

# Connecting to John Deere JDLink Machine Data API Using Esri GeoEvent Server

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## Introduction

This document provides instructions for consuming data from the John Deere data APIs using the Esri ArcGIS GeoEvent Server application.

The instructions in this document were created using the John Deere references below.

- <https://developer.deere.com/#!/help&doc=.%2Fgetstarted%2FHELPguides.htm&anchor=>
- <https://developer.deere.com/#!/help&doc=.%2Ffaq%2FHELPFAQMJDPostman.htm&anchor=>

## ArcGIS GeoEvent Server

[ArcGIS GeoEvent Server](#) extends the capabilities of your enterprise GIS with support for Real-Time GIS. GeoEvent Server enables real-time data streaming and analytics in your everyday GIS applications, workflows, and analyses. Use GeoEvent Server to:

- Extend existing GIS data and IT infrastructure with support for real-time event processing.
- Incorporate data received from real-time events into your ArcGIS Enterprise workflows.
- Perform continuous processing and analysis on streaming data as it is received in real-time.
- Store large volumes of data from real-time observations in the spatiotemporal big data store.
- Visualize large volumes of real-time observations using dynamic on-the-fly data aggregations.
- Notify those who need to know about patterns of interest with updates and alerts in real-time.
- Produce new streams of data that can be leveraged throughout the ArcGIS platform.

Commercial organizations, transportation managers, defense and intelligence analysts – anyone with a need to leverage streaming data – can use GeoEvent Server to receive, analyze, and produce streaming data from a variety of sources including mobile devices, in-vehicle GPS devices, sensor networks, online social media, RFID tags, environmental monitors, and more.

## Assumptions and Limitations to this Approach

The intended audience for this tutorial is those who have worked with GeoEvent Server. If you have not used GeoEvent Server before, it is recommended you start with the Introduction to GeoEvent Server tutorial available, along with other tutorials, on the [ArcGIS GeoEvent Server Gallery](#). The introduction tutorial provides a foundation for the concepts highlighted below.

This document was developed against ArcGIS GeoEvent Server version 10.7.

**NOTE:** There is a limitation in the John Deere API that only allows you to access 100 equipment records at a time via **Pages**. The page is added to the end of the URL that you request data from. If you have more than 100 pieces of equipment you will need to create a new GeoEvent Input for each set of 100 equipment records, where each input requests a batch of 100 equipment records. For example:

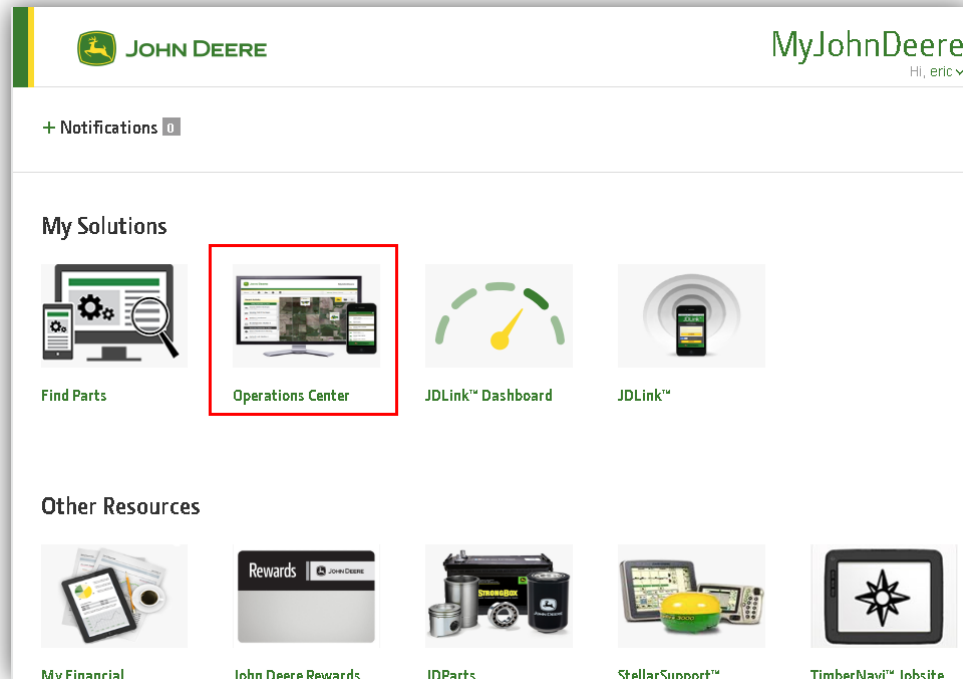
- Input 1: Equipment records 1-100 <https://sandboxapi.deere.com/aemp/Fleet/1>
- Input 2: Equipment records 101-200 <https://sandboxapi.deere.com/aemp/Fleet/2>
- Input 3: Equipment records 201-300 <https://sandboxapi.deere.com/aemp/Fleet/3>
- ...

## Create An Application Account on MyJohnDeer

Create an Account (skip if you already have one)

1. If you do not have a MyJohnDeere account, create one here.  
<https://myjohndeere.deere.com/wps/portal/myjd/registration?requestFlow=myjdlogin>
  - a. Fill in both pages of the registration form, and then click the yellow "Submit" button.
2. Check the e-mail account you used when registering.
  - a. You will have a new e-mail from [do-not-reply@johndeere.com](mailto:do-not-reply@johndeere.com).
  - b. Click the yellow **Validate Profile** button in this e-mail.
3. The My John Deere sign-in form will open again, in a new window with your new username already entered in.
  - a. Enter in your password and log in to your new account.
4. Click the yellow **Continue Validation** button.
  - a. Problems? See the account help page.

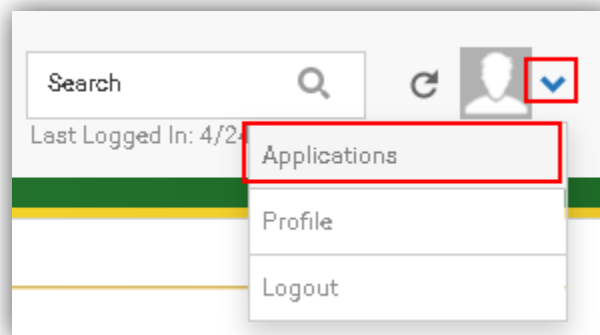
5. Log into **Operations Center** and create an organization.



6. Open a browser and navigate to <https://developer.deere.com>
7. Accept the terms and conditions to confirm your Deere Developer account.

### Create an Application on Developer.Deere.Com

1. Open a browser and navigate to <https://developer.deere.com> and sign in.
2. Click on the down arrow next to your avatar in the top navigation pane and select **Applications** from the drop-down menu.



3. Click on the **Add Application** button.



4. Enter your application information.
  - a. At minimum, you must fill out an **App Name** and **Version ID**.
  - b. The **App Name** field can be anything that makes sense to you.
    - i. Please use a name that describes your company and/or product.
    - ii. Do not use names like "test" or "test app".
  - c. The **Version ID** field can be anything that makes sense to you.
    - i. It does not need to be any specific format.
  - d. While **Description** isn't required, you should add one anyway
  - e. Click the **Finish** button in the bottom right corner of the window.

The screenshot shows a web form titled "Add App". On the left, there is a sidebar with a dark square icon containing the word "APP" in white, and a "Details" link. The main form area contains several input fields and options:

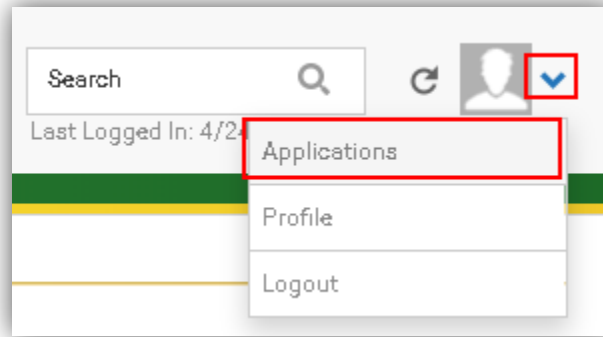
- App Name \***: A text input field with the placeholder "Enter Name".
- Tags**: A text input field with the placeholder "Enter tags here, separated by commas".
- Summary**: A text input field with the placeholder "Enter Value".
- App Description**: A larger text input field with the placeholder "Add description here".
- Version ID \***: A text input field with the placeholder "Enter App Version".
- Version Notes**: A larger text input field with the placeholder "Add description here".
- Visibility**: Three radio button options: "Public", "Private" (which is selected), and "Registered Users".
- App Website**: A text input field with the placeholder "Enter URL".

At the bottom of the form, there are three buttons: "Cancel" (in blue), "Back" (in grey), and "Next" (in blue). A "Finish" button is also visible in the bottom right corner of the window.

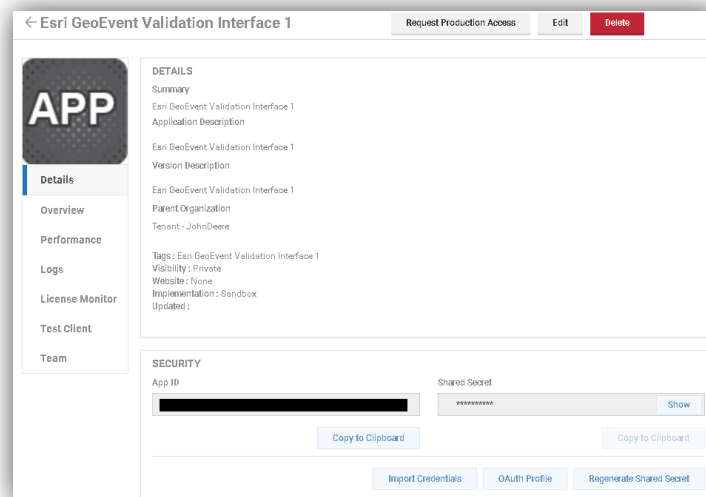
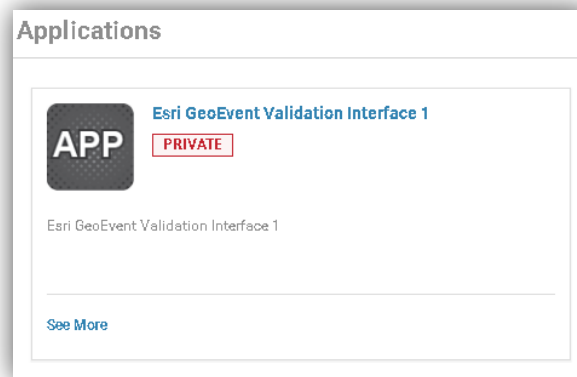
5. Get some coffee.
  - a. Most of the time, a newly created application is ready to use within 5 - 10 minutes.

## Setup your Application Authentication on Developer.Deere.Com

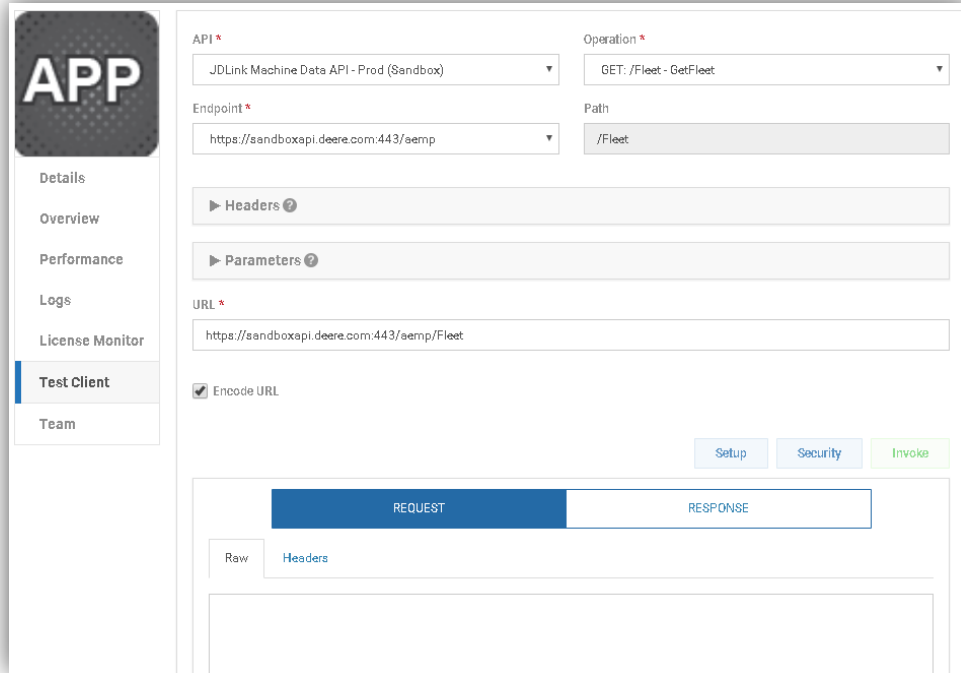
1. Open a browser and navigate to <https://developer.deere.com> and sign in.
2. Click on the down arrow next to your avatar in the top navigation pane and select **Applications** from the drop-down menu.



3. Select your application from the list of applications by clicking on its title.



4. Select **Test Client** from the menu list on the left-hand side of the screen.



5. Click the **Setup** button
  - a. Your OAuth 1 **Consumer Key** is equal to the **App ID** listed here.
  - b. Your OAuth 1 **Consumer Secret** is equal to the **Shared Secret** listed here.
  - c. Copy both values to a safe place for later.



- d. Press the **Save** button.

- Back on the **Test Client** screen press the **Security** button to open the **Security** dialog

Security

Security Policy: OAuth

OAuth Version: OAuth 1.0a

Authentication Method: Secret

Add Additional Parameter

Get Token

Token \*

Enter the Access Token, or click 'Get Token'

- Press the **Get Token** button to open the **Authorization** dialog

APP

Esri GeoEvent Validation Interface 1

Esri GeoEvent Validation Interface 1

AUTHORIZE

CANCEL

ABOUT THIS APP

Esri GeoEvent Validation Interface 1

THIS APP WILL RECEIVE

- John Deere Machine Data

- Press the **Authorize** button to generate an authorization token





# Configure GeoEvent

## Create GeoEvent Connector

1. In **GeoEvent Manager**, navigate to **Site > Connectors** and click **Create Connector**.
2. On the **Creating New Connector** page set the following property values:
  - a. Name: **oauth1-external-xml-poll**
  - b. Label: **Poll an External Website for XML using OAuth1**
  - c. Description: **Polls an external website (URL) using OAuth1 credentials for XML and converts it to GeoEvents.**
  - d. Type: **Input**
  - e. Adapter: **Xml**
  - f. Transport: **HTTP-OAuth1**
  - g. Default Input Name: **xml-oauth-poll-in**
  - h. Configure the **Shown**, **Advanced**, and **Hidden** properties so they appear as below

The screenshot shows the 'Editing Connector' interface in ArcGIS GeoEvent Manager. The title bar includes the ArcGIS logo, 'GeoEvent Manager', and navigation tabs for 'Services', 'Site', and 'Logs'. Below the title bar are tabs for 'GeoEvent', 'Components', and 'Settings'. The main content area is titled 'Editing Connector - oauth1-external-xml-poll' and includes 'Save' and 'Cancel' buttons. The form contains the following fields:

- Name:** oauth1-external-xml-poll
- Label:** Poll an External Website for XML using OAuth1
- Description:** Polls an external website (URL) using OAuth1 credentials for XML and converts it to GeoEvents.
- Type:** Input (selected), Output
- Adapter:** Xml
- Transport:** HTTP-OAuth1
- Default Input Name:** xml-oauth-poll-in

Below the form is the 'Configure Properties' section, which is divided into three panes:

- Shown Properties:** A list of properties including URL, Create GeoEvent Definition, GeoEvent Definition Name (Existing), GeoEvent Definition Name (New), Frequency (in seconds), Consumer Key, Consumer Secret, Access Token, Access Token Secret, XML Object Name, Build Geometry From Fields, X Geometry Field, Y Geometry Field, Z Geometry Field, and Default Spatial Reference.
- Advanced Properties:** A list of properties including Parameters, Header Parameter Name:Value List, Expected Date Format, Learning Mode, Use URL Proxy, URL Proxy, Post/Put From, Post/Put Parameters, Content Body, Post/Put body MIME Type, HTTP Timeout (in seconds), and Get Request Contains Raw Data.
- Hidden Properties:** A list of properties including Use Long Polling, Mode, Append to the End of Payload, and Acceptable MIME Types (Server Mode).

Navigation arrows are present between the panes to move properties between them.

- i. Edit the **Acceptable MIME Types (Client Mode)** and set the default value to **application/xml**

The screenshot shows a dialog box titled "Update Property Definition" with the following fields and values:

Source:	HTTP-OAuth1 (Transport)
Type:	String
Description:	Comma-separated list of MIME Types that are acceptable to the REST Transport in Client Mode.
Name:	acceptableMimeTypesClientMode
Label:	Acceptable MIME Types (Client Mode)
Source Default Value:	[no default value defined]
Overwrite Default Value:	<input checked="" type="checkbox"/>
Default Value:	application/xml

Buttons: Save, Cancel

- j. Set the property **Receive new Data Only** default value to **False**

The screenshot shows a dialog box titled "Update Property Definition" with the following fields and values:

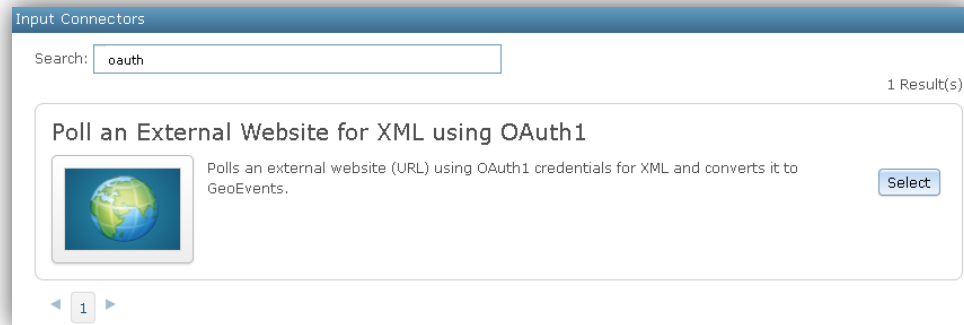
Source:	HTTP-OAuth1 (Transport)
Type:	Boolean
Description:	If set to true, the last-modified header parameter in http response will be considered.
Name:	honorLastModified
Label:	Receive New Data Only
Source Default Value:	true
Overwrite Default Value:	<input checked="" type="checkbox"/>
Default Value:	False

Buttons: Save, Cancel

- k. Press the **Create** button.

## Create an OAuth 1 Input

1. In **GeoEvent Manager**, navigate to **Services > Inputs** and click **Add Input**. In the Search bar enter **oauth** and press the **Select** button next to **Poll an External Website for XML using OAuth1**.



2. On the **Creating Input - Poll an External Website for XML using OAuth1** page, enter the following properties:
  - a. Name: **jdeere-xml-oauth-poll-in**
  - b. URL: <https://sandboxapi.deere.com/aemp/Fleet/1>

**NOTE:** There is a limitation in the api that only allows you to access 100 equipment records at a time. If you have more than 100 pieces of equipment you will need to create a new Input for each set of 100 equipments. Example: to get records 101-200 you would use the URL <https://sandboxapi.deere.com/aemp/Fleet/2>

- c. Create GeoEvent Definition: **Yes**
- d. GeoEvent Definition Name (New): **jdeere-fleet-auto**
- e. Frequency (in seconds): **60**
- f. XML Object Name: **Equipment**
- g. Build Geometry From Fields: **Yes**
- h. X Geometry Field: **Location.Longitude**
- i. Y Geometry Field: **Location.Latitude**
- j. Default Spatial Reference: **4326**
- k. Consumer Key\*: **[Your App ID from above]**
- l. Consumer Secret\*: **[Your App's Shared Secret from above]**
- m. Access Token\*: **[Your App's token\_key from above]**
- n. Access Token Secret\*: **[Your App's token\_shared\_secret from above]**

**jdeere-xml-oauth-poll-in (Poll an External Website for XML using OAuth1)** Save

Name\*:

URL:

Create GeoEvent Definition:  Yes  No

GeoEvent Definition Name (New):

Frequency (in seconds):

Consumer Key\*:

Consumer Secret\*:

Access Token\*:

Access Token Secret\*:

XML Object Name:

Build Geometry From Fields:  Yes  No

X Geometry Field:

Y Geometry Field:

Z Geometry Field:

Default Spatial Reference:

▶ Advanced

- o. Press **Save**
- 3. Navigate to **Services > Monitor** and verify you are receiving data

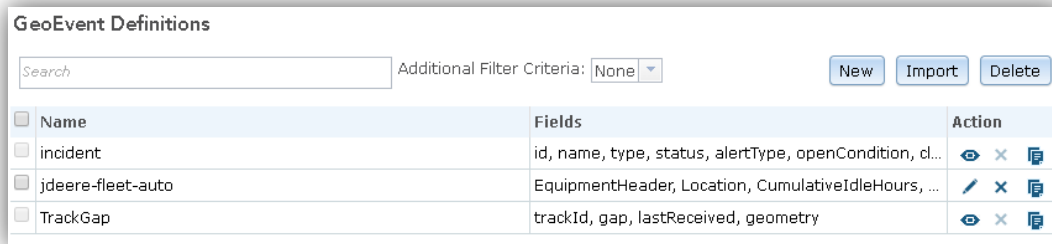
**ArcGIS GeoEvent Manager** Services Site Logs

Monitor Inputs GeoEvent Services Outputs

Monitor Refresh Interval Reset Statistics

GeoEvent Services		In/Out	Count	Rate	Edit Rate	Max Rate	Time Since Last
▼ Inputs			Count	Rate	Edit Rate	Max Rate	Time Since Last
<input checked="" type="checkbox"/>	jdeere-xml-oauth-poll-in [ Running On: eironside ]		35	0/sec		1/sec	00:00:09
▼ Outputs			Count	Rate	Edit Rate	Max Rate	Time Since Last

4. Navigate to **Site > GeoEvent > GeoEvent Definitions**



5. Click on the **copy icon** (pages) next to the **jdeere-fleet-auto** definition to make a copy of the automatically created GeoEvent Definition.
  - a. Change the name to **jdeere-fleet-in**
  - b. Review the schema provided by the incoming xml
    - i. Change the type from **String** to **Double** for the following parameters
      1. Location.**Latitude**
      2. Location.**Longitude**
      3. CumulativeIdleHours.**Hour**
      4. CumulativeOperatingHours.**Hour**
      5. DEFRemaining.**Percent**
      6. Distance.**Odometer**
      7. FuelUsed.**FuelConsumed**
      8. FuelRemaining.**Percent**
  - c. Press the **Save** button
6. Click the **New** button to create a new GeoEvent Definition, name the new definition **jdeere-fleet-flat** and press the **Create** button.



- a. Add the following fields to the **jdeer-fleet-flat** GeoEvent Definition

Name	Type	Cardinality	Tags
<b>oemname</b>	String	1	
<b>model</b>	String	1	
<b>equipmentid</b>	String	1	TRACK_ID
<b>serialnumber</b>	String	1	

<b>pin</b>	String	1	
<b>locationdatetime</b>	Date	1	TIME_START
<b>latitude</b>	Double	1	
<b>longitude</b>	Double	1	
<b>cumulativeidlehoursdatetime</b>	Date	1	
<b>cumulativeidlehours</b>	Double	1	
<b>cumulativeophoursdatetime</b>	Date	1	
<b>cumulativeophours</b>	Double	1	
<b>defremainingdatetime</b>	Date	1	
<b>defremainingpercent</b>	Double	1	
<b>distancedatetime</b>	Date	1	
<b>distanceunits</b>	String	1	
<b>distance</b>	Double	1	
<b>fueluseddatetime</b>	Date	1	
<b>fuelusedunits</b>	String	1	
<b>fuelused</b>	Double	1	
<b>fuelremainingdatetime</b>	Date	1	
<b>fuelremainingpercent</b>	Double	1	
<b>geometry</b>	Geometry	1	GEOMETRY

- b. Press the **Save** button
7. Navigate to **Services > Inputs** and click **jdeere-xml-aouth-poll-in** to edit the properties of your input. Change the following properties:
  - a. Create GeoEvent Definition: **No**
  - b. GeoEvent Definition Name (Existing): **jdeere-fleet-in**
  - c. Press the **Save** button

## Using the Input

In a GeoEvent Service the first thing you will want to map your **jdeere-fleet-in** data to the **jdeere-fleet-flat** definition. Here is how that Field Mapper would be configured:

Name:*	Field Map
Processor:	Field Mapper
Source GeoEvent Definition*:	jdeere-fleet-in
Target GeoEvent Definition*:	jdeere-fleet-flat
<b>Source Fields</b>	<b>Target Fields</b>
EquipmentHeader.OEMName	oemname <i>String</i>
EquipmentHeader.Model	model <i>String</i>
EquipmentHeader.EquipmentID	equipmentid <i>String</i>
EquipmentHeader.SerialNumber	serialnumber <i>String</i>
EquipmentHeader.PIN	pin <i>String</i>
Location.datetime	locationdatetime <i>Date</i>
Location.Latitude	latitude <i>Double</i>
Location.Longitude	longitude <i>Double</i>
CumulativeIdleHours.datetime	cumulativeidlehoursdatetime <i>Date</i>
CumulativeIdleHours.Hour	cumulativeidlehours <i>Double</i>
CumulativeOperatingHours.datetime	cumulativeophoursdatetime <i>Date</i>
CumulativeOperatingHours.Hour	cumulativeophours <i>Double</i>
DEFRemaining.datetime	defremainingdatetime <i>Date</i>
DEFRemaining.Percent	defremainingpercent <i>Double</i>
Distance.datetime	distancedatetime <i>Date</i>
Distance.OdometerUnits	distanceunits <i>String</i>
Distance.Odometer	distance <i>Double</i>
FuelUsed.datetime	fueluseddatetime <i>Date</i>
FuelUsed.FuelUnits	fuelusedunits <i>String</i>
FuelUsed.FuelConsumed	fuelused <i>Double</i>
FuelRemaining.datetime	fuelremainingdatetime <i>Date</i>
FuelRemaining.Percent	fuelremainingpercent <i>Double</i>
geometry	geometry <i>Geometry</i>