5. Part 5: Address Data Exchange

5.1 Introduction

The purpose of this section is three-fold: to provide a template for the XML documents and metadata that will move addresses from place to place, to provide information on preparing address data to be packaged, and to provide information on unpackaging address data that has been received.

Historically, the data format aspect of data exchange has impeded the flow of information. By providing a single and flexible data structure for exchanging street address data, the Address Standard will simplify the implementation of data exchanges, making them more reliable and less likely to need small changes, especially over time. Local data processing systems and applications change over time and frequently data exchange programs and reports must be rewritten along with those changes. Such changes may be as seemingly minor as the renaming of a data element, shortening or extending the length of a field, or the addition or subtraction of a field. When new data sharing partners are identified, a data format for sharing data with that partner must be constructed and implemented by each party. The Address Standard aims to minimize local changes necessary when upgrading computer systems and to provide a structure that can be reused by all data sharing parties without their having to implement something new.

The data sharing benefits of the Address Standard will only be realized when local agencies have implemented both export and import engines to process exchanged street addresses. The initial implementation of these data engines or programs will provide a lasting benefit to implementers in that once created, the agency will never again need to be concerned with creating programs or engines to share data with any new data sharing partners that they identify in the future.

The Address Standard is designed to be flexible enough to fit within current data sharing methods. There are two basic forms of sharing data between parties:

- Monolithic, in which all records are in the exchange package.

- Transactional, in which the exchange package records include commands to add or remove a record from the local copy of all records.

The Standard supports both of these forms, using a slightly modified structure to enable transactional exchanges.

5.2 Structure of a Transfer Package

All packages of address data to be exchanged must include:

- FGDC Metadata, (conforming to the FGDC-STD-001-1998 Content Standard for Digital Geospatial Metadata, Version 2.0. See Part 6 for a complete citation).

- Address data, expressed as an XML document conforming to the AddrStd XML Schema.

5.2.1 FGDC Metadata

Metadata provides a common set of terminology and definitions for the documentation of digital geospatial data (CSDGM, Introduction). It is a required part of all Federal standards, and is required of all federally generated geospatial data per Executive Order 12906. The transfer of data always needs to be accompanied by copyright information, use restrictions, contact information, data lineage information, known data defects and a description of the geographic area that the data represents. The *Content Standard for Digital Geospatial Metadata* provides a uniform, consistent, and well known way to express those things amongst others.

5.2.2 Address Data

The Address Standard XML schema is a way of packaging address data such that only fields meaningful to the particular data transfer package need to be included. The nature of XML is that only meaningful data is included but the meaning of everything that could be included is documented. In addition, XML data transfer implementations can be extended without breaking existing implementations. Existing implementations will not understand the extensions but by definition will ignore them.

Data is produced by agencies possessing address information and consumed by those receiving the address data. Many agencies will be both producers and consumers at different times. The roles of producer and consumer describe, respectively, the activity at hand when exporting or importing address data.

5.2.2.1 Exporting Data

A data producer will follow these basic steps while implementing an export:

- Construct a logical map of local data fields into the equivalent Address Standard Content and Classification elements.

- Write programs or subroutines to split local fields into the Address Standard elements if necessary.

- Collect support information required by the CSDGM metadata into an accessible place.

- Optionally, write programs or subroutines to automate the CSDGM "Data Quality" tests documented in the Data Quality section of this standard.

- Write programs or subroutines to include the CSDGM support data into a complete and valid CSDGM document.

A data producer will follow these basic steps while creating a package of address data:

- Run the Data Quality tests and collect the reports into the CSDGM metadata.

- Set the "Publication Date" element of the CSDGM metadata to be the time the package will be published.

- Run the data remapping and splitting programs.

- Set the "DirectSource" element of the Address Standard to be the producer's Id.

- Set the "AddressId" and "AuthorityId" elements of the Address Standard for any addresses created by the producer.

- Export the data into the Address Standard XML format.

- Transfer both the Address Standard XML document and the CSDGM document to another party.

5.2.2.2   Importing data

A data consumer will follow these basic steps while implementing an import:

- Construct a logical map of local data fields into the equivalent Address Standard Content and Classification elements.

- Write programs or subroutines to combine Address Standard elements into local data fields, if necessary.

- Create a place to store the CSDGM data from received packages.

- Optionally write programs or subroutines to automate the CSDGM "Data Quality" tests documented in the Data Quality section of this standard on the received data.

A data consumer will follow these basic steps while importing a package of address data:

- Receive both the Address Standard XML document and the CSDGM document from another party.

- Parse the Address Standard XML document into a working area.

- Parse the CSDGM XML document into a working area.

- Run the Data Quality tests and compare to the report in the CSDGM metadata received.

- Run the data remapping and combining programs.

- Import from the working area to the local production database.

When mapping local data fields into the equivalent Address Standard Content and Classification elements, or the reverse, it is important to understand that the Address Standard is set up to allow address producers to directly and unequivocally express the taxonomy of their own addresses. The Content and Classification sections provide a taxonomy to help parse addresses into descriptive elements.

For example, given an address such as **225 North Avenue Northwest Atlanta GA 30318**, the Address Standard allows the address producer to state that the word **North** is not a Street Name Pre Directional but is actually a Street Name. When stated by the actual addressing authority, it should be taken as factual and not converted.

Within other agencies, database design requirements might cause the address to be stored differently, but they should record the **official** form somewhere within their databases.

It is important, if distributing data received from other address authorities, that their taxonomy or parsing of addresses into elements be maintained and be reproducible.

5.3   The Address Standard XSD Data Model

See Appendix A for the Complete XSD.

General Notes on the XML schema

Content and Classification use the word **element** in a way that differs slightly from its use in designing XML document schemes.

- ▪ Content and Classification use **element** to describe a taxonomy facet for parsing an address.

- ▪ XML Scheme Document (XSD) uses **element** to describe an XML tag.

Some Content and Classification **elements** become XSD elements and others become XSD attributes of other XSD elements.

The Address Standard XSD has been designed by creating a simple type for almost everything in Content and Classification. The simple data type is a place to describe the form of data that populates the simple type. Many times no attempt to provide an automatable test for correctness of form is given in the XSD. Local implementers may attempt such tests outside the scope of the Address standard.

From the simple types simple elements are created. Simple elements and some simple types cluster into complex elements. Finally, elements are gathered into the **global** elements that comprise the top level XML data types.

5.3.1   Relation of the Address Standard XSD data model to the Content and Classification parts.

A crosswalk chart relating the Content and Classification elements into XSD classes, types, elements, and attributes.

Classes	XSD Type Name	Simple or Complex (in XSD terms)	Element or Attribute Name	XSD	Parent XSD class
NumbereredThoroughfareAddress	NumberedThoroughfareAddress _type	Complex	NumberedThoroughfareAddress	Global Element	Global, AddressCollection
IntersectionAddress	IntersectionAddress _type	Complex	IntersectionAddress	Global Element	Global, AddressCollection
TwoNumberAddressRange	TwoNumberAddressRange _type	Complex	TwoNumberAddressRange	Global Element	Global, AddressCollection
FourNumberAddressRange	FourNumberAddressRange _type	Complex	FourNumberAddressRange	Global Element	Global, AddressCollection
UnnumberedThoroughfareAddress	UnnumberedThoroughfareAddress _type	Complex	UnnumberedThoroughfareAddress	Global Element	Global, AddressCollection
LandmarkAddress	LandmarkAddress _type	Complex	LandmarkAddress	Global Element	Global, AddressCollection
Community (Urbanization) Address	CommunityAddress _type	Complex	CommunityAddress	Global Element	Global, AddressCollection
USPS Postal Delivery Box	USPSPostalDeliveryBox _type	Complex	USPSPostalDeliveryBox	Global Element	Global, AddressCollection

Classes	XSD Type Name	Simple or Complex (in XSD terms)	Element or Attribute Name	XSD	Parent XSD class
USPS Postal Delivery Route	USPSPostalDeliveryRoute _type	Complex	USPSPostalDeliveryRoute	Global Element	Global, AddressCollection
USPS General Delivery Address	USPSGeneralDeliveryAddress _type	Complex	USPSGeneralDeliveryAddress	Global Element	Global, AddressCollection
General Address	GeneralAddressClass _type	Complex	GeneralAddressClass	Global Element	Global, AddressCollection
AddressReferenceSystem	AddressReferenceSystem _type	Complex	AddressReferenceSystem	Global Element	Global, AddressCollection
	AddressCollection _type	Complex	AddressCollection	Global Element	
Complete Address Number	CompleteAddressNumber _type	Complex	CompleteAddressNumber	Element	Various, AddressNumberRange
Address Number Prefix	AddressNumberPrefix _type	Simple	Prefix	Element	CompleteAddressNumber, AddressNumberRange
Address Number	AddressNumber _type	Simple	Number	Element	CompleteAddressNumber, AddressNumberRange
Address Number Suffix	AddressNumberSuffix _type	Simple	Suffix	Element	CompleteAddressNumber, AddressNumberRange
SeparatorElement	SeparatorElement _type	Simple	SeparatorElement	Attribute	CompleteAddressNumber, AddressNumberRange
CompletStreetName	CompleteStreetName _type	Complex	CompleteStreetName	Element	Global objects
Street Name Pre-modifier	StreetNameModifier _type	Simple	PreModifier	Element	CompleteStreetName
Street Name Pre-directional	StreetNameDirectional _type	Simple	PreDirectional	Element	CompleteStreetName
Street Pre-type	StreetNameType _type	Simple	PreType	Element	CompleteStreetName
Street Name	StreetName _type	Simple	StreetName	Element	CompleteStreetName
Street Post-type	StreetNameType _type	Simple	PostType	Element	CompleteStreetName
Street Post-directional	StreetNameDirectional _type	Simple	PostDirectional	Element	CompleteStreetName
Street Name Post-modifier	StreetNameModifier _type	Simple	PostModifier	Element	CompleteStreetName
CompleteSubaddress	CompleteSubaddress _type	Complex	CompleteSubaddress	Element	Global objects
Subaddress Type	SubaddressType _type	Simple	SubaddressType	Element	Building
Subaddress Identifier	SubaddressIdentifier _type	Simple	SubaddressIdentifier	Element	Building
CompleteLandmarkName	CompleteLandmarkName _type	Simple	CompleteLandmarkName	Element	Global objects
Landmark Name	LandmarkName _type	Complex	LandmarkName	Element	LandmarkAddress
Community (Urbanization) Place Name	CommunityPlaceName _type	Simple	CommunityPlaceName	Element	PlaceName, LandmarkSiteAddress,CommunityAddress
CompletePlaceName	completePlaceName_type	Complex	CompletePlaceName	Element	Global objects
PlaceName	PlaceName _type	Simple	PlaceName	Element	CompletePlaceName
PlaceNameType	PlaceNameType _type	Simple	PlaceNameType	Attribute	PlaceName
County Name	CountyName _type	Simple	CountyName _type	Element	PlaceName
State	StateName _type	Simple	StateName	Element	Global objects
ZIP Code	ZipCode _type	Simple	ZipCode	Element	Global objects
ZIP+4 Code	ZipPlus4 _type	Simple	ZipPlus4	Element	Global objects
CountryName	CountryName _type	Simple	CountryName	Element	Global objects
USPS Box Type	USPSBoxType _type	Simple	USPSBoxType	Attribute	USPSBox
USPS Box ID	USPSBoxId _type	Simple	USPSBoxId		USPSBox
	USPSBox_type	Complex	USPSBox	Element	USPSPostalDelivery Classes
USPS Box Group Type	USPSBoxGroupType _type	Simple	USPSBoxGroupType	Attribute	USPSBoxGroup
USPS Box Group ID	USPSBoxGroupId _type	Simple	USPSBoxGroupId		USPSBoxGroup
	USPSBoxGroup _type	Complex	USPSBoxGroup	Element	USPSPostalDelivery Classes
USPS General Delivery Point	USPSGeneralDeliveryPoint _type	Simple	USPSGeneralDeliveryPoint	Element	USPSPostalDelivery Classes
DeliveryAddress	CompleteFeatureAddress _type	Simple	DeliveryAddress	Element	GeneralAddress
Place State ZIP	PlaceStateZip _type	Simple	PlaceStateZip	Element	GeneralAddress
Address ID	AddressId _type	Simple	AddressId	Element	Global objects

Classes	XSD Type Name	Simple or Complex (in XSD terms)	Element or Attribute Name	XSD	Parent XSD class
Address X Coordinate	AddressXCoordinate _type	Simple	X	Element	XYCoordinate
Address Y Coordinate	AddressXCoordinate _type	Simple	Y	Element	XYCoordinate
Address Longitude	AddressLongitude _type	Simple	Longitude	Element	LongLat
Address Latitude	AddressLatitude _type	Simple	Latitude	Element	LongLat
US National Grid Coordinate	LocationUSNG _type	Simple	USNGCoordinate	Element	Global objects
Address Z Value	AddressZValue _type	Simple	Zvalue	Element	Global objects
Address Classification		Internal		Internal to model	The XSD element name stores this information
Feature Type	FeatureType _type	Simple	AddressFeatureType	Element	Global objects
Address Lifecycle Status	AddressLifecycleStatus _type	Simple	AddressLifecycleStatus	Element	Global objects
Address Official Status	AddressOfficialStatus _type	Simple	OfficialStatus	Element	Global objects
Address Anomaly Status	AddressAnomalyStatus _type	Simple	AddressAnomalyStatus	Element	Global objects
Address Range Type	AddressRangeType _type	Simple	AddressRangeType	Element	Global objects
Location Description	LocationDescription _type	Simple	LocationDescription	Element	Global objects
Address Number Parity	AddressNumberParity _type	Simple	Parity	Attribute	TwoNumberAddressRange
Address ReferenceSystem Name	AddressReferenceSystemName _type	Simple	AddressReferenceSystemName _type	Element	Global objects
Address ReferenceSystem Axis	AddressReferenceSystemeAxes _type	Simple	AddressReferenceSystemAxis _type	Element	AddressReferenceSystem
Address ReferenceSystem DocumentCitation	AddressReferenceSystemDocumentCitation _type	Simple	AddressDocumentCitation _type	Element	AddressReferenceSystem
Address ReferenceSystem Origin	AddressReferenceSystemOrigin _type	Simple	AddressReferenceSystemOrigin _type	Element	AddressReferenceSystem
Address ReferenceSystem Extent	AddressReferenceSystemExtent _type	Simple	AddressReferenceSystemExtent _type	Element	AddressReferenceSystem
Address ReferenceSystem	AddressReferenceSystem _type	Complex	AddressReferenceSystem	Global Element	Global
Address Start Date	AddressStartDate _type	Simple	AddressStartDate	Element	Global objects
Address End Date	AddressEndDate _type	Simple	AddressEndDate	Element	Global objects
Address Direct Source	AddressDirectSource _type	Simple	AddressDirectSource	Element	Global objects
Address Authority	AddressAuthority _type	Simple	AddressAuthority	Element	Global objects
Address Authority Idenitifier	AddressAuthorityIdentifier _type	Simple	AddressAuthorityIdentifier	Element	Global objects

5.3.2   Diagrams of Elements of the XSD Data Model

- Data Model 0.4.2:
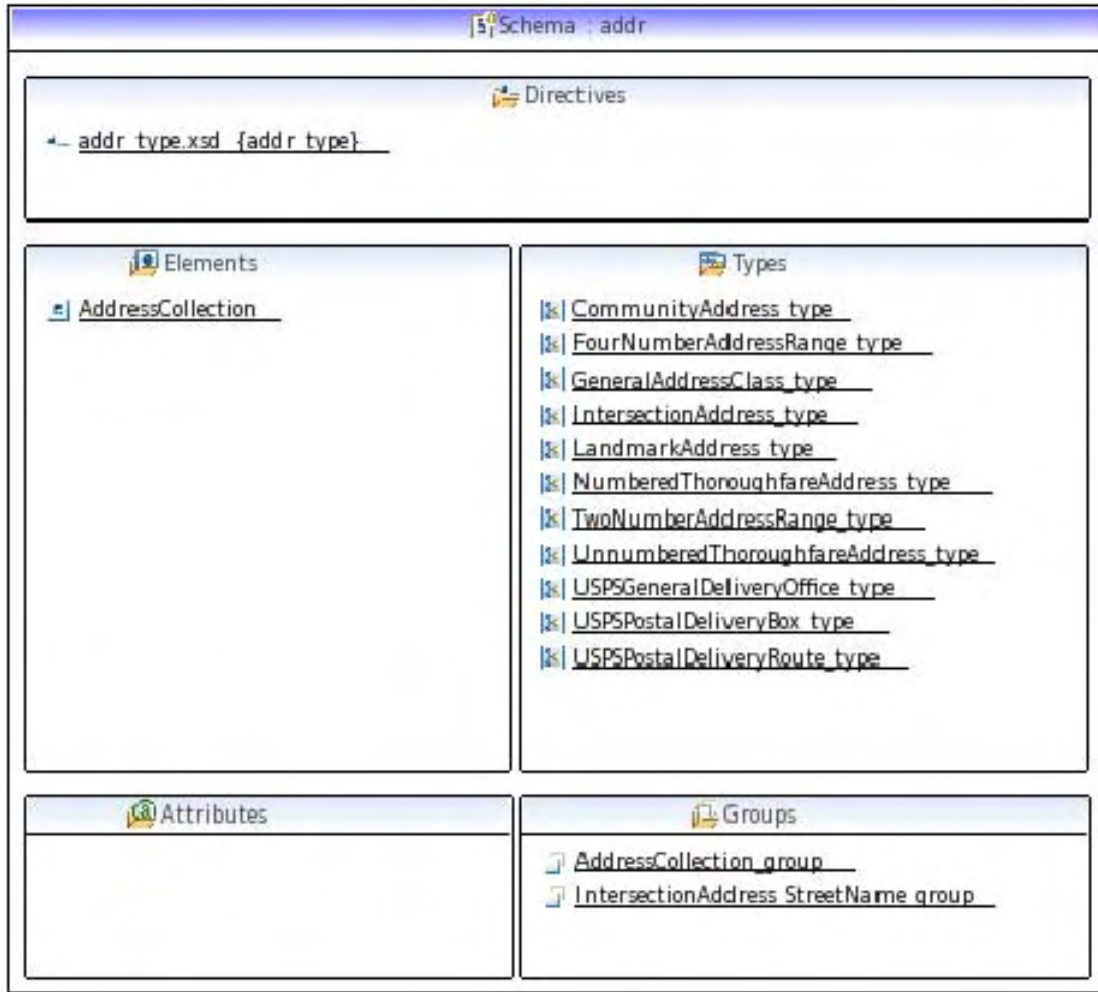
5.3.2.1   Complex Types
- Complete Street Name v0.4.2:
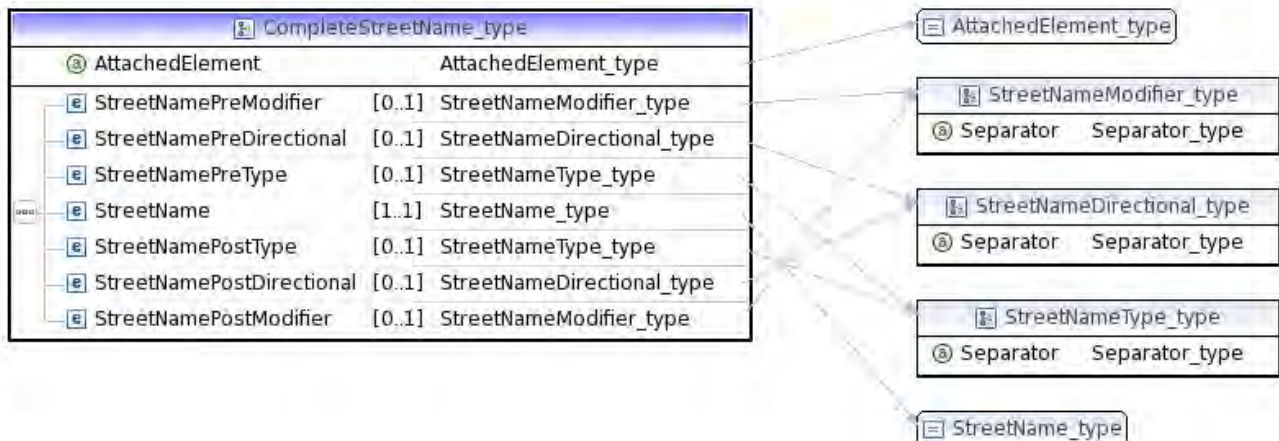
- Complete Address Number v0.4.2:
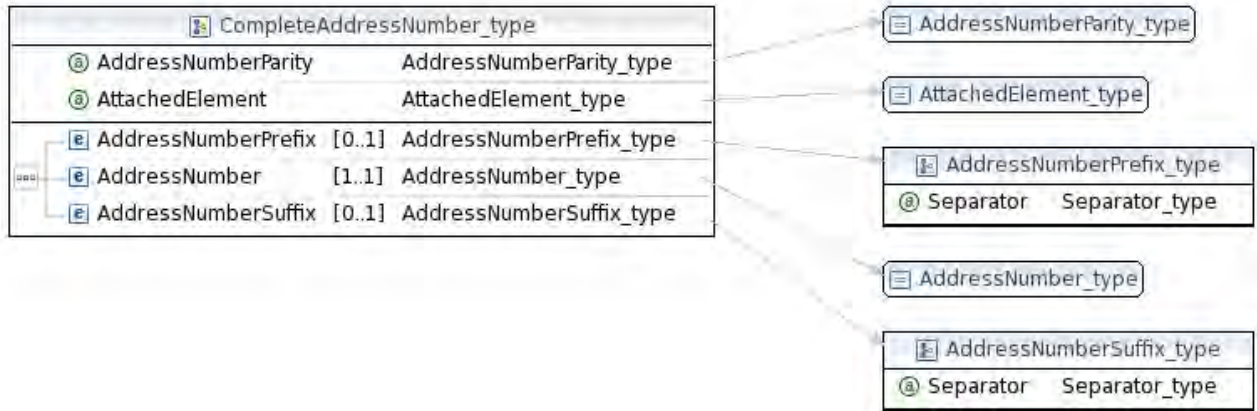
- Complete Landmark Name v0.4.2:
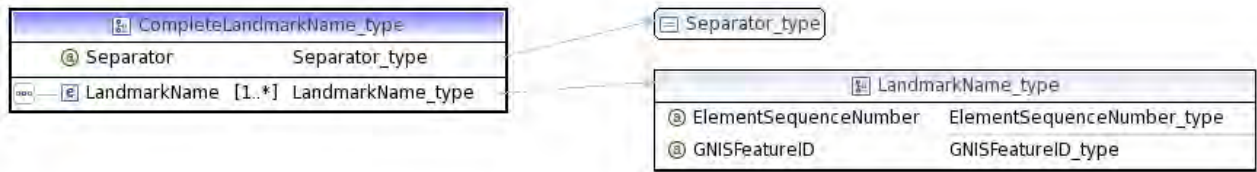
- Complete Place Name v0.4.2:

- Complete Subaddress v0.4.2:
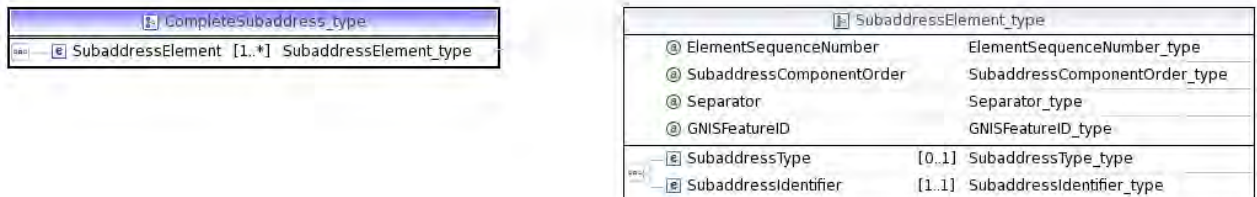
▪ Address Reference System v0.4.2:
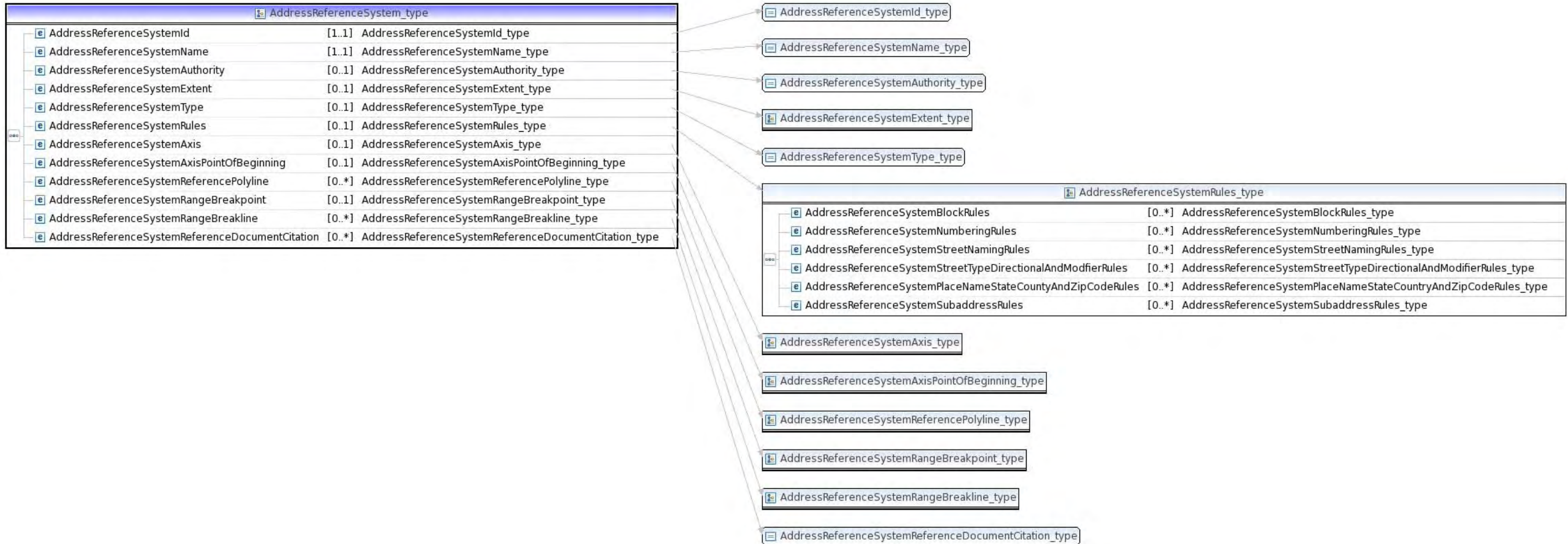
▪ Address Collection v0.4.2:

5.3.2.2 Thoroughfare Address Classes

▪ Numbered Thoroughfare Address v0.4.2:

▪ Intersection Address v0.4.2:

- Two Number Address Range v 0.4.2:

- Four Number Address Range v0.4.2:

▪ Unnumbered Thoroughfare Address v0.4.2:

5.3.2.3   Landmark Address Classes

▪ Landmark Address v0.4.2:

▪ Community Address v0.4.2:

5.3.2.4 Postal Delivery Address Classes

- USPS Postal Delivery Route v0.4.2:

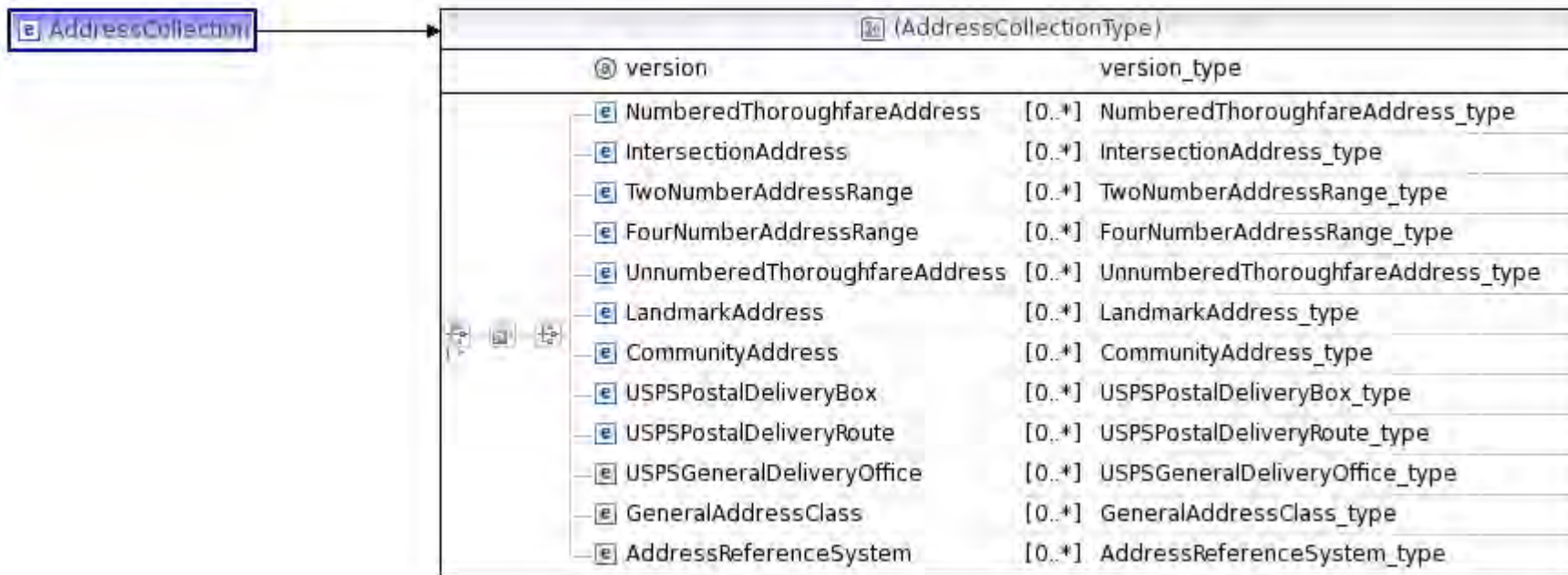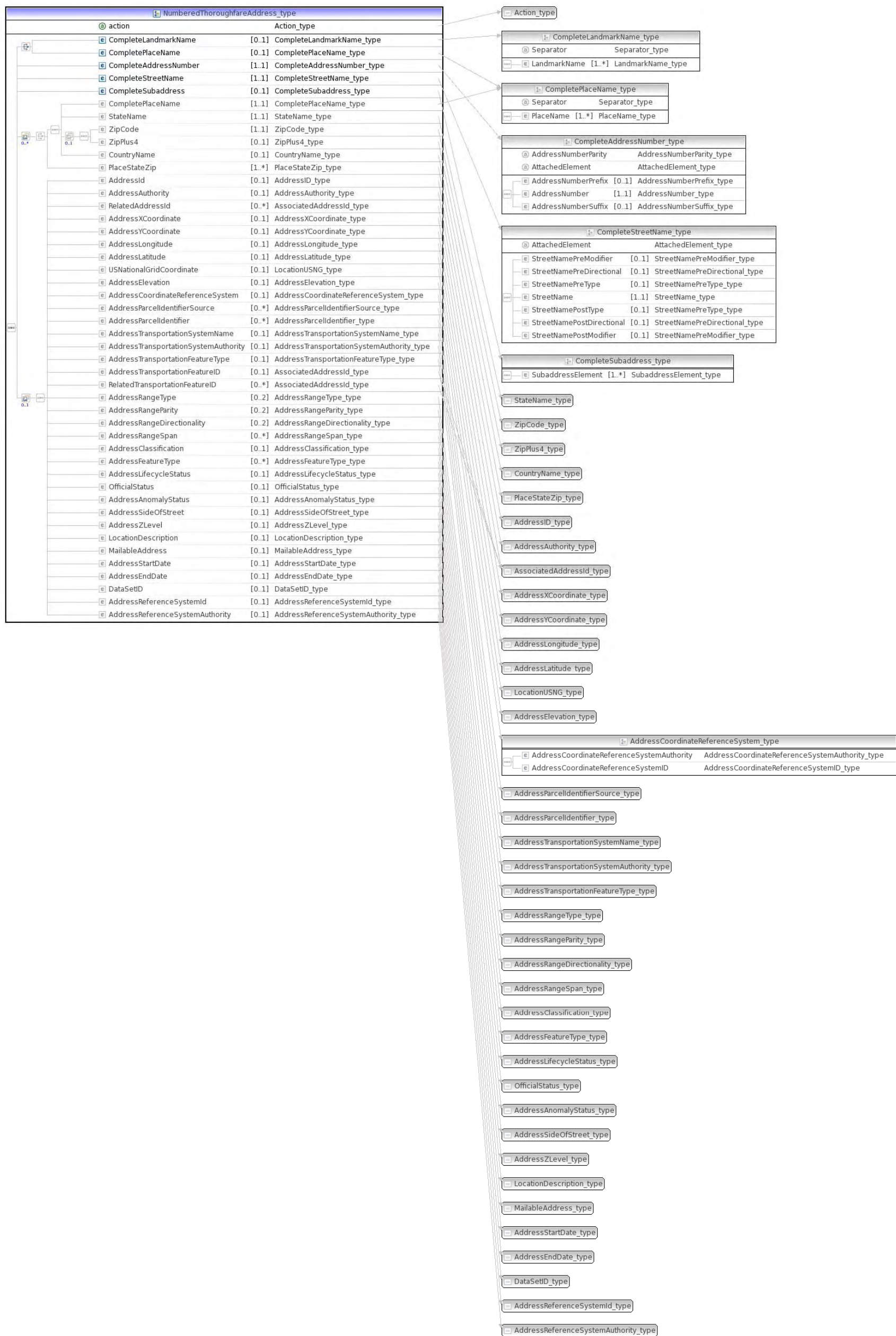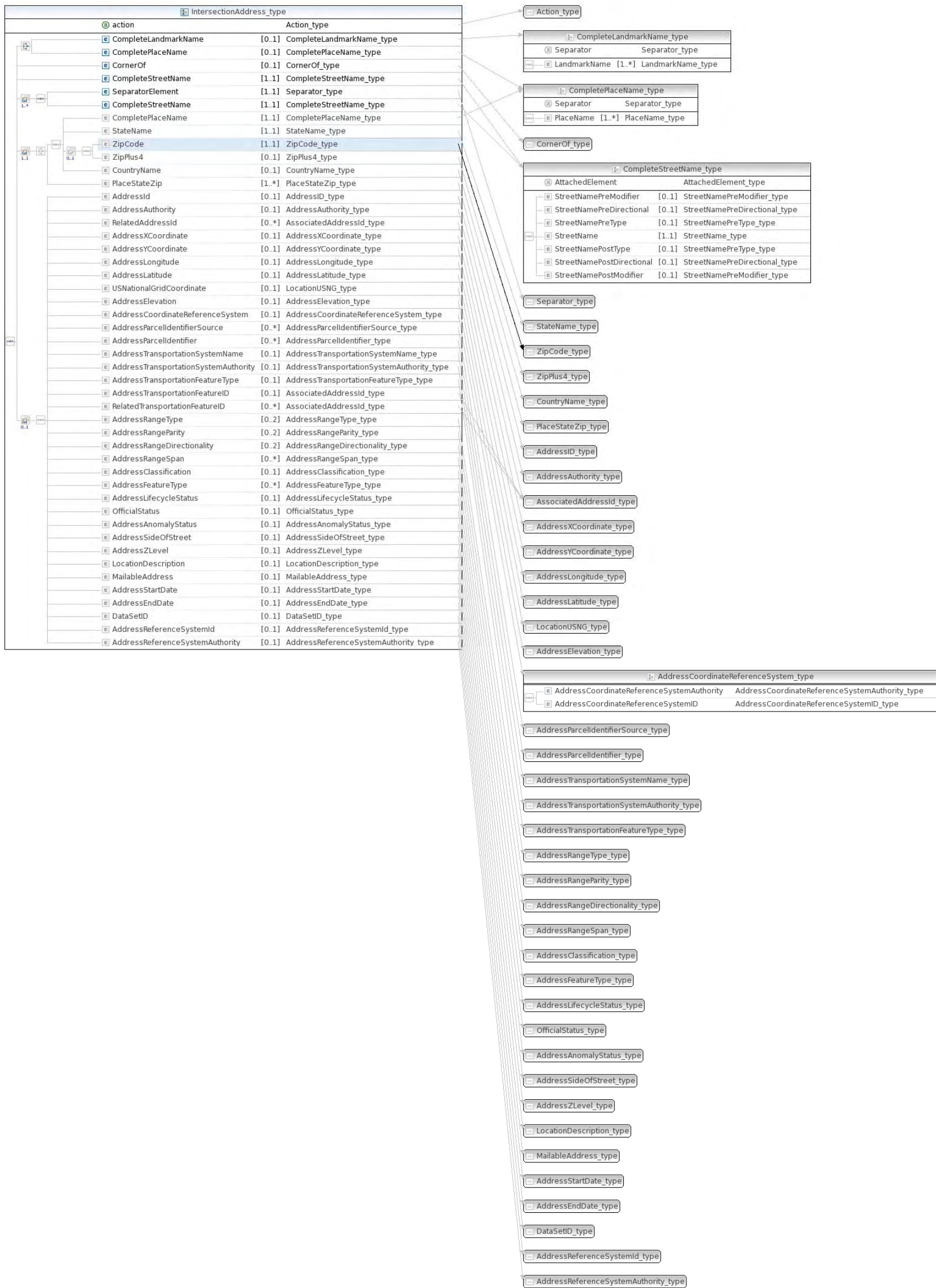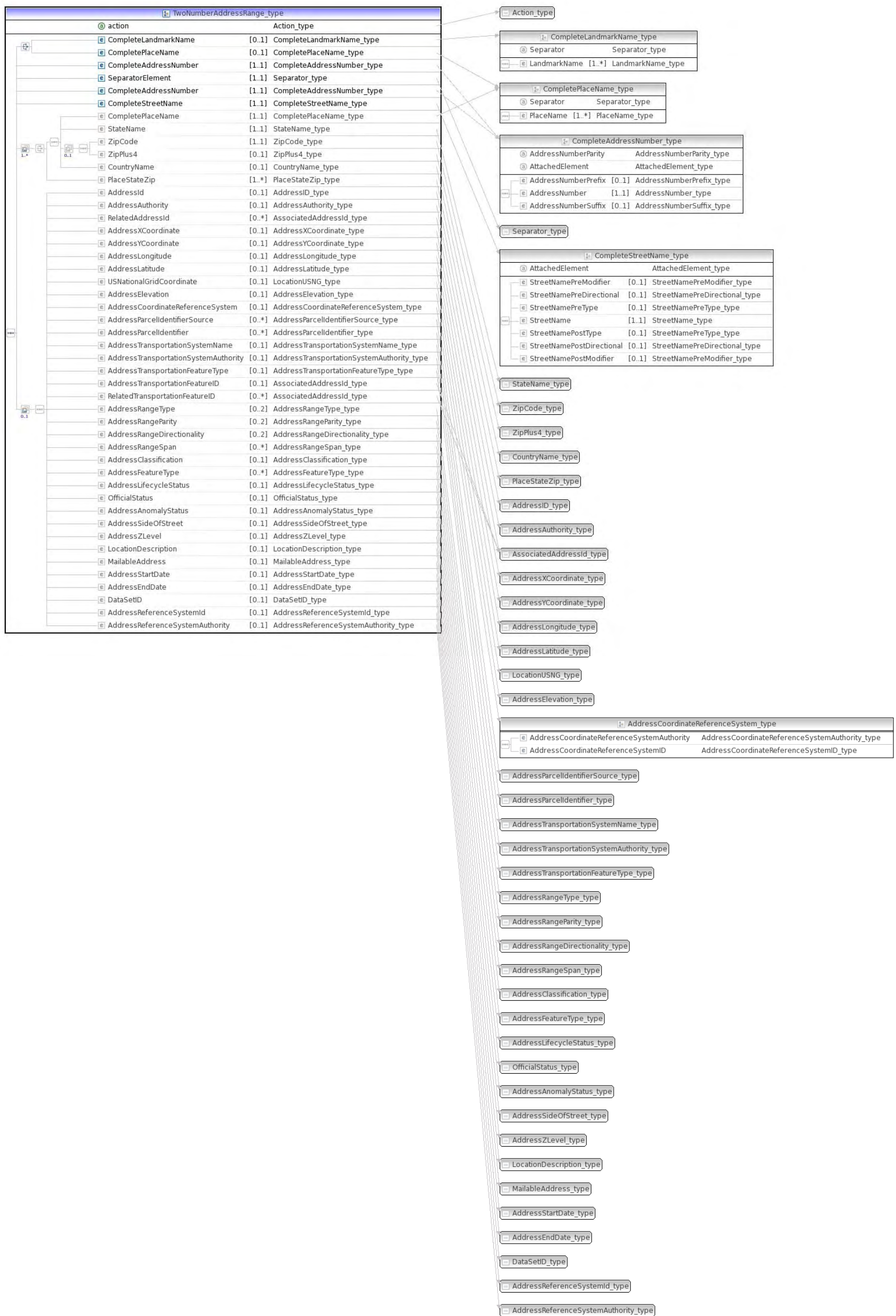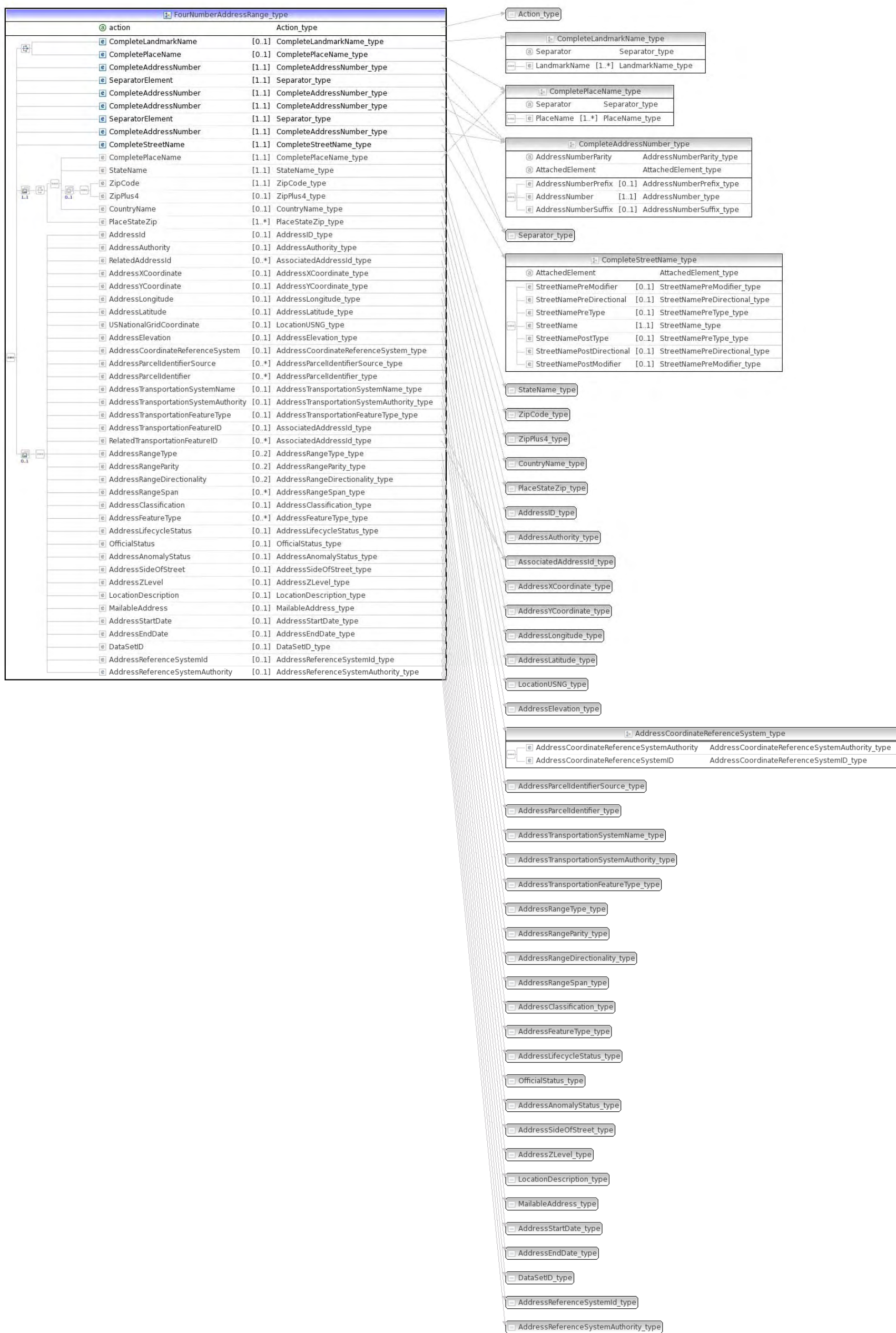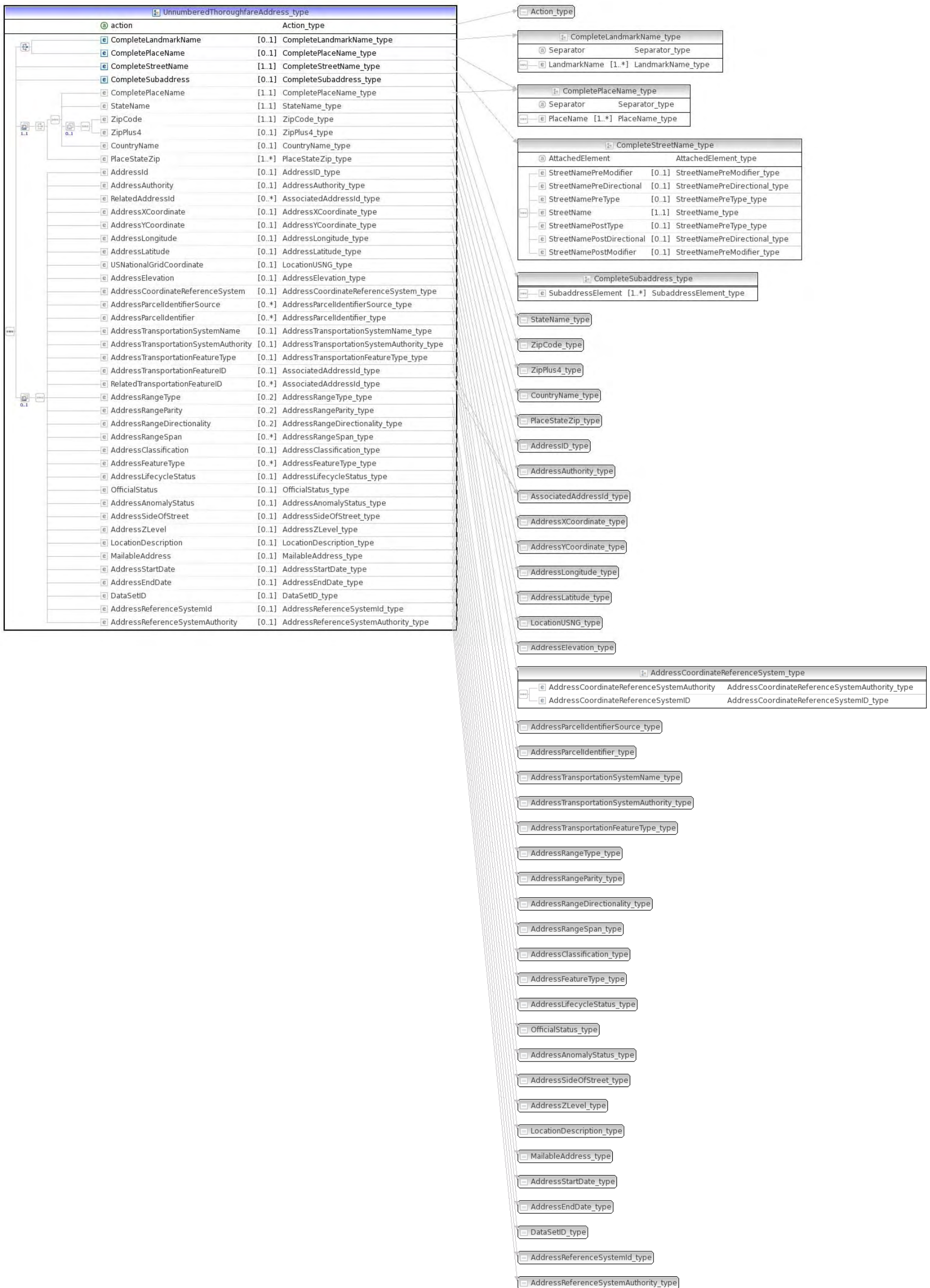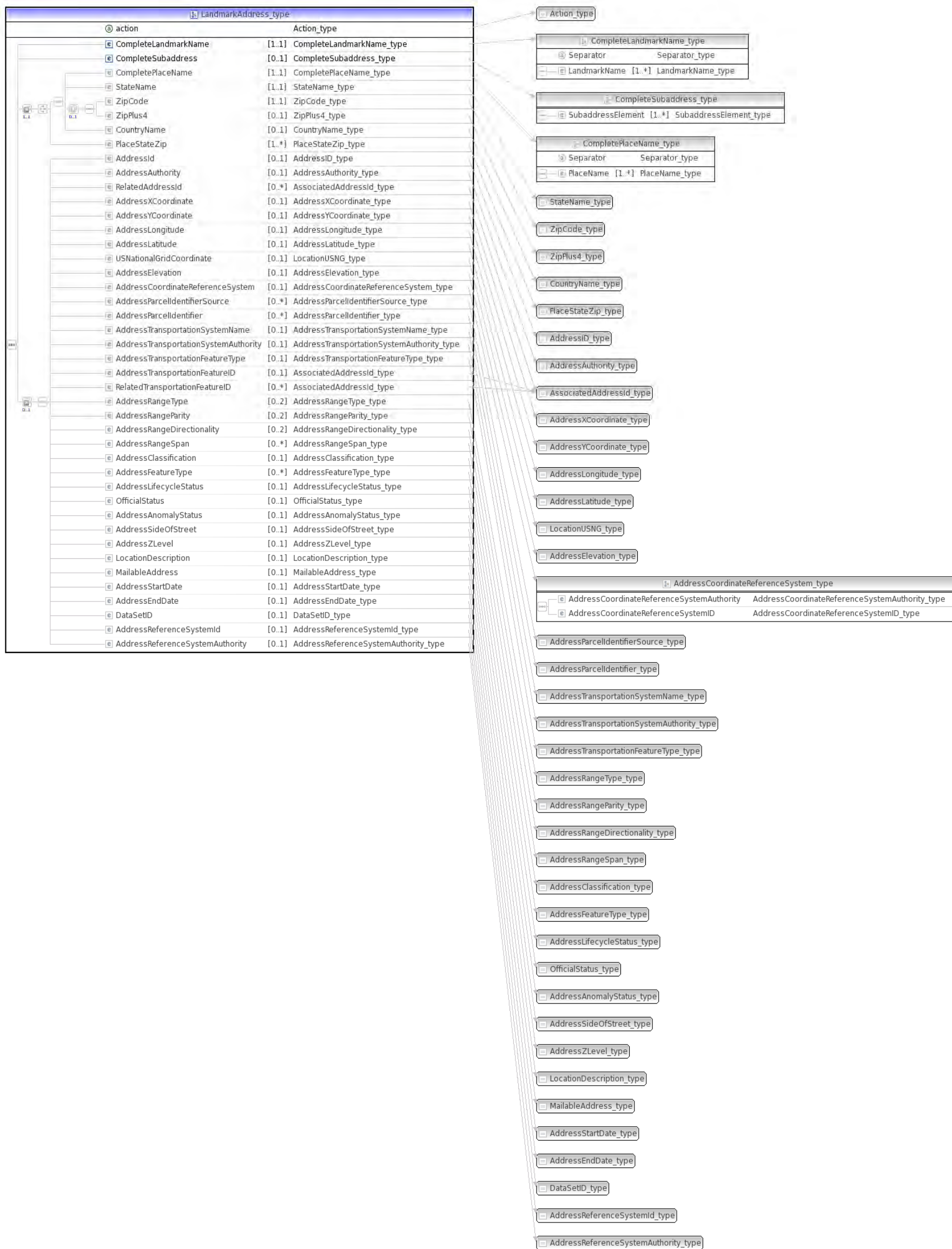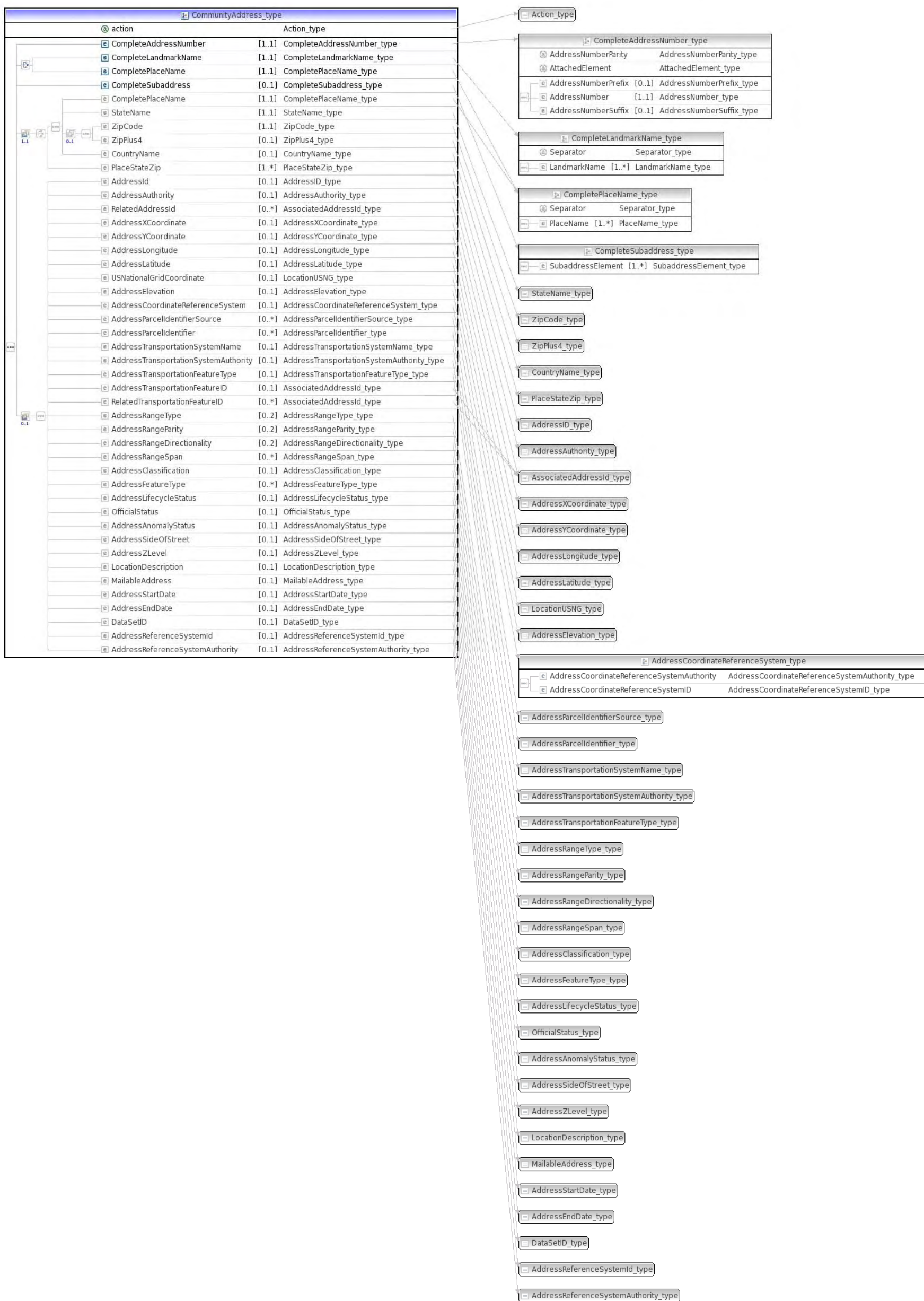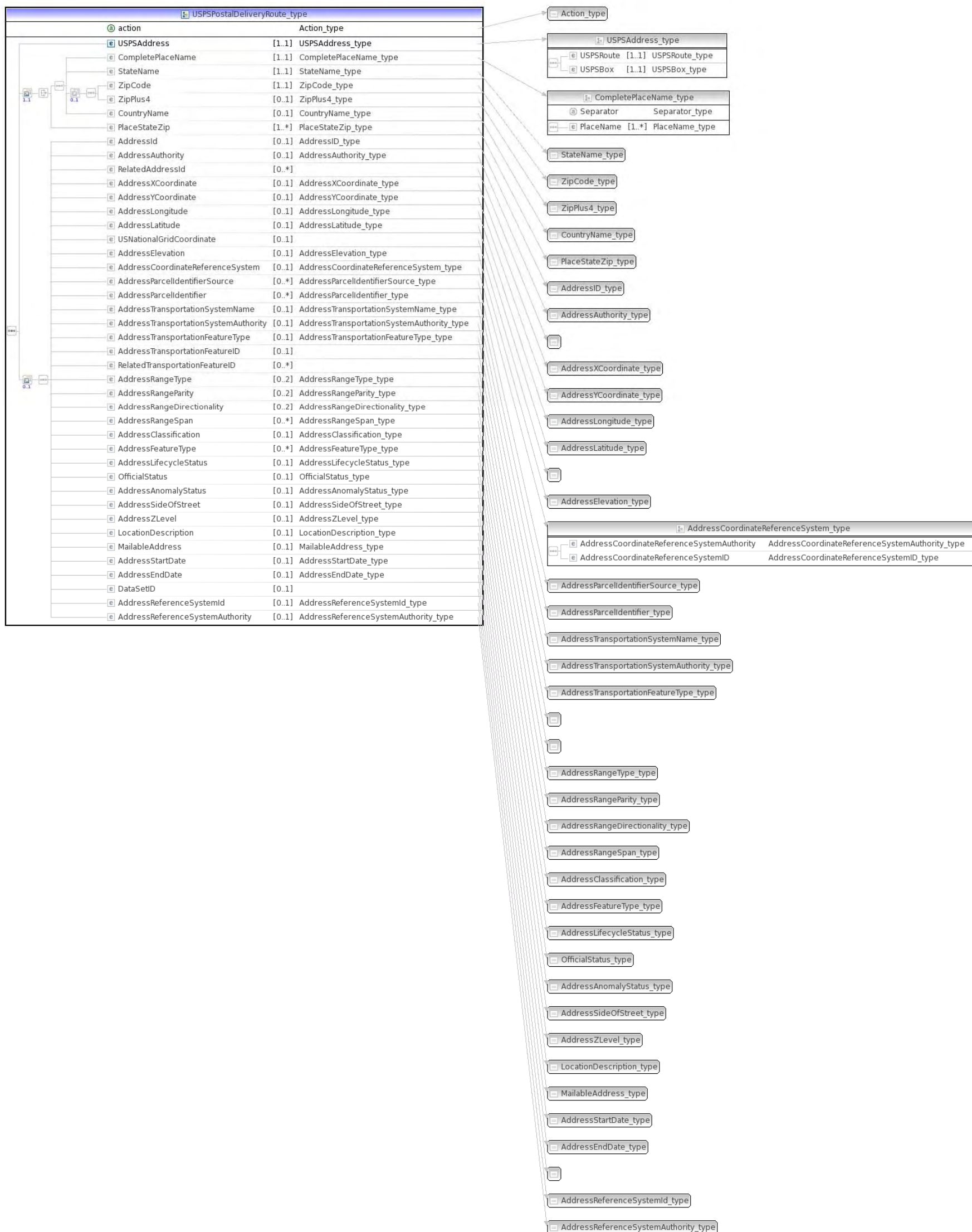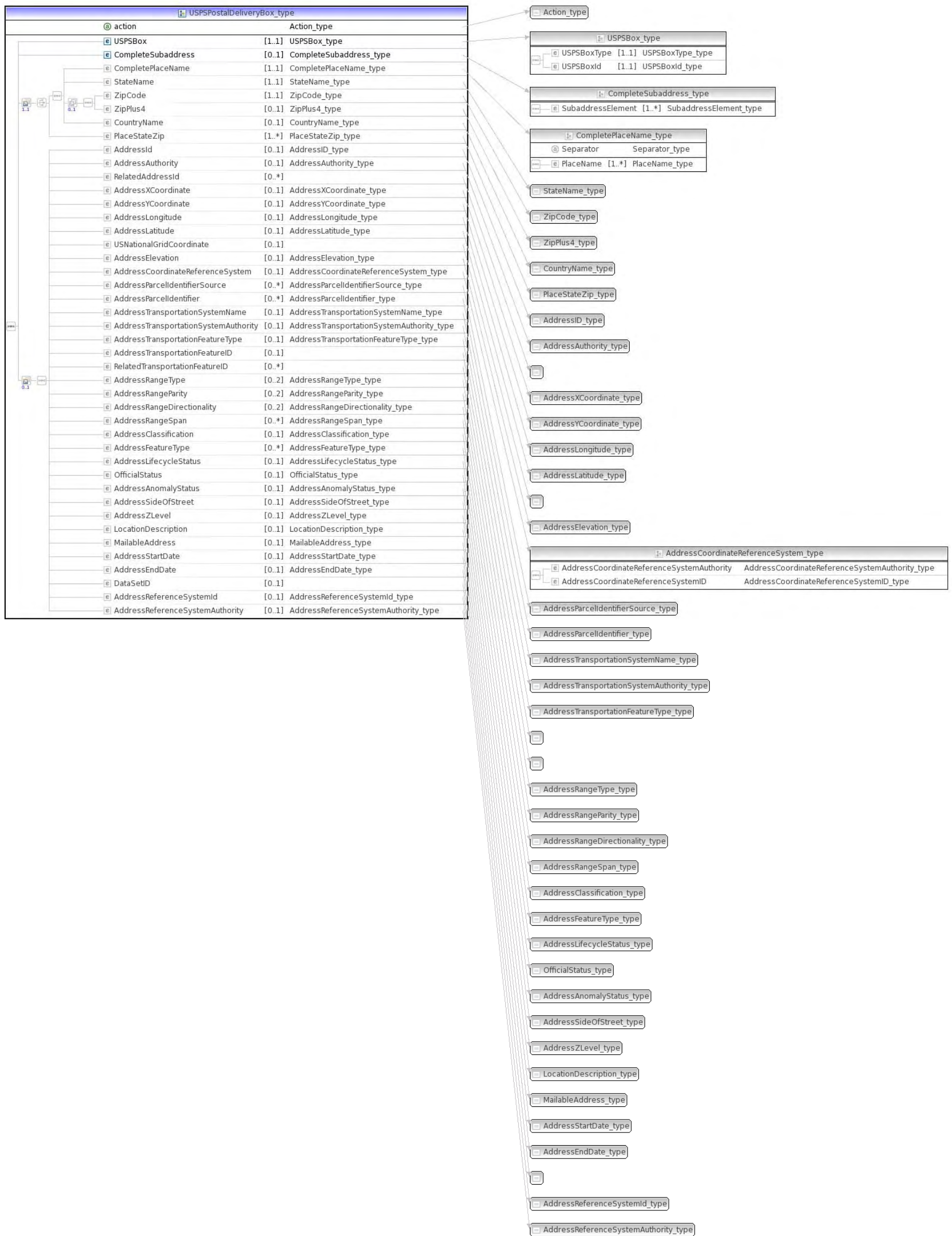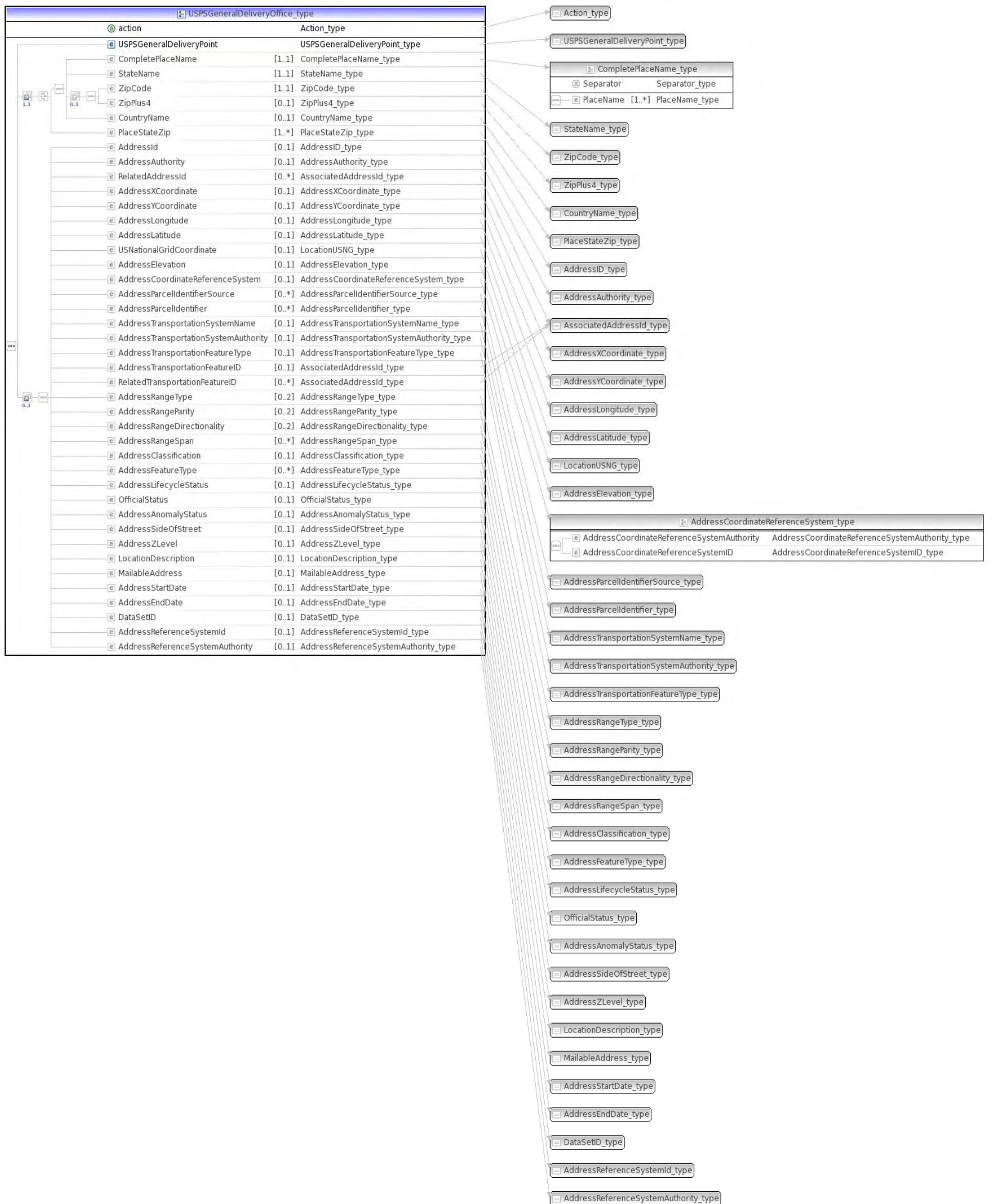| USPSPostalDeliveryRoute_type		
⊚ action		Action_type
USPSAddress	[1..1]	USPSAddress_type
CompletePlaceName	[1..1]	CompletePlaceName_type
StateName	[1..1]	StateName_type
ZipCode	[1..1]	ZipCode_type
ZipPlus4	[0..1]	ZipPlus4_type
CountryName	[0..1]	CountryName_type
PlaceStateZip	[1..*]	PlaceStateZip_type
AddressId	[0..1]	AddressID_type
AddressAuthority	[0..1]	AddressAuthority_type
RelatedAddressId	[0..*]	
AddressXCoordinate	[0..1]	AddressXCoordinate_type
AddressYCoordinate	[0..1]	AddressYCoordinate_type
AddressLongitude	[0..1]	AddressLongitude_type
AddressLatitude	[0..1]	AddressLatitude_type
USNationalGridCoordinate	[0..1]	
AddressElevation	[0..1]	AddressElevation_type
AddressCoordinateReferenceSystem	[0..1]	AddressCoordinateReferenceSystem_type
AddressParcelIdentifierSource	[0..*]	AddressParcelIdentifierSource_type
AddressParcelIdentifier	[0..*]	AddressParcelIdentifier_type
AddressTransportationSystemName	[0..1]	AddressTransportationSystemName_type
AddressTransportationSystemAuthority	[0..1]	AddressTransportationSystemAuthority_type
AddressTransportationFeatureType	[0..1]	AddressTransportationFeatureType_type
AddressTransportationFeatureID	[0..1]	
RelatedTransportationFeatureID	[0..*]	
AddressRangeType	[0..2]	AddressRangeType_type
AddressRangeParity	[0..2]	AddressRangeParity_type
AddressRangeDirectionality	[0..2]	AddressRangeDirectionality_type
AddressRangeSpan	[0..*]	AddressRangeSpan_type
AddressClassification	[0..1]	AddressClassification_type
AddressFeatureType	[0..*]	AddressFeatureType_type
AddressLifecycleStatus	[0..1]	AddressLifecycleStatus_type
OfficialStatus	[0..1]	OfficialStatus_type
AddressAnomalyStatus	[0..1]	AddressAnomalyStatus_type
AddressSideOfStreet	[0..1]	AddressSideOfStreet_type
AddressZLevel	[0..1]	AddressZLevel_type
LocationDescription	[0..1]	LocationDescription_type
MailableAddress	[0..1]	MailableAddress_type
AddressStartDate	[0..1]	AddressStartDate_type
AddressEndDate	[0..1]	AddressEndDate_type
DataSetID	[0..1]	
AddressReferenceSystemId	[0..1]	AddressReferenceSystemId_type
AddressReferenceSystemAuthority	[0..1]	AddressReferenceSystemAuthority_type

Action_type

USPSAddress_type		
USPSRoute	[1..1]	USPSRoute_type
USPSBox	[1..1]	USPSBox_type

CompletePlaceName_type	
⊚ Separator	Separator_type
PlaceName [1..*]	PlaceName_type

StateName_type

ZipCode_type

ZipPlus4_type

CountryName_type

PlaceStateZip_type

AddressID_type

AddressAuthority_type

AddressXCoordinate_type

AddressYCoordinate_type

AddressLongitude_type

AddressLatitude_type

AddressElevation_type

AddressCoordinateReferenceSystem_type	
AddressCoordinateReferenceSystemAuthority	AddressCoordinateReferenceSystemAuthority_type
AddressCoordinateReferenceSystemID	AddressCoordinateReferenceSystemID_type

AddressParcelIdentifierSource_type

AddressParcelIdentifier_type

AddressTransportationSystemName_type

AddressTransportationSystemAuthority_type

AddressTransportationFeatureType_type

AddressRangeType_type

AddressRangeParity_type

AddressRangeDirectionality_type

AddressRangeSpan_type

AddressClassification_type

AddressFeatureType_type

AddressLifecycleStatus_type

OfficialStatus_type

AddressAnomalyStatus_type

AddressSideOfStreet_type

AddressZLevel_type

LocationDescription_type

MailableAddress_type

AddressStartDate_type

AddressEndDate_type

AddressReferenceSystemId_type

AddressReferenceSystemAuthority_type

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- USPS Postal Delivery Box v0.4.2:

▪ USPS General Delivery Office v0.4.2:

5.3.2.5 General Address Class

- General Address Class v0.4.2: