Extreme®
Connect Beyond the Network

ExtremeLocation API Reference Guide

Release v1.2.0

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Preface

This section discusses the conventions used in this guide, ways to provide feedback, additional help, and other Extreme Networks publications.

Conventions

This section discusses the conventions used in this guide.

Text Conventions

The following tables list text conventions that are used throughout this guide.

Table 1: Notice Icons

Icon	Notice Type	Alerts you to...
	General Notice	Helpful tips and notices for using the product.
	Note	Important features or instructions.
	Caution	Risk of personal injury, system damage, or loss of data.
	Warning	Risk of severe personal injury.
New!	New Content	Displayed next to new content. This is searchable text within the PDF.

Table 2: Text Conventions

Convention	Description
`Screen displays`	This typeface indicates command syntax, or represents information as it appears on the screen.
The words **enter** and **type**	When you see the word "enter" in this guide, you must type something, and then press the Return or Enter key. Do not press the Return or Enter key when an instruction simply says "type."
[Key] names	Key names are written with brackets, such as **[Return]** or **[Esc]**. If you must press two or more keys simultaneously, the key names are linked with a plus sign (+). Example: Press **[Ctrl]**+**[Alt]**+**[Del]**
Words in italicized type	Italics emphasize a point or denote new terms at the place where they are defined in the text. Italics are also used when referring to publication titles.

Terminology

When features, functionality, or operation is specific to a switch family, such as ExtremeSwitching™ or Summit®, the family name is used. Explanations about features and operations that are the same across all product families simply refer to the product as the switch.

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- **Extreme Portal** — Search the GTAC knowledge base, manage support cases and service contracts, download software, and obtain product licensing, training, and certifications.
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- Your Extreme Networks service contract number and/or serial numbers for all involved Extreme Networks products
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- A description of any action(s) already taken to resolve the problem
- A description of your network environment (such as layout, cable type, other relevant environmental information)
- Network load at the time of trouble (if known)
- The device history (for example, if you have returned the device before, or if this is a recurring problem)
- Any related RMA (Return Material Authorization) numbers

Related Publications

ExtremeLocation™ and other Extreme Networks product documentation can be found on Extreme Documentation page at http://documentation.extremenetworks.com.

We recommend the following guides for users of ExtremeLocation products:

- *ExtremeLocation User Guide*
- *ExtremeLocation Quick Reference Guide*
- *ExtremeLocation Release Notes*

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1 ExtremeLocation APIs

Introduction

ExtremeLocation provides a set of Outbound APIs to push real-time location data and events for wireless clients that are detected in a venue. ExtremeLocation also provides RESTful APIs to query and retrieve information from the server.

The Outbound APIs and RESTful APIs are a part of ExtremeLocation's Subscriber service.

To receive real-time data from ExtremeLocation, you must have a server in your network capable of receiving and processing the real-time data. You must configure the credentials required for accessing your server through the **Subscriber Settings** page in ExtremeLocation. The ExtremeLocation server authenticates with your remote server using the credentials provided and pushes the location data and events in real-time. To prevent transmission of data in clear text, Extreme Networks suggests enabling HTTPS support on the your server. Data is presented in JSON format and is encrypted before transmission to your server.

You can then use the location data and events and integrate them with your other systems like CRM and big data systems to engage with visitors in the venue or build applications that require real-time location data.

To retrieve data from the ExtremeLocation server as and when required, use the REST APIs. You can query the ExtremeLocation server to fetch information such as sites list, floors list, floor plan, devices list, and other such lists. You can directly fetch this information from the ExtremeLocation using a simple web browser as and when required.

ExtremeLocation provides the following API types:
* Outbound APIs
* REST APIs

Outbound APIs

ExtremeLocation supports real-time reporting of events and notifications to an external server (also called a Subscriber). This feature is available for all ExtremeLocation customers by default. You can use these events and notifications by integrating them with your CRM systems or with your big data systems to engage with your customers in real-time. Or, you could build your own applications that uses this real-time location data.

You must configure a web server to receive these messages. This web server can be located within the your network and must have an interface that can be accessed directly from outside the your network.

You must set up a web server capable of receiving the messages sent by ExtremeLocation and then provide that web server's IP address/URL and credentials to ExtremeLocation.

> **Note**
> This document includes instructions to build a sample Web Server to receive notifications from ExtremeLocation service. See Sample Web Server Application for step by step instructions.

Outbound API Overview

When an event is generated for any site in the ExtremeLocation account, it is sent to the outbound API handler in real-time. The outbound API handler checks if any filters are to be applied to the event. Filters are used to control the event types to pass to the external web server. It then uses the subscriber connection information to send the filtered events to the your web server.

At your end, a web server or service must be configured to receive the data. This web server can then pass on the received data to third party application data processors for further action or it can store the data locally.

For more information on configuring subscriber settings, see Configure Subscriber Settings.
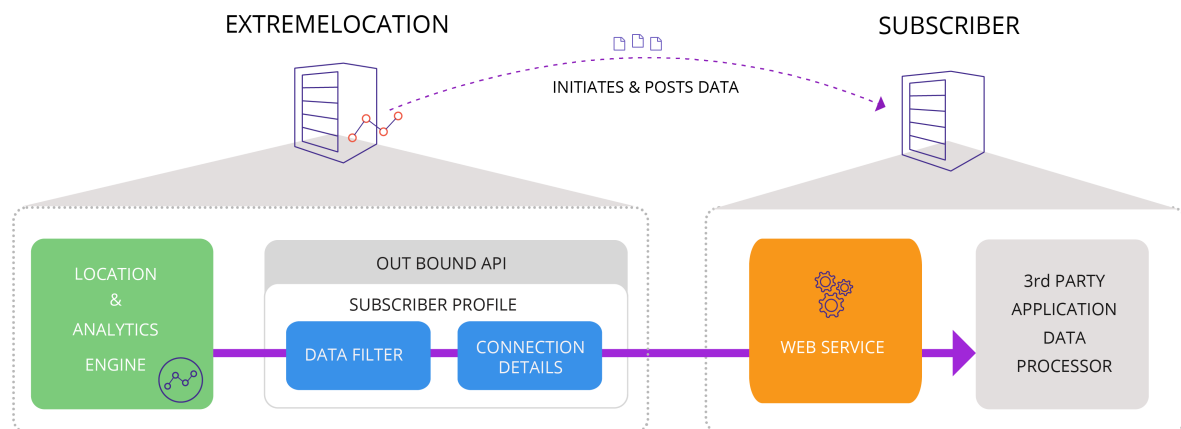
> **Note**
> This is an unidirectional connection from ExtremeLocation to the subscriber server. The subscriber server cannot send requests to ExtremeLocation.

Event Filtering

As a ExtremeLocation customer, you can configure which events types can be filtered out before being sent to your web server. This can be configured from the **Subscriber Settings** item from the **Preferences** dialog. The data sent to the web server can then be filtered further on your side. Use the filter options to gain granular control on what data is sent to the third party application for analysis. For more information on configuring filtering, see Configure Subscriber Settings.

Outbound Events

The Outbound APIs can be classified as:

- Location Events - sends events triggered when a device is first located or identified by a site or location
- Device Events - sends events triggered when a device enters or exits a site or location
- Category Events - sends events triggered when a device enters or exits a category

See Outbound APIs for detailed description of these events.

REST APIs

REST APIs

Representational State Transfer (REST) is a way to provide stateless interoperability between different computer systems. Using REST, requesting systems can access and manipulate textual representations of a remote web resource using a uniform and predefined set of stateless operations. ExtremeLocation's REST API calls provide access to a wide range of authentication, site, floor, and device information.

ExtremeLocation REST APIs are available for all ExtremeLocation customers by default. You can use any programming language to make calls to the ExtremeLocation server to fetch specific data. The returned data is in JSON format and can then be used for purposes like analysis and management or engaging with visitor devices.

The following categories of REST APIs are available for use:

- Site APIs - The Site APIs are used to fetch Site specific information for an ExtremeLocation account
- Floor APIs - The Floor APIs are used to fetch Floor and Region specific information for a Site
- Device API - The Device API is used to fetch a list of Devices placed on a Floor in a Site

2 Outbound APIs

This chapter describes the events generated by ExtremeLocation when the it detects a client device interacting with a site by entering into or exiting out of a location or a zone. This information is then sent to your remote web server in real-time.

Your remote server information is configured through the **Configuration** > **Subscriber Settings** configuration parameters from the ExtremeLocation graphical user interface. See Configure Subscriber Settings to know how to configure subscriber settings for your ExtremeLocation account.

The events generated by the ExtremeLocation can be classified as location, category or presence events.

A Location event is generated when multiple sensors deployed at a site see a device. This is called Positional tracking of the client device. The Location event is also generated when multiple sensors deployed at a site detect the device above a defined RSSI threshold value. This is called Zone Tracking of the client device.

A Presence event is generated when a client device enters a site or location for the first time or when the device is last seen by the sensors at a site. This event is only generated for devices seen within the site's perimeter or in its vicinity.

A Category event is generated when the client device is detected in a region or a zone that has been assigned a category. This type of event is also generated when a device is seen moving away from the category it was detected in.

A Crowding Event event is generated when the ratio of number of visitor devices to the number of associate devices exceeds a configured threshold. Crowding event can either be set globally for the site or on a per category basis.

Subscribe Settings

When an event is generated for any site in your ExtremeLocation account, it is sent to your remote web server in real-time. Filters, if any, are applied to the events before being transmitted. Filters are used to control the event types to be passed to your web server.

Use the Subscriber Settings window to configure the information required for ExtremeLocation to connect to your server. Also use this screen to filter the event types of interest for your deployment.

At your end, a web server or service must be configured to receive the data. This web server can then pass on the received data to third party application data processors for further action or it can store the data locally.

To configure ExtremeLocation to connect to your remote web server:

1   Select **Settings** > **System Settings** > **Subscriber Settings**.
    The **Subscriber Classification and Management** window opens.

Figure 1: Subscriber Classification and Management window

2   Provide the following to configure the Subscriber Settings:

Subscriber Push URL
: Configure the remote web server where all events types selected in the **Events** field is transferred to in real-time.

> **Note**
> The web server must listen on one of the standard ports, 443 (https) or 80 (http). ExtremeLocation does not support web servers listening on ports other than these two ports.

Username
: Set the user name valid for accessing the remote web server.

Password
: Set the password for the above user name.

Events
: Select the events that will be pushed to the remote web server in real-time.
  - Presence - All events of the type **Presence** will be included when events are pushed to the remote server.
  - Category - All events of the type **Category** will be included when events are pushed to the remote server.
  - Location - All events of the type **Location** will be included when events are pushed to the remote server.
  - Crowding - All events of the type **Crowding** will be included when events are pushed to the remote server.

3   Select **Save** to save the changes made to the **Subscriber Settings** parameters.
    At any time, select the **Reset** button to revert the changes made to the subscriber settings parameters.

Location Event

Location Event

A Location event is generated when multiple sensors deployed at a site see a device. This is called *Positional Tracking* of the client device. The Location event is also generated when multiple sensors deployed at a site detect the device above a defined RSSI threshold value. This is called Zone Tracking of the client device.

A Location event is also generated when the calculated location (x,y) of a device changes as it moves around the site.

Sample JSON

```
{
    "eventType":"LOCATION_EVENT",
    "clientMac":"34:f3:9a:2d:a7:b2",
    "siteName":"SanJose_Office",
    "floorName":"4thFloor",
    "x":51.913044445216656,
    "y":20.260869942605495,
    "deviceType":"VISITOR",
    "confidence":"0.1",
    "timestamp":1503902860334
}
```

JSON Content Description

Field	Description
eventType	The event type. For a location event this value is LOCATION_EVENT.
clientMac	The MAC address of the device for which the location event was generated.
siteName	The name of the Site in which the client is located.
floorName	The name of the floor in which the client is located.
x	The "X" coordinate of the location where the client is located. This is the positional coordinate of the location relative to the floor map's origin (0,0) point.
y	The "Y" coordinate of the location where the client is located. This is the positional coordinate of the location relative to the floor map's origin (0,0) point.

Field	Description
deviceType	The device classification type of the client. This classification is performed based on rules configured by the user. The valid values are: • VISITOR - A visitor is a device that is present at a site for a limited duration and then leaves the site. • ASSET - An asset is a device that belongs to a site. An asset could be a wireless POS, an access point deployed at a site, or such similar devices. • ASSOCIATE - An associate is a classification that is used for devices that are carried by an associate and used for work related activities. An associate device could be a hand held device like a wireless bar code scanner, a mobile/ tablet used for inventory purposes, or other similar devices.
confidence	The confidence level of the Location engine for locating this client at the x and y coordinates. The value in this field is in the range 0 - 1. Multiplying this value by 100 indicates the confidence value in percentage (%). A high value indicates that the Location engine is confident that the client device is located at that particular x and y coordinate.
timestamp	The time (in epoch notation) when the event was triggered.

Presence Events

Presence Events are generated when a client device enters or exits a site or is in the vicinity of the site.

A Device Enter event is generated when a client device enters a site and it is detected by sensors deployed at the site. The sensors report information such as the time of entry or exit, the signal strength value recorded at the time the device was seen, the calculated visitor type (first time visitor or repeat visitor), etc.

A Device Exit event is generated when a device exits a site, the sensor reports information such as the time the client device spent at the site, the type of engagement, the visitor type (first time or repeat visitor), etc.

Device Enter Event

Device Enter Event

The Device Enter Event is generated every time a device is first seen by a location's sensor.

Sample JSON

```
{
    "eventType":"DEVICE_ENTERED",
    "clientMac":"00:6f:64:31:59:5f",
    "sensorMac":"74:67:f7:9a:15:ba",
    "siteId":"SITE_203a7140654a4db5a1c82ef12264e64b",
    "siteName":"SanJose_Office",
    "lastSeen":"1503902650494",
    "timestamp":1503902398255,
    "rssiValue":-87.0,
    "loyalty":"REPEAT"
```

```
}
```

JSON Content Description

Field	Description
eventType	The event type. For a Device Presence event this value is DEVICE_ENTERED.
clientMac	The MAC address of the device for which the Device Enter event was generated.
sensorMac	The MAC address of the sensor which saw the client device first.
siteId	The unique ID assigned to the site by ExtremeLocation system. This value is used internally and is not for external third party subscribers.
siteName	The name of the Site in which the client has been seen.
lastSeen	The time (in epoch notation) when the client was last seen in this site.
timestamp	The time (in epoch notation) when the event was triggered.
rssiValue	The signal strength measured by the sensor for this client device.
loyalty	The client device's calculated loyalty value. This value can be one of: • UNKNOWN - Possibly a passerby device with no loyalty information. • NEW - A client device which is seen for the first time at this site. • REPEAT - A client device which was seen in this site in the last 30 days and is detected again. This device is also known as a repeat visitor.

Device Exit Event

Device Exit Event

The Device Exit Event is generated when a device is no longer seen by a location's sensor.

Sample JSON

```
{
    "eventType":"DEVICE_EXIT",
    "clientMac":"80:58:f8:d0:29:29",
    "siteId":"SITE_203a7140654a4db5a1c82ef12264e64b",
    "siteName":"SanJose_Office",
    "firstSeen":"1503898669390",
    "lastSeen":"1503901358434",
    "dwell":2689044,
    "timestamp":1503902510362,
    "visitType":"VISITOR",
    "loyalty":"REPEAT",
    "engagement":"TYPE2",
    "bestSensorMac":"74:67:f7:06:fb:96",
    "bestRSSI":-67.0
}
```

JSON Content Description

Field	Description
eventType	The event type. For a Device Presence event this value is DEVICE_EXIT.
client Mac	The MAC address of the device for which the Device Exit event was generated.
siteId	The unique ID assigned to the site by ExtremeLocation system. This value is used internally and is not for external third party subscribers.
siteName	The name of the Site in which the client has been seen.
firstSeen	The time (in epoch notation) when the client was first seen in this site and when the DEVICE_ENTERED event was triggered.
lastSeen	The time (in epoch notation) when the client was last seen in this site.
dwell	The time duration in seconds that the client spent in this site. This is the difference in time (epoch time) between the time the client was first seen and subsequently, last seen.
timestamp	The time (in epoch notation) when the event was triggered.
visitType	The classified visit type. The client is classified according to the duration spent in the site. The various classification types are: • PASSERBY - This classification is for devices that are for devices that are seen by the location's sensors but are not located inside the site's perimeter. • BOUNCED_VISITOR - This classification is for devices that are seen inside the site but have spent time that is below a configured duration within the site. • VISITOR - This classification is for devices that are seen inside a site and have spent time that is above a configured duration within the site.
loyalty	The client device's calculated loyalty value. This value can be one of: • UNKNOWN - Possibly a passerby device with no loyalty information. • NEW - A client device which is seen for the first time at this site. • REPEAT - A client device which has already been seen in this site before. This device is also known as a repeat visitor.
engagement	The client device's engagement type. This classification is done based on the duration the client device spends in the site. The following are the classifications: • TYPE0 - This classification is for clients that have spent up to 5 minutes inside the site. • TYPE1 - This classification is for clients that have spent up to 20 minutes inside the site. • TYPE2 - This classification is for clients that have spent up to 1 hour (60 minutes) inside the site. • TYPE3 - This classification is for clients that have spent up to 6 hours (360 minutes) inside the site. • TYPE4 - This classification is for clients that have spent more than 6 hours (360 minutes) inside the site.

Field	Description
bestSensorMac	The MAC address of the sensor which saw the client device with the highest RSSI value.
bestRSSI	The highest RSSI value recorded by the sensor with the MAC address as in the "bestSensorMac" field.

Category Events

Category Events are generated when a client device enters or exists a category.

A Category Enter event is generated when a client device is first seen by a sensor which has its category configured. The client is then assigned the category as configured on the sensor that reported it first. This event is also generated when a sensor reports having seen the client with the highest RSSI value.

A Category Exit event is also generated when a device exists a category, the sensor reports information such as the previously assigned category, the time when the device was last seen, the amount of time spent in the category, etc.

Category Enter Event

Category Enter Event

The Category Enter event is triggered when a client device enters a region (if configured) for which a category has been assigned.

This event is also triggered when the client device is seen by a sensor (the sensor that reports the highest RSSI value) in a region. If the region has a category assigned to it, then that category has precedence over the category assigned (if assigned) to an access point in that region.

Sample JSON

```
{
    "eventType":"CATEGORY_ENTERED",
    "clientMac":"00:6f:64:31:59:5f",
    "sensorMac":"74:67:f7:9a:15:ba",
    "siteName":"SanJose_Office",
    "floorName":"4thFloor",
    "x":51.913044445216656,
    "y":20.260869942605495,
    "deviceType":"VISITOR",
    "previousCategories":"[Cali_AP1]",
    "categories":"[Cali_AP2]",
    "firstseen":"1503901450747",
    "lastSeen":"1503902650494",
    "timestamp":1503902398255,
}
```

JSON Content Description

Field	Description
eventType	The event type. For a Device Presence event this value is CATEGORY_ENTERED.
clientMac	The MAC address of the device for which the Device Enter event was generated.
sensorMac	The MAC address of the sensor which saw the client device first.
siteName	The name of the Site in which the client has been seen.
floorName	The name of the floor in which the client is located.
x	The "X" coordinate of the location where the client is located. This is the geographical coordinate of the location.
y	The "Y" coordinate of the location where the client is located. This is the geographical coordinate of the location.
deviceType	The device classification type of the client. This classification is performed based on rules configured by the user. The valid values are: • VISITOR • ASSET • ASSOCIATE
previousCategories	The name of the category (if any) that the client device as previously identified in. Value is empty if no previous category is found.
categories	The name of the category the client device is in now.
firstSeen	The time (in epoch notation) when the client was first seen in the current category and when the CATEGORY_ENTERED event was triggered.
lastSeen	The time (in epoch notation) when the client was last seen in the current category.
timestamp	The time (in epoch notation) when the event was triggered.

Category Exit Event

Category Exit Event

The Category Exit Event is triggered when a client device exits a region (if configured) for which a category has been assigned.

This event is also triggered when the client device is no longer visible to any sensor having the same category.

Sample JSON

```
{
    "eventType":"CATEGORY_EXIT",
    "clientMac":"34:f3:9a:2d:a7:b2",
    "siteName":"SanJose_Office",
    "floorName":"4thFloor",
    "x":51.913044445216656,
    "y":20.260869942605495,
```

```
        "deviceType":"VISITOR",
        "categories":["Cali_AP2"],
        "firstSeen":"1503898669390",
        "lastSeen":"1503901358434",
        "dwell":2689044,
        "timestamp":1503902510362,
        "engagement":"TYPE2"
}
```

JSON Content Description

Field	Description
eventType	The event type. For a Category Exit event this value is CATEGORY_EXIT.
clientMac	The MAC address of the device for which the Category Exit event was generated.
siteName	The name of the Site in which the client was seen in.
floorName	The name of the floor in which the client was seen in.
x	The "X" coordinate of the location where the client was last located. This is the geographical coordinate of the location.
y	The "Y" coordinate of the location where the client was last located. This is the geographical coordinate of the location.
deviceType	The device classification type of the client. This classification is performed based on rules configured by the user. The valid values are: • VISITOR • ASSET • ASSOCIATE
categories	The name of the category the client device was last identified in.
firstSeen	The time (in epoch notation) when the client was first seen in the current category and when the CATEGORY_ENTERED event was triggered.
lastSeen	The time (in epoch notation) when the client was last seen in the current category.
dwell	The time duration in seconds that the client spent in this category. This is the difference in time (epoch time) between the time the client was first seen in the category and subsequently, last seen.
timestamp	The time (in epoch notation) when the event was triggered.
engagement	The client device's engagement type. This classification is done based on the duration the client device spends in the site. The following are the classifications: • TYPE0 - This classification is for clients that have spent up to 5 minutes inside the site. • TYPE1 - This classification is for clients that have spent up to 20 minutes inside the site. • TYPE2 - This classification is for clients that have spent up to 1 hour (60 minutes) inside the site. • TYPE3 - This classification is for clients that have spent up to 6 hours (360 minutes) inside the site. • TYPE4 - This classification is for clients that have spent more than 6 hours (360 minutes) inside the site.

Crowding Event

A Crowding Event is generated when the ratio of the number of visitor devices to the number of associate devices exceeds the configured threshold. Crowding Event threshold can be set either globally or category wise.

A Crowding Event is generated for the following conditions:

- Threshold value exceeds when no "Associate" device is detected within a category: The global settings for triggering a Crowding Event is set as the number of visitors seen in a category if no associate devices are detected within the same category. When the number of visitors devices exceeds this value, a Crowding Event is triggered.
- Threshold value exceeds when "Associate" device or devices are detected within a category: A per category Crowding Event is triggered when the ratio of visitor devices to associate devices exceeds the configured threshold ratio for a category.

Device Crowding Event

Device Crowding Event

The Device Crowding Event is generated every time the visitor to associate ratio per category exceeds the configured threshold.

Sample JSON

```
{
    "siteName":"SanJose_Office",
    "category":"Cali_AP2",
    "eventType":"CROWDING_EVENT",
    "timestamp":1513801441993
}
```

JSON Content Description

Field	Description
siteName	The name of the Site for which the Crowding event is generated.
category	The name of the category for which the Crowding event is generated.
eventType	The event type. For a Crowding event this value is CROWDING_EVENT.
timestamp	The time (in epoch notation) when the event was triggered.

3 REST APIs

Site APIs
Floor APIs
Device API

This chapter describes the REST APIs available for use with ExtremeLocation. Use these APIs to interact with the ExtremeLocation server to fetch Site, Floor, and Device information.

ExtremeLocation REST APIs can be classified as:

*   Site APIs - Use the Site APIs to fetch Site specific information
*   Floor APIs - Use the Floor APIs to fetch Floor and Region specific information
*   Device API - Use this API to fetch a list of Devices placed on a Floor in a Site

APIs can be of 2 types, POST and GET. Use these API types to fetch information from or to modify information on the ExtremeLocation server. The GET method is used to list or to retrieve a collection of information such as a list. The GET method can also be used to retrieve an individual item in a list.

The POST method is used to create a new entry in a collection or to update an item in a collection on the server.

Fetching your API Key

To use these REST APIs, pass the current API Key for your ExtremeLocation account in the query header.

The API Key for your account can be found in the **Settings** > **System Settings** > **API Keys** screen.
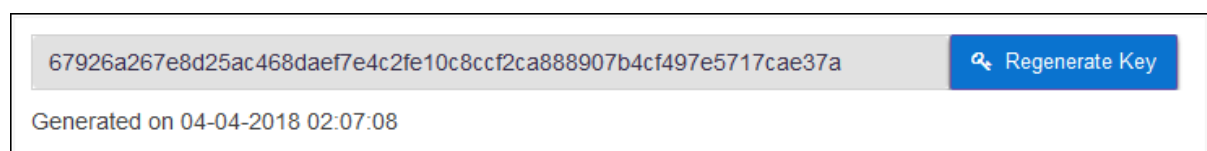
The value in this gray box is your current valid API Key. This value has to be passed to each of the APIs to fetch the relevant details from the ExtremeLocation server.

Site APIs

The Site APIs provide methods to retrieve the following site specific information:

*   the complete list of sites that the user has created
*   the complete list of site groups that the user has created
*   the complete list of categories that the user has created across all the sites

The information thus retrieved from the server can then be used to get site specific information such as floors, floor maps, and devices installed at the site.

Get Site List

Get List of Sites

The Get List of Sites API queries the ExtremeLocation server for a list of Sites managed by this user account. This API requires you to pass the valid API Key for your ExtremeLocation account.

URL	http://<ip>:<port>/WifiHelperServices/list/sites
Method	GET
Type	

Headers	Header Name: Authorization
	Header Value: API_KEY <token>
	Example:
	`API_KEY`
	`386f9e229398e85954b2603aedad33da06a8991f219dde08682b241a898d`
	`a89d`

URL Parameters	
Data Parameters	

Response Codes	Returns the following responses:
	• Success (200 OK)
	• Bad Request (400)
	• Unauthorized (401)
	
	Example:
	`{`
	`    "sites":[`
	`     {`
	`        "name":"San Jose",`
	`        "siteId": "SITE_f7662a49cfd74992b27a9a74a4418e3a"`
	`        },`
	`        {`
	`        "name": "New York",`
	`        "siteId": "SITE_e21ec70877314f6297037e88c72feec4"`
	`     }`
	`    ],`
	`    "success": true,`
	`    "total": 2`
	`}`

Get Site Group List

Get List of Site Groups

The Get List of Site Groups API queries the ExtremeLocation server for a list of Site Groups created by this user account. This API requires you to pass the valid API Key for your ExtremeLocation account.

Site Groups are a user created logical grouping of multiple sites that can be managed collectively.

URL	http://<ip>:<port>/WifiHelperServices/siteGroup/.*
Method	GET
Type	

Headers	Header Name: Authorization
	Header Value: API_KEY <token>
	Example:
	`API_KEY`
	`386f9e229398e85954b2603aedad33da06a8991f219dde08682b241a898d`
	`a89d`

URL Parameters	
Data Parameters	

Response Codes	Returns the following responses:
	• Success (200 OK)
	• Bad Request (400)
	• Unauthorized (401)
	
	Example:
	`{`
	`[`
	`    {"_id":"Central America", "description":"Sites in`
	`Central America"},`
	`    {"_id":"East Coast","description":"Sites in East Coast`
	`of North America"},`
	`    {"_id":"West Coast","description":"Sites in West Coast`
	`of North America"}`
	`]`
	`}`

Get Site Categories

Get List of Site Categories

The Get List of Sites Categories API queries the ExtremeLocation server for a list of Site Categories created and managed by this user account. This API requires you to pass the valid API Key for your ExtremeLocation account.

URL	http://<ip>:<port>/WifiHelperServices/db/generic/lsense_category_$tid
Method	GET
Type	

Headers	Header Name: Authorization
	Header Value: API_KEY <token>
	Example:
	`API_KEY`
	`386f9e229398e85954b2603aedad33da06a8991f219dde08682b241a898d`
	`a89d`

URL Parameters	

Data Parameters	

Response Codes	Returns the following responses:
	• Success (200 OK)
	• Bad Request (400)
	• Unauthorized (401)
	
	Example:
	<pre>[
	    {
	        "_id":
	            {"$oid":"59148974039d8a1898c2448a"},
	            "name":"fresh_produce",
	            "desc":"Fresh produce like vegetables & fruits"
	    },
	    {
	        "_id":
	            {"$oid":"591af0e5831f1a1f6749075b"} ,
	            "name":"poultry" ,
	            "desc":"Poultry"
	    },
	    {
	        "_id":
	            {"$oid":"591af408039d8a21725f3959"} ,
	            "name":"fish" ,
	            "desc":"Fish"
	    }
	]</pre>

Floor APIs

The Floor APIs provide methods to retrieve the following floor specific information:

• the complete list of floors for a specific site
• the floor plan of a specific floor in a specific site
• the complete list of regions configured on a specific floor of a specific site

The information thus retrieved from the server can then be used to get information on the devices installed at the floor.

Get Floors List

Get List of Floors for a Site

The Get List of Floors API queries the ExtremeLocation server for a list of floors for a site. This API requires you to pass the valid API Key for your ExtremeLocation account and also pass the ID of the site for which this information is required.

URL	http://<ip>:<port>/WifiHelperServices/surveyfloorplanservice/list/floors
Method	POST
Type	application/json

Headers	Header Name: Authorization
	Header Value: API_KEY <token>
	Example:
	`API_KEY 386f9e229398e85954b2603aedad33da06a8991f219dde08682b241a898da89d`
URL Parameters	

Data Parameters	These parameters are mandatory:
	nodeType Type of node for which this request is made. For this request, the node type should always be "FLOOR"
	parent The unique site ID for the site for which this query is made.
	Example:

	``
	{
	    "nodeType":"FLOOR",
	    "parent":"SITE_203a7140654a4db5a1c82ef12264e64b"
	}
	``

Response Codes	Returns the following responses:
	• Success (200 OK)
	• Bad Request (400)
	• Unauthorized (401)
	
	Example:
	``
	{
	    "total":3,
	    "floors":
	    [
	        {
	            "floorNumber":1,
	            "floorName":"4th Floor",
	            "ceilingHeight":3.048,
	            "backgroundImages":
	                [
	
	{"fileName":"FLOOR_d2b6ddcbde2441619e263ad4bd4a41d0"}
	                ],
	            "regions":
	            [
	                {
	                    "regionname":"Bakery",
	                    "categories":["Calibration_Reg1"],
	                    "description":"The Bakery",
	                    "bgcolor":"ffff00",
	                    "x1":37.23,
	                    "y1":24.41,
	                    "x2":42.65,
	                    "y2":30.4
	                },
	
	                {
	                    "regionname":"Toys",
	                    "categories": ["Calibration_Reg2"],
	                    "description":"The Toys Section",
	                    "bgcolor":"00ffa2",
	                    "x1":37.32,
	                    "y1":18.66,
	                    "x2":42.4,
	                    "y2":23.74
	                },
	
	                {
	                    "regionname":"Male Clothing",
	                    "categories": ["Calibration_Reg3"],
	                    "description":"The Male clothing
	section",
	                    "bgcolor":"ff1dd7",
	                    "x1":63.39,
	                    "y1":18.33,
	``

```
                                        "x2":69.05,
                                        "y2":30.07
                                    },

                                    {
                                        "regionname":"FreshProduce",
                                        "categories":  ["Calibration_Reg3"],
                                        "description":"Fresh Fruits &
                        Vegetables",
                                        "bgcolor":"ff1800",
                                        "x1":14.17,
                                        "y1":22.46,
                                        "x2":23.19,
                                        "y2":29.08
                                    }
                                ],
                                "scale":14.41,
                                "bounds":
                                {
                                    "bottomLeft":{"x":0.0,"y":0.0},
                                    "topRight":
                                    {"x":71.0617626648161,
                                    "y":56.14156835530881
                                }
                            },
                            "gridMeta":
                            {
                                "cols":8,"rows":6},
                                "id":"FLOOR_d2b6ddcbde2441619e263ad4bd4a41d0",
                                "nodeType":"FLOOR",
                                "ance  stors":
                                [
                                    "dd59b67dca9b4686810adc46d3cd530a",
                                    "SITE_203a7140654a4db5a1c82ef12264e64b"
                                ],
                                "parent":"SITE_203a7140654a4db5a1c82ef12264e64b"
                            }
                        ],
                        "success":true
                    }
                                                        }
```

Get the Floor Plan

Get the Floor Plan

The Get Floor Plan API queries the ExtremeLocation server for the floor plan of a floor in a site. This API requires you to pass the valid API Key for your ExtremeLocation account and also pass the ID of the site and the ID of the floor for which this information is required.

URL	http://<ip>:<port>/WifiHelperServices/surveyfloorplanservice/get/image/floorplan
Method	POST
Type	application/json

Headers	Header Name: Authorization
	Header Value: API_KEY <token>
	Example:
	`API_KEY`
	`386f9e229398e85954b2603aedad33da06a8991f219dde08682b241a898d`
	`a89d`

URL Parameters	

Data Parameters	These parameters are mandatory:
	
	id The unique ID of the floor for which you require the floor plan
	
	parent The unique site ID for the site for which this query is made
	
	Example:
	`{`
	`    "id":"FLOOR_d2b6ddcbde2441619e263ad4bd4a41d0",`
	`    "parent":"SITE_203a7140654a4db5a1c82ef12264e64b"`
	`}`

Response Codes	Returns the following responses: • Success (200 OK) • Bad Request (400) • Unauthorized (401) The floor map image is also returned.

Get Regions List

Get List of Regions Assigned to a Floor

The Get List of Regions API queries the ExtremeLocation server for a list of regions assigned on a floors in a site. This API requires you to pass the valid API Key for your ExtremeLocation account and also pass the ID of the site and the ID for the floor for which this information is required.

URL	http://<ip>:<port>/WifiHelperServices/get/floor/regions
Method	POST
Type	application/json

Headers	Header Name: Authorization
	Header Value: API_KEY <token>
	Example:
	`API_KEY`
	`386f9e229398e85954b2603aedad33da06a8991f219dde08682b241a898d`
	`a89d`

URL Parameters	

Data Parameters	These parameters are mandatory:
	nodeType Type of node for which this request is made. For this request, the node type should always be "FLOOR"
	id The unique ID of the floor for which you require the regions
	parent The unique site ID for the site for which this query is made.

	Example:
	```{```
	``` "nodeType":"FLOOR",```
	``` "id":"FLOOR_d2b6ddcbde2441619e263ad4bd4a41d0",```
	``` "parent":"SITE_203a7140654a4db5a1c82ef12264e64b"```
	```}```

Response Codes	Returns the following responses: • Success (200 OK) • Bad Request (400) • Unauthorized (401)

Example:
```
{
    "total":3,
    "floors":
    [
        {
            "floorNumber":1,
            "floorName":"4th Floor",
            "ceilingHeight":3.048,
            "backgroundImages":
                [

{"fileName":"FLOOR_d2b6ddcbde2441619e263ad4bd4a41d0"}
                ],
            "regions":
            [
                {
                    "regionname":"Bakery",
                    "categories":["Calibration_Reg1"],
                    "description":"The Bakery",
                    "bgcolor":"ffff00",
                    "x1":37.23,
                    "y1":24.41,
                    "x2":42.65,
                    "y2":30.4
                },

                {
                    "regionname":"Toys",
                    "categories":  ["Calibration_Reg2"],
                    "description":"The Toys Section",
                    "bgcolor":"00ffa2",
                    "x1":37.32,
                    "y1":18.66,
                    "x2":42.4,
                    "y2":23.74
                },

                {
                    "regionname":"Male Clothing",
                    "categories":  ["Calibration_Reg3"],
                    "description":"The Male clothing
section",
```

```
                                    "bgcolor":"ff1dd7",
                                    "x1":63.39,
                                    "y1":18.33,
                                    "x2":69.05,
                                    "y2":30.07
                                },

                                {
                                    "regionname":"FreshProduce",
                                    "categories":  ["Calibration_Reg3"],
                                    "description":"Fresh Fruits &
                        Vegetables",
                                    "bgcolor":"ff1800",
                                    "x1":14.17,
                                    "y1":22.46,
                                    "x2":23.19,
                                    "y2":29.08
                                }
                            ],
                            "scale":14.41,
                            "bounds":
                            {
                                "bottomLeft":{"x":0.0,"y":0.0},
                                "topRight":
                                {"x":71.0617626648161,
                                "y":56.14156835530881
                            }
                        },
                        "gridMeta":
                        {
                            "cols":8,"rows":6},
                            "id":"FLOOR_d2b6ddcbde2441619e263ad4bd4a41d0",
                            "nodeType":"FLOOR",
                            "ance   stors":
                            [
                                "dd59b67dca9b4686810adc46d3cd530a",
                                "SITE_203a7140654a4db5a1c82ef12264e64b"
                            ],
                            "parent":"SITE_203a7140654a4db5a1c82ef12264e64b"
                        }
                    ],
                    "success":true
                }
                                                    }
```

Device API

The Device API provides a method to get the list of all devices deployed on a floor. This API also returns the exact physical location of the device, the categories assigned to it, and its RSSI threshold.

Get Device List

Get List of Devices Deployed on a Floor

The Get Device List API queries the ExtremeLocation server for a list of devices deployed on a floor in a site. This API requires you to pass the valid API Key for your ExtremeLocation account and also pass the ID of the site and the ID for the floor for which this information is required.

URL	http://<ip>:<port>/WifiHelperServices/get/devices
Method	POST
Type	application/json

Headers	Header Name: Authorization
	Header Value: API_KEY <token>
	Example:
	`API_KEY`
	`386f9e229398e85954b2603aedad33da06a8991f219dde08682b241a898d`
	`a89d`

URL Parameters	

Data Parameters	These parameters are mandatory:
	
	floorId The unique ID of the floor for which you require the list of devices
	
	siteId The unique site ID for the site for which this query is made.
	
	Example:
	`{`
	`    "floorId":"FLOOR_d2b6ddcbde2441619e263ad4bd4a41d0",`
	`    "siteId":"SITE_203a7140654a4db5a1c82ef12264e64b"`
	`}`

Response Codes	Returns the following responses:
	• Success (200 OK)
	• Bad Request (400)
	• Unauthorized (401)
	
	Example:
	`{`
	`    "total":1,`
	`    "devices":[`
	`    {`
	`        "mac":"74:67:f7:9a:12:db",`
	`        "floorId":"FLOOR_d2b6ddcbde2441619e263ad4bd4a41d0",`
	`        "location":{"x":50.527412,"y":28.66415,"z":0.0},`
	`        "categories":["Cali_AP3"],`
	`        "zoneRssiThreshold":-55,`
	`        "id":"7467f79a12db",`
	`        "nodeType":"DEVICE",`
	`        "ancestors":`
	`["dd59b67dca9b4686810adc46d3cd530a","SITE_203a7140654a4db5a1`
	`c82ef12264e64b"],`
	`        "parent":"SITE_203a7140654a4db5a1c82ef12264e64b"}],`
	`        "success":true`
	`    }`
	`}`

4 Creating the Web Application

<div style="background:#b3a0cc">

Locationing Event
Presence Events
Notification Store
Notification Subscriber Ex
Zone Notification
Zone Notification Data
Creating the Web Server Application

</div>

This topic provides information about the java classes and jsp pages that enables you to create a sample web server application for handling notification events from ExtremeLocation. This topic also provides step by step instructions to create and deploy the server application using Eclipse IDE and Apache Tomcat server.

These resources are available for download from ExtremeLocation user interface. To download these resources:

1 Select from the top right of the screen.

    The following menu displays:
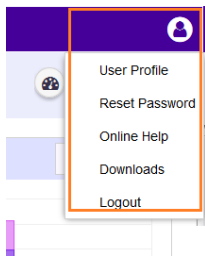
2 Select **Downloads**.

    The **Downloads** screen displays.
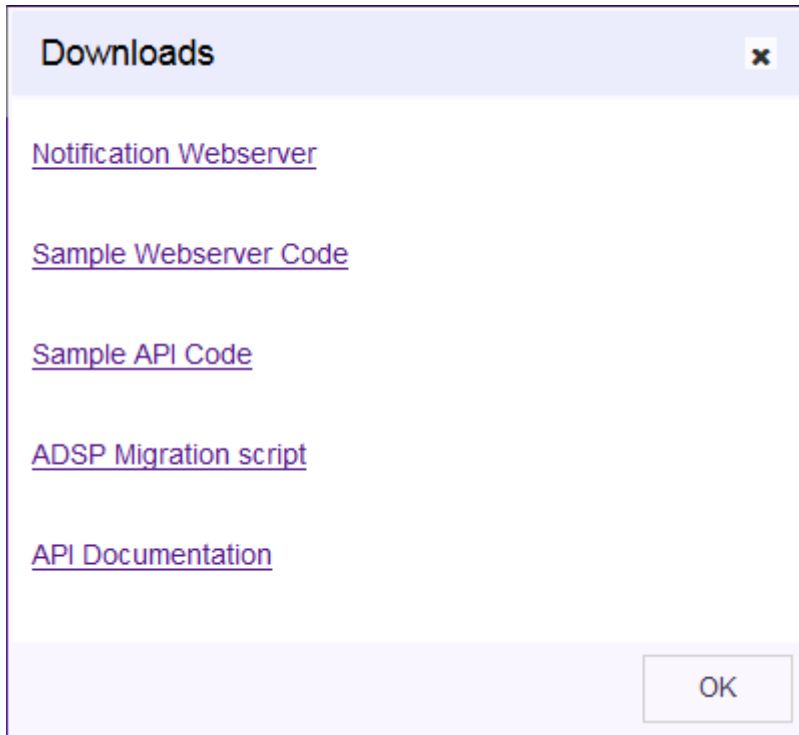
3   Select the appropriate link to download the required resource.

Locationing Event

LocationingEvent.java

This class is a Plain Old Java Object (POJO) class with fields and 'get' and 'set' methods to access these fields. This class is meant for storing locationing event 'LOCATION_EVENT'. You can use this POJO object to add this event type to the list of events object and then use it in the JSP to display the location events.

Presence Events

PresenseEvent.java

This class is a Plain Old Java Object (POJO) class with fields and 'get' and 'set' methods to access these fields. This class is meant for storing presence events such as 'DEVICE_ENTERED' & 'DEVICE_EXIT'. You can use this POJO object to add these event types to the list of events object and then use it in the JSP to display presence events.

Notification Store

NotificatonStore.java

This is a utility class that stores multiple events into list objects of different types.

Notification Subscriber Ex

NotificationSubscriberEx.java

This servlet performs POST operations and retrieves the request header from the "request" object. It then parses the "request" object to get the JSON sent from the server. It parses the JSON object to identify the event type and the specific event. This servlet then stores the event data into their respective POJO followed by saving the POJO into the list object that is used for displaying the events.

Zone Notification

ZoneNotification.jsp

This Java Server Page (JSP) is responsible for displaying event data and their numbers.

Zone Notification Data

ZoneNotificationData

This class is a Plain Old Java Object (POJO) class with fields and 'get' and 'set' methods to access these fields. This class is meant for storing category events such as 'CATEGORY_ENTERED' & 'CATEGORY_EXIT'. You can use this POJO object to add these event types to the list of events object and then use it in the JSP to display category events.

Creating the Web Server Application

The Sample Web Server requires the following components:
- Apache Tomcat Server
- An IDE that supports JAVA development (Eclipse)
- Java Development Kit version 1.8 and above

Note

The following resources are available for download from the ExtremeLocation user interface.
- **Notification Webserver** - Apache Tomcat Server files
- **Sample Webserver Code** - Sample web server application as an Eclipse project
- **Sample API Code** - Sample API code as an Eclipse project
- **API Documentation** - Launches a web page that displays help about the various ExtremeLocation APIs available for use

The server also requires the following JAVA components.
- common-codec-1.6.jar
- commons-logging-1.1.1.jar
- gson-2.3.jar

- httpclient-4.2.5.jar
- httpclient-cache-4.2.5.jar
- httpcore-4.2.4.jar
- httpmime-4.2.5.jar
- jackson-annotations-2.2.0.jar
- jackson-core-2.2.0.jar
- jackson-databind-2.2.0.jar
- javax.servlet-api-3.1.0.jar
- log4j-1.2.16.jar

Logging requires the following properties file;

- log4j.properties

The class files required for Apache Tomcat support are included in the Eclipse project file.

Note

Ensure that you have a working installation of the Eclipse IDE able to compile `java` code. When using *Windows*, ensure you have set the `JAVA_HOME` environment variable to the JDK directory where the `javac.exe` file is installed.

Refer to the following steps to create your sample Web Server Application.

1   From the open Eclipse IDE instance, select **File** > **Import**

The Import dialog displays.
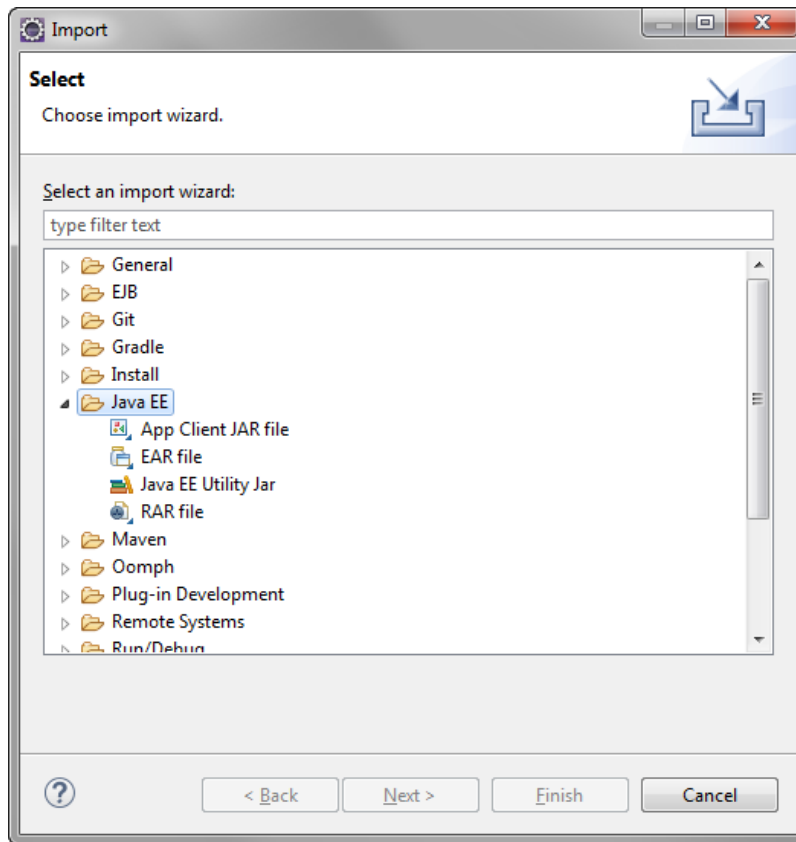
Figure 2: Eclipse IDE - Import Dialog

2   From the **Select the import wizard** list, select the item **General** to expand it and then select the
    Existing Projects into Workspace item.
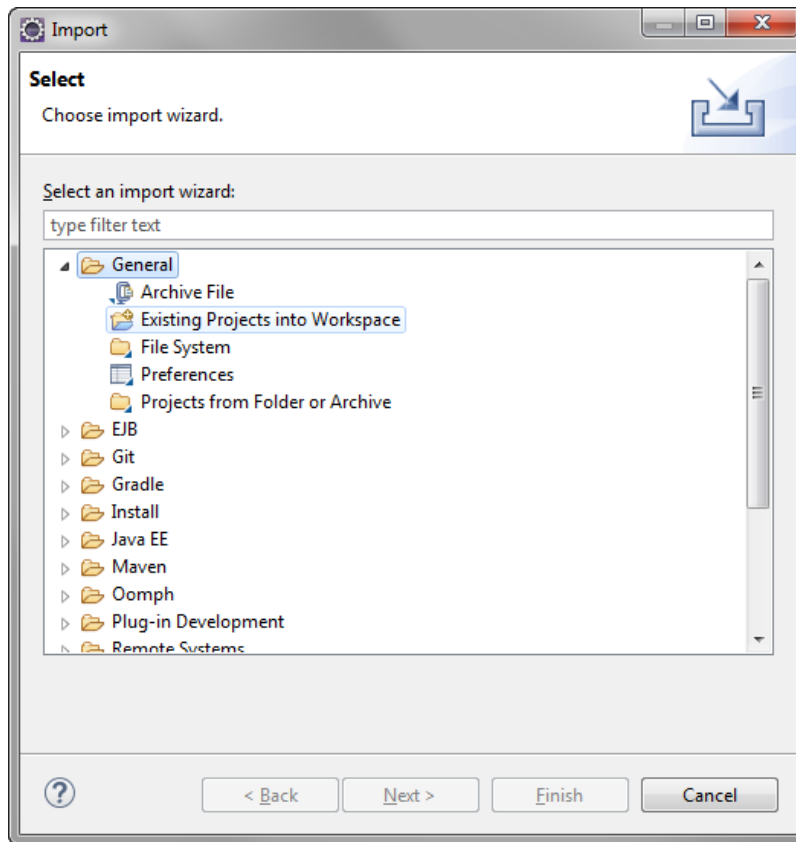
Figure 3: Eclipse IDE - Import Dialog - Select project import type

3   Select the **Next** button.

The **Import Projects** screen displays.
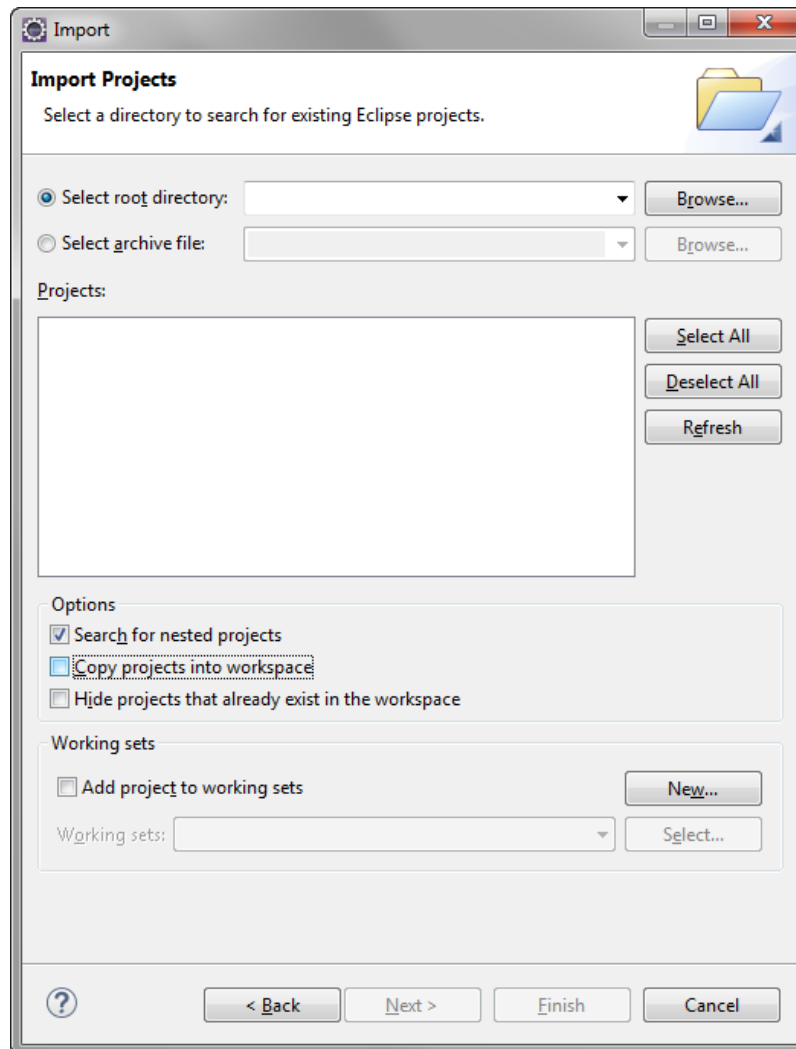
Figure 4: Eclipse IDE - Import Dialog - Import Projects

4   Select the **Select archive file** option and then select the **Browse** button next to this option.

The operating system's file open dialog displays.
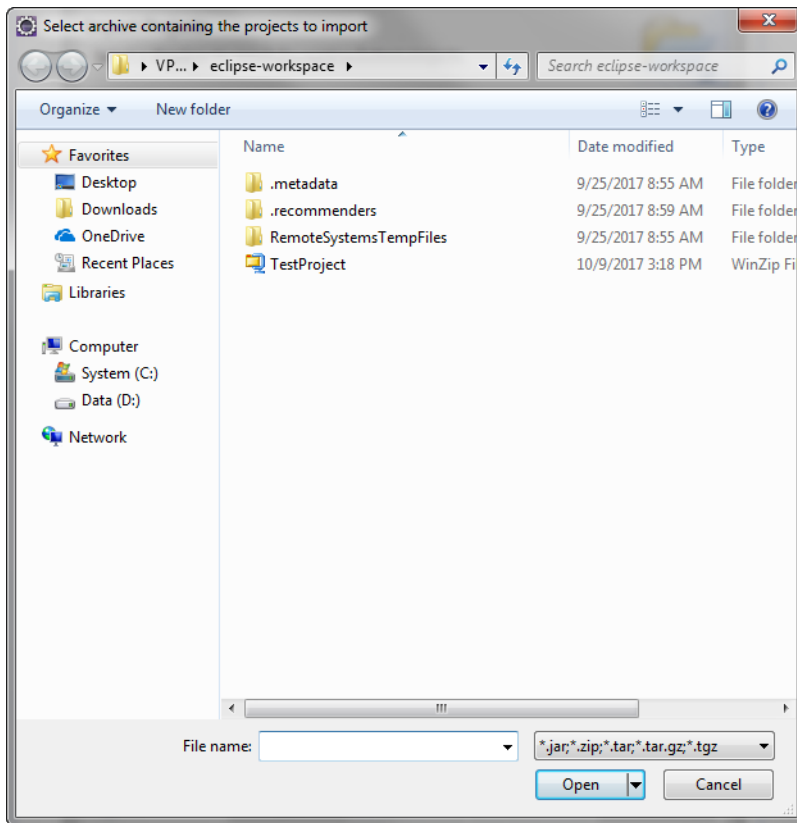
Figure 5: Open Dialog

5   Navigate to the directory where you have downloaded the Eclipse Sample Web Application project's archive file and then select it. Click **Finish** button to import the archive file into the Eclipse IDE.

The project's archive file is imported into the Eclipse IDE.
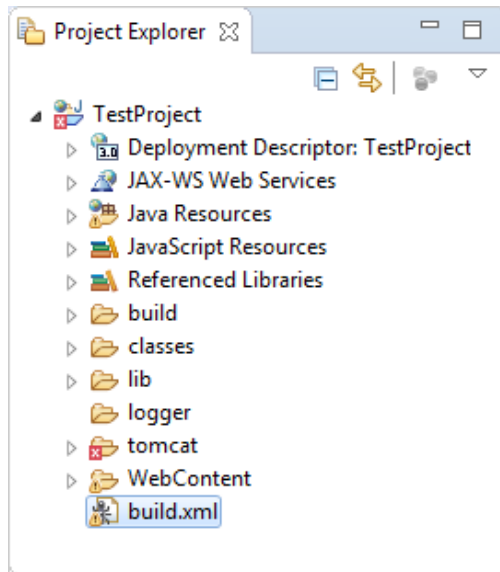
Figure 6: Eclipse IDE - Directory Structure After Project Import

6   Right click the `build.xml` file from the **Project Explorer** window. Select **Run As** > **Ant Build**.

The project is compiled. If the project builds successfully, a new folder named **war** is created under the project's main directory.

7   Expand the **war** folder.
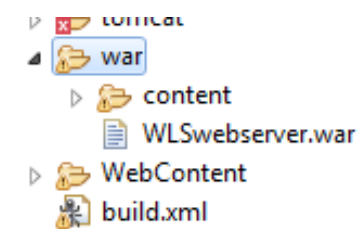
Figure 7: Eclipse IDE - Directory Contents for the .war Folder

8   Copy the `.war` file located in this folder to your installation of the Apache Tomcat server.

9 Once the web application is deployed on the Apache Tomcat server, use the following example URL to launch the web application:

```
http://localhost:9090/WLSwebserver/ZoneNotification.jsp?
presencedata=on&loactiondata=on&zonedata=on
```

The following screen displays.

Figure 8: Demo Web Application in a Browser