ThreatScape® App for Splunk
Overview, Installation and Configuration

December 23, 2015

Description

The ThreatScape App for Splunk facilitates the delivery of iSIGHT Partners ThreatScape Indicators to our customers' Splunk instances. Once consumed by a Splunk instance, the ThreatScape Indicators are treated as additional Splunk source types and can be used in search, correlation, reporting, and visualization workflows in the same manner as other data.

System Requirements

The ThreatScape App for Splunk shares the requirements of a properly installed Splunk instance and has been fully tested on the following platforms under the Splunk Enterprise 6.2.7 and 6.3.1 Free Edition:

OS Platforms
CentOS 64 Bit Server 7
CentOS 64 Bit Server 6.6
Ubuntu 64 Bit Server 14.04 LTS

ThreatScape App for Splunk Functionality

The functionality of the ThreatScape App for Splunk is underpinned by the ThreatScape API 2; the ThreatScape API is the repository from which the ThreatScape App for Splunk retrieves its data, after which Splunk users rely on the Splunk engine to leverage the ThreatScape API Data. As such, an understanding of the ThreatScape Cyber Threat Indicators and its delivery mechanism (i.e., the ThreatScape API) is fundamental for the efficient integration of ThreatScape API data into Splunk operations.

ThreatScape Cyber Threat Intelligence and Indicators

ThreatScape Cyber Threat Intelligence and Indicators as delivered by the ThreatScape API can best be understood in the context of threat indicators as a whole. There are many sources of threat indicators – commercial feeds, open-source lists, proprietary honeypots, etc. – and threat data can be obtained from any or all of these sources. What differentiates the iSIGHT Partners indicators from others is that the indicators are truly intelligence-based; all indicators delivered by the API have been observed by iSIGHT Partners intelligence researchers and analysts during the course of their collections and research, and all of these indicators have context in the form of intelligence reporting.

Additionally, the iSIGHT Partners API delivers vulnerabilities and two types of indicators. The first type, Indications and Warnings (I&Ws) are *any* indicators that iSIGHT Partners researchers and analysts discover during their research. The second type, Indicators of Compromise (IOCs), is confirmed as having been used in an actual attack. I&Ws are useful for security researchers who are looking for trends and as much intelligence as possible, whereas IOCs are most suited for Security Operators who want to minimize false positives.

The Venn diagram below shows the relationship among the different types of indicators:

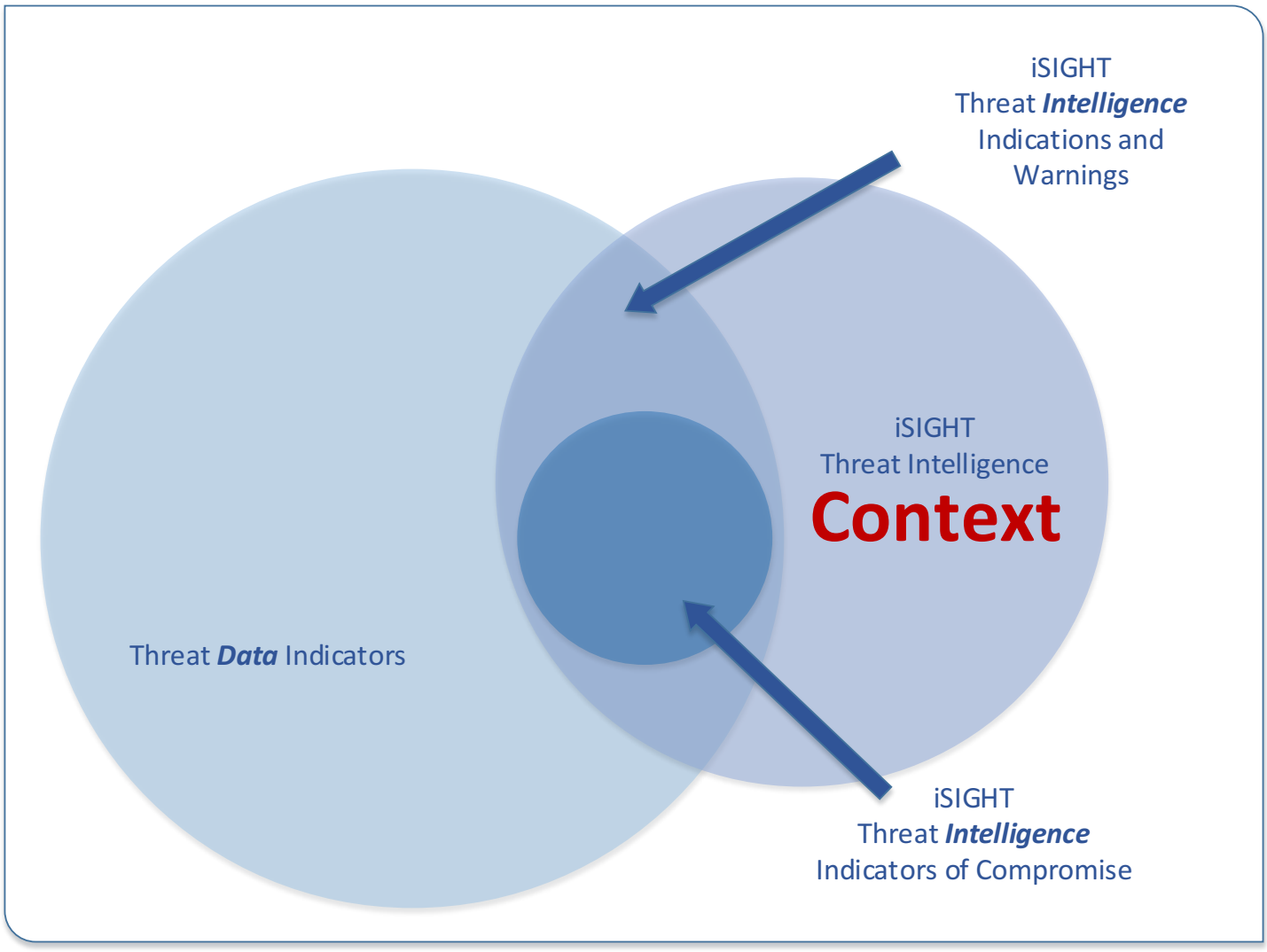


Diagram 1: Relationship Among Indicators Types

Threat Intelligence Indicator Fields and Splunk CIM Compliance

The ThreatScape App for Splunk downloads records containing the following fields from the ThreatScape API:

ThreatScape	fileType	productType	senderName
asn	fuzzyHash	Protocol	sha1
cidr	Ip	publishDate	sha256
description	Language	Recipient	sourceDomain
domain	md5	registrantE-mail	sourceIp
domainTimeOfLookup	networkIdentifier	registrantName	Subject
e-mailIdentifier	networkName	Registry	Title
fileIdentifier	networkType	reportId	url
fileName	packer	reportLink	userAgent
fileSize	Port	senderAddress	webLink
attackingEase	cpe	cveIds	cveOriginalReleaseDate
cvssBaseScore	cvssTemporalScore	exploitInTheWild	mitigations

There are a few features of the ThreatScape API that must be covered to maximize the use of the API data in Splunk:

1. Because the ThreatScape API delivers machine intelligence to a variety of products, the API uses generic field names that are not by themselves Splunk Common Information Model (CIM) compliant. This fact is overcome with the use of Splunk *FIELDALIAS* mappings within the ThreatScape App for the Splunk *props.conf* file located at:

   /opt/splunk/etc/apps/iSIGHTPartners_ThreatScape_App/default

   Splunk operators are of course free to modify this *props.conf* file to define any additional aliases that are required for their environments or they can use the Splunk *rename* command in the search dialog to achieve similar results.

2. ThreatScape API network-related fields are intentionally non-directional, as this provides the most flexibility in searching disparate data sets. For example, an "ip" address indicator can, depending on the search requirements, either be a source address or a destination address. For this reason, the ThreatScape API "ip" and "port" fields are aliased to *both* corresponding CIM compliant "src" and "dest" fields.

3. Despite the aliased field names, each of the native field names remains available for searching. This is particularly useful when searching for known hashes of a certain type.

ThreatScape App for Splunk ALIASFIELD Entries

The following is a list of ALIASFIELD entries used for Splunk CIM compliance:

```
[host::ThreatScape® API]
#Direct Field Mappings
FIELDALIAS-file_cat = fileType AS category
FIELDALIAS-dest_domain = domain AS dest
FIELDALIAS-dest_ip = ip AS dest_ip
FIELDALIAS-dest_port = port AS dest_port
FIELDALIAS-hash_fuzzy = fuzzyHash AS file_hash
FIELDALIAS-hash_md5 = md5 AS file_hash
FIELDALIAS-hash_sha1 = sha1 AS file_hash
FIELDALIAS-hash_sha256 = sha256 AS file_hash
FIELDALIAS-file_name = fileName AS file_name
FIELDALIAS-http_user_agent = userAgent AS http_user_agent
FIELDALIAS-registry_obj_cat = registry AS object_category
FIELDALIAS-src_domain = domain AS src
FIELDALIAS-source_domain = sourceDomain AS src
FIELDALIAS-src_ip = ip AS src_ip
FIELDALIAS-source_ip = sourceIp AS src_ip
FIELDALIAS-src_port = port AS src_port
FIELDALIAS-transport = protocol AS transport
#Aggregate Field Mappings
FIELDALIAS-dest_all_ip = dest_ip AS dest
FIELDALIAS-src_all_ip = src_ip AS src
EVAL-file_hash = mvappend(md5, sha256, sha1)
#New Mappings
FIELDALIAS-cveIds = cveIds as cve
FIELDALIAS-cvssBaseScore = cvssBaseScore as cvss
FIELDALIAS-cvssTemporalScore = cvssTemporalScore AS cvss
```

ThreatScape App for Splunk Index and Sourcetypes

As described in the previous sections, the ThreatScape API contains vulnerabilities and two types of intelligence indicators: I&Ws and IOCs. All intelligence indicators and vulnerabilities data is saved in the same index named "isightpartners." I&Ws, IOCs and vulnerabilities are defined as the Splunk sourcetypes "isight_indicators", "isight_iocs" and “isight_vulnerabilities” respectively. This approach allows for maximum search flexibility, although it does mean that the index will have duplicate data. Duplicate data can be minimized by selecting one source type or the other during configuration (see below for more details).

IOC Dashboard

This dashboard will search iSIGHT reporting for the indicators users specify. When results are generated, user may click "Report ID" values to visit the MySIGHT portal and view the entire report.
Dashboard components:

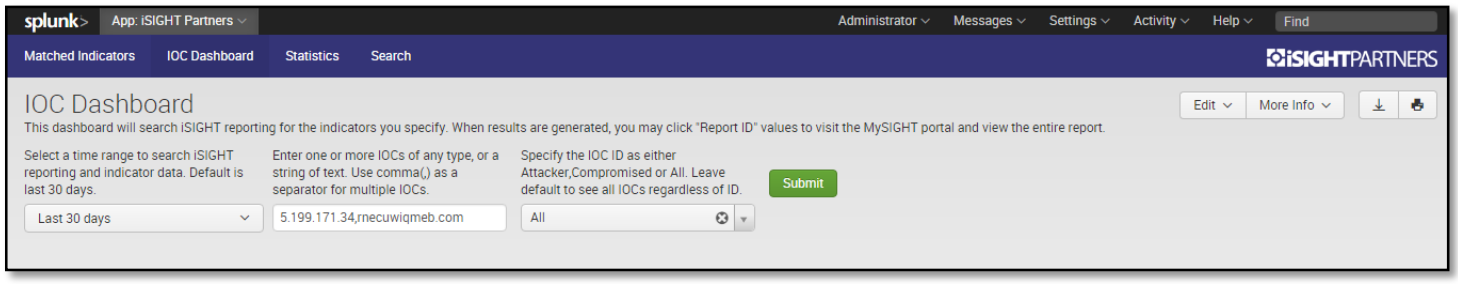


Figure-1 (IOC Dashboard)

In the above Figure-1, you see the normal Splunk web app header and the first row of form inputs.

1. The first option is a time range dialog, and this will drive how far back into reporting users wish to search (time is based on a report's publish date)
2. Enter IOCs. This can be any indicator type, in any sequence separated by a delimiter comma (,).
3. Since IOCs are tagged as Attacker and Compromised, user can select either of these options or all.
4. Clicking the "Submit" button to launch the search, the following response data is returned.

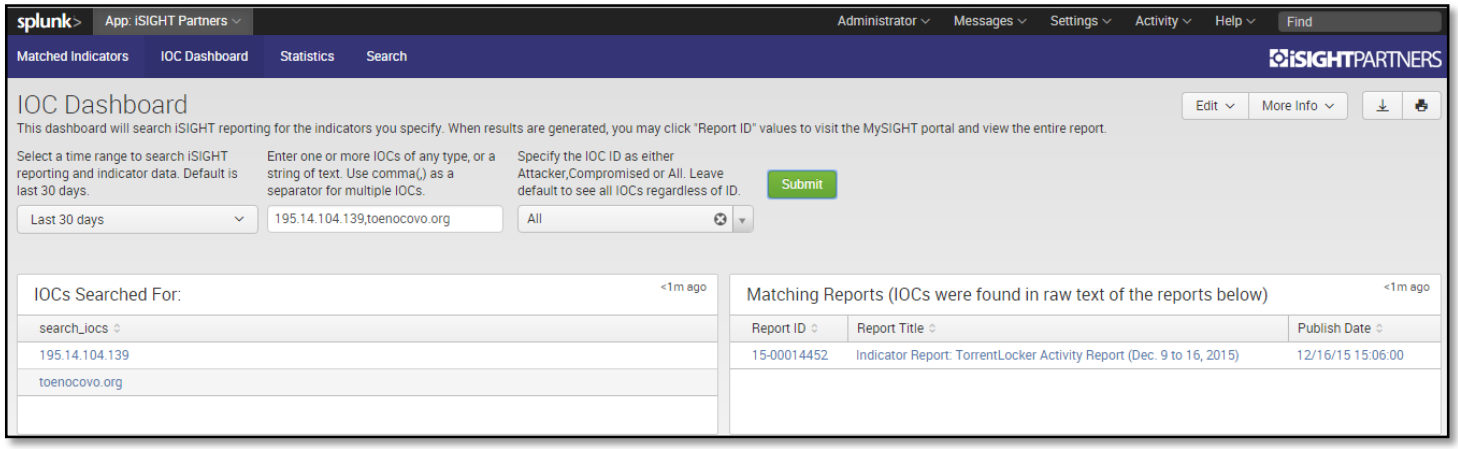


Figure-2 (IOC Dashboard Results)

Creating Correlations Using iSIGHT Threatscape Intel Data in Splunk

There are few sample searches that come bundled with iSIGHT Threatscape App for Splunk as shown below:

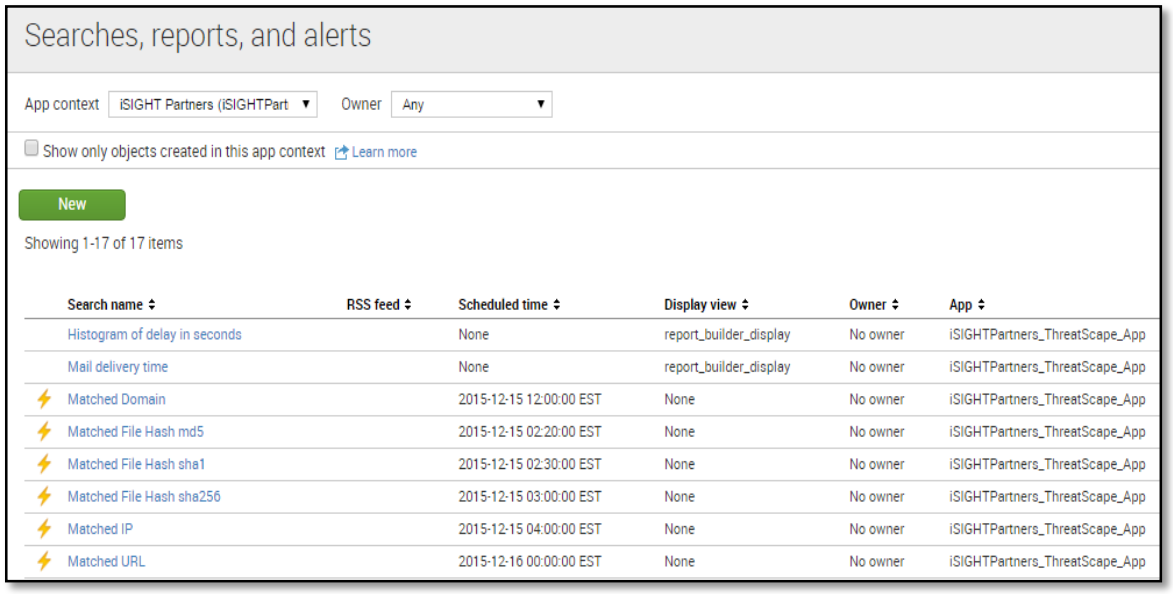


Figure-3 (Searches, reports and alerts)

This section is accessible from: **Settings -> Knowledge -> Searches, Reports and Alerts.**
Users can create a new search, by selecting the "New" button in the top left, or they can clone or modify existing searches. This example shows a rule being modified, but the dialog is the same for all functions:

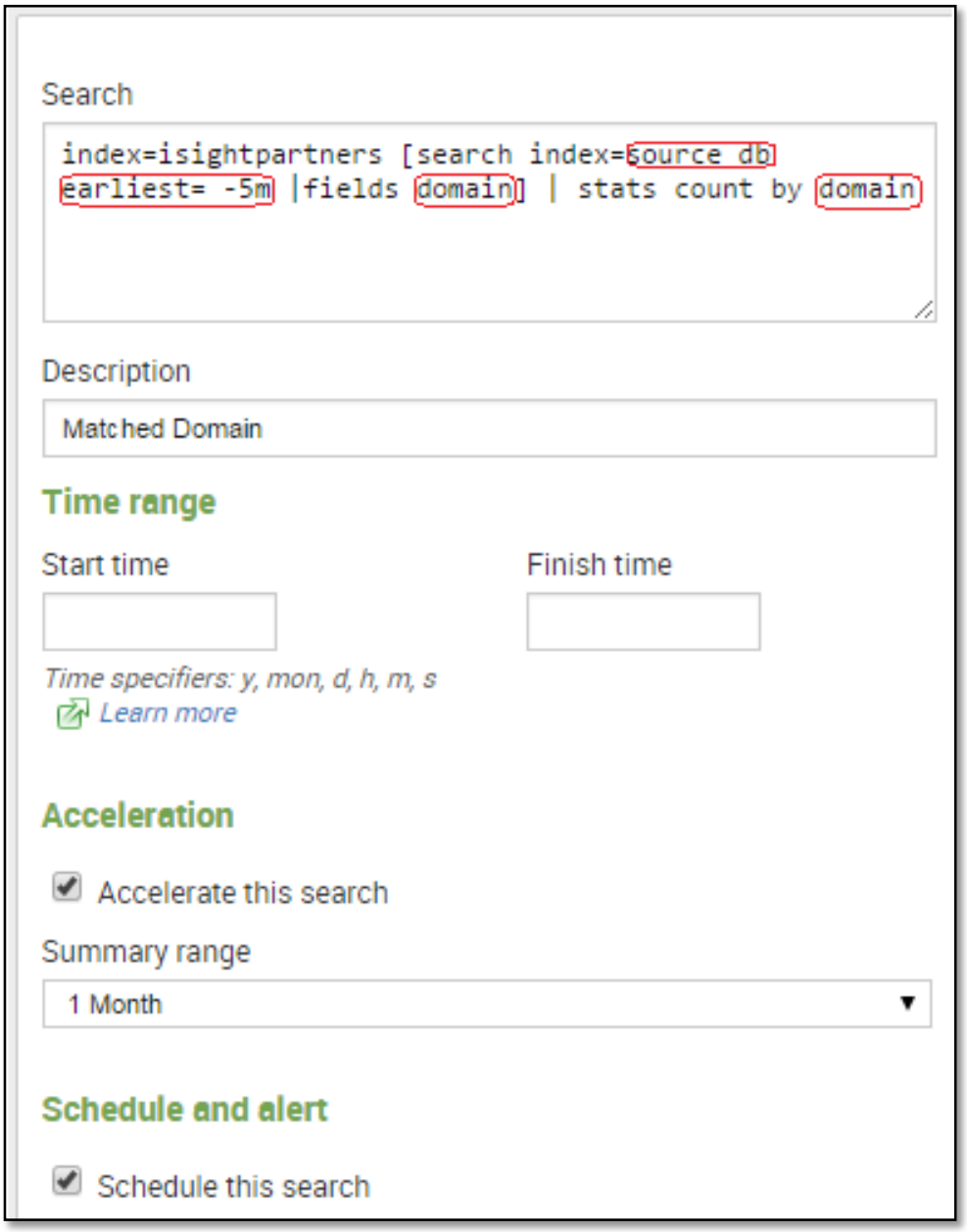


Figure-4 (Edit search window)

In the above Figure-4, ***source_db*** can be replaced with any custom index which is to be matched with index of **isightpartners**. User can also provide any supported CIM fields like *fields domain*, *fields ip*, *fields md5* etc. Description is for referencing the Search.

So, in case a user has one or more index created in Splunk, the same can be used for correlation (instead of source_db that is mentioned in the search query screen shown above)

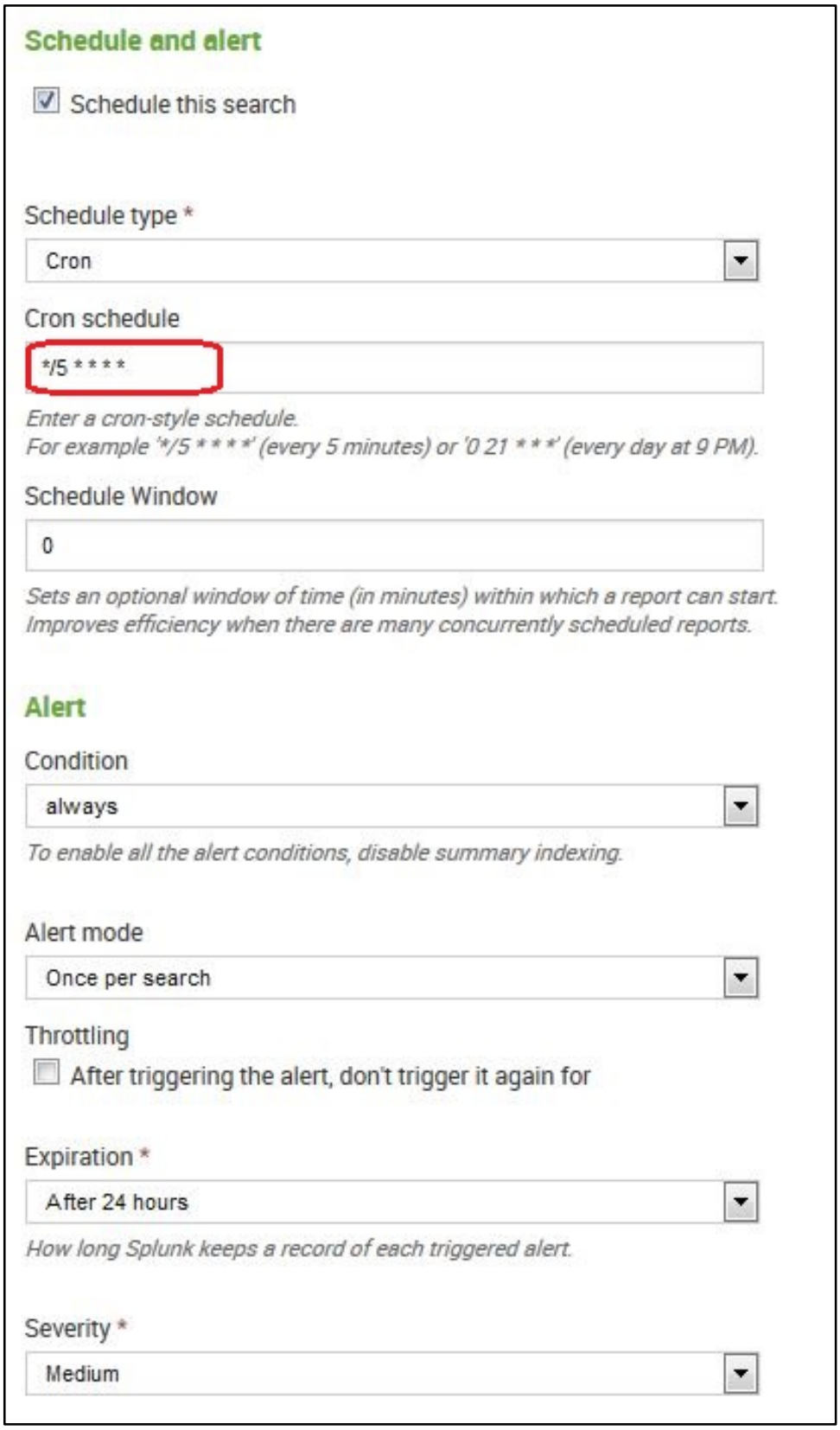


Figure-5 (Edit search window contd)

This job can be scheduled as cron job as shown in Figure-5, this schedule can be specified the highlighted text box.

Note: Scheduled cron job time should be equal to earliest time (‘earliest’ value used in search query shown in Figure-4 above) to avoid duplication.

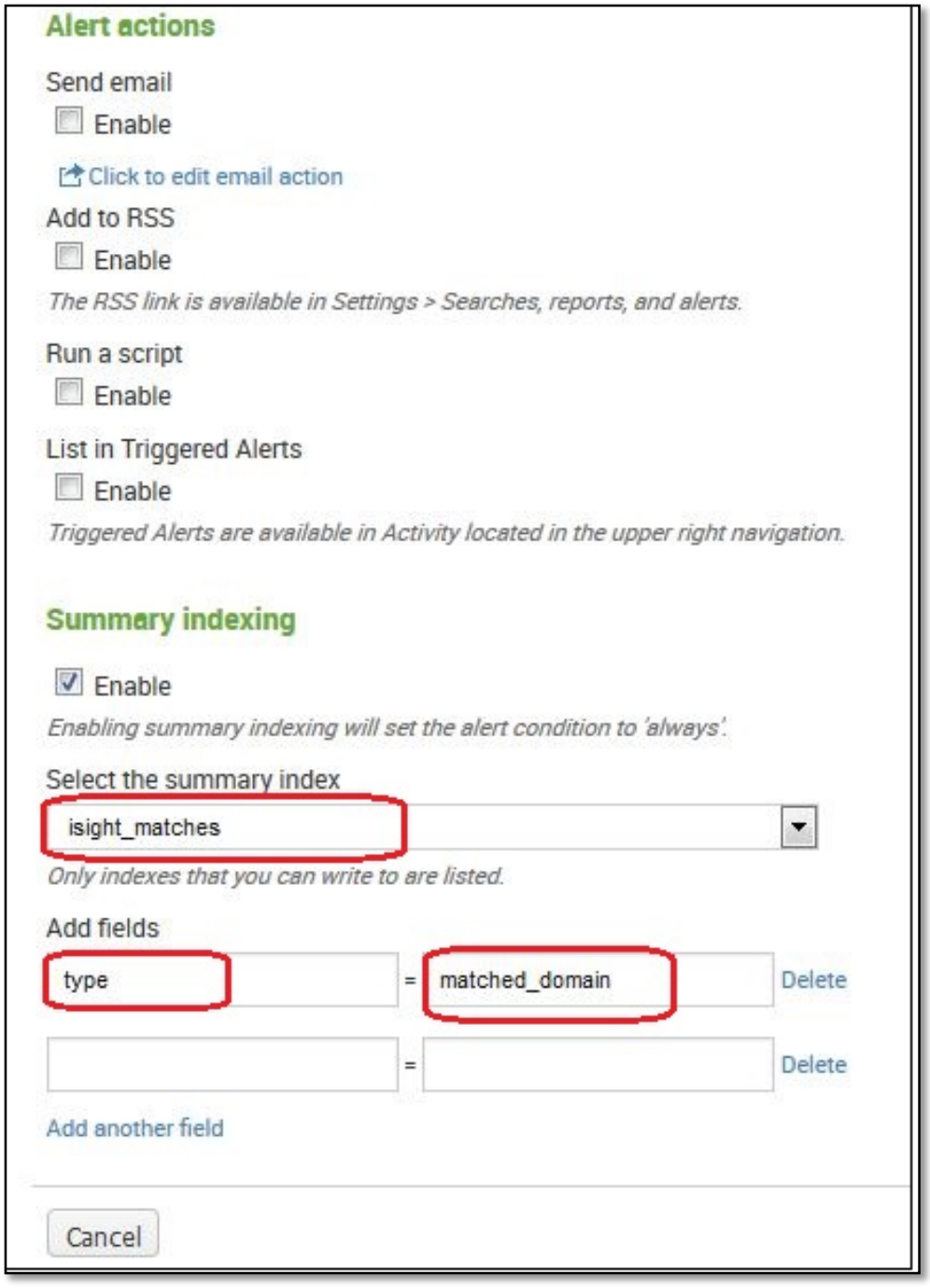


Figure-6 (Edit search window cont’d)

The ThreatScape App provides the option of summary indexing for the correlation of customer data. With summary indexing, users can extract precise information based on search strings queried frequently. Each

time Splunk Enterprise runs these searches, it saves the results into a summary index that the user designates. Users can then run searches and reports on this significantly smaller (and thus more responsive) summary index.

By default, ThreatScape App uses **isight_matches** as the summary index. User can run searches and reports on this summary index for matched results. Users can however create their own summary index instead of default. Figure-6 shows the configuration of summary indexing.

To classify the search result separately a field ***type*** is added with value ***matched_domain.***

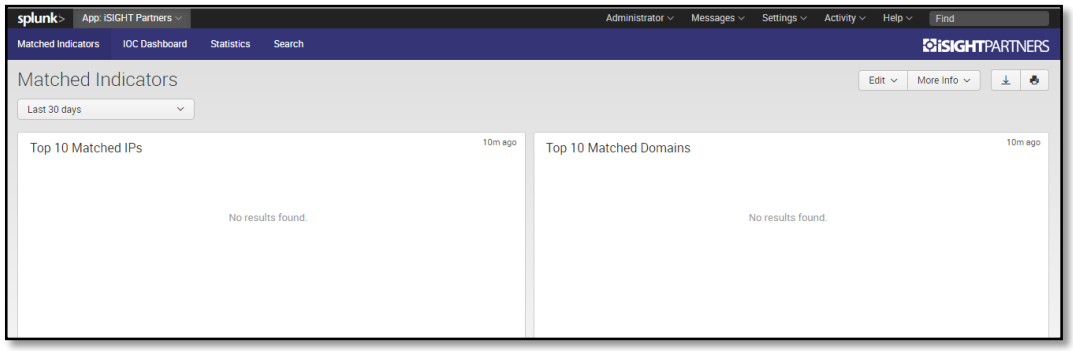
Example Rules/Correlations

1. Find correlation of passiveDNS data from internal log file with iSIGHT IOCs.
    a. Rule helps with discovery of exfiltration in organization. Needs passiveDNS logs as comparison input.
    b. index=isightpartners sourcetype=isight_iocs | rename domain as pDNSDomain | join pDNSDomain [search sourcetype=passiveDNS NOT (Recursion OR Response)] | table _time, sourcetype, queryHost, pDNSDomain, ip, reportId, webLink, title, ThreatScape | dedup pDNSDomain
    c. This is a great indicator to detect where or not there is outbound communication with a bad actor. Business problem = Exfiltration. Address with DLP.

2. Find correlation of data in index 'test_index' that are not in iSIGHT iocs.
    a. The event data from this index may share at least one common field. You can use the values of this field to search for events in **test** index based on a value that is not in sourcetyp= isight_iocs.
    b. index=test_index NOT [search index=isightpartners sourcetype=isight_iocs| fields ip] | stats count by ip | dedup ip
    c. This helps ascertaining that there are no known indicators of compromise with regard to the given set of data.

Matched Indicators

Once the required correlations are created as defined in the above section, the 'Matched indicator' section in the app offers a quick view of top/relevant matches between customer and iSIGHT data. This is further customizable by the Admin, so as to show relevant data as per preferences. In case the relevant customer data index and correlation is not setup, the tab will display blank panels(as shown below).



Workflow Actions:

The ThreatScape App provides three types of workflow actions:

1. Search against iSIGHT Partners indicators
2. Pivot search against iSIGHT Partners indicators
3. View report on MySIGHT portal

Workflow actions appear in menus associated with events in search results. To select event-level workflow actions, expand an event in your search results and click **Event Actions.** as shown in the figure below. This is an example of "Search/Pivot Search/View report," an event-level workflow action that, when clicked, displays the new tab with the appropriate search/pivot search strings and results.

View report redirects the user to the MySIGHT Portal report page.

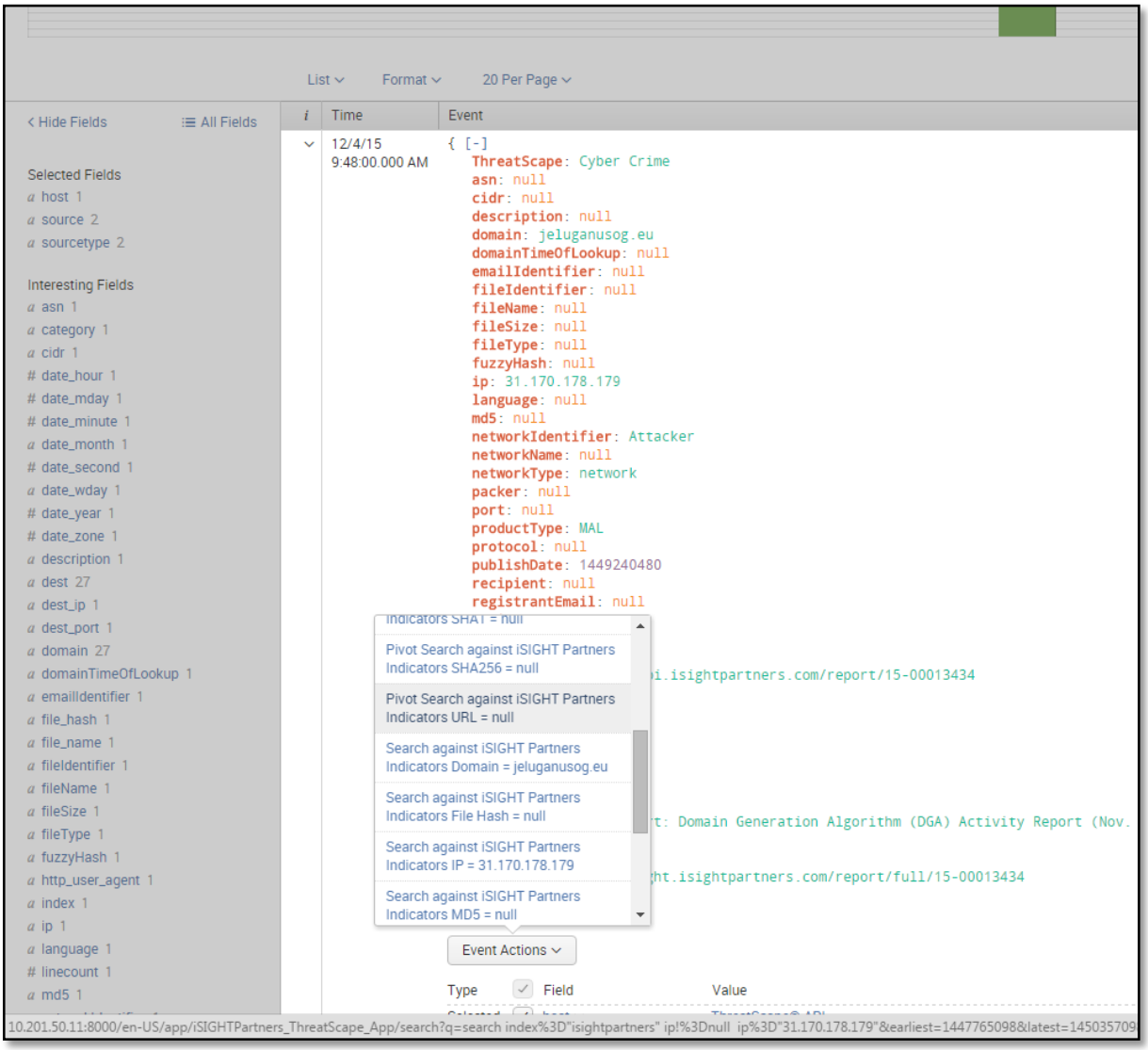


Figure-7 (Workflow actions)

These workflow actions for search/pivot search are available for 6 types of indicators: IP, Domain, SHA1, SHA256, MD5, URL and FileHash.

Pivot Search

Pivot search functionality is provided to retrieve additional indicators related to a given indicator, within the Splunk interface. It is provided as ~~a~~ part of the workflow actions described above and can be performed by introducing the custom search command “pivotsearch”. The following figure shows an example of pivot search command for a URL indicator and the results.

When clicked, the pivot search command will be executed. With the below search query, the result is also saved as a file (name specified in the search query) under apps bin directory. Pivoting on matching indicators (inside and outside the organization) extend the observable and actionable information. An IP can pivot to a domain owned by architects of specific malware which can identify intent and capability thus guiding a particular mitigation response.

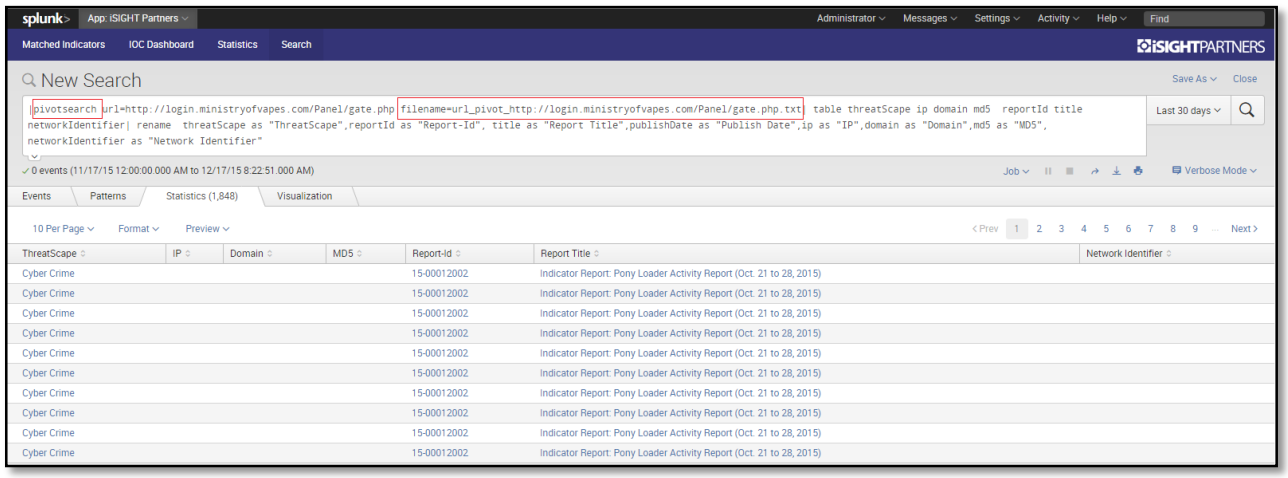
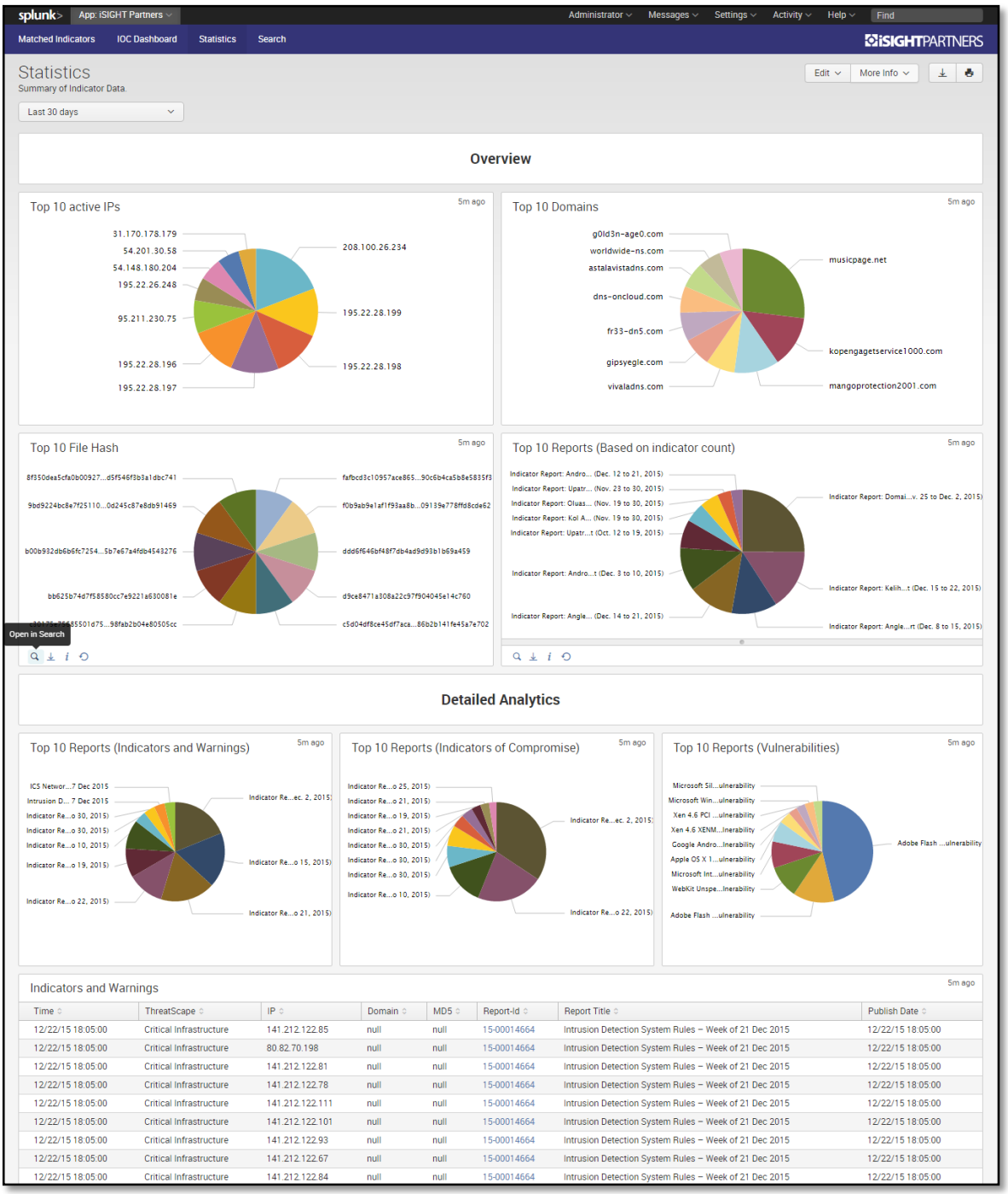


Figure-8 (Pivot search command)

Statistics

The app offers a visual interface to quickly look at the top indicators (IPs, Domains, File Hash, etc.) and interact with this data. The page uses predefined search queries to pull the relevant data into the panels and this can be further customized to suit user preferences. The user also has the option of accessing the search query through the 'search' icon in the ribbon as well as exporting the results in the preferred format (CSV, XML, JSON)



ThreatScape App for Splunk Acquisition, Installation and Configuration

Acquisition

The ThreatScape App for Splunk is available from Splunk's splunkbase at:

https://splunkbase.splunk.com/app/2764

The ThreatScape App for Splunk can also be obtained directly from within the Apps page of Splunk (search for "ThreatScape") or from your iSIGHT Partners point of contact. Keep in mind that before using the ThreatScape App for Splunk, you will need a set of ThreatScape API keys[1].

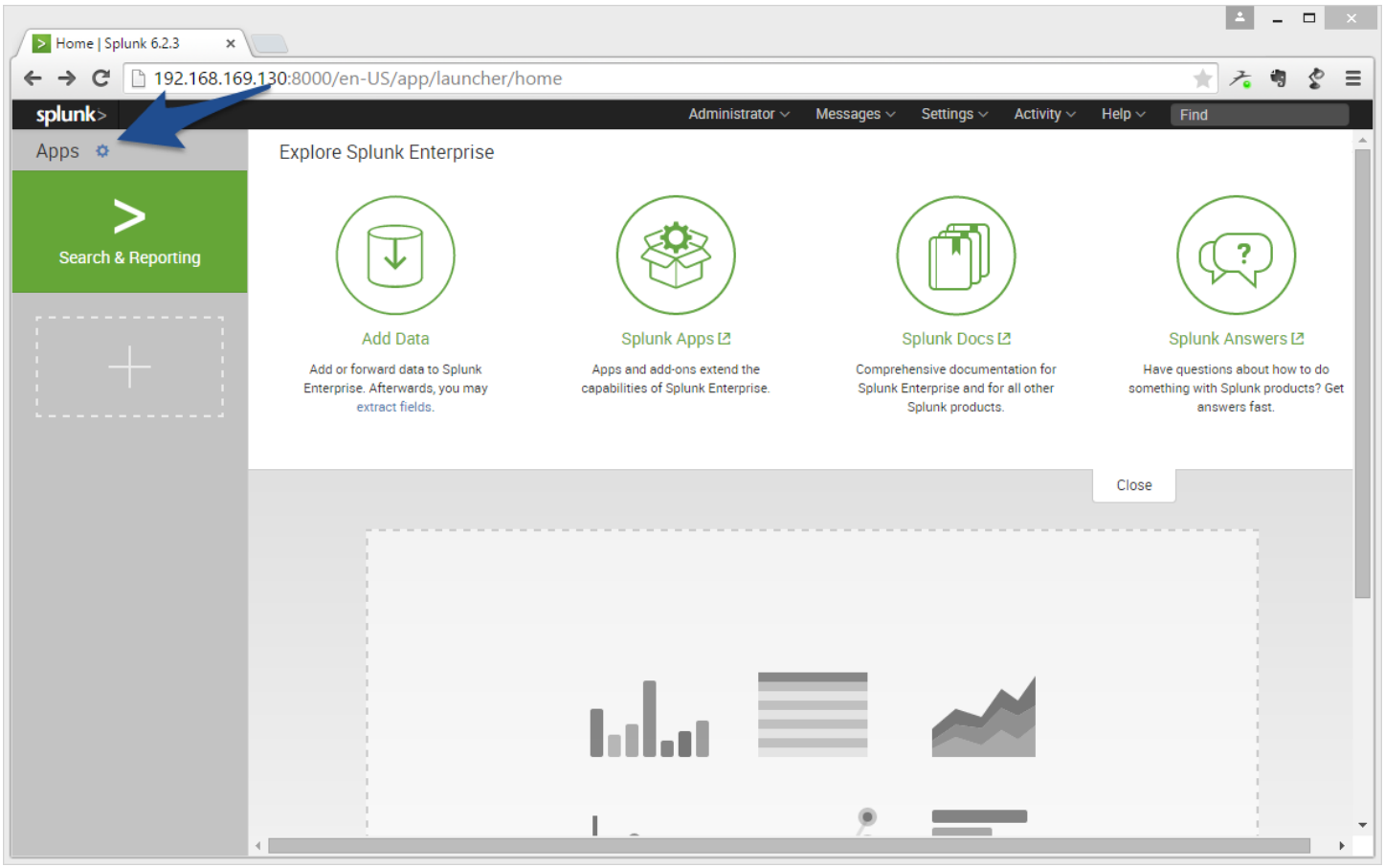
Installation/Upgrade

If the ThreatScape App for Splunk is acquired through the Splunk admin browser, the app will automatically install following Splunk standard prompting. **In the case of an upgrade it is recommended to run the provided script prior to the upgrade to avoid duplicate indexing of data.**

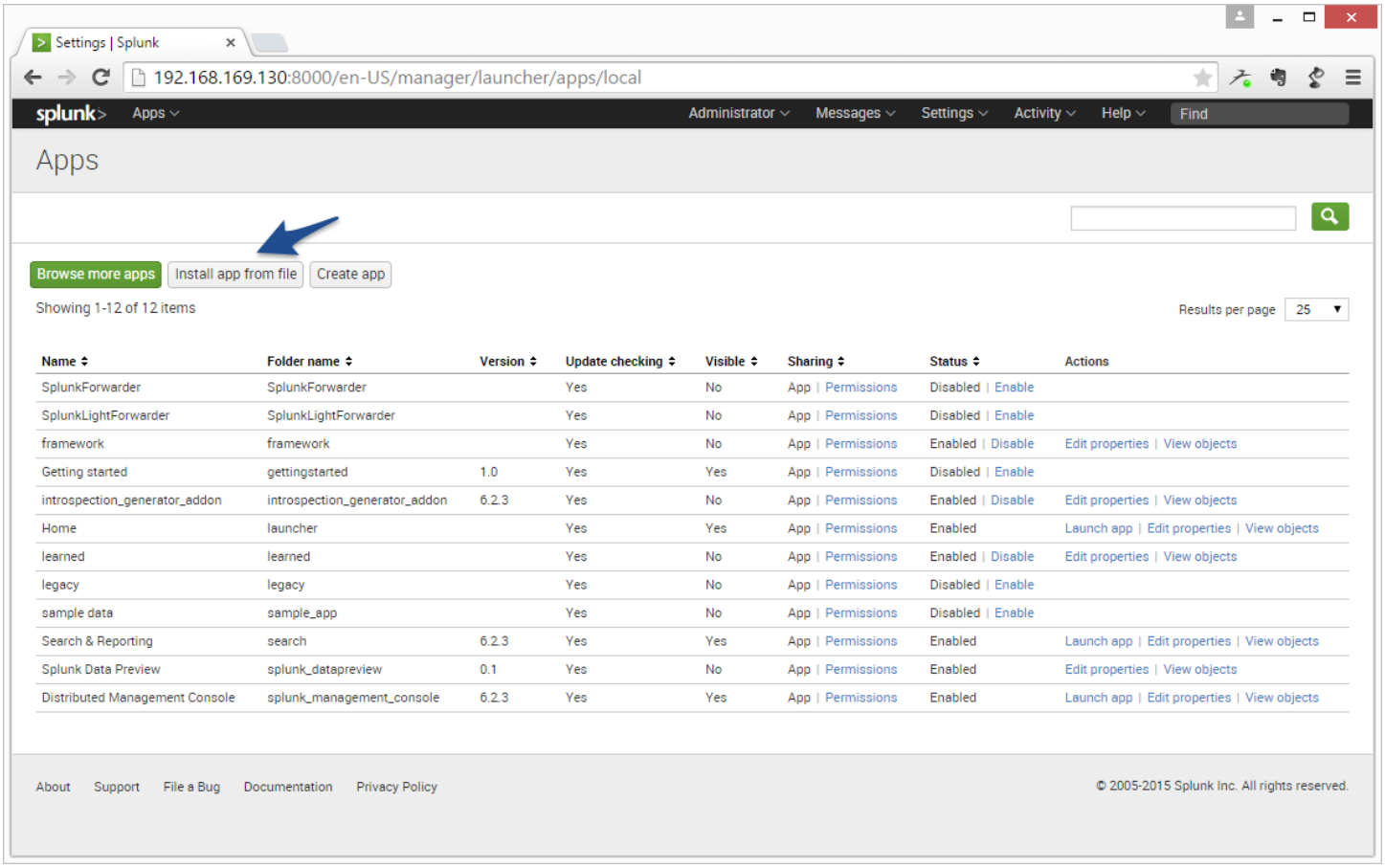
If the ThreatScape App for Splunk is obtained as a file from your iSIGHT Partners Point of Contact or if it is downloaded from Splunk's splunkbase, you will need to install the file from the Splunk admin browser using the following steps:

1. From the Splunk home page, navigate to the Splunk App page.

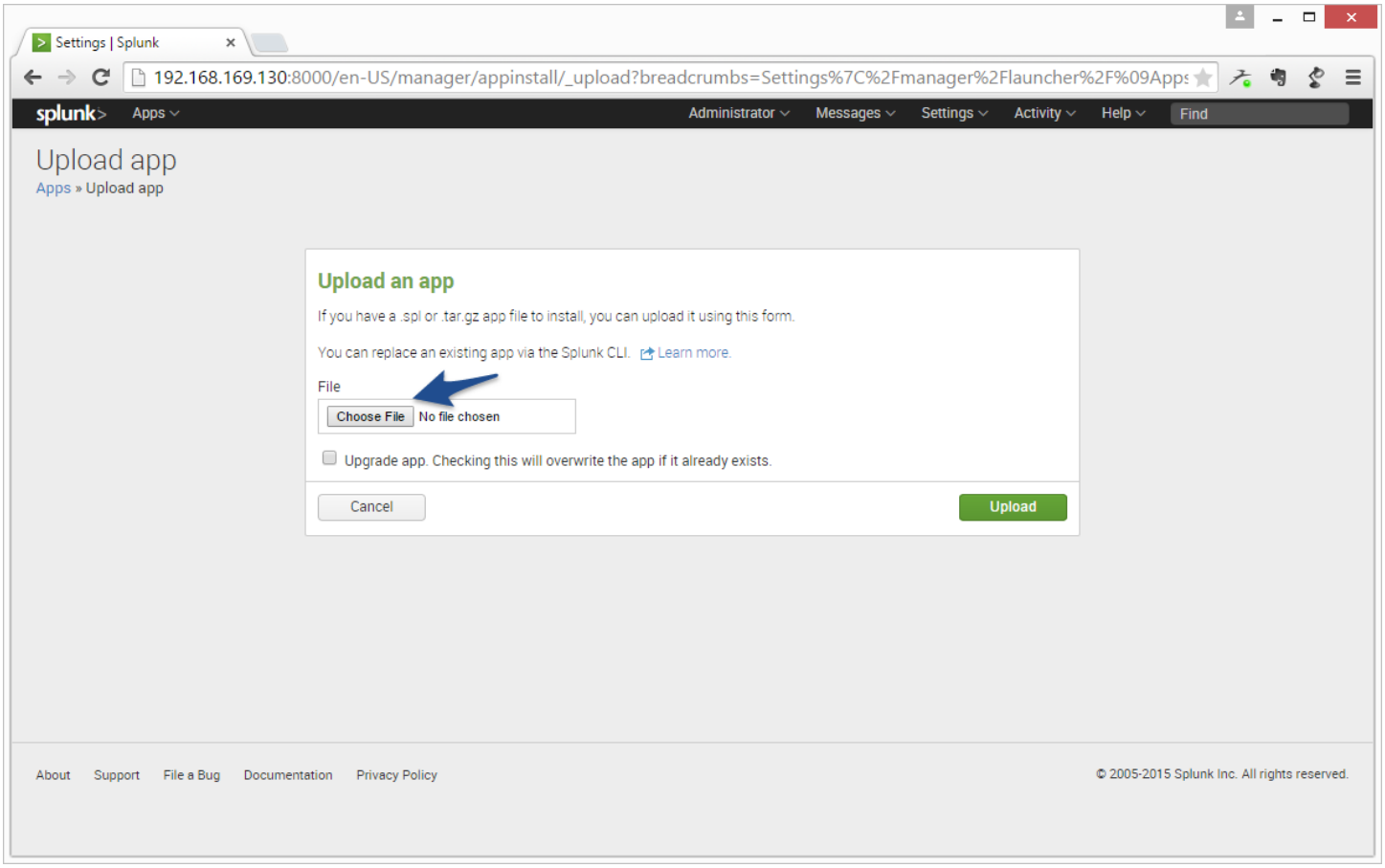
[1] If you do not have an iSIGHT Partners ThreatScape API account, please request that we contact you by visiting the following site: http://www.isightpartners.com/act-today/request-consultation/



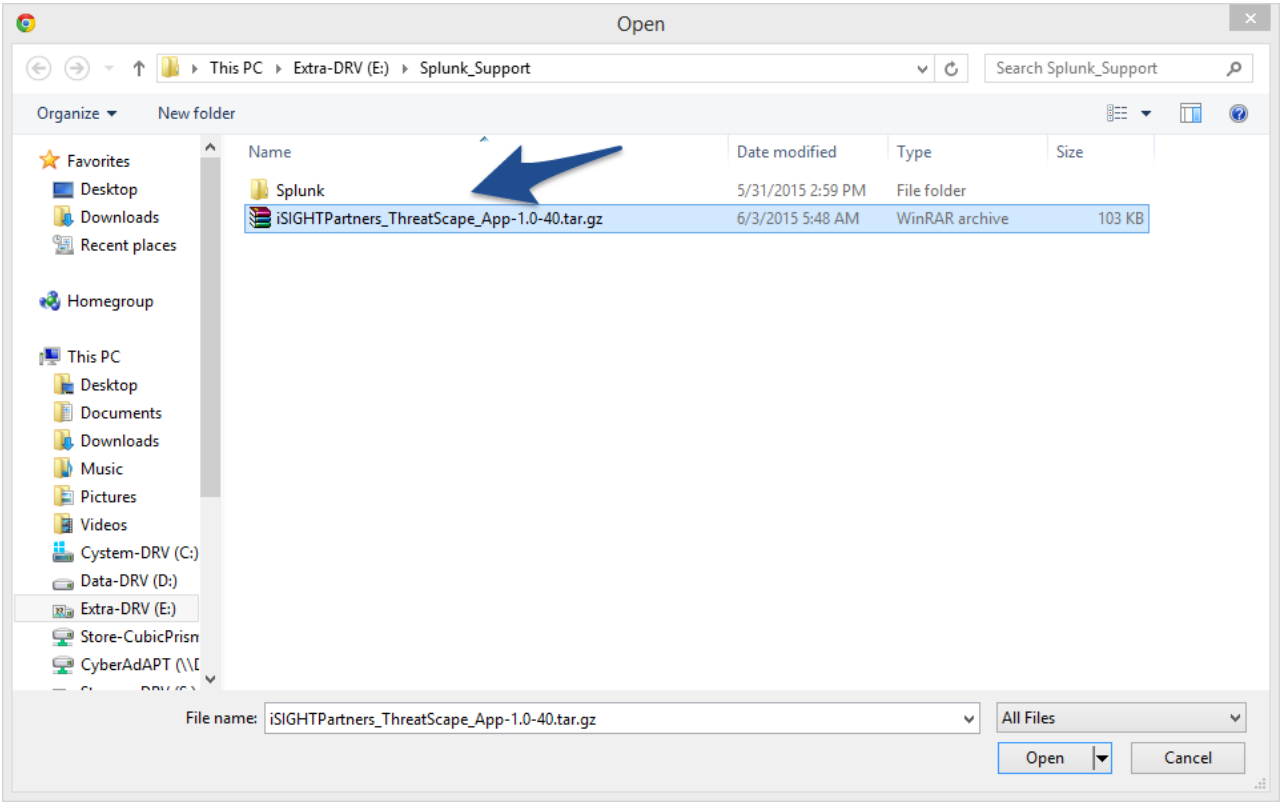
2. Select the button labeled "Install app from file."



3. Select the button labeled "Choose File."



4. Navigate to the ThreatScape App for Splunk file on your local system and select the button labeled "Open".

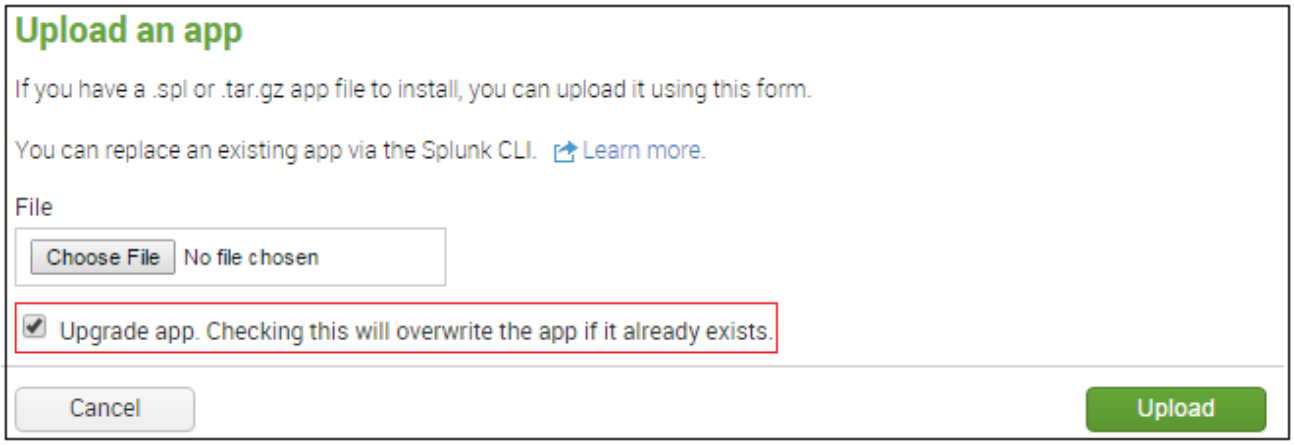


NOTE: ThreatScape App Upgrade:

To upgrade the ThreatScape App, the user needs to enable the upgrade checkbox as shown below in Figure-6. This will help the user to NOT setup another instance of the app

IMPORTANT NOTE (Please read carefully **before updating** the App):

Due to a documented issue in the original version of the ThreatScape App, there may be some duplicate data indexing present that needs to be addressed prior to upgrade. To solve this issue, the user can choose **one of the 3 approaches** listed below (**need to be implemented prior to upgrading the app**):



The options to avoid duplicate data indexing issue (as described above) are :

Approach 1 - Scripted:

The user can achieve the same results from approach 1, by running the python script available at the link given below, just before upgrade of the ThreatScape App.

The script is available at:

https://github.com/iSIGHTPartners/iSIGHT-connectors/blob/master/Splunk%20Upgrade/splunk_pre_upgrade.py

Note: This script execution is a one time activity for the release 1.1 and will not be needed for future releases.

Approach 2 - Manual:

Go to splunk app local directory ($SPLUNK_HOME/etc/apps/iSIGHTPartners_App/local).

Open file iSIGHTPartners_ThreatScape_App.conf file.

At the end of file, paste the lines mentioned below:

[isight_iocs]
delay = <copy this value from $SPLUNK_HOME/etc/apps/iSIGHTPartners_App/bin/isight_iocs.conf>
last_exec = <copy this value from $SPLUNK_HOME/etc/apps/iSIGHTPartners_App/bin/isight_iocs.conf>

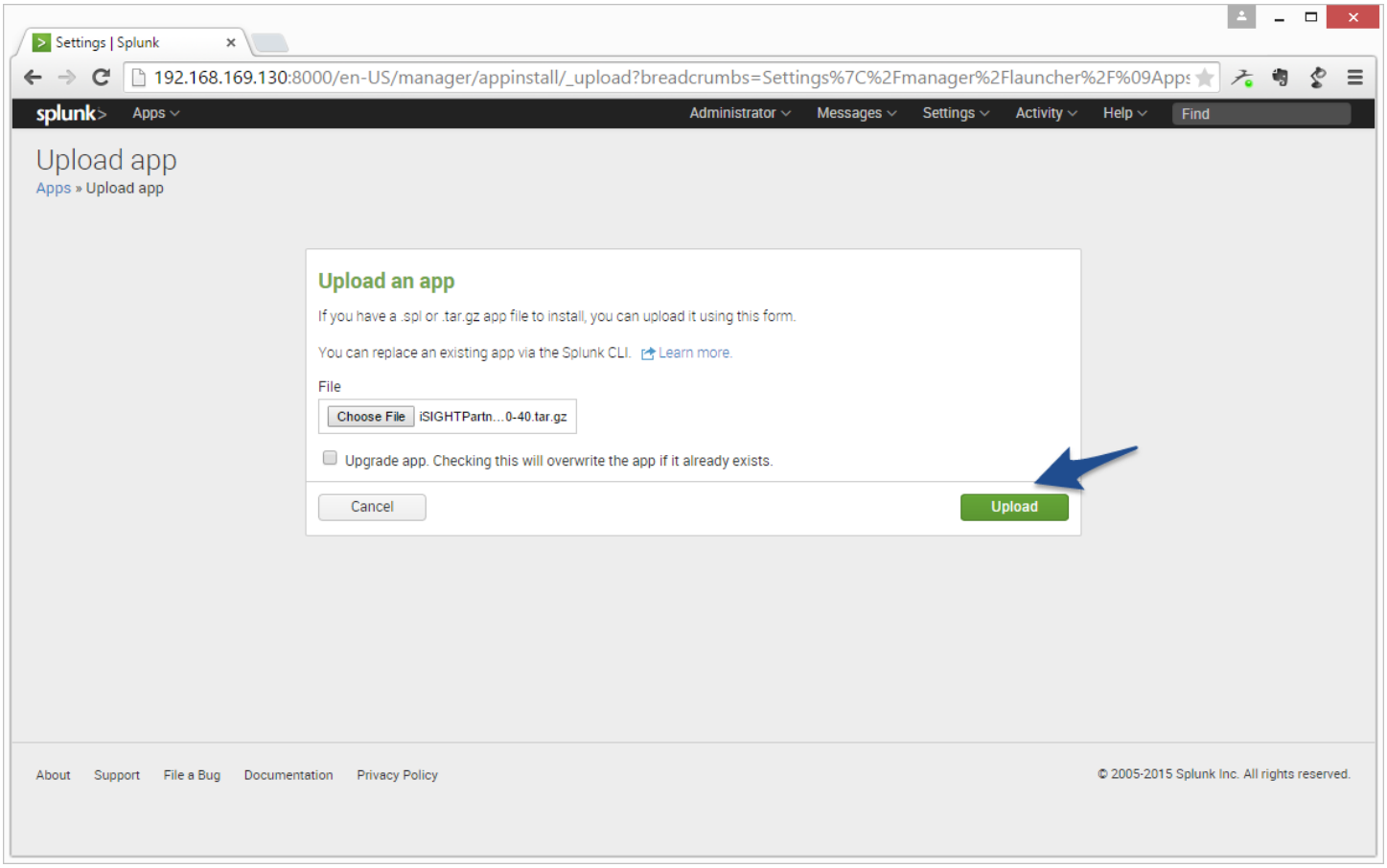
[isight_indicators]
last_exec = <copy this value from $SPLUNK_HOME/etc/apps/iSIGHTPartners_App/bin/isight_indicators.conf>
delay = <copy this value from $SPLUNK_HOME/etc/apps/iSIGHTPartners_App/bin/isight_indicators.conf>

Remove all files from bin directory($SPLUNK_HOME/etc/apps/iSIGHTPartners_App/bin/).

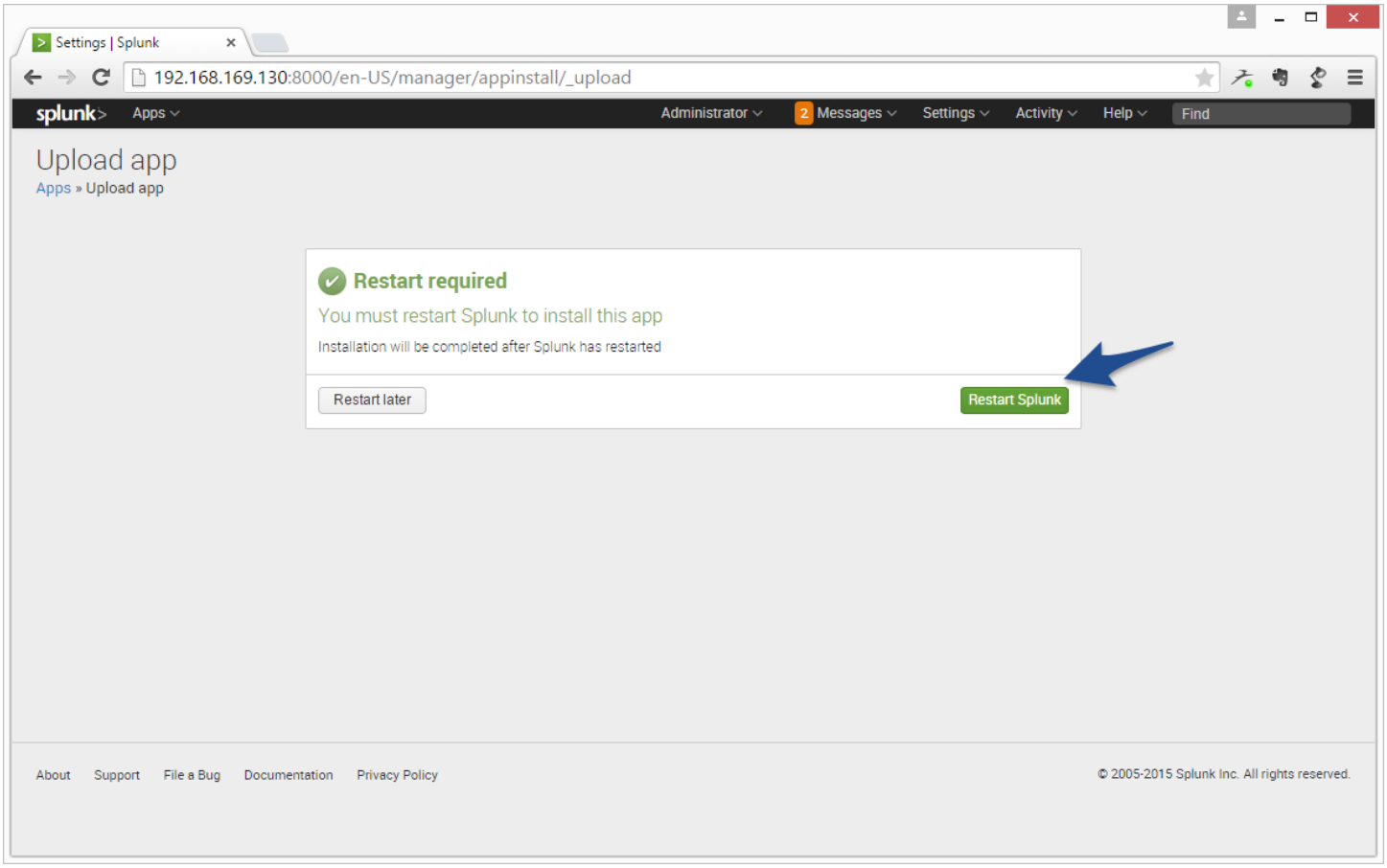
Approach 3 (uninstall before upgrade):

The above steps can be avoided by completely uninstalling the ThreatScape App and indexes and reinstalling the new version.

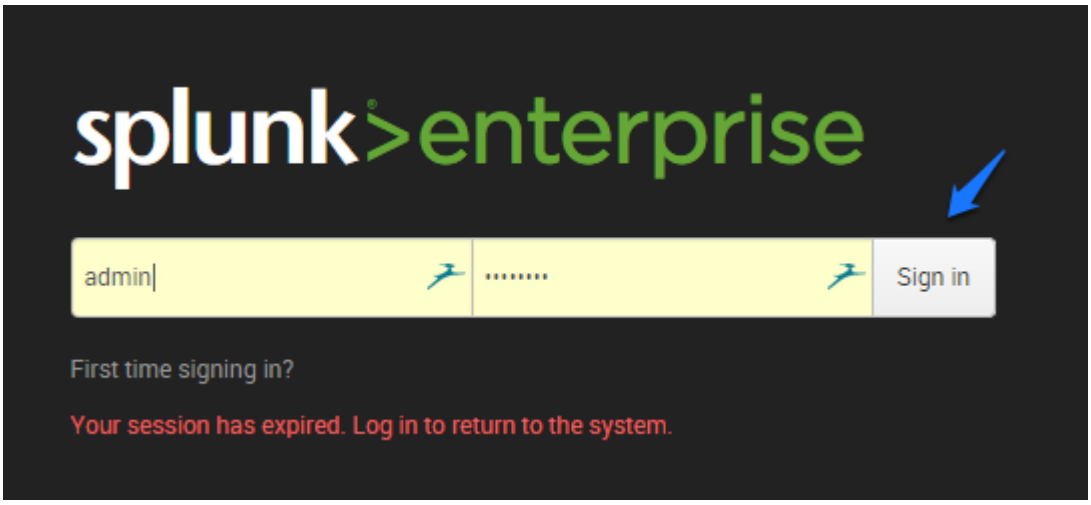
5. Select the button labeled "Upload."



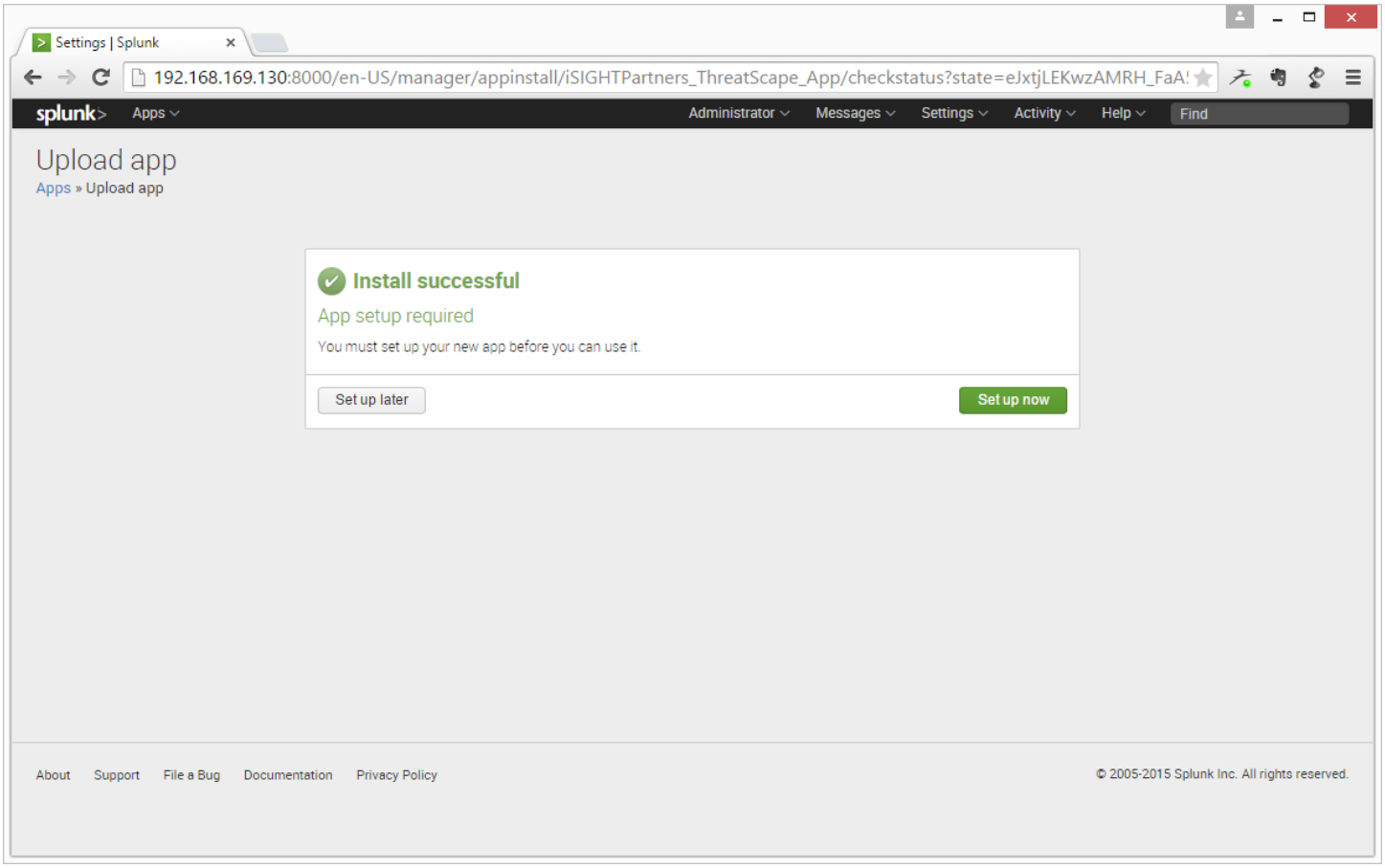
6. The ThreatScape App for Splunk is now installed! Select the button labeled "Restart Splunk."



7. And log back into Splunk.



8. A message is displayed that the ThreatScape App for Splunk has been installed. Select the button labeled "Set up now" to configure the ThreatScape App for Splunk.



Configuration

Configuration is required to allow the ThreatScape App for Splunk to retrieve ThreatScape API data. The following steps walk through the configuration process:

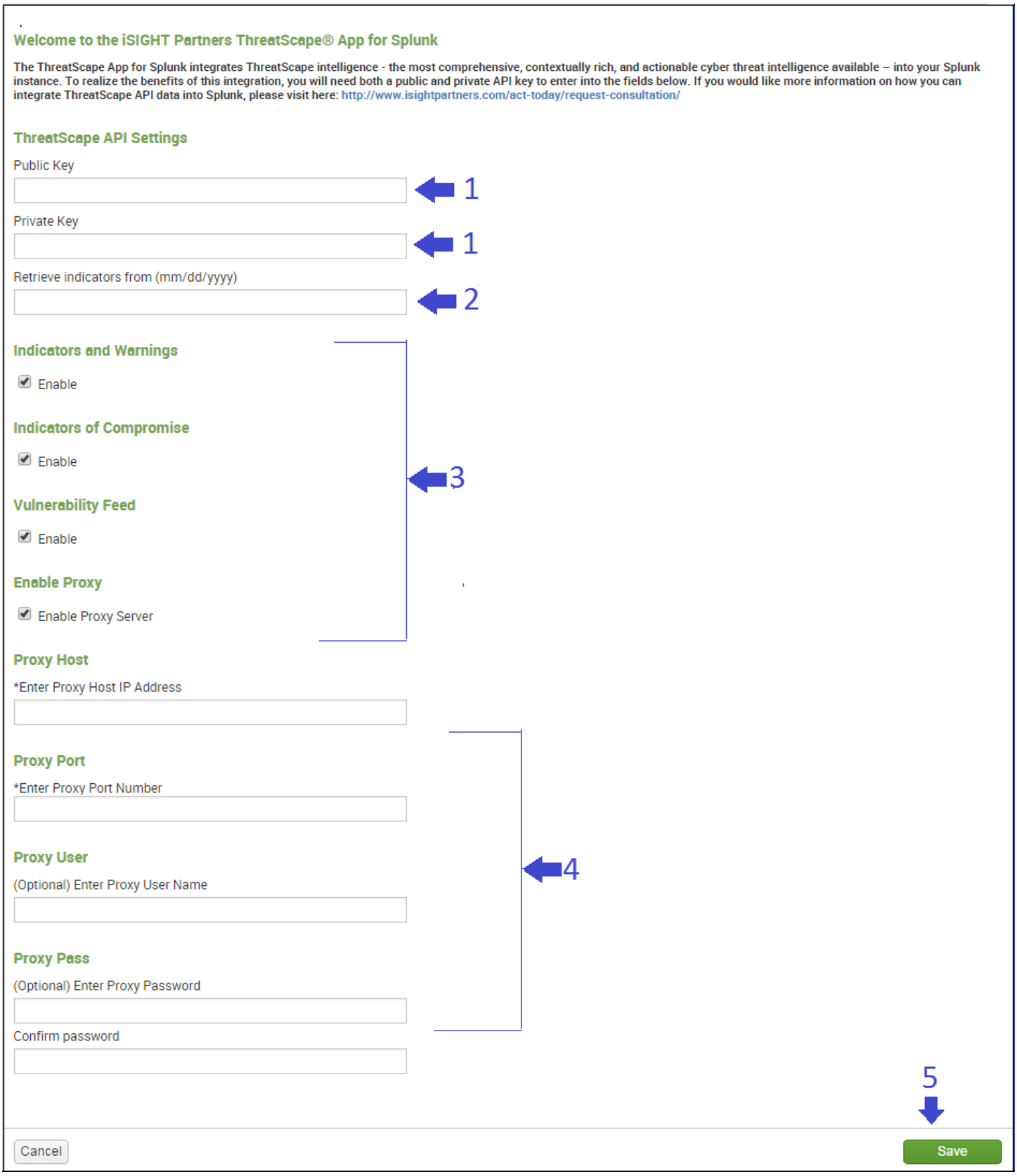
1. Copy and paste the Public API key (1) and the Private API key (2) into the respective fields. These keys are available with a subscription to the ThreatScape API and can be obtained from the account's customer engagement representative.

2. Enter the date from which you would like to retrieve indicators. This can be as far back as the API Keys subscription date.

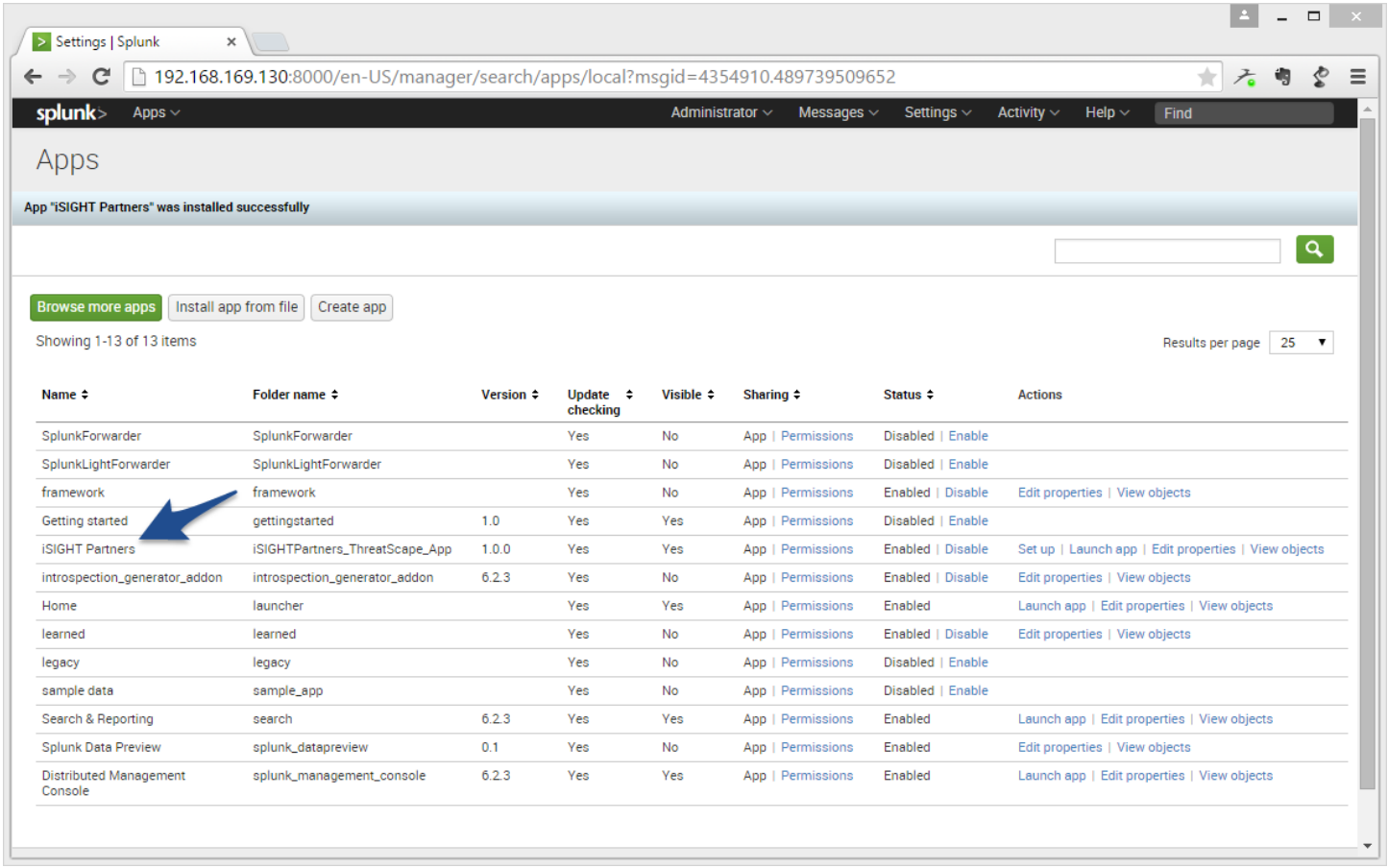
3. Select the desired indicator feeds (IOCs, I&Ws and Vulnerabilities) available via the API. We recommend that you avoid duplicate data by selecting EITHER I&Ws (most suitable for researchers) OR the IOCs (most suitable for SOC operators because there will be fewer false positives, as these indicators are verified as having been used in an attack or a campaign). **If both feeds are selected to be retrieved, then while performing search, duplicate results can be avoided by specifying the appropriate source type ("isight_indicators" and "isight_iocs," respectively) within Splunk searches**.

4. Enable proxy server if the user needs to use the proxy for Threatscape API Communications by splunk. User needs to provide the proxy details by filling in the values of “Proxy host”, “Proxy port”, “Proxy user” and “Proxy password”.

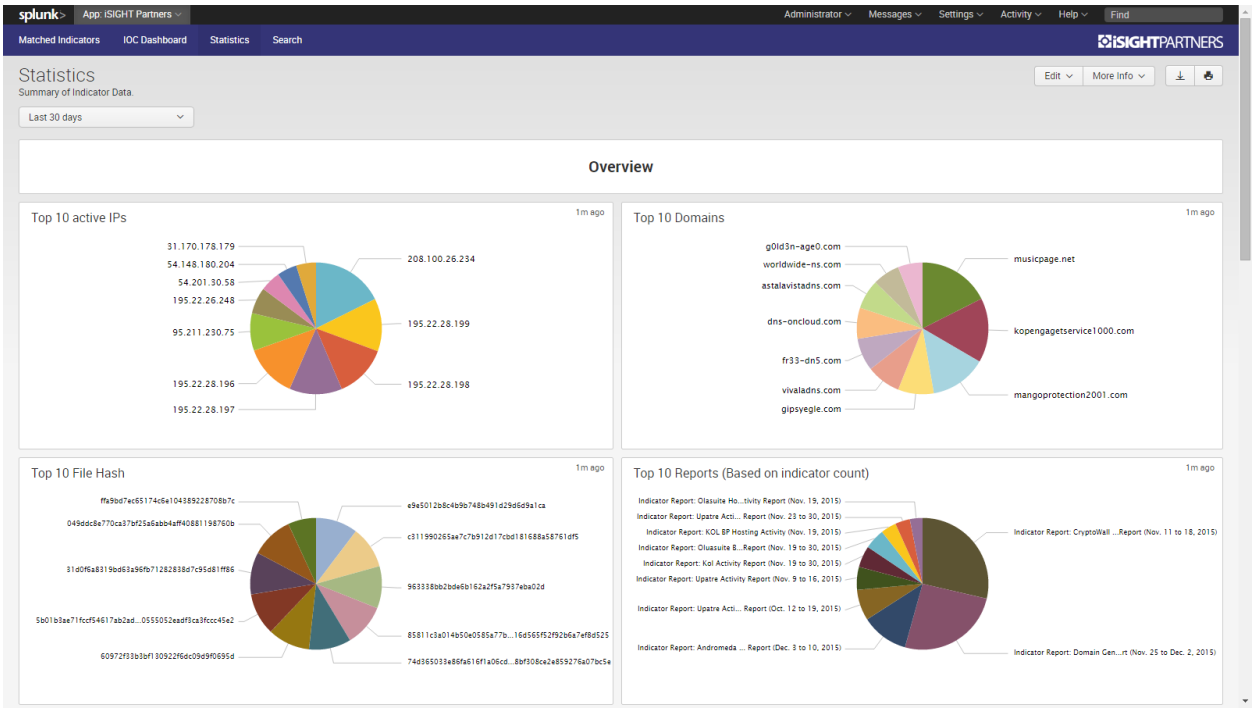
5. Select the button labeled "Save" to save the configuration options.



6. Validate that the ThreatScape App for Splunk installed and is enabled.



7. Navigate to the ThreatScape App for Splunk dashboard and verify that API data is being retrieved.



8. It is also a good idea to make sure that the ThreatScape API data is available to be used in searches. This can be accomplished by pressing the "Search" menu option and executing a simple search (For example: index=isightpartners (sourcetype="isight_indicators") |table, _time, reportId, title, webLink, sourcetype, ThreatScape, ip, networkIdentifier, productType). The return should look something like this: