

WHITEPAPER

Adobe Marketo Engage-CRM Synchronization Architecture



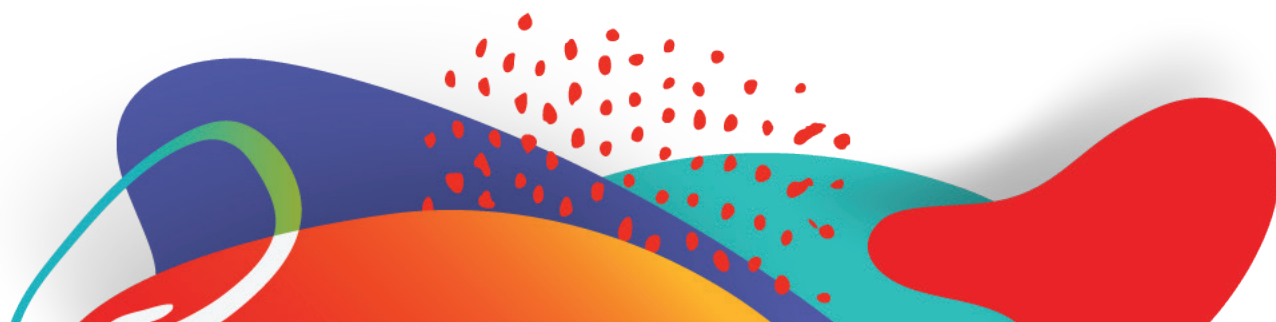
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Introduction

This document aims to provide detailed information regarding implementation of a synchronization architecture between Adobe Marketo Engage (Marketo or Marketo Engage) and an external CRM system. Entities are described, and the specifics of performing initial synchronization, or “bootstrapping,” and maintaining synchronization of new and updated records.

Revision History

V1 – April 2016

- Initial release

V2 – June 2018

- Updated Reference Architecture to reflect usage of Bulk APIs as preferred synchronization method.
- Corrected typos.
- Updated list of activities pruned after 90 days.
- Additional diagrams for lead qualification, webhook push.
- Added Marketo Data Retention Policy section

V3 – March 2021

- Updated for latest changes platform, nomenclature, and APIs

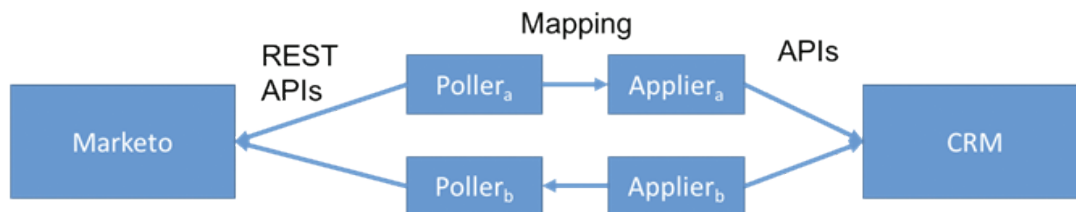


Overview

This document assumes that the reader has basic familiarity with the Marketo Engagement Platform Core Applications, a working knowledge of REST APIs in general, and familiarity with the concepts of a CRM and a Marketing Automation platform.

Marketo recommends implementation of CRM synchronization applications using a two-way polling model, retrieving changes and new records from either system, and pushing those changes as mapped in the application configuration to the other system. The middleware system should query for changes of selected record types periodically and then perform any necessary translation and filtration before pushing the record updates to CRM or Marketo, respectively.

Polling Between CRM and Marketo



Notes on Terminology

While in most product areas, Marketo now refers to lead, contact, and prospect records as “People” or “Persons,” this document uses terms such as “Lead,” “Contact,” and “Person” interchangeably to refer to records which represent a single human entity.

Additional Reading

In addition to what is described in this document, architects and implementors would be well advised to do additional reading on the specifics of using the Marketo REST and Bulk APIs. Useful documents include:

- [Getting Started](#)
- [REST API](#)
- [Best Practices](#)
- [Performance](#)
- [Error Codes](#)

Typical Synchronized Entities

A minimally functional CRM integration with Marketo will provide two-way synchronization of Leads, and Companies, and one-way CRM-to-Marketo integration of the following entities:

- Opportunities
- Opportunity Roles
- SalesPersons

Global Notes for Object Models

Some object schemas in Marketo are dynamic and user-editable, so it is extremely desirable to allow dynamic updates to the schema, this should be a routine part of a synchronization cycle. For these types of objects, a Describe {Object} endpoint is made available, which will return all the fields available to the Marketo APIs, along with datatype and length information where applicable. Where available, the Describe endpoint should be used as the exclusive source of truth for the object schema. Administrative users should be permitted to add, remove and alter mapping for non-ID fields at any time.

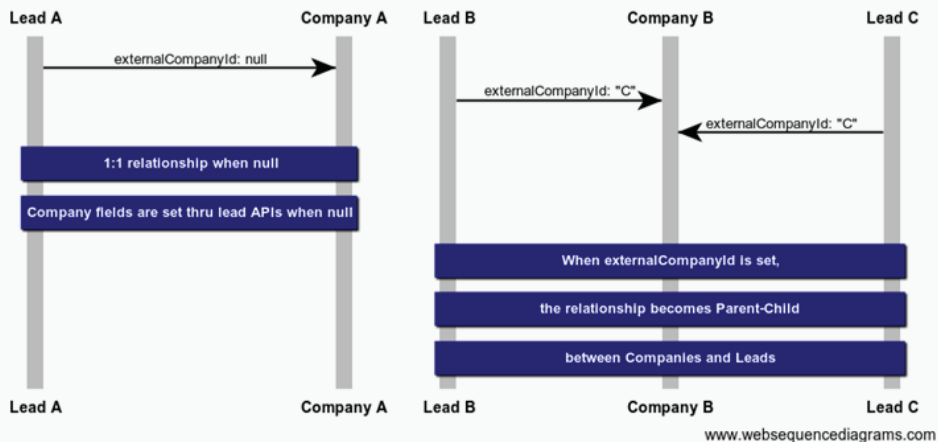
For Marketo's data type definitions, please refer to this [document](#).

Leads

Primary Key: id

The integer id of a Marketo lead record and the primary key. This is system managed by Marketo and may only be assigned by Marketo. Any insert operations attempted by a foreign system which include id will be rejected.

In Marketo leads represent any person-record which represents a sales or marketing target. They are distinct from sales person records, which own and have responsibility over lead records. All Smart Campaigns, commonly referred to as a workflow in non-Marketo systems, filter, trigger, and operate on lead records, based on their characteristics and actions. Unlike most typical CRM systems, Marketo does not have two separate record types for Lead and Contact records, rather, each Person in Marketo has additional fields which match those available for Companies. The distinction between contacts and leads is logically represented by whether a value is present in the field "externalCompanyId." If set, then the record is a member of a company. The set of company type fields on a company record is no longer updateable when the externalCompanyId field is set for that record and needs to be deferred to the linked company record, instead of modified through the person record.



Model

Leads are highly extensible in Marketo and may include an unlimited number of custom fields. When synchronizing any subscription, a set of standard fields should not be relied upon, and the Describe Lead function of the REST API should be used as the exclusive source of truth to determine field availability and updateability in a particular subscription.

The model for a lead is also potentially dynamic, as fields may be added or hidden by end-users at any time, so the schema of lead records should be maintained whenever a synchronization cycle is initiated.

A custom lead field should be created in Marketo to hold the primary key of the CRM, in order to permit unambiguous upsert operations for lead records.

Mapping

Lead field mapping should be determined by the available person types in the CRM system. A typical CRM implementation would only include Leads and Contacts would be mapped to the logical corresponding field for each record type. When possible a suggested list of mappings should be given for fields which are known in both Marketo and the CRM, but users should be allowed to change these field mappings freely to account for different usages. If leads are mapped to multiple object types, then mappings for each type should be allowed to be mapped independently. It is possible and sometimes desired to have leads mapped to multiple types of records, differentiating the type based on a custom CRM type string field, referring either to the ID of the record type, or a plaintext string representing the type.

Relationships

Leads are related to numerous accessible object types in Marketo:

Object	Relationship Type	Link Type	Link Field
Company	N:1	Lead Field	externalCompanyId
SalesPerson	N:1	Lead Field	externalSalesPersonId
Opportunity	N:N	Opportunity Role Object	leadId
Custom Objects	1:N, N:1, or N:N	See Custom Object Section	See Custom Object Section
Activities	1:N	Activity Field	leadId
Program	N:N	Program Membership Object	See Program Membership

Accessibility

Leads may be read and written to freely in Marketo provided that the Read-Write Lead Permission has been awarded to the API user being used. Leads can be read through the following endpoints:

- [Bulk Lead Export](#)
- [Get Lead by ID](#)
- [Get Multiple Leads by Filter Type](#)
- [Get Multiple Leads by List Id](#)
- [Get Multiple Leads by Program Id](#)

Leads can be written to through the following endpoints:

- [Import Lead](#)
- [Push Lead](#)
- [Create/Update Leads](#)

Lead Records may be merged through the Merge Leads endpoint. A discussion of this endpoint's behavior may be [found here](#).

Leads may be deleted through the [Delete Leads](#) endpoint.

Lead Metadata is read through the [Describe Lead](#) endpoint.

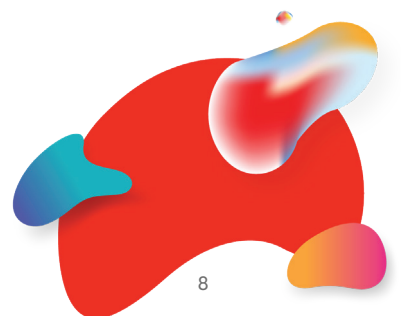
Companies

Primary Key: externalCompanyId, id

externalCompanyId is an arbitrary string field set upon creation by the external system. It is guaranteed to be unique and is not updateable. Id is a unique system-generated integer id.

Company objects represent the organization to which lead records belong. Leads are added to a Company by populating their corresponding externalCompanyId. Leads linked to a company record will directly inherit the values from a company record as though the values existed on the lead's own record. Attributes available on the company record are available for triggering and filtering on lead records from within the application.

Company records may only be created by external systems, and the CRM should be treated as the source of truth, except when changes to company records are detected in Marketo.



Model

- Companies are fully extensible and may have any number and type of custom fields
- Schema should be dynamic and capable of ingesting or evicting fields from the model at any time. The schema should be refreshed with Describe Company as a routine part of synchronization.
- Describe Company should be used as the exclusive source of truth for the schema of company

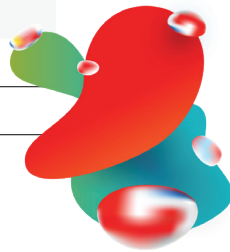
Mapping

Company records in Marketo should be mapped to an equivalent object type in CRM. These are typically referred to as Companies, Accounts, or Organizations, but terminology may vary for different CRMs. Users should be allowed to edit the mappings of Marketo Company fields to CRM Company fields.

The primary key of company records in CRM should be mapped to the externalCompanyId field whenever possible.

Relationships

Object	Relationship Type	Link Type	Link Field
Lead	1:N	Lead Field	externalCompanyId
Opportunity	1:N	Opportunity Field	externalCompanyId
SalesPerson	1:N	SalesPerson Field	externalSalesPersonId



Accessibility

In order to read and write to company records, an API user must have the Read-Write Company permission.

- Companies may be read through a single endpoint, Get Companies by Filter Type. Companies may only be filtered on a limited number of fields, which are provided in the searchableFields attribute of the Describe Company result.
- Companies can be written to using the Create/Update Companies endpoint.
- Companies may be deleted through the Delete Companies endpoint.

Opportunities

Primary Key: externalOpportunityId, marketoGUID

externalOpportunityId is an arbitrary string field which is set upon creation by the external system. It is guaranteed to be unique and is not updateable. marketoGUID is a system generated GUID string which is guaranteed to be unique.

Opportunity objects loosely represent sales deals in Marketo, and are responsible for attributing revenue to leads, companies and programs. Opportunity usage varies between both CRM implementations and organizational implementations, so they may encompass anywhere from a sales deal complete with individual line items to broader records of sales efforts. It may not be possible to accommodate an organization's use cases for tracking sales deals through the implementation opportunities alone, so additional extension through Custom Objects may be required.

To perform proper Revenue Attribution, Opportunities must be linked to leads via roles, and linked to companies via the externalCompanyId field. For information on Revenue Attribution, please see the [Program-Opportunity Attribution](#) section.

Model

Like leads and companies, opportunities have a flexible and user extensible schema, which should be routinely updated through the Describe Opportunity endpoint.

Mapping

In general, the same mapping strategy should be employed for Opportunities as Leads and Companies, but Opportunities have some special-case fields which should be mapped with care:

- The “Amount” field in Marketo is the field from which all revenue calculations are made and should always be mapped to the Opportunity field which represents the estimated amount of the proposed deal before close, and the realized amount of the deal after close.
- The “Revenue Expected” metric is the product of Amount and Close Probability. The Close Probability percentage is multiplied against Amount to return Revenue Expected.
- Stage has a set of calculated values based on the “Closed” and “Won” fields on opportunity records. Closed should be set to true if the sales deal is no longer being pursued, either because the effort failed, or because the deal was won. Won should be set to true only if Closed is also true and the deal has been won. Different CRMs may treat these characteristics differently, and so they may require translation from the system.

externalOpportunityId should be mapped to the primary key in the CRM whenever possible.

externalCreatedDate should be mapped to the CRM system’s canonical creation date for opportunities.

Relationships

Object	Relationship Type	Link Type	Link Field
Company	N:1	Opportunity Field	externalCompanyId
Lead	N:N	Opportunity Role Object	leadId
Program	N:N	See Program-Opportunity Attribution section	See Program Opportunity Attribution section

Accessibility

- In order to read and write to opportunities, an API user must have the Read-Write Opportunities permission.
- Opportunities can be read via the Get [Opportunities by Filter Type](#) endpoint. Like companies, they have a limited set of searchable fields which can be retrieved via the Describe Opportunity endpoint.
- Opportunities may be created or updated via the [Create/Update Opportunities](#) endpoint.
- Opportunities may be deleted through the [Delete Opportunities](#) endpoint.





Opportunity Roles

Primary Key: Compound Key [leadId, role, externalOpportunityId], marketoGUID.

Opportunity roles have a compound key of leadId, role, and externalOpportunityId. leadId and externalOpportunityId are relationship fields to their respective lead and opportunities. To insert a record, or update it via its dedupeFields key, all three fields must be passed in the record. marketoGUID is a unique GUID string, which is system-managed and generate on creation of the record.

Opportunity roles are link objects from lead records to opportunity records. Without this relationship, leads will not be associated to Opportunities in any way. They are also required relationships to perform end-to-end Program Opportunity Attribution.

Model

The schema for Opportunity Roles is non-extensible and should be derived from the Describe Opportunity Role endpoint once. Primary contacts on an opportunity are designated in Marketo by the isPrimary flag on the opportunity role. If the primary contact concept exists in the CRM being integrated, this should be implemented as part of the model and mapping.

Mapping

isPrimary should be matched if there is a concept of primary contacts in the CRM being integrated.

externalCreatedDate should be mapped to the canonical date in the CRM which corresponds to the date that a person became a member of the opportunity.

Relationships

Object	Relationship Type	Link Type	Link Field
Lead	N:1	Opportunity Role Field	leadId
Opportunity	N:1	Opportunity Role Field	externalOpportunityId

Accessibility

- To read and write opportunity roles, an API user must have the Read-Write Opportunities permission.
- Opportunity Roles can be read via the [Get Opportunity Roles by Filter Type](#) endpoint. Like companies, they have a limited set of searchable fields which can be retrieved via the Describe Opportunity endpoint.
- Opportunity Roles may be created or updated via the [Create/Update Opportunity Roles](#) endpoint.
- Opportunity Roles may be deleted through the [Delete Opportunity Roles](#) endpoint.

SalesPersons

Primary Key: externalSalesPersonId, marketoGUID

externalSalesPersonId is an arbitrary string field set upon creation by an external system. marketoGUID is a unique system managed GUID string which is set upon creation by Marketo.

SalesPersons represent an internal entity which has ownership of a set of person records, typically for sales purposes. The information present on these records is used to derive certain formula fields and tokens for lead records in Marketo.

Model

The schema for SalesPersons is non-extensible and should be read once from the Describe Sales Person endpoint.

Mapping

externalSalesPersonId should be mapped to the primary key for the corresponding user or owner object type in the integrated CRM.

Relationships

Object	Relationship Type	Link Type	Link Field
Lead	1:N	Lead Field	externalSalesPersonId
Company	N:1	Company Field	externalCompanyId

Accessibility

In order to read and write to sales persons, an API user must have the Read-Write Sales Person permission.

Sales persons can be read via the Get SalesPersons by Filter Type endpoint. Like companies, they have a limited set of searchable fields which can be retrieved via the Describe SalesPersons endpoint.

SalesPersons may be created or updated via the Create/Update SalesPersons endpoint.

SalesPersons may be deleted through the Delete SalesPersons endpoint.



Extended Synchronized Entities

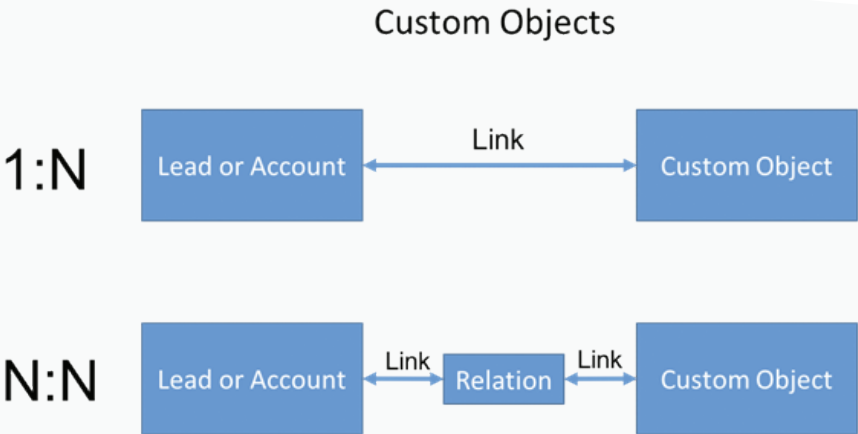
Custom Objects

Primary Key: marketoGUID, Additional User Defined keys

Note: This section refers to Marketo-originated custom objects, not to those sourced from one of the Native CRM Sync Connectors

Custom objects always have a unique system-generated marketoGUID which is set upon creation. There will be at least one additional key, and possibly more, which are user-defined in the custom object definition. Keys may be single fields for types which are linked directly to leads or companies and may have compound keys for types which are linked to leads or accounts and another custom object type. Keys can be determined by using Describe Custom Object to retrieve the list of dedupeFields.

Marketo allows the definition of Custom Object types by users to extend the Marketo schema. Marketo custom objects may be related to leads or companies, in either a one record to many custom object configuration, or a many-to-many configuration through the usage of intermediate custom objects.



Model

The schema for custom objects is dynamic. Each custom object may have any number of fields which may be updated.

Mapping

Custom object mapping should be driven by customer requirements and cannot be rigidly defined in general terms.

Relationships

Marketo Custom Objects may only be related to either leads or companies, in either a 1:N configuration or N:N configuration through the usage of intermediate custom objects. Relationships can be derived from the relationships parameter of the result of Describe Custom Object.

Accessibility

To read and write to custom objects, an API user must have the Read-Write Custom object permission. Custom objects have the standard set of Get, Create/Update, and Delete endpoints. A List Custom Objects endpoint is also provided to give a means of determining what custom object types are available in each subscription.

Activities

Primary Key: marketoGUID, id

Activities have a unique GUID that is set upon creation by Marketo.

Activities are records of activities associated to lead records in Marketo. They may record activity of many different types, as indicated by their activityTypeId. Activities are read-only in Marketo. Certain activity types are pruned after 90 days in the Marketo system outside of the standard data retention policy. Pruned Activities:

- Add to List
- Change Score
- Change Data Value
- Visit Webpage
- Click Link on Webpage
- Sync Lead to SFDC
- Sync Lead to Microsoft
- Sync Lead Updates to SFDC
- Update Opportunity
- Request Campaign
- Email Delivered*
- Send Email*

* Email Delivered and Send Email activities changed from 25 months to 90 days effective August 31st, 2020. More information [here](#).

The types of activities available in each subscription are variable depending on many factors, including type of subscription. The available types and their metadata should always be determined by calling Get Activity Types from the target subscription.

Standard activities in Marketo are read-only and cannot be updated.

Model

Activities have a semi-strict schema. The following fields are defined, but not necessarily used for all activity types:

Name	Datatype	Description
marketoGUID	String	Unique id
leadId	Integer	Id of the linked lead. Maps to id on lead records
activityTypeId	Integer	Id of the type of activity corresponding to a result of Get Activity Types
activityDate	Datetime	Date that the activity occurred
primaryAttributeValue	String	Value of the primary attribute
primaryAttributeValuel	Integer	Id of the primary attribute
attributes	Array	Array of name/value pairs representing the attributes of the activity



Each activity type has a primary attribute which corresponds to a value of some kind. The attribute may be related to any type of asset or object type in Marketo. For example, the `primaryAttributeValue` of the `Visits Web Page` type corresponds to the name or URL of the web page which was visited. The Marketo name will be presented if the page was a landing page, and the URL if it is not a Marketo page. Attributes consists of an array of name/value pairs, naming each of the fields for an activity type and the corresponding value.

Activities may be modeled as either a single object type with an array of attributes, or as individual object types, depending on the requirements or best practices for the external CRM system.

Relationships

Activities in Marketo are always related to lead records through the `leadId` field. Some activity types may have a relationship to other Marketo assets through their `primaryAttributeValue`.

Accessibility

In order to read activities, an API user must have the `Read-Only Activity` permission. To write custom activities the `Read-Write Custom Activities` permission is required.

Activities can be read through the following methods:

- [Bulk Activity Export](#)
- [Get Lead Activities](#)
- [Get Lead Changes](#)
- [Get Deleted Leads](#)

Custom Activities

Custom activities help you track an activity that is outside the Marketo standard out-of-box activities, such those related to form fill, email, or landing page.

Want to track when someone deposits a check? Use a custom activity. Want to keep tabs on when someone attends a webinar? Use a custom activity.

Reference the documentation on Custom Activities [here](#). Custom Activities may be written through the Custom Activities endpoint documentation referenced [here](#).

Programs

Programs in Marketo are both a primary organizational asset and a key attribution component. Programs are representational of high-level marketing strategies, individual marketing tactics, and operational workflows. Each program may encapsulate marketing collateral, and Smart Campaigns/workflows. Opportunity-related revenue is attributed to programs based on a lead's relationship to a program, represented either by the `Acquisition Program lead` field, or by a lead's program membership in that program.

It is a common practice in CRM integration for a program not to be directly represented in CRM but to be translated to another type of object. For example, in Marketo's native SFDC synch, the Program is mapped to the Campaign type, and the Program's membership is mapped to the Campaign Membership type.



Model

The schema for programs is mostly static. The number of fields available for program records will not change, but the Channels and Tags have user customizable values, which should be modeled if choosing to allow creation of new programs from CRM to Marketo. A program will have the following fields:

Name	Datatype	Description
id	Integer	Unique id of the program
name	String	User-defined name
description	String	User-defined description
createdAt	Datetime	Date of creation
updatedAt	Datetime	Date of last update
url	url	Url of the program in the subscription
type	String	Type of the program, one of: Default, Event, Event with Webinar, Nurture, or Email
channel	String	Channel of the program. Defines acceptable statuses for program membership
folder	Object	Parent folder of the program.
status	String	Status of the program.
workspace	String	Parent workspace of the program
tags	Array	Array of user-defined tags. Tags provide customizable information for programs.
costs	Array	Array of costs. Used to define costs related to running a program.

Mapping

The CRM to be integrated may have an object type which maps to the Marketo program naturally. Programs broadly represent marketing efforts and are linked to leads through the Program Membership object which defines the lead's status, and success in the marketing effort.

Relationships

Programs are related to leads through the Program Membership object. Programs also have other relationships to assets which are not pertinent to the discussion of CRM integration.

Accessibility

To read programs, the Read-Only Asset permission is required. Programs can be read through Browse Programs, Get Program by Id, Get Program by Name, and Get Program by Tag Type.

To write programs, the Read-Write Asset permissions is required. Programs can be created through Create Program, can be update through Update Program, cloned through Clone Program, and Deleted through Delete Program.

Program Membership

Primary Key: Compound [Id of Program, Id of Lead]





The primary key for program membership is a unique compound key of the id of the linked program and the id of the linked lead. There may only be one program membership record for each unique pair.

Program Membership represents a lead's relationship to a program and their status in that program. IN addition, Program Member custom fields allow you to collect/specify program-specific data for each member. They can be used in: Marketo forms, Smart List filters and triggers, and Smart Campaign flow actions, and API calls. The data is viewable in the Program Members tab.

Model

Program Membership has a strict schema. In relation to CRM some fields may be considered optional depending on customer requirements. Stream, isExhausted and nurtureCadence will only be populated when the membership record is related to a Nurture Program and may not have external relevance.

Name	Datatype	Description
progressionStatus	String	Status of the lead in the parent program
Stream	String	Name of the stream that the lead is a member of
nurtureCadence	String	Cadence of the lead in a nurture program. Either Normal or Paused
isExhausted	Boolean	Whether the lead is exhausted in its current Nurture Stream
acquiredBy	Boolean	Whether the lead was acquired by the parent program
reachedSuccess	Boolean	Whether the lead is in a success status in the parent program
reachedSuccessDate	Datetime	The date that the lead became successful in the program
membershipDate	Datetime	The date the lead became a member of the program
Program Member Custom Fields	As Defined	Program Member Custom Fields defined in Marketo Admin for Field Management

The id of the parent program and of the parent lead are not explicitly returned by Get Leads by Program Id, but are inferred by the given program id, and the returned parent lead.

Mapping

Like programs, program membership may have a natural mapping to an existing object type but may also need to be represented by a custom object type in the integrated CRM.

Relationships

Program membership is related to programs and leads by their respective ids.

Accessibility

Reading and writing program membership requires the Read-Write Lead permission. Program membership may be read through Get Leads by Program Id and written through Change Lead Program Status.



Static Lists

Primary Key: id

Static lists have a unique system-managed integer id which is set at creation.

Static lists represent arbitrary groupings of lead records in Marketo. Static lists can be created by users using the UI or programmatically via REST API. Static lists may or may not be important in external systems depending on customer requirements and have an extremely broad set of usages. Static lists are used to flexibly represent groups of people.

Model

Static lists have a strict schema defined below.

Name	Datatype	Description
Id	Integer	Unique Id
Name	String	User-defined name
Description	String	User-defined description
programName	String	Name of the parent program if applicable
createdAt	Datetime	Date the list was created
updatedAt	Datetime	Date the list was last updated

List Membership is defined as a simple record containing the id of the parent list and the id of the parent lead.

Mapping

Static lists and their membership may have a natural corollary in the targeted CRM.

Relationships

Static lists are related to leads through the list membership object containing the id of both the lead and the list.

Accessibility

Marketo offers a set of REST APIs for performing CRUD operations on static lists. These APIs follow the standard interface pattern for asset APIs providing Query, Create, Update, and Delete options. Reference the complete set of functions available [here](#).

Synchronization

Configuration

To maintain the best possible performance, a set of configuration options should be presented to administrative users.

Synchronized Fields

Not all fields need to be mapped and synchronized between Marketo and an associated CRM system. Admin users should be presented with the option to enable or disable synchronization of specific fields for each entity type where this is appropriate (Leads, Companies, Opportunities, Custom Objects). Only specialty fields as discussed in the entities section should be mandatory for synchronization, while all others should be optional. Reducing the number of synchronized fields will improve synchronization performance in all cases.

Synchronized Custom Objects

Not all custom objects need to be mapped and synchronized between Marketo and an associated CRM system. Admin users should be presented with the option to enable or disable synchronization of Custom Objects and be made aware of any manual data extension which needs to occur in the CRM prior to enablement of synchronization. Where possible, your server should perform automatic provisioning of associated custom objects in the CRM for objects where bootstrapping from Marketo to CRM is being performed. In the case that this is not available, manual and flexible mapping should be permitted to available types and fields. For CRM-to-Marketo synchronization, the definition should be derived from the type in CRM.

Synchronized Activity Types

Many activity types do not have any relevance in a CRM system and should not be synchronized ever, while others may or may not be needed on a client-by-client basis. Admin users should be able to select which types are and are not synchronized to limit API call usage and improve synchronization performance.

Bootstrapping Configuration

An admin user or implementer upon initial configuration should be able to configure which set of fields and record types need to be retrieved from Marketo. An option should also be given to these users allowing them to configure earliest date, or "low watermark," from which to synchronize for each record type. Initial synchronization time can often be reduced dramatically by setting a more recent low watermark.

Synchronization Interval

Marketo's native synchronization connectors queue a new batch of pushes and pulls five minutes after the completion of the previous batch. This covers a great deal of cases and strikes an acceptable compromise between relatively low synchronization latency, and utilization of API calls. For your solution, you should base the synchronization interval based on how many API calls a typical synchronization cycle will take. For accounts provisioned or renewed after June 2018, the default number of API calls per day is 50,000 with optional additional API calls purchased in groups of 10,000/day; the bulk extract allocation is 500MB/day by default.

The number of changes that a client expects to occur for their lead records and their synchronized activities will be the greatest influence on the cumulative number of API calls which will be used in a given day, and this should influence your design. Your baseline for continuous synchronization where no changes are retrieved in any given cycle generally should not exceed 7,500 calls per day.





Bootstrapping from Marketo

If there is existing data in a Marketo subscription which will be required for future use in the corresponding CRM system, then this data should be retrieved from Marketo for the primary objects Leads, Companies, Opportunities, Roles, and SalesPersons.

Bootstrapping should be performed separately from and prior to initiating continuous synchronization, as sometimes bootstrapping will not be necessary at all. Bootstrapping from Marketo should only be performed if the client indicates that there is existing data for a given type in Marketo. Wherever possible, the retrieval should also be focused to the smallest possible set of data required.

Leads

The most efficient way to retrieve lead data is by using Bulk Lead Extract functionality. In order to use this process, the destination instance must have the Marketo Corona Smart List processor enabled. If this was not provisioned initially, it can be enabled by a request to our support team. The typical process to bootstrap lead records is as follows:

- [Create a new Bulk Lead Extract job](#), using the createdAt filter type, setting your low watermark to a date prior to the creation of the target instance, and a high watermark 31 days later. Low watermarks need never be set prior to 2007-01-01.
- [Enqueue the job](#)
- [Poll the status of the job](#) until the status is "Completed"
- [Retrieve the resulting file](#)
- Repeat these steps until the complete set is retrieved

Companies

The necessity to bootstrap company records from Marketo will be rare as of this writing in June 2018.

Companies should be bootstrapped on the basis of the presence of externalCompanyId on bootstrapped leads. The typical process is as follows: Call Get Companies with filterType of idField. filterValues should be sets of up to 300 values taken from the externalCompanyId fields of the Leads already obtained.

Opportunities and Roles

It should be noted that it is not at all ideal to bootstrap opportunities from Marketo. If there is another available data source to retrieve this data, it is likely the source that should be used, as Marketo does not originate Opportunity data from within the application.

Bootstrapping Opportunities and roles should be done based on the data present in the Add to Opportunity activity type. The typical process to bootstrap opportunities and roles is as follows:

- [Create a new Bulk Activity Export job](#) for the "Added to Opportunity" activity type, with an appropriate low watermark, and a high watermark 31 days later.
- [Enqueue the job](#)
- [Poll the status of the job](#) until the status is "Completed"
- [Retrieve the resulting file](#)

- Repeat these steps until the complete set is retrieved
- The resulting set of opportunities should be retrieved with Get Opportunities based on the available Oppty ID in the activity results, using idField as the filterType.
- If required the role records should be retrieved with Get Opportunity Roles, based on the leadId, role, and Oppty Id fields, using dedupeFields as the filterType.

SalesPersons

The necessity to bootstrap salesperson records from Marketo will be rare as of this writing in June 2018.

Salespersons should be bootstrapped on the basis of the presence of externalSalesPersonId on bootstrapped leads. The typical process is as follows: Call Get Salespersons with filterType of idField. filterValues should be sets of up to 300 values taken from the externalSalesPersonId fields of the Leads already obtained.

Custom Objects

Bootstrapping custom objects from Marketo should be carefully considered. Marketo currently does not expose the ability to pull incremental updates from Marketo custom object records, so the option may present limited usefulness.

The method of bootstrapping from Marketo will depend on the definition of the object. For 1:N relationships with leads or accounts, there will only be one object type to retrieve. For N:N relationships there will be two types. Refer to the Entities section for more specific information on Custom Object definitions.

The typical process for retrieving custom objects is as follows:

- [Create a new Bulk Activity Export job](#) for the "Added to {Custom Object}" activity type, with an appropriate low watermark, and a high watermark 31 days later.
- [Enqueue the job](#)
- [Poll the status of the job](#) until the status is "Completed"
- [Retrieve the resulting file](#)
- Repeat these steps until the complete set is retrieved
- Call Get Custom Objects based on the keys retrieved from the activities. This will need to be cross-referenced to the corresponding Describe Custom Object result.

Programs and Membership

Note: If implemented, it is recommended that membership for programs only be synchronized on an on-demand basis.

To retrieve all programs from Marketo, the client simply needs to call Browse Programs and page through the results by incrementing the offset parameter. Programs may also be synchronized incrementally by passing the earliestUpdatedAt and latestUpdatedAt, to reduce the data set to only those programs updated during the given time range.

To retrieve all membership from Marketo, the client needs to call Get Leads by Program Id for each synchronized program and page through each result set, retrieving the information in the child membership object

Activities

The typical process for Bulk Activity Export is as follows:

- [Create a new Bulk Activity Export job](#) with an appropriate low watermark, and a high watermark 31 days later.



- [Enqueue the job](#)
- [Poll the status of the job](#) until the status is "Completed"
- [Retrieve the resulting file](#)

Lists and Membership

To retrieve all Lists from Marketo, the client needs to call Get Multiple Lists and page through the result set until the end.

To retrieve all list membership, the client needs to call Get Multiple Lists by List Id for each synchronized list, and page through the result set.

Recommended Bootstrapping Order

1. New Lead Activities since instance creation
2. Lead Records by leadId for New Lead Activities
3. Company records by externalCompanyId from Leads
4. Add to Opportunity activities
5. Opportunities by Opportunity ID from activities
6. Opportunity Roles by leadId, externalOpportunityId, and role from activities
7. SalesPersons by externalSalesPersonId from Leads
8. Other record types as required



Maintaining Synchronization

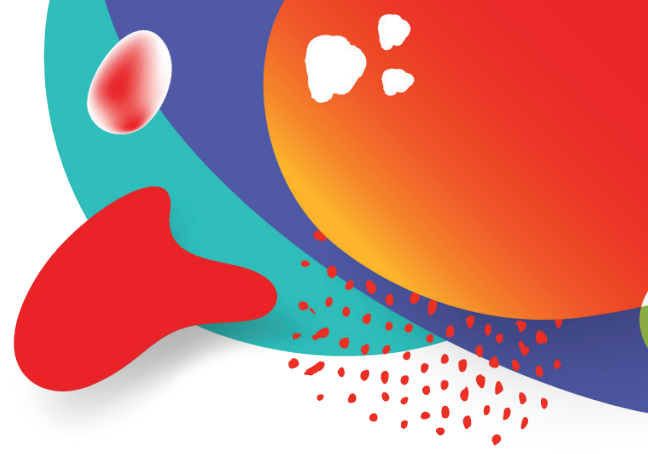
The simplest and most consistent way to maintain continuous synchronization is to implement a polling process which retrieves changes to records in Marketo and pushes them to CRM and then from CRM and pushes them to Marketo, and then repeats the cycle after a predetermined period each time.

To retrieve changes from Marketo, two high watermarks must be maintained, one for changes to lead/company records which have occurred since the most recently retrieved change, one for the activities which have occurred since the most recently retrieved lead activity. If multiple queues are maintained for different activities, a separate high watermark is required for each queue. These are datetime values. When retrieving leads or activities in a subsequent synchronization cycle, the exact datetime of the most recently created record should be used. Since Marketo maintains only per-second and not per-millisecond resolution for datetimes, it is possible that activities may occur with the same datetime as the high-watermark. This will result in retrieval of duplicate activities which may be safely ignored based on the id of the activity.

Recommended Synchronization Order

1. Create and Update Salespersons
2. Create and Update Companies
3. Create and Update Leads
4. Get Leads and Companies

5. Get Lead Merges and Deletions
6. Get Lead Activities
7. Delete Leads
8. Create and Update Opportunities
9. Create and Update Roles
10. Delete Roles
11. Delete Opportunities
12. Delete Companies
13. Delete Salespersons
14. Create and Update Custom Objects



Leads and Companies

Synchronization for Leads and Companies is maintained primarily using [Bulk Lead Extract](#) functionality to retrieve records which have been updated during a specific time range, using the `updatedAt` filter. The `startAt` value of the filter should be the value of the high watermark from most recent sync cycle.


In addition to lead record updates, in order to maintain synchronization, the Merge Lead and Delete Lead activities must be retrieved in order to account for lead records which are merged together. The merge activity indicates that two records have been merged into a single record. The CRM may or may not choose to honor the merge/delete, delete the losing record and retrieve the changes from the winning lead, or it may be ignored and have a “Deleted in Marketo” flag set to indicate that the Marketo Lead ID for that record is no longer valid.

For implementation details on retrieving activities, see the section on [Activities](#).

As part of a standard synchronization cycle, changes from the CRM should also be retrieved. Ideally only fields which have been updated since the most recent synch cycle should be retrieved, but this may not be possible given the constraints of the system. If this is available, all the changes for a given record should be aggregated into a single lead record prior to submission to Marketo. If a changes-only option is not available, then it is viable to retrieve the whole record with all of the Marketo-mapped fields for submission to Marketo.

To push changes for lead records, there are two options, the Bulk Import Lead API and the Create/Update Leads endpoint. Import Lead is the preferred option and allows a CSV file of leads as rows to be submitted into Marketo for creation or update, which may be up to 10MB in size. Create/Update lead allows for the input of up to 300 lead records as JSON. There are advantages to either one. Import Lead is asynchronous and has a higher total throughput but requires an individual polling implementation to check on the status of the import, and it shares a queue with Marketo list imports, so it is possible for the call to remain enqueued for a significant period of time, resulting in a great deal of latency. Create/Update Lead offers much faster feedback but will consume significantly greater numbers of API calls to import large numbers of leads per batch as it may only submit up to 300 records per call.

In either case, for incremental syncing of updates from CRM, the `lookupField` should be specified as the primary key selected from the CRM system, and the `createOrUpdate` mode should be used when using Create/Update lead. This allows sharing of the same queue by net new leads and lead updates which need to be pushed into Marketo.



In the case that a Marketo Lead is linked to a company record via `externalCompanyId`, commonly conceptualized as a Contact, the company type fields that were part of the lead record are no longer writeable through the lead record and are deferred to the linked company record

Companies

It is important to determine which fields are Company-type fields, and which fields are Lead-type fields. This can be done with the Describe Company endpoint. All fields listed there are Company-type fields, of which most are mirrored as lead fields for unlinked leads. If a Company-type field is reflected in a Change Data Value operation, then the change can be reflected against the company record in CRM if the change was made against a lead which is linked to a company record via `externalCompanyId`. If not, the change should just be reflected against the lead record.

SalesPersons

Note: In a single-CRM case Sales Person records should be managed by the CRM itself, so these records should not be pulled from Marketo after the bootstrapping process.

Sales Person records should be created or deleted in Marketo whenever a corresponding event occurs in the CRM system. This check should be performed by the integration software upon every sync cycle to see if changes are required. In the event that a salesperson record requires deletion, all leads which have that salesperson's `externalSalesPersonId` must have that value changed to a new value or have the value set to null before the record can be deleted.

Synchronization of lead ownership should be performed as part of lead synchronization via the `externalSalesPersonId` field.

Opportunities and Roles

Note: In a single-CRM case it is exceedingly rare for Opportunities and Roles to be created by non-CRM sources. It is unlikely to be a requirement to pull these types of records from Marketo.

Opportunity and roles records should be created, updated, or deleted whenever a corresponding event occurs in the CRM system. This should be performed as part of a routine sync cycle. If an opportunity requires deletion, all of its child role records must be deleted prior to its deletion. The order of operations for opportunities should be as such:

1. Create and Update Opportunities
2. Create and Update Opportunity roles
3. Delete Opportunity Roles
4. Delete Opportunities

Activities

The most efficient method to retrieve lead activities is by leveraging the [Bulk Activity Extract APIs](#). The high watermark from the most recent activities sync cycle should be used as the `startAt` value for the job.

Activities are used to retrieve incremental data regarding custom objects and opportunities.

Custom Objects

To perform Marketo to CRM synchronization of custom objects, the “Add to {Custom Object Name}” activity must be retrieved, and the corresponding records retrieved with the Get Custom Objects endpoint. Custom Objects may have different relationship types which need to be modeled. For more information, please see the [Custom objects](#) section in Entities.

Ingestion of custom objects should be performed using [Bulk Custom Object Import](#).

Lead Conversion

The meaning and representation of lead conversion can vary widely across different CRM systems. Marketo does not take a strongly opinionated stance on lead conversion, and largely defers this to the associated CRM, treating both lead and contact records as the same record type. There is only one significant variation between a lead and a contact record in Marketo which is the association to a Company record via the externalCompanyId lead field. This causes company type fields to be deferred to the company record. Here is a typical set of actions undertaken when reflecting a CRM conversion in Marketo. Depending on the system being used, these processes may require modification to account for differences.

Converting a Lead to a Contact in a new Company

1. Update the foreign key field used for CRM to reflect the new ID if appropriate
2. Create a new corresponding company record in Marketo
3. Associate the existing person in Marketo to the new company via the externalCompanyId field.
4. Update the externalSalesPersonId field if necessary
5. Update any contact-only fields which have been populated
6. Clean up any Custom Objects that are only connected to the deactivated lead record

Converting a Lead to a Contact in an Existing Company

1. Update the foreign key field used for CRM to reflect the new ID if appropriate
2. Associate the existing person in Marketo to the new company via the externalCompanyId field.
3. Update the externalSalesPersonId field if necessary
4. Update any contact-only fields which have been populated
5. Clean up any Custom Objects that are only connected to the deactivated lead record

Converting a Lead into an Existing Contact Record

1. Merge the lead record with the corresponding winning record in Marketo

Program-Opportunity Attribution

Marketo’s most important attribution model is based on the relationship between Leads, Programs and Opportunities, where programs represent some level of unified marketing effort, and opportunities represent sales deals. These relationships are inferred, and the amount of money earned in the closure of an opportunity is attributed to the associated marketing effort, one or more programs, through the associated leads’ program



membership record. Marketo has two forms of attribution which have related but distinct methods of attribution, First-Touch (FT), and Multi-Touch (MT). Care should be taken to ensure that the relevant fields for opportunities and leads are mapped correctly to provide for proper revenue attribution of opportunities.

First-Touch Attribution (FT)

First Touch attribution is meant to indicate the programs which are most effective at acquiring leads which convert to won opportunities. This is done by designating acquisition program and acquisition date for a lead record and a few other requirements:

- The lead must have an acquisition program
- The lead's acquisition date must occur before the CreatedDate of the Opportunity
- The lead must reach success in the program

Meeting these prerequisites will give first-touch attribution to the program for Opportunities associated to the lead. These requirements alone should populate the Cost of Opportunity (based on Program Cost), Pipeline Created, Pipeline Created (Still Open), and Revenue Expected measure in a Program Opportunity Analysis report. (Each of these is dependent on the Amount field, Amount in SFDC and Estimated Revenue in MSD).

To populate the Revenue Won and Revenue to Investment metrics, the Opportunity must be in Stage "Closed Won."

Multi-Touch Attribution (MT)

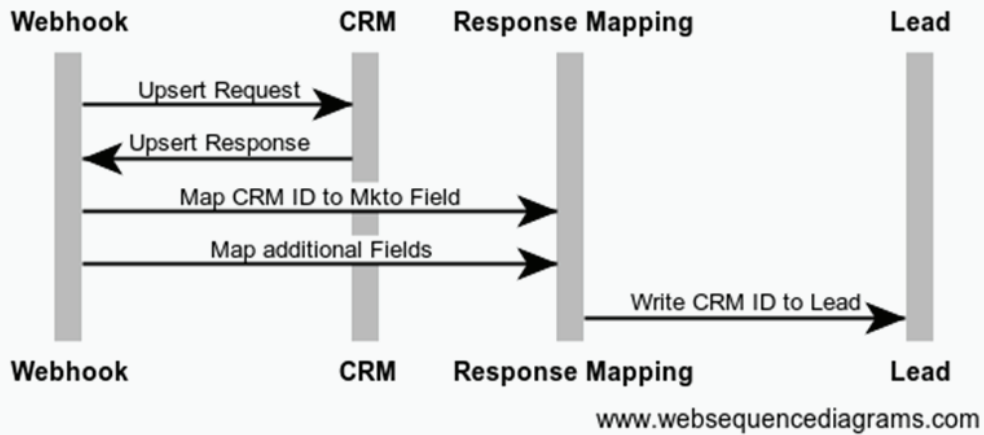
Multi-Touch Attribution is used to indicate the usefulness of a program in generating potential deals(opportunities) from existing leads/contacts and closing existing opportunities. There are two slightly different forms of attribution because of this.

An opportunity with have its Pipeline and Opportunities Created measures attributed via MT to a program when a lead reaches success in that program prior to the Created date of the opportunity. This is used to determine the efficacy of a program for generating potential deals from existing leads.

An opportunity will have its Revenue Won, Opportunities Won, and Revenue to Investment attributed to a program via MT when a lead reaches success in a program between the Created Date and the Close Date of an Opportunity. This is used to determine the efficacy of a program in closing deals.

On-Demand Synchronization

Clients often require the ability to perform on-demand synchronization of lead records from Marketo to their CRM system. This allows marketers to fast-track leads to sales which have performed a behavior which indicates urgency in their sales process with a very low latency, allowing sales to act quickly on high priority leads. Marketo implements this as flow steps for its native CRM connectors, and they have very widespread utilization. To implement this for a non-native system, Marketo has Webhooks. Marketo's webhooks allow GET and POST calls to external systems with arbitrary URLs, Headers, and Bodies. Your system will need to expose a public endpoint with a well-defined serialization format to receive lead records as payloads and transmit them to the corresponding CRM. Your serialization format should be either a JSON or XML format, as these are the encoding types supported by webhook payloads.



Webhooks are defined in the Admin section of a Marketo instance, and when defined are exposed as flow steps which can be executed by smart campaigns. When a webhook flow step executes, it populates any lead data indicated by the tokens in template and transmits the HTTP request as defined.

For specific information on defining a webhook, [see here](#).

Marketo Data Retention Policy

To enable Marketo to meet the performance demands of its customers, Marketo has a standardized Data Retention Policy used across the platform. This policy applies to the activities stored in the activity logs of people in your database. You can read more about this policy [here](#).



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