Uniform Loan Application Dataset (ULAD)
Data Relationships Using Xlink and MISMO Arcroles Document

Document Version 1.0
August 23, 2016
# Data Relationships Using Xlink and MISMO Arcroles

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<th>Acronym or Abbreviation</th>
<th>Term</th>
</tr>
</thead>
<tbody>
<tr>
<td>MISMO</td>
<td>Mortgage Industry Standards Maintenance Organization</td>
</tr>
<tr>
<td>MISMO LDD</td>
<td>MISMO Logical Data Dictionary</td>
</tr>
<tr>
<td>MISMO v3.4</td>
<td>MISMO Version 3.4 Reference Model</td>
</tr>
<tr>
<td>REO</td>
<td>Real Estate Owned</td>
</tr>
<tr>
<td>ULAD</td>
<td>Uniform Loan Application Dataset</td>
</tr>
<tr>
<td>UMDP</td>
<td>Uniform Mortgage Data Program</td>
</tr>
<tr>
<td>URLA</td>
<td>Uniform Residential Loan Application</td>
</tr>
</tbody>
</table>
## Glossary

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>MISMO v3.4 Reference Model Structures</strong></td>
<td>The hierarchical organization of XML elements (containers and data points) providing an entity-relationship model of the mortgage life cycle.</td>
</tr>
<tr>
<td><strong>MISMO v3.4 Structures</strong></td>
<td>The hierarchical organization of XML elements (containers and data points) providing an entity-relationship model of a specific portion of the mortgage life cycle.</td>
</tr>
<tr>
<td><strong>XLink</strong></td>
<td><strong>XML Linking Language</strong>, or XLink, is an <a href="https://www.w3.org/XML/2001/03/xml-linking">XML markup language</a> and <a href="https://www.w3.org">W3C</a> specification that provides methods for creating internal and external links within XML documents, and associating metadata with those links.</td>
</tr>
<tr>
<td><strong>XLink Arcroles</strong></td>
<td>A defined relationship between two data facts or groups of facts (containers) described using the Xlink standard linking language and a descriptive arcrole defined in the MISMO data standards.</td>
</tr>
</tbody>
</table>
This document provides the details of the data relationships in the MISMO Version 3.4 standard. There is an introduction to data relationship concepts as well as detailed information for the creation and usage of data relationships used as part of the Uniform Loan Application Dataset (ULAD) Data Mapping document. The sections outlined in this document will provide the following information about data relationships used by the ULAD as defined within the MISMO Data Standard:

- An overview of data relationship concepts that may be used in the MISMO Data Standards Version 3.4. These include relationship concepts for One-to-One, One-to-Many and Many-to-Many as well as an explanation of different types of relationships (Reflexive and Irreflexive). This section was copied from the MISMO Version 3 Reference Model General Information Guide.
- An overview of the use of the W3C standard, XLink, used for communicating the different data relationships that can be used within the MISMO Data Standards. This section was copied from the MISMO Version 3 Reference Model General Information Guide.
- An explanation of the each data relationship used in the ULAD.
- An XML data example including each of the data relationships that are possible within the ULAD.
This section was copied from the MISMO Version 3 Reference Model General Information Guide. Providing a list of mortgage industry data elements and their definitions is an important feature of the MISMO Reference Model. Equally important is how the Reference Model Schema defines the relationships between those data elements. Source and target data elements in a relationship are generally referred to as end points. The following types of relationships are supported in the Reference Model.

### ONE-TO-ONE RELATIONSHIP

A One-to-One Relationship is one in which any given instance of the source element may only be associated with one instance of the target element, and no two instances of the source element are associated with the same instance of the target element.

For example: Each instance of the source PARTY / INDIVIDUAL element may be associated with one instance of the target NAME element, which is not associated with any other instances of the PARTY / INDIVIDUAL element.

```
INDIVIDUAL 1 → NAME 1
INDIVIDUAL 2 → NAME 2
```

Most One-to-One Relationships are established in the MISMO Reference Model by containment. Containment means that there is a direct parent/child relationship between the elements. In the example above the INDIVIDUAL element contains a NAME element, which itself contains the individual’s name components – First Name, Middle Name, Last Name, and others. Other One-to-One Relationships may be needed which cannot be made using containment. For example, relating two data elements that are in different container elements. These types of relationships are sometimes referred to as “pointing relations” and are defined using “XLink Relationships”, which are discussed later in this chapter.

### ONE-TO-MANY RELATIONSHIP

A One-to-Many Relationship is one in which one instance of the source element may be associated with one or more instances of the target element and no two instances of the source element are associated with the same instance of the target element.
For example: Each instance of the source BORROWER element may have multiple instances of the target EMPLOYER element, each of those is not associated with any other instances of BORROWER. Even if both borrowers on a loan may have the same employer, the values of some the employer data elements may be different, such as their income amounts, start dates, and positions.

![Diagram of Data Relationships]

Most One-to-Many Relationships are also established in the MISMO Reference Model by containment. Other One-to-Many Relationships may be defined using “XLink Relationships”.

**MANY-TO-MANY RELATIONSHIP**

A Many-to-Many Relationship is one in which one instance of the source element may be associated with multiple instances of the target element and multiple instances of the source element may be associated with the same instance of the target element.

For example: Each BORROWER element may be associated with multiple ASSET elements, and multiple BORROWER elements may be associated with the same ASSET element.

![Diagram of Many-to-Many Relationship]

Many-to-Many Relationships are defined using “XLink Relationships”.

**REFLEXIVE RELATIONSHIP**

A Reflexive Relationship is a one-to-one, one-to-many, or many-to-many relationship between instances of the same element, i.e., the source and target elements are of the same type.

For example: An instance of the INDIVIDUAL element may be associated with another instance of the INDIVIDUAL element to represent a marriage relationship.

Reflexive Relationships are defined using “XLink Relationships”.

![Diagram of Reflexive Relationship]
IRREFLEXIVE RELATIONSHIP

An Irreflexive Relationship is the opposite of a Reflexive Relationship. It is a one-to-one, one-to-many, or many-to-many relationship between instances of different elements, i.e., the source and target elements are of different types.

For example: The One-to-One INDIVIDUAL to NAME relationship, One-to-Many BORROWER to EMPLOYER relationship, and Many-to-Many BORROWER to ASSET relationships discussed earlier are all examples of Irreflexive Relationships.
RULES FOR XLINK RELATIONSHIPS

This section was copied from the [MISMO Version 3 Reference Model General Information Guide](#).

OVERVIEW

The previous section identified types of relationships and the methods MISMO uses to define relationships – either by containment or by pointing. Whenever we need to identify relationships between elements that are not directly contained by another, we use Xlink Relationships. MISMO has added the appropriately named RELATIONSHIPS container structure as a means of specifying those relationships.

The RELATIONSHIPS container is a child of MESSAGE, DEAL_SETS, DEAL_SET, DEALS, DEAL, and DOCUMENT. The location in the Reference Model of the RELATIONSHIPS container is determined by the XML instance and its structure. The RELATIONSHIPS container used MUST be at the lowest structural level that is a parent or sibling of the elements being joined.

Examples include:

- The RELATIONSHIPS container as a child of a DEAL_SETS container links DEAL_SETS/PARTY data to DEAL_SETS/DEAL_SET/DEALS/DEAL/LOANS/LOAN data.
- The RELATIONSHIPS container as a child of a DOCUMENT container links all the information about document signatures in the DOCUMENT/SIGNATORIES/SIGNATORY container to the actual DOCUMENT/DEAL_SETS/DEAL_SET/DEALS/DEAL/PARTY container representing the person that signed the document.
- The RELATIONSHIPS container as a child of a DEAL container links all the information for a DEAL/LOANS/LOAN, such as asset and liability information, to an individual borrowers under DEAL/PARTIES/PARTY container.

The MISMO Reference Model uses an XML specification called XLink to define data relationships in a MISMO message that are not naturally expressed by the MISMO container hierarchy. The full XLink standard is defined by the W3C at [http://www.w3.org/TR/xlink](http://www.w3.org/TR/xlink). At this time MISMO is only using a limited set of the XLink attributes.

One of the XLink attributes, arcrole describes the type of relationship between source data and target data. The XLink from attribute identifies the source data point or container. The XLink to attribute identifies the target data point or container. The XLink label attribute is an identifier that is attached to data point or container elements that will be used to express an arcrole relationship. The MISMO RELATIONSHIP container elements hold the XLink arcrole, from and to attributes that describe the data relationships.

In the simplified example below, a CREDIT_RESPONSE has returned CREDIT_SCORE data for BORROWER parties in a loan DEAL. XLink label attributes are added to each CREDIT_SCORE element and each PARTY element’s ROLE element. The MISMO RELATIONSHIP element identifies which credit score is associated with each borrower.
RELATIONSHIP ELEMENT TYPES “FROM” AND “TO” END POINT CONDITIONS

Each from and to attribute value in a RELATIONSHIP element must satisfy the following conditions:

- **Sufficiency** – Each endpoint must unambiguously represent the data that is being linked in the relationship.
- **Uniqueness** – Each instance of endpoint must represent a different instance of the relationship.

For example, to represent the relationship where a party is a borrower on a loan, link the elements LOAN and ROLE. That relationship meets the rules of **sufficiency** and **uniqueness**.

LOAN is sufficient to represent an instance of a loan because all the elements under LOAN work together to describe the same loan. If we go any higher in the model, we would fail to identify a loan. We could not use the DEAL element, because it may contain multiple loans and we would not know to which one of them the relationship is being applied.

LOAN is unique because it represents one specific instance of the LOAN container. Any other sibling
instance would be a different loan. If we go any lower, the endpoint would not be unique. For example, we could not use LOAN_IDENTIFIER because all sibling occurrences of LOAN_IDENTIFIER refer to the same loan.

ROLE is sufficient to identify a party as a borrower (by setting the ROLE_DETAIL element’s PartyRoleType attribute value to “Borrower”). If we go any higher in the model, we would fail to identify the role. For example, we could not use the PARTY element, because it may contain multiple roles and we would not know to which of them the relationship is being applied.

The ROLE element is unique. Any given party will only have one ROLE element of type borrower. If we want to say that a party is a borrower on a loan, we need to use one specific instance of the ROLE element. Pointing to any other sibling instance would mean a different role. If we go any lower, the endpoint would not be unique. For example, we could not use EMPLOYER because all sibling instances of EMPLOYER refer to the same borrower.

RELATIONSHIP ELEMENT ATTRIBUTES: FROM, TO AND ARCROLE

Each instance of the RELATIONSHIP element must contain at least three XLink attributes: from, to, and arcrole. Since these attributes are part of the XLink standard’s “namespace”, in a XML message they must contain the namespace prefix that the MISMO schema assigns for them. By default the schema usually assigns xlink: as the namespace prefix, to differentiate these XLink attributes from MISMO data elements and attributes.

Example:

```xml
```

RELATIONSHIP ELEMENT “ARCROLE” NAMING CONVENTION

The architectural rules for the use of XLink are detailed in MEG 0036, Use of XLink to Manage Relationships, available at the link below:


Each arcrole value will be composed as follows:

- {URN} {FromName} ‘_’ {VerbPhrase} ‘_’ {ToName}
- **URN** – for arcroles defined by MISMO, the URN string value is `urn:fdc:mismo.org:2009:residential/`. For arcroles not defined by MISMO the “extended” URN is the string “urn:fdc:” + domain name of the extending organization + “:” + year of first use + “:” + optional qualifier + separator character “/” or “/”. Example: `urn:fdc:AcmeLending.com:2013:mortgage`
- **FromName** – the element name that is pointed to by xlink:from attribute.
- **VerbPhrase** – is defined according to the type of relationship. For Irreflexive Relationships (i.e. FromName is different from ToName), the value of VerbPhrase is ‘IsAssociatedWith’.
- **ToName** – the element name that is pointed to by the xlink:to attribute.
Example of a “MISMO V3.3.0” arcrole value:

```
xlink:arcrole="urn:fdc:mismo.org:2009:residential/ASSET_IsAssociatedWith_ROLE"
```

Example of an “extended” arcrole value:

```
```

### RELATIONSHIP ELEMENT “ARCROLE” FROMNAME/TONAME VALUE ORDER

When the relationship is connecting two container elements, the arcrole value used for the **FromName** must precede the value of the **ToName** alphabetically.

For example, if a relationship is being established between ROLE and LOAN elements, LOAN must be the **FromName** and ROLE must be the **ToName**, since LOAN precedes ROLE alphabetically.


When the relationship is connecting a container element to a data point element, the **FromName** is always the container name and the **ToName** is always the data point element name.

For example: "urn:fdc:mismo.org:2009:residential/DATA_SOURCE_IsAssociatedWith_GrossLivingAreaSquareFeetNumber"
This section will provide information about data relationships used in the ULAD that will require the use of Xlink and a MISMO arcroles. Each of these data relationships will require the use of the XLink standard used to represent data relationships within the MISMO Data Standards and a MISMO arcrole. The following list of data relationships that will be used as part of the ULAD implementation using XLink within the MISMO Data Standards.

- Relationship between a borrower’s income and the associated employer
- Relationship between a counseling event and the associated housing counseling agency (covers both “education” and “counseling”)
- Relationship between a owned property (asset) and the associated liabilities
- Relationship between a related loan and the associated creditor

**RELATIONSHIP BETWEEN A BORROWER’S INCOME AND THE ASSOCIATED EMPLOYER**

The following example provides details about xlink arcrole relationship needed to define a data relationship between income items for a borrower and the associated employment (employer) providing that income.
The figure below (Figure 1) shows examples of a borrower’s income items, by type, that will need to be linked to the associated employer.

```
CURRENT_INCOME_ITEM And EMPLOYER Containers
Identifying Endpoints Of Relationships

PARTIES
PARTY
INDIVIDUAL
NAME
ROLE
BORROWER
CURRENT INCOME
CURRENT INCOME ITEMS
CURRENT INCOME ITEM
Sequence Number = “1”
xlink:label = “INCOME_ITEM_1”
CURRENT INCOME ITEM DETAIL
Current Income Monthly Total Amount = 1000
Income Type = Base
CURRENT INCOME ITEM
Sequence Number = “2”
xlink:label = “INCOME_ITEM_2”
CURRENT INCOME ITEM DETAIL
Current Income Monthly Total Amount = 400
Income Type = Overtime
EMPLOYERS
EMPLOYER
Sequence Number = “1”
xlink:label = “EMPLOYER_1”
LEGAL_ENTITY
LEGAL_ENTITY_DETAIL
Full Name
ROLE DETAIL
Party Role Type = Borrower
```

Figure 1. Establishing Endpoints of Relationship

The table below (Table 1) shows the endpoints that will makeup the xlink arcrole relationship for each relationship.

<table>
<thead>
<tr>
<th>CONTAINER</th>
<th>XPath For Container</th>
<th>Sequence Number</th>
<th>Xlink:label</th>
</tr>
</thead>
<tbody>
<tr>
<td>CURRENT_INCOME_ITEM</td>
<td>DEAL/PARTIES/PARTY/ROLES/ROLE/BORROWER/CURRENT_INCOME/CURRENT_INCOME_ITEMS/CURRENT_INCOME_ITEM</td>
<td>1</td>
<td>INCOME_ITEM_1</td>
</tr>
<tr>
<td>CURRENT_INCOME_ITEM</td>
<td>DEAL/PARTIES/PARTY/ROLES/ROLE/BORROWER/CURRENT_INCOME/CURRENT_INCOME_ITEMS/CURRENT_INCOME_ITEM</td>
<td>2</td>
<td>INCOME_ITEM_2</td>
</tr>
<tr>
<td>EMPLOYER</td>
<td>DEAL/PARTIES/PARTY/ROLES/ROLE/BORROWER/EMPLOYERS/EMPLOYER</td>
<td>1</td>
<td>EMPLOYER_1</td>
</tr>
</tbody>
</table>

Table 1. Identifying Endpoints in the Relationship
The table below (Table 2) shows a breakdown of the detailed components of the relationships used to relate a borrower’s income to the employment source.

<table>
<thead>
<tr>
<th>RELATIONSHIPS CONTAINER</th>
<th>XPath</th>
<th>Attribute</th>
<th>xlink:label</th>
<th>Value</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>First instance of RELATIONSHIP</td>
<td>MESSAGE/DEAL_SETS/DEAL_SET/DEALS/DEAL/RELATIONSHIPS/RELATIONSHIP</td>
<td>Sequence Number</td>
<td>1</td>
<td>arcrole=&quot;urn:fdc:mismo.org:2009:residential&quot;</td>
<td>CURRENT_INCOME_ITEM_EM_IsAssociatedWith_EMPLOYER</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>from</td>
<td>INCOME_ITEM_1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>to</td>
<td>EMPLOYER_1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>from</td>
<td>INCOME_ITEM_2</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>to</td>
<td>EMPLOYER_1</td>
</tr>
</tbody>
</table>

Table 2. Relationships Container – Component Details

The figure below (Figure 2) shows basic examples of how the xlink arcrole relationships linking a borrower’s income items to an employer would look in the RELATIONSHIPS container. Note that both the income and employment structures are contained under the borrower structure, thus the relationship to the borrower is handled by containment and no further xlink arcrole relationship is needed to relate the income and employment to an individual borrower.

Figure 2. Using Endpoints and an Arcrole To Define a Relationship
RELATIONSHIP BETWEEN A COUNSELING EVENT AND THE ASSOCIATED HOUSING COUNSELING AGENCY

The following example provides details about the xlink arcrole relationship needed to define a data relationship between a Counseling Event and the Housing Counseling Agency that provided the counseling and the borrower. While the example provided below shows a counseling event type of “Counseling”, the same xlink arcrole relationship would be used for an education event (Counseling Type = “Education”).

The figure below (Figure 3) shows examples of a counseling event, by type, that will need to be linked to the housing counseling agency.

<table>
<thead>
<tr>
<th>COUNSELING EVENT (Counseling or Education) And ROLE (HousingCounselingAgency) Containers Identifying Endpoints Of Relationships</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PARTIES</strong></td>
</tr>
<tr>
<td><strong>PARTY</strong></td>
</tr>
<tr>
<td><strong>INDIVIDUAL</strong></td>
</tr>
<tr>
<td><strong>NAME</strong></td>
</tr>
<tr>
<td><strong>ROLE</strong></td>
</tr>
<tr>
<td><strong>BORROWER</strong></td>
</tr>
<tr>
<td><strong>COUNSELING EVENTS</strong></td>
</tr>
<tr>
<td><strong>COUNSELING EVENT</strong></td>
</tr>
<tr>
<td><strong>Sequence Number = “1”</strong></td>
</tr>
<tr>
<td><strong>xlink:label = “COUNSELING_EVENT_1”</strong></td>
</tr>
<tr>
<td><strong>COUNSELING EVENT DETAIL</strong></td>
</tr>
<tr>
<td>Counseling Completed Date = 2015-10-05</td>
</tr>
<tr>
<td>Counseling Confirmation Indicator= true</td>
</tr>
<tr>
<td>Counseling Format Type = FaceToFace</td>
</tr>
<tr>
<td>Counseling Type= Counseling</td>
</tr>
</tbody>
</table>

| **PARTIES**                                                                                                               |
| **PARTY**                                                                                                                 |
| **LEGAL ENTITY**                                                                                                          |
| **LEGAL ENTITY DETAIL**                                                                                                    |
| Full Name                                                                                                                 |
| **ROLE**                                                                                                                  |
| **Sequence Number = “1”**                                                                                                   |
| **xlink:label = “HOUSING_COUNSELING_AGENCY_1”**                                                                            |
| **ROLE DETAIL**                                                                                                           |
| Party Role Type = HousingCounselingAgency                                                                                   |

Figure 3. Establishing Endpoints of Relationship
The table below (Table 3) shows the endpoints that will makeup the xlink arcrole relationship for each relationship.

<table>
<thead>
<tr>
<th>CONTAINER</th>
<th>XPath For Container</th>
<th>Sequence Number</th>
<th>Xlink:label</th>
</tr>
</thead>
<tbody>
<tr>
<td>COUNSELING_EVENT</td>
<td>DEAL/PARTIES/PARTY/ROLES/ROLE/BORROWER/COUNSELING_EVENTS/COUNSELING_EVENT</td>
<td>1</td>
<td>COUNSELING_EVENT_1</td>
</tr>
<tr>
<td>ROLE</td>
<td>DEAL/PARTIES/PARTY/ROLES/ROLE</td>
<td>1</td>
<td>HOUSING_COUNSELING_AGENCY_1</td>
</tr>
</tbody>
</table>

Table 3. Identifying Endpoints in the Relationship

The table below (Table 4) shows a breakdown of the detailed components of the relationship used to relate a counseling event to housing counseling agency that provided the counseling.

<table>
<thead>
<tr>
<th>RELATIONSHIPS CONTAINER</th>
<th>XPath</th>
<th>Attribute</th>
<th>xlink:label</th>
<th>Value</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>First instance of RELATIONSHIP</td>
<td>MESSAGE/DEAL_SETS/RELATIONSHIPS/RELATIONSHIP</td>
<td>Sequence Number</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>xlink:arcrole</td>
<td>&quot;urn:fdc:mismo.org:2009:residential&quot;</td>
<td>COUNSELING_EVENT_IsAssociatedWith_ROLE</td>
<td>where Counseling Type = “Counseling”</td>
</tr>
<tr>
<td></td>
<td></td>
<td>from</td>
<td>COUNSELING_EVENT_1</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>to</td>
<td>HOUSING_COUNSELING_AGENCY_1</td>
<td>where PartyRoleType = “HousingCounselingAgency”</td>
<td></td>
</tr>
</tbody>
</table>

Table 4. Relationships Container – Component Details

The figure below (Figure 4) shows a basic example of how the xlink arcrole relationship linking a counseling event to the housing counseling agency that provided the counseling would look in the RELATIONSHIPS container.

Figure 4. Using Endpoints and an Arcrole To Define a Relationship
The following example provides details about the xlink arcrole relationship needed to define a data relationship between an owned property and the associated liabilities for that owned property.

The figure below (Figure 5) shows examples of an asset (owned property) that will need to be linked to the associated liability for that property.

<table>
<thead>
<tr>
<th>ASSET (Owned Property) And LIABILITY Containers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identifying Endpoints Of Relationships</td>
</tr>
<tr>
<td>ASSETS</td>
</tr>
<tr>
<td>ASSET</td>
</tr>
<tr>
<td>Sequence Number = “1”</td>
</tr>
<tr>
<td>xlink:label = “OWNED_PROPERTY_1”</td>
</tr>
<tr>
<td>OWNED_PROPERTY</td>
</tr>
<tr>
<td>Owned Property Disposition Status Type = Retain</td>
</tr>
<tr>
<td>Owned Property Maintenance Expense Amount = 100</td>
</tr>
<tr>
<td>Owned Property Subject Indicator = false</td>
</tr>
<tr>
<td>PROPERTY</td>
</tr>
<tr>
<td>ADDRESS</td>
</tr>
<tr>
<td>PROPERTY_DETAIL</td>
</tr>
<tr>
<td>LIABILITIES</td>
</tr>
<tr>
<td>LIABILITY</td>
</tr>
<tr>
<td>Sequence Number = “1”</td>
</tr>
<tr>
<td>xlink:label = “LIABILITY_1”</td>
</tr>
<tr>
<td>LIABILITY_DETAIL</td>
</tr>
<tr>
<td>Liability Account Identifier = ABC123</td>
</tr>
<tr>
<td>Liability Monthly Payment Amount = 1100</td>
</tr>
<tr>
<td>Liability Payment Includes Taxes Insurance Indicator = true</td>
</tr>
<tr>
<td>Liability Payoff Status Indicator = false</td>
</tr>
<tr>
<td>Liability Type = MortgageLoan</td>
</tr>
<tr>
<td>Liability Unpaid Principal Balance Amount = 75000</td>
</tr>
<tr>
<td>Mortgage Type = Conventional</td>
</tr>
</tbody>
</table>

Figure 5. Establishing Endpoints of Relationship
The table below (Table 5) shows the endpoints that will makeup the xlink arcrole relationship for the relationship.

<table>
<thead>
<tr>
<th>CONTAINER</th>
<th>XPath For Container</th>
<th>Sequence Number</th>
<th>Xlink:label</th>
</tr>
</thead>
<tbody>
<tr>
<td>LIABILITY</td>
<td>DEAL/LIABILITIES/LIABILITY</td>
<td>1</td>
<td>LIABILITY_1</td>
</tr>
<tr>
<td>ASSET</td>
<td>DEAL/ASSETS/ASSET</td>
<td>1</td>
<td>OWNED_PROPERTY_1</td>
</tr>
</tbody>
</table>

Table 5. Identifying Endpoints in the Relationship

The table below (Table 6) shows a breakdown of the detailed components of the relationship used to relate an asset (owned property) to a borrower’s liability for that owned property.

<table>
<thead>
<tr>
<th>RELATIONSHIPS CONTAINER</th>
<th>XPath</th>
<th>Attribute</th>
<th>xlink:label</th>
<th>Value</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>First instance of RELATIONSHIP</td>
<td></td>
<td>Sequence Number</td>
<td>xlink:arcrole</td>
<td>urn:fde:mismo:2009:residential</td>
<td>ASSET_IsAssociatedWith_LIABILITY</td>
</tr>
<tr>
<td></td>
<td></td>
<td>from</td>
<td>xlink:from</td>
<td>OWNED_PROPERTY_1</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>to</td>
<td>xlink:to</td>
<td>LIABILITY_1</td>
<td></td>
</tr>
</tbody>
</table>

Table 6. Relationships Container – Component Details

The figure below (Figure 6) shows a basic example of how the xlink arcrole relationship linking an asset (owned property) to a borrower’s liability would look in the RELATIONSHIPS container.

Figure 6. Using Endpoints and an Arcrole To Define a Relationship

RELATIONSHIP BETWEEN A RELATED LOAN AND THE ASSOCIATED CREDITOR

The following example provides details about the xlink arcrole relationship needed to define a data relationship between a related loan and the associated creditor (NotePayTo) for that related loan.

The figure below (Figure 7) shows examples of a related loan that will need to be linked to the associated creditor (NotePayTo) for that related loan. Note that the example below uses a legal entity as the creditor but the creditor can also be an individual.
The table below (Table 7) shows the endpoints that will makeup the xlink arcrole relationship for the relationship.

<table>
<thead>
<tr>
<th>CONTAINER</th>
<th>XPath For Container</th>
<th>Sequence Number</th>
<th>Xlink:label</th>
</tr>
</thead>
<tbody>
<tr>
<td>LOAN</td>
<td>DEAL/LOANS/LOAN</td>
<td>2</td>
<td>RELATED_LOAN_2</td>
</tr>
<tr>
<td>ROLE</td>
<td>DEAL/PARTIES/PARTY/ROLES/ROLE</td>
<td>1</td>
<td>NOTE_PAY_TO_1</td>
</tr>
</tbody>
</table>

Table 7. Identifying Endpoints in the Relationship

The table below (Table 8) shows a breakdown of the detailed components of the relationship used to relate a related loan to a creditor (NotePayTo) for that loan.

<table>
<thead>
<tr>
<th>RELATIONSHIPS CONTAINER</th>
<th>Attribute</th>
<th>xlink:label</th>
<th>Value</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>First instance of RELATIONSHIP</td>
<td>Sequence Number</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>ROLE</td>
<td>from</td>
<td>NOTE_PAY_TO_1</td>
<td></td>
</tr>
</tbody>
</table>

Table 8. Relationships Container – Component Details
The figure below (Figure 8) shows a basic example of how the xlink arcrole relationship linking a related loan to a creditor (NotePayTo) would look in the RELATIONSHIPS container.

```
RELATIONSHIPS CONTAINER
Showing the RELATIONSHIP Using The Endpoints

RELATIONSHIPS
RELATIONSHIP
  Sequence Number = “1”
  xlink:from = “RELATED_LOAN_2”
  xlink:to = “NOTE_PAY_TO_1”
  xlink:arcrole = “LOAN_IsAssociatedWith_ROLE”
```

Figure 8. Using Endpoints and an Arcrole To Define a Relationship
APPENDIX A: XML CODE SAMPLE FOR XLINK MISMO ARCROLE EXAMPLES

The following XML code sample is provided to express an example of how the ULAD data relationship using Xlink and MISMO arcroles might look. The example provided shows a sample for the relationship between a borrower’s income and the associated employer.

XML CODE SAMPLE:

The information and examples provided in this document are for illustration purposes only and should not be used as production or pseudo code. The following XML sample corresponds to a use case of a borrower with concurrent income from two different employers. The borrower receives two income components from the first employer: a base salary and a bonus for a total of 1,400 dollars. The borrower receives one income component from his second employer, a base salary of 950 dollars.

```xml
<Message>
<DealSets>
<DealSet>
<Deals>
<Deal>

<Parties>

<Party>

<Individual>

<Name>

<FirstName>John</FirstName>

<LastName>Homeowner</LastName>

</Name>

</Individual>

</Roles>

<Role>

<CurrentIncome>

<CurrentIncomeItems>

<!--Income from Current Employer 1-->

<CurrentIncomeItem xlink:label="INCOME_ITEM_1" SequenceNumber="1">

<CurrentIncomeItemDetail>

<IncomeType>Base</IncomeType>

<CurrentIncomeMonthlyTotalAmount>1000</CurrentIncomeMonthlyTotalAmount>

<EmploymentIncomeIndicator>true</EmploymentIncomeIndicator>

</CurrentIncomeItemDetail>

</CurrentIncomeItem>

<!--Income from Current Employer 2-->

<CurrentIncomeItem xlink:label="INCOME_ITEM_2" SequenceNumber="2">

<CurrentIncomeItemDetail>

<IncomeType>Overtime</IncomeType>

<CurrentIncomeMonthlyTotalAmount>400</CurrentIncomeMonthlyTotalAmount>

<EmploymentIncomeIndicator>true</EmploymentIncomeIndicator>

</CurrentIncomeItemDetail>

</CurrentIncomeItem>

<!--Income from Second Employer-->

<CurrentIncomeItem xlink:label="INCOME_ITEM_3" SequenceNumber="3">

<CurrentIncomeItemDetail>

<IncomeType>Base</IncomeType>

<CurrentIncomeMonthlyTotalAmount>950</CurrentIncomeMonthlyTotalAmount>

<EmploymentIncomeIndicator>true</EmploymentIncomeIndicator>

</CurrentIncomeItemDetail>

</CurrentIncomeItem>

</CurrentIncomeItems>

</CurrentIncome>

</Party>

</Parties>

</Deal>

</Deals>

</DealSet>

</DealSets>

</Message>
```
<CURRENT_INCOME_ITEM xlink:label="INCOME_ITEM_3" SequenceNumber="3">
  <IncomeType>Base</IncomeType>
  <CurrentIncomeMonthlyTotalAmount>950</CurrentIncomeMonthlyTotalAmount>
  <EmploymentIncomeIndicator>true</EmploymentIncomeIndicator>
</CURRENT_INCOME_ITEM>

<EMPLOYERS>
  <EMPLOYER xlink:label="EMPLOYER_1" SequenceNumber="1">
    <LEGAL_ENTITY>
      <LEGAL_ENTITY_DETAIL>
        <FullName>ABC Corporation</FullName>
      </LEGAL_ENTITY_DETAIL>
    </LEGAL_ENTITY>
    <ADDRESS>
      <AddressLineText>ABC Address</AddressLineText>
    </ADDRESS>
    <EMPLOYMENT>
      <EmploymentMonthlyIncomeAmount>1400</EmploymentMonthlyIncomeAmount>
      <EmploymentStatusType>Current</EmploymentStatusType>
    </EMPLOYMENT>
  </EMPLOYER>
  <EMPLOYER xlink:label="EMPLOYER_2" SequenceNumber="2">
    <LEGAL_ENTITY>
      <LEGAL_ENTITY_DETAIL>
        <FullName>Consulting Inc.</FullName>
      </LEGAL_ENTITY_DETAIL>
    </LEGAL_ENTITY>
    <ADDRESS>
      <Address>123 Address</Address>
    </ADDRESS>
    <EMPLOYMENT>
      <EmploymentBorrowerSelfEmployedIndicator>true</EmploymentBorrowerSelfEmployedIndicator>
      <EmploymentMonthlyIncomeAmount>950</EmploymentMonthlyIncomeAmount>
      <EmploymentStatusType>Current</EmploymentStatusType>
    </EMPLOYMENT>
  </EMPLOYER>
</EMPLOYERS>

<ROLE_DETAIL>
  <PartyRoleType>Borrower</PartyRoleType>
</ROLE_DETAIL>

<RELATIONSHIPS xsi:type="RELATIONSHIPS">
  <RELATIONSHIP SequenceNumber="1" xlink:from="INCOME_ITEM_1" xlink:to="EMPLOYER_1" xlink:arcrole="urn:fdc:mismo.org:2009:residential/CURRENT_INCOME_ITEM_ISASSOCIATEDWITH_EMPLOYER"/>
  <RELATIONSHIP SequenceNumber="2" xlink:from="INCOME_ITEM_2" xlink:to="EMPLOYER_1" xlink:arcrole="urn:fdc:mismo.org:2009:residential/CURRENT_INCOME_ITEM_ISASSOCIATEDWITH_EMPLOYER"/>
  <RELATIONSHIP SequenceNumber="3" xlink:from="INCOME_ITEM_3" xlink:to="EMPLOYER_2" xlink:arcrole="urn:fdc:mismo.org:2009:residential/CURRENT_INCOME_ITEM_ISASSOCIATEDWITH_EMPLOYER"/>
<MESSAGE>
  <DEAL_SET>
    <DEALS>
      <DEAL>
      </DEAL>
    </DEALS>
  </DEAL_SET>
</MESSAGE>