MultiNet® Address Points 1.8

Data and Format Specifications

Document version 1.3.1
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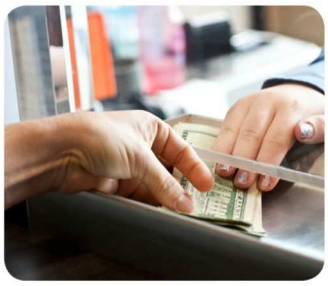

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Section 1 General Specifications

1 Introduction

The MultiNet Address Point product delivers point locations and information which are associated with an Address. Within the MultiNet Address Point product, these features are referred to as Anchor Points. Anchor Points are map features that provide a hook for features associated to a point which are then used in conjunction with the core map. In the Address Point product known Addresses are hooked to the Anchor Point providing stable locations for the Address. There are varying types of Anchor Points which are differentiated according to the type of feature being hooked or represented by the Anchor Point.

2 Product Description

The MultiNet Address Points product enhances core products by allowing address-matching (geocoding) to an explicit point feature instead of through an interpolation along street segments. As these points are derived from approved external sources as opposed to an interpolation of address ranges they can be expected to provide more precise and meaningful locations for the objects they represent. In most cases the geocoded result will be superior because of its independence from segment ranges and the potential interpolation errors.

These point features represent a competitive advantage over our competitors and provide additional value over industry-standard segment ranges in several ways:

- More accurate routing (destinations are no longer positioned along-segment using interpolation)
- Superior Find capabilities
- Enhanced map display
- Benefits to other geocoded products, such as Points of Interest (POIs)
- A source for validation of address ranges

In many countries within the Asia-Pacific region, address points represent the only reliable means of locating addresses, as the range interpolation model is not valid due to the irregular nature of house numbering. For these countries, address points are an absolute requirement for navigation onto the house number level.

3 Overview

This section provides the set of common specifications for all formats included in the MultiNet Address Points product version 1.7.

3.1 Conceptual Model

The conceptual model (Figure 1) shows three essential concepts included in the MultiNet Address Point product. The first concept is that Anchor Points are really a collection of points associated on the base map.

The second concept, being the concept of an Address Point is a means of attaching an address to an Anchor Point. In this model an instance of Anchor Point can be associated with an address, with multiple representations in varying languages.

Finally, Addresses are a collection of components and that each Address Component contributes to the minimum requirements of a complete address. These minimum requirements are determined by the standards of the local area of interest and will vary accordingly. Additionally, an address simply reflects a specific location and exists independently of any entity or entities that may occupy the address.

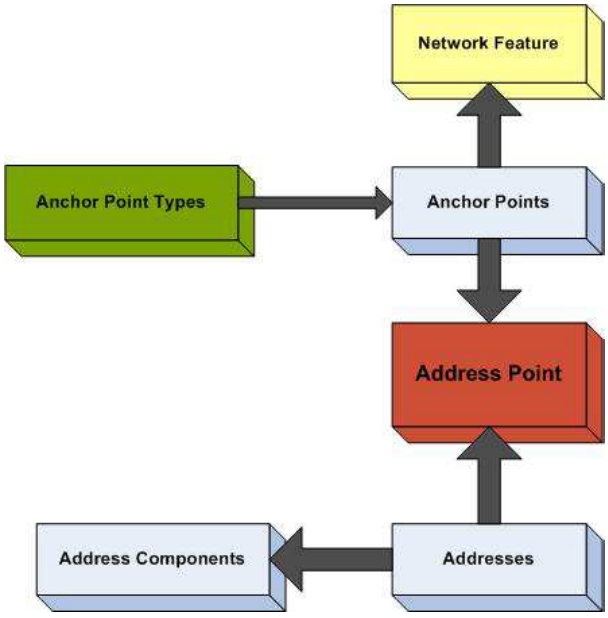


Fig. 1.1.1: Conceptual Design

3.2 Geographic Coordinate Information

Datum: WGS84

Projection: Geographic (un-projected)

Units: Decimal degrees

Coordinate Precision: 7 decimal places

3.3 Supported Formats

MultiNet Address Points are delivered in the following Global Product Formats:

- Shapefile
- Oracle Spatial Loader (OSL file)

- GDF - AS
- GDF - AR

3.4 Character Set and Name Casing

Character set: UTF-8

Name casing: All names are mixed case except for acronyms within names

3.5 Related Documents

The MultiNet Address Points is an add-on product for Standard MultiNet. Please refer to the following MultiNet documentation for more information.

- MultiNet Data Specification and Model 3.6
- MultiNet Global Address Points 1.7 User Guide
- MultiNet POI v1.8 Specification
- MultiNet User Guide 3.6
- MultiNet and Enhancements Directory Structure and File Naming 2.1

Section 2 Data Specification

1 Overview

This section describes the conceptual data specifications of the components that make up the MultiNet Address Point Modeling schema and the MultiNet Address Point product. For product format specifications, please refer to the corresponding section within this document.

The MultiNet Address Point concept consists of the following topics:

Anchor Point**:** provides the point location to which an *Address* can be linked for the Address Point.

Address**:** provides the addressing components in a given language that uniquely identifies a location along the transportation network.

Address Scheme**:** defines the complete structure of an Address.

Address Components**:** are the components necessary to build a complete *Address*.

Meta Information**:** provides the details of the Address Scheme implemented for each country including the Address Components labels in all supported languages.

The MultiNet Address Point concept consists of the following relationships:

Anchor Point Along Transportation Element**:** links an *Anchor Point* to a *Network* Feature by a Relative Position and Side Of Line.

Feature Associated with Anchor Point**:** provides a relationship for linking *Entry Points* with a parent *Anchor Point*.

1.1 Anchor Point

Definition

An *Anchor Point* represents a location that is of relevance for Geocoding, Find and Routing applications and is categorized according to the type of feature which it represent.

Description

The *Anchor Point* class provides point objects that links dynamic information to the core database. Examples of such dynamic content includes POIs, individual addresses, etc.

An instance of *Anchor Point* is qualified as to the type of feature represented based upon its Anchor Point Type. For examples refer to Figure 2.2.1.

Each *Anchor Point* is spatially defined by a X, Y and Z coordinate, of which the X and Y are mandatory.

An instance of *Anchor Point* must be associated to one instance of *Address.*

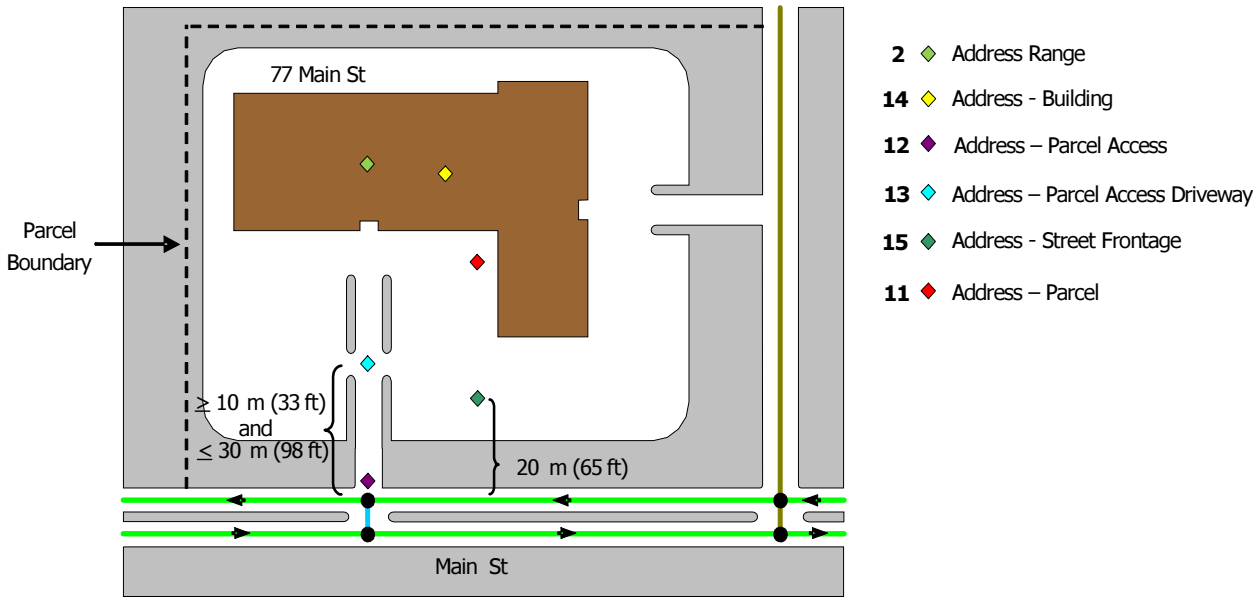


Fig. 2.2.1: A graphic example illustrating various types of *Anchor Points*

Attributes

- Anchor Point Stable ID
- Anchor Point Type
- Geocoding Accuracy Level

1.1.1 Anchor Point Stable ID

Definition

Anchor Point Stable ID is a globally unique and stable identifier.

Description

The MultiNet Address Point product delivers a stable identifier that is globally unique for *Anchor Point* features.

The Anchor Point Stable ID is not treated as a Feature ID and therefore not used as a key field in relationships. It is an unique attribute and is only mandatory for *Anchor Points* that do not represent 'Entry Points'.

For *Anchor Point* of type *Entry*, the Anchor Point Stable ID is only provided for those points which are not generated algorithmically.

Example:

276004923456789 (Germany)
056003234567890 (Belgium)
484005012345678 (Mexico)
840410123456789 (USA New Hampshire)

Anchor Point Stable ID applies to the following Anchor Point types:

- Address Range
- Address - Parcel Centroid
- Address - Parcel Access
- Address - Parcel Access Driveway
- Address - Building
- Address - Street Frontage.

Note: Anchor Point Stable ID is not defined as globally unique across all other "unique IDs" such as the "Address ID" on page 20.

1.1.2 Anchor Point Type

Definition

Anchor Point Type differentiates the kind of entity the *Anchor Point* represents.

Description

The following list describes possible values that are valid for *Anchor Point Type* - there is no implied hierarchy.

2: Address Range
7: Entry
11: Address - Parcel Centroid
12: Address - Parcel Access
13: Address - Parcel Access Driveway
14: Address - Building
15: Address - Street Frontage

Each Anchor Point has one and only one Anchor Point type.

Address Range

An instance of *Anchor Point* type *Address Range* represents an *Anchor Point* which identifies a named building where the House Numbers represent an internal range of addresses specific to the building which references the Building Name and does not reference a Street Name.

This type of *Anchor Point* is linked to the routing network through a relationship with an *Anchor Point* type *Entry.*

An instance of *Anchor Point* type *Address Range* has a single instance of an *Address.*

IMPORTANT: *Anchor Points* of type Address Range are only permitted in data sets for USA and CAN.

Entry

An instance of an *Anchor Point* type *Entry* represents either a location on the navigable network based upon the associated *Address* of an *Anchor Point* of another type (types 2, 11-15) or the location from where the *Anchor Point* can be reached. In certain instances these two locations can be different. This type of *Anchor Point* is always linked with an *Anchor Point* of another type (types 2, 11-15) which is referred to as the 'parent Anchor Point' and is also linked to the routing network through a relationship with a *Transportation Element*

An instance of *Anchor Point* type *Entry* can have one and only one instance of an *Address.*

The *Anchor Point* type *Entry* is often referred to as an Entry Point.

Address - Parcel Centroid

An instance of *Anchor Point* type *Address - Parcel Centroid* is a point that represents a location within a property - often the centroid of the polygonal feature representing a property. A property is normally a parcel of land which represents the area generally associated to a single address and could be a combination of one or more tracts or lots, or a portion thereof.

This type of *Anchor Point* is linked to the routing network through a relationship with an *Anchor Point* type *Entry.*

An instance of *Anchor Point* type *Address - Parcel Centroid* has a single instance of an *Address.*

Address - Parcel Access

An instance of *Anchor Point* type *Address - Parcel Access* is a point that represents a location on the primary access road for a parcel, just immediately off the *Network Feature*, but topologically connected to the *Network Feature*.

This type of *Anchor Point* is linked to the routing network through a relationship with an *Anchor Point* type *Entry.*

An instance of *Anchor Point* type *Address - Parcel Access* has a single instance of an *Address.*

Address - Parcel Access Driveway

An instance of *Anchor Point* type *Address - Parcel Access Driveway* is a point that represents a location on what is considered to be the driveway associated with a building, monument, structure or residence and is just immediately off the network feature, but topologically connected to the network feature.

This type of *Anchor Point* is linked to the routing network through a relationship with an *Anchor Point* type *Entry.*

An instance of *Anchor Point* type *Address - Parcel Access Driveway* has a single instance of an *Address.*

Address - Building

An instance of *Anchor Point* type *Address - Building* represents any aspect of the building, inclusive of the centroid for the footprint, front door or alternative means of access to the building, structure, monument, or residence.

This type of *Anchor Point* is linked to the routing network through a relationship with an *Anchor Point* type *Entry.*

An instance of *Anchor Point* type *Address - Building* has a single instance of an *Address.*

Address - Street Frontage

An instance of *Anchor Point* type *Address - Street Frontage* represents a point that is approximately 20 meters (65.6 feet) offset from the street centerline and centered between property boundaries.

This type of *Anchor Point* is linked to the routing network through a relationship with an *Anchor Point* type *Entry.*

An instance of *Anchor Point* type *Address - Street Frontage* has a single instance of an Address.

1.1.3 Geocoding Accuracy Level

Definition

Geocoding Accuracy Level is a representation of the level of accuracy based on the used geocoding method and the available information.

Legitimate values for the *Geocoding Accuracy* Level include:

Table 2.2-1 Geocoding Accuracy Levels

Value	Description
1	L0.1
*11	L1
*12	L2
13	L3
14	L4
15	L5

Table 2.2-1 Geocoding Accuracy Levels

16	L6
17	L7
18	L8
19	L9
20	L10
99	Closest Position on Associated Edge

* These values represent the *Geocoding Accuracy Level* of the *POI* which has been matched to the *Anchor Point* and not of the *Anchor Point* itself. However if a *POI* has been geocoded to an *Anchor Point*, that *Anchor Point* will inherit the *Geocoding Accuracy Level* of the *POI*.

Description

The *Geocoding Accuracy Level* represents a level of accuracy based on both the geocoding method applied and how well the matching process linked the locational information of the *Anchor Point* to the base information in the map.

The *Geocoding Accuracy Level* attribute represents the fact that the *Anchor Point* fulfilled the matching requirements of a certain *Geocoding Accuracy Level*. The resulting value is dependent upon the input information of the *Anchor Point* compared with the availability and accuracy of the base map.

The *Geocoding Accuracy Level* is not an indicator of the accuracy of the point - but rather how it matched to the base map.

Geocoding Accuracy Levels

The Geocoding Actuary Levels are organized based upon the method in which the point was located on the map. These include:

- **Manually Placed -** The location of the point was digitized or manually edited.
- **Forward Geocoded -** The location of the point was determined using the addressing information provided with the point against the addressing information available in the base map.
- **Reverse Geocoded -** The location of the point was provided as an coordinate pair and the addressing information of the point is used to link the point to the road network.

The available levels of geocoding accuracy are defined as follows:

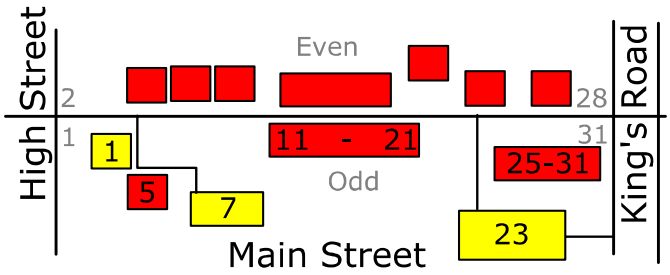
Manually Placed

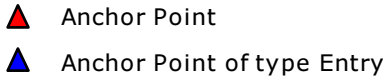
Table 2.2-2 Manual Geocoding Levels

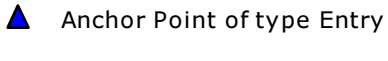
Value	Level	Label	Description	Location	Returned
1	L0.1	Manually Placed and Connected to the Road Network	The Anchor Point is manually located in the correct position and is connected to the road network with one or more Entry Points.	A Digitized location	The Address information of the located point

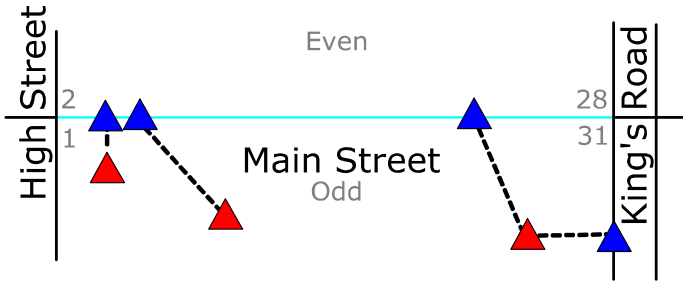
Level 0.1 - Correctly Placed and Connected to the Road Network

Input: Main Street 1
Main Street 7
Main Street 23









Forward Geocoding

Table 2.2-3 Forward Geocoding Levels

Value	Level	Label	Description	Location	Returned
11	L1	Exact House Number	A POI has been matched to an Anchor Point with the correct house number. The address of the matching Anchor Point includes the exact house number and street name.	The POI is located at the X,Y of the Anchor Point.	The address information of the matched Anchor Point

Table 2.2-3 Forward Geocoding Levels

Value	Level	Label	Description	Location	Returned
12	L2	Nearby House Number	A POI is has been matched to an nearby Anchor Point with the matching numerical portion of the house number. The address of the nearby Anchor Point includes the numeric value of the house number and the street name.	The POI is located at the X,Y of the Anchor Point. There is no guarantee of correct side	The address information of the matched Anchor Point.
13	L3	Interpolated House Number	The address of the Anchor Point matches with an interpolated position along the Road Element that has the correct street name and house number range.	The Anchor Point is located at an offset of approximately 5m from the interpolated position on the correct side of the Road Element.	The address information of the interpolated location on the correct Road Element.
14	L4	Nearby Interpolated House Number	The address of the Anchor Point matches with an interpolated position along a Road Element that has the correct street name and house number range. The house number range is within the acceptable difference (100 by default) of the house number in the address of the Anchor Point.	The Anchor Point is located on the Road Element at the interpolated position of the house number. The correct side is not guaranteed.	The interpolated location on the correct edge with the correct street name and house number range that is within the acceptable difference
15	L5	Street Intersection	The two street names making up the address of the Anchor Point match with a unique instance of an intersection or join of two streets with correct street names. The Place Name and Postal Code match as well.	The Anchor Point is located at the exact point of the intersection. If dual carriage ways are included and multiple intersection points are available, one is picked.	The location of the intersection.

Table 2.2-3 Forward Geocoding Levels

Value	Level	Label	Description	Location	Returned
19	L9	Center Point of the Street	The Anchor Point is matched with the street with the correct street name within a given area/ postal code.	The center point of a group of topologically linked edges with the matched street name	The center point of the group of topologically linked edges and the street name.
99	L99	Closest Position on Associated Edge	An Entry point is created automatically at the closest position of the associated Road Element.	The Entry Point is located along the associated Road Element at the nearest position to the Anchor Point.	The ID of the Road Element.

Forward GeoCoding Key

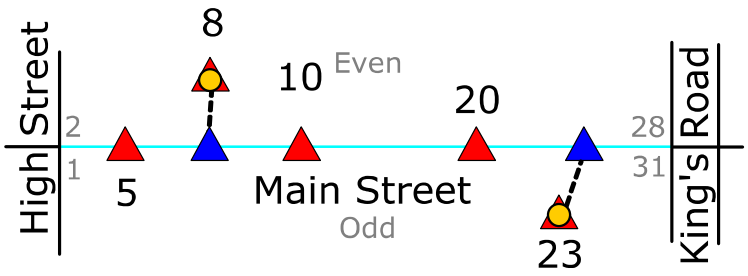
Anchor Point

Anchor Point of type Entry

Level 1 - Exact House Number

Input: Main Street 8
Main Street 23

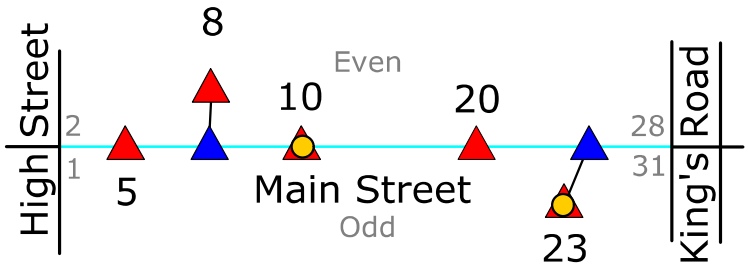
POI



Level 2 - Nearby House Number

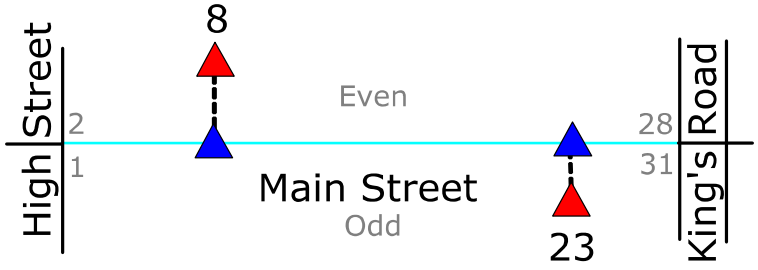
Input: Main Street 10a
Main Street 23b

POI



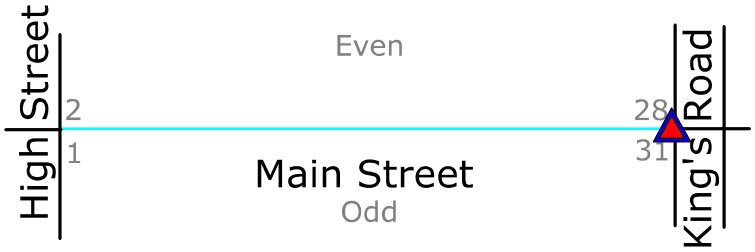
Level 3 - Interpolated House Number

Input: Main Street 8
Main Street 23



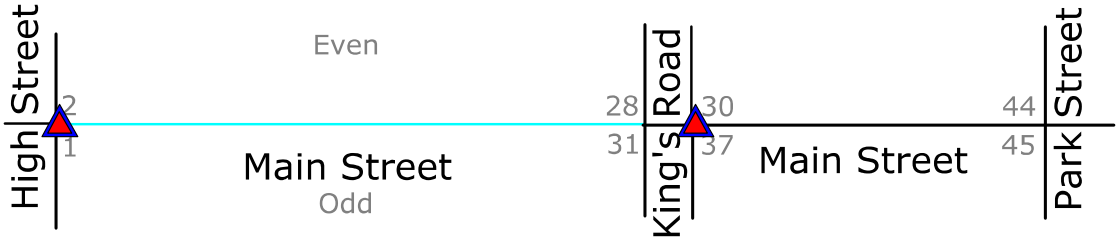
Level 4 - Nearby Interpolated House Number

Input: Main Street 63



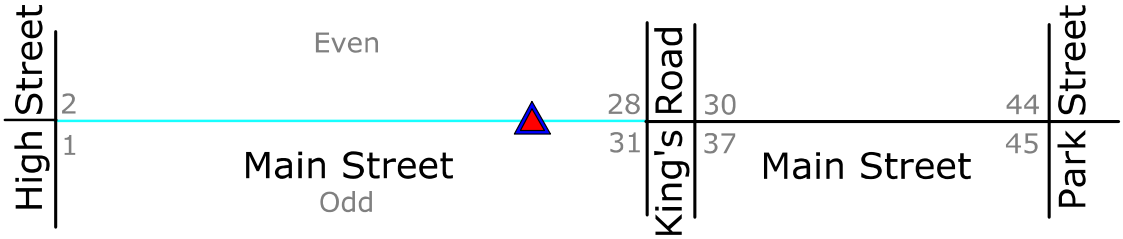
Level 5 - Street Intersection

Input: Main Street/High Street



Level 9 - Center Point of Street

Input: Main Street 35
Main Street 48



Reverse Geocoding

Table 2.2-4 Reverse Geocoding Levels

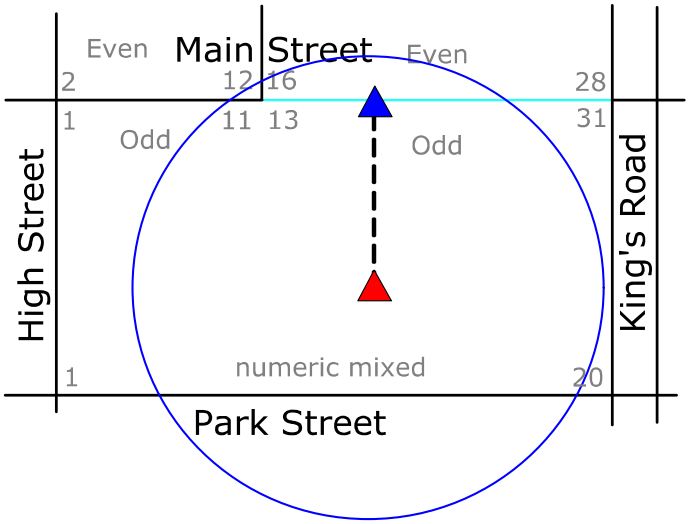
Value	Level	Label	Description	Location	Returned
16	L6	House Number Range	The Anchor Point is associated with the closest road part of the road within the defined search radius which has the correct street name and the correct house number range.	The Anchor Point is located on its original coordinates.	The nearest part of the matched edge.
17	L7	Closest House Number	The Anchor Point is associated with a road part of the road within the search radius which has the correct street name and the correct house number range.	The Anchor Point is located on its original coordinates.	
18	L8	Street Match	The Anchor Point is associated with the closest road part within the search radius with the correct street name.	The Anchor Point is located on its original coordinates.	The nearest part of the edge with the correct street name within the search radius.
20	L10	Nearest Edge	The Anchor Point is associated with the closest road part within the search radius.	The Anchor Point is located on its original coordinates.	The nearest edge within the search radius.

Reverse GeoCoding Key

- Anchor Point
- Anchor Point of type Entry
- Search Area

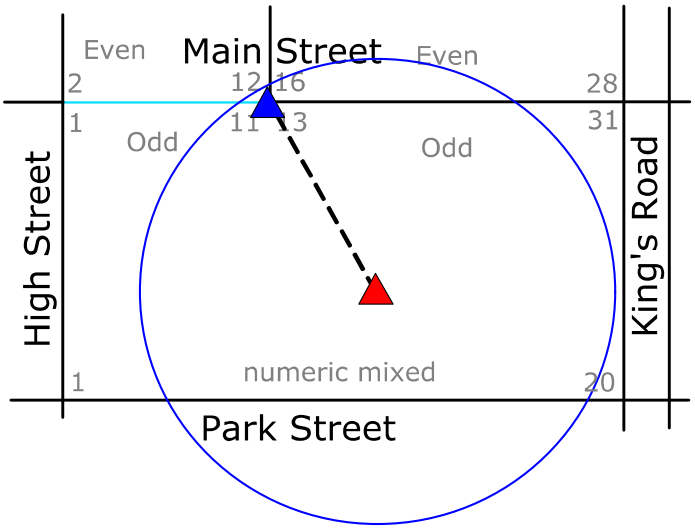
Level 6 - House Number Range

Input: Main Street 20



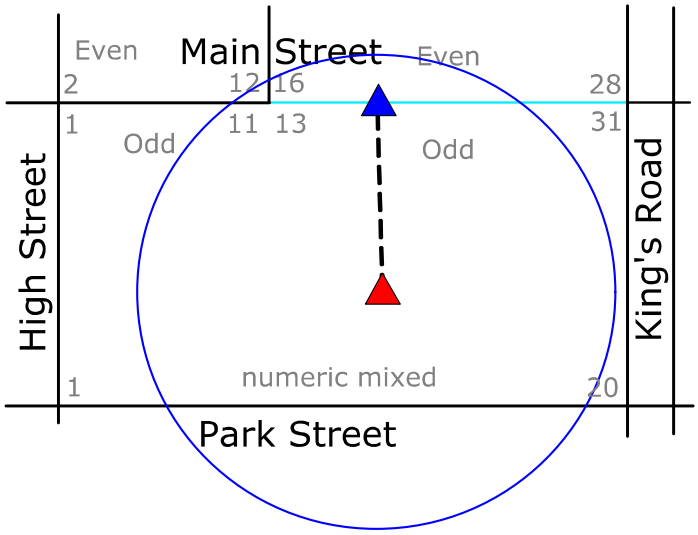
Level 7 - Closest House Number

Input: Main Street 2



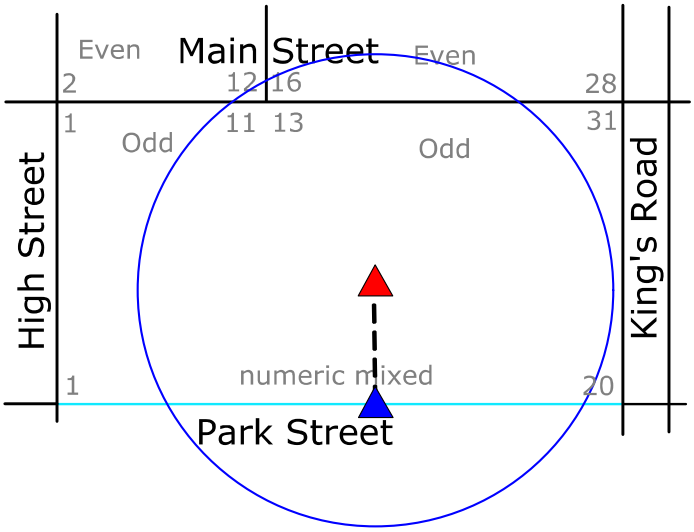
Level 8 - Street Match

Input: Main Street 34



Level 10 - Nearest Edge

Input: Avenue B 34



Capturing Rules

Geocoding Accuracy Level is captured for each captured *Anchor Point*.

- For *Entry Points* the expected values for the *Geocoding Accuracy Level* are to be 1 or 99 (see Table 2.2-1 for the definitions of these values). However, an exception could occur when the *Entry Point* itself has an *Address.*
- In the case where the *Entry Point* has its own *Address*, the *Anchor Point Type* is still set to a type "Entry", but the *Geocoding Accuracy Level* will be set to a value other than 99 (see Table 2.2-1 for the definitions of these values).
- If an *Anchor Point* with *Geocoding Accuracy Level* L3 or L4 should occur, it is always related to at least one *Entry Point* and if the Entry Point(s) are pre-existing, then the *Geocoding Accuracy Level* of the *Entry Point* will be L99.

- In the case where an *Entry Point* is captured based upon a georeferenced source, even without an Address, the Geocoding Accuracy Level will never be set to "99" (Closest Position on Associated Edge).

An *Anchor Point* with *Geocoding Accuracy Level* L6, L7, L8, and L10 uses an *Entry Point* to represent the *Postal Link* on the closest *Road Element*. This closest *Road Element* is not necessarily the location of the real world *Entry Point*. The Relative Position of the *Entry Point* is obtained from the original *Anchor Point*.

Geocoding Accuracy Level is a mandatory and unique attribute.

1.2 Address

Definition

An *Address* is a collection of components concatenated together in a specific sequence necessary to define a legitimate unique location along the transportation network.

Description

All instances of *Address* are uniquely identified and its composition is determined by an *Address Scheme ID*.

Each instance of an *Address* has one or more complete set of address components with each set having a unique language. This could result in multiple variations of the same *Address* - with each variation being in a unique language. However, it is still considered as a single instance of an *Address* in that it represents a unique location along the transportation network.

An instance of *Address* represents a complete standard address for the location.

An *Address* is mandatory for an *Anchor Point* of type:

- Address Range
- Address - Parcel Centroid
- Address - Parcel Access
- Address - Parcel Access Driveway
- Address - Building
- Address - Street Frontage

An *Address* is optional for an *Anchor Point* of type Entry.

Address Completeness

All *Addresses* associated with an *Anchor Point* of any type, are complete. Address completeness is according to the Address Scheme referenced by the *Address Scheme ID* associated to the *Address*, in that all of the mandatory address components must be present. Optional *Address Components can* be present, but are not required. *Address Components* not defined by the *Address Scheme ID* are not permitted.

The mandatory or optional settings for each component, are provided in the meta data section as part of the *Address Scheme*. See Section 3 Meta Information for a complete description of the *Address Scheme*.

Attributes

- Address ID
- Address Scheme ID
- Language Code
- Address Component Set

1.2.1 Address ID

The *Address ID* is a globally unique identifier for one specific *Address* available in one or more different languages.

The Address ID is a 15 digit numeric value.

Example: 276004923456789 (Germany)
056003234567890 (Belgium)
484005022334455 (Mexico)
840419998887776 (USA New Hampshire)

IMPORTANT: The *Address ID* is not guaranteed to be stable and is not guaranteed to be unique across all other unique IDs.

1.2.2 Address Scheme ID

Address Scheme ID identifies the defined composition of a complete Address.

The composition of an *Address* includes the *Address Components* and whether the components are mandatory or optional.

An instance of *Address Scheme ID* is universal. Any number of countries might implement the same ID. In the example below in Table 2.2-5 it is entirely possible for Country A to implement *Address Scheme IDs* 26 and 29, while Country K implements only *Address Scheme ID* 26. Then the *Language Code* might be the only distinction between Country A's implementation of scheme 26 and Country K's implementation.

The absence of an *Address Component* from the list of components referenced by an *Address Scheme ID* indicates that the *Address Component* can not occur within the *Address*.

Example:

Table 2.2-5 Composition of an Address

Address Scheme ID	Address Component	Mandatory
13	Street Name	N
	Plot/Cadaster Number	Y
	Separator	N
	House Number	N
	Dependent Locality	Y
	Postal Code	N
	Place Name	Y
	Major Metropolitan Area	Y
	Country Name	N
26	Street Name	Y
	House Number	Y
	Postal Code	Y
	Place Name	Y
	Country Name	N
29	Building Name	Y
	Street Name	Y
	Dependent Locality	Y
	Place Name	Y
	Major Metropolitan Area	N
	Postal Code	Y
	Country Name	N

Note: The complete *Address Scheme* definition and description *(Country, Address SchemeID, Address Component Set, Language Code, Row and Position)* is provided as meta data. See section 3.1 Address Scheme for a complete description.

1.2.3 Language Code

Language Code is the Marc Language Code associated with the combination of *Address ID, Address Scheme ID*.

A *Language Code* will be captured for each supported language in which the *Address* is being captured. See Table 2.2-6 on page 22 and Table 2.2-7 on page 22 for examples of how Language Code is applied.

1.3 Address Component Set

Definition

An *Address Component Set* is the collection of *Address Components* which comprise a complete *Address*.

Description

All *Address Components* of the same language are collected into a set. The set must represent a complete *Address* as defined by the Address Scheme and referenced by the *Address Scheme ID*. Every component in the set must have the same Language and no *Address Components* can repeat within the set.

The specific list of address components which are or can be included in the *Address Component Set* are determined by the Address Scheme and referenced by the *Address Scheme ID*. The *Address Scheme* wll list which components within the set are mandatory or optional.

Example: The following two tables provide examples that illustrate a single *Address* with two sets of Address Components with different *Language Codes* while each set adheres to one *Address Scheme ID*.

Table 2.2-6 Address Component Set example

Address ID	Address Scheme ID	Language	Address Component Set
124071156763928	24	French	1669 Boulevard de Maisonneuve Ouest Montréal, Québec, H3H 1J6 Canada
		English	1669 Maisonneuve Boulevard. West Montreal, Quebec, H3H 1J6 Canada

Table 2.2-7 Address Component Set example

Address ID	Address Scheme ID	Language	Address Component Set
056003234567890	36	French	53 Rue de Gretry 1000 Bruxelles, Belgique
		Dutch	Gretrystraat 53 1000 Brussel, België

Note: In the example shown in Table 1.2.7, for the one *Address* the *Address Scheme ID* remains the same while there are two instances of the *Address Component Set* (language specific). However, within those sets, the ordering of the House Number and Street Name have changed. A complete description about the ordering of Address Components can be found in section 3.1 Address Scheme

Attributes

- Address Component

1.4 Address Component

Definition

Address Components are the individual elements, text and numerics, necessary to construct an *Address*. A component is defined as a unique piece of text within the *Address*.

Description

An *Address Component* is typed to indicate the kind of information the text represents.

The Text for an instance of *Address Component* may include multiple words, symbols, and separators.

Some components such as House Number and Postal Code have no Language Code and will be repeated in each *Address Component Set* that comprise an *Address*, regardless of the *Language Code*.

Table 2.2-8 Example Address Components

Component	Component Type	Language	Text		
Country	1	dan	Danmark		
Postal Code	2	und	DK - 2880		
Street Name	3	dan	Langemosevej		
Locality	4	dan	Bagsværd		
House Number	5	und	40		

Example: Table 2.2-8 identifies the components and format for the following address

Langemosevej 40
DK-2880 Bagsværd
Danmark

Attributes

- Component Type
- Component Text

1.4.1 Component Type

Component Type identifies the type of address information the *Component Text* represents.

Example: Values for *Component Type* could include the following:

1: Country

2: State/Province
3: Place Name
4: Postal Code
5: Street Name
...
22: Dependent Locality
23: Double Dependent Locality
24: Mile Post
...
30: Other Dependent Area
...
34: Geographic Code

1.4.2 Component Text

The *Component Text* attribute represents the text string of the component and may include multiple words and/or numbers, symbols delimited by spaces or other characters.

The *Component Text* of an *Address Component* may include non alpha-numeric characters such as hyphens, periods, commas etc., and may also contain a single space between multiple words within the component.

All *Component Text* for an *Address Component* are to be trimmed of leading and ending spaces.

The contents of the *Component Text* attribute is not case sensitive, but maintains the upper and lower casing.

An abbreviation for the prefix or suffix of a street name are permitted.

Component Text should not include concatenated text from multiple sources.

IMPORTANT: Postal Code information is provided as completely as possible. As a minimum for those countries where the Postal Code is a required *Address Component of Address Component Set* of the *Address,* the main postal code is guaranteed. If the sub postal code information is available it will be part to the *Component Text* for that component. Both *Main* and *Sub Postal Code* are represented in one string. No separator is included between the part of the *Main* and the *Sub Postal Code* information.

1.5 Name Component

Definition

Name Component allows for further parsing of the *Address Component Text* in order that the text be subtyped according to its *Name Component* Type.

Description

Name Components can be parsed with or without a delimiter.

Attributes

- Type
- Offset
- Length

1.5.1 Type

Type identifies the type of text for a particular *Name Component*.

Type can have values of one of the following:

1: Pre-Directional
2: Prefix
3: Body
4: Suffix
5: Post-Directional
6: Key
7: Surname
8: Article/Preposition
9: Exit Number

Example:

Pre-Directional:	101 Northeast Columbia Road
Prefix:	53 Rue de Gretry
Body:	101 Northeast Columbia Road 53 Rue de Gretry
Suffix:	101 Northeast Columbia Road Gretrystraat 53
Post-Directional:	101 Columbia Road Northeast

1.5.2 Offset

Offset defines the starting location within the *Address Component* in order to define the *Name Component*.

1.5.3 Length

Length refers to the number of characters to be included when defining the *Name Component.*

Example: Address Component: Northeast Columbia Road

Type: Pre-Directional (Northeast)
Offset: 1
Length: 9
Type: Body (Columbia)
Offset: 11
Length: 8
Type: Suffix (Road)
Offset: 20
Length: 4

2 Relationships

The MultiNet Address Point product provides the following relationships:

- Anchor Point Along Transportation Element
- Feature Associated with Anchor Point

2.1 Anchor Point Along Transportation Element

Definition

Anchor Point Along Transportation Element is a relationship linking an instance of an *Anchor Point* to a *Road Element*.

Description

The *Anchor Point Along Transportation Element* represents the link of an *Anchor Point* to the *Road Element*. Each instance of this relationship is further defined by the use of the *Relative Position* along and the *Side of Line* of the associated *Road Element*.

For *Anchor Points* of types 11 - 15, the point must be linked with at least one *Road Element,* but can participate in many instances of this relationship.

For *Anchor Point* of type 2, it is not expect that the point will be linked with a *Road Element*, however it is allowed.

An instance of the *Anchor Point Along Transportation Element* relationship is created between an *Anchor Point* (types 11 - 15) and each *Road Element* that is linked with every *Entry Point* associated to the *Anchor Point*. Refer to Figure 2.2.2.for a graphic representation.

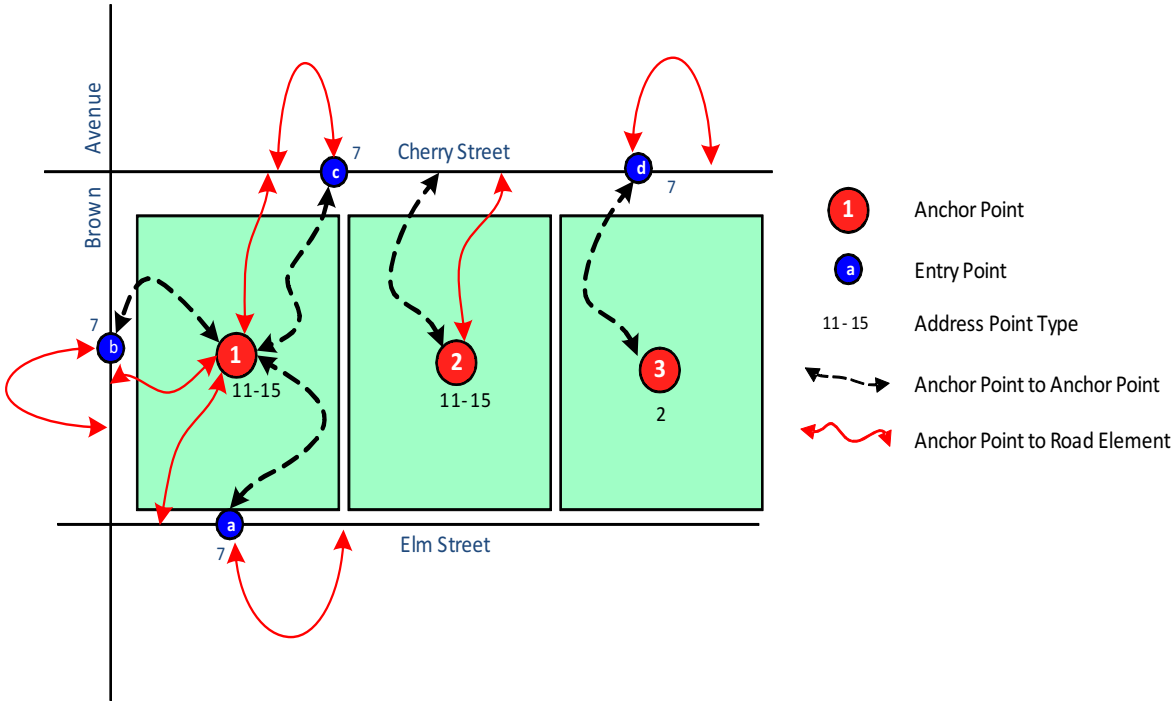


Fig. 2.2.2: Examples of the Anchor Point Along Transportation Element relationship

The relationship has two mandatory parts:

- Road Element
- Anchor Point

Attributes

- Side of Line
- Relative Position

2.1.1 Side of Line

Side of Line identifies the side of the *Road Element* to which the *Anchor Point* is located for a given instance of this relationship. For Anchor Points type Entry, *Side Of Line* will always be set to 3: On.

0: Both

1: Left

2: Right

3: On

Note: Although this list is complete and consistent with the MultiNet core map specification, the value of "0: Both" is not applicable to Anchor Points.

The left and right sides the *Road Element* are relative to the beginning and ending Junctions of the *Road Element*.

2.1.2 Relative Position

Relative Position reflects the location of the *Anchor Point* along the *Network Feature* relative to the *Start Junction* of the *Road Element*. This is expressed as a percentage with a precision of six and a scale of three decimal places.

In the case of where an *Anchor Point* (types 2, 11-15) is associated to an *Anchor Point* of type *Entry* (type 7) that has been manually located along the *Road Element*, then the location of that *Entry Point* will be used in the calculation of the relative position for the parent *Anchor Point*.

In the case where the Anchor Point (types 2, 11 - 15) is located beyond the start position of the linear feature, the Anchor Point will be linked to the location on the *Road Element* equivalent to the Start Junction and will have a Relative Position of 0.000.

In the case where the Anchor Point (types 2, 11 - 15) is located beyond the end position of the linear feature the Anchor Point will be linked to the location on the *Road Element* equivalent to the End Junction and will have a Relative Position of 100.000.

Refer to Figure 2.2.3.for an example of these two cases.

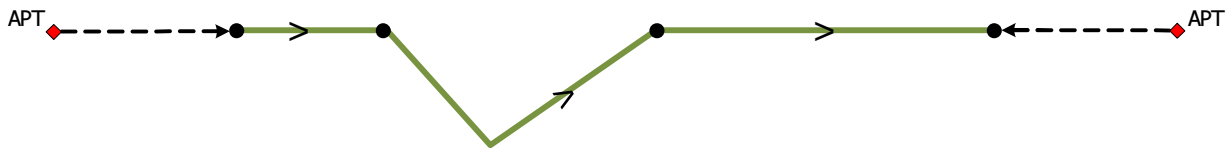


Fig. 2.2.3: An example of linking the Anchor Point to the Start and End Junctions.

0...100.000: Percent

2.2 Feature Associated with Anchor Point

Definition

Feature Associated With Anchor Point is a relationship for associating one or many instances of an *Anchor Point* of type Entry to one or more instances of an *Anchor Point* (types 2, 11-15) features.

Description

This relationship creates a link between an *Entry Point* and its parent *Anchor Point*. Each *Anchor Point* has to be associated with at least one *Entry Point.* An *Entry Point* can not exist without a parent *Anchor Point* (types 2, 11-15)

Multiple instances of an *Entry Point* can be associated to a single *Anchor Point* (types 2, 11-15) and multiple instances of *Anchor Point* (types 2, 11-15) can be associated to a single *Entry Point.* However, there needs to be at least one relationship with an *Entry Point* where the Type is 'Main'.

At least one *Entry Point* typed as Main represents the link to the routing network for the parent *Anchor Point*.

This relationship has two mandatory parts.

- Anchor Point (types 2, 11-15)
- Anchor Point (type 7)

Attributes

- Type

2.2.1 Type

Type defines whether the Entry Point is a Main or a Minor for that instance of the relationship.

1: Main

2: Minor

Note: If an Entry Point is linked to two or more *Anchor Points* (types 2, 11 - 15) the value of Type could vary in each instance of the relationship. The outcome of this is that an *Entry Point* could be in one relationship with an *Anchor Point* where the value of Type is 1: Main, while the same *Entry Point* could be in a second instance of this relationship with another *Anchor Point* and the value of Type could be 2: Minor.

3 Meta Information

The MultiNet Address Point product provides the *Address Scheme* information as Meta data.

3.1 Address Scheme

Definition

Address Scheme provides the formatting information along with the labeling of the individual address components identified by the *Address Scheme ID* for a given *Language Code* within a given *Country*.

Description

For each *Address Scheme* being implemented, the following is provided:

- Address Scheme ID

- the Country implementing the Address Scheme
- the Language of the Address Scheme
- the component's position within a properly formatted address
- a language specific label of local relevance for each address component

The *Address Scheme* is country specific and each country implements at least one *Address Scheme*.

Attributes

- Address Scheme ID
- Country
- Sub Area
- Language
- Component Type
- Label
- Row
- Position
- Mandatory

3.1.1 Address Scheme ID

The *Address Scheme* ID identifies the structure for a set of *Address Components.* . For a complete description of *Address Scheme ID* see Section 1.2.2 Address Scheme ID

3.1.2 Country

Country identifies the *Administative Area* in which the *Address Scheme* is being implemented.

3.1.3 Sub Area

Sub Area labels the area within the *Administrative Area* in which the scheme applies. This allows for identifying regional formats that differ from the country wide scheme that might be specific to only a given area.

Note: Sub Area is currently not implemented.

3.1.4 Language

The *Language* of the Address Scheme applies to the *Label* of the *Address Component*.

3.1.5 Component Type

Component Type identifies the address information the text represents. For a complete description of Component Type see Section 1.4.1 Component Type

3.1.6 Label

Label provides a language specific and commonly understood reference of what the Component Type represents within the country. *Labels* are provided in English and each supported language of the country.

3.1.7 Row

Row identifies the row within the *Address* on which the Address Component appears.

3.1.8 Position

Position identifies the *Address Component's* location within the *Row*.

3.1.9 Mandatory

Indicates whether the *Address Component* is mandatory or optional

0: No

1: Yes

4 UML

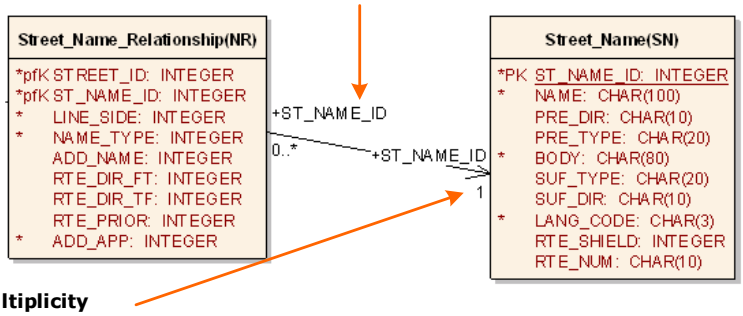
This UML diagram models the schema for the core MultiNet Address Points.

4.1 Reading UML Diagrams

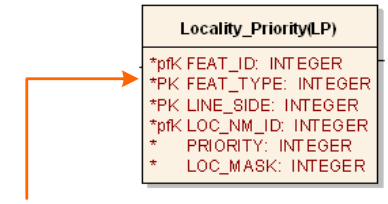
The UML (Unified Modeling Language) in this document describes the classes including spatial data and the non-spatial data along with the relationships between them. The data model for Address Point also shows how it will fit within the MultiNet product. That is to say that the features of this data model are bounded on both ends by the Network Feature and Localities respectively.

The foreign key identifier within each class (FK or fK when part of pfK) is not always displayed. Each foreign key is identified for each class in the Record Layouts section of the format specification.

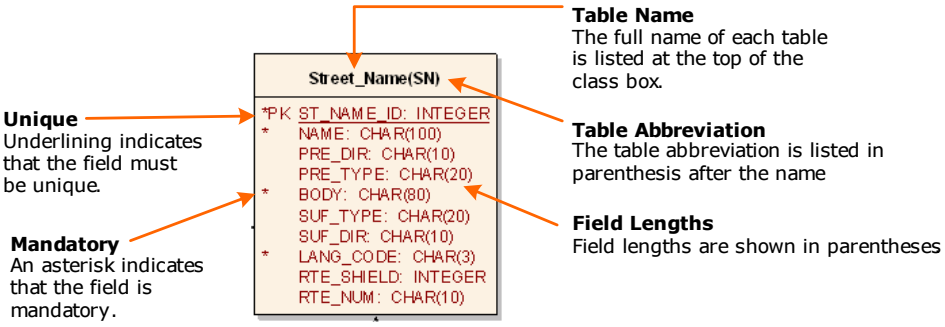
Key
The names of the primary and foreign keys are listed on the association line
Example: Records in the Street_Name_Relationship table can be matched to records in the Street_Name table by linking the ST_NAME_ID fields of both tables



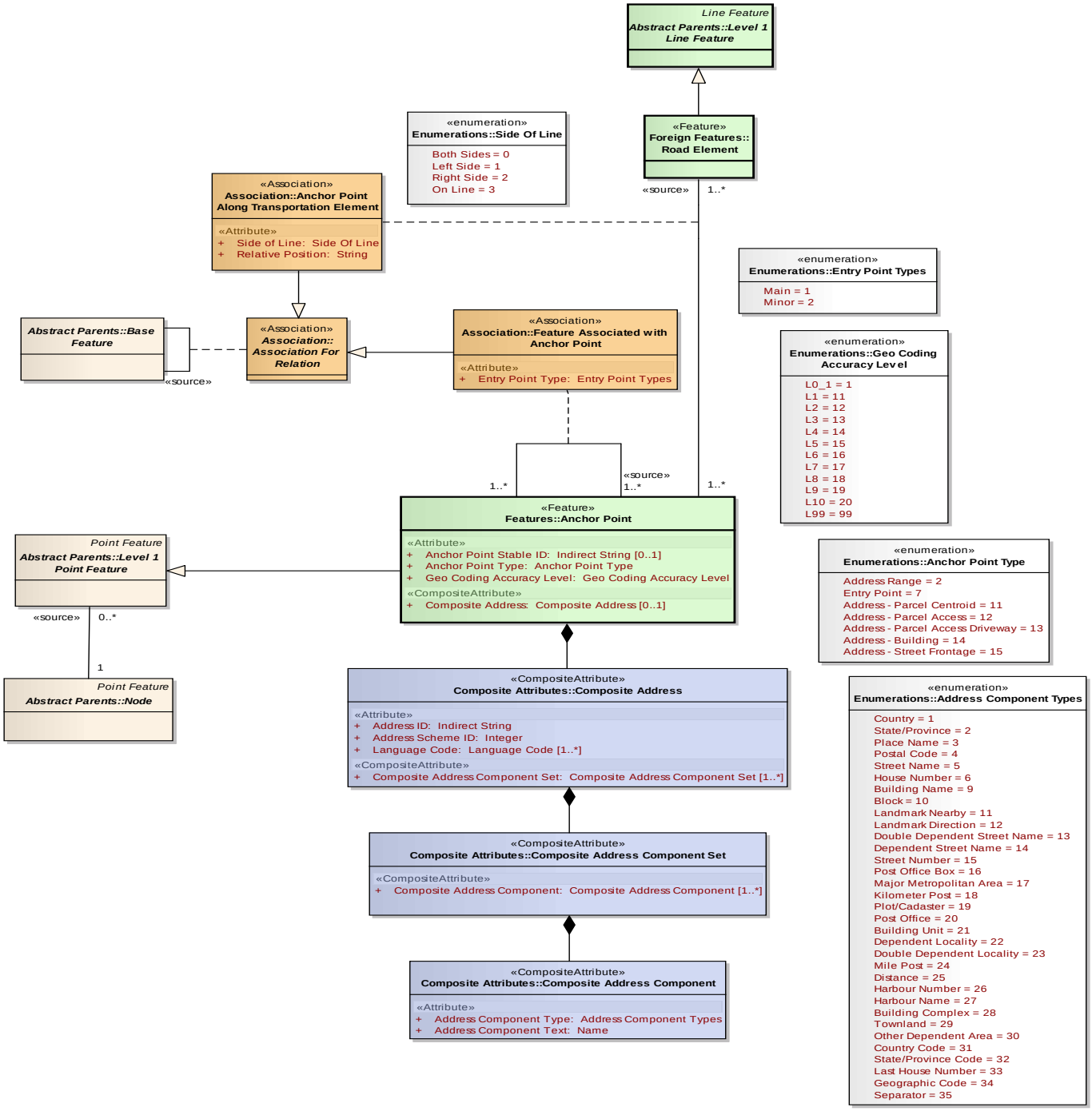
Multiplicity
Multiplicity is a range defining the number of times a key may be referenced
Example: Each record in Street_Name_Relationship must link to exactly one record in Street_Name. Conversely, each record in Street_Name may link to 0 to * records in Street_Name_Relationship.



Keys:
PK indicates that the field is a Primary Key.
FK indicates that the field is a Foreign Key.
pfK indicates that the field is both a Primary and Foreign Key.



4.2 Address Point Core Data Model



Section 3 GDF Format Specifications

1 Overview

This section provides the detailed product specifications necessary for the GDF format product of the MultiNet Address Points.

1.1 Feature Description

1.1.1 Anchor Point

Anchor Point Feature Code: 8010

Table 3.3-1 Anchor Point

Attribute Code	Attribute Name	Attribute Value	Attribute Value Name	Mandatory	Repetitive	Direct/ Indirect
AQ	Anchor Point Type	2	Address Range	Y	N	Direct
		7	Entry			
		11	Parcel Centroid			
		12	Access			
		13	Offset Driveway			
		14	Building			
		15	Street Frontage			
6A	Geocoding Accuracy	1	L0.1	Y	N	Direct
		11	L1			
		12	L2			
		13	L3			
		14	L4			
		15	L5			
		16	L6			
		17	L7			
		18	L8			
		19	L9			
		20	L10			
		99	No Geocoding Accuracy Level			
0B	Anchor Point Stable ID		see Anchor Point Stable ID	N	N	Indirect
ADRS	Composite Address			N	N	

1.1.2 GDF Point Feature Implementation

The *Anchor Point* is stored as a Point Feature. The Point Feature Record for *Anchor Point* follows the Point Feature Record format as described in the current MultiNet GDF Format Specifications.

For the GDF-AS format, it is stored according to the current MultiNet GDF-AS format specifications. Point Feature Record (51) references the point features. The coordinates of the point features reference the Node Record (25) and the actual X and Y coordinates are stored in the Coordinate Record (23). In the Coordinate Record, the X and Y coordinates are mandatory, while the Z coordinate is optional.

For the GDF-AR format it is stored according to the current MultiNet GDF-AR format specifications, where the .PNT file contains all point features. The coordinates of the point features are stored in the .NDE-file.

1.1.3 Anchor Point Type

Anchor Point Type is a mandatory and unique attribute of *Anchor Point*. There is no default value.

The values of Anchor Point Type are of type unsigned numeric.

1.1.4 Anchor Point Stable ID

The Anchor Point Stable ID is an optional and unique attribute.

For a complete definition of the Anchor Point Stable ID, please see "Anchor Point Stable ID" on page 7

1.1.5 Address

Address is a mandatory and unique composite attribute of the feature *Anchor Point* with the following attributes:

Table 3.3-2 Composite Address (ADRS)

Attribute Code	Attribute Name	Mandatory	Repetitive	Direct/ Indirect	Order
1X	Address ID	Y	N	Indirect	1
AJ	Address Scheme ID	Y	N	Direct	2
LL	Language Code	Y	Y	Direct	3
ADCS	Composite Address Component Set	Y	Y		4

Address ID (1X) is a optional and unique attribute of Composite Address

Address Scheme ID (AJ) is a mandatory and unique attribute of Composite Address

Language Code (LL) is a mandatory and unique attribute of Composite Address

Composite Address Component Set (ADCS) is a mandatory and repetitive composite attribute of Address

Table 3.3-3 Composite Address Component Set (ADCS)

Attribute Code	Attribute Name	Mandatory	Repetitive	Direct/ Indirect	Order
ADCO	Composite Address Component	Y	Y		1

Composite Address Component (ADCO) is a mandatory and repetitive composite attribute of Composite Address Component Set.

Note: It is required that each instance of the sub-attribute Composite Address Component Set (ADCO) contains only instances of the Component Text (GN) attribute with exactly the same Language.

Table 3.3-4 Composite Address Component (ADCO)

Attribute Code	Attribute Name	Mandatory	Repetitive	Direct/ Indirect	Order
GN	Component Text	Y	N	Indirect	1
GD	Component Type	Y	N	Direct	2

Component Text (GN) is a mandatory and unique attribute of Composite Address Component.

Component Type (GD) is a mandatory and unique attribute of Composite Address Component.

Table 3.3-5 Composite Name Component

Attribute Code	Attribute Name	Mandatory	Repetitive	Direct/ Indirect	Order
NO	Name Component Offset	Y	N	Direct	1
NC	Name Component Length	Y	N	Direct	2
NT	Name Component Type	Y	N	Direct	3

All sub-attributes of Composite Name Component are mandatory and unique attributes of Composite Name Component.

Note: *Address Component Name* is an indirect attribute referring to a name record. The name record has a reference to attribute records that give the name component of each address component name.

1.2 Relationships

Anchor Point participates in the following relationships:

1.2.1 Anchor Point Along Transportation Element

Anchor Point Along Transportation Element (1090) associates the *Anchor Point* to one or more *Road Elements* from which the *Anchor Point* is reachable and has the attribute *Relative Position* (8R) and *Side Of Line* (8D).

1.2.2 Feature Associated with Anchor Point

Feature Associated With Anchor Point (1088) associates an *Anchor Point* (type 2, 11-15) to an *Anchor Point Type* of Entry (Type 7) and has the attribute *Entry Point Type* (9N).

Table 3.3-6 Relationship Attributes

Relationship Code	Relationship Name	Attributes	Attribute Value
1090	Anchor Point Along Transporta-tion Element	Relative Position (8R)	Percent from Start Junction
		Side Of Line (8D)	1 = Left Side
			2 = Right Side
			3 = On
1088	Feature Associated With Anchor Point	Entry Point Type (9N)	1=Main 2=Minor

Table 3.3-7 Relationship Composition

Relationship Code	Relationship Name	Part 1	Part 2
1090	Anchor Point Along Transportation Element	Road Element	Anchor Point
1088	Feature Associated With Anchor Point	Anchor Point	Anchor Point (type Entry)

Table 3.3-8 ??????????(Multiplicity of Attributes for Relationships

Attribute	Code	Mandatory	Repetitive	Direct/Indirect
Relative Position	8R	Y	N	Direct
Side of Line	8D	Y	N	Direct
Entry Point Type	9N	N	N	Direct

1.3 Meta Tables

1.3.1 Address Scheme

Address Scheme provides the formatting information needed for fully implementing a fully readable Address based upon local requirements. *Addresss Scheme* is specific to the country and language.

1.3.2 GDF Meta Records Format

Customized GDF meta information records are added to support Address Points with data on the sturcture of the Address. The structures are defined globally, however, on a per Data Set basis only a subset of defined address structures are supported. The descriptions for each of the Address Components can vary ona sub-administrative level.

GDF AS

For the GDF-AS records ADDSTRUREC, ADDSCHMREC and ADDCMPDREC, as of MultiNet 3.6.2 please refer to the MultiNet GDF-AS 3.6.2 format specification for descriptions and definitions.

GDF-AR

For the GDF-AR meta information files .CAS, .ASC. ACG and .ADC as of MultiNet 3.6.2 please refer to the MultiNet GDF-AR 3.6.2 format specification for descriptions and definitions

1.4 Attribute Mapping

The following table maps the attributes from the Data Model Specifications to the GDF Format Specifications

Table 3.3-9 Attribute Mapping from the Data Model Specification to the GDF Format Specification

Data Model Specification	GDF Format Specification
Geometric Point	**GDF ISO 4.Point Feature**
X Coord	
Y Coord	
Z Coord	
Anchor Point	**Anchor Point**
Anchor Point Stable ID	Anchor Point Stable ID (0B)
Feature	Field in Point Feature Record
Geocoding Accuracy Level	Geocoding Accuracy Level (6A)
Address	**Composite Address**
Address ID	Address ID (1X)
Address Scheme ID	Address Scheme ID (AJ)
Language Code	Language Code (LL)
Address Component Set	Composite Address Component Set (ADCS)
Address Component Set	**Composite Address Component Set**
Address Component	Composite Address Component (ADCO)
Address Component	**Composite Address Component**
Component Text	Address Component Text (GN)
Component Type	Address Component Type (GD)
Composite Name Component	**GDF Name Component attribution on Name record; current model in 3.4 and later**
Offset	Name Component Offset (NO)
Length	Name Component Length (NC)
Type	Name Component Type (NT)

Section 4 Shapefile - OSL Format Specifications

1 Overview

This section provides the detailed product specifications necessary for the Shapefile/OSL format product of the MultiNet Address Points.

1.1 Feature Layers and Tables

The Following Feature Layers and Tables are derived from the Data Model Specifications and all attributes can be mapped back to the core scheme.

In the Shapefile/OSL format the Anchor Point class is spatially enabled and provides the geometry for the Address Point product. For the Shapefile format, all other related tables are in a dBase format.

The following table lists all of the feature data layers and tables included in the MultiNet Address Points Shapefile and OSL product.

Table 4.4-1 Shapefile/OSL Layers and Tables

Table/Layer Name	Abbreviation	Feature Type
AnchorPoint	AT	Point
Address	ATAD	Table
AddressComponent	ATAC	Table
NameComponent	ATNC	Table

Table 4.4-2 Relationships

Table Name	Abbreviation	Relationships
FeatureAssociatedWithAnchorPoint	ATAT	Associates and Anchor Point to its Entry Points
AnchorPointAlongTransportationElement	ATTE	Anchor Point Along Transportation Element

Table 4.4-3 Address Scheme Meta Tables

Table/Layer	Abbreviation
ComponentFormat	ATCF

1.1.1 Anchor Point

Definition

The
Anchor Point feature layer (AT) implements instances *Anchor Points.*

Description

The *Anchor Point* feature layer is spatially enabled with Point geometry for each instance of the *Anchor Point* class.

The Anchor Point Stable ID is implemented as the field ANCHPNT_ID and Anchor Point Type is identified in the field ANCH_TYPE

For a complete description of the Anchor Point Stable ID refer to Section 1.1.1 Anchor Point Stable ID and for a complete description Anchor Point Type refer to Section 1.1.2 Anchor Point Type.

Tile Boundary Notes

Anchor Point features are duplicated between adjacent tiles for features along tile boundaries.

Geometry Type

Point

Structure

The following represents the structure for the layer *Anchor Point*

Table 4.4-4 Anchor Point (AT)

Field Name	Type	Width	Dec	Key	Field Content
Geometry	B				Point
PNT_ID	I	15		PK	Globally Unique Point Feature ID and key field linking other attributes to a particular Anchor Point feature.
ANCHPNT_ID	I	15			A permanent and globally unique identifier for the point feature.
ADDRESS_ID	I	15		FK	A key field linking to a particular instance of Address In case of an Anchor Point type Entry, an address is not mandatory. In that case the Address_ID = NULL
ANCH_TYPE	I	2			Identifies the type of feature the point represent. Possible values include: 2: Address Range 7: Entry 11: Parcel Centroid 12: Access 13: Offset Driveway 14: Building 15: Street Frontage

Table 4.4-4 Anchor Point (AT)

Field Name	Type	Width	Dec	Key	Field Content
GEO_CODE	I	2			Identifies the geocoding accuracy level 1 = L0.1 11 = L1 12 = L2 13 = L3 14 = L4 15 = L5 16 = L6 17 = L7 18 = L8 19 = L9 20 = L10 99 = L99 Closest Position on Associated Edge
CLTRPELID	I	15		FK	Closest Transportation Element ID. A key field linking to a particular Network feature. **Note:** Contains the Road Element ID associated with one of the Main Entry Points.
SOL	I	1			Identifies the side of the Network feature which the point is located 1: Left 2: Right 3: On
REL_POS	D	6	3		Relative position along the Network feature beginning at the Start Junction and is expressed as a percentage with a precision of three decimal places. **Note:** The width and precision described here reflect the actual data. Some applications might adjust the width to 6 to accommodate the decimal point. **Note:** Contains the Relative Position of one of the main Entry Points in case the Anchor Point is not an Entry Point itself.

Note: An *Anchor Point* can have one and only one *Address*. Consequently a unique combination of ANCHPNT_ID and ADDRESS_ID should occur once. An *Address* can have multiple variations - each variation has a unique language code. For a complete description of *Address* please refer to section 1.2 Address.

1.1.2 Address

Definition

The *Address* table (ATAD) provides the necessary combination of information that for one unique Address and one unique Address Scheme ID, an Address Component Set is provided in each supported Language for that Country.

Description

A record in the Address table represents an unique instance of an *Address, Address Scheme ID, Address Component Set and Language Code*.

For a complete description of *Address* please see Section 1.2 Address.

Tile Boundary Notes:

Does not apply

Feature Type

Table

Structure

The following represents the structure for the table *Address*

Table 5: Address (ATAD)

Field Name	Type	Width	Dec	Key	Field Content
ADDRESS_ID	I	15		PK	A unique identifier for the Address and key field linking other attributes to a particular Address
SCHEME_ID	I	3		PK, FK	Global identifier referencing the list of Address Components of the Address and a key field for linking to the Address Scheme Meta data.
ADDSET_ID	I	15		FK	A unique non-stable identifier for the Address Component Set and key field linking other attributes to a particular Address Component Set
LANG_CODE	C	3		PK	MARC language code for the Address Set
CNTY_SCHEM	C	6		FK	A key field to identify country specific Address Scheme

Note: An *Address Component Set* includes all of the address components used in a variant of an *Address*. Consequently ADDRESS_ID will repeat for each instance of an Address Component Set. Uniqueness is defined by a combination of ADDRESS_ID, SCHEME_ID, ADDSET_ID and LANG_CODE. For a complete description of *Address Component Set* please refer to section 1.3 Address Component Set.

1.1.3 Address Component Set

Definition

An *Address* is parsed into individual address components within the *Address Component Set* table (ATAC).

Description

Each *Address Component* is typed by the attribute COMP_TYPE.

All components in the set must have the same unique language. For a complete description of the *Address Component Set*, please refer to 1.3 Address Component Set

Tile Boundary Notes

Address Component Set records are duplicated between adjacent tiles for features along tile boundaries.

Feature Type

Table

Structure

The following table represents the structure for the *Address Component Set* table.

Table 4.4-1 Address Component Set (ATAC)

Field Name	Type	Width	Dec.	Key	Field Content
ADDSET_ID	I	15		PK	A unique non-stable identifier for the Address Component Set
COMP_TYPE	I	2		PK	Identifies the type of Address Component
COMP_TEXT	C	70			The text of the Addrss Component
NAMCOMP_ID	I	15		FK	Identifies the related Name Components.

Note: ADDSET_ID will repeat for each address component included in the *Address Component Set*. Consequently it requires a unique combination of ADDSET_ID and COMP_TYPE to define a unique record. For a complete description of *Address Components* please refer to section 1.4 Address Component.

1.1.4 Name Component

Definition

The *Name Component* table (ATNC) allows for further parsing of *Address Components* so the text within the *COMP_TEXT* attribute can be subtyped according to its *NAME_TYPE*.

Description

The Name Component table stores Address Components that have been subdivided into smaller components.

Tile Boundary Notes

Does not apply

Feature Type

Table

Structure

The following represents the structure for the table *Name Components*

Table 4.4-2 NameComponent (ATNC)

Field Name	Type	Width	Dec	Key	Field Content
NAMCOMP_ID	I	15		PK	Identifies the related Name Components.
SEQNR	1	2		PK	Sequence number is to support a unique Primary Key constraint.
NAME_OFF	I	2			Identifies the starting position of the text component to be typed
NAME_LEN	I	2			Identifies the number of characters to be included in the text component
NAME_TYPE	I	2			Identifies the type of text for a particular component 1: Pre-Directional 2: Prefix 3: Body 4: Suffix 5: Post-Directional 6: Key 7: Surname 8: Article/Preposition 9: ExitNumber

Note: All name components related to one Component Text share the same NAMCOMP_ID.

1.2 Relationships

Relationships define the association between feature layers and tables and between tables. Each relationship listed below specifies the multiplicity for each layer or table, the directionality of the relationship and the key fields in the relationship. There are two attributed relationships provided and described below:

- Anchor Point Along Transportation Element
- Feature Associated With Anchor Point

1.2.1 Anchor Point Along Transportation Element

Definition

The *Anchor Point Along Transportation Element* relationship table (ATTE) links an *Anchor Point* (of all types) to each *Road Element* from which the *Anchor Point* is reachable.

Description

The relationship between *Anchor Point* and *Road Element* is defined by identifying the *Road Element* (TRPEL_ID), the Side Of Line (SOL), and the Relative Position (REL_POS) fields.

Table 4.4-3 Anchor Point Along Transportation Element (ATTE)

Field Name	Type	Width	Dec	Key	Field Content
PNT_ID	I	15		PK	A key field linking to a particular Anchor Point feature
TRPEL_ID	I	15		PK	A key field linking to a particular Road Element feature
SOL	I	1			Identifies the side of the Network feature which the point is located 1: Left 2: Right 3: On
REL_POS	D	6	3		Relative position along the Network feature beginning at the Start Junction and is expressed as a percentage with a precision of three decimal places. **Note:** The width and precision described here reflect the actual data. Some applications might adjust the width to 7 to accommodate the decimal point.

Note: A record is added to the ATTE table for each Anchor Point of type 2, 11 - 15 and for each instance of an Anchor Point type Entry (type 7) to which the first Anchor Point is related.

1.2.2 Feature Associated With Anchor Point

Definition

The *Feature Associated With Anchor Point* relationship table (ATAT) allows for one or more Entry *Points* to be associated to one or more location of an *Address*.

Description

The *Feature Associated With Anchor Point* relationship table (ATAT) combines the Anchor Point types 2, 11-15 (F_PNT_ID) with one or more Anchor Point type Entry (T_PNT_ID) with the Anchor Point Type (TYPE).

Tile Boundary Notes

Anchor Points type Entry are duplicated between adjacent tiles for features along tile boundaries.

Feature Type

Table

Structure

The following represents the structure for the table linking two types of Anchor Points together. The second Anchor Point, referenced by the T_PNT_ID, always refers to the Entry Point of the parent Anchor Point, is referenced by the F_PNT_ID.

Table 4.4-4 Feature Associated With Anchor Point (ATAT)

Field Name	Type	Width	Dec	Key	Field Content
F_PNT_ID	I	15		PK	From Anchor Point feature ID.
T_PNT_ID	I	15			To Anchor Point feature ID.
TYPE	I	1			Identifies the type of Entry Point 1: Main 2: Minor

1.3 Shapefile Table Relationships

The following provides a description of the designed relationships between the various tables included in the Shapefile/OSL format product of the MultiNet Address Points and is provided to aid in navigating those relationships.

1.3.1 Anchor Point Has Address

Source Table: AnchorPoint (AT)

Source Key: ADDRESS_ID

Source Multiplicity: One (1)

Target Table: Address (ATAD)
Target Key: ADDRESS_ID
Target Multiplicity: One (1)

1.3.2 Address Has Address Component

Source: Address (ATAD)
Source Key: ADDSET_ID
Source Multiplicity: One (1)

Target: AddressComponent (ATAC)
Target Key: ADDSET_ID
Target Multiplicity: One or Many (1..*)

1.3.3 Address Component Has Name Component

Source Table: AddressComponent (ATAC)
Source Key: NAMCOMP_ID
Source Multiplicity: Zero or One (0..1)

Target Table: NameComponent (ATNC)
Target Key: NAMCOMP_ID
Target Multiplicity: Zero or Many (0..*)

1.3.4 Address Has Address Scheme

Source Table: Address (ATAD)
Source Key: SCHEME_ID
Source Multiplicity: One (1)

Target Table: Component Format (ATCF)
Target Key: SCHEME_ID
Target Multiplicity: One or Many (1..*)

1.3.5 Address Has Country Address Scheme

Source Table: Address (ATAD)
Source Key: CNTY_SCHEM
Source Multiplicity: One (1)

Target Table: Component Format (ATCF)
Target Key: CNTY_SCHEM
Target Multiplicity: One or Many (1..*)

1.3.6 Anchor Point Associated with Anchor Point

Source Table: AnchorPoint (AT)
Source Key: PNT_ID
Source Multiplicity: One (1)

Target Table: Anchor Point Associated With Anchor Point (ATAT)
Target Key: F_PNT_ID / T_PNT_ID
Target Multiplicity: One or Many (1..*)

1.3.7 Anchor Point Along Transportation Element Relationship

Source Table: AnchorPointAlongTransportationElement (ATTE)
Source Key: TRPEL_ID
Source Multiplicity: One (1)

Target Table: Network (NW table in Base Map product)
Target Key: ID
Target Multiplicity: One or Many (1..*)

1.4 Meta Tables

The Meta Table provides enhanced information that contributes towards fully implementing the product. For the Shapefile/OSL format product of the MultiNet Address Points one meta table is included:

- Address Format

This meta tableis country specific.

1.4.1 Address Format

Definition

The *Address Format* table provides all of the *Address Scheme* information.

Description

The *Address Format* table provides Address Scheme information, inclusive of all language specific formatting, necessary to organize the *Address Components* into supported *Address Schemes*. The following Address Scheme information is provided:

- Address Scheme ID
- Country Code
- Sub Area
- Language Code
- Component Type
- Label Text
- Row
- Position
- Mandatory

For a complete description of *Address Scheme* please see section 3.1 Address Scheme

Tile Boundary Notes

Does not apply

Feature Type

Table

Structure

The following represents the structure for the *Component Format* table

Table 4.4-5 Component Format (ATCF)

Field Name	Type	Width	Dec	Key	Field Content
SCHEME_ID	I	3		PK, FK	Provides the indetifier of the Address Scheme
CNTY_SCHEM	C	6		FK	A key field for organizing the country specific Address Scheme information
CNTRY_CODE	C	3		PK	The 3 character ISO country code
SUB_AREA	I	4			Identifies the sub area where the scheme would apply
LANG_CODE	C	3		PK	MARC language code for the Label Text
COMP_TYPE	I	2		PK	Identifies the type of component
LABEL_TEXT	C	50			Text describing the Address Component
ROW_NUM	I	2			Identifies the row where the Address Component appears within the format of the Address
POS_NUM	I	2			Identifies the position of the Address Component within the Row
MANDATORY	I	1			Indicates whether or not for the given Address Scheme the Address Component is mandatory or optional

2 UML

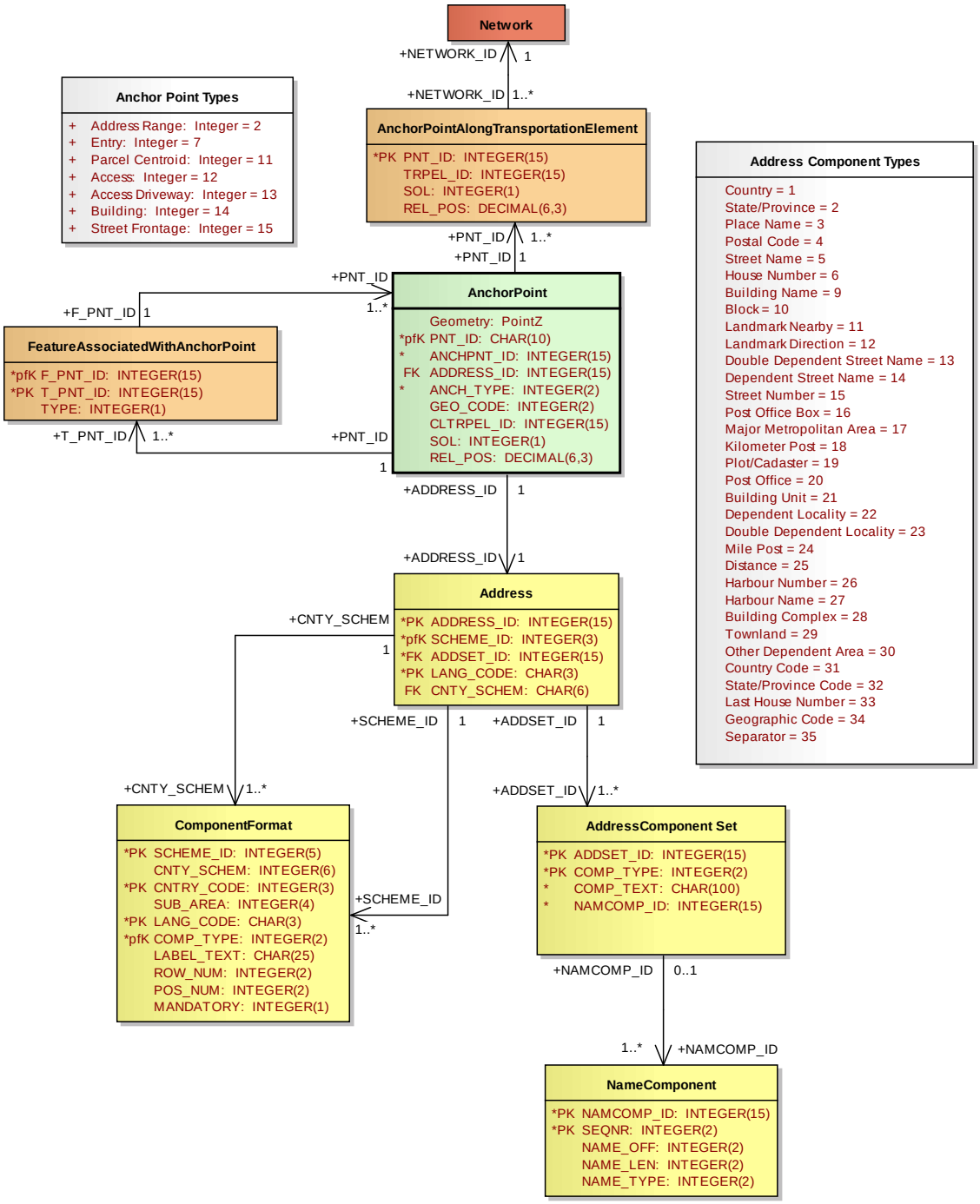


Fig. 4.4.1: This UML diagram represents the data schema for the MultiNet Address Points Shapefile/OSL format.

3 Shapefile Format Specifics

3.1 Attribute Mapping

Table 5: Attribute Mapping from the Data Model Specification to the Shapefile/OSL Format Specification

Data Model Specification	Shapefile/OSL Format Specification
Anchor Point Along Transportation Network	**Anchor Point**
Transportation Element	TRPEL_ID
Relative Position	REL_POS
SideOfLine	SOL
Feature Associated With Anchor Point	**Feature Associated With Anchor Point**
Anchor Point (2, 11-15)	F_PNT_ID
Anchor Point (7)	T_PNT_ID
Type	TYPE
Anchor Point	**Anchor Point**
	PNT_ID
Anchor Point Stable ID	ANCHPNT_ID
Anchor Point Type	ANCH_TYPE
Geocoding Accuracy Level	GEO_CODE
Address ID	ADDRESS_ID
Closest Transportation Element	CLTRPEL_ID
Side of Line	SOL
Relative Position	REL_POS
Address	**Address**
Address ID	ADDRESS_ID
Address Scheme ID	ADD_SCHEME
Address Component Sett	ADDSET_ID
Language Code	LANG_CODE
Address Component Set	**Address Component Set**
Address Component Set	ADDSET_ID
Name Component	NAMCOMP_ID
Component Text	COMP_TEXT
Component Type	COMP_TYPE
Name Component	**Name Component**
	NAMCOMP_ID
	SQRNR
Offset	NAME_OFF
Length	NAME_LEN
Type	NAME_TYPE

3.2 Shapefile File Types

All data files are delivered compliant with ESRI's™ Shapefile format requirements.

dBASE File (.dbf):

Standard dBASE table stores feature attributes and links to other tables. As a table defining the attributes for a shapefile layer, the table links to the shapefile index file with a shape ID.

Index File (.shx):

Shapefile index file links shapes in the.shp file to the.dbf file for a shapefile layer.

Coordinate File (.shp):

The coordinate file contains all the coordinates for the nodes and vertices of each shape feature.

Projection File (.prj):

A projection file with coordinate projection information is provided with each layer (point, line, and polygon) and contains the following record:

GEOGCS[“GCS_WGS_1984”,DATUM[“D_WGS_1984”,SPHEROID[“WGS_1984”,6378137,298.257223563]],PRIMEM[“Greenwich”,0],UNIT[“Degree”,0.0174532925199433295]]

Note:

A shapefile layer includes at least all four file types with the each file having the same file name excluding the file extension (.shp, .shx, .shp, .dbf).

All attribute tables are in the form of a dBASE file (.dbf).

3.3 Shapefile Naming

For specifications on file naming please refer to Appendix 1 Naming, Layer, Sectioning Conventions.

Appendix 1 Naming, Layer, Sectioning Conventions

1 Overview

All directory structures, file names, and extensions for this product are in accordance with the MultiNet and Enhancements Directory Structure and File Naming specification version 2.1.

The file naming structure for enhancement products now replicate the same file naming structure as the core MultiNet product. Only the Product Name Prefix will vary. Consequently if the files of this product are combined with the files of the core product, the core product version will be overwritten. The user is advised to take great care in doing this as not all data files of the same name contain the same data.

Note: If no points exist within a dataset, the data files are provided empty.

1.1 GDF-AS

1.1.1 Layer ID

The MN Address Point Layer ID for Address Points is 25.

1.1.2 Sectioning

Each GDF AS file is in accordance with the sectioning scheme implemented in the MultiNet core map.

1.2 GDF-AR

1.2.1 Layer ID

The MN Address Point Layer ID for Address Points is 25.

1.2.2 Sectioning

Each GDF AR file is in accordance with the sectioning scheme implemented in the MultiNet core map.

Appendix 2 Statistics File

1 Overview

The statistic file is an additional file that provides a summary of the total number of Address Points per Anchor Point Type. Each file is based upon country specific statistics.

1.1 Description

The statistic file is provided as a delimited text file of variable length and as an Access database file.

In the text file, the delimiting character is a pipe (|).

AA01 and AA08 values are only populated if these Administrative Areas are available, otherwise total numbers for each APT type are based upon the AA00.

If no instances of a given point type exist, a zero (0) is written to the column.

If an AA01 does not exist, then the AA01 and AA01_Name columns are left blank. Otherwise each instance of AA01 is a new record.

If an AA08 does not exist, then the AA08 and AA08_Name columns are left blank. Otherwise each instance of AA08 is a new record.

Table 2.6-1 Statistic file structure

Column Name	Data Type	Description
AA00 (country)	C	The Administrative Area Order 0 Code
AA00_Name	C	The Administrative Area Order 0 Name
AA01	C	The Administrative Area Order 1 Code
AA01_Name	C	The Administrative Area Order 1 Name
AA08	C	The Administrative Area Order 8 Code
AA08_Name	C	The Administrative Area Order 8 Name
APT 2	N	Total number of AP Type 2 points
APT 7	N	Total number of AP Type 7 points
APT 11	N	Total number of AP Type 11 points
APT 12	N	Total number of AP Type 12 points
APT 13	N	Total number of AP Type 13 points
APT 14	N	Total number of AP Type 14 points
APT 15	N	Total number of AP Type 15 points
TOTAL	N	Total number of Points (all types)

1.2 Coverage

Files are delivered for each country.

1.3 Directory Structure and File Naming

Statistic files are provided with the documentation. The directory structure adheres to the Global Directory Structure and File Naming specification, version 2.1.

Specifications Meta Information

Product Change Information

Version	Date	Initials	Status	Remark
Address Point 1.8	Jan 29, 2013	MJB		Updated to include Address Schemes
Address Point 1.7	Oct 2, 2008	MJB		

Document Meta Information

Version	Date	Initials	Remark
Address Point 1.8 v1.3.1	July 23, 2013	MJB	• Corrected the Direct/Indirect label for GDF Attributes GD and GN. Refer to Table 3.3-4 Composite Address Component (ADCO) on page 36 for details
Address Point 1.8 v1.3.0	June 5, 2013	MJB	• Added fields CNT_CODE, SUB_AREA and ADD_SCHEME to GDF-AS meta table ADDCMPDREC. • Added field ADD_SCHM to GDF-AR meta table ACD. • Updated the Field Description for the NUM_LAN field of the GDF-AR ASC table.
Address Point 1.8 v1.2.0	May 21, 2013	MJB	• Updated GDF-AS Meta table Country Address Structure Schemes by removing the NUM_LANG and LANG_CODE fields • Added new GDF-AS Meta table Country Address Component Description • Renamed NUM_SCHM field of Country Address Structure to be SUP_SCHM
Address Point 1.8 v1.1.0	April, 24 2013	MJB	• Changed the name of the Address Scheme attribute (AJ) to be Address Scheme ID. • Added a new attribute Language Code (LL) to Composite Address (ADRS). • Changed name of Shapefile field ATAD.ADD_SCHEME to ATAD.SCHEME_ID • Changed name of Shapefile field ATCF.ADD_SCHEME to ATCF.SCHEME_ID • Added some additional clarity to the section on Meta data. • For the GDF-AR meta table ACG, changed the field LANG to be LAN_CODE • Updated Primary Keys for Shapefile tables ATAD, ATCF

Version	Date	Initials	Remark
Address Point 1.8 v1.0.0	January 29, 2013	MJB	• Added a new attribute of Address called Address Scheme. • Updated the GDF product spec with the new attribute Address Scheme (AJ) • Updated the Shapefile product spec with a new field in the ATAD table called ADD_SCHEME • Updated the Shapefile product spec with a new field in the ATAD table called CNTY_SCHEM • Removed references in the data spec to the attributes Row and Sequence from Address Component. • Updated Shapefile table ATCF fields ROW_NUM and POS_NUM to have a field width of 2 • Removed attributes Matrix Row Number (JR) and Matrix Column Number (JC) in the GDF Product spec • Removed fields ROW_NUM and SEQ_NUM from the ATAC table in the Shapefile spec. • Changed the column SCEN_ID to ADD_SCHM in the GDF Meta Tables • Changed the field SCEN_ID to ADD_SCHM in the Shapefile meta table ATCF • Rewrote much of the section GeoCoding Accuracy Level to provide additional clarity to the assignment of GAL values to Entry Points. • Updated the description Component Type to add clarity • Added additional information regarding how Relative Position is determined. • Updated all UMLs with new information • Several grammatical corrections • Added a new column MANDTRY to the GDF Meta Tables. • Added a new field MANDATORY to the Shapefile meta table ATCF • Changed the meta information attribute Sequence to Position • Changed the field SEQ_NUM to POS_NUM in the Shapefile meta table ATCF • Reoraganized the order of the attributes in Component Format • Added Composite Address Component Set to the GDF product section • Reordered the Fields in the Shapefile table ATCF • Added the key field CNTY_SCHEM to the Shapefile ATAD and ATCF tables. • Reorganized the data spec section on Address to include Address Set
Address Point 1.7 Final 1.2.1	October 12, 2012	MJB	• Removed Appendix 1.7 Geocode Accuracy Level Mapping • Updated the definition of Geocoding Accuracy Level 99 • Updated the definition of an Anchor Point type Entry to include a reference to a postal location.

Version	Date	Initials	Remark
Address Point 1.7 Final 1.2.0	July 24, 2012	MJB	• Added the Anchor Point type Address Range for USA and Canada only. • Added additional notes to clarify how the AT, ATAD and ATAC tables in the Shapefile format should be populated.
Address Point 1.7 Final 1.1.2	April 4, 2012	MJB	Cosmetic updates to clarify various topics, specifically partaining to the Relationship.
Address Point 1.7 Final 1.1.1	May 26, 2011	MJB	Removed reference to the 2GB limitation of the .dbf files.
Address Point 1.7 Final 1.1.0	May 18, 2011	MJB	Updated the REL_POS to be a width of 6 and with a precision of 3.
Address Point 1.7 Final 1.0.7	March 10, 2011	MJB	Update the definitions and description of the GAL values Updated the GDF-AS fields COMP_TYPE to COMP_TYP and COMP_DESC to COMP_DSC Added a table identifying which attributes are Direct and Indirect. Added an Appendix showing the mapping between the new GAL values
Address Point 1.7 Final 1.0.6	March 07, 2010	MJB	Rebranding update
Address Point 1.7 Final 1.0.5	December 22, 2010	MJB	Removed Appendix C:Address Component Meta Data
Address Point 1.7 Final 1.0.4	January 11, 2010	MJB	Aligned Anchor Point types between section 3.1.1 and 3.1.2 Added Note to appendix on Naming and Sectioning that files with no points will be provided empty. The keyfield for Address Has Address Component was updated to be ADDSET_ID. Descriptions for Scenario, Country, Sub Area and Language have been added to section 5.1 Address ID has been further defined. Details have been added to clarify the data type and width of the field REL_POS. The field NAMCOMP_ID has been added to the ATNC table. Anchor Point ID and Anchor Point Stable ID has been aligned to Anchor Point Stable ID within the document. Details have been added to section on Address to clarify address information associated to Entry Points. Various typing and grammatical edits A new Appendix has been added that includes the Address Component Meta Data
Address Point 1.7 Final 1.0.3	September 22, 2009	MJB	Updated directory structure and file naming to conform to GDS v_2.0

Version	Date	Initials	Remark
Address Point 1.7 Final 1.0.2	August 10, 2009	MJB	CodeList for Side of Line is not in sync with core map. Values should be 0: Both, 1: Left, 2: Right 3: On. Both should probably not be used. Update the file names according to the latest release of GDS Change the geometry type of Anchor Point to Point, not a PointZ. Add specifics for statistic files Update the Geocoding Accuracy Level of the entry point generated during product create so that they inherit the Geocoding Accuracy Level of their parent anchor point. Change the field name of Lang to Lan_Code Rel_Pos needs to be a decimal with a precision of 3 Inconsistent field naming Update the field names of NUM_LAN, NUM_COMP in GDF AS format spec to be a length of 10. The file name for the shapefile product of AP conflicts with core map file naming for Adminis-trative Places. All file names are changed to use AT in place of AP.
Address Point 1.7 Final 1.0.1		MJB	Reo gran i zed some of the spec and moved content from the format section to the data model section. Updated the Stable Identifier.
Address Point 1.7 Final 1.0.0		MJB	Initial final release
Address Point 1.7 Draft 1.0.3	Oct 24, 2008	MJB	Updated and further defined Geocoding Accuracy Updated description of values for Confidence Level Update values and definitions for AnchorPoint Source Introduced a FormCode referencing a format per country as defined by Graham Rhind Further defined Address Component Types for countries Improved consistent wording in Data Specifica-tion

Version	Date	Initials	Remark
Address Point 1.7 Draft 1.0.2	Oct 17, 2008	MJB	Reformatted document to adhere with MultiNet style Included GDF Format specifications Added AddressComplete class Added UtilityConnect as a AnchorPoint type Removed AddressComponent Subtype and Delimiter Added Field Mapping from core data model to the Shapefile format data model Added NameComponents Have included initial Quality Requirements
Address Point 1.7 Draft 1.0.1	Oct 3, 2008	MJB	Updated the Core spec to be more general, by removing tables. Moved tables to the data model section Merged the Shapefile format spec as an appendix of the core spec
Address Point 1.7 Draft 1.0.1	Oct 2, 2008	MJB	Change Product Name to "Tele Atlas Global Address Points" Change font to "Verdana" Update Primary Key labels in Models.