ThreatConnect™ Java API

Quick Start Guide

DRAFT

Table of Contents

About This Document

This quick start guide gets you started coding Java applications using the ThreatConnect API. The Java API offers coverage of all features in version 2.0 of the ThreatConnect API -- this includes the ability to write data to ThreatConnect. This document will provide an overview of the reference implementation of the ThreatConnect Java API.

The goal of this Java API library is to provide a programmatic abstraction layer around the ThreatConnect API without losing functional coverage over the available API resources. This abstraction layer enables developers to focus on writing enterprise functionality without worrying about low-level RESTful calls and authentication management.

This document is not a replacement for the official ThreatConnect API Documentation. This document serves as a companion to the official documentation for the RESTful ThreatConnect API. Read the official documentation to gain a further understanding of the functional aspects of using the ThreatConnect API.

How to Use This Document

This document will teach you how to create groups, indicators, associations, tags, security labels, and victims. Along with creating data elements, you will be able to create, update, delete, and request data from the API using Java. This document assumes the reader knows the Java Programming Language.

All code examples will be noted in a separate box with a monospaced font and line numbers to facilitate explanation of code functionality. When a single line of code wraps, the rounded right arrow "↪" will highlight that the code is a continuation of the prior line (see between line 2 and 3 below). This is a code sample with line numbers and syntax highlighting.

```
1     private static void doCreate(Connection conn) {
2         AbstractGroupWriterAdapter<Adversary> writer
  ↪ WriterAdapterFactory.createAdversaryGroupWriter(conn);
3
4         Adversary adversary = new Adversary();
5         adversary.setName("Test Adversary");
6         adversary.setOwnerName("System");
7
8         try {
9             Adversary savedAdversary = writer.create(adversary);
10            System.out.println("Saved: " + savedAdversary.toString() );
11
12        } catch (IOException | FailedResponseException ex) {
13            System.err.println("Error: " + ex.toString());
14        }
15
16    }
```

Getting Started

To get started, you'll need to have JDK 7+ installed along with the ThreatConnect Java API library. This section will also highlight basic API user configuration to connect to the ThreatConnect API. While an IDE will facilitate development of larger scale systems, it is not required to follow the examples in this document.

Important: The following software is required to use the ThreatConnect Java API.

- ➔ Java JDK 7+ http://www.oracle.com/technetwork/java/javase/downloads/index.html
- ➔ ThreatConnect Java API<Insert Download Link Here or note that it was downloaded with doc>

To use the ThreatConnect RESTful API, an API user must be provisioned. See the official ThreatConnect API documentation for details on how to create an API user as it is out of scope for this document.

The Java API will need to be configured with an Access ID and Secret Key. The Java API searches system properties for the "threatconnect.api.config" property. In Java this property can be defined in two ways:

1. In the JVM, you can call your program with the following -D property flag:

```
threatconnect.api.config=<YOUR CONFIG FILE LOCATION>
```

2. The system property can be directly set at runtime using the following code:

```
System.getProperties().setProperty("threatconnect.api.config", "<YOUR CONFIG FILE LOCATION>");
```

The configuration file should contain the following lines at a minimum:

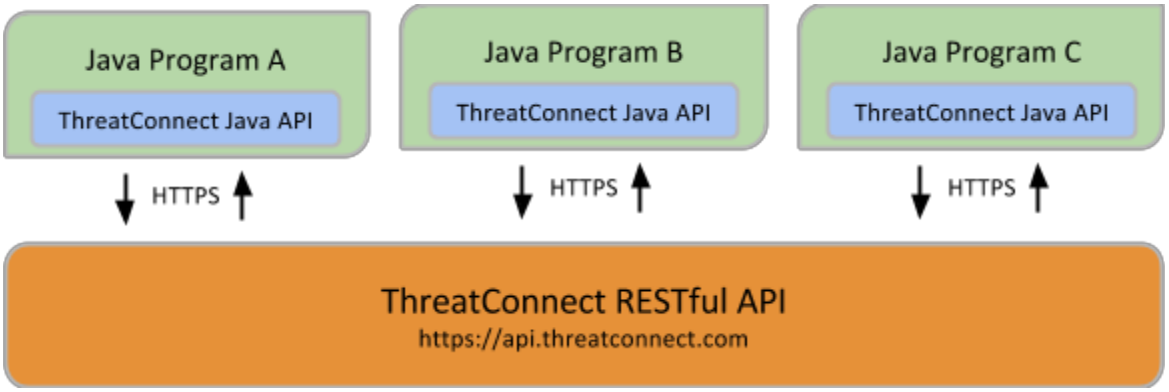
```
connection.tcApiUrl=https://api.threatconnect.com
connection.tcApiAccessID=<YOUR API ACCESS ID>
connection.tcApiUserSecretKey=<YOUR API SECRET KEY>
```

Once the configuration has been set up, you should be able to run the examples in this document as long as the ThreatConnect Java API is part of your classpath. See the following examples for a typical startup script.

```
Windows:  java -cp ".;tcApiLib.jar" -Dthreatconnect.api.config=myConfig.properties TestClass
*nix:     java -cp ".:./tcApiLib.jar" -Dthreatconnect.api.config=myConfig.properties TestClass
```

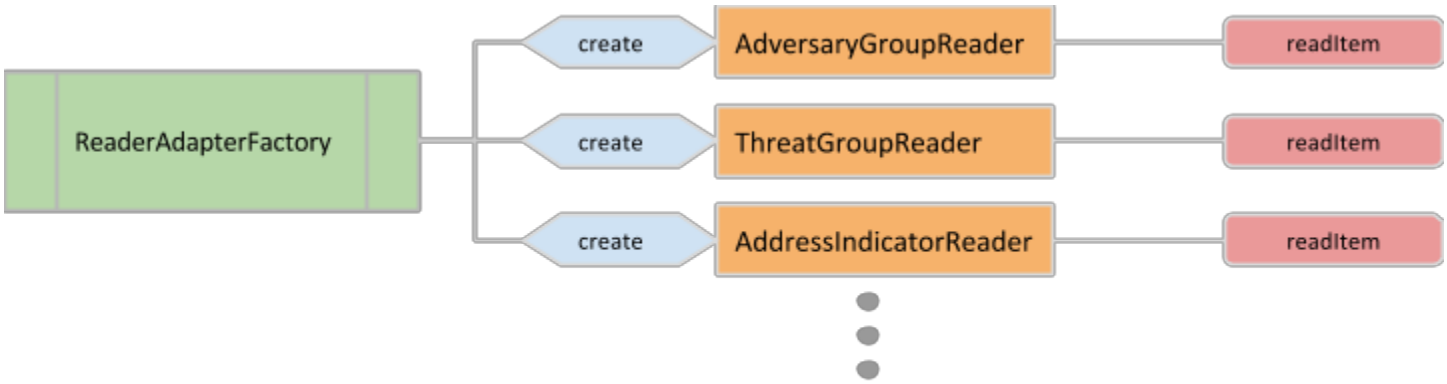
Technical Design

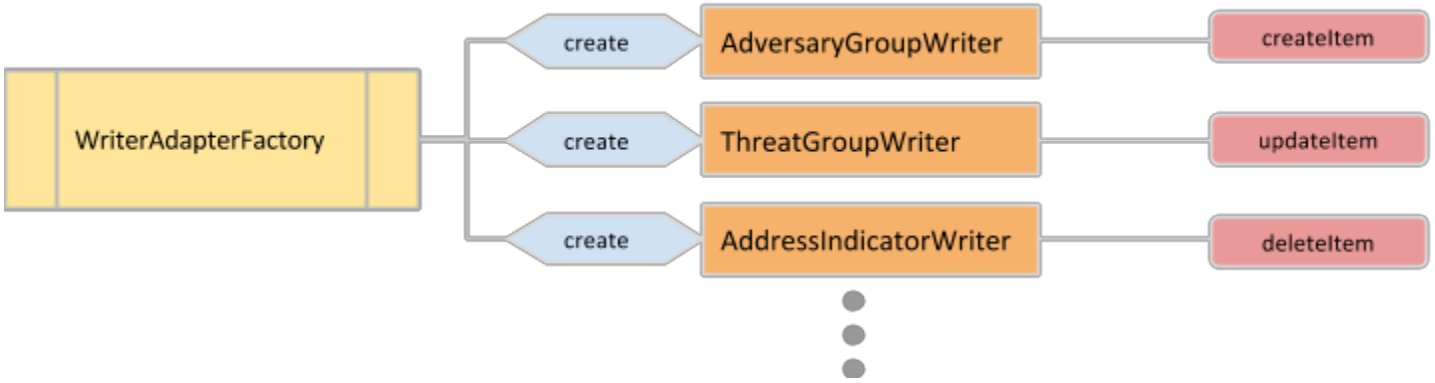
The ThreatConnect Java API was designed with a focus on abstracting the API REST calls while enabling the developer to use an enterprise level programming language. The abstraction layer is relatively "thin" because it coincides directly with all of the REST API calls. In fact, the entities themselves were ported directly from the ThreatConnect API to enable consistent communication between the Java API and the REST API.



The Java library was designed with common programming design patterns. You'll notice the "Adapter" pattern used to manage the interaction with the API connection and REST calls. The Java API depends the Apache HTTP Components open source library to handle these calls. Because instantiating an Adapter requires a low-level RequestExecutor, a "Factory" design pattern was utilized to expose reading/writing functionality in a simplified way.

You'll notice the use of Java Generics to type many of the Adapters in an effort to reuse code, as most readers share functional resources. Below is a diagram that will help illustrate common interactions between different classes (Note: names are conceptual to illustrate interaction, actual class names and methods will be discussed later in this document) . All interactions with the Java API will follow this programmatic idiom.





To facilitate interaction with the full set of Java API readers and writers, it's highly advised to use the ReaderAdapterFactory and WriterAdapterFactory respectively.

First API Example

Now that we've covered setup and the Java API design, let's write our first program using the Java API. We'll create an Adversary reader to pull a collection of all Adversaries belonging to organization "System". Once retrieved, the adversary objects will be printed to the console.

```
1 import com.cyber2.api.lib.client.reader.AbstractGroupReaderAdapter;
2 import com.cyber2.api.lib.client.reader.ReaderAdapterFactory;
3 import com.cyber2.api.lib.conn.Connection;
4 import com.cyber2.api.lib.exception.FailedResponseException;
5 import com.cyber2.api.lib.server.entity.Adversary;
6 import java.io.IOException;
7 import java.util.List;
```

```
 8
 9 public class GroupExample {
10
11     public static void main(String[] args) {
12
13         Connection conn = null;
14
15         try {
16
17             System.getProperties().setProperty("threatconnect.api.config", "/config.properties");
18             conn = new Connection();
19
20             AbstractGroupReaderAdapter<Adversary> reader =
   ↪ ReaderAdapterFactory.createAdversaryGroupReader(conn);
21             List<Adversary> data = reader.getAll("System");
22             for (Adversary g : data ) {
23                 System.out.println( "Adversary: " + g.toString() );
24             }
25
26         } catch (IOException | FailedResponseException ex) {
27             System.err.println("Error: " + ex);
28         } finally {
29             if ( conn != null )     conn.disconnect();
30         }
31
32     }
33
34 }
```

Line 1-7 Notable imports include:

- ➔ The "`com.cyber2.api.lib.client.reader`" package holds all Adapter classes that read data from the API
- ➔ The "`com.cyber2.api.lib.server.entity`" package holds all entities returned by the Java API

Line 17-18 We programmatically define the system property to load the configuration file. This allows the developer to instantiate Connection objects (line 18) with a no-arg constructor. If the "`threatconnect.api.config`" property isn't defined, the developer has the option of passing the configuration file name string in the single-arg Connection constructor.

Line 20 Here is the standard way to create an AbstractGroupReaderAdapter<Adversary> object. Using the ReaderAdapterFactory pattern and generics, we enforce compile-time type constraints on this abstract
class. We pass the connection object used by the Adapter to interact with the ThreatConnect API.

Line 21 Using the reader object, we call getAll() method and pass it the organization string name to return all Adversaries for the "System" organization.

Line 22-24 We iterate through the data collection to print the contents to the console.

Line 26 The IOException is potentially thrown if the Connection object can't find the properties file. The FailedResponseException is thrown if the API request is invalid.

Line 29 In all cases when processing is complete, we call disconnect() on the connection object to release resources.

In this section we learned:

- ➔ How to connect to the ThreatConnect API by passing the configuration file in system properties
- ➔ How to get a list of Adversaries for organization "System"
- ➔ What types of exceptions a connection and read operation can potentially throw
- ➔ How to close a ThreatConnect API connection

The Reader Package

The reader package is the primary package to retrieve data from the ThreatConnect API. It covers all available resources exposed through the ThreatConnect API. The primary classes in the reader package are listed below. They encompass all read functionality from the ThreatConnect API.

Class	Description
ReaderAdapterFactory	Primary entry point to instantiate all readers in the reader package.
AbstractGroupReaderAdapter<T extends Group>	Generic Group Reader Abstract class. Concrete object available in ReaderAdapterFactory.
AbstractIndicatorReaderAdapter<T extends Indicator>	Generic Indicator Reader Abstract class. Concrete object available in ReaderAdapterFactory.
AbstractReaderAdapter	Base Abstract Reader for all Reader Adapters in the reader package.
OwnerReaderAdapter	Concrete Reader for Organization owner data. Convenience object available in ReaderAdapterFactory.
SecurityLabelReaderAdapter	Concrete Reader for SecurityLabel data. Convenience object available in ReaderAdapterFactory.
TagReaderAdapter	Concrete Reader for Tag data. Convenience object available in ReaderAdapterFactory.
VictimReaderAdapter	Concrete Reader for Victim data. Convenience object available in ReaderAdapterFactory.

Reader Factory

The ReaderAdapterFactory class is effectively the "hub" for reader adapters. It provides convenience objects for all the adapters in the reader package. Below is a list of the static methods and return types of the **ReaderAdapterFactory**.

Modifier and Type	Method
static AbstractGroupReaderAdapter<Adversary>	createAdversaryGroupReader(Connection conn)
static AbstractGroupReaderAdapter<Email>	createEmailGroupReader(Connection conn)
static AbstractGroupReaderAdapter<Incident>	createIncidentGroupReader(Connection conn)
static AbstractGroupReaderAdapter<Signature>	createSignatureGroupReader(Connection conn)
static AbstractGroupReaderAdapter<Threat>	createThreatGroupReader(Connection conn)
static AbstractIndicatorReaderAdapter<Address>	createAddressIndicatorReader(Connection conn)
static AbstractIndicatorReaderAdapter<EmailAddress>	createEmailAddressIndicatorReader(Connection conn)
static AbstractIndicatorReaderAdapter<File>	createFileIndicatorReader(Connection conn)
static AbstractIndicatorReaderAdapter<Host>	createHostIndicatorReader(Connection conn)
static AbstractIndicatorReaderAdapter<Url>	createUrlIndicatorReader(Connection conn)
static OwnerReaderAdapter	createOwnerReader(Connection conn)
static SecurityLabelReaderAdapter	createSecurityLabelReader(Connection conn)
static TagReaderAdapter	createTagReader(Connection conn)
static VictimReaderAdapter	createVictimReader(Connection conn)

Reader Factory Example

Let's continue building from our first example and use more Adapters available to us in the reader package. The following example reads all groups available to the "System" organization. It then proceeds to iterate through each group printing and performing "`getById()`" lookups to get the full Group object from the ThreatConnect API. Note the "`...`" characters were added to code sections removed for brevity.

```
 1 import com.cyber2.api.lib.client.reader.AbstractGroupReaderAdapter;
 2 import com.cyber2.api.lib.client.reader.ReaderAdapterFactory;
 3 import com.cyber2.api.lib.conn.Connection;
 4 import com.cyber2.api.lib.exception.FailedResponseException;
 5 import com.cyber2.api.lib.server.entity.Adversary;
 6 import com.cyber2.api.lib.server.entity.Email;
 7 import com.cyber2.api.lib.server.entity.Group;
 8 import com.cyber2.api.lib.server.entity.Incident;
 9 import com.cyber2.api.lib.server.entity.Signature;
10 import com.cyber2.api.lib.server.entity.Threat;
11 import java.io.IOException;
12 import java.util.List;
13
...
53     private static void doGetById(Connection conn) throws IOException, FailedResponseException {
54
55         AbstractGroupReaderAdapter reader = ReaderAdapterFactory.createAdversaryGroupReader(conn);
56         List<Group> data = reader.getAllGroups();
57         for (Group group : data) {
58             System.err.println("Checking group.class=" + group.getClass() + ", type=" + group.getType());
59             Group result = null;
60             switch( Group.Type.valueOf(group.getType()) ) {
61                 case Adversary:
62                     AbstractGroupReaderAdapter<Adversary> adversaryReader
63                         = ReaderAdapterFactory.createAdversaryGroupReader(conn);
64                     // "result" is assigned an Adversary object
65                     result = adversaryReader.getById(group.getId(), group.getOwnerName());
66                     break;
67                 case Email:
68                     AbstractGroupReaderAdapter<Email> emailReader
69                         = ReaderAdapterFactory.createEmailGroupReader(conn);
70                     // "result" is assigned an Email object
71                     result = emailReader.getById(group.getId(), group.getOwnerName());
72                     break;
73                 case Incident:
74                     AbstractGroupReaderAdapter<Incident> incidentReader
75                         = ReaderAdapterFactory.createIncidentGroupReader(conn);
76                     // "result" is assigned an Incident object
77                     result = incidentReader.getById(group.getId(), group.getOwnerName() );
78                     break;
79                 case Signature:
80                     AbstractGroupReaderAdapter<Signature> sigReader
81                         = ReaderAdapterFactory.createSignatureGroupReader(conn);
82                     // "result" is assigned a Signature object
83                     result = sigReader.getById(group.getId(), group.getOwnerName() );
84                     break;
85                 case Threat:
86                     AbstractGroupReaderAdapter<Threat> threatReader
87                         = ReaderAdapterFactory.createThreatGroupReader(conn);
88                     // "result" is assigned a Threat object
```

```
89                      result = threatReader.getById(group.getId(), group.getOwnerName() );
90                      break;
91                  default:
92                      System.err.println("Unknown Group Type: " + group.getType() );
93                      break;
94              }
95
96              assert result.getId().equals(group.getId());
97          }
98
99      }
```

Lines 5-10 Notice how we've added all Group level entities in the imports. Results from reader adapters will return an entity or a collection of entities from the "`com.cyber2.api.lib.server.entity`" package.

Line 52-53 We are interested in retrieving all groups that the current API user has access to under the "System" organization. All AbstractGroupReaderAdapter's have access to the "`getAllGroups()`" method -- it returns a collection of Group objects for the "System" organization from the ThreatConnect API.

Line 60 To illustrate the different instantiations, we use a switch statement on the generic group object.

Line 61-63 Based on the Group.Type enum value, in this section "Adversary", we create an Adversary Group Reader object from the ReaderAdapterFactory. The assignment to the adversaryReader variable is typed using generics to enforce compile time checks on the data returned from this reader.

Line 65 Here we use the "`getById()`" method to retrieve the proper Adversary group data, based on the ID and organization name, from the ThreatConnect API. The "`result`" variable is assigned an Adversary type object.

Line 67-90 The remaining case statement blocks check for different Group types, but effectively do the same operation. Take some time to review these blocks to understand how the ReaderFactory facilitates the creation of proper readers.

Line 96 Here we compare the group ID against the result ID returned by the "`getById`" method to assert that they are in fact the same entity.

There are more concise ways to handle reading data and purely checking it's ID. This code was written in a more verbose form strictly to illustrate the usage of different methods in the ReaderFactory.

Reader Class Overview

While the main entry point to the reader package is the ReaderFactory, getting familiar with the main Adapters will help you understand how to interact with the data returning from the ThreatConnect API. While there is extensive

use of Java Generics, the method naming conventions will be familiar and self-explanatory. Parameter naming conventions have been kept abstract to allow for a better representation of the identifiers being passed.

Parameter Naming Convention

Modifier and Type	Method
uniqueId	Identifier for the reader/writer Group or Incident Adapter type. For Groups, this is an Integer that requires an Adversary ID, Email ID, Incident ID, Signature ID, or Threat ID. This identifier is system generated when the group is created in ThreatConnect. For Indicators, this is a String that requires an IP Address, Email Address, File Hash, Host Name, or URL Text. This identifier is user generated when the indicator is created in ThreatConnect.
victimId	Identifier for the Victim Adapter type. This identifier is an Integer created by the system when the Victim entry is created in ThreatConnect.
assetId	Identifier for the VictimAsset Adapter type. This identifier is an Integer created by the system when the VictimAsset is created in ThreatConnect. This identifier is represents a VictimEmailAddress ID, VictimNetworkAccount ID, VictimPhone ID, VictimSocialNetwork ID, or VictimWebsite ID.
securityLabel	Identifier for SecurityLabel Adapter type. This is a user-provided String that represents the security label.
tagName	Identifier for Tag Adapter type. This is a user-provided String that represents the tag.

Let's start with the AbstractGroupReaderAdapter, the object returned when you call a GroupReader from the ReaderFactory. We reviewed these GroupReader instantiations in our last example.

The ThreatConnect Java API library comes with JavaDocs in the “apidocs” directory -- this is the reference for the Java API.

AbstractGroupReaderAdapter Class

The following methods get data for the Group type (T) linked to this Adapter. The uniqueId (P) for Groups is an Integer.

Modifier and Type	Method
T	getById(P uniqueId)
T	getById(P uniqueId, String ownerName)
List<T>	getAll()
List<T>	getAll(String ownerName)

The methods below get generic Group objects associated to this Group type (T).

Modifier and Type	Method
List<Group>	getAllGroups()
List<Group>	getAllGroups(String ownerName)
String	getAllGroupsAsText()

Associated Groups

The methods below get associated Group elements by distinct type.

Modifier and Type	Method
List<Adversary>	getAssociatedGroupAdversaries(Integer uniqueId)
List<Adversary>	getAssociatedGroupAdversaries(Integer uniqueId, String ownerName)

Adversary	getAssociatedGroupAdversary(Integer uniqueId, Integer adversaryId)
Adversary	getAssociatedGroupAdversary(Integer uniqueId, Integer adversaryId, String ownerName)
Email	getAssociatedGroupEmail(Integer uniqueId, Integer emailId)
Email	getAssociatedGroupEmail(Integer uniqueId, Integer emailId, String ownerName)
List<Email>	getAssociatedGroupEmails(Integer uniqueId)
List<Email>	getAssociatedGroupEmails(Integer uniqueId, String ownerName)
Incident	getAssociatedGroupIncident(Integer uniqueId, Integer incidentId)
Incident	getAssociatedGroupIncident(Integer uniqueId, Integer incidentId, String ownerName)
List<Incident>	getAssociatedGroupIncidents(Integer uniqueId)
List<Incident>	getAssociatedGroupIncidents(Integer uniqueId, String ownerName)
List<Group>	getAssociatedGroups(Integer uniqueId)
List<Group>	getAssociatedGroups(Integer uniqueId, String ownerName)
Signature	getAssociatedGroupSignature(Integer uniqueId, Integer signatureId)
Signature	getAssociatedGroupSignature(Integer uniqueId, Integer signatureId, String ownerName)
List<Signature>	getAssociatedGroupSignatures(Integer uniqueId)
List<Signature>	getAssociatedGroupSignatures(Integer uniqueId, String ownerName)
Threat	getAssociatedGroupThreat(Integer uniqueId, Integer threatId)
Threat	getAssociatedGroupThreat(Integer uniqueId, Integer threatId, String ownerName)
List<Threat>	getAssociatedGroupThreats(Integer uniqueId)
List<Threat>	getAssociatedGroupThreats(Integer uniqueId, String ownerName)

Associated Indicators

The following methods get associated Indicator elements by distinct types.

Modifier and Type	Method
Address	getAssociatedIndicatorAddress(Integer uniqueId, String ipAddress)
Address	getAssociatedIndicatorAddress(Integer uniqueId, String ipAddress, String ownerName)
List<Address>	getAssociatedIndicatorAddresses(Integer uniqueId)
List<Address>	getAssociatedIndicatorAddresses(Integer uniqueId, String ownerName)
Email	getAssociatedIndicatorEmail(Integer uniqueId, String emailAddress)
Email	getAssociatedIndicatorEmail(Integer uniqueId, String emailAddress, String ownerName)
List<Email>	getAssociatedIndicatorEmails(Integer uniqueId)
List<Email>	getAssociatedIndicatorEmails(Integer uniqueId, String ownerName)
File	getAssociatedIndicatorFile(Integer uniqueId, String fileHash)
File	getAssociatedIndicatorFile(Integer uniqueId, String fileHash, String ownerName)
List<File>	getAssociatedIndicatorFiles(Integer uniqueId)
List<File>	getAssociatedIndicatorFiles(Integer uniqueId, String ownerName)
Host	getAssociatedIndicatorHost(Integer uniqueId, String hostName)
Host	getAssociatedIndicatorHost(Integer uniqueId, String hostName, String ownerName)
List<Host>	getAssociatedIndicatorHosts(Integer uniqueId)
List<Host>	getAssociatedIndicatorHosts(Integer uniqueId, String ownerName)
List<Indicator>	getAssociatedIndicators(Integer uniqueId)
List<Indicator>	getAssociatedIndicators(Integer uniqueId, String ownerName)

Url	getAssociatedIndicatorUrl(Integer uniqueId, String urlText)
Url	getAssociatedIndicatorUrl(Integer uniqueId, String urlText, String ownerName)
List<Url>	getAssociatedIndicatorUrls(Integer uniqueId)
List<Url>	getAssociatedIndicatorUrls(Integer uniqueId, String ownerName)

Associated Security Labels

The methods below get associated SecurityLabel data elements.

Modifier and Type	Method
SecurityLabel	getAssociatedSecurityLabel(Integer uniqueId, String securityLabelName)
SecurityLabel	getAssociatedSecurityLabel(Integer uniqueId, String securityLabelName, String ownerName)
List<SecurityLabel>	getAssociatedSecurityLabels(Integer uniqueId)
List<SecurityLabel>	getAssociatedSecurityLabels(Integer uniqueId, String ownerName)

Associated Tags

The methods below get associated Tag data elements.

Modifier and Type	Method
Tag	getAssociatedTag(Integer uniqueId, String tagName)
Tag	getAssociatedTag(Integer uniqueId, String tagName, String ownerName)
List<Tag>	getAssociatedTags(Integer uniqueId)
List<Tag>	getAssociatedTags(Integer uniqueId, String ownerName)

Associated VictimAssets

The methods below get associated VictimAsset data elements.

Modifier and Type	Method
VictimEmailAddress	getAssociatedVictimAssetEmailAddress(Integer uniqueId, Integer assetId)
VictimEmailAddress	getAssociatedVictimAssetEmailAddress(Integer uniqueId, Integer assetId, String ownerName)
List<VictimEmailAddress>	getAssociatedVictimAssetEmailAddresses(Integer uniqueId)
List<VictimEmailAddress>	getAssociatedVictimAssetEmailAddresses(Integer uniqueId, String ownerName)
VictimNetworkAccount	getAssociatedVictimAssetNetworkAccount(Integer uniqueId, Integer assetId)
VictimNetworkAccount	getAssociatedVictimAssetNetworkAccount(Integer uniqueId, Integer assetId, String ownerName)
List<VictimNetworkAccount>	getAssociatedVictimAssetNetworkAccounts(Integer uniqueId)
List<VictimNetworkAccount>	getAssociatedVictimAssetNetworkAccounts(Integer uniqueId, String ownerName)
VictimPhone	getAssociatedVictimAssetNetworkPhoneNumber(Integer uniqueId, Integer assetId)
VictimPhone	getAssociatedVictimAssetNetworkPhoneNumber(Integer uniqueId, Integer assetId, String ownerName)
List<VictimPhone>	getAssociatedVictimAssetNetworkPhoneNumbers(Integer uniqueId)
List<VictimPhone>	getAssociatedVictimAssetNetworkPhoneNumbers(Integer uniqueId, String ownerName)
List<VictimAsset>	getAssociatedVictimAssets(Integer uniqueId, String ownerName)
VictimSocialNetwork	getAssociatedVictimAssetSocialNetwork(Integer uniqueId, Integer assetId)
VictimSocialNetwork	getAssociatedVictimAssetSocialNetwork(Integer uniqueId, Integer assetId, String ownerName)
List<VictimSocialNetwork>	getAssociatedVictimAssetSocialNetworks(Integer uniqueId)
List<VictimSocialNetwork>	getAssociatedVictimAssetSocialNetworks(Integer uniqueId, String ownerName)

VictimWebSite	getAssociatedVictimAssetWebsite(Integer uniqueId, Integer assetId)
VictimWebSite	getAssociatedVictimAssetWebsite(Integer uniqueId, Integer assetId, String ownerName)
List<VictimWebSite>	getAssociatedVictimAssetWebsites(Integer uniqueId)
List<VictimWebSite>	getAssociatedVictimAssetWebsites(Integer uniqueId, String ownerName)

Associated Attributes

The methods below Get Attributes and Attribute SecurityLabels for this Group Type.

Modifier and Type	Method
Attribute	getAttribute(Integer uniqueId, Integer attributeId)
Attribute	getAttribute(Integer uniqueId, Integer attributeId, String ownerName)
List<Attribute>	getAttributes(Integer uniqueId)
List<Attribute>	getAttributes(Integer uniqueId, String ownerName)
SecurityLabel	getAttributeSecurityLabel(Integer uniqueId, Integer attributeId, String securityLabelName)
SecurityLabel	getAttributeSecurityLabel(Integer uniqueId, Integer attributeId, String securityLabelName, String ownerName)
List<SecurityLabel>	getAttributeSecurityLabels(Integer uniqueId, Integer attributeId)
List<SecurityLabel>	getAttributeSecurityLabels(Integer uniqueId, Integer attributeId, String ownerName)

Take the time to review the different data element classifications and associations that the ThreatConnect API makes available. For the remaining Class overview in the reader package, we'll highlight the differences from the Group Adapter.

AbstractIndicatorReaderAdapter Class

Much of the AbstractIndicatorReaderAdapter is similar to the AbstractGroupReaderAdapter Class. Indicators share the ability to associate Groups, Indicators, SecurityLabels, Tags, VictimAssets, and Attributes. The listings below are some distinctions or subtle differences.

All indicators in the ThreatConnect API have a uniqueId data type of "String". This identifier is provided by each Organization in the form of an Email Address, IP Address, File Hash, Hostname, or URL text. To understand this distinction, read the Indicator section in the ThreatConnect API Documentation.

The following methods get data for the Indicator type (T) linked to this Adapter. The uniqueId (P) for Indicators is a String.

Modifier and Type	Method
T	getById(P uniqueId)
T	getById(P uniqueId, String ownerName)
List<T>	getAll()
List<T>	getAll(String ownerName)

The method below returns all the generic Indicators the current API user has access to.

Modifier and Type	Method
List<Indicator>	getIndicators()

The methods below return Owner's who have created the indicator under the uniqueId.

Modifier and Type	Method
List<Owner>	getAssociatedOwners(String uniqueId)
List<Owner>	getAssociatedOwners(String uniqueId, String ownerName)

The AbstractIndicatorReaderAdapter class has a concrete subclass **FileIndicatorReaderAdapter** that exposes the following methods.

Modifier and Type	Method

FileOccurrence	getFileOccurrence(String uniqueId, Integer fileOccurrencId)
FileOccurrence	getFileOccurrence(String uniqueId, Integer fileOccurrencId, String ownerName)

OwnerReaderAdapter Class

The OwnerReaderAdapter is a simple Adapter that returns a list of Organizations your API user has access to. There is a second method called "getOwnerMine()" that returns your Organization.

Modifier and Type	Method
Owner	getOwnerMine()
List<Owner>	getOwners()

SecurityLabelReaderAdapter Class

The SecurityLabelReaderAdapter class is a concrete class (available through the ReaderFactory) that returns SecurityLabels your API user has access to as well as by uniqueId (P). The uniqueId data type for SecurityLabels is a String.

Modifier and Type	Method
T	getById(P uniqueId)
T	getById(P uniqueId, String ownerName)
List<T>	getAll()
List<T>	getAll(String ownerName)

In addition to retrieving basic SecurityLabel data, you can get associated Groups and Indicators. For more details on those methods, look at the AbstractGroupReaderAdapter class.

TagReaderAdapter Class

The TagReaderAdapter class is a concrete class (available through the ReaderFactory) that returns Tags your API user has access to as well as by uniqueId (P). The uniqueId data type for Tags is a String.

Modifier and Type	Method
T	getById(P uniqueId)
T	getById(P uniqueId, String ownerName)
List<T>	getAll()
List<T>	getAll(String ownerName)

In addition to retrieving basic Tag data, you can get associated Groups and Indicators. For more details on those methods, review the AbstractGroupReaderAdapter class.

VictimReaderAdapter Class

The VictimReaderAdapter class is a concrete class (available through the ReaderFactory) that returns Victims your API user has access to as well as by uniqueId (P). The uniqueId data type for a Victim is an Integer.

Modifier and Type	Method
T	getById(P uniqueId)
T	getById(P uniqueId, String ownerName)
List<T>	getAll()
List<T>	getAll(String ownerName)

In addition to retrieving basic Victim data, you can get associated Groups, Indicators, and VictimAssets. For more details on those methods, review the AbstractGroupReaderAdapter class.

Reader IP Address and Tag Example

Now that we've reviewed the primary ReaderAdapter classes, let's dive into another example by using the reader package to retrieve associated Tags from our IP Address Indicators.

```
1
2     private static void doGetAssociatedTags(Connection conn) throws IOException, FailedResponseException {
3         AbstractIndicatorReaderAdapter reader = ReaderAdapterFactory.createAddressIndicatorReader(conn);
4         List<Address> data = reader.getAll();
5         for (Address address : data) {
6             System.out.printf("IP Address: %20s", address.getIp() );
7
8             List<Tag> associatedTags = reader.getAssociatedTags( address.getIp() );
9             System.out.printf("\tAssociated Tag:");
10            for(Tag tag : associatedTags) {
11                System.out.printf("%20s", tag.getName() );
12            }
13            System.out.println();
14        }
15    }
16
```

Line 3-4 We create an IndicatorReaderAdapter to read all the Addresses the API user has access to. The "`getAll()`" method returns a collection of Addresses from the ThreatConnect API.

Line 5-6 We iterate through each Address and print out it's uniqueId. As mentioned in the section on AbstractIndicatorReaderAdapter's, all uniqueId's for Indicators are Strings. In the case of Address objects, it's the IP Address or the "`getIp()`" getter method.

Line 8 To get a collection of associated tags for the IP Address, we call the "`getAssociatedTags()`" method.

Line 10-11 We iterate through each tag returned from the ThreatConnect API for that specific IP Address and print it out to the console.

In this example we learned how to:

- ➔ Get a collection of Indicators the API user has access to.
- ➔ Retrieve associated data (in this case tags) based on the uniqueId of the Indicator.

Reader Example 2

TODO

In this example we learned how to:

Writer Package

The Writer package shares many of the concepts of the Reader package with the distinction of introducing the new functionality of version 2.0 of the ThreatConnect API.

Note the WriterAdapterFactory class is effectively the "hub" for writer adapters. It provides convenience objects for all the adapters in the writer package. Below is a list of the static methods and return types of the **WriterAdapterFactory**.

Class	Description
WriterAdapterFactory	Primary entry point to instantiate all writers in the writer package
AbstractGroupWriterAdapter<T extends Group>	Generic Group Writer Abstract class. Concrete object available in WriterAdapterFactory.
AbstractIndicatorWriterAdapter<T extends Indicator>	Generic Indicator Writer Abstract class. Concrete object available in WriterAdapterFactory.
AbstractWriterAdapter	Base Abstract Writer for all Reader Adapters in the reader package.
SecurityLabelWriterAdapter	Concrete Writer for SecurityLabel data. Convenience object available in WriterAdapterFactory.
TagWriterAdapter	Concrete Writer for Tag data. Convenience object available in WriterAdapterFactory.
VictimWriterAdapter	Concrete Writer for Victim data. Convenience object available in WriterAdapterFactory.

Writer Factory

The primary methods for the WriterFactory are listed below. They encompass all write functionality for the ThreatConnect API.

Modifier and Type	Method
static AbstractGroupWriterAdapter<Adversary>	createAdversaryGroupWriter(Connection conn)
static AbstractIndicatorWriterAdapter<Address>	createAddressIndicatorWriter(Connection conn)
static AbstractIndicatorWriterAdapter<EmailAddress>	createEmailAddressIndicatorWriter(Connection conn)
static AbstractGroupWriterAdapter<Email>	createEmailGroupWriter(Connection conn)
static AbstractIndicatorWriterAdapter<File>	createFileIndicatorWriter(Connection conn)
static AbstractIndicatorWriterAdapter<Host>	createHostIndicatorWriter(Connection conn)
static AbstractGroupWriterAdapter<Incident>	createIncidentGroupWriter(Connection conn)
static SecurityLabelWriterAdapter	createSecurityLabelWriter(Connection conn)
static AbstractGroupWriterAdapter<Signature>	createSignatureGroupWriter(Connection conn)
static TagWriterAdapter	createTagWriter(Connection conn)
static AbstractGroupWriterAdapter<Threat>	createThreatGroupWriter(Connection conn)
static AbstractIndicatorWriterAdapter<Url>	createUrlIndicatorWriter(Connection conn)
static VictimWriterAdapter	createVictimWriter(Connection conn)

Writer Responses

Now that we've introduced the WriterFactory, we'll go over some conventions used in the writer API that will help clarify how deletes, creates, and updates are handled by the Java API and what the developer should expect when a failure occurs.

When a single item is modified (create/delete/update) using the Java API, the return type is an ApiEntitySingleResponse object. In an effort to simplify write operation response handling, the ApiEntitySingleResponse object provides a single object for the developer to validate the modify operation.

When a collection of items is modified (create/delete/update) using the Java API, the return type is a WriteListResponse object. Likewise, in an effort to simplify write operation response handling, the WriteListResponse

object holds collections of failed/succeeded ApiEntitySingleResponse objects. The following listing describes how modify responses should be handled.

Modifier and Type	Method	Description
List<ApiEntitySingleResponse>	getFailureList()	Collection of **failed** ApiEntitySingleResponse objects for each element the API user attempted a write operation to the ThreatConnect API.
List<ApiEntitySingleResponse>	getSuccessList()	Collection of **successful** ApiEntitySingleResponse objects for each element the API user attempted a write operation to the ThreatConnect API.

The ApiEntitySingleResponse class contains the following relevant methods.

Modifier and Type	Method	Description
boolean	isSuccess()	Returns whether the attempted operation returned successfully from the ThreatConnect API for the item that is part of this response. This should be the first element
String	getMessage()	If “isSuccess()” returns false, check this field to find the cause of the failure for the item that is part of this response.
T	getItem()	This field is a convenience method that returns the item that is part of this response. Note that not all responses return an item.

While the ApiEntitySingleResponse class manages failed write operations to the ThreatConnect API, the developer is responsible for capturing any runtime exceptions that may occur because of network, configuration, or data input issues.

Writer Create Example

Before we get into the writer package and how to use it to write data to the ThreatConnect API, let's run through a simple example.

```
  ...
  3 import com.cyber2.api.lib.client.writer.AbstractGroupWriterAdapter;
  4 import com.cyber2.api.lib.client.writer.WriterAdapterFactory;
  5 import com.cyber2.api.lib.conn.Connection;
  6 import com.cyber2.api.lib.exception.FailedResponseException;
  7 import com.cyber2.api.lib.server.entity.Adversary;
  8 import com.cyber2.api.lib.server.response.entity.ApiEntitySingleResponse;
  9 import java.io.IOException;
 10 import java.util.List;
 ...
103     private static void doCreate(Connection conn) {
104         AbstractGroupWriterAdapter<Adversary> writer = WriterAdapterFactory.createAdversaryGroupWriter(conn);
105 
106         Adversary adversary = new Adversary();
107         adversary.setName("Test Adversary");
108         adversary.setOwnerName("System");
109 
110         try {
111             ApiEntitySingleResponse<Adversary,?> response = writer.create(adversary);
112             if ( response.isSuccess() ) {
113                 Adversary savedAdversary = response.getItem();
114                 System.out.println("Saved: " + savedAdversary.toString() );
115             } else {
116                 System.err.println("Error: " + response.getMessage() );
117 
118             }
119 
120         } catch (IOException | FailedResponseException ex) {
121             System.err.println("Error: " + ex.toString());
122         }
123 
124     }
```

Line 104 Creates an AbstractGroupWriterAdapter for the Adversary Group type. With this adapter, we can write/update/delete group data elements, victim assets, attributes, and associations.

Line 106-108 Here we create a simple Adversary with a name and owner (organization).

Line 111 We use the writer to create an adversary using the ThreatConnect API. For single item writes, we always get back an ApiEntitySingleResponse object. This object allows us to inspect the response and handle appropriately.

Line 112-114 We call "`isSuccess()`" to see if the create was successful. If the check passes, we'll get the item associated with the response using the "`getItem()`" method (Line 113). The successfully saved Adversary object returns from the ThreatConnect API with a valid ID value.

Line 116 If the response is unsuccessful, we print out the response message to the console.

Line 121 We catch any potential runtime exceptions and handle appropriately. In the case of this basic example, we simply dump it out to the console.

In this example we learned how to:

- ➔ Create an Adapter using the WriterFactory.
- ➔ Create an Adversary, and verify if the save was successful.
- ➔ Handle errors from a write operation to the ThreatConnect API.

Writer Class Overview

Most of the conventions in the reader package are mirrored in the writer package. Much like the reader package, the method naming conventions will be familiar and self-explanatory. Parameter naming conventions have been kept abstract to allow for a better representation of the identifiers being passed. Below is a listing of the classes in the writer package.

AbstractGroupWriterAdapter Class

The following methods write data for the Group type (T) linked to this Adapter.

- The create methods require a Group type object as a collection or single object
- The delete methods require the key ID value as a collection or single object
- The update methods require a Group type object as a collection or single object

Modifier and Type	Method and Description
WriteListResponse<T>	create(List<T> itemList)
ApiEntitySingleResponse	create(T item)
ApiEntitySingleResponse	create(T item, String ownerName)
WriteListResponse<P>	delete(List<P> itemIds)
WriteListResponse<P>	delete(List<P> itemIds, String ownerName)
ApiEntitySingleResponse	delete(P itemId)
ApiEntitySingleResponse	delete(P itemId, String ownerName)
WriteListResponse<T>	update(List<T> itemList)

WriteListResponse<T>	update(List<T> itemList, String ownerName)
ApiEntitySingleResponse	update(T item)
ApiEntitySingleResponse	update(T item, String ownerName)

Associate Groups

The methods below associate a Group type to another Group type. We associate groups by passing in the uniqueId (Integer) with the group id that we want to associate to.

Modifier and Type	Method
WriteListResponse<Integer>	associateGroupAdversaries(Integer uniqueId, List<Integer> adversaryIds)
WriteListResponse<Integer>	associateGroupAdversaries(Integer uniqueId, List<Integer> adversaryIds, String ownerName)
ApiEntitySingleResponse	associateGroupAdversary(Integer uniqueId, Integer adversaryId)
ApiEntitySingleResponse	associateGroupAdversary(Integer uniqueId, Integer adversaryId, String ownerName)
ApiEntitySingleResponse	associateGroupEmail(Integer uniqueId, Integer emailId)
ApiEntitySingleResponse	associateGroupEmail(Integer uniqueId, Integer emailId, String ownerName)
WriteListResponse<Integer>	associateGroupEmails(Integer uniqueId, List<Integer> emailIds)
WriteListResponse<Integer>	associateGroupEmails(Integer uniqueId, List<Integer> emailIds, String ownerName)
ApiEntitySingleResponse	associateGroupIncident(Integer uniqueId, Integer incidentId)
ApiEntitySingleResponse	associateGroupIncident(Integer uniqueId, Integer incidentId, String ownerName)
WriteListResponse<Integer>	associateGroupIncidents(Integer uniqueId, List<Integer> incidentIds)
WriteListResponse<Integer>	associateGroupIncidents(Integer uniqueId, List<Integer> incidentIds, String ownerName)
ApiEntitySingleResponse	associateGroupSignature(Integer uniqueId, Integer signatureId)
ApiEntitySingleResponse	associateGroupSignature(Integer uniqueId, Integer signatureId, String ownerName)

WriteListResponse<Integer>	associateGroupSignatures(Integer uniqueId, List<Integer> signatureIds)
WriteListResponse<Integer>	associateGroupSignatures(Integer uniqueId, List<Integer> signatureIds, String ownerName)
ApiEntitySingleResponse	associateGroupThreat(Integer uniqueId, Integer threatId)
ApiEntitySingleResponse	associateGroupThreat(Integer uniqueId, Integer threatId, String ownerName)
WriteListResponse<Integer>	associateGroupThreats(Integer uniqueId, List<Integer> threatIds)
WriteListResponse<Integer>	associateGroupThreats(Integer uniqueId, List<Integer> threatIds, String ownerName)

Associate Indicators

The following methods associate Indicators to the Group type.

Modifier and Type	Method
ApiEntitySingleResponse	associateIndicatorAddress(Integer uniqueId, String ipAddress)
ApiEntitySingleResponse	associateIndicatorAddress(Integer uniqueId, String ipAddress, String ownerName)
WriteListResponse<String>	associateIndicatorAddresses(Integer uniqueId, List<String> ipAddresses)
WriteListResponse<String>	associateIndicatorAddresses(Integer uniqueId, List<String> ipAddresses, String ownerName)
ApiEntitySingleResponse	associateIndicatorEmailAddress(Integer uniqueId, String emailAddress)
ApiEntitySingleResponse	associateIndicatorEmailAddress(Integer uniqueId, String emailAddress, String ownerName)
WriteListResponse<String>	associateIndicatorEmailAddresses(Integer uniqueId, List<String> emailAddresses)
WriteListResponse<String>	associateIndicatorEmailAddresses(Integer uniqueId, List<String> emailAddresses, String ownerName)
ApiEntitySingleResponse	associateIndicatorFile(Integer uniqueId, String fileHash)
ApiEntitySingleResponse	associateIndicatorFile(Integer uniqueId, String fileHash, String ownerName)
WriteListResponse<String>	associateIndicatorFiles(Integer uniqueId, List<String> fileHashes)

WriteListResponse<String>	associateIndicatorFiles(Integer uniqueId, List<String> fileHashes, String ownerName)
ApiEntitySingleResponse	associateIndicatorHost(Integer uniqueId, String hostName)
ApiEntitySingleResponse	associateIndicatorHost(Integer uniqueId, String hostName, String ownerName)
WriteListResponse<String>	associateIndicatorHosts(Integer uniqueId, List<String> hostNames)
WriteListResponse<String>	associateIndicatorHosts(Integer uniqueId, List<String> hostNames, String ownerName)
ApiEntitySingleResponse	associateIndicatorUrl(Integer uniqueId, String urlText)
ApiEntitySingleResponse	associateIndicatorUrl(Integer uniqueId, String urlText, String ownerName)
WriteListResponse<String>	associateIndicatorUrls(Integer uniqueId, List<String> urlTexts)
WriteListResponse<String>	associateIndicatorUrls(Integer uniqueId, List<String> urlTexts, String ownerName)

Associate Security Labels

The following methods associate security labels to the Group type.

Modifier and Type	Method
ApiEntitySingleResponse	associateSecurityLabel(Integer uniqueId, String securityLabel)
ApiEntitySingleResponse	associateSecurityLabel(Integer uniqueId, String securityLabel, String ownerName)
WriteListResponse<String>	associateSecurityLabels(Integer uniqueId, List<String> securityLabels)
WriteListResponse<String>	associateSecurityLabels(Integer uniqueId, List<String> securityLabels, String ownerName)

Associate Tag

The following methods associate tags to the Group type.

Modifier and Type	Method
ApiEntitySingleResponse	associateTag(Integer uniqueId, String tagName)
ApiEntitySingleResponse	associateTag(Integer uniqueId, String tagName, String ownerName)
WriteListResponse<String>	associateTags(Integer uniqueId, List<String> tagNames)
WriteListResponse<String>	associateTags(Integer uniqueId, List<String> tagNames, String ownerName)

Associate Victim

The following methods associate Victims to the Group type.

Modifier and Type	Method
ApiEntitySingleResponse	associateVictim(Integer uniqueId, Integer victimId)
ApiEntitySingleResponse	associateVictim(Integer uniqueId, Integer victimId, String ownerName)
WriteListResponse<Integer>	associateVictims(Integer uniqueId, List<Integer> victimIds)
WriteListResponse<Integer>	associateVictims(Integer uniqueId, List<Integer> victimIds, String ownerName)

Associate Victim Asset

The following methods associate VictimAssets to the Group type.

Modifier and Type	Method
ApiEntitySingleResponse	associateVictimAssetEmailAddress(Integer uniqueId, Integer assetId)
ApiEntitySingleResponse	associateVictimAssetEmailAddress(Integer uniqueId, Integer assetId, String ownerName)
WriteListResponse<Integer>	associateVictimAssetEmailAddresses(Integer uniqueId, List<Integer> assetIds)
WriteListResponse<Integer>	associateVictimAssetEmailAddresses(Integer uniqueId, List<Integer> assetIds, String ownerName)
ApiEntitySingleResponse	associateVictimAssetNetworkAccount(Integer uniqueId, Integer assetId)

ApiEntitySingleResponse	associateVictimAssetNetworkAccount(Integer uniqueId, Integer assetId, String ownerName)
WriteListResponse<Integer>	associateVictimAssetNetworkAccounts(Integer uniqueId, List<Integer> assetIds)
WriteListResponse<Integer>	associateVictimAssetNetworkAccounts(Integer uniqueId, List<Integer> assetIds, String ownerName)
ApiEntitySingleResponse	associateVictimAssetPhoneNumber(Integer uniqueId, Integer assetId)
ApiEntitySingleResponse	associateVictimAssetPhoneNumber(Integer uniqueId, Integer assetId, String ownerName)
WriteListResponse<Integer>	associateVictimAssetPhoneNumbers(Integer uniqueId, List<Integer> assetIds)
WriteListResponse<Integer>	associateVictimAssetPhoneNumbers(Integer uniqueId, List<Integer> assetIds, String ownerName)
ApiEntitySingleResponse	associateVictimAssetSocialNetwork(Integer uniqueId, Integer assetId)
ApiEntitySingleResponse	associateVictimAssetSocialNetwork(Integer uniqueId, Integer assetId, String ownerName)
WriteListResponse<Integer>	associateVictimAssetSocialNetworks(Integer uniqueId, List<Integer> assetIds)
WriteListResponse<Integer>	associateVictimAssetSocialNetworks(Integer uniqueId, List<Integer> assetIds, String ownerName)
ApiEntitySingleResponse	associateVictimAssetWebsite(Integer uniqueId, Integer assetId)
ApiEntitySingleResponse	associateVictimAssetWebsite(Integer uniqueId, Integer assetId, String ownerName)
WriteListResponse<Integer>	associateVictimAssetWebsites(Integer uniqueId, List<Integer> assetIds)
WriteListResponse<Integer>	associateVictimAssetWebsites(Integer uniqueId, List<Integer> assetIds, String ownerName)

Add Attributes

The following set of methods add Attribute types to a Group.

Modifier and Type	Method
ApiEntitySingleResponse	addAttribute(Integer uniqueId, Attribute attribute)
ApiEntitySingleResponse	addAttribute(Integer uniqueId, Attribute attribute, String ownerName)
WriteListResponse<Attribute>	addAttributes(Integer uniqueId, List<Attribute> attributes)

WriteListResponse<Attribute>	addAttributes(Integer uniqueId, List<Attribute> attribute, String ownerName)
ApiEntitySingleResponse	addAttributeSecurityLabel(Integer uniqueId, Integer attributeId, String securityLabel)
ApiEntitySingleResponse	addAttributeSecurityLabel(Integer uniqueId, Integer attributeId, String securityLabel, String ownerName)
WriteListResponse<String>	addAttributeSecurityLabels(Integer uniqueId, Integer attributeId, List<String> securityLabels)
WriteListResponse<String>	addAttributeSecurityLabels(Integer uniqueId, Integer attributeId, List<String> securityLabels, String ownerName)

Update Attribute

The following methods update an Attribute added to a specific Group type.

Modifier and Type	Method
ApiEntitySingleResponse	updateAttribute(Integer uniqueId, Attribute attribute)
ApiEntitySingleResponse	updateAttribute(Integer uniqueId, Attribute attribute, String ownerName)
WriteListResponse<Attribute>	updateAttributes(Integer uniqueId, List<Attribute> attributes)
WriteListResponse<Attribute>	updateAttributes(Integer uniqueId, List<Attribute> attribute, String ownerName)

Delete Group Association

The following methods **delete** Group associations to a specific Group type.

Modifier and Type	Method
WriteListResponse<Integer>	deleteAssociatedGroupAdversaries(Integer uniqueId, List<Integer> adversaryIds)

WriteListResponse<Integer>	deleteAssociatedGroupAdversaries(Integer uniqueId, List<Integer> adversaryIds, String ownerName)
ApiEntitySingleResponse	deleteAssociatedGroupAdversary(Integer uniqueId, Integer adversaryId)
ApiEntitySingleResponse	deleteAssociatedGroupAdversary(Integer uniqueId, Integer adversaryId, String ownerName)
ApiEntitySingleResponse	deleteAssociatedGroupEmail(Integer uniqueId, Integer emailId)
ApiEntitySingleResponse	deleteAssociatedGroupEmail(Integer uniqueId, Integer emailId, String ownerName)
WriteListResponse<Integer>	deleteAssociatedGroupEmails(Integer uniqueId, List<Integer> emailIds)
WriteListResponse<Integer>	deleteAssociatedGroupEmails(Integer uniqueId, List<Integer> emailIds, String ownerName)
ApiEntitySingleResponse	deleteAssociatedGroupIncident(Integer uniqueId, Integer incidentId)
ApiEntitySingleResponse	deleteAssociatedGroupIncident(Integer uniqueId, Integer incidentId, String ownerName)
WriteListResponse<Integer>	deleteAssociatedGroupIncidents(Integer uniqueId, List<Integer> incidentIds)
WriteListResponse<Integer>	deleteAssociatedGroupIncidents(Integer uniqueId, List<Integer> incidentIds, String ownerName)
ApiEntitySingleResponse	deleteAssociatedGroupSignature(Integer uniqueId, Integer signatureId)
ApiEntitySingleResponse	deleteAssociatedGroupSignature(Integer uniqueId, Integer signatureId, String ownerName)
WriteListResponse<Integer>	deleteAssociatedGroupSignatures(Integer uniqueId, List<Integer> signatureIds)
WriteListResponse<Integer>	deleteAssociatedGroupSignatures(Integer uniqueId, List<Integer> signatureIds, String ownerName)
ApiEntitySingleResponse	deleteAssociatedGroupThreat(Integer uniqueId, Integer threatId)
ApiEntitySingleResponse	deleteAssociatedGroupThreat(Integer uniqueId, Integer threatId, String ownerName)
WriteListResponse<Integer>	deleteAssociatedGroupThreats(Integer uniqueId, List<Integer> threatIds)
WriteListResponse<Integer>	deleteAssociatedGroupThreats(Integer uniqueId, List<Integer> threatIds, String ownerName)

Delete Indicator Associations

The following methods will delete Indicator associations to a specific Group type.

Modifier and Type	Method
ApiEntitySingleResponse	deleteAssociatedIndicatorAddress(Integer uniqueId, String ipAddress)
ApiEntitySingleResponse	deleteAssociatedIndicatorAddress(Integer uniqueId, String ipAddress, String ownerName)
WriteListResponse<String>	deleteAssociatedIndicatorAddresses(Integer uniqueId, List<String> ipAddresses)
WriteListResponse<String>	deleteAssociatedIndicatorAddresses(Integer uniqueId, List<String> ipAddresses, String ownerName)
ApiEntitySingleResponse	deleteAssociatedIndicatorEmailAddress(Integer uniqueId, String emailAddress)
ApiEntitySingleResponse	deleteAssociatedIndicatorEmailAddress(Integer uniqueId, String emailAddress, String ownerName)
WriteListResponse<String>	deleteAssociatedIndicatorEmailAddresses(Integer uniqueId, List<String> emailAddresses)
WriteListResponse<String>	deleteAssociatedIndicatorEmailAddresses(Integer uniqueId, List<String> emailAddresses, String ownerName)
ApiEntitySingleResponse	deleteAssociatedIndicatorFile(Integer uniqueId, String fileHash)
ApiEntitySingleResponse	deleteAssociatedIndicatorFile(Integer uniqueId, String fileHash, String ownerName)
WriteListResponse<String>	deleteAssociatedIndicatorFiles(Integer uniqueId, List<String> fileHashes)
WriteListResponse<String>	deleteAssociatedIndicatorFiles(Integer uniqueId, List<String> fileHashes, String ownerName)
ApiEntitySingleResponse	deleteAssociatedIndicatorHost(Integer uniqueId, String hostName)
ApiEntitySingleResponse	deleteAssociatedIndicatorHost(Integer uniqueId, String hostName, String ownerName)
WriteListResponse<String>	deleteAssociatedIndicatorHosts(Integer uniqueId, List<String> hostNames)

WriteListResponse<String>	deleteAssociatedIndicatorHosts(Integer uniqueId, List<String> hostNames, String ownerName)
ApiEntitySingleResponse	deleteAssociatedIndicatorUrl(Integer uniqueId, String urlText)
ApiEntitySingleResponse	deleteAssociatedIndicatorUrl(Integer uniqueId, String urlText, String ownerName)
WriteListResponse<String>	deleteAssociatedIndicatorUrls(Integer uniqueId, List<String> urlTexts)
WriteListResponse<String>	deleteAssociatedIndicatorUrls(Integer uniqueId, List<String> urlTexts, String ownerName)

Delete Security Label Associations

The following methods will **delete** SecurityLabel associations to a specific Group type.

Modifier and Type	Method
WriteListResponse<String>	deleteAssociatedSecurityLabel(Integer uniqueId, List<String> securityLabels)
WriteListResponse<String>	deleteAssociatedSecurityLabel(Integer uniqueId, List<String> securityLabels, String ownerName)
ApiEntitySingleResponse	deleteAssociatedSecurityLabel(Integer uniqueId, String securityLabel)
ApiEntitySingleResponse	deleteAssociatedSecurityLabel(Integer uniqueId, String securityLabel, String ownerName)

Delete Tag Associations

The following methods will **delete** Tag associations to a specific Group type.

Modifier and Type	Method
ApiEntitySingleResponse	deleteAssociatedTag(Integer uniqueId, String tagName)

ApiEntitySingleResponse	deleteAssociatedTag(Integer uniqueId, String tagName, String ownerName)
WriteListResponse<String>	deleteAssociatedTags(Integer uniqueId, List<String> tagNames)
WriteListResponse<String>	deleteAssociatedTags(Integer uniqueId, List<String> tagNames, String ownerName)

Delete Victim Associations

The following methods will **delete** Victim associations to a specific Group type.

Modifier and Type	Method
ApiEntitySingleResponse	deleteAssociatedVictim(Integer uniqueId, Integer victimId)
ApiEntitySingleResponse	deleteAssociatedVictim(Integer uniqueId, Integer victimId, String ownerName)
WriteListResponse<Integer>	deleteAssociatedVictims(Integer uniqueId, List<Integer> victimIds)
WriteListResponse<Integer>	deleteAssociatedVictims(Integer uniqueId, List<Integer> victimIds, String ownerName)

Delete VictimAsset Associations

The following methods will **delete** VictimAsset associations to a specific Group type.

Modifier and Type	Method
ApiEntitySingleResponse	deleteAssociatedVictimAssetEmailAddress(Integer uniqueId, Integer assetId)
ApiEntitySingleResponse	deleteAssociatedVictimAssetEmailAddress(Integer uniqueId, Integer assetId, String ownerName)
WriteListResponse<Integer>	deleteAssociatedVictimAssetEmailAddresses(Integer uniqueId, List<Integer> assetIds)
WriteListResponse<Integer>	deleteAssociatedVictimAssetEmailAddresses(Integer uniqueId, List<Integer> assetIds, String ownerName)
ApiEntitySingleResponse	deleteAssociatedVictimAssetNetworkAccount(Integer uniqueId, Integer assetId)
ApiEntitySingleResponse	deleteAssociatedVictimAssetNetworkAccount(Integer uniqueId, Integer assetId, String ownerName)

WriteListResponse<Integer>	deleteAssociatedVictimAssetNetworkAccounts(Integer uniqueId, List<Integer> assetIds)
WriteListResponse<Integer>	deleteAssociatedVictimAssetNetworkAccounts(Integer uniqueId, List<Integer> assetIds, String ownerName)
ApiEntitySingleResponse	deleteAssociatedVictimAssetPhoneNumber(Integer uniqueId, Integer assetId)
ApiEntitySingleResponse	deleteAssociatedVictimAssetPhoneNumber(Integer uniqueId, Integer assetId, String ownerName)
WriteListResponse<Integer>	deleteAssociatedVictimAssetPhoneNumbers(Integer uniqueId, List<Integer> assetIds)
WriteListResponse<Integer>	deleteAssociatedVictimAssetPhoneNumbers(Integer uniqueId, List<Integer> assetIds, String ownerName)
ApiEntitySingleResponse	deleteAssociatedVictimAssetSocialNetwork(Integer uniqueId, Integer assetId)
ApiEntitySingleResponse	deleteAssociatedVictimAssetSocialNetwork(Integer uniqueId, Integer assetId, String ownerName)
WriteListResponse<Integer>	deleteAssociatedVictimAssetSocialNetworks(Integer uniqueId, List<Integer> assetIds)
WriteListResponse<Integer>	deleteAssociatedVictimAssetSocialNetworks(Integer uniqueId, List<Integer> assetIds, String ownerName)
ApiEntitySingleResponse	deleteAssociatedVictimAssetWebsite(Integer uniqueId, Integer assetId)
ApiEntitySingleResponse	deleteAssociatedVictimAssetWebsite(Integer uniqueId, Integer assetId, String ownerName)
WriteListResponse<Integer>	deleteAssociatedVictimAssetWebsites(Integer uniqueId, List<Integer> assetIds)
WriteListResponse<Integer>	deleteAssociatedVictimAssetWebsites(Integer uniqueId, List<Integer> assetIds, String ownerName)

Delete Attribute

The following methods **delete** attributes from a specific Group type.

Modifier and Type	Method
ApiEntitySingleResponse	deleteAttribute(Integer uniqueId, Integer attribute)
ApiEntitySingleResponse	deleteAttribute(Integer uniqueId, Integer attribute, String ownerName)
WriteListResponse<Integer>	deleteAttributes(Integer uniqueId, List<Integer> attributes)

WriteListResponse<Integer>	deleteAttributes(Integer uniqueId, List<Integer> attribute, String ownerName)
ApiEntitySingleResponse	deleteAttributeSecurityLabel(Integer uniqueId, Integer attributeId, String securityLabel)
ApiEntitySingleResponse	deleteAttributeSecurityLabel(Integer uniqueId, Integer attributeId, String securityLabel, String ownerName)
WriteListResponse<String>	deleteAttributeSecurityLabels(Integer uniqueId, Integer attributeId, List<String> securityLabels)
WriteListResponse<String>	deleteAttributeSecurityLabels(Integer uniqueId, Integer attributeId, List<String> securityLabels, String ownerName)

Update Attribute

The following methods **update** the attribute of the specific Group type.

Modifier and Type	Method
ApiEntitySingleResponse	updateAttribute(Integer uniqueId, Attribute attribute)
ApiEntitySingleResponse	updateAttribute(Integer uniqueId, Attribute attribute, String ownerName)
WriteListResponse<Attribute>	updateAttributes(Integer uniqueId, List<Attribute> attributes)
WriteListResponse<Attribute>	updateAttributes(Integer uniqueId, List<Attribute> attribute, String ownerName)

AbstractIndicatorWriterAdapter

The AbstractIndicatorWriterAdapter share most of the write functionality with the AbstractGroupWriterAdapter. In fact, they both implement the following writer interfaces.

Interface
AttributeAssociateWritable<T>
GroupAssociateWritable<T>

IndicatorAssociateWritable<T>
SecurityLabelAssociateWritable<T>
TagAssociateWritable<T>
VictimAssetAssociateWritable<T>

These interfaces allow the AbstractIndicatorWriterAdapter to run all of the same methods as the AbstractGroupWriterAdapter see that section for more detail.

The key parameter-level distinction between the AbstractIndicatorWriterAdapter and the AbstractGroupWriterAdapter is the type (T) for the uniqueId parameter. As mentioned in previous sections, Indicator uniqueId types are all String's. The method naming conventions are the same.

There is one additional subclass of the AbstractIndicatorWriterAdapter that has a concrete implementation. This class is the **FileIndicatorWriterAdapter**. It obviously has all the functionality of the AbstractIndicatorWriterAdapter with the addition of the following write methods.

Modifier and Type	Method
FileOccurrence	updateFileOccurrence(String fileHash, FileOccurrence fileOccurrence)
FileOccurrence	updateFileOccurrence(String fileHash, FileOccurrence fileOccurrence, String ownerName)
WriteListResponse<FileOccurrence>	updateFileOccurrences(String fileHash, List<FileOccurrence> fileOccurrences)
WriteListResponse<FileOccurrence>	updateFileOccurrences(String fileHash, List<FileOccurrence> fileOccurrences, String ownerName)

SecurityLabelWriterAdapter

The SecurityLabelWriterAdapter class allows Group and Indicator associations. Much like the Indicator Adapters, the uniqueId is a user-created security label String. In addition to creating associations, the SecurityLabelWriterAdapter allows deleting associations from Group and Indicator types..

Below is the standard create methods available to all WriterAdapter's. Note that the deletes require the Security Label as the "uniqueId" String (P). The create and update requires the full SecurityLabel object (T).

Modifier and Type	Method
WriteListResponse<T>	create(List<T> itemList)
ApiEntitySingleResponse	create(T item)
ApiEntitySingleResponse	create(T item, String ownerName)
WriteListResponse<P>	delete(List<P> itemIds)
WriteListResponse<P>	delete(List<P> itemIds, String ownerName)
ApiEntitySingleResponse	delete(P itemId)
ApiEntitySingleResponse	delete(P itemId, String ownerName)
WriteListResponse<T>	update(List<T> itemList)
WriteListResponse<T>	update(List<T> itemList, String ownerName)
ApiEntitySingleResponse	update(T item)
ApiEntitySingleResponse	update(T item, String ownerName)

TagWriterAdapter

The TagWriterAdapter class allows Group and Indicator associations. Much like the Indicator Adapters, the uniqueId is a user-created tag name String. In addition to creating associations, the TagWriterAdapter allows deleting associations from Group and Indicator types.

Below is the standard create methods available to all WriterAdapter's. Note that the deletes require the Tag Name as the "uniqueId" String (P). The create and update requires the full Tag object (T).

Modifier and Type	Method
WriteListResponse<T>	create(List<T> itemList)

ApiEntitySingleResponse	create(T item)
ApiEntitySingleResponse	create(T item, String ownerName)
WriteListResponse<P>	delete(List<P> itemIds)
WriteListResponse<P>	delete(List<P> itemIds, String ownerName)
ApiEntitySingleResponse	delete(P itemId)
ApiEntitySingleResponse	delete(P itemId, String ownerName)
WriteListResponse<T>	update(List<T> itemList)
WriteListResponse<T>	update(List<T> itemList, String ownerName)
ApiEntitySingleResponse	update(T item)
ApiEntitySingleResponse	update(T item, String ownerName)

VictimWriterAdapter

The TagWriterAdapter class allows Group, Indicator, and VictimAsset associations. Much like the Group Adapters, the uniqueId is a user-created security label String. In addition to creating associations, the VictimAssetWriterAdapter can remove associations for Group, Indicator, and VictimAssets.

Below is the standard create methods available to all WriterAdapter's. Note that the deletes require the system generated VictimAsset ID as the "uniqueId" Integer (P). The create and update requires the full VictimAsset object (T).

Modifier and Type	Method
WriteListResponse<T>	create(List<T> itemList)
ApiEntitySingleResponse	create(T item)
ApiEntitySingleResponse	create(T item, String ownerName)
WriteListResponse<P>	delete(List<P> itemIds)
WriteListResponse<P>	delete(List<P> itemIds, String ownerName)

ApiEntitySingleResponse	delete(P itemId)
ApiEntitySingleResponse	delete(P itemId, String ownerName)
WriteListResponse<T>	update(List<T> itemList)
WriteListResponse<T>	update(List<T> itemList, String ownerName)
ApiEntitySingleResponse	update(T item)
ApiEntitySingleResponse	update(T item, String ownerName)

Writer Examples

Now that we've covered the writer package, let's go over creating, deleting, and updating data using the ThreatConnect Java API.

Writer Delete Example

```
...
 2
 3 import com.cyber2.api.lib.client.reader.AbstractGroupReaderAdapter;
 4 import com.cyber2.api.lib.client.reader.ReaderAdapterFactory;
 5
 6 import com.cyber2.api.lib.client.writer.AbstractGroupWriterAdapter;
 7 import com.cyber2.api.lib.client.writer.WriterAdapterFactory;
 8 import com.cyber2.api.lib.server.response.entity.ApiEntitySingleResponse;
 9
10 import com.cyber2.api.lib.server.entity.Adversary;
11 import com.cyber2.api.lib.conn.Connection;
12 import java.io.IOException;
13
...
130    private static void doDelete(Connection conn) {
131        AbstractGroupWriterAdapter<Adversary> writer = WriterAdapterFactory.createAdversaryGroupWriter(conn);
132
133        Adversary adversary = new Adversary();
134        adversary.setName("Test Adversary");
135        adversary.setOwnerName("System");
136
137        try {
138            ApiEntitySingleResponse<Adversary,?> createResponse = writer.create(adversary);
139            if ( createResponse.isSuccess() ) {
140                System.out.println("Saved: " + createResponse.getItem() );
141                ApiEntitySingleResponse<Adversary,?> deleteResponse
142                    = writer.delete( createResponse.getItem().getId() );
143                if ( deleteResponse.isSuccess() ) {
144                    System.out.println("Deleted: " + createResponse.getItem() );
```

```
145                 } else {
146                     System.err.println("Delete Failed. Cause: " + deleteResponse.getMessage() );
147                 }
148             } else {
149                 System.err.println("Create Failed. Cause: " + createResponse.getMessage());
150             }
151 
152         } catch (IOException | FailedResponseException ex) {
153             System.err.println("Error: " + ex.toString());
154         }
155 
156     }
 ...
```

Line 131 Since we'll be creating and deleting Adversary objects from the ThreatConnect API, let's instantiate an AbstractGroupWriterAdapter with the Adversary parameterized type applied.

Line 138-139 Here we create an Adversary object with the ThreatConnect API. We capture the response and check if the save was successful by calling "`isSuccess()`".

Line 140 We print out the response Adversary object returned from the ThreatConnect API. The "`getItem()`" method will return this object with the ID field populated. This method will always hold the saved item on a successful response.

Line 141-142 We use the ID from the successful create to delete the same Adversary object. Note the call to the "`delete()`" method requires the system generated Adversary ID.

Line 143-144 We check if the delete response was successful and dump the original response.

Line 146 With a failed delete, we can print out the error message by calling the "`getMessage()`" method on the response object.

Line 149 If the original create failed, we do the same as a failed delete and call the "`getMessage()`" method to find the cause.

Writer Update Example

```
...
 2 
 3 import com.cyber2.api.lib.client.reader.AbstractGroupReaderAdapter;
 4 import com.cyber2.api.lib.client.reader.ReaderAdapterFactory;
 5 import com.cyber2.api.lib.client.writer.AbstractGroupWriterAdapter;
 6 import com.cyber2.api.lib.client.writer.WriterAdapterFactory;
 7 import com.cyber2.api.lib.conn.Connection;
 8 import com.cyber2.api.lib.exception.FailedResponseException;
 9 import com.cyber2.api.lib.server.entity.Adversary;
...
15 import com.cyber2.api.lib.server.response.entity.ApiEntitySingleResponse;
16 import java.io.IOException;
17 import java.util.List;
```

```
 18
...
153
154     private static void doUpdate(Connection conn) {
155         AbstractGroupWriterAdapter<Adversary> writer = WriterAdapterFactory.createAdversaryGroupWriter(conn);
156
157         Adversary adversary = new Adversary();
158         adversary.setName("Test Adversary");
159         adversary.setOwnerName("System");
160
161         try {
162             ApiEntitySingleResponse<Adversary,?> createResponse = writer.create(adversary);
163             if ( createResponse.isSuccess() ) {
164                 System.out.println("Created Adversary: " + createResponse.getItem() );
165
166                 Adversary updatedAdversary = createResponse.getItem();
167                 updatedAdversary.setName("UPDATED: " + createResponse.getItem().getName() );
168                 System.out.println("Saving Updated Adversary: " + updatedAdversary );
169
170                 ApiEntitySingleResponse<Adversary,?> updateResponse = writer.update( updatedAdversary );
171                 if ( updateResponse.isSuccess() ) {
172                     System.out.println("Updated Adversary: " + updateResponse.getItem() );
173                 } else {
174                     System.err.println("Failed to Update Adversary: " + updateResponse.getMessage() );
175                 }
176             } else {
177                 System.err.println("Failed to Create Adversary: " + createResponse.getMessage() );
178             }
179
180         } catch (IOException | FailedResponseException ex) {
181             System.err.println("Error: " + ex.toString());
182         }
183
184     }
..
```

Lines 155-164 As we did with the delete example, we create a test Adversary and save it to the ThreatConnect API.

Lines 166-168 We assign the created Adversary to a variable called "`updatedAdversary()`" so we can change the name of the Adversary (line 167). Before we update the Adversary in ThreatConnect, we print it out to the console. The output should have an ID value populated and the name should read: "UPDATED: Test Adversary".

Lines 170-172 At this point we call the "`update()`" method to save the changes to ThreatConnect. The argument to this method is the actual Adversary object. Just like the delete, we check the response for success and write it to the console.

Writer Add Attribute Example

```
 1
 2     private static Email createTestEmail() {
 3         Email email = new Email();
 4         email.setName("Test Email");
 5         email.setOwnerName("System");
```

```
 6         email.setFrom("admin@test.com");
 7         email.setTo("test@test.com");
 8         email.setSubject("Test Subject");
 9         email.setBody("Test Body");
10         email.setHeader("Test Header");
11
12         return email;
13     }
14
15     private static Attribute createTestAttribute() {
16         Attribute attribute = new Attribute();
17         attribute.setSource("Test Source");
18         attribute.setDisplayed(true);
19         attribute.setType("Description");
20         attribute.setValue("Test Attribute Description");
21
22         return attribute;
23     }
...
69     private static void doAddAttribute(Connection conn) {
70         AbstractGroupWriterAdapter<Email> writer = WriterAdapterFactory.createEmailGroupWriter(conn);
71
72         Email email = createTestEmail();
73         Attribute attribute = createTestAttribute();
74
75         try {
76             // ------------------------------------------------------------------
77             // Create Email
78             // ------------------------------------------------------------------
79             ApiEntitySingleResponse<Email, ?> createResponse = writer.create(email);
80             if (createResponse.isSuccess()) {
81                 System.out.println("Created Email: " + createResponse.getItem());
82
83                 // ------------------------------------------------------------------
84                 // Add Attribute
85                 // ------------------------------------------------------------------
86                 ApiEntitySingleResponse<Attribute, ?> attribResponse
87                     = writer.addAttribute( createResponse.getItem().getId(), attribute );
88
89                 if ( attribResponse.isSuccess() ) {
90                     System.out.println("\tAdded Attribute: " + attribResponse.getItem() );
91                 } else {
92                     System.err.println("Failed to Add Attribute: " + attribResponse.getMessage());
93                 }
94
95             } else {
96                 System.err.println("Failed to Create Email: " + createResponse.getMessage());
97             }
98
99         } catch (IOException | FailedResponseException ex) {
100            System.err.println("Error: " + ex.toString());
101        }
102
103    }
104
```

Lines 72-73 Create test email object and the attribute we will add.

Line 79-81 Here we create the email in ThreatConnect and check if it was successful.

Line 86-87 The "`addAttribute()`" method takes the email group id and the attribute object we want to add.

Line 89-90 To confirm we added the attribute successfully, we check the response.

Writer Associate Indicator Example

```
 1
 2     private static Email createTestEmail() {
 3         Email email = new Email();
 4         email.setName("Test Email");
 5         email.setOwnerName("System");
 6         email.setFrom("admin@test.com");
 7         email.setTo("test@test.com");
 8         email.setSubject("Test Subject");
 9         email.setBody("Test Body");
10         email.setHeader("Test Header");
11
12         return email;
13     }
14
...
25     private static Host createTestHost() {
26         Host host = new Host();
27         host.setOwnerName("System");
28         host.setDescription("Test Host");
29         host.setHostName("www.bad-hostname.com");
30         host.setRating( 5.0 );
31         host.setConfidence(98.0);
32
33         return host;
34     }
...
104
105    private static void doAssociateIndicator(Connection conn) {
106        AbstractGroupWriterAdapter<Email> gWriter= WriterAdapterFactory.createEmailGroupWriter(conn);
107        AbstractIndicatorWriterAdapter<Host> hWriter = WriterAdapterFactory.createHostIndicatorWriter(conn);
108
109        Email email = createTestEmail();
110        Host host = createTestHost();
111
112        try {
113
114            // ----------------------------------------
115            // Create Email and Host
116            // ----------------------------------------
117            ApiEntitySingleResponse<Email, ?> createResponseEmail = gWriter.create(email);
118            ApiEntitySingleResponse<Host, ?> createResponseHost = hWriter.create(host);
119            if (createResponseEmail.isSuccess() && createResponseHost.isSuccess() ) {
120                System.out.println("Created Email: " + createResponseEmail.getItem());
121                System.out.println("Created Host: " + createResponseHost.getItem());
122
123                // ----------------------------------------
124                // Associate Host
125                // ----------------------------------------
126                ApiEntitySingleResponse assocResponse
127                    = gWriter.associateIndicatorHost(createResponseEmail.getItem().getId()
128                                                     , createResponseHost.getItem().getHostName() );
129
130                if ( assocResponse.isSuccess() ) {
131                    System.out.println("\tAssociated Host: " + createResponseHost.getItem().getHostName() );
132                } else {
133                    System.err.println("Failed to Add Attribute: " + assocResponse.getMessage());
134                }
135
```

```
136             } else {
137                 if ( !createResponseEmail.isSuccess() ) {
138                     System.err.println("Failed to Create Email: " + createResponseEmail.getMessage());
139                 }
140                 if ( !createResponseHost.isSuccess() ) {
141                     System.err.println("Failed to Create Host: " + createResponseHost.getMessage());
142                 }
143             }
144 
145         } catch (IOException | FailedResponseException ex) {
146             System.err.println("Error: " + ex.toString());
147         }
148 
149     }
```

Line 106-107 We create two writers -- one for the email we want to create and the other is for the host we want to associate.

Line 109-110 Create test email object and the host we will associate.

Line 117-121 To set up our example, we create both email and host in ThreatConnect. We also check to ensure the create was successful and print the items to the console.

Line 126-128 We associate the host to the email group by using the email ID and the hostname (the unique ID for the host indicator).

Line 130-133 Here we verify the association was successful.

Writer Associate Group Example

```
...
  2     private static Email createTestEmail() {
  3         Email email = new Email();
  4         email.setName("Test Email");
  5         email.setOwnerName("System");
  6         email.setFrom("admin@test.com");
  7         email.setTo("test@test.com");
  8         email.setSubject("Test Subject");
  9         email.setBody("Test Body");
 10         email.setHeader("Test Header");
 11 
 12         return email;
 13     }
 14 
...
 36     private static Threat createTestThreat() {
 37         Threat threat = new Threat();
 38         threat.setOwnerName("System");
 39         threat.setName("Test Threat");
 40 
 41         return threat;
 42     }
...
151 
152     private static void doAssociateGroup(Connection conn) {
```

```
153         AbstractGroupWriterAdapter<Email> gWriter= WriterAdapterFactory.createEmailGroupWriter(conn);
154         AbstractGroupWriterAdapter<Threat> tWriter = WriterAdapterFactory.createThreatGroupWriter(conn);
155
156         Email email = createTestEmail();
157         Threat threat = createTestThreat();
158
159         try {
160             // ---------------------------------
161             // Create Email and Threat
162             // ---------------------------------
163             ApiEntitySingleResponse<Email, ?> createResponseEmail = gWriter.create(email);
164             ApiEntitySingleResponse<Threat, ?> createResponseThreat = tWriter.create(threat);
165             if (createResponseEmail.isSuccess() && createResponseThreat.isSuccess() ) {
166                 System.out.println("Created Email: " + createResponseEmail.getItem());
167                 System.out.println("Created Threat: " + createResponseThreat.getItem());
168
169                 // ---------------------------------
170                 // Associate Threat
171                 // ---------------------------------
172                 ApiEntitySingleResponse assocResponse
173                     = gWriter.associateGroupThreat(createResponseEmail.getItem().getId(),
174                                                    createResponseThreat.getItem().getId());
175
176                 if ( assocResponse.isSuccess() ) {
177                     System.out.println("\tAssociated Threat: " + createResponseThreat.getItem().getId() );
178                 } else {
179                     System.err.println("Failed to Associate Threat: " + assocResponse.getMessage());
180                 }
181
182             } else {
183                 if ( !createResponseEmail.isSuccess() ) {
184                     System.err.println("Failed to Create Email: " + createResponseEmail.getMessage());
185                 }
186                 if ( !createResponseThreat.isSuccess() ) {
187                     System.err.println("Failed to Create Threat: " + createResponseThreat.getMessage());
188                 }
189             }
190
191         } catch (IOException | FailedResponseException ex) {
192             System.err.println("Error: " + ex.toString());
193         }
194
195     }
196
```

Line 153-154 We create two writers -- one for the email we want to create and the other is for the threat we want to associate.

Line 156-157 Create test email object and the threat we will associate.

Line 163-167 To set up our example, we create both email and threat in ThreatConnect. We also check to ensure the

create was successful and print the items to the console.

Line 172-174 We associate the threat to the email group by using the email ID and the threat ID.

Line 176-179 Here we verify the association was successful.

Writer Associate Tag Example

```
...
  2     private static Email createTestEmail() {
  3         Email email = new Email();
  4         email.setName("Test Email");
  5         email.setOwnerName("System");
  6         email.setFrom("admin@test.com");
  7         email.setTo("test@test.com");
  8         email.setSubject("Test Subject");
  9         email.setBody("Test Body");
 10         email.setHeader("Test Header");
 11 
 12         return email;
 13     }
 14 
...
 44     private static Tag createTestTag() {
 45         Tag tag = new Tag();
 46         tag.setName("Test-Tag");
 47         tag.setDescription("Test Tag Description");
 48 
 49         return tag;
 50     }
...
196 
197     private static void doAssociateTag(Connection conn) {
198         AbstractGroupWriterAdapter<Email> gWriter= WriterAdapterFactory.createEmailGroupWriter(conn);
199         TagWriterAdapter tWriter = WriterAdapterFactory.createTagWriter(conn);
200 
201         Email email = createTestEmail();
202         Tag tag = createTestTag();
203 
204         try {
205             // ------------------------------------------
206             // Create Email and Tag
207             // ------------------------------------------
208             ApiEntitySingleResponse<Email, ?> createResponseEmail = gWriter.create(email);
209             tWriter.delete(tag.getName()); // delete if it exists
210             ApiEntitySingleResponse<Tag, ?> createResponseTag = tWriter.create(tag);
211 
212             if (createResponseEmail.isSuccess() && createResponseTag.isSuccess() ) {
213                 System.out.println("Created Email: " + createResponseEmail.getItem());
214                 System.out.println("Created Tag: " + createResponseTag.getItem());
215 
216                 // ------------------------------------------
217                 // Associate Tag
218                 // ------------------------------------------
219                 ApiEntitySingleResponse assocResponse
220                     = gWriter.associateTag(createResponseEmail.getItem().getId()
221                                 , createResponseTag.getItem().getName() );
222 
223                 if ( assocResponse.isSuccess() ) {
224                     System.out.println("\tAssociated Tag: " + createResponseTag.getItem().getName() );
225                 } else {
226                     System.err.println("Failed to Associate Tag: " + assocResponse.getMessage());
227                 }
228 
229             } else {
230                 if ( !createResponseEmail.isSuccess() ) {
231                     System.err.println("Failed to Create Email: " + createResponseEmail.getMessage());
232                 }
233                 if ( !createResponseTag.isSuccess() ) {
234                     System.err.println("Failed to Create Tag: " + createResponseTag.getMessage());
235                 }
```

```
236             }
237
238         } catch (IOException | FailedResponseException ex) {
239             System.err.println("Error: " + ex.toString());
240         }
241     }
```

Line 198-199 We create two writers -- one for the email we want to create and the other is for the tag we want to associate.

Line 201-202 Create test email object and the tag we will associate.

Line 208-214 To set up our example, we create both email and tag in ThreatConnect. We also check to ensure the create was successful and print the items to the console.

Line 219-221 We associate the tag to the email group by using the email ID and the tag name (the unique ID for the tag).

Line 223-226 Here we verify the association was successful.

Writer Associate Victim Example

```
...
 59
 60     private static Victim createTestVictim() {
 61         Victim victim = new Victim();
 62         victim.setOrg("System");
 63         victim.setName("Test API Victim");
 64         victim.setDescription("Test API Victim Description");
 65
 66         return victim;
 67     }
...
304     private static void doAssociateVictim(Connection conn) {
305         AbstractGroupWriterAdapter<Email> gWriter= WriterAdapterFactory.createEmailGroupWriter(conn);
306         VictimWriterAdapter vWriter = WriterAdapterFactory.createVictimWriter(conn);
307
308         Email email = createTestEmail();
309         Victim victim = createTestVictim();
310
311         try {
312             // --------------------------------
313             // Create Email and Victim
314             // --------------------------------
315             ApiEntitySingleResponse<Email, ?> createResponseEmail = gWriter.create(email);
316             ApiEntitySingleResponse<Victim, ?> createResponseVictim = vWriter.create(victim);
317             if (createResponseEmail.isSuccess() && createResponseVictim.isSuccess() ) {
318                 System.out.println("Created Email: " + createResponseEmail.getItem());
319                 System.out.println("Created Victim: " + createResponseVictim.getItem());
320
321                 // --------------------------------
322                 // Associate Victim
323                 // --------------------------------
324                 ApiEntitySingleResponse assocResponse
325                     = gWriter.associateVictim(createResponseEmail.getItem().getId()
```

```
326                                         , createResponseVictim.getItem().getId());
327
328                 if ( assocResponse.isSuccess() ) {
329                     System.out.println("\tAssociated Victim: " + createResponseVictim.getItem().getId() );
330                 } else {
331                     System.err.println("Failed to Associate Victim: " + assocResponse.getMessage());
332                 }
333
334             } else {
335                 if ( !createResponseEmail.isSuccess() ) {
336                     System.err.println("Failed to Create Email: " + createResponseEmail.getMessage());
337                 }
338                 if ( !createResponseVictim.isSuccess() ) {
339                     System.err.println("Failed to Create Victim: " + createResponseVictim.getMessage());
340                 }
341             }
342
343         } catch (IOException | FailedResponseException ex) {
344             System.err.println("Error: " + ex.toString());
345         }
346
347     }
```

Line 305-306 We create two writers -- one for the email we want to create and the other is for the victim we want to associate.

Line 308-309 Create test email object and the victim we will associate.

Line 315-319 To set up our example, we create both email and victim in ThreatConnect. We also check to ensure the

create was successful and print the items to the console.

Line 324-326 We associate the victim to the email group by using the email ID and the victim ID.

Line 328-331 Here we verify the association was successful.

Writer Remove Association Example

```
...
243     private static void doRemoveAssociatedTag(Connection conn) {
244
245         AbstractGroupWriterAdapter<Email> gWriter= WriterAdapterFactory.createEmailGroupWriter(conn);
246         TagWriterAdapter tWriter = WriterAdapterFactory.createTagWriter(conn);
247
248         Email email = createTestEmail();
249         Tag tag = createTestTag();
250
251         try {
252             // ----------------------------------------
253             // Create Email and Tag
254             // ----------------------------------------
255             ApiEntitySingleResponse<Email, ?> createResponseEmail = gWriter.create(email);
256             tWriter.delete(tag.getName()); // delete if it exists
257             ApiEntitySingleResponse<Tag, ?> createResponseTag = tWriter.create(tag);
258
```

```
259             if (createResponseEmail.isSuccess() && createResponseTag.isSuccess() ) {
260                 System.out.println("Created Email: " + createResponseEmail.getItem());
261                 System.out.println("Created Tag: " + createResponseTag.getItem());
262 
263                 // ----------------------------------------
264                 // Associate Tag
265                 // ----------------------------------------
266                 ApiEntitySingleResponse assocResponse
267                     = gWriter.associateTag(createResponseEmail.getItem().getId()
268                                 , createResponseTag.getItem().getName() );
269 
270                 if ( assocResponse.isSuccess() ) {
271                     System.out.println("\tAssociated Tag: " + createResponseTag.getItem().getName() );
272 
273                     // ----------------------------------------
274                     // Delete Association
275                     // ----------------------------------------
276                     ApiEntitySingleResponse deleteAssocResponse
277                         = gWriter.deleteAssociatedTag(createResponseEmail.getItem().getId()
278                                                 , createResponseTag.getItem().getName() );
279 
280                     if ( deleteAssocResponse.isSuccess() ) {
281                         System.out.println("\tDeleted Associated Tag: "
    ↪ + createResponseTag.getItem().getName() );
282                     } else {
283                         System.err.println("Failed to delete Associated Tag: "
    ↪ + deleteAssocResponse.getMessage());
284                     }
285 
286                 } else {
287                     System.err.println("Failed to Associate Tag: " + assocResponse.getMessage());
288                 }
289 
290             } else {
291                 if ( !createResponseEmail.isSuccess() ) {
292                     System.err.println("Failed to Create Email: "
    ↪ + createResponseEmail.getMessage());
293                 }
294                 if ( !createResponseTag.isSuccess() ) {
295                     System.err.println("Failed to Create Tag: " + createResponseTag.getMessage());
296                 }
297             }
298 
299         } catch (IOException | FailedResponseException ex) {
300             System.err.println("Error: " + ex.toString());
301         }
302     }
```

Lines 245-271 As we have reviewed in prior examples, we create and associate the email group with the tag item.

Line 276-278 Here we call the "`deleteAssociatedTag()`" method using the same parameters as the associate method. We use the email item ID value with the tag name.

Line 280-281 Finally we check that the deleting was successful and dump out the message to the console.

In the previous two examples we learned how to:

- ➔ Delete and update an Adversary and verify it was saved successfully to ThreatConnect.

- ➔ Add an Attribute to a Group item.
- ➔ Associate Indicators, Groups, Tags, and Victims.
- ➔ Remove Association from a Group item.