Lemur™

Introduction to GeoFencing

For Internal Use Only

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Summary

The GeoFencing tool allows for configuration of areas of interest to be monitored, as well as what notification to be shown to the end user - toast, alert, and/or audio.

How Geofences work

When a user crosses a fence/boundary (such as a zip code), a notification and an audio event can be sent to the Lemur Pro user. Both the notification text and audio can be changed to fit the customer's needs.

Figure 1: Driver Crossing a Boundary

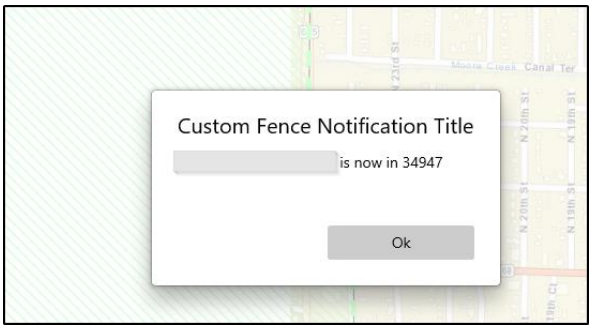

Figure 2: Custom Fence Notification Title

To change geofence settings, you must edit the JSON code by going to **Environments** > **Bundle JSON** in Lemur Admin Pro.

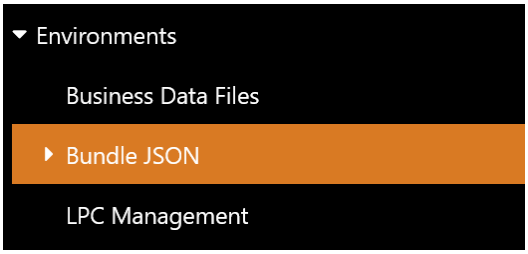

Figure 3: Bundle JSON Tab

The example below will add a geofence that uses a zip code layer inside of it.


```
"FenceSettings" : [
    {
      "Id": "a35d1764-ad0b-420b-be81-db390345bf60",
      "EnterEvent": {
        "Id": "c307dd5b-f659-4af5-a431-065728eaf56a",
        "NotificationOptions": [
          {
            "Id": "6e6ee1ae-0d90-440f-87b7-8f3feff9b162",
            "Type": "Audio",
            "EnabledRuleId": null,
            "AudioResourceKey": "Beep",
            "NotificationMessage": {
              "Format": "Beep",
              "Parameters": null
            },
            "Comment": null
          },
          {
            "Id": "fb3c80f0-7981-4874-b9af-46910c66a4a4",
            "Type": "Alert",
            "EnabledRuleId": null,
            "AudioResourceKey": null,
            "NotificationMessage": {
              "Format": "{0} is now in {1}",
              "Parameters": [
                "#; LMR_USERID#;",
                "ZCTA5CE10"
              ]
            },
            "Comment": null
          }
        ],
        "EnabledRuleId": null,
        "Comment": null
      },
      "ExitEvent": null,
      "DwellEvent": null,
      "BufferDistanceMeters": 10.0,
      "WhereClause": "ZCTA5CE10 = '34947'",
      "AreaOfInterestGeometryJson": null,
      "ActiveOption": "Always",
      "Comment": "Zipcode rules"
    },
```


Please note:

1. The “WhereClause” is used to set the rule to work only for a specific feature or group of features. In this example we are defining the fence as Zip Code 34947.
2. The buffer is used so that the notification fires just prior to entering or leaving the fence feature. It is highly recommended to use a buffer if your fence features have line or point geometry.

Mapping a Feature Layer to a Fence Setting

A feature layer can be mapped to zero-N fence settings. This is done by adding one or more FenceSetting.Id values to the FenceSettingsIds collection property for a FeatureService. The id values in the collection must be unique for a given feature service and must exist in the FenceSettings collection.


```
"FeatureServices": [
            {
              "Id": "6edb8872-ae5f-4dde-bf38-631f3e76a077",
              "TableName": "ZipCodes",
              "DataActions": null,
              "GroupActionDataDefinitions": null,
              "RefreshIntervalSeconds": null,
              "Transform": null,
              "Transforms": null,
              "ShowSublayersInPicker": true,
              "SublayerIdsToHideOnMap": null,
              "SublayerIdsToHideInPicker": null,
              "SublayerIdPickerOrder": null,
              "ShowSublayersInSearch": true,
              "SublayerIdsToHideInSearch": null,
              "FenceSettingIds": [
                "a35d1764-ad0b-420b-be81-db390345bf60"
              ],
              "SearchHelpText": null,
              "SearchQueryFields": null,
              "SearchResultFields": null,
              "ServiceUrl": null,
              "UniqueIdFieldName": "OBJECTID",
              "PinStyleId": null,
              "IsPinnable": false,
              "SingleObjectName": null,
              "RemoveDuplicateLegends": false,
              "FieldSortoption": "AlphabeticalByInternalName",
              "AssociatedLayers": null,
              "ImagePath": null,
              "ImageWidthRequest": 80,
              "ImageHeightRequest": 80,
              "IsVisible": true,
              "FilterResultFields": null,
              "Label": "ZipCodes",
              "LayerGroupId": "0c75d1a5-3f66-4d07-a820-9d0b09d6bd59",
              "MapOrder": 40,
              "PickerOrder": 40,
              "ShowInPicker": true,
              "RenderingMode": "Dynamic",
              "Comment": null
            }
          ],
```

GeoFence Audio Support

An audio resource (in MP3 format) must be associated with a geofence notification. If no AudioResourceKey is provided in the Notification Option, the default audio sound will be used.

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If you wish to use your own sound file for the event notification, you will need to do the following:

- Open Admin Pro and open the Audio Resource page under tools.
- Click Import and select your MP3 audio file.
- Click Play to assess whether Lemur Pro will be able to play your file properly.
- Click "Copy to Clipboard" to copy the encoded audio to your clipboard.
- Open your bundle and go to the ResourceDictionaries property.
- If null, you will need to add a new property for your language. Example

```
"ResourceDictionaries": {
        "EN-US": {
        }
}
```

- Inside the appropriate language culture code, e.g., add a new resource key for your sound, and for the value you will paste in the encoded audio previously copied to your clipboard. Example:

```
"ResourceDictionaries": {
     "EN-US": {
          "MyEventSound": "SUQzBAAAAAAAZ1RJVDIAAAAZAAADUmV0cm8sIF……."
     }
}
```

- Be sure to set the value in your event to the name of your resource key you added.

GeoFence Bundle Definitions

Note: Any ids shown are for example only

JSON	Notes	Phase 2
"FenceSettings": [	A collection of Fences, e.g., areas of interest	
{		
"Id": "093568cd-eb7b-4de1-ba14-09abbb3573fa",	This Id can be referenced by one or more feature layers. See	
"EnterEvent": {	Defines what should happen when the user's location enters a fence	
"Id": "84757e1b-4aa0-4107-9b49-03b09a2ace88",		
"NotificationOptions": [	A collection of notification options for what happens when this event fires	
{		
"Id": "c6eaa409-2e10-4194-a5b0-22e32fe44ce3",		
"Type": "None",	Valid values are None (no notification), Alert (pop-up dialog), (play an audio file), Toast (issue a toast notification)	
"EnabledRuleId": null,	Used to turn on/off the event notification. This rule will be evaluated against the fence feature object. E.g., only perform this notification if the feature property RiskLevel = High	Phase 2
"AudioResourceKey": null,	The name of the resource key for the type alert.	
"NotificationMessage": {	Defines the message that will appear to the user if the notification type is Alert or Toast. This property can be null if is Audio, however if the value is null a warning will be added to the log (all event messages are logged). Our recommendation is to define a notification message for ALL events so that we can better debug when problems arise.	
"Format": null,	This string can contain format placeholders	
"Parameters": null	A collection of internal field names for the format placeholders	
},		

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"Comment": null	Free-form text field	
}		
],		
"EnabledRuleId": null,	Used to turn off ALL event notifications. This rule will be evaluated against the application. E.g., do not display any notifications while editing	Phase 2
"Comment": null		
},		
"ExitEvent": {	Defines what should happen when the user's location leaves a fence	
"Id": "1c775239-2835-40b2-b8f2-7ce67f09c590",		
"NotificationOptions": [		
{		
"Id": "f5a60098-106c-4c49-b9d1-d75fca8dc9dd",		
"Type": "None",		
"EnabledRuleId": null,		Phase 2
"AudioResourceKey": null,		
"NotificationMessage": {		
"Format": null,		
"Parameters": null		
},		
"Comment": null		
}		
],		
"EnabledRuleId": null,		Phase 2
"Comment": null		

},		
"DwellEvent": {	Defines what should happen if a user's location is inside a fence	
"Id": "ff839959-7921-47c5-a401-5df54338c0f6",		
"DwellNotificationOptions": [		
{		
"Id": "186fa62d-e95b-47b4-bb28-17a6b0746098",		
"InitialThresholdSeconds": 0,	The number of seconds to wait before issuing this notification. Non-null values must be non-negative.	
"RepeatLimit": null,	The number of times the notification be repeated? Null = repeat until user leaves fence, Zero = no repeating.	
"RepeatThresholdSeconds": 60,	The number of seconds to wait before we issue a notification after the first notification. This is ignored if RepeatLimit = 0. Value must be greater than zero.	
"Type": "None",		
"EnabledRuleId": null,		Phase 2
"AudioResourceKey": null,		
"NotificationMessage": {		
"Format": null,		
"Parameters": null		
},		
"Comment": null		
}		
],		
"EnabledRuleId": null,		
"Comment": null		
},		

"BufferDistanceMeters": 0.0,	Buffer distance to apply to the fence features when checking if an event has occurred	
"WhereClause": null,	Defines a where clause used to select features from the layer to use as fences	
"AreaOfInterestGeometryJson": null,	Geometry that can be used to spatially filter features to be used as fences. Must be an envelope or polygon.	
"ActiveOption": "Always",	Defines when this fence is created and/or active. See	Phase 2
"Comment": null		
}		
],		

ActiveOption (Phase 2)

Key	Value
Always	Fence is created during initialization
WhenLayerVisible	Fence is created during initialization, but is only active when layer is visible
UserControlledInitiallyOn	Fence is created during initialization, and can be manually disabled by the user
UserControlledInitiallyOff	Fence in not created until the user decides to enable it
UserControlledInitiallyOnWhenLayerVisible	Fence is created during initialization, and can be manually disabled by the user, and is only active when the layer is visible
UserControlledInitiallyOffWhenLayerVisible	Fence in not created until the user decides to enable it, and is only active when the layer is visible

Glossary

1. GeoFencing - Configuration of areas of interest to be monitored, as well as what notification to be shown to the end user - toast, alert, and/or audio.

2. EnterEvent – Defines what happens when a unit enters a geofence.

3. ExitEvent – Defines what happens when a unit exits a geofence.

4. DwellEvent – Defines what happens when a unit stays in a geofenced area for too long.

5. GUID – A “Globally Unique Identifier” that uses a pseudo-random 128-bit number scheme.

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