Splunk4Admins

Forwarder Management

splunk>
a CISCO company

Forward-looking statements

This presentation may be deemed to contain forward-looking statements, which are subject to the safe harbor provisions of the Private Securities Litigation Reform Act of 1995. Any statements that are not statements of historical fact (including statements containing the words “will,” “believes,” “plans,” “anticipates,” “expects,” “estimates,” “strives,” “goal,” “intends,” “may,” “endeavors,” “continues,” “projects,” “seeks,” or “targets,” or the negative of these terms or other comparable terminology, as well as similar expressions) should be considered to be forward-looking statements, although not all forward-looking statements contain these identifying words. Readers should not place undue reliance on these forward-looking statements, as these statements are management’s beliefs and assumptions, many of which, by their nature, are inherently uncertain, and outside of management’s control. Forward-looking statements may include statements regarding the expected benefits to Cisco, Splunk and their respective customers from the completed transaction, the integration of Splunk’s and Cisco’s complementary capabilities and products to create an end-to-end platform designed to unlock greater digital resilience for customers, our expectations regarding greater resiliency and better product outcomes, including for security and observability, plans for future investment, our development and use of AI and the role that our innovation plays as our customers adopt AI. Statements regarding future events are based on Cisco’s current expectations, estimates, and projections and are necessarily subject to associated risks related to, among other things, (i) the ability of Cisco to successfully integrate Splunk’s market opportunities, technology, personnel and operations and to achieve expected benefits, (ii) Cisco’s ability to implement its plans, forecasts and other expectations with respect to Splunk’s business and realize expected synergies, (iii) the outcome of any legal proceedings related to the transaction, (iv) the effects on the accounting relating to the acquisition of Splunk, (v) legislative, regulatory, and economic developments, (vi) general economic conditions, and (vii) the retention of key personnel. Therefore, actual results may differ materially and adversely from the anticipated results or outcomes indicated in any forward-looking statements. For information regarding other related risks, see the “Risk Factors” section of Cisco’s most recent report on Form 10-Q filed on February 20, 2024 and its most recent report on Form 10-K filed on September 7, 2023, as well as the “Risk Factors” section of Splunk’s most recent reports on Form 10-Q filed with the SEC on February 20, 2024 and November 21, 2023, respectively. The parties undertake no obligation to revise or update any forward-looking statements for any reason, except as required by law.

In addition, any information about our roadmap outlines our general product direction and is subject to change at any time without notice. It is for informational purposes only and shall not be incorporated into any contract or other commitment. We undertake no obligation either to develop the features or functionalities described, in beta or in preview (used interchangeably), or to include any such feature or functionality in a future release.

Please introduce yourself!

- Name
- Company/organisation
- Role
- Are you currently using Splunk?
- What are you interested in using Splunk for?

Workshop Agenda

- Expectations
- What is a forwarder?
  - Types
- What is a Deployment Server?
- App management via Deployment Server?
- Forwarder Management & Deployment Labs
- Forwarder Image Lab (Extra Credit)
- Summary

Audience

Who is this Workshop for?

- Splunk Admins
- “Required”: Power User Certified
- “Preferred”: Splunk Admin enabled (at least started …), Certified

Expectations for Workshop

- Last roughly 60-90 minutes
- Understand the Forwarder types
- Understand how data moves to be searchable
- See and experience managing Forwarders
- Know the ways to install/upgrade Forwarders
- Understand the Deployment Server
- Experience configuring a Deployment Server
- Experience setting up an app and push to a Forwarder
- Experience creating and leveraging a universal forwarder tarball image
- Experience using an intermediate forwarder

REGISTRATION 5 MINS

Enroll in Today’s Workshop

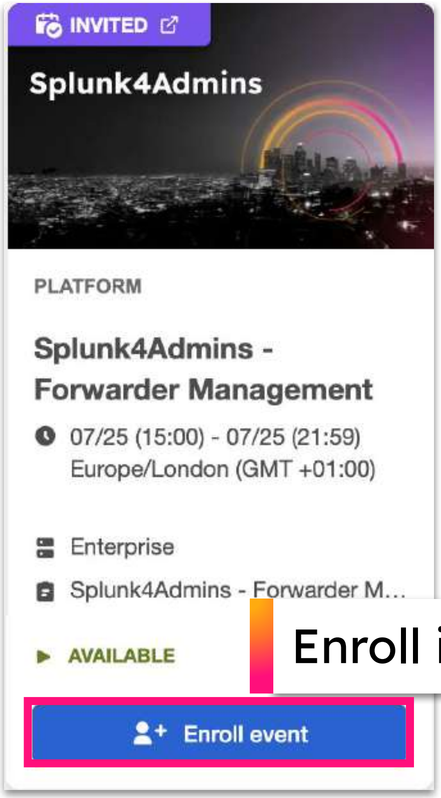
Tasks

1. Get a splunk.com account if you don’t have one yet: https://splk.it/SignUp
2. Enroll in the Splunk Show workshop event: https://show.splunk.com/event/<eventID>
3. Download the hands-on lab guide: https://splk.it/S4A-FM-Lab-Guide

   Contains step-by-step instructions for all of today’s exercises!

4. Download a copy of today’s slide deck: https://splk.it/S4A-FM-Attendee

Goal



INVITED

Splunk4Admins

PLATFORM

Splunk4Admins - Forwarder Management

07/25 (15:00) - 07/25 (21:59) Europe/London (GMT +01:00)

Enterprise

Splunk4Admins - Forwarder M...

AVAILABLE

Enroll event

Enroll in today’s event

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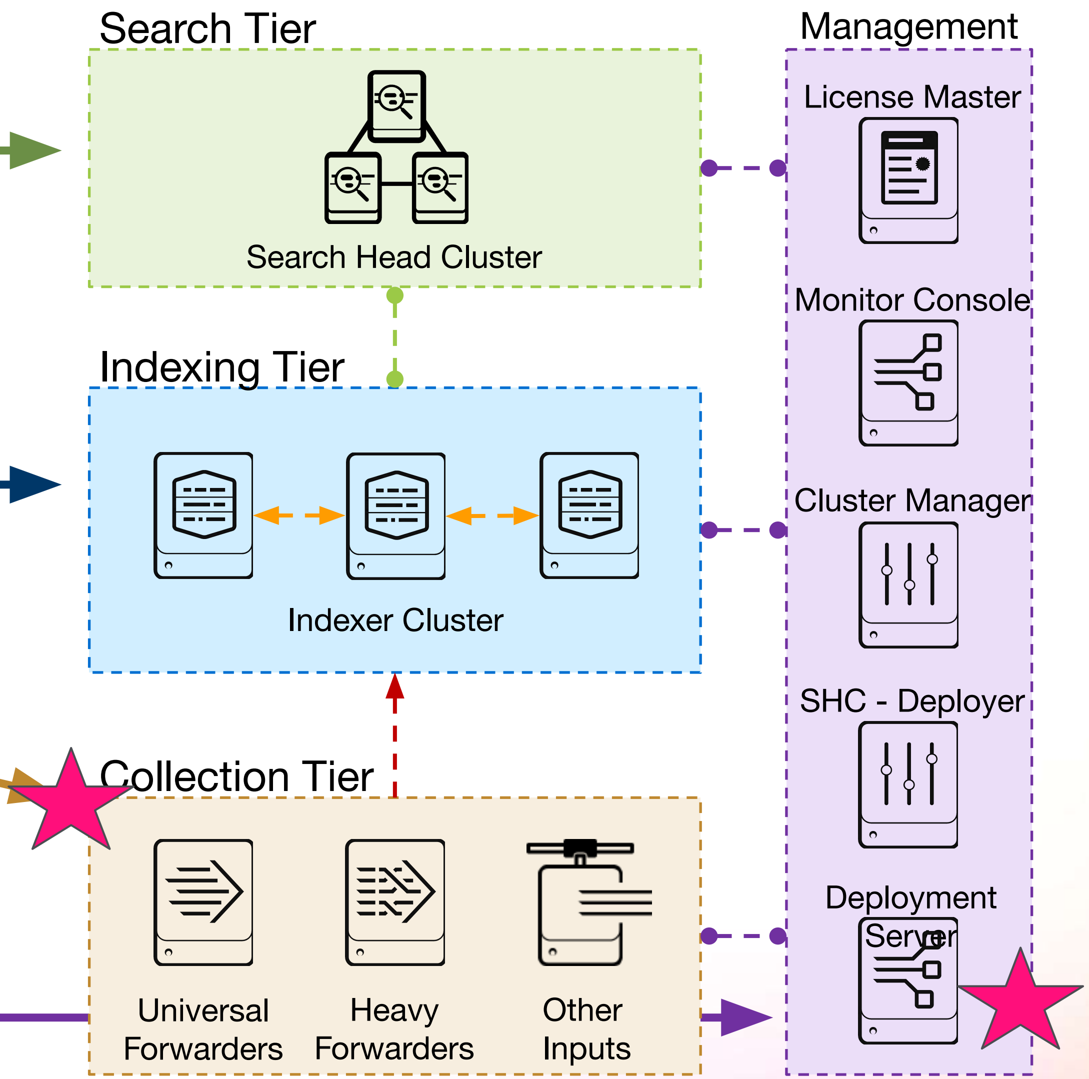
Splunk Components and Processes (RECAP)

- Allow users to submit search requests using SPL
- Distribute search requests to the indexers
- Consolidate results and render visualizations of results
- Store search-time knowledge objects (such as field extractions, alerts, and dashboards)

- Receive incoming data from forwarders
- Index and store data in Splunk indexes
- Search data in response to requests from search heads

- Monitor configured inputs and forward the data to the indexers (best practice data collection method)
- Requires minimal resources and typically installed on the machines that produce the data

- Centralizes configuration management for various functions including clustering, licensing, and clients
- Requires systems running Splunk Enterprise

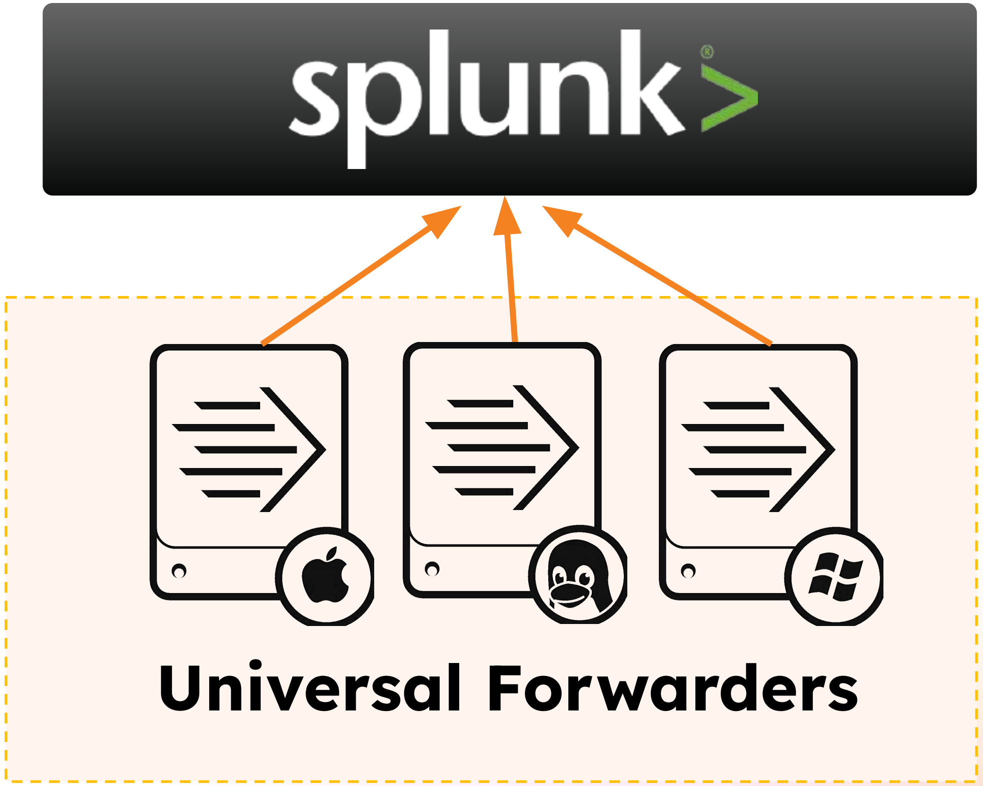


Single-instance Monitoring Console setup steps	https://docs.splunk.com/Documentation/Splunk/latest/Deploy/Manageyourdeployment

Review: Universal Forwarders

- Gathers data from a host
- Sends data over network to receiving ports on receivers (usually an indexer)
- Provided as separate installation binary with a built-in license (no limits)
- Designed to run on production servers

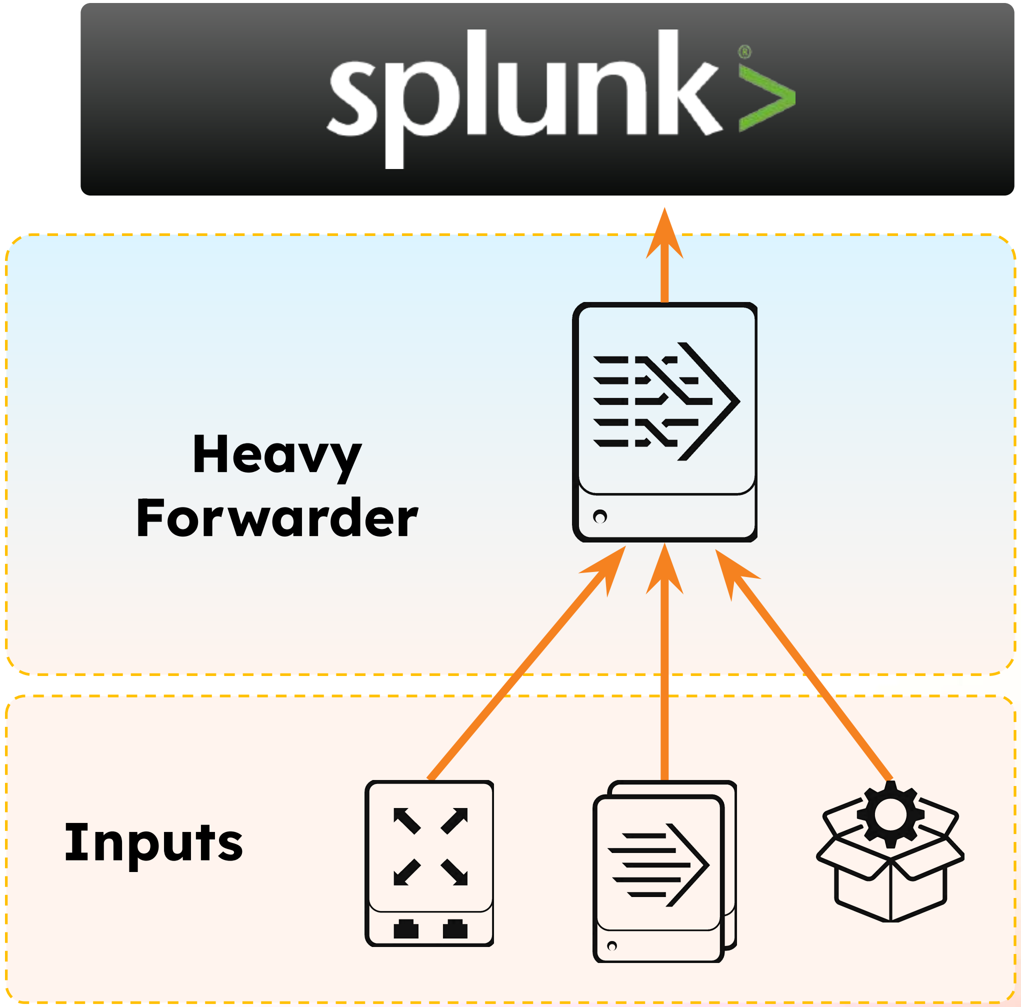
  (minimal CPU / memory use, bandwidth constrained to 256 KBps by default, no web interface, cannot search or index)



Universal Forwarders

Review: Heavy Forwarders

- Splunk Enterprise instance with the Forwarder License enabled
- Can parse data before forwarding it
- Can route data based on event criteria to different indexers or 3rd party receivers
- Supports complex use cases
- Cannot perform distributed searches



Deciding Between UF and HF

Universal Forwarder

- Ideal for most circumstances, including collecting files or as intermediate forwarder
- Minimal footprint on production servers
- Generally requires less bandwidth and has faster processing than same data on HF
- Supports simple routing or cloning data to separate indexers
- Does not support filtering based on regular expressions*

* Except for Windows Event Logs on Windows

VS

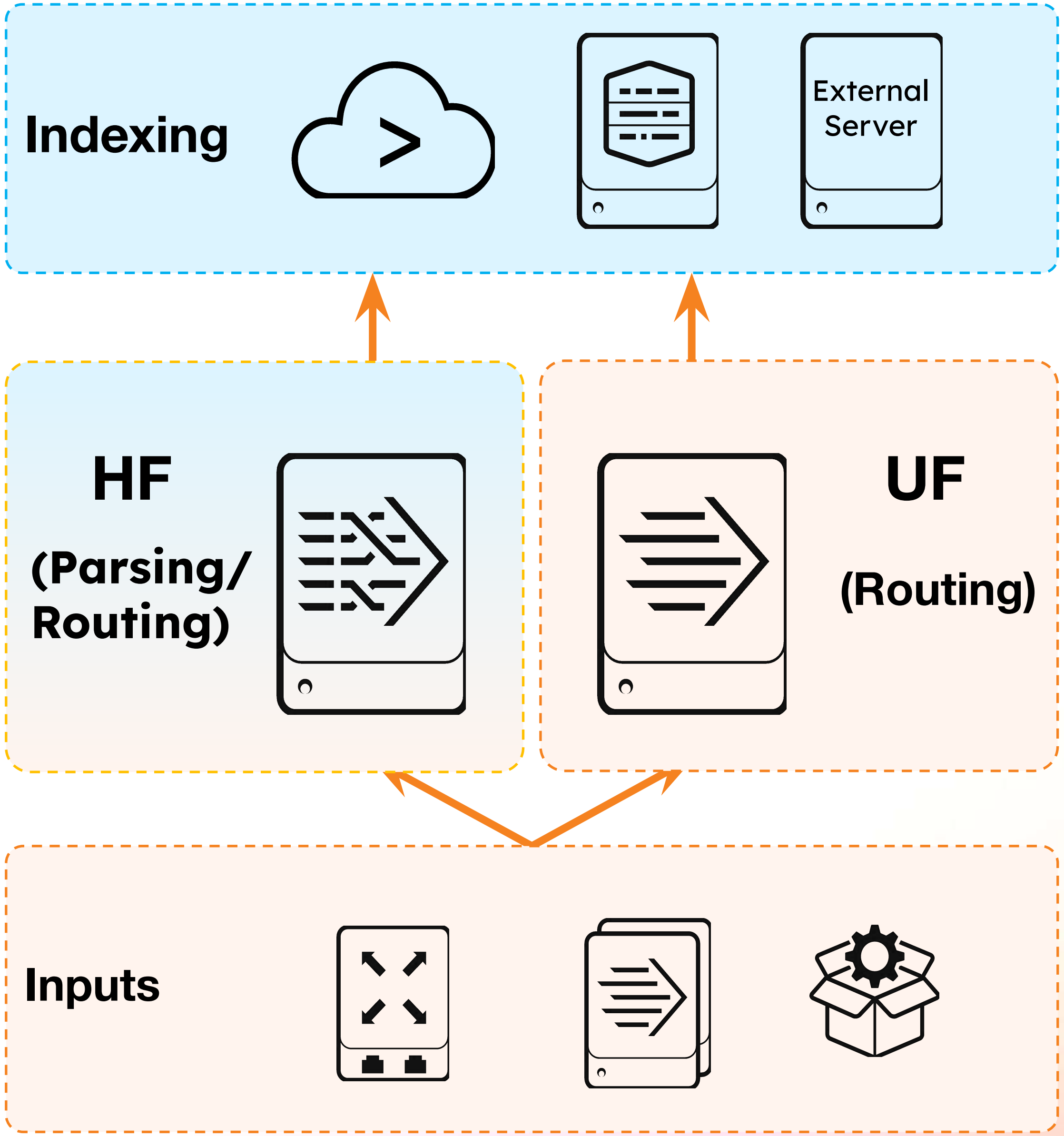
Heavy Forwarder

- Generally runs on dedicated servers
- Required by some apps, add-ons, or input types (such as HEC, DBconnect)
- Supports complex, event-level routing and filtering
- Can anonymize or mask data before forwarding to an indexer
- Provides Splunk Web and predictable version of Python, if needed
- May increase network traffic

Reference Hardware	https://docs.splunk.com/Documentation/Splunk/latest/Capaciy/Referencehardware

Review: Intermediate Forwarders

- Often Heavy Forwarders
- Route data from inputs to indexers or other intermediate forwarders
- Can reduce or limit bandwidth on specific network segments
- Can limit security concerns (DMZ, firewalls)
- Can parse, filter or index data if a HF



Comparing Intermediate Forwarders

Universal Forwarders

- Smallest resource footprint
- Efficient network utilization profile
- Cannot process time zones (run all on UTC)

Heavy Forwarders

- Can parse and route data
- Can process time zones
- More network bandwidth
- More system resources
- Usually affected by blocking - not utilizing the indexing performance in Splunk Cloud for index time parsing

Forwarder Deployment Best Practices

- Update firewall rules to allow outbound connections on port 9997
- Secure data using SSL (default using Splunk Cloud)
- Use direct communication between forwarders and indexers
  - If not possible, use a combination of intermediate UFs and HFs
    - Maintain a minimum Forwarder:Indexer ratio of 2:1

> Best Practice

UF Best Practices: Improve Load Balancing

- Configure event breaker per sourcetype on UF
  - Controls how the forwarders package and send the data to receivers
  - Distributes data more evenly for indexers in a load-balanced target group
  - Can be enabled for any source type
  - Works with any kind of load balancing setup
  - Configured as **`EVENT_BREAKER_ENABLE`** and **`EVENT_BREAKER`** in **`props.conf`**
  - Single line event example:

```
[my_syslog]
EVENT_BREAKER_ENABLE = true
```

  - Multi-line event example:

```
[my_log4j]
EVENT_BREAKER_ENABLE = true
EVENT_BREAKER = ([\r\n]+)\d\d\d\d-\d\d-\d\d
```

Installing a Universal Forwarder

	*NIX	Windows
Download	www.splunk.com/en_us/download/universal-forwarder.html	
Install	• Un-compress `.tgz`, `.rpm`, or `.deb` file in the path Splunk will run from • Default `SPLUNK_HOME` is: `/opt/splunkforwarder`	• Execute `.msi` installer (or use the CLI) • Default `SPLUNK_HOME` is: `C:\Program Files\SplunkUniversalForwarder`

- Silent installation methods exist on all platforms
- Same splunk command-line interface in `SPLUNK_HOME/bin`
  - Same commands for start/stop, restart, etc.
  - An admin account and password are required

Install Linux UF	https://docs.splunk.com/Documentation/Forwarder/latest/Forwarder/Installanixuniversalforwarder
Install Windows UF	https://docs.splunk.com/Documentation/Forwarder/latest/Forwarder/InstallaWindowsuniversalforwarderfromthecommandline

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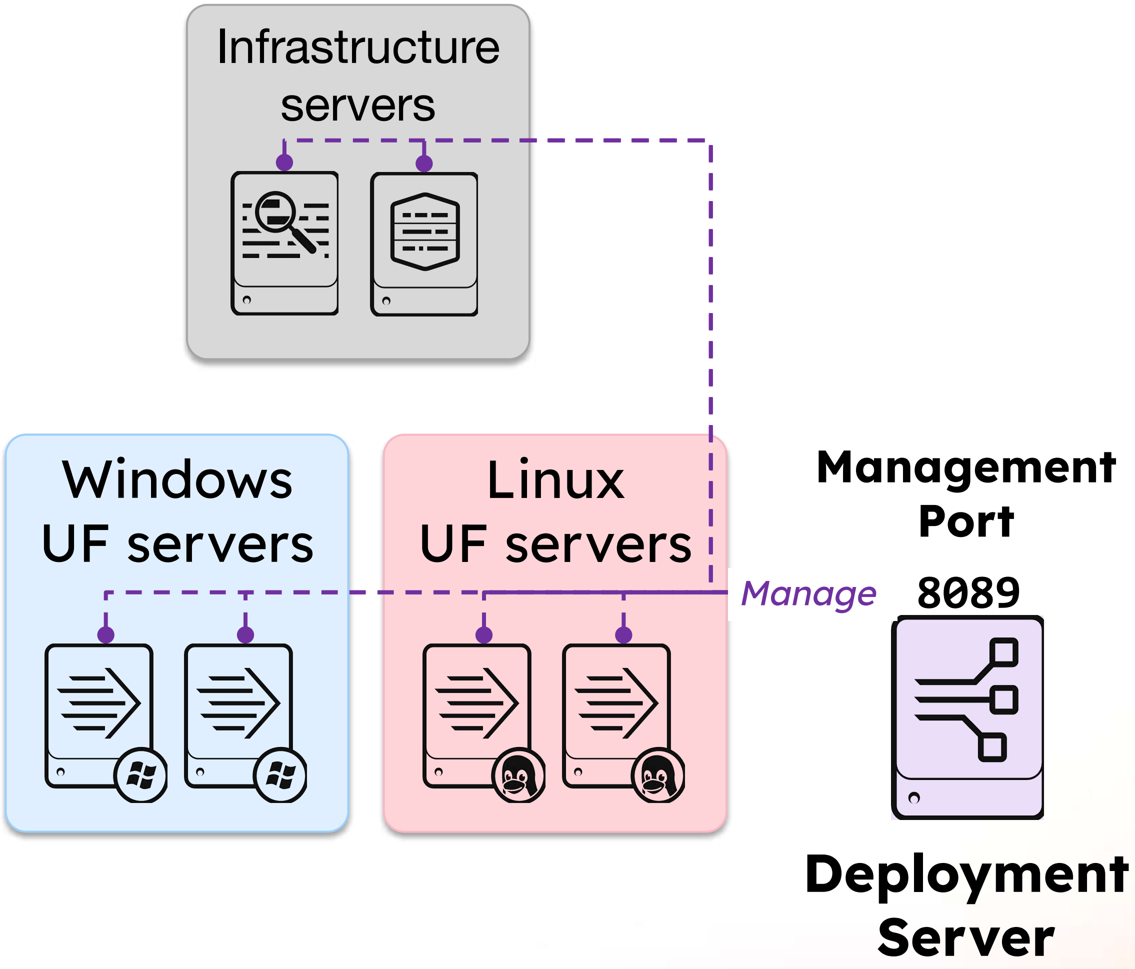
Understanding the Deployment Server

Deployment Server (DS)

- Built-in tool for centrally managing configuration packages as apps for clients
- Includes Forwarder Management as the graphical user interface
- Can restart remote Splunk instances
- Requires an Enterprise license and should be on a dedicated server



Updating Splunk Enterprise Instances	http://docs.splunk.com/Documentation/Splunk/latest/Updating/Calculatedeploymentserverperformance

Deployment Server Components

Deployment Apps

- Configuration files (such as `inputs.conf`) packaged as apps to be deployed to the deployment clients
- Reside in `SPLUNK_HOME/etc/deployment-apps/`

Deployment Clients

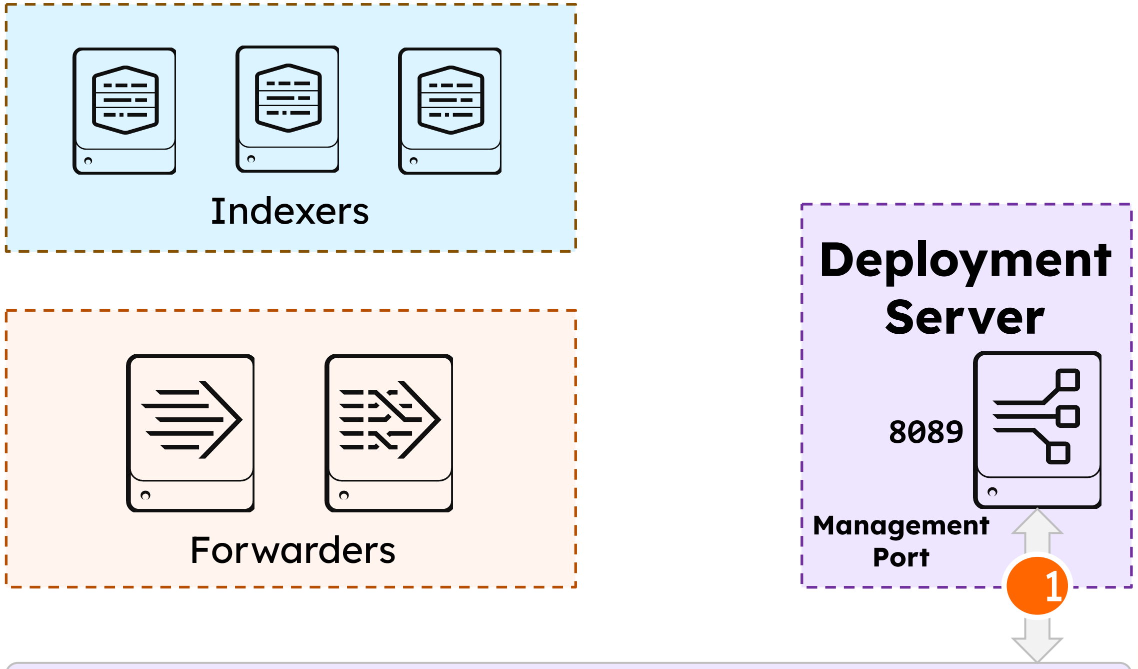
- Splunk instances (Enterprise or UF) that are connected to the Deployment Server (DS) and are phoning home
- Initiate the connection to the Deployment Server

Server Classes

- Groupings of deployment clients
- Define what apps should be deployed to which clients
- Saved in `serverclass.conf`

Deployment Server Configuration (1)

1. Configure DS, server classes, and app packages



Configuration on DS

Map clients to apps:

`SPLUNK_HOME/etc/apps/<app>/local/serverclass.conf`

App repository:

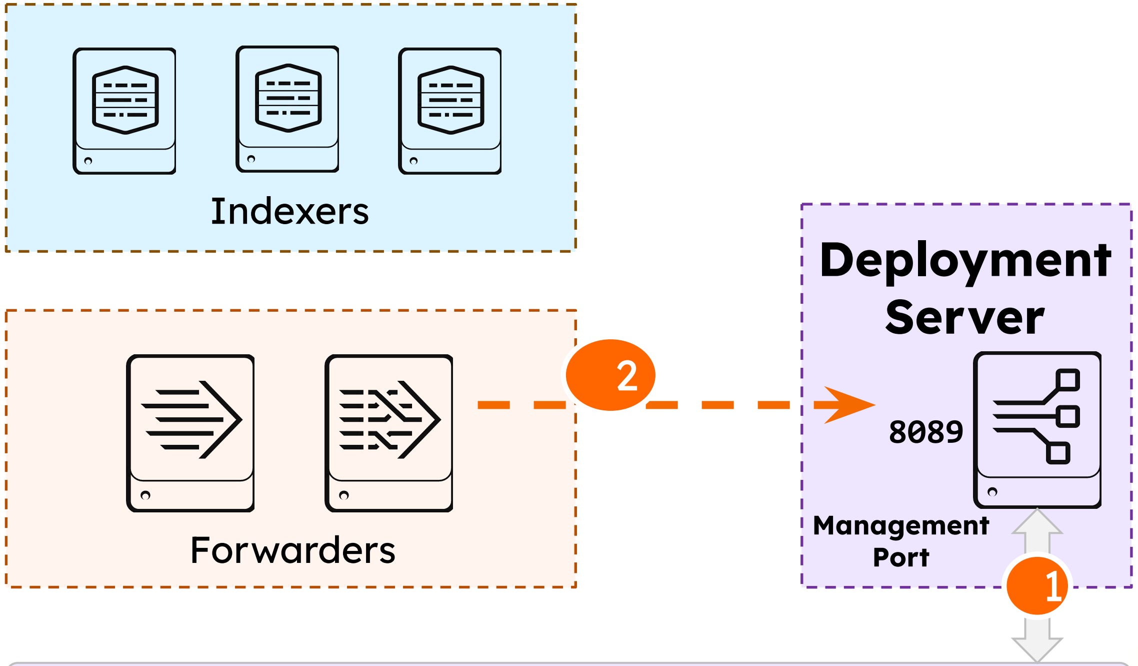
`SPLUNK_HOME/etc/deployment-apps/<app>/`

Apps/configs to deploy:

`outputs.conf`, `inputs.conf`, etc.

Deployment Server Configuration (2)

1. Configure DS, server classes, and app packages
2. Configure instances as deployment clients with **deploymentclient.conf**
   - Client starts phone home to DS



Configuration on DS

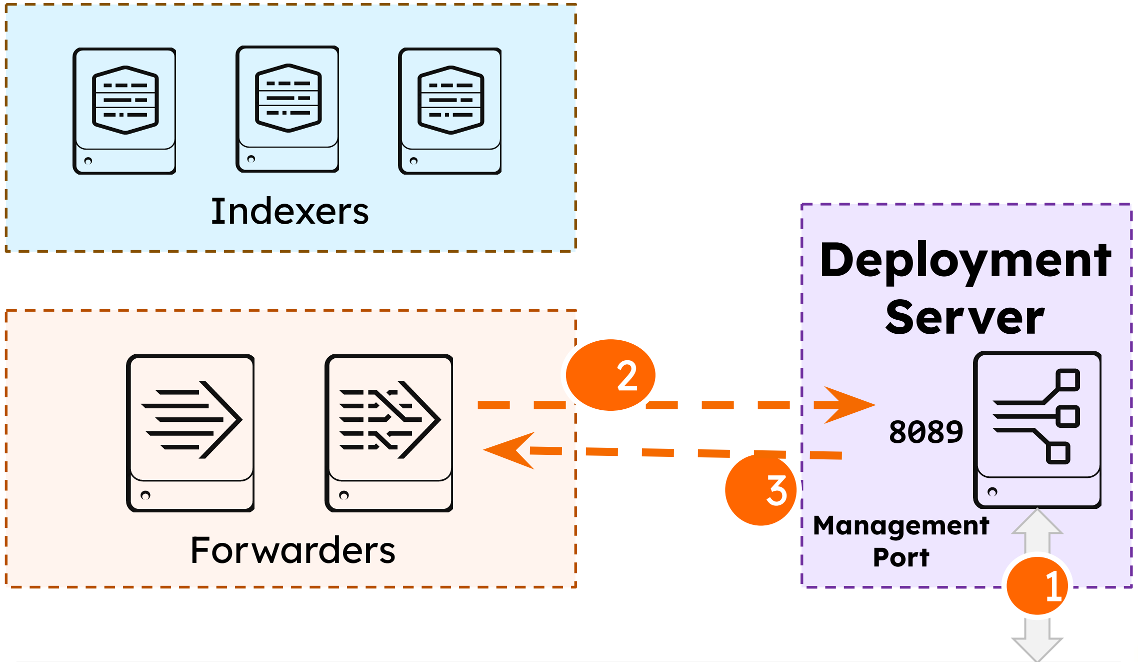
Map clients to apps:
`SPLUNK_HOME/etc/apps/<app>/local/serverclass.conf`

App repository:
`SPLUNK_HOME/etc/deployment-apps/<app>/`

Apps/configs to deploy:
`outputs.conf`, `inputs.conf`, etc.

Deployment Server Configuration (3)

1. Configure DS, server classes, and app packages
2. Configure instances as deployment clients with **deploymentclient.conf**
   - Client starts phone home to DS
3. Client downloads subscribed apps
   - As directed by server classes on DS



<u>Configuration on DS</u>

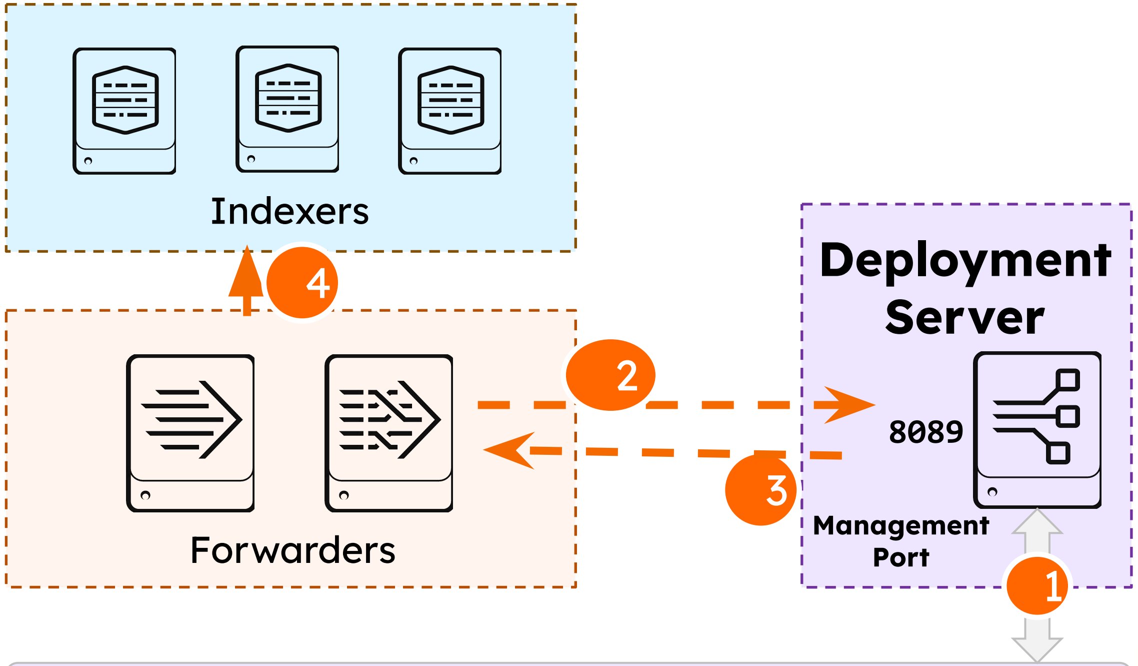
Map clients to apps:
`SPLUNK_HOME/etc/apps/<app>/local/serverclass.conf`

App repository:
`SPLUNK_HOME/etc/deployment-apps/<app>/`

Apps/configs to deploy:
`outputs.conf`, `inputs.conf`, etc.

Deployment Server Configuration (4)

1. Configure DS, server classes, and app packages
2. Configure instances as deployment clients with **deploymentclient.conf**
   - Client starts phone home to DS
3. Client downloads subscribed apps
   - As directed by server classes on DS
4. Client uses app configurations
   - For example: sending data to indexers



Configuration on DS

Map clients to apps:
`SPLUNK_HOME/etc/apps/<app>/local/serverclass.conf`

App repository:
`SPLUNK_HOME/etc/deployment-apps/<app>/`

Apps/configs to deploy:
`outputs.conf`, `inputs.conf`, etc.

Enabling Forwarder Management

1. On deployment server:
   - Install an Enterprise license (to retain GUI)
   - Add one or more apps in **SPLUNK_HOME/etc/deployment-apps**
2. On forwarders: Set up the deployment client
   - Create **org_all_deploymentclient** base app with **deploymentclient.conf** file
   - Run **splunk restart**
3. On deployment server: Create one or more server classes
   - Use forwarder management in Splunk Web
   - Modify **serverclass.conf (Preferred)**

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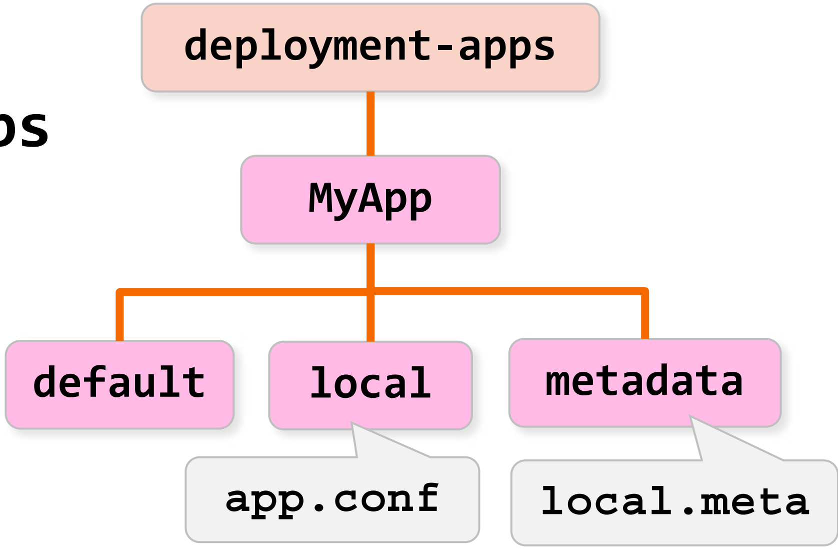
Configuring a Deployment App

- Follows app structure and rules
  - Place files in **`SPLUNK_HOME/etc/deployment-apps`**
  - Recommended files:
    - **`app.conf`** (in **`default`** or **`local`**)
    - **`local.meta`** (in **`metadata`**)
  - Add necessary configuration files, scripts, and other resources to appropriate directories



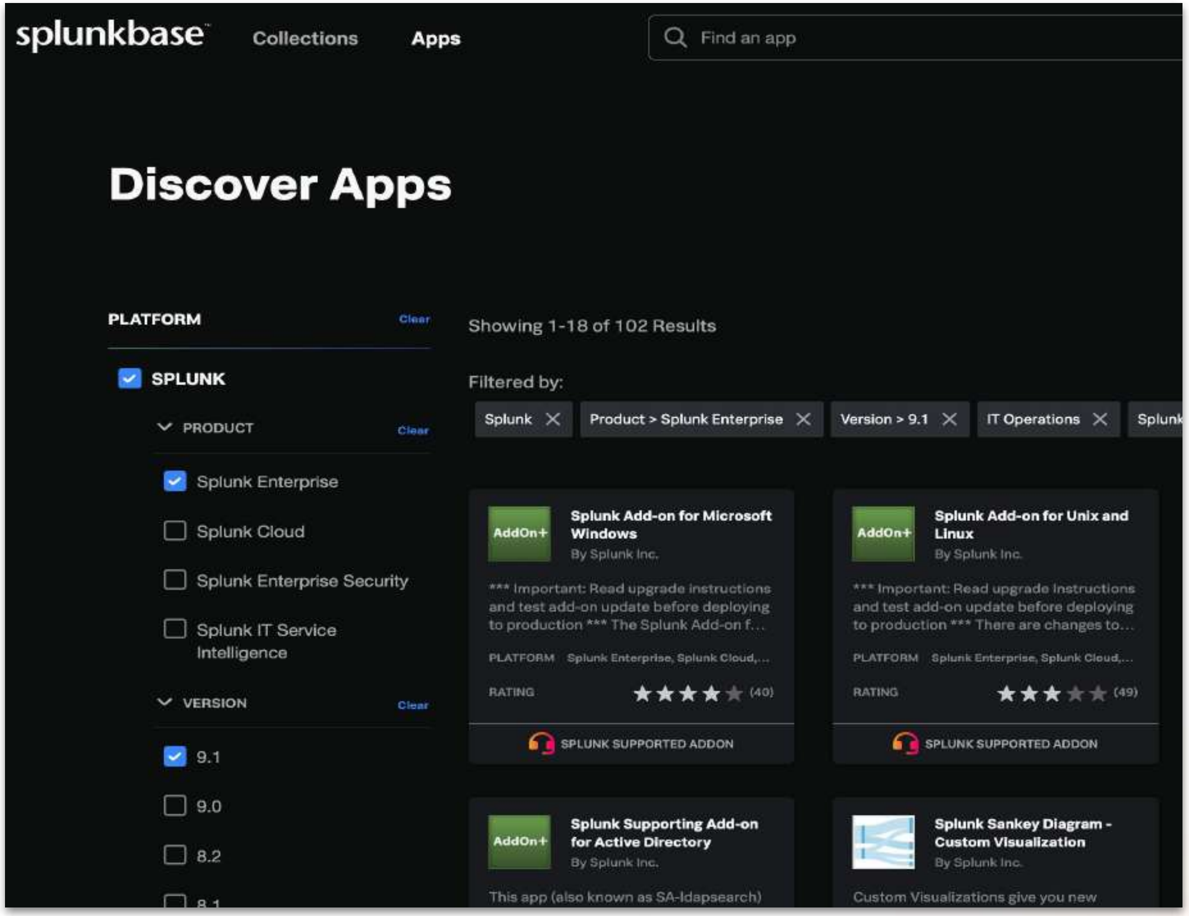
- Files are deployed to client's **`SPLUNK_HOME/etc/apps`** folder by default
- Best practice
  - Create small and discrete deployment apps
  - Take advantage of **`.conf`** file layering
  - Use a consistent naming convention

> Best Practice

Creating Deployment Apps	https://docs.splunk.com/Documentation/Splunk/9.2.1/Updating/Createdeploymentapps

Apps and Add-ons

- Can be downloaded from Splunkbase
- Installed on a Splunk instance:
  - Using the Deployment Server
  - Using CLI on the instance
  - Manually by extracting the app
- Deploy to `SPLUNK_HOME/etc/apps`
- Comes with documentation for details about settings for `inputs.conf`, and so on



Discover Apps

PLATFORM Clear

☑ SPLUNK

PRODUCT Clear

☑ Splunk Enterprise
☐ Splunk Cloud
☐ Splunk Enterprise Security
☐ Splunk IT Service Intelligence

VERSION Clear

☑ 9.1
☐ 9.0
☐ 8.2
☐ 8.1

Showing 1-18 of 102 Results

Filtered by:
Splunk × | Product > Splunk Enterprise × | Version > 9.1 × | IT Operations × | Splunk

Splunk Add-on for Microsoft Windows
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*** Important: Read upgrade instructions and test add-on update before deploying to production *** The Splunk Add-on f...
PLATFORM Splunk Enterprise, Splunk Cloud,...
RATING ★★★★☆ (40)
SPLUNK SUPPORTED ADDON

Splunk Add-on for Unix and Linux
By Splunk Inc.
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PLATFORM Splunk Enterprise, Splunk Cloud,...
RATING ★★★☆☆ (49)
SPLUNK SUPPORTED ADDON

Splunk Supporting Add-on for Active Directory
By Splunk Inc.
This app (also known as SA-ldapsearch)

Splunk Sankey Diagram - Custom Visualization
By Splunk Inc.
Custom Visualizations give you new

Configuring Deployment Clients

- On prospective deployment clients (usually forwarders):
  1. Create **`deploymentclient.conf`** manually or using a software management tool
  2. Run: **`splunk set deploy-poll <deployment_server:splunkd_port>`**
     - Creates **`deploymentclient.conf`** in **`SPLUNK_HOME/etc/system/local`**
     - **Don't do this**
  3. Restart the deployment clients:
     `splunk restart`
- Edit **`[deployment-client]`** stanza to override defaults
  - Can be part of initial deployment app
  - Contains phone home setting (default: 60 seconds)

deploymentclient.conf

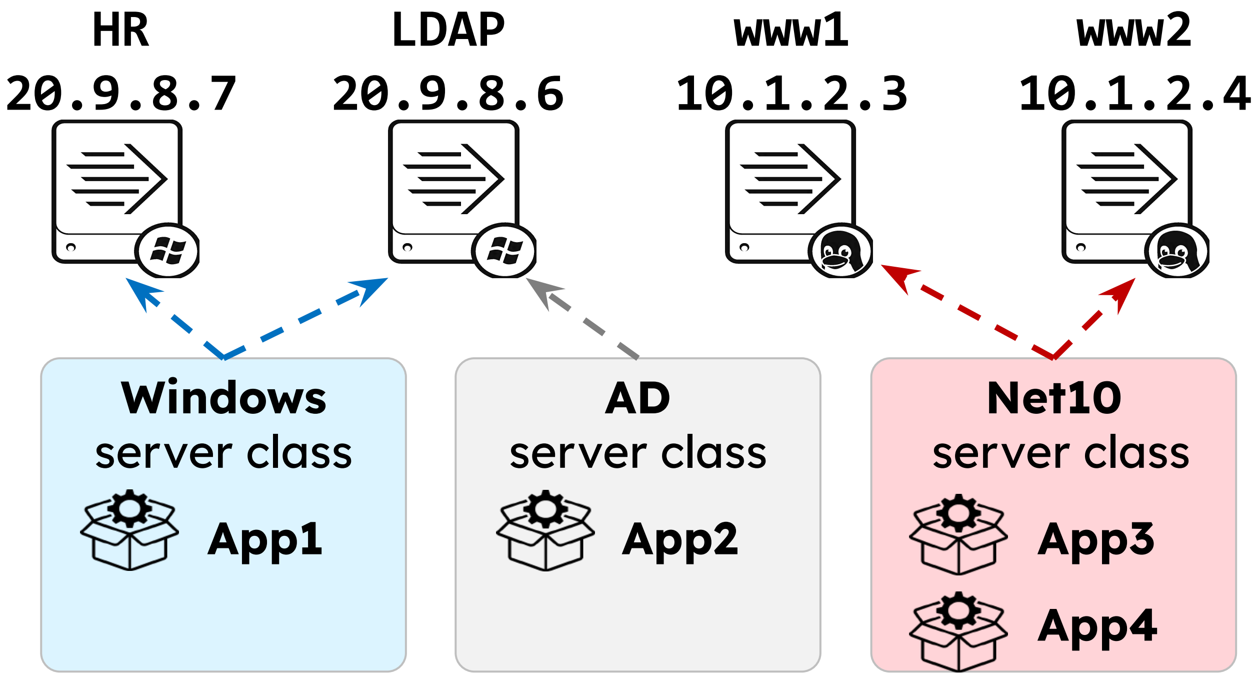
```
[target-broker:deploymentServer]
targetUri = splunk_server:8089
```

```
...
```

```
[deployment-client]
clientName = webserver_1
phoneHomeIntervalInSecs = 300
```

What’s a Server Class?

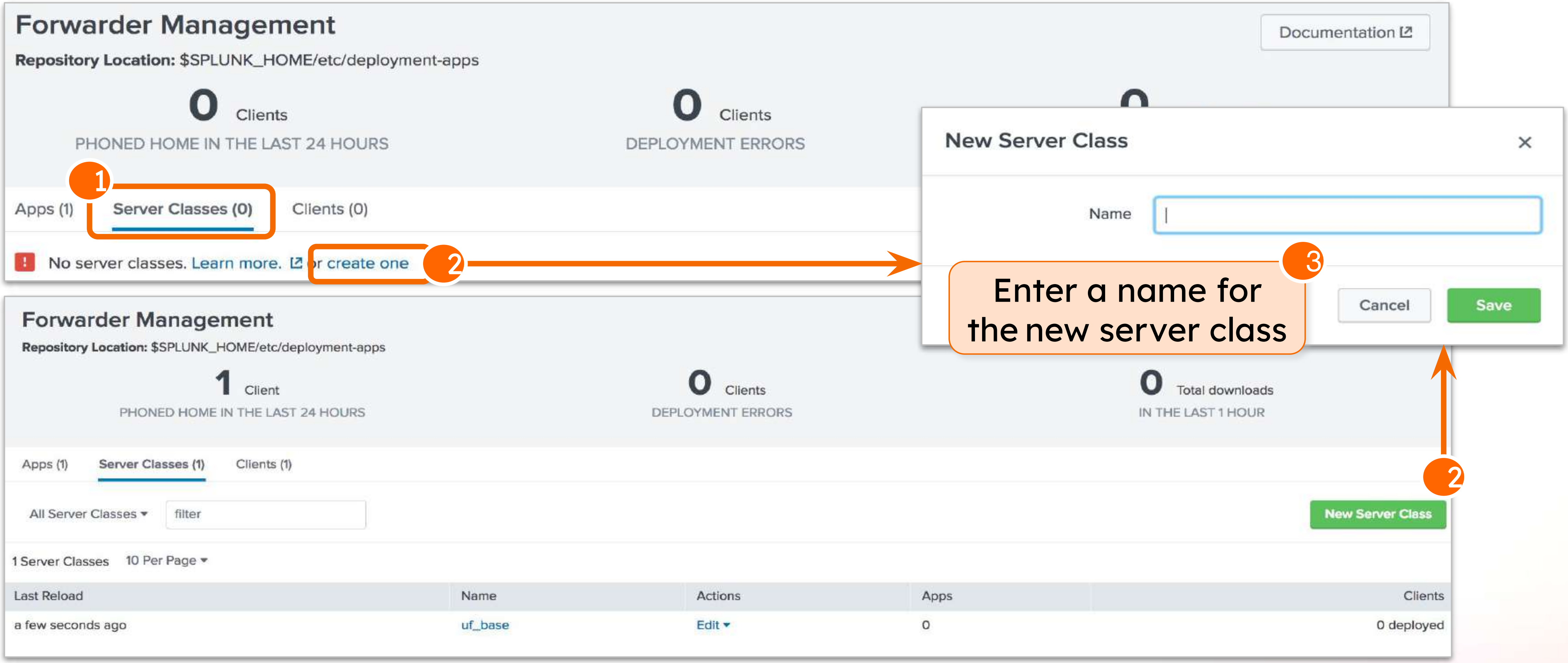
- Maps groups of clients to deployment apps
  - Can be based on client name, host name, IP address, DNS name, or machine types



Deployment Server

Server class	Rules
Windows	• Assigned to Windows systems • Installs **App1**
AD	• Assigned to Active Directory servers • Installs **App2**
Net10	• Assigned to hosts on `10.1.2.*` subnet • Installs **App3** and **App4**

Adding a Server Class



Forwarder Management

Repository Location: $SPLUNK_HOME/etc/deployment-apps

0 Clients PHONED HOME IN THE LAST 24 HOURS

0 Clients DEPLOYMENT ERRORS

No server classes. Learn more. or create one

New Server Class

Name: |

Enter a name for the new server class

Forwarder Management

Repository Location: $SPLUNK_HOME/etc/deployment-apps

1 Client PHONED HOME IN THE LAST 24 HOURS

0 Clients DEPLOYMENT ERRORS

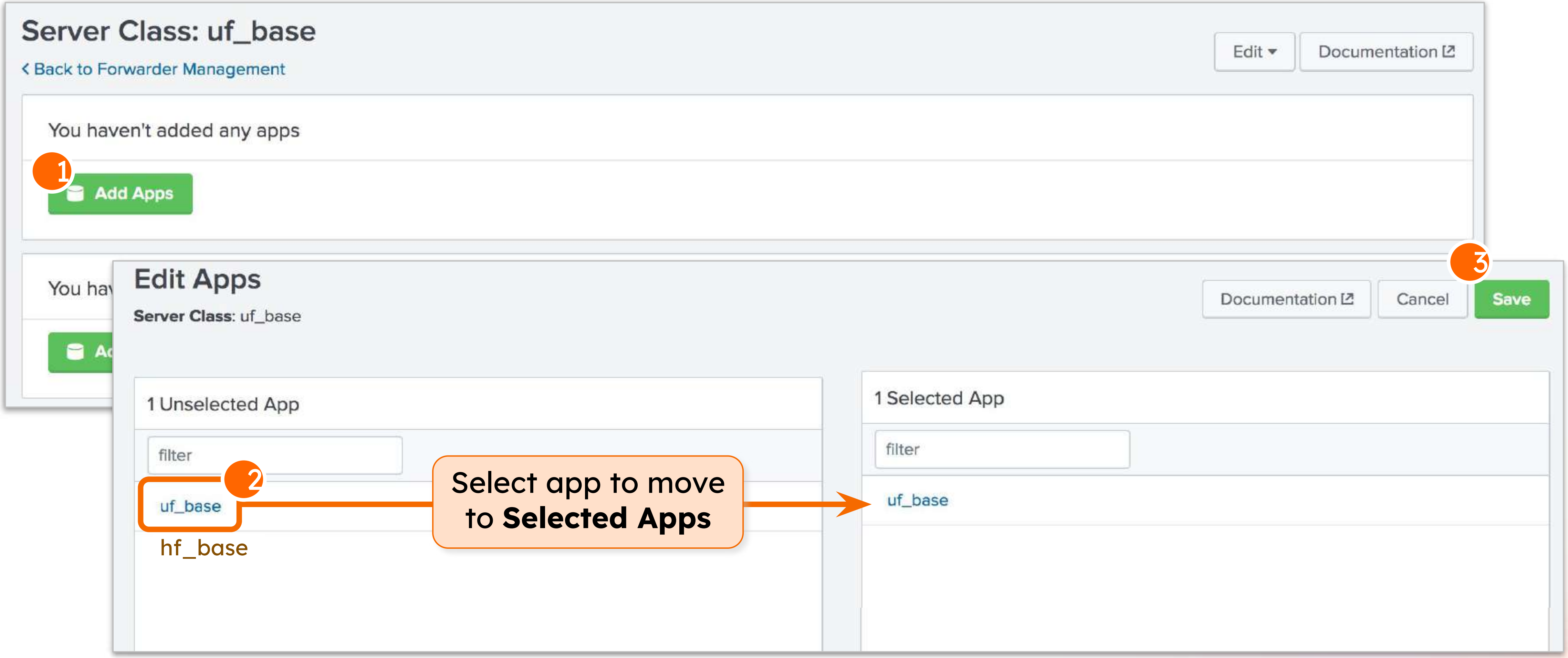
0 Total downloads IN THE LAST 1 HOUR

1 Server Classes 10 Per Page

Last Reload	Name	Actions	Apps	Clients
a few seconds ago	uf_base	Edit ▾	0	0 deployed

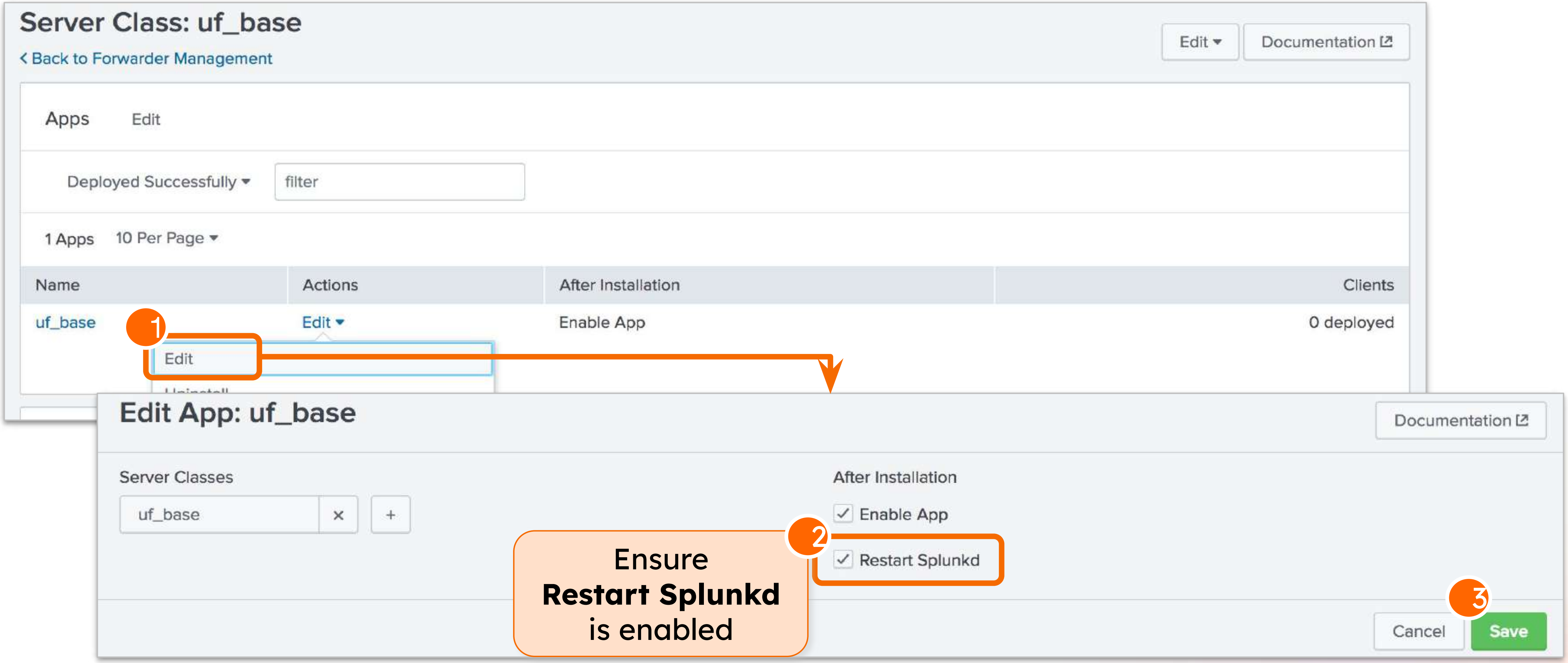
Naming Conventions	https://lantern.splunk.com/Splunk_Success_Framework/Data_Management/Naming_conventions

Selecting Apps for the Server Class



Select app to move to **Selected Apps**

Post Deployment Behavior Setting



Server Class: uf_base

< Back to Forwarder Management

Apps Edit

Deployed Successfully ▾ filter

1 Apps 10 Per Page ▾

Name	Actions	After Installation	Clients
uf_base	Edit ▾	Enable App	0 deployed

1 Edit

Edit App: uf_base

Server Classes: uf_base

After Installation

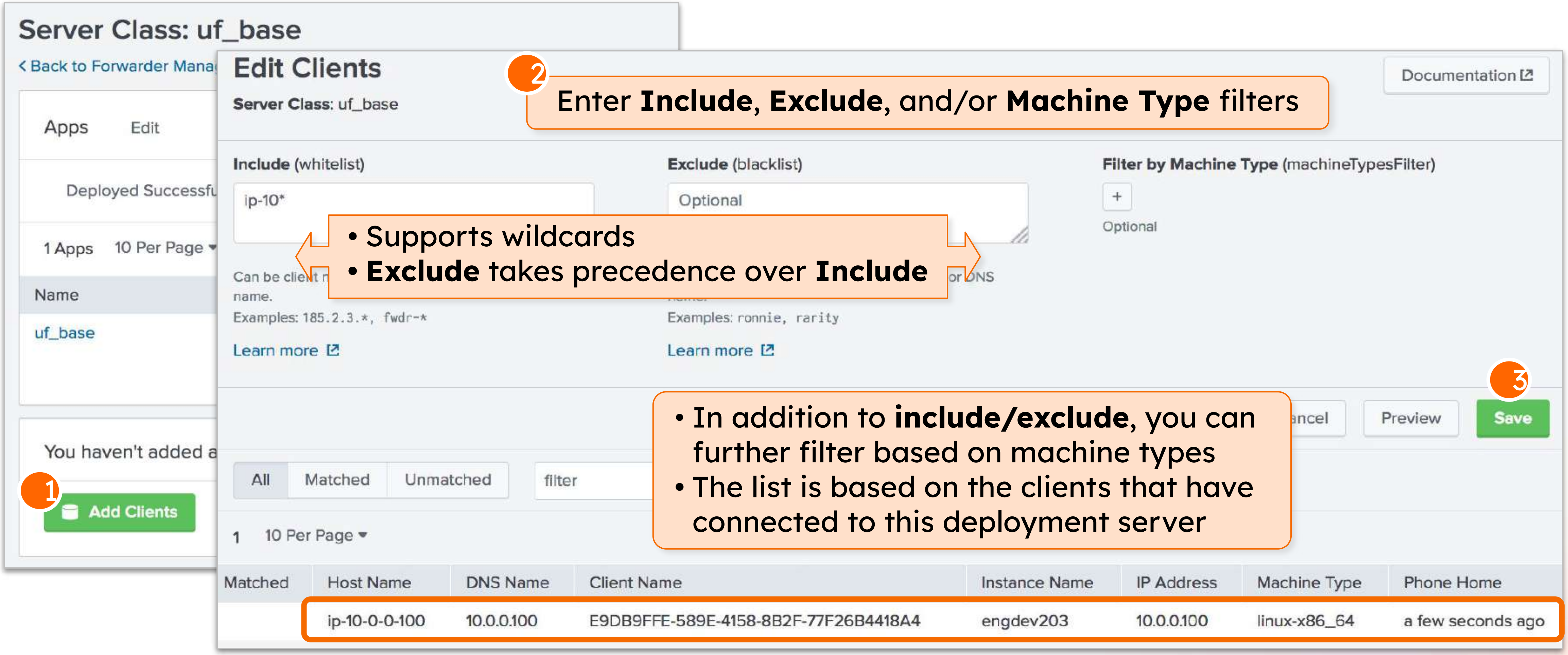
☑ Enable App

2 ☑ Restart Splunkd

Ensure **Restart Splunkd** is enabled

3 Save

Selecting Clients for the Server Class



Server Class: uf_base

Include (whitelist): ip-10*

Exclude (blacklist): Optional

Filter by Machine Type (machineTypesFilter): Optional

Can be client n... name.
Examples: 185.2.3.*, fwdr-*
Learn more

...or DNS name.
Examples: ronnie, rarity
Learn more

Matched	Host Name	DNS Name	Client Name	Instance Name	IP Address	Machine Type	Phone Home
	ip-10-0-0-100	10.0.0.100	E9DB9FFE-589E-4158-8B2F-77F26B4418A4	engdev203	10.0.0.100	linux-x86_64	a few seconds ago

2. Enter **Include**, **Exclude**, and/or **Machine Type** filters

- Supports wildcards
- **Exclude** takes precedence over **Include**

- In addition to **include/exclude**, you can further filter based on machine types
- The list is based on the clients that have connected to this deployment server

Verify Forwarder Management

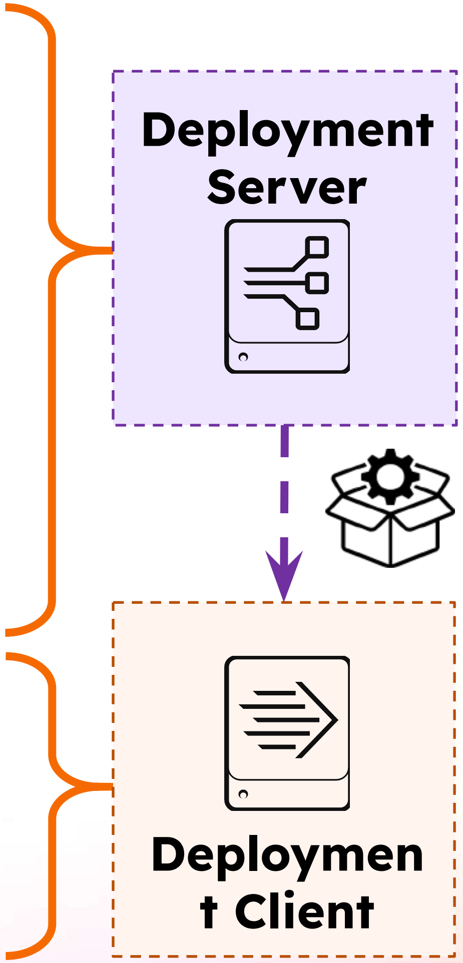
- On the deployment client:
  - Display the deployment server and management port:
    `splunk show deploy-poll`
  - Confirm expected app directories and contents in
    `SPLUNK_HOME/etc/apps/app_name`
    - Occurs at the next phone home interval
- On the deployment server:
  - Display information about the deployment clients:
    `splunk list deploy-clients`

Updating Deployed Apps

1. Add new apps or change existing app in **`deployment-apps`**

2. Run **`splunk reload deploy-server`**
   - Detects changes to deployment apps on DS
     - Re-caches list of deployment apps
     - Re-calculates checksums used to uniquely identify apps by their contents
   - Eliminates need to restart Splunk

3. Verify the client downloads new/changed apps after next phone-home
   - Client downloads apps when checksums have changed



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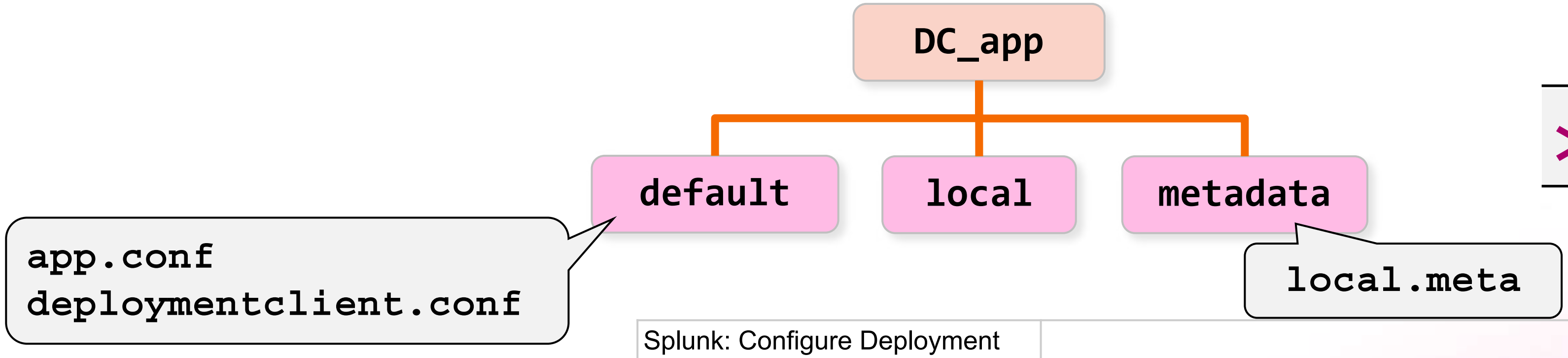
Manage Deployment Client Settings Centrally

- Must configure client to phone home to DS first
- Use an app to manage deployment client settings
  - Create a deployment client settings app (example: **`DC_app`**)
  - Move **`deploymentclient.conf`** settings from **`etc/system/local/ to etc/apps/DC_app/local/`**
  - Deploy **`DC_app`** to clients using a dedicated server class



> Best Practice

Splunk: Configure Deployment Clients	https://docs.splunk.com/Documentation/Splunk/9.2.1/Updating/Configuredeploymentclients

Forwarder Management & Deployment Labs

1. Access the Web UI and CLI of your Deployment Server
2. Retrieve Splunk settings from your deployment server using the CLI
3. Examine Splunk configuration file documentation and basic .conf files
4. Create the outputs base app
5. Create the deployment client base app
6. Create the serverclass.conf file

Splunk4Admins - FM Lab Guide	https://splk.it/S4A-FM-Lab-Guide

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Forwarder Image Lab (Extra Credit)

1. Preparation for Cloning
2. Creating a Tarball
3. Optional Secure Copy (SCP)

Splunk4Admins - FM Lab Guide	https://splk.it/S4A-FM-Lab-Guide

Useful Commands

Deployment Server

Deployment Client

Command	Operation
From the Deployment Server (DS):	
`splunk reload deploy-server`	Checks all apps for changes and notifies the relevant clients the next time they phone home
`splunk list deploy-clients`	Displays information about the deployment clients
From the Deployment Client:	
`splunk set deploy-poll`	Connects the client to the deployment server and management port
`splunk show deploy-poll`	Displays the current deployment server and management port
`splunk list forward-server`	Displays the current forward server configuration
`splunk disable deploy-client`	Disables the deployment client

Workshop Agenda

- Expectations
- What is a forwarder?
  - Types
- What is a Deployment Server?
- App management via Deployment Server?
- Forwarder Management & Deployment Labs
- Forwarder Image Lab (Extra Credit)
- Summary

Key Takeaways

1. Understanding Universal Forwarders:
   a. Learn the role of Splunk Universal Forwarders in collecting and forwarding data from various sources to Splunk indexers.
   b. Understand the difference between Universal Forwarders and Heavy Forwarders.
2. Deployment Server Configuration:
   a. Setup and configuration of a Splunk Deployment Server.
   b. Create and manage server classes to define groups of deployment clients.
   c. Assign apps to server classes for efficient distribution of configurations and updates.
3. Creating Serverclass.conf:
   a. Gain hands-on experience in creating and configuring the serverclass.conf file.
   b. Learn to define whitelist and blacklist criteria to include or exclude forwarders from server classes.
4. Managing Forwarders:
   a. Develop skills to manage and monitor forwarders effectively.
   b. Learn to troubleshoot common issues with forwarder deployment and communication.

Thank you

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