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# **KSConf Documentation**

*Release 0.5.5*

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# CHAPTER 1

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## Intro

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This utility handles a number of common Splunk app maintenance tasks in an installable python package. Specifically, this tools deals with many of the nuances with storing Splunk apps in a version control system like git and pointing live Splunk apps to a working tree, merging changes from the live system's (local) folder to the version controlled (default) folder, and dealing with more than one layer of "default" (which splunk can't handle natively).



```
pip install kintyre-splunk-conf
```

## 2.1 Installation Guide

The following doc describes installation options for Kintyre's Splunk Configuration tool. This tool is available as a normal Python package that should require very minimal effort to install and upgrade. However, sometimes Python packaging gets ugly and the one-liner may not work.

A portion of this document is targeted at those who can't install packages as Admin or are forced to use Splunk's embedded Python. For everyone else, please start with the one-liner!

### 2.1.1 Quick install

Using pip:

```
pip install kintyre-splunk-conf
```

System-level install: (For Mac/Linux)

```
curl https://bootstrap.pypa.io/get-pip.py | sudo python - kintyre-splunk-conf
```

Note: This will also install/update pip and work around some known TLS/SSL issues

### Enable Bash completion

If you're on a Mac or Linux, and would like to enable bash completion, run these commands:

```
pip install argcomplete
echo 'eval "$$(register-python-argcomplete ksconf)"' >> ~/.bashrc
```

## 2.1.2 Requirements

- Python Supports Python 2.7, 3.4+
- PIP (strongly recommended)
- Tested on Mac, Linux, and Windows

### Check Python version

Check your installed python version by running:

```
python --version
```

Note that Linux distributions and Mac OS X that ship with multiple version of Python may have renamed this to `python2`, `python2.7` or similar.

### Check PIP Version

```
pip --version
```

If you are running a different python interpreter version, you can instead run this as:

```
python2.7 -m pip --version
```

## 2.1.3 Installation

There are several ways to install ksconf. Technically all standard python packaging approaches should work just fine, there's no compiled code or external run-time dependencies so installation is fairly easy, but for non-python developers there are some gotchas. Installation options are listed from the most easy and recommended to more obscure and difficult:

### Install from PyPI with PIP

The preferred installation method is to install via the standard Python package tool 'pip'. Ksconf can be installed via the registered `kintyre-splunk-conf` package using the standard python process.

There are 2 popular variations, depending on whether or not you would like to install for all users or just play around with it locally.

### Install ksconf into a virtual environment

*Use this option if you don't have admin access*

Installing `ksconf` with `virtualenv` is a great way to test the tool without requiring admin privileges and has many advantages for a production install too. Here are the basic steps to get started.

Please change `venv` to a suitable path for your environment.



```
# Install Python virtualenv package (if not already installed)
pip install virtualenv

# Create and activate new 'venv' virtual environment
virtualenv venv
source venv/bin/activate

pip install kintyre-splunk-conf
```

*Windows users:* The above virtual environment activation should be run as `venv\Scripts\activate.bat`.

## Install ksconf system-wide

**Note:** *This requires admin access.*

This is the absolute easiest install method where ‘ksconf’ is available to all users on the system but it requires root access and pip must be installed and up-to-date.

On Mac or Linux, run:

```
sudo pip install kintyre-splunk-conf
```

On Windows, run this commands from an Administrator console.

```
pip install kintyre-splunk-conf
```

## CentOS (RedHat derived) distros

```
# Enable the EPEL repo so that `pip` can be installed.
sudo yum install -y epel-release

# Install pip
sudo yum install -y python-pip

# Install ksconf (globally, for all users)
sudo pip install kintyre-splunk-conf
```

## Install from GIT

If you’d like to contribute to ksconf, or just build the latest and greatest, then install from the git repository is a good choice. (Technically this is still installing with pip, so it’s easy to switch between a PyPI install, and a local install.)

```
git clone https://github.com/Kintyre/ksconf.git
cd ksconf
pip install .
```

See [developer docs](#) for additional details about contributing to ksconf.

### 2.1.4 Use the standalone executable

Ksconf can be installed as a standalone executable zip app. This approach still requires a python interpreter to be present either from the OS or the one embedded with Splunk Enterprise. This works well for testing or when all other options fail.

From the [GitHub releases](#) page, grab the file name `ksconf-*.pyz`, download it, copy it to a `bin` folder in your `PATH` and rename it `ksconf`. The default shebang looks for ‘python’ in the `PATH`, but this can be adjusted as needed. Since installing with Splunk is a common use case, a second file named `ksconf-*-splunk.pyz` already has the shebang set for the standard `/opt/splunk` install path.

Typical embedded Splunk install example:

```
VER=0.5.0
curl https://github.com/Kintyre/ksconf/releases/download/v${VER}/ksconf-${VER}-splunk.
↳pyz
mv ksconf-${VER}-splunk.pyz /opt/splunk/bin/
cd /opt/splunk/bin
ln -sf ksconf-${VER}-splunk.pyz ksconf
chmod +x ksconf
ksconf --version
```

Reasons why this is a non-ideal install approach:

- Lower performance since all python files live in a zip file, and precompiled version’s can be cached.
- No standard install pathway (doesn’t use pip); user must manually copy the executable into place.
- Uses a non-standard build process. (May not be a big deal, but could cause things to break in the future.)

### Install the Wheel manually (offline mode)

Download the latest “Wheel” file from [PyPI](#), copy it to the destination server and install with pip.

Offline pip install:

```
pip install ~/Downloads/kintyre-splunk-conf-0.4.2-py2.py3-none-any.whl
```

### Install with Splunk’s Python

Splunk Enterprise 6.x and later installs an embedded Python 2.7 environment. However, Splunk does not provide packing tools (such as `pip` or the `distutils` standard library which is required to bootstrap install `pip`). For these reasons, it’s typically easier and cleaner to install `ksconf` with the system provided Python. However, sometimes the system-provided Python environment is the wrong version, is missing (like on Windows), or security restrictions prevent the installation of additional packages. In such cases, Splunk’s embedded Python becomes a beacon of hope.

### On Linux or Mac

Download the latest “Wheel” file from [PyPI](#). The path to this download will be set in the `pkg` variable as shown below.

Setup the shell:

```
export SPLUNK_HOME=/opt/splunk
export pkg=~Downloads/kintyre_splunk_conf-0.4.9-py2.py3-none-any.whl
```

Run the following:

```
cd $SPLUNK_HOME
mkdir Kintyre
cd Kintyre
```

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```
# Unzip the 'kconf' folder into SPLUNK_HOME/Kintyre
unzip "$pkg"

cat > $SPLUNK_HOME/bin/ksconf <<HERE
#!/bin/sh
export PYTHONPATH=$PYTHONPATH:$SPLUNK_HOME/Kintyre
exec $SPLUNK_HOME/bin/python -m ksconf \$*
HERE
chmod +x $SPLUNK_HOME/bin/ksconf
```

Test the install:

```
ksconf --version
```

## On Windows

1. Open a browser and download the latest “Wheel” file from [PyPI](#).
2. Rename the .whl extension to .zip. (This may require showing file extensions in Explorer.)
3. Extract the zip file to a temporary folder. (This should create a folder named “ksconf”)
4. Create a new folder called “Kintyre” under the Splunk installation path (aka SPLUNK\_HOME) By default this is C:\Program Files\Splunk.
5. Copy the “ksconf” folder to “SPLUNK\_HOME\Kintyre”.
6. Create a new batch file called ksconf.bat and paste in the following. Be sure to adjust for a non-standard %SPLUNK\_HOME% value, if necessary.

```
@echo off
SET SPLUNK_HOME=C:\Program Files\Splunk
SET PYTHONPATH=%SPLUNK_HOME%\bin;%SPLUNK_HOME%\Python-2.7\Lib\site-packages\win32;
↪%SPLUNK_HOME%\Python-2.7\Lib\site-packages;%SPLUNK_HOME%\Python-2.7\Lib
SET PYTHONPATH=%PYTHONPATH%;%SPLUNK_HOME%\Kintyre
CALL "%SPLUNK_HOME%\bin\python.exe" -m ksconf %*
```

7. Move ksconf.bat to the Splunk\bin folder. (This assumes that %SPLUNK\_HOME%/bin is part of your %PATH%. If not, add it, or find an appropriate install location.)
8. Test this by running ksconf --version from the command line.

### 2.1.5 Validate the install

Confirm installation with the following command:

```
ksconf --help
```

If this works, it means that ksconf installed and is part of your PATH and should be useable everywhere in your system. Go forth and conquer!

### 2.1.6 Command line completion

Bash completion allows for a more intuitive interactive workflow by providing quick access to command line options and file completions. Often this saves time since the user can avoid mistyping file names or be reminded of which

command line actions and arguments are available without switching contexts. For example, if the user types `ksconf d` and hits `tab` then the `ksconf diff` is completed. Or if the user types `ksconf` and hits `tab` twice, the full list of command actions are listed.

This feature is use the [argcomplete](#) python package and supports Bash, zsh, tcsh.

Install via pip:

```
pip install argcomplete
```

Enable command line completion for `ksconf` can be done in two ways. The easiest option is to enable it for `ksconf` only. (However, it only works for the current user, it can break if the `ksconf` command is referenced in a non-standard way.) The alternate option is to enable global command line completion for all python scripts at once, which is preferable if you use this module with many python tool.

Enable `argcomplete` for `ksconf` only:

```
# Edit your bashrc script
vim ~/.bashrc

# Add the following line
eval "$(register-python-argcomplete ksconf)"

# Reload your bashrc (Alternative: restart your shell)
source ~/.bashrc
```

To enable `argcomplete` globally, run the command:

```
activate-global-python-argcomplete
```

This adds new script to your the `bash_completion.d` folder, which can be use for all scripts and all users, but it does add some minor overhead to each completion command request.

OS-specific notes:

- **Mac OS X:** The global registration option has issue due the old version of Bash shipped by default. So either use the one-shot registration or install a later version of bash with homebrew: `brew install bash` then. Switch to the newer bash by default with `chsh /usr/local/bin/bash`.
- **Windows:** `Argcomplete` doesn't work on windows Bash for GIT. See [argcomplete issue 142](#) for more info. If you really want this, use Linux subsystem for Windows instead.

### 2.1.7 Offline installation

Installing `ksconf` to an offline or network restricted computer requires three steps: (1) download the latest packages from the Internet to a staging location, (2) transfer the staged content (often as a zip file) to the restricted host, and (3) use `pip` to install packages from the staged copy. Fortunately, `pip` makes offline workflows quite easy to achieve. `Pip` can download a python package with all dependencies stored as wheels files into a single directory, and `pip` can be told to install from that directory instead of attempting to talk to the Internet.

The process of transferring these files is very organization-specific. The example below shows the creation of a tarball (since `tar` is universally available on Unix systems), but any acceptable method is fine. If security is a high concern, this step is frequently where safety checks are implemented. For example, antivirus scans, static code analysis, manual inspection, and/or comparison of cryptographic file hashes.

One additional use-case for this workflow is to ensure the exact same version of all packages are deployed consistently across all servers and environments. Often building a `requirements.txt` file with `pip freeze` is a more appropriate solution. Or consider using `pipenv lock` for even more security benefits.

## Offline installation steps

**NOTE:** Pip must be installed on the destination server for this process to work. If pip is NOT installed see the *Offline installation of pip* section below.

**Step 1:** Use pip to download the latest package and their dependencies. Be sure to use the same version of python that is running on destination machine

```
# download packages
python2.7 -m pip download -d ksconf-packages kintyre-splunk-conf
```

A new directory named 'ksconf-packages' will be created and will contain the necessary \*.whl files.

**Step 2:** Transfer the directory or archive to the remote computer. Insert whatever security and file copy procedures necessary for your organization.

```
# Compress directory (on staging computer)
tar -czvf ksconf-packages.tgz ksconf-packages

# Copy file using whatever means
scp ksconf-packages.tgz user@server:/tmp/ksconf-packages.tgz

# Extract the archive (on destination server)
tar -xzvf ksconf-packages.tgz
```

**Step 3:**

```
# Install ksconf package with pip
pip install --no-index --find-links ksconf-packages kintyre-splunk-conf

# Test the installation
ksconf --version
```

The ksconf-packages folder can now safely be removed.

## Offline installation of pip

Use the recommended pip install procedures listed elsewhere if possible. But if a remote bootstrap of pip is your only option, then here are the steps. (This process mirrors the steps above and can be combined, if needed.)

**Step 1:** Fetch bootstrap script and necessary wheels

```
mkdir ksconf-packages
curl https://bootstrap.pypa.io/get-pip.py -o ksconf-packages/get-pip.py
python2.7 -m pip download -d /tmp/my_packages pip setuptools wheel
```

The ksconf-packages folder should contain 1 script, and 3 wheel (\*.whl) files.

**Step 2:** Archive and/or copy to offline server

**Step 3:** Bootstrap pip

```
sudo python get-pip.py --no-index --find-links=ksconf-packages/

# Test with
pip --version
```

## 2.1.8 Frequent gotchas

### PIP Install TLS Error

If `pip` throws an error message like the following:

```
There was a problem confirming the ssl certificate: [SSL: TLSV1_ALERT_PROTOCOL_
↪VERSION] tlsv1 alert protocol version
...
No matching distribution found for setuptools
```

The problem is likely caused by changes to PyPI website in April 2018 when support for TLS v1.0 and 1.1 were removed. Downloading new packages requires upgrading to a new version of `pip`. Like so:

Upgrade `pip` as follows:

```
curl https://bootstrap.pypa.io/get-pip.py | python
```

Note: Use `sudo python` above if not in a virtual environment.

Helpful links:

- [Not able to install Python packages \[SSL: TLSV1\\_ALERT\\_PROTOCOL\\_VERSION\]](#)
- [‘pip install’ fails for every package \(“Could not find a version that satisfies the requirement”\)](#)

## 2.1.9 Resources

- [Python packaging docs](#) provide a general overview on installing Python packages, how to install per-user vs install system-wide.
- [Install PIP docs](#) explain how to bootstrap or upgrade `pip` the Python packaging tool. Recent versions of Python come with this by default, but releases before Python 2.7.9 do not.

## 2.2 Command line reference

The following documents the CLI options

### 2.2.1 ksconf

```
usage: ksconf [-h] [--version] [--force-color]
              {check,combine,diff,filter,promote,merge,minimize,snapshot,sort,rest-
↪export,unarchive}
              ...
```

Ksconf: Kintyre Splunk CONFIG tool

This utility handles a number of common Splunk app maintenance tasks **in** a small **and** easy to deploy package. Specifically, this tool deals **with** many of the nuances **with** storing Splunk apps **in** git, **and** pointing live Splunk apps to a git repository. Merging changes **from the** live system's (local) folder to the version controlled (default) folder, **and** dealing **with** more than one layer of "default" (which splunk can't handle natively) are all supported tasks.

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```
positional arguments:
  {check,combine,diff,filter,promote,merge,minimize,snapshot,sort,rest-export,
↪unarchive}
  check                Perform basic syntax and sanity checks on .conf files
  combine              Combine configuration files across multiple source
                      directories into a single destination directory. This
                      allows for an arbitrary number of splunk configuration
                      layers to coexist within a single app. Useful in both
                      ongoing merge and one-time ad-hoc use. For example,
                      combine can consolidate 'users' directory across
                      several instances after a phased server migration.
  diff                Compare settings differences between two .conf files
                      ignoring spacing and sort order
  filter              A stanza-aware GREP tool for conf files
  promote             Promote .conf settings from one file into another
                      either in batch mode (all changes) or interactively
                      allowing the user to pick which stanzas and keys to
                      integrate. Changes made via the UI (stored in the
                      local folder) can be promoted (moved) to a version-
                      controlled directory.
  merge               Merge two or more .conf files
  minimize            Minimize the target file by removing entries
                      duplicated in the default conf(s)
  snapshot            Snapshot .conf file directories into a JSON dump
                      format
  sort                Sort a Splunk .conf file creating a normalized format
                      appropriate for version control
  rest-export         Export .conf settings as a curl script to apply to a
                      Splunk instance later (via REST)
  unarchive           Install or upgrade an existing app in a git-friendly
                      and safe way

optional arguments:
  -h, --help          show this help message and exit
  --version           show program's version number and exit
  --force-color       Force TTY color mode on. Useful if piping the output a
                      color-aware pager, like 'less -R'
```

## 2.2.2 ksconf check

```
usage: ksconf check [-h] [--quiet] FILE [FILE ...]

Provide basic syntax and sanity checking for Splunk's .conf files. Use
Splunk's builtin 'btool check' for a more robust validation of keys and
values. Consider using this utility as part of a pre-commit hook.

positional arguments:
  FILE                One or more configuration files to check. If '-' is given, then
                      read a list of files to validate from standard input

optional arguments:
  -h, --help          show this help message and exit
  --quiet, -q         Reduce the volume of output.
```

### 2.2.3 ksconf combine

```
usage: ksconf combine [-h] [--target TARGET] [--dry-run] [--banner BANNER]
       source [source ...]
```

Merge .conf settings from multiple source directories into a combined target directory. Configuration files can be stored in a '/etc/\*.d' like directory structure and consolidated back into a single 'default' directory.

This command supports both one-time operations and recurring merge jobs. For example, this command can be used to combine all users knowledge objects (stored in 'etc/users') after a server migration, or to merge a single user's settings after an their account has been renamed. Recurring operations assume some type of external scheduler is being used. A best-effort is made to only write to target files as needed.

The 'combine' command takes your logical layers of configs (upstream, corporate, splunk admin fixes, and power user knowledge objects, ...) expressed as individual folders and merges them all back into the single 'default' folder that Splunk reads from. One way to keep the 'default' folder up-to-date is using client-side git hooks.

No directory layout is mandatory, but but one simple approach is to model your layers using a prioritized 'default.d' directory structure. (This idea is borrowed from the Unix System V concept where many services natively read their config files from '/etc/\*.d' directories.)

#### THE PROBLEM:

In a typical enterprise deployment of Splunk, a single app can easily have multiple logical sources of configuration: (1) The upstream app developer, (2) local developer app-developer adds organization-specific customizations or fixes, (3) splunk admin tweaks the inappropriate 'indexes.conf' settings, and (4) custom knowledge objects added by your subject matter experts. Ideally we'd like to version control these, but doing so is complicated because normally you have to manage all 4 of these logical layers in one 'default' folder. (Splunk requires that app settings be located either in 'default' or 'local'; and managing local files with version control leads to merge conflicts; so effectively, all version controlled settings need to be in 'default', or risk merge conflicts.) So when a new upstream version is released, someone has to manually upgrade the app being careful to preserve all custom configurations. The solution provided by the 'combine' functionality is that all of these logical sources can be stored separately in their own physical directories allowing changes to be managed independently. (This also allows for different layers to be mixed-and-matched by selectively including which layers to combine.) While this doesn't completely remove the need for a human to review app upgrades, it does lower the overhead enough that updates can be pulled in more frequently, thus reducing the divergence potential. (Merge frequently.)

#### NOTES:

The 'combine' command is similar to running the 'merge' subcommand recursively against a set of directories. One key difference is that this command will gracefully handle non-conf files intelligently too.

#### EXAMPLE:

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```

Splunk_CiscoSecuritySuite/
├── README
├── default.d
│   ├── 10-upstream
│   │   ├── app.conf
│   │   ├── data
│   │   │   └── ui
│   │   │       ├── nav
│   │   │       │   └── default.xml
│   │   │       └── views
│   │   │           ├── authentication_metrics.xml
│   │   │           ├── cisco_security_overview.xml
│   │   │           ├── getting_started.xml
│   │   │           ├── search_ip_profile.xml
│   │   │           ├── upgrading.xml
│   │   │           └── user_tracking.xml
│   │   ├── eventtypes.conf
│   │   ├── macros.conf
│   │   ├── savedsearches.conf
│   │   └── transforms.conf
│   ├── 20-my-org
│   │   └── savedsearches.conf
│   ├── 50-splunk-admin
│   │   ├── indexes.conf
│   │   ├── macros.conf
│   │   └── transforms.conf
│   └── 70-firewall-admins
│       ├── data
│       │   └── ui
│       │       └── views
│       │           ├── attacks_noc_bigscreen.xml
│       │           ├── device_health.xml
│       │           └── user_tracking.xml
│       └── eventtypes.conf

```

**Commands:**

```

cd Splunk_CiscoSecuritySuite
ksconf combine default.d/* --target=default

```

**positional arguments:**

**source** The source directory where configuration files will be merged from. When multiple sources directories are provided, start with the most general and end with the specific; later sources will override values from the earlier ones. Supports wildcards so a typical Unix 'conf.d/##-NAME' directory structure works well.

**optional arguments:**

**-h, --help** show this help message and exit

**--target TARGET, -t TARGET** Directory where the merged files will be stored. Typically either 'default' or 'local'

**--dry-run, -D** Enable dry-run mode. Instead of writing to TARGET, preview changes as a 'diff'. If TARGET doesn't exist, then show the merged file.

**--banner BANNER, -b BANNER**

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```
A warning banner to discourage manual editing of conf
files.
```

## 2.2.4 kskonf diff

```
usage: kskonf diff [-h] [-o FILE] [--comments] CONF1 CONF2
```

Compares the content differences of two .conf files

This command ignores textual differences (like order, spacing, **and** comments) **and** focuses strictly on comparing stanzas, keys, **and** values. Note that spaces within **any** given value will be compared. Multiline fields are compared **in** are compared **in** a more traditional 'diff' output so that long savedsearches **and** macros can be compared more easily.

positional arguments:

```
CONF1          Left side of the comparison
CONF2          Right side of the comparison
```

optional arguments:

```
-h, --help          show this help message and exit
-o FILE, --output FILE
                    File where difference is stored. Defaults to standard
                    out.
--comments, -C      Enable comparison of comments. (Unlikely to work
                    consistently)
```

## 2.2.5 kskonf filter

```
usage: kskonf filter [-h] [-o FILE] [--comments]
                    [--match {regex,wildcard,string}] [--ignore-case]
                    [--invert-match] [--files-with-matches] [--count]
                    [--stanza PATTERN] [--attr-present ATTR]
                    [--keep-attrs WC-ATTR] [--reject-attrs WC-ATTR]
                    CONF [CONF ...]
```

Filter the contents of a conf file **in** various ways. Stanzas can be included **or** excluded based on provided **filter**, based on the presents **or** value of a key. Where possible, this command supports GREP-like arguments to bring a familiar feel.

positional arguments:

```
CONF          Input conf file
```

optional arguments:

```
-h, --help          show this help message and exit
-o FILE, --output FILE
                    File where the filtered results are written. Defaults
                    to standard out.
--comments, -C      Preserve comments. Comments are discarded by default.
--match {regex,wildcard,string}, -m {regex,wildcard,string}
                    Specify pattern matching mode. Defaults to 'wildcard'
```

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```

allowing for '*' and '?' matching. Use 'regex' for
more power but watch out for shell escaping. Use
'string' enable literal matching.
--ignore-case, -i      Ignore case when comparing or matching strings. By
                        default matches are case-sensitive.
--invert-match, -v    Invert match results. This can be used to show what
                        content does NOT match, or make a backup copy of
                        excluded content.

```

**Output mode:**

Select an alternate output mode. If **any** of the following options are used, the stanza output **is not** shown.

```

--files-with-matches, -l      List files that match the given search criteria
--count, -c                  Count matching stanzas

```

**Stanza selection:**

Include **or** exclude entire stanzas using these **filter** options. All **filter** options can be provided multiple times. If you have a long **list** of **filters**, they can be saved **in** a file **and** referenced using the special 'file://' prefix.

```

--stanza PATTERN           Match any stanza who's name matches the given pattern.
                           PATTERN supports bulk patterns via the 'file://'
                           prefix.
--attr-present ATTR       Match any stanza that includes the ATTR attribute.
                           ATTR supports bulk attribute patterns via the
                           'file://' prefix.

```

**Attribute selection:**

Include **or** exclude attributes passed through. By default **all** attributes are preserved. Whitelist (keep) operations are preformed before blacklist (reject) operations.

```

--keep-attrs WC-ATTR      Select which attribute(s) will be preserved. This
                           space separated list of attributes indicates what to
                           preserve. Supports wildcards.
--reject-attrs WC-ATTR   Select which attribute(s) will be discarded. This
                           space separated list of attributes indicates what to
                           discard. Supports wildcards.

```

## 2.2.6 ksconf promote

```

usage: ksconf promote [-h] [--batch | --interactive] [--force] [--keep]
                    [--keep-empty]
                    SOURCE TARGET

```

Propagate .conf settings applied **in** one file to another. Typically this **is** used to take local changes made via the UI **and** push them into a default (**or** default.d/) location.

**NOTICE:** By default, changes are **\*MOVED\***, **not** just copied.

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Promote has two different modes: batch **and** interactive. In batch mode **all** changes are applied automatically **and** the (now empty) source file **is** removed. In interactive mode the user **is** prompted to pick which stanzas **and** keys to integrate. This can be used to push changes made via the UI, which are stored **in** a 'local' file, to the version-controlled 'default' file. Note that the normal operation moves changes **from the** SOURCE file to the TARGET, updating both files **in** the process. But it's also possible to preserve the local file, if desired.

If either the source file **or** target file **is** modified **while** a promotion **is** under progress, changes will be aborted. And **any** custom selections you made will be lost. (This needs improvement.)

positional arguments:

SOURCE	The source configuration file to pull changes from. (Typically the 'local' conf file)
TARGET	Configuration file <b>or</b> directory to push the changes into. (Typically the 'default' folder) As a shortcut, a directory <b>is</b> given, then it's assumed that the same basename <b>is</b> used <b>for</b> both SOURCE <b>and</b> TARGET. In fact, <b>if</b> different basename <b>as</b> provided, a warning <b>is</b> issued.

optional arguments:

-h, --help	show this help message <b>and</b> exit
--batch, -b	Use batch mode where <b>all</b> configuration settings are automatically promoted. All changes are removed <b>from source and</b> applied to target. The source file will be removed, unless '--keep-empty' <b>is</b> used.
--interactive, -i	Enable interactive mode where the user will be prompted to approve the promotion of specific stanzas <b>and</b> keys. The user will be able to apply, skip, <b>or</b> edit the changes being promoted. (This functionality was inspired by 'git add --patch').
--force, -f	Disable safety checks.
--keep, -k	Keep conf settings <b>in</b> the source file. All changes will be copied into the target file instead of being moved there. This <b>is</b> typically a bad idea since local always overrides default.
--keep-empty	Keep the source file, even <b>if</b> after the settings promotions the file has no content. By default, SOURCE will be removed after <b>all</b> content has been moved into TARGET. Splunk will re-create <b>any</b> necessary local files on the fly.

## 2.2.7 ksconf merge

```
usage: ksconf merge [-h] [--target FILE] [--dry-run] [--banner BANNER]
                FILE [FILE ...]
```

Merge two **or** more .conf files into a single combined .conf file. This could be used to merge the props.conf file **from ALL** technology addons into a single file:

```
ksconf merge --target=all-ta-props.conf etc/apps/*TA*/{default,local}/props.conf
```

positional arguments:

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FILE	The source configuration file to pull changes from.
optional arguments:	
-h, --help	show this help message <b>and</b> exit
--target FILE, -t FILE	Save the merged configuration files to this target file. If <b>not</b> provided, the the merged conf <b>is</b> written to standard output.
--dry-run, -D	Enable dry-run mode. Instead of writing to TARGET, preview changes <b>in</b> 'diff' format. If TARGET doesn't exist, then show the merged file.
--banner BANNER, -b BANNER	A banner <b>or</b> warning comment added to the top of the TARGET file. This <b>is</b> often used to warn Splunk admins <b>from editing</b> an auto-generated file.

## 2.2.8 ksconf minimize

usage: ksconf minimize [-h] [--target FILE] [--dry-run   --output OUTPUT] [--explode-default] [-k PRESERVE_KEY] FILE [FILE ...]
Minimize a conf file by removing the default settings
Reduce local conf file to only your indented changes without manually tracking which entries you've edited. Minimizing local conf files makes your local customizations easier to read <b>and</b> often results <b>in</b> cleaner add-on upgrades.
A typical scenario & why does this matter:
To customizing a Splunk app <b>or</b> add-on, start by copying the conf file <b>from default</b> to local <b>and</b> then applying your changes to the local file. That's good. But stopping here may complicated future upgrades, because the local file doesn't contain <i>*just* your settings, it contains all the default settings too.</i> Fixes published by the app creator may be masked by your local settings. A better approach <b>is</b> to reduce the local conf file leaving only the stanzas <b>and</b> settings that you indented to change. This make your conf files easier to read <b>and</b> makes upgrades easier, but it's tedious to do by hand.
For special cases, the '--explode-default' mode reduces duplication between entries normal stanzas <b>and</b> global/default entries. If 'disabled = 0' <b>is</b> a <b>global</b> default, it's technically safe to remove that setting from individual stanzas. But sometimes it's preferable to be explicit, and this behavior may be too heavy-handed <b>for</b> general use so it's off by default. Use this mode if your conf file that's been fully-expanded. (i.e., conf entries downloaded via REST, <b>or</b> the output of "btool list"). This isn't perfect, since many apps push their settings into the <b>global</b> namespace, but it can help.
Example usage:
<pre>cd Splunk_TA_nix cp default/inputs.conf local/inputs.conf  # Edit 'disabled' and 'interval' settings in-place vi local/inputs.conf</pre>

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```

# Remove all the extra (unmodified) bits
ksconf minimize --target=local/inputs.conf default/inputs.conf

```

positional arguments:

FILE                   The default configuration file(s) used to determine what base settings are " unnecessary to keep in the target file.

optional arguments:

-h, --help             show this help message **and** exit

--target FILE, -t FILE       This **is** the local file that you **with** to remove the duplicate settings from. By default, this file will be read **and** the updated **with** a minimized version.

--dry-run, -D            Enable dry-run mode. Instead of writing the minimizing the TARGET file, preview what what be removed **in** the form of a 'diff'.

--output OUTPUT         Write the minimized output to a separate file instead of updating TARGET. This can be use to preview changes **if** dry-run produces a large diff. This may also be helpful **in** other workflows.

--explode-default, -E    Enable minimization across stanzas **as** well **as** files **for** special use-cases. This mode will **not** only minimize the same stanza across multiple config files, it will also attempt to minimize default **any** values stored **in** the [default] **or** global stanza **as** well. Example: Trim out cruft **in** savedsearches.conf by pointing to etc/system/default/savedsearches.conf

-k PRESERVE\_KEY, --preserve-key PRESERVE\_KEY   Specify a key that should be allowed to be a duplication but should be preserved within the minimized output. For example, it may be desirable keep the 'disabled' settings **in** the local file, even **if** it's enabled by default.

## 2.2.9 ksconf snapshot

```

usage: ksconf snapshot [-h] [--output FILE] [--minimize] PATH [PATH ...]

```

Build a static snapshot of various configuration files stored within a structured json export **format**. If the .conf files being captured are within a standard Splunk directory structure, then certain metadata **is** assumed based on path locations. Otherwise, less metadata **is** recorded. ksconf snapshot

```

--output=daily.json /opt/splunk/etc/app/

```

positional arguments:

PATH                    Directory **from which** to load configuration files. All .conf **and** .meta file are included recursively.

optional arguments:

-h, --help             show this help message **and** exit

--output FILE, -o FILE   Save the snapshot to the named files. If **not** provided,

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<code>--minimize</code>	the snapshot <b>is</b> written to standard output. Reduce the size of the JSON output by removing whitespace. Reduces readability.
-------------------------	--

## 2.2.10 kskonf sort

```
usage: kskonf sort [-h] [--target FILE | --inplace] [-F] [-q] [-n LINES]
           FILE [FILE ...]
```

Sort a Splunk `.conf` file. Sort has two modes: (1) by default, the `sorted` config file will be echoed to the screen. (2) the config files are updated inplace when the `'-i'` option **is** used.

Manually managed conf files can be blacklisted by add a comment containing the string `'KSCONF-NO-SORT'` to the top of *any* `.conf` file.

To recursively sort **all** files:

```
find . -name '*.conf' | xargs kskonf sort -i
```

positional arguments:

FILE Input file to sort, **or** standard `input`.

optional arguments:

`-h, --help` show this help message **and** exit  
`--target FILE, -t FILE` File to write results to. Defaults to standard output.  
`--inplace, -i` Replace the `input` file **with** a `sorted` version. **Warning** this a potentially destructive operation that may move/remove comments.  
`-n LINES, --newlines LINES` Lines between stanzas.

In-place update arguments:

`-F, --force` Force file sorting **for** all files, even **for** files containing the special `'KSCONF-NO-SORT'` marker.  
`-q, --quiet` Reduce the output. Reports only updated **or** invalid files. This **is** useful **for** pre-commit hooks, **for** example.

## 2.2.11 kskonf rest-export

```
usage: kskonf rest-export [-h] [--output FILE] [--disable-auth-output]
           [--pretty-print] [-u | -D] [--url URL] [--app APP]
           [--user USER] [--conf TYPE]
           [--extra-args EXTRA_ARGS]
           CONF [CONF ...]
```

Build an executable script of the stanzas in a configuration file that can be later `↪` applied to a running Splunk instance via the Splunkd REST endpoint.

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This can be helpful when pushing complex props & transforms to an instance where you only have UI access and can't directly publish an app.

WARNING: This command is indented for manual admin workflows. It's quite possible that shell escaping bugs exist that may allow full shell access if you put this into an automated workflow. Evaluate the risks, review the code, and run as a least-privilege user, and be responsible.

For now the assumption is that 'curl' command will be used. (Patches to support the Power Shell Invoke-WebRequest cmdlet would be greatly welcomed!)

```
ksconf rest-export --output=apply_props.sh etc/app/Splunk_TA_aws/local/props.conf
```

positional arguments:

CONF Configuration file(s) to export settings from.

optional arguments:

-h, --help show this help message and exit

--output FILE, -t FILE Save the shell script output to this file. If not provided, the output is written to standard output.

-u, --update Assume that the REST entities already exist. By default output assumes stanzas are being created. (This is an unfortunate quark of the configs REST API)

-D, --delete Remove existing REST entities. This is a destructive operation. In this mode, stanzas attributes are unnecessary and ignored. NOTE: This works for 'local' entities only; the default folder cannot be updated.

--url URL URL of Splunkd. Default: https://localhost:8089

--app APP Set the namespace (app name) for the endpoint

--user USER Set the user associated. Typically the default of 'nobody' is ideal if you want to share the configurations at the app-level.

--conf TYPE Explicitly set the configuration file type. By default this is derived from CONF, but sometime it's helpful set this explicitly. Can be any valid Splunk conf file type, example include 'app', 'props', 'tags', 'savedsearches', and so on.

--extra-args EXTRA\_ARGS Extra arguments to pass to all CURL commands. Quote arguments on the commandline to prevent confusion between arguments to ksconf vs curl.

Output Control:

--disable-auth-output Turn off sample login curl commands from the output.

--pretty-print, -p Enable pretty-printing. Make shell output a bit more readable by splitting entries across lines.



## 2.2.12 kskonf unarchive

```
usage: kskonf unarchive [-h] [--dest DIR] [--app-name NAME]
                        [--default-dir DIR] [--exclude EXCLUDE] [--keep KEEP]
                        [--allow-local]
                        [--git-sanity-check {off,changed,untracked,ignored}]
                        [--git-mode {nochange,stage,commit}] [--no-edit]
                        [--git-commit-args GIT_COMMIT_ARGS]
                        SPL
```

Install or overwrite an existing app in a git-friendly way.  
If the app already exist, steps will be taken to upgrade it safely.

The 'default' folder can be redirected to another path (i.e., 'default.d/10-upstream' [↪](#) or whatever which is helpful if you're using the kskonf 'combine' mode.)

Supports tarballs (.tar.gz, .spl), and less-common zip files (.zip)

positional arguments:

SPL The path to the archive to install.

optional arguments:

-h, --help show this help message and exit

--dest DIR Set the destination path where the archive will be extracted. By default the current directory is used, but sane values include etc/apps, etc/deployment-apps, and so on. This could also be a git repository working tree where splunk apps are stored.

--app-name NAME The app name to use when expanding the archive. By default, the app name is taken from the archive as the top-level path included in the archive (by convention). Expanding archives that contain multiple (ITSI) or nested apps (NIX, ES) is not supported.)

--default-dir DIR Name of the directory where the default contents will be stored. This is a useful feature for apps that use a dynamic default directory that's created and managed by the 'combine' mode.

--exclude EXCLUDE, -e EXCLUDE Add a file pattern to exclude. Splunk's pseudo-glob patterns are supported here. '\*' for any non-directory match, '...' for ANY (including directories), and '?' for a single character.

--keep KEEP, -k KEEP Specify a pattern for files to preserve during an upgrade. Repeat this argument to keep multiple patterns.

--allow-local Allow local/ and local.meta files to be extracted from the archive. Shipping local files is a Splunk app packaging violation so local files are blocked to prevent content from being overridden.

--git-sanity-check {off,changed,untracked,ignored} By default 'git status' is run on the destination folder to detect working tree or index modifications before the unarchive process starts, but this is configurable. Sanity check choices go from least restrictive to most thorough: Use 'off' to prevent any 'git status' safely checks. Use 'changed' to abort

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```

only upon local modifications to files tracked by git.
Use 'untracked' (the default) to look for changed and
untracked files before considering the tree clean. Use
'ignored' to enable the most intense safety check
which will abort if local changes, untracked, or
ignored files are found. NOTE: Sanity checks are
automatically disabled if the app is not in a git
working tree, or git is not installed.
--git-mode {nochange,stage,commit}
    Set the desired level of git integration. The default
    mode is 'stage', where new, updated, or removed files
    are automatically handled for you. If 'commit' mode is
    selected, then files are committed with an auto-
    generated commit message. To prevent any 'git add' or
    'git rm' commands from being run, pick the 'nochange'
    mode. Notes: (1) The git mode is irrelevant if the app
    is not in a git working tree. (2) If a git commit is
    incorrect, simply roll it back with 'git reset' or fix
    it with a 'git commit --amend' before the changes are
    pushed anywhere else. (That's why you're using git in
    the first place, right?)
--no-edit
    Tell git to skip opening your editor. By default you
    will be prompted to review/edit the commit message.
    (Git Tip: Delete the content of the message to abort
    the commit.)
--git-commit-args GIT_COMMIT_ARGS, -G GIT_COMMIT_ARGS

```

## 2.3 Developer setup

The following steps highlight the developer install process.

### 2.3.1 Setup tools

If you are a developer then we strongly suggest installing into a virtual environment to prevent overwriting the production version of ksconf and for the installation of the developer tools. (The virtualenv name `ksconfdev-pyve` is used below, but this can be whatever suites, just make sure not to commit it.)

```

# Setup and activate virtual environment
virtualenv ksconfdev-pyve
. ksconfdev-pyve/bin/activate

# Install developer packages
pip install -r requirements-dev.txt

```

### 2.3.2 Install ksconf

```

git clone https://github.com/Kintyre/ksconf.git
cd ksconf
pip install .

```

### 2.3.3 Building the docs

```
cd kskonf
. kskonfdev-pyve/bin/activate

cd docs
make html
open build/html/index.html
```

If you'd like to build PDF, then you'll need some extra tools. On Mac, you may also want to install the following (for building docs, and the like):

```
brew install homebrew/cask/mactex-no-gui
```

(Doh! Still doesn't work, instructions are incomplete for mac latex, ...)

## 2.4 Contributing back

Pull requests are greatly welcome! If you plan on contributing code back to the main `ksconf` repo, please follow the standard GitHub fork and pull-request work-flow. We also ask that you enable a set of git hooks to help safeguard against avoidable issues.

### 2.4.1 Pre-commit hook

The `ksconf` project uses the `pre-commit` hook to enable the following checks:

- Fixes trailing whitespace, EOF, and EOLs
- Confirms python code compiles (AST)
- Blocks the committing of large files and keys
- Rebuilds the CLI docs. (Eventually to be replaced with an `argparse` Sphinx extension)
- Confirms that all Unit test pass. (Currently this is the same tests also run by Travis CI, but since test complete in under 5 seconds, the run-everywhere approach seems appropriate for now. Eventually, the local testing will likely become a subset of the full test suite.)

Note that this repo both uses `pre-commit` for it's own validation (as discussed here) and provides a `pre-commit` hook service to other repos. This way repositories housing Splunk apps can, for example, use `ksconf --check` or `ksconf --sort` against their own `.conf` files for validation purposes.

#### Installing the pre-commit hook

To run ensure you changes comply with the `ksconf` coding standards, please install and activate `pre-commit`.

Install:

```
sudo pip install pre-commit

# Register the pre-commit hooks (one time setup)
cd kskonf
pre-commit install --install-hooks
```

## 2.4.2 Install gitlint

Gitlint will check to ensure that commit messages are in compliance with the standard subject, empty-line, body format. You can enable it with:

```
gitlint install-hook
```

## 2.5 Changelog

*Changes in master, but not released yet are in the **DRAFT** section.*

### 2.5.1 Ksconf 0.5.x

Add Python 3 support, new commands, support for external command plugins, tox and vagrant for testing.

#### Release v0.5.5 (2019-01-28)

- New `filter` command added for slicing up a conf file into smaller pieces. Think of this as GREP that's stanza-aware. Can also whitelist or blacklist attributes, if desirable.
- Expanded `rest-export` CLI capabilities to include a new `-delete` option, pretty-printing, and now supports stdin by allowing the user to explicitly set the file type using `-conf`.
- Refactored all CLI unittests for increased readability and long-term maintenance. Unit tests now can also be run individually as scripts from the command line.
- Minor tweaks to the `snapshot` output format, v0.2. This feature is still highly experimental.

#### Release v0.5.4 (2019-01-04)

- New commands added:
  - `snapshot` will dump a set of configuration files to a JSON formatted file. This can be used used for incremental “snapshotting” of running Splunk apps to track changes overtime.
  - `rest-export` builds a series of custom `curl` commands that can be used to publish or update stanzas on a remote instance without file system access. This can be helpful when pushing configs to Splunk Cloud when all you have is REST (splunkd) access. This command is indented for interactive admin not batch operations.
- Added the concept of command maturity. A listing is available by running `ksconf --version`
- Fix typo in `KSCONF_DEBUG`.
- Resolving some build issues.
- Improved support for development/testing environments using Vagrant (fixes) and Docker (new). Thanks to Lars Jonsson for these enhancements.

#### Release v0.5.3 (2018-11-02)

- Fixed bug where `ksconf combine` could incorrectly order directories on certain file systems (like ext4), effectively ignoring priorities. Repeated runs may resulted in undefined behavior. Solved by explicitly sorting input paths forcing processing to be done in lexicographical order.

- Fixed more issues with handling files with BOM encodings. BOMs and encodings in general are NOT preserved by kscnf. If this is an issue for you, please add an enhancement issue.
- Add Python 3.7 support
- Expand install docs specifically for offline mode and some OS-specific notes.
- Enable additional tracebacks for CLI debugging by setting `KSCONF_DEBUG=1` in the environment.

### Release v0.5.2 (2018-08-13)

- Expand CLI output for `--help` and `--version`
- Internal cleanup of CLI entry point module name. Now the kscnf CLI can be invoked as `python -m kscnf`, you know, for anyone who's into that sort of thing.
- Minor docs and CI/testing improvements.

### Release v0.5.1 (2018-06-28)

- Support external kscnf command plugins through custom 'entry\_points', allowing for others to develop their own custom extensions as needed.
- Many internal changes: Refactoring of all CLI commands to use new entry\_points as well as pave the way for future CLI unittest improvements.
- Docs cleanup / improvements.

### Release v0.5.0 (2018-06-26)

- Python 3 support.
- Many bug fixes and improvements resulting from wider testing.

## 2.5.2 Kscnf 0.4.x

Kscnf 0.4.x switched to a modular code base, added build/release automation, PyPI package registration (installation via `pip install` and, online docs.

### Release v0.4.10 (2018-06-26)

- Improve file handling to avoid "unclosed file" warnings. Impacted `parse_conf()`, `write_conf()`, and many unittest helpers.
- Update badges to report on the master branch only. (No need to highlight failures on feature or bug-fix branches.)

### Release v0.4.9 (2018-06-05)

- Add some missing docs files

### Release v0.4.8 (2018-06-05)

- Massive cleanup of docs: revamped install guide, added ‘standalone’ install procedure and developer-focused docs. Updated license handling.
- Updated docs configuration to dynamically pull in the ksconf version number.
- Using the classic ‘read-the-docs’ Sphinx theme.
- Added additional PyPi badges to README (GitHub home page).

### Release v0.4.4-v0.4.1 (2018-06-04)

- Deployment and install fixes (It’s difficult to troubleshoot/test without making a new release!)

### Release v0.4.3 (2018-06-04)

- Rename PyPI package `kintyre-splunk-conf`
- Add support for building a standalone executable (zipapp).
- Revamp install docs and location
- Add GitHub release for the standalone executable.

### Release v0.4.2 (2018-06-04)

- Add readthedocs.io support

### Release v0.4.1 (2018-06-04)

- Enable PyPI production package building

### Release v0.4.0 (2018-05-19)

- Refactor entire code base. Switched from monolithic all-in-one file to clean-cut modules.
- Versioning is now discoverable via `ksconf --version`, and controlled via git tags (via `git describe --tags`).

### Module layout

- `ksconf.conf.*` - Configuration file parsing, writing, comparing, and so on
- `ksconf.util.*` - Various helper functions
- `ksconf.archive` - Support for uncompressing Splunk apps (tgz/zip files)
- `ksconf.vc.git` - Version control support. Git is the only VC tool supported for now. (Possibly ever)
- `ksconf.commands.<CMD>` - Modules for specific CLI functions. I may make this extendable, eventually.

### 2.5.3 Ksconf 0.3.x

First public releases.

#### Release v0.3.2 (2018-04-24)

- Add AppVeyor for Windows platform testing
- Add codecov integration
- Created `ConfFileProxy.dump()`

#### Release v0.3.1 (2018-04-21)

- Setup automation via Travis CI
- Add code coverage

#### Release v0.3.0 (2018-04-21)

- Switched to semantic versioning.
- 0.3.0 feels representative of the code maturity.

### 2.5.4 Ksconf legacy releases

Ksconf started in a private Kintyre repo. There are no official releases; all git history has been rewritten.

#### Release legacy-v1.0.1 (2018-04-20)

- Fixes to blacklist support and many enhancements to `ksconf unarchive`.
- Introduces parsing profiles.
- Lots of bug fixes to various subcommands.
- Added automatic detection of 'subcommands' for CLI documentation helper script.

#### Release legacy-v1.0.0 (2018-04-16)

- This is the first public release. First work began Nov 2017 (as a simple `conf 'sort'` tool, which was imported from yet another repo.) Version history was extracted/rewritten/preserved as much as possible.
- Mostly stable features.
- Unit test coverage over 85%
- Includes pre-commit hook configuration (so that other repos can use this to run `ksconf sort` and `ksconf check` against their conf files.

## 2.6 License

Apache License  
Version 2.0, January 2004  
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## CHAPTER 3

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### Indices and tables

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