DDF®

Data Distribution Facility
Data Feed Technical Documentation

Version 2.15

CREA
THE CANADIAN REAL ESTATE ASSOCIATION

Contents

Version History

Version	Published Date	Description
1.0	July 3rd, 2012	DDF® Release
1.1	September 6th, 2012	• Added support for STANDARD-XML-ENCODED format • Added METADATA-LOOKUP and METADATA-LOOKUP_TYPE (Available in STANDARD-XML only)
1.2	January 14, 2013	• Added new version of GetObject (includes boundary between images and content headers) • Modified DDF® documentation URL
2.0	March 12, 2012	• Added support for COMPACT and COMPACT-DECODED format Property searches, based on the RESO Data Dictionary • Added COMPACT version of METADATA-LOOKUP and METADATA-LOOKUP_TYPE • Expanded METADATA-TABLE results to include elements that can be used in SELECT statements for COMPACT format Property searches
2.1	January 22, 2014	• Removed DisplayAsYears element from the Listing payload • Removed StoriesType element from the Listing payload
2.2	March 24, 2014	• Added Property Photos Handling Section • Added Recommended Time to Pull Data Section
2.3	June 16, 2014	• Removed ListAgentEmail element from the Listing payload • Removed CoListOfficeEmail element from the Listing payload
2.4	December 8th, 2014	• Updated cardinality of Address element in PropertyDetails to be a **0..1** instead of **1**, since this element is not always included in payload. No change in behavior, just documentation.
2.5	January 2nd, 2015	• Added new cardinality type: **0..1 (*)**, and explanation of cardinality as first Appendix
2.6	February 2, 2015	• Added Lease and LeaseFrequency to Compact Property payload.
2.7	February 23, 2015	• Incorporated Analytics Web service documentation. Deprecated Analytics Java scripts. • Added Appendix P – Sample Environment credentials
2.8	April 24, 2015	• Consolidated section 11 and Appendix P.
2.9	October 19, 2015	• Added 'Board' element to the PropertyDetails (Standard-XML) payload Table. • Added street-related elements to the Address payload. • Added new example in GetObject examples table.
2.10	December 16, 2015	• The object-id-list element in the GetObject Transaction uses a comma as the character separator. • Content-ID is only returned in multipart responses by the GetObject Transaction
2.11	January 20, 2016	• Added new payload fields: AssociationFee, AssociationFeeFrequency, ListingContractDate, PhotoLastUpdated
2.12	May 2, 2017	• Updated data types in documentation (no functional changes) for FirePlaceTotal (from String to Integer) and several date fields (from String to DateTime)

2.13	Aug 14, 2017	• Added MoreInformationLink field to PropertyDetails Payload (Compact) on Appendix J
2.14	Nov 6, 2017	• Deleted references to the DDF® Dashboard URL
2.15	Jan 16, 2018	• Reworded Section 11 - Sample Data Feed

1.Overview

Data Distribution Facility Overview

CREA has created a Data Distribution Facility (DDF®) to enable CREA's members to easily disseminate MLS® listing content to multiple websites, and to ensure that MLS® listing content that is displayed on these websites is accurate, up to date, and uses CREA's trademarks correctly.
The DDF® is permission based and consists of three modules: a National Shared Pool Module; a Member Website Feed Module; and a Third Party Module.

1. National Shared Pool Module - Participants can contribute their listings to a national data pool and receive a feed from that pool to display all other participants' listings on their websites. Participants can filter the data feed they receive based on objective criteria. Participants can also choose to contribute their listings to a data feed made available for display on participating franchisors' websites.

2. Member Website Feed Module–Participants can use this module to receive a data feed of their listings to display on their own website in order to track the success of their website as a marketing tool.

3. Third Party Module – Participants can choose to send listing content to a number of Third Party websites.

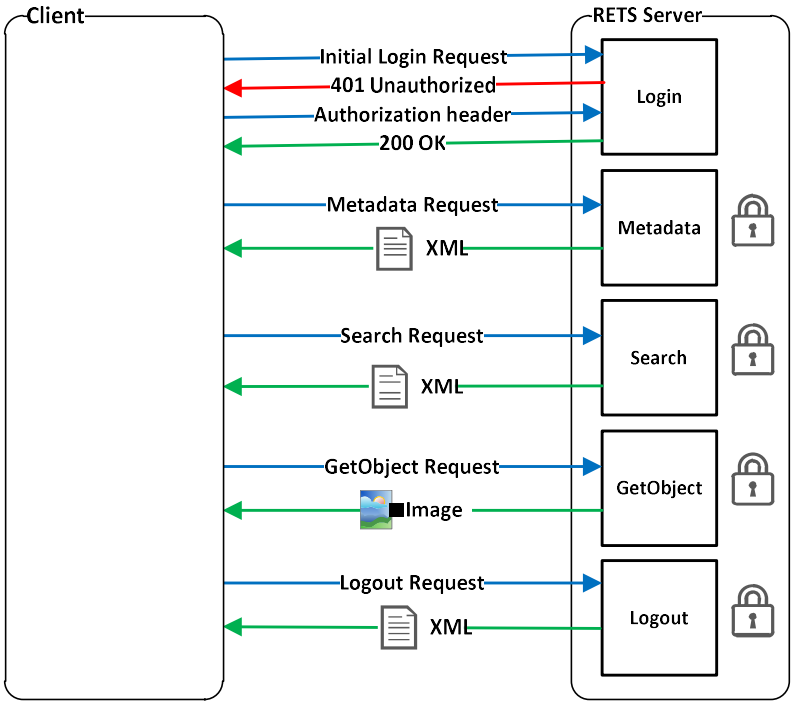
4. Any Technology Providers who are pulling data feeds on behalf of those members utilizing a National Shared Pool (NSP) or Member Website Feed (MWF) must complete, sign and return a hard copy of the Data Access Agreement to CREA prior to pulling data from DDF®. CREA requires each individual that the Technology Provider is represented to be identified within the Data Access Agreement.
   Please contact CREA (support@crea.ca) to obtain a copy of the Data Access Agreement or if you have any questions.

Recommended Time to Pull Data

Data collection, synchronization and ultimately distribution through the DDF® are possible through the collaboration of multiple centralized processes running in the early hours of each day at CREA. To ensure you get the most up-to-date data possible and to prevent possible inconsistencies, it is recommended clients start pulling data through the DDF® data feeds after 10am.

Data Feed Overview

CREA's Data Distribution Facility Data Feed supports 5 transactions: Login, Metadata, Search, GetObject and Logout. CREA supports transactions using Representation State Transfer (REST) architecture to facilitate the transfer of data between the CREA server and the websites receiving the data. All transactions may be requested by clients using either HTTP GET or HTTP POST methods.



2.RETS Support

CREA's Data Distribution Facility Data Feed adheres as closely as possible to the Real Estate Transaction Standard (RETS) version 1.7.2 standard. However, there are a few key differences between the service offered by CREA and a fully compliant, certified RETS server.

- Compact and Compact-Decoded format is only available for Property searches. Compact formatted responses use the RESO Data Dictionary, which as of Version 1.0 only provides a Property dictionary. Once an Agent and Office dictionary are finalized, support will be added to DDF.
- Query support is restricted, as CREA's service does not allow ad-hoc querying of records. If filtering of results is required by clients, this needs to be configured by the owner of the feed. For assistance contact support@crea.ca.
- Select is only supported for Property queries in Compact or Compact-Decoded format.
- A server limit on the number of details returned in a single Search request is strictly enforced. Any Search request with a Limit greater than the server maximum with be rejected

3. Authentication

CREA requires that all access is authenticated using digest authentication (RFC 2617, HTTP Authentication).
A client **must** issue a Login request prior to proceeding with any other request. The Login transaction verifies all login information provided by the user and begins a session. Subsequent session control may be mediated by HTTP cookies or any other method, though clients are required to support at least session control via HTTP cookies.
Users of the CREA service are assigned authentication credentials when registering their data feed. These credentials are used to identify the registered user and grants access to all property, agent and office data available to the user.
All requests for Metadata, Search, GetObject and Logout require clients to submit both the Digest Authentication authorization header and the session cookie.

4. Login Transaction

Description

A client **must** issue a Login request prior to proceeding with any other request. The Login transaction verifies all login information provided by the user and begins a session. Subsequent session control may be mediated by HTTP cookies or any other method, though clients are required to support at least session control via HTTP cookies.
The server's response to the login transaction contains the information necessary for a client to issue other requests. It includes URLs that may be used for other supported requests, and may also contain identity and parameter information if required by the functions supported by the server.

End Point

http://data.crea.ca/Login.svc/Login

Request Arguments

There are no request arguments for the Login transaction.

Login Response Body Format

```
<?xml version="1.0" encoding="UTF-8"?>
<RETS ReplyText="Operation Successful" ReplyCode="0">
      <RETS-RESPONSE>
            Broker= (Destination Owner ID)
            MemberName=(Destination Owner Name)
            MetadataVersion= (Current metadata version number)
            MinMetadataVersion= (Earliest version of metadata supported by server)
            MetadataTimestamp= (Timestamp of current version of metadata)
            MinMetadataTimestamp= (Timestamp of earliest version of metadata supported by
      server)
            User=(Destination Owner ID,,, Destination Owner ID)
            GetObject=(URL to use for GetObject requests)
            Login=(URL to use for Login requests)
            Logout=(URL to use for Logout requests)
            Search=(URL to use for Search requests)
            GetMetadata=(URL to use for GetMetadata requests)
      </RETS-RESPONSE>
</RETS>
```

NOTE: RETS spec requires clients to include any cookies set by the server:

https://www.reso.org/specifications/

A successful Login response header includes a Set-Cookie with **X-SESSIONID** value. This X-SessionID value needs to be submitted with every request after logging in.

5.Metadata Transaction

Description

This transaction is used to retrieve metadata. Metadata enables a client that receives data from a compliant server to better format the data for display, and to store it efficiently for future retrieval.

End Point

http://data.crea.ca/Metadata.svc/GetMetadata

Request Arguments

Argument	Type	Description	Default	Required	Supported Values
Type	String	Selects the type of metadata to be returned		RETS 1.7.2	METADATA-SYSTEM METADATA-RESOURCE METADATA-CLASS METADATA-LOOKUP METADATA-LOOKUP_TYPE
Format	String	Selects the supported data return format for the query response	STANDARD -XML		STANDARD-XML COMPACT
ID	String	List of the names of the parent elements for the desired element, separated by colons			**0** – request is for all Type metadata contained within that level *. - request is for all Type metadata contained within that level and within the requested Type (i.e. all metadata) **Resource:Class**

Note: The metadata ID for METADATA-SYSTEM and METADATA-RESOURCE must be 0 or *.

Note: METADATA-LOOKUP and METADATA-LOOKUP_TYPE requests only support STANDARD-XML format

Metadata Examples

Action	Syntax
Retrieve all Resource metadata, all levels	Type=METADATA-RESOURCE&Format=COMPACT&ID=*
Retrieve all Class metadata, class level only	Type=METADATA-CLASS&Format=COMPACT&ID=0
Retrieve Class metadata for a specific resource	Type=METADATA-CLASS&Format=COMPACT&ID=Property
Retrieve Table metadata for a specific resource and class	Type=METADATA-TABLE&Format=COMPACT&ID=Property:Property
Retrieve Lookup metadata for a specific resource	Type=METADATA-LOOKUP&Format=STANDARD-XML&ID=Property
Retrieve Lookup metadata for a specific resource and lookup type	Type=METADATA-LOOKUP_TYPE&Format=STANDARD-XML&ID=Property:Crop

Server Response Header Fields

Request Argument	Type	Description	Default	Required	Supported Values
Content-Type	String	Media type of the underlying data		RETS 1.7.2	text/xml

6.Search

CREA's data distribution server allows DDF® clients to request and receive a parallel set of CREA data that will be displayed on their websites. The parallel data set needs to be refreshed regularly as CREA adds, updates and deletes its' records.

The set of records available to DDF® clients are rules-based and determined by

- the type of destination making the request,
- the owner of the destination, and
- the approval settings of boards/associations, brokerage owners and/or salespersons (where applicable).

CREA's data distribution server implementation does not support ad-hoc queries against its data. Filtering of search results, such as restricting results to only recreational properties or a specific price range, is currently not possible as part of the search transaction. Filtering of results is configured when registering or editing a data feed.

Search transactions are performed against 3 possible resources: Office, Agent and Property. The process for searching against each resource type is the same:

1. Retrieve all active records updated since a specified date/time
2. Retrieve a master list of all active records (IDs and LastUpdated)
3. Compare master list to client data store by matching IDs. Identify any records that are missing or have different LastUpdated values.
4. Retrieve set of records by ID

Step 1. Retrieve all active records updated since a specified date/time

It is not necessary or recommended for clients to retrieve complete property details for all active records on every request. Clients should instead request only records that have been updated since the last request was made. Searches with a LastUpdated query parameter included will return complete record details for all records that have been updated since that date/time.

Limit, Offset, and Count parameters are supported when processing LastUpdated queries, allowing clients to page through results in batches. If Count is requested as part of a search, results will include a Pagination element which includes the TotalRecords, Limit, Offset, RecordsReturned, and TotalPages.
Query Syntax: (LastUpdated=***RETSDateTime)***

Sample Result (Standard-XML):

```
<?xml version="1.0"?>
<RETS ReplyText="Operation successful" ReplyCode="0">
  - <RETS-RESPONSE xmlns="CREA.Search.Property">
      - <Pagination>
            <TotalRecords>41</TotalRecords>
            <Limit>10</Limit>
            <Offset>21</Offset>
            <TotalPages>5</TotalPages>
            <RecordsReturned>10</RecordsReturned>
        </Pagination>
      + <PropertyDetails>
      + <PropertyDetails>
      + <PropertyDetails>
      - <PropertyDetails>
            <ID>10494823</ID>
            <LastUpdated>Tue, 07 Jun 2011 04:20:24 GMT</LastUpdated>
            <ListingID>55131841</ListingID>
          - <Building>
                <BathroomTotal>1</BathroomTotal>
                <BedroomsTotal>3</BedroomsTotal>
```

Sample Result (Compact):

```
<?xml version="1.0" encoding="UTF-8"?>
<RETS ReplyText="Operation successful" ReplyCode="0">
    <COUNT Records="40"/>
    <DELIMITER value="09"/>
    <COLUMNS> ArchitecturalStyle AttachedGarageYN BathroomsHalf Bathroom
        CoListAgentOfficePhoneExt CoListAgentPager CoListAgentTollFreePhon
        Flooring FrontageLength FrontageType GarageSpaces GarageYN GreenB
        ListOfficeFax ListOfficeKey ListOfficeName ListOfficePhone ListOfficePh
        PhotosChangeTimestamp PhotosCount PoolFeatures PoolYN PostalCode
        RoomDimensions12 RoomDimensions13 RoomDimensions14 RoomDime
        RoomLength10 RoomLength11 RoomLength12 RoomLength13 RoomLen
        RoomLengthWidthUnits6 RoomLengthWidthUnits7 RoomLengthWidthUn
        RoomLengthWidthUnits18 RoomLengthWidthUnits19 RoomLengthWidth
        RoomLevel19 RoomLevel20 RoomType1 RoomType2 RoomType3 RoomT
        RoomWidth3 RoomWidth4 RoomWidth5 RoomWidth6 RoomWidth7 Roo
        StreetDirSuffix StreetName StreetNumber StreetSuffix SubdivisionNam
    <DATA> False 1 3 6 213.688327 4 False Ottawa 18 613-237-7111 613-237-
        Major Renovations 2009 Silver 9 29 3 110 1,2,67 613-237-5555 DDF (in
        24/09/2012 10:16:06 AM 6 21 True DDFResListing08 Parry Sound Real
        at Reception Catherine 200 Street This is the English Subdivision field F
        [25491,25493],[214479,],[0,0]);var crea = new Image;crea.src = 'http
        type='text/javascript'></script><script type='text/javascript'>var ev
        'type', 'view');event.record();</script>]]> </DATA>
    <DATA> False 1 3 6 213.688327 4 False Ottawa 2 1 1 True Canada 1 5 2 13
        Office Kanata East English 613-237-7111 2274 http://www.yahoo.com
        Public Listing Remarks Addendum field 103 1200 ft X 1200 ft 14400 3 6
        ('createst');event.viewedProperty(799658,345,[214484],[25491],[214
```

Step 2. Retrieve a master list of all active records

This search provides clients with a master list of the complete set of records clients should have in their data store. This list contains 2 values for each record: the record ID and the LastUpdated timestamp. By comparing the master list with the client's data store, it is possible to identify any records that need to be updated, deleted or inserted. This search will always return a complete list of records. Paging through this list using Limit and Offset is not supported in Standard-XML, but is supported for Compact format queries.
Query Syntax: (ID=*)

Note: When request Compact format data, the master list can also be retrieved by selecting just the ListingKey and ModificationTimestamp: SELECT=(ListingKey,ModificationTimestamp). This will return all records, regardless of Query supplied

Sample Result (Standard-XML):

```
<?xml version="1.0"?>
<RETS ReplyText="Operation successful" ReplyCode="0">
  - <RETS-RESPONSE xmlns="CREA.Search.Property">
      + <Pagination>
        <Property LastUpdated="Fri, 03 Dec 2010 01:55:46 GMT" ID="10166883"/>
        <Property LastUpdated="Fri, 03 Dec 2010 01:55:48 GMT" ID="10166893"/>
        <Property LastUpdated="Sat, 04 Dec 2010 01:42:33 GMT" ID="10166885"/>
        <Property LastUpdated="Tue, 07 Jun 2011 04:20:29 GMT" ID="10766286"/>
        <Property LastUpdated="Tue, 07 Jun 2011 04:20:29 GMT" ID="10589785"/>
        <Property LastUpdated="Tue, 07 Jun 2011 04:20:31 GMT" ID="10166894"/>
        <Property LastUpdated="Tue, 07 Jun 2011 04:20:31 GMT" ID="10460866"/>
        <Property LastUpdated="Tue, 07 Jun 2011 04:20:32 GMT" ID="10710770"/>
        <Property LastUpdated="Tue, 07 Jun 2011 04:28:32 GMT" ID="10166889"/>
        <Property LastUpdated="Tue, 07 Jun 2011 04:28:32 GMT" ID="10166890"/>
        <Property LastUpdated="Wed, 08 Jun 2011 05:12:45 GMT" ID="10514640"/>
        <Property LastUpdated="Wed, 08 Jun 2011 05:12:48 GMT" ID="10311699"/>
    </RETS-RESPONSE>
</RETS>
```

Sample Result (Compact):

```
<?xml version="1.0" encoding="UTF-8"?>
<RETS ReplyText="Operation successful" ReplyCode="0">
    <COUNT Records="1248"/>
    <DELIMITER value="09"/>
    <COLUMNS> ListingKey ModificationTimestamp </COLUMNS>
    <DATA> 799656 24/09/2012 10:16:08 AM </DATA>
    <DATA> 799658 24/09/2012 10:16:17 AM </DATA>
    <DATA> 799662 24/09/2012 10:16:31 AM </DATA>
    <DATA> 799664 24/09/2012 10:16:40 AM </DATA>
    <DATA> 799666 24/09/2012 10:16:47 AM </DATA>
    <DATA> 799668 24/09/2012 10:16:54 AM </DATA>
    <DATA> 808529 24/09/2012 10:17:26 AM </DATA>
```

Step 3. Compare master list to client data store

Any properties, offices or agents in a client data store that are not part of the master list must be deleted from the client data store. For example, the master list will include a property as long as it is active on the market and approved for distribution. Once removed from the market (sold, cancelled, etc.), it will no longer be included in the master list and must be deleted from the client data store.

The master list can also be used to ensure data integrity. Steps 1 and 2 alone should be enough to allow clients to maintain accurate data sets for all resources. However, any discrepancies between LastUpdated values in master list and the client data store (e.g. a property missing or out of date in the client data) can be corrected in Step 4.

Step 4. Retrieve set of records by ID

This search method supports querying against either a single ID or a comma separated list of IDs. The complete list of requested records, if available, is returned. Paging through this list using Limit and Offset is not supported.

Query Syntax: (ID=***1*9Digit*** (,***1*9Digit***))

Sample Result (Standard-XML):

Sample Result (Standard-XML):

7.Property Photos Handling

Search transactions performed against the Property resource do not return property photos. Clients must retrieve property photos separately using the GetObject transaction (described later in this document) in conjunction with the corresponding data returned by the Search transaction.

Once it has been decided that full details for a Property need to be requested, as per explanation steps in the Search section above, clients should do any of the following if applicable:

Adding Property Photos – Initial download

If a new Property is being added to the client data store, all related property photos should be added as well. This is done using the Get Object Transaction.

When requesting all photos for a property, they will all be bundled up in a single multipart MIME type object. Clients will need to parse the object and extract from it the individual photos which are separated by a boundary (--creaboundary) and a content header.

Refer to the GetObject section later in the document for syntax examples on how to request ALL photos for a property and for more details on the multipart image object.

Updating Property Photos

If a Property is being updated in the client data store, clients need to find out if any of the corresponding property photos has been updated as well:

- On Standard-XML Search requests, clients need to compare the PhotoLastUpdated value of each property photo against the corresponding value in their data store. If an update is detected, clients should request and replace that specific property photo. Refer to the GetObject section later in the document for syntax examples on how to request ONE specific property photo.

- Compact Search requests do not return individual property photo attributes, so the client needs to compare the PhotosChangeTimestamp value in the Property against the corresponding value in the client's data store. If a change is detected, then ALL property photos should be deleted from the client's data store and a request for ALL property photos should be made using the GetObject transaction. Refer to the GetObject section later in the document for syntax examples on how to request ALL photos for a property.

Adding New Property Photos

If a Property is being updated in the client data store, clients need to find out if any new property photos have been added as well:

- On Standard-XML Search requests, clients need to compare the SequenceID value of each property photo against the corresponding values in their data store. If an addition is detected, clients should request the new property photo. Refer to the GetObject section later in the document for syntax examples on how to request ONE specific property photo.

- Compact Search requests do not return individual property photo attributes, so the client needs to compare the PhotosChangeTimestamp value in the Property against the corresponding value in the client's data store. If a change is detected, then ALL property photos must be deleted from the client's data store and a request for ALL property photos must be made using the GetObject transaction. Refer to the GetObject section later in the document for syntax examples on how to request ALL photos for a property.

Removing Property Photos

If a Property is being updated in the client data store, clients need to find out if any property photos have been removed as well:

- On Standard-XML Search requests, clients should compare the SequenceID value of each property photo against the corresponding values in their data store. If a deletion is detected, clients should remove the corresponding photo from the client's data store.

- Compact Search requests do not return individual property photo attributes, so the client needs to compare the PhotosChangeTimestamp value in the Property against the corresponding value in the client's data store. If a change is detected, then ALL property photos must be deleted from the client's data store and a request for ALL property photos must be made using the GetObject transaction. Refer to the GetObject section later in the document for syntax examples on how to request ALL photos for a property.

Default Property Photo

Properties are assigned a default photo which is identified by the SequenceID = 0. Clients who have some kind of constraints may wish to work with the default property photo only. Refer to the GetObject section later in the document for syntax examples on how to request the default property photo for a Property.

8.Search Transaction

Description

This transaction is used to search available offices, agents and properties.

End Point

http://data.crea.ca/Search.svc/Search

Request Arguments

Argument	Type	Description	Default	Required	Supported Values
Format	String	Selects the supported data return format for the query response	STANDARD-XML		STANDARD-XML STANDARD-XML-Encoded COMPACT COMPACT-Decoded
SearchType	String	Selects the Resource type to be returned		RETS 1.7.2	Office Agent Property
Class	String	Represents the class of the data within the SearchType		RETS 1.7.2	Office Agent Property
QueryType	String	An enumeration giving the language in which the query is presented		RETS 1.7.2	DMQL2
Query	String	The query to be executed by the server		RETS 1.7.2	(ID=*) or (ID=0+) (ID=***1*9Digit*** (,***1*9Digit***)) (LastUpdated=***RETSDateTime****)*
Select	String	Sets the fields that are returned by the query. (COMPACT format only)	All elements		See list of elements in **Appendix J – Property Details Payload (Compact)**
Count	Integer	Controls whether the server response includes a record count	1		0 – results only 1 – record count and results 2 – record count only
Limit	String	Request the server to apply a limit on the number of records returned in the search.	"None"		"None" 1*9Digit (greater than 0, maximum of 100)
Offset	Integer	Request the server start at other than the first record in the set of matching records	1		1*9Digit (greater than 0)
Culture	String	Results localization	en-CA		en-CA fr-CA

Note: If using HTTP Get, all parameters passed in the query string should be URL-encoded. Failure to do so may result in rejection of the request during the authentication stage of the request, making it appear as if authentication has failed.

Query Parameters Supported

Query Parameter	Type	Resource	Required	Description
LastUpdated	***RETSDateTime***	Office Agent Property		Limits response to only those resources that have been updated since the supplied date/time. **Example:** 2011-05-08T22:00:17Z
ID	***1*9Digit*** (,***1*9Digit***) - or - ***String***	Office Agent Property	CREA	Single or comma separated list of IDs to include in the response. - or - Asterisk (*) or (0+), which signifies all available records will be returned

Note: If specific records are requested using the ID parameter, LastUpdated is ignored and matching records will be returned regardless of when they were last updated.

Select Parameters Supported

This server implementation does not support customizing response content using Select arguments.

Search Response Body Format

```
<?xml version="1.0" encoding="UTF-8"?>
<RETS ReplyText="Operation Successful" ReplyCode="0">
      <RETS-RESPONSE>
            (<Pagination>)
            [Office Payload]
            [OfficeDetails Payload]
            [Agent Payload]
            [AgentDetails Payload]
            [Property Payload]
            [PropertyDetails Payload]
      </RETS-RESPONSE>
</RETS>
```

Pagination

When the server receives a request asking for record count to be provided, a Pagination element is returned as part of the response.

Attribute	Description
TotalRecords	The total number of records matching the request criteria.
Limit	The number of rows that are returned in a single page. This is equal to the Limit parameter if specified, or if not specified, the default value.
Offset	Starting record in paged results
TotalPages	The total number of pages matching the request criteria.

RecordsReturned	The number of records included in the current results.

Difference between Compact and Standard-XML

Compact formatted payloads contain tabular data, wrapped in an XML shell, as described by the RETS 1.7.2 standard (http://www.reso.org/specifications). A <COLUMNS> element provides the table header, and each record is represented in a single, flat <DATA> element. Several commonly available RETS tools and libraries are designed to work with Compact formatted results, since the structure is identical from one RETS server to another. In order to make DDF® as compatible as possible with commonly used RETS tools, CREA's Data Distribution Facility provides Compact data as described in the RESO Data Dictionary 1.0 (http://www.reso.org/data-dictionary). Aside from analytics scripts (which are deprecated but still included for backwards compatibility), all elements in the payload originate from this dictionary. Compact support for Agent and Office searches will be made available once the RESO Data Dictionary standard for these resources becomes available. There are several known limitations to the RESO Data Dictionary 1.0, including a limit to only 2 agents and 20 rooms per property, as well as several data elements that are available through Standard-XML which is do not fit within the current RESO Data Dictionary.

Standard-XML is the default format for searches against CREA's Data Distribution Facility. Payloads contain structured XML which matches as closely as possible the data provided by the boards and associations, as displayed on Realtor.ca and ICX.ca. Unless using RETS tools that support only Compact, Standard-XML format should be used by data feed clients whenever possible.

Difference between STANDARD-XML and STANDARD-XML-Encoded

STANDARD-XML format returns field data in an expanded form, while STANDARD-XML-Encoded format returns data in coded form, with a matching Lookup available in the Metadata. The corresponding LookupType table contains at four values: MetadataEntryID, Value, LongValue and ShortValue.

For example, a property may have a LandscapeFeatures value of "Vegetable garden" as part of its data. If a request is made for property details in STANDARD-XML format, the response will give just the text value "Vegetable garden". If the same request is made asking for STANDARD-XML-Encoded format, the response will include both the text value and the appropriate code value and the name of the Lookup table containing the value/LongValue pairs.
The STANDARD-XML format is a lighter weight payload and makes storage/display easier on DDF destination systems. However, STANDARD-XML-Encoded format allows more normalized storage of data in destination systems, allowing for more powerful searches to be created.

STANDARD-XML	<LandscapeFeatures>Landscaped, Vegetable garden</LandscapeFeatures>
STANDARD-XML-Encoded	<LandscapeFeatures ID="1,3" LookupName="LandscapeFeatures">Landscaped, Vegetable garden</LandscapeFeatures>

The other key difference between in STANDARD-XML format and STANDARD-XML-Encoded format is that the encoded version will contain measurement values broken down into a numeric value and a unit type, while the default decoded version returns these values as a fully formed

string, ready for display. The IDs returned in the Unit attribute can be matched up with the values returned by the MeasureUnit lookup metadata call.

STANDARD-XML	<SizeFrontage>125 sqft</SizeFrontage>
STANDARD-XML-Encoded	<SizeFrontage Unit="1">125</SizeFrontage>

Payloads

Office
See Appendix A – Office Payload.

OfficeDetails
See Appendix B – OfficeDetails Payload.

Agent
See Appendix C – Agent Payload.

AgentDetails
See Appendix D – AgentDetails Payload.

Property (Standard-XML)
See Appendix E – Property Payload.

PropertyDetails (Standard-XML)
See Appendix F – PropertyDetails Payload.

PropertyDetails (Compact)
See Appendix J – Property Details Payload (Compact)

9.GetObject Transaction

Description

The GetObject transaction is used to retrieve structured information related to known system entities. It can be used to retrieve multimedia files and other key-related information. Objects requested and returned from this transaction are requested and returned as MIME media types. Multiple images are separated by a boundary (--creaboundary) and content-headers (Content-Type, Content-ID, Object-ID, Content-Description). The last image is followed by a closing boundary (--creaboundary--).

End Point

http://data.crea.ca/Object.svc/GetObject

Client Request Header Fields

Request Argument	Type	Description	Default	Required	Supported Values
Accept	String	Acceptable media types		RETS 1.7.2	Image/jpeg

Request Arguments

Request Argument	Type	Description	Default	Required	Supported Values
Resource	String	A resource defined in the metadata dictionary		RETS 1.7.2	Office Agent Property
Type	String	The object type as defined in the metadata	Photo	RETS 1.7.2	Photo ThumbnailPhoto LargePhoto See ***Type Argument Notes*** section below
ID	String	A string identifying the object or objects being requested		RETS 1.7.2	See ***ID Argument Explanation*** section below
Culture	String	Results localization Office Resource only	en-CA		en-CA fr-CA

Type Argument Notes

1. Supported Type for Office is ThumbnailPhoto only.
2. Supported Types for Agent are ThumbnailPhoto and LargePhoto only.
3. Supported Types for Property are Photo, ThumbnailPhoto and LargePhoto.

ID Argument Explanation
CREA supports only a limited subset of ID arguments described in RETS 1.7.2 Specification:
http://retsdoc.onconfluence.com/display/rets172/5.3+Required+Request+Arguments

ID	::= resource-set
resource-set	::= resource-entity [**:** object-id-list]
resource-entity	::= 1*ALPHANUM
object-id-list	::= *| object-id * (, object-id)
object-id	::= ***** | 1*5DIGIT

NOTE: Property is the only resource that supports object-id arguments. For Agent and Office resources, only a single image is available, so resource-entity is the only field that will be used.

Server Response Header Fields

Request Argument	Type	Description	Default	Required	Supported Values
Content-Type	String	Media type of the object(s) being returned		RETS 1.7.2	Image/jpeg Multipart/parallel; boundary=
Content-ID	String	An ID for the object, matching the ID requested.		RETS 1.7.2 Only Returned in a multipart response	
Object-ID		The object number being returned		RETS 1.7.2	Integer * (only if error processing multipart/parallel response)
MIME-Version	String	Mime version of response object		RETS 1.7.2	1.0

Response Arguments

Objects requested and returned from this transaction are requested and returned as MIME media types. The message body for successful retrievals contains only the objects in the specified MIME media type. Error responses follow the normal response format.

GetObject Examples

Action	Syntax
Get Agent High resolution photo for agent 12345	Resource=Agent&Type=LargePhoto&ID=12345
Get Office Logo for office 12345	Resource=Office&Type=ThumbnailPhoto&ID=12345
Get all Medium resolution Photos for Property with ID 12345	Resource=Property&Type=Photo&ID=12345 -- or -- Resource=Property&Type=Photo&ID=12345:*
Get High resolution Photo #3 for Property with ID 12345	Resource=Property&Type=LargePhoto&ID=12345:3
Return default Medium resolution Photo for Property with ID 12345	Resource=Property&Type=Photo&ID=12345:0
Return Medium resolution Photos 2,4 and 7 for Property with ID 12345	Resource=Property&Type=Photo&ID=12345:2,4,7

Multiple Images (Multipart) Feed Example

--creaboundary
Content-Type: image/jpeg
Content-ID:12345
Object-ID:1
Content-Description: null

<image 1 data>
--creaboundary
Content-Type: image/jpeg
Content-ID:12345
Object-ID:2
Content-Description: null

<image 2 data>
--creaboundary—

10. Logout Transaction

Description

The Logout transaction terminates a session. Clients should send a Logout transaction at the end of every session. While impossible to enforce Logout at the server due to the stateless nature of the requests, compliance will be monitored by CREA and clients that regularly do not end sessions with a Logout will be notified and ultimately suspended. Any subsequent Login attempts may be rejected if a client has not performed a proper Logout to terminate their last session.

End Point

http://data.crea.ca/Logout.svc/Logout

Request Arguments

There are no request arguments for the Login transaction.

Logout Response Body Format

```
<?xml version="1.0" encoding="UTF-8"?>
<RETS ReplyText="Operation Successful" ReplyCode="0" />
```

11. Sample Data Feed

CREA has created a Sample Data Feed to help DDF® clients test their systems and prepare them for receiving live data. The data provided by the Sample Data Feed reflects volume and variety of live data.

There is no need to register before accessing the sample RETS server, since access is provided through a shared, public set of credentials. Clients should be comfortable with the process of pulling and storing data from the sample service before registering for a live feed.

Connection Information

Username	**CXLHfDVrziCfvwgCuL8nUahC**
Password	mFqMsCSPdnb5WO1gpEEtDCHH

End Points

Login	http://sample.data.crea.ca/Login.svc/Login
Metadata	http://sample.data.crea.ca/Metadata.svc/GetMetadata
Search	http://sample.data.crea.ca/Search.svc/Search
GetObject	http://sample.data.crea.ca/GetObject.svc/GetObject
Logout	http://sample.data.crea.ca/Logout.svc/Logout

12. Developer Resources

Sample code, frequently asked questions, XML schema definitions and other developer resources are available at https://support.crea.ca
If you have any questions or comments about the Data Distribution Facility Data Feed or this document, please contact The Canadian Real Estate Association at support@crea.ca

13. Website requirements

Displaying data

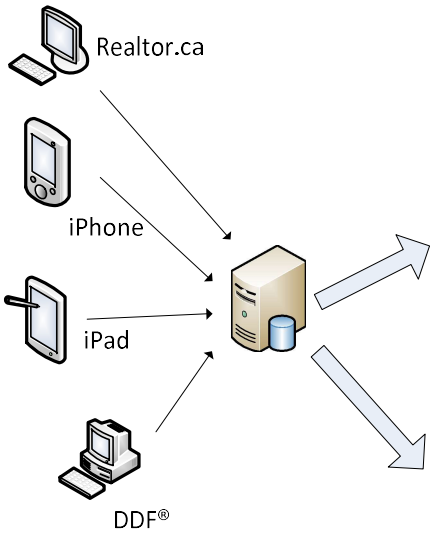
The complete rules for displaying data on websites can be found in the current version of the CREA Data Distribution Policy and Rules. Currently section 6 covers display rules:

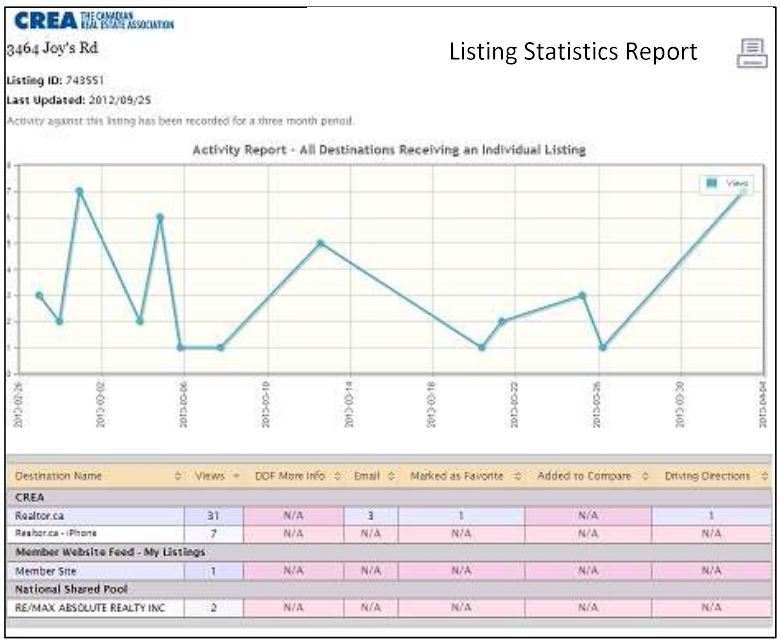
http://www.realtorlink.ca/portal/server.pt/document/3807762/data_distribution_facility_policy_and_rules_updated_november_2013

Analytics

Besides distributing data to member websites, brokerage owner sites, franchisors and Third Party websites through DDF®, CREA also provides data to several of its own websites (Realtor.ca, ICX.ca) and mobile applications (iPhone, iPad, Android, etc.).

With a single listing potentially being viewed on dozens of different websites and applications, agents and brokerage owners need a way to track where their listing data is being viewed. To accomplish this, CREA has developed a data warehousing solution that allows for the collection of all listing activity, broken down by several facets, including site/application, listing agent, firm, brokerage owner and franchisor.





Analytics Web Service

The analytics web service is used to capture listing statistics from various sources. Whenever a listing event occurs (e.g. a listing is viewed), the website or application should make a request to the Analytics Web Service to record the event. No response handling is required, so these requests may be made asynchronously.

End Point

http://analytics.crea.ca/LogEvents.svc/LogEvents

Request Arguments

Argument	Type	Description	Required	Supported Values
ListingID	Integer	ID of the Listing	Yes	
DestinationID	Integer	ID of the Destination	Yes	Destination ID of the DDF® data feed where the event occurs.
EventType	String	Event tracked by analytics	Yes	See Event Types section below.
UUID	String	Unique Identifier of the user/device. This ID should be the same for all requests from a single user/device.	Yes	GUID or device identifier with the Destination ID appended. *Note: UUID's are tracked in 5 minute windows. If the same UUID creates the identical event within 5 minutes the event is ignored.*
IP	IP Address	If available, IP address of the client or device	No	*Note: this parameter is used to resolve geographic data. If it is not supplied this information will not be resolved.*
ReferralURL	URL	This URL is validated during the analytics processing.	No	
LanguageId	Integer	Language being used by the user	No	1 = English 2 = French

Event Types

Event	Description
view	Event to be triggered when a listing is viewed on a website.
click	This event applies to Third Party websites only. It should be triggered when the MoreInformationLink (included in the PropertyDetails payload) is clicked.
email_realtor	This event applies to Third Party websites only It should be triggered when an email inquiring about a particular listing is sent to the REALTOR®.

Example

Template	http://analytics.crea.ca/LogEvents.svc/LogEvents?ListingID={ListingID}&DestinationID={DestinationID}&EventType={EventType}&UUID={UUID}&IP={IP}&ReferralURL={ReferralURL}
Example	http://analytics.crea.ca/LogEvents.svc/LogEvents?ListingID=12830763&DestinationID=355&EventType=view&UUID=6b106320-b422-11e2-9e96-0800200c9a66-355&IP=192.168.1.1&ReferralURL=http://samplesite.com

Appendix – Payload Legend

This appendix describes the columns used in the payload tables in Appendix A-J

Cardinality is used to identify how many times an element can be expected within the Standard-XML payload.

1	Exactly one instance of this element.
0..1	Zero or one instance of this element.
0..*	Zero or more instances of this element.
1..*	One or more instances of this element will be included

Type is used to identify the type of data to be expected in an element within the Standard-XML payload.

Boolean	True/False
Collection	A collection of similar elements
Complex	Comprised of primitive data types and/or other complex elements.
DateTime	A date and time
Integer	A whole number
Lookup	A value taken from the associated lookup. In Encoded format, the both the lookup ID and text value is available.
Lookup (CSV)	A comma separated list of values taken from the associated lookup. In Encoded format, the both the lookup ID and text values are available.
Script	A JavaScript script to be used for gathering analytics data from client websites (deprecated, still included for backwards compatibility)
String	Free text representation of the value
String (CSV)	A comma separated set of free text values
URL	Website address

Type is used to identify the metadata lookup table associated with the element. Any values available in the element can be found in the identified Lookup table.

Appendix A – Office Payload

Parent	Cardinality	Name	Type	Description	Lookup
Office	1	ID	Integer	Unique ID assigned to the office	
Office	1	LastUpdated	DateTime	The date the office information was last updated	

Appendix B – OfficeDetails Payload

Parent	Cardinality	Name	Type	Description	Lookup
OfficeDetails	1	Name	String	The name of the Office	
OfficeDetails	1	ID	Integer	**(Attribute)** Unique ID assigned to the Office	
OfficeDetails	1	LastUpdated	DateTime	**(Attribute)** Date the agent information was last updated	
OfficeDetails	1	LogoLastUpdated	DateTime	The date the logo was last updated	
OfficeDetails	1	OrganizationType	Lookup	The type of organization	OrganizationType
OfficeDetails	0..1	Designation	Lookup	The designation of the organization	OrganizationDesignations
OfficeDetails	1	**Address**	Complex	Address of the office. See Appendix G – Address Payload	
OfficeDetails	0..1	**Phones**	Collection	Collection of Phone. See Appendix H – Phone Payload	
OfficeDetails	0..1	**Websites**	Collection	Collection of Website. See Appendix I – Website Payload	
OfficeDetails	0..1	Franchisor	Lookup	The name of the franchisor	Franchisor

Appendix C – Agent Payload

Parent	Cardinality	Name	Type	Description	Lookup
Agent	1	ID	Integer	(Attribute) Unique ID assigned to the Agent	
Agent	1	LastUpdated	DateTime	(Attribute) The date agent information was last updated	

Appendix D – AgentDetails Payload

Parent	Cardinality	Name	Type	Description	Lookup
AgentDetails	1	Name	String	The name of the Agent	
AgentDetails	1	ID	Integer	**(Attribute)** Unique ID assigned to the Agent	
AgentDetails	1	LastUpdated	String	**(Attribute)** The date the agent was last updated	
AgentDetails	0..1	Position	String	The position of the Agent	
AgentDetails	0..1	**Websites**	Collection	Collection of Website. See Appendix I – Website Payload	
AgentDetails	0..1	**Phones**	Collection	Collection of Phone. See Appendix H – Phone Payload	
AgentDetails	1	**Office**	Complex	The organization that the Agent works for. See Appendix B – OfficeDetails Payload	
AgentDetails	0..1	EducationCredentials	String (CSV)	The credentials of the Agent	
AgentDetails	0..1	PhotoLastUpdated	DateTime	The date the photo was last updated	
AgentDetails	1	**Address**	Complex	Address of the office. See Appendix G – Address Payload	
AgentDetails	0..1	Specialties	Collection	The specialty of the Agent	
Specialties	1..*	Specialty	Lookup	The specialty of the Agent	Specialties
AgentDetails	0..1	Designations	Collection	Collection of Designation	
Designations	1..*	Designation	Lookup	The designation of the Agent	IndividualDesignations
AgentDetails	0..1	Languages	Collection	Collection of Language	
Languages	1..*	Language	Lookup	Language spoken of the Agent	Languages
AgentDetails	0..1	TradingAreas	Collection	Collection of TradingArea	
TradingAreas	1..*	TradingArea	String	Trading area of the agent	

Appendix E – Property Payload (Standard-XML)

Parent	Cardinality	Name	Type	Description	Lookup
Property	1	ID	Integer	Unique ID assigned to the Property	
Property	1	LastUpdated	DateTime	The date the property was last updated	

Appendix F – PropertyDetails Payload (Standard-XML)

Parent	Cardinality	Name	Type	Description	Lookup
PropertyDetails	1	ID	Integer	**(Attribute)** Unique ID assigned to the property	
PropertyDetails	1	ListingID	String	The MLS Number or Reference Number for the property.	
PropertyDetails	1	LastUpdated	DateTime	**(Attribute)** The date the property was last updated	
PropertyDetails	0..1	**Business**	Complex	Business details of property	
PropertyDetails	0..1	Board	Integer	ID of the Board/Association responsible for the listing	Boards
Business	0..1	BusinessType	Lookup (CSV)	Type of Business	BusinessType
Business	0..1	BusinessSubType	Lookup (CSV)	Business Sub Type	BusinessSubType
Business	0..1	EstablishedDate	String	Date the Business was established	
Business	1	Franchise	Boolean	Indicates whether business is a franchise or not	
Business	0..1	Name	String	Business Name	
Business	0..1	OperatingSince	String	Date indicating how long the business has been opened	
PropertyDetails	1	**Building**	Complex	Building details of the property	
Building	0..1	BathroomTotal	Integer	Number of bathrooms	
Building	0..1	BedroomsAboveGround	Integer	Number of bedrooms above ground	
Building	0..1	BedroomsBelowGround	Integer	Number of bedrooms below ground	
Building	0..1	BedroomsTotal	Integer	Number of bedrooms (below + above ground)	
Building	0..1	Age	String	The age of the building	
Building	0..1	Amenities	Lookup (CSV)	The building amenities	Amenities
Building	0..1	Amperage	Lookup (CSV)	The building amperage	Amperage

Building	0..1	Anchor	String	The building anchor	
Building	0..1	Appliances	Lookup (CSV)	The appliances included with the building	Appliances
Building	0..1	ArchitecturalStyle	Lookup (CSV)	Architectural style of the building	ArchitecturalStyle
Building	0..1	BasementDevelopment	Lookup (CSV)	Development of the basement	BasementDevelopment
Building	0..1	BasementFeatures	Lookup (CSV)	Features of the basement	BasementFeatures
Building	0..1	BasementType	Lookup (CSV)	The type of basement	BasementType
Building	0..1	BomaRating	String	BOMA energy performance rating	
Building	0..1	CeilingHeight	String	Ceiling height of the building	MeasureUnit*
Building	0..1	CeilingType	Lookup (CSV)	Ceiling type of the building	CeilingType
Building	0..1	ClearCeilingHeight	Lookup (CSV)	Clear ceiling height of the building	ClearCeilingHeight
Building	0..1	ConstructedDate	String	The year the building was built	
Building	0..1	ConstructionMaterial	Lookup (CSV)	List of construction materials used in the building	ConstructionMaterial
Building	0..1	ConstructionStatus	Lookup	The status of the building	ConstructionStatus
Building	0..1	ConstructionStyleAttachment	Lookup	The attachment style of the building	ConstructionStyleAttachment
Building	0..1	ConstructionStyleOther	Lookup	Construction style other	ConstructionStyleOther
Building	0..1	ConstructionStyleSplitLevel	Lookup	Construction style split level	ConstructionStyleSplitLevel
Building	0..1	CoolingType	Lookup (CSV)	Type of Cooling in the building	CoolingType
Building	0..1	EnerguideRating	String	Energuide energy performance rating	
Building	0..1	ExteriorFinish	Lookup (CSV)	The exterior finish of the building	ExteriorFinish
Building	0..1	FireProtection	Lookup (CSV)	Fire protection and security features of building	FireProtection
Building	0..1	FireplaceFuel	Lookup (CSV)	List of fireplace fuels for the fireplaces in building	FireplaceFuel
Building	0..1	FireplacePresent	String	Indicates whether there is a fireplace in building	
Building	0..1	FireplaceTotal	Integer	Total number of fireplaces present in building	
Building	0..1	FireplaceType	Lookup (CSV)	The types of fireplace in the building	FireplaceType
Building	0..1	Fixture	Lookup (CSV)	Building fixture	Fixture
Building	0..1	FlooringType	Lookup (CSV)	The type of flooring in the building	FlooringType
Building	0..1	FoundationType	Lookup (CSV)	The type of foundation of the building	FoundationType

Building	0..1	HalfBathTotal	String	The number of half Bathrooms	
Building	0..1	HeatingFuel	Lookup (CSV)	Fuel used for heating the building	HeatingFuel
Building	0..1	HeatingType	Lookup (CSV)	The heating type of the building	HeatingType
Building	0..1	LeedsCategory	String	LEEDS green building certification category	
Building	0..1	LeedsRating	String	LEEDS green building certification rating	
Building	0..1	RenovatedDate	String	The date the building was renovated	
Building	0..1	RoofMaterial	Lookup (CSV)	The type of roofing material of the building	RoofMaterial
Building	0..1	RoofStyle	Lookup (CSV)	The roof style of the building	RoofStyle
Building	0..1	**Rooms**	Collection	Collection of Room	
Rooms	1..*	**Room**	Complex	Details of a single room	
Room	0..1	Type	Lookup	Type of room	RoomType
Room	0..1	Width	String	Width of the room	MeasureUnit*
Room	0..1	Level	Lookup	The level of the room	RoomLevel
Room	0..1	Length	String	The length of the room	MeasureUnit*
Room	0..1	Description	String	General description of the room	
Room	0..1	Dimension	String	The dimensions of the room	
Building	0..1	StoriesTotal	Integer	The number of stories of the building	
Building	0..1	SizeExterior	String	Building interior size	MeasureUnit*
Building	0..1	SizeInterior	String	Building exterior size	MeasureUnit*
Building	0..1	SizeInteriorFinished	String	The size of finished interior	MeasureUnit*
Building	0..1	StoreFront	Lookup (CSV)	The building storefront	StoreFront
Building	0..1	TotalFinishedArea	String	Total finished area	MeasureUnit*
Building	0..1	Type	Lookup (CSV)	Type of Building	BuildingType
Building	0..1	Uffi	String	UFFI (Urea Formaldehyde Foam Insulation) status	
Building	0..1	UnitType	String	Type of unit	
Building	0..1	UtilityPower	Lookup (CSV)	The types of power in the building	UtilityPower
Building	0..1	UtilityWater	Lookup (CSV)	Building water type	UtilityWater
Building	0..1	VacancyRate	String	The rate of vacancy	
PropertyDetails	0..1	**Land**	Complex	Details about the land of the property	
Land	0..1	SizeTotal	String	The total size of the property	MeasureUnit*
Land	0..1	SizeTotalText	String	The total size of the property as text	

Land	0..1	SizeFrontage	String	The amount of frontage of the property	MeasureUnit*
Land	0..1	AccessType	Lookup (CSV)	The type of access to the property	AccessType
Land	0..1	Acreage	Boolean	Whether the property has acreage or not	
Land	0..1	Amenities	Lookup (CSV)	The land amenities	AmenitiesNearby
Land	0..1	ClearedTotal	String	The amount of cleared land	MeasureUnit*
Land	0..1	CurrentUse	Lookup (CSV)	What the land is currently used for	CurrentUse
Land	0..1	Divisible	String	Whether the land is divisible or not (True/False)	
Land	0..1	FenceTotal	String	The amount of fencing	MeasureUnit*
Land	0..1	FenceType	Lookup (CSV)	The type of fence	FenceType
Land	0..1	FrontsOn	Lookup	The front type	FrontsOn
Land	0..1	LandDisposition	Lookup (CSV)	List of disposition features of the land	LandDispositionType
Land	0..1	LandscapeFeatures	Lookup (CSV)	List of landscape features of the land	LandscapeFeatures
Land	0..1	PastureTotal	String	The amount of pasture available	MeasureUnit*
Land	0..1	Sewer	Lookup (CSV)	List of sewer types on the land	Sewer
Land	0..1	SizeDepth	String	The depth of the land	MeasureUnit*
Land	0..1	SizeIrregular	String	The size of irregular land	
Land	0..1	SoilEvaluation	Lookup	The soil evaluation	SoilEvaluationType
Land	0..1	SoilType	Lookup (CSV)	The type of soil	SoilType
Land	0..1	SurfaceWater	Lookup (CSV)	List of surface water types on the land	SurfaceWater
Land	0..1	TiledTotal	String	The size of tiled land	MeasureUnit*
Land	0..1	TopographyType	Lookup (CSV)	Land topography type	TopographyType
PropertyDetails	1..*	**AgentDetails**	Complex	Agent details. See Appendix D – AgentDetails Payload	
PropertyDetails	0..1	**Address**	Complex	Address of property. See Appendix G – Address Payload	
PropertyDetails	0..1	**AlternateURL**	Complex	Set of links to information about the property	
AlternateURL	0..1	BrochureLink	URL	Link to brochure web site or document	
AlternateURL	0..1	MapLink	URL	Link to a mapping site displaying the property location	
AlternateURL	0..1	PhotoLink	URL	Link to a site containing additional photos	
AlternateURL	0..1	SoundLink	URL	Link to a site containing sound clips	
AlternateURL	0..1	VideoLink	URL	Link to a site containing video for the property	

PropertyDetails	0..1	AmmenitiesNearBy	Lookup (CSV)	List of amenities nearby to the property	AmenitiesNearBy
PropertyDetails	0..1	CommunicationType	Lookup (CSV)	The communication type available	CommunicationType
PropertyDetails	0..1	CommunityFeatures	Lookup (CSV)	The community features	CommunityFeatures
PropertyDetails	0..1	Crop	Lookup (CSV)	The types of crops available	Crop
PropertyDetails	0..1	DocumentType	Lookup (CSV)	Documents available	DocumentType
PropertyDetails	0..1	EquipmentType	Lookup (CSV)	List of equipment available	EquipmentType
PropertyDetails	0..1	Easement	Lookup (CSV)	The property easement types	Easement
PropertyDetails	0..1	FarmType	Lookup (CSV)	The type of farm	FarmType
PropertyDetails	0..1	Features	Lookup (CSV)	The property features available	Features
PropertyDetails	0..1	IrrigationType	Lookup (CSV)	The type of irrigation of the property	IrrigationType
PropertyDetails	0..1	Lease	String	Lease value	
PropertyDetails	0..1	LeasePerTime	Lookup	Lease time e.g. quarterly	PaymentUnit
PropertyDetails	0..1	LeasePerUnit	Lookup	Lease unit e.g. square feet	MeasureUnit
PropertyDetails	0..1	LeaseTermRemaining	String	Duration of the lease remaining.	
PropertyDetails	0..1	LeaseTermRemainingFreq	Lookup	The frequency of the remaining lease e.g. daily	PaymentUnit
PropertyDetails	0..1	LeaseType	Lookup	Type of lease	LeaseType
PropertyDetails	0..1	ListingContractDate	String	The effective date of the agreement between the seller and the seller's broker	
PropertyDetails	0..1	LiveStockType	Lookup (CSV)	The types of livestock available	LiveStockType
PropertyDetails	0..1	LoadingType	Lookup (CSV)	Property loading type available	LoadingType
PropertyDetails	0..1	LocationDescription	String	A description of the location	
PropertyDetails	0..1	Machinery	Lookup (CSV)	Machinery available	Machinery
PropertyDetails	0..1	MaintenanceFee	String	Condo/Maintenances fees	
PropertyDetails	0..1	MaintenanceFeePaymentUnit	String	Condo/Maintenances fee payment unit (Frequency)	
PropertyDetails	0..1	MaintenanceFeeType	Lookup (CSV)	Condo/Maintenances fee type	MaintenanceFeeType
PropertyDetails	0..1	ManagementCompany	String	The name of management company	
PropertyDetails	0..1	MunicipalID	String	The id of municipality	
PropertyDetails	0..1	**OpenHouse**	Collection	Collection of open house Events	
OpenHouse	1..*	**Event**	Complex	Details of a single open house event	
Event	1	StartDateTime	DateTime	The open house start date and end time	
Event	1	EndDateTime	DateTime	The open house date and end time	

Event	1	Comments	String	Comments about the open house	
PropertyDetails	0..1	OwnershipType	Lookup	The type of ownership ex: Condo/Strata, freehold etc.	OwnershipType
PropertyDetails	0..1	**ParkingSpaces**	Collection	Collection of Parking. Available if parking type details are available	
ParkingSpaces	1..*	**Parking**	Complex	Details of the parking type	
Parking	1	Name	Lookup	Type of parking available	ParkingType
Parking	1	Spaces	String	Number of spaces for the associated parking type	
PropertyDetails	0..1	ParkingSpaceTotal	String	The total number of parking spaces	
PropertyDetails	0..1	**Photo**	Collection	Collection of PropertyPhoto	
Photo	1..*	**PropertyPhoto**	Complex	Details of a single property photo	
PropertyPhoto	1	SequenceID	Integer	ID of the property photo. Required for GetObject calls	
PropertyPhoto	0..1	Description	String	Description of the photo	
PropertyPhoto	1	LastUpdated	DateTime	The timestamp, not including time zone, of when the photo was last updated	
PropertyPhoto	1	PhotoLastUpdated	DateTime	The timestamp, including time zone, of when the photo was last updated. Example: Tue, 20 Oct 2015 09:23:13 GMT	
PropertyDetails	0..1	Plan	String	Plan of the property	
PropertyDetails	0..1	PoolType	Lookup (CSV)	The type of pool on the property	PoolType
PropertyDetails	0..1	PoolFeatures	Lookup (CSV)	The features of the pool	PoolFeatures
PropertyDetails	0..1	Price	String	Price of the Property	
PropertyDetails	0..1	PricePerTime	Lookup	Price of property per time	PaymentUnit
PropertyDetails	0..1	PricePerUnit	String	Price of property per unit	MeasureUnit
PropertyDetails	0..1	PropertyType	Lookup	Type of real estate property	PropertyType
PropertyDetails	0..1	PublicRemarks	String	Description of the property	
PropertyDetails	0..1	RentalEquipmentType	Lookup (CSV)	The type of rental equipment	RentalEquipmentType
PropertyDetails	0..1	RightType	Lookup (CSV)	List of property rights	RightType
PropertyDetails	0..1	RoadType	Lookup (CSV)	Type of road	RoadType
PropertyDetails	0..1	StorageType	Lookup (CSV)	Storage Type Included	StorageType
PropertyDetails	0..1	Structure	Lookup (CSV)	List of structures on the property	StructureType
PropertyDetails	0..1	SignType	Lookup (CSV)	Type of signage	SignType
PropertyDetails	0..1	TransactionType	Lookup	Type of transaction (e.g. sale, lease)	TransactionType

PropertyDetails	0..1	TotalBuildings	String	Total number of buildings included in the property	
PropertyDetails	0..1	**UtilitiesAvailable**	Collection	Collection of Utility	
UtilitiesAvailable	1..*	**Utility**	Complex	Details of a single utility	
Utility	1	Type	Lookup	Type of utility available	UtilityType
Utility	1	Description	String	Description of utility available	
PropertyDetails	0..1	ViewType	Lookup (CSV)	Types of views available	ViewType
PropertyDetails	0..1	WaterFrontType	Lookup	Waterfront type of the property	WaterFrontType
PropertyDetails	0..1	WaterFrontName	String	Name of the waterfront the property is on	
PropertyDetails	0..1	AdditionalInformationIndicator	String	Additional information indicator text	
PropertyDetails	0..1	ZoningDescription	String	Description of the zoning	
PropertyDetails	0..1	ZoningType	Lookup	Property Zoning type	ZoningType
PropertyDetails	1	MoreInformationLink	URL	Link to a site providing more information about that property.	
PropertyDetails	1	AnalyticsClick	Script	Used for statistical tracking of MoreInformationLink. (deprecated, included for backwards compatibility)	
PropertyDetails	1	AnalyticsView	Script	Used for statistical tracking of property details views on DDF® client sites. (deprecated, included for backwards compatibility)	

* For explanation of fields with a MeasureUnit lookup, see Section 7 – Search Transaction - Difference between STANDARD-XML and STANDARD-XML-Encoded

Appendix G – Address Payload

Parent	Cardinality	Name	Type	Description	Lookup
Address	0..1	StreetAddress	String	This field returns a formatted street address. It may contain a vertical bar (|) line delimiter if address contains multiple lines. It includes the following address fields if available: AdditionalStreetInfo, UnitNumber, StreetNumber, StreetDirectionPrefix, StreetName,	

				StreetSuffix, StreetDirectionSuffix, BoxNumber, If the above fields do not yield a valid street Address, the following fields will be included instead (if available) AdditionalStreetInfo, UnitNumber, AddressLine1, AddressLine2	
Address	0..1	AddressLine1	String	The first address line of the address	
Address	0..1	AddressLine2	String	The second address line of the address	
Address	0..1	StreetNumber	String	The building number in the address	
Address	0..1	StreetDirectionPrefix	String	Directional indicator that precedes the street name	
Address	0..1	StreetName	String	Official name of the street in the address	
Address	0..1	StreetSuffix	String	The street type	
Address	0..1	StreetDirectionSuffix	String	Directional indicator that follows a street name	
Address	0..1	UnitNumber	String	Apartment, suite or office number portion of a postal address	
Address	0..1	BoxNumber	String	Post office box if applicable	
Address	0..1	City	String	City of the address	
Address	0..1	Province	String	Province of the address	
Address	0..1	PostalCode	String	Postal code of the address	
Address	0..1	Country	String	Country of the address	
Address	0..1	AdditionalStreetInfo	String	Additional information about the street	
Address	0..1	CommunityName	String	Community name of the address	
Address	0..1	Neighbourhood	String	Neighbourhood name of the address	
Address	0..1	Subdivision	String	Subdivision name of the address	

Appendix H – Phone Payload

Parent	Cardinality	Name	Type	Description	Lookup
Phones	1..*	Phone	String	The phone number	
Phone	1	ContactType	String	(Attribute) The type of contact, e.g. Business	

Phone	1	PhoneType	String	(Attribute) The Type of phone line (Toll free, Fax, etc.)	

Appendix I – Website Payload

Parent	Cardinality	Name	Type	Description	Lookup
Websites	1..*	Website	String	The website of the organization	
Website	1	ContactType	String	(Attribute) The type of contact (Business, Office, etc.)	
Website	1	WebsiteType	String	(Attribute) The type of the website	

Appendix J – PropertyDetails Payload (Compact)

Payload based on RESO Data Dictionary 1.0: http://www.reso.org/data-dictionary

Standard Name	Data Type	Encoded	Lookup Name	RESO Field Description
ArchitecturalStyle	String	Y	ArchitecturalStyle	A list describing the style of the structure. For example, Victorian, Ranch, Craftsman, etc.
AssociationFee	Decimal			A fee paid by the homeowner to the Home Owners Association which is used for the upkeep of the common area, neighborhood or other association related benefits. Synonym: Condo fee
AssociationFeeFrequency	String			The frequency the association fee is paid. For example, Weekly, Monthly, Annually, Bi-Monthly, One Time, etc.
AttachedGarageYN	Boolean			A flag indicating that the garage attached to the dwelling.
BathroomsHalf	Integer			A room containing 2 of the 4 elements constituting a bath, which are; Toilet, Sink, Bathtub or Shower Head. A Half Bath will typically contain a Sink and Toilet.
BathroomsTotal	String			String allowing for whatever total of bathrooms existed in legacy systems. Examples may be "three full and one half", 1.2, One and a half, 1.5
BedroomsTotal	Integer			The total number of bedrooms in the dwelling.
BuildingAreaTotal	Decimal			Total area of the structure. Includes both finished and unfinished

				areas.
BuildingAreaUnits	String	Y	MeasureUnit	A pick list of the unit of measurement for the area. i.e. Square Feet, Square Meters, Acres, etc.
CarportSpaces	Integer			The number of carport spaces included in the sale.
CarportYN	Boolean			A flag indicating that the listing has a garage. This flag may be T/F, Y/N or other true, false or unknown indicator. As with all flags, the field may be null.
City	String			The city in listing address.
CoListAgentCellPhone	String			North American 10 digit phone numbers should be in the format of ###-###-#### (separated by hyphens). Other conventions should use the common local standard. International numbers should be preceded by a plus symbol.
CoListAgentDesignation	String	Y	IndividualDesignations	Designations and certifications acknowledging experience and expertise in various real estate sectors are awarded by NAR and each affiliated group upon completion of required courses.
CoListAgentDirectPhone				North American 10 digit phone numbers should be in the format of ###-###-#### (separated by hyphens). Other conventions should use the common local standard. International numbers should be preceded by a plus symbol.
CoListAgentFax	String			North American 10 digit phone numbers should be in the format of ###-###-#### (separated by hyphens). Other conventions should use the common local standard. International numbers should be preceded by a plus symbol.
CoListAgentFullName	String			The full name of the co-listing agent. (First Middle Last)
CoListAgentKey	String			A system unique identifier. Specifically, in aggregation systems, the Key is the system unique identifier from the system that the record was just retrieved. This may be identical to the related xxxID identifier, but the key is guaranteed unique for this record set.

CoListAgentOfficePhone	String			North American 10 digit phone numbers should be in the format of ###-###-#### (separated by hyphens). Other conventions should use the common local standard. International numbers should be preceded by a plus symbol.
CoListAgentOfficePhoneExt	String			The extension of the given phone number (if applicable).
CoListAgentPager	String			North American 10 digit phone numbers should be in the format of ###-###-#### (separated by hyphens). Other conventions should use the common local standard. International numbers should be preceded by a plus symbol.
CoListAgentTollFreePhone	String			North American 10 digit phone numbers should be in the format of ###-###-#### (separated by hyphens). Other conventions should use the common local standard. International numbers should be preceded by a plus symbol.
CoListAgentURL	String			The website URI of the co-listing agent.
CoListOfficeFax	String			North American 10 digit phone numbers should be in the format of ###-###-#### (separated by hyphens). Other conventions should use the common local standard. International numbers should be preceded by a plus symbol.
CoListOfficeKey	String			A system unique identifier. Specifically, in aggregation systems, the Key is the system unique identifier from the system that the record was just retrieved. This may be identical to the related xxxID identifier, but the key is guaranteed unique for this record set.
CoListOfficeName	String			The legal name of the brokerage co-representing the seller.
CoListOfficePhone	String			North American 10 digit phone numbers should be in the format of ###-###-#### (separated by hyphens). Other conventions should use the common local standard. International numbers should be preceded by a plus symbol.
CoListOfficePhoneExt	String			The extension of the given phone number (if applicable).
CoListOfficeURL	String			The website URI for the co-listing office.

CommunityFeatures	String	Y	CommunityFeatures	A list of features related to, or available within, the community.
ConstructionMaterials	String	Y	ConstructionMaterial	A list of the materials that were used in the construction of the property.
Cooling	String	Y	CoolingType	A list describing the cooling or air conditioning features of the property.
CoolingYN	Boolean			The property has cooling or Air Conditioning.
Country	String			The country abbreviation in a postal address.
CoveredSpaces	Integer			The total number of garage and carport spaces.
Fencing	String	Y	FenceType	A list of types of fencing found at the property being sold.
FireplaceFeatures	String	Y	FireplaceType	A list of features or description of the fireplace(s) included in the sale/lease.
FireplaceFuel	String	Y	FireplaceFuel	A list describing the types of fuel that may be used in the property's fireplace(s).
FireplacesTotal	Integer			The total number of fireplaces included in the property.
Flooring	String	Y	FlooringType	A list of the type(s) of flooring found within the property.
FrontageLength	Decimal			Textual description of the length of the frontages selected in the Frontage Type field.
FrontageType	String	Y	FrontsOn	Pick list of types of frontage. i.e. Oceanfront, Lakefront, Golf course…etc….
GarageSpaces	Integer			The number of spaces in the garage(s).
GarageYN	Boolean			A flag indicating that the listing has a garage. This flag may be T/F, Y/N or other true, false or unknown indicator. As with all flags, the field may be null.
GreenBuildingCertification	String			The name of the certification awarded to a new or pre-existing residential or commercial structure. For example: LEED, Energy

				Star, ICC-700.
GreenCertificationRating	String			Many certifications have a rating system that provides an indication of the structure's level of energy efficiency. This is commonly expressed in a numeric value but can also be a name, such as Gold or Silver.
Heating	String	Y	Heating Type	A list describing the heating features of the property.
HeatingFuel	String	Y	HeatingFuel	A list describing the heating fuel of the property.
Lease	String		Lease	Lease value.
LeaseFrequency	String	Y	LeaseFrequency	The frequency of lease payments.
LeaseTerm	String		LeaseTerm	The lease term payment type.
Levels	String			The number of levels in the property being sold. For example, One Level, Two Levels, Split Level, Three or More Levels, Multi Level, Loft. A discreet horizontal plane of interior living space (excluding basements).
ListAOR	String	Y	Boards	The responsible Board or Association of REALTORS for this listing.
ListAgentCellPhone	String			North American 10 digit phone numbers should be in the format of ###-###-#### (separated by hyphens). Other conventions should use the common local standard. International numbers should be preceded by a plus symbol.
ListAgentDesignation	String	Y	IndividualDesignations	Designations and certifications acknowledging experience and expertise in various real estate sectors are awarded by NAR and each affiliated group upon completion of required courses.
ListAgentFax	String			North American 10 digit phone numbers should be in the format of ###-###-#### (separated by hyphens). Other conventions should use the common local standard. International numbers should be preceded by a plus symbol.
ListAgentFullName	String			The full name of the listing agent. (First Middle Last)

ListAgentKey	String			A system unique identifier. Specifically, in aggregation systems, the ListAgentKey is the system unique identifier from the system that the record was retrieved. This may be identical to the related xxxID.
ListAgentOfficePhone	String			North American 10 digit phone numbers should be in the format of ###-###-#### (separated by hyphens). Other conventions should use the common local standard. International numbers should be preceded by a plus symbol.
ListAgentOfficePhoneExt	String			The extension of the given phone number (if applicable).
ListAgentPager	String			North American 10 digit phone numbers should be in the format of ###-###-#### (separated by hyphens). Other conventions should use the common local standard. International numbers should be preceded by a plus symbol.
ListAgentURL	String			The website URI of the listing agent.
ListingID	String			The well-known identifier for the listing. The value may be identical to that of the Listing Key, but the Listing ID is intended to be the value used by a human to retrieve the information about a specific listing. In a multiple originating system or a merged system, this value may not be unique and may require the use of the provider system to create a synthetic unique value.
ListingContractDate	String			The effective date of the agreement between the seller and the seller's broker. This is the date entered by the agent reflecting when the change occurred contractually, not a timestamp of when the change was made in the MLS.
ListingKey	String			A unique identifier for this record from the immediate source. This may be a number, or string that can include URI or other forms. This is the system you are connecting to and not necessarily the original source of the record.
ListOfficeFax	String			North American 10 digit phone numbers should be in the format of ###-###-#### (separated by hyphens). Other conventions should use the common local standard. International numbers

				should be preceded by a plus symbol.
ListOfficeKey	String			A system unique identifier. Specifically, in aggregation systems, the Key is the system unique identifier from the system that the record was just retrieved. This may be identical to the related xxxID identifier, but the key is guaranteed unique for this record set.
ListOfficeName	String			The legal name of the brokerage representing the seller.
ListOfficePhone	String			North American 10 digit phone numbers should be in the format of ###-###-#### (separated by hyphens). Other conventions should use the common local standard. International numbers should be preceded by a plus symbol.
ListOfficePhoneExt	Decimal			The extension of the given phone number (if applicable).
ListOfficeURL	String			The website URI for the listing office.
ListPrice	String			The current price of the property as determined by the seller and the seller's broker. For auctions this is the minimum or reserve price.
LotFeatures	String	Y	LandscapeFeatures	A list of features or description of the lot included in the sale/lease.
LotSizeArea	Decimal			The total area of the lot. See Lot Size Units for the units of measurement (Square Feet, Square Meters, Acres, etc.).
LotSizeUnits	String	Y	MeasureUnit	A pick list of the unit of measurement for the area. i.e. Square Feet, Square Meters, Acres, etc.
ModificationTimestamp	DateTime			The transactional timestamp automatically recorded by the MLS system representing the date/time the listing was last modified.
MoreInformationLink	URL			Link to a site providing more information about that property.
NumberOfUnitsTotal	Integer			Total number of units included in the income property, occupied or unoccupied.
OpenParkingSpaces	Integer			The number of open or uncovered parking spaces included in the

				sale.
OpenParkingYN	Boolean			A flag indicating that any parking spaces associated with the property are not covered by a roof.
OriginatingSystemKey	String			Unique identifier from the originating system which is commonly a key to that system. In the case where data is passed through more than one system, this is the originating system key.
OriginatingSystemName	String			The name of the originating record provider. Most commonly the name of the MLS. The place where the listing is originally input by the member. The legal name of the company. To be used for display.
ParkingTotal	Integer			The total number of parking spaces included in the sale.
PhotosChangeTimestamp	DateTime			System generated timestamp of when the last update or change to the photos for this listing was made.
PhotosCount	Integer			The total number of pictures or photos included with the listing.
PoolFeatures	String	Y	PoolFeatures	A list of features or description of the pool included in the sale/lease.
PoolYN	Boolean			The property has a pool.
PostalCode	String			The postal code portion of a street or mailing address.
PropertyType	String	Y	PropertyType	A list of types of properties such as Residential, Lease, Income or Land.
PublicRemarks	String			Text remarks that may be displayed to the public. In an MLS, it is the field where information is entered for the public. This information is intended to be visible on-line. This is typically information that describes the selling points of the building and/or land for sale. Local conditions and rules will determine what such content can contain. Generally, the following information is excluded: any information pertaining to entry to the property, the seller and/or tenant, listing member contact information. In other

				systems, these remarks will be determined by local business rules.
Roof	String	Y	RoofStyle	A list describing the type or style of roof. For example Spanish Tile, Composite, Shake, etc.
RoomDimensions *	String			* This field is a repeating element. If this field is repeated, add 1, 2, 3, etc., to the end of the field. The dimensions of the room minimally represented as length and width (i.e. 12 x 10). For irregular rooms a measurement of all sides of the polygon representing the inner walls of the room. i.e. 10 x 12 x 8 x 2.
RoomLength *	Decimal			* This field is a repeating element. If this field is repeated, add 1, 2, 3, etc., to the end of the field. Measurement specifying the horizontal dimension of something that is fixed in place. The source attribute defines the source of the measurement, while the units attribute defines the unit of measurement: feet, meters or other units of measure. The general use of this is restricted to regular rectangular objects.
RoomLengthWidthUnits *	String	Y	MeasureUnit	* This field is a repeating element. If this field is repeated, add 1, 2, 3, etc., to the end of the field. A pick list of the unit of measurement for the area. i.e. Square Feet, Square Meters, Acres, etc.
RoomLevel *	String	Y	RoomLevel	* This field is a repeating element. If this field is repeated, add 1, 2, 3, etc., to the end of the field. The level or floor on which the room is located. This should correspond to the selections in the Levels field.
RoomType *	String	Y	RoomType	* This field is a repeating element. If this field is repeated, add 1, 2, 3, etc., to the end of the field. i.e. RoomType1, RoomType2, etc. The Type is a list of possible room types. i.e. Bedroom, Bathroom, Living Room, Workshop, etc.
RoomWidth *	Decimal			* This field is a repeating element. If this field is repeated, add 1, 2, 3, etc., to the end of the field. Measurement specifying the smaller horizontal dimension of something that is fixed in place. The source attribute defines the source of the measurement, while the units attribute defines the unit of measurement: feet, meters or

				other units of measure. The general use of this is restricted to regular rectangular objects.
Sewer	String	Y	Sewer	A list describing the sewer or septic features of the property.
StateOrProvince	String			Text field containing the accepted postal abbreviation for the state or province.
Stories	String			The number of floors in the property being sold.
StreetAdditionalInfo	String			Information other than a prefix or suffix for the street portion of a postal address.
StreetDirPrefix	String			The direction indicator that precedes the listed property's street name.
StreetDirSuffix	String			The direction indicator that follows a listed property's street address.
StreetName	String			The street name portion of a listed property's street address.
StreetNumber	String			The street number portion of a listed property's street address.
StreetSuffix	String			The suffix portion of a listed property's street address.
SubdivisionName	String			A neighborhood, community, complex or builder tract.
UnitNumber	String			Text field containing the number or portion of a larger building or complex. Unit Number should appear following the street suffix or, if it exists, the street suffix direction, in the street address. Examples are: "APT G", "55", etc.
UnparsedAddress	String			The UnparsedAddress is a text representation of the address with the full civic location as a single entity. It may optionally include any of City, StateOrProvince, PostalCode and Country.
View	String	Y	ViewType	A view as seen from the listed property.
ViewYN	Boolean			The property has a view.

WaterBodyName	String			The name, if known, of the body of water on which the property is located. (E.g., lake name, river name, ocean name, sea name, canal name).
WaterfrontYN	Boolean			The property is on the waterfront.
YearBuilt	Integer			The year that an occupancy permit is first granted for the house or other local measure of initial habitability of the build. The type definition permits an empty value with an attribute noting that it is an unknown date or that the building is new construction. While constraints have not been applied, convention at the time of adoption has this as a four (4) digit year value.
Zoning	String	Y	ZoningType	A division of the city or county into areas of different permissible land uses.
AnalyticsView	String			Used for statistical tracking of MoreInformationLink. (deprecated, included for backwards compatibility)
AnalyticsClick	String			Used for statistical tracking of property details views on DDF® client sites. (deprecated, included for backwards compatibility)

Appendix K – Digest Authentication

Digest authentication is a mechanism in which a client application authenticates itself to a server by sending the server a message digest along with its HTTP request message. The digest is computed by employing a one-way hash algorithm to a concatenation of the HTTP request message and the client's password.
This typical transaction consists of the following steps:

1. A client makes an initial request that requires authentication but does not provide a username and password.
2. The server responds with a 401 Unauthorized response code, providing the authentication realm and a nonce (randomly-generated, single-use value).

HTTP/1.1 401 Unauthorized
WWW-Authenticate: Digest realm="CREA.Distribution", nonce="NjM0NjkxNDY3NDU3NzYuNDo3YWNiNjk3NjIzNmY2MWU2ZmY2ZGRlZWRlMWFiYmVhNw==", qop="auth"

3. The client makes another request , including an Authorization header

Authorization: Digest username="11UUctLDhfS8hkqpuhkgfhrB",realm="CREA.Distribution",nonce="NjM0NjkxNDY3NDU3NzYuNDo3YWNiNjk3NjIzNmY2MWU2ZmY2ZGRlZWRlMWFiYmVhNw==",uri="/Distribution/Login.svc/Login",cnonce="5ee95aeee8c10a3e780da1455e33a2f3",nc=00000001,response="a5621bb7658b8936808db14d5ac02862",qop="auth"

4. If the server accepts the authentication, the request is processed, and a session ID cookie is returned as part of the response

HTTP/1.1 200 OK
Set-Cookie: X-SESSIONID=c838d36c-506e-4595-9697-3f7a6ae6e08d; expires=Fri, 04-May-2012 14:36:34 GMT; path=/

5. If the username is invalid and/or the password is incorrect, the server responds with a 401 Unauthorized response code, including a new nonce.

HTTP/1.1 401 Unauthorized
WWW-Authenticate: Digest realm="CREA.Distribution", nonce="NjM0NjkxNDY3NDU3NzYuNDo3YWNiNjk3NjIzNmY2MWU2ZmY2ZGRlZWRlMWFiYmVhNw==", qop="auth"

Digest Authentication Response Calculations

http://en.wikipedia.org/wiki/Digest_access_authentication
The "response" value is calculated in three steps, as follows. Where values are combined, they are delimited by colon symbols.

1. The MD5 hash of the combined username, authentication realm and password is calculated. The result is referred to as HA1.
2. The MD5 hash of the combined method and digest URI is calculated, e.g. of "GET" and "/dir/index.html". The result is referred to as HA2.
3. The MD5 hash of the combined HA1 result, server nonce (nonce), request counter (nc), client nonce (cnonce), quality of protection code (qop) and HA2 result is calculated. The result is the "response" value provided by the client.

Since the server has the same information as the client, the response can be checked by performing the same calculation. In the example given above the result is formed as follows, where MD5() represents a function used to calculate an MD5 hash, backslashes represent a continuation and the quotes shown are not used in the calculation.
Completing the example given in RFC 2617 gives the following results for each step.

HA1 = MD5("Mufasa:testrealm@host.com:Circle Of Life")
= 939e7578ed9e3c518a452acee763bce9
HA2 = MD5("GET:/dir/index.html")
= 39aff3a2bab6126f332b942af96d3366
Response = MD5("939e7578ed9e3c518a452acee763bce9:\
dcd98b7102dd2f0e8b11d0f600bfb0c093:\
00000001:0a4f113b:auth:\
39aff3a2bab6126f332b942af96d3366")
= 6629fae49393a05397450978507c4ef1

At this point the client may make another request, reusing the server nonce value (the server only issues a new nonce for each "401" response) but providing a new client nonce (cnonce). For subsequent requests, the hexadecimal request counter (nc) must be greater than the last value it used – otherwise an attacker could simply "replay" an old request with the same credentials. It is up to the server to ensure that the counter increases for each of the nonce values that it has issued, rejecting any bad requests appropriately. Obviously changing the method, URI and/or counter value will result in a different response value.
The server should remember nonce values that it has recently generated. It may also remember when each nonce value was issued, expiring them after a certain amount of time. If an expired value is used, the server should respond with the "401" status code and add stale=TRUE to the authentication header, indicating that the client should re-send with the new nonce provided, without prompting the user for another username and password.
The server does not need to keep any expired nonce values – it can simply assume that any unrecognised values have expired. It is also possible for the server to only allow each nonce value to be returned once, although this forces the client to repeat every request. Note that expiring a server nonce immediately will not work, as the client would never get a chance to use it.

Appendix L - Reply Codes

Transaction	Reply Code	Meaning
Login Metadata Search GetObject Logout	0	Operation successful
Login	20022	Additional login not permitted There is already a user logged in with this user name, and this server does not permit multiple logins.
Login	20036	Miscellaneous server login error The quoted-string of the body-start-line contains text that SHOULD be displayed to the user
Search	20201	No Records Found No matching records were found.
Search	20203	Miscellaneous Search Error The quoted-string of the body-start-line contains text that MAY be displayed to the user.
Search	20206	Invalid Query Syntax The query could not be understood due to a syntax error.
GetObject	20400	Invalid Resource The request could not be understood due to an unknown resource.
GetObject	20401	Invalid Type The request could not be understood due to an unknown object type for the resource.
GetObject	20402	Invalid Identifier The identifier does not match the KeyField of any data in the resource.
GetObject	20403	No Object Found No matching object was found to satisfy the request.
GetObject	20413	Miscellaneous error The server encountered an internal error.
Metadata	20500	Invalid Resource The request could not be understood due to an unknown resource.
Metadata	20501	Invalid Type The request could not be understood due to an unknown metadata type.
Metadata	20502	Invalid Identifier The identifier is not known inside the specified resource.
Metadata	20503	No Metadata Found No matching metadata of the type requested was found.
Metadata	20509	Metadata Unavailable The requested metadata is currently unavailable.
Metadata	20513	Miscellaneous error The server encountered an internal error.
Metadata Search GetObject Logout	20701	Not logged in The server did not detect an active login for the session in which the Logout transaction was submitted.
Logout	20702	Miscellaneous error. The transaction could not be completed. The ReplyText gives additional

		information.

Appendix M – Complete List of Metadata Lookups Available

Resource	Metadata-Lookup
Property	AccessType
Property	Amenities
Property	AmenitiesNearby
Property	Amperage
Property	Appliances
Property	ArchitecturalStyle
Property	BasementDevelopment
Property	BasementFeatures
Property	BasementType
Property	Boards
Property	BuildingType
Property	BusinessSubType
Property	BusinessType
Property	CeilingType
Property	ClearCeilingHeight
Property	CommunicationType
Property	CommunityFeatures
Property	ConstructionMaterial
Property	ConstructionStatus
Property	ConstructionStyleAttachment
Property	ConstructionStyleOther
Property	ConstructionStyleSplitLevel
Property	CoolingType
Property	Crop
Property	CurrentUse
Property	DocumentType
Property	Easement
Property	EquipmentType
Property	ExteriorFinish
Property	FarmType
Property	Features
Property	FenceType
Property	FireProtection
Property	FireplaceFuel
Property	FireplaceType
Property	Fixture
Property	FlooringType
Property	FoundationType
Property	FrontsOn
Property	Heating Type
Property	HeatingFuel
Property	IrrigationType
Property	LandDispositionType
Property	LandscapeFeatures
Property	LeaseType
Property	LiveStockType
Property	LoadingType

Property	Machinery
Property	MaintenanceFeeType
Property	MeasureUnit
Property	OwnershipType
Property	ParkingType
Property	PaymentUnit
Property	PoolFeatures
Property	PoolType
Property	PropertyType
Property	RentalEquipmentType
Property	RightType
Property	RoadType
Property	RoofMaterial
Property	RoofStyle
Property	RoomLevel
Property	RoomType
Property	Sewer
Property	SignType
Property	SoilEvaluationType
Property	SoilType
Property	StorageType

Property	StoreFront
Property	StoreFront
Property	StructureType
Property	SurfaceWater
Property	TopographyType
Property	TransactionType
Property	UffiCodes
Property	UtilityPower
Property	UtilityType
Property	UtilityWater
Property	ViewType
Property	WaterFrontType
Property	ZoningType
Agent	Boards
Agent	IndividualDesignations
Agent	Languages
Agent	Specialties
Office	Franchisor
Office	OrganizationType
Office	OrganizationDesignations