Arc Integration Guide

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Contents

Overview

Arc provides tools to measure and score the operational performance of spaces, buildings, and places.

The platform allows authorized apps to interact on behalf of authorized users with the data stored about their projects within the platform.

The API provides access to data for the following four types of projects:

- Buildings (including spaces, such as commercial interiors)
- Cities
- Communities
- Transit

The API provides access to the following:

- Basic project details
- Performance scores
- Meters (e.g., energy, water) for Buildings and Transit
- Rendered plaque animation
- Analysis and reporting
- Embeddable surveys for Buildings and Transit

Score data requirements

Read more about the Version 4.1 data needed to generate a performance score for a:

- Building project.
- Transit project. Transit projects are a type of Building project, with different data requirements for the Human Experience category score.
- Cities or Communities project.

Legal

The Arc platform encourages and invites other companies, software developers and data partners to utilize the API and create a better experience for our users. We also believe strongly in upholding privacy and security of our users' data. In order to ensure that all parties involved in data handling for our users are using best practices for security, privacy

and user preferences, we ask that any entities developing tools on behalf of a customer first contact us and establish a business relationship with an agreement that covers these points.

Developers working directly for a customer whose data is being interchanged can start right away.

Process

Outlined below is a typical process. Not all steps apply to all integrations, but this should give a good sense of what to expect.

Action	Owner
Review integration guide	Partner
Checkpoint call to answer any questions	Partner and Arc
Sign business agreement	Partner
Sign up at developer.usgbc.org and subscribe to Arc data dev products	Partner
Create test user account	Arc
Review documentation	Partner
Checkpoint call to answer any questions	Partner and Arc
Announce partnership (PR)*	Partner and Arc
Develop integration against Arc API (QAS)	Partner
Perform QA on partner integration	Partner and Arc
Enable Production access and switch connection to Production	Partner and Arc
Set up partner info in Apps section*	Arc
Announce partnership (PR)*	Partner and Arc
Ongoing updates and partner communication	Arc

* Items marked with an asterisk are optional for customers directly using the API. A partner is an entity that will serve multiple customers.

Getting Started

This section provides a high-level summary of actions needed to work with performance data, and the sections that follow go into each concept in more detail. More detailed documentation can also be found at developer.usgbc.org, which can be access using below access.

Please create an account at developer.usgbc.org and subscribe to Arc data dev APIs. Once you have a subscription, you can get a subscription key. This subscription key is required to use any API and is used to differentiate you from any other partner. You will also

be able to go through details of each and every API using your developer account. You would also need a test user account to create a few test projects at **qas.arconline.io** in our development environment, and then use these projects through API for your development. If you don't have a user account or are not able to subscribe to Arc data development APIs, please reach out to the Arc team.

You start by authenticating the user and retrieving the list of projects that the user has access to. From this list, you can choose the specific project you wish to work with. If this is a project you will be interacting with regularly, we recommend that you map the LEED ID of this project in your application to minimize the calls required to identify the project.

Once you have the ID, you can retrieve a list of available meters for a building project. For each meter ID, you can retrieve data (as interval readings), or submit data. Data submission can include multiple readings in one POST, packaged as a JSON array.

Once data is submitted, you can invoke a score recomputation manually. If this is not done, the system will recompute scores through its batch processed jobs, which can take up to a few hours depending on the queue size. Manual invocation will recompute the score within 5 minutes. This is recommended if you send data in batches. However, if your system sends a continuous stream of data, then manual invocation is not necessary, and you can let the background jobs perform the recompute action.

Authentication

All requests are authenticated using a combination of an OAuth 2.0 style bearer token and an API subscription key. The API subscription key is generated and managed through the Azure platform. The token is retrieved using the login service.

All operations are performed on behalf of a user, and not as an authorized app. If a user does not exist, they must first create a user account on the USGBC.org website.

The API will check the basic credentials to determine which projects they may access. The user information also determines which resources you can modify using PUT and POST requests.

Buildings and Transit

The API treats each individual entity as a building. You will see the terms 'project' and 'building' being used interchangeably in various places. For the purposes of the API, a project and a building are interchangeable if you have the unique ID associated with it. This ID is usually in the form of "LEED:" in the URL or responses.

Cities and Communities

The API treats each individual entity as a place. For the purposes of the API, the term 'project' is interchangeable with both 'city' and 'community' if you have the unique ID associated with the place. This ID is usually in the form of "LEED:" in the URL or responses.

Performance Scores

Arc presents scores via the API for all project types. The request can include a parameter to specify a historical time for which you need the score.

The score includes the scores for each individual category (or "racetrack") - Energy, Water, Waste, Transportation, and Human Experience – and the maxima for each racetrack.

Meters

For buildings, all energy, water, and indoor air quality data is collected in the form of meters. A building can have multiple meters associated with it, and meters are distinguished by the Type ID. Each meter will capture time-series data with a start time, end time, and reading.

For energy and water, the reading is a consumption value (i.e., total consumption within the supplied time period). For example, if the total energy consumed in a day is 100 units, then you can provide this information in the following ways:

Method 1

This example shows one reading of total consumption over a 24-hour period.

```
[{
        "start_date": "2015-03-01T00:00:00+05",
        "end_date": "2015-03-02T00:00:00+05",
        "reading": "100"
}]
```

Method 2

This example shows the same consumption provided as 4 readings over a 6-hour period each.

```
[{
        "start_date": "2015-03-01T00:00:00+05",
        "end_date": "2015-03-01T06:00:00+05",
        "reading": "20"
},
{
        "start_date": "2015-03-01T06:00:00+05",
        "end_date": "2015-03-01T12:00:00+05",
        "reading": "25"
},
{
        "start_date": "2015-03-01T12:00:00+05",
        "end_date": "2015-03-01T18:00:00+05",
        "reading": "30"
},
{
        "start_date": "2015-03-01T18:00:00+05",
        "end_date": "2015-03-02T00:00:00+05",
        "reading": "25"
}]
```

Similarly, readings can be provided in high resolution, down to 1 second intervals (at the risk of transferring a large data volume), or aggregated up to a few hours, days, weeks, or even months, depending on the application capabilities and tradeoff with the data volumes.

Key Concepts

Treatment of Time

Internally, all data are represented using a full date + time representation with a resolution of seconds. Much of the data is interval data; that is, it applies to a time region rather than a point of time; examples include a meter reading for a month, or a carbon dioxide measurement sampled over a 15-minute interval.

To represent this data, all measurements are associated with both a start_date and end_date value. These are both nominally full date + time values. If the intention is for it to apply to a date, the time portion should be set to zero (e.g., 2013-02-01T00:00:00+5); this is inferred if only a date string is provided. These values are represented using ISO8601 formats in all cases.

The range of time referenced by a start_date, end_date pair include the time point encoded by start_date, but do not include the point encoded by end_date (the range is [start, end).) We often write these as a tuple (start_date, end_date).

To represent an entire day in January, you would use, for instance, (2013-01-01, 2013-01-02). Because the end range excludes the point itself, the last point in that range would be 2013-01-01T23:59:59 as desired.

A similar strategy works for months; for instance, the month of January 2013 would be represented by (2013-01-01, 2013-02-01).

Full datetimes are supported; for instance, the first fifteen minutes of a day would be (2013-01-01T00:00:00, 2013-02-01T00:15:00).

As a best practice, all timestamps should include time zone specification. This is not a requirement for data to be acceptable, but exclusion of time zone information introduces the risk of misinterpreting time zone as it'll be assumed to be the same as building's physical location.

Fuel Types

Each meter is associated with a fuel type indicating the underlying quantity the meter is tracking. The 'Resource' section in the developer portal contains a list of valid fuel types. In the case of electricity, the fuel type also includes the grid or renewable source of the electricity. Since each fuel type is associated with a set of emissions coefficients specific to that grid or renewable source, you should attempt to provide the correct eGrid region and not just the national average.

If you do not know the eGrid region, or your region is not listed in the available sources, please contact us to identify or add yours.

Rendered plaque animation

For every project type, the Arc platform provides an animation of the performance score racetracks, including total performance score in the middle.

This is an example of the animation for a certified Building project:

https://app.arconline.io/plaque/1000000117/1960ea90d643eb54e19be82b

This is an example of the animation for a non-certified Cities project:

https://app.arconline.io/plaque/1000096264/KM7RCVfeqDWAMHe0ajAGVNlZ

Analysis and reporting

The Arc platform provides analysis of data for all project types, as well as at an aggregated level for a portfolio of Buildings.

Surveys

The Arc platform makes it possible for Buildings and Transit projects to survey users of a building. The survey provides anonymous data on Commuting patterns and users Satisfaction and uses this data to calculate the Transportation category score and the Human Experience category score, respectively.

The Re-Entry section includes separate surveys for facility managers and occupant experience. These surveys contribute to the Re-Entry Comprehensiveness score. They do not contribute directly to the Arc Performance Score.

API Documentation

More information about Arc API's is available on the developer.usgbc.org website. This website allows users to:

1. Learn more about each end point.
2. Generate a subscription key.
3. Test APIs in a development environment.

There are two types of accounts, including:

1. *A developer account* manages Arc API subscriptions
2. *A user account* automates the exchange of data between Arc and a partner.

Get started:

1. Sign up for a developer account from developer.usgbc.org.
2. Request a user account from contact@arcskoru.com