



Video Analytics

Version 1.0

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Preface

OMG

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1 Abstract

1.1 Overview

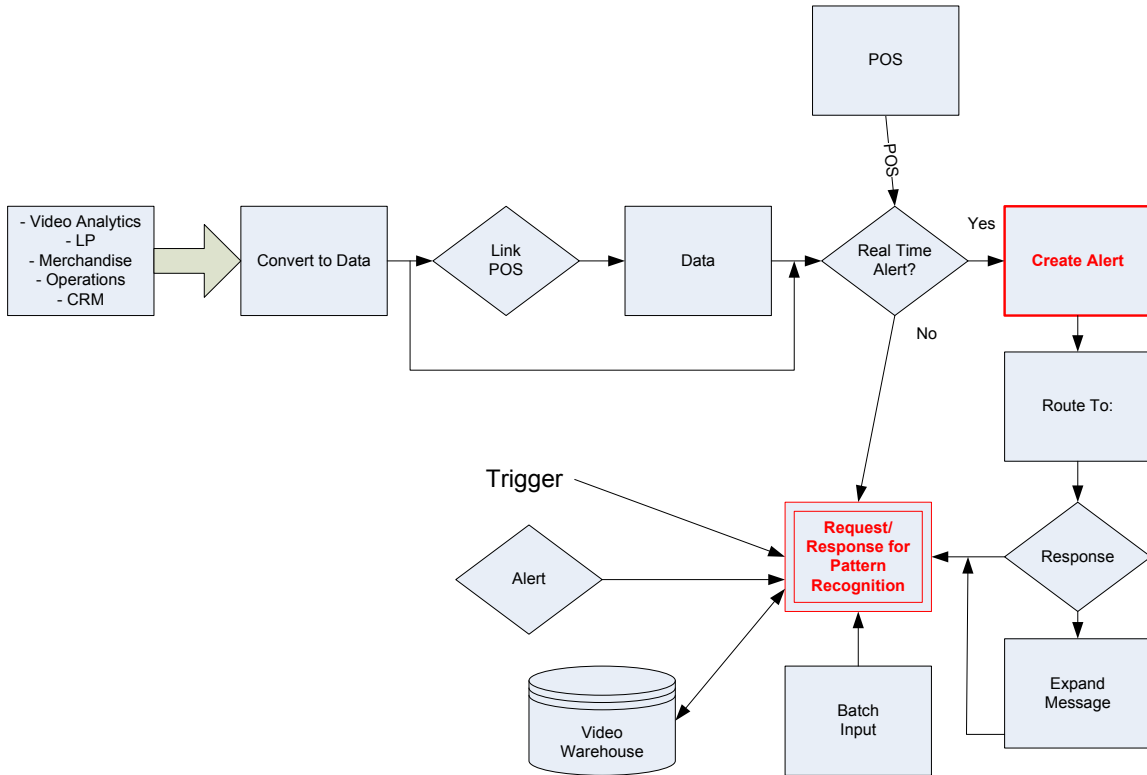


Figure 1: Video Analytics Model

Video Analytics is the emerging technology where computer vision is used to capture behavior and events as well as filter and manage real time video for security and store intelligence. Video surveillance has traditionally been used in Retail for loss prevention. Retailers have come to realize that video analytics makes it possible to not only support loss prevention but also to provide safety, analyze store operations, customer behavior to enhance the shopping experience, decrease shrinkage, and increase sales. Today there are a number of video analytic products that identify behaviors, events, and trends captured on video. Given the complexity of developing video analytic products, vendors may optimize their products for specific behaviors such as people counting, line queuing, packages left behind, or tracking people and assets. When a Retailer or third party creates an application that analyzes a range of behaviors and events, it may require working with several video analytic products. Retailers are therefore seeking a standard to easily integrate events detected by multiple video analytic products and access the analytic results that describe the different behaviors.

1.2 Area of Interest

An Area of Interest is the physical area being analyzed for this message. For version 1, it is a pre-condition that the areas of interest are already configured in the video analytic system.

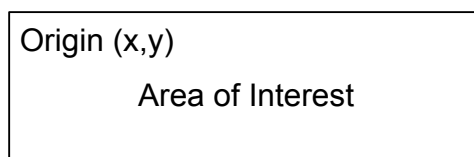


Figure 2: Pre-Defined Area of Interest

In future versions, the area of interest might be dynamic with the coordinate system following standard graphics programming. To that end, this schema defines the origin of the coordinate system for the information in the area of interest to be at the upper left corner of the area (similar to a viewport). Following this pattern, the positive increasing x-coordinate starts at the origin increasing to the right and the positive increasing y-coordinates starts at the origin and goes down.

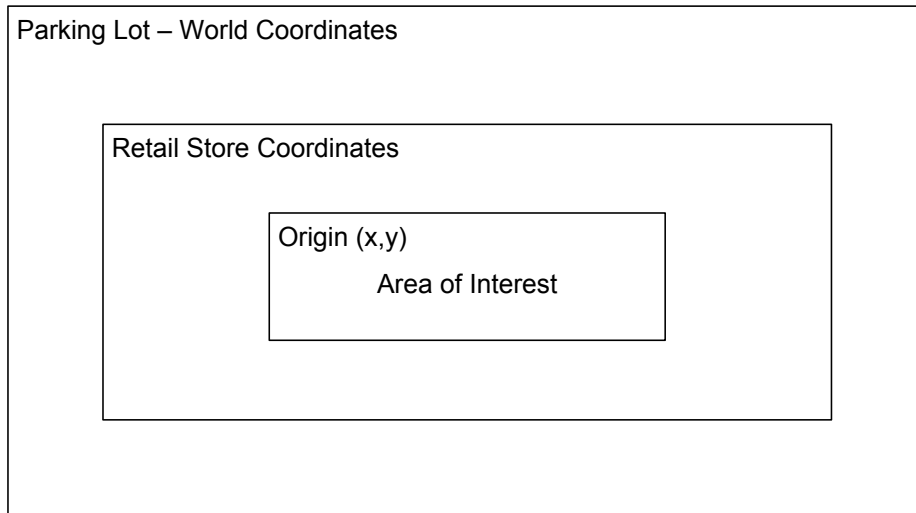


Figure 3: Reserved for Future Definitions

What is not defined in this version is how the Area of Interest relates to the world coordinate system and how the worlds coordinate system relates to the physical store environment.

1.2.1 Boundary Area of Interest



Figure 4: Front Door Boundary Area of Interest

A Boundary is the dividing line or location between two areas. This is things like the front door, the edge of a department, the bathroom, etc.

1.2.2 Camera View Area of Interest

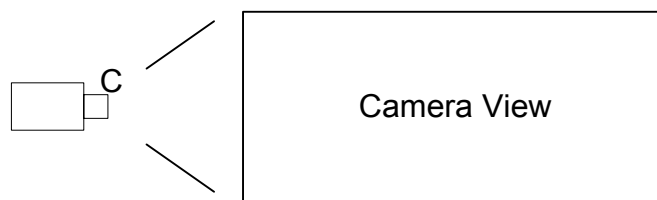


Figure 5: Camera View Area of Interest

This area of interest encompasses the entire camera view.

1.2.3 Path Area of Interest

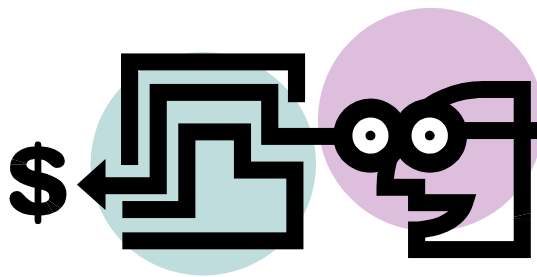


Figure 6: Path Area of View

The Path Area of Interest is a course taken. For example, to evaluate the effectiveness of the plan-o-gram, one may follow the paths taken by the customers after they enter the store.

1.2.4 Queue Area of Interest

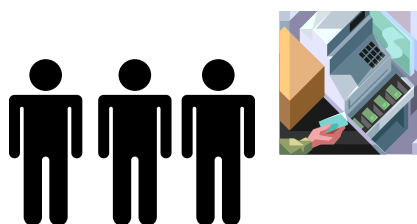


Figure 7: Register Checkout Queue Area of Interest

A line of people, vehicles or other objects, in which the person or object at the front end is dealt with first, the one behind is dealt with next, and so on, and which newcomers join at the opposite end. For example, the Queue Area of Interest is the queue at the checkout register.

1.2.5 Zone Area of Interest

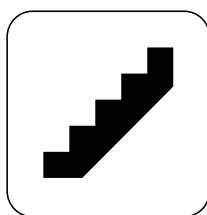


Figure 8: Stairs Zone Area of Interest

An area distinguished on the basis of a particular characteristic, use, restriction, etc.

1.3 Object of Interest

The Object of Interest is the physical object being analyzed for this message. It is a person or thing, such as a store item, a shopping unit, or a trolley.

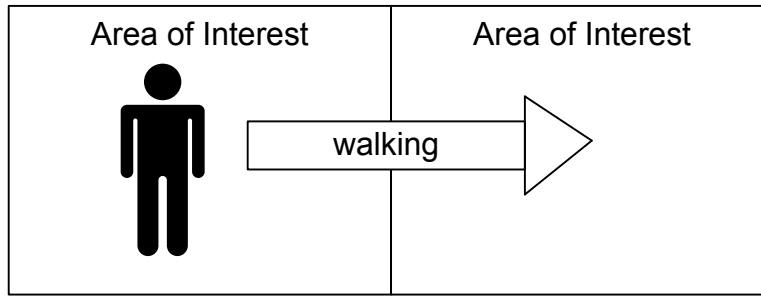


Figure 9: One Object over Multiple Areas of Interest

The top of the hierarchy for an Object Of Interest which moves between Areas Of Interest is the object. In this case an Object Of Interest can contain more than one Area Of Interest. The reverse is also true, an Area Of Interest can contain multiple Objects of Interest. This gives the flexibility to report the information in the most relevant format.

1.4 ARTS Domain Models

1.4.1 Venetian Blind Architecture

The ARTS Schemas are built following the Venetian Blind Architecture. This architecture follows a building block approach. XML Schema Complex Types form the basis for these building blocks. They are then built into a hierarchical pattern in the structure of an XML Schema. This technique provides maximum flexibility for building the schema.

To easily understand the relationships contained within the schema, ARTS developed the Schema Domain Model. This Domain Model is a cross between a data model and a UML model. As it turns out neither approach properly models XML Schemas and in fact can lead to misunderstandings.

1.4.2 Domain Views

Because the schemas can be very complex some contain over 100 complex types, ARTS has developed a technique to simplify the understanding of the schema in a particular context. In the data model world there are “views” of the overall data. These views are custom-tailored presentations of the data in one or more tables derived from the base data model.

ARTS has developed a similar concept called a “Domain View”. Just like a data model view, a Domain View is a custom-tailored presentation of the data in a particular use case and/or scenario. This allows the reader to understand the appropriate subset of relationships necessary to support a particular use case and/or scenario without getting lost in the enormous detail of the larger Domain Model.

In this technical specification, both event and request/response models are valid for most scenarios. Rather than duplicating the same information in both domain views for each scenario, only one was chosen to represent the valid information in a particular use case.

1.4.3 Common Data

In the process of creating multiple schemas to support the enterprise, ARTS has identified repeated patterns, such as name and address. These patterns have been aggregated into reusable complex type components call “Common Data”. The common data complex types used in the Domain Models is identified in blue.

1.4.4 Root Elements

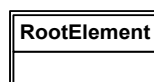


Figure 10: Root Elements

1.4.5 Complex Type Content

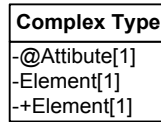


Figure 11: Complex Type Content

The content of each complex type is made up of attributes and elements. The attributes are identified following the XPath nomenclature “@” sign. The other content is the elements. If an element’s type definition is a complex type then there is a “+” sign placed in front of the element name.

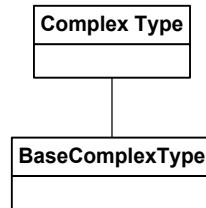


Figure 12: Base Complex Type Model

The Venetian Blind Architecture model is comprised of a number of base complex type building blocks. Elements in one node reference complex types through their type definition.

```
<xs:element name="asdf" type="BaseComplexType"/>
```

This relationship is indicated by a straight line between the two complex types.

1.4.6 Model Groups

The W3C XML Schema Language supports three varieties of Model Groups; sequence, choice and all. Because the ARTS schemas support many different scenarios, the most common model group used is the sequence. The choice model group is used in particular situations and the all model group is rarely used.

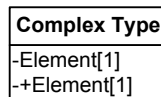


Figure 13: Sequence Model Group

The sequence model group is the default and implied by the structure of the complex type. Because the Domain Models provide extensive support to their respective domain, they are complex in nature and this simplification reduces the clutter.

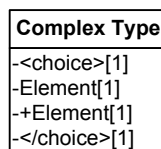


Figure 14: Choice Model Group

In the various locations where a choice is appropriate, the Domain Model surrounds the choice with the schema representation of the choice. This clearly delineates the breadth of the choice.

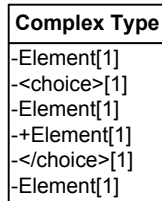


Figure 15: Choice Model Group Embedded within a Sequence Model Group

This allows us to support the particles in a model group which can be themselves other model groups.

1.4.7 Derivation by Extension

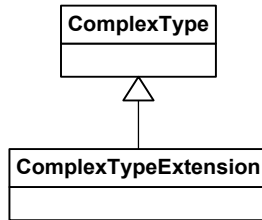


Figure 16: Derivation by Extension

In some cases, it makes reuse a complex type in a manner similar to an abstract base class. This is best used when one wants to leverage the existing data and add additional data in the derived class. This technique is called derivation by extension. An example of this is an item. The information in an item is used in several line items such as a sale and a return. Each of which can add other information that is only used in that instance, i.e., a return needs a disposition. This is modeled using the line with an arrowhead pointing from the derived class to the abstract complex type.

1.4.8 Anonymous Complex Types

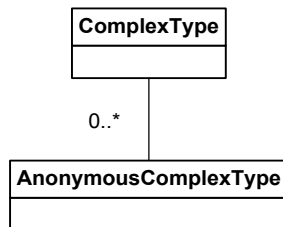


Figure 17: Anonymous Complex Types

The final relationship modeled in the Domain Model is an anonymous complex type. Anonymous are characterized by having the node embedded within the higher node.

```
<xs:element name="HigherComplexType" maxOccurs="unbounded">
  <xs:complexType>
    <xs:sequence>
      <xs:element name="AnonymousComplexElementType"/>
      <xs:element name="AnonymousComplexTypeElement2"/>
    </xs:sequence>
  </xs:complexType>
</xs:element>
```

Anonymous Complex Types are modeled with a straight line to the higher node. The cardinality of the anonymous complex type is listed next to the line.

1.5 Project Scope for Version 1.0

The video analytics work team will define a set of:

- User defined events (actions and conditions) detected by video analytics.
- Messages to be able to query (request/response) the repository for video analytic events.

1.6 Out of Scope for Version 1.0

- Audio
- Video Format (MPEG, etc.)
- Application configuration
- Facial Recognition
- Video Images

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2 Conformance

The Video Analytics specification specifies a number of conformance points for implementers. Each use case includes example conforming XML requests and responses and events. These should be considered independent conformance points.

2.1 Arts Pass/Fail Criteria

Schema Validation Report

The first report is a basic schema validation. This report indicates if the test document submitted by the vendor is a valid XML document and conforms to the appropriate ARTS published schema. Must be error free to pass.

ARTS Data Dictionary Check Report

The second report identifies element names within the test document that are not contained within the ARTS Data Dictionary. All elements must be in the Dictionary to pass.

Missing Tags Report

Each use case/scenario identifies a minimal set of mandatory elements necessary to support each particular use case. To pass there can be no missing tags within a particular use case/scenario.

Extension Tags Report

The Extensions Tags Report identifies any vendor specific (proprietary) extensions. To pass a vendor must extend using only the ARTS approved methodology. Furthermore, the functionality provided by the extension must not be present in the ARTS approved schema. Extension information is confidential and will not be disclosed by ARTS.

Overall conformance to the specification by a product is achieved when a majority of the use case events are supported.

2.2 ARTS IP Policy

This specification was originally created under the ARTS IP Policy which can be found here:

<https://www.omg.org/cgi-bin/doc?retail/2017-12-01>

2.3 Summary Points

1. The Policy is applicable to all members of ARTS and acceptance of this Policy will be a condition of ARTS membership. Non-members wishing to attend technical meetings must agree in writing to accept the Policy.
2. The Policy is applicable to the Data Model, ARTS XML, UnifiedPOS and future technical committees established by the ARTS Board to develop specifications.
3. The Policy permits members that disclose intellectual property to reserve rights on how they will license its use.
4. The Policy encourages members to immediately disclose upon discovery of intellectual property that may be imbedded in ARTS specifications.
5. No member is required to conduct patent searches to search for intellectual property within ARTS specification(s.)
6. Members who participate in the development of ARTS specifications must assign representatives with reasonable knowledge in the field of work.
7. The Policy establishes defined periods for review of developing draft specifications for both technical accuracy and intellectual property. A public review period is also provided.

8. Members who do not disclose intellectual property within an ARTS specification before that specification is approved by the ARTS Board, must provide a 12- month royalty-free license to all implementers, during which time ARTS may modify the specification to remove the infringing IP and each implementer may make appropriate resolution.
9. There is a default reasonable and non-discriminatory (“RAND”) licensing obligation for members of Work teams and Technical Committees with only limited exceptions.

NOTE:

The following XML examples include “namespace references”. These are not actual file locations but placeholders for the appropriate namespace where the support files can be found.

For example, in the XMLPOS references to file locations shown:

“<https://www.omg.org/retail/VideoAnalytics/namespace/>” are not actual locations for the support files. You must replace these references with actual locations.

In summary, when an application uses the schema examples as a basis for their code, it is necessary to replace the placeholders with valid namespace locations.

3 Use Case: Traffic Identification and Counting

3.1 Scenario: How Many People Enter, Exit, or Pass Directionally Through a User Defined Zone?

Brief Description

Scenario Description

Between 10:00am to 10:15am 200 people passed through the store entrance. Of those 150 were entering the store and 50 were exiting.

Pre-Conditions

event: regularly scheduled alert

Post-Conditions

Data

Event

Count: the number of count type

Count type: individuals, shopping units, dogs, shopping carts

Area of Interest: 'physical threshold name': the spot/line/curve/boundary the VA uses to determine the count. In the description above, there could be separate boundaries for the left, center and right. Note that the boundary should be fully qualified to identify the store within the organizational hierarchy.

Direction: the direction across the Area of Interest

Start Time/Date: optional. May also be same as end time

End Time/Date

Domain View

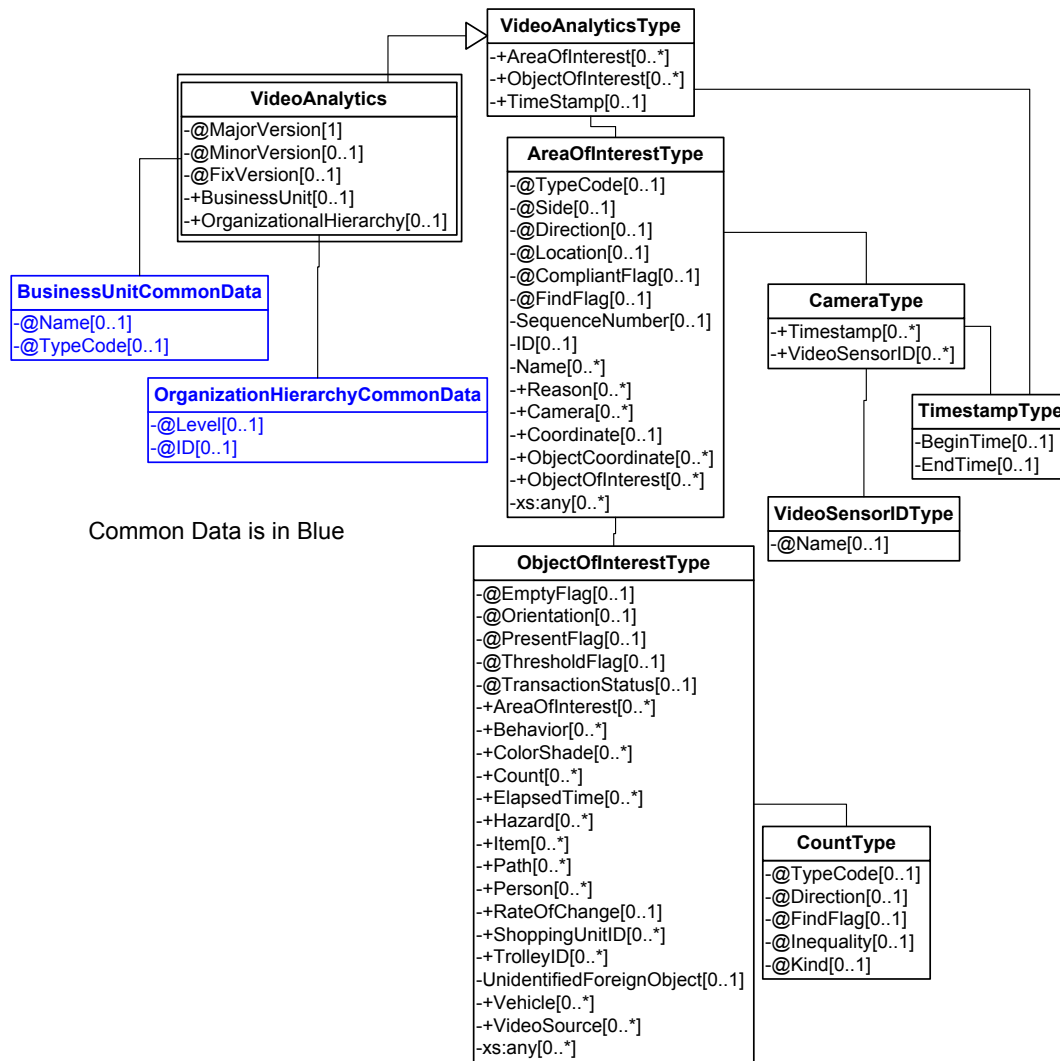


Figure 18: People Passing Through a Zone Request/Response Domain View

Event

ARTS XML Conformance XML Instance Document – People Passing Through a Zone Event

```

<?xml version="1.0" encoding="UTF-8"?>
<VideoAnalyticsEvent xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.omg.org/retail/VideoAnalytics/namespace/
  ../VideoAnalyticsEventV1.0.0.xsd"
  xmlns="http://www.omg.org/retail/VideoAnalytics/namespace/" MajorVersion="1" MinorVersion="0"
  FixVersion="0" TypeCode="Boundary">
  <SequenceNumber>11234</SequenceNumber>
  <EventDateTime>2006-05-04T18:13:51.0Z</EventDateTime>
  <SourceURI>Camera 1</SourceURI>
  <VideoAnalytic>
    <AreaOfInterest TypeCode="Boundary" Direction="Enter">
      <Name>Front Door</Name>
    </AreaOfInterest>
    <AreaOfInterest TypeCode="Boundary" Direction="Exit">
      <Name>Front Door</Name>
    </AreaOfInterest>
  </VideoAnalytic>
</VideoAnalyticsEvent>
  
```

Request/Response

ARTS XML Conformance XML Instance Document – People Passing Through a Zone – Request

```
<?xml version="1.0" encoding="UTF-8"?>
<VideoAnalyticsMessage xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.omg.org/retail/VideoAnalytics/namespace/
  ../VideoAnalyticsMessageOrientedV1.0.0.xsd"
  xmlns="http://www.omg.org/retail/VideoAnalytics/namespace/" MajorVersion="1" MinorVersion="0"
  FixVersion="0">
  <ARTSHeader ActionCode="Read" MessageType="Request">
    <MessageID>12345678</MessageID>
    <DateTime>2006-05-04T18:13:51.0Z</DateTime>
  </ARTSHeader>
  <VideoAnalysis>
    <AreaOfInterest TypeCode="Zone" Direction="Enter" Location="Entry">
      <Camera>
        <!-- Front Door Camera -->
        <VideoSensorID>10</VideoSensorID>
      </Camera>
      <ObjectOfInterest>
        <Count xsi:nil="true" Kind="Individuals" FindFlag="true"/>
        <ElapsedTime TypeCode="Actual">15:00:00</ElapsedTime>
        <Person PresentFlag="true"/>
      </ObjectOfInterest>
    </AreaOfInterest>
    <AreaOfInterest TypeCode="Zone" Direction="Exit" Location="Entry">
      <Camera>
        <!-- Front Door Camera -->
        <VideoSensorID>10</VideoSensorID>
      </Camera>
      <ObjectOfInterest>
        <Count xsi:nil="true" Kind="Individuals" FindFlag="true"/>
        <ElapsedTime TypeCode="Actual">15:00:00</ElapsedTime>
        <Person PresentFlag="true"/>
      </ObjectOfInterest>
    </AreaOfInterest>
    <TimeStamp>
      <BeginTime>2006-05-04T18:13:51.0Z</BeginTime>
    </TimeStamp>
  </VideoAnalysis>
</VideoAnalyticsMessage>
```

ARTS XML Conformance XML Instance Document – People Passing Through a Zone – Response

```
<?xml version="1.0" encoding="UTF-8"?>
<VideoAnalyticsMessage xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.omg.org/retail/VideoAnalytics/namespace/
  ../VideoAnalyticsMessageOrientedV1.0.0.xsd"
  xmlns="http://www.omg.org/retail/VideoAnalytics/namespace/" MajorVersion="1" MinorVersion="0"
  FixVersion="0">
  <ARTSHeader ActionCode="Read" MessageType="Response">
    <MessageID>987654</MessageID>
    <DateTime>2006-05-04T18:15:51.0Z</DateTime>
    <Response ResponseCode="OK">
      <RequestID>12345678</RequestID>
    </Response>
  </ARTSHeader>
  <VideoAnalysis>
    <AreaOfInterest TypeCode="Boundary" Direction="Enter">
      <Name>Front Door</Name>
      <ObjectOfInterest>
```

```
        <Count Kind="Individuals" xsi:nil="true"/>
      </ObjectOfInterest>
    </AreaOfInterest>
    <AreaOfInterest TypeCode="Boundary" Direction="Exit">
      <Name>Front Door</Name>
      <ObjectOfInterest>
        <Count Kind="Individuals" xsi:nil="true"/>
      </ObjectOfInterest>
    </AreaOfInterest>
    <TimeStamp>
      <BeginTime>2006-05-04T18:15:51.0Z</BeginTime>
      <EndTime>2006-05-04T18:30:51.0Z</EndTime>
    </TimeStamp>
  </VideoAnalysis>
</VideoAnalyticsMessage>
```

3.2 Scenario: Boundary Direction Event

Brief Description

Multiple events which are then aggregated into one request/response message.

Scenario Description

Of the 150 entering the store from 10:00am to 10:15am, 125 entered to the right, 20 entered to the left, and 5 walked straight ahead.

Pre-Conditions

Post-Conditions

Data

Domain View

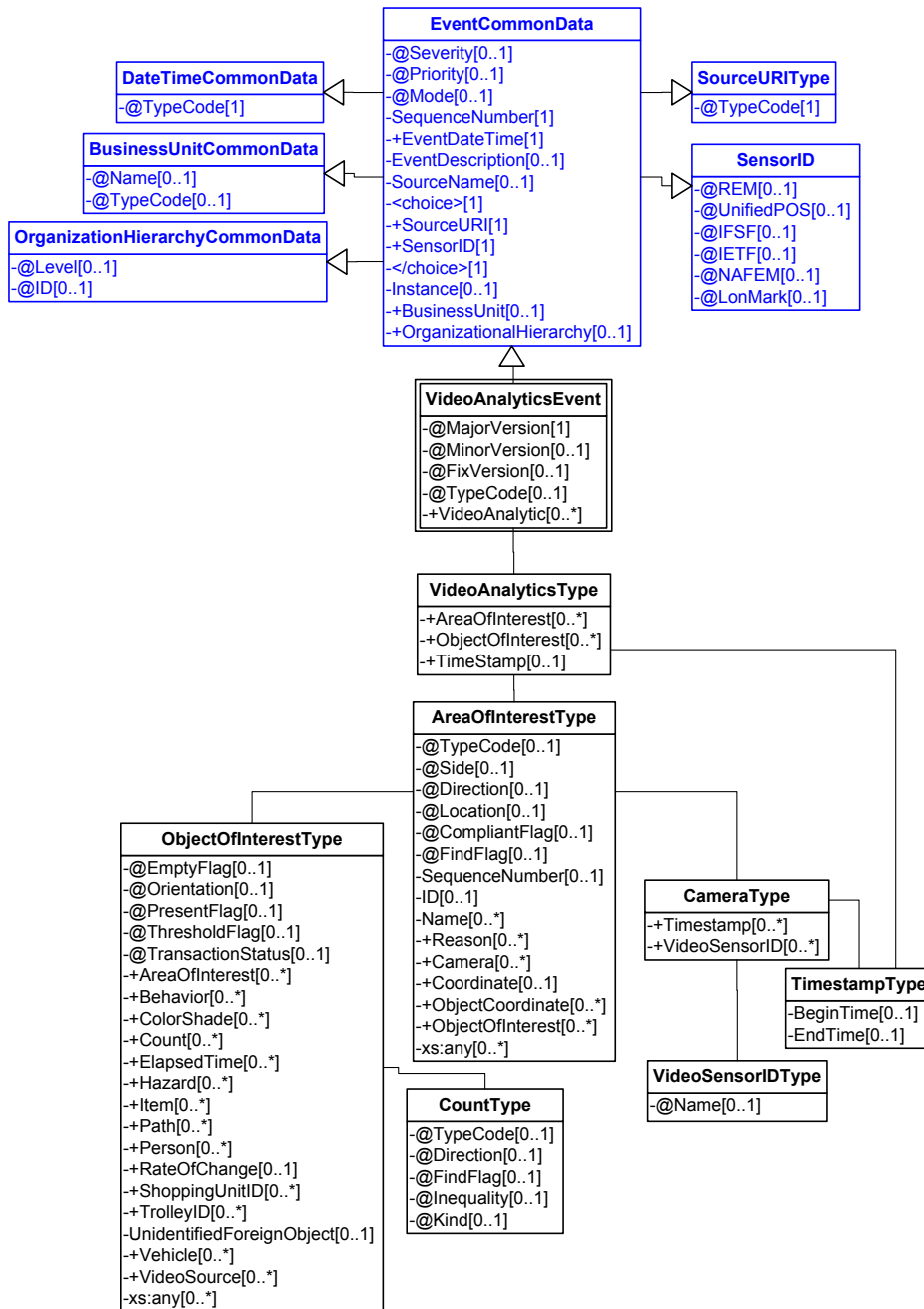


Figure 19: Boundary Direction Event Domain View

Event

ARTS XML Conformance XML Instance Document – Boundary Direction Event

```
<?xml version="1.0" encoding="UTF-8"?>
<VideoAnalyticsEvent xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.omg.org/retail/VideoAnalytics/namespace/
  ../VideoAnalyticsEventV1.0.0.xsd"
  xmlns="http://www.omg.org/retail/VideoAnalytics/namespace/" MajorVersion="1" MinorVersion="0"
  FixVersion="0" TypeCode="Boundary">
  <SequenceNumber>11234</SequenceNumber>
  <EventDateTime>2006-05-04T18:13:51.0Z</EventDateTime>
  <SourceURI>Camera 1</SourceURI>
  <VideoAnalytic>
    <AreaOfInterest TypeCode="Boundary" Direction="Exit" Side="Right">
      <ObjectOfInterest>
        <Count Kind="Individuals" xsi:nil="true"/>
      </ObjectOfInterest>
    </AreaOfInterest>
  </VideoAnalytic>
</VideoAnalyticsEvent>
```

Request/Response

ARTS XML Conformance XML Instance Document – Boundary Direction Request

```
<?xml version="1.0" encoding="UTF-8"?>
<VideoAnalyticsMessage xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.omg.org/retail/VideoAnalytics/namespace/
  ../VideoAnalyticsMessageOrientedV1.0.0.xsd"
  xmlns="http://www.omg.org/retail/VideoAnalytics/namespace/" MajorVersion="1" MinorVersion="0"
  FixVersion="0">
  <ARTSHeader ActionCode="Read" MessageType="Request">
    <MessageID>12345678</MessageID>
    <DateTime>2006-05-04T18:15:51.0Z</DateTime>
  </ARTSHeader>
  <VideoAnalysis>
    <AreaOfInterest TypeCode="Boundary" Direction="Exit" Side="Left" Location="Entry">
      <Camera>
        <VideoSensorID>Camera 10</VideoSensorID>
      </Camera>
      <ObjectOfInterest>
        <Count xsi:nil="true" Kind="Individuals" FindFlag="true"/>
      </ObjectOfInterest>
    </AreaOfInterest>
    <AreaOfInterest TypeCode="Boundary" Direction="Exit" Side="Middle" Location="Entry">
      <Camera>
        <VideoSensorID>Camera 10</VideoSensorID>
      </Camera>
      <ObjectOfInterest>
        <Count xsi:nil="true" Kind="Individuals" FindFlag="true"/>
      </ObjectOfInterest>
    </AreaOfInterest>
    <AreaOfInterest TypeCode="Boundary" Direction="Exit" Side="Right" Location="Entry">
      <Camera>
        <VideoSensorID>Camera 10</VideoSensorID>
      </Camera>
      <ObjectOfInterest>
        <Count xsi:nil="true" Kind="Individuals" FindFlag="true"/>
      </ObjectOfInterest>
    </AreaOfInterest>
  </VideoAnalysis>
  <TimeStamp>
    <BeginTime>2006-05-04T18:15:51.0Z </BeginTime>
    <EndTime>2006-05-04T18:30:51.0Z </EndTime>
  </TimeStamp>
</VideoAnalyticsMessage>
```

```

    </TimeStamp>
  </VideoAnalysis>
</VideoAnalyticsMessage>

```

ARTS XML Conformance XML Instance Document – Boundary Direction Response

```

<?xml version="1.0" encoding="UTF-8"?>
<VideoAnalyticsMessage xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.omg.org/retail/VideoAnalytics/namespace/
  ../VideoAnalyticsMessageOrientedV1.0.0.xsd"
  xmlns="http://www.omg.org/retail/VideoAnalytics/namespace/" MajorVersion="1" MinorVersion="0"
  FixVersion="0">
  <ARTSHeader ActionCode="Read" MessageType="Response">
    <MessageID>987654</MessageID>
    <DateTime>2006-05-04T18:15:51.0Z</DateTime>
    <Response ResponseCode="OK">
      <RequestID>12345678</RequestID>
    </Response>
  </ARTSHeader>
  <VideoAnalysis>
    <AreaOfInterest TypeCode="Boundary" Direction="Exit" Side="Left" Location="Entry">
      <Camera>
        <VideoSensorID>4</VideoSensorID>
      </Camera>
      <ObjectOfInterest>
        <Count Kind="Individuals">20</Count>
      </ObjectOfInterest>
    </AreaOfInterest>
    <AreaOfInterest TypeCode="Boundary" Direction="Exit" Side="Middle" Location="Entry">
      <Camera>
        <VideoSensorID>4</VideoSensorID>
      </Camera>
      <ObjectOfInterest>
        <Count Kind="Individuals">5</Count>
      </ObjectOfInterest>
    </AreaOfInterest>
    <AreaOfInterest TypeCode="Boundary" Direction="Exit" Side="Right" Location="Entry">
      <Camera>
        <VideoSensorID>4</VideoSensorID>
      </Camera>
      <ObjectOfInterest>
        <Count Kind="Individuals">125</Count>
      </ObjectOfInterest>
    </AreaOfInterest>
    <TimeStamp>
      <BeginTime>2006-05-04T18:15:51.0Z </BeginTime>
      <EndTime>2006-05-04T18:30:51.0Z </EndTime>
    </TimeStamp>
  </VideoAnalysis>
</VideoAnalyticsMessage>

```

3.3 Scenario: Boundary Entry Event

Brief Description

Scenario Description

Every time one shopping unit walks through the front door an event is sent.

Pre-Conditions

Post-Conditions

Data

Domain View

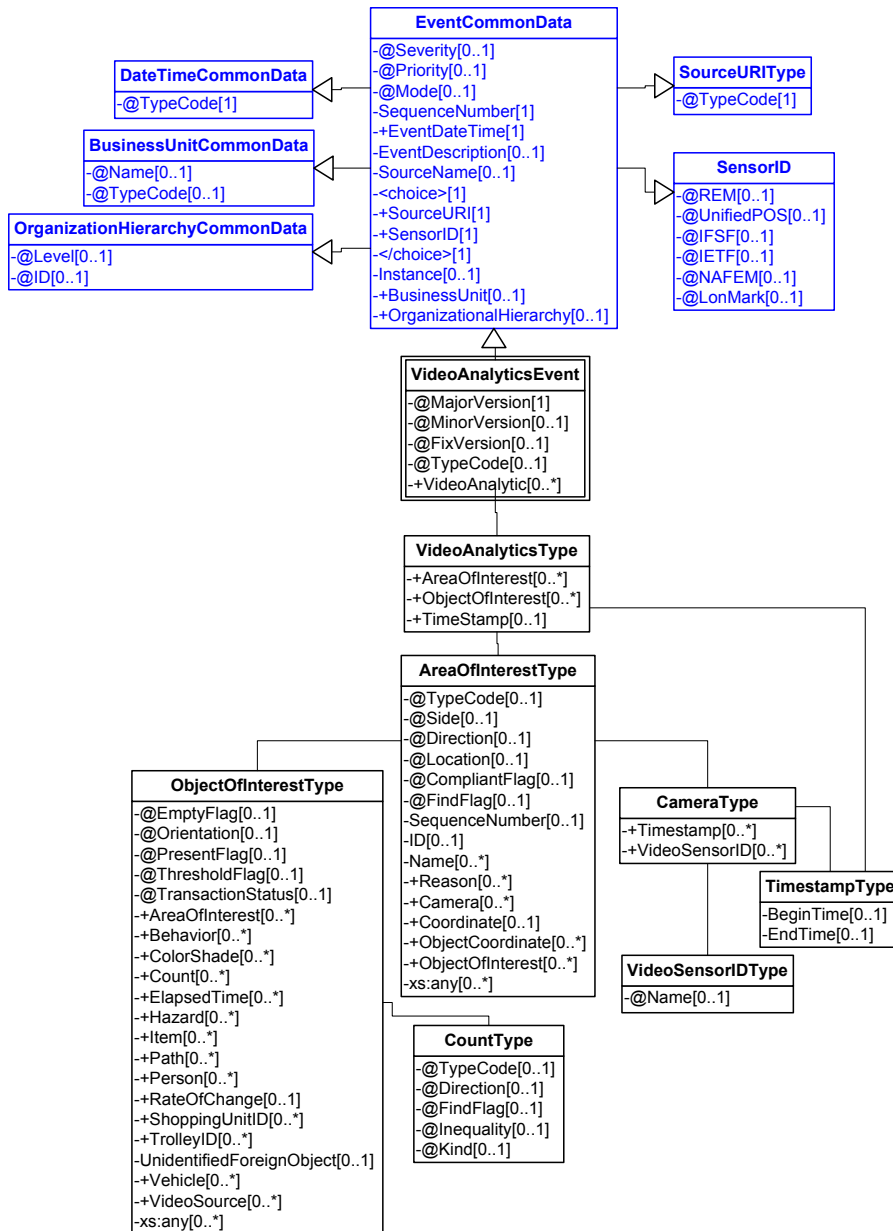


Figure 20: Boundary Entry Event Domain View

Event

ARTS XML Conformance XML Instance Document – Boundary Entry Event

```
<?xml version="1.0" encoding="UTF-8"?>
<VideoAnalyticsEvent xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.omg.org/retail/VideoAnalytics/namespace/
  ../VideoAnalyticsEventV1.0.0.xsd"
  xmlns="http://www.omg.org/retail/VideoAnalytics/namespace/" MajorVersion="1" MinorVersion="0"
  FixVersion="0" TypeCode="Boundary">
  <SequenceNumber>11234</SequenceNumber>
```

```

<EventDateTime>2006-05-04T18:13:51.0Z</EventDateTime>
<SourceURI>Camera 1</SourceURI>
<VideoAnalytic>
  <AreaOfInterest TypeCode="Boundary" Location="Entry">
    <ObjectOfInterest>
      <Count Kind="ShoppingUnits" xsi:nil="true"/>
    </ObjectOfInterest>
  </AreaOfInterest>
</VideoAnalytic>
</VideoAnalyticsEvent>

```

3.4 Scenario: Count Shopping Units

Brief Description

If counting shopping units, identify the individual characteristics (shopping unit id).

Scenario Description

A group of individuals arrived at the same time (1 shopping unit).

Pre-Conditions

Post-Conditions

Data

Domain View

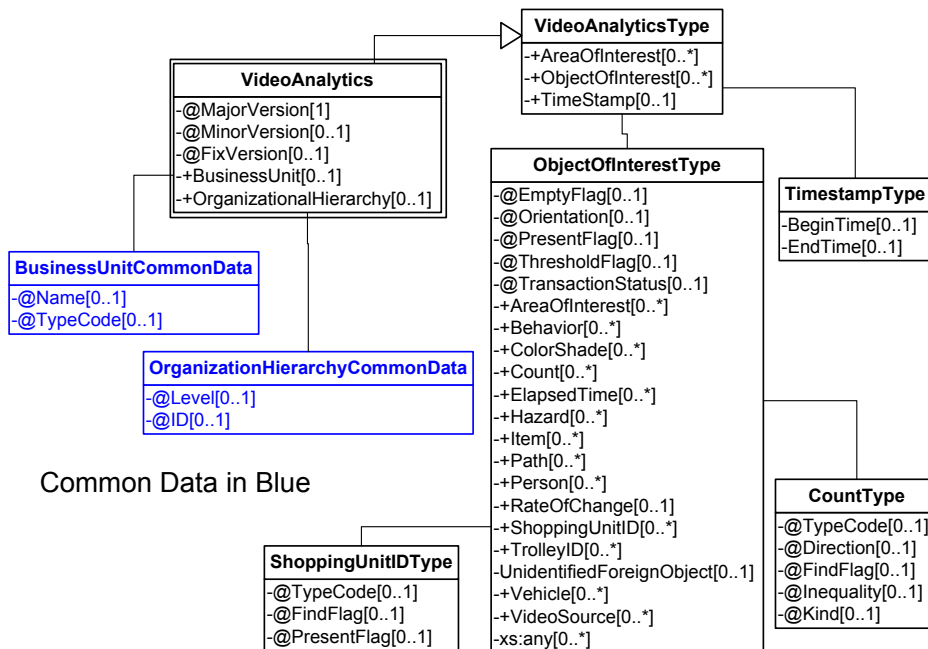


Figure 21: Count Shopping Units Request/Response Domain View

Event

ARTS XML Conformance XML Instance Document - Count Shopping Units – Event

```

<?xml version="1.0" encoding="UTF-8"?>
<VideoAnalyticsEvent xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"

```

```

    xsi:schemaLocation="http://www.omg.org/retail/VideoAnalytics/namespace/
../VideoAnalyticsEventV1.0.0.xsd"
    xmlns="http://www.omg.org/retail/VideoAnalytics/namespace/" MajorVersion="1" MinorVersion="0"
FixVersion="0" TypeCode="Boundary">
  <SequenceNumber>11234</SequenceNumber>
  <EventDateTime>2006-05-04T18:13:51.0Z</EventDateTime>
  <SourceURI>Camera 1</SourceURI>
  <VideoAnalytic>
    <AreaOfInterest TypeCode="Boundary" Location="Entry">
      <ObjectOfInterest>
        <ShoppingUnitID TypeCode="Group">1</ShoppingUnitID>
      </ObjectOfInterest>
    </AreaOfInterest>
  </VideoAnalytic>
</VideoAnalyticsEvent>

```

Request/Response

ARTS XML Conformance XML Instance Document - Count Shopping Units – Request

```

<?xml version="1.0" encoding="UTF-8"?>
<VideoAnalyticsMessage xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.omg.org/retail/VideoAnalytics/namespace/
../VideoAnalyticsMessageOrientedV1.0.0.xsd"
  xmlns="http://www.omg.org/retail/VideoAnalytics/namespace/" MajorVersion="1" MinorVersion="0"
FixVersion="0">
  <ARTSHeader ActionCode="Read" MessageType="Request">
    <MessageID>12345678</MessageID>
    <DateTime>2006-05-04T18:13:51.0Z</DateTime>
  </ARTSHeader>
  <VideoAnalysis>
    <AreaOfInterest TypeCode="Boundary" Location="Entry">
      <Camera>
        <TimeStamp>
          <BeginTime>2006-05-04T18:13:51.0Z</BeginTime>
          <EndTime>2006-05-04T18:28:51.0Z</EndTime>
        </TimeStamp>
        <VideoSensorID>Camera 1</VideoSensorID>
      </Camera>
      <ObjectOfInterest>
        <Count Kind="ShoppingUnits" xsi:nil="true" FindFlag="true"/>
      </ObjectOfInterest>
    </AreaOfInterest>
  </VideoAnalysis>
</VideoAnalyticsMessage>

```

ARTS XML Conformance XML Instance Document - Count Shopping Units – Response

```

<?xml version="1.0" encoding="UTF-8"?>
<VideoAnalyticsMessage xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.omg.org/retail/VideoAnalytics/namespace/
../VideoAnalyticsMessageOrientedV1.0.0.xsd"
  xmlns="http://www.omg.org/retail/VideoAnalytics/namespace/" MajorVersion="1" MinorVersion="0"
FixVersion="0">
  <ARTSHeader ActionCode="Read" MessageType="Response">
    <MessageID>987654</MessageID>
    <DateTime>2006-05-04T18:15:51.0Z</DateTime>
    <Response>
      <RequestID>12345678</RequestID>
    </Response>
  </ARTSHeader>
  <VideoAnalysis>
    <AreaOfInterest TypeCode="Boundary" Location="Entry">

```

```
<!-- Front Door Camera -->
<ID>Front </ID>
<Camera>
  <TimeStamp>
    <BeginTime>2006-05-04T18:13:51.0Z</BeginTime>
    <EndTime>2006-05-04T18:28:51.0Z</EndTime>
  </TimeStamp>
  <VideoSensorID>Camera 1</VideoSensorID>
</Camera>
<ObjectOfInterest>
  <Count Kind="ShoppingUnits">2</Count>
</ObjectOfInterest>
</AreaOfInterest>
</VideoAnalysis>
</VideoAnalyticsMessage>
```

3.5 Scenario: Threshold Event

Brief Description

Excessive Number of People in Store Notification. There may be regulatory reasons that stores are limited, or it may be simply for operational management purposes.

By scenario definition, the VA system is monitoring ALL entrances and exits to provide all the required information.

Scenario Description

At 12:00am when The Sorcerer's Story went on sale, large number of people begin to stream into the store, fire code regulations for this store limit the number of people allowed in the store at one time to 300 people. The VA system generates an event when it determines that the capacity limit has been exceeded.

Pre-Conditions

Event

Post-Conditions

Data

Event Type – Compliance event

Event Sub Type – Capacity Exceeded

Count

Count Type: people

Date/Time

Store identifier

Domain View

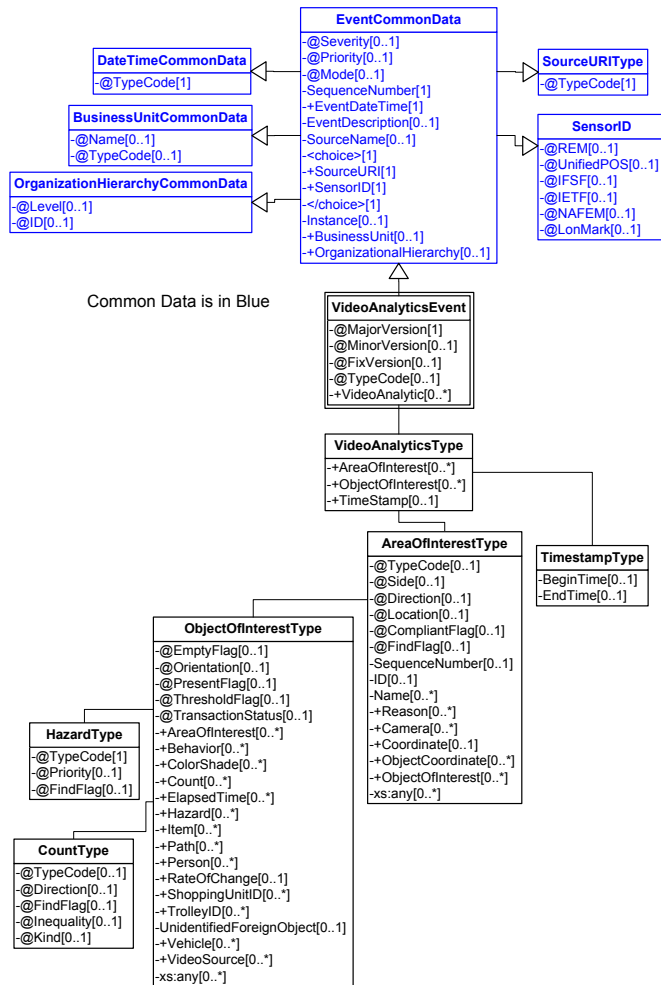


Figure 22: Threshold Event Domain View

Event

ARTS XML Conformance XML Instance Document – Threshold Event

```

<?xml version="1.0" encoding="UTF-8"?>
<VideoAnalyticsEvent xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.omg.org/retail/VideoAnalytics/namespace/
  ../VideoAnalyticsEventV1.0.0.xsd"
  xmlns="http://www.omg.org/retail/VideoAnalytics/namespace/" MajorVersion="1" MinorVersion="0"
  FixVersion="0" TypeCode="Safety">
  <SequenceNumber>11234</SequenceNumber>
  <EventDateTime>2006-05-04T00:00:00.0Z</EventDateTime>
  <SourceURI>Camera 1</SourceURI>
  <VideoAnalytic>
    <AreaOfInterest TypeCode="Boundary" Location="Entry">
      <Name>Front Door</Name>
      <ObjectOfInterest ThresholdFlag="true">
        <Count Kind="Individuals">301</Count>
        <Hazard TypeCode="ExcessiveOccupancy">Excessive People</Hazard>
      </ObjectOfInterest>
    </AreaOfInterest>
  </VideoAnalytic>
</VideoAnalyticsEvent>

```


4 Use Case: Customer Identification

Brief Description

Identify customer by either individual or Shopping Unit.

Define the shopping unit, for instance Mom & 3 children, Woman, Man, Man/Woman.

There are limits to the accuracy of current technology, specifically in identifying shopping units.

It is possible that VA systems may be able to express queue metrics in several ways:

- Individuals
- Shopping units
- Shopping carts/shopping baskets
- Physical length of the queue

4.1 Scenario: Shopping Units in Queue

Brief Description

The VA system is queried to determine the metrics of a specifically identified queue at the current time.

Scenario Description

At register one, at 10:15pm 5 families are waiting in line.

Pre-Conditions

Query

Post-Conditions

Data

Request

Fully qualified Area of Interest identifier

Date/Time

Response

Count

Count type - List of shopping units: some form of GUID assigned to each shopping unit identified by the VA system

Date/Time

Fully qualified Area of Interest identifier

Domain View

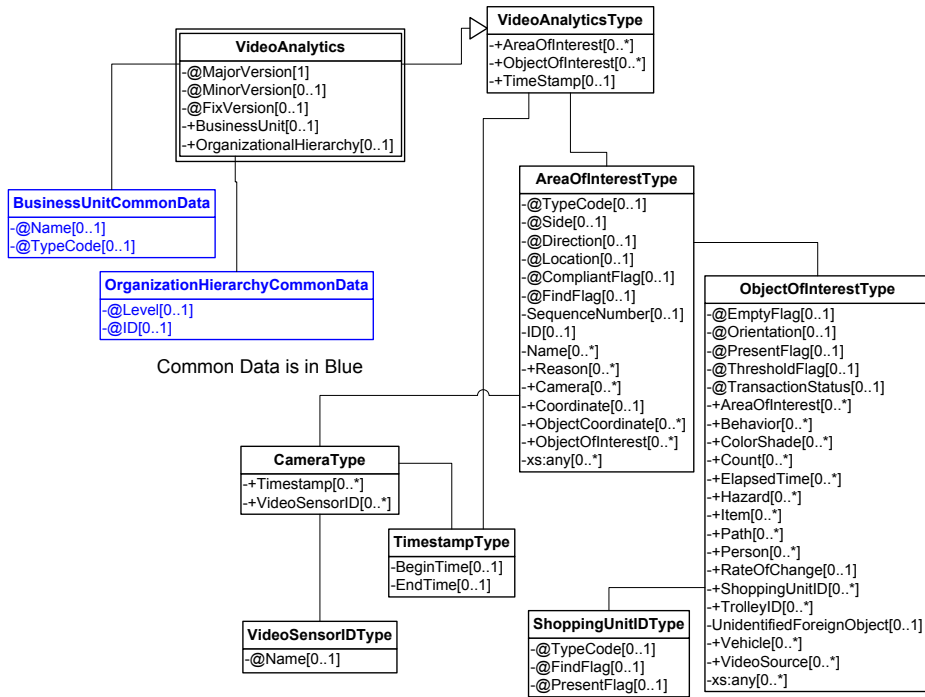


Figure 23: Shopping Units in Queue Request/Response Domain View

Event

ARTS XML Conformance XML Instance Document – Shopping Units in Queue Event

```

<?xml version="1.0" encoding="UTF-8"?>
<VideoAnalyticsEvent xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.omg.org/retail/VideoAnalytics/namespace/
  ../VideoAnalyticsEventV1.0.0.xsd"
  xmlns="http://www.omg.org/retail/VideoAnalytics/namespace/" MajorVersion="1" MinorVersion="0"
  FixVersion="0" TypeCode="Security">
  <SequenceNumber>11234</SequenceNumber>
  <EventDateTime>2006-05-04T18:13:51.0Z</EventDateTime>
  <SourceURI>Camera 1</SourceURI>
  <VideoAnalytic>
    <AreaOfInterest TypeCode="Workstation">
      <!-- ID for the area around Register 1 -->
      <ID>1</ID>
      <ObjectOfInterest>
        <Count Kind="ShoppingUnits">5</Count>
      </ObjectOfInterest>
    </AreaOfInterest>
    <TimeStamp>
      <BeginTime>2006-05-04T18:15:51.0Z </BeginTime>
    </TimeStamp>
  </VideoAnalytic>
</VideoAnalyticsEvent>

```

Request/Response

ARTS XML Conformance XML Instance Document – Shopping Units in Queue Request

```

<?xml version="1.0" encoding="UTF-8"?>
<VideoAnalyticsMessage xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.omg.org/retail/VideoAnalytics/namespace/
  ../VideoAnalyticsMessageOrientedV1.0.0.xsd"

```

```

    xmlns="http://www.omg.org/retail/VideoAnalytics/namespace/" MajorVersion="1" MinorVersion="0"
FixVersion="0">
  <ARTSHeader ActionCode="Read" MessageType="Request">
    <MessageID>12345678</MessageID>
    <DateTime>2006-05-04T18:13:51.0Z</DateTime>
  </ARTSHeader>
  <VideoAnalysis>
    <AreaOfInterest TypeCode="Queue">
      <!-- ID for the area around Register 1 -->
      <ID>1</ID>
      <ObjectOfInterest>
        <Count xsi:nil="true" Kind="ShoppingUnits" FindFlag="true"/>
      </ObjectOfInterest>
    </AreaOfInterest>
    <TimeStamp>
      <BeginTime>2006-05-04T10:15:00.0Z </BeginTime>
    </TimeStamp>
  </VideoAnalysis>
</VideoAnalyticsMessage>

```

ARTS XML Conformance XML Instance Document – Shopping Units in Queue Response

```

<?xml version="1.0" encoding="UTF-8"?>
<VideoAnalyticsMessage xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.omg.org/retail/VideoAnalytics/namespace/
  ../VideoAnalyticsMessageOrientedV1.0.0.xsd"
  xmlns="http://www.omg.org/retail/VideoAnalytics/namespace/" MajorVersion="1" MinorVersion="0"
FixVersion="0">
  <ARTSHeader ActionCode="Read" MessageType="Response">
    <MessageID>987654</MessageID>
    <DateTime>2006-05-04T18:15:51.0Z</DateTime>
    <Response ResponseCode="OK">
      <RequestID>12345678</RequestID>
    </Response>
  </ARTSHeader>
  <VideoAnalysis>
    <AreaOfInterest TypeCode="Workstation">
      <!-- ID for the area around Register 1 -->
      <ID>1</ID>
      <ObjectOfInterest>
        <Count Kind="ShoppingUnits">5</Count>
      </ObjectOfInterest>
    </AreaOfInterest>
    <TimeStamp>
      <BeginTime>2006-05-04T18:15:51.0Z </BeginTime>
    </TimeStamp>
  </VideoAnalysis>
</VideoAnalyticsMessage>

```

4.2 Scenario: Request Queue Length for All Registers

Brief Description

Scenario Description

Ask for the queue lengths in all registers in my store (could be selected 1,3,4 or range of registers 1 thru 5) for 10:15am.

Pre-Conditions

For this scenario there are 2 registers in the store.

NOTE: For all registers or register 1,3,5 type requests require separate messages.

Post-Conditions

Data (Batch Upload)

Domain View

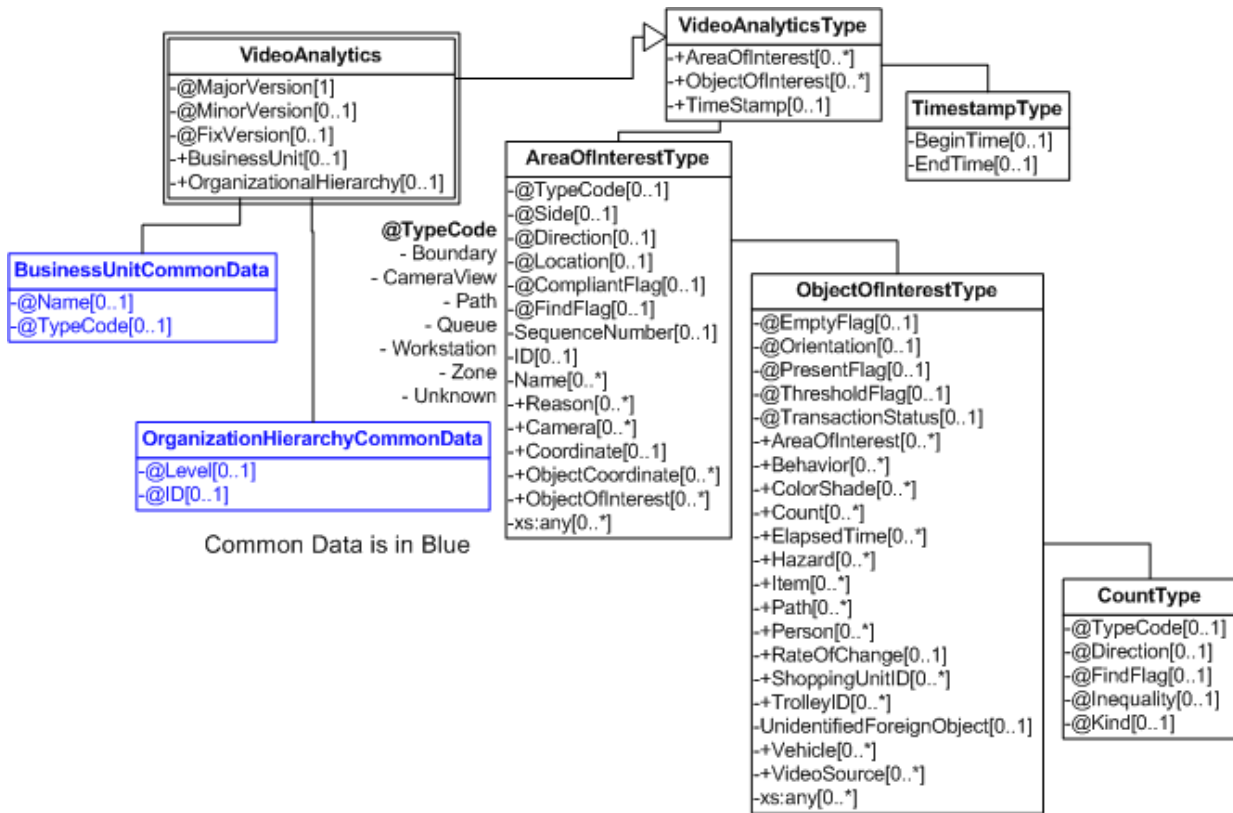


Figure 24: Request Queue Length For All Registers Request/Response Domain View

Request/Response

ARTS XML Conformance XML Instance Document – Request Queue Length for All Registers in Store – Request

```
<?xml version="1.0" encoding="UTF-8"?>
<VideoAnalyticsMessage xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.omg.org/retail/VideoAnalytics/namespace/
  ../VideoAnalyticsMessageOrientedV1.0.0.xsd"
  xmlns="http://www.omg.org/retail/VideoAnalytics/namespace/" MajorVersion="1" MinorVersion="0"
  FixVersion="0">
  <ARTSHeader ActionCode="Read" MessageType="Request">
    <MessageID>12345678</MessageID>
    <DateTime>2006-05-04T18:13:51.0Z</DateTime>
  </ARTSHeader>
  <VideoAnalysis>
    <AreaOfInterest TypeCode="Queue">
      <!-- Queue for Register 1 -->
      <ID>1</ID>
      <ObjectOfInterest>
        <Count xsi:nil="true" Kind="ShoppingUnits" FindFlag="true"/>
      </ObjectOfInterest>
    </AreaOfInterest>
    <AreaOfInterest TypeCode="Queue">
      <!-- Queue for Register 2 -->
      <ID>2</ID>
      <ObjectOfInterest>
        <Count xsi:nil="true" Kind="ShoppingUnits" FindFlag="true"/>
      </ObjectOfInterest>
    </AreaOfInterest>
    <TimeStamp>
      <BeginTime>2006-05-04T18:13:51.0Z </BeginTime>
    </TimeStamp>
  </VideoAnalysis>
</VideoAnalyticsMessage>
```

ARTS XML Conformance XML Instance Document – Request Queue Length for All Registers in Store – Response

```
<?xml version="1.0" encoding="UTF-8"?>
<VideoAnalyticsMessage xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.omg.org/retail/VideoAnalytics/namespace/
  ../VideoAnalyticsMessageOrientedV1.0.0.xsd"
  xmlns="http://www.omg.org/retail/VideoAnalytics/namespace/" MajorVersion="1" MinorVersion="0"
  FixVersion="0">
  <ARTSHeader ActionCode="Read" MessageType="Response">
    <MessageID>987654</MessageID>
    <DateTime>2006-05-04T18:15:51.0Z</DateTime>
    <Response ResponseCode="OK">
      <RequestID>12345678</RequestID>
    </Response>
  </ARTSHeader>
  <VideoAnalysis>
    <AreaOfInterest TypeCode="Queue">
      <!-- Queue at Register 1 -->
      <ID>1</ID>
      <ObjectOfInterest>
        <Count Kind="ShoppingUnits">3</Count>
      </ObjectOfInterest>
    </AreaOfInterest>
    <AreaOfInterest TypeCode="Queue">
      <!-- Queue at Register 2 -->
      <ID>2</ID>
      <ObjectOfInterest>
        <Count Kind="ShoppingUnits">5</Count>
      </ObjectOfInterest>
    </AreaOfInterest>
  </VideoAnalysis>
</VideoAnalyticsMessage>
```

```

    </ObjectOfInterest>
  </AreaOfInterest>
  <TimeStamp>
    <BeginTime>2006-05-04T18:15:51.0Z </BeginTime>
  </TimeStamp>
</VideoAnalysis>
</VideoAnalyticsMessage>

```

4.3 Scenario: Queue Length

Brief Description

Line of customers waiting outside to catch a cab. (Security event)

Scenario Description

Pre-Conditions

Post-Conditions

Data

Domain View

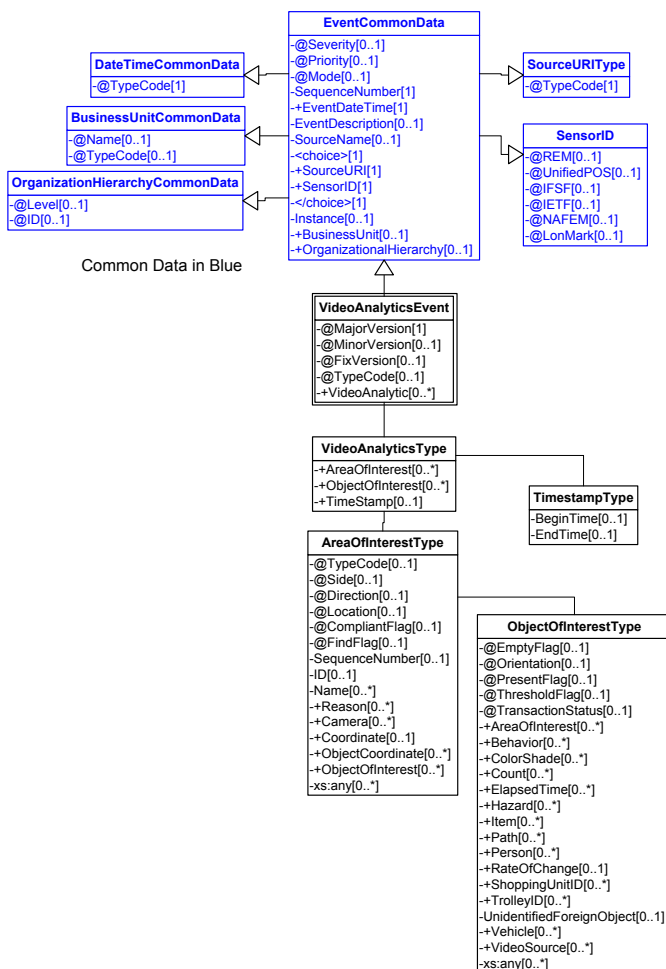


Figure 25: Queue Length Event Domain View

Event

ARTS XML Conformance XML Instance Document – Queue Length Event

```
<?xml version="1.0" encoding="UTF-8"?>
<VideoAnalyticsEvent xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.omg.org/retail/VideoAnalytics/namespace/
  ../VideoAnalyticsEventV1.0.0.xsd"
  xmlns="http://www.omg.org/retail/VideoAnalytics/namespace/" MajorVersion="1" MinorVersion="0"
  FixVersion="0" TypeCode="Security">
  <SequenceNumber>11234</SequenceNumber>
  <EventDateTime>2006-05-04T18:13:51.0Z</EventDateTime>
  <SourceURI>Camera 1</SourceURI>
  <VideoAnalytic>
    <AreaOfInterest TypeCode="Zone" Location="Entry">
      <ObjectOfInterest ThresholdFlag="true">
        <Count Kind="Individuals">10</Count>
        <Hazard TypeCode="PathObstruction">Excessive Cab Line</Hazard>
      </ObjectOfInterest>
    </AreaOfInterest>
  </VideoAnalytic>
</VideoAnalyticsEvent>
```

4.4 Scenario: Queue Wait Time

Brief Description

How many shopping units have waited over 5 minutes in a line?

At a point in time the VA system is queried to determine how many shopping units have waited more than X minutes in one or more queues.

This would generally be used to assign more staff to improve customer service.

Scenario Description

3 families have been waiting for over 5 minutes at the customer service counter.

Pre-Conditions

Query

Post-Conditions

Data

Request

FQQID: (Fully Qualified Queue Identifier): possible to use more than one FQQID, or partially qualified so one can select a group of queues.

X: number of time units (seconds, minutes, tbd) that is the threshold for the query.

Details flag: instructs VA system whether or not to return the GUIDs of the shopping units.

Time threshold (over 5 minutes)

Response

FQQID (more than one possible returned value. The subsequent data is returned for each queue.)

Count

Count type

List of shopping units: some form of GUID assigned to each shopping unit identified by the VA system. Not present unless details requested.

Date/Time

Domain View

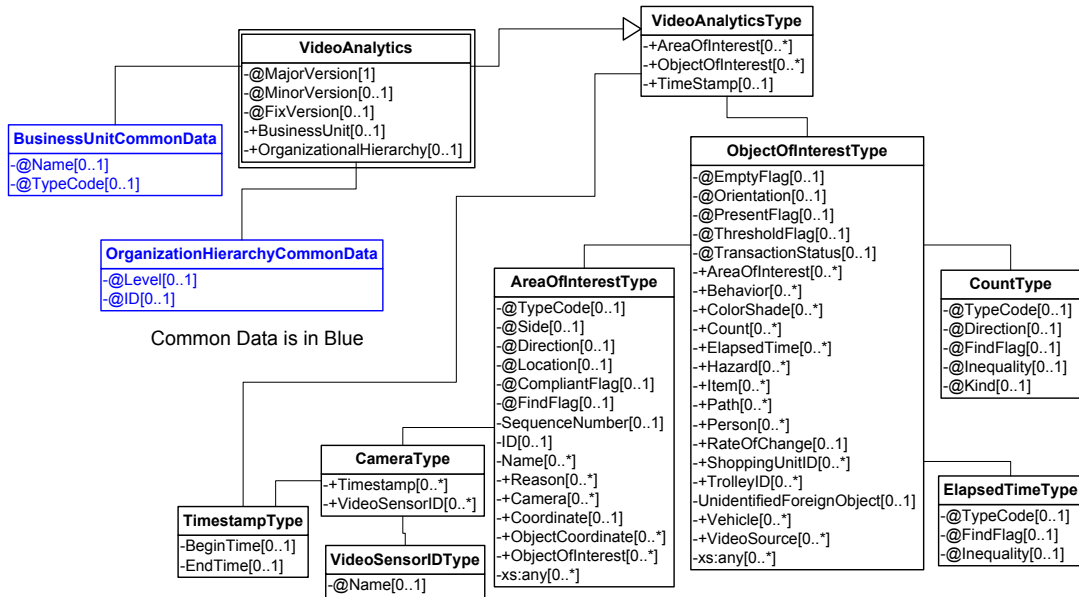


Figure 26: Excessive Queue Wait Time Request/Response Domain View

Event

```

<?xml version="1.0" encoding="UTF-8"?>
<VideoAnalyticsEvent xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.omg.org/retail/VideoAnalytics/namespace/
  ../VideoAnalyticsEventV1.0.0.xsd"
  xmlns="http://www.omg.org/retail/VideoAnalytics/namespace/" MajorVersion="1" MinorVersion="0"
  FixVersion="0" TypeCode="Safety">
  <SequenceNumber>11234</SequenceNumber>
  <EventDateTime>2006-05-04T00:00:00.0Z</EventDateTime>
  <SourceURI>Camera 1</SourceURI>
  <VideoAnalytic>
    <ObjectOfInterest ThresholdFlag="true">
      <AreaOfInterest TypeCode="Queue">
        <Camera>
          <TimeStamp>
            <BeginTime>2006-05-04T18:13:51.0Z</BeginTime>
          </TimeStamp>
          <VideoSensorID>Customer Service Camera</VideoSensorID>
        </Camera>
      </AreaOfInterest>
      <Count Kind="ShoppingUnits">5</Count>
      <ElapsedTime Inequality="GreaterThan">05:00:00.000</ElapsedTime>
    </ObjectOfInterest>
  </VideoAnalytic>
</VideoAnalyticsEvent>
  
```


Request/Response

ARTS XML Conformance XML Instance Document – Excessive Queue Wait Time Request

```
<?xml version="1.0" encoding="UTF-8"?>
<VideoAnalyticsMessage xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.omg.org/retail/VideoAnalytics/namespace/
  ../VideoAnalyticsMessageOrientedV1.0.0.xsd"
  xmlns="http://www.omg.org/retail/VideoAnalytics/namespace/" MajorVersion="1" MinorVersion="0"
  FixVersion="0">
  <ARTSHeader ActionCode="Read" MessageType="Request">
    <MessageID>12345678</MessageID>
    <DateTime>2006-05-04T18:13:51.0Z</DateTime>
  </ARTSHeader>
  <VideoAnalysis>
    <ObjectOfInterest ThresholdFlag="true">
      <AreaOfInterest TypeCode="Queue">
        <Camera>
          <TimeStamp>
            <BeginTime>2006-05-04T18:13:51.0Z</BeginTime>
          </TimeStamp>
          <VideoSensorID>Customer Service Camera</VideoSensorID>
        </Camera>
      </AreaOfInterest>
      <Count xsi:nil="true" Kind="ShoppingUnits" FindFlag="true"/>
      <ElapsedTime Inequality="GreaterThan">05:00:00.000</ElapsedTime>
    </ObjectOfInterest>
  </VideoAnalysis>
</VideoAnalyticsMessage>
```

ARTS XML Conformance XML Instance Document –Queue Wait Time Response

```
<?xml version="1.0" encoding="UTF-8"?>
<VideoAnalyticsMessage xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.omg.org/retail/VideoAnalytics/namespace/
  ../VideoAnalyticsMessageOrientedV1.0.0.xsd"
  xmlns="http://www.omg.org/retail/VideoAnalytics/namespace/" MajorVersion="1" MinorVersion="0"
  FixVersion="0">
  <ARTSHeader ActionCode="Read" MessageType="Response">
    <MessageID>987654</MessageID>
    <DateTime>2006-05-04T18:15:51.0Z</DateTime>
    <Response ResponseCode="OK">
      <RequestID>12345678</RequestID>
    </Response>
  </ARTSHeader>
  <VideoAnalysis>
    <ObjectOfInterest ThresholdFlag="true">
      <AreaOfInterest TypeCode="Queue">
        <Camera>
          <TimeStamp>
            <BeginTime>2006-05-04T18:13:51.0Z</BeginTime>
          </TimeStamp>
          <VideoSensorID>Customer Service Camera</VideoSensorID>
        </Camera>
      </AreaOfInterest>
      <Count Kind="ShoppingUnits">5</Count>
      <ElapsedTime Inequality="GreaterThan">05:00:00.000</ElapsedTime>
    </ObjectOfInterest>
  </VideoAnalysis>
</VideoAnalyticsMessage>
```

4.5 Scenario: Report the Average Queue Wait Time

Brief Description

Scenario Description

At 12:00 the system reports that over the last 15 minutes the average queue wait time was 3.15 minutes.

Pre-Conditions

Post-Conditions

Data

Domain View

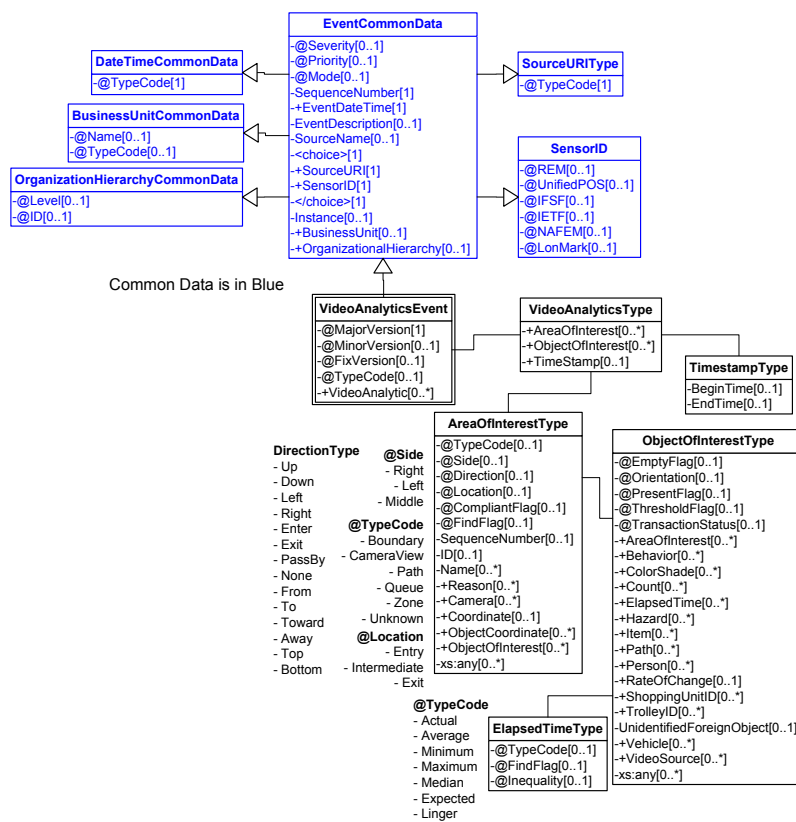


Figure 27: Report the Average Queue Wait Time Event Domain View

Request/Response

ARTS XML Conformance XML Instance Document – Report the Average Queue Wait Time Request

```

<?xml version="1.0" encoding="UTF-8"?>
<VideoAnalyticsMessage xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.omg.org/retail/VideoAnalytics/namespace/
  ../VideoAnalyticsMessageOrientedV1.0.0.xsd"
  xmlns="http://www.omg.org/retail/VideoAnalytics/namespace/" MajorVersion="1" MinorVersion="0"
  FixVersion="0">
  <ARTSHeader ActionCode="Read" MessageType="Request">
    <MessageID>12345678</MessageID>
    <!-- Date/time of the request message -->
    <DateTime>2006-05-04T18:15:51.0Z</DateTime>
  </ARTSHeader>
</VideoAnalysis>

```

```

<AreaOfInterest TypeCode="Queue">
  <Camera>
    <TimeStamp>
      <!-- time interval for the data -->
      <BeginTime>2006-05-04T18:13:51.0Z</BeginTime>
      <EndTime>2006-05-04T18:28:51.0Z</EndTime>
    </TimeStamp>
    <VideoSensorID>Customer Service Camera</VideoSensorID>
  </Camera>
  <ObjectOfInterest>
    <!-- find the average queue time over the time interval -->
    <ElapsedTime TypeCode="Average" FindFlag="true" xsi:nil="true"/>
  </ObjectOfInterest>
</AreaOfInterest>
</VideoAnalysis>
</VideoAnalyticsMessage>

```

ARTS XML Conformance XML Instance Document – Report the Average Queue Wait Time Response

```

<?xml version="1.0" encoding="UTF-8"?>
<VideoAnalyticsMessage xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.omg.org/retail/VideoAnalytics/namespace/
  ../VideoAnalyticsMessageOrientedV1.0.0.xsd"
  xmlns="http://www.omg.org/retail/VideoAnalytics/namespace/" MajorVersion="1" MinorVersion="0"
  FixVersion="0">
  <ARTSHeader ActionCode="Read" MessageType="Response">
    <MessageID>987654</MessageID>
    <DateTime>2006-05-04T18:15:51.0Z</DateTime>
    <Response ResponseCode="OK">
      <RequestID>12345678</RequestID>
    </Response>
  </ARTSHeader>
  <VideoAnalysis>
    <AreaOfInterest TypeCode="Queue">
      <Camera>
        <TimeStamp>
          <BeginTime>2006-05-04T18:13:51.0Z</BeginTime>
        </TimeStamp>
        <VideoSensorID>Customer Service Camera</VideoSensorID>
      </Camera>
      <ObjectOfInterest>
        <ElapsedTime TypeCode="Average">00:03:15.000</ElapsedTime>
      </ObjectOfInterest>
    </AreaOfInterest>
  </VideoAnalysis>
</VideoAnalyticsMessage>

```

4.6 Scenario: Over all the front of store registers, query the average queue wait time over the last 12 hours

Brief Description

The store manager wants to evaluate the effectiveness of store operations and queries the VA database for the average wait time from 12:00pm to 12:00am.

Scenario Description

Pre-Conditions

Post-Conditions

Data

Domain View

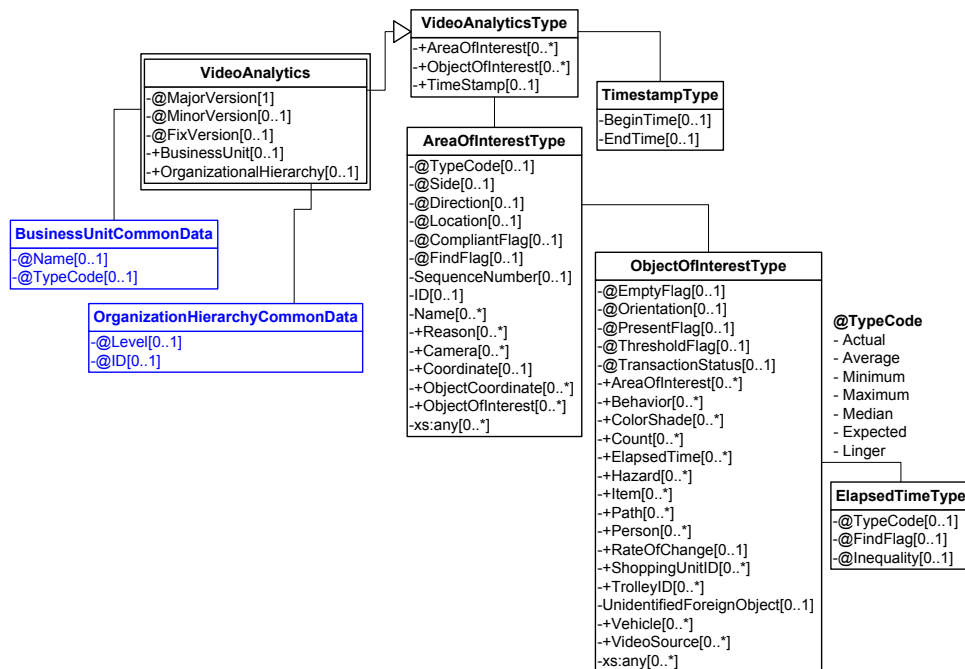


Figure 28: Average Wait Time Query Request/Response Domain View

Request/Response

ARTS XML Conformance XML Instance Document – Average Wait Time Query – Request

```
<?xml version="1.0" encoding="UTF-8"?>
<VideoAnalyticsMessage xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.omg.org/retail/VideoAnalytics/namespace/
  ../VideoAnalyticsMessageOrientedV1.0.0.xsd"
  xmlns="http://www.omg.org/retail/VideoAnalytics/namespace/" MajorVersion="1" MinorVersion="0"
  FixVersion="0">
  <ARTSHeader ActionCode="Read" MessageType="Request">
    <MessageID>12345678</MessageID>
    <DateTime>2006-05-04T18:13:51.0Z</DateTime>
  </ARTSHeader>
  <VideoAnalysis>
    <AreaOfInterest TypeCode="Queue">
      <ObjectOfInterest>
        <ElapsedTime TypeCode="Average" xsi:nil="true" FindFlag="true"/>
      </ObjectOfInterest>
    </AreaOfInterest>
  </VideoAnalysis>
</VideoAnalyticsMessage>
```

```

    </AreaOfInterest>
    <TimeStamp>
      <BeginTime>2006-05-04T00:00:00.0Z </BeginTime>
      <EndTime>2006-05-04T12:00:00.0Z </EndTime>
    </TimeStamp>
  </VideoAnalysis>
</VideoAnalyticsMessage>

```

ARTS XML Conformance XML Instance Document – Average Wait Time Query – Response

```

<?xml version="1.0" encoding="UTF-8"?>
<VideoAnalyticsMessage xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.omg.org/retail/VideoAnalytics/namespace/
  ../VideoAnalyticsMessageOrientedV1.0.0.xsd"
  xmlns="http://www.omg.org/retail/VideoAnalytics/namespace/" MajorVersion="1" MinorVersion="0"
  FixVersion="0">
  <ARTSHeader ActionCode="Read" MessageType="Response">
    <MessageID>987654</MessageID>
    <DateTime>2006-05-04T18:15:51.0Z</DateTime>
    <Response ResponseCode="OK">
      <RequestID>12345678</RequestID>
    </Response>
  </ARTSHeader>
  <VideoAnalysis>
    <AreaOfInterest TypeCode="Queue">
      <ObjectOfInterest>
        <ElapsedTime TypeCode="Average">00:03:00.000</ElapsedTime>
      </ObjectOfInterest>
    </AreaOfInterest>
    <TimeStamp>
      <BeginTime>2006-05-04T00:00:00.0Z </BeginTime>
      <EndTime>2006-05-04T12:00:00.0Z </EndTime>
    </TimeStamp>
  </VideoAnalysis>
</VideoAnalyticsMessage>

```

4.7 Scenario: Average Queue Length

Brief Description

The labor scheduling system in trying to determine manpower needs queried the VA database for the average queue length in the period from 12:00pm to 12:00am.

Scenario Description

Pre-Conditions

Post-Conditions

Data

This is average queue length.

Domain View

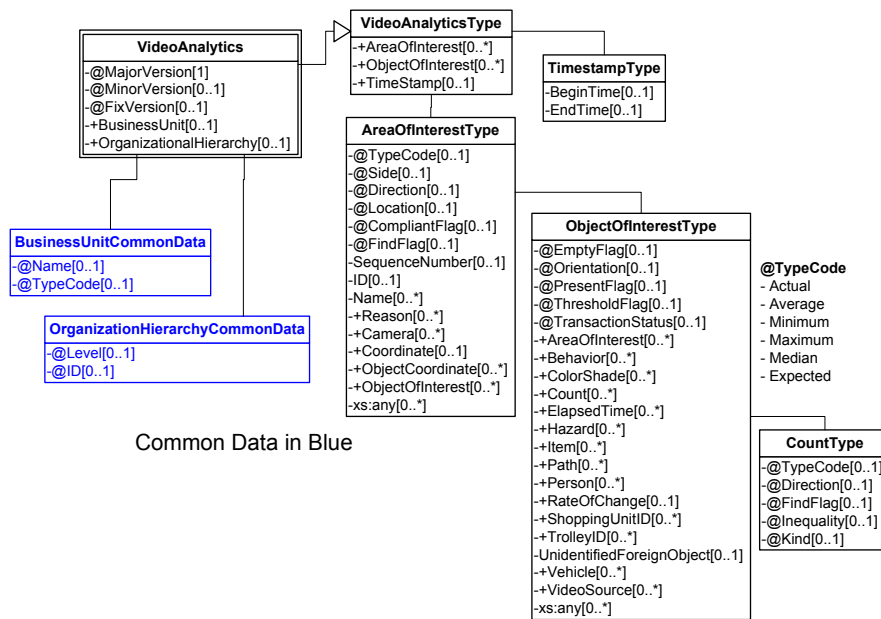


Figure 29: Average Queue Length Request/Response Domain View

Request/Response

ARTS XML Conformance XML Instance Document - Average Queue Length – Request

```

<?xml version="1.0" encoding="UTF-8"?>
<VideoAnalyticsMessage xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.omg.org/retail/VideoAnalytics/namespace/
  ../VideoAnalyticsMessageOrientedV1.0.0.xsd"
  xmlns="http://www.omg.org/retail/VideoAnalytics/namespace/" MajorVersion="1" MinorVersion="0"
  FixVersion="0">
  <ARTSHeader ActionCode="Read" MessageType="Request">
    <MessageID>12345678</MessageID>
    <DateTime>2006-05-04T18:13:51.0Z</DateTime>
  </ARTSHeader>
  <VideoAnalysis>
    <AreaOfInterest TypeCode="Queue">
      <ObjectOfInterest>
        <Count TypeCode="Average" Kind="ShoppingUnits" xsi:nil="true" FindFlag="true"/>
      </ObjectOfInterest>
    </AreaOfInterest>
    <TimeStamp>
      <BeginTime>2006-05-04T00:00:00.0Z </BeginTime>
      <EndTime>2006-05-04T12:00:00.0Z </EndTime>
    </TimeStamp>
  </VideoAnalysis>
</VideoAnalyticsMessage>

```

ARTS XML Conformance XML Instance Document - Average Queue Length – Response

```

<?xml version="1.0" encoding="UTF-8"?>
<VideoAnalyticsMessage xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.omg.org/retail/VideoAnalytics/namespace/
  ../VideoAnalyticsMessageOrientedV1.0.0.xsd"
  xmlns="http://www.omg.org/retail/VideoAnalytics/namespace/" MajorVersion="1" MinorVersion="0"
  FixVersion="0">
  <ARTSHeader ActionCode="Read" MessageType="Response">
    <MessageID>987654</MessageID>
    <DateTime>2006-05-04T18:15:51.0Z</DateTime>
  </ARTSHeader>

```

```
<Response ResponseCode="OK">
  <RequestID>12345678</RequestID>
</Response>
</ARTSHeader>
<VideoAnalysis>
  <AreaOfInterest TypeCode="Queue">
    <ObjectOfInterest>
      <Count TypeCode="Average" Kind="ShoppingUnits">4</Count>
    </ObjectOfInterest>
  </AreaOfInterest>
  <TimeStamp>
    <BeginTime>2006-05-04T00:00:00.0Z </BeginTime>
    <EndTime>2006-05-04T12:00:00.0Z </EndTime>
  </TimeStamp>
</VideoAnalysis>
</VideoAnalyticsMessage>
```

4.8 Scenario: When checkout lines exceed a specified length, additional checkouts need to be opened

Brief Description

Scenario Description

At 10:15am checkout lines at all open registers exceeded a pre-specified length and an alert was communicated to the store manager.

Pre-Conditions

Post-Conditions

Data

Count of people in line

Threshold count

Domain View

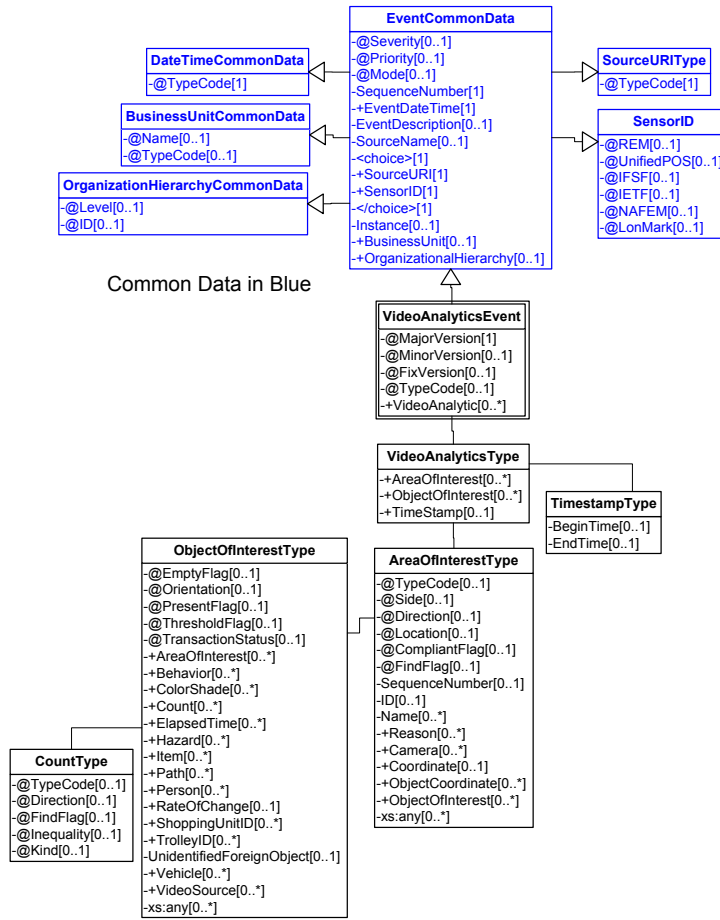


Figure 30: Checkout Lines Exceed a Specified Length Event Domain View

Event

ARTS XML Conformance XML Instance Document – Checkout Lines Exceed a Specified Length Event

```

<?xml version="1.0" encoding="UTF-8"?>
<VideoAnalyticsEvent xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.omg.org/retail/VideoAnalytics/namespace/
  ../VideoAnalyticsEventV1.0.0.xsd"
  xmlns="http://www.omg.org/retail/VideoAnalytics/namespace/" MajorVersion="1" MinorVersion="0"
  FixVersion="0" TypeCode="Staffing">
  <SequenceNumber>11234</SequenceNumber>
  <EventDateTime>2006-05-04T10:15:00.0Z</EventDateTime>
  <SourceURI>Camera 1</SourceURI>
  <VideoAnalytic>
    <AreaOfInterest TypeCode="Queue">
      <ObjectOfInterest ThresholdFlag="true">
        <Count Inequality="GreaterThan" Kind="ShoppingUnits">10</Count>
      </ObjectOfInterest>
    </AreaOfInterest>
  </VideoAnalytic>
</VideoAnalyticsEvent>
  
```


5 Use Case: LP – Safety

5.1 Scenario: Water on the floor...safety problem

Brief Description

Scenario Description

A customer spilled her soft drink on aisle 5.

Pre-Conditions

Post-Conditions

Data

Object of interest (Hazard type) contains area of interest

In query – request Object of Interest (Spill) and response returns area of interest.

Domain View

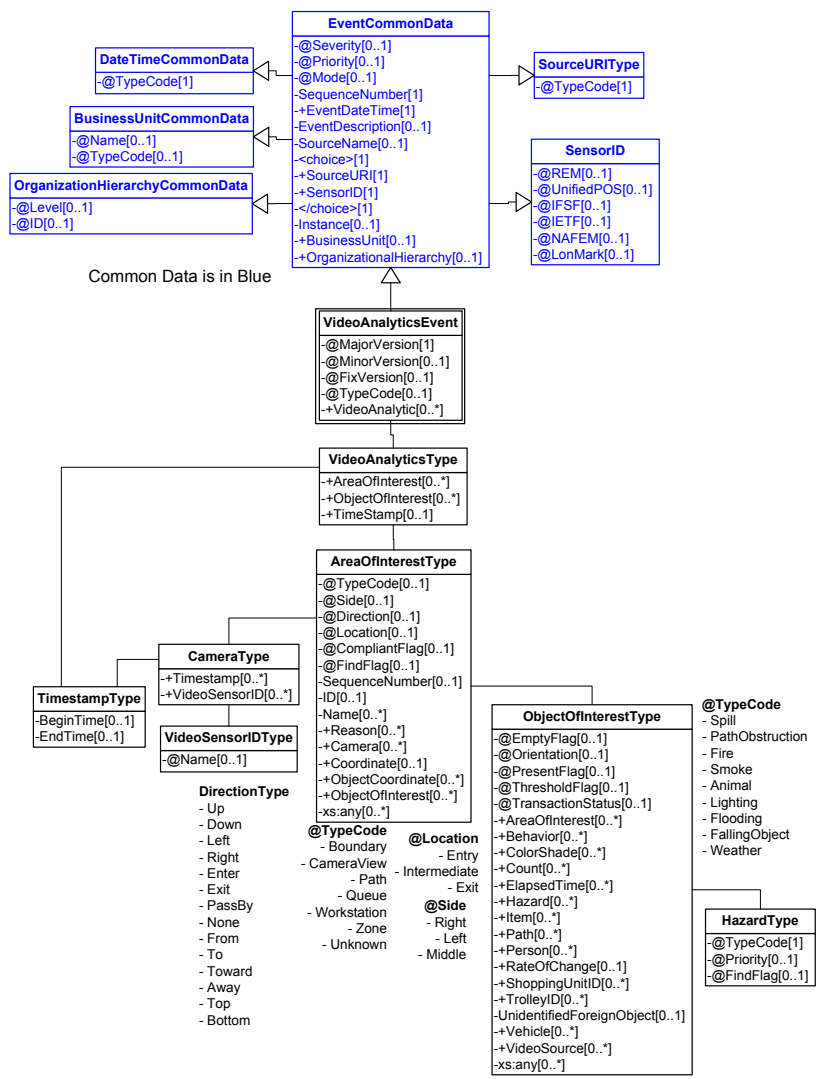


Figure 31: Water Spill - Safety Problem Event Domain View

Event

ARTS XML Conformance XML Instance Document – Water Spill - Safety Problem Event

```
<?xml version="1.0" encoding="UTF-8"?>
<VideoAnalyticsEvent xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.omg.org/retail/VideoAnalytics/namespace/
  ../VideoAnalyticsEventV1.0.0.xsd"
  xmlns="http://www.omg.org/retail/VideoAnalytics/namespace/" MajorVersion="1" MinorVersion="0"
  FixVersion="0" TypeCode="Safety">
  <SequenceNumber>11234</SequenceNumber>
  <EventDateTime>2006-05-04T18:13:51.0Z</EventDateTime>
  <SourceURI>Camera 1</SourceURI>
  <VideoAnalytic>
    <AreaOfInterest TypeCode="Zone">
      <!-- Aisle 1 -->
      <ID>1</ID>
      <ObjectOfInterest>
        <Hazard TypeCode="Spill">Spill in Aisle 1</Hazard>
      </ObjectOfInterest>
    </AreaOfInterest>
  </VideoAnalytic>
</VideoAnalyticsEvent>
```

Request/Response

ARTS XML Conformance XML Instance Document – Water Spill - Safety Problem - Request

```
<?xml version="1.0" encoding="UTF-8"?>
<VideoAnalyticsMessage xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.omg.org/retail/VideoAnalytics/namespace/
  ../VideoAnalyticsMessageOrientedV1.0.0.xsd"
  xmlns="http://www.omg.org/retail/VideoAnalytics/namespace/" MajorVersion="1" MinorVersion="0"
  FixVersion="0">
  <ARTSHeader ActionCode="Read" MessageType="Request">
    <MessageID>12345678</MessageID>
    <DateTime>2006-05-04T18:13:51.0Z</DateTime>
  </ARTSHeader>
  <VideoAnalysis>
    <ObjectOfInterest>
      <Hazard TypeCode="Spill" FindFlag="true"/>
    </ObjectOfInterest>
  </VideoAnalysis>
</VideoAnalyticsMessage>
```

ARTS XML Conformance XML Instance Document – Water Spill - Safety Problem – Response

```
<?xml version="1.0" encoding="UTF-8"?>
<VideoAnalyticsMessage xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.omg.org/retail/VideoAnalytics/namespace/
  ../VideoAnalyticsMessageOrientedV1.0.0.xsd"
  xmlns="http://www.omg.org/retail/VideoAnalytics/namespace/" MajorVersion="1" MinorVersion="0"
  FixVersion="0">
  <ARTSHeader ActionCode="Read" MessageType="Response">
    <MessageID>987654</MessageID>
    <DateTime>2006-05-04T18:15:51.0Z</DateTime>
    <Response ResponseCode="OK">
      <RequestID>12345678</RequestID>
    </Response>
  </ARTSHeader>
  <VideoAnalysis>
    <AreaOfInterest TypeCode="Zone">
      <!-- Aisle 1 -->
    </AreaOfInterest>
  </VideoAnalysis>
</VideoAnalyticsMessage>
```

```
<ID>1</ID>
<Camera>
  <TimeStamp>
    <!-- When the video shows a spill occurred -->
    <BeginTime>2006-04-04T18:15:51.0Z </BeginTime>
  </TimeStamp>
  <VideoSensorID>400</VideoSensorID>
</Camera>
<ObjectOfInterest>
  <Hazard TypeCode="Spill">Spill</Hazard>
</ObjectOfInterest>
</AreaOfInterest>
</VideoAnalysis>
</VideoAnalyticsMessage>
```

5.2 Scenario: Slip and Fall Event

Brief Description

Scenario Description

Guest fell in the parking lot on the ice.

Pre-Conditions

Post-Conditions

Data

Date/Time

Person vs. thing (boxes that fell)

Area of interest – where the person fell

Event type – safety

Event Sub type – slip and fall

Domain View

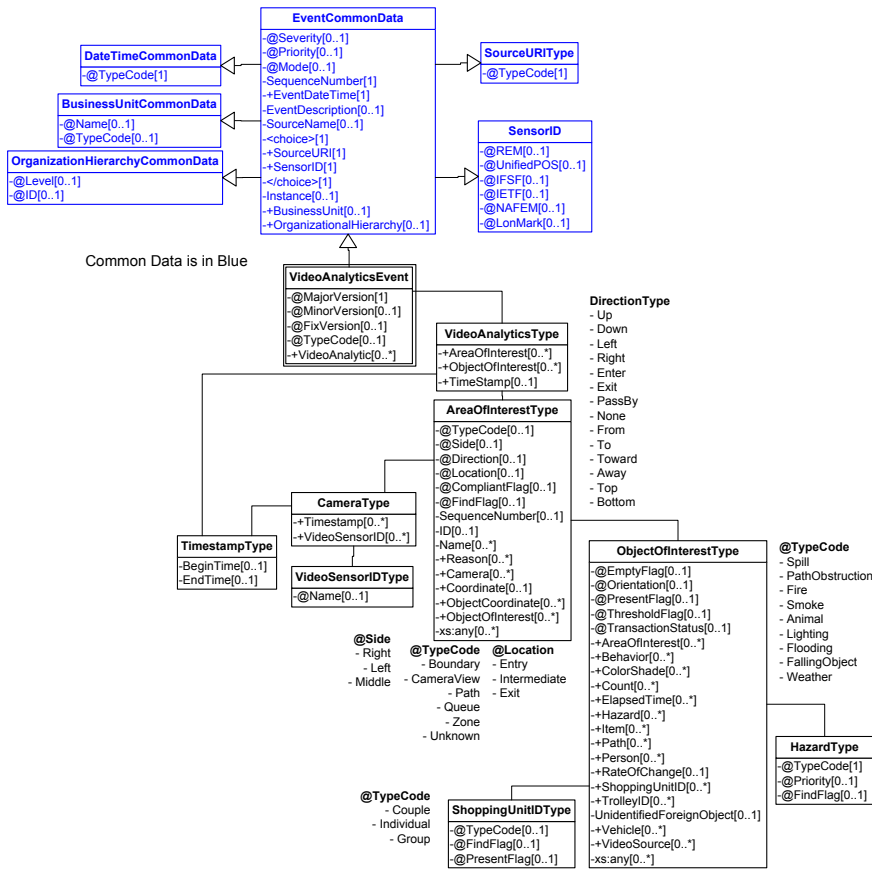


Figure 32: Slip and Fall Event Domain View

Event

ARTS XML Conformance XML Instance Document – Slip and Fall – Event

```
<?xml version="1.0" encoding="UTF-8"?>
<VideoAnalyticsEvent xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.omg.org/retail/VideoAnalytics/namespace/
  ../VideoAnalyticsEventV1.0.0.xsd"
  xmlns="http://www.omg.org/retail/VideoAnalytics/namespace/" MajorVersion="1" MinorVersion="0"
  FixVersion="0" TypeCode="Safety">
  <SequenceNumber>11234</SequenceNumber>
  <EventDateTime>2006-05-04T18:13:51.0Z</EventDateTime>
  <SourceURI>Camera 1</SourceURI>
  <VideoAnalytic>
    <AreaOfInterest TypeCode="CameraView">
      <ObjectOfInterest>
        <Hazard TypeCode="SlipAndFall">Parking Lot</Hazard>
        <ShoppingUnitID TypeCode="Individual"/>
      </ObjectOfInterest>
    </AreaOfInterest>
  </VideoAnalytic>
</VideoAnalyticsEvent>
```

Request/Response

ARTS XML Conformance XML Instance Document – Real-time validation of slip & fall claims Request

```
<?xml version="1.0" encoding="UTF-8"?>
<VideoAnalyticsMessage xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
```

```

    xsi:schemaLocation="http://www.omg.org/retail/VideoAnalytics/namespace/
    ../VideoAnalyticsMessageOrientedV1.0.0.xsd"
    xmlns="http://www.omg.org/retail/VideoAnalytics/namespace/" MajorVersion="1" MinorVersion="0"
    FixVersion="0">
    <ARTSHeader ActionCode="Read" MessageType="Request">
        <MessageID>12345678</MessageID>
        <DateTime>2006-05-04T18:13:51.0Z</DateTime>
    </ARTSHeader>
    <VideoAnalysis>
        <AreaOfInterest TypeCode="CameraView">
            <Camera>
                <TimeStamp>
                    <BeginTime>2006-05-04T10:00:00.0Z </BeginTime>
                </TimeStamp>
                <!-- The camera which covers the area of interest -->
                <VideoSensorID>1</VideoSensorID>
            </Camera>
            <ObjectOfInterest>
                <Hazard TypeCode="SlipAndFall" FindFlag="true"/>
                <Person TypeCode="Customer" Gender="Female"/>
            </ObjectOfInterest>
        </AreaOfInterest>
    </VideoAnalysis>
</VideoAnalyticsMessage>

```

ARTS XML Conformance XML Instance Document – Real-time validation of slip & fall claims Response

```

<?xml version="1.0" encoding="UTF-8"?>
<VideoAnalyticsMessage xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
    xsi:schemaLocation="http://www.omg.org/retail/VideoAnalytics/namespace/
    ../VideoAnalyticsMessageOrientedV1.0.0.xsd"
    xmlns="http://www.omg.org/retail/VideoAnalytics/namespace/" MajorVersion="1" MinorVersion="0"
    FixVersion="0">
    <ARTSHeader ActionCode="Read" MessageType="Response">
        <MessageID>987654</MessageID>
        <DateTime>2006-05-04T18:15:51.0Z</DateTime>
        <Response ResponseCode="OK">
            <RequestID>12345678</RequestID>
        </Response>
    </ARTSHeader>
    <VideoAnalysis>
        <AreaOfInterest TypeCode="CameraView">
            <Camera>
                <TimeStamp>
                    <BeginTime>2006-05-04T10:00:00.0Z </BeginTime>
                </TimeStamp>
                <!-- The camera which covers the area of interest -->
                <VideoSensorID>1</VideoSensorID>
            </Camera>
            <ObjectOfInterest>
                <Hazard TypeCode="SlipAndFall"/>
                <Person TypeCode="Customer" Gender="Female"/>
            </ObjectOfInterest>
        </AreaOfInterest>
    </VideoAnalysis>
</VideoAnalyticsMessage>

```

5.3 Scenario: Abnormal Behavior in the Parking Lot Event

Brief Description

Monitor people wandering in parking lot...suspect car break-ins or other crimes

Scenario Description

A guest is walking around the parking lot and not going into the store.

Pre-Conditions

Post-Conditions

Data

Date/Time

Person

Behavior

Area(s) of Interest

Domain View

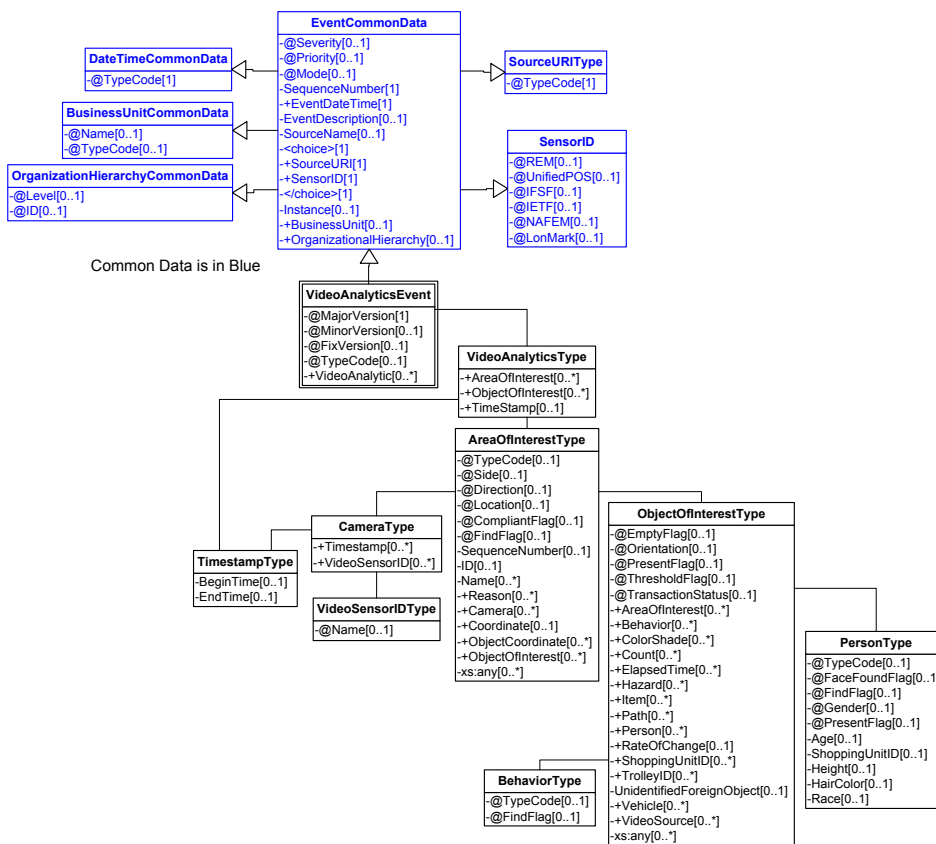


Figure 33: Abnormal Behavior in the Parking Event Lot Domain View

Event

ARTS XML Conformance XML Instance Document – Abnormal Behavior in the Parking Lot – Event

```
<?xml version="1.0" encoding="UTF-8"?>
<VideoAnalyticsEvent xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.omg.org/retail/VideoAnalytics/namespace/
  ../VideoAnalyticsEventV1.0.0.xsd"
  xmlns="http://www.omg.org/retail/VideoAnalytics/namespace/" MajorVersion="1" MinorVersion="0"
  FixVersion="0" TypeCode="Security">
  <SequenceNumber>11234</SequenceNumber>
  <EventDateTime>2006-05-04T18:13:51.0Z</EventDateTime>
  <SourceURI>Camera 1</SourceURI>
  <VideoAnalytic>
```

```
<AreaOfInterest TypeCode="CameraView">
  <ObjectOfInterest>
    <Behavior TypeCode="Lingering"/>
    <ElapsedTime TypeCode="Actual">00:10:51.0Z</ElapsedTime>
    <Person TypeCode="Customer"/>
  </ObjectOfInterest>
</AreaOfInterest>
</VideoAnalytic>
</VideoAnalyticsEvent>
```

5.4 Scenario: Amber Alerts Query

Brief Description

Scenario Description

Mother comes in and says her child was abducted in a red car in the north parking lot in the last 10 minutes.

Pre-Conditions

Post-Conditions

Data

Request

Date/Time

Person

Area of Interest

Vehicle

Response

Domain View

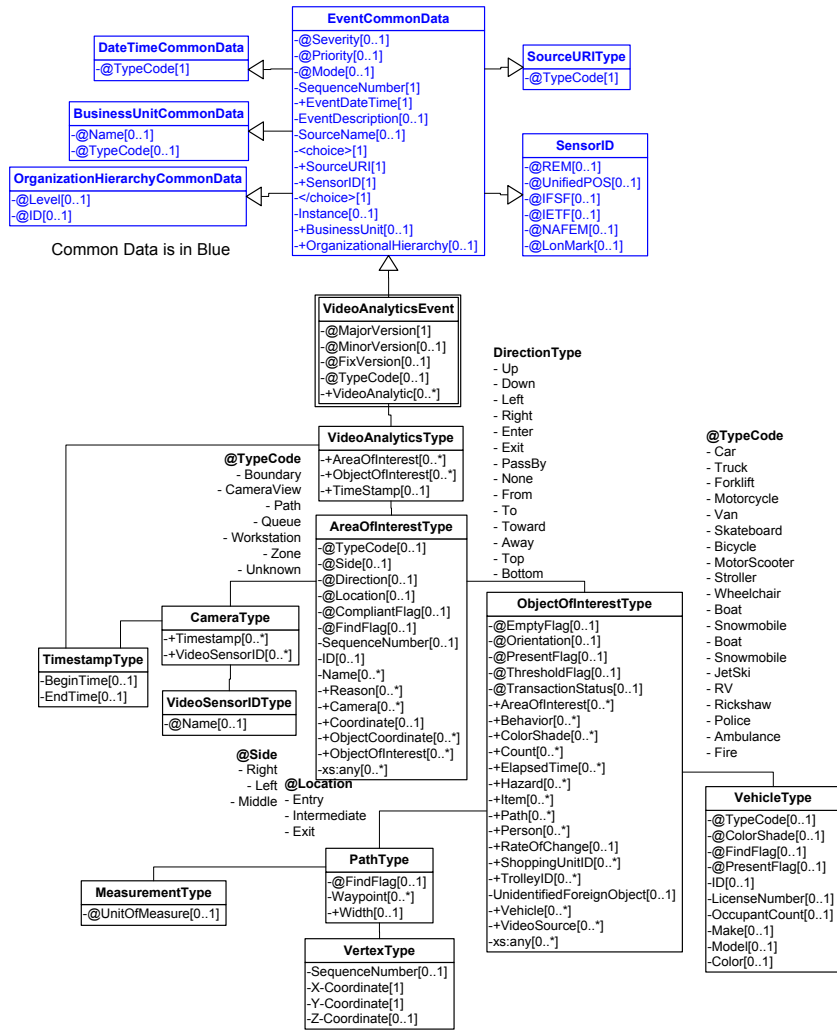


Figure 34: Amber Alerts Event Domain View

5.4.1 Query – Find all the children getting into a red car in the last 10 minutes

Data

Request

Date/Time

Person (Height) (Child, teenager, adult)

Area of Interest

Vehicle

Response

Date/Time

VideoSensorID

Person

Object of Interest (Vehicle)

Area of Interest

Request/Response

ARTS XML Conformance XML Instance Document – Amber Alerts – Request

```
<?xml version="1.0" encoding="UTF-8"?>
<VideoAnalyticsMessage xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.omg.org/retail/VideoAnalytics/namespace/
  ../VideoAnalyticsMessageOrientedV1.0.0.xsd"
  xmlns="http://www.omg.org/retail/VideoAnalytics/namespace/" MajorVersion="1" MinorVersion="0"
  FixVersion="0">
  <ARTSHeader ActionCode="Read" MessageType="Request">
    <MessageID>12345678</MessageID>
    <DateTime>2006-05-04T18:13:51.0Z</DateTime>
  </ARTSHeader>
  <VideoAnalysis>
    <AreaOfInterest TypeCode="CameraView">
      <Camera>
        <!-- Parking Lot Camera -->
        <VideoSensorID>PL1</VideoSensorID>
      </Camera>
      <ObjectOfInterest>
        <Behavior TypeCode="Abduction"/>
        <Person Gender="Male" FindFlag="true"/>
        <Person Gender="Boy"/>
        <Vehicle TypeCode="Car">
          <Color>Red</Color>
        </Vehicle>
      </ObjectOfInterest>
    </AreaOfInterest>
    <TimeStamp>
      <BeginTime>2006-05-04T18:13:51.0Z </BeginTime>
      <EndTime>2006-05-04T18:28:51.0Z </EndTime>
    </TimeStamp>
  </VideoAnalysis>
</VideoAnalyticsMessage>
```

ARTS XML Conformance XML Instance Document – Amber Alerts – Response

```
<?xml version="1.0" encoding="UTF-8"?>
<VideoAnalyticsMessage xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.omg.org/retail/VideoAnalytics/namespace/
  ../VideoAnalyticsMessageOrientedV1.0.0.xsd"
  xmlns="http://www.omg.org/retail/VideoAnalytics/namespace/" MajorVersion="1" MinorVersion="0"
  FixVersion="0">
  <ARTSHeader ActionCode="Read" MessageType="Response">
    <MessageID>987654</MessageID>
    <DateTime>2006-05-04T18:15:51.0Z</DateTime>
    <Response ResponseCode="OK">
      <RequestID>12345678</RequestID>
    </Response>
  </ARTSHeader>
  <VideoAnalysis>
    <AreaOfInterest TypeCode="CameraView">
      <Camera>
        <!-- Parking Lot Camera -->
        <VideoSensorID>PL1</VideoSensorID>
      </Camera>
      <ObjectOfInterest>
        <Behavior TypeCode="Abduction"/>
        <Person Gender="Male">
          <HairColor>Brown</HairColor>
          <Race>Caucasian</Race>
        </Person>
        <Vehicle TypeCode="Car">

```

```

        <Color>Red</Color>
      </Vehicle>
    </ObjectOfInterest>
  </AreaOfInterest>
  <TimeStamp>
    <BeginTime>2006-05-04T18:15:51.0Z </BeginTime>
    <EndTime>2006-05-04T18:30:51.0Z </EndTime>
  </TimeStamp>
</VideoAnalysis>
</VideoAnalyticsMessage>

```

5.4.2 Query – find all the red cars that were present in the last 30 minutes in the parking lot

Data

Request

Date/Time range

Area of Interest

Object of Interest (Vehicle)

Response

Date/Time

VideoSensorID

Area of Interest

Object of Interest (Vehicle)

Request/Response

ARTS XML Conformance XML Instance Document – Find Red Cars – Request

```

<?xml version="1.0" encoding="UTF-8"?>
<VideoAnalyticsMessage xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.omg.org/retail/VideoAnalytics/namespace/
  ../VideoAnalyticsMessageOrientedV1.0.0.xsd"
  xmlns="http://www.omg.org/retail/VideoAnalytics/namespace/" MajorVersion="1" MinorVersion="0"
  FixVersion="0">
  <ARTSHeader ActionCode="Read" MessageType="Request">
    <MessageID>12345678</MessageID>
    <DateTime>2006-05-04T18:13:51.0Z</DateTime>
  </ARTSHeader>
  <VideoAnalysis>
    <AreaOfInterest TypeCode="CameraView">
      <Camera>
        <!-- Parking Lot Camera -->
        <VideoSensorID>PL1</VideoSensorID>
      </Camera>
      <ObjectOfInterest>
        <Vehicle TypeCode="Car" FindFlag="true"/>
        <Color>Red</Color>
      </Vehicle>
    </ObjectOfInterest>
  </AreaOfInterest>
  <TimeStamp>
    <BeginTime>2006-05-04T18:00:51.0Z </BeginTime>
    <EndTime>2006-05-04T18:30:51.0Z </EndTime>
  </TimeStamp>
</VideoAnalysis>
</VideoAnalyticsMessage>

```

ARTS XML Conformance XML Instance Document – Find Red Cars – Response

```
<?xml version="1.0" encoding="UTF-8"?>
<VideoAnalyticsMessage xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.omg.org/retail/VideoAnalytics/namespace/
  ../VideoAnalyticsMessageOrientedV1.0.0.xsd"
  xmlns="http://www.omg.org/retail/VideoAnalytics/namespace/" MajorVersion="1" MinorVersion="0"
  FixVersion="0">
  <ARTSHeader ActionCode="Read" MessageType="Response">
    <MessageID>987654</MessageID>
    <DateTime>2006-05-04T18:15:51.0Z</DateTime>
    <Response ResponseCode="OK">
      <RequestID>12345678</RequestID>
    </Response>
  </ARTSHeader>
  <VideoAnalysis>
    <AreaOfInterest TypeCode="CameraView">
      <Camera>
        <!-- Parking Lot Camera -->
        <VideoSensorID>PL1</VideoSensorID>
      </Camera>
      <!-- This Red car was there from 8 to 10am -->
      <ObjectOfInterest>
        <AreaOfInterest>
          <Camera>
            <TimeStamp>
              <BeginTime>2006-05-04T08:00:00.0Z</BeginTime>
              <EndTime>2006-05-04T10:00:00.0Z</EndTime>
            </TimeStamp>
          </Camera>
        </AreaOfInterest>
        <Vehicle TypeCode="Car">
          <ID>101</ID>
          <Color>Red</Color>
        </Vehicle>
      </ObjectOfInterest>
      <!-- This Red car was there from 8:30 to 9am -->
      <ObjectOfInterest>
        <AreaOfInterest>
          <Camera>
            <TimeStamp>
              <BeginTime>2006-05-04T08:30:00.0Z</BeginTime>
              <EndTime>2006-05-04T09:00:00.0Z</EndTime>
            </TimeStamp>
          </Camera>
        </AreaOfInterest>
        <Vehicle TypeCode="Car">
          <ID>200</ID>
          <Color>Red</Color>
        </Vehicle>
      </ObjectOfInterest>
    </AreaOfInterest>
  </VideoAnalysis>
</VideoAnalyticsMessage>
```

5.4.3 Query – find the full path of the car

Data

Request

Date/Time

Area of Interest

Vehicle

Response

Date/Time

VideoSensorID(s)

Path Object (X, Y Coordinate) with respect to an Area of Interest (normally this is a normalized set of coordinates with respect to the camera)

Object of Interest (Vehicle)

Request/Response

ARTS XML Conformance XML Instance Document – Find Car Path – Request

```
<?xml version="1.0" encoding="UTF-8"?>
<VideoAnalyticsMessage xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.omg.org/retail/VideoAnalytics/namespace/
  ../VideoAnalyticsMessageOrientedV1.0.0.xsd"
  xmlns="http://www.omg.org/retail/VideoAnalytics/namespace/" MajorVersion="1" MinorVersion="0"
  FixVersion="0">
  <ARTSHeader ActionCode="Read" MessageType="Request">
    <MessageID>12345678</MessageID>
    <DateTime>2006-05-04T18:13:51.0Z</DateTime>
  </ARTSHeader>
  <VideoAnalysis>
    <ObjectOfInterest>
      <AreaOfInterest TypeCode="Path">
        <Camera>
          <TimeStamp>
            <BeginTime>2006-05-04T18:13:51.0Z</BeginTime>
            <EndTime>2006-05-04T18:13:51.0Z</EndTime>
          </TimeStamp>
          <VideoSensorID>ParkingLot1</VideoSensorID>
        </Camera>
        <ObjectCoordinate FindFlag="true"/>
      </AreaOfInterest>
      <Vehicle TypeCode="Car">
        <ID>100</ID>
        <Color>Red</Color>
      </Vehicle>
    </ObjectOfInterest>
  </VideoAnalysis>
</VideoAnalyticsMessage>
```

ARTS XML Conformance XML Instance Document – Find Car Path – Response

```
<?xml version="1.0" encoding="UTF-8"?>
<VideoAnalyticsMessage xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.omg.org/retail/VideoAnalytics/namespace/
  ../VideoAnalyticsMessageOrientedV1.0.0.xsd"
  xmlns="http://www.omg.org/retail/VideoAnalytics/namespace/" MajorVersion="1" MinorVersion="0"
  FixVersion="0">
  <ARTSHeader ActionCode="Read" MessageType="Response">
    <MessageID>987654</MessageID>
    <DateTime>2006-05-04T18:15:51.0Z</DateTime>
    <Response ResponseCode="OK">
      <RequestID>12345678</RequestID>
    </Response>
  </ARTSHeader>
  <VideoAnalysis>
    <ObjectOfInterest>
      <AreaOfInterest TypeCode="Path">
```

```

    <Camera>
      <TimeStamp>
        <BeginTime>2006-05-04T18:13:51.0Z</BeginTime>
        <EndTime>2006-05-04T18:13:51.0Z</EndTime>
      </TimeStamp>
      <VideoSensorID>ParkingLot1</VideoSensorID>
    </Camera>
    <ObjectCoordinate>
      <SequenceNumber>1</SequenceNumber>
      <!-- Resolution is determined during configuration -->
      <X-Coordinate>100</X-Coordinate>
      <Y-Coordinate>20</Y-Coordinate>
    </ObjectCoordinate>
    <ObjectCoordinate>
      <SequenceNumber>2</SequenceNumber>
      <X-Coordinate>120</X-Coordinate>
      <Y-Coordinate>30</Y-Coordinate>
    </ObjectCoordinate>
  </AreaOfInterest>
  <Vehicle TypeCode="Car">
    <ID>100</ID>
    <Color>Red</Color>
  </Vehicle>
</ObjectOfInterest>
</VideoAnalysis>
</VideoAnalyticsMessage>

```

5.4.4 Query – find path of the driver prior to getting in the car

Data

Request

Date/Time

Person

Area of Interest

Response

Date/Time

VideoSensorID(s)

Path Object (X, Y Coordinate) with respect to an Area of Interest (normally this is a normalized set of coordinates with respect to the camera)

Object of Interest (Person)

Request/Response

ARTS XML Conformance XML Instance Document – find path of the driver prior to getting in the car – Request

```

<?xml version="1.0" encoding="UTF-8"?>
<VideoAnalyticsMessage xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.omg.org/retail/VideoAnalytics/namespace/
  ../VideoAnalyticsMessageOrientedV1.0.0.xsd"
  xmlns="http://www.omg.org/retail/VideoAnalytics/namespace/" MajorVersion="1" MinorVersion="0"
  FixVersion="0">
  <ARTSHeader ActionCode="Read" MessageType="Request">
    <MessageID>12345678</MessageID>
    <DateTime>2006-05-04T18:13:51.0Z</DateTime>
  </ARTSHeader>
  <VideoAnalysis>
    <ObjectOfInterest>
      <AreaOfInterest TypeCode="Path">

```

```

    <Camera>
      <TimeStamp>
        <BeginTime>2006-05-04T18:13:51.0Z</BeginTime>
        <EndTime>2006-05-04T18:28:51.0Z</EndTime>
      </TimeStamp>
      <VideoSensorID>Parking Lot 1</VideoSensorID>
    </Camera>
    <!-- We are requesting the coordinates for this object -->
    <ObjectCoordinate FindFlag="true"/>
  </AreaOfInterest>
  <Person TypeCode="Driver">
    <ID>100</ID>
  </Person>
  <Vehicle TypeCode="Car">
    <ID>234</ID>
    <Color>Red</Color>
  </Vehicle>
</ObjectOfInterest>
</VideoAnalysis>
</VideoAnalyticsMessage>

```

ARTS XML Conformance XML Instance Document – find path of the driver prior to getting in the car - Response

```

<?xml version="1.0" encoding="UTF-8"?>
<VideoAnalyticsMessage xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.omg.org/retail/VideoAnalytics/namespace/
  ../VideoAnalyticsMessageOrientedV1.0.0.xsd"
  xmlns="http://www.omg.org/retail/VideoAnalytics/namespace/" MajorVersion="1" MinorVersion="0"
  FixVersion="0">
  <ARTSHeader ActionCode="Read" MessageType="Response">
    <MessageID>987654</MessageID>
    <DateTime>2006-05-04T18:15:51.0Z</DateTime>
    <Response ResponseCode="OK">
      <RequestID>12345678</RequestID>
    </Response>
  </ARTSHeader>
  <VideoAnalysis>
    <ObjectOfInterest>
      <!-- If the object crosses multiple cameras then there would be multiple
      AreaOfInterests -->
      <AreaOfInterest TypeCode="Path">
        <Camera>
          <TimeStamp>
            <BeginTime>2006-05-04T18:13:51.0Z</BeginTime>
            <EndTime>2006-05-04T18:28:51.0Z</EndTime>
          </TimeStamp>
          <VideoSensorID>Parking Lot 1</VideoSensorID>
        </Camera>
        <!-- These are repeated for the entire path of this object in this Area of Interest -->
        <!-- Resolution is determined during configuration -->
        <ObjectCoordinate>
          <SequenceNumber>1</SequenceNumber>
          <X-Coordinate>100</X-Coordinate>
          <Y-Coordinate>20</Y-Coordinate>
        </ObjectCoordinate>
        <ObjectCoordinate>
          <SequenceNumber>2</SequenceNumber>
          <X-Coordinate>110</X-Coordinate>
          <Y-Coordinate>35</Y-Coordinate>
        </ObjectCoordinate>
      </AreaOfInterest>
    </ObjectOfInterest>
    <Person TypeCode="Driver">
      <ID>100</ID>
    </Person>
    <Vehicle TypeCode="Car">

```

```
<ID>234</ID>  
<Color>Red</Color>  
</Vehicle>  
</ObjectOfInterest>  
</VideoAnalysis>  
</VideoAnalyticsMessage>
```

5.5 Scenario: Lost Child

Brief Description

Scenario Description

Within minutes of reported lost child, track parent on the video back to where they lost the child and then track the child forward on the video to identify their current location. Mitigate risk of abduction and avoid store lockdown for lost child event.

Pre-Conditions

Post-Conditions

Data

Domain View

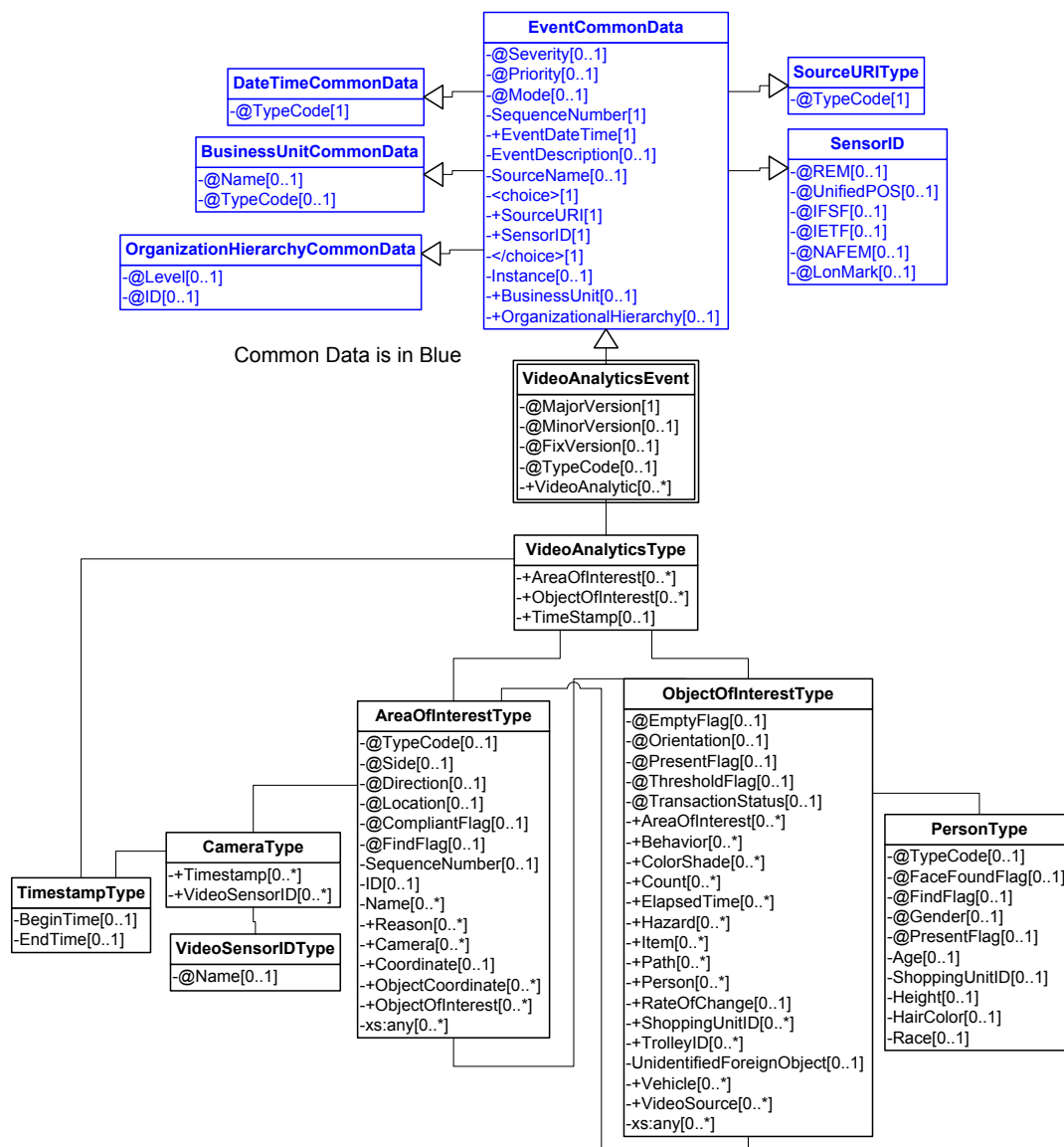


Figure 35: Lost Child Domain View

5.5.1 Query - track the parent back to entry in the store

Request

Date Range

Object of interest (person (mom))

Area of interest (current location) (used to track back to the entrance)

Response

Date/Time

VideoSensorID(s)

Path

Request/Response

ARTS XML Conformance XML Instance Document – track the parent back to entry in the store – Request

```
<?xml version="1.0" encoding="UTF-8"?>
<VideoAnalyticsMessage xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.omg.org/retail/VideoAnalytics/namespace/
  ../VideoAnalyticsMessageOrientedV1.0.0.xsd"
  xmlns="http://www.omg.org/retail/VideoAnalytics/namespace/" MajorVersion="1" MinorVersion="0"
  FixVersion="0">
  <ARTSHeader ActionCode="Read" MessageType="Request">
    <MessageID>12345678</MessageID>
    <DateTime>2006-05-04T18:13:51.0Z</DateTime>
  </ARTSHeader>
  <VideoAnalysis>
    <ObjectOfInterest>
      <AreaOfInterest TypeCode="Path">
        <Camera>
          <TimeStamp>
            <BeginTime>2006-05-04T18:13:51.0Z</BeginTime>
            <EndTime>2006-05-04T18:28:51.0Z</EndTime>
          </TimeStamp>
          <VideoSensorID>Parking Lot 1</VideoSensorID>
        </Camera>
        <!-- We are requesting the coordinates for this object -->
        <ObjectCoordinate FindFlag="true"/>
      </AreaOfInterest>
      <Person TypeCode="Driver" Gender="Female">
        <ID>102</ID>
      </Person>
      <Vehicle TypeCode="Car">
        <ID>334</ID>
        <Color>Red</Color>
      </Vehicle>
    </ObjectOfInterest>
  </VideoAnalysis>
</VideoAnalyticsMessage>
```

ARTS XML Conformance XML Instance Document – track the parent back to entry in the store – Response

```
<?xml version="1.0" encoding="UTF-8"?>
<VideoAnalyticsMessage xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.omg.org/retail/VideoAnalytics/namespace/
  ../VideoAnalyticsMessageOrientedV1.0.0.xsd"
  xmlns="http://www.omg.org/retail/VideoAnalytics/namespace/" MajorVersion="1" MinorVersion="0"
  FixVersion="0">
  <ARTSHeader ActionCode="Read" MessageType="Response">
    <MessageID>987654</MessageID>
    <DateTime>2006-05-04T18:15:51.0Z</DateTime>
    <Response ResponseCode="OK">
      <RequestID>12345678</RequestID>
    </Response>
  </ARTSHeader>
  <VideoAnalysis>
    <ObjectOfInterest>
      <!-- If the object crosses multiple cameras then there would be multiple
      AreaOfInterests -->
      <AreaOfInterest TypeCode="Path">
        <Camera>
```

```

        <TimeStamp>
            <BeginTime>2006-05-04T18:13:51.0Z</BeginTime>
            <EndTime>2006-05-04T18:28:51.0Z</EndTime>
        </TimeStamp>
        <VideoSensorID>Parking Lot 1</VideoSensorID>
    </Camera>
<!-- These are repeated for the entire path of this object in this Area of Interest -->
<!-- Resolution is determined at configuration -->
    <ObjectCoordinate>
        <SequenceNumber>1</SequenceNumber>
        <X-Coordinate>100</X-Coordinate>
        <Y-Coordinate>20</Y-Coordinate>
    </ObjectCoordinate>
    <ObjectCoordinate>
        <SequenceNumber>2</SequenceNumber>
        <X-Coordinate>110</X-Coordinate>
        <Y-Coordinate>35</Y-Coordinate>
    </ObjectCoordinate>
</AreaOfInterest>
<Person TypeCode="Driver" Gender="Female"/>
<Vehicle TypeCode="Car">
    <Color>Red</Color>
</Vehicle>
</ObjectOfInterest>
</VideoAnalysis>
</VideoAnalyticsMessage>

```

5.5.2 Query – Find all persons with these characteristics

Request:

Date/Time range

Height, color

Response:

Date/Time

VideoSensorID

Area of Interest

Object of Interest (Person)

Request/Response

ARTS Conformance XML Instance Document – Find all persons with these characteristics – Request

```

<?xml version="1.0" encoding="UTF-8"?>
<VideoAnalyticsMessage xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
    xsi:schemaLocation="http://www.omg.org/retail/VideoAnalytics/namespace/
    ../VideoAnalyticsMessageOrientedV1.0.0.xsd"
    xmlns="http://www.omg.org/retail/VideoAnalytics/namespace/" MajorVersion="1" MinorVersion="0"
    FixVersion="0">
    <ARTSHeader ActionCode="Read" MessageType="Request">
        <MessageID>12345678</MessageID>
        <DateTime>2006-05-04T18:13:51.0Z</DateTime>
    </ARTSHeader>
    <VideoAnalysis>
        <ObjectOfInterest>
            <Person TypeCode="Customer" Gender="Male" FindFlag="true">
                <Height UnitOfMeasureCode="INH">67</Height>
                <HairColor>Brown</HairColor>
            </Person>
        </ObjectOfInterest>
        <TimeStamp>

```

```

        <BeginTime>2006-05-04T10:00:00.0Z</BeginTime>
        <EndTime>2006-05-04T10:15:00.0Z</EndTime>
    </TimeStamp>
</VideoAnalysis>
</VideoAnalyticsMessage>

```

ARTS Conformance XML Instance Document – Find all persons with these characteristics w – Response

```

<?xml version="1.0" encoding="UTF-8"?>
<VideoAnalyticsMessage xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.omg.org/retail/VideoAnalytics/namespace/
  ../VideoAnalyticsMessageOrientedV1.0.0.xsd"
  xmlns="http://www.omg.org/retail/VideoAnalytics/namespace/"
  MajorVersion="1"
  MinorVersion="0" FixVersion="0">
  <ARTSHeader ActionCode="Read" MessageType="Response">
    <MessageID>987654</MessageID>
    <DateTime>2006-05-04T18:15:51.0Z</DateTime>
    <Response ResponseCode="OK">
      <RequestID>12345678</RequestID>
    </Response>
  </ARTSHeader>
  <VideoAnalysis>
    <!-- First Person -->
    <ObjectOfInterest>
      <AreaOfInterest TypeCode="Path">
        <ObjectCoordinate>
          <SequenceNumber>1</SequenceNumber>
          <X-Coordinate>100</X-Coordinate>
          <Y-Coordinate>20</Y-Coordinate>
        </ObjectCoordinate>
      </AreaOfInterest>
      <Person TypeCode="Customer" Gender="Male">
        <Height UnitOfMeasureCode="INH">67</Height>
        <HairColor>Brown</HairColor>
      </Person>
    </ObjectOfInterest>
    <!-- Second Person -->
    <ObjectOfInterest>
      <AreaOfInterest TypeCode="Path">
        <ObjectCoordinate>
          <SequenceNumber>1</SequenceNumber>
          <X-Coordinate>200</X-Coordinate>
          <Y-Coordinate>26</Y-Coordinate>
        </ObjectCoordinate>
      </AreaOfInterest>
      <Person TypeCode="Customer" Gender="Male">
        <Height UnitOfMeasureCode="INH">67</Height>
        <HairColor>Brown</HairColor>
      </Person>
    </ObjectOfInterest>
    <TimeStamp>
      <BeginTime>2006-05-04T10:00:00.0Z</BeginTime>
      <EndTime>2006-05-04T10:15:00.0Z</EndTime>
    </TimeStamp>
  </VideoAnalysis>
</VideoAnalyticsMessage>

```

5.6 Scenario: Object Abandoned in the Aisle

Brief Description

Scenario Description

A - Criminal gets spooked and leaves the trolley with 50 cartons of baby formula in the stuff zone or push aisle. (type code = security)

Pre-Conditions

Post-Conditions

Data

Event – Alert when the cart was abandoned

Date/Time

Area of Interest

Object of Interest (Trolley)

Request – find out when and who abandoned it

Date/Time range

Area of Interest

Object of Interest (Trolley)

Response

Date/Time

VideoSensorID

Area of Interest

Object of Interest (Person)

Domain View

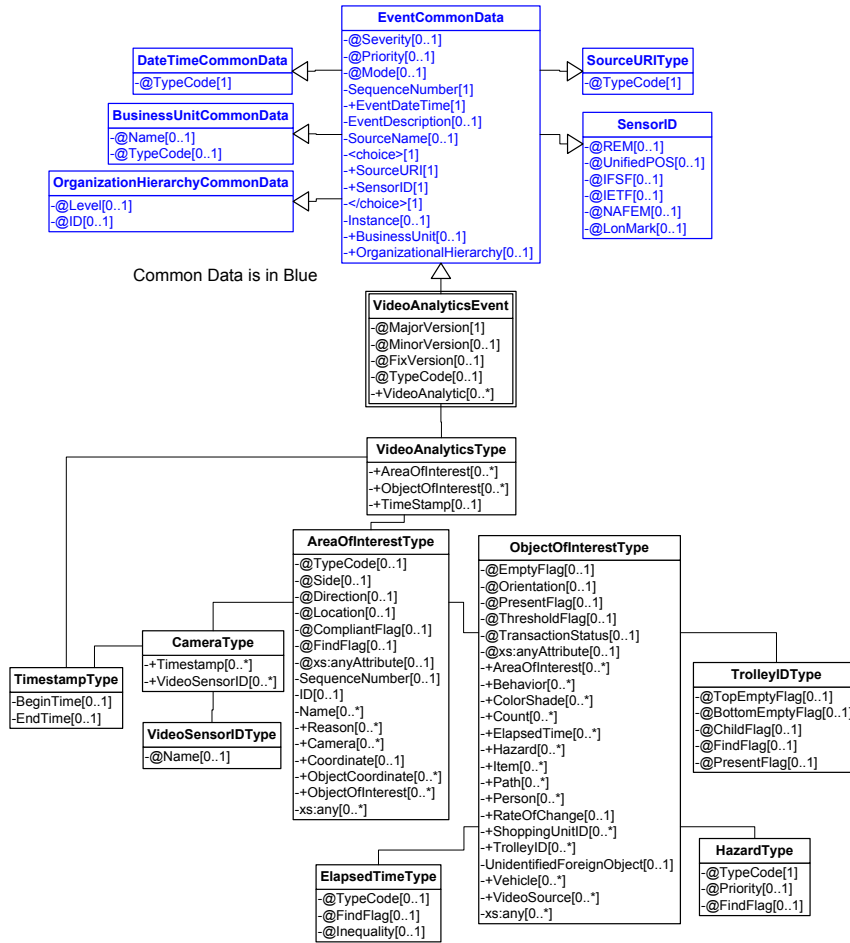


Figure 36: Object Abandoned in the Aisle Domain View

Event

ARTS XML Conformance XML Instance Document – Object Abandoned in the Aisle Event

```

<?xml version="1.0" encoding="UTF-8"?>
<VideoAnalyticsEvent xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.omg.org/retail/VideoAnalytics/namespace/
  ../VideoAnalyticsEventV1.0.0.xsd"
  xmlns="http://www.omg.org/retail/VideoAnalytics/namespace/" MajorVersion="1" MinorVersion="0"
  FixVersion="0" TypeCode="Security">
  <SequenceNumber>11234</SequenceNumber>
  <EventDateTime>2006-05-04T18:13:51.0Z</EventDateTime>
  <SourceURI>Camera 1</SourceURI>
  <VideoAnalytic>
    <AreaOfInterest TypeCode="Zone">
      <ID>100</ID>
      <ObjectOfInterest>
        <ElapsedTime TypeCode="Actual">00:10:51.0Z</ElapsedTime>
        <ElapsedTime TypeCode="Threshold">00:10:00.0Z</ElapsedTime>
        <Hazard TypeCode="LeftObject"/>
        <TrolleyID>TrolleyID0</TrolleyID>
      </ObjectOfInterest>
    </AreaOfInterest>
  </VideoAnalytic>
</VideoAnalyticsEvent>

```

Request/Response

ARTS XML Conformance XML Instance Document – Object Abandoned in the Aisle Request

```
<?xml version="1.0" encoding="UTF-8"?>
<VideoAnalyticsMessage xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.omg.org/retail/VideoAnalytics/namespace/
  ../VideoAnalyticsMessageOrientedV1.0.0.xsd"
  xmlns="http://www.omg.org/retail/VideoAnalytics/namespace/" MajorVersion="1" MinorVersion="0"
  FixVersion="0">
  <ARTSHeader ActionCode="Read" MessageType="Request">
    <MessageID>12345678</MessageID>
    <DateTime>2006-05-04T18:13:51.0Z</DateTime>
  </ARTSHeader>
  <VideoAnalysis>
    <AreaOfInterest TypeCode="Zone">
      <ID>100</ID>
      <ObjectOfInterest>
        <Hazard TypeCode="LeftObject" FindFlag="true"/>
      </ObjectOfInterest>
    </AreaOfInterest>
    <TimeStamp>
      <BeginTime>2006-05-04T10:00:00.0Z</BeginTime>
      <EndTime>2006-05-04T10:15:00.0Z</EndTime>
    </TimeStamp>
  </VideoAnalysis>
</VideoAnalyticsMessage>
```

ARTS XML Conformance XML Instance Document – Object Abandoned in the Aisle Response

```
<?xml version="1.0" encoding="UTF-8"?>
<VideoAnalyticsMessage xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.omg.org/retail/VideoAnalytics/namespace/
  ../VideoAnalyticsMessageOrientedV1.0.0.xsd"
  xmlns="http://www.omg.org/retail/VideoAnalytics/namespace/" MajorVersion="1" MinorVersion="0"
  FixVersion="0">
  <ARTSHeader ActionCode="Read" MessageType="Response">
    <MessageID>987654</MessageID>
    <DateTime>2006-05-04T18:15:51.0Z</DateTime>
    <Response ResponseCode="OK">
      <RequestID>12345678</RequestID>
    </Response>
  </ARTSHeader>
  <VideoAnalysis>
    <AreaOfInterest TypeCode="Zone">
      <ID>100</ID>
      <ObjectOfInterest>
        <ElapsedTime TypeCode="Actual">00:10:51.0Z</ElapsedTime>
        <ElapsedTime TypeCode="Threshold">00:10:00.0Z</ElapsedTime>
        <Hazard TypeCode="LeftObject"/>
        <TrolleyID>TrolleyID0</TrolleyID>
      </ObjectOfInterest>
    </AreaOfInterest>
    <TimeStamp>
      <BeginTime>2006-05-04T10:00:00.0Z</BeginTime>
      <EndTime>2006-05-04T10:15:00.0Z</EndTime>
    </TimeStamp>
  </VideoAnalysis>
</VideoAnalyticsMessage>
```

6 Use Case: LP – Loss Prevention – Video Asset Surveillance

Domain View

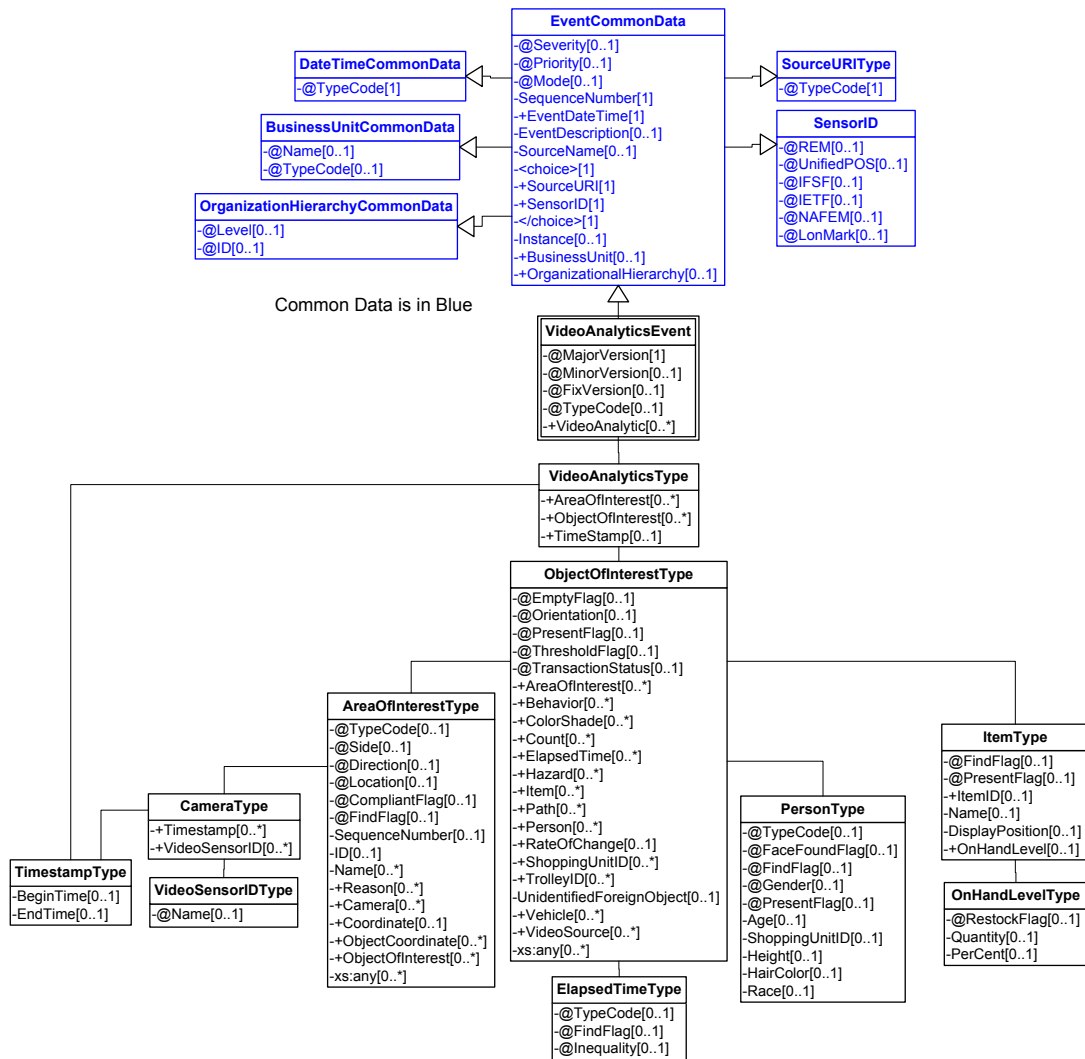


Figure 37: Video Asset Surveillance Domain View

6.1 Scenario: High Dollar Items Removed from Shelf

Brief Description

MP3 player removed from shelf in aisle 3.

Pre-Conditions

Post-Conditions

Data

Event – Alert when MP3 player removed from shelf

Date/Time

Area of Interest

Object of Interest (MP3)

Request – Find who removed MP3 player from shelf

Date/Time range

Area of Interest

Object of Interest (MP3)

Response

Date/Time

VideoSensorID

Area of Interest

Object of Interest (Person)

Object of Interest (MP3)

Event

ARTS XML Conformance XML Instance Document – High Dollar Items Removed from Shelf Event

```
<?xml version="1.0" encoding="UTF-8"?>
<VideoAnalyticsEvent xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.omg.org/retail/VideoAnalytics/namespace/
  ../VideoAnalyticsEventV1.0.0.xsd"
  xmlns="http://www.omg.org/retail/VideoAnalytics/namespace/" MajorVersion="1" MinorVersion="0"
  FixVersion="0" TypeCode="Security">
  <SequenceNumber>11234</SequenceNumber>
  <EventDateTime>2006-05-04T18:13:51.0Z</EventDateTime>
  <SourceURI>Camera 1</SourceURI>
  <VideoAnalytic>
    <ObjectOfInterest>
      <AreaOfInterest TypeCode="Shelf">
        <ID>234</ID>
      </AreaOfInterest>
      <Item>
        <!-- This id is configured in the VA system for this shelf -->
        <ItemID>2345</ItemID>
        <Name>MP3</Name>
        <DisplayPosition>Shelf</DisplayPosition>
      </Item>
      <Person TypeCode="Customer"/>
    </ObjectOfInterest>
  </VideoAnalytic>
</VideoAnalyticsEvent>
```

Request/Response

ARTS XML Conformance XML Instance Document – High Dollar Items Removed from Shelf – Request

```
<?xml version="1.0" encoding="UTF-8"?>
<VideoAnalyticsMessage xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.omg.org/retail/VideoAnalytics/namespace/
  ../VideoAnalyticsMessageOrientedV1.0.0.xsd"
  xmlns="http://www.omg.org/retail/VideoAnalytics/namespace/" MajorVersion="1" MinorVersion="0"
  FixVersion="0">
  <ARTSHeader ActionCode="Read" MessageType="Request">
    <MessageID>12345678</MessageID>
    <DateTime>2006-05-04T18:13:51.0Z</DateTime>
  </ARTSHeader>
  <VideoAnalysis>
    <!-- when was a high dollar item removed -->
    <ObjectOfInterest>
```



```

<!-- The unique id for this shelf -->
<AreaOfInterest TypeCode="Shelf">
  <ID>234</ID>
  <!-- Camera point at that shelf -->
  <Camera>
    <!-- time frame we are checking -->
    <TimeStamp>
      <BeginTime>2006-05-04T10:00:00.0Z</BeginTime>
      <EndTime>2006-05-04T10:15:00.0Z</EndTime>
    </TimeStamp>
    <VideoSensorID>10</VideoSensorID>
  </Camera>
</AreaOfInterest>
<Item FindFlag="true"/>
</ObjectOfInterest>
</VideoAnalysis>
</VideoAnalyticsMessage>

```

ARTS XML Conformance XML Instance Document – High Dollar Items Removed from Shelf – Response

```

<?xml version="1.0" encoding="UTF-8"?>
<VideoAnalyticsMessage xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.omg.org/retail/VideoAnalytics/namespace/
  ../VideoAnalyticsMessageOrientedV1.0.0.xsd"
  xmlns="http://www.omg.org/retail/VideoAnalytics/namespace/" MajorVersion="1" MinorVersion="0"
  FixVersion="0">
  <ARTSHeader ActionCode="Read" MessageType="Response">
    <MessageID>987654</MessageID>
    <DateTime>2006-05-04T18:15:51.0Z</DateTime>
    <Response ResponseCode="OK">
      <RequestID>12345678</RequestID>
    </Response>
  </ARTSHeader>
  <VideoAnalysis>
    <ObjectOfInterest>
      <AreaOfInterest TypeCode="Shelf">
        <ID>234</ID>
        <Camera>
          <TimeStamp>
            <BeginTime>2006-05-04T10:05:00.0Z</BeginTime>
          </TimeStamp>
          <VideoSensorID>10</VideoSensorID>
        </Camera>
      </AreaOfInterest>
      <Item>
        <!-- This id is configured in the VA system for this shelf -->
        <ItemID>2345</ItemID>
        <Name>MP3</Name>
        <DisplayPosition>Shelf</DisplayPosition>
      </Item>
      <Person TypeCode="Customer"/>
    </ObjectOfInterest>
  </VideoAnalysis>
</VideoAnalyticsMessage>

```

6.2 Scenario: Shelf Sweep (wipeout) of a Large Quantity of Items

Brief Description

A customer takes many items from a peg hook.

Pre-Conditions

Post-Conditions

Data

Event – Abnormal change in quantity of the product on the shelf within a time period

Date/Time

Area of Interest

Object of Interest (Merchandise – with OnHandLevel below a threshold type and Duration type and Elapsed time within a range)

Request – Find abnormal changes in quantity of product on shelf within a time period

Date/Time range

Area of Interest

Object of Interest (Merchandise – with OnHandLevel below a threshold type and Duration type and Elapsed time within a range)

Response

Date/Time

VideoSensorID

Area of Interest

Object of Interest (Merchandise – with OnHandLevel and Duration)

Domain View

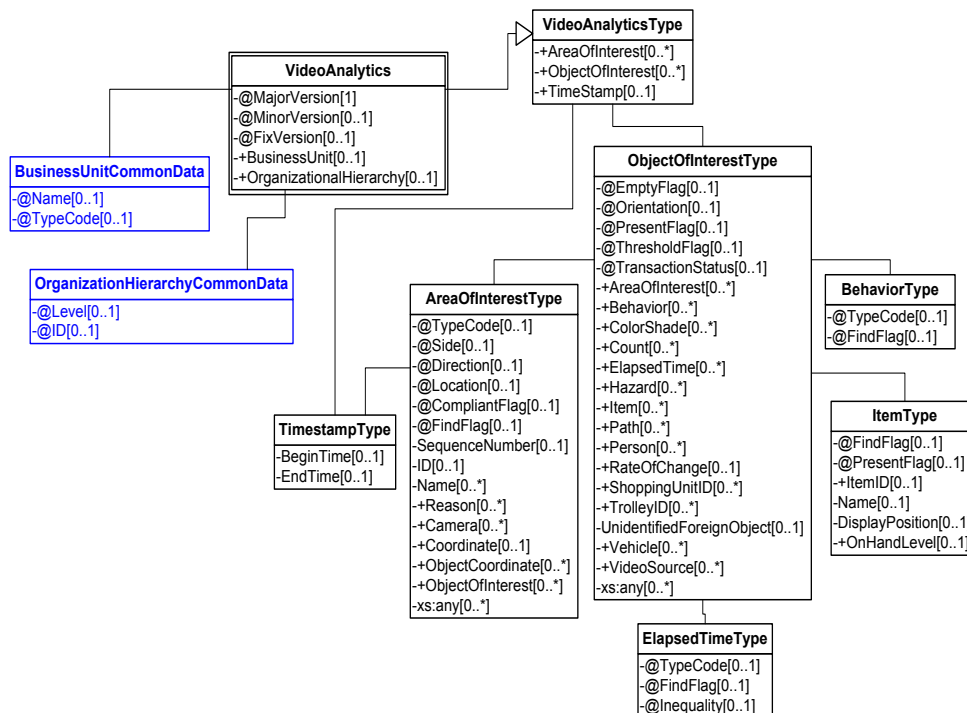


Figure 38: Shelf Sweep Domain View

Event

ARTS XML Conformance XML Instance Document – Shelf Sweep Event

```
<?xml version="1.0" encoding="UTF-8"?>
<VideoAnalyticsEvent xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.omg.org/retail/VideoAnalytics/namespace/
  ../VideoAnalyticsEventV1.0.0.xsd"
  xmlns="http://www.omg.org/retail/VideoAnalytics/namespace/" MajorVersion="1" MinorVersion="0"
  FixVersion="0" TypeCode="Security">
  <SequenceNumber>11234</SequenceNumber>
  <EventDateTime>2006-05-04T18:13:51.0Z</EventDateTime>
  <SourceURI>Camera 1</SourceURI>
  <VideoAnalytic>
    <ObjectOfInterest ThresholdFlag="true">
      <AreaOfInterest TypeCode="Path" Side="Left">
        <Name>Shelf</Name>
      </AreaOfInterest>
      <!-- Indicates a large number of the items from the shelf were removed at one time -->
      <Behavior TypeCode="Wipeout"/>
      <ElapsedTime TypeCode="Actual">10:00:00</ElapsedTime>
      <Item>
        <!-- Identifies the item that is supposed to be on that shelf -->
        <ItemID>123</ItemID>
      </Item>
    </ObjectOfInterest>
  </VideoAnalytic>
</VideoAnalyticsEvent>
```

Request/Response

ARTS XML Conformance XML Instance Document – Shelf Sweep – Request

```
<?xml version="1.0" encoding="UTF-8"?>
<VideoAnalyticsMessage xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.omg.org/retail/VideoAnalytics/namespace/
  ../VideoAnalyticsMessageOrientedV1.0.0.xsd"
  xmlns="http://www.omg.org/retail/VideoAnalytics/namespace/"
  MajorVersion="1"
  MinorVersion="0" FixVersion="0">
  <ARTSHeader ActionCode="Read" MessageType="Request">
    <MessageID>12345678</MessageID>
    <DateTime>2006-05-04T18:13:51.0Z</DateTime>
  </ARTSHeader>
  <VideoAnalysis>
    <ObjectOfInterest ThresholdFlag="true">
      <AreaOfInterest TypeCode="Path" Side="Left">
        <Name>Shelf</Name>
      </AreaOfInterest>
      <Behavior TypeCode="Wipeout"/>
      <Count Kind="Items" Direction="Down" xsi:nil="true" FindFlag="true"/>
      <ElapsedTime TypeCode="Actual">10:00:00</ElapsedTime>
    </ObjectOfInterest>
  </VideoAnalysis>
</VideoAnalyticsMessage>
```

ARTS XML Conformance XML Instance Document – Shelf Sweep – Response

```
<?xml version="1.0" encoding="UTF-8"?>
<VideoAnalyticsMessage xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.omg.org/retail/VideoAnalytics/namespace/
  ../VideoAnalyticsMessageOrientedV1.0.0.xsd"
```

```

xmlns="http://www.omg.org/retail/VideoAnalytics/namespace/"
MajorVersion="1"
MinorVersion="0" FixVersion="0">
  <ARTSHeader ActionCode="Read" MessageType="Response">
    <MessageID>987654</MessageID>
    <DateTime>2006-05-04T18:15:51.0Z</DateTime>
    <Response ResponseCode="OK">
      <RequestID>12345678</RequestID>
    </Response>
  </ARTSHeader>
  <VideoAnalysis>
    <ObjectOfInterest ThresholdFlag="true">
      <AreaOfInterest TypeCode="Path" Side="Left">
        <Name>Shelf</Name>
      </AreaOfInterest>
      <Behavior TypeCode="Wipeout"/>
      <Count Kind="Items" Direction="Down">30</Count>
      <ElapsedTime TypeCode="Actual">10:00:00</ElapsedTime>
    </ObjectOfInterest>
  </VideoAnalysis>
</VideoAnalyticsMessage>

```

6.3 Scenario: Suspicious Person Movement Occurred

Brief Description

Store manager wants to find whether anyone entered a locked office over the weekend. Searches a weekend of recorded video to find when a person last passed through a specified area.

Pre-Conditions

Post-Conditions

Data

Event – If a person enters a cash office

Date/Time

Area of Interest

Object of Interest (Person)

Request – When did anyone enter the cash office

Date/Time range

Area of Interest

Response

Date/Time

VideoSensorID

Area of Interest

Object of Interest (Person)

Domain View

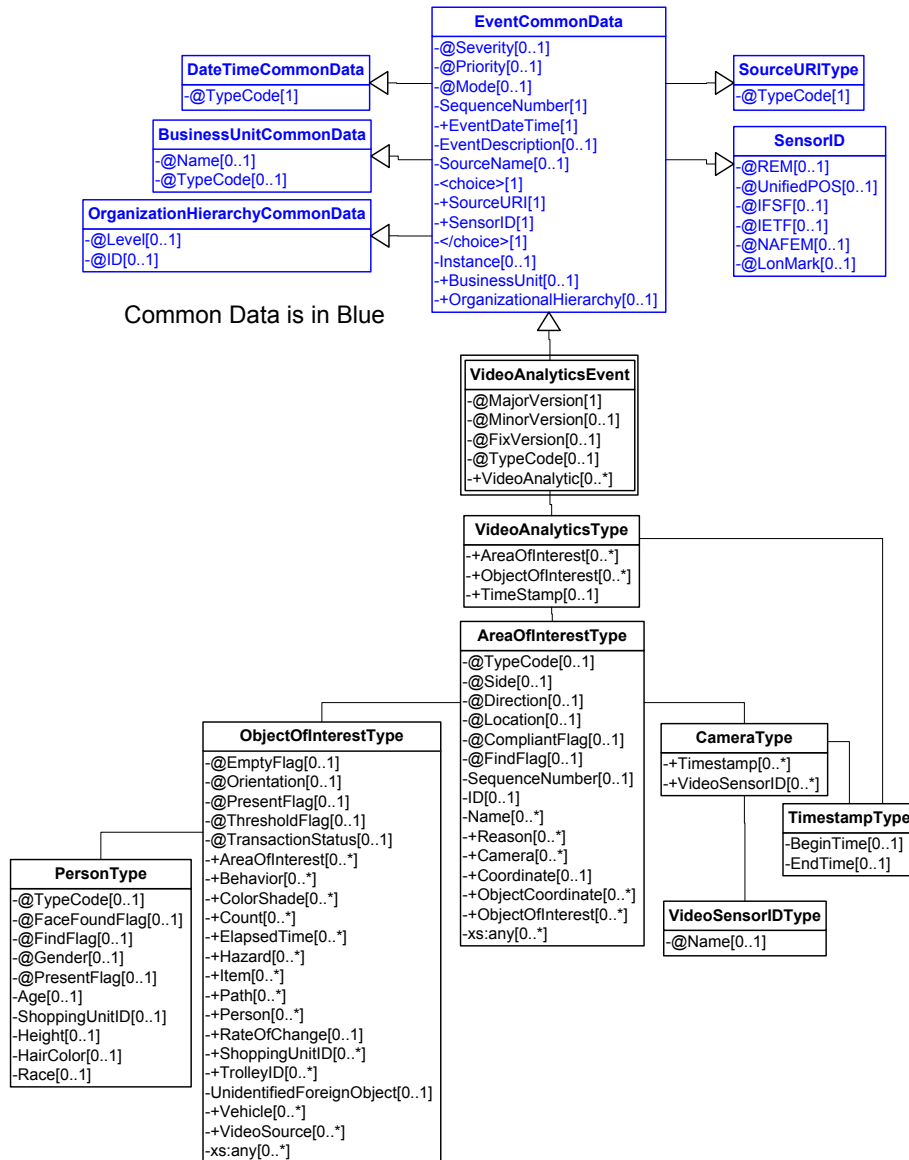


Figure 39: Suspicious Person Movement Domain View

Event

ARTS XML Conformance XML Instance Document – Suspicious Person Movement – Event

```

<?xml version="1.0" encoding="UTF-8"?>
<VideoAnalyticsEvent xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.omg.org/retail/VideoAnalytics/namespace/
  ../VideoAnalyticsEventV1.0.0.xsd"
  xmlns="http://www.omg.org/retail/VideoAnalytics/namespace/" MajorVersion="1" MinorVersion="0"
  FixVersion="0" TypeCode="Security">
  <SequenceNumber>11234</SequenceNumber>
  <EventDateTime>2006-05-04T18:13:51.0Z</EventDateTime>
  <SourceURI>Camera 1</SourceURI>
  <VideoAnalytic>
    <AreaOfInterest TypeCode="Zone" Location="Entry">
      <!-- Cash Office -->
      <ID>1234</ID>
    </AreaOfInterest>
  </VideoAnalytic>
</VideoAnalyticsEvent>

```

Request/Response

ARTS XML Conformance XML Instance Document – Suspicious Person Movement – Request

```
<?xml version="1.0" encoding="UTF-8"?>
<VideoAnalyticsMessage xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.omg.org/retail/VideoAnalytics/namespace/
  ../VideoAnalyticsMessageOrientedV1.0.0.xsd"
  xmlns="http://www.omg.org/retail/VideoAnalytics/namespace/"
  MajorVersion="1" MinorVersion="0" FixVersion="0">
  <ARTSHeader ActionCode="Read" MessageType="Request">
    <MessageID>12345678</MessageID>
    <DateTime>2006-05-04T18:13:51.0Z</DateTime>
  </ARTSHeader>
  <VideoAnalysis>
    <!-- Identify anyone who entered during this timeframe -->
    <AreaOfInterest TypeCode="Zone" Location="Entry">
      <!-- Cash Office -->
      <ID>1234</ID>
    </AreaOfInterest>
    <TimeStamp>
      <BeginTime>2006-05-04T10:00:00.0Z</BeginTime>
      <EndTime>2006-05-04T10:15:00.0Z</EndTime>
    </TimeStamp>
  </VideoAnalysis>
</VideoAnalyticsMessage>
```

ARTS XML Conformance XML Instance Document – Suspicious Person Movement – Response

```
<?xml version="1.0" encoding="UTF-8"?>
<VideoAnalyticsMessage xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.omg.org/retail/VideoAnalytics/namespace/
  ../VideoAnalyticsMessageOrientedV1.0.0.xsd"
  xmlns="http://www.omg.org/retail/VideoAnalytics/namespace/"
  MajorVersion="1" MinorVersion="0" FixVersion="0">
  <ARTSHeader ActionCode="Read" MessageType="Response">
    <MessageID>987654</MessageID>
    <DateTime>2006-05-04T18:15:51.0Z</DateTime>
    <Response ResponseCode="OK">
      <RequestID>12345678</RequestID>
    </Response>
  </ARTSHeader>
  <VideoAnalysis>
    <AreaOfInterest TypeCode="Zone" Location="Entry">
      <!-- Cash Office -->
      <ID>1234</ID>
      <ObjectOfInterest>
        <Behavior TypeCode="SuspiciousMovement"/>
        <Person>
          <Height UnitOfMeasureCode="INH">67</Height>
          <HairColor>Brown</HairColor>
        </Person>
      </ObjectOfInterest>
    </AreaOfInterest>
    <TimeStamp>
      <BeginTime>2006-05-04T10:00:00.0Z</BeginTime>
      <EndTime>2006-05-04T10:15:00.0Z</EndTime>
    </TimeStamp>
  </VideoAnalysis>
</VideoAnalyticsMessage>
```

7 Use Case : Merchandising (Understand and Influence Customer Behavior)

Brief Description

Count the number of people who pass by a particular display, the number who linger in front of the display for a period of time, count the number of people who look at the display and the number who remove merchandise from the display. The difference between each of these scenarios has to do primarily with customer behavior.

7.1 Scenario: Count People Passing a Display

Brief Description

Scenario Description

Count the number of people who pass by shelf #43 from 10:00 to 10:15am.

Pre-Conditions

Post-Conditions

Data

Request

Date/Time range

Area of Interest (In front of display)

Object of Interest (Person)

Response

Date/Time

VideoSensorID

Area of Interest

Object of Interest (Person count)

Domain View

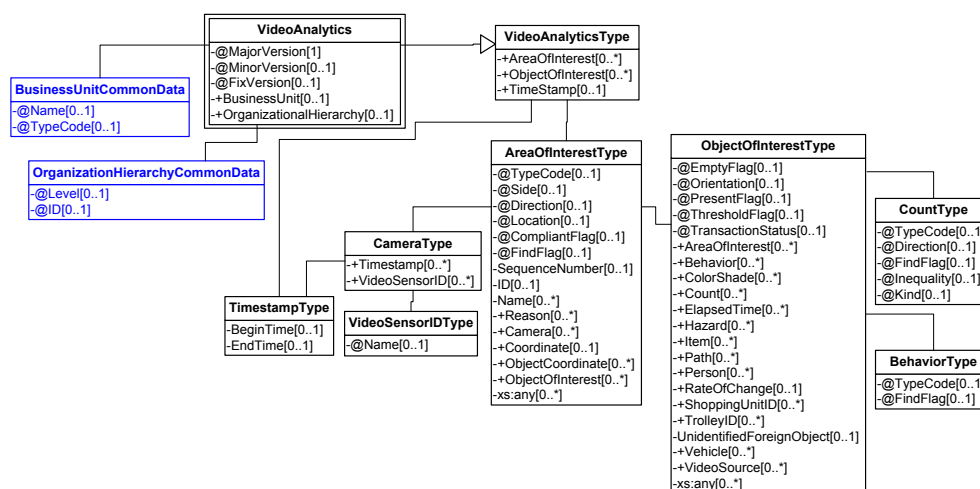


Figure 40: Count People Passing a Display Domain View

Event

ARTS XML Conformance XML Instance Document – Count People Passing a Display – Event

```
<?xml version="1.0" encoding="UTF-8"?>
<VideoAnalyticsEvent xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.omg.org/retail/VideoAnalytics/namespace/
  ../VideoAnalyticsEventV1.0.0.xsd"
  xmlns="http://www.omg.org/retail/VideoAnalytics/namespace/" MajorVersion="1" MinorVersion="0"
  FixVersion="0" TypeCode="Security">
  <SequenceNumber>11234</SequenceNumber>
  <EventDateTime>2006-05-04T18:13:51.0Z</EventDateTime>
  <SourceURI>Camera 1</SourceURI>
  <VideoAnalytic>
    <AreaOfInterest TypeCode="Shelf">
      <!-- Shelf #43 -->
      <ID>43</ID>
      <Camera>
        <TimeStamp>
          <BeginTime>2006-05-04T10:00:00.0Z</BeginTime>
        </TimeStamp>
      </Camera>
      <ObjectOfInterest>
        <Behavior TypeCode="PassBy"/>
      </ObjectOfInterest>
    </AreaOfInterest>
  </VideoAnalytic>
</VideoAnalyticsEvent>
```

Request/Response

ARTS XML Conformance XML Instance Document – Count People Passing a Display – Request

```
<?xml version="1.0" encoding="UTF-8"?>
<VideoAnalyticsMessage xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.omg.org/retail/VideoAnalytics/namespace/
  ../VideoAnalyticsMessageOrientedV1.0.0.xsd"
  xmlns="http://www.omg.org/retail/VideoAnalytics/namespace/" MajorVersion="1" MinorVersion="0"
  FixVersion="0">
  <ARTSHeader ActionCode="Read" MessageType="Request">
    <MessageID>12345678</MessageID>
    <DateTime>2006-05-04T18:13:51.0Z</DateTime>
  </ARTSHeader>
  <VideoAnalysis>
    <AreaOfInterest TypeCode="Shelf" Direction="PassBy">
      <!-- Shelf #43 -->
      <ID>43</ID>
      <Camera>
        <TimeStamp>
          <BeginTime>2006-05-04T10:00:00.0Z</BeginTime>
          <EndTime>2006-05-04T10:15:00.0Z</EndTime>
        </TimeStamp>
      </Camera>
      <ObjectOfInterest>
        <Count Kind="Individuals" xsi:nil="true" FindFlag="true"/>
      </ObjectOfInterest>
    </AreaOfInterest>
  </VideoAnalysis>
</VideoAnalyticsMessage>
```


ARTS XML Conformance XML Instance Document – Count People Passing a Display – Response

```
<?xml version="1.0" encoding="UTF-8"?>
<VideoAnalyticsMessage xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.omg.org/retail/VideoAnalytics/namespace/
  ../VideoAnalyticsMessageOrientedV1.0.0.xsd"
  xmlns="http://www.omg.org/retail/VideoAnalytics/namespace/"
  MajorVersion="1" MinorVersion="0" FixVersion="0">
  <ARTSHeader ActionCode="Read" MessageType="Response">
    <MessageID>987654</MessageID>
    <DateTime>2006-05-04T18:15:51.0Z</DateTime>
    <Response ResponseCode="OK">
      <RequestID>12345678</RequestID>
    </Response>
  </ARTSHeader>
  <VideoAnalysis>
    <AreaOfInterest TypeCode="Shelf" Direction="PassBy">
      <!-- Shelf #43 -->
      <ID>43</ID>
      <Camera>
        <TimeStamp>
          <BeginTime>2006-05-04T10:00:00.0Z</BeginTime>
          <EndTime>2006-05-04T10:15:00.0Z</EndTime>
        </TimeStamp>
      </Camera>
      <ObjectOfInterest>
        <Count Kind="Individuals">23</Count>
      </ObjectOfInterest>
    </AreaOfInterest>
  </VideoAnalysis>
</VideoAnalyticsMessage>
```

7.2 Scenario - Count the number of people who remove merchandise from the display

Scenario Description

Count the number of people who remove merchandise from shelf #43 from 10:00 to 10:15am.

Pre-Conditions

Post-Conditions

Data

Request

Date/Time range

Area of Interest (In front of display)

Area of Interest (Merchandise Location – could be the same as Infront of Display)

Object of Interest (Person)

Response

Date/Time

VideoSensorID

Area of Interest

Object of Interest (Person)

Domain View

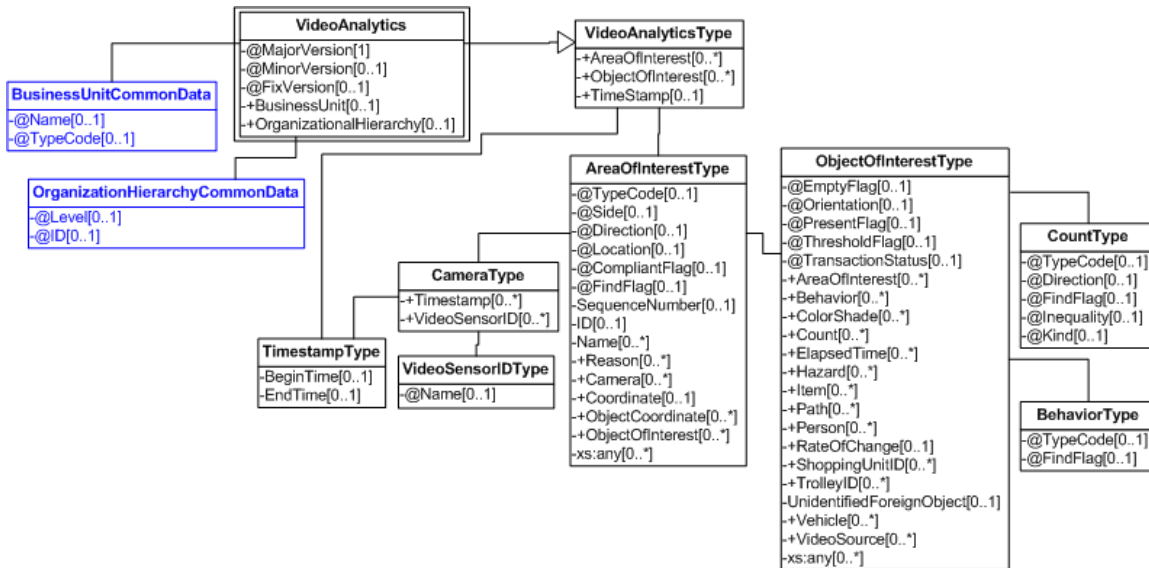


Figure 41: Count People Who Pickup Items Domain View

Event

```

<?xml version="1.0" encoding="UTF-8"?>
<VideoAnalyticsEvent xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.omg.org/retail/VideoAnalytics/namespace/
  ../VideoAnalyticsEventV1.0.0.xsd"
  xmlns="http://www.omg.org/retail/VideoAnalytics/namespace/" MajorVersion="1" MinorVersion="0"
  FixVersion="0" TypeCode="VideoSource">
  <SequenceNumber>11234</SequenceNumber>
  <EventDateTime>2006-05-04T18:13:51.0Z</EventDateTime>
  <SourceURI>Camera 1</SourceURI>
  <VideoAnalytic>
    <AreaOfInterest TypeCode="Shelf">
      <!-- Shelf #43 -->
      <ID>43</ID>
      <ObjectOfInterest>
        <Behavior TypeCode="PickUp"/>
        <Count Kind="Individuals">10</Count>
      </ObjectOfInterest>
    </AreaOfInterest>
  </VideoAnalytic>
</VideoAnalyticsEvent>
  
```

Request/Response

ARTS XML Conformance XML Instance Document – Count People Who Pickup Items – Request

```

<?xml version="1.0" encoding="UTF-8"?>
<VideoAnalyticsMessage xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.omg.org/retail/VideoAnalytics/namespace/
  ../VideoAnalyticsMessageOrientedV1.0.0.xsd"
  xmlns="http://www.omg.org/retail/VideoAnalytics/namespace/" MajorVersion="1" MinorVersion="0"
  FixVersion="0">
  <ARTSHeader ActionCode="Read" MessageType="Request">
    <MessageID>12345678</MessageID>
    <DateTime>2006-05-04T18:13:51.0Z</DateTime>
  </ARTSHeader>
  <VideoAnalysis>
    <AreaOfInterest TypeCode="Shelf">
      <!-- Shelf #43 -->
    </AreaOfInterest>
  </VideoAnalysis>
  
```

```

<ID>43</ID>
<Camera>
  <TimeStamp>
    <BeginTime>2006-05-04T10:00:00.0Z</BeginTime>
    <EndTime>2006-05-04T10:15:00.0Z</EndTime>
  </TimeStamp>
</Camera>
<ObjectOfInterest>
  <Behavior TypeCode="PickUp"/>
  <Count FindFlag="true" Kind="Individuals" xsi:nil="true"/>
</ObjectOfInterest>
</AreaOfInterest>
</VideoAnalysis>
</VideoAnalyticsMessage>

```

ARTS XML Conformance XML Instance Document – Count People Who Pickup Items – Response

```

<?xml version="1.0" encoding="UTF-8"?>
<VideoAnalyticsMessage xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.omg.org/retail/VideoAnalytics/namespace/
  ../VideoAnalyticsMessageOrientedV1.0.0.xsd"
  xmlns="http://www.omg.org/retail/VideoAnalytics/namespace/"
  MajorVersion="1" MinorVersion="0" FixVersion="0">
  <ARTSHeader ActionCode="Read" MessageType="Response">
    <MessageID>987654</MessageID>
    <DateTime>2006-05-04T18:15:51.0Z</DateTime>
    <Response ResponseCode="OK">
      <RequestID>12345678</RequestID>
    </Response>
  </ARTSHeader>
  <VideoAnalysis>
    <AreaOfInterest TypeCode="Shelf">
      <!-- Shelf #43 -->
      <ID>43</ID>
      <Camera>
        <TimeStamp>
          <BeginTime>2006-05-04T10:00:00.0Z</BeginTime>
          <EndTime>2006-05-04T10:15:00.0Z</EndTime>
        </TimeStamp>
      </Camera>
      <ObjectOfInterest>
        <Behavior TypeCode="PickUp"/>
        <Count Kind="Individuals">10</Count>
      </ObjectOfInterest>
    </AreaOfInterest>
  </VideoAnalysis>
</VideoAnalyticsMessage>

```

7.3 Scenario: Count People Who Linger at a Display

Brief Description

Count the number who linger in front of the display for a period of time.

Scenario Description

Count the number of people linger in front of shelf #43 from 10:00 to 10:15am for over 10 seconds.

Pre-Conditions

Post-Conditions

Data

Request

Date/Time range

Area of Interest (In front of display)

Object of Interest (Person with duration)

Response

Date/Time

VideoSensorID

Area of Interest

Object of Interest (Person with duration count which meet threshold)

Domain View

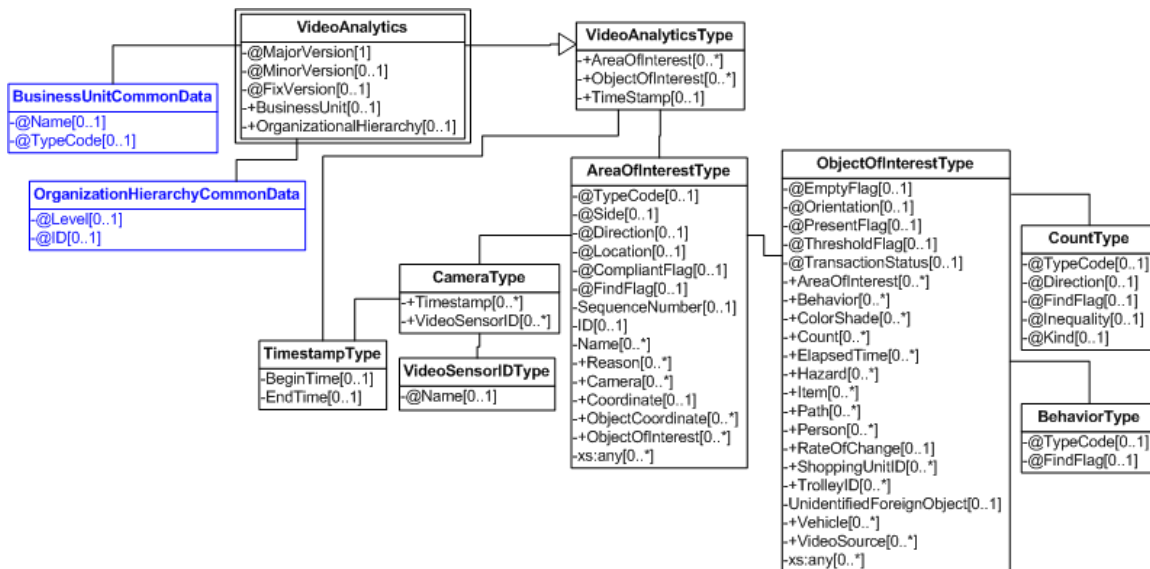


Figure 42: Count People Who Linger Domain View

Event

ARTS XML Conformance XML Instance Document – Count People Who Linger – Event

```

<?xml version="1.0" encoding="UTF-8"?>
<VideoAnalyticsEvent xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.omg.org/retail/VideoAnalytics/namespace/
  ../VideoAnalyticsEventV1.0.0.xsd"
  xmlns="http://www.omg.org/retail/VideoAnalytics/namespace/" MajorVersion="1" MinorVersion="0"
  FixVersion="0" TypeCode="Marketing">
  <SequenceNumber>11234</SequenceNumber>
  <EventDateTime>2006-05-04T18:13:51.0Z</EventDateTime>
  <SourceURI>Camera 1</SourceURI>
  <VideoAnalytic>
    <AreaOfInterest TypeCode="Shelf">
      <!-- Shelf #43 -->
      <ID>43</ID>
      <!-- Indicates a shopping unit which lingered in front of a shelf -->
    
```

```

        <!-- what is considered lingering is configured into the VA system -->
        <ObjectOfInterest>
            <Behavior TypeCode="Lingering"/>
            <Count Kind="ShoppingUnits">1</Count>
            <!-- Reports how long this shopping unit lingered -->
            <ElapsedTime TypeCode="Linger">08:03:51.0Z</ElapsedTime>
        </ObjectOfInterest>
    </AreaOfInterest>
</VideoAnalytic>
</VideoAnalyticsEvent>

```

Request/Response

NOTE: To be clear, is this counting the number of lingering events that already are associated with a linger time (hence, the time that generated the event to be created).

ARTS XML Conformance XML Instance Document – Count People Who Linger – Request

```

<?xml version="1.0" encoding="UTF-8"?>
<VideoAnalyticsMessage xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.omg.org/retail/VideoAnalytics/namespace/
  ../VideoAnalyticsMessageOrientedV1.0.0.xsd"
  xmlns="http://www.omg.org/retail/VideoAnalytics/namespace/"
  MajorVersion="1" MinorVersion="0" FixVersion="0">
  <ARTSHeader ActionCode="Read" MessageType="Response">
    <MessageID>987654</MessageID>
    <DateTime>2006-05-04T18:15:51.0Z</DateTime>
    <Response ResponseCode="OK">
      <RequestID>12345678</RequestID>
    </Response>
  </ARTSHeader>
  <VideoAnalysis>
    <AreaOfInterest TypeCode="Shelf">
      <!-- Shelf #43 -->
      <ID>43</ID>
      <Camera>
        <TimeStamp>
          <BeginTime>2006-05-04T10:00:00.0Z</BeginTime>
          <EndTime>2006-05-04T10:15:00.0Z</EndTime>
        </TimeStamp>
      </Camera>
      <ObjectOfInterest>
        <!-- Count the number of shopping units who linger longer than 5 minutes -->
        <Behavior TypeCode="Lingering"/>
        <Count FindFlag="true" Kind="ShoppingUnits" xsi:nil="true"/>
        <ElapsedTime TypeCode="Threshold">00:05:00.0Z</ElapsedTime>
      </ObjectOfInterest>
    </AreaOfInterest>
  </VideoAnalysis>
</VideoAnalyticsMessage>

```

ARTS XML Conformance XML Instance Document – Count People Who Linger – Response

```

<?xml version="1.0" encoding="UTF-8"?>
<VideoAnalyticsMessage xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.omg.org/retail/VideoAnalytics/namespace/
  ../VideoAnalyticsMessageOrientedV1.0.0.xsd"
  xmlns="http://www.omg.org/retail/VideoAnalytics/namespace/"
  MajorVersion="1" MinorVersion="0" FixVersion="0">
  <ARTSHeader ActionCode="Read" MessageType="Response">
    <MessageID>987654</MessageID>
    <DateTime>2006-05-04T18:15:51.0Z</DateTime>
    <Response ResponseCode="OK">

```

```

    <RequestID>12345678</RequestID>
  </Response>
</ARTSHeader>
<VideoAnalysis>
  <AreaOfInterest TypeCode="Shelf">
    <!-- Shelf #43 -->
    <ID>43</ID>
    <Camera>
      <TimeStamp>
        <BeginTime>2006-05-04T10:00:00.0Z</BeginTime>
        <EndTime>2006-05-04T10:15:00.0Z</EndTime>
      </TimeStamp>
    </Camera>
    <ObjectOfInterest>
      <Behavior TypeCode="Lingering"/>
      <Count Kind="ShoppingUnits">10</Count>
      <ElapsedTime TypeCode="Threshold">00:05:00.0Z</ElapsedTime>
    </ObjectOfInterest>
  </AreaOfInterest>
</VideoAnalysis>
</VideoAnalyticsMessage>

```

7.4 Scenario: Count the number who are facing the display for a period of time

Brief Description

Scenario Description

Count the number of people who face shelf #43 from 10:00 to 10:15am.

Pre-Conditions

Post-Conditions

Data

Request

Date/Time range

Area of Interest (In front of display)

Object of Interest (Person with duration and orientation/direction)

Response

Date/Time

VideoSensorID

Area of Interest

Object of Interest (Person with duration count which meets threshold and orientation/direction)

Domain View

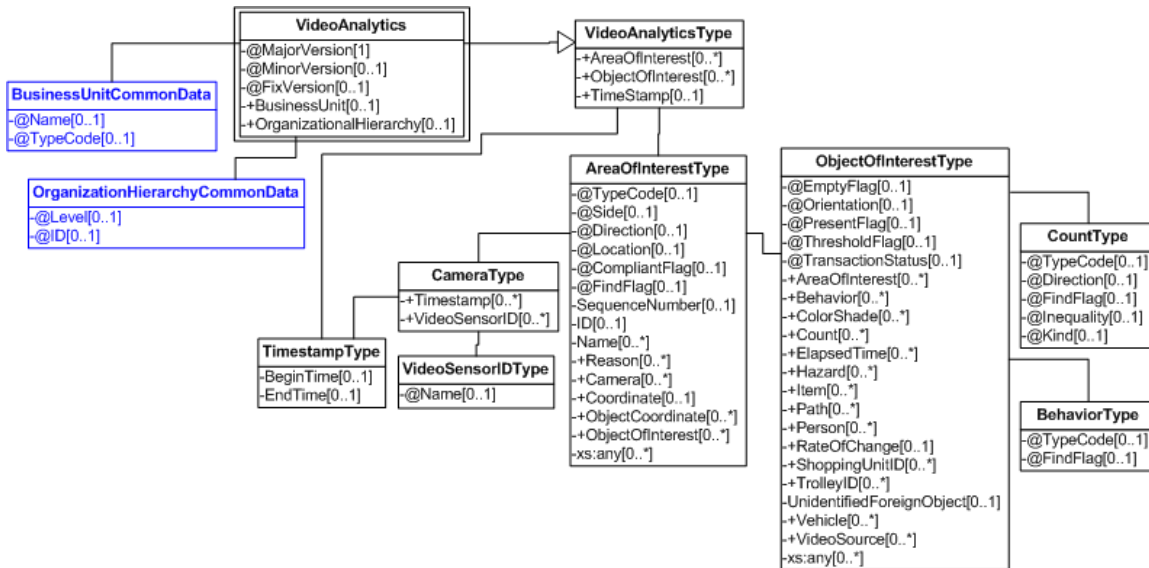


Figure 43: Count People Who are Facing a Display Domain View

Request/Response

ARTS XML Conformance XML Instance Document – Count People Who are Facing a Display – Request

```

<?xml version="1.0" encoding="UTF-8"?>
<VideoAnalyticsMessage xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.omg.org/retail/VideoAnalytics/namespace/
  ../VideoAnalyticsMessageOrientedV1.0.0.xsd"
  xmlns="http://www.omg.org/retail/VideoAnalytics/namespace/" MajorVersion="1" MinorVersion="0"
  FixVersion="0">
  <ARTSHeader ActionCode="Read" MessageType="Request">
    <MessageID>12345678</MessageID>
    <DateTime>2006-05-04T18:13:51.0Z</DateTime>
  </ARTSHeader>
  <VideoAnalysis>
    <AreaOfInterest TypeCode="Shelf">
      <!-- Shelf #43 -->
      <ID>43</ID>
      <Camera>
        <TimeStamp>
          <BeginTime>2006-05-04T10:00:00.0Z</BeginTime>
          <EndTime>2006-05-04T10:15:00.0Z</EndTime>
        </TimeStamp>
      </Camera>
      <ObjectOfInterest>
        <Behavior TypeCode="Facing"/>
        <Count FindFlag="true" Kind="Individuals" xsi:nil="true"/>
      </ObjectOfInterest>
    </AreaOfInterest>
  </VideoAnalysis>
</VideoAnalyticsMessage>
  
```

ARTS XML Conformance XML Instance Document – Count People Who are Facing a Display – Response

```

<?xml version="1.0" encoding="UTF-8"?>
<VideoAnalyticsMessage xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.omg.org/retail/VideoAnalytics/namespace/
  ../VideoAnalyticsMessageOrientedV1.0.0.xsd"
  xmlns="http://www.omg.org/retail/VideoAnalytics/namespace/"
  MajorVersion="1" MinorVersion="0" FixVersion="0">
  
```

```

<ARTSHeader ActionCode="Read" MessageType="Response">
  <MessageID>987654</MessageID>
  <DateTime>2006-05-04T18:15:51.0Z</DateTime>
  <Response ResponseCode="OK">
    <RequestID>12345678</RequestID>
  </Response>
</ARTSHeader>
<VideoAnalysis>
  <AreaOfInterest TypeCode="Shelf">
    <!-- Shelf #43 -->
    <ID>43</ID>
    <Camera>
      <TimeStamp>
        <BeginTime>2006-05-04T10:00:00.0Z</BeginTime>
        <EndTime>2006-05-04T10:15:00.0Z</EndTime>
      </TimeStamp>
    </Camera>
    <ObjectOfInterest>
      <Behavior TypeCode="Facing"/>
      <Count Kind="Individuals">10</Count>
    </ObjectOfInterest>
  </AreaOfInterest>
</VideoAnalysis>
</VideoAnalyticsMessage>

```

7.5 Scenario: Count People Looking at Video Game on Endcap

Brief Description

Provide feedback to manufacturer about packaging to help them adjust their packaging to make more effective sales.

Scenario Description

150 people look at a video game on an endcap...report to manufacture for compensation.

Pre-Conditions

Post-Conditions

Data

Domain View

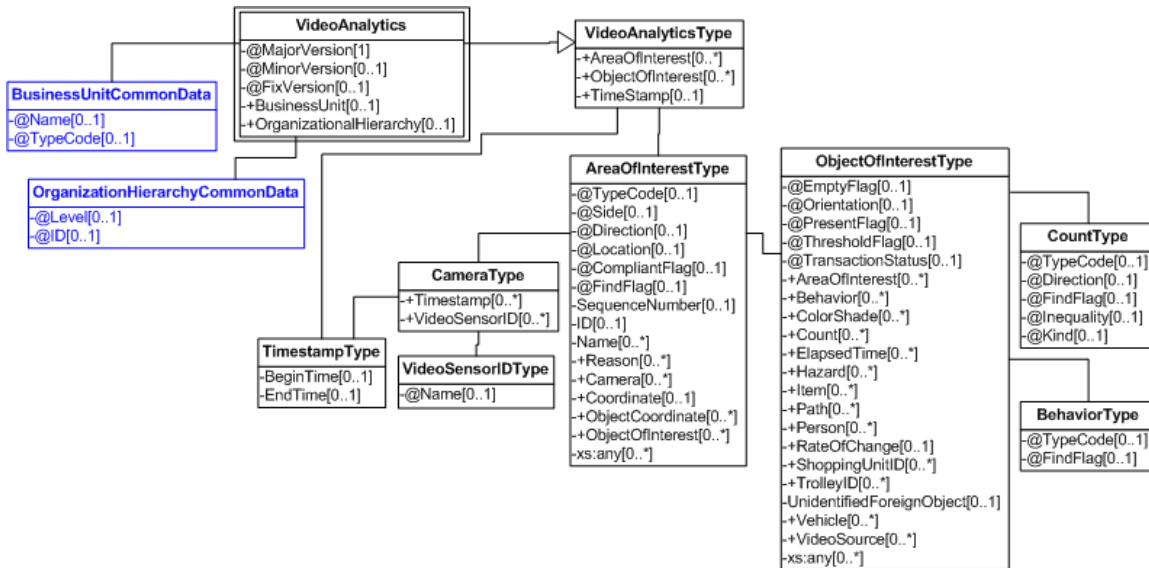


Figure 44: Count People Playing Video Game on Endcap Domain View

Event

ARTS XML Conformance XML Instance Document – Count People Playing Video Game on Endcap – Event

```
<?xml version="1.0" encoding="UTF-8"?>
<VideoAnalyticsEvent xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.omg.org/retail/VideoAnalytics/namespace/
  ../VideoAnalyticsEventV1.0.0.xsd"
  xmlns="http://www.omg.org/retail/VideoAnalytics/namespace/" MajorVersion="1" MinorVersion="0"
  FixVersion="0" TypeCode="Security">
  <SequenceNumber>11234</SequenceNumber>
  <EventDateTime>2006-05-04T18:13:51.0Z</EventDateTime>
  <SourceURI>Camera 1</SourceURI>
  <VideoAnalytic>
    <AreaOfInterest TypeCode="EndCap">
      <!-- Endcap -->
      <ID>4</ID>
      <ObjectOfInterest>
        <Behavior TypeCode="LookAt"/>
        <Count Kind="Individuals">10</Count>
      </ObjectOfInterest>
    </AreaOfInterest>
  </VideoAnalytic>
</VideoAnalyticsEvent>
```

Request/Response

ARTS XML Conformance XML Instance Document – Count People Playing Video Game on Endcap – Request

```
<?xml version="1.0" encoding="UTF-8"?>
<VideoAnalyticsMessage xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.omg.org/retail/VideoAnalytics/namespace/
  ../VideoAnalyticsMessageOrientedV1.0.0.xsd"
  xmlns="http://www.omg.org/retail/VideoAnalytics/namespace/" MajorVersion="1" MinorVersion="0"
  FixVersion="0">
  <ARTSHeader ActionCode="Read" MessageType="Request">
    <MessageID>12345678</MessageID>
    <DateTime>2006-05-04T18:13:51.0Z</DateTime>
  </ARTSHeader>
  <VideoAnalysis>
    <AreaOfInterest TypeCode="EndCap">
      <!-- Endcap -->
      <ID>4</ID>
      <Camera>
        <TimeStamp>
          <BeginTime>2006-05-04T10:00:00.0Z</BeginTime>
          <EndTime>2006-05-04T10:15:00.0Z</EndTime>
        </TimeStamp>
      </Camera>
      <ObjectOfInterest>
        <Behavior TypeCode="LookAt"/>
        <Count FindFlag="true" Kind="Individuals" xsi:nil="true"/>
      </ObjectOfInterest>
    </AreaOfInterest>
  </VideoAnalysis>
</VideoAnalyticsMessage>
```

ARTS XML Conformance XML Instance Document – Count People Playing Video Game on Endcap – Response

```
<?xml version="1.0" encoding="UTF-8"?>
<VideoAnalyticsMessage xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.omg.org/retail/VideoAnalytics/namespace/
  ../VideoAnalyticsMessageOrientedV1.0.0.xsd"
  xmlns="http://www.omg.org/retail/VideoAnalytics/namespace/"
  MajorVersion="1" MinorVersion="0" FixVersion="0">
  <ARTSHeader ActionCode="Read" MessageType="Response">
    <MessageID>987654</MessageID>
    <DateTime>2006-05-04T18:15:51.0Z</DateTime>
    <Response ResponseCode="OK">
      <RequestID>12345678</RequestID>
    </Response>
  </ARTSHeader>
  <VideoAnalysis>
    <AreaOfInterest TypeCode="EndCap">
      <!-- Endcap -->
      <ID>4</ID>
      <Camera>
        <TimeStamp>
          <BeginTime>2006-05-04T10:00:00.0Z</BeginTime>
          <EndTime>2006-05-04T10:15:00.0Z</EndTime>
        </TimeStamp>
      </Camera>
      <ObjectOfInterest>
        <Behavior TypeCode="LookAt"/>
        <Count Kind="Individuals">150</Count>
      </ObjectOfInterest>
    </AreaOfInterest>
  </VideoAnalysis>
</VideoAnalyticsMessage>
```

8 Use Case: Training

8.1 Scenario: Measure Customer-Associate Interaction Time

Brief Description

Measuring the time an associate is interacting with a customer.

Pre-Conditions

Post-Conditions

Query- Measure the amount of time a specific associate spends interacting with a customer.

Request

Date/Time range

Area of Interest (could be all the cameras in the store)

Object of Interest (Person – associate (ID). Behavior - Grouping. Duration - threshold)

Object of Interest (Person – customer)

Response

Date/Time range

VideoSensorID

Area of Interest

Object of Interest (Person – associate. Behavior - Grouping. Duration - threshold)

Object of Interest (Person – customer)

Domain View

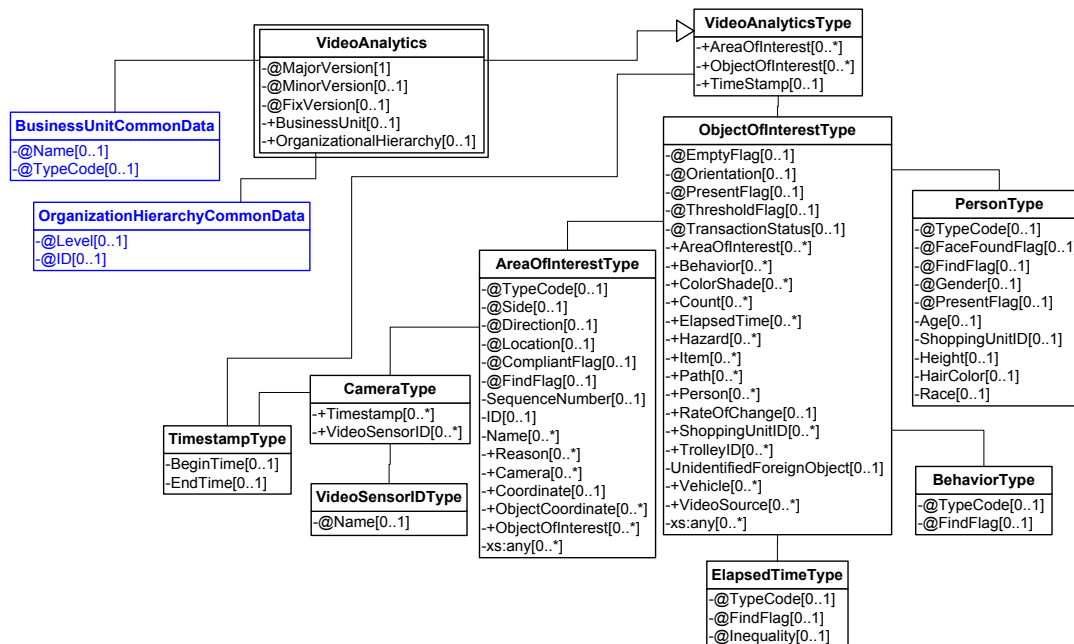


Figure 45: Training Domain View

Request/Response

ARTS XML Conformance XML Instance Document – Measure Customer – Associate Interaction Time – Request

```
<?xml version="1.0" encoding="UTF-8"?>
<VideoAnalyticsMessage xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.omg.org/retail/VideoAnalytics/namespace/
  ../VideoAnalyticsMessageOrientedV1.0.0.xsd"
  xmlns="http://www.omg.org/retail/VideoAnalytics/namespace/" MajorVersion="1" MinorVersion="0"
  FixVersion="0">
  <ARTSHeader ActionCode="Read" MessageType="Request">
    <MessageID>12345678</MessageID>
    <DateTime>2006-05-04T18:13:51.0Z</DateTime>
  </ARTSHeader>
  <VideoAnalysis>
    <ObjectOfInterest>
      <!-- What interacting means will be dependent upon the individual VA system -->
      <Behavior TypeCode="Interacting"/>
      <ElapsedTime FindFlag="true" xsi:nil="true"/>
      <Person TypeCode="Associate"/>
      <Person TypeCode="Customer"/>
    </ObjectOfInterest>
    <TimeStamp>
      <BeginTime>2006-05-04T18:00:00.0Z</BeginTime>
      <EndTime>2006-05-04T18:15:00.0Z</EndTime>
    </TimeStamp>
  </VideoAnalysis>
</VideoAnalyticsMessage>
```

ARTS XML Conformance XML Instance Document – Measure Customer-Associate Interaction Time – Response

```
<?xml version="1.0" encoding="UTF-8"?>
<VideoAnalyticsMessage xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.omg.org/retail/VideoAnalytics/namespace/
  ../VideoAnalyticsMessageOrientedV1.0.0.xsd"
  xmlns="http://www.omg.org/retail/VideoAnalytics/namespace/"
  MajorVersion="1" MinorVersion="0" FixVersion="0">
  <ARTSHeader ActionCode="Read" MessageType="Response">
    <MessageID>987654</MessageID>
    <DateTime>2006-05-04T18:15:51.0Z</DateTime>
    <Response ResponseCode="OK">
      <RequestID>12345678</RequestID>
    </Response>
  </ARTSHeader>
  <VideoAnalysis>
    <ObjectOfInterest>
      <!-- What interacting means will be dependent upon the individual VA system -->
      <Behavior TypeCode="Interacting"/>
      <ElapsedTime TypeCode="Actual">05:02:00</ElapsedTime>
      <Person TypeCode="Associate"/>
      <Person TypeCode="Customer"/>
    </ObjectOfInterest>
    <TimeStamp>
      <BeginTime>2006-05-04T18:00:00.0Z</BeginTime>
      <EndTime>2006-05-04T18:15:00.0Z</EndTime>
    </TimeStamp>
  </VideoAnalysis>
</VideoAnalyticsMessage>
```

9 Use Case : Product Restocking

9.1 Scenario: Product Restocking

Brief Description

Does an endcap need product restocked?

Pre-Conditions

Post-Conditions

Data

Domain View

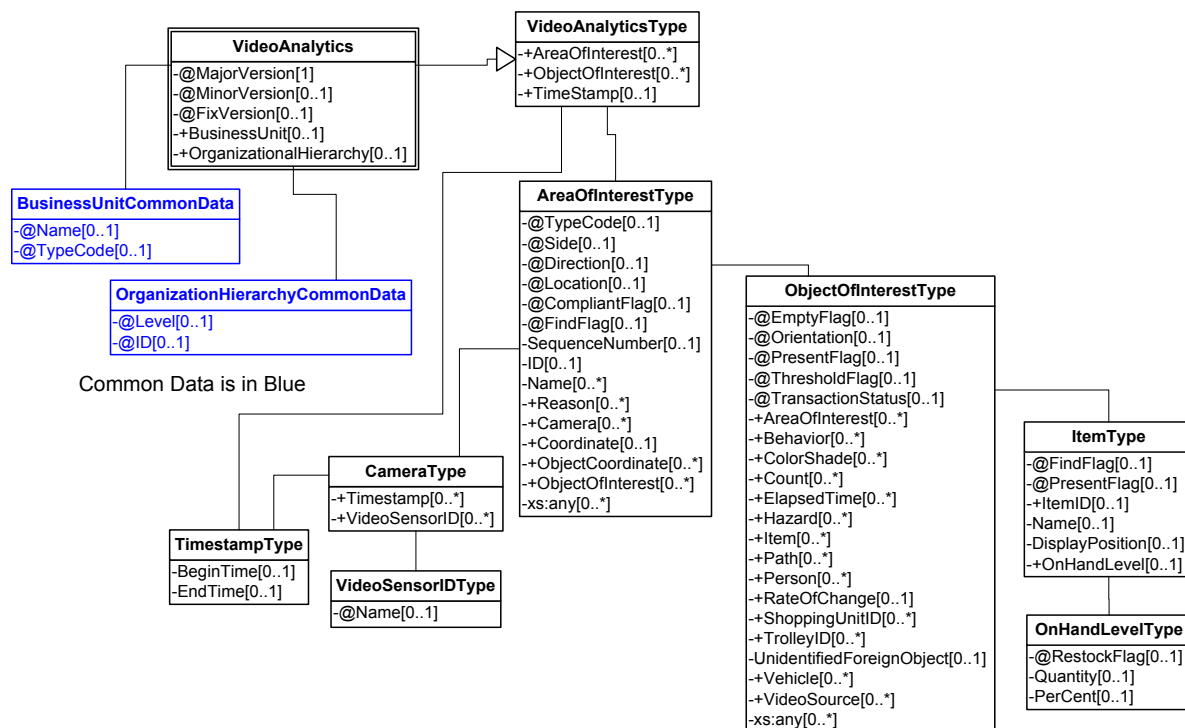


Figure 46: Product Restocking Domain View

Event

ARTS XML Conformance XML Instance Document – Product Restocking – Event

```

<?xml version="1.0" encoding="UTF-8"?>
<VideoAnalyticsEvent xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.omg.org/retail/VideoAnalytics/namespace/
  ../VideoAnalyticsEventV1.0.0.xsd"
  xmlns="http://www.omg.org/retail/VideoAnalytics/namespace/" MajorVersion="1" MinorVersion="0"
  FixVersion="0" TypeCode="Compliance">
  <SequenceNumber>11234</SequenceNumber>
  <EventDateTime>2006-05-04T18:13:51.0Z</EventDateTime>
  <SourceURI>Camera 1</SourceURI>
  <VideoAnalytic>
    <AreaOfInterest TypeCode="EndCap">

```

```

        <!-- ID of the end cap in question -->
        <ID>110</ID>
        <!-- The items on this endcap went below and it needs restocking -->
        <ObjectOfInterest ThresholdFlag="true">
            <Count Kind="Items" Inequality="LessThan">5</Count>
            <Item>
                <OnHandLevel RestockFlag="true"/>
            </Item>
        </ObjectOfInterest>
    </AreaOfInterest>
</VideoAnalytic>
</VideoAnalyticsEvent>

```

ARTS XML Conformance XML Instance Document – Product Restocked – Event

```

<?xml version="1.0" encoding="UTF-8"?>
<VideoAnalyticsEvent xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
    xsi:schemaLocation="http://www.omg.org/retail/VideoAnalytics/namespace/
    ../VideoAnalyticsEventV1.0.0.xsd"
    xmlns="http://www.omg.org/retail/VideoAnalytics/namespace/" MajorVersion="1" MinorVersion="0"
    FixVersion="0" TypeCode="Compliance">
    <SequenceNumber>11234</SequenceNumber>
    <EventDateTime>2006-05-04T18:13:51.0Z</EventDateTime>
    <SourceURI>Camera 1</SourceURI>
    <VideoAnalytic>
        <AreaOfInterest TypeCode="EndCap">
            <!-- ID of the end cap in question -->
            <ID>110</ID>
            <!-- The items on this endcap was restocked -->
            <ObjectOfInterest ThresholdFlag="true">
                <Count Kind="Items" Inequality="GreaterThan">5</Count>
            </ObjectOfInterest>
        </AreaOfInterest>
    </VideoAnalytic>
</VideoAnalyticsEvent>

```

Request/Response

ARTS XML Conformance XML Instance Document – Product Restocking – Request

```

<?xml version="1.0" encoding="UTF-8"?>
<VideoAnalyticsMessage xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
    xsi:schemaLocation="http://www.omg.org/retail/VideoAnalytics/namespace/
    ../VideoAnalyticsMessageOrientedV1.0.0.xsd"
    xmlns="http://www.omg.org/retail/VideoAnalytics/namespace/" MajorVersion="1" MinorVersion="0"
    FixVersion="0">
    <ARTSHeader ActionCode="Read" MessageType="Request">
        <MessageID>12345678</MessageID>
        <DateTime>2006-05-04T18:13:51.0Z</DateTime>
    </ARTSHeader>
    <VideoAnalysis>
        <AreaOfInterest TypeCode="EndCap">
            <!-- ID of the end cap in question -->
            <ID>110</ID>
            <Camera>
                <TimeStamp>
                    <BeginTime>2006-05-04T15:00:00.0Z</BeginTime>
                    <EndTime>2006-05-04T15:15:00.0Z</EndTime>
                </TimeStamp>
                <VideoSensorID>05</VideoSensorID>
            </Camera>
            <ObjectOfInterest ThresholdFlag="true">
                <Count Kind="Items" FindFlag="true" xsi:nil="true"/>
            </ObjectOfInterest>
        </AreaOfInterest>
    </VideoAnalysis>
</VideoAnalyticsMessage>

```

```

    </ObjectOfInterest>
  </AreaOfInterest>
</VideoAnalysis>
</VideoAnalyticsMessage>

```

ARTS XML Conformance XML Instance Document – Product Restocking – Response

```

<?xml version="1.0" encoding="UTF-8"?>
<VideoAnalyticsMessage xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.omg.org/retail/VideoAnalytics/namespace/
  ../VideoAnalyticsMessageOrientedV1.0.0.xsd"
  xmlns="http://www.omg.org/retail/VideoAnalytics/namespace/"
  MajorVersion="1" MinorVersion="0" FixVersion="0">
  <ARTSHeader ActionCode="Read" MessageType="Response">
    <MessageID>987654</MessageID>
    <DateTime>2006-05-04T18:15:51.0Z</DateTime>
    <Response ResponseCode="OK">
      <RequestID>12345678</RequestID>
    </Response>
  </ARTSHeader>
  <VideoAnalysis>
    <AreaOfInterest TypeCode="EndCap">
      <!-- ID of the end cap in question -->
      <ID>110</ID>
      <Camera>
        <TimeStamp>
          <BeginTime>2006-05-04T15:00:00.0Z</BeginTime>
          <EndTime>2006-05-04T15:15:00.0Z</EndTime>
        </TimeStamp>
        <VideoSensorID>05</VideoSensorID>
      </Camera>
      <!-- The quantity of items on this endcap fell below the threshold and need
restocking -->
      <ObjectOfInterest ThresholdFlag="true">
        <Count Kind="Items" Inequality="LessThan">5</Count>
        <Item>
          <OnHandLevel RestockFlag="true"/>
        </Item>
      </ObjectOfInterest>
    </AreaOfInterest>
  </VideoAnalysis>
</VideoAnalyticsMessage>

```

9.2 Scenario: People Loitering – Customer Service Opportunity

Brief Description

Customer needs help with an electronics item providing a Customer Service Opportunity.

Pre-Conditions

Post-Conditions

Data

Domain View

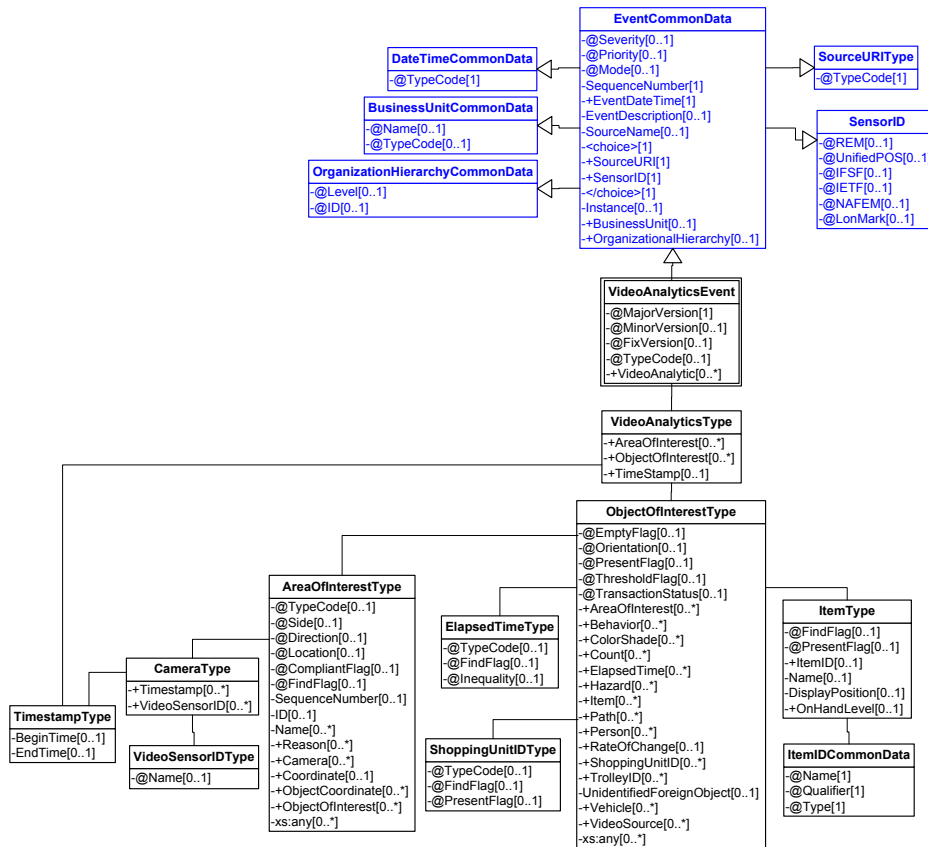


Figure 47: People Loitering – Customer Service Opportunity Domain View

Event

ARTS XML Conformance XML Instance Document – People Loitering – Event

```

<?xml version="1.0" encoding="UTF-8"?>
<VideoAnalyticsEvent xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.omg.org/retail/VideoAnalytics/namespace/
  ../VideoAnalyticsEventV1.0.0.xsd"
  xmlns="http://www.omg.org/retail/VideoAnalytics/namespace/" MajorVersion="1" MinorVersion="0"
  FixVersion="0" TypeCode="Staffing">
  <SequenceNumber>11234</SequenceNumber>
  <EventDateTime>2006-05-04T18:13:51.0Z</EventDateTime>
  <SourceURI>Camera 1</SourceURI>
  <VideoAnalytic>
    <AreaOfInterest TypeCode="CameraView">
      <Name>Isle 1</Name>
      <ObjectOfInterest>
        <Behavior TypeCode="Lingering"/>
        <ElapsedTime TypeCode="Actual">10:00:00.000</ElapsedTime>
        <ShoppingUnitID TypeCode="Individual"/>
      </ObjectOfInterest>
    </AreaOfInterest>
  </VideoAnalytic>
</VideoAnalyticsEvent>

```


9.3 Scenario: People Loitering – Loss Prevention

Brief Description

Customer lingers beyond a specified length of time in front of locked fragrance or electronics cabinet - either needs assistance or is a break-in in process.

Pre-Conditions

Post-Conditions

Data

Domain View

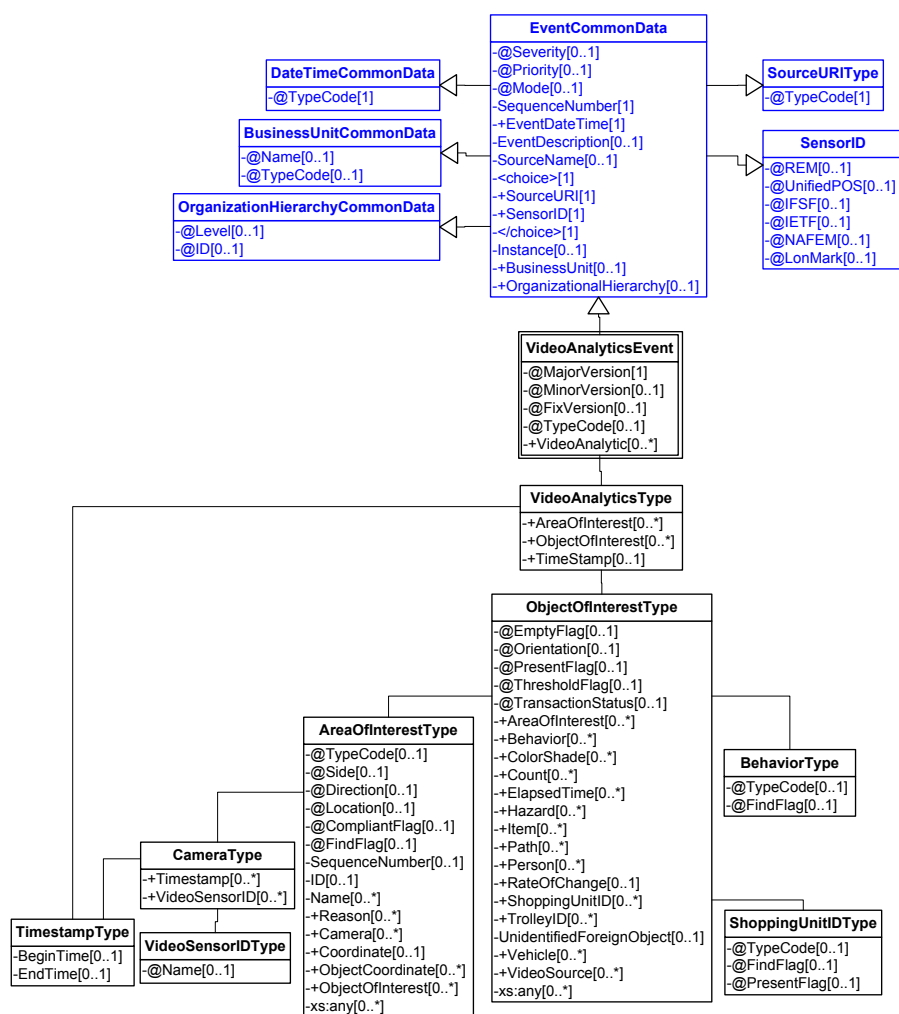


Figure 48: People Loitering – Loss Prevention Domain View

Event

ARTS XML Conformance XML Instance Document – People Loitering – Loss Prevention

```

<?xml version="1.0" encoding="UTF-8"?>
<VideoAnalyticsEvent xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.omg.org/retail/VideoAnalytics/namespace/
  ../VideoAnalyticsEventV1.0.0.xsd"
  xmlns="http://www.omg.org/retail/VideoAnalytics/namespace/" MajorVersion="1" MinorVersion="0"
  FixVersion="0" TypeCode="Security">
  
```

```
<SequenceNumber>11234</SequenceNumber>
<EventDateTime>2006-05-04T18:13:51.0Z</EventDateTime>
<SourceURI>Camera 1</SourceURI>
<VideoAnalytic>
  <ObjectOfInterest>
    <AreaOfInterest TypeCode="Zone" Direction="Toward">
      <Name>Fragrance Cabinet</Name>
    </AreaOfInterest>
    <Behavior TypeCode="Lingering"/>
    <ElapsedTime TypeCode="Actual">10:00:00.000</ElapsedTime>
    <ShoppingUnitID TypeCode="Individual"/>
  </ObjectOfInterest>
</VideoAnalytic>
</VideoAnalyticsEvent>
```

10 Use Case: Product Affinity Analysis

10.1 Scenario: Identify other products purchased by identifying which drove purchase of the other

Brief Description

A female customer purchased a tube of toothpaste and then purchased a toothbrush.

Pre-Conditions

Post-Conditions

Data

Query- Identify customers who purchase two related products.

Request

Date/Time range

Area of Interest (Merchandise location)

Area of Interest (Merchandise location)

Object of Interest (Merchandise)

Object of Interest (Merchandise)

Response

Date/Time

VideoSensorID

Area of Interest

Object of Interest (Person)

Domain View

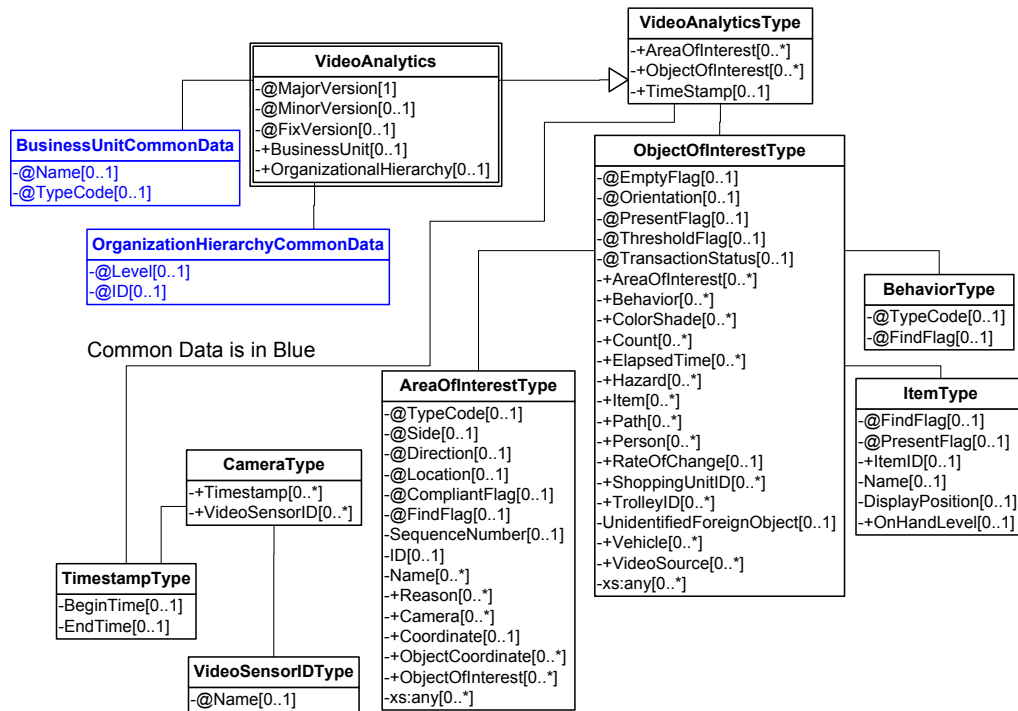


Figure 49: Product Affinity Analysis Domain View

Request/Response

ARTS XML Conformance XML Instance Document – Product Affinity Analysis – Request

```

<?xml version="1.0" encoding="UTF-8"?>
<VideoAnalyticsMessage xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.omg.org/retail/VideoAnalytics/namespace/
  ../VideoAnalyticsMessageOrientedV1.0.0.xsd"
  xmlns="http://www.omg.org/retail/VideoAnalytics/namespace/" MajorVersion="1" MinorVersion="0"
  FixVersion="0">
  <ARTSHeader ActionCode="Read" MessageType="Request">
    <MessageID>12345678</MessageID>
    <DateTime>2006-05-04T18:13:51.0Z</DateTime>
  </ARTSHeader>
  <VideoAnalysis>
    <ObjectOfInterest>
      <AreaOfInterest TypeCode="EndCap">
        <!-- This is the id for the end cap in question -->
        <ID>4</ID>
        <Camera>
          <TimeStamp>
            <BeginTime>2006-05-04T10:00:00.0Z</BeginTime>
            <EndTime>2006-05-04T10:15:00.0Z</EndTime>
          </TimeStamp>
          <!-- This is the camera focused on the end cap -->
          <VideoSensorID>101</VideoSensorID>
        </Camera>
      </AreaOfInterest>
      <Behavior TypeCode="PickUp"/>
      <Item FindFlag="true"/>
    </ObjectOfInterest>
  </VideoAnalysis>
</VideoAnalyticsMessage>
  
```

ARTS XML Conformance XML Instance Document – Product Affinity Analysis – Response

```
<?xml version="1.0" encoding="UTF-8"?>
<VideoAnalyticsMessage xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.omg.org/retail/VideoAnalytics/namespace/
  ../VideoAnalyticsMessageOrientedV1.0.0.xsd"
  xmlns="http://www.omg.org/retail/VideoAnalytics/namespace/" MajorVersion="1" MinorVersion="0"
  FixVersion="0">
  <ARTSHeader ActionCode="Read" MessageType="Response">
    <MessageID>987654</MessageID>
    <DateTime>2006-05-04T18:15:51.0Z</DateTime>
    <Response ResponseCode="OK">
      <RequestID>12345678</RequestID>
    </Response>
  </ARTSHeader>
  <VideoAnalysis>
    <!-- The timestamp tells which item is picked up first -->
    <!-- Toothpaste -->
    <ObjectOfInterest>
      <AreaOfInterest TypeCode="EndCap">
        <!-- This is the id for the end cap in question -->
        <ID>4</ID>
        <Camera>
          <TimeStamp>
            <BeginTime>2006-05-04T10:10:35.0Z</BeginTime>
          </TimeStamp>
          <!-- This is the camera focused on the end cap -->
          <VideoSensorID>101</VideoSensorID>
        </Camera>
      </AreaOfInterest>
      <Behavior TypeCode="PickUp"/>
      <!-- Toothpaste -->
      <Item>
        <ItemID>123</ItemID>
      </Item>
    </ObjectOfInterest>
    <!-- Toothbrush -->
    <ObjectOfInterest>
      <AreaOfInterest TypeCode="EndCap">
        <!-- This is the id for the end cap in question -->
        <ID>4</ID>
        <Camera>
          <TimeStamp>
            <BeginTime>2006-05-04T10:10:55.0Z</BeginTime>
          </TimeStamp>
          <!-- This is the camera focused on the end cap -->
          <VideoSensorID>101</VideoSensorID>
        </Camera>
      </AreaOfInterest>
      <Behavior TypeCode="PickUp"/>
      <!-- Toothbrush -->
      <Item>
        <ItemID>543</ItemID>
      </Item>
    </ObjectOfInterest>
  </VideoAnalysis>
</VideoAnalyticsMessage>
```

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11 Use Case: Operations

11.1 Scenario: Labor Management

Brief Description

100 people come in the front door at 10:00, 15 minutes later they will need to check out and the store will need 10 more associates to move from stocking to checking.

Pre-Conditions

Post-Conditions

Data

Event – 100 people enter store within set period of time

Date/Time

Area of Interest

Object of Interest (Person)

DurationType

Elapsed

Request – When did 100 or more people enter store within X amount of time

Date/Time range

Area of Interest

Object of Interest (Person)

DurationType

Elapsed

Response (Threshold met for associate increase event)

Date/Time

VideoSensorID

Area of Interest

Domain View

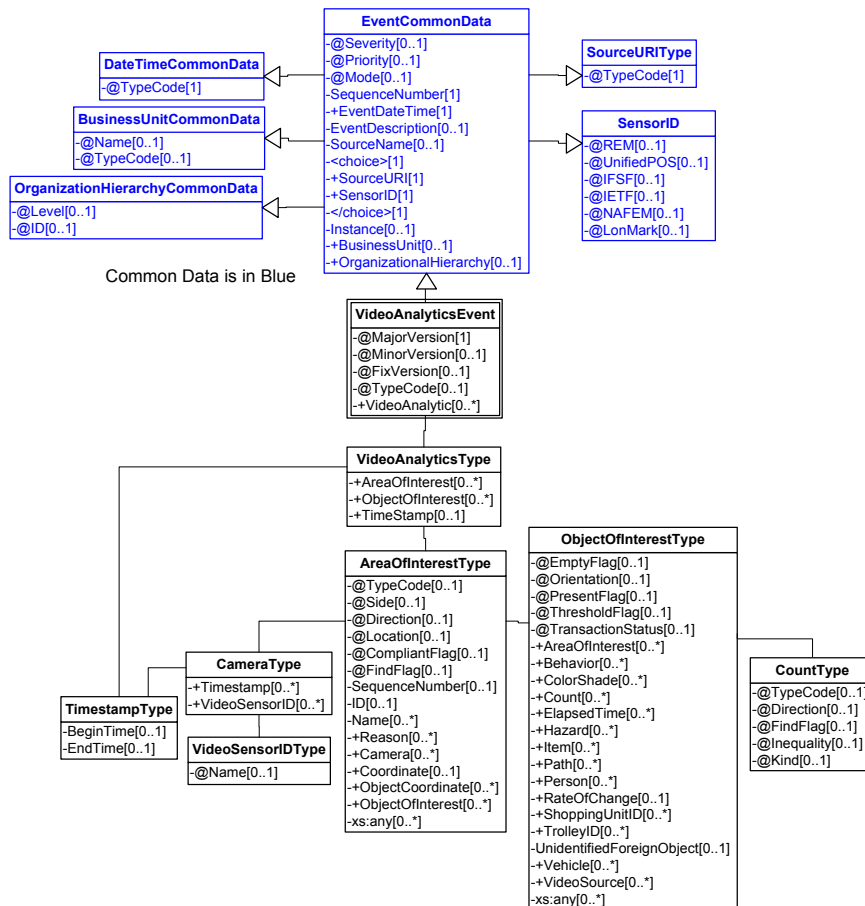


Figure 50: Labor Management Domain View

Event

ARTS XML Conformance XML Instance Document – Labor Management – Event

```
<?xml version="1.0" encoding="UTF-8"?>
<VideoAnalyticsEvent xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.omg.org/retail/VideoAnalytics/namespace/
  ../VideoAnalyticsEventV1.0.0.xsd"
  xmlns="http://www.omg.org/retail/VideoAnalytics/namespace/" MajorVersion="1" MinorVersion="0"
  FixVersion="0" TypeCode="Staffing">
  <SequenceNumber>11234</SequenceNumber>
  <EventDateTime>2006-05-04T18:13:51.0Z</EventDateTime>
  <SourceURI>Camera 1</SourceURI>
  <VideoAnalytic>
    <!-- 100 individuals enter the front door at 10 am -->
    <AreaOfInterest TypeCode="Boundary" Location="Entry">
      <Name>Front Door</Name>
      <ObjectOfInterest ThresholdFlag="true">
        <Count TypeCode="Actual" Kind="Individuals">100</Count>
      </ObjectOfInterest>
    </AreaOfInterest>
    <!-- The timestamp for when 100 people have entered -->
    <TimeStamp>
      <BeginTime>2006-05-04T10:00:00.0Z </BeginTime>
    </TimeStamp>
  </VideoAnalytic>
</VideoAnalyticsEvent>
```


12 Use Case : Store Layout

12.1 Scenario: Traffic Patterns

Brief Description

Identify the traffic patterns to determine the most used and unused entrances and exits from a store, department, or zone. Determine how these flows change at different times or on different days.

Pre-Conditions

Post-Conditions

Data

Request – Number of people entering or exiting Area of Interest

Date/Time range

Area of Interest

Object of Interest (Person)

Count

Response – Quantity of people entering or exiting per request

Date/Time

VideoSensorID

Area of Interest

Object of Interest (person)

Count

Domain View

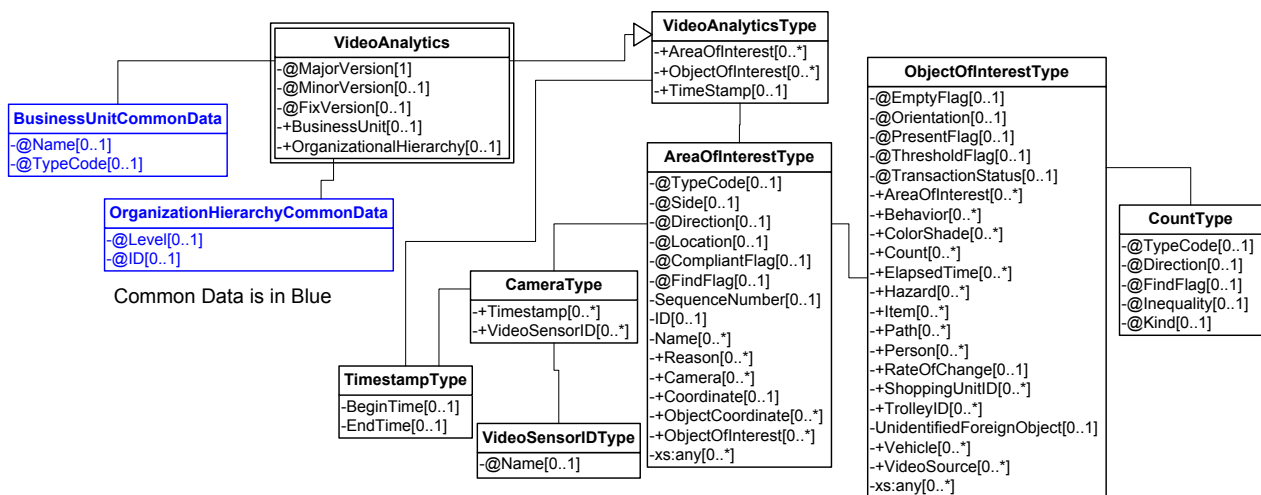


Figure 51: Traffic Patterns Domain View

Event

```
<?xml version="1.0" encoding="UTF-8"?>
<VideoAnalyticsEvent xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.omg.org/retail/VideoAnalytics/namespace/
  ../VideoAnalyticsEventV1.0.0.xsd"
  xmlns="http://www.omg.org/retail/VideoAnalytics/namespace/" MajorVersion="1" MinorVersion="0"
  FixVersion="0" TypeCode="Compliance">
  <SequenceNumber>11234</SequenceNumber>
  <EventDateTime>2006-05-04T18:13:51.0Z</EventDateTime>
  <SourceURI>Camera 1</SourceURI>
  <VideoAnalytic>
    <AreaOfInterest TypeCode="Boundary" Direction="Exit">
      <!-- Front door camera -->
      <ID>Front</ID>
      <Camera>
        <TimeStamp>
          <BeginTime>2006-05-04T18:00:00.0Z</BeginTime>
        </TimeStamp>
        <VideoSensorID>1</VideoSensorID>
      </Camera>
      <!-- an individual exited the front door -->
      <ObjectOfInterest>
        <Count Kind="Individuals" xsi:nil="true"/>
      </ObjectOfInterest>
    </AreaOfInterest>
  </VideoAnalytic>
</VideoAnalyticsEvent>
```

Request/Response

ARTS XML Conformance XML Instance Document – Traffic Patterns – Request

```
<?xml version="1.0" encoding="UTF-8"?>
<VideoAnalyticsMessage xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.omg.org/retail/VideoAnalytics/namespace/
  ../VideoAnalyticsMessageOrientedV1.0.0.xsd"
  xmlns="http://www.omg.org/retail/VideoAnalytics/namespace/"
  MajorVersion="1" MinorVersion="0" FixVersion="0">
  <ARTSHeader ActionCode="Read" MessageType="Request">
    <MessageID>12345678</MessageID>
    <DateTime>2006-05-04T18:13:51.0Z</DateTime>
  </ARTSHeader>
  <VideoAnalysis>
    <AreaOfInterest TypeCode="Boundary" Direction="Exit">
      <!-- Front door camera -->
      <ID>Front</ID>
      <Camera>
        <TimeStamp>
          <BeginTime>2006-05-04T18:00:00.0Z</BeginTime>
          <EndTime>2006-05-04T18:15:00.0Z</EndTime>
        </TimeStamp>
        <VideoSensorID>1</VideoSensorID>
      </Camera>
      <ObjectOfInterest>
        <Count Kind="Individuals" FindFlag="true" xsi:nil="true"/>
      </ObjectOfInterest>
    </AreaOfInterest>
  </VideoAnalysis>
</VideoAnalyticsMessage>
```

ARTS XML Conformance XML Instance Document – Traffic Patterns – Response

```
<?xml version="1.0" encoding="UTF-8"?>
<VideoAnalyticsMessage xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
```

```

    xsi:schemaLocation="http://www.omg.org/retail/VideoAnalytics/namespace/
../VideoAnalyticsMessageOrientedV1.0.0.xsd"
    xmlns="http://www.omg.org/retail/VideoAnalytics/namespace/" MajorVersion="1" MinorVersion="0"
FixVersion="0">
  <ARTSHeader ActionCode="Read" MessageType="Response">
    <MessageID>987654</MessageID>
    <DateTime>2006-05-04T18:15:51.0Z</DateTime>
    <Response ResponseCode="OK">
      <RequestID>12345678</RequestID>
    </Response>
  </ARTSHeader>
  <VideoAnalysis>
    <AreaOfInterest TypeCode="Boundary" Direction="Exit">
      <!-- Front door camera -->
      <ID>Front</ID>
      <Camera>
        <TimeStamp>
          <BeginTime>2006-05-04T18:00:00.0Z</BeginTime>
          <EndTime>2006-05-04T18:15:00.0Z</EndTime>
        </TimeStamp>
        <VideoSensorID>1</VideoSensorID>
      </Camera>
      <!-- 45 individuals exited the front door during this 15 min -->
      <ObjectOfInterest>
        <Count Kind="Individuals">45</Count>
      </ObjectOfInterest>
    </AreaOfInterest>
  </VideoAnalysis>
</VideoAnalyticsMessage>

```

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13 Use Case : Customer Relationship Management (CRM)

13.1 Scenario: Targeted Store Signage

Brief Description

Targeted signage for individuals

Scenario Description

Identify the characteristics of the people who are looking at the sign (zone).

Pre-Conditions

Post-Conditions

Data

Request – Breakdown of who is viewing particular signage in store

Date/Time range

Area of Interest (This would be AOI around sign)

Object of Interest (Person)

PersonType

Response – Who is viewing of selected type

Date/Time

VideoSensorID

Area of Interest

Object of Interest (person)

PersonType

Domain View

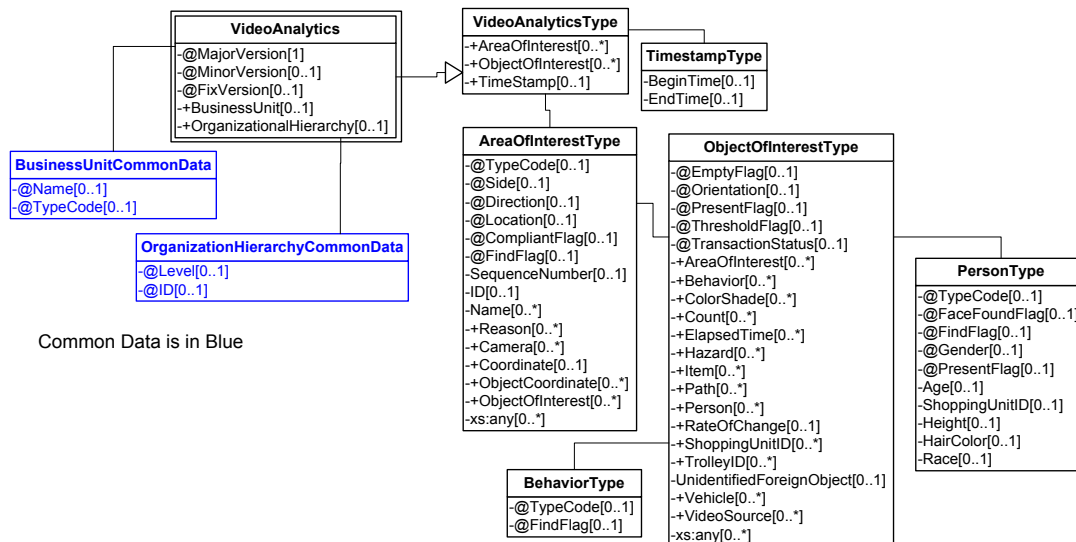


Figure 52: Targeted Store Signage Domain View

Request/Response

ARTS XML Conformance XML Instance Document – Targeted Store Signage – Request

```

<?xml version="1.0" encoding="UTF-8"?>
<VideoAnalyticsMessage xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.omg.org/retail/VideoAnalytics/namespace/
  ../VideoAnalyticsMessageOrientedV1.0.0.xsd"
  xmlns="http://www.omg.org/retail/VideoAnalytics/namespace/" MajorVersion="1" MinorVersion="0"
  FixVersion="0">
  <ARTSHeader ActionCode="Read" MessageType="Request">
    <MessageID>12345678</MessageID>
    <DateTime>2006-05-04T18:13:51.0Z</DateTime>
  </ARTSHeader>
  <VideoAnalysis>
    <AreaOfInterest TypeCode="Zone" Direction="Toward" Side="Left">
      <!-- Signage in question -->
      <ID>666</ID>
      <Camera>
        <TimeStamp>
          <BeginTime>2006-05-04T18:00:00.0Z</BeginTime>
          <EndTime>2006-05-04T18:30:00.0Z</EndTime>
        </TimeStamp>
        <VideoSensorID>509</VideoSensorID>
      </Camera>
      <ObjectOfInterest>
        <Behavior TypeCode="LookAt"/>
        <Person TypeCode="Customer" FindFlag="true"/>
      </ObjectOfInterest>
    </AreaOfInterest>
  </VideoAnalysis>
</VideoAnalyticsMessage>
  
```

ARTS XML Conformance XML Instance Document – Targeted Store Signage – Response

```

<?xml version="1.0" encoding="UTF-8"?>
<VideoAnalyticsMessage xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.omg.org/retail/VideoAnalytics/namespace/
  ../VideoAnalyticsMessageOrientedV1.0.0.xsd"
  
```

```

xmlns="http://www.omg.org/retail/VideoAnalytics/namespace/" MajorVersion="1" MinorVersion="0"
FixVersion="0">
  <ARTSHeader ActionCode="Read" MessageType="Response">
    <MessageID>987654</MessageID>
    <DateTime>2006-05-04T18:15:51.0Z</DateTime>
    <Response ResponseCode="OK">
      <RequestID>12345678</RequestID>
    </Response>
  </ARTSHeader>
  <VideoAnalysis>
    <AreaOfInterest TypeCode="Zone" Direction="Toward" Side="Left">
      <!-- Signage in question -->
      <ID>666</ID>
      <Camera>
        <TimeStamp>
          <BeginTime>2006-05-04T18:00:00.0Z</BeginTime>
          <EndTime>2006-05-04T18:30:00.0Z</EndTime>
        </TimeStamp>
        <VideoSensorID>509</VideoSensorID>
      </Camera>
      <ObjectOfInterest>
        <Behavior TypeCode="LookAt"/>
        <Person TypeCode="Customer" Gender="Women">
          <HairColor>Red</HairColor>
        </Person>
      </ObjectOfInterest>
    </AreaOfInterest>
  </VideoAnalysis>
</VideoAnalyticsMessage>

```

13.2 Scenario: Store Signage – Customer Demographics

Brief Description

Note who is viewing signage.

Scenario Description

Between 10 and 10:15 am identify the average duration women who were looking at the sign in jewelry.

Pre-Conditions

How do we identify what signage? We only identify in which direction the customer is looking.

Post-Conditions

Data

Request – What types of customers is viewing signage

Date/Time range

Area of Interest

Object of Interest (Person)

PersonType

DurationType

Elapsed

Response – Breakdown of Person Type per AOI selected in request

Date/Time
VideoSensorID
Area of Interest
Object of Interest (person)
PersonType
DurationType (How long they viewed signage)
Elapsed

Domain View

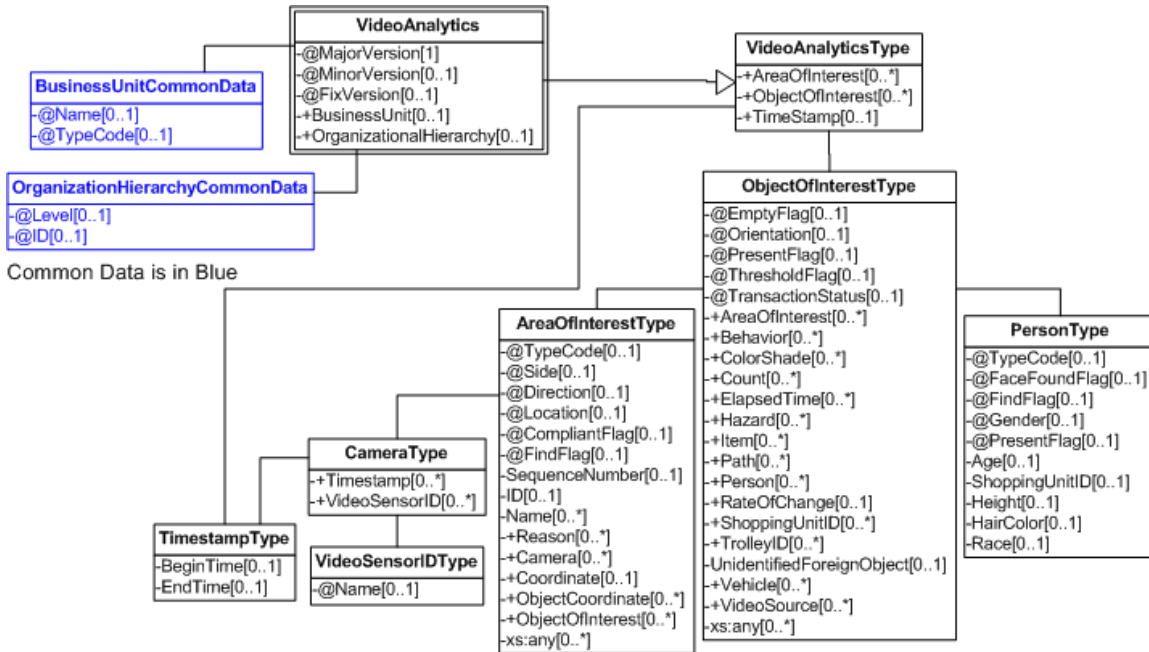


Figure 53: Store Signage - Customer Demographics Domain View

Request/Response

ARTS XML Conformance XML Instance Document – Store Signature – Customer Demographics – Request

```

<?xml version="1.0" encoding="UTF-8"?>
<VideoAnalyticsMessage xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.omg.org/retail/VideoAnalytics/namespace/
  ../VideoAnalyticsMessageOrientedV1.0.0.xsd"
  xmlns="http://www.omg.org/retail/VideoAnalytics/namespace/" MajorVersion="1" MinorVersion="0"
  FixVersion="0">
  <ARTSHeader ActionCode="Read" MessageType="Request">
    <MessageID>12345678</MessageID>
    <DateTime>2006-05-04T18:13:51.0Z</DateTime>
  </ARTSHeader>
  <VideoAnalysis>
    <ObjectOfInterest Orientation="Toward">
      <AreaOfInterest TypeCode="Zone">
        <!-- The id of the sign in jewelry -->
        <ID>5768</ID>
        <Camera>
          <TimeStamp>
            <BeginTime>2006-05-04T10:00:00.0Z</BeginTime>
            <EndTime>2006-05-04T10:15:00.0Z</EndTime>
          </TimeStamp>
        </Camera>
      </AreaOfInterest>
    </ObjectOfInterest>
  </VideoAnalysis>
</VideoAnalyticsMessage>
  
```



```

        <VideoSensorID>Jewelry1</VideoSensorID>
    </Camera>
</AreaOfInterest>
<Behavior TypeCode="LookAt"/>
<ElapsedTime TypeCode="Average" xsi:nil="true"/>
<Person TypeCode="Customer" Gender="Women" FindFlag="true"/>
</ObjectOfInterest>
</VideoAnalysis>
</VideoAnalyticsMessage>

```

ARTS XML Conformance XML Instance Document – Store Signage – Customer Demographics – Response

```

<?xml version="1.0" encoding="UTF-8"?>
<VideoAnalyticsMessage xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
    xsi:schemaLocation="http://www.omg.org/retail/VideoAnalytics/namespace/
    ../VideoAnalyticsMessageOrientedV1.0.0.xsd"
    xmlns="http://www.omg.org/retail/VideoAnalytics/namespace/" MajorVersion="1" MinorVersion="0"
    FixVersion="0">
    <ARTSHeader ActionCode="Read" MessageType="Response">
        <MessageID>987654</MessageID>
        <DateTime>2006-05-04T18:15:51.0Z</DateTime>
        <Response ResponseCode="OK">
            <RequestID>12345678</RequestID>
        </Response>
    </ARTSHeader>
    <VideoAnalysis>
        <ObjectOfInterest Orientation="Toward">
            <AreaOfInterest TypeCode="Zone">
                <!-- The id of the sign in jewelry -->
                <ID>5768</ID>
                <Camera>
                    <TimeStamp>
                        <BeginTime>2006-05-04T10:00:00.0Z</BeginTime>
                        <EndTime>2006-05-04T10:15:00.0Z</EndTime>
                    </TimeStamp>
                    <VideoSensorID>Jewelry1</VideoSensorID>
                </Camera>
            </AreaOfInterest>
            <Behavior TypeCode="LookAt"/>
            <ElapsedTime TypeCode="Average" xsi:nil="true"/>
            <Person TypeCode="Customer" Gender="Women">
                <HairColor>Red</HairColor>
            </Person>
        </ObjectOfInterest>
    </VideoAnalysis>
</VideoAnalyticsMessage>

```

13.3 Scenario: Shopper Segmentation Profile

Brief Description

This ad for this soft drink affects buying patterns for this 14-year-old male. The VA system is queried to determine how many people looked at the add for over a configured elapsed time.

Pre-Conditions

How do we identify what ad? We only identify in which direction the customer is looking.

Post-Conditions

Data

Request – How many 14-year-old males viewed soft drink sign

Date/Time range

Area of Interest

ObjectofInterest (Person)

PersonType

Gender

Age

DurationType

Elapsed

Response – Results of request

Date/Time

VideoSensorID

Area of Interest

Object of Interest (person)

PersonType

Gender

Age

Count

DurationType (How long they viewed signage)

Elapsed

Domain View

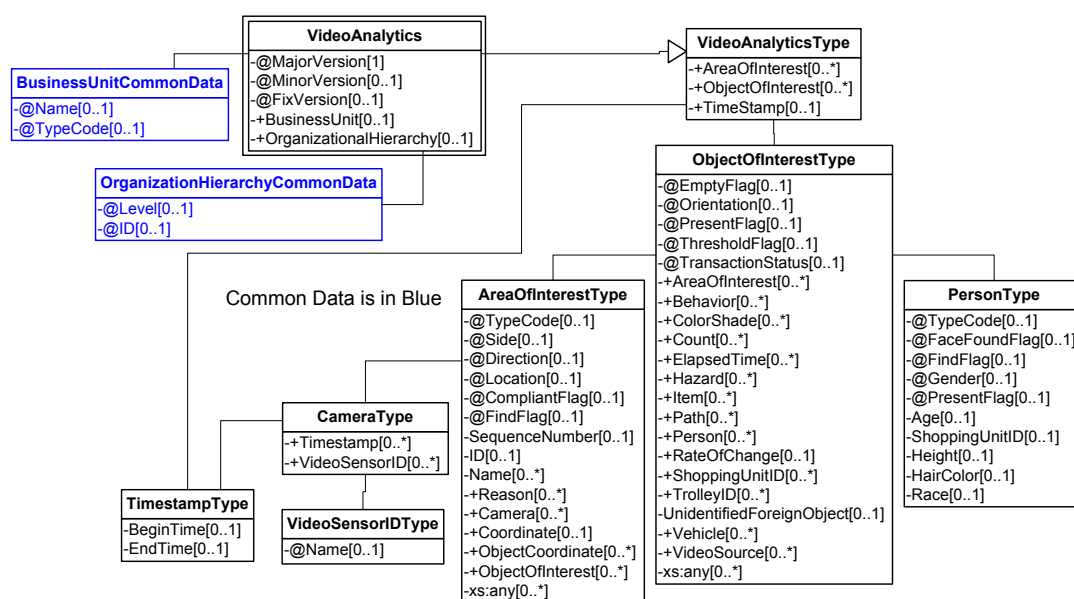


Figure 54: Shopper Segmentation Profile Domain View

Request/Response

ARTS XML Conformance XML Instance Document – Shopper Segmentation Profile – Request

```
<?xml version="1.0" encoding="UTF-8"?>
<VideoAnalyticsMessage xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.omg.org/retail/VideoAnalytics/namespace/
  ../VideoAnalyticsMessageOrientedV1.0.0.xsd"
  xmlns="http://www.omg.org/retail/VideoAnalytics/namespace/" MajorVersion="1" MinorVersion="0"
  FixVersion="0">
  <ARTSHeader ActionCode="Read" MessageType="Request">
    <MessageID>12345678</MessageID>
    <DateTime>2006-05-04T18:13:51.0Z</DateTime>
  </ARTSHeader>
  <VideoAnalysis>
    <ObjectOfInterest Orientation="Toward">
      <AreaOfInterest TypeCode="Zone">
        <!-- This is the ID of the Zone which contains the sign -->
        <ID>2357</ID>
        <Camera>
          <TimeStamp>
            <BeginTime>2006-05-04T10:00:00.0Z</BeginTime>
            <EndTime>2006-05-04T10:15:00.0Z</EndTime>
          </TimeStamp>
          <!-- Camera pointing at the area around the sign -->
          <VideoSensorID>3987</VideoSensorID>
        </Camera>
      </AreaOfInterest>
      <Behavior TypeCode="LookAt"/>
      <Count TypeCode="Actual" Kind="Individuals" FindFlag="true" xsi:nil="true"/>
      <ElapsedTime TypeCode="Average" FindFlag="true" xsi:nil="true"/>
      <Person Gender="Boy">
        <Age>14</Age>
      </Person>
    </ObjectOfInterest>
  </VideoAnalysis>
</VideoAnalyticsMessage>
```

ARTS XML Conformance XML Instance Document – Shopper Segmentation Profile – Response

```
<?xml version="1.0" encoding="UTF-8"?>
<VideoAnalyticsMessage xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.omg.org/retail/VideoAnalytics/namespace/
  ../VideoAnalyticsMessageOrientedV1.0.0.xsd"
  xmlns="http://www.omg.org/retail/VideoAnalytics/namespace/"
  MajorVersion="1" MinorVersion="0" FixVersion="0">
  <ARTSHeader ActionCode="Read" MessageType="Response">
    <MessageID>987654</MessageID>
    <DateTime>2006-05-04T18:15:51.0Z</DateTime>
    <Response ResponseCode="OK">
      <RequestID>12345678</RequestID>
    </Response>
  </ARTSHeader>
  <VideoAnalysis>
    <ObjectOfInterest Orientation="Toward">
      <AreaOfInterest TypeCode="Zone">
        <!-- This is the ID of the Zone which contains the sign -->
        <ID>2357</ID>
        <Camera>
          <TimeStamp>
```

```
        <BeginTime>2006-05-04T10:00:00.0Z</BeginTime>
        <EndTime>2006-05-04T10:15:00.0Z</EndTime>
    </TimeStamp>
    <!-- Camera pointing at the area around the sign -->
    <VideoSensorID>3987</VideoSensorID>
</Camera>
</AreaOfInterest>
<Behavior TypeCode="LookAt"/>
<Count TypeCode="Actual" Kind="Individuals">10</Count>
<ElapsedTime TypeCode="Average">00:10:00</ElapsedTime>
<Person Gender="Boy">
    <Age>14</Age>
</Person>
</ObjectOfInterest>
</VideoAnalysis>
</VideoAnalyticsMessage>
```

14 Use Case : Inventory Management

14.1 Scenario: Empty, Partially Empty Shelves

Brief Description

Shelf falls below 50% capacity notify the store manager–

Pre-Conditions

Post-Conditions

Data

Event – Alert when a shelf/display falls below capacity threshold

Type Compliance

Date/Time

Area of Interest (shelf/display)

Capacity (ThresholdFlag – says a threshold was reached. What threshold requires decoding the information)

Request – Find when a shelf/display fell below capacity threshold

Date/Time range

Area of Interest (shelf/display)

Capacity threshold

Response

Date/Time

Area of Interest (shelf/display)

Capacity

Domain View

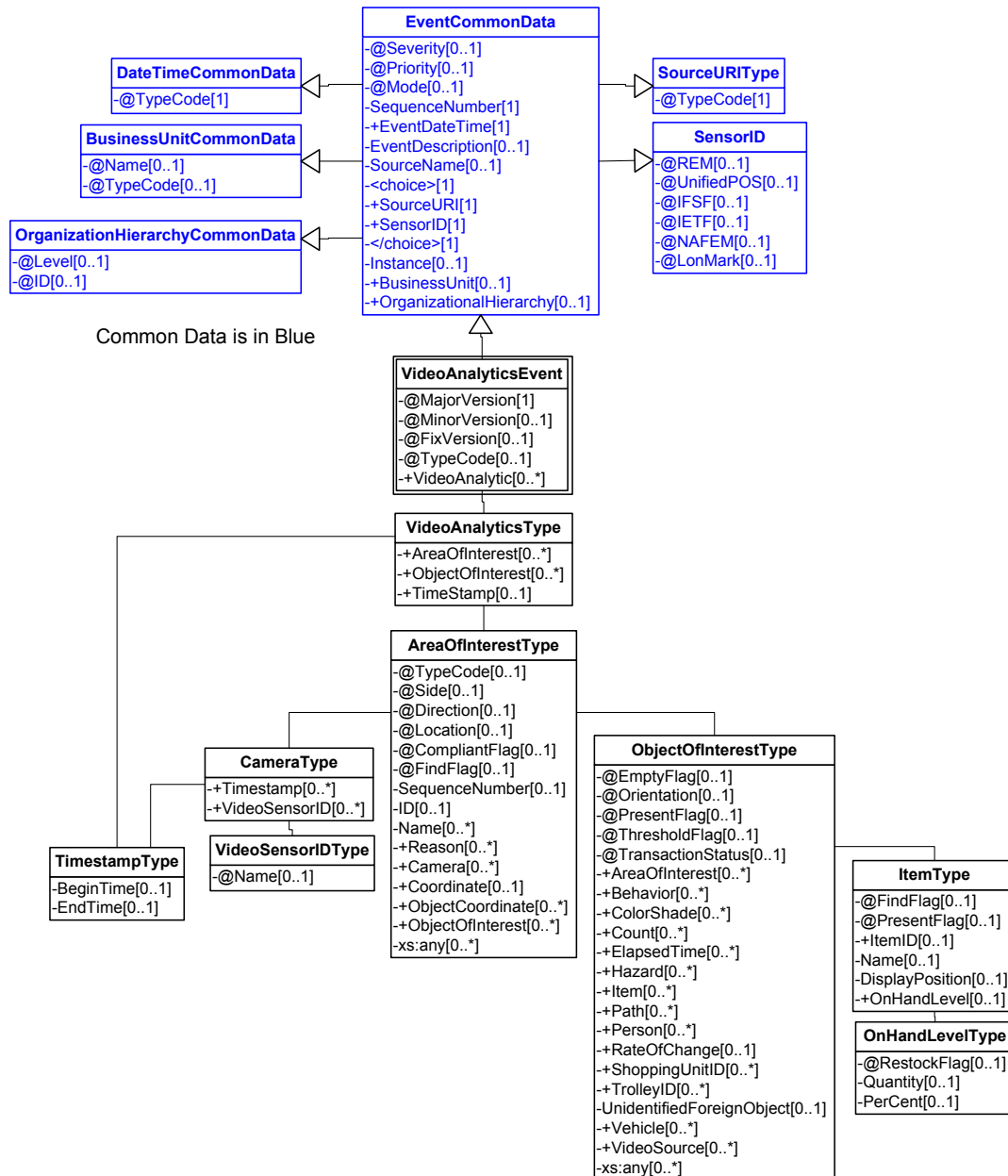


Figure 55: Empty, Partially Empty Shelves Domain View

Event

ARTS XML Conformance XML Instance Document – Empty, Partially Empty Shelves – Event

```

<?xml version="1.0" encoding="UTF-8"?>
<VideoAnalyticsEvent xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.omg.org/retail/VideoAnalytics/namespace/
  ../VideoAnalyticsEventV1.0.0.xsd"
  xmlns="http://www.omg.org/retail/VideoAnalytics/namespace/" MajorVersion="1" MinorVersion="0"
  FixVersion="0" TypeCode="Compliance">
  <SequenceNumber>11234</SequenceNumber>
  <EventDateTime>2006-05-04T18:13:51.0Z</EventDateTime>
  <SourceURI>Camera 1</SourceURI>
  <VideoAnalytic>
    <AreaOfInterest TypeCode="Zone">
      <Name>Shelf</Name>
      <ObjectOfInterest ThresholdFlag="true">
        <Count Kind="Items">10</Count>
      </ObjectOfInterest>
    </AreaOfInterest>
  </VideoAnalytic>
</VideoAnalyticsEvent>
  
```

```

        <Item>
            <ItemID Type="SKU">534</ItemID>
        </Item>
    </ObjectOfInterest>
</AreaOfInterest>
</VideoAnalytic>
</VideoAnalyticsEvent>

```

Request/Response

ARTS XML Conformance XML Instance Document – Empty, Partially Empty Shelves – Request

```

<?xml version="1.0" encoding="UTF-8"?>
<VideoAnalyticsMessage xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
    xsi:schemaLocation="http://www.omg.org/retail/VideoAnalytics/namespace/
    ../VideoAnalyticsMessageOrientedV1.0.0.xsd"
    xmlns="http://www.omg.org/retail/VideoAnalytics/namespace/" MajorVersion="1" MinorVersion="0"
    FixVersion="0">
    <ARTSHeader ActionCode="Read" MessageType="Request">
        <MessageID>12345678</MessageID>
        <DateTime>2006-05-04T18:13:51.0Z</DateTime>
    </ARTSHeader>
    <VideoAnalysis>
        <ObjectOfInterest ThresholdFlag="true">
            <AreaOfInterest TypeCode="Shelf">
                <ID>ID1</ID>
            </AreaOfInterest>
            <Item FindFlag="true">
                <ItemID>1234</ItemID>
                <OnHandLevel>
                    <PerCent>50</PerCent>
                </OnHandLevel>
            </Item>
        </ObjectOfInterest>
    </VideoAnalysis>
</VideoAnalyticsMessage>

```

ARTS XML Conformance XML Instance Document – Empty, Partially Empty Shelves – Response

```

<?xml version="1.0" encoding="UTF-8"?>
<VideoAnalyticsMessage xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
    xsi:schemaLocation="http://www.omg.org/retail/VideoAnalytics/namespace/
    ../VideoAnalyticsMessageOrientedV1.0.0.xsd"
    xmlns="http://www.omg.org/retail/VideoAnalytics/namespace/" MajorVersion="1" MinorVersion="0"
    FixVersion="0">
    <ARTSHeader ActionCode="Read" MessageType="Response">
        <MessageID>987654</MessageID>
        <DateTime>2006-05-04T18:15:51.0Z</DateTime>
        <Response ResponseCode="OK">
            <RequestID>12345678</RequestID>
        </Response>
    </ARTSHeader>
    <VideoAnalysis>
        <ObjectOfInterest ThresholdFlag="true">
            <AreaOfInterest TypeCode="Shelf">
                <ID>ID1</ID>
                <Camera>
                    <!-- This is the time the shelf fell below the threshold -->
                    <TimeStamp>
                        <BeginTime>2006-05-04T18:15:51.0Z</BeginTime>
                    </TimeStamp>
                </Camera>
            </AreaOfInterest>
        </ObjectOfInterest>
    </VideoAnalysis>
</VideoAnalyticsMessage>

```

```
<Item FindFlag="true">
  <ItemID>1234</ItemID>
  <OnHandLevel>
    <PerCent>50</PerCent>
  </OnHandLevel>
</Item>
</ObjectOfInterest>
</VideoAnalysis>
</VideoAnalyticsMessage>
```

14.2 Scenario: Rapidly Emptying Shelves (Change per Unit Time)

Brief Description

The shelf containing the hottest MP3 player is emptying at 30 units per hour.

Pre-Conditions

Post-Conditions

Data

Event – Alert when shelf/display empties faster than some threshold

EventType Security/Compliance

Date/Time

Area of Interest (shelf/display)

Emptying rate

Domain View

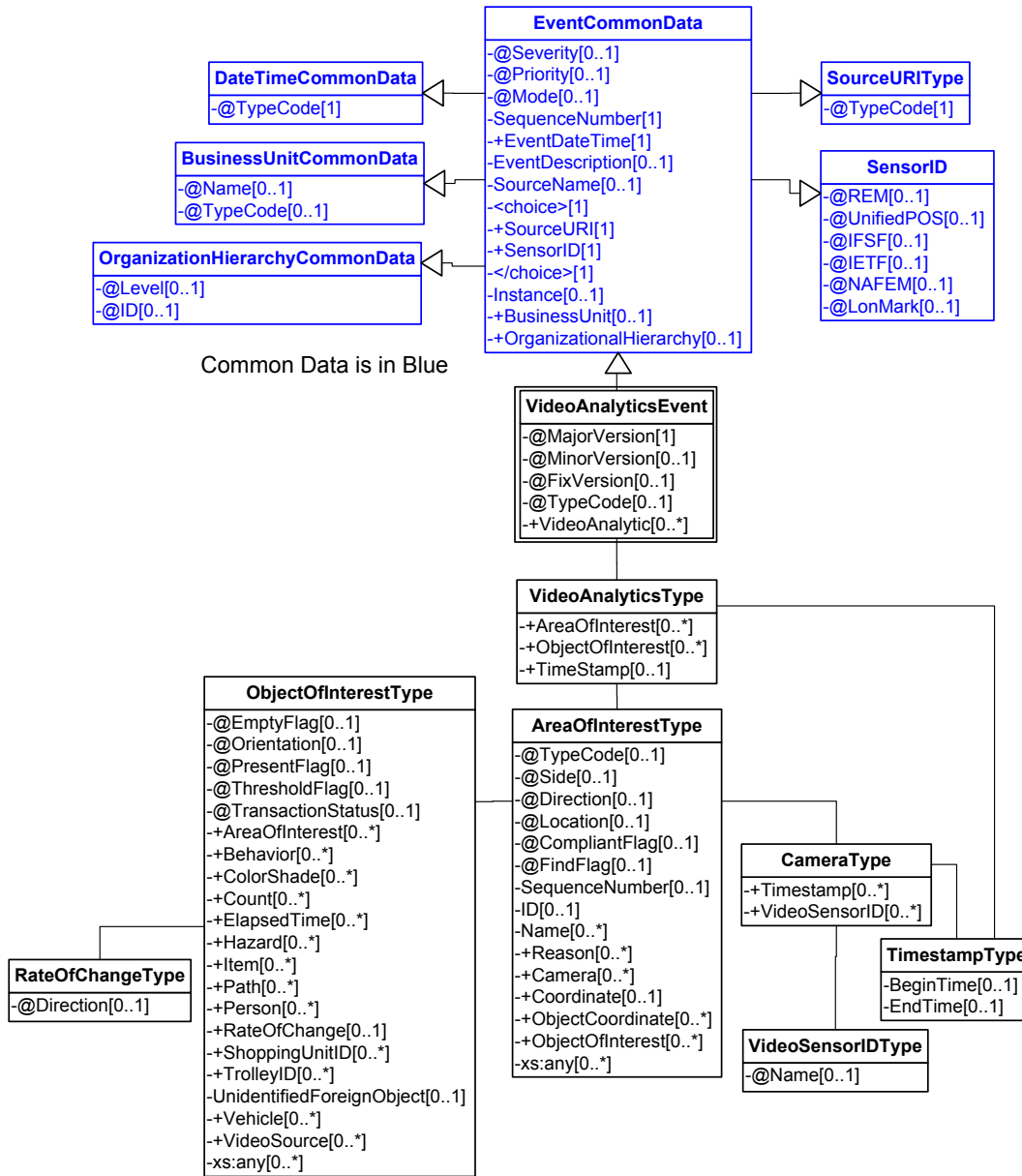


Figure 56: Rapidly Emptying Shelves Domain View

Event

ARTS XML Conformance XML Instance Document – Rapidly Emptying Shelves – Event

```
<?xml version="1.0" encoding="UTF-8"?>
<VideoAnalyticsEvent xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.omg.org/retail/VideoAnalytics/namespace/
  ../VideoAnalyticsEventV1.0.0.xsd"
  xmlns="http://www.omg.org/retail/VideoAnalytics/namespace/" MajorVersion="1" MinorVersion="0"
  FixVersion="0" TypeCode="Compliance">
  <SequenceNumber>11234</SequenceNumber>
  <EventDateTime>2006-05-04T18:13:51.0Z</EventDateTime>
  <SourceURI>Camera 1</SourceURI>
  <VideoAnalytic>
    <!-- The Shelf is a zone -->
    <AreaOfInterest TypeCode="Zone">
      <ObjectOfInterest ThresholdFlag="true">
        <AreaOfInterest></AreaOfInterest>
      </ObjectOfInterest>
    </AreaOfInterest>
  </VideoAnalytic>
</VideoAnalyticsEvent>
```

```
        <RateOfChange Direction="Down">30</RateOfChange>
    </ObjectOfInterest>
</AreaOfInterest>
</VideoAnalytic>
</VideoAnalyticsEvent>
```

14.3 Scenario: End Cap Compliance

Brief Description

Verify the hottest lipstick end cap is setup and displayed properly

Pre-Conditions

Post-Conditions

Data

Event – Alert when endcap/shelf/display is out of compliance

Type Compliance

Date/Time

Area of Interest (endcap/shelf/display)

ComplianceViolationType - ReasonString

Request – Find when an endcap is out of compliance

Date/Time range

Area of Interest (endcap/shelf/display)

OptionalComplianceViolationType

Response

Date/Time

Area of Interest (endcap/shelf/display)

ComplianceViolationType - ReasonString

Domain View

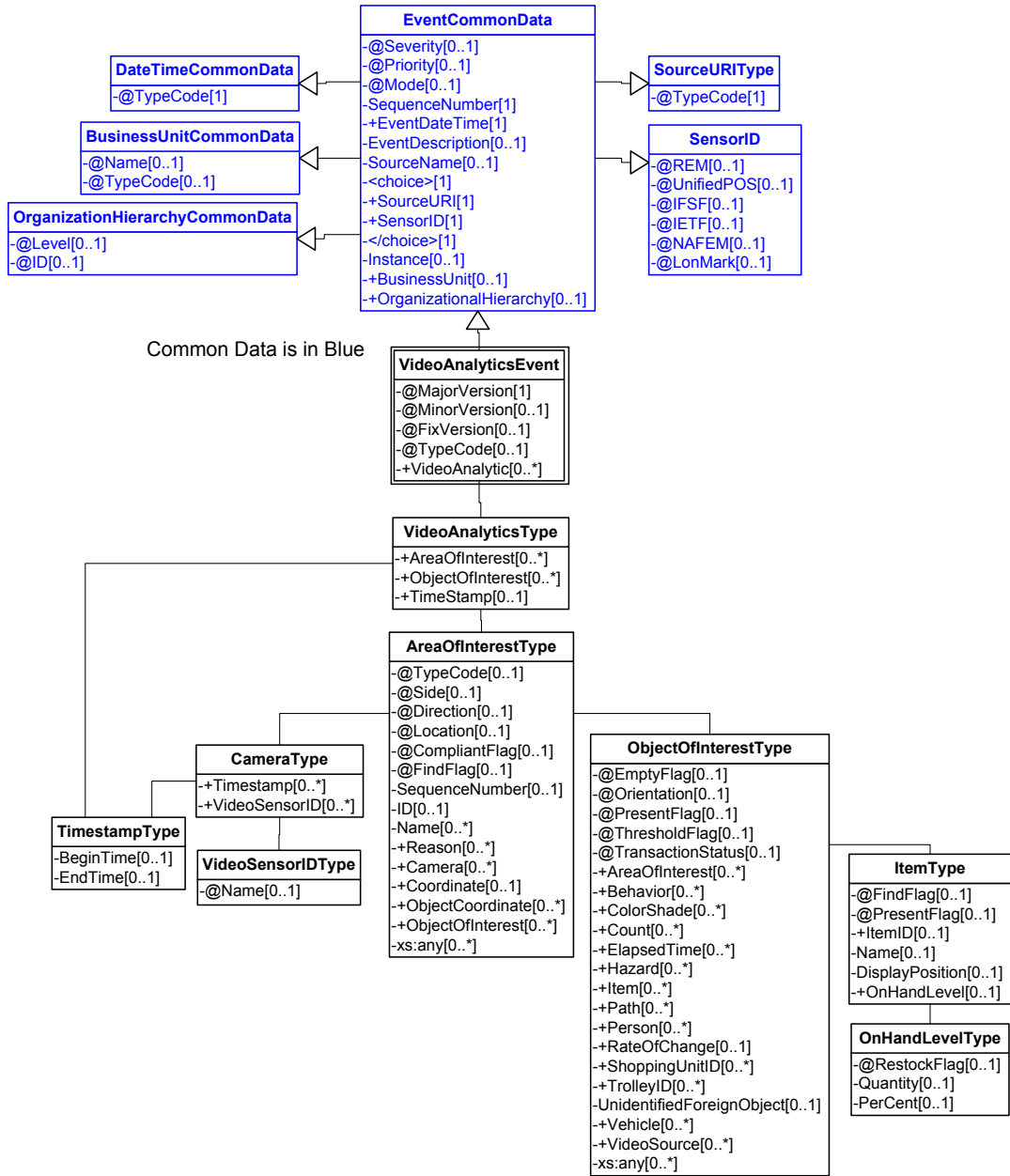


Figure 57: End Cap Compliance Domain View

Event

ARTS XML Conformance XML Instance Document – End Cap Compliance – Event

```

<?xml version="1.0" encoding="UTF-8"?>
<VideoAnalyticsEvent xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.omg.org/retail/VideoAnalytics/namespace/
  ../VideoAnalyticsEventV1.0.0.xsd"
  xmlns="http://www.omg.org/retail/VideoAnalytics/namespace/" MajorVersion="1" MinorVersion="0"
  FixVersion="0" TypeCode="Compliance">
  <SequenceNumber>11234</SequenceNumber>
  <EventDateTime>2006-05-04T18:13:51.0Z</EventDateTime>
  <SourceURI>Camera 1</SourceURI>
  <VideoAnalytic>
    <!-- End Cap is a Zone -->
    <AreaOfInterest TypeCode="EndCap" CompliantFlag="false">
      <ID>100</ID>
    </AreaOfInterest>
  </VideoAnalytic>
</VideoAnalyticsEvent>

```

```

        <ObjectOfInterest ThresholdFlag="true">
          <Item>
            <ItemID Type="SKU">1234</ItemID>
            <OnHandLevel>
              <Quantity>3</Quantity>
            </OnHandLevel>
          </Item>
        </ObjectOfInterest>
      </AreaOfInterest>
    </VideoAnalytic>
  </VideoAnalyticsEvent>

```

Request/Response

ARTS XML Conformance XML Instance Document – End Cap Compliance – Request

```

<?xml version="1.0" encoding="UTF-8"?>
<VideoAnalyticsMessage xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.omg.org/retail/VideoAnalytics/namespace/
  ../VideoAnalyticsMessageOrientedV1.0.0.xsd"
  xmlns="http://www.omg.org/retail/VideoAnalytics/namespace/" MajorVersion="1" MinorVersion="0"
  FixVersion="0">
  <ARTSHeader ActionCode="Read" MessageType="Request">
    <MessageID>12345678</MessageID>
    <DateTime>2006-05-04T18:13:51.0Z</DateTime>
  </ARTSHeader>
  <VideoAnalysis>
    <!-- End Cap is a Zone -->
    <AreaOfInterest TypeCode="EndCap" CompliantFlag="false">
      <ID>100</ID>
      <Camera>
        <!-- Find the time when the end cap went below the threshold -->
        <TimeStamp>
          <BeginTime FindFlag="true" xsi:nil="true"/>
        </TimeStamp>
      </Camera>
      <ObjectOfInterest ThresholdFlag="true">
        <Count Kind="Items" Direction="Down" FindFlag="true">20</Count>
      </ObjectOfInterest>
    </AreaOfInterest>
  </VideoAnalysis>
</VideoAnalyticsMessage>

```

ARTS XML Conformance XML Instance Document – End Cap Compliance – Response

```

<?xml version="1.0" encoding="UTF-8"?>
<VideoAnalyticsMessage xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.omg.org/retail/VideoAnalytics/namespace/
  ../VideoAnalyticsMessageOrientedV1.0.0.xsd"
  xmlns="http://www.omg.org/retail/VideoAnalytics/namespace/" MajorVersion="1" MinorVersion="0"
  FixVersion="0">
  <ARTSHeader ActionCode="Read" MessageType="Response">
    <MessageID>987654</MessageID>
    <DateTime>2006-05-04T18:15:51.0Z</DateTime>
    <Response ResponseCode="OK">
      <RequestID>12345678</RequestID>
    </Response>
  </ARTSHeader>
  <VideoAnalysis>
    <!-- End Cap is a Zone -->
    <AreaOfInterest TypeCode="EndCap" CompliantFlag="false">
      <ID>100</ID>
      <Camera>

```

```
<!-- The end cap went below the threshold at this time -->
<TimeStamp>
  <BeginTime>2006-05-04T18:15:51.0Z</BeginTime>
</TimeStamp>
</Camera>
<ObjectOfInterest ThresholdFlag="true">
  <Count Kind="Items" Direction="Down" FindFlag="true">20</Count>
</ObjectOfInterest>
</AreaOfInterest>
</VideoAnalysis>
</VideoAnalyticsMessage>
```

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15 Use Case : Warehouse

15.1 Scenario: Vehicle at the Loading Dock

Brief Description

A small vehicle is parked at the loading dock where only large trucks are supposed to be.

Pre-Conditions

Post-Conditions

Data

Event – Alert when vehicle at the loading doc.

Type Staffing/Security

Date/Time

Area of Interest (loading doc)

Object of Interest (vehicle)

Request – Find when a vehicle was at a loading doc.

Date/Time range

Area of Interest (loading doc)

Response

Date/Time

Area of Interest (loading doc)

Object of Interest (vehicle)

Domain View

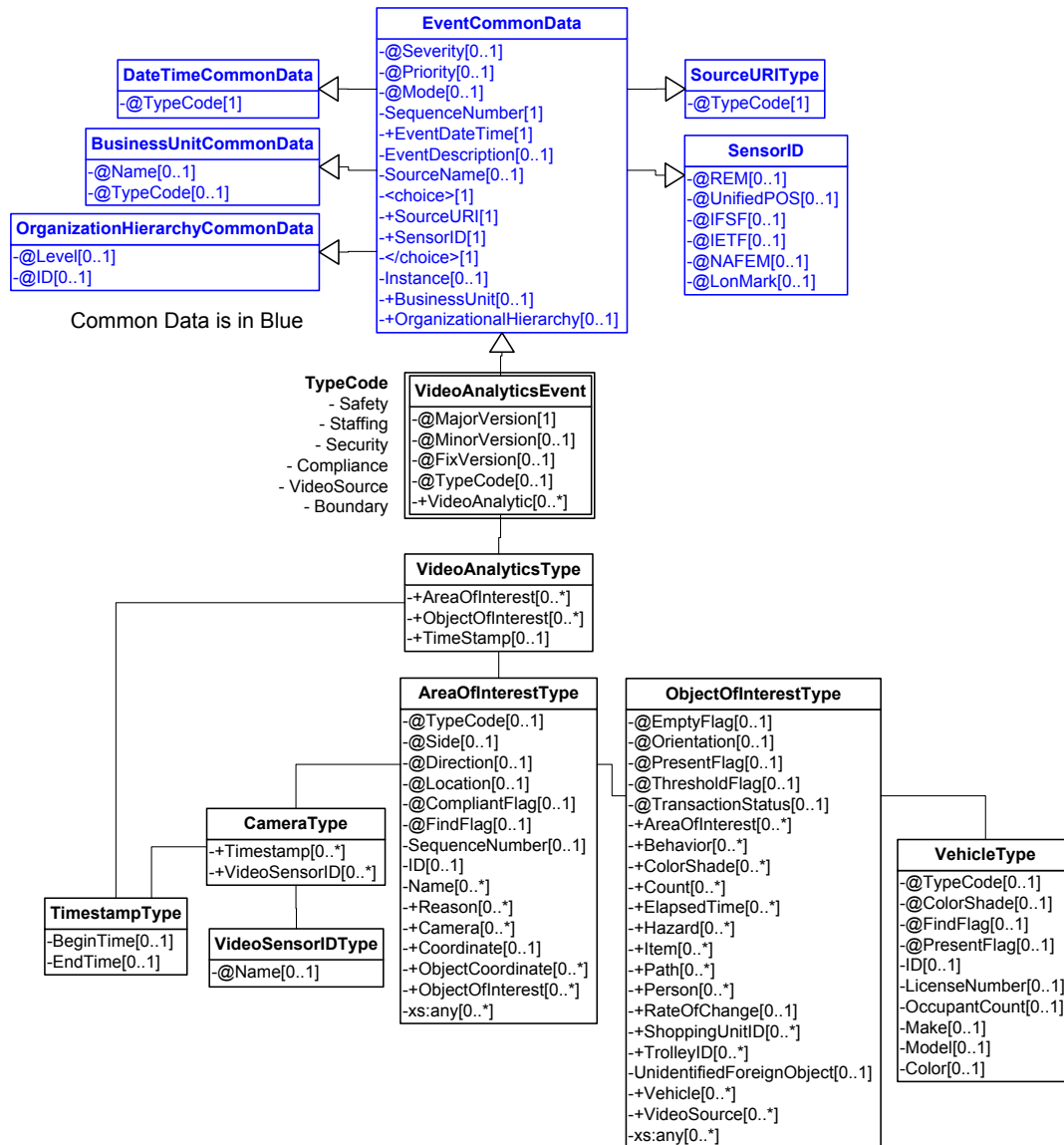


Figure 58: Vehicle at the Loading Dock Domain View

Event

ARTS XML Conformance XML Instance Document – Vehicle at the Loading Dock – Event

```
<?xml version="1.0" encoding="UTF-8"?>
<VideoAnalyticsEvent xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.omg.org/retail/VideoAnalytics/namespace/
  ../VideoAnalyticsEventV1.0.0.xsd"
  xmlns="http://www.omg.org/retail/VideoAnalytics/namespace/" MajorVersion="1" MinorVersion="0"
  FixVersion="0" TypeCode="Security">
  <SequenceNumber>11234</SequenceNumber>
  <EventDateTime>2006-05-04T18:13:51.0Z</EventDateTime>
  <SourceURI>Camera 1</SourceURI>
  <VideoAnalytic>
    <AreaOfInterest TypeCode="Zone">
      <!-- the id for the loading dock zone -->
      <ID>123</ID>
      <ObjectOfInterest>
        <Vehicle TypeCode="Truck"/>
      </ObjectOfInterest>
    </AreaOfInterest>
  </VideoAnalytic>
</VideoAnalyticsEvent>
```



```
</VideoAnalytic>
</VideoAnalyticsEvent>
```

ARTS XML Conformance XML Instance Document – Vehicle at the Loading Dock – Request

```
<?xml version="1.0" encoding="UTF-8"?>
<VideoAnalyticsMessage xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.omg.org/retail/VideoAnalytics/namespace/
  ../VideoAnalyticsMessageOrientedV1.0.0.xsd"
  xmlns="http://www.omg.org/retail/VideoAnalytics/namespace/" MajorVersion="1" MinorVersion="0"
  FixVersion="0">
  <ARTSHeader ActionCode="Read" MessageType="Request">
    <MessageID>12345678</MessageID>
    <DateTime>2006-05-04T18:13:51.0Z</DateTime>
  </ARTSHeader>
  <VideoAnalysis>
    <AreaOfInterest TypeCode="Zone">
      <!-- the id for the loading dock zone -->
      <ID>123</ID>
      <Camera>
        <TimeStamp>
          <BeginTime FindFlag="true">2006-05-04T18:00:00.0Z</BeginTime>
          <EndTime>2006-05-04T18:15:00.0Z</EndTime>
        </TimeStamp>
      </Camera>
      <ObjectOfInterest>
        <Vehicle TypeCode="Truck"/>
      </ObjectOfInterest>
    </AreaOfInterest>
  </VideoAnalysis>
</VideoAnalyticsMessage>
```

ARTS XML Conformance XML Instance Document – Vehicle at the Loading Dock – Response

```
<?xml version="1.0" encoding="UTF-8"?>
<VideoAnalyticsMessage xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.omg.org/retail/VideoAnalytics/namespace/
  ../VideoAnalyticsMessageOrientedV1.0.0.xsd"
  xmlns="http://www.omg.org/retail/VideoAnalytics/namespace/" MajorVersion="1" MinorVersion="0"
  FixVersion="0">
  <ARTSHeader ActionCode="Read" MessageType="Response">
    <MessageID>987654</MessageID>
    <DateTime>2006-05-04T18:15:51.0Z</DateTime>
    <Response ResponseCode="OK">
      <RequestID>12345678</RequestID>
    </Response>
  </ARTSHeader>
  <VideoAnalysis>
    <AreaOfInterest TypeCode="Zone">
      <!-- the id for the loading dock zone -->
      <ID>123</ID>
      <Camera>
        <TimeStamp>
          <BeginTime>2006-05-04T20:00:00.0Z</BeginTime>
        </TimeStamp>
      </Camera>
      <ObjectOfInterest>
        <Vehicle TypeCode="Truck"/>
      </ObjectOfInterest>
    </AreaOfInterest>
  </VideoAnalysis>
</VideoAnalyticsMessage>
```

15.2 Scenario: Watching Product Orientation

Brief Description

A box on the conveyor is tilted on its side and about to fall off the belt.

Pre-Conditions

Post-Conditions

Data

Event – Alert when a hazard exists on a conveyor.

Type Security

Date/Time

Area of Interest (conveyor)

Object of Interest (hazard)

Request – Find when hazards occurred on a conveyor.

Date/Time range

Area of Interest (conveyor)

Response

Date/Time

Area of Interest (conveyor)

Object of Interest (hazard)

Domain View

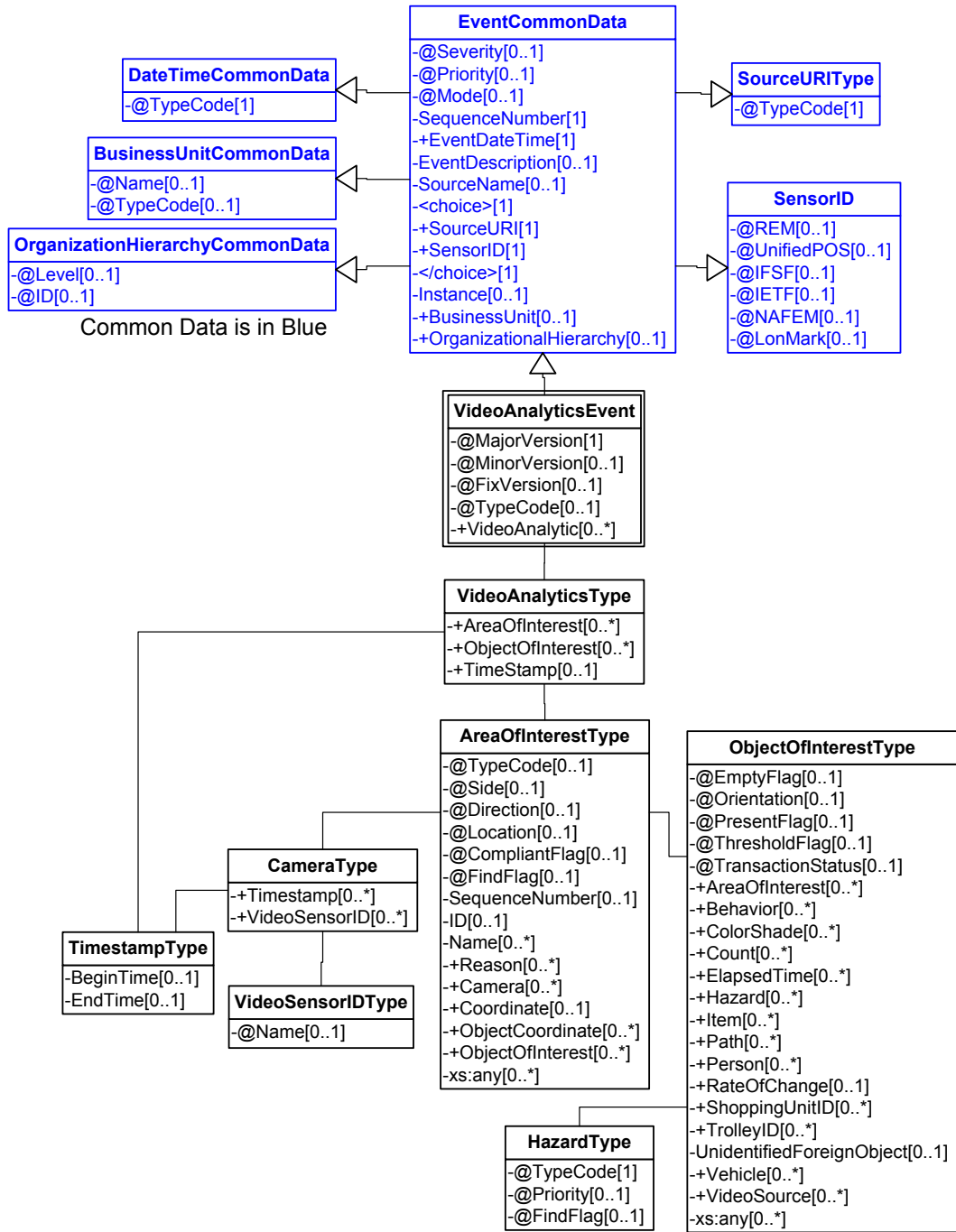


Figure 59: Watching Product Orientation Domain View

Event

ARTS XML Conformance XML Instance Document – Watching product orientation on conveyor belt – Event

```

<?xml version="1.0" encoding="UTF-8"?>
<VideoAnalyticsEvent xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.omg.org/retail/VideoAnalytics/namespace/
  ../VideoAnalyticsEventV1.0.0.xsd"
  xmlns="http://www.omg.org/retail/VideoAnalytics/namespace/" MajorVersion="1" MinorVersion="0"
  FixVersion="0" TypeCode="Security">
  <SequenceNumber>11234</SequenceNumber>
  <EventDateTime>2006-05-04T18:13:51.0Z</EventDateTime>
  <SourceURI>Camera 1</SourceURI>

```

```

<VideoAnalytic>
  <AreaOfInterest TypeCode="Zone">
    <Name>Conveyor</Name>
    <ObjectOfInterest>
      <Hazard TypeCode="FallingObject">Product Orientation</Hazard>
    </ObjectOfInterest>
  </AreaOfInterest>
</VideoAnalytic>
</VideoAnalyticsEvent>

```

Request/Response

ARTS XML Conformance XML Instance Document – Watching product orientation – Request

```

<?xml version="1.0" encoding="UTF-8"?>
<VideoAnalyticsMessage xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.omg.org/retail/VideoAnalytics/namespace/
  ../VideoAnalyticsMessageOrientedV1.0.0.xsd"
  xmlns="http://www.omg.org/retail/VideoAnalytics/namespace/" MajorVersion="1" MinorVersion="0"
  FixVersion="0">
  <ARTSHeader ActionCode="Read" MessageType="Request">
    <MessageID>12345678</MessageID>
    <DateTime>2006-05-04T18:13:51.0Z</DateTime>
  </ARTSHeader>
  <VideoAnalysis>
    <AreaOfInterest TypeCode="Zone">
      <!-- ID for this zone (conveyor) -->
      <ID>101</ID>
      <Camera>
        <TimeStamp>
          <BeginTime>2006-05-04T18:00:00.0Z</BeginTime>
          <EndTime>2006-05-04T18:15:00.0Z</EndTime>
        </TimeStamp>
      </Camera>
      <!-- During this 15 minutes find objects which have the wrong orientation on the
      conveyor -->
      <ObjectOfInterest>
        <Hazard TypeCode="FallingObject" FindFlag="true">Product Orientation</Hazard>
      </ObjectOfInterest>
    </AreaOfInterest>
  </VideoAnalysis>
</VideoAnalyticsMessage>

```

ARTS XML Conformance XML Instance Document – Watching product orientation – Response

```

<?xml version="1.0" encoding="UTF-8"?>
<VideoAnalyticsMessage xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.omg.org/retail/VideoAnalytics/namespace/
  ../VideoAnalyticsMessageOrientedV1.0.0.xsd"
  xmlns="http://www.omg.org/retail/VideoAnalytics/namespace/" MajorVersion="1" MinorVersion="0"
  FixVersion="0">
  <ARTSHeader ActionCode="Read" MessageType="Response">
    <MessageID>987654</MessageID>
    <DateTime>2006-05-04T18:15:51.0Z</DateTime>
    <Response ResponseCode="OK">
      <RequestID>12345678</RequestID>
    </Response>
  </ARTSHeader>
  <VideoAnalysis>
    <AreaOfInterest TypeCode="Zone">
      <!-- ID for this zone (conveyor) -->
      <ID>101</ID>
      <Camera>

```

```
<TimeStamp>
  <!-- There was a product orientation problem at this time -->
  <BeginTime>2006-05-04T18:12:12.0Z</BeginTime>
</TimeStamp>
</Camera>
  <ObjectOfInterest>
    <Hazard TypeCode="FallingObject" FindFlag="true">Product Orientation</Hazard>
  </ObjectOfInterest>
</AreaOfInterest>
</VideoAnalysis>
</VideoAnalyticsMessage>
```

15.3 Scenario: Build Wall of Products to Hide Activity

Brief Description

Person uses objects (e.g., boxes) to obstruct camera view in order to do something nefarious without being seen.

Pre-Conditions

Post-Conditions

Data

Event – Alert when obstruction occurs

Type Security/Compliance

Date/Time

Area of Interest (VideoSensorID)

Object of interest (obstruction)

Request – Find when obstructions occurred

Date/Time range

Area of Interest (VideoSensorID(s))

Response

Date/Time

Area of Interest (VideoSensorID)

Object of interest (obstruction)

Domain View

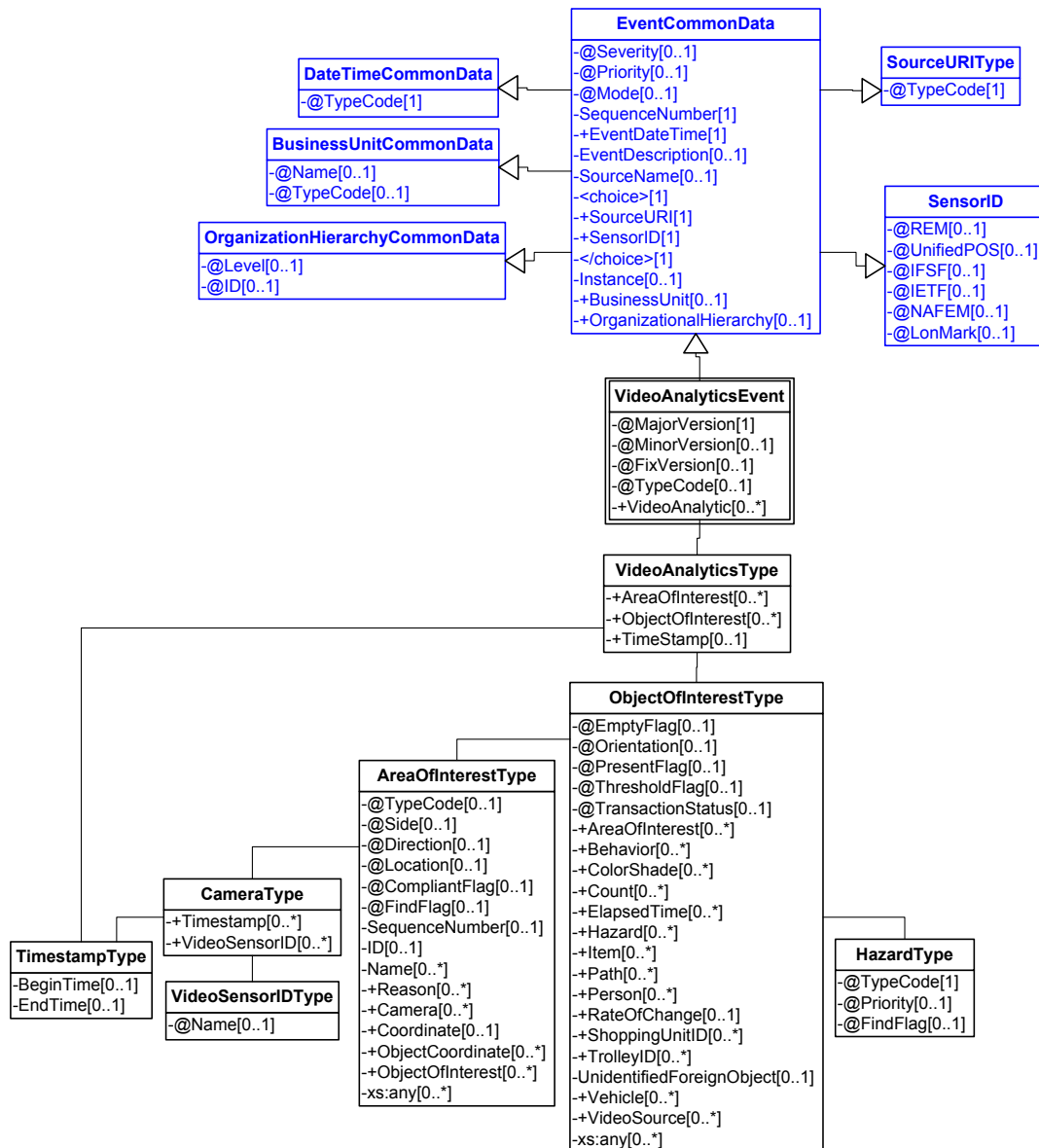


Figure 60: Build Wall of Products to Hide Activity Domain View

Event

ARTS XML Conformance XML Instance Document – Build Wall of Products to Hide Activity – Event

```
<?xml version="1.0" encoding="UTF-8"?>
<VideoAnalyticsEvent xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.omg.org/retail/VideoAnalytics/namespace/
  ../VideoAnalyticsEventV1.0.0.xsd"
  xmlns="http://www.omg.org/retail/VideoAnalytics/namespace/" MajorVersion="1" MinorVersion="0"
  FixVersion="0" TypeCode="Security">
  <SequenceNumber>11234</SequenceNumber>
  <EventDateTime>2006-05-04T18:13:51.0Z</EventDateTime>
  <SourceURI>Camera 1</SourceURI>
  <VideoAnalytic>
    <AreaOfInterest TypeCode="Path">
      <ID>Path ID</ID>
      <Reason>Boxes block view</Reason>
      <ObjectOfInterest>
        <Behavior TypeCode="Concealment"/>
        <Hazard TypeCode="PathObstruction"/>
      </ObjectOfInterest>
    </AreaOfInterest>
  </VideoAnalytic>
</VideoAnalyticsEvent>
```

```

        </ObjectOfInterest>
    </AreaOfInterest>
</VideoAnalytic>
</VideoAnalyticsEvent>

```

Request/Response

ARTS XML Conformance XML Instance Document – Build Wall of Products to Hide Activity – Request

```

<?xml version="1.0" encoding="UTF-8"?>
<VideoAnalyticsMessage xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
    xsi:schemaLocation="http://www.omg.org/retail/VideoAnalytics/namespace/
    ../VideoAnalyticsMessageOrientedV1.0.0.xsd"
    xmlns="http://www.omg.org/retail/VideoAnalytics/namespace/" MajorVersion="1" MinorVersion="0"
    FixVersion="0">
    <ARTSHeader ActionCode="Read" MessageType="Request">
        <MessageID>12345678</MessageID>
        <DateTime>2006-05-04T18:13:51.0Z</DateTime>
    </ARTSHeader>
    <VideoAnalysis>
        <AreaOfInterest TypeCode="Path">
            <ID>Path 4</ID>
            <Camera>
                <TimeStamp>
                    <!-- Find the time(s) when a wall of products blocked the path -->
                    <BeginTime FindFlag="true">2006-05-04T18:00:00.0Z</BeginTime>
                    <EndTime>2006-05-04T18:15:00.0Z</EndTime>
                </TimeStamp>
            </Camera>
            <Reason>Boxes block view</Reason>
            <ObjectOfInterest>
                <Behavior TypeCode="Concealment"/>
                <Hazard TypeCode="PathObstruction"/>
            </ObjectOfInterest>
        </AreaOfInterest>
    </VideoAnalysis>
</VideoAnalyticsMessage>

```

ARTS XML Conformance XML Instance Document – Build Wall of Products to Hide Activity – Response

```

<?xml version="1.0" encoding="UTF-8"?>
<VideoAnalyticsMessage xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
    xsi:schemaLocation="http://www.omg.org/retail/VideoAnalytics/namespace/
    ../VideoAnalyticsMessageOrientedV1.0.0.xsd"
    xmlns="http://www.omg.org/retail/VideoAnalytics/namespace/"
    MajorVersion="1"
    MinorVersion="0" FixVersion="0">
    <ARTSHeader ActionCode="Read" MessageType="Response">
        <MessageID>987654</MessageID>
        <DateTime>2006-05-04T18:15:51.0Z</DateTime>
        <Response ResponseCode="OK">
            <RequestID>12345678</RequestID>
        </Response>
    </ARTSHeader>
    <VideoAnalysis>
        <AreaOfInterest TypeCode="Path">
            <ID>Path 4</ID>
            <Camera>
                <TimeStamp>
                    <BeginTime>2006-05-04T18:25:00.0Z</BeginTime>
                </TimeStamp>
            </Camera>
            <Reason>Boxes block view</Reason>
            <ObjectOfInterest>

```

```
        <Behavior TypeCode="Concealment"/>
        <Hazard TypeCode="PathObstruction"/>
    </ObjectOfInterest>
</AreaOfInterest>
</VideoAnalysis>
</VideoAnalyticsMessage>
```


16 Use Case: Parking Space Management

16.1 Scenario: Parking Time Exceeded

Brief Description

The Video Analysis system generates an event when it determines a car parking at a rent space for more than 24 hours and send alerts to parking manager.

Pre-Conditions

Event

Post-Conditions

Data

Event Type: Compliance

Domain View

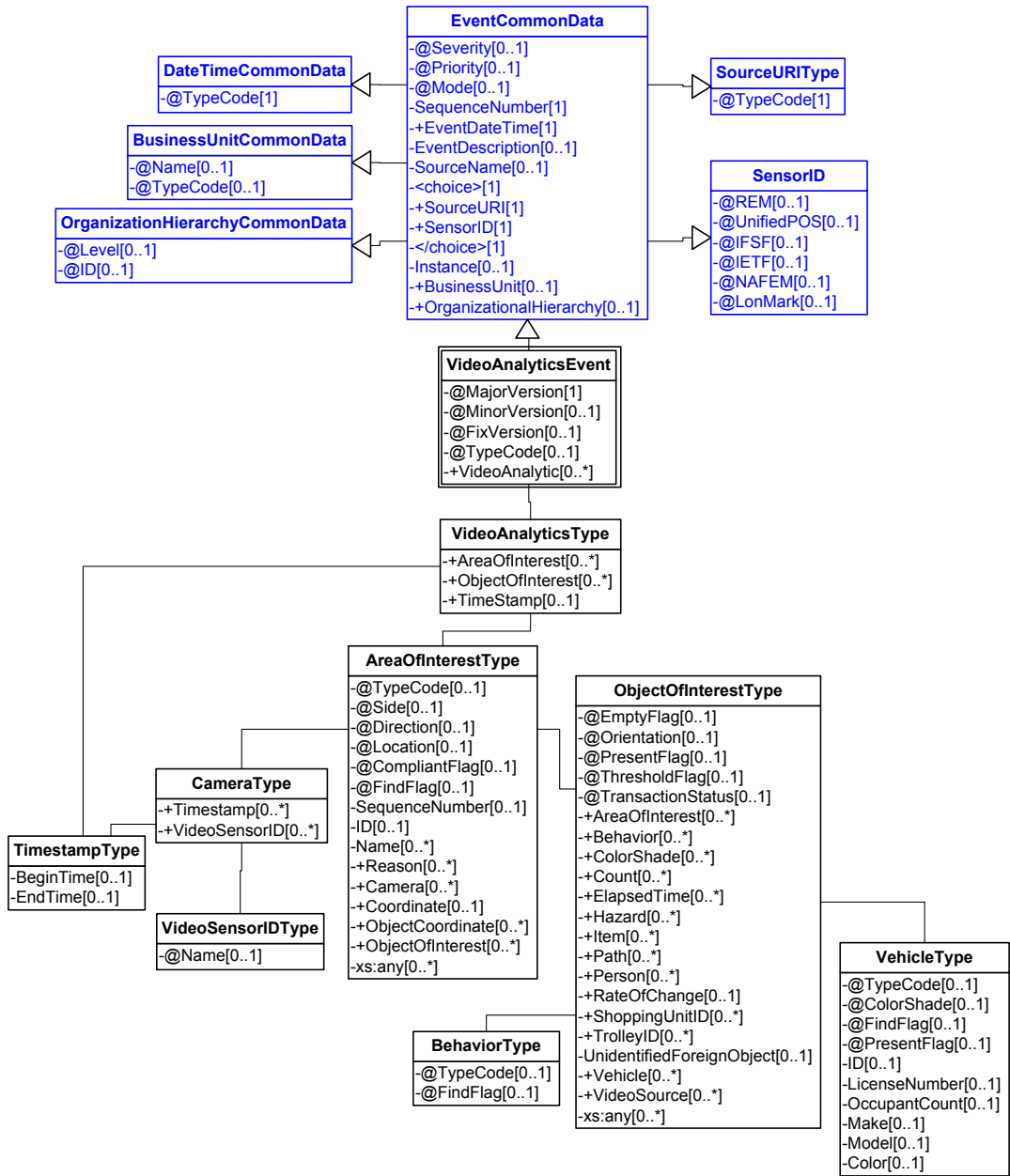


Figure 61: Parking Time Exceeded Domain View

ARTS XML Conformance XML Instance Document – Parking Time Exceeded – Event

```

<?xml version="1.0" encoding="UTF-8"?>
<VideoAnalyticsEvent xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.omg.org/retail/VideoAnalytics/namespace/
  ../VideoAnalyticsEventV1.0.0.xsd"
  xmlns="http://www.omg.org/retail/VideoAnalytics/namespace/" MajorVersion="1" MinorVersion="0"
  FixVersion="0" TypeCode="Compliance">
  <SequenceNumber>11234</SequenceNumber>
  <EventDateTime>2006-05-04T18:13:51.0Z</EventDateTime>
  <SourceURI>Camera 1</SourceURI>
  <VideoAnalytic>
    <AreaOfInterest TypeCode="CameraView">
      <Name>Parking Stall 1</Name>
      <ObjectOfInterest>
        <Behavior TypeCode="Lingering"/>
        <Vehicle TypeCode="Car">
          <LicenseNumber>555</LicenseNumber>
        </Vehicle>
      </ObjectOfInterest>
    </AreaOfInterest>
  </VideoAnalytic>
</VideoAnalyticsEvent>

```

```

    </Vehicle>
  </ObjectOfInterest>
</AreaOfInterest>
</VideoAnalytic>
</VideoAnalyticsEvent>

```

16.2 Scenario: Directing Customers to Empty Parking Spaces

Brief Description

The VA system detects an empty parking space on aisle 3 and directs the customer to the empty spot.

Pre-Conditions

Post-Conditions

Data

Query – At a point time the VA system is queried to determine the empty spot.

Request

DateTime

Area of Interest

Response

VideoSensorID

Area of Interest

Domain View

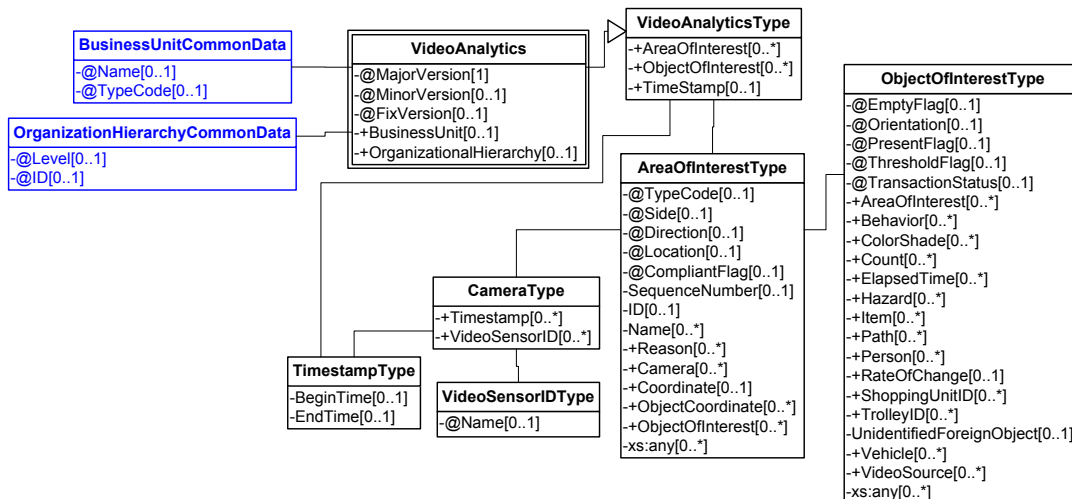


Figure 62: Directing Customers to Empty Parking Spaces Domain View

Request/Response

ARTS XML Conformance XML Instance Document – Directing Customers to Empty Parking Spaces – Request

```
<?xml version="1.0" encoding="UTF-8"?>
<VideoAnalyticsMessage xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.omg.org/retail/VideoAnalytics/namespace/
  ../VideoAnalyticsMessageOrientedV1.0.0.xsd"
  xmlns="http://www.omg.org/retail/VideoAnalytics/namespace/" MajorVersion="1" MinorVersion="0"
  FixVersion="0">
  <ARTSHeader ActionCode="Read" MessageType="Request">
    <MessageID>12345678</MessageID>
    <DateTime>2006-05-04T18:13:51.0Z</DateTime>
  </ARTSHeader>
  <VideoAnalysis>
    <!-- Find an empty parking spot at 10am? -->
    <AreaOfInterest TypeCode="Zone" FindFlag="true">
      <Camera>
        <TimeStamp>
          <BeginTime>2006-05-04T10:00:00.0Z</BeginTime>
        </TimeStamp>
      </Camera>
      <ObjectOfInterest EmptyFlag="false"/>
    </AreaOfInterest>
  </VideoAnalysis>
</VideoAnalyticsMessage>
```

ARTS XML Conformance XML Instance Document – Directing Customers to Empty Parking Spaces – Response

```
<?xml version="1.0" encoding="UTF-8"?>
<VideoAnalyticsMessage xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.omg.org/retail/VideoAnalytics/namespace/
  ../VideoAnalyticsMessageOrientedV1.0.0.xsd"
  xmlns="http://www.omg.org/retail/VideoAnalytics/namespace/" MajorVersion="1" MinorVersion="0"
  FixVersion="0">
  <ARTSHeader ActionCode="Read" MessageType="Response">
    <MessageID>987654</MessageID>
    <DateTime>2006-05-04T18:15:51.0Z</DateTime>
    <Response ResponseCode="OK">
      <RequestID>12345678</RequestID>
    </Response>
  </ARTSHeader>
  <VideoAnalysis>
    <!-- this parking spot empty at 10am -->
    <AreaOfInterest TypeCode="Zone">
      <!-- the id for the parking spot in question -->
      <ID>ID0</ID>
      <Camera>
        <TimeStamp>
          <BeginTime>2006-05-04T10:00:00.0Z</BeginTime>
        </TimeStamp>
      </Camera>
      <ObjectOfInterest EmptyFlag="true"/>
    </AreaOfInterest>
  </VideoAnalysis>
</VideoAnalyticsMessage>
```

17 Use Case : Vendor

17.1 Scenario: Feedback Customer Dwell Time

Brief Description

Feedback to aid targeting customer with Video Content based upon customer dwell time.

Pre-Conditions

Post-Conditions

Data

Request

Date Range

Area of Interest

Object of Interest (Person – Customer with dwell time)

Response

Date/Time Range

VideoSensorID

Area of Interest

Object of Interest (Person – Customer with dwell time which meet threshold)

Domain View

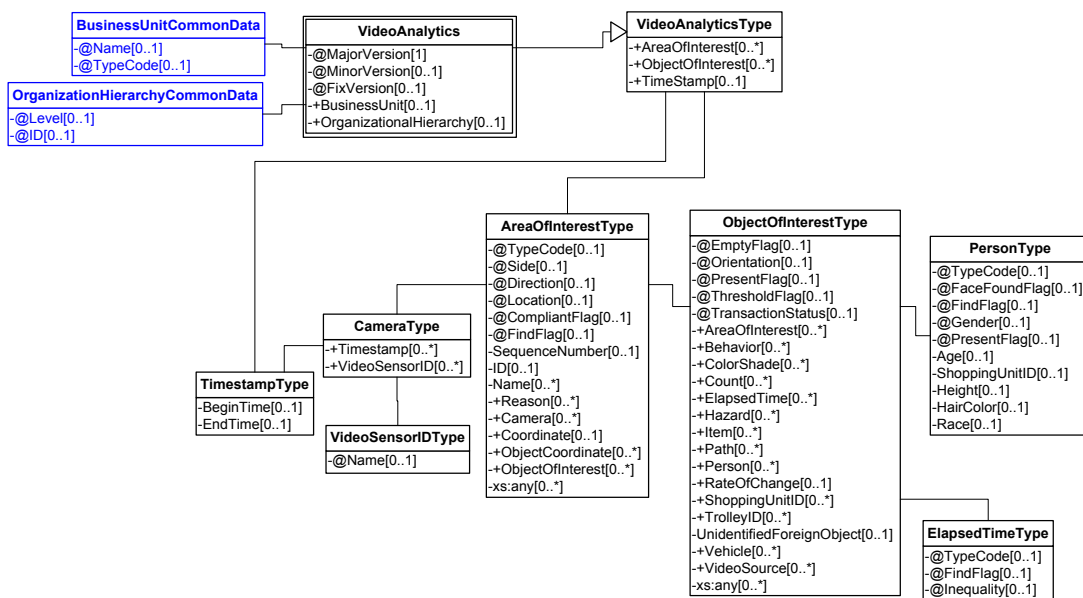


Figure 63: Feedback Customer Dwell Time Domain View

Request/Response

ARTS XML Conformance XML Instance Document – Feedback Customer Dwell Time – Request

```

<?xml version="1.0" encoding="UTF-8"??>
<VideoAnalyticsMessage xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"

```

```

    xsi:schemaLocation="http://www.omg.org/retail/VideoAnalytics/namespace/
    ../VideoAnalyticsMessageOrientedV1.0.0.xsd"
    xmlns="http://www.omg.org/retail/VideoAnalytics/namespace/" MajorVersion="1" MinorVersion="0"
    FixVersion="0">
    <ARTSHeader ActionCode="Read" MessageType="Request">
        <MessageID>12345678</MessageID>
        <DateTime>2006-05-04T18:13:51.0Z</DateTime>
    </ARTSHeader>
    <VideoAnalysis>
        <AreaOfInterest TypeCode="Zone">
            <!-- Find the actual dwell time people spend in front of our ads between 10 and 12 am
-->
            <ObjectOfInterest>
                <ElapsedTime TypeCode="Actual" FindFlag="true" xsi:nil="true"/>
                <Person/>
            </ObjectOfInterest>
        </AreaOfInterest>
        <TimeStamp>
            <BeginTime>2006-05-04T10:00:00.0Z</BeginTime>
            <EndTime>2006-05-04T12:00:00.0Z</EndTime>
        </TimeStamp>
    </VideoAnalysis>
</VideoAnalyticsMessage>

```

ARTS XML Conformance XML Instance Document – Feedback Customer Dwell Time – Response

```

<?xml version="1.0" encoding="UTF-8"?>
<VideoAnalyticsMessage xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
    xsi:schemaLocation="http://www.omg.org/retail/VideoAnalytics/namespace/
    ../VideoAnalyticsMessageOrientedV1.0.0.xsd"
    xmlns="http://www.omg.org/retail/VideoAnalytics/namespace/" MajorVersion="1" MinorVersion="0"
    FixVersion="0">
    <ARTSHeader ActionCode="Read" MessageType="Response">
        <MessageID>987654</MessageID>
        <DateTime>2006-05-04T18:15:51.0Z</DateTime>
        <Response ResponseCode="OK">
            <RequestID>12345678</RequestID>
        </Response>
    </ARTSHeader>
    <VideoAnalysis>
        <AreaOfInterest TypeCode="Zone">
            <ID>1</ID>
            <Camera>
                <TimeStamp>
                    <BeginTime>2006-05-04T10:00:00.0Z</BeginTime>
                    <EndTime>2006-05-04T10:15:00.0Z</EndTime>
                </TimeStamp>
                <VideoSensorID>Camera1</VideoSensorID>
            </Camera>
            <ObjectOfInterest>
                <ElapsedTime TypeCode="Actual">00:05:00.001</ElapsedTime>
                <Person/>
            </ObjectOfInterest>
        </AreaOfInterest>
        <AreaOfInterest TypeCode="Zone">
            <ID>2</ID>
            <Camera>
                <TimeStamp>
                    <BeginTime>2006-05-04T11:20:00.0Z</BeginTime>
                    <EndTime>2006-05-04T11:35:00.0Z</EndTime>
                </TimeStamp>
                <VideoSensorID>Camera2</VideoSensorID>
            </Camera>
            <ObjectOfInterest>
                <ElapsedTime TypeCode="Actual">00:02:00.001</ElapsedTime>

```

```
        <Person/>
      </ObjectOfInterest>
    </AreaOfInterest>
  <TimeStamp>
    <BeginTime>2006-05-04T10:00:00.0Z</BeginTime>
    <EndTime>2006-05-04T12:00:00.0Z</EndTime>
  </TimeStamp>
</VideoAnalysis>
</VideoAnalyticsMessage>
```

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18 Use Case: POS

Brief Description

Detect whether merchandise is present, customer present, or cashier present at any specific period of time or any combination of the above three in a query. Corresponding events are related to the 'arrival' or 'departure' of the customer or cashier.

18.1 Scenario: Verify Staff Member Present at Register

Brief Description

A vendor may want to validate the presence of a staff member at a POS. The video analytics system generates an alert if a staff member is not present to the store manager.

Scenario Description

Is an associate behind register 101 between 10:00 and 10:15 am.

Pre-Conditions

Analytics should assume detecting human presence only in a designated area; possibly requires external integration with RFID or some other sensor to confirm staff member.

Post-Conditions

none

Data

Event – Validate human presence

Type Staffing/Security

Date/Time

Area of Interest (behind the register)

Request – Find if a person is behind a register

Date/Time range

Area of Interest (behind the register)

Object of Interest (person)

Response

Boolean (success/failure of a person present)

Date/Time

VideoSensorID(s)

Domain View

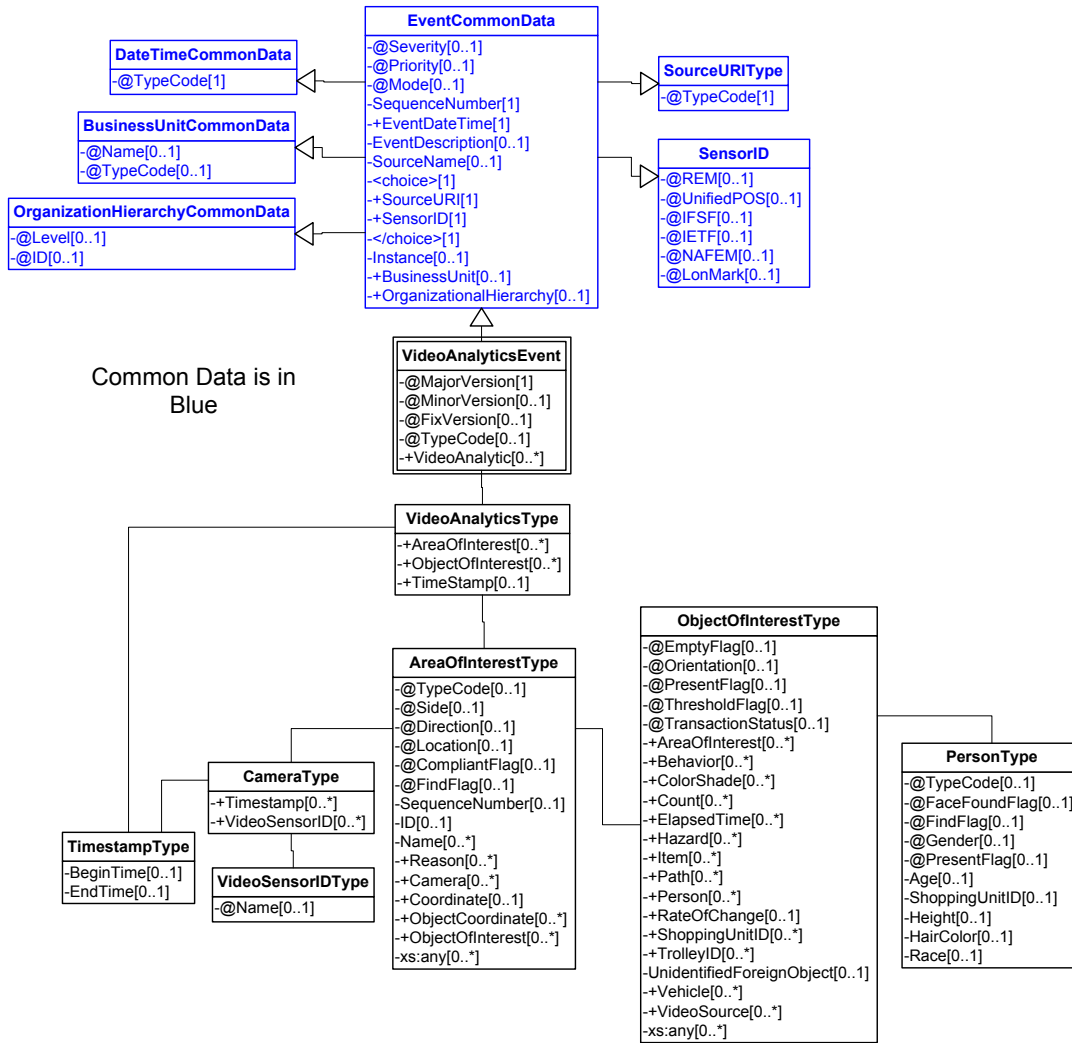


Figure 64: Verify Staff Member Present at Register Domain View

Event

ARTS XML Conformance XML Instance Document – Verify Staff Member Present at Register – Event

```
<?xml version="1.0" encoding="UTF-8"?>
<VideoAnalyticsEvent xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.omg.org/retail/VideoAnalytics/namespace/
  ../VideoAnalyticsEventV1.0.0.xsd"
  xmlns="http://www.omg.org/retail/VideoAnalytics/namespace/" MajorVersion="1" MinorVersion="0"
  FixVersion="0" TypeCode="Staffing">
  <SequenceNumber>11234</SequenceNumber>
  <EventDateTime>2006-05-04T18:13:51.0Z</EventDateTime>
  <SourceURI>Camera 1</SourceURI>
  <VideoAnalytic>
    <AreaOfInterest TypeCode="Workstation" Direction="Behind">
      <ID>100</ID>
      <ObjectOfInterest>
        <Person TypeCode="Associate" PresentFlag="true"/>
      </ObjectOfInterest>
    </AreaOfInterest>
  </VideoAnalytic>
</VideoAnalyticsEvent>
```

Request/Response

ARTS XML Conformance XML Instance Document – Verify Staff Member Present at Register – Request

```
<?xml version="1.0" encoding="UTF-8"?>
<VideoAnalyticsMessage xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.omg.org/retail/VideoAnalytics/namespace/
  ../VideoAnalyticsMessageOrientedV1.0.0.xsd"
  xmlns="http://www.omg.org/retail/VideoAnalytics/namespace/" MajorVersion="1" MinorVersion="0"
  FixVersion="0">
  <ARTSHeader ActionCode="Read" MessageType="Request">
    <MessageID>12345678</MessageID>
    <DateTime>2006-05-04T18:13:51.0Z</DateTime>
  </ARTSHeader>
  <VideoAnalysis>
    <!-- Is an associate behind register 101 between 10:00 and 10:15 am -->
    <AreaOfInterest TypeCode="Workstation" Direction="Behind">
      <ID>100</ID>
      <ObjectOfInterest>
        <Person TypeCode="Associate" PresentFlag="true" FindFlag="true"/>
      </ObjectOfInterest>
    </AreaOfInterest>
    <TimeStamp>
      <BeginTime>2006-05-04T10:00:00.0Z</BeginTime>
      <EndTime>2006-05-04T10:15:00.0Z</EndTime>
    </TimeStamp>
  </VideoAnalysis>
</VideoAnalyticsMessage>
```

ARTS XML Conformance XML Document – Verify Staff Member Present at Register – Response

```
<?xml version="1.0" encoding="UTF-8"?>
<VideoAnalyticsMessage xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.omg.org/retail/VideoAnalytics/namespace/
  ../VideoAnalyticsMessageOrientedV1.0.0.xsd"
  xmlns="http://www.omg.org/retail/VideoAnalytics/namespace/" MajorVersion="1" MinorVersion="0"
  FixVersion="0">
  <ARTSHeader ActionCode="Read" MessageType="Response">
    <MessageID>987654</MessageID>
    <DateTime>2006-05-04T18:15:51.0Z</DateTime>
    <Response ResponseCode="OK">
      <RequestID>12345678</RequestID>
    </Response>
  </ARTSHeader>
  <VideoAnalysis>
    <AreaOfInterest TypeCode="Workstation" Direction="Behind">
      <ID>100</ID>
      <ObjectOfInterest>
        <Person TypeCode="Associate" PresentFlag="true"/>
      </ObjectOfInterest>
    </AreaOfInterest>
    <TimeStamp>
      <BeginTime>2006-05-04T10:00:00.0Z</BeginTime>
      <EndTime>2006-05-04T10:15:00.0Z</EndTime>
    </TimeStamp>
  </VideoAnalysis>
</VideoAnalyticsMessage>
```

18.2 Scenario: Customer present or arriving at the register but no cashier present

Brief Description

A vendor may want to check if a customer is present at a register that is not manned by a cashier. The video analytics system generates an alert to the store manager if a customer arrives can also respond to a query with a specific timestamp.

Customer service opportunity

Scenario Description

Look in front of a register to see if a customer is present and no associate is present between 10 and 10:15am

Pre-Conditions

None

Post-Conditions

None

Data

Event – Detect customer arriving at front of the register with no cashier.

(Data element needs to added)

Type Staffing/Security

Date/Time

Area of Interest (customer side of register)

Area of Interest (cashier side of register)

Request – Find if a person is in front of the register but no one is behind it at a specific time range.

Date/Time range

Area of Interest (customer side of register)

Area of Interest (cashier side of register)

Object of Interest (person)

Response

Boolean (success if a person is present in front of the register while no one is behind it. Failure otherwise).

Date/Time

VideoSensorID(s)

Domain View

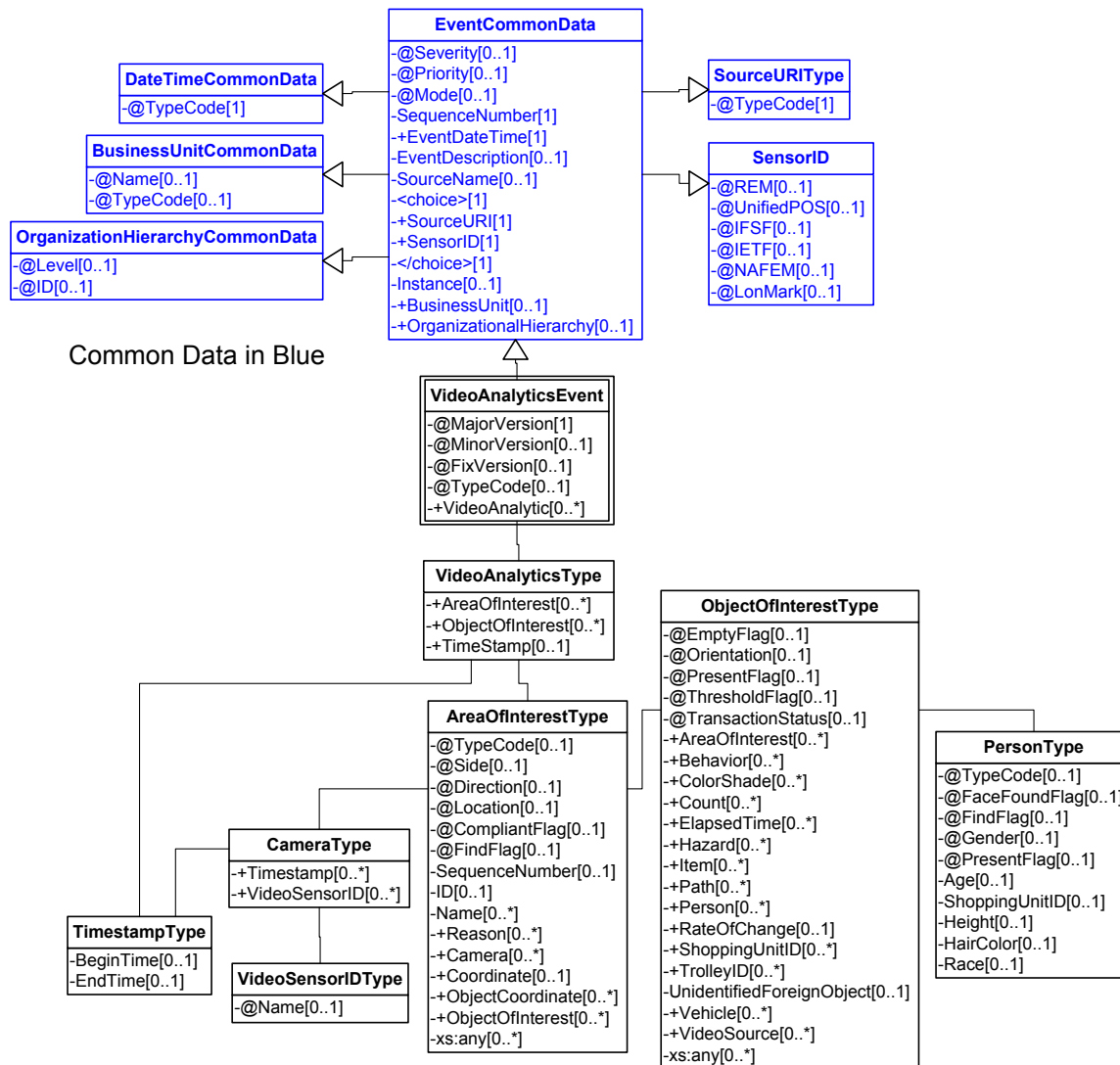


Figure 65: Customer present at the register but no cashier present Domain View

Event

ARTS XML Conformance XML Instance Document – Customer present at the register but no cashier present – Event

```

<?xml version="1.0" encoding="UTF-8"?>
<VideoAnalyticsEvent xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.omg.org/retail/VideoAnalytics/namespace/
  ../VideoAnalyticsEventV1.0.0.xsd"
  xmlns="http://www.omg.org/retail/VideoAnalytics/namespace/" MajorVersion="1" MinorVersion="0"
  FixVersion="0" TypeCode="Staffing">
  <SequenceNumber>11234</SequenceNumber>
  <EventDateTime>2006-05-04T18:13:51.0Z</EventDateTime>
  <SourceURI>Camera 1</SourceURI>
  <VideoAnalytic>
    <!-- Person is in the zone 100 (in front of the register) -->
    <AreaOfInterest TypeCode="Workstation">
      <ID>100</ID>
      <ObjectOfInterest>
        <Person PresentFlag="true"/>
      </ObjectOfInterest>
    </AreaOfInterest>
  </VideoAnalytic>
</VideoAnalyticsEvent>

```

```

        </ObjectOfInterest>
    </AreaOfInterest>
    <!-- Person is not in zone 101 (behind the register) -->
    <AreaOfInterest TypeCode="Workstation">
        <ID>101</ID>
        <ObjectOfInterest>
            <Person PresentFlag="false"/>
        </ObjectOfInterest>
    </AreaOfInterest>
</VideoAnalytic>
</VideoAnalyticsEvent>

```

Request/Response

ARTS XML Conformance XML Instance Document – Customer present at the register but no cashier present – Request

```

<?xml version="1.0" encoding="UTF-8"?>
<VideoAnalyticsMessage xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
    xsi:schemaLocation="http://www.omg.org/retail/VideoAnalytics/namespace/
    ../VideoAnalyticsMessageOrientedV1.0.0.xsd"
    xmlns="http://www.omg.org/retail/VideoAnalytics/namespace/" MajorVersion="1" MinorVersion="0"
    FixVersion="0">
    <ARTSHeader ActionCode="Read" MessageType="Request">
        <MessageID>12345678</MessageID>
        <DateTime>2006-05-04T18:13:51.0Z</DateTime>
    </ARTSHeader>
    <VideoAnalysis>
        <!-- Look in front of a register (AOI 100) to see if a customer is present and no
        associate is present (AOI 101) between 10 and 10:15am -->
        <AreaOfInterest TypeCode="Workstation">
            <ID>100</ID>
            <ObjectOfInterest>
                <Person PresentFlag="true" FindFlag="true"/>
            </ObjectOfInterest>
        </AreaOfInterest>
        <AreaOfInterest TypeCode="Workstation">
            <ID>101</ID>
            <ObjectOfInterest>
                <Person PresentFlag="false" FindFlag="true"/>
            </ObjectOfInterest>
        </AreaOfInterest>
        <TimeStamp>
            <BeginTime>2006-05-04T10:00:00.0Z</BeginTime>
            <EndTime>2006-05-04T10:15:00.0Z</EndTime>
        </TimeStamp>
    </VideoAnalysis>
</VideoAnalyticsMessage>

```

ARTS XML Conformance XML Instance Document – Customer present at the register but no cashier present – Response

```

<?xml version="1.0" encoding="UTF-8"?>
<VideoAnalyticsMessage xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
    xsi:schemaLocation="http://www.omg.org/retail/VideoAnalytics/namespace/
    ../VideoAnalyticsMessageOrientedV1.0.0.xsd"
    xmlns="http://www.omg.org/retail/VideoAnalytics/namespace/" MajorVersion="1" MinorVersion="0"
    FixVersion="0">
    <ARTSHeader ActionCode="Read" MessageType="Response">
        <MessageID>987654</MessageID>
        <DateTime>2006-05-04T18:15:51.0Z</DateTime>
        <Response ResponseCode="OK">
            <RequestID>12345678</RequestID>
        </Response>
    </ARTSHeader>

```

```

    </Response>
</ARTSHeader>
<VideoAnalysis>
  <!-- A person is in front of the register -->
  <AreaOfInterest TypeCode="Workstation">
    <ID>100</ID>
    <ObjectOfInterest>
      <Person PresentFlag="true"/>
    </ObjectOfInterest>
  </AreaOfInterest>
  <!-- A person is not behind the register -->
  <AreaOfInterest TypeCode="Workstation">
    <ID>101</ID>
    <ObjectOfInterest>
      <Person PresentFlag="false"/>
    </ObjectOfInterest>
  </AreaOfInterest>
  <TimeStamp>
    <BeginTime>2006-05-04T10:00:00.0Z</BeginTime>
    <EndTime>2006-05-04T10:15:00.0Z</EndTime>
  </TimeStamp>
</VideoAnalysis>
</VideoAnalyticsMessage>

```

18.3 Scenario: Determine if a Customer Present at a Register at Specific Time (Request Response – no Event)

Brief Description

Determine if a customer present at a register at specific time

Scenario Description

Pre-Conditions

None

Post-Conditions

None

Data

Domain View

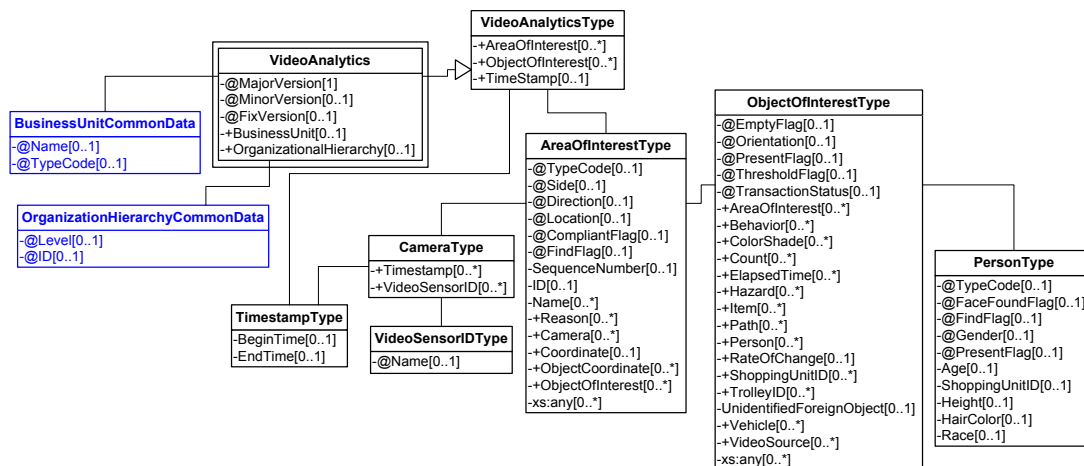


Figure 66: Determine If a Customer Present at a Register at Specific Time Domain View

Request/Response

ARTS XML Conformance XML Instance Document – Determine If a Customer Present at a Register at Specific Time – Request

```

<?xml version="1.0" encoding="UTF-8"?>
<VideoAnalyticsMessage xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.omg.org/retail/VideoAnalytics/namespace/
  ../VideoAnalyticsMessageOrientedV1.0.0.xsd"
  xmlns="http://www.omg.org/retail/VideoAnalytics/namespace/" MajorVersion="1" MinorVersion="0"
  FixVersion="0">
  <ARTSHeader ActionCode="Read" MessageType="Request">
    <MessageID>12345678</MessageID>
    <DateTime>2006-05-04T18:13:51.0Z</DateTime>
  </ARTSHeader>
  <VideoAnalysis>
    <!-- Determine if a customer is present at register 1000 at 10:am -->
    <AreaOfInterest TypeCode="Workstation">
      <!-- Register id -->
      <ID>1000</ID>
      <Camera>
        <TimeStamp>
          <BeginTime>2006-05-04T10:00:00.0Z</BeginTime>
        </TimeStamp>
        <VideoSensorID>Camera1</VideoSensorID>
      </Camera>
      <ObjectOfInterest>
        <Person TypeCode="Customer" FindFlag="true" PresentFlag="true"/>
      </ObjectOfInterest>
    </AreaOfInterest>
  </VideoAnalysis>
</VideoAnalyticsMessage>
  
```

ARTS XML Conformance XML Instance Document – Determine If a Customer Present at a Register at Specific Time – Response

```

<?xml version="1.0" encoding="UTF-8"?>
<VideoAnalyticsMessage xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.omg.org/retail/VideoAnalytics/namespace/
  ../VideoAnalyticsMessageOrientedV1.0.0.xsd"
  
```



```

xmlns="http://www.omg.org/retail/VideoAnalytics/namespace/" MajorVersion="1" MinorVersion="0"
FixVersion="0">
  <ARTSHeader ActionCode="Read" MessageType="Response">
    <MessageID>987654</MessageID>
    <DateTime>2006-05-04T18:15:51.0Z</DateTime>
    <Response ResponseCode="OK">
      <RequestID>12345678</RequestID>
    </Response>
  </ARTSHeader>
  <VideoAnalysis>
    <!-- a customer is present at register 1000 at 10:am -->
    <AreaOfInterest TypeCode="Workstation">
      <!-- Register id -->
      <ID>1000</ID>
      <Camera>
        <TimeStamp>
          <BeginTime>2006-05-04T10:00:00.0Z</BeginTime>
        </TimeStamp>
        <VideoSensorID>Camera1</VideoSensorID>
      </Camera>
      <ObjectOfInterest>
        <Person TypeCode="Customer" PresentFlag="true"/>
      </ObjectOfInterest>
    </AreaOfInterest>
  </VideoAnalysis>
</VideoAnalyticsMessage>

```

18.4 Scenario: Determine if merchandise present at specific register at specific point time (Request, Response – no Event)

Brief Description

Determine if a particular type of merchandise or any merchandise is present at a specific register at a specific time.

Scenario Description

Pre-Conditions

None

Post-Conditions

None

Data

Domain View

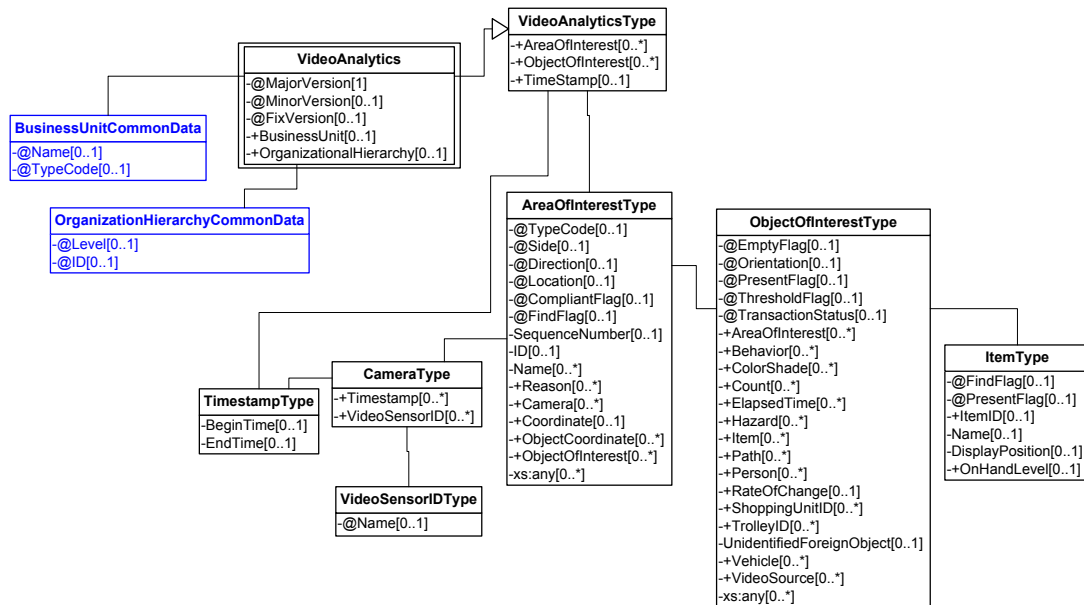


Figure 67: Determine if merchandise present at specific register at specific point time Domain View

Request/Response

ARTS XML Conformance XML Instance Document – Determine if merchandise present at specific register at specific point time – Request

```

<?xml version="1.0" encoding="UTF-8"?>
<VideoAnalyticsMessage xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.omg.org/retail/VideoAnalytics/namespace/
  ../VideoAnalyticsMessageOrientedV1.0.0.xsd"
  xmlns="http://www.omg.org/retail/VideoAnalytics/namespace/" MajorVersion="1" MinorVersion="0"
  FixVersion="0">
  <ARTSHeader ActionCode="Read" MessageType="Request">
    <MessageID>12345678</MessageID>
    <DateTime>2006-05-04T18:13:51.0Z</DateTime>
  </ARTSHeader>
  <VideoAnalysis>
    <!-- Determine if items are present at a specific register at a point in time -->
    <AreaOfInterest TypeCode="Workstation">
      <ID>ID0</ID>
      <Camera>
        <TimeStamp>
          <BeginTime>2006-05-04T10:00:00.0Z</BeginTime>
          <EndTime>2006-05-04T10:15:00.0Z</EndTime>
        </TimeStamp>
        <VideoSensorID>Camera1</VideoSensorID>
      </Camera>
      <ObjectOfInterest>
        <Item PresentFlag="true" FindFlag="true"/>
      </ObjectOfInterest>
    </AreaOfInterest>
  </VideoAnalysis>
</VideoAnalyticsMessage>

```

ARTS XML Conformance XML Instance Document – Determine if merchandise present at specific register at specific point time – Request

```
<?xml version="1.0" encoding="UTF-8"?>
<VideoAnalyticsMessage xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.omg.org/retail/VideoAnalytics/namespace/
  ../VideoAnalyticsMessageOrientedV1.0.0.xsd"
  xmlns="http://www.omg.org/retail/VideoAnalytics/namespace/" MajorVersion="1" MinorVersion="0"
  FixVersion="0">
  <ARTSHeader ActionCode="Read" MessageType="Response">
    <MessageID>987654</MessageID>
    <DateTime>2006-05-04T18:15:51.0Z</DateTime>
    <Response ResponseCode="OK">
      <RequestID>12345678</RequestID>
    </Response>
  </ARTSHeader>
  <VideoAnalysis>
    <!-- items are present at a specific register at a point in time -->
    <AreaOfInterest TypeCode="Workstation">
      <ID>ID0</ID>
      <Camera>
        <TimeStamp>
          <BeginTime>2006-05-04T10:00:00.0Z</BeginTime>
          <EndTime>2006-05-04T10:15:00.0Z</EndTime>
        </TimeStamp>
        <VideoSensorID>Camera1</VideoSensorID>
      </Camera>
      <ObjectOfInterest>
        <Item PresentFlag="true"/>
      </ObjectOfInterest>
    </AreaOfInterest>
  </VideoAnalysis>
</VideoAnalyticsMessage>
```

18.5 Scenario: Top of Trolley is Not Empty

Brief Description

When checking out the customer is requested to place all items on the belt. When the cart passes the POS, it is audited if it is really empty. If the cart is not empty, a message is sent to the POS system.

Pre-Conditions

An empty cart must be trained by the VA system.

An image had to be written to a file and the filename has to be passed.

Post-Conditions

NOTE: This is out of scope for this version.

The POS system sends the transaction number to the VA system.

Data

Filename

Event – Alert when

Cart is not empty

Domain View

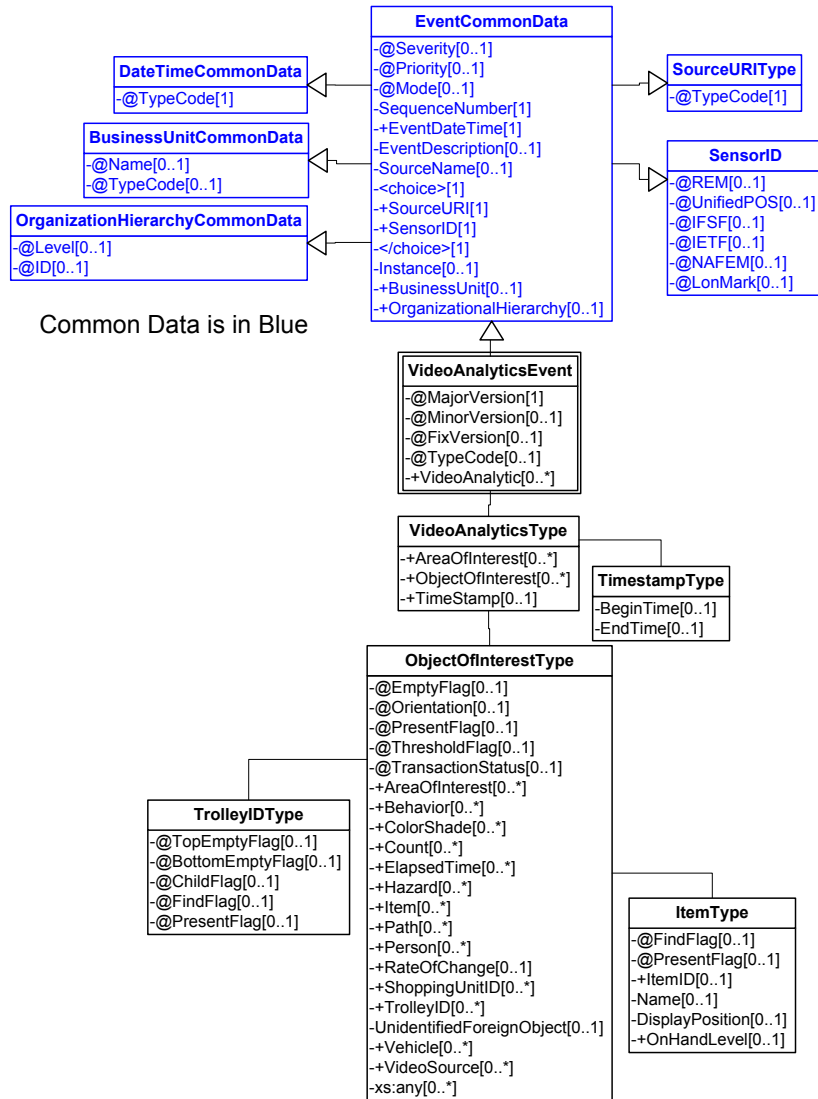


Figure 68: Top of Trolley is Not Empty Domain View

ARTS XML Conformance XML Instance Document – Top of Trolley is Not Empty – Event

```
<?xml version="1.0" encoding="UTF-8"?>
<VideoAnalyticsEvent xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.omg.org/retail/VideoAnalytics/namespace/
  ../VideoAnalyticsEventV1.0.0.xsd"
  xmlns="http://www.omg.org/retail/VideoAnalytics/namespace/" MajorVersion="1" MinorVersion="0"
  FixVersion="0" TypeCode="Boundary">
  <SequenceNumber>11234</SequenceNumber>
  <EventDateTime>2006-05-04T18:13:51.0Z</EventDateTime>
  <SourceURI>Camera 1</SourceURI>
  <VideoAnalytic>
    <AreaOfInterest TypeCode="Workstation">
      <!-- Register 100 -->
      <ID>100</ID>
      <ObjectOfInterest>
        <TrolleyID TopEmptyFlag="false"/>
      </ObjectOfInterest>
    </AreaOfInterest>
  </VideoAnalytic>
</VideoAnalyticsEvent>
```

18.6 Scenario: Product Identified in Bottom of Cart

Brief Description

When checking out a customer, the operator is notified that a product is “hiding” in the bottom of the cart and has not been included in the POS transaction. It may be possible for the notification to include the actual product information (SKU/PLU etc) for easy addition to the POS transaction.

Pre-Conditions

Connection to the Item File to identify and get Item SKU information.

Post-Conditions

Data

Domain View

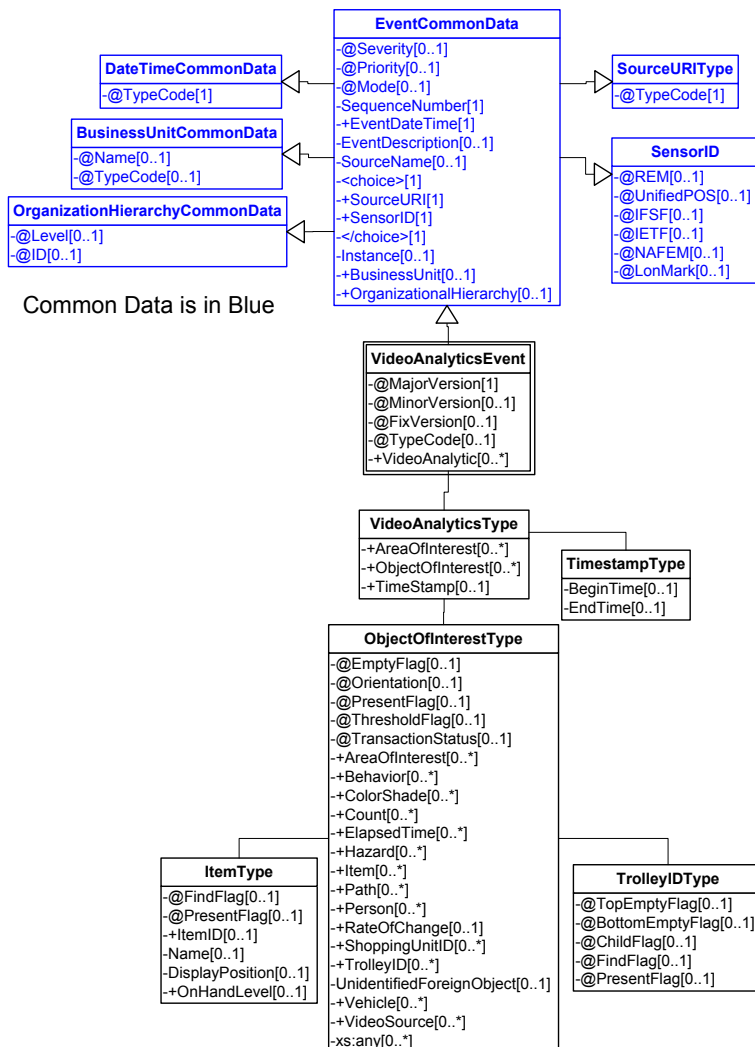


Figure 69: Product Identified in Bottom of Cart Domain View

Event

ARTS XML Conformance XML Instance Document – Product Identified in Bottom of Cart – Event

```
<?xml version="1.0" encoding="UTF-8"?>
<VideoAnalyticsEvent xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.omg.org/retail/VideoAnalytics/namespace/
  ../VideoAnalyticsEventV1.0.0.xsd"
  xmlns="http://www.omg.org/retail/VideoAnalytics/namespace/" MajorVersion="1" MinorVersion="0"
  FixVersion="0" TypeCode="VideoSource">
  <SequenceNumber>11234</SequenceNumber>
  <EventDateTime>2006-05-04T18:13:51.0Z</EventDateTime>
  <SourceURI>Camera 1</SourceURI>
  <VideoAnalytic>
    <ObjectOfInterest TransactionStatus="InProgress">
      <Merchandise PresentFlag="true">
        <ItemID Type="SKU">1234</ItemID>
      </Merchandise>
      <TrolleyID BottomEmptyFlag="false"/>
    </ObjectOfInterest>
  </VideoAnalytic>
</VideoAnalyticsEvent>
```

18.7 Scenario: Self Service Item Counting

Brief Description

In an environment where there are only a few items for sale, pre-create the transaction by identifying the items on the tray before the customer arrives at the POS.

Pre-Conditions

Connection to the Item File to identify and get Item SKU information.

Post-Conditions

Data

Domain View

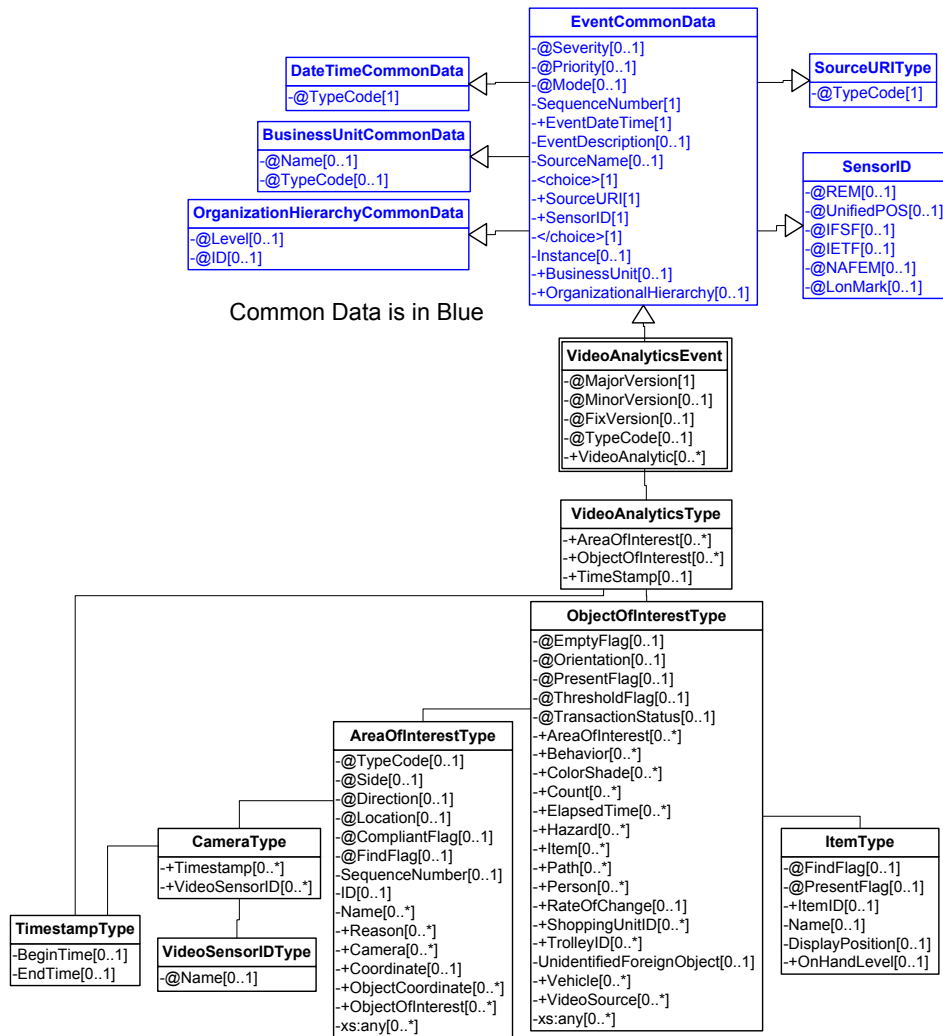


Figure 70: Self Service Item Counting Domain View

Event

ARTS XML Conformance XML Instance Document – Self Service Item Counting – Event

```
<?xml version="1.0" encoding="UTF-8"?>
<VideoAnalyticsEvent xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.omg.org/retail/VideoAnalytics/namespace/
  ../VideoAnalyticsEventV1.0.0.xsd"
  xmlns="http://www.omg.org/retail/VideoAnalytics/namespace/" MajorVersion="1" MinorVersion="0"
  FixVersion="0" TypeCode="VideoSource">
  <SequenceNumber>11234</SequenceNumber>
  <EventDateTime>2006-05-04T18:13:51.0Z</EventDateTime>
  <SourceURI>Camera 1</SourceURI>
  <VideoAnalytic>
    <ObjectOfInterest TransactionStatus="InProgress">
      <AreaOfInterest>
        <Name>Tray 1</Name>
      </AreaOfInterest>
      <Count>3</Count>
      <Merchandise>
        <!-- For example, Loaf of bread -->
        <ItemID Type="SKU">1234</ItemID>
      </Merchandise>
      <Merchandise>
        <!-- For example, Package of Printer Paper -->

```

```
        <ItemID Type="SKU">3456</ItemID>
    </Merchandise>
    <Merchandise>
        <!-- For example, Shirt -->
        <ItemID Type="SKU">2345</ItemID>
    </Merchandise>
</ObjectOfInterest>
</VideoAnalytic>
</VideoAnalyticsEvent>
```


19 Use Case: Staff Management and Monitoring

19.1 Scenario: Notify When Associate Enters a Secure Zone

Brief Description

Associate pushing a cart (identifier) through a security zone. This is probably an aisle.

Event is when someone enters an area they shouldn't be allowed into rather than following a particular path.

Alternate Description: Staff member is supposed to take an item from the warehouse directly to a specific shelf location in the store. VA system alerts manager when employee deviates from the defined route.

This may be better suited to a query rather than an event due to the nature of the request as there is a definitive starting point for path analysis (use select employee in the warehouse to monitor). With an event, it may be difficult to identify those employees that must take the pre-defined route from the ones that are allowed to deviate.

Assuming that the desire is to determine if the certain path is followed, the data would be the following. (Data similar to pathing/tracking.)

* Desired Path could be an ordered list of areas that an object must walkthrough; this is not the actual path itself but general flow through video sensors that an object takes to get from point A to B.

Pre-Conditions

Post-Conditions

Data

Request

Date/Time

Area of Interest

Object of Interest (Person in this example)

Desired Path*

Response

Boolean (success/failure on whether there was deviation)

VideoSensorID(s) [optional if the actual path information is to be returned]

Path Object [optional if the actual path information is to be returned]

Domain View

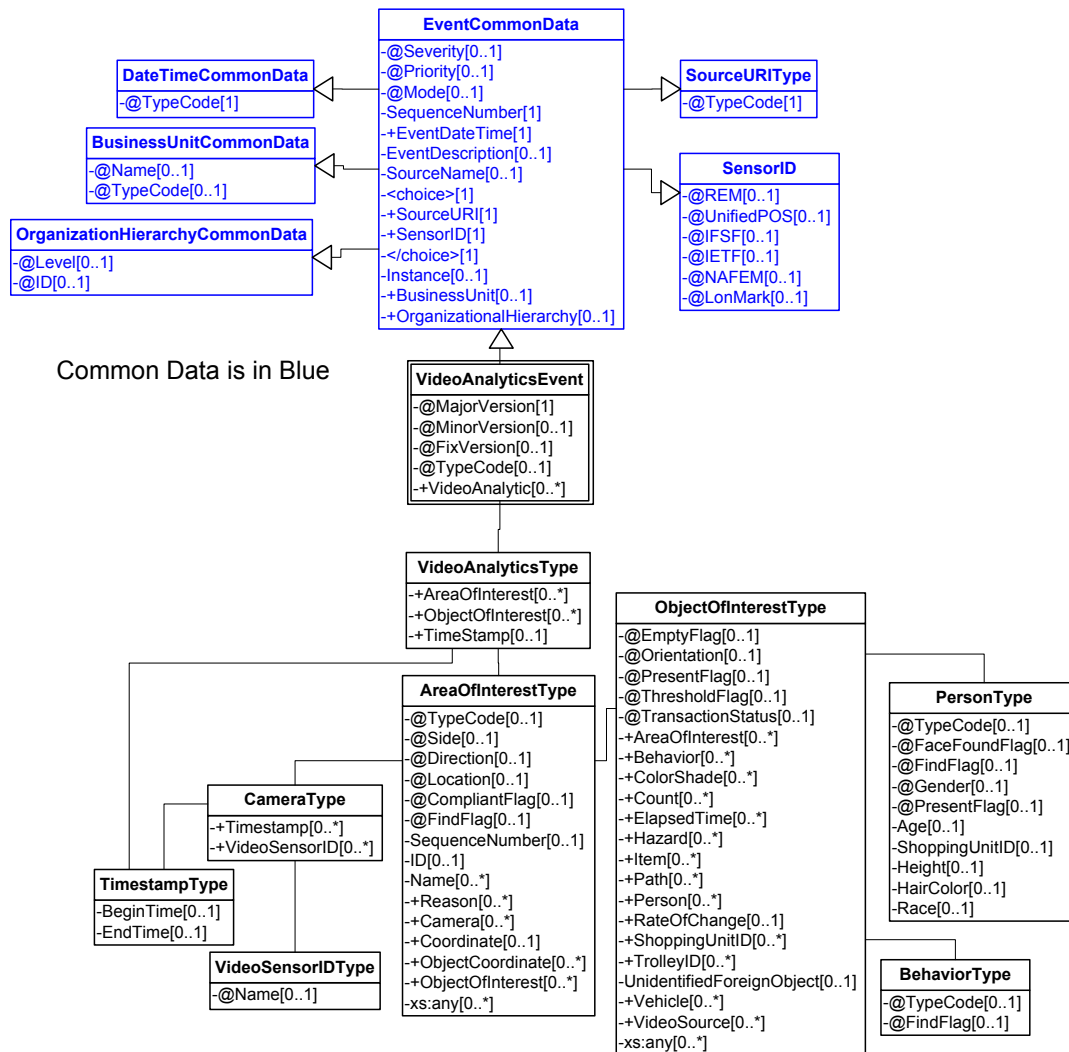


Figure 71: Notify When Associate Enters a Secure Zone Domain View

Event

ARTS XML Conformance XML Instance Document – Notify When Associate Enters a Secure Zone – Event

```
<?xml version="1.0" encoding="UTF-8"?>
<VideoAnalyticsEvent xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.omg.org/retail/VideoAnalytics/namespace/
  ../VideoAnalyticsEventV1.0.0.xsd"
  xmlns="http://www.omg.org/retail/VideoAnalytics/namespace/" MajorVersion="1" MinorVersion="0"
  FixVersion="0" TypeCode="VideoSource">
  <SequenceNumber>11234</SequenceNumber>
  <EventDateTime>2006-05-04T18:13:51.0Z</EventDateTime>
  <SourceURI>Camera 1</SourceURI>
  <VideoAnalytic>
    <AreaOfInterest TypeCode="Zone" Direction="Enter">
      <!-- The id of the secure location zone -->
      <ID>456</ID>
      <ObjectOfInterest>
        <Behavior TypeCode="AbnormalPath"/>
        <Person TypeCode="Associate" PresentFlag="true"/>
      </ObjectOfInterest>
    </AreaOfInterest>
  </VideoAnalytic>
</VideoAnalyticsEvent>
```

```
</VideoAnalytic>
</VideoAnalyticsEvent>
```

Request/Response

ARTS XML Conformance XML Instance Document – Notify When Associate Enters a Secure Zone – Request

```
<?xml version="1.0" encoding="UTF-8"?>
<VideoAnalyticsMessage xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.omg.org/retail/VideoAnalytics/namespace/
  ../VideoAnalyticsMessageOrientedV1.0.0.xsd"
  xmlns="http://www.omg.org/retail/VideoAnalytics/namespace/" MajorVersion="1" MinorVersion="0"
  FixVersion="0">
  <ARTSHeader ActionCode="Read" MessageType="Request">
    <MessageID>12345678</MessageID>
    <DateTime>2006-05-04T18:13:51.0Z</DateTime>
  </ARTSHeader>
  <VideoAnalysis>
    <!-- Determine if an associate was found following an abnormal path into a secure zone --
  >
    <AreaOfInterest TypeCode="Zone" Direction="Enter">
      <!-- The id of the secure location zone -->
      <ID>456</ID>
      <Name>Secure Zone</Name>
      <ObjectOfInterest>
        <Behavior TypeCode="AbnormalPath"/>
        <Person TypeCode="Associate" PresentFlag="true" FindFlag="true"/>
      </ObjectOfInterest>
    </AreaOfInterest>
  </VideoAnalysis>
</VideoAnalyticsMessage>
```

ARTS XML Conformance XML Instance Document – Notify When Associate Enters a Secure Zone – Response

```
<?xml version="1.0" encoding="UTF-8"?>
<VideoAnalyticsMessage xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.omg.org/retail/VideoAnalytics/namespace/
  ../VideoAnalyticsMessageOrientedV1.0.0.xsd"
  xmlns="http://www.omg.org/retail/VideoAnalytics/namespace/" MajorVersion="1" MinorVersion="0"
  FixVersion="0">
  <ARTSHeader ActionCode="Read" MessageType="Response">
    <MessageID>987654</MessageID>
    <DateTime>2006-05-04T18:15:51.0Z</DateTime>
    <Response ResponseCode="OK">
      <RequestID>12345678</RequestID>
    </Response>
  </ARTSHeader>
  <VideoAnalysis>
    <!-- An associate was found following an abnormal path into a secure zone -->
    <AreaOfInterest TypeCode="Zone" Direction="Enter">
      <!-- The id of the secure location zone -->
      <ID>456</ID>
      <Name>Secure Zone</Name>
      <ObjectOfInterest>
        <Behavior TypeCode="AbnormalPath"/>
        <Person TypeCode="Associate" PresentFlag="true"/>
      </ObjectOfInterest>
    </AreaOfInterest>
  </VideoAnalysis>
</VideoAnalyticsMessage>
```

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20 Referenced Documents

- ARTS XML Video Analytics Charter, Version 1.00
- ARTS XML Extending Schemas Technical Report
- ARTS XML Best Practices V2.1.0 20070515.doc
- ARTS Dictionary
- ARTS Data Model, Version 5.1

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21 Document History

Version History

Ver	Date	Sections	Description of Change
1.0.1	2008-10-07	all	Orionally published NRF-ARTS specification.
1.0.2	2017-12-02	Entire Document	Format and pre-pend OMG usage, small typographical changes

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22 Glossary

Term	Definition
FQQID	Fully qualified queue identifier

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Appendix A : Identified for Potential Future Releases

Scenario: Event generated for each customer who enters or exits the store

Brief Description

Count is 1 by definition of the scenario

Scenario: Event generated when the number of people in the store drops below a specific number

Brief Description

The manager would like to be informed when the number of people in the store drops below a defined threshold at any time in the day. The VA system generates an event when it determines that the threshold has been crossed (Drops below defined capacity).

The manager may choose to send some staff on break at this point.

By scenario definition, the VA system is monitoring ALL entrances and exits to provide all the required information.

Scenario: Query the number of people in the store at the current time

Brief Description

At a specific point in time, a query is sent to the VA system to ask the current number of people in the store.

Scenario: Query the number of people in the store at a specific time in the past

Brief Description

A query is sent to the VA system to ask the number of people in the store at a specific time in the past.

Scenario: How many shopping units are predicted to wait more than X minutes in a line?

Brief Description

At a point in time the VA system is queried to determine how many shopping units are predicted to wait more than X minutes in one or more queues.

Scenario: Event generated when X shopping units have waited over Y minutes in a line?

Brief Description

The VA system generates an event when a system configured number of shopping units (X) have waited more than a system configured number of time units (Y minutes) in a queue.

Details are provided based on system configurations within the RA system.

Scenario: Event generated when X shopping units are predicted to wait over Y minutes in a line?

Brief Description

The VA system generates an event when a system configured number of shopping units (X) have waited more than a system configured number of time units (Y minutes) in a queue.

Details are provided based on system configurations within the RA system.

Scenario: Loading Dock Load Factors

Brief Description

Truck is at a loading dock but there isn't anyone scheduled to be at that dock.

Use Case: License Plate Recognition (Out of Scope)

Scenario: Baby Formula Heist Notifying Other Stores to Look Out for this License Number(s)

Brief Description

A car containing potential baby formula thief has left the parking lot. The store notifies other stores about the identify of the car.

Scenario: Co-OP Dollars based upon recognition of customer effectiveness of coupons (OUT OF SCOPE?)

Scenario: Identify Other Potential Affinity by Watching Customer Purchase Item a then go to Look at Other Items which are not Purchased

Brief Description

A male customer purchased a tube of toothpaste then looked at a toothbrush but didn't buy it.

Scenario – Blocking Fire Exit

Scenario Description

B – Trolley blocking the exit door or fire exit (type code = safety).

Scenario: Evaluate Advertising Effectiveness (Store Signage)

Brief Description

How long does a customer look at a particular digital sign? (count of people and average duration)

Scenario: Evaluate Advertising Effectiveness (Store Signage)

Brief Description

Did the digital signage drive more traffic to the product?

Scenario: Identifying Items on the Scale (out of scope)

Brief Description

Identify the side of lamb setting on the scale.

Pre-Conditions

Connection to the Item File to identify and get Item SKU information.

Use Case: Information Retrieval (out of scope)

Scenario: Batch Upload of Video

Brief Description

Upload all video with red cars (child abduction).

Technically video analytics does not do video retrieval or manipulation. If the desire is to find all video (or video from a subset of sources) with the desired query, then the data would look like the following.

Note – this is only a query not an event.

Pre-Conditions

Post-Conditions

Data

Request

Date/Time Block

VideoSensorID (s) [optional]

Object Of Interest

Response

Array of:

VideoSourceID

Date/Time

Scenario: Retrieve the video that relates to this POSLog transaction

Technically video analytics does not do video retrieval or manipulation. This should be a simple date/time query into the video management system.

Brief Description

The LP system identified that POSLog transaction 100 occurred at 12 :15 and queries the video management system to retrieve the video analytics from camera 1 at 12 :15pm in store number 1.

Scenario: Manager required presence for certain transactions. (deferred to next ver of spec)

Brief Description

A vendor may want to validate the presence of a store manager when certain transactions are carried out by the cashier. The video analytics system will generate an alert when the condition is not met.

Pre-Conditions

The video analytics system is integrated with a data stream to identify the position of an employee, and the POS data stream. At the minimum, the POS data stream and the video analytics data stream need to be time synchronized.

Post-Conditions

None

Data

Event – Validate manager presence for a certain transaction

Type: Security

Date/Time

Area of Interest (register scan area)

Request – Find if there are two people in the cash register area

Date/Time range

Area of Interest (register scan area)

Object of Interest (person)

Response

Boolean (success if two people are present)

Date/Time

VideoSensorID(s)

Scenario: Transaction going on with customer present but no merchandise present (defer to next ver of spec)

Brief Description

A vendor may want to validate the presence of merchandise when a transaction is completed, given the presence of a customer. The video analytics system will be able to alert the store manager if the event occurs.

Loss Prevention Issue

Pre-Conditions

The video analytics system is integrated with the POS system.

Post-Conditions

Data

Event – Validate merchandise presence when a transaction is completed and a customer is present.

Type: Security

Date/Time

Area of Interest (register scan area, area in front of the register)

Request – Find if the item scanned is the same that was put in the bag.

Date/Time range

Area of Interest (register scan area, area in front of the register)

Object of Interest (item scanned)

Response

Boolean (success if a person is present but there is no merchandise)

Date/Time

VideoSensorID(s)

Scenario: Tracking items being scanned at checkout counter (defer to to next ver of spec)

Brief Description

Cashier scanning one product but putting another more expensive item in the bag.

NOTE: This requires hooking up to the item file to identify which item, then to the PLU for finding out which price.

Scenario: Transaction going on when no customer present (Deferred to future ver of spec)

Brief Description

A vendor may want to validate the presence of a customer at the time of a transaction. This would be a particularly useful during merchandise return transactions. The video analytics system generates an alert to the manager of the store on duty and stores these alerts for case management by a loss prevention manager.

Loss Prevention

Pre-Conditions

POS transaction data stream integrated into the video analytics event detection data stream.

This could be two separate data streams that are then compared via daily batch or query. It is a pre-condition that time is synchronized between video storage, analytics, and POS.

Post-Conditions

Data

Event – Validate the absence of a customer when a transaction occurs.

Type: Security

Date/Time

Area of Interest (customer side of the cash register)

Transaction type - What kind of information do we need here? Transaction ID, Type?

Request – Find if a person is absent in front of a cash register during a transaction.

Date/Time range

Area of Interest (customer side of the register)

Object of Interest (person)

Transaction type

Note: This use case assumes a general query to search for these events for a particular camera/register over a period of time. Use case can be extended to allow a loss prevention manager to query these events over multiple registers and/or stores, and possible further query based on number of instances by a particular cashier over a period of time. Point is, this use case can be expanded to detail the full application that would use these generated events.

Response

Boolean (success if a person is absent and a transaction of defined type occurs)

Date/Time

VideoSensorID(s)

Scenario: Customer reaching into the cash drawer (deffer to next version of spec)

Brief Description

A retailer may want to receive an alert when a customer reaches into the cash register when the cashier is not present. The video analytics system generates an alert to the security personnel on duty.

Loss Prevention – cashier may be present and someone does a quick snatch.

Pre-Conditions

Post-Conditions

Data

Event

Type Security

Date/Time

Area of Interest (cash register and behind the cash register)

Request – Find if a person is in front of the register but no one is behind it.

Date/Time range

Area of Interest (in front of the register and behind it)

Response

Boolean (success if a hand appears in the cash register area and no one is behind the cash register. Failure otherwise.)

Date/Time

VideoSensorID(s)

Query – track from the point where this is a good location identified for the child to where they are now

Request

Date Range

Object of interest (person (child))

Area of interest (where split from parent)

Response

Date/Time

VideoSensorID(s)

Path through various cameras

Scenario: Intelligent filtering of POS transactions to detect Illegal Returns

Brief Description

LP investigator wants to identify all instances of cashier doing a return but no customer standing there in the last 2 weeks; suspect cashier.

Pre-Conditions

Post-Conditions

Query – Count the number of people next to the returns POS terminal within a time range (zero is the number of interest when there is a return transacted).

Request

Date Range

Object of interest (Person)

Area of interest (e.g., guests' side of the register)

Response

Date/Time

VideoSensorID(s)

Area of interest

Alternate Query: Count the number of objects on the counter when the transaction is a return (zero is of interest)

Request:

Date/Time range

Object of interest (merchandise)

Area of interest (POS counter)

Response:

Date/Time

VideoSensorID

Area of Interest

Scenario - Count the number of people who linger in front of the display and remove merchandise from the display (duplicate information)

Request

Date/Time range

Area of Interest (In front of display)

Area of Interest (Merchandise location could be the same as Infront of Display)

Object of Interest (Person with duration)

Response

Date/Time

VideoSensorID

Area of Interest

Object of Interest (Person with duration count which meet threshold)

Direction (direction object of interest is facing)

Scenario- Count the number of people who linger in front of the display and are facing a display for a period of time and remove merchandise from the display (duplicate Information)

Request

Date/Time range

Area of Interest (In front of display)

Area of Interest (Merchandise location – could be the same as Infront of display)

Object of Interest (Person with duration)

Response

Date/Time

VideoSensorID

Area of Interest

Object of Interest (Person with duration count which meet threshold)

Scenario- Count the number of people customer-associate grouping for a given time period. (Future – need way to identify associates vs customers)

Brief Description

Scenario Description

Count the number of customer-associate interactions from 10:00 to 10:15am.

Pre-Conditions

Post-Conditions

Data

Request

Date/Time range

Area of Interest (could be all the cameras in the store)

Object of Interest (Person – associate. Behavior - Grouping. Duration - threshold)

Object of Interest (Person – customer)

Response

Date/Time range

VideoSensorID

Area of Interest

Object of Interest (Person – associate. Behavior - Grouping. Duration - threshold)

Object of Interest (Person – customer)

Scenario: Optimize location of related merchandise to drive increased basket sizes (the analysis is up to some other system)

Brief Description

Confirm whether customers removing item 1 from the shelf also remove item 2 from the shelf and how this propensity changes based on different locations for item 2.

Pre-Conditions

Post-Conditions

Data

Query- Identify customers who purchase two related products.

Request

Date/Time range

Area of Interest (Merchandise location)

Area of Interest (Merchandise location)

Object of Interest (Merchandise)

Object of Interest (Merchandise)

Response

Date/Time

VideoSensorID

Area of Interest

Object of Interest (Person)

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