



One Identity Safeguard for Privileged  
Sessions 6.0

DEPRECATED Duo Multi-Factor  
Authentication - Tutorial

**Copyright 2019 One Identity LLC.**

**ALL RIGHTS RESERVED.**

This guide contains proprietary information protected by copyright. The software described in this guide is furnished under a software license or nondisclosure agreement. This software may be used or copied only in accordance with the terms of the applicable agreement. No part of this guide may be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopying and recording for any purpose other than the purchaser's personal use without the written permission of One Identity LLC .

The information in this document is provided in connection with One Identity products. No license, express or implied, by estoppel or otherwise, to any intellectual property right is granted by this document or in connection with the sale of One Identity LLC products. EXCEPT AS SET FORTH IN THE TERMS AND CONDITIONS AS SPECIFIED IN THE LICENSE AGREEMENT FOR THIS PRODUCT, ONE IDENTITY ASSUMES NO LIABILITY WHATSOEVER AND DISCLAIMS ANY EXPRESS, IMPLIED OR STATUTORY WARRANTY RELATING TO ITS PRODUCTS INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTY OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, OR NON-INFRINGEMENT. IN NO EVENT SHALL ONE IDENTITY BE LIABLE FOR ANY DIRECT, INDIRECT, CONSEQUENTIAL, PUNITIVE, SPECIAL OR INCIDENTAL DAMAGES (INCLUDING, WITHOUT LIMITATION, DAMAGES FOR LOSS OF PROFITS, BUSINESS INTERRUPTION OR LOSS OF INFORMATION) ARISING OUT OF THE USE OR INABILITY TO USE THIS DOCUMENT, EVEN IF ONE IDENTITY HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES. One Identity makes no representations or warranties with respect to the accuracy or completeness of the contents of this document and reserves the right to make changes to specifications and product descriptions at any time without notice. One Identity does not make any commitment to update the information contained in this document.

If you have any questions regarding your potential use of this material, contact:

One Identity LLC.  
Attn: LEGAL Dept  
4 Polaris Way  
Aliso Viejo, CA 92656

Refer to our Web site (<http://www.OneIdentity.com>) for regional and international office information.

**Patents**

One Identity is proud of our advanced technology. Patents and pending patents may apply to this product. For the most current information about applicable patents for this product, please visit our website at <http://www.OneIdentity.com/legal/patents.aspx>.

**Trademarks**

One Identity and the One Identity logo are trademarks and registered trademarks of One Identity LLC. in the U.S.A. and other countries. For a complete list of One Identity trademarks, please visit our website at [www.OneIdentity.com/legal](http://www.OneIdentity.com/legal). All other trademarks are the property of their respective owners.

**Legend**

 **WARNING:** A WARNING icon highlights a potential risk of bodily injury or property damage, for which industry-standard safety precautions are advised. This icon is often associated with electrical hazards related to hardware.

 **CAUTION:** A CAUTION icon indicates potential damage to hardware or loss of data if instructions are not followed.

# Contents

<b>Introduction</b> .....	<b>4</b>
<b>How SPS and Duo MFA work together</b> .....	<b>6</b>
<b>Technical requirements</b> .....	<b>8</b>
<b>How SPS and Duo work together in detail</b> .....	<b>10</b>
<b>Mapping SPS usernames to Duo identities</b> .....	<b>12</b>
<b>Bypassing Duo authentication</b> .....	<b>13</b>
<b>Configure your Duo account for SPS</b> .....	<b>14</b>
<b>Configure SPS to use Duo multi-factor authentication</b> .....	<b>15</b>
<b>SPS Duo plugin parameter reference</b> .....	<b>17</b>
[duo] .....	18
[plugin] .....	20
[auth] .....	21
[cache] .....	22
[ldap] .....	23
[username_transform] .....	25
[question_1] .....	25
<b>Store sensitive plugin data securely</b> .....	<b>27</b>
<b>Perform multi-factor authentication with the SPS Duo plugin in terminal connections</b> .....	<b>28</b>
<b>Perform multi-factor authentication with the SPS Duo plugin in Remote Desktop connections</b> .....	<b>29</b>
<b>About us</b> .....	<b>31</b>
Contacting us .....	31
Technical support resources .....	31

# Introduction

## **i** NOTE:

This tutorial describes the deprecated version of the plugin.

To upgrade your deprecated plugin for One Identity Safeguard for Privileged Sessions 6.0, see [Upgrading plugins for One Identity Safeguard for Privileged Sessions version 6.0](#).

This document describes how you can use the services of [Duo](#) to authenticate the sessions of your privileged users with One Identity Safeguard for Privileged Sessions (SPS).

## **One Identity Safeguard for Privileged Sessions:**

One Identity Safeguard for Privileged Sessions (SPS) controls privileged access to remote IT systems, records activities in searchable, movie-like audit trails, and prevents malicious actions. SPS is a quickly deployable enterprise device, completely independent from clients and servers — integrating seamlessly into existing networks. It captures the activity data necessary for user profiling and enables full user session drill down for forensic investigations.

SPS acts as a central authentication gateway, enforcing strong authentication before users access sensitive IT assets. SPS can integrate with remote user directories to resolve the group memberships of users who access nonpublic information. Credentials for accessing information systems can be retrieved transparently from SPS's local credential store or a third-party password management system. This method protects the confidentiality of passwords as users can never access them. When used together with Duo (or another multi-factor authentication provider), SPS directs all connections to the authentication tool, and upon successful authentication, it permits the user to access the information system.

## **Integrating Duo with SPS:**

SPS can interact with your Duo account and can automatically request strong multi-factor authentication for your privileged users who are accessing the servers and services protected by PSM. When used together with Duo, SPS directs all connections to the Duo tool, and upon successful authentication, it permits the user to access the information system.

The integration adds an additional security layer to the gateway authentication performed on SPS. If the Duo Mobile app is installed on the user's device (smartphone, notebook,

smartwatch, and so on), the user can generate a one-time password on the device. This will be used for the authentication to the One Identity platform. This way, the device turns into a two-factor authentication token for the user. The one-time password is changed after every authentication and is generated using dynamic keys.

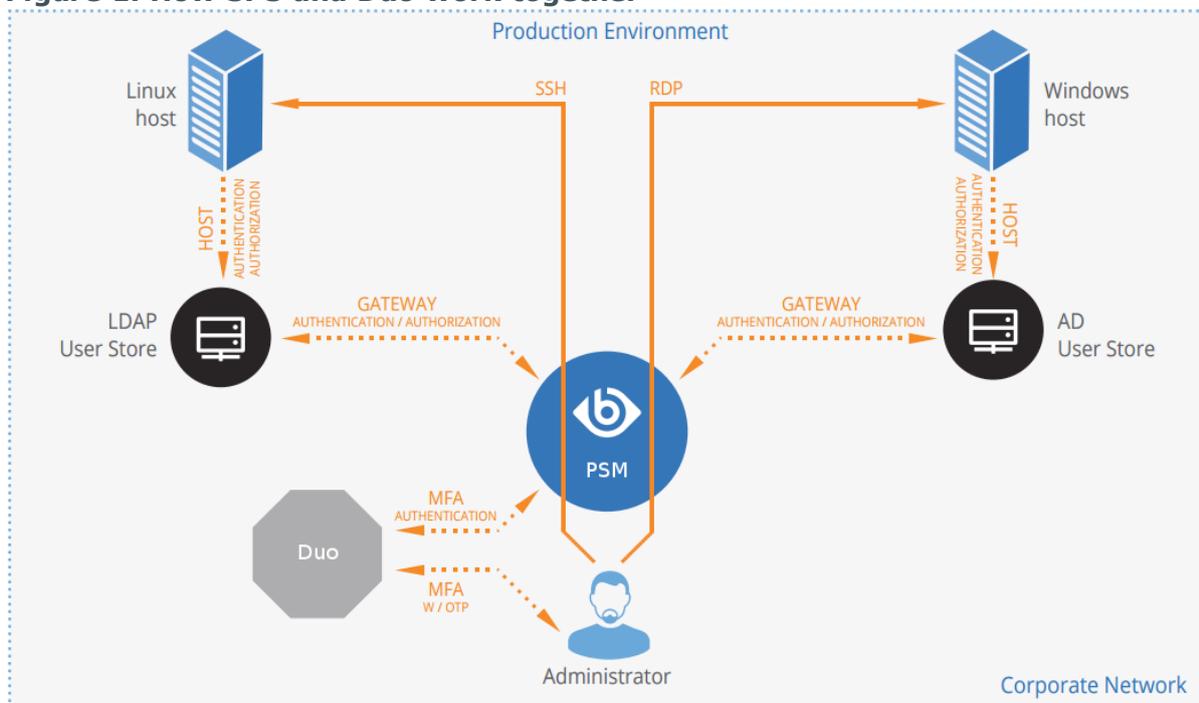
## Meet compliance requirements

ISO 27001, ISO 27018, SOC 2, and other regulations and industry standards include authentication-related requirements, for example, multi-factor authentication (MFA) for accessing production systems, and the logging of all administrative sessions. In addition to other requirements, using SPS and Duo helps you comply with the following requirements:

- PCI DSS 8.3: Secure all individual non-console administrative access and all remote access to the cardholder data environment (CDE) using multi-factor authentication.
- PART 500.12 Multi-Factor Authentication: Covered entities are required to apply multi-factor authentication for:
  - Each individual accessing the covered entity's internal systems.
  - Authorized access to database servers that allow access to nonpublic information.
  - Third parties accessing nonpublic information.
- NIST 800-53 IA-2, Identification and Authentication, network access to privileged accounts: The information system implements multi-factor authentication for network access to privileged accounts.

## How SPS and Duo MFA work together

Figure 1: How SPS and Duo work together



1. A user attempts to log in to a protected server.
2. **Gateway authentication on SPS**

SPS receives the connection request and authenticates the user. SPS can authenticate the user to a number of external user directories, for example, LDAP, Microsoft Active Directory, or RADIUS. This authentication is the first factor.

### 3. Outband authentication on Duo

If gateway authentication is successful, SPS connects the Duo server to check which authentication factors are available for the user. Then SPS requests the second authentication factor from the user.

- For OTP-like authentication factors, SPS requests the one-time password (OTP) from the user, and sends it to the Duo server for verification.
  - For the Duo push notification factor, SPS asks the Duo server to check if the user successfully authenticated on the Duo server.
4. If multi-factor authentication is successful, the user can start working, while SPS records the user's activities. (Optionally, SPS can retrieve credentials from a local or external credential store or password vault, and perform authentication on the server with credentials that are not known to the user.)

## Technical requirements

In order to successfully connect SPS with Duo, you need the following components.

### In Duo:

- A valid Duo subscription that permits multi-factor authentication.
- Your users must be enrolled in Duo and their access must be activated.
- The users must install the Duo Mobile app.

### In SPS:

- A One Identity Safeguard for Privileged Sessions appliance (virtual or physical), at least version 5 F1.
- A copy of the SPS Duo plugin. This plugin is an Authentication and Authorization (AA) plugin customized to work with the Duo multi-factor authentication service.
- SPS must be able to access the Internet (at least the API services). Since Duo is a cloud-based service provider, SPS must be able to access its web services to authorize the user.

The connection also requires the `ikey`, `skey`, and `host` parameters:

1. Log on to the [Duo Admin Panel](#) interface and navigate to **Applications**.
  2. Click **Protect an Application** and locate **Web SDK** in the applications list.
  3. Click **Protect this Application** to get your **integration key** (`ikey`), **secret key**, (`skey`), and **API hostname** (`host`). For details, see [Getting Started with Duo Security](#).
- Depending on the factor you use to authenticate your users, your users might need Internet access on their cellphones.
  - SPS supports AA plugins in the RDP, SSH, and Telnet protocols.
  - In RDP, using an **AA plugin** together with Network Level Authentication in a Connection Policy has the same limitations as using Network Level Authentication without domain membership. For details, see "[Network Level Authentication without domain membership](#)" in the Administration Guide.

- In RDP, using an **AA plugin** requires TLS-encrypted RDP connections. For details, see ["Enabling TLS-encryption for RDP connections" in the Administration Guide](#).

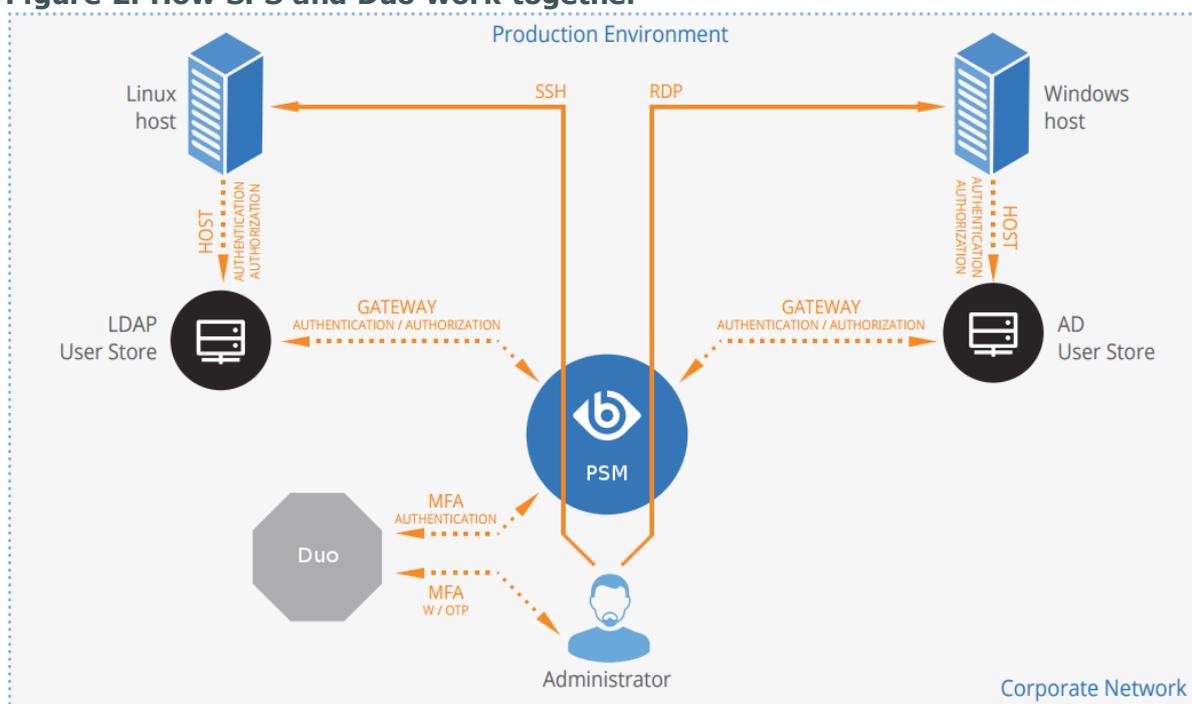
### **Availability and support of the plugin**

The SPS Duo plugin is available as-is, free of charge to every SPS customer from the [Plugin Page](#). In case you need any customizations or additional features, [contact our Professional Services Team](#).

You can use the plugin on SPS 5 F5 and later. If you need to use the plugin on SPS 5 LTS, [contact our Professional Services Team](#).

## How SPS and Duo work together in detail

Figure 2: How SPS and Duo work together



1. A user attempts to log in to a protected server.

### 2. Gateway authentication on SPS

SPS receives the connection request and authenticates the user. SPS can authenticate the user to a number of external user directories, for example, LDAP, Microsoft Active Directory, or RADIUS. This authentication is the first factor.

### 3. Check if the user is exempt from multi-factor authentication

You can configure SPS using whitelists and blacklists to selectively require multi-factor authentication for your users, for example, to create break-glass access for specific users.

- If multi-factor authentication is not required, the user can start working, while SPS records the user's activities. The procedure ends here.
- If multi-factor authentication is required, SPS continues the procedure with the next step.

For details on creating exemption lists, see [whitelist](#).

### 4. Determining the Duo username

If the gateway usernames are different from the Duo usernames, you must configure the SPS Duo plugin to map the gateway usernames to the Duo usernames. The mapping can be as simple as appending a domain name to the gateway username, or you can query an LDAP or Microsoft Active Directory server. For details, see [Mapping SPS usernames to Duo identities](#).

### 5. Outband authentication on Duo

If gateway authentication is successful, SPS connects the Duo server to check which authentication factors are available for the user. Then SPS requests the second authentication factor from the user.

- For OTP-like authentication factors, SPS requests the OTP from the user, and sends it to the Duo server for verification.
  - For the Duo push notification factor, SPS asks the Duo server to check if the user successfully authenticated on the Duo server.
6. If multi-factor authentication is successful, the user can start working, while SPS records the user's activities. (Optionally, SPS can retrieve credentials from a local or external credential store or password vault, and perform authentication on the server with credentials that are not known to the user.)
  7. If the user opens a new session within a short period, they can do so without having to perform multi-factor authentication again. After this configurable grace period expires, the user must perform multi-factor authentication to open the next session. For details, see [\[cache\]](#).

## Mapping SPS usernames to Duo identities

By default, SPS assumes that the Duo username of the user is the same as the gateway username (that is, the username the user used to authenticate on SPS during the gateway authentication). To identify the users, SPS uses the username (login) field in Duo, which is an email address.

If the gateway usernames are different from the Duo usernames, you must configure the SPS Duo plugin to map the gateway usernames to the Duo usernames. You can use the following methods:

- To simply append a string to the gateway username, configure the [append\\_domain parameter](#). In this case, SPS automatically appends the @ character and the value of this option to the username from the session, and uses the resulting username on the Duo server to authenticate the user. For example, if the domain is set as `append_domain: example.com` and the username is `Example.User`, the SPS plugin will look for the user `Example.User@example.com` on the Duo server.
- To look up the Duo username of the user from an LDAP/Active Directory database, configure the `[ldap]` section of the SPS Duo plugin. Typically, the SPS plugin queries the email address corresponding to the username from your LDAP or Active Directory database. For details on LDAP parameters, see [\[ldap\]](#).
- If you configure both the [append\\_domain parameter](#) and the [\[ldap\] section](#) of the SPS Duo plugin, SPS appends the @ character and the value of the `append_domain` parameter to the value retrieved from the LDAP database.
- If you have configured neither the `Domain` parameter nor the `[ldap]` section, SPS assumes that the Duo username of the user is the same as the gateway username.

## Bypassing Duo authentication

Having to perform multi-factor authentication to a remote server every time the user opens a session can be tedious and inconvenient for the users, and can impact their productivity. SPS offers the following methods to solve this problem:

- In SPS, the Connection policy determines the type of authentication required to access a server. If you do not need multi-factor authentication for accessing specific servers, configure your Connection policies accordingly.
- If the user opens a new session within a short period, they can do so without having to perform multi-factor authentication. After this configurable grace period expires, the user must perform multi-factor authentication to open the next session. For details, see [\[cache\]](#).
- You can configure SPS using whitelists and blacklists to selectively require multi-factor authentication for your users, for example, to create break-glass access for specific users. For details on creating exemption lists, see [whitelist](#).

# Configure your Duo account for SPS

## Prerequisites:

- Administrator access to your Duo account.
- Make sure that you have all the required components listed in [Technical requirements](#).

### 1. Add users to your Duo account.

The users you want to authenticate with SPS must have an activated account in Duo. For details on adding or importing your users, see [Enrolling Users](#) in the Duo documentation.

### 2. Enable Multi-factor Authentication (MFA) for your organization.

Optionally, you can create a Policy in Duo to enable MFA only for the group of users who you want to authenticate with SPS.

For details, see [Protecting Applications](#) in the Duo documentation.

### 3. Create an API token.

Navigate to *Admin > API > Tokens*, click *Create Token*, and save it.

# Configure SPS to use Duo multi-factor authentication

## Prerequisites:

- Your Duo API token.

**⚠ CAUTION:**

According to the current Duo policies, your API token expires if it is not used for 30 days. Make sure that you use it regularly, because SPS will reject your sessions if the API token is expired.

- Administrator access to SPS.
- Make sure that you have all the required components listed in [Technical requirements](#).

## To configure SPS to use Duo multi-factor authentication

### 1. Download the SPS Duo plugin

SPS customers can [download the official plugin from GitHub](#).

### 2. Upload the plugin to SPS

Upload the plugin to SPS. For details, see "[Using a custom Authentication and Authorization plugin to authenticate on the target hosts](#)" in the [Administration Guide](#).

### 3. Configure the plugin on SPS

The plugin includes a default configuration file, which is an ini-style configuration file with sections and name=value pairs. You can edit it on the **Policies > AA Plugin Configurations** page of the SPS web interface.

- a. Configure the usermapping settings if needed. SPS must find out which Duo user belongs to the username of the authenticated connection. For that, it can query your LDAP/Microsoft Active Directory server. For details, see [Mapping](#)

[SPS usernames to Duo identities.](#)

- b. Configure other parameters of your plugin as needed for your environment. For details, see [SPS Duo plugin parameter reference](#).

#### 4. **Configure a Connection policy and test it**

Configure a Connection policy on SPS. In the **AA plugin** field of the Connection policy, select the SPS Duo plugin you configured in the previous step, then start a session to test it. For details on how a user can perform multi-factor authentication, see [Perform multi-factor authentication with the SPS Duo plugin in terminal connections](#) and [Perform multi-factor authentication with the SPS Duo plugin in Remote Desktop connections](#).

 **CAUTION:**

**According to the current Duo policies, your API token expires if it is not used for 30 days. Make sure that you use it regularly, because SPS will reject your sessions if the API token is expired.**

## SPS Duo plugin parameter reference

This section describes the available options of the SPS Duo plugin.

The plugin uses an ini-style configuration file with sections and name=value pairs. This format consists of sections, led by a [section] header and followed by name=value entries. Note that the leading whitespace is removed from values. The values can contain format strings, which refer to other values in the same section. For example, the following section would resolve the %(dir)s value to the value of the dir entry (/var in this case).

```
[section name]
dirname=%(dir)s/mydirectory
dir=/var
```

All reference expansions are done on demand. Lines beginning with # or ; are ignored and may be used to provide comments.

You can edit the configuration file from the SPS web interface. The following code snippet is a sample configuration file.

```
[duo]
# Do NOT use ikey and skey in production
; ikey=<API-integration-key>
; skey=<API-security-key>
host=<API-hostname>
timeout=60
ignore_conn_err=no

[plugin]
config_version=1
log_level=info
cred_store=<name-of-credstore-storing-sensitive-data>

[auth]
prompt=Hit Enter to send Duo push notification or provide the OTP:
whitelist=name-of-a-userlist

[username_transform]
append_domain=""
```

```

[ldap]
ldap_server_config=<SPS-LDAP-server-policy-name>
filter=(&(samAccountName={})(objectClass=user))
user_attribute=mail

[cache]
soft_timeout=15
hard_timeout=90
conn_limit=5

[question_1]
key=<name-of-name-value-pair>
prompt=<the-question-itself-in-text>
disable_echo=No

[question_2]...

```

## [duo]

This section contains the options related to your Duo account.

```

[duo]
# Do NOT use ikey and skey in production
; ikey=<API-integration-key>
; skey=<API-security-key>
host=<API-hostname>
timeout=60
ignore_conn_err=no

```

### ikey

Type:	string
Required:	yes
Default:	N/A

#### CAUTION:

**This parameter contains sensitive data. Make sure to store this data in your local Credential Store. Type the \$ value for this parameter in production.**

**For details, see "Store sensitive plugin data securely".**

**Only enter a value different than \$ for this parameter in the configuration for testing purposes in a secure, non-production environment.**

*Description:* The API integration key.

## skey

Type:	string
Required:	yes
Default:	N/A



### CAUTION:

**This parameter contains sensitive data. Make sure to store this data in your local Credential Store. Type the \$ value for this parameter in production.**

**For details, see "Store sensitive plugin data securely".**

**Only enter a value different than \$ for this parameter in the configuration for testing purposes in a secure, non-production environment.**

*Description:* The API security key.

## host

Type:	string
Required:	yes
Default:	N/A

*Description:* The API host name.

## timeout

Type:	integer [seconds]
Required:	no
Default:	60

*Description:* How long an HTTP request can take during the communication with the Duo server.

## ignore\_conn\_err

Type:	yes   no
Required:	no

Default: no

*Description:* Determines how to handle the sessions if the Duo service is not available. If set to *yes*, the plugin assumes that the user successfully authenticated even if the plugin cannot access Duo to verify this.

**⚠ CAUTION:**

**Enabling this option allows the users to bypass multi-factor authentication if SPS cannot access the Duo service for any reason, for example, a network configuration error in your environment.**

## [plugin]

This section contains general plugin-related settings.

```
[plugin]
config_version=1
log_level=20
cred_store=<name-of-credstore-hosting-sensitive-data>
```

### config\_version

Type:	integer
Required:	yes
Default:	1

*Description:* The version number of the configuration format. This is used to enable potentially incompatible changes in the future. If provided, the configuration will not be upgraded automatically. If not provided, the configuration will be upgraded automatically.

### cred\_store

Type:	string
Required:	no
Default:	N/A

*Description:* The name of a local credential store policy configured on SPS. You can use this credential store to store sensitive information of the plugin in a secure way, for example, the *ikey/skey* values in the `[duo]` section. For details, see [Store sensitive plugin data securely](#).

## log\_level

Type:	integer or string
Required:	no
Default:	info

*Description:* The logging verbosity of the plugin. The plugin sends the generated log messages to the SPS syslog system. You can check the log messages in the **Basic settings > Troubleshooting > View log files** section of the SPS web interface. Filter on the plugin: string to show only the messages generated by the plugins.

The possible values are:

- debug or 10
- info or 20
- warning or 30
- error or 40
- critical or 50

For details, see Python logging API's log levels: [Logging Levels](#).

## [auth]

This section contains the options related to authentication.

```
[auth]
prompt=Hit Enter to send Duo push notification or provide the OTP:
whitelist=name-of-a-userlist
```

### prompt

Type:	string
Required:	no
Default:	Hit Enter to send push notification or provide the OTP:

*Description:* SPS displays this text to the user in a terminal connection to request an OTP interactively. The text is displayed only if the user uses an OTP-like factor, and does not send the OTP in the connection request.

```
prompt=Hit Enter to send Duo push notification or provide the OTP:
```

## whitelist

Type:	string
Required:	no
Default:	N/A

*Description:* The name of a user list containing gateway users configured on SPS (**Policies > User Lists**). You can use this option to selectively require multi-factor authentication for your users, for example, to create break-glass access for specific users.

- If you set the **Default Policy** of the user list to Reject, then the list is a whitelist, so the plugin will not request Duo authentication from the users on the list.
- If you set the **Default Policy** of the user list to Accept, then the list is a blacklist, so the plugin will request Duo authentication only from the users on the list.

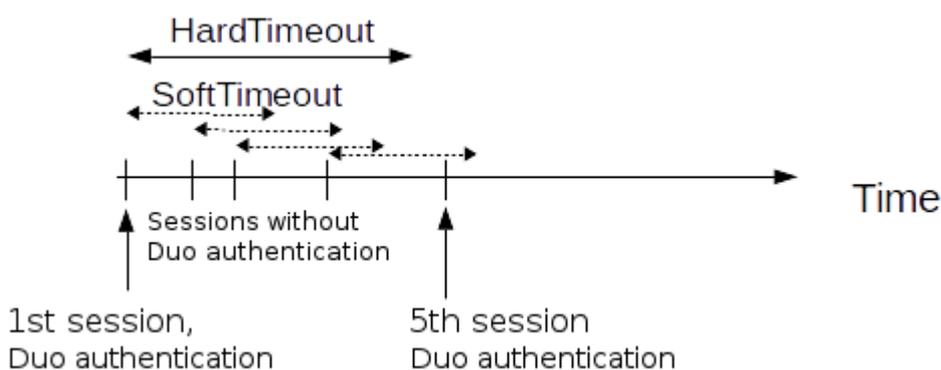
For details on creating user lists, see ["Creating and editing user lists" in the Administration Guide](#).

## [cache]

This section contains the settings that determine how soon after performing a Duo authentication must the user repeat the authentication when opening a new session.

After the first Duo authentication of the user, SPS will not request a new Duo authentication from the user as long as the new authentications would happen within `soft_timeout` seconds from each other. After the `hard_timeout` expires (measured from the first Duo login of the user), SPS will request a new Duo authentication.

In other words, after opening the first session and authenticating on Duo, the user can keep opening other sessions without having to authenticate again on Duo as long as the time between opening any two sessions is less than `soft_timeout`, but must authenticate on Duo if `hard_timeout` expires.



```
[cache]
soft_timeout=15
hard_timeout=90
conn_limit=5
```

### **soft\_timeout**

Type:	integer [seconds]
Required:	yes, if you want caching
Default:	N/A

*Description:* The time in seconds after which the SPS plugin requires a new Duo authentication for the next new session of the user, unless the user successfully authenticates another session within this period.

### **hard\_timeout**

Type:	integer [seconds]
Required:	yes, if you want caching
Default:	N/A

*Description:* The time in seconds after which the SPS plugin requires a new Duo authentication for the next new session of the user. The time is measured from the last Duo authentication of the user.

### **conn\_limit**

Type:	integer [number of]
-------	---------------------

*Description:* The cache can be used `conn_limit` times without multi-factor authentication. If the number of logins exceeds this number, the plugin will request multi-factor authentication again. If this parameter is not set, the number of logins from cache are unlimited.

## **[ldap]**

This section contains the settings you configure when you need to use an LDAP query to map the usernames from your audited sessions to the usernames in Duo.

To look up the Duo username of the user from an LDAP/Active Directory database, configure the [ldap] section of the SPS Duo plugin. Typically, the SPS plugin queries the email address corresponding to the username from your LDAP or Active Directory database. For details on LDAP parameters, see [ldap].

If you configure both the [append\\_domain parameter](#) and the [ldap] section of the SPS Duo plugin, SPS appends the @ character and the value of the append\_domain parameter to the value retrieved from the LDAP database.

For other methods of mapping gateway usernames to Duo usernames, see [Mapping SPS usernames to Duo identities](#).

```
[ldap]
ldap_server_config=<SPS-LDAP-server-policy-name>
filter=(&(cn={})(objectClass=inetOrgPerson))
user_attribute=CN
```

### ldap\_server\_config

Type:	string
Required:	no
Default:	N/A

*Description:* The name of a configured LDAP server policy in SPS. For details on configuring LDAP policies, see ["Authenticating users to an LDAP server" in the Administration Guide](#).

### filter

Type:	string
Required:	no
Default:	(&(cn={})(objectClass=inetOrgPerson))

*Description:* The LDAP filter query that locates the user based on the gateway username. The plugin automatically replaces the {} characters with the gateway username from the session.

```
filter=(&(cn={})(objectClass=inetOrgPerson))
```

### user\_attribute

Type:	string
Required:	no
Default:	cn

*Description:* The name of the LDAP attribute that contains the Duo username.

## [username\_transform]

This section contains username transformation-related settings.

```
[username_transform]  
append_domain=""
```

### append\_domain

Type:	string (nonrequired, no default)
Required:	no
Default:	N/A

*Description:* If the gateway usernames are different from the Duo usernames, you must configure the SPS Duo plugin to map the gateway usernames to the Duo usernames.

To simply append a string to the gateway username, configure the [append\\_domain parameter](#). In this case, SPS automatically appends the @ character and the value of this option to the username from the session, and uses the resulting username on the Duo server to authenticate the user. For example, if the domain is set as `append_domain: example.com` and the username is `Example.User`, the SPS plugin will look for the user `Example.User@example.com` on the Duo server.

If you configure both the [append\\_domain parameter](#) and the [\[ldap\] section](#) of the SPS Duo plugin, SPS appends the @ character and the value of the `append_domain` parameter to the value retrieved from the LDAP database.

For other methods of mapping gateway usernames to Duo usernames, see [Mapping SPS usernames to Duo identities](#).

## [question\_1]

Type: integer [seconds]

*Description:* Used for communication between plugins. This is an interactive request/response right after authentication in order to supply data to credential store plugins. The question is transferred to the session cookie and all hooks of all plugins receive it.

For example, if you have an external authenticator app, you do not have to wait for the question to be prompted but can authenticate with a one-time password:

```
ssh otp=123456@root@scb
```

Name subsequent questions with the appropriate number, for example, [question\_1], [question\_2], and so on.

For details, see ["Performing authentication with AA plugin in terminal connections" in the Administration Guide](#) and ["Performing authentication with AA plugin in Remote Desktop connections" in the Administration Guide](#).

### key

Type:	string
Required:	yes
Default:	N/A

*Description:* The name of the name-value pair.

### prompt

Type:	string
Required:	yes
Default:	N/A

*Description:* The question itself in text format.

### disable\_echo

Type:	boolean yes no
Required:	no
Default:	no

*Description:* Whether the answer to the question is visible (yes), or replaced with asterisks (no).

## Store sensitive plugin data securely

By default, the configuration of the plugin is stored on SPS in the configuration of SPS. Make sure that you store the sensitive parameters (for example, [ikey](#) and [skey](#)) of the plugin in an encrypted way.

### *To store sensitive plugin data securely*

1. Log in to SPS and create a local Credential Store. For details, see "[Configuring local Credential Stores](#)" in the [Administration Guide](#).  
Instead of usernames and passwords, you will store the configuration parameters of the plugin in this Credential Store.
2. Add the plugin parameters you want to store in an encrypted way to the Credential Store. You can store any configuration parameter of the plugin in the Credential Store, but note that if an option appears in the Credential Store, the plugin will use it. If the same parameter appears in the configuration of the plugin, it will be ignored.
  - Enter the name of the configuration section without the brackets in the **HOST** field (for example, duo).
  - Enter the name of the plugin parameter in the **USERNAME** field (for example, ikey).
  - Enter the value of the plugin parameter in the **PASSWORD** field.
3. Commit your changes, and navigate to the configuration of the plugin on the **Policies > AA Plugin Configurations** page.
4. In the plugin configuration file, enter the name of the local Credential Store under the [plugin] section, in the [cred\\_store](#) parameter.

# Perform multi-factor authentication with the SPS Duo plugin in terminal connections

The following describes how to establish a terminal connection (SSH, TELNET, or TN3270) to a server.

## ***To establish a terminal connection (SSH, TELNET, or TN3270) to a server***

1. Connect to the server.
  - If you can authenticate using an OTP or token, encode the OTP as part of the username. You can use the @ as a field separator. For example:

```
ssh otp=YOUR-ONE-TIME-PASSWORD@user@server
```

Replace YOUR-ONE-TIME-PASSWORD with your actual OTP. If needed, you can specify the type of OTP as a prefix to the OTP. For example, to specify the OTP of a YubiKey token:

```
ssh otp=y_ YOUR-ONE-TIME-PASSWORD@user@server
```

- Google Authenticator: g
  - inWebo Authenticator: o
  - Symantec token: s
  - YubiKey: y
  - RSA token: r
- If you need to authenticate using the Duo Verify push notification, approve the connection in your mobile app.
2. If SPS prompts you for further information, enter the requested information. If you need to authenticate with an OTP, but you have not supplied the OTP in your username, you will be prompted to enter the OTP.
  3. Authenticate on the server.
  4. If authentication is successful, you can access the server.

## Perform multi-factor authentication with the SPS Duo plugin in Remote Desktop connections

The following describes how to establish a Remote Desktop (RDP) connection to a server when the **AA plugin** is configured.

### ***To establish an RDP connection to a server when the AA plugin is configured***

1. Open your Remote Desktop client application.
2. If you have to provide additional information to authenticate on the server, you must enter this information in your Remote Desktop client application in the *User name* field, before the regular content (for example, your username) of the field.

If you can authenticate using an OTP or token, encode the OTP as part of the username. To encode additional data, you can use the following special characters:

- % as a field separator
- ~ as the equal sign
- ^ as a colon (for example, to specify the port number or an IPv6 IP address)

For example, use the following format:

```
domain\otp~YOUR-ONE-TIME-PASSWORD%Administrator
```

Replace YOUR-ONE-TIME-PASSWORD with your actual OTP. If needed, you can specify the type of OTP as a prefix to the OTP. For example, to specify the OTP of a YubiKey token: domain\otp~y\_YOUR-ONE-TIME-PASSWORD%Administrator

- Google Authenticator: g
- inWebo Authenticator: o
- Symantec token: s
- YubiKey: y
- RSA token: r

3. Connect to the server.

If you need to authenticate using the Duo Authenticator push notification, approve the connection in your mobile app.

4. Authenticate on the server.
5. If authentication is successful, you can access the server.

One Identity solutions eliminate the complexities and time-consuming processes often required to govern identities, manage privileged accounts and control access. Our solutions enhance business agility while addressing your IAM challenges with on-premises, cloud and hybrid environments.

## Contacting us

For sales and other inquiries, such as licensing, support, and renewals, visit <https://www.oneidentity.com/company/contact-us.aspx>.

## Technical support resources

Technical support is available to One Identity customers with a valid maintenance contract and customers who have trial versions. You can access the Support Portal at <https://support.oneidentity.com/>.

The Support Portal provides self-help tools you can use to solve problems quickly and independently, 24 hours a day, 365 days a year. The Support Portal enables you to:

- Submit and manage a Service Request
- View Knowledge Base articles
- Sign up for product notifications
- Download software and technical documentation
- View how-to videos at [www.YouTube.com/OneIdentity](http://www.YouTube.com/OneIdentity)
- Engage in community discussions
- Chat with support engineers online
- View services to assist you with your product