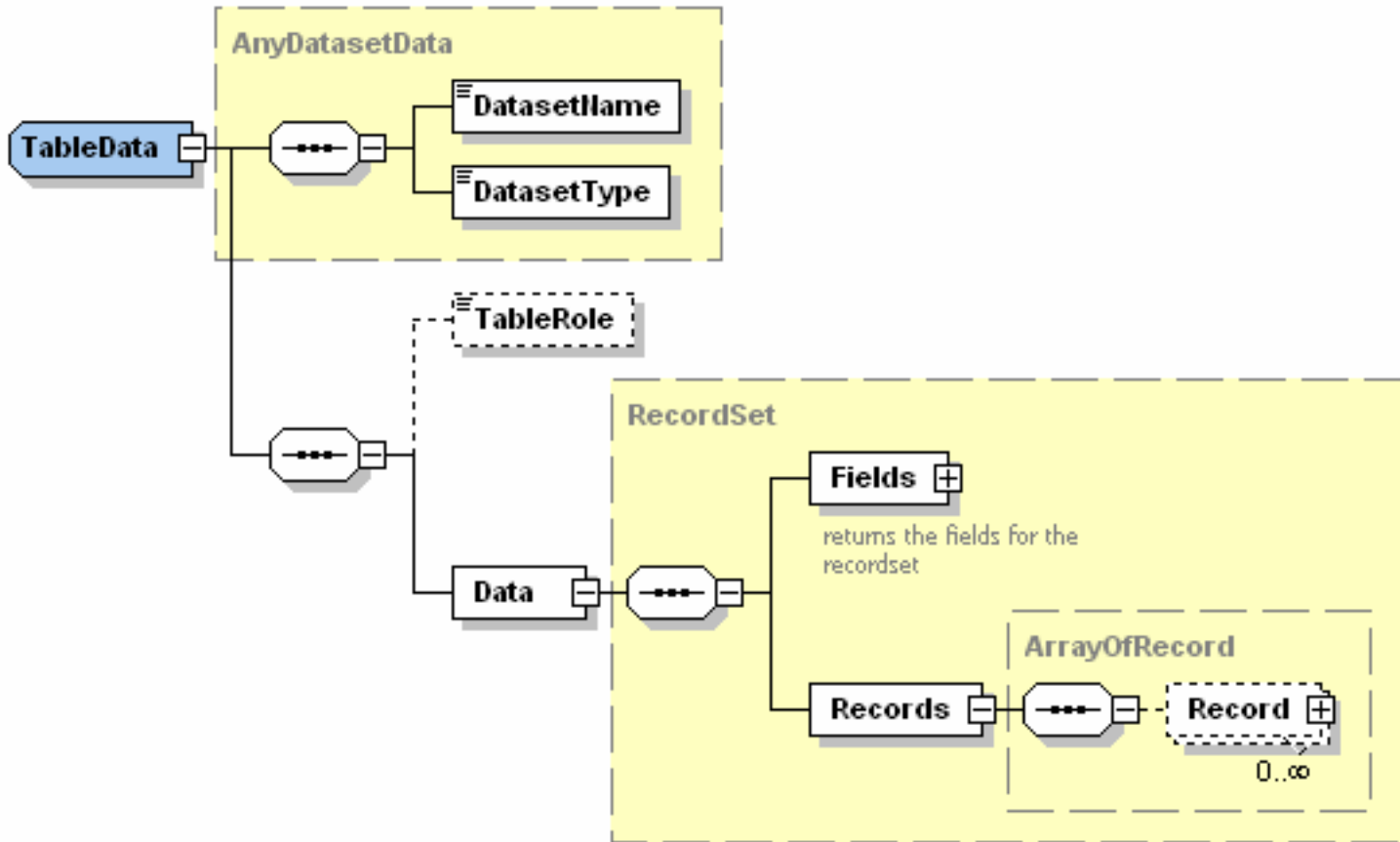
Workspace document composed of WorkspaceDefinition WorkspaceData



Key terms

Workspace,
WorkspaceDefinition
WorkspaceData

TableData



Key terms

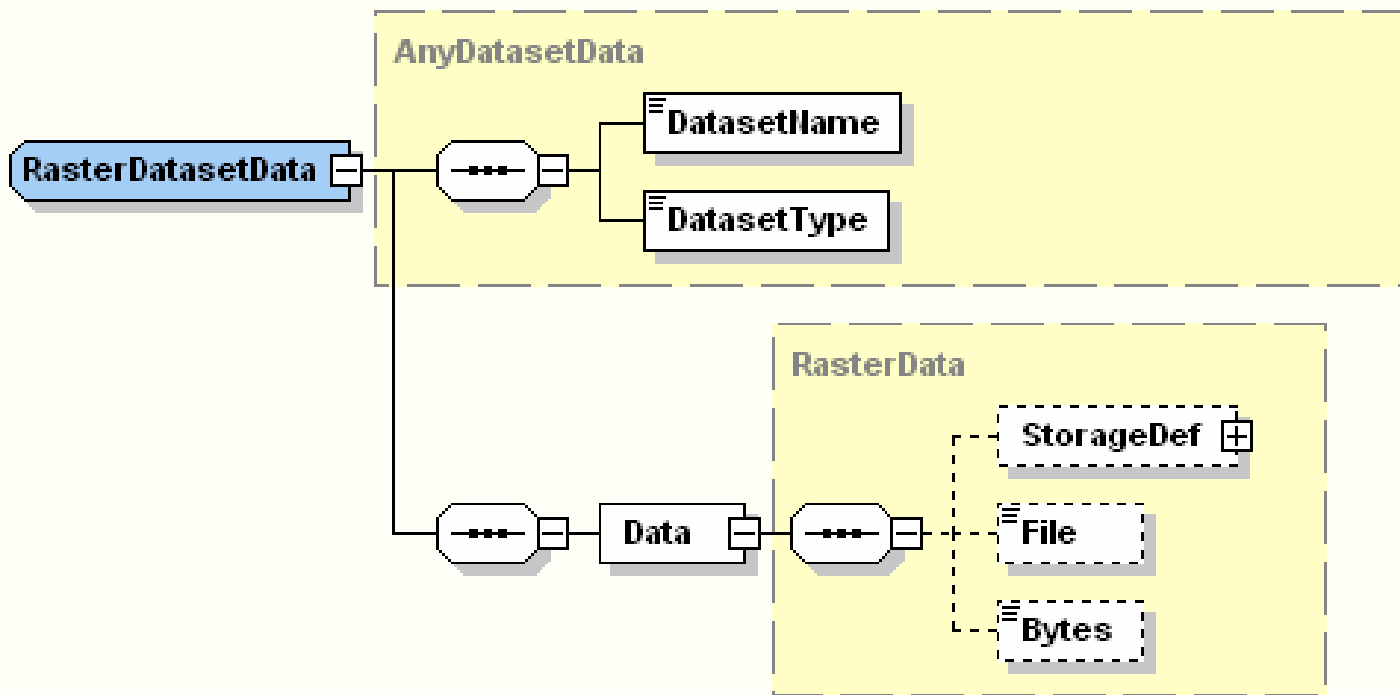
TableData
DatasetName
DatasetType
Data
Fields
Records

Consider the Recordset Tags (for record set document, slide 13)

Esri, 2008 XML Schema of the Geodatabase, p. 5

http://downloads2.esri.com/support/whitepapers/ao/XML_Schema_of_Geodatabase.pdf

RasterDatasetData



Consider the RasterData tag hierarchy StorageDef, File, Bytes

Esri, 2008 XML Schema of the Geodatabase, p. 6

http://downloads2.esri.com/support/whitepapers/ao/XML_Schema_of_Geodatabase.pdf

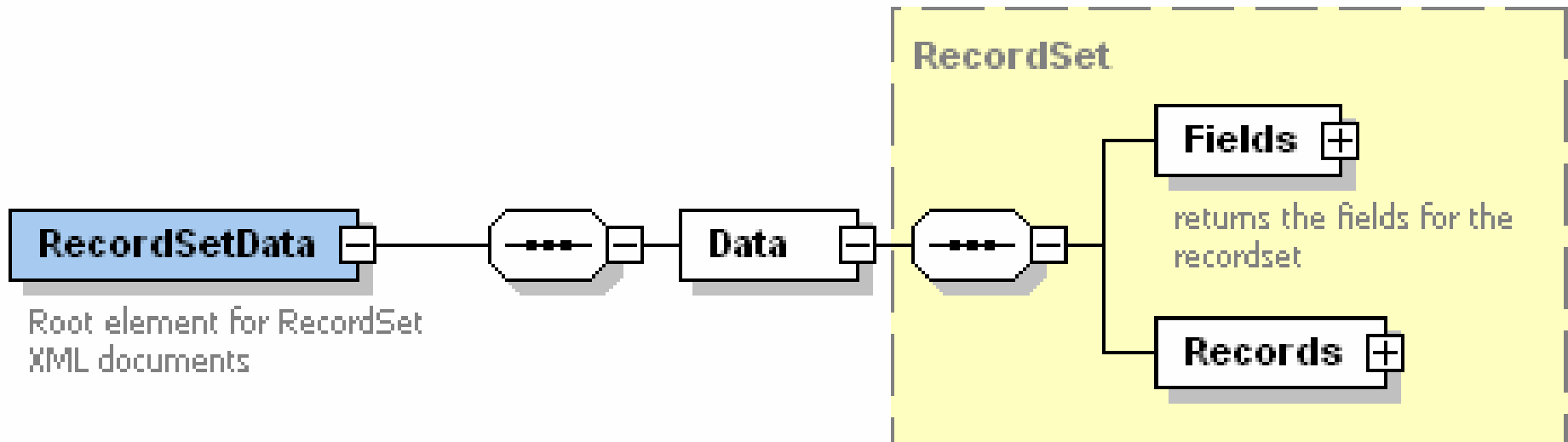
3. What composes a RecordSet Document?

The rows from a single feature class or table can be exported as simple features to a **RecordSet Document**. Features are exported as simple features, and no additional geodatabase-related information is written to the output file. **Exporting to a record set document is analogous to exporting to a shapefile.** For example, complex edge features in a geometric network will be exported as simple features, and relationships to features in other tables will not be exported.

Key terms

Fields

Records



Root element for RecordSet
XML documents

4. What composes a Data Changes Document?

- A Data Changes Document contains edits.
- ArcGIS “disconnected editing framework” allows you to **check out data** from a database into a separate geodatabase, then edit the data without having a live connection to the parent database.
- Once editing is done, it is possible to export only the changes (not all the data) to an XML file.
- This file can be used to subsequently **check in data** changes to the parent database.
- The root element of a data changes document is UpdateGram (see next graphic)

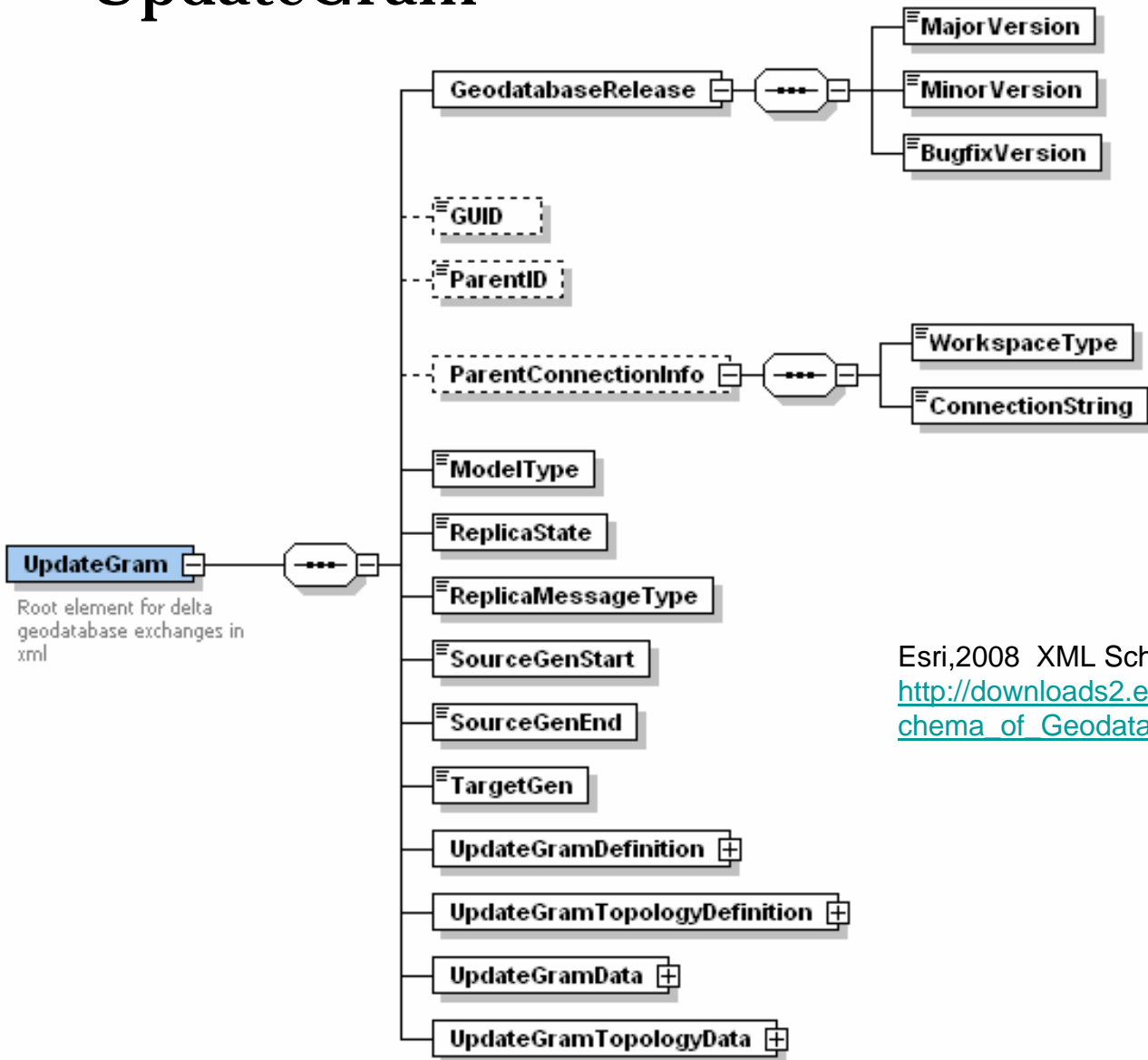
Key terms

Disconnected editing

Check out data

Check in data

UpdateGram



Key terms

UpdateGram

Esri,2008 XML Schema of the Geodatabase, p. 7
http://downloads2.esri.com/support/whitepapers/ao/XML_Schema_of_Geodatabase.pdf

XML Types in a Schema

XML types are used to create the three kinds of XML documents -
Workspace, RecordSet, and Data Changes - described earlier.

- DataElement
- Arrays
- DEDataset
- DEGeoDataset
- DEFeatureDataset
- DETable, DEFeatureClass, and DERasterCatalog
- Fields and Field
- Subtype
- DETopology
- DEGeometricNetwork

DataElement

A set of ArcObjects classes originally added to ArcGIS 9.

These objects describe all aspects of a dataset in a geodatabase.

For example, the DataElement for a feature class captures the name, feature type, fields, indexes, subtypes, and other characteristics of a feature class, but it does this through “inheritance hierarchy” (slide 18). There are data elements for most geodatabase items.

Key terms

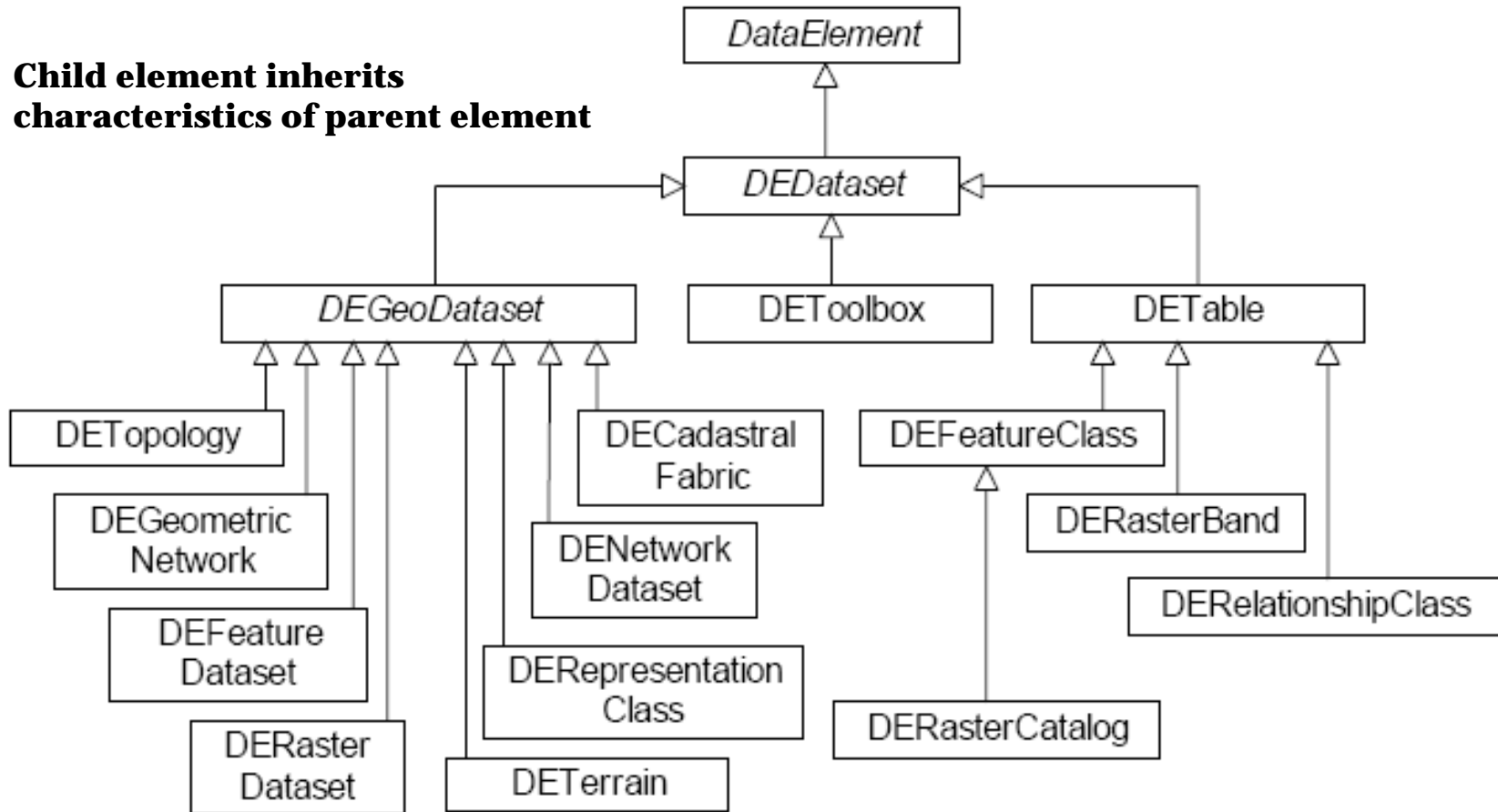
ArcObject classes
Parent Types
Abstract Types

All information that relates to a database schema is exported to XML as data elements (definitions and data).

Shown in graphic (next slide) is part of the hierarchy of XML types that correspond to the data element ArcObjects. The generalization triangles (arrow heads) point to the parent types, and the names in italics denote abstract types.

5. What is a DataElement inheritance hierarchy?

Child element inherits characteristics of parent element



Esri, 2008 XML Schema of the Geodatabase, p. 10

http://downloads2.esri.com/support/whitepapers/ao/XML_Schema_of_Geodatabase.pdf

DENetworkDataset

Abstract types of the Network Dataset

- NetworkDirections
- EdgeFeatureSources
- NetworkSourceDirections
- Shields
- StreetNameFields
- JunctionFeatureSources
- SystemJunctionSources
- TurnFeatureSources
- EvaluatedNetworkAttributes
- AttributeParameters
- NetworkAttributes
- NetworkAssignments

More abstract types

- DECadastralFabric
- DERepresentationClass
- DETerrain
 - TerrainDataSources
 - TerrainPyramidLevelZT
 - TerrainPyramidLevelWindowSize

Controllers and Memberships

DERelationshipClass

Index and Indexes

DERasterDataset and DERasterBand

DERasterCatalog

DEToolbox

RecordSet

RasterData

Geometry

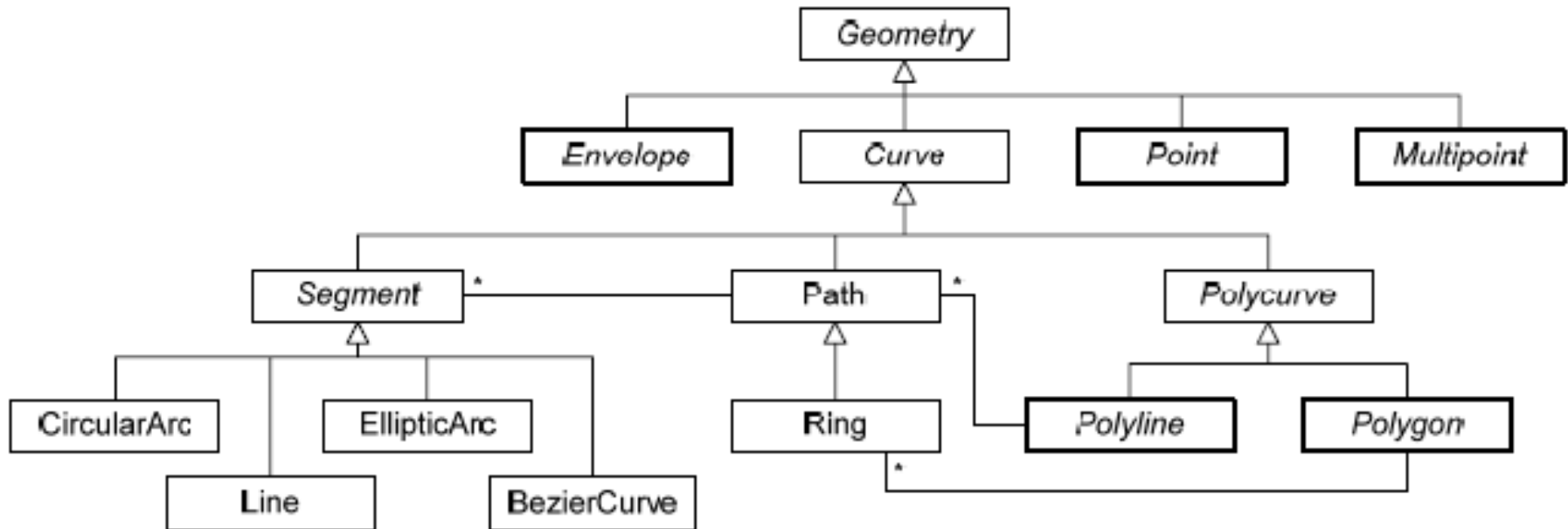
In feature classes, the shape field contains the geometry for each feature.

- Geometry Types
- Point and Multipoint
- Envelope
- Segment, Line, CircularArc, and EllipticArc
- Path and Ring
- Polycurve, Polyline, and Polygon
- 3D Geometry
- XMLPersistedObject
- XmlPropertySet

Complex geometry relies upon inheritance hierarchy.

6. What is geometry inheritance?

Geometry inheritance hierarchy showing parent-child relationships of types. Parent above, child below.



Esri,2008 XML Schema of the Geodatabase, p. 46

http://downloads2.esri.com/support/whitepapers/ao/XML_Schema_of_Geodatabase.pdf

Summary

In this lesson, you learned about...

1. Label tags for XML Schemas
 2. Two components of a workspace document
 3. Composition of a RecordSet Document
 4. Composition of a Data Changes Document
 5. Data element inheritance hierarchy
 6. Geometry inheritance hierarchy
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Contact me at
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have questions or
comments about this
lesson.

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END Lesson 7: XML Schemas