



# Splunk Enterprise Data Administration

# Document Usage Guidelines

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- Should be used only for enrolled students
- Not meant to be a self-paced document, an instructor is needed
- Do not distribute

# Course Prerequisites

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- Required:
  - Splunk Fundamentals 1
- Strongly recommended:
  - Splunk Fundamentals 2
  - Splunk Enterprise System Administration

# Course Goals

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- Understand sourcetypes
- Manage and deploy forwarders with Forwarder Management
- Configure data inputs
  - File monitors
  - Network inputs (TCP/UDP)
  - Scripted inputs
  - HTTP inputs (via the HTTP Event Collector)
- Customize the input phase parsing process
- Define transformations to modify raw data before it is indexed
- Define search time knowledge object configurations

# Course Outline

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Module 1: Getting Data Into Splunk

Module 2: Configuration Files

Module 3: Forwarder Configuration

Module 4: Forwarder Management

Module 5: Monitor Inputs

Module 6: Network Inputs

Module 7: Scripted Inputs

Module 8: Agentless Inputs

Module 9: Operating System Inputs

Module 10: Fine-tuning Inputs

Module 11: Parsing Phase and Data Preview

Module 12: Manipulating Raw Data

Module 13: Supporting Knowledge Objects

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# System Administrator versus Data Administrator

## Splunk System Administrator

### *System Management*

- Install, configure, and manage Splunk components
- Install and manage Splunk apps
- Monitor Splunk operations
- Manage Splunk licensing
- Manage Splunk indexes
- Manage Splunk users and authentication
- Manage Splunk configuration files
- Monitor MC and respond to system health alerts

## Splunk Data Administrator

### *Data Onboarding and Management*

- Work with users requesting new data sources
- Document existing and newly ingested data sources
- Design and manage inputs for UFs/HFs to capture data
- Manage parsing, event line breaking, timestamp extraction
- Move configuration through non-production testing as required
- Deploy changes to production
- Manage Splunk configuration files

# Module 1: Getting Data Into Splunk

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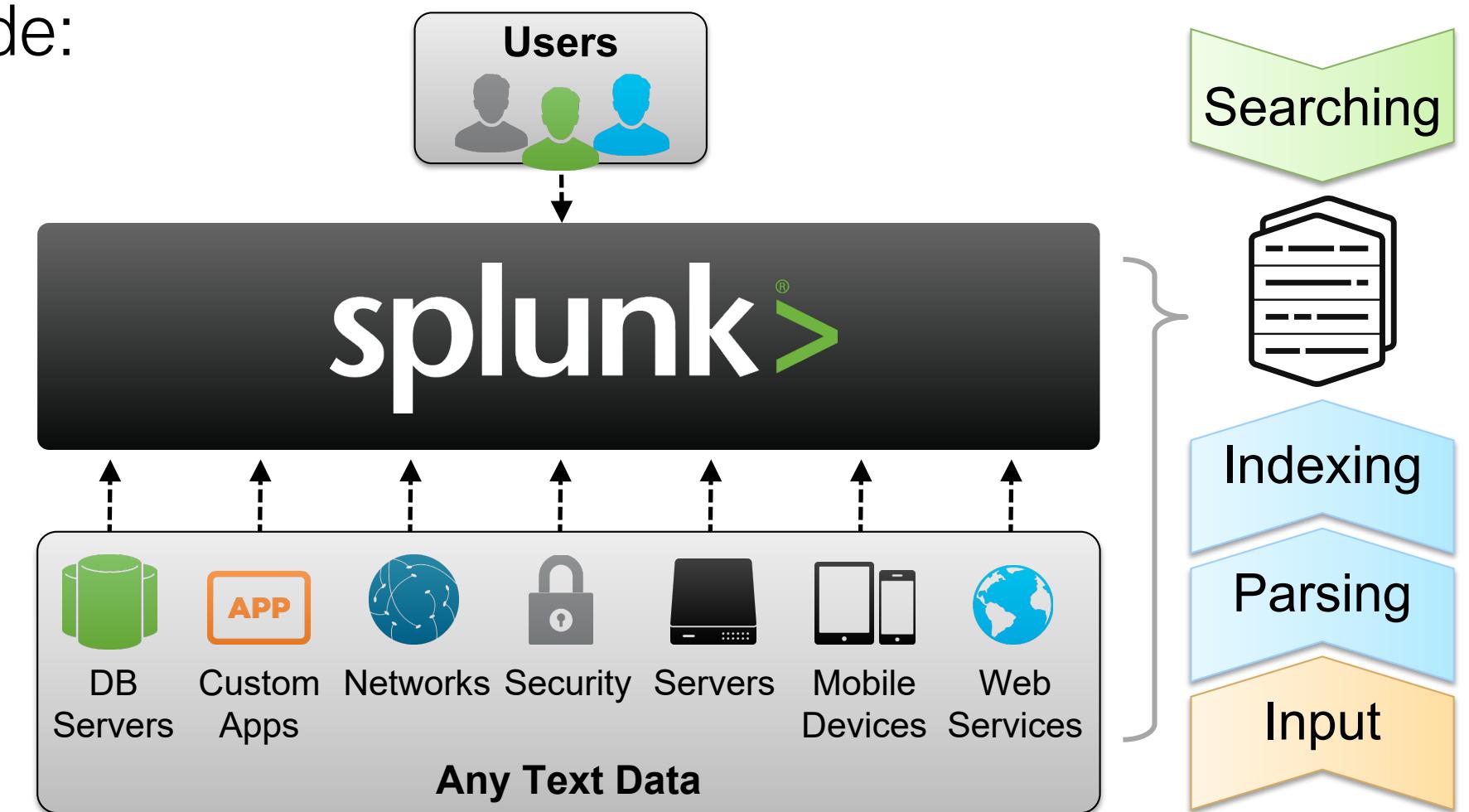
# Module Objectives

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- Provide an overview of Splunk
- Describe the four phases of the distributed model
- Describe data input types and metadata settings
- Configure initial input testing with Splunk Web
- Testing Indexes with Input Staging

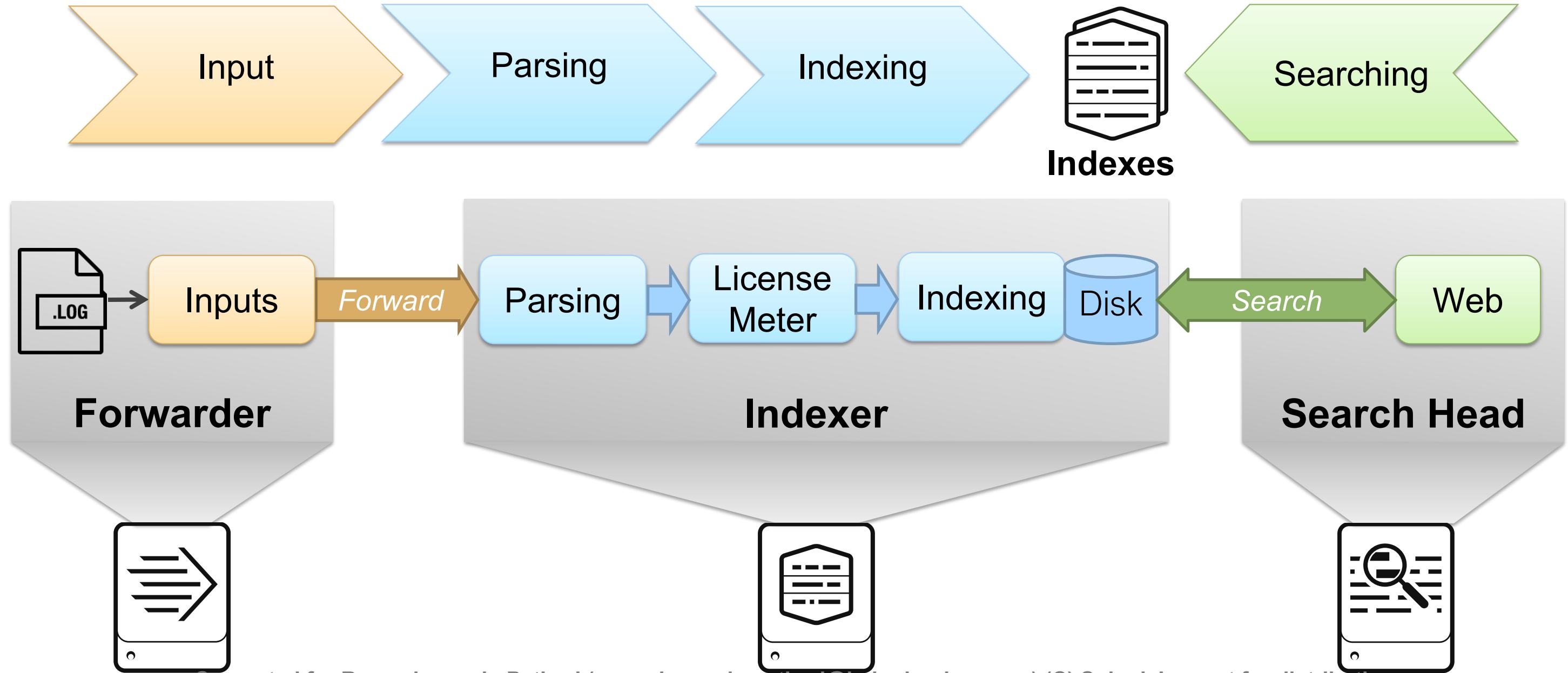
# Splunk Overview

- Splunk can be deployed in a variety of configurations
- Scales from a single server to a distributed infrastructure
- Four stages of Splunk include:
  - Input any text data
  - Parse the data into events
  - Index and store events
  - Search and report



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# The Four Phases of the Distributed Model



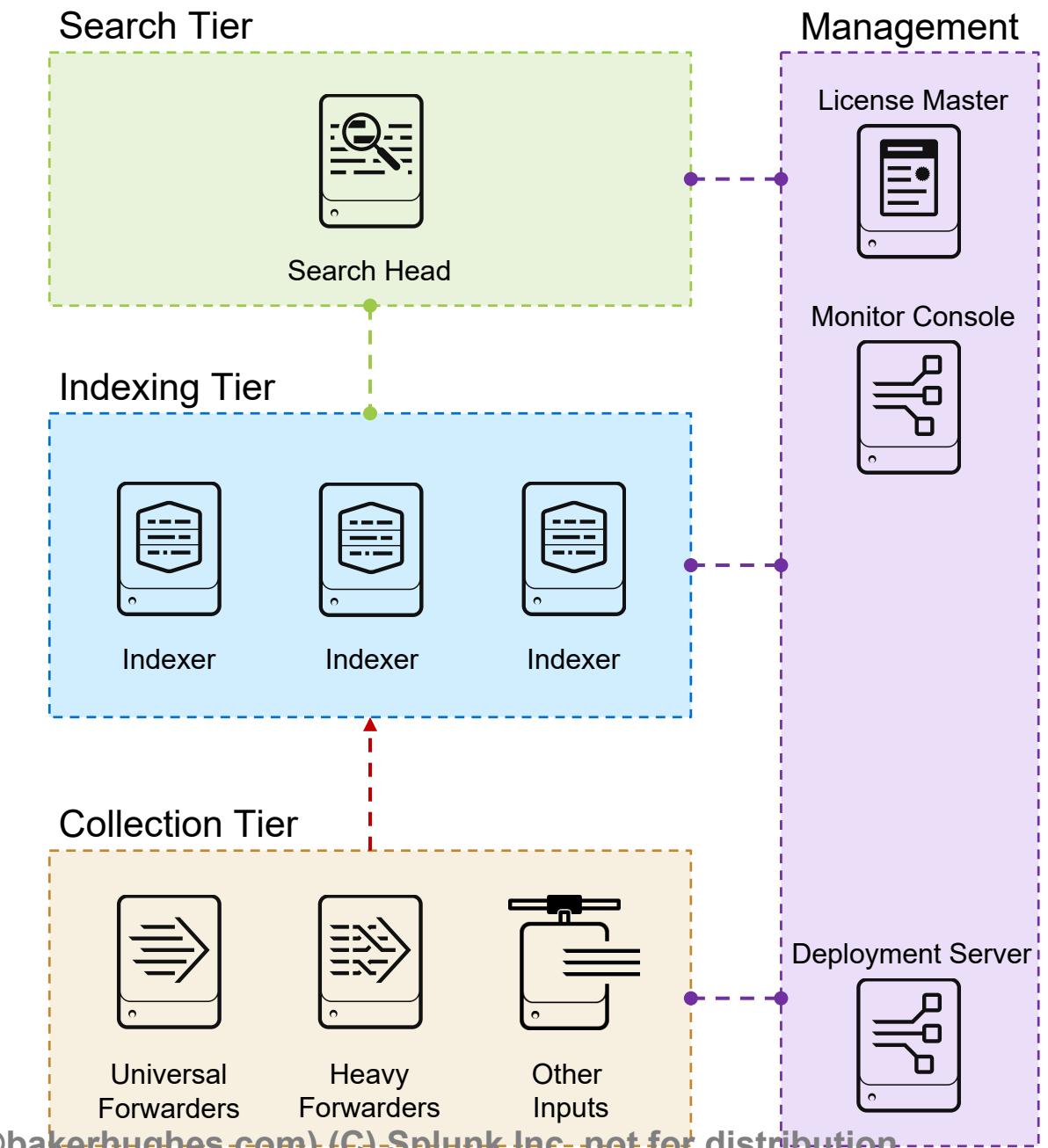
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# Distributed Non-Cluster Environment

- Scale Splunk in various ways
  - Add indexers to handle more inputs
  - Add indexers and search heads to handle more searching
- Centralize management using dedicated servers including:
  - Deployment server for forwarder management
  - License Master
  - Monitoring Console

**Note** 

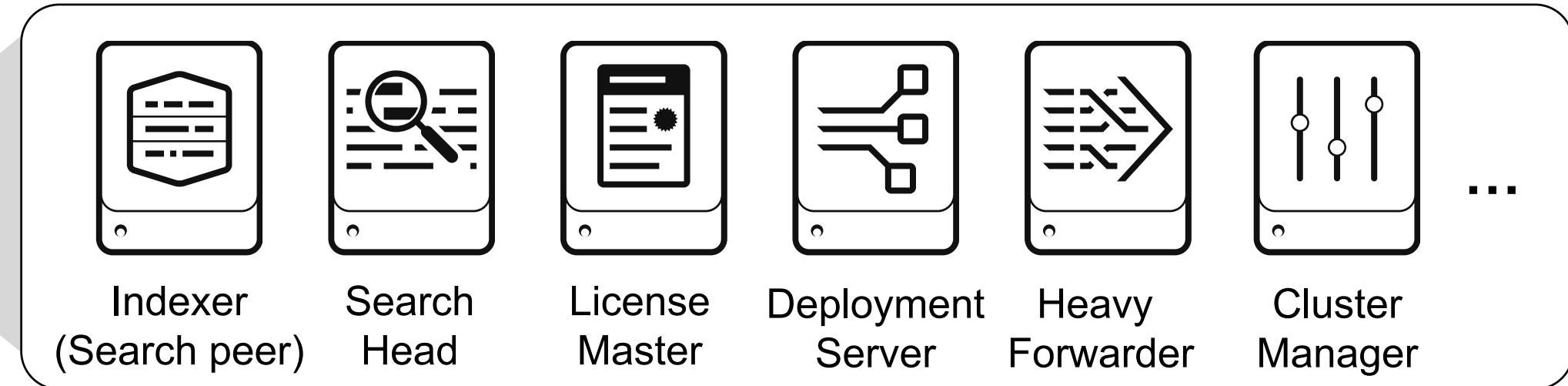
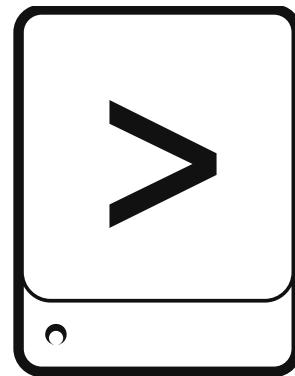
You will configure a Deployment Server and different types of forwarders in later lab exercises.



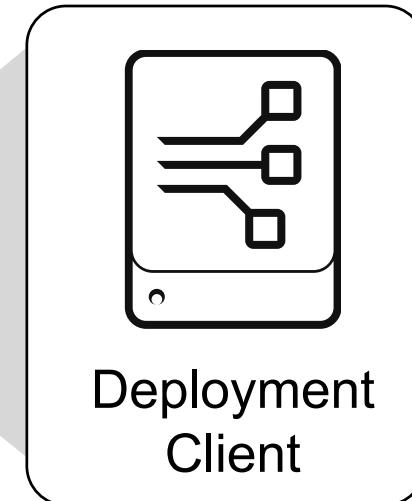
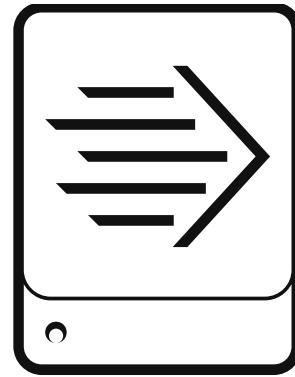
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# Software in Splunk Enterprise Packages

**Splunk  
Enterprise  
package**



**Universal  
Forwarder  
package**



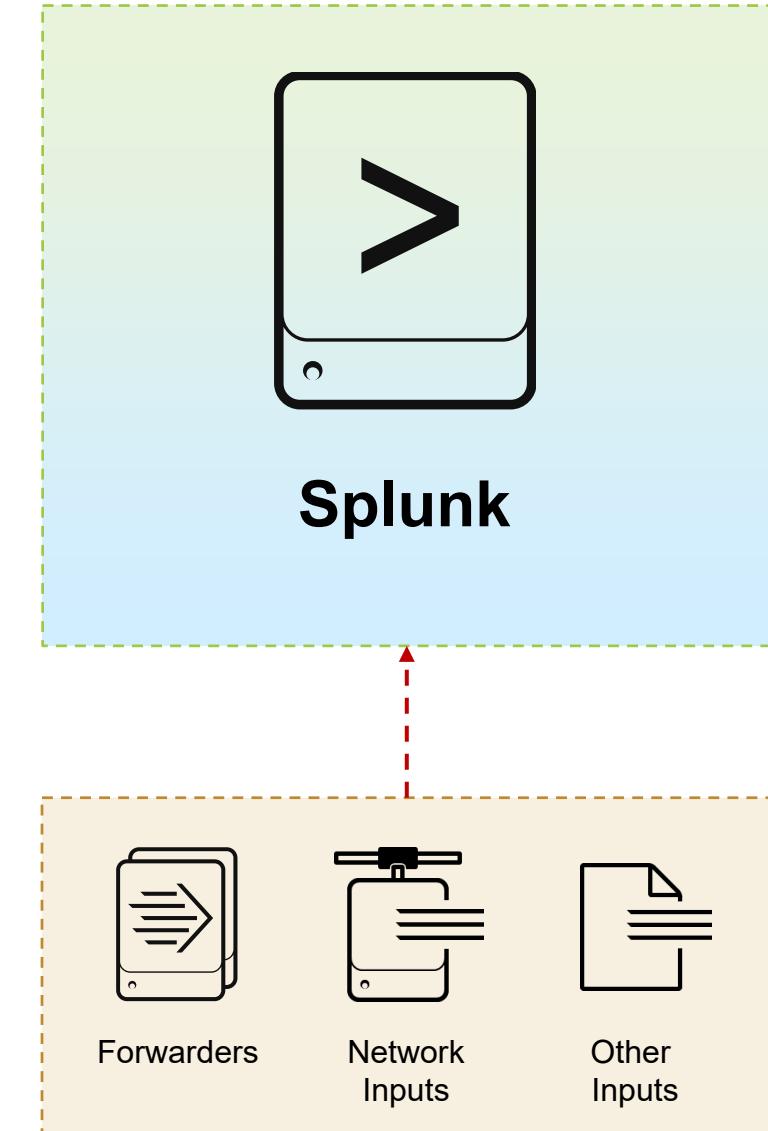
**Note**

The System Administrator is responsible for installing and configuring Splunk components.

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# Data Input Types

- Supported types of data input
  - **Files and directories**
  - **Network data**
  - **Script output**
  - **Linux and Windows logs**
  - **HTTP**
  - And more...
- You can add data inputs with:
  - Apps and add-ons
  - Splunk Web
  - CLI
  - Editing **inputs.conf**



Indexes any text data from any source

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# Metadata Settings

- Assigned when Splunk indexes event data
- Generally assigned to entire source during input phase
- Defaults are used if alternates are not specified
  - Overriding values can be performed at input time or later

Metadata	Description	Examples
<b>host</b>	Host where an event originates	<code>websvr1.example.com</code> <code>10.0.21.55</code>
<b>source</b>	Source file, stream or input of an event	<code>/var/log/messages</code> <code>UDP:514</code>
<b>sourcetype</b>	Format and category of the data input	<code>access_combined</code> <code>cisco_syslog</code>
<b>index</b>	Where data is stored by Splunk	<code>main</code> (default) <code>itops</code>

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# Adding an Input with Splunk Web

- Click the Add Data icon
  - On admin's Home page
  - On the Settings panel

- Or select:
  1. Settings
  2. Data inputs
  3. Add new

The screenshot shows the Splunk Web interface. At the top, there is a navigation bar with tabs: Administrator, Messages, Settings (highlighted with a red circle containing the number 1), Activity, Help, and Find. Below the navigation bar is a main menu with several categories: KNOWLEDGE (Searches, reports, and alerts, Data models, Event types, Tags, Fields, Lookups, User interface), DATA (highlighted with a red circle containing the number 2), and FORWARDING (Forwarding and receiving, Indexes, Report acceleration summaries, Virtual indexes, Source types). A green arrow points from the 'Add Data' icon on the Home page to the 'Data inputs' link in the DATA category. Another green arrow points from the 'Data inputs' link to the '+ Add new' button in the Local inputs table. A third green arrow points from the '+ Add new' button to the 'Add new' link at the bottom right of the table.

**Data inputs**  
Set up data inputs from files and directories, network ports, and scripted inputs. If you want to set up forwarding and receiving between two Splunk instances, go to [Forwarding and receiving](#).

Type	Inputs	Actions
Files & Directories Index a local file or monitor an entire directory.	12	<a href="#">+ Add new</a>
HTTP Event Collector	0	<a href="#">+ Add new</a>

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# Add Data Menu

What data do you want to send to the Splunk platform?

Follow guides for onboarding popular data sources

Cloud computing  
Get your cloud computing data in to the Splunk platform.  
10 data sources

Networking  
Get your networking data in to the Splunk platform.  
2 data sources

OS Operating System  
Get your operating system data in to the Splunk platform.  
1 data source

Security  
Get your security data in to the Splunk platform.  
3 data sources

Guides for popular data sources

Or get data in with the following methods

Get data into Splunk

Upload  
files from my computer  
Local log files  
Local structured files (e.g. CSV)  
[Tutorial for adding data](#)

Monitor  
files and ports on this Splunk platform instance  
Files - HTTP - WMI - TCP/UDP - Scripts  
Modular inputs for external data sources

Forward  
data from a Splunk forwarder  
Files - TCP/UDP - Scripts

Operating System  
WIN Microsoft Windows  
Windows event logs

Choose your deployment environment  
Single instance  
A single instance Splunk Enterprise deployment that combines indexing and search management functions.

Distributed  
A distributed Splunk Enterprise deployment that separates indexing and search management into separate nodes.

Splunk Cloud  
A cloud-based Splunk software service that performs all indexing and search management functions.

Overview of required configuration for your environment

Splunk Enterprise search head

Splunk Enterprise indexer cluster

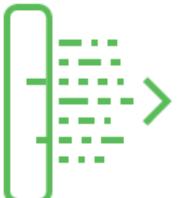
High level steps

1. Configure security groups on the Windows hosts
2. Install a Splunk universal forwarder on each remote Windows host
3. Install and configure the Splunk Add-on for Windows on the universal forwarders
4. Install the Splunk Add-on for Windows across your Splunk platform deployment
5. Validate

[Full Configuration Documentation](#)

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# Add Data Menu (cont.)

 <b>Upload</b> files from my computer  Local log files Local structured files (e.g. CSV) <a href="#">Tutorial for adding data</a> ↗	 <b>Monitor</b> files and ports on this Splunk platform instance  Files - HTTP - WMI - TCP/UDP - Scripts Modular inputs for external data sources	 <b>Forward</b> data from a Splunk forwarder  Files - TCP/UDP - Scripts
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## Upload

- Indexed once, for data that never gets updated
- Useful for testing
- File on the local machine
- Does not update **inputs.conf**

## Monitor

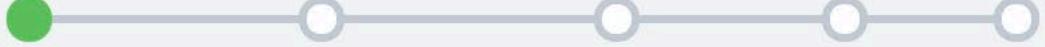
- Indexed once or continuously
- Useful for testing or production
- File on the remote Splunk server
- Updates **inputs.conf**
- Supports files, directories, http events, network ports, and scripts

## Forward

- Data from forwarders managed by this Deployment Server
- Sent to indexers' receiving port
- Main source of input in production
- Updates **inputs.conf**

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# Select Source

Add Data          [Select Source](#)   [Set Source Type](#)   [Input Settings](#)   [Review](#)   [Done](#)   [Back](#)   [Next >](#)

To configure a monitor input

**Files & Directories** 1

Upload a file, index a local file, or monitor an entire directory.

Configure this instance to monitor files and directories for data. To monitor all objects in a directory, select the directory. Then, Splunk monitors all objects within the directory. Then, it indexes data sources in the directory. To add more data inputs, click [Add Input](#). To configure individual data inputs for those objects, click [Learn More](#).

**HTTP Event Collector**

Configure tokens that clients can use to send data over HTTP or HTTPS.

**TCP / UDP**

Configure the Splunk platform to listen on a network port.

**Scripts**

Get data from any API, service, or database with a script.

**Systemd Journald Input for Splunk**

This is the input that gets data from journald (systemd's logging component) into Splunk.

File or Directory ? 2 /opt/log/www1/access.log [Browse](#)

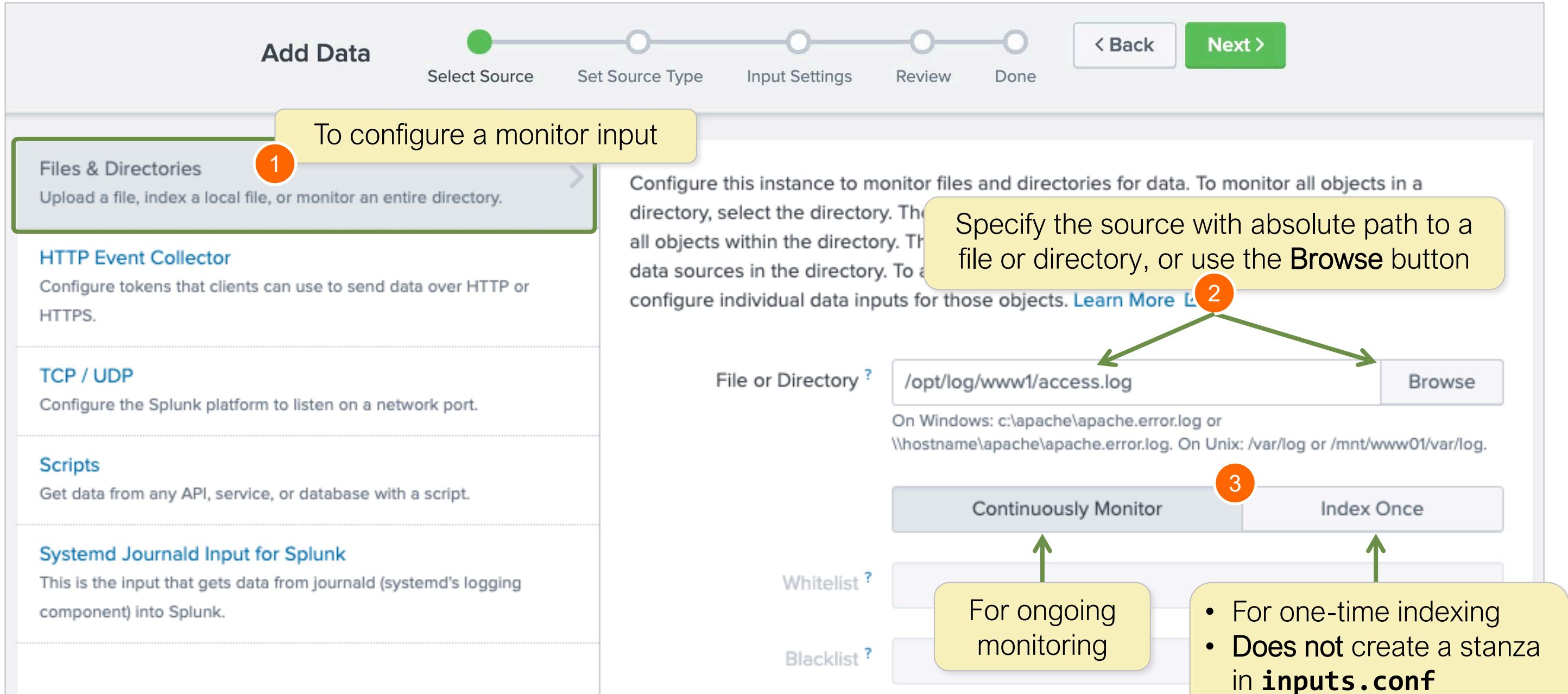
On Windows: c:\apache\apache.error.log or \\hostname\apache\apache.error.log. On Unix: /var/log or /mnt/www01/var/log.

Continuously Monitor   3 Index Once

Whitelist ?      Blacklist ?

For ongoing monitoring

• For one-time indexing  
• Does not create a stanza in **inputs.conf**



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# Select Source: Additional Information

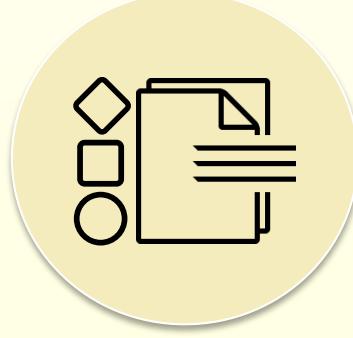
- To monitor a shared network drive, enter:

*nix:	<code>&lt;host&gt;/&lt;path&gt;</code>
Windows:	<code>\\"&lt;host&gt;\&lt;path&gt;</code>

- Splunk requires read access to the share
- Additional sources on Linux Splunk instances
  - Systemd Journald Input
- Additional sources on Windows Splunk instances
  - Including Event Logs, Performance Monitoring, Registry monitoring, and Active Directory monitoring

<b>Local Event Logs</b> Collect event logs from this machine.
<b>Remote Event Logs</b> Collect event logs from remote hosts. Note: this uses WMI and requires a domain account.
<b>Files &amp; Directories</b> Upload a file, index a local file, or monitor an entire directory.
<b>HTTP Event Collector</b> Configure tokens that clients can use to send data over HTTP or HTTPS.
<b>TCP / UDP</b> Configure the Splunk platform to listen on a network port.
<b>Local Performance Monitoring</b> Collect performance data from this machine.
<b>Remote Performance Monitoring</b> Collect performance and event information from remote hosts. Requires domain credentials.
<b>Registry monitoring</b> Have the Splunk platform index the local Windows Registry, and monitor it for changes.
<b>Active Directory monitoring</b> Index and monitor Active Directory.

# Understanding Source Types



## Source Types

- Splunk's way of categorizing data types
- Frequently used during index processes
- Used in searches, reports, apps, etc.
- Can be explicitly set with Splunk Web, CLI, or by modifying **inputs.conf**
- Assigned automatically when possible
- Can be set by administrators or apps

Source type: access\_combined\_wcookie ▾

> filter

> Default Settings  
Splunk's default source type settings

> Application

> Database

> Email

> Log to Metrics

> Metrics

> Miscellaneous

> Network & Security

> Operating System

> Structured

> Uncategorized

> Web

access\_combined  
National Center for Supercomputing Applications (NCSA) combined format HTTP web server logs (can be generated by apache or other web servers)

apache\_error  
Error log format produced by the Apache web server (typically error\_log on \*nix systems)

iis  
W3C Extended log format produced by the Microsoft Internet Information Services (IIS) web server

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# Pretrained Source Types

- Built-in source types shipped with Splunk
- Can be added to manually and defined by Splunk apps
- Listed in Splunk documentation:

[docs.splunk.com/Documentation/Splunk/latest/Data/Listofpretrainedsourcetypes](https://docs.splunk.com/Documentation/Splunk/latest/Data/Listofpretrainedsourcetypes)

## Automatically recognized source types [edit]

Source type name	Origin	Examples
<code>access_combined</code>	NCSA combined format http web server logs (can be generated by apache or other web servers)	<code>10.1.1.43 - webdev [08/Aug/2005:13:18:16 -0700] "GET /HTTP/1.0" 200 0442 "-" "check_http/1.10 (nagios-plugins 1.4)"</code>
<code>access_combined_wcookie</code>	NCSA combined format http web server logs (can be generated by apache or other web servers), with cookie field added at end	<code>"66.249.66.102.1124471045570513" 59.92.110.121 -- [19/Aug/2005:10:04:07 -0700] "GET /themes/splunk_com/images/logo_splunk.png HTTP/1.1" 200 994 "<a href="http://www.splunk.org/index.php/docs">http://www.splunk.org/index.php/docs</a>" "Mozilla/5.0 (X11; U; Linux i686; en-US; rv:1.7.8) Gecko/20050524 Fedora/1.0.4-4 Firefox/1.0.4" "61.3.110.148.1124404439914689"</code>
<code>access_common</code>	NCSA common format http web server logs (can be generated by	<code>10.1.1.140 -- [16/May/2005:15:01:52 -0700] "GET</code>

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# Set Source Type (Data Preview - 1)

**Set Source Type**

Automatically determined for major data types

Tip: Click **View Event Summary** to see the raw data before indexing. If the events look correct and have the right timestamps, click **Save As** to save the source type. You can always change the source type later if you need to.

Source type: access\_combined\_wcookie ▾

Save As

List ▾ Format 20 Per Page ▾

< Prev 1 2 3 4 5 6 7 8 ... Next >

	Time	Event
1	7/14/20 5:19:23.000 AM	211.191.168.25 -- [14/Jul/2020:05:19:23] "POST /oldlink?itemId=EST-27&JSESSIONID=SD3SL3FF2ADFF4954 HTTP 1.1" 200 1391 "http://www.google.com" "Mozilla/5.0 (Windows; U; Windows NT 5.1; en-US; rv:1.9.2.28) Gecko/20120306 YFF3 Firefox/3.6.28 (.NET CLR 3.5.30729; .NET4.0C)" 677
2	7/14/20 5:19:29.000 AM	211.191.168.25 -- [14/Jul/2020:05:19:29] "GET /product.screen?productId=WC-SH-A01&JSESSIONID=SD3SL3FF2ADFF4954 HTTP 1.1" 200 1053 "http://www.buttercupgames.com/oldlink?itemId=EST-6" "Mozilla/5.0 (Windows; U; Windows NT 5.1; en-US; rv:1.9.2.28) Gecko/20120306 YFF3 Firefox/3.6.28 (.NET CLR 3.5.30729; .NET4.0C)" 531
3	7/14/20 5:19:30.000 AM	211.191.168.25 -- [14/Jul/2020:05:19:30] "GET /product.screen?productId=MB-AG-T01&JSESSIONID=SD3SL3FF2ADFF4954 HTTP 1.1" 200 1434 "http://www.buttercupgames.com/oldlink?itemId=EST-16" "Mozilla/5.0 (Windows; U; Windows NT 5.1; en-US; rv:1.9.2.28) Gecko/20120306 YFF3 Firefox/3.6.28 (.NET CLR 3.5.30729; .NET4.0C)" 862
4	7/14/20 5:19:34.000 AM	211.191.168.25 -- [14/Jul/2020:05:19:34] "POST /cart.do?action=changequantity&itemId=EST-15&productId=FI-AG-G08&JSESSIONID=SD3SL3FF2ADFF4954 HTTP 1.1" 200 3279 "http://www.buttercupgames.com/category.screen?categoryId=ARCADE" "Mozilla/5.0 (Windows; U; Windows NT 5.1; en-US; rv:1.9.2.28) Gecko/20120306 YFF3 Firefox/3.6.28 (.NET CLR 3.5.30729; .NET4.0C)" 655
5	7/14/20 5:19:38.000 AM	211.191.168.25 -- [14/Jul/2020:05:19:38] "GET /product.screen?productId=MB-AG-T01&JSESSIONID=SD3SL3FF2ADFF4954 HTTP 1.1" 200 2316 "http://www.buttercupgames.com/oldlink?itemId=EST-26" "Mozilla/5.0 (Windows; U; Windows NT 5.1; en-US; rv:1.9.2.28) Gecko/20120306 YFF3 Firefox/3.6.28 (.NET CLR 3.5.30729; .NET4.0C)" 672

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# Set Source Type (Data Preview - 2)

## Set Source Type

This page lets you see how the Splunk platform sees your data before indexing. If the events look correct and have the right timestamps, click "Next" to proceed. If not, use the options below to define proper event breaks and timestamps. If you cannot find an appropriate source type for your data, create a new one by clicking "Save As".

Source: /opt/log/www1/access.log View Event Summary

Source type: access\_combined\_wcookie Save As

filter Q

List ▾ Format 20 Per Page ▾ < Prev 1 2 3 4 5 6 7 8 ... Next >

	Time	Event
1	7/14/20 5:19:23.000 AM	211.191.168.25 -- [14/Jul/2020:05:19:23] "POST /oldlink?itemId=EST-27&JSESSIONID=SD3SL3FF2ADFF4954 HTTP 1.1" 200 1391 "http://www.google.com" "Mozilla/5.0 (Windows; U; Windows NT 5.1; en-US; rv:1.9.2.28) Gecko/20120306 YFF3 Firefox/3.6.28 (.NET CLR 3.5.30729; .NET4.0C)" 677
2	7/14/20 5:19:29.000 AM	211.191.168.25 -- [14/Jul/2020:05:19:29] "GET /product.screen?productId=WC-SH-A01&JSESSIONID=SD3SL3FF2ADFF4954 HTTP 1.1" 200 1053 "http://www.buttercupgames.com/oldlink?itemId=EST-6" "Mozilla/5.0 (Windows; U; Windows NT 5.1; en-US; rv:1.9.2.28) Gecko/20120306 YFF3 Firefox/3.6.28 (.NET CLR 3.5.30729; .NET4.0C)" 531
3	7/14/20 5:19:30.000 AM	211.191.168.25 -- [14/Jul/2020:05:19:30] "GET /product.screen?productId=MB-AG-T01&JSESSIONID=SD3SL3FF2ADFF4954 HTTP 1.1" 200 1434 "http://www.buttercupgames.com/oldlink?itemId=EST-16" "Mozilla/5.0 (Windows; U; Windows NT 5.1; en-US; rv:1.9.2.28) Gecko/20120306 YFF3 Firefox/3.6.28 (.NET CLR 3.5.30729; .NET4.0C)" 862
4	7/14/20 5:19:34.000 AM	-- [14/Jul/2020:05:19:34] "POST /cart.do?action=changequantity&itemId=EST-15&G08&JSESSIONID=SD3SL3FF2ADFF4954 HTTP 1.1" 200 3279 "http://www.buttercupgame.com/screen?categoryId=ARCADE" "Mozilla/5.0 (Windows; U; Windows NT 5.1; en-US; rv:20120306 YFF3 Firefox/3.6.28 (.NET CLR 3.5.30729; .NET4.0C)" 655
5	7/14/20 5:19:38.000 AM	211.191.168.25 -- [14/Jul/2020:05:19:38] "GET /product.screen?productId=MB-AG-T01&JSESSIONID=SD3SL3FF2ADFF4954 HTTP 1.1" 200 2316 "http://www.buttercupgames.com/oldlink?itemId=EST-26" "Mozilla/5.0 (Windows; U; Windows NT 5.1; en-US; rv:1.9.2.28) Gecko/20120306 YFF3 Firefox/3.6.28 (.NET CLR 3.5.30729; .NET4.0C)" 672

Optional choose a different source type 2

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# Set Source Type (Data Preview - 3)

## Set Source Type

This page lets you see how the Splunk platform sees your data before indexing. If the events look correct and have the right timestamps, click "Next" to proceed. If not, use the options below to define proper event breaks and timestamps. If you cannot find an appropriate source type for your data, create a new one by clicking "Save As".

Source: /opt/log/www1/access.log View Event Summary

Source type: access\_combined\_wcookie Save As

List ▾ Format 20 Per Page ▾ < Prev 1 2 3 4 5 6 7 8 ... Next >

	Time	Event
1	7/14/20 5:19:23.000 AM	211.191.168.25 -- [14/Jul/2020:05:19:23] "POST /oldlink?itemId=EST-27&JSESSIONID=SD3SL3FF2ADFF4954 HTTP 1.1" 200 1391 "http://www.google.com" "Mozilla/5.0 (Windows; U; Windows NT 5.1; en-US; rv:1.9.2.28) Gecko/20120306 YFF3 Firefox/3.6.28 (.NET CLR 3.5.30729; .NET4.0C)" 677
2	7/14/20 5:19:29.000 AM	211.191.168.25 -- [14/Jul/2020:05:19:29] "GET /product.screen?productId=WC-SH-A01&JSESSIONID=SD3SL3FF2ADFF4954 HTTP 1.1" 200 1055 "http://www.buttercupgames.com/oldlink?itemId=EST-6" "Mozilla/5.0 (Windows NT 5.1; en-US; rv:1.9.2.28) Gecko/20120306 YFF3 Firefox/3.6.28 (.NET CLR 3.5.30729; .NET4.0C)" 677
3	7/14/20 5:19:30.000 AM	211.191.168.25 -- [14/Jul/2020:05:19:30] "GET /product.screen?productId=WC-SH-A01&JSESSIONID=SD3SL3FF2ADFF4954 HTTP 1.1" 200 1055 "http://www.buttercupgames.com/oldlink?itemId=EST-6" "Mozilla/5.0 (Windows NT 5.1; en-US; rv:1.9.2.28) Gecko/20120306 YFF3 Firefox/3.6.28 (.NET CLR 3.5.30729; .NET4.0C)" 677
4	7/14/20 5:19:34.000 AM	211.191.168.25 -- [14/Jul/2020:05:19:34] "POST /cart.do?action=changequantity&itemId=EST-15&productId=FI-AG-G08&JSESSIONID=SD3SL3FF2ADFF4954 HTTP 1.1" 200 3279 "http://www.buttercupgames.com/category.screen?categoryId=ARCADE" "Mozilla/5.0 (Windows; U; Windows NT 5.1; en-US; rv:1.9.2.28) Gecko/20120306 YFF3 Firefox/3.6.28 (.NET CLR 3.5.30729; .NET4.0C)" 655
5	7/14/20 5:19:38.000 AM	211.191.168.25 -- [14/Jul/2020:05:19:38] "GET /product.screen?productId=MB-AG-T01&JSESSIONID=SD3SL3FF2ADFF4954 HTTP 1.1" 200 2316 "http://www.buttercupgames.com/oldlink?itemId=EST-26" "Mozilla/5.0 (Windows; U; Windows NT 5.1; en-US; rv:1.9.2.28) Gecko/20120306 YFF3 Firefox/3.6.28 (.NET CLR 3.5.30729; .NET4.0C)" 672

3 Data Preview displays how processed events will be indexed

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# Set Source Type (Data Preview - Warning)

## Set Source Type

This page lets you see how the Splunk platform sees your data before indexing. If the events look correct and have the right timestamps, click "Next" to proceed. If not, use the options below to define proper event breaks or your data, create a new one by clicking "Save As".

Source: /opt/log/www1/access.log

Allows creation of a new source type for a specific source data

Source type: apache\_error ▾

Save As

> Event Breaks

> Timestamp

> Advanced

List ▾ Format 20 Per Page ▾ < Prev 1 2 Next >

	Time	Event
1	7/14/20 5:57:03.000 AM	188.173.152.100 -- [14/Jul/2020:05:57:03] "GET /category.screen?categoryId=ACCESSORIES&JSESSIONID=SD2SL6FF10ADFF4967 HTTP 1.1" 200 3994 "http://www.buttercupgames.com" "Mozilla/5.0 (Windows NT 6.1; WOW64) AppleWebKit/536.5 (KHTML, like Gecko) Chrome/19.0.1084.52 Safari/536.5" 106 188.173.152.100 -- [14/Jul/2020:05:57:10] "GET /oldlink?itemId=EST-15&JSESSIONID=SD2SL6FF10ADFF4967 HTTP 1.1" 200 2992 "http://www.buttercupgames.com/product.screen?productId=DC-SG-G02" "Mozilla/5.0 (Windows NT 6.1; WOW64) AppleWebKit/536.5 (KHTML, like Gecko) Chrome/19.0.1084.52 Safari/536.5" 359 188.173.152.100 -- [14/Jul/2020:05:57:16] "GET /oldlink?itemId=EST-7&JSESSIONID=SD2SL6FF10ADFF4967 HTTP 1.1" 400 3314 "http://www.buttercupgames.com/oldlink?itemId=EST-7" "Mozilla/5.0 (Windows NT 6.1; WOW64) AppleWebKit/536.5 (KHTML, like Gecko) Chrome/19.0.1084.52 Safari/536.5" 316 188.173.152.100 -- [14/Jul/2020:05:57:19] "GET /category.screen?categoryId=TEE&JSESSIONID=SD2SL6FF10ADFF4967 HTTP 1.1" 200 2715 "http://www.tecategoryId=TEE" "Mozilla/5.0 (Windows NT 6.1; WOW64) AppleWebKit/536.5 (KHTML, like Gecko) Chrome/19.0.1084.52 Safari/536.5" 879 188.173.152.100 -- [14/Jul/2020:05:57:23] "GET /prSIONID=SD2SL6FF10ADFF4967 HTTP 1.1" 500 750 "http://n?categoryId=NULL" "Mozilla/5.0 (Windows NT 6.1; WOcko) Chrome/19.0.1084.52 Safari/536.5" 157

Show all 257 lines

View Event Summary

Warning

If events are not separated correctly or have incorrect timestamps, select a different source type from the list or customize the source type settings.

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# Input Settings

The screenshot shows the 'Add Data' wizard at the 'Input Settings' step. The progress bar indicates 'Select Source' (green), 'Set Source Type' (green), 'Input Settings' (gray), 'Review' (white), and 'Done' (white). The main area is titled 'Input Settings' and contains instructions: 'Optional set additional input parameters for this data input as follows:'.

**App context:** Application contexts are folders within a Splunk platform instance that contain configurations for a specific use case or domain of data. App contexts improve manageability of input and source type definitions. The Splunk platform loads all app contexts based on precedence rules. [Learn More](#)

**Host:** When the Splunk platform indexes data, each event receives a "host" value. The host value should be the name of the machine from which the event originates. The type of input you choose determines the available configuration options. [Learn More](#)

**Index:** The Splunk platform stores incoming data as events in the selected index. Consider using a "sandbox" index as a destination if you have problems determining a source type for.

**Configuration Options (Visible in screenshot):**

- App Context:** Set to 'Search & Reporting (search)'.
- Host field value:** Set to 'splunk03'. Radio buttons below show 'Constant value' (selected), 'Regular expression on path', and 'Segment in path'.
- Index:** Set to 'itops'. Buttons include 'itops' (selected), 'Create a new index', and '...'.

**Annotations:**

- A callout bubble points to the 'App Context' dropdown with the text: 'Where input configuration is saved'.
- A callout bubble points to the 'Host field value' input with the text: 'For Search & Reporting (search): **SPLUNK\_HOME/etc/apps/search/local**'.
- A callout bubble points to the 'Index' dropdown with the text: 'By default, the **default host name in General settings** is used'.
- A callout bubble points to the 'Index' dropdown with the text: 'Select index where input will be stored'.

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# Review

Review the input configuration summary and click **Submit** to finalize

The screenshot shows the 'Add Data' wizard in the 'Review' step. The top navigation bar includes 'Add Data' on the left, a progress bar with five steps ('Select Source', 'Set Source Type', 'Input Settings', 'Review', 'Done') where the first four are green and the last one is grey, and buttons for '< Back' and 'Submit >' on the right. The main content area is titled 'Review' and displays the following configuration details:

Input Type .....	File Monitor
Source Path .....	/opt/log/www1/access.log
Continuously Monitor .....	Yes
Source Type .....	access_combined_wcookie
App Context .....	search
Host .....	splunk03
Index .....	itops

To the right of the configuration details is a light blue callout box with an 'i' icon containing the following note:

Note  
Confirm settings before proceeding.  
It is easier to use < Back and make changes than to rectify later.

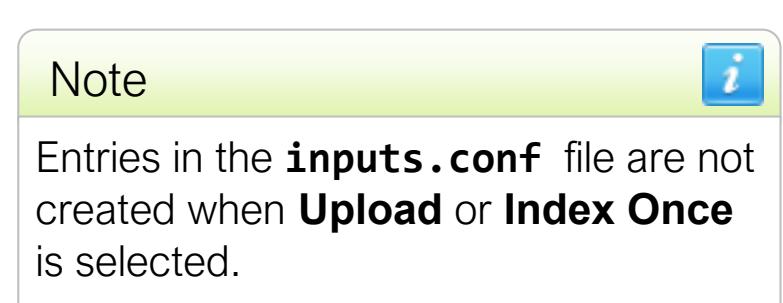
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# What Happens Next?

- Indexed events are available for immediate search
  - Splunk may take a minute to start indexing the data
- You are given other options to do more with your data
- Input configuration is saved in:

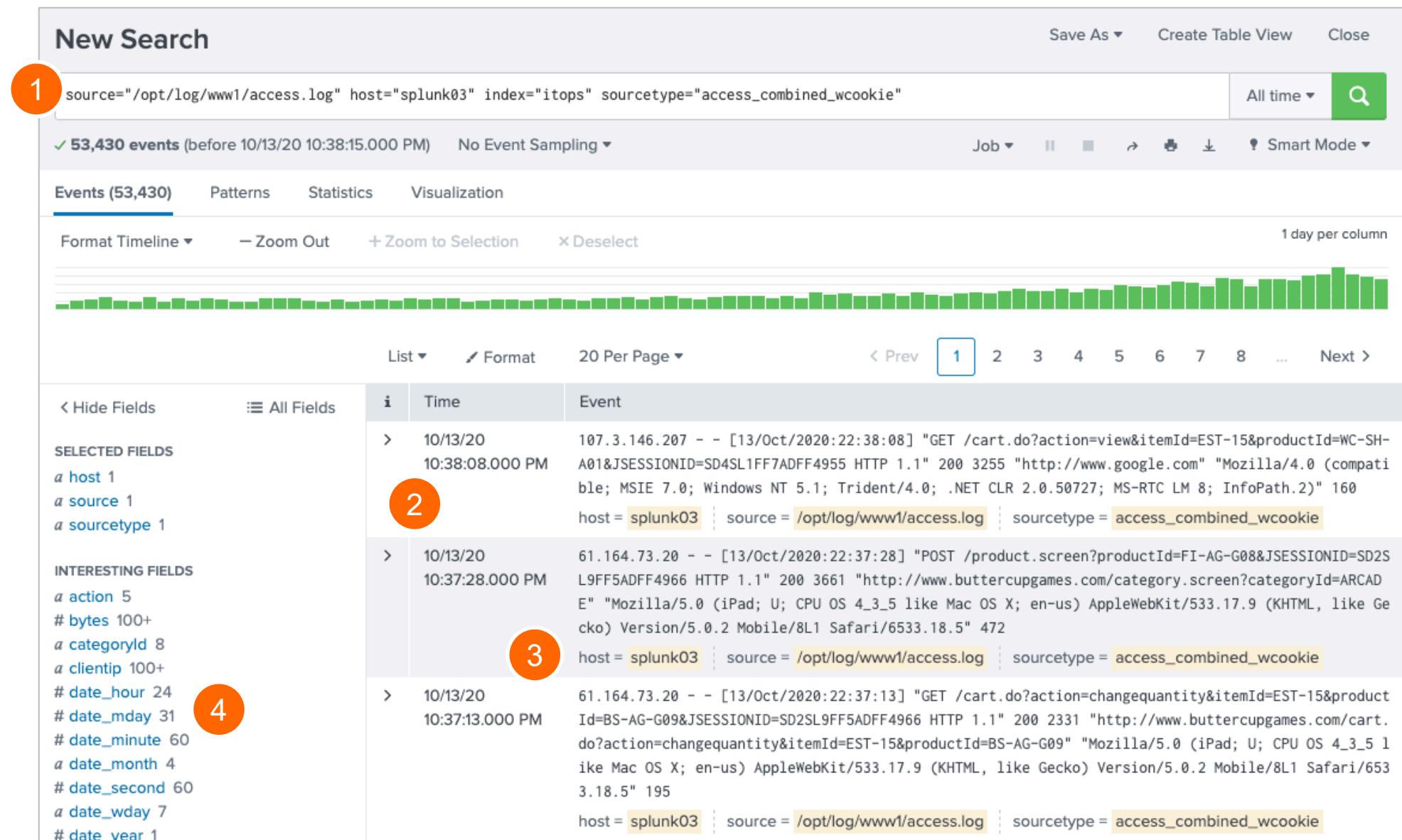
The screenshot shows the 'Add Data' wizard with the progress bar at the top indicating the 'Review' step is complete. The main message says 'File input has been created successfully.' Below it, there's a link to 'Configure your inputs by going to Settings > Data Inputs'. There are several buttons with links: 'Start Searching' (Search your data now or see examples and tutorials), 'Extract Fields' (Create search-time field extractions), 'Add More Data' (Add more data inputs now or see examples and tutorials), 'Download Apps' (Apps help you do more with your data), and 'Build Dashboards' (Visualize your searches).

**SPLUNK\_HOME/etc/apps/<app>/local/inputs.conf**



# Verify your Input

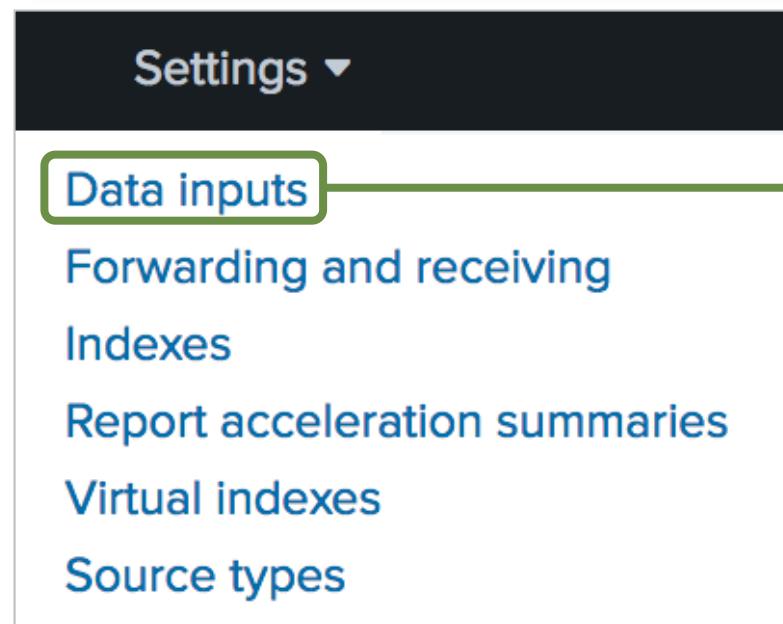
1. Click Start Searching or search for **index=<test\_idx>**
2. Verify events and timestamps
3. Confirm the host, source, and sourcetype field values
4. Check the auto-extracted field names



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# Viewing Configured Inputs

Select Settings > Data Inputs



Data inputs			
Local inputs		Inputs handled by this server	
Type		Inputs	Actions
Files & Directories		10	+ Add new
HTTP Event Collector		0	+ Add new
TCP		0	+ Add new
UDP		0	+ Add new
...			

Forwarded inputs			
Type		Actions	
Windows Event Logs		0	+ Add new
Files & Directories		0	+ Add new

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# Viewing Configured Inputs: Files & Directories

Files & directories

Data inputs » Files & directories

Showing 1-12 of 12 items

filter 

Index Location of configuration (app context)

New Local File & Directory

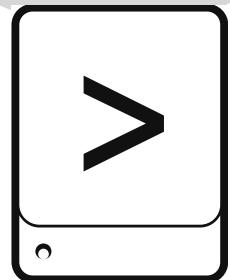
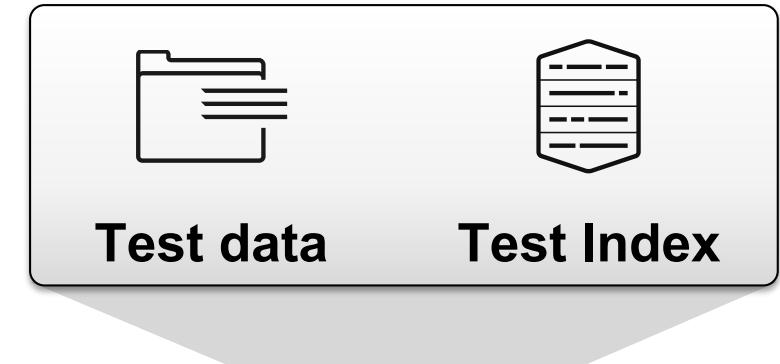
Full path to your data	Set host	Source type	Index	Number of files	App	Status	Actions
\$SPLUNK_HOME/etc/splunk.version	Constant Value	splunk_version	_internal	1	system	Enabled   Disable	
\$SPLUNK_HOME/var/log/introspection	Constant Value	Automatic	_introspection	7	introspection_generator_addon	Enabled   Disable	
\$SPLUNK_HOME/var/log/splunk	Constant Value	Automatic	_internal	69	system	Enabled   Disable	
\$SPLUNK_HOME/var/log/splunk/license_usage_summary.log	Constant Value	Automatic	_telemetry	1	system	Enabled   Disable	
\$SPLUNK_HOME/var/log/splunk/splunk_instrumentation_cloud.log*	Constant Value	splunk_cloud_telemetry	_telemetry	1	system	Enabled   Disable	
\$SPLUNK_HOME/var/log/watchdog/watchdog.log*	Constant Value	Automatic	_internal	1	system	Enabled   Disable	
\$SPLUNK_HOME/var/run/splunk/search_telemetry/*search_telemetry.json	Constant Value	search_telemetry	_introspection	0	system	Enabled   Disable	
\$SPLUNK_HOME/var/spool/splunk	Constant Value	Automatic	default		system	Disabled   Enable	
\$SPLUNK_HOME/var/spool/splunk/...stash_hec	Constant Value	stash_hec	default		system	Disabled   Enable	
\$SPLUNK_HOME/var/spool/splunk/...stash_new	Constant Value	stash_new	default		system	Disabled   Enable	
\$SPLUNK_HOME/var/spool/splunk/tracker.log*	Constant Value	splunkd_latency_tracker	_internal	0	system	Enabled   Disable	
/opt/log/www2/access.log	Constant Value	access_combined_wcookie	test	1	search	Enabled   Disable	Delete

Click to edit existing input settings

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# Initial Data Input Testing

- Use a Splunk test server
  - Should be running same version as production
- Use test indexes
- Procedure:
  1. Copy production data to test server
  2. Use Splunk Web > Add Data
  3. Check to see if **sourcetype** and other settings are applied correctly
  4. Delete the test data, change your test configuration, and repeat as necessary



**Test server**

# Module 1 Knowledge Check

---

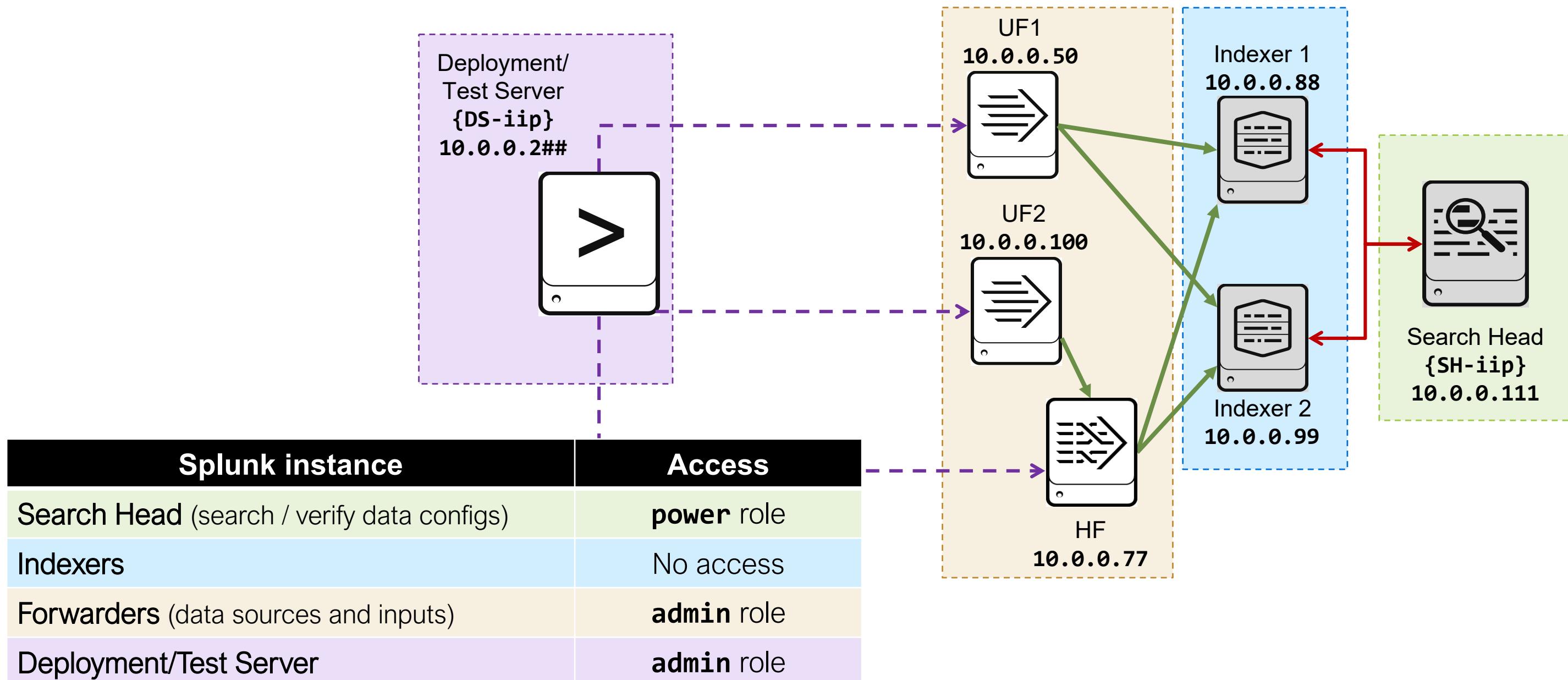
- True or False. You cannot change the sourcetype when you go through the **Settings > Add Data** wizard.
- True or False. Splunk will not update an **inputs.conf** file when you use the **Upload** option in **Settings > Add Data**.

# Module 1 Knowledge Check – Answers

---

- True or False. You cannot change the sourcetype when you go through the **Settings > Add Data** wizard.  
**False.** You can change the source type from the dropdown. In fact, you can even create a new source type. We will learn how to do this in Module 9.
- True or False. Splunk will not update an **inputs.conf** file when you use the **Upload** option in **Settings > Add Data**.  
**True.** Upload is a one-time process, so Splunk does not update an **inputs.conf**.

# Access Scenario For Course Labs



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# Module 1 Lab Exercise

---

**Time:** 20 minutes

**Description:** Add a Local Data Input

**Tasks:**

- Discover Splunk Enterprise lab environment
- Log into search head and test/deployment server
- Create a test index on the deployment/test server
- Index a file on the deployment server
- Verify the indexed events with their metadata values

# Module 2: Configuration Files

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# Module Objectives

---

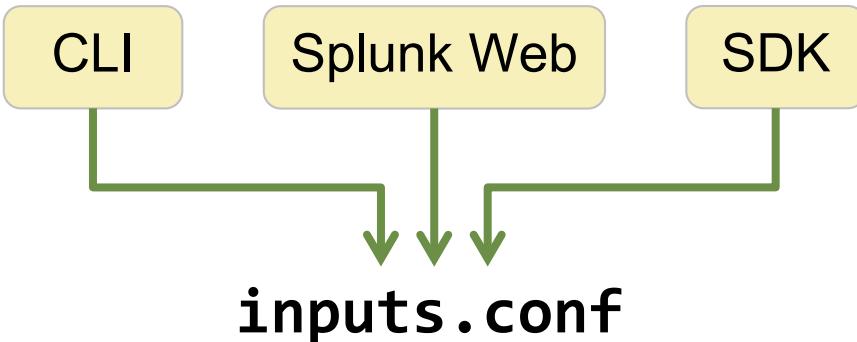
- Identify Splunk configuration files and directories
- Describe index-time and search-time precedence
- Validating and updating configuration files

# Splunk Configuration Files



## Configuration Files (.conf)

- Govern an aspect of Splunk functionality
- Text files are generally case sensitive with **[stanza]** and **attribute = value** format
- Modified using Splunk Web, CLI, SDK, app install, or directly editing
- Saved under **SPLUNK\_HOME/etc**
- Come with documentation and examples under **SPLUNK\_HOME/etc/system/README/**



```
[default]
host=www
```

```
[monitor:///var/log/httpd]
sourcetype = access_common
ignoreOlderThan = 7d
index = web
```

### Note

For **.conf** file documentation and examples view **SPLUNK\_HOME/etc/system/README/**:

- **\*.conf.spec**
- **\*.conf.example**

# Methods for Modifying Splunk Configurations

- Splunk Web
- Splunk CLI

```
./splunk add monitor /opt/log/www1/access.log -index itops  
-sourcetype access_combined_wcookie -host splunk01
```

- Editing .conf files

```
[monitor:///opt/log/www1/access.log]  
disabled = false  
host = splunk01  
index = itops  
sourcetype = access_combined_wcookie
```

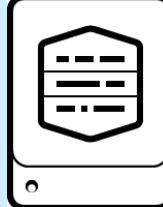
**Host**  
Tell Splunk how to set the value of the host field in your events from.  
Set host constant value  
Specify method for getting host  
Host field value **splunk01**

**Source type**  
Tell Splunk what kind of data this is so you can group it with other data types. You can specify what you want if Splunk gets it wrong.  
Set the source type Manual  
When this is set to automatic, sourcetypes placeholder names are used.  
Source type \* **access\_combined\_wcookie**

**Index**  
Set the destination index for this source.  
Index **itops**

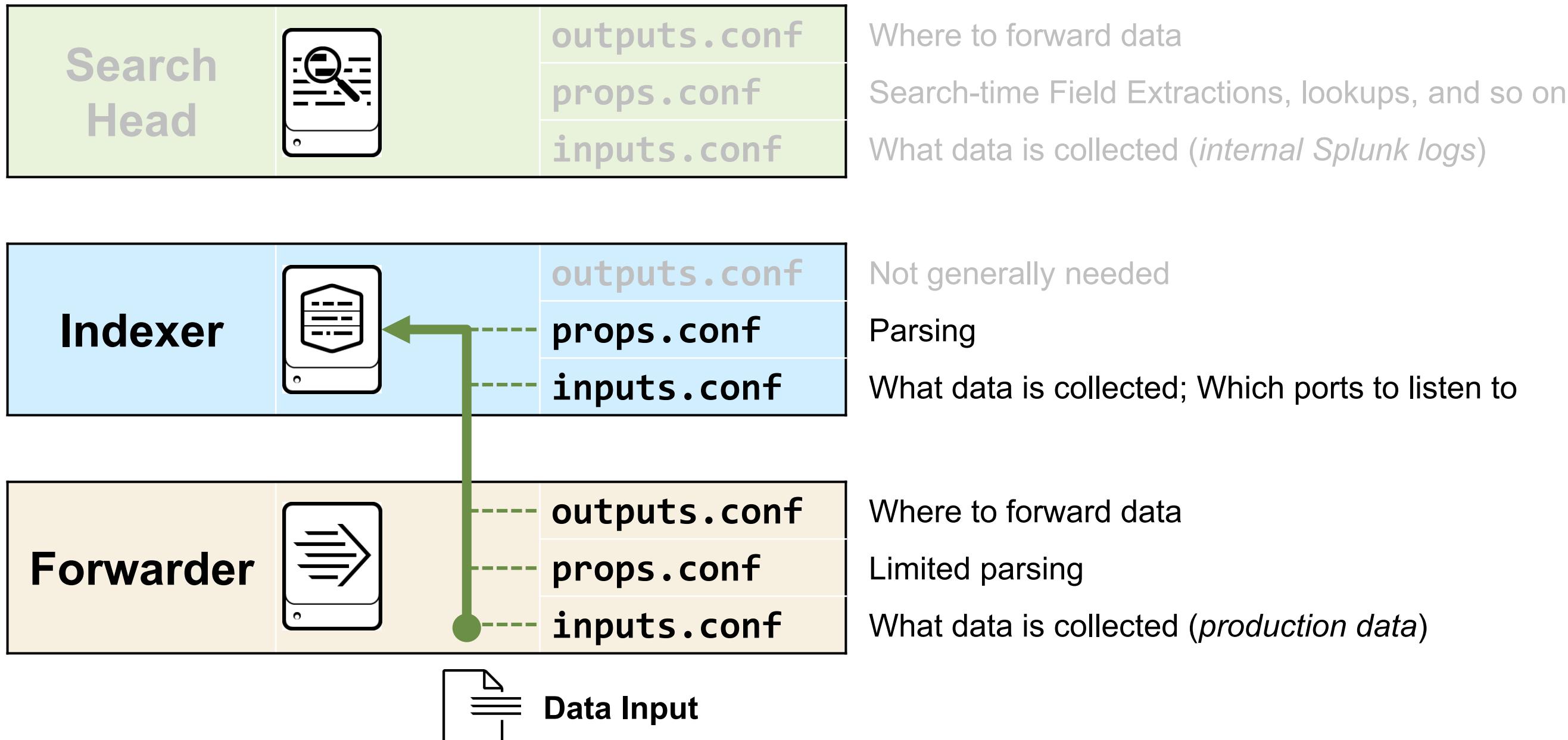
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# Commonly Used Splunk Configuration Files

<b>Search Head</b>		<b>outputs.conf</b> <b>props.conf</b> <b>inputs.conf</b>	Where to forward data Search-time Field Extractions, lookups, and so on What data is collected ( <i>internal Splunk logs</i> )
<b>Indexer</b>		<b>outputs.conf</b> <b>props.conf</b> <b>inputs.conf</b>	Not generally needed Parsing What data is collected; Which ports to listen to
<b>Forwarder</b>		<b>outputs.conf</b> <b>props.conf</b> <b>inputs.conf</b>	Where to forward data Limited parsing What data is collected ( <i>production data</i> )

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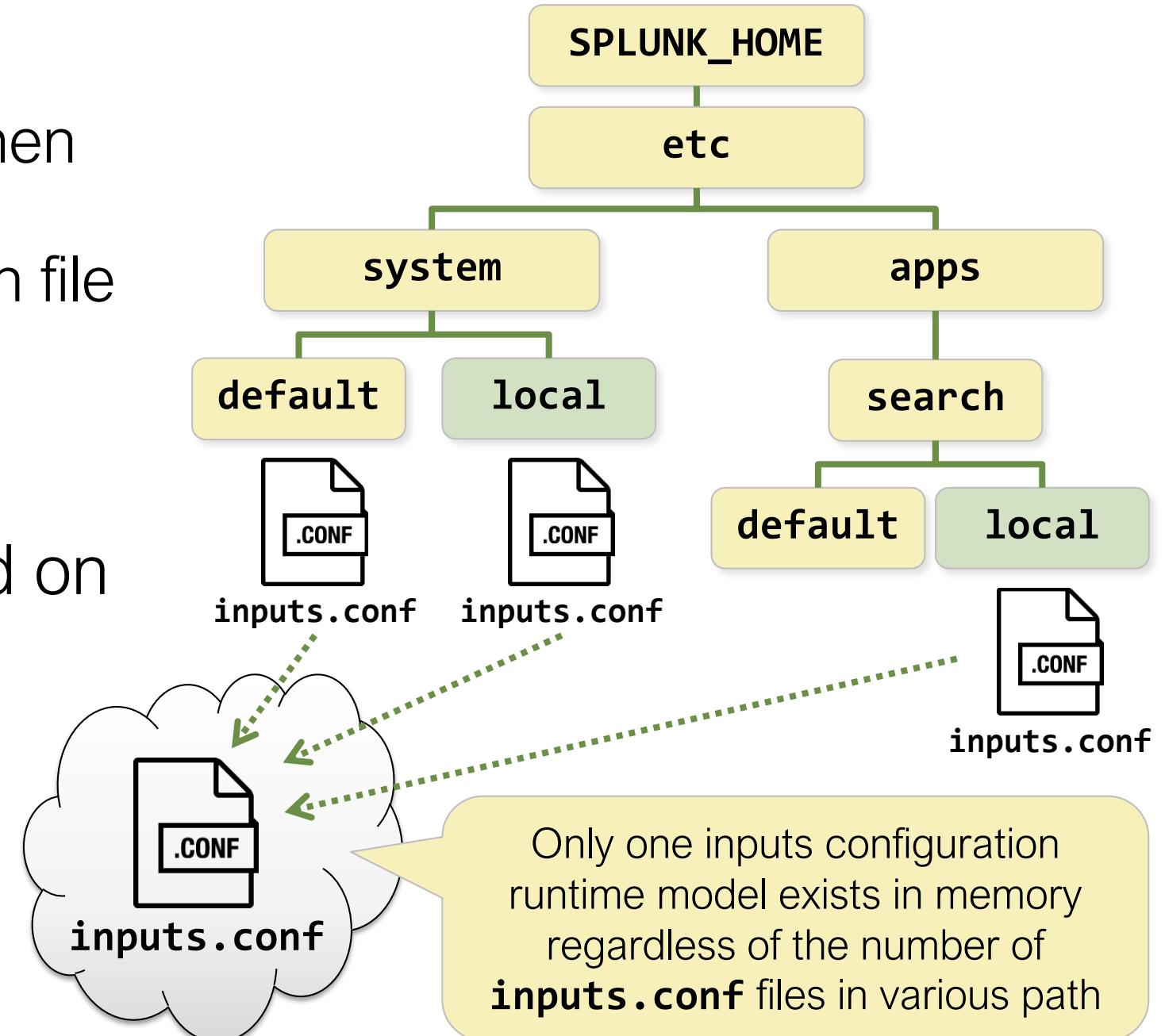
# Configuration Files Used During Data Input



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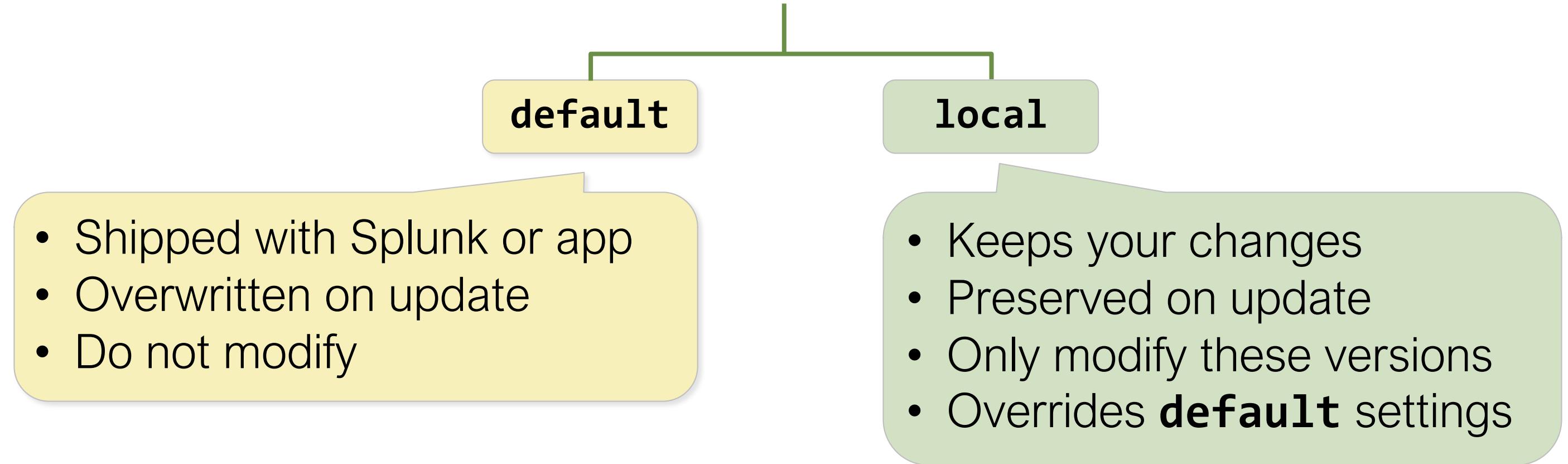
# Merging of Configuration Files

- Splunk merges configuration files
  - Generally when Splunk starts, or when searches are run
  - Into a single run-time model for each file type
  - As a union of all files if no duplicates/conflicts exist
- In case of conflicts, priority is based on the context:
  - **Global context** (index-time)
  - **App/User context** (search-time)
    - ▶ Discussed in *Supporting Knowledge Objects* module

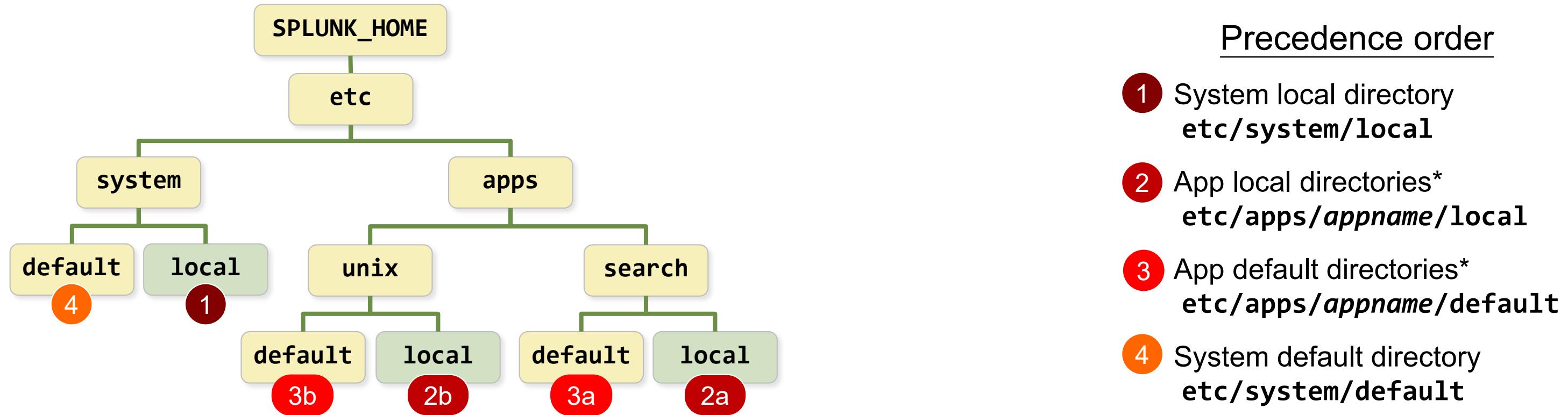


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# Default versus Local Configuration



# Index-Time Precedence (Global Context)



Note

\* When determining priority of app directories in global context (for steps 2 and 3), Splunk uses *lexicographical* order. (Files in apps directory "A" have higher priority than files in apps directory "B".)



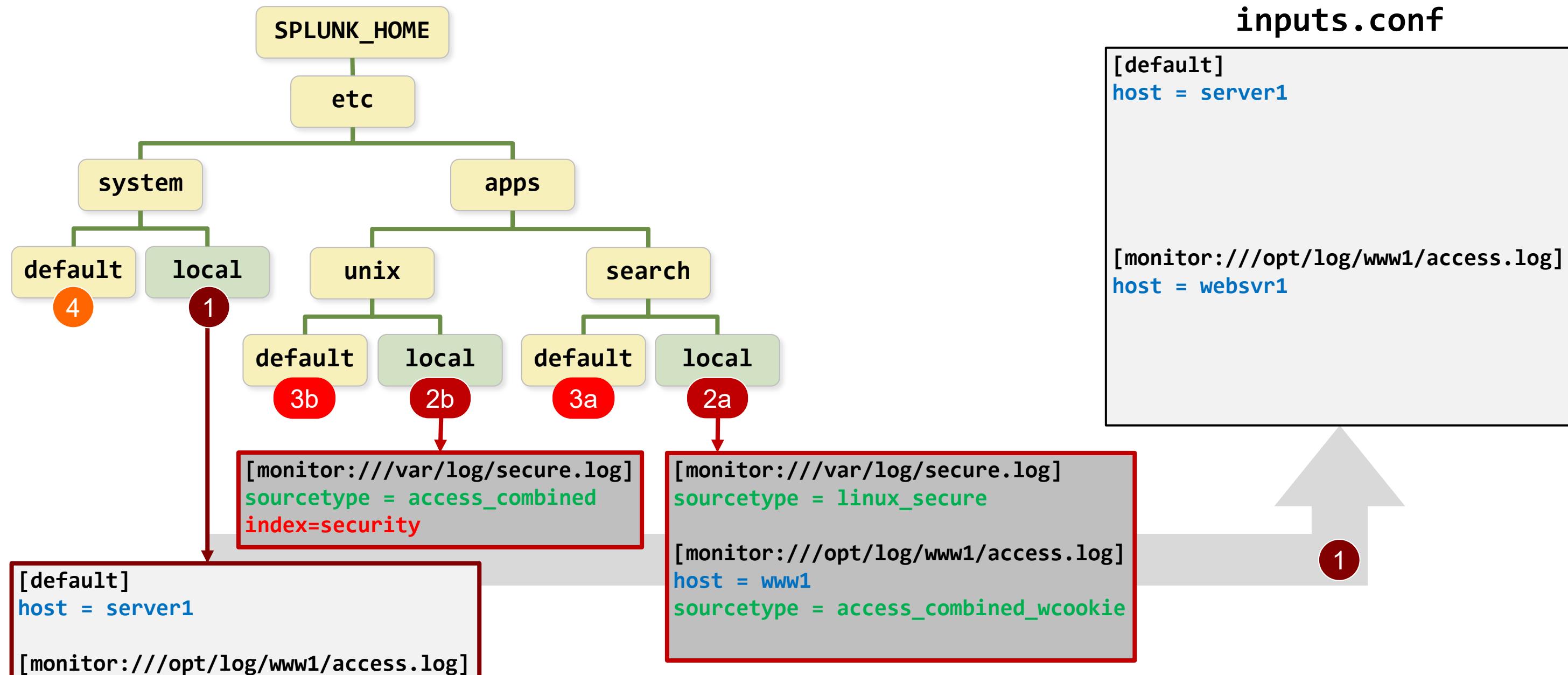
Note

This precedence is different for indexer cluster peers.



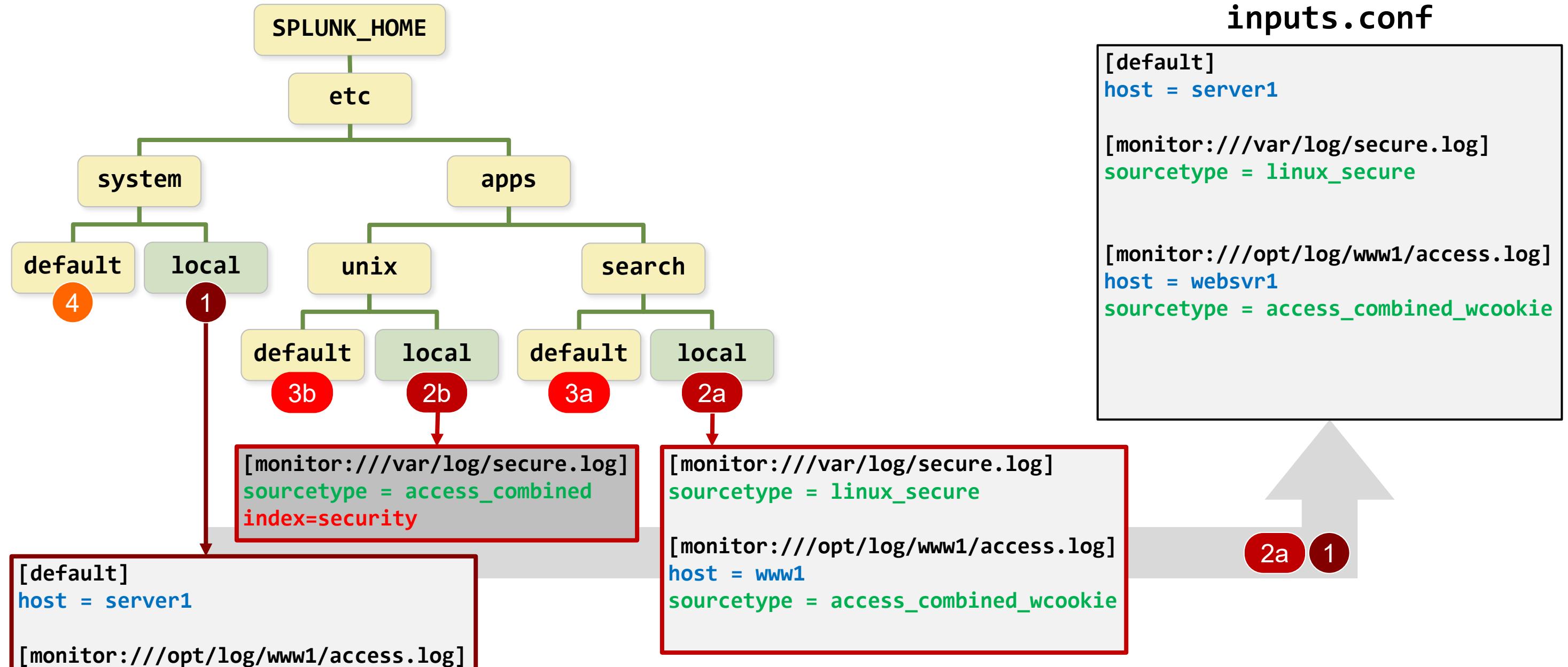
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# Example of Index-Time Precedence (1)



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# Example of Index-Time Precedence (2)



## inputs.conf

```
[default]
host = server1

[monitor:///var/log/secure.log]
sourcetype = linux_secure

[monitor:///opt/log/www1/access.log]
host = websvr1
sourcetype = access_combined_wcookie
```

```
[default]
host = server1

[monitor:///opt/log/www1/access.log]
host = websvr1
```

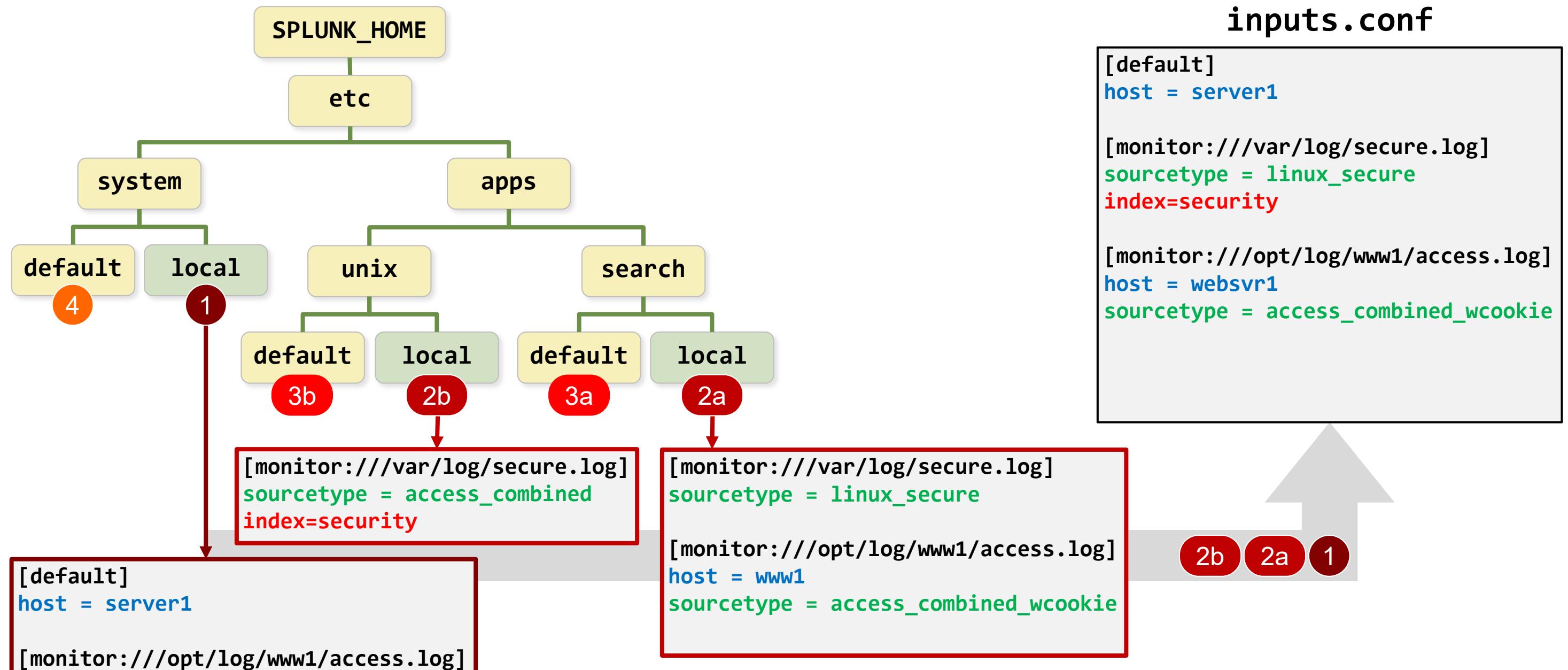
```
[monitor:///var/log/secure.log]
sourcetype = access_combined
index=security

[monitor:///var/log/secure.log]
sourcetype = linux_secure

[monitor:///opt/log/www1/access.log]
host = www1
sourcetype = access_combined_wcookie
```

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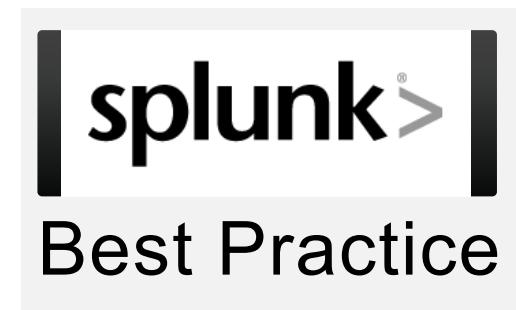
# Example of Index-Time Precedence (3)



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# Configuration Best Practices

- Avoid storing configurations in **SPLUNK\_HOME/etc/system/local**
  - Local context settings *always* take precedence
  - Attempting to override index-time settings in an app will fail
  - Managing these settings with a deployment server is impossible
- Create an app to manage system settings
  - Allows you to manage settings with a deployment server
  - Manage system configurations in an app (e.g. **DC\_app**) under **SPLUNK\_HOME/etc/apps/<appname>/local**
  - Refer to the *Forwarder Management* module



# Validating the Splunk Configuration

## Validating the on-disk configuration

- Performed with **splunk btool** CLI
- Syntax: **splunk btool <conf\_file> list**
- Example: **splunk btool inputs list**

## Validating the in-memory configuration

- Performed with **splunk show config** CLI or REST API
- Syntax: **splunk show config <conf\_file>**
- Example: **splunk show config inputs**

# Configuration Validation with **btool**

---

- **splunk btool <conf-name> list [options]**
  - Shows on-disk configuration for requested file
  - Useful for checking the configuration scope and permission rules
  - Run **splunk btool check** each time Splunk starts
    - Use **--debug** to display the exact **.conf** file location
    - Add **--user= <user> --app=<app>** to see the user/app context layering

- Examples:

```
splunk help btool
```

```
splunk btool check
```

```
splunk btool inputs list
```

```
splunk btool inputs list monitor:///var/log
```

```
splunk btool inputs list monitor:///var/log --debug
```

[docs.splunk.com/Documentation/Splunk/latest/Troubleshooting/Usebtooltotroubleshootconfigurations](https://docs.splunk.com/Documentation/Splunk/latest/Troubleshooting/Usebtooltotroubleshootconfigurations)

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# Example using btool

Scenario: What are the **/var/log/secure.log** input configurations and where are they specified?

```
> splunk btool inputs list monitor:///var/log/secure.log --debug
```

etc/apps/search/local/inputs.conf	[monitor:///var/log/secure.log]
system/local/inputs.conf	host = server1
etc/apps/unix/local/inputs.conf	index = security
etc/apps/search/local/inputs.conf	sourcetype = linux_secure

**etc/apps/unix/local/inputs.conf**

```
[monitor:///var/log/secure.log]
sourcetype = access_combined
index = security
```

**etc/apps/search/local/inputs.conf**

```
[monitor:///var/log/secure.log]
sourcetype = linux_secure
```

# Module 2 Knowledge Check

---

- Which configuration file tells a Splunk instance to ingest data?
- True or False. **btool** shows on-disk configuration for requested file
- True or False. The best place to add a parsing configuration on an indexer would be **SPLUNK\_HOME/etc/system/local** directory as it has the highest precedence.

# Module 2 Knowledge Check – Answers

---

- Which configuration file tells a Splunk instance to ingest data?  
**inputs.conf**
- True or False. **btool** shows on-disk configuration for requested file.  
True.
- True or False. The best place to add a parsing configuration on an indexer would be the **SPLUNK\_HOME/etc/system/local** directory, as it has the highest precedence.  
False. Best practice is to put the configuration in an app's **local** directory (**SPLUNK\_HOME/etc/apps/<appname>/local**).

# Module 2 Lab Exercise

---

**Time:** 10 minutes

**Description:** Configuration Files

**Tasks:**

- Use CLI to connect to Splunk components
- View the **inputs.conf** stanzas manually and using **btool**

# Module 3: Forwarder Configuration

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# Module Objectives

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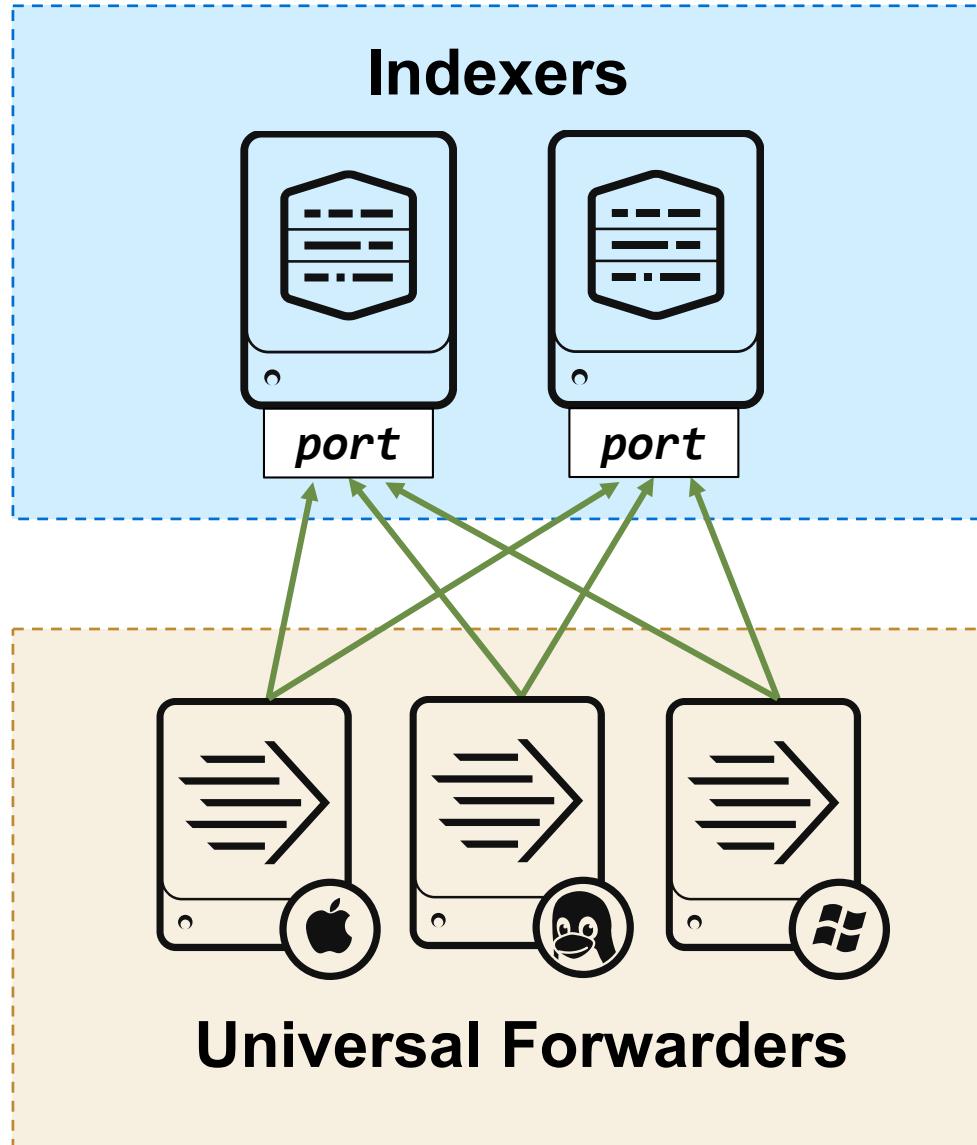
- Identify the role of production indexers and forwarders
- Understand and configure Universal Forwarders
- Understand and configure Heavy Forwarders
- Understand and configure intermediate forwarders
- Identify additional forwarder options

# Understanding Universal Forwarders



## Universal Forwarders (UF)

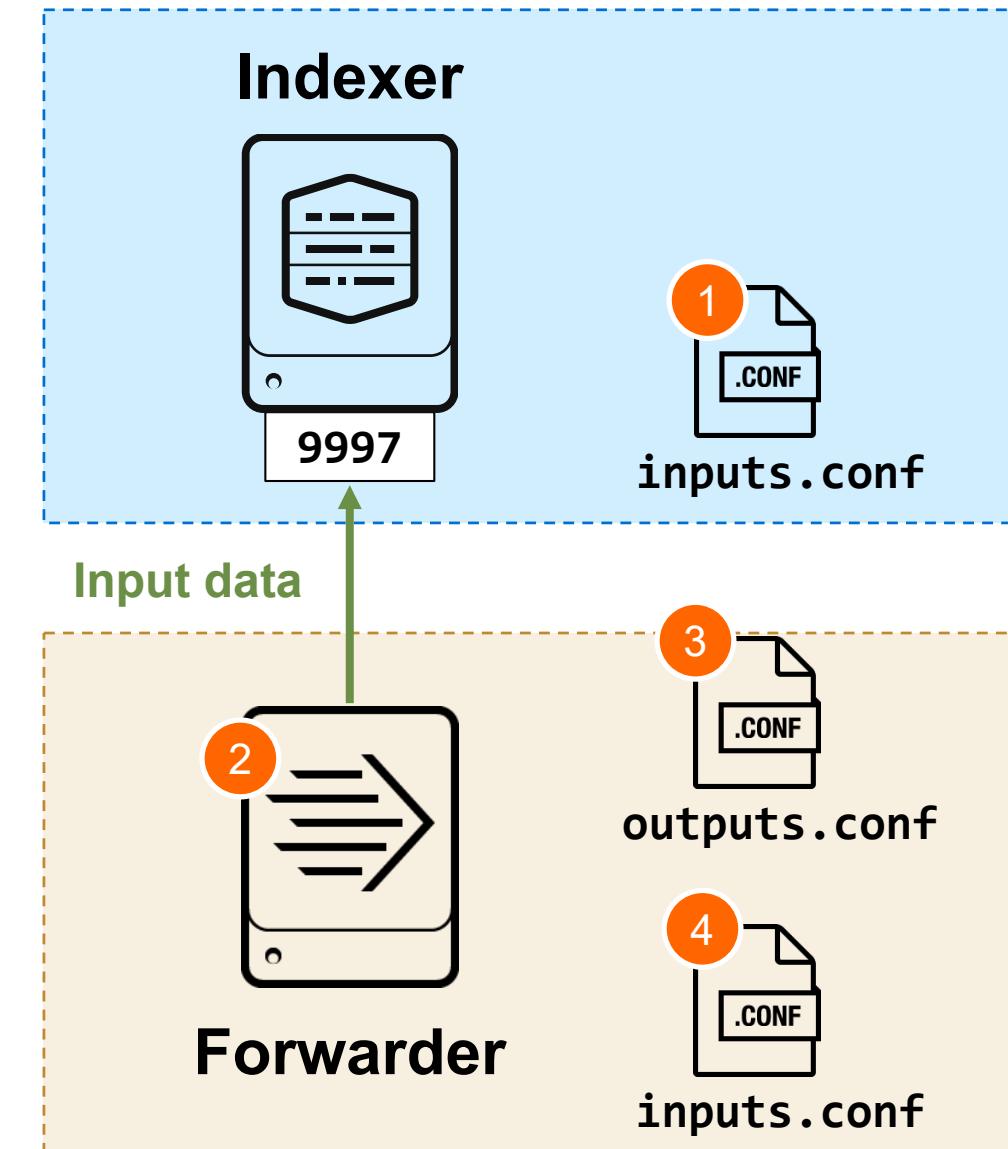
- Gathers data from a host
- Sends data over the network to receiving ports on receivers (usually an indexer)
- Provided as separate installation binary with a built-in license (no limits)
- Designed to run on production servers  
(minimal CPU / memory use, bandwidth constrained to 256 KBps by default, no web interface, cannot search or index)



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# Universal Forwarder Configuration Steps

1. Set up a receiving port on each indexer
  - Task only needs to be performed once
2. Download and install Universal Forwarder
3. Set up forwarding on each forwarder
4. Add inputs on forwarders



# Configure the Receiving Port on Each Indexer

- Using Splunk Web:
  1. Select **Settings > Forwarding and receiving**
  2. Next to **Configure receiving**, select **Add new**
  3. Enter a port number and click **Save**
    - Stored in most recently visited app:  
**SPLUNK\_HOME/etc/apps/<app>/local**
- Using CLI:
  - Run **splunk enable listen <port>**
  - Stored in **SPLUNK\_HOME/etc/apps/search/local**
- Manually in **inputs.conf** as:  
**[splunktcp://port]**

The screenshot shows the 'Forwarding and receiving' settings page. It has two main sections: 'Forward data' and 'Receive data'. In the 'Forward data' section, there is a 'Forwarding defaults' link. In the 'Receive data' section, there is a 'Configure receiving' link and a '+ Add new' button. A green arrow points from the 'Listen on this port' input field in the 'Configure receiving' section to the '+ Add new' button in the 'Receive data' section.

# Installing a Universal Forwarder

	*NIX	Windows
Download	<a href="http://www.splunk.com/en_us/download/universal-forwarder.html">www.splunk.com/en_us/download/universal-forwarder.html</a>	
Install	<ul style="list-style-type: none"><li>• Un-compress <b>.tgz</b>, <b>.rpm</b>, or <b>.deb</b> file in the path Splunk will run from</li><li>• Default <b>SPLUNK_HOME</b> is: <b>/opt/splunkforwarder</b></li></ul>	<ul style="list-style-type: none"><li>• Execute <b>.msi</b> installer (or use the CLI)</li><li>• Default <b>SPLUNK_HOME</b> is: <b>C:\Program Files\SplunkUniversalForwarder</b></li></ul>

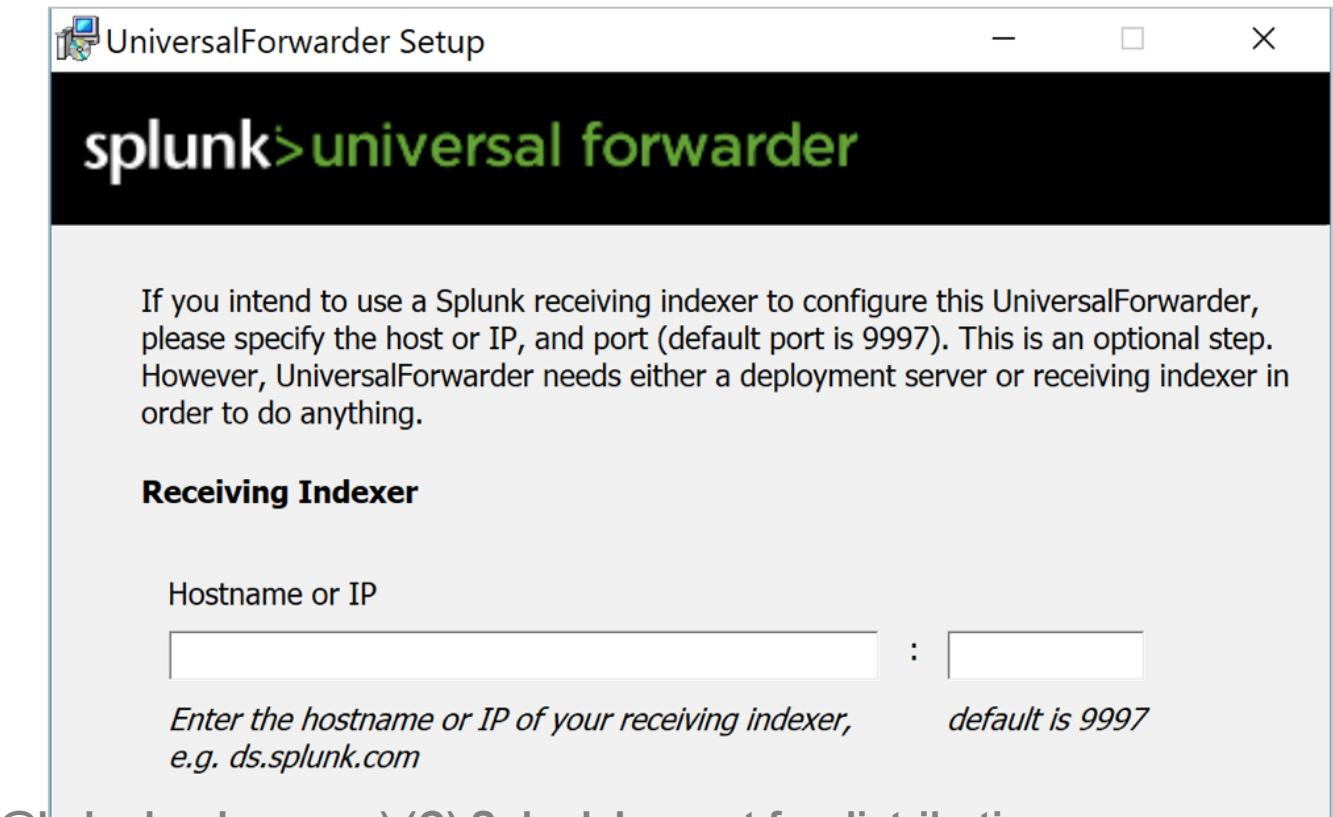
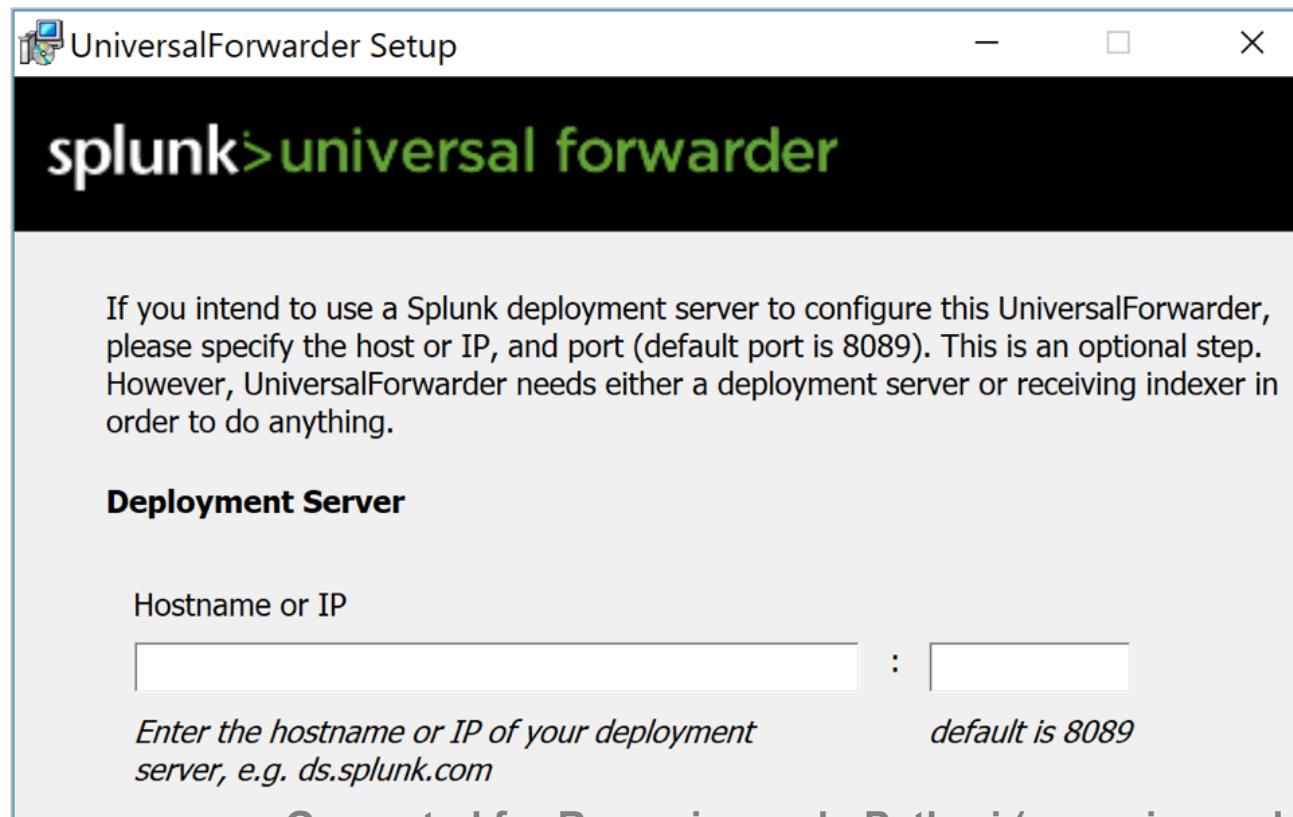
- Silent installation methods exist on all platforms
- Same **splunk** command-line interface in **SPLUNK\_HOME/bin**
  - Same commands for start/stop, restart, etc.
  - An admin account and password are required

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# Using the Interactive Windows Installer

- Most forwarder settings can be configured using the installer wizard
  - Can run as a local or domain user without local administrator privileges
- CLI installation is available for scripted installations

[docs.splunk.com/Documentation/Forwarder/latest/Forwarder/Installawindowsuniversalforwarderfromthecommandline](https://docs.splunk.com/Documentation/Forwarder/latest/Forwarder/Installawindowsuniversalforwarderfromthecommandline)



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# Defining Target Indexers on the Forwarder

- To configure target indexers on forwarders, either:
  - Run **splunk add forward-server <indexer:receiving\_port>**
  - Modify **outputs.conf**
- Splunk logs are automatically sent to indexer's **\_internal** index
- Example: **splunk add forward-server 10.1.2.3:9997** configures **outputs.conf** as:

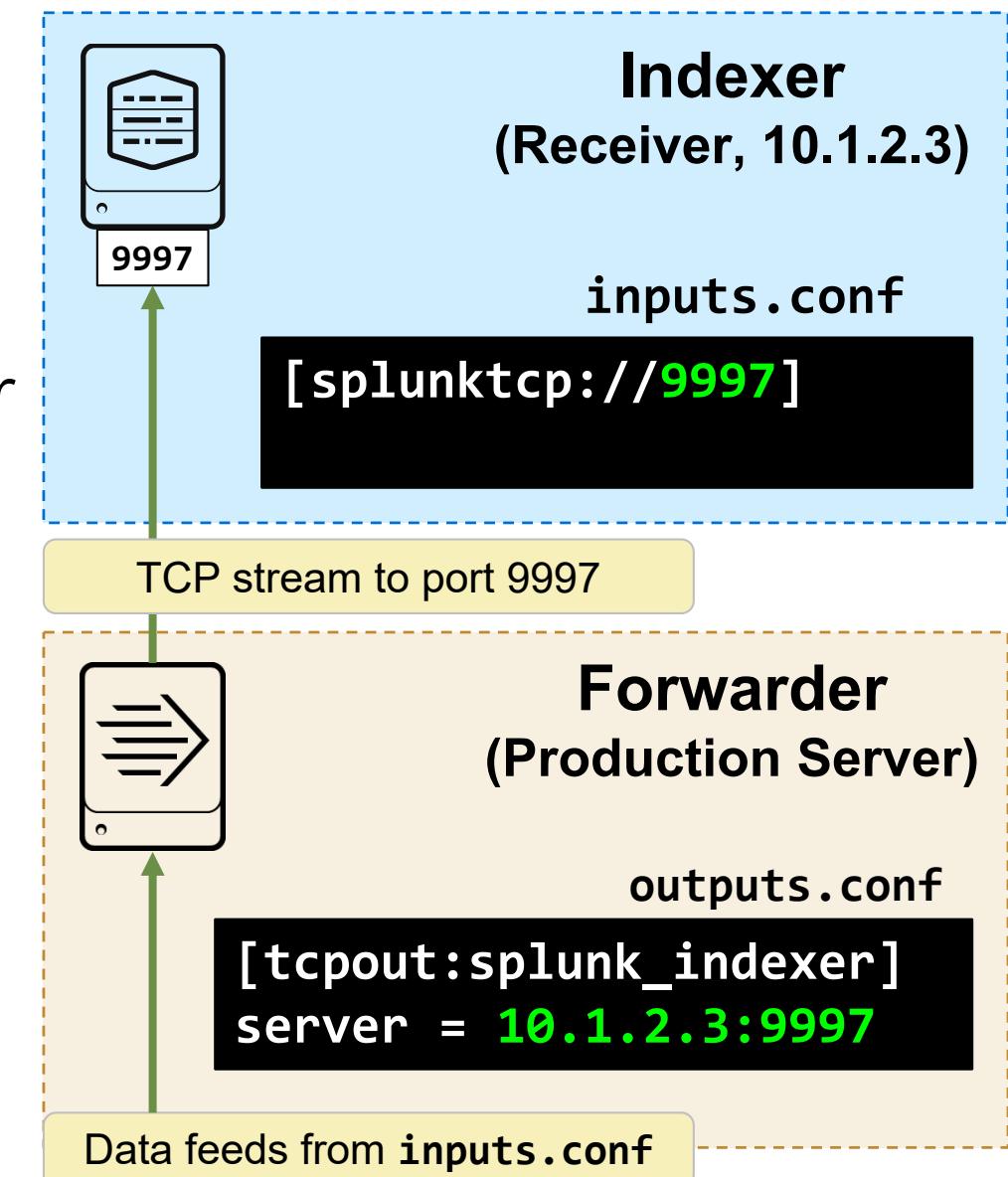
```
[tcpout]
defaultGroup = default-autolb-group

[tcpout-server://10.1.2.3:9997]

[tcpout:default-autolb-group]
disabled = false
server = 10.1.2.3:9997
```

# Forwarder outputs.conf File

- Points the forwarder to the receivers
  - **splunktcp** stanza sets the indexer to listen on a port for feeds from Splunk forwarders
  - **server** sets a forwarder's destination to one or more receivers (IP or DNS name + receiver port), separated by commas
- Can specify additional options:
  - Load balancing
  - SSL
  - Compression
  - Alternate indexers
  - Indexer acknowledgement



# Configuration Validation and Troubleshooting

- To verify the configuration:
  - On forwarder, run: **splunk list forward-server**
  - On indexer, run: **splunk display listen**
- To verify successful connection:
  - On search head, search: **index=\_internal host=<forwarder\_hostname>**
- Troubleshooting forwarder connection
  - Check **SPLUNK\_HOME/var/log/splunk/splunkd.log** on forwarder:  
**tail -f splunkd.log | egrep 'TcpOutputProc|TcpOutputFd'**

# Selectively Forwarding Data to Indexers

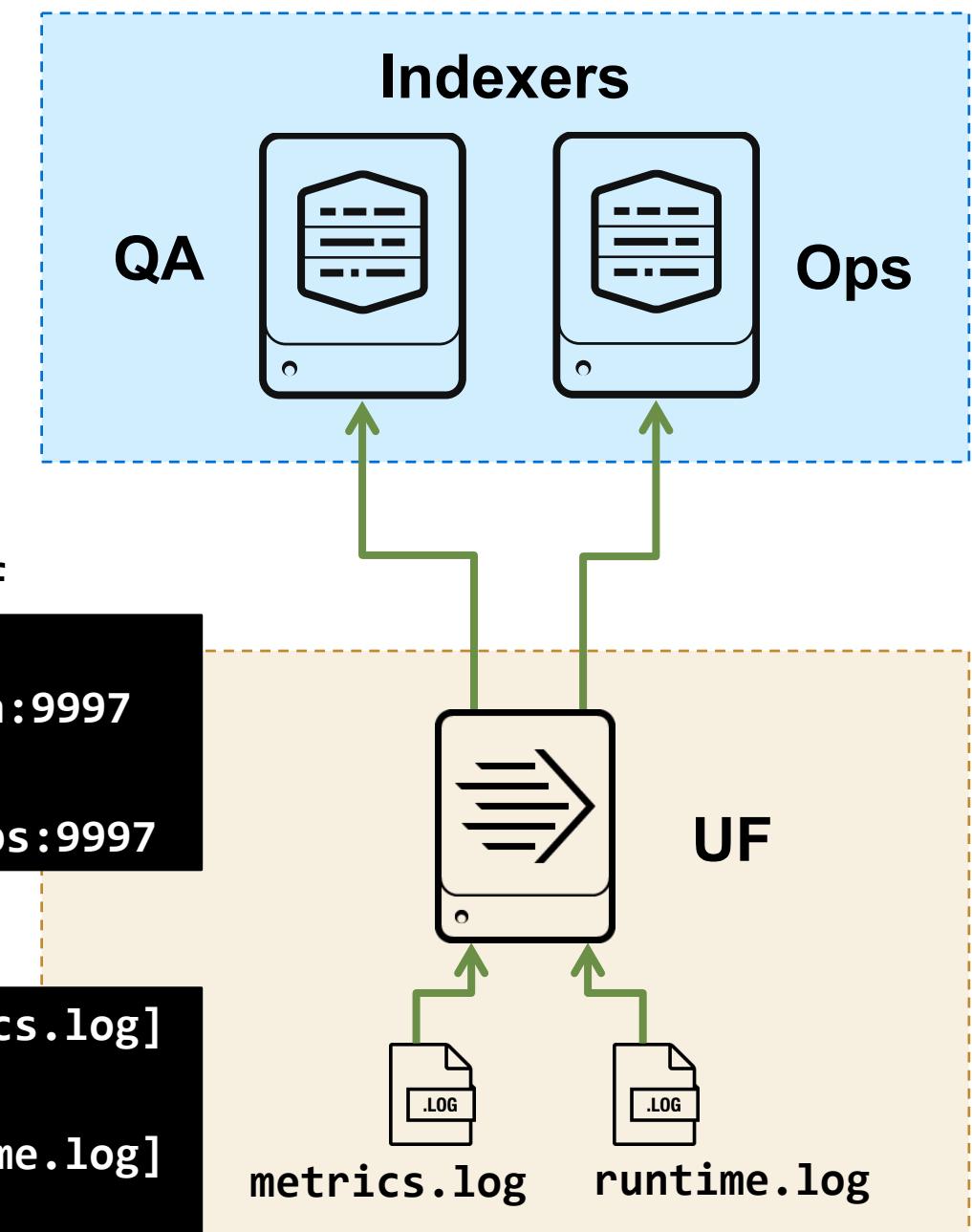
- Universal forwarder can route based on sources
- Example:
  - metrics.log** → QA indexer
  - runtime.log** → Ops indexer

Define multiple **tcpout** stanzas in **outputs.conf**

Specify **\_TCP\_ROUTING** for each source in **inputs.conf**

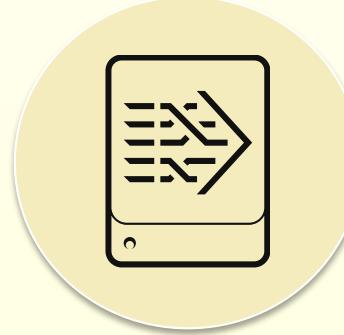
```
outputs.conf
[tcpout:QA]
server=srv.qa:9997
[tcpout:Ops]
server=srv.ops:9997
```

```
inputs.conf
[monitor://.../metrics.log]
_TCP_ROUTING = QA
[monitor://.../runtime.log]
_TCP_ROUTING = Ops
```



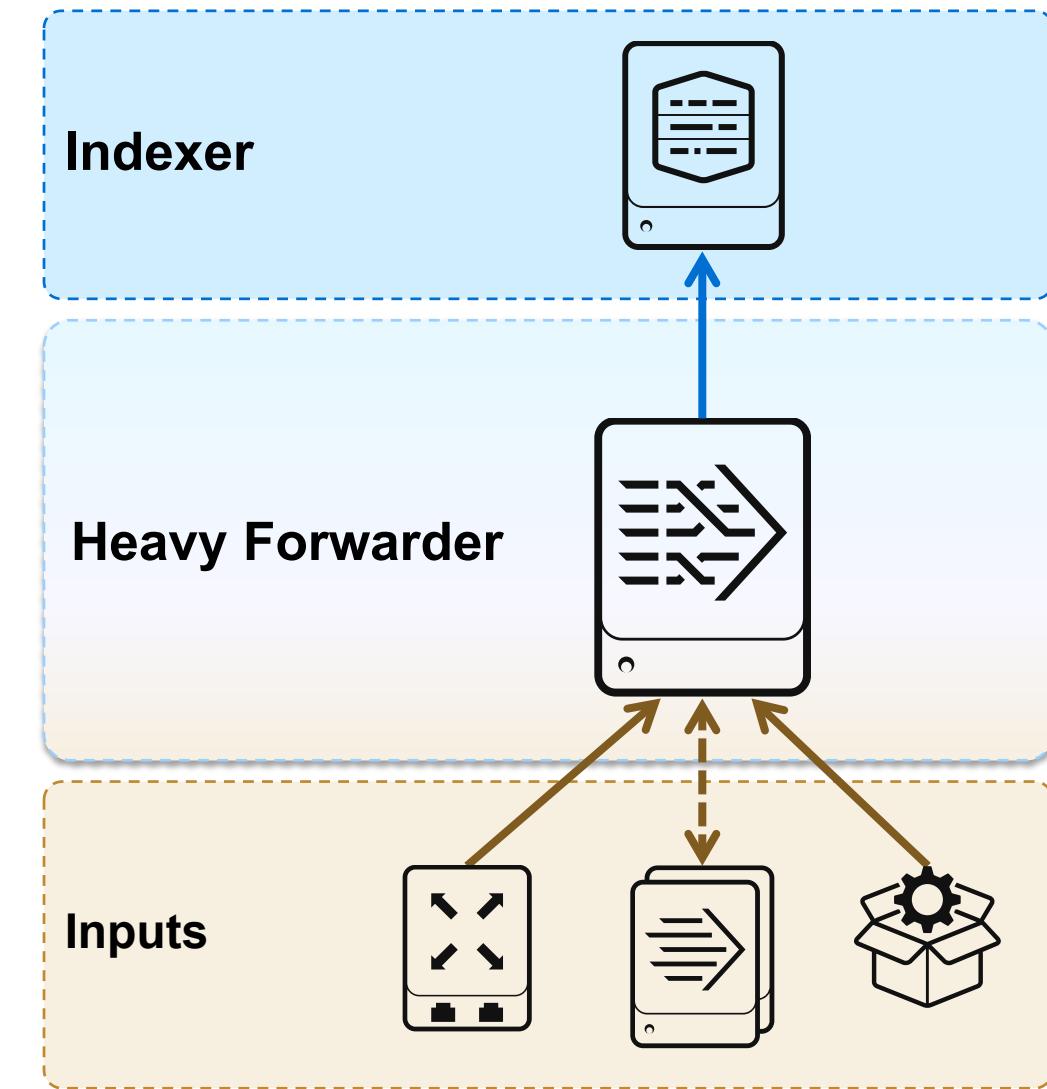
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# Understanding Heavy Forwarders (HF)



## Heavy Forwarders (HF)

- 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 some complex requirements
- Cannot perform distributed searches



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# Deciding Between UF and HF



## Universal Forwarder

vs.



## Heavy 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

- Able to do all UF tasks, as well as...
- Required by some apps, add-ons, or input types (such as HEC, DBconnect)
- Supports complex, event-level routing
- Can anonymize or mask data before forwarding to an indexer
- Provides Splunk Web, if needed
- Predictable version of Python
- May increase network traffic

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# Optimizing the Heavy Forwarder

- Based on your use case
- Disable indexing data on the HF:

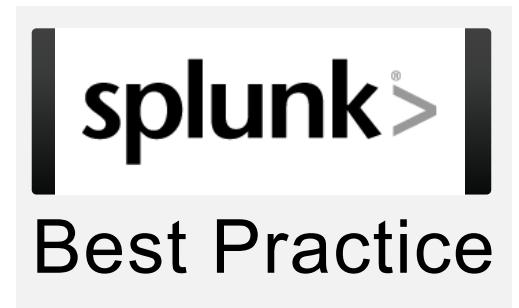
**outputs.conf**

```
[indexAndForward]  
index = false
```

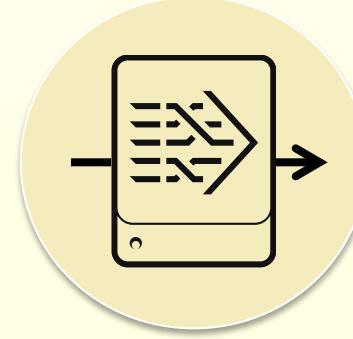
- Disable Splunk Web on the HF:

**web.conf**

```
[settings]  
startwebserver = 0
```

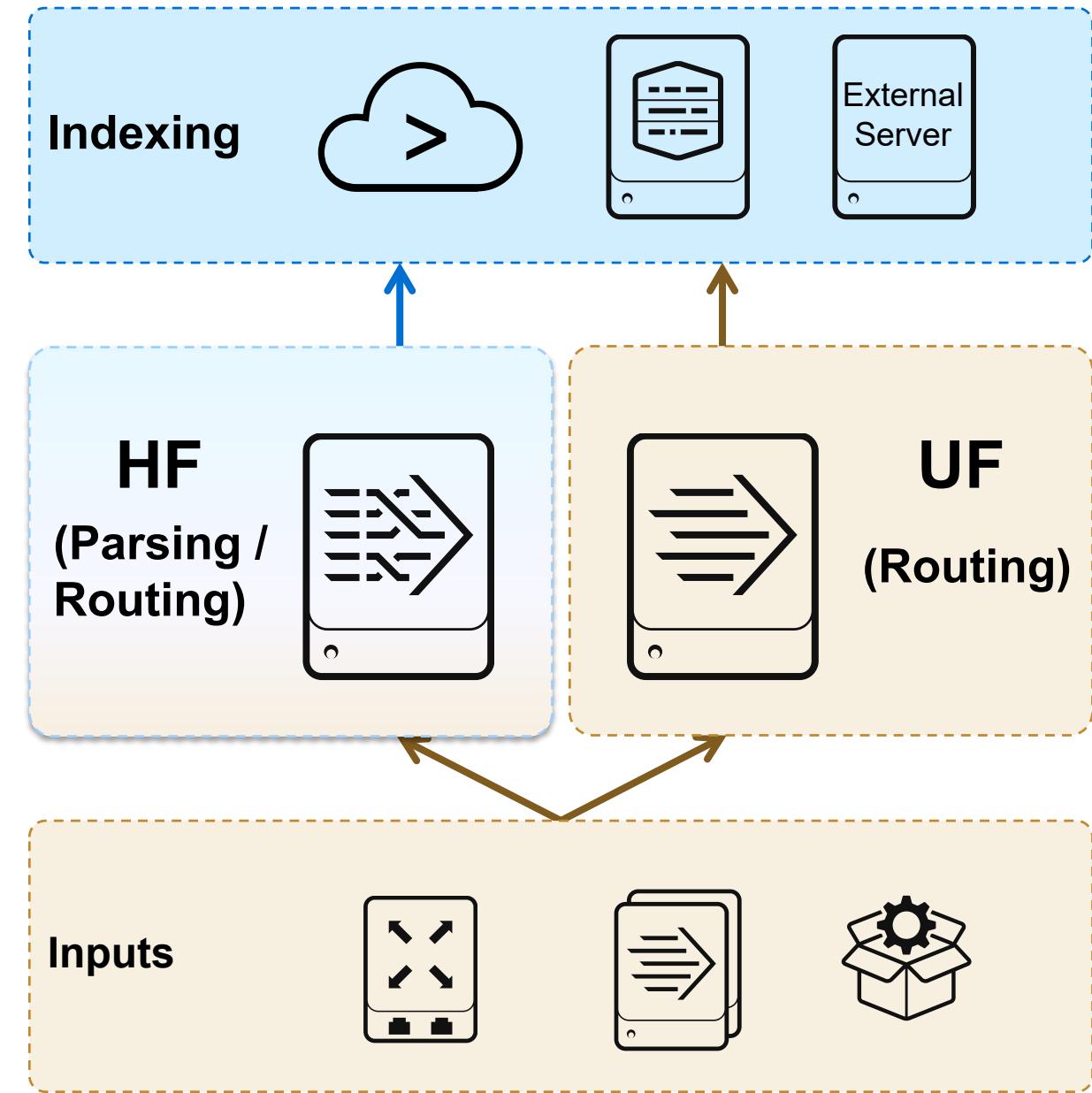


# Understanding Intermediate Forwarders



## Intermediate Forwarders

- Can be a Universal or Heavy Forwarder
- 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

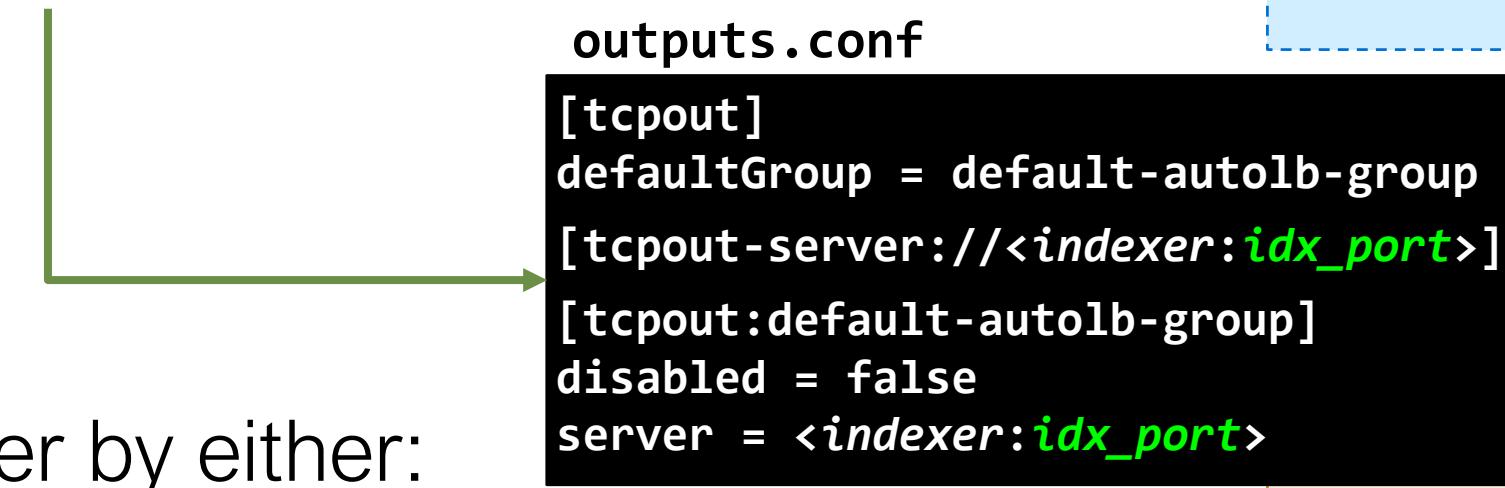


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# Configuring an Intermediate Forwarder

- Configure forwarding by either:

- Running:  
`splunk add forward-server:<idx:port>`
- Modifying **outputs.conf**



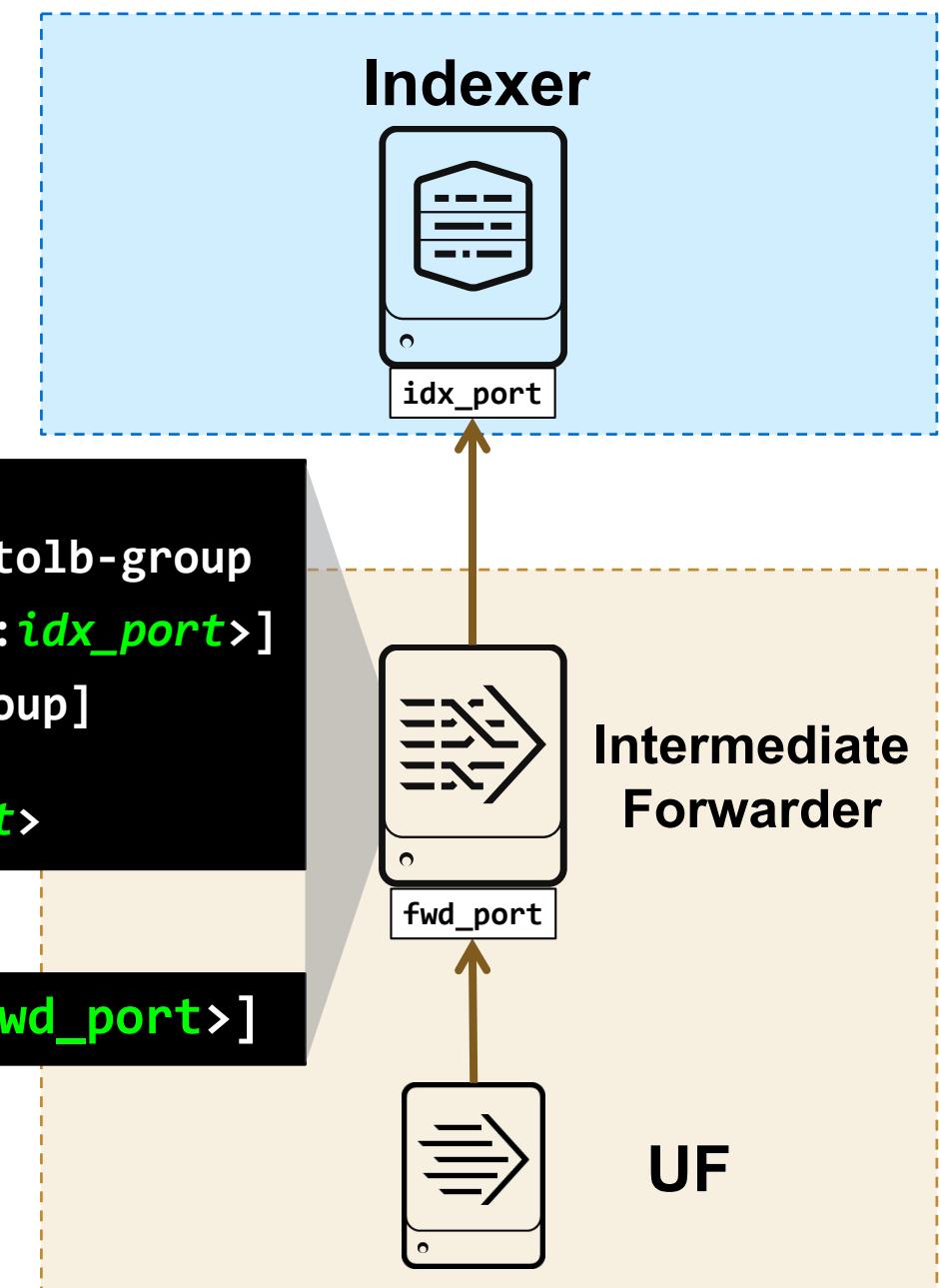
A diagram illustrating the configuration flow. A green arrow points from the "outputs.conf" section to the "inputs.conf" section, indicating that the configuration in "outputs.conf" defines the target for the input in "inputs.conf".

```
outputs.conf
[tcpout]
defaultGroup = default-autolb-group
[tcpout-server://<indexer:idx_port>]
[tcpout:default-autolb-group]
disabled = false
server = <indexer:idx_port>

inputs.conf
[splunktcp://<fwd_port>]
```

- Configure receiver by either:

- Running:  
`splunk enable listen <port>`
- Modifying **inputs.conf**
- Using Splunk Web (if a HF)



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# Additional Forwarding Options



Compressing the feed



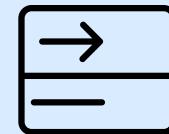
Securing the feed



Automatic load balancing to multiple indexers



Indexer acknowledgement to forwarder



Forwarder queue size

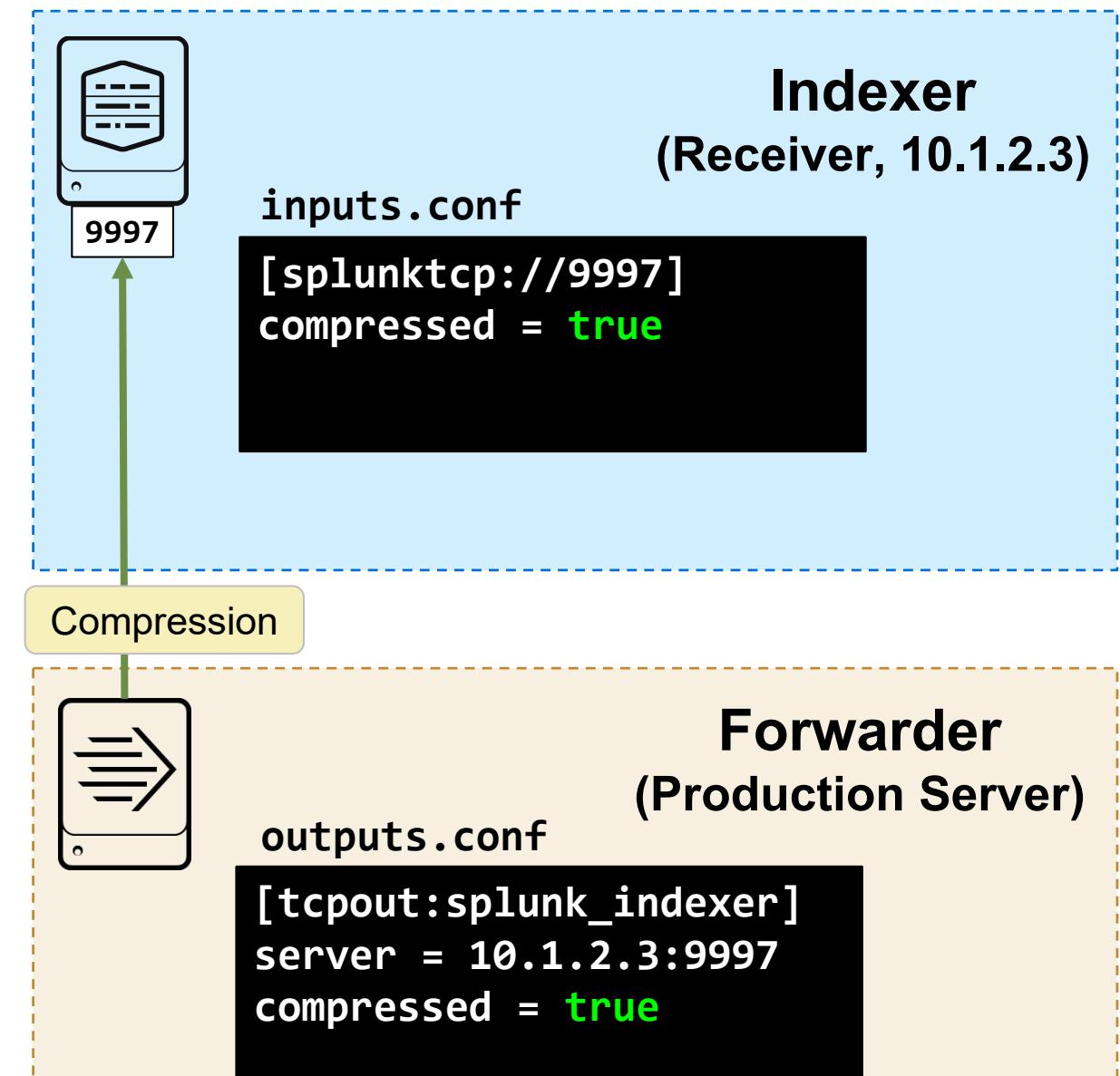


Send the feed over HTTP

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# Compressing the Feed

- Reduces network utilization
- Increases CPU utilization slightly
- Set either at the forwarder or the indexer
  - Compress select feeds by setting on the forwarder
  - Compress all feeds by setting on the indexer



# Securing the Feed with SSL

- Encrypts the feed
- Automatically compresses the feed
- Increases CPU utilization
- Requires the use of certificates
  - To configure with default root certificates:

- On a \*nix indexer:

```
server.conf  
[sslConfig]
```

```
sslRootCAPath = SPLUNK_HOME/etc/auth/cacert.pem
```

- On a Windows indexer: Nothing required

- On a \*nix forwarder:

```
server.conf  
[sslConfig]
```

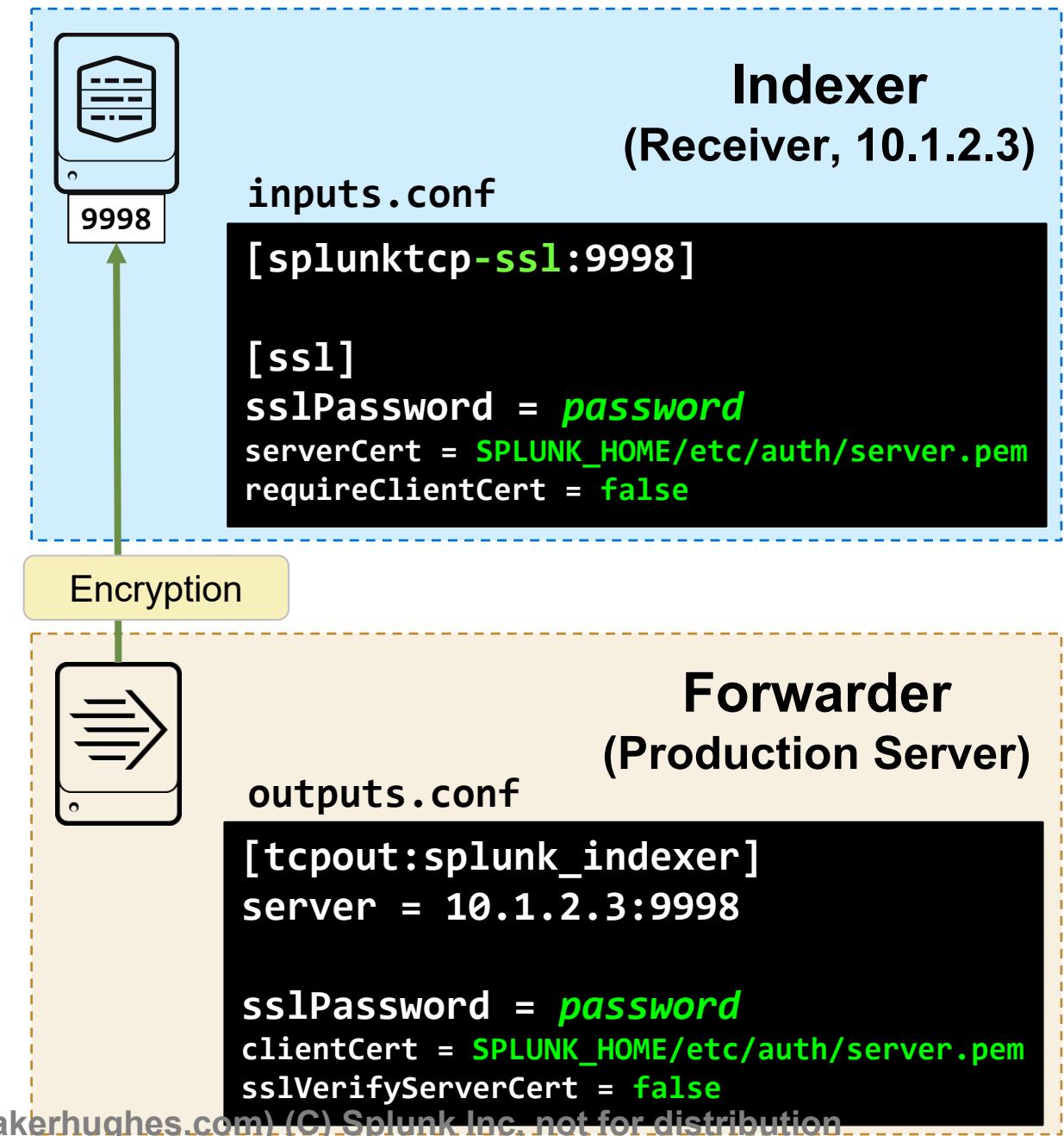
```
sslRootCAPath = SPLUNK_HOME/etc/auth/cacert.pem
```

- On a Windows forwarder:

```
server.conf  
[sslConfig]
```

```
caCertFile = cacert.pem  
caPath = SPLUNK_HOME\etc\auth
```

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# Notes About SSL

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- Splunk uses OpenSSL to generate its default certificates
  - Default certificate password is **password**
- Use external certs or create new ones using Splunk's OpenSSL
- Refer to:

[docs.splunk.com/Documentation/Splunk/latest/Security/AboutsecuringyourSplunkconfigurationwithSSL](https://docs.splunk.com/Documentation/Splunk/latest/Security/AboutsecuringyourSplunkconfigurationwithSSL)

[docs.splunk.com/Documentation/Splunk/latest/Security/Aboutsecuringdatafromforwarders](https://docs.splunk.com/Documentation/Splunk/latest/Security/Aboutsecuringdatafromforwarders)

[docs.splunk.com/Documentation/Splunk/latest/Security/ConfigureSplunkforwardingtousesthedefaultcertificate](https://docs.splunk.com/Documentation/Splunk/latest/Security/ConfigureSplunkforwardingtousesthedefaultcertificate)

[docs.splunk.com/Documentation/Splunk/latest/Security/ConfigureSplunkforwardingtousesignedcertificates](https://docs.splunk.com/Documentation/Splunk/latest/Security/ConfigureSplunkforwardingtousesignedcertificates)

[wiki.splunk.com/Community:Splunk2Splunk\\_SSL\\_DefaultCerts](https://wiki.splunk.com/Community:Splunk2Splunk_SSL_DefaultCerts)

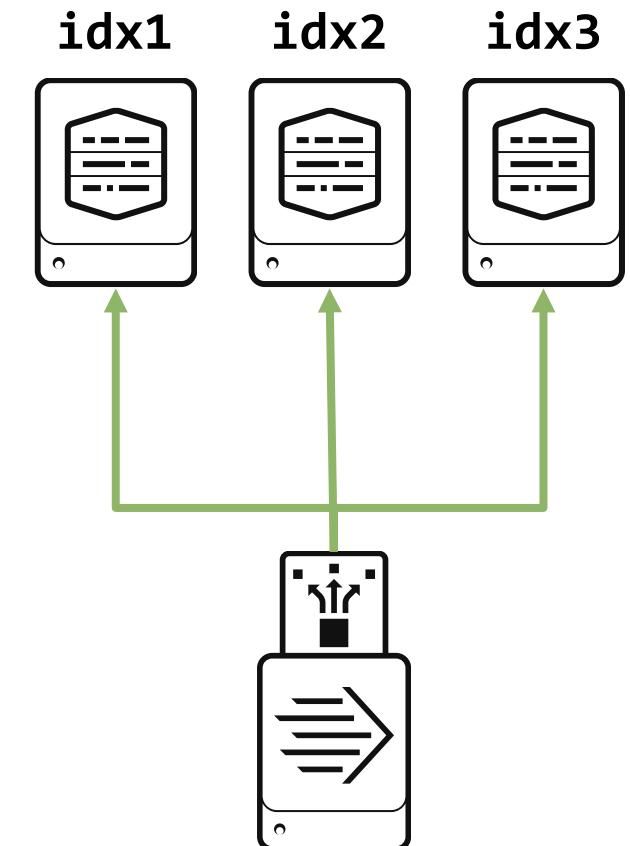
[wiki.splunk.com/Community:Splunk2Splunk\\_SSL\\_SelfSignedCert\\_NewRootCA](https://wiki.splunk.com/Community:Splunk2Splunk_SSL_SelfSignedCert_NewRootCA)

# Automatic Load Balancing

- Configured in forwarder's **outputs.conf** using static list target:

```
[tcpout:my_LB_indexers]
server = idx1:9997, idx2:9997, idx3:9997
```

- Causes forwarder to split data between multiple indexers
- Switching indexers is performed:
  - By time, every **autoLBFrequency** seconds (default: 30 sec.)
  - By volume, every **autoLBVolume** bytes (default: 0 = disabled)
  - When it is safe for the data stream (e.g. an **EOF** is detected)
  - When a receiving indexer goes down



**Load-balancing forwarder**

[docs.splunk.com/Documentation/Splunk/latest/Forwarding/Setuploadbalancingd](https://docs.splunk.com/Documentation/Splunk/latest/Forwarding/Setuploadbalancingd)  
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# Defining Event Boundary on UF

---

- Event boundaries
  - Detecting when one event ends and another starts
  - Normally determined during parsing (on indexer or HF)
- UF switches safely when:
  - An **EOF** (End of File) is detected
  - There is a short break in I/O activity
- Potential side effects
  - Streaming data (**syslog**) can prevent a UF from switching
  - A multi-line data (**log4j**) can result in event splits
    - Especially if the application has pauses in writing its log file
- Solution:
  - Enable event breaker on the UF per sourcetype

# Defining Event Boundary on UF (cont.)

- Add event breaker settings on UF per sourcetype in **props.conf**
  - Single line event

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

- Multi-line event

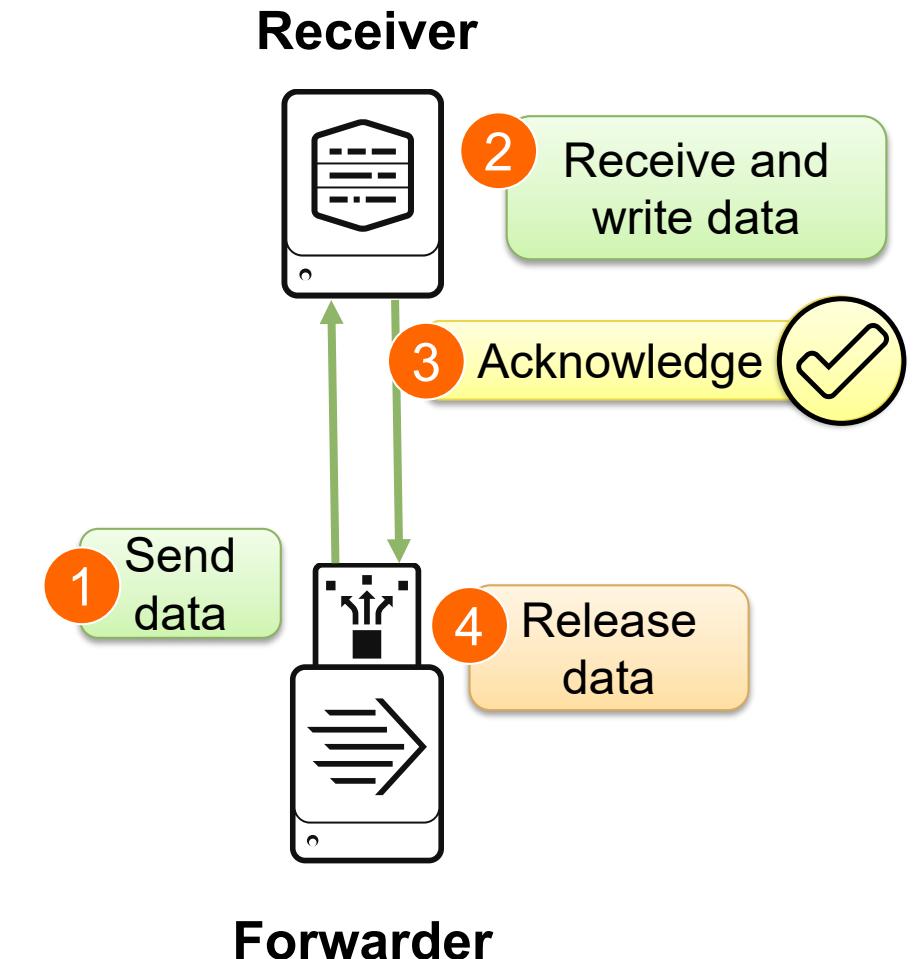
```
[my_log4j]
EVENT_BREAKER_ENABLE = true
EVENT_BREAKER = ([\r\n]+)\d\d\d\d-\d\d-\d\d
```

[docs.splunk.com/Documentation/Forwarder/latest/Forwarder/Configureloadbalancing](https://docs.splunk.com/Documentation/Forwarder/latest/Forwarder/Configureloadbalancing)

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# Indexer Acknowledgement

- Configured in **outputs.conf**
  - Disabled by default (**useACK=false**)
  - Enabled with **useACK=true**
- Guards against loss of forwarded data
  - If no acknowledgement is received, forwarder instead resends the data
- Enable along all segments of data path if using intermediate forwarders



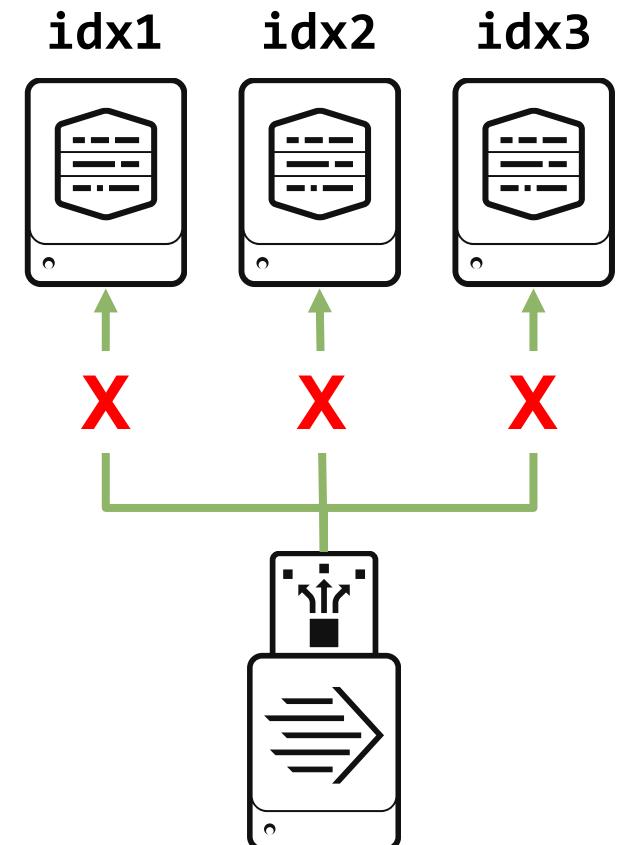
[docs.splunk.com/Documentation/Splunk/latest/Forwarding/Protectagainstlossofin-flightdata](https://docs.splunk.com/Documentation/Splunk/latest/Forwarding/Protectagainstlossofin-flightdata)

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# Forwarder Queue Size

- When forwarder can't reach an indexer, forwarder automatically switches to another indexer
- When forwarder can't reach **any** indexer, data is queued on the forwarder
- Output and wait queue sizes are affected by **maxQueueSize** and **useACK** in **outputs.conf**
  - Default: **maxQueueSize=auto**

<b>maxQueueSize=</b>	<b>useACK=</b>	<b>Output queue</b>	<b>Wait queue</b>
auto	false	500 KB	-
auto	true	7 MB	21 MB
20MB	true	20 MB	60 MB



**Load-balancing forwarder**

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# Configuring a UF to Send Data over HTTP

- Use cases
  - Use existing network rules for HTTP
  - Easily supports off-the-shelf Load Balancers
- Limitations:
  - UF performs httpout or tcpout, but not both simultaneously
  - No support for indexer acknowledgements
- To break events on the UF for sending over HTTP:

**outputs.conf**

```
[httpout]
httpEventCollectorToken = <authToken>
uri = https://<ip>:8088
batchSize = 65536          (default: 64 KB)
batchTimeout = 30           (default: 30 sec)
```

**props.conf**

```
LB_CHUNK_BREAKER = ([\r\n]+)      (default)
```

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# Forwarding Resources

---

- Overview of forwarders  
[docs.splunk.com/Documentation/Splunk/latest/Data/Usingforwardingagents](https://docs.splunk.com/Documentation/Splunk/latest/Data/Usingforwardingagents)
- Forwarder deployment overview  
[docs.splunk.com/Documentation/Splunk/latest/Forwarding/Aboutforwardingandreceivingdata](https://docs.splunk.com/Documentation/Splunk/latest/Forwarding/Aboutforwardingandreceivingdata)
- Splunk Blog: Universal or Heavy, that is the question?  
[www.splunk.com/en\\_us/blog/tips-and-tricks/universal-or-heavy-that-is-the-question.html](https://www.splunk.com/en_us/blog/tips-and-tricks/universal-or-heavy-that-is-the-question.html)
- Overview of enterprise installation
  - Link at the bottom of the web page has example install packages and Windows install  
[wiki.splunk.com/Deploying\\_Splunk\\_Light\\_Forwarders](https://wiki.splunk.com/Deploying_Splunk_Light_Forwarders)

# Useful Commands

Command	Operation
<b>From the Forwarder:</b>	
<b>splunk add forward-server</b>	Configures the forwarder to send data to the receiver
<b>splunk list forward-server</b>	Displays the current receivers
<b>splunk remove forward-server</b>	Removes the receiver from the forwarder
<b>From the Receiver:</b>	
<b>splunk enable listen</b>	Configures the Splunk receiving port number
<b>splunk display listen</b>	Displays the current Splunk receiving port number

# Module 3 Knowledge Check

---

- If the forwarder is set to send its data to 2 indexers at 30 second intervals, does it switch exactly at the 30<sup>th</sup> second?
- True or False. Turning SSL on between the forwarder and the receiver automatically compresses the feed.
- What configuration file on the forwarder defines where data is to be forwarded to?
- Which installer will the System Admin use to install the heavy forwarder?
- True or False. The UF and the HF can be used to mask data before transmitting to indexers.

# Module 3 Knowledge Check - Answers

---

- If the forwarder is set to send its data to 2 indexers at 30 second intervals, does it switch exactly at the 30<sup>th</sup> second?

Not always. To prevent sending a partial event to an indexer, the forwarder waits for an EOF or a pause in I/O activity before it switches.

- True or False. Turning SSL on between the forwarder and the receiver automatically compresses the feed.

True

- What configuration file on the forwarder defines where data is to be forwarded to?

**outputs.conf**

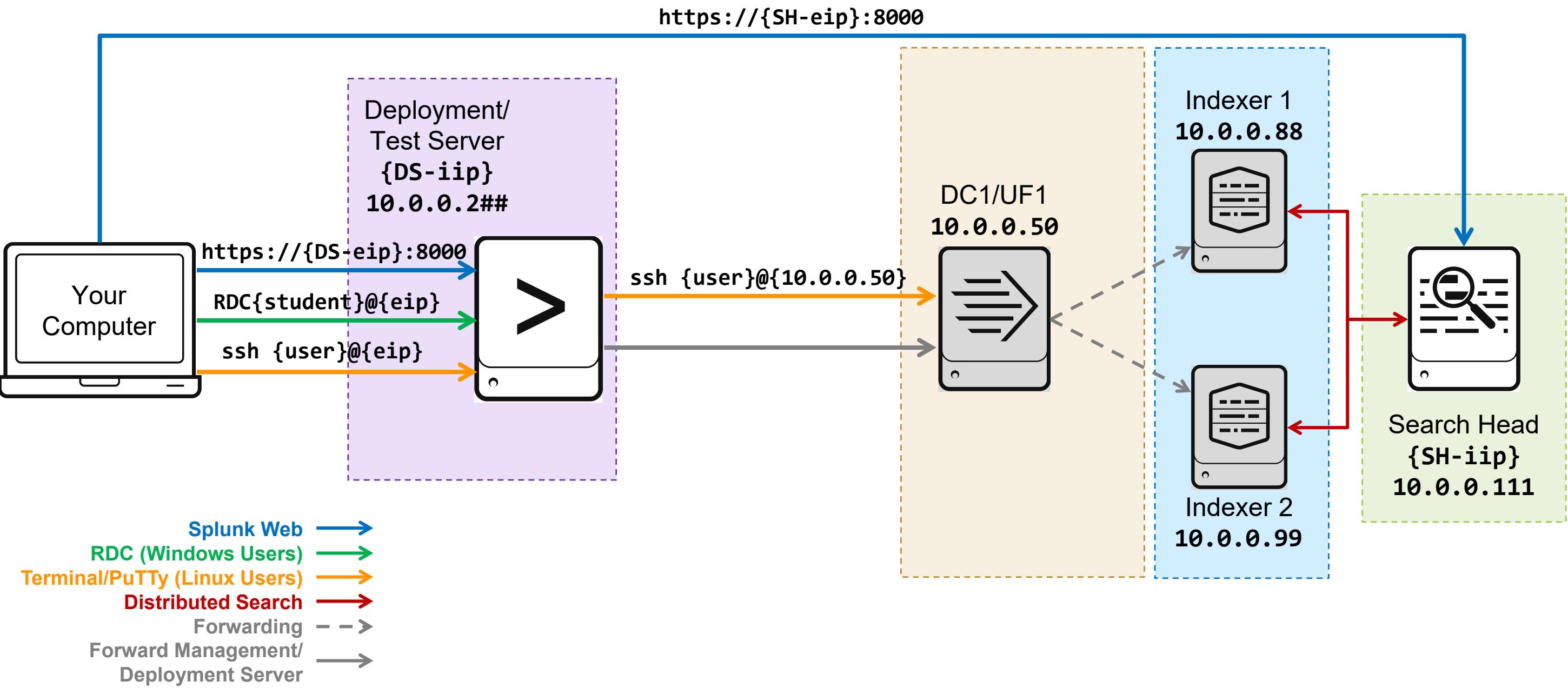
- Which installer will the System Admin use to install the heavy forwarder?

Splunk Enterprise

- True or False. The UF and the HF can be used to mask data before transmitting to indexers.

False. Only the HF, specifically a Splunk Enterprise instance, can perform data masking.

# Module 3 Lab Exercise – Environment Diagram



# Module 3 Lab Exercise

Time: 20-25 minutes

Description: Set up forwarders

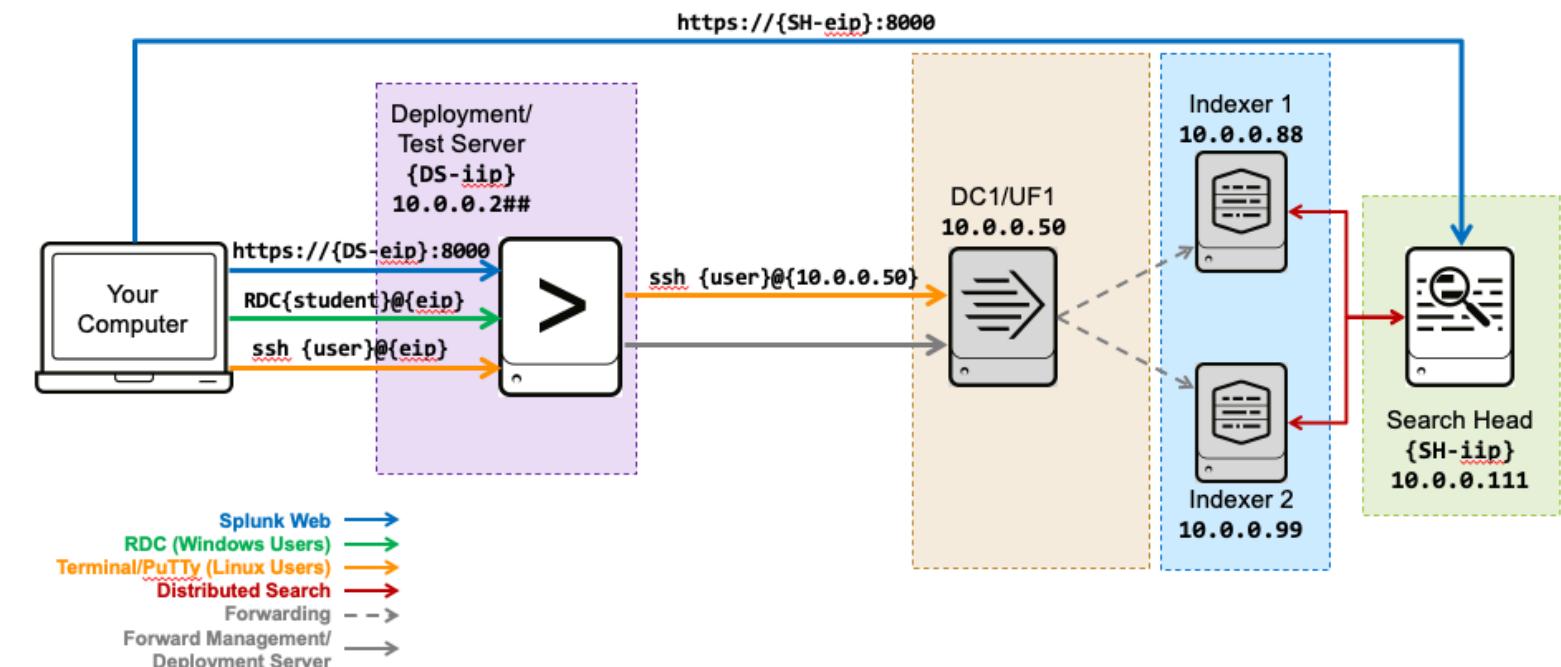
Tasks:

- Configure forwarder to send data to Indexer 1 (**10.0.0.88**) and Indexer 2 (**10.0.0.99**)
- Confirm forwarder connection from your search head

## Note

You have a login on a remote Linux host that is your forwarder.

This lab exercise only establishes the connection between your UF and indexer.

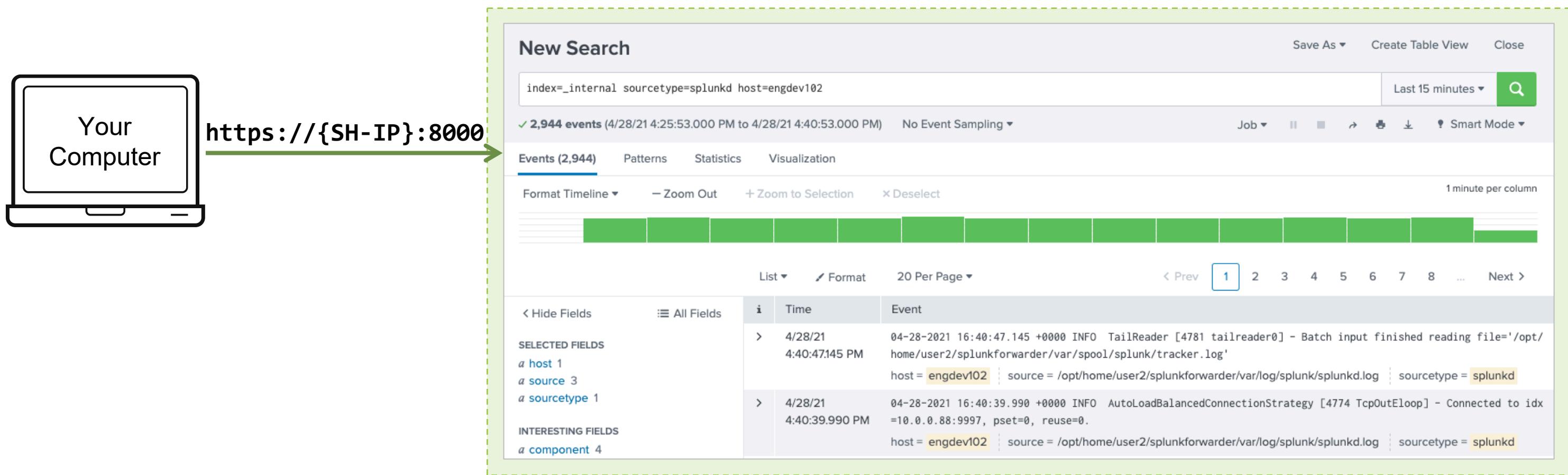


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# Module 3 Lab Exercise – Setting up Forwarders (cont.)

Verification: Run a search to get forwarded internal logs from UF1

**index=\_internal sourcetype=splunkd host=engdev1##**



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# Module 4: Forwarder Management

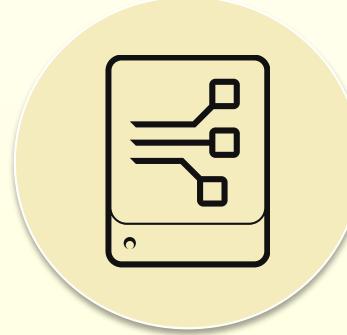
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# Module Objectives

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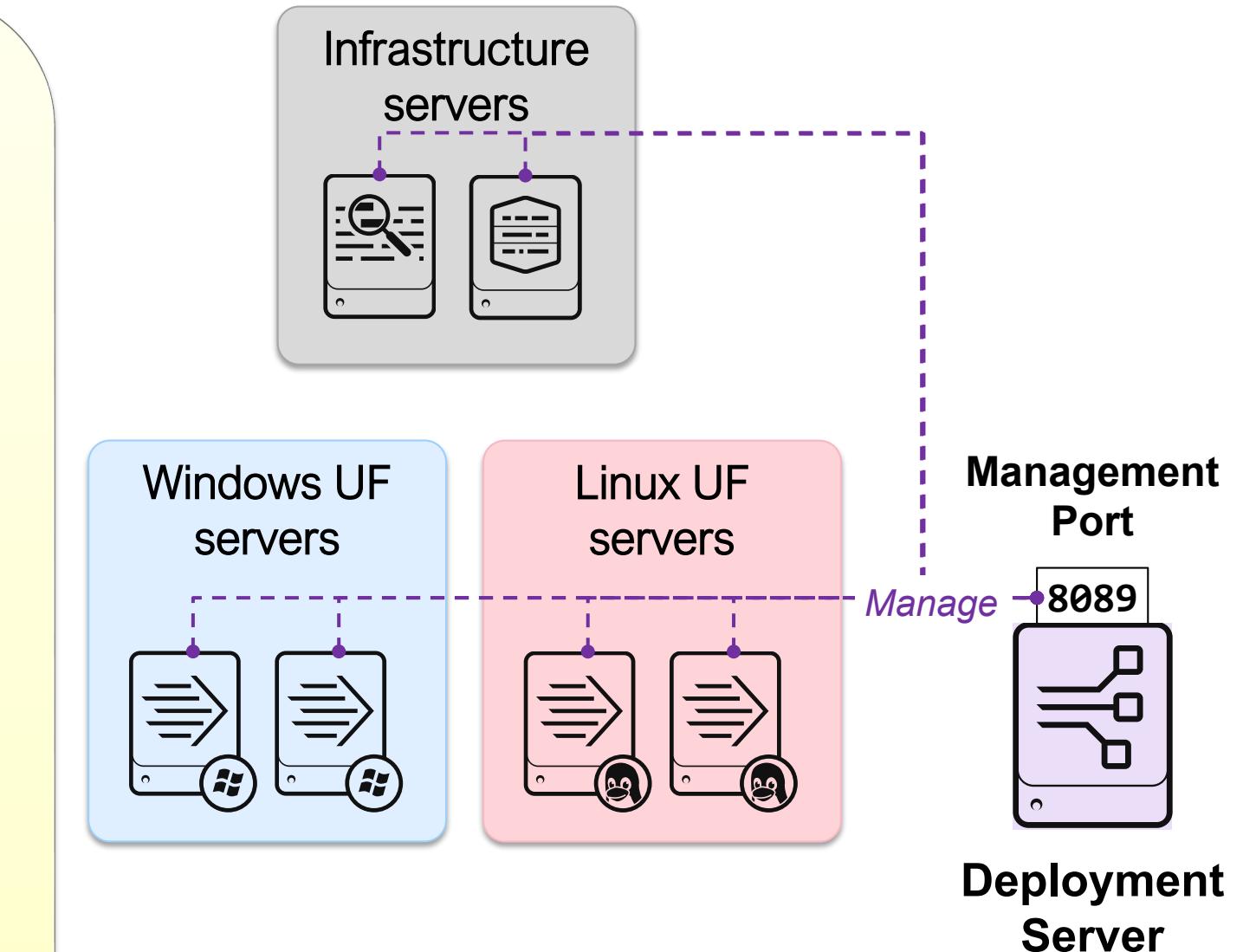
- Describe Splunk Deployment Server (DS)
- Manage forwarders using deployment apps
- Configure deployment clients and client groups
- Monitor forwarder management activities

# 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



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# 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/**

## Server Classes

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

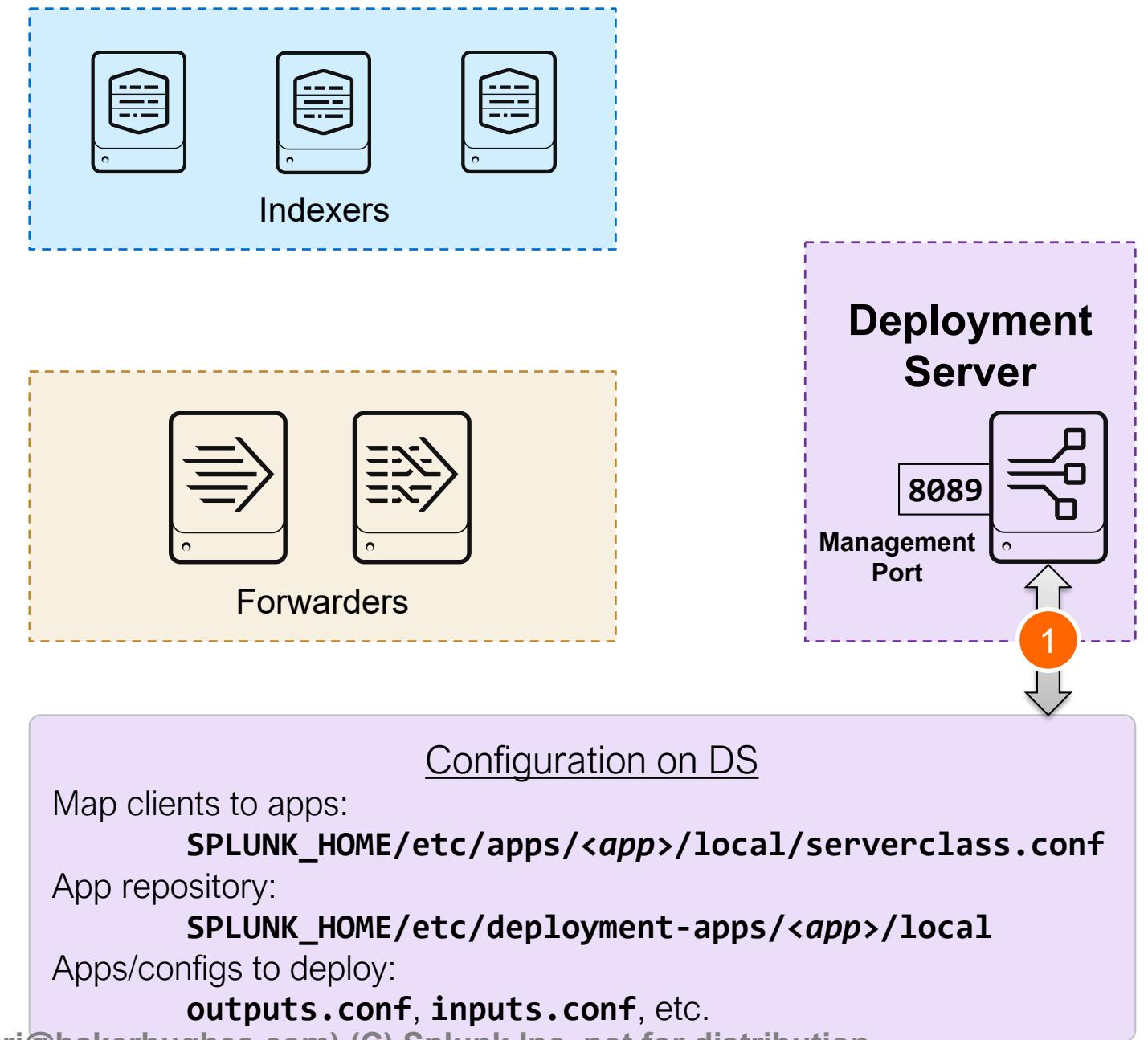
## Deployment Clients

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

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# Deployment Server Configuration (1)

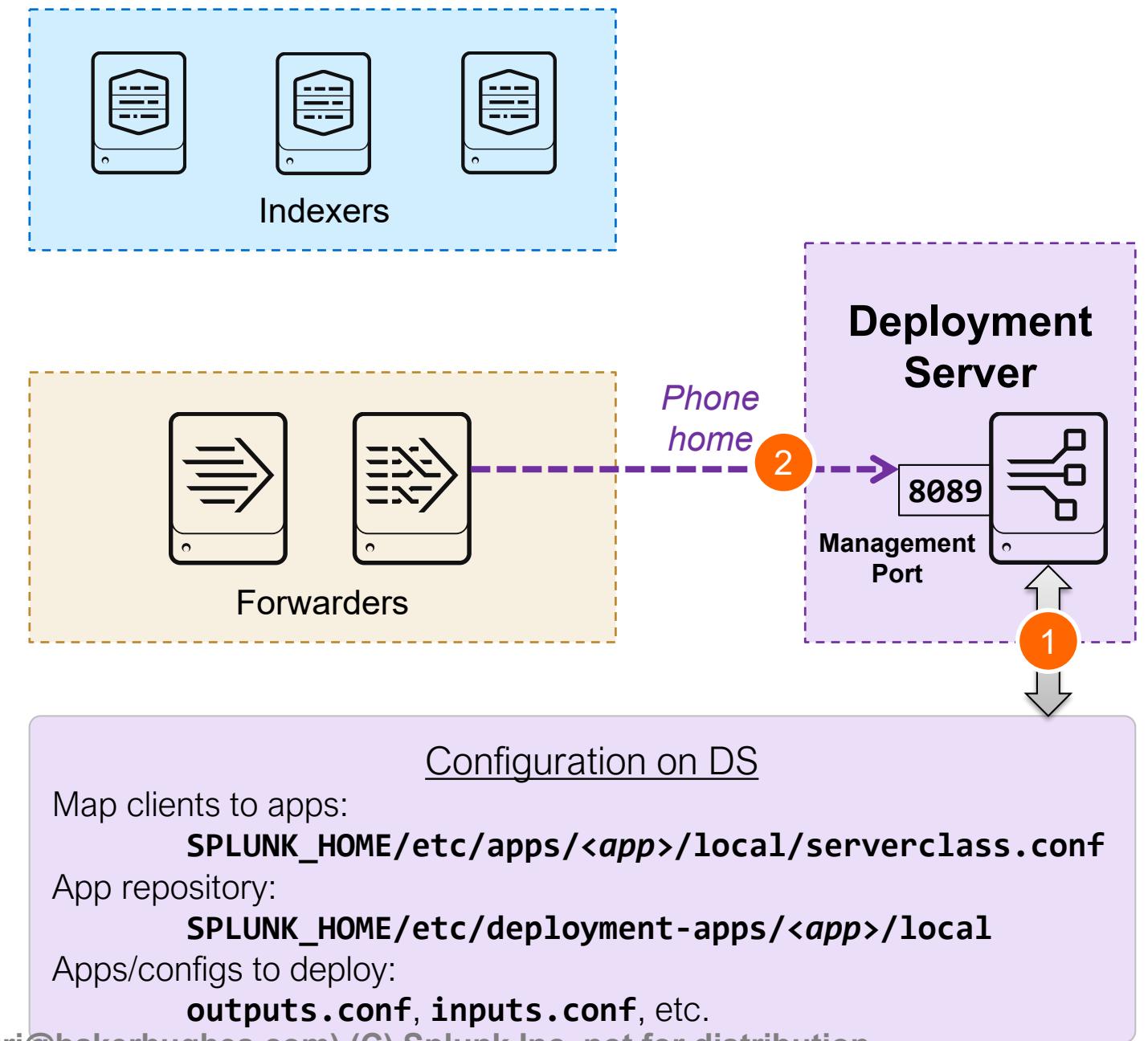
1. Configure DS, server classes, and app packages



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# Deployment Server Configuration (2)

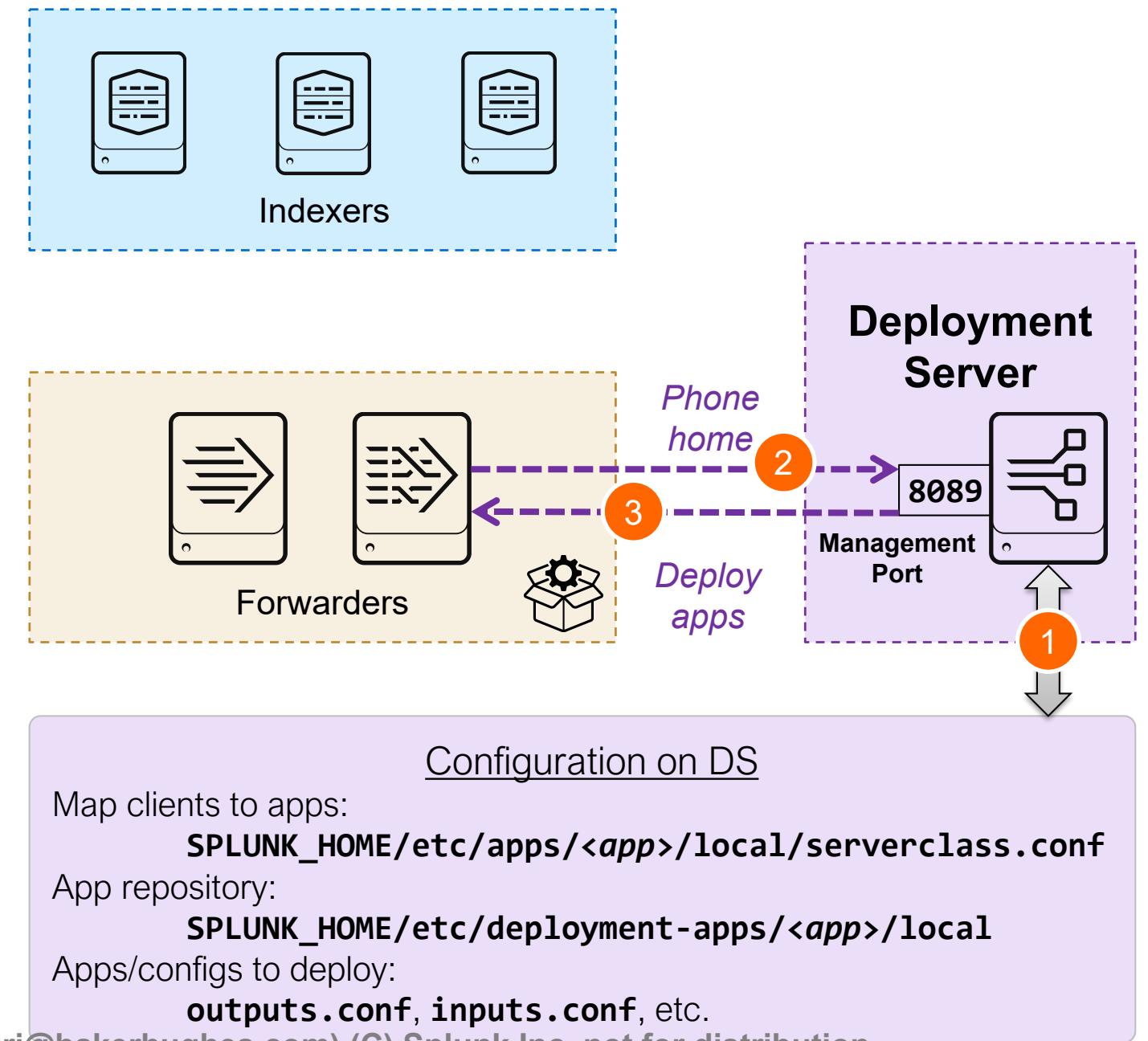
1. Configure DS, server classes, and app packages
2. Use **deploymentclient.conf** to configure instances as deployment clients; phones home to DS



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# Deployment Server Configuration (3)

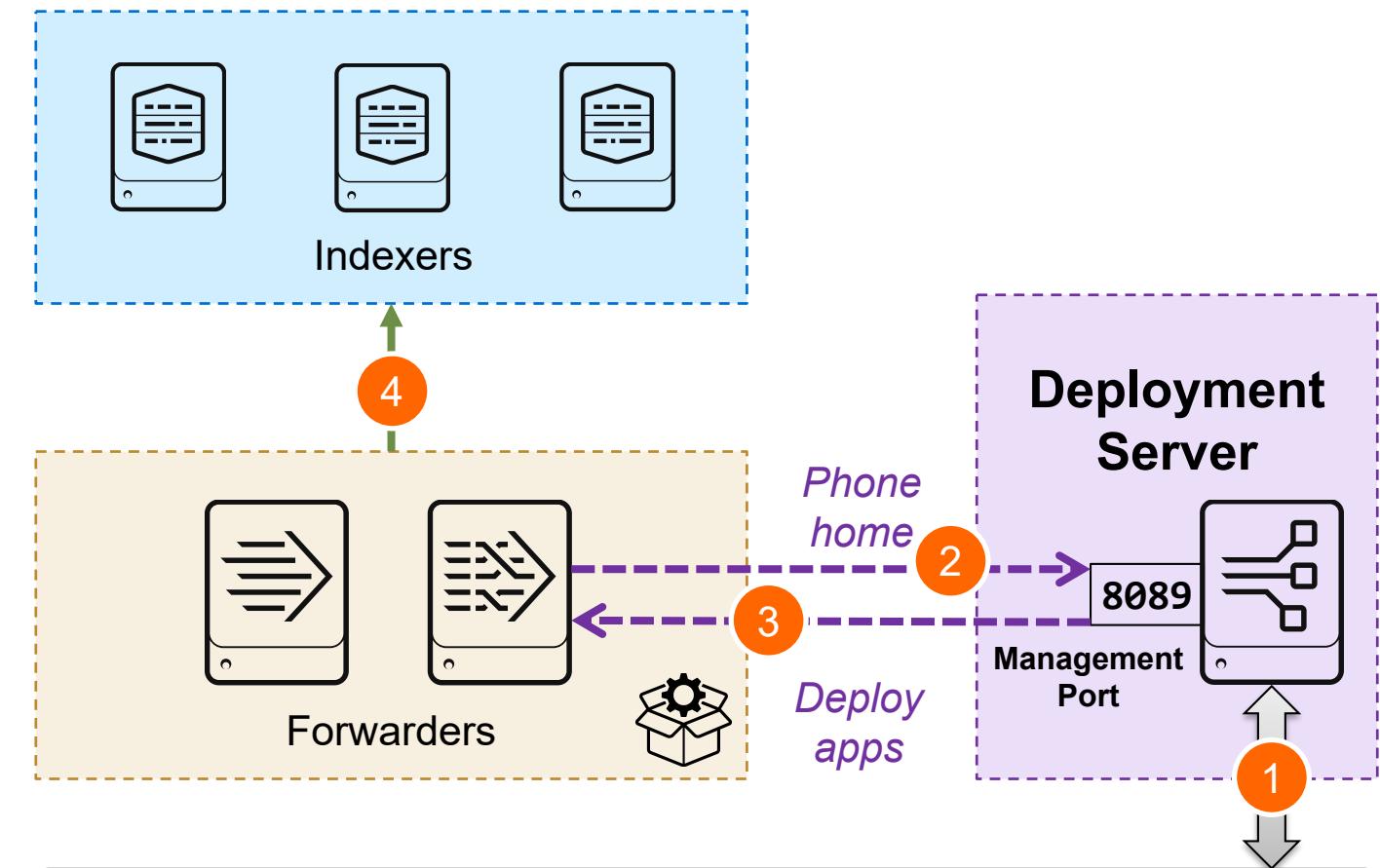
1. Configure DS, server classes, and app packages
2. Use **deploymentclient.conf** to configure instances as deployment clients; phones home to DS
3. Client downloads subscribed apps as directed by server classes on DS



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# Deployment Server Configuration (4)

1. Configure DS, server classes, and app packages
2. Use **deploymentclient.conf** to configure instances as deployment clients; phones home to DS
3. Client downloads subscribed apps as directed by server classes on DS
4. Client uses configuration; for example, sending data to indexers configured in **outputs.conf**



## Configuration on DS

Map clients to apps:

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

App repository:

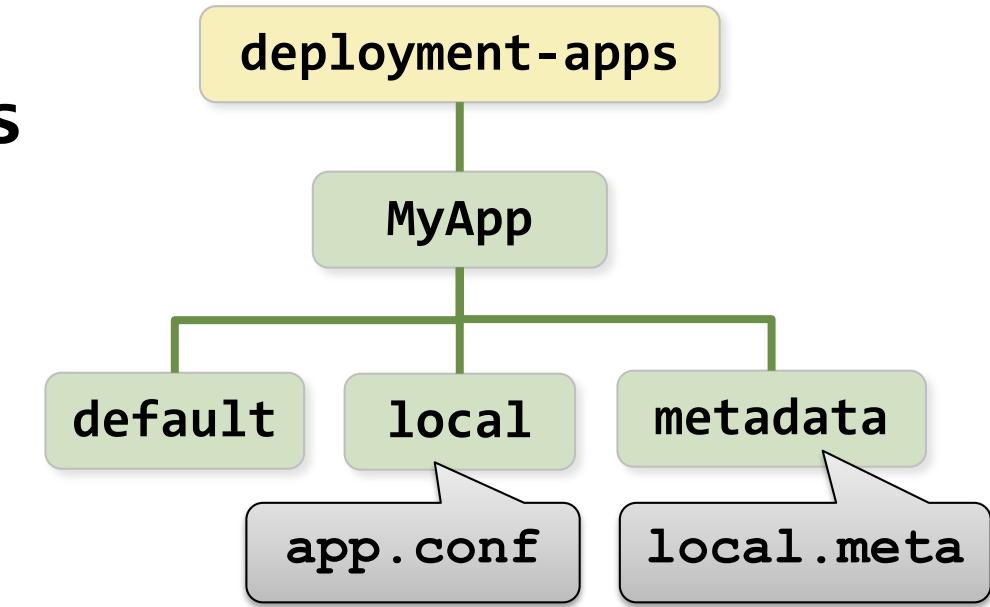
`SPLUNK_HOME/etc/deployment-apps/<app>/local`

Apps/configs to deploy:

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

# Configuring a Deployment App

- Follows app structure and rules
  - Place files in **SPLUNK\_HOME/etc/deployment-apps**
  - Required files:
    - **app.conf** (in **default** or **local**)
    - **local.meta** (in **metadata**)
  - Optionally may contain configuration files, scripts, and other resources
- 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



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# 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 installing the app
- Deploy to **SPLUNK\_HOME/etc/apps**
- Comes with documentation for details about settings for **inputs.conf**, and so on

The screenshot shows the Splunkbase App Search Results page. At the top, there is a navigation bar with links for 'My Account', 'My Splunk', and 'Support & Services'. Below the navigation is a search bar labeled 'Search App by keyword, technology...'. The main title is 'App Search Results'. On the left, there is a sidebar with the following filter categories:

- PRODUCTS & SOLUTIONS**: Shows 1 result.
- CATEGORIES**: Shows 2 results, with 'IT Operations' checked and highlighted in blue.
- TECHNOLOGIES**: Shows 1 result.
- APP TYPE**: Shows 1 result.
- APP CONTENTS**: Shows 1 result.
- SPLUNK VERSION**: Shows 2 results, with 'Splunk Version: 8.0' and 'Splunk Version: 8.1' selected.
- CIM VERSION**: Shows 1 result.
- VALIDATIONS**: Shows 1 result.
- SPLUNK BUILT & OTHER**: Shows 1 result.

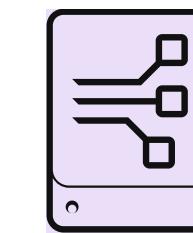
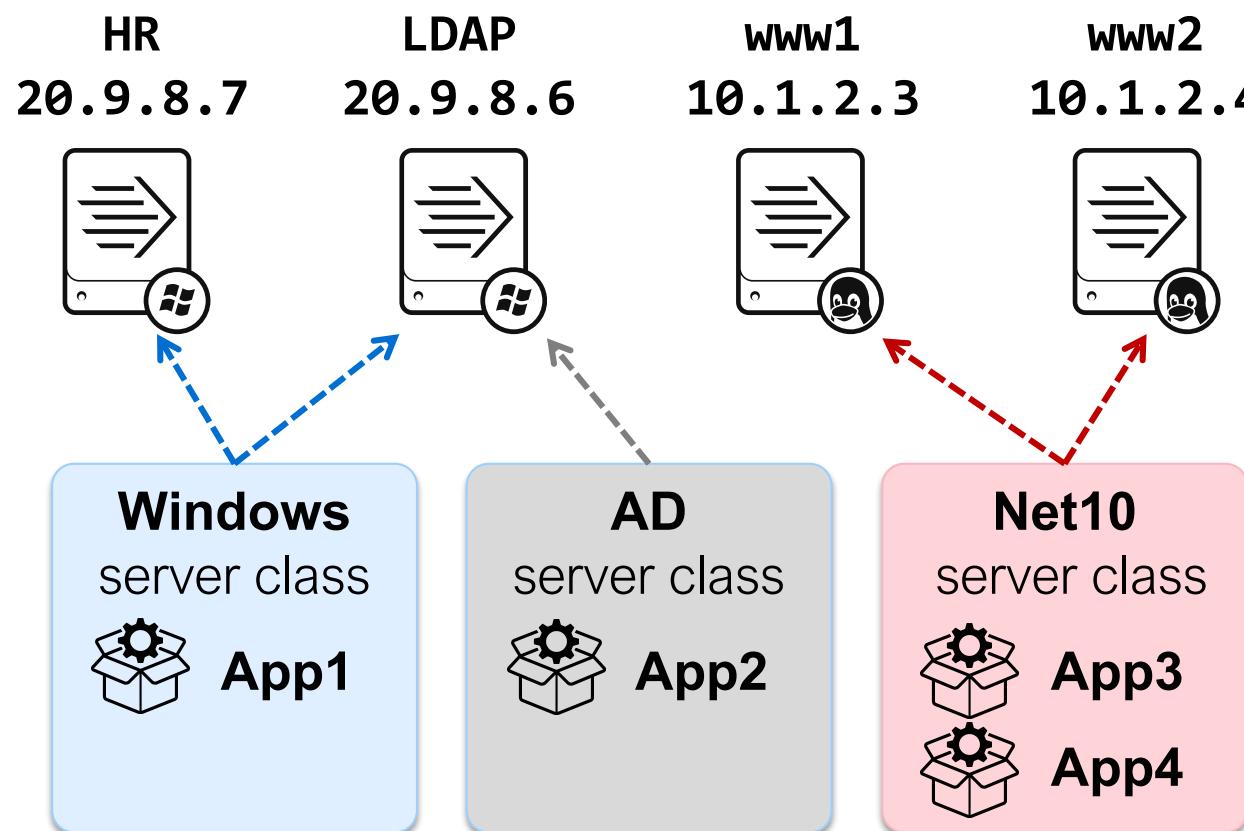
At the top right, there are three selected filters: 'Product & Solutions: Splunk Enterprise', 'Category: IT Operations', and 'Category: Utilities'. Below the filters, it says 'Showing 1-20 of 764 results'. On the far right, there are buttons for 'Newest' and a grid view icon. The main area displays a grid of 20 app cards, each with a thumbnail, name, install count, and a small orange checkmark icon. The apps listed include:

- Malwarebytes Cloud Remediation (26 installs)
- Azure blob storage archiving (0 installs)
- Administration App for RSA NetWitness (8 installs)
- Radware DefensePro for (112 installs)
- Cisco CDR Reporting and (340 installs)
- Canary (717 installs)
- REST API Modular Input (2584 installs)
- NetFlow LOGIC Technology Add-on for NetFlow (514 installs)
- NetFlow LOGIC (1)
- ALEXA (2)
- PDI (3)
- MQTT Modular (4)

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# 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	<ul style="list-style-type: none"><li>Assigned to Windows systems</li><li>Installs <b>App1</b></li></ul>
AD	<ul style="list-style-type: none"><li>Assigned to Active Directory servers</li><li>Installs <b>App2</b></li></ul>
Net10	<ul style="list-style-type: none"><li>Assigned to hosts on <b>10.1.2.*</b> subnet</li><li>Installs <b>App3</b> and <b>App4</b></li></ul>

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# Enabling Forwarder Management

---

1. On deployment server: Add one or more apps in  
**SPLUNK\_HOME/etc/deployment-apps**
2. On forwarders: Set up the deployment client
  - Run **splunk set deploy-poll <deployment\_server:splunkd\_port>**
  - Run **splunk restart**
3. In Forwarder Management UI: Create one or more server classes
4. On deployment server: Verify deployment clients and deployment status
5. On forwarders: Verify **SPLUNK\_HOME/etc/apps** folder for deployed apps

# Configuring Deployment Clients

- On prospective deployment clients (usually forwarders):
  1. Run: **splunk set deploy-poll <deployment\_server:splunkd\_port>**
    - Creates **deploymentclient.conf** in **SPLUNK\_HOME/etc/system/local**
    - Alternatively create **deploymentclient.conf** manually
  2. 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 = 600
```

# 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

0 Total downloads  
IN THE LAST 1 HOUR

Apps (1) **Server Classes (0)** Clients (0)

No server classes. Learn more. [Learn more](#) or [create one](#)

Select the Server Classes tab

1 Client  
PHONED HOME IN THE LAST 24 HOURS

0 Clients  
DEPLOYMENT ERRORS

0 Total downloads  
IN THE LAST 1 HOUR

Apps (1) **Server Classes (1)** Clients (1)

All Server Classes ▾ filter

1 Server Classes 10 Per Page ▾

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

New Server Class

Name

Cancel Save

Enter a name for the new server class

2 New Server Class

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# Selecting Apps for the Server Class

The screenshot shows the 'Server Class: uf\_base' configuration page. At the top left is the title 'Server Class: uf\_base'. Below it is a link 'Back to Forwarder Management'. On the right are buttons for 'Edit' and 'Documentation'. The main content area displays a message 'You haven't added any apps' and features a green 'Add Apps' button with a '1' badge. A modal window titled 'Edit Apps' is open, showing the 'Server Class: uf\_base'. It contains two sections: 'Unselected Apps' and 'Selected Apps'. In the 'Unselected Apps' section, there is a 'filter' input field and a list with 'uf\_base' (highlighted with a red box and a '2' badge) and 'hf\_base'. A yellow callout bubble points from the 'uf\_base' item to the text 'Select app to move it to Selected Apps'. In the 'Selected Apps' section, there is also a 'filter' input field and a list with 'uf\_base'. On the right side of the modal are buttons for 'Documentation', 'Cancel', and a green 'Save' button with a '3' badge.

1 Add Apps

You haven't added any apps

2 Select app to move it to Selected Apps

3 Save

4 Documentation

5 Cancel

6 Save

7 Edit

8 Documentation

9 Back to Forwarder Management

10 You haven't added any clients

11 Add Clients

12 Edit Apps

13 Server Class: uf\_base

14 1 Unselected App

15 filter

16 uf\_base

17 hf\_base

18 1 Selected App

19 filter

20 uf\_base

21 Documentation

22 Cancel

23 Save

24 Server Class: uf\_base

25 You haven't added any apps

26 Add Apps

27 Documentation

28 Cancel

29 Save

30 Edit

31 Documentation

32 Back to Forwarder Management

33 You haven't added any clients

34 Add Clients

35 1 Unselected App

36 filter

37 uf\_base

38 hf\_base

39 1 Selected App

40 filter

41 uf\_base

42 Documentation

43 Cancel

44 Save

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# Post Deployment Behavior Setting

**Server Class: uf\_base**

[Edit ▾](#) [Documentation ↗](#)

[Back to Forwarder Management](#)

Apps [Edit](#)

Deployed Successfully ▾

1 Apps 10 Per Page ▾

Name	Actions	After Installation	Clients
uf_base	<a href="#">Edit ▾</a> <a href="#">Edit</a> <a href="#">Uninstall</a>	Enable App	0 deployed

**Edit App: uf\_base**

Documentation ↗

Server Classes  
 [x](#) [+](#)

After Installation  
 Enable App  
 Restart Splunkd

Ensure Restart  
Splunkd is enabled

3 [Cancel](#) [Save](#)

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# Selecting Clients for the Server Class

## Server Class: uf\_base

< Back to Forwarder Management

Apps Edit

Deployed Successful

1 Apps 10 Per Page ▾

Name

uf\_base

You haven't added any clients yet.

1 Add Clients

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

3 Save

Include (whitelist)

ip-10\*

Can be client name, host name.  
Examples: 185.2.3.\* , fwdr-\*  
Learn more ↗

Exclude (blacklist)

Optional

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

Filter by Machine Type (machineTypesFilter)

+ Optional

All Matched Unmatched filter

1 10 Per Page ▾

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

- 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

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105

Splunk Enterprise Data Administration

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15 September 2021

# Verifying Clients Are Receiving Apps

---

- Confirm expected app directories and contents
  - As **SPLUNK\_HOME/etc/apps/app\_name** on deployment clients
- App changes on DS causes client to reload
  - Occurs after client's next phone-home
  - To change the app settings using Forwarder Management, use app's **Edit** menu associated with the server class
  - To change inputs for an app: **Settings > Data Inputs > Forwarded Inputs**
- Set post-deployment behavior to automatically restart the forwarder
- To troubleshoot the deployment client
  - Check the deployment server settings: **splunk show deploy-poll**

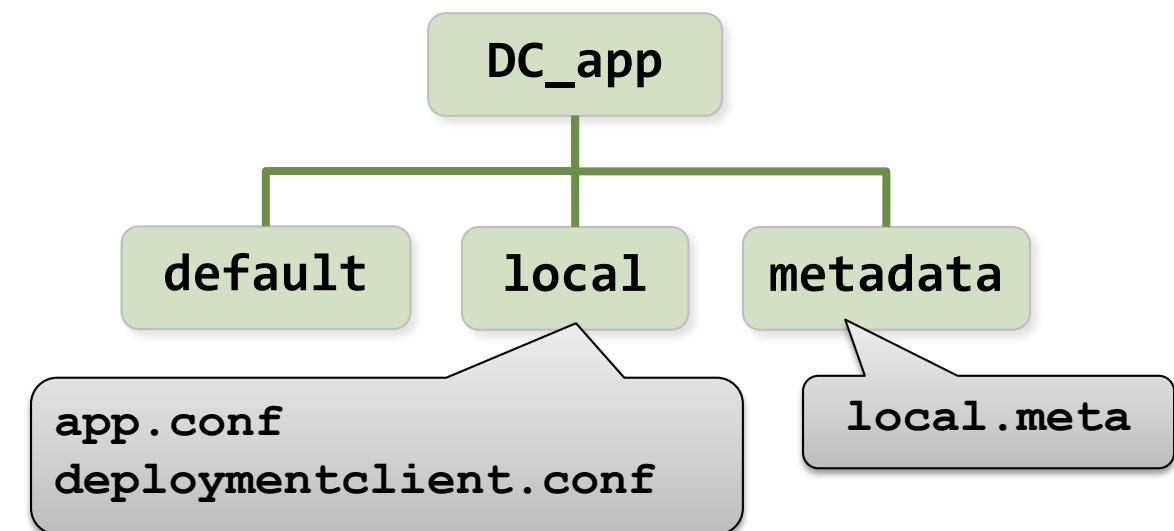
# Reload Deployment Server

---

- DS uses checksums to compare app on server with client
- Checksums are updated during Splunk start
- Issue:
  - DS is unaware if deployed app configuration files are edited manually
  - Restarting Splunk on DS may be costly
- Solution:
  - Run **splunk reload deploy-server** on the DS to re-cache the deployable apps and update checksums (without Splunk restart).
  - Next time client phones home, app checksums are different, causing the app to be re-deployed

# Manage Deployment Client Settings Centrally

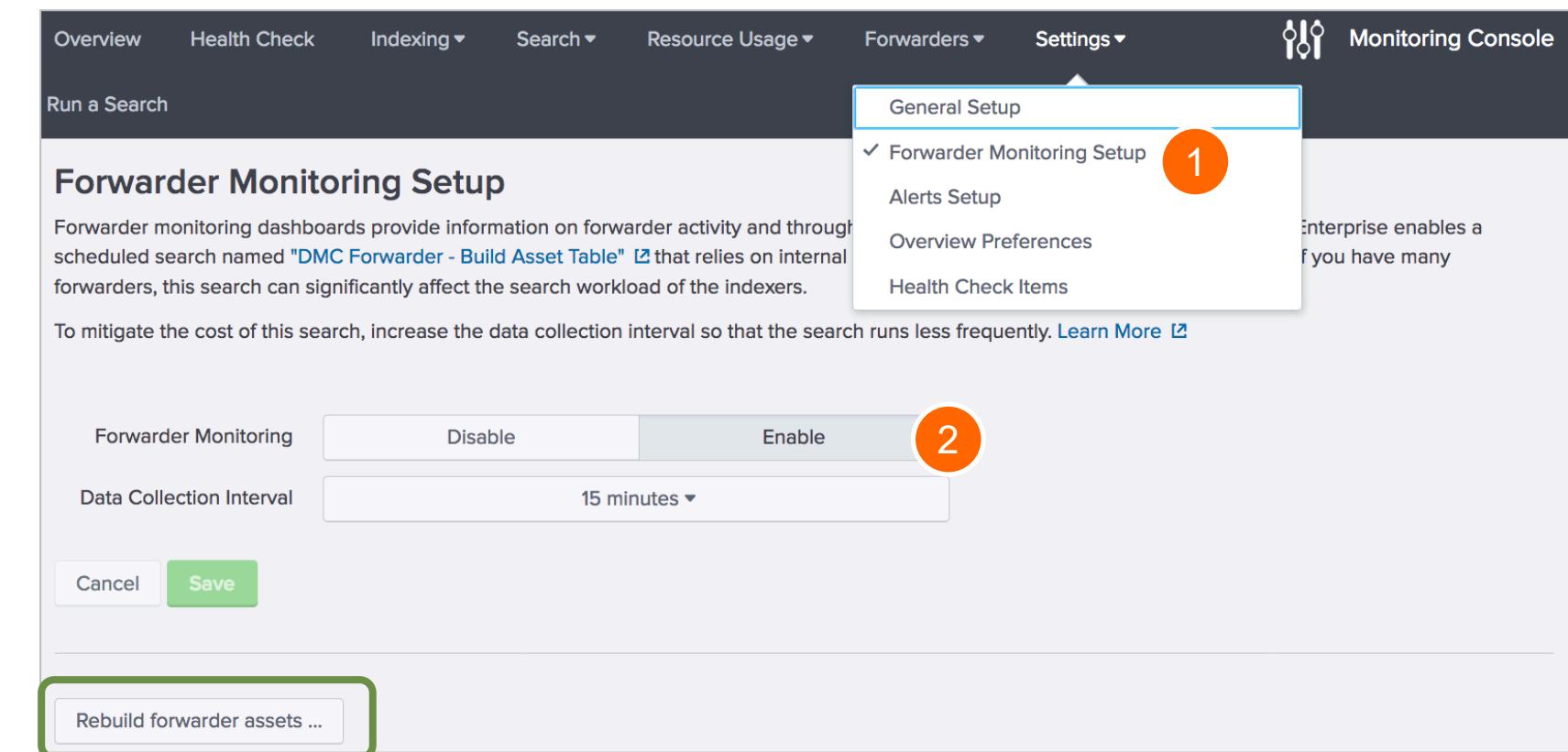
- Use an app to manage deployment client settings
  - Create a deployment client settings app (example: **DC\_app**)
  - Move **deploymentclient.conf** settings from **etc/system/local/** to **etc/apps/DC\_app/local/**
  - Deploy **DC\_app** to clients using a Server Class



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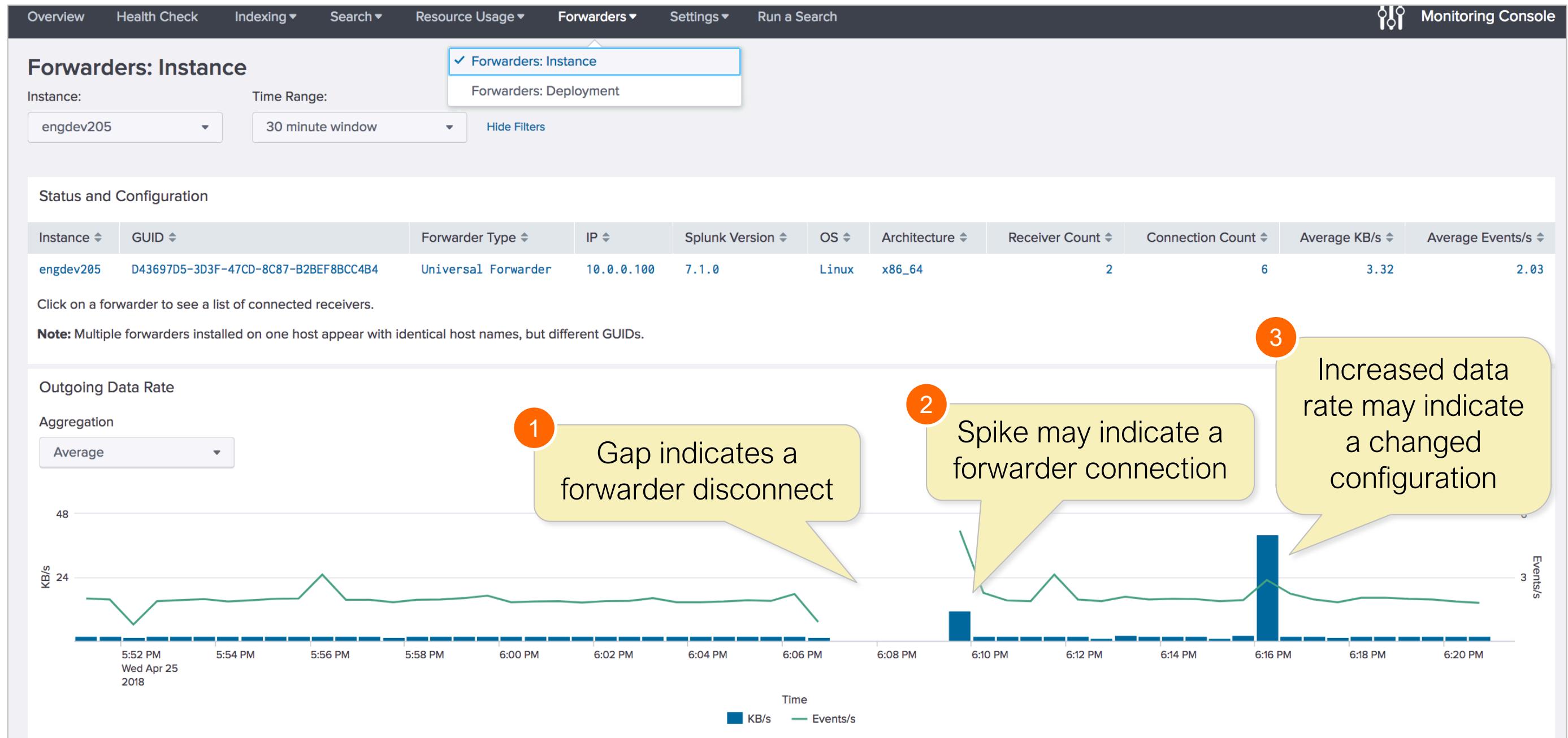
# Forwarder Monitoring with Monitoring Console

- Provides valuable information on forwarder activity and throughput
- Runs a scheduled search that builds a forwarder asset table
  - Runs every 15 minutes by default
  - Relies on forwarder internal logs
  - Can affect search workload if you have many forwarders
  - Can be rebuilt manually
- Enabled with:
  1. MC: Settings > Forwarder Monitoring Setup
  2. Forwarder Monitoring: Enable



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# Forwarder Monitoring with MC



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# Useful Commands

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

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# Module 4 Knowledge Check

---

- On the DS, what is the difference between the apps sitting in the **SPLUNK\_HOME/etc/apps** folder versus the **SPLUNK\_HOME/etc/deployment-apps** ?
- When an app is deployed from the DS to the client, where will you find that app on the client by default?
- True or False. Deployment clients poll the DS on port 9997.

# Module 4 Knowledge Check – Answers

---

- On the DS, what is the difference between the apps sitting in the **SPLUNK\_HOME/etc/apps** folder versus the **SPLUNK\_HOME/etc/deployment-apps**?

The apps in the **.../etc/apps** folder are for the Deployment Server and the apps in the **../etc/deployment-apps** are apps for deployment to a client.

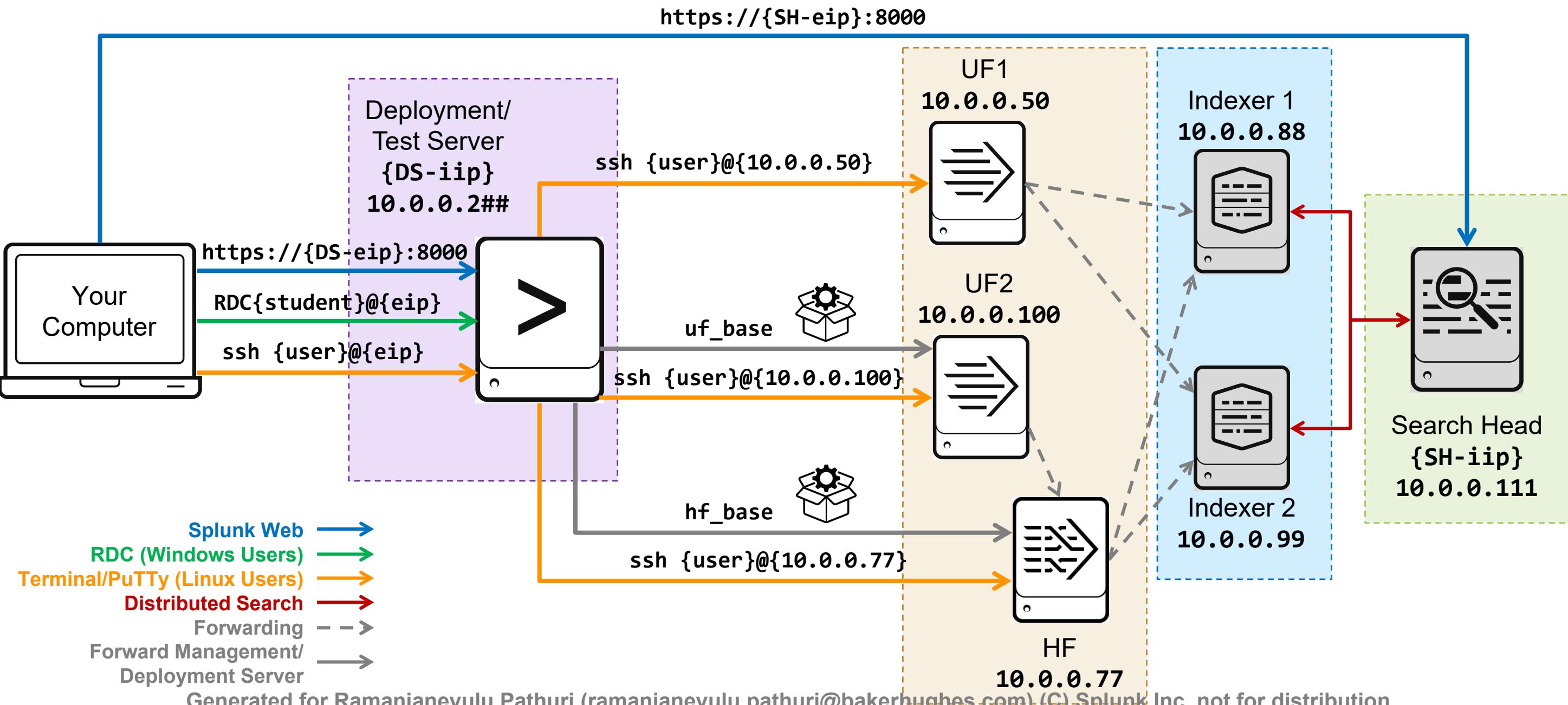
- When an app is deployed from the Deployment Server to the client, where will you find that app on the client by default?

Apps by default are deployed from the DS to the client in the **SPLUNK\_HOME/etc/apps** folder.

- True or False. Clients poll the DS on port 9997.

False. Clients poll the DS on its management port (**8089** by default.)

# Module 4 Lab Exercise – Environment Diagram



# Module 4 Lab Exercise

---

**Time:** 25-30 minutes

**Description:** Configure Forwarder Management

**Tasks:**

- Copy deployment apps to the DS folders
- Configure UF2 as a deployment client
- Enable listening port on HF (as an intermediate forwarder)
- Configure the HF as a deployment client
- Create two server classes to manage UF2 and the HF from the DS
- Confirm deployment of deployment apps on UF2 and HF

# Module 5: Monitor Inputs

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# Module Objectives

---

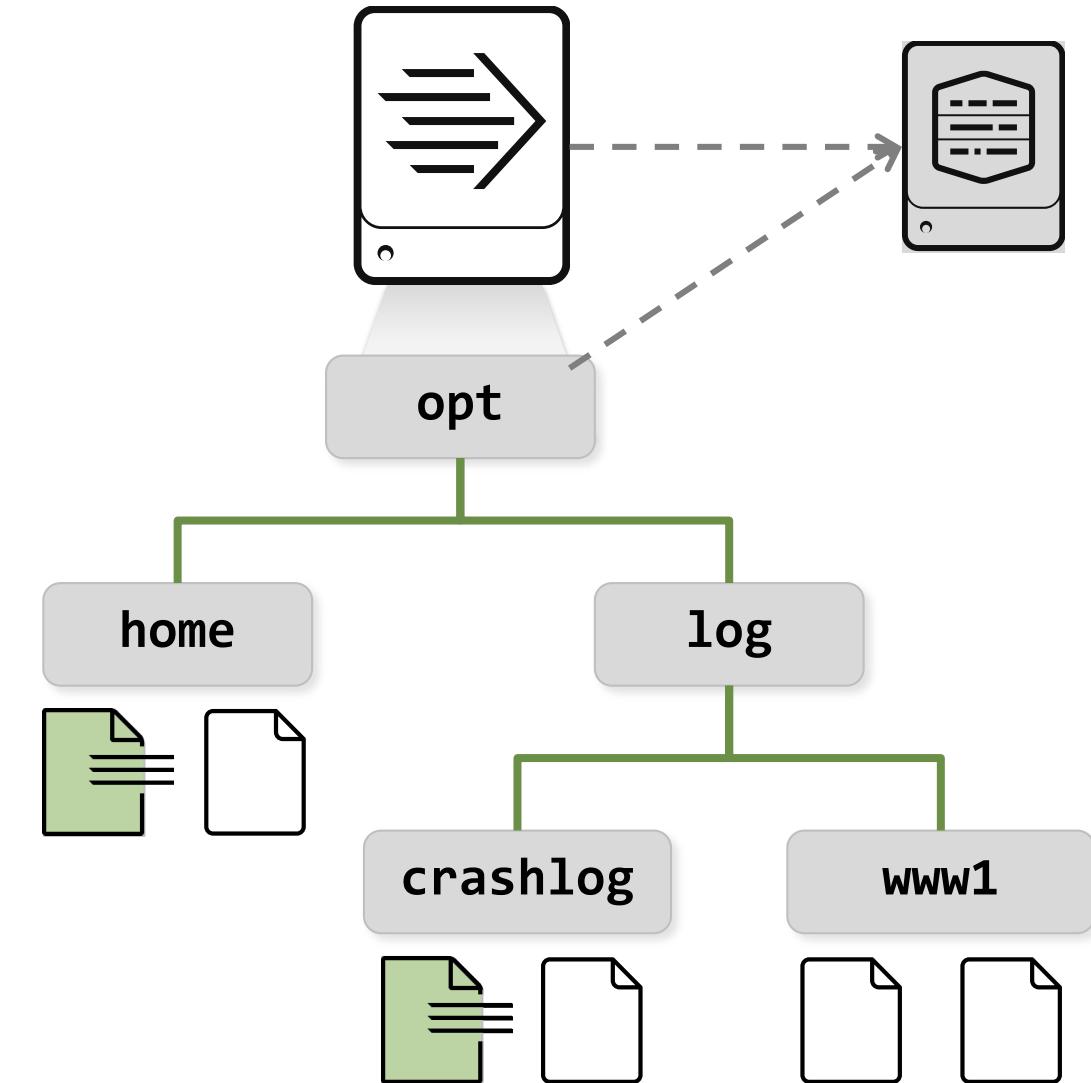
- Create file and directory monitor inputs
- Use optional settings for monitor inputs
- Deploy a remote monitor input

# Monitoring Input Files



## Monitoring Files

- Defines a single file as the source, with input settings (**sourcetype**, **index**, **host**, etc.)
- Ingests current contents of the file
- Continuously monitors for new content using the Splunk Fishbucket to keep a checkpoint
- Supports any text format, such as: plain text, structured text (**CSV**, **XML**, **JSON**), multi-line logs (**Log4J**), and files compressed with **gzip**



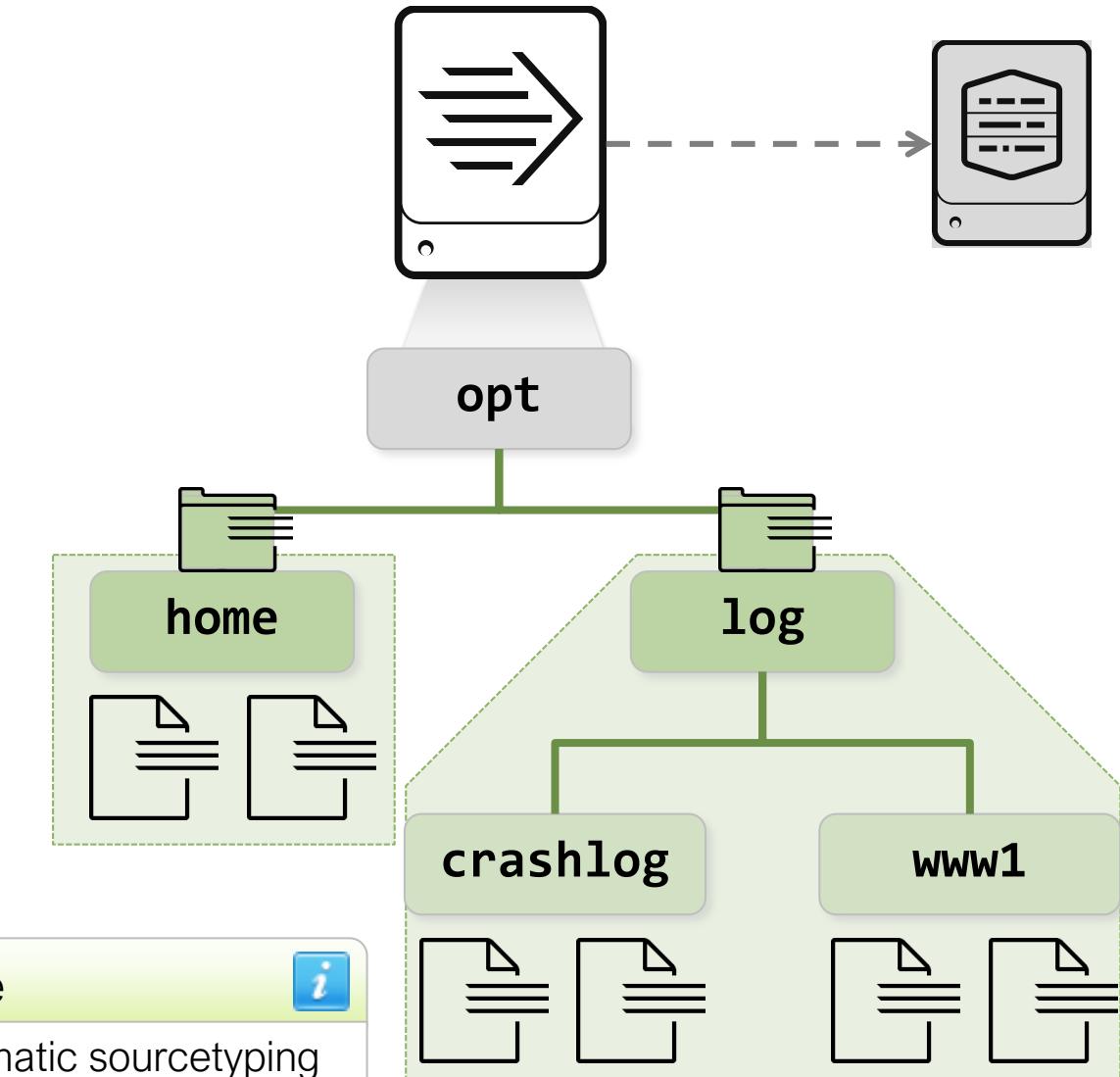
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# Monitoring Input Directories



## Monitoring Directories

- Defines a directory tree as data source
- Recursively traverses directory and monitors all discovered text files
- Unzips compressed files automatically before ingesting them, one at a time
- Includes new files added to the directories
- Detects and handles log file rotation
- Input settings applied to all contained files



Note

Automatic sourcetyping is recommended for directories with mixed file types.

# Monitor Input Options in `inputs.conf`

- Defining the source
  - Place after `monitor://` in stanza header
  - Absolute path to a file or directory
  - Can contain wildcards
- Defining attributes
  - All attributes are optional
  - Default `host` is defined in `SPLUNK_HOME/etc/system/local/inputs.conf`
  - Omitting `sourcetype` causes Splunk to try to determine it automatically
- For more attributes and documentation
  - See `inputs.conf.spec` in `SPLUNK_HOME/etc/system/README`

`inputs.conf` format:

```
[monitor://<path>]
disabled=[0|1|false|true]
sourcetype=<string>
host=<string>
index=<string>
blacklist=<regular expression>
whitelist=<regular expression>
```

Example `monitor` path entries:

```
[monitor:///var/log/secure]
[monitor:///var/log/]
[monitor://C:\logs\system.log]
[monitor://C:\logs\]
```

# File Pathname Wildcards in `inputs.conf`

Wildcard	Description
...	The ellipsis wildcard recurses through directories and subdirectories to match.
*	The asterisk wildcard matches anything in that specific directory path segment but does not go beyond that segment in the path. Normally it should be used at the end of a path.

# File and Directory Matching

```
[monitor:///var/log/www1/secure.log]
sourcetype = linux_secure
```

- ✓ /var/log/www1/secure.log
- ✗ /var/log/www1/secure.1
- ✗ /var/log/www1/logs/secure.log
- ✗ /var/log/www2/secure.log

```
[monitor:///var/log/www1/secure.*]
sourcetype = linux_secure
```

- ✓ /var/log/www1/secure.log
- ✓ /var/log/www1/secure.1
- ✗ /var/log/www1/logs/secure.log
- ✗ /var/log/www2/secure.log

```
[monitor:///var/log/www*/secure.*]
sourcetype = linux_secure
```

- ✓ /var/log/www1/secure.log
- ✓ /var/log/www1/secure.1
- ✗ /var/log/www1/logs/secure.log
- ✓ /var/log/www2/secure.log

```
[monitor:///var/log/.../secure.*]
sourcetype = linux_secure
```

- ✓ /var/log/www1/secure.log
- ✓ /var/log/www1/secure.1
- ✓ /var/log/www1/logs/secure.log
- ✓ /var/log/www2/secure.log

✓ Matches  
✗ Doesn't match

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# Additional Options

## Follow tail (**followTail**)

- Splunk ignores file's existing content, indexing new data as it arrives
- DO NOT leave enabled indefinitely

## Ignore older than (**ignoreOlderThan**)

- Only index events after the time window (such as only events within last 60 days with **ignoreOlderThan = 60d**)
- Completely ignores files with modification time outside the time window (even if the file is updated later)

## Whitelist and Blacklist

- Use regular expressions to filter files or directories from the input
- In case of a conflict, the blacklist prevails

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# Example: Using Whitelist to Include Files

- Files/directories that match the regular expression are indexed
- The syntax for blacklists is identical

```
[monitor:///var/log/www1/]
whitelist = \.log$
```

✓ /var/log/www1/access.log  
✓ /var/log/www1/dbaccess.log  
✓ /var/log/www1/access.1.log  
✗ /var/log/www1/access.log.2

```
[monitor:///var/log/www1/]
whitelist = query\.log$|my\.log$
```

✓ /var/log/www1/query.log  
✓ /var/log/www1/dbquery.log  
✓ /var/log/www1/my.log  
✗ /var/log/www1/my.log4j

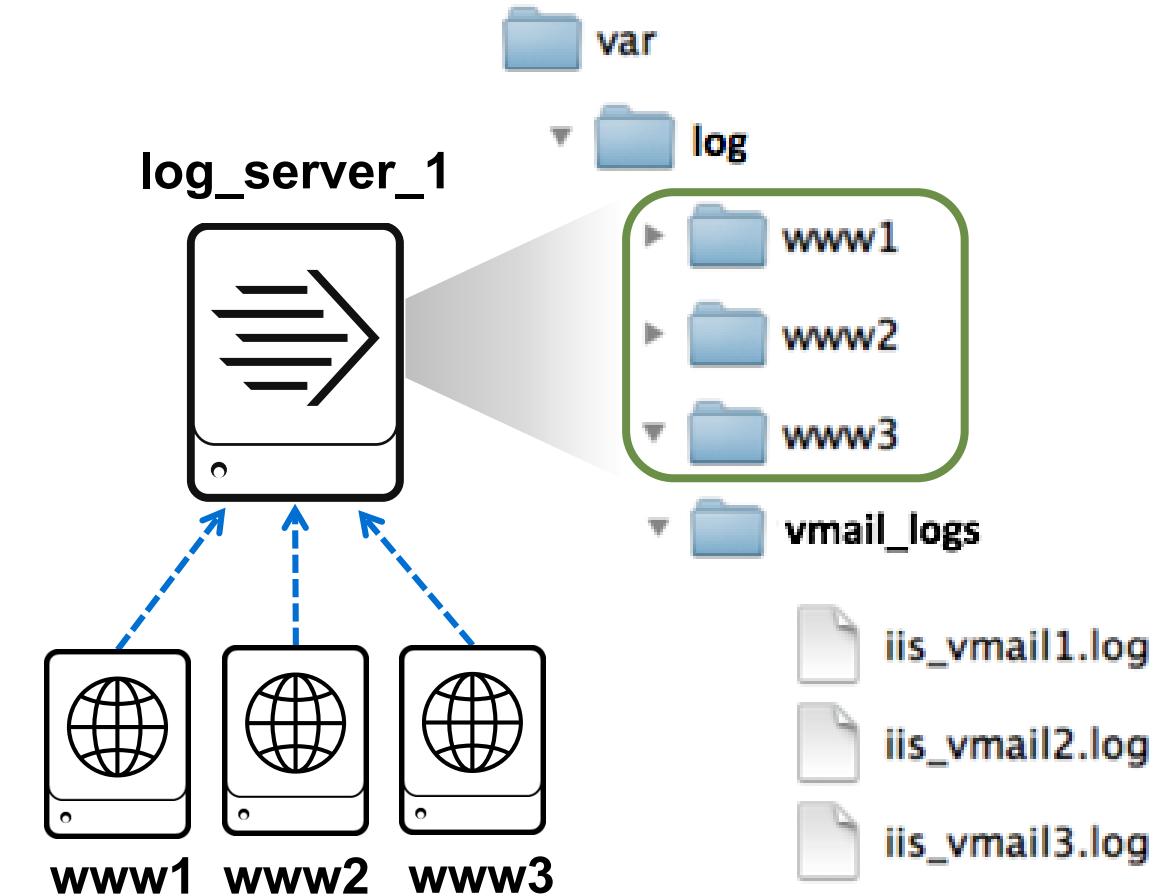
```
[monitor:///var/log/www1/]
whitelist = /query\.log$|/my\.log$
```

✓ /var/log/www1/query.log  
✓ /var/log/www1/my.log  
✗ /var/log/www1/dbquery.log  
✗ /var/log/www1/my.log4j

✓ Matches  
✗ Doesn't  
match

# Overriding the Host Field

- When data is stored on a different server than its origin
  - Example: A web farm where each web server stores its log file on a centralized file server
- By explicitly setting the host
  - Using a specified value
  - Using a directory name
  - Using a regular expression



# Setting the Host With a Directory Name

- Used with **host\_segment = <integer>**

Example: Setting **host\_segment** to 3 uses the 3rd segment of the directory path as the host name for files in that directory

The screenshot shows the 'Add Data' wizard in Splunk. The steps are: Select Source (green dot), Set Source Type (green dot), Input Settings (green dot), Review (gray dot), and Done (gray dot). The 'Review' button is highlighted in green.

The left sidebar shows a file system tree:

- var
- log
  - www1
  - www2
  - www3

A green arrow points from the 'www3' folder to a text input field labeled 'Segment number?'. The input field contains the value '3'. A red box highlights the radio button 'Segment in path'.

The configuration command shown in a black box is:

```
[monitor:///var/log/]
host_segment=3
```

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# Setting the Host With a Regular Expression

- Used with **host\_regex = <regular expression>**

Example: Setting **host\_regex** to `\w+(vmail.+)\.log$` selects the second part of the log file name as its host name

The screenshot shows the "Add Data" wizard in Splunk. The steps are: Select Source (green dot), Set Source Type (green dot), Input Settings (green dot), Review (light gray dot), and Done (light gray dot). The "Input Settings" step is active. On the left, a file system tree shows a path: var/log/vmail\_logs/iis\_vmail1.log, iis\_vmail2.log, and iis\_vmail3.log. A green arrow points from the vmail\_logs folder to the "Regular expression?" field. The "Regular expression?" field contains the value `\w+(vmail.+)\.log$`. To the right of this field is a large black box containing the configuration command:

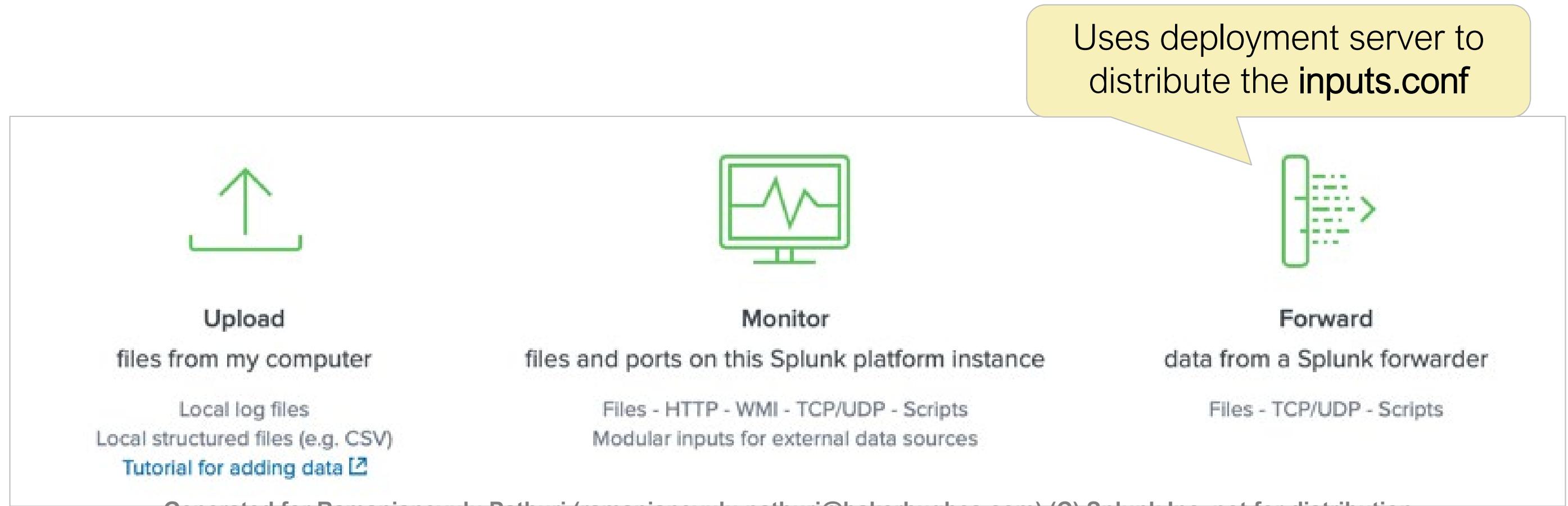
```
[monitor://C:\var\log\vmail_logs]
host_regex=\w+(vmail+)\.log$
```

A red box highlights the radio button for "Regular expression on path".

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# Creating Forwarded Inputs

- Use the deployment server to create forwarded inputs
- Optionally create deployment apps for configuring inputs on deployment clients



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# Creating Forwarded Inputs (cont.)

Add Data

Select Forwarders   Select Source   Input Settings   Review   Done

Next >

## Select Forwarders

Create or select a server class for data inputs. Use this page only in a single-instance Splunk environment.

To enable forwarding of data from deployment clients to this instance, set the output con

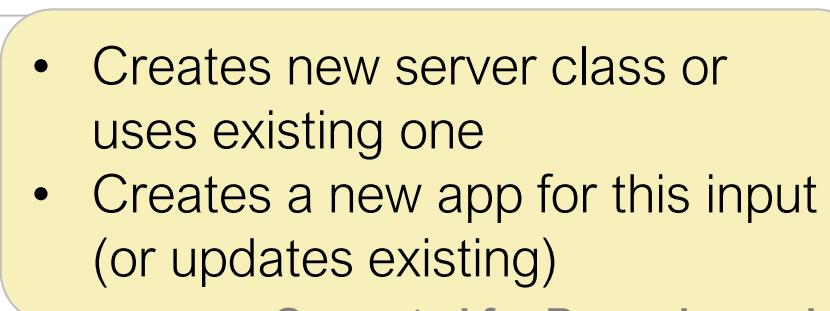
Select Server Class	New	Existing
---------------------	-----	----------

Available host(s)

LINUX ip-10-0-0-100

add all >

New Server Class Name eng\_webservers



• Creates new server class or uses existing one  
• Creates a new app for this input (or updates existing)

Add Data

Select Forwarders   Select Source   Input Settings   Review   Done

Next >

## Select Forwarders

Configure selected Splunk Universal Forwarders to monitor both existing an file or directory. If you choose to monitor a directory, you can only assign a s the data within that directory. If a directory contains different log files from va sources, configure individual file monitor inputs for each type of log file (you opportunity to set individual source types this way). If the specified directory subdirectories, Splunk recursively examines them for new files. [Learn More](#)

File or Directory ? /opt/log/www2

On Windows: c:\apache\apache.error.log or \\hostname\apache.error.log. On Unix: /var/log or /mnt/www01/var

Whitelist ? optional

Blacklist ? optional

Files & Directories

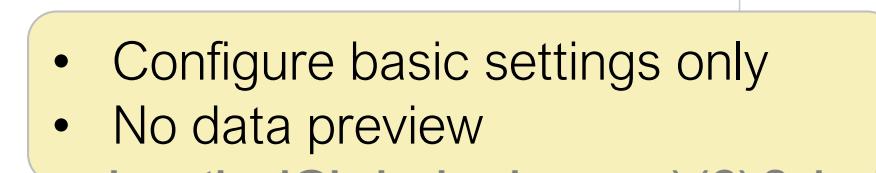
Upload a file, index a local file, or monitor an entire directory.

TCP / UDP

Configure Splunk to listen on a network port.

Scripts

Get data from any API, service, or database with a script.



• Configure basic settings only  
• No data preview

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# Editing Forwarded Inputs

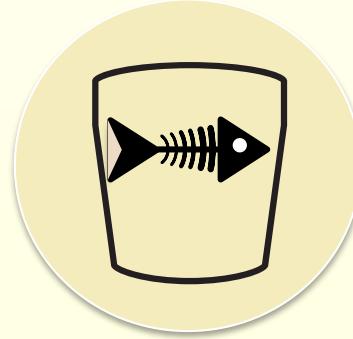
The screenshot shows the 'Forwarded inputs' configuration page in Splunk. The left sidebar lists 'Type' (Windows Event Logs) and 'Files & Directories'. A green arrow points to the 'Files & Directories' section, which is highlighted with a red circle labeled '1'. Inside this section, two items are listed: '/opt/log' and '/opt/www2/access.log'. The item '/opt/www2/access.log' is highlighted with a red circle labeled '2'. The main configuration area on the right is titled '3' and contains the following fields:

- Type**: Windows Event Logs (Collect event logs from forwarders)
- Host**: Set host: constant value (Specify method for getting host field for events coming from this source)
- Source type**: Set the source type: Automatic (When this is set to automatic, Splunk classifies and assigns the sourcetype automatically, and gives unknown sourcetypes placeholder names)
- Index**: Index: test
- Advanced options**: Whitelist: /opt/log (Specify a regex that files from this source must match to be monitored by Splunk)  
Blacklist: /opt/www2/access.log (Specify a regex that files from this source must NOT match to be monitored by Splunk)

At the bottom right are 'Cancel' and 'Save' buttons.

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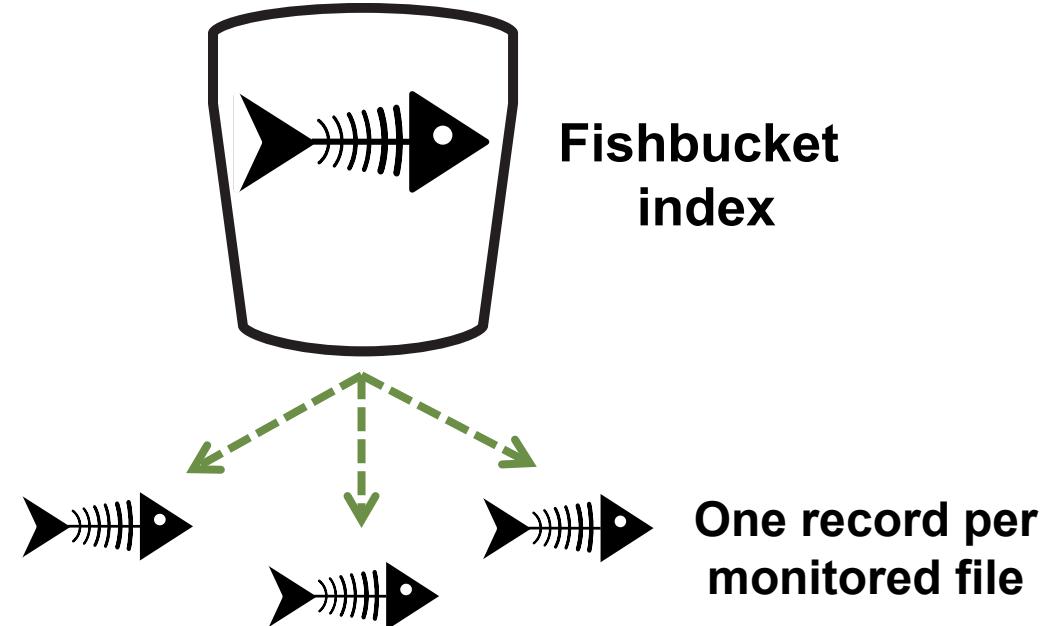
# What is the Fishbucket?



## Fishbucket

- Allows Splunk to track monitored input files
- Contains file metadata which identifies a pointer to the file, and a pointer to where Splunk last read the file
- Exists on all Splunk instances
- Stored in a special subdirectory found at **SPLUNK\_DB/fishbucket**

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Includes:

- **Head:** Pointer to the file
- **Tail:** Pointer showing where Splunk last left off indexing in the file

# Editing Inputs and Re-indexing Data

---

- Editing the **inputs.conf**
  - Only applies changes to new data
  - Does not change or cause re-indexing of existing ingested data
- To re-index:
  1. Delete the old, erroneous data on the indexers
    - May require assistance from the system administrator
  2. Change the **inputs.conf** on the deployment server (or forwarders)
  3. Reset the fishbucket checkpoint on the involved forwarders
  4. Restart Splunk forwarders

# Resetting Input File Monitors

1. Stop Splunk
2. Reset applicable file monitors on the source system
  - Individually for each source:

```
splunk cmd btprobe -d SPLUNK_DB/fishbucket/splunk_private_db  
--file <source> --reset
```

- All sources (use only on test systems / with extreme caution):

```
splunk clean eventdata -index _thefishbucket
```

or

```
rm -r SPLUNK_DB/fishbucket
```

3. Start Splunk

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## Warning

Resetting the fishbucket forces re-indexing of all file monitors affected. The re-indexing results in more license usage.

# Module 5 Knowledge Check

---

- True or False. You can use the wildcards ... and \* in the whitelist and blacklist.
- True or False. The **host\_regex** setting in **inputs.conf** can extract the host from the filename only.
- After a file monitor is set up and is running, if you change the host value, will the new host value be reflected for already ingested data?
- In our environment, we have a UF, an Indexer and a SH. Which instance contains the fishbucket?

# Module 5 Knowledge Check – Answers

---

- True or False. You can use the wildcards, ... and \* in the whitelist and blacklist.  
False. The wildcards, ... and \* are meant for the stanzas.
- True or False. The **host\_regex** setting in **inputs.conf** can extract the host from the filename only.  
False. It can extract the host from the path of the file.
- After a file monitor is set up and is running, if you change the host value, will the new host value be reflected for already ingested data?  
No. All changes apply to the new data only. To reflect changes for your old data: delete the data, reset the fishbucket, and re-ingest the old data.
- In our environment, we have a UF, an Indexer and a SH. Which instance contains the fishbucket?  
Each instance will have its own local fishbucket.

# Module 5 Lab Exercise

---

**Time:** 20-25 minutes

**Description:** File Monitor Input

**Tasks:**

- Add a monitor input for a remote directory on UF2 to the **test** index
- Modify the **inputs.conf** file using the following caveats
  - Send the source logs to the **sales** index
  - Override the **default-host** name value
  - Monitor only the **www.\*** sub-directories
  - Exclude the indexing of the **secure.log** files
- Re-deploy the **inputs.conf** file

# Module 6: Network Inputs

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# Module Objectives

---

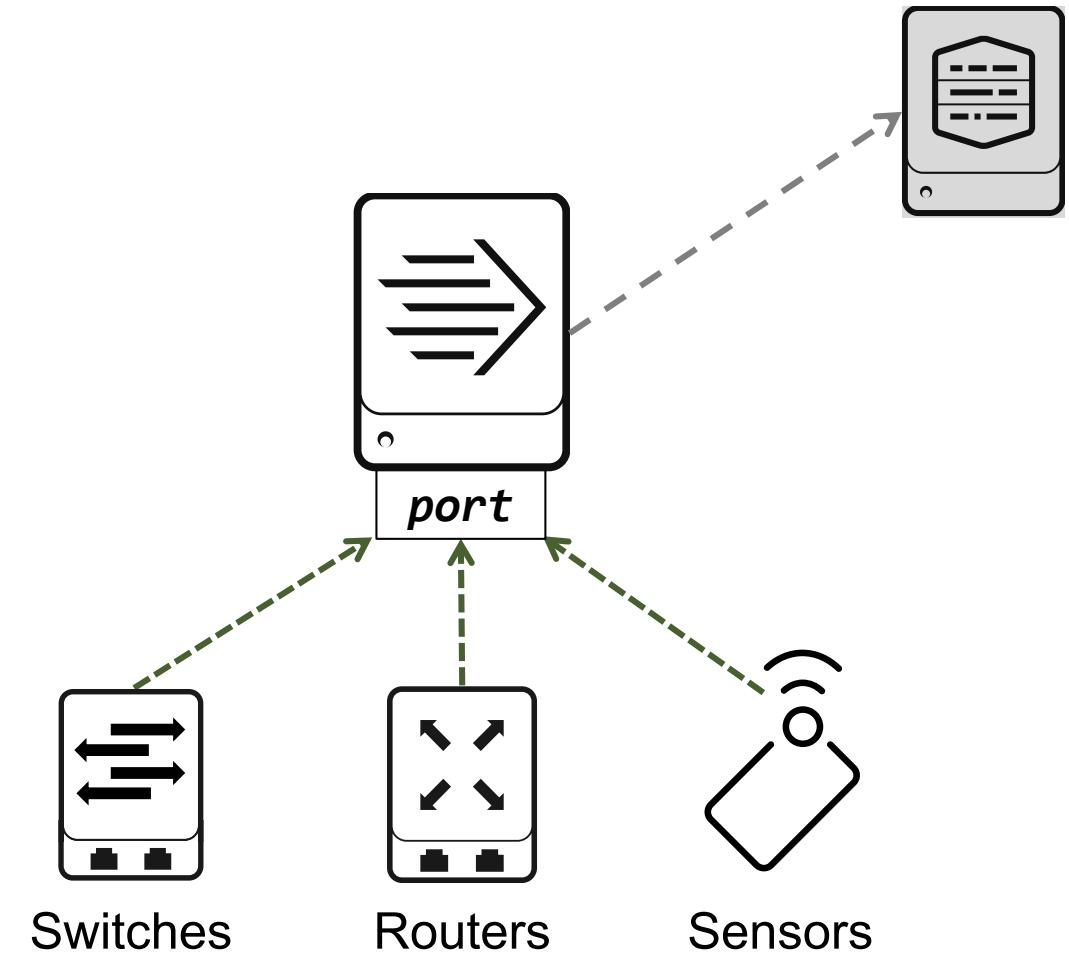
- Create network (TCP and UDP) inputs
- Describe optional settings for network inputs

# Network Inputs



## Network Inputs

- Input data sent to a Splunk instance on a TCP/UDP port (for example: Syslog)
- Adds a layer of resiliency (buffering, load balancing, cloning, indexer restarts)
- Can minimize indexer workload by managing network connections on the forwarder (which can additionally bridge network segments)



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# Adding Network Input

**Add Data**      Select Source    Input Settings    Review    Done    < Back    Next >

**Files & Directories**  
Upload a file, index a local file, or monitor an entire directory.

**HTTP Event Collector**  
Configure tokens that clients can use to send data over HTTP or HTTPS.

**TCP / UDP**  
Configure the Splunk platform to listen on a network port.

**Scripts**  
Get data from any API, service, or database with a script.

**System**  
This is a component of the Splunk Platform.

Configure this instance to listen on any TCP or UDP port to capture data sent over the network (such as syslog). [Learn More](#)

TCP     UDP

Port ? **9001**  
Example: 514

Source name override ? **dns\_10-1-2-3**  
host:port

Only accept connection from ? **10.1.2.3**  
example: 10.1.2.3, !badhost.splunk.com, \*.splunk.com

If not specified, default:  
• TCP: `tcp:<port>`  
• UDP: `udp:<port>`

• If specified, only accepts connections from this host  
• If unspecified: all hosts are allowed

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# Optional Network Input Settings

- Edit the stanza directly to fine-tune input settings:
  - Metadata override
  - Sender filtering options
  - Network input queues
    - Memory queues
    - Persistent queues

```
[udp://<[host:]port>]  
connection_host = dns  
sourcetype=<string>
```

```
[tcp://<[host:]port>]  
connection_host = dns  
source=<string>
```

Examples:

```
[udp://514]  
connection_host = dns  
sourcetype=syslog
```

```
[tcp://10.1.2.3:9001]  
connection_host = dns  
source = dns_10-1-2-3
```

# Network Input: Host Field

- Set in **inputs.conf** with the **connection\_host** attribute:
  - **dns** (default for TCP inputs)
    - The host is set to a DNS name using reverse IP lookup
  - **ip** (default for UDP inputs)
    - The host is set to the originating host's IP address
  - **none** (Custom in the UI)
    - Requires explicit setting of the **host** value

```
[tcp://9002]
sourcetype=auth-data
connection_host=dns

[tcp://9003]
sourcetype=ops-data
connection_host=ip

[tcp://9001]
sourcetype=dnslog
connection_host=none
host=dnsserver
```

The screenshot shows the 'Source' configuration page in Splunk. The 'Host' section is highlighted with a green rounded rectangle. In this section, there is a 'Set host' button with three options: 'IP' (radio button), 'DNS' (radio button), and 'Custom' (radio button, which is selected). Below the button is a text input field containing the value 'dnsserver'. Above the 'Host' section, there is a 'More settings' checkbox which is checked.

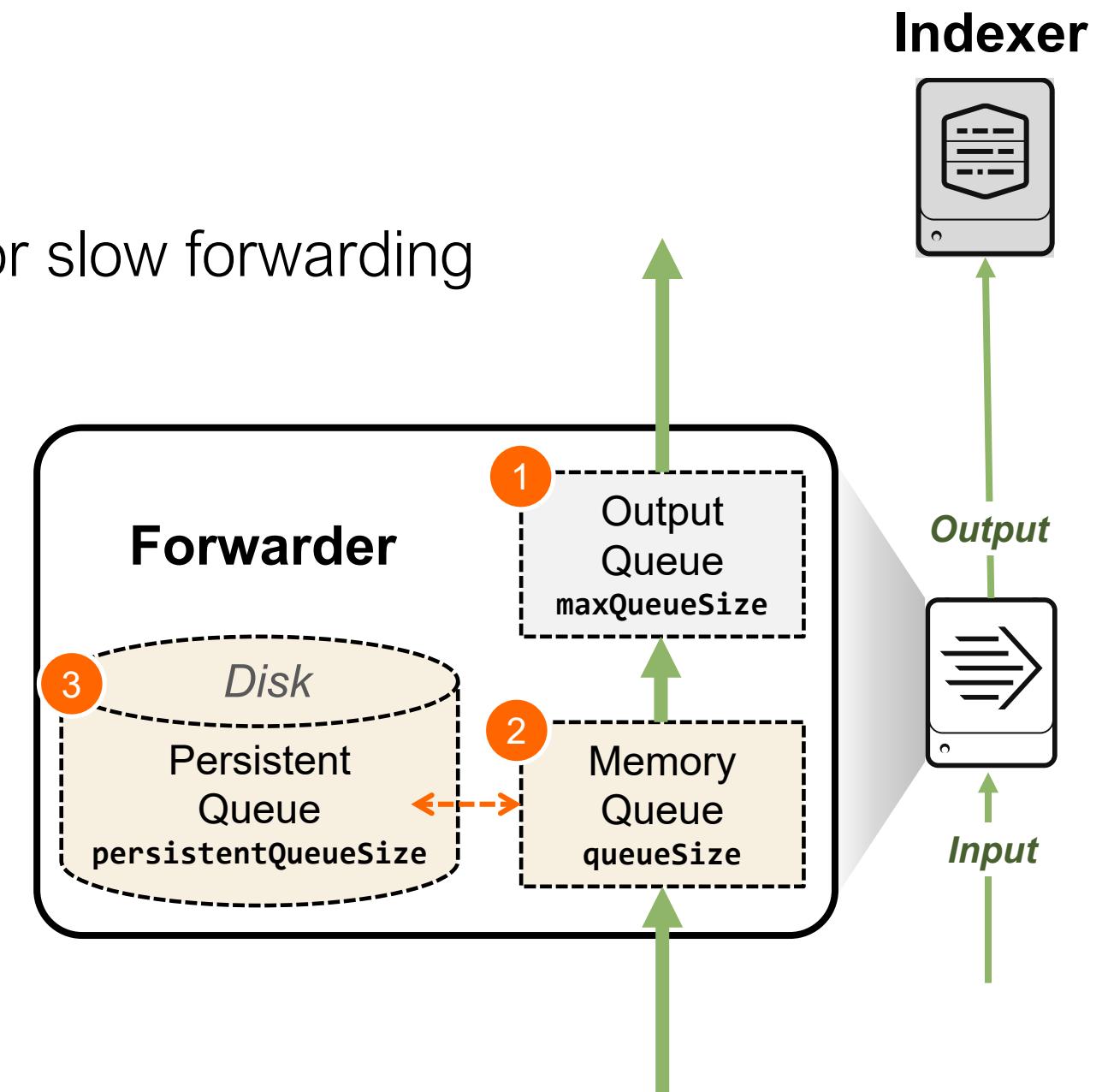
# Network Input: Sender Filtering Options

- Specify which input streams are accepted by Splunk
- Example:
  - Network devices are sending syslog reports (UDP 514) to the Splunk network input, but want to accept UDP inputs selectively
- Use **acceptFrom = <network\_acl>**
  - List address rules separated by commas or spaces
  - Available formats include:
    - ▶ Single IPv4 or IPv6 address
    - ▶ CIDR block of addresses
    - ▶ DNS name
    - ▶ Wildcards: \* (any), ! (not)

```
[udp://514]
sourcetype=syslog
connection_host=ip
acceptFrom=!10.1/16, 10/8
```

# Network Input: Queues

- Provide input flow control
- Apply to TCP, UDP, scripted input
- Control network data bursts, slow resources, or slow forwarding
  1. If indexers can't be reached:
    - Data is stored in the output queue
  2. If the output queue is full:
    - Data is stored in the memory queue
  3. If the memory queue is full:
    - Data is stored in the persistent queue
- Persistent queue preserves across restarts
  - Not a solution for input failure



# Network Input: Setting Queue Attributes

- Memory queue
  - Set with **queueSize** (default = 500 KB)
  - Memory-resident queue that buffers data before forwarding
  - Useful if indexer receives data slower than forwarder is acquiring it
  - Independent of forwarder's **maxQueueSize** attribute
- Persistent queue
  - Set with **persistentQueueSize** (doesn't exist by default)
  - Provides additional, file-system buffering of data
  - Written to **SPLUNK\_HOME/var/run/splunk/...**
  - Useful for high-volume data and in  
the case of network outage to indexers

**inputs.conf**

```
[tcp://9001]
queueSize=10MB
persistentQueueSize=5GB
```

# Special Handling and Best Practices

## UDP

- Splunk merges UDP data until it finds a timestamp by default
- Default behavior can be overridden during the parsing phase

## Syslog

- Send data to a syslog collector that writes into a directory structure (for example: **/var/log/syslog/servername/filename.txt**)
- Monitor the directory and use **host\_segment**
- [docs.splunk.com/Documentation/Splunk/latest/Data/HowSplunkEnterprisehandlessyslogdata](https://docs.splunk.com/Documentation/Splunk/latest/Data/HowSplunkEnterprisehandlessyslogdata)

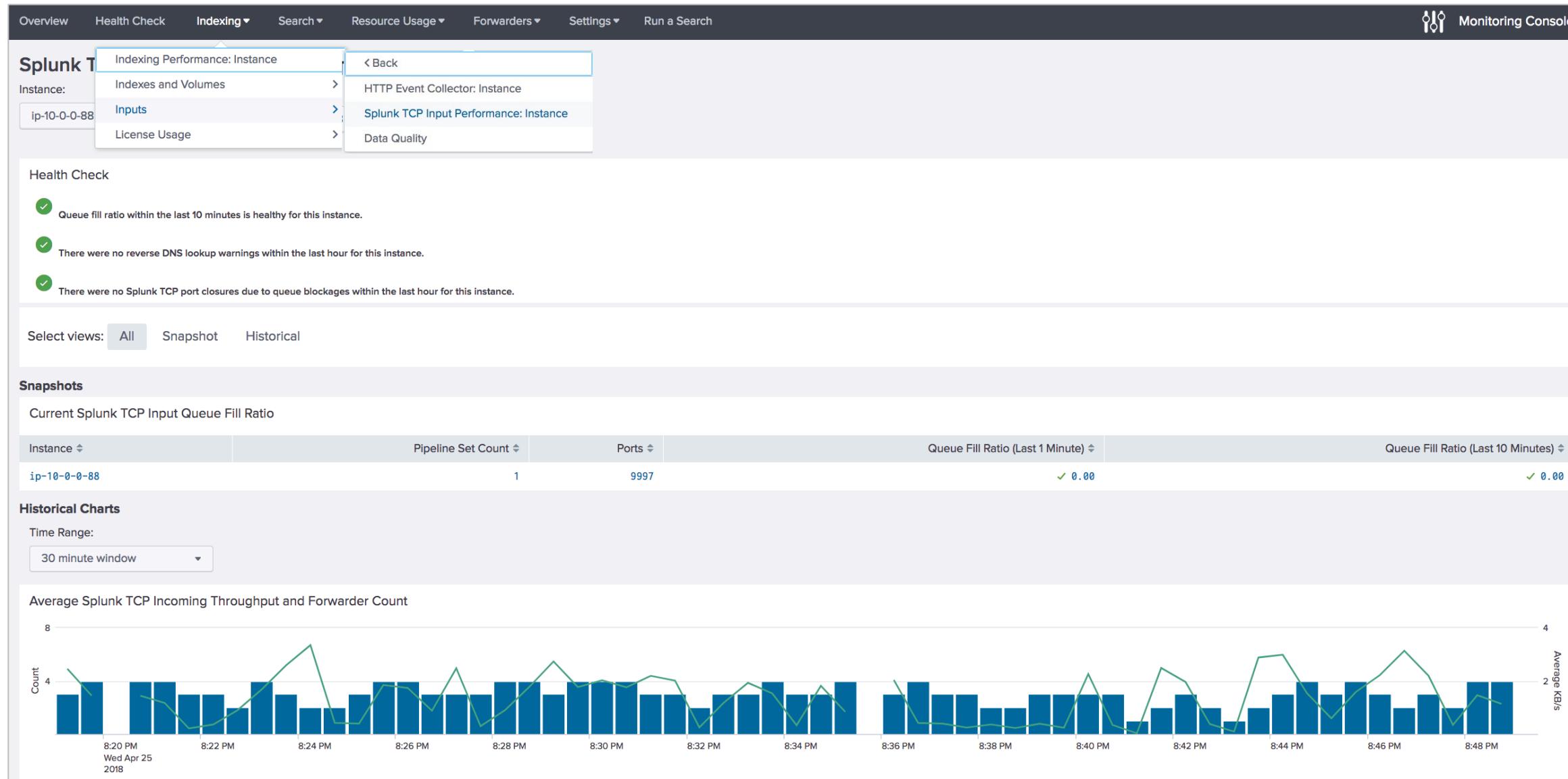
## SNMP traps

- Write the traps to a file and use the monitor input
- [docs.splunk.com/Documentation/Splunk/latest/Data/SendSNMPEventstoSplunk](https://docs.splunk.com/Documentation/Splunk/latest/Data/SendSNMPEventstoSplunk)

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# Monitoring with MC: Splunk TCP Inputs

For remote input monitoring, click Indexing > Inputs > Splunk TCP Input Performance



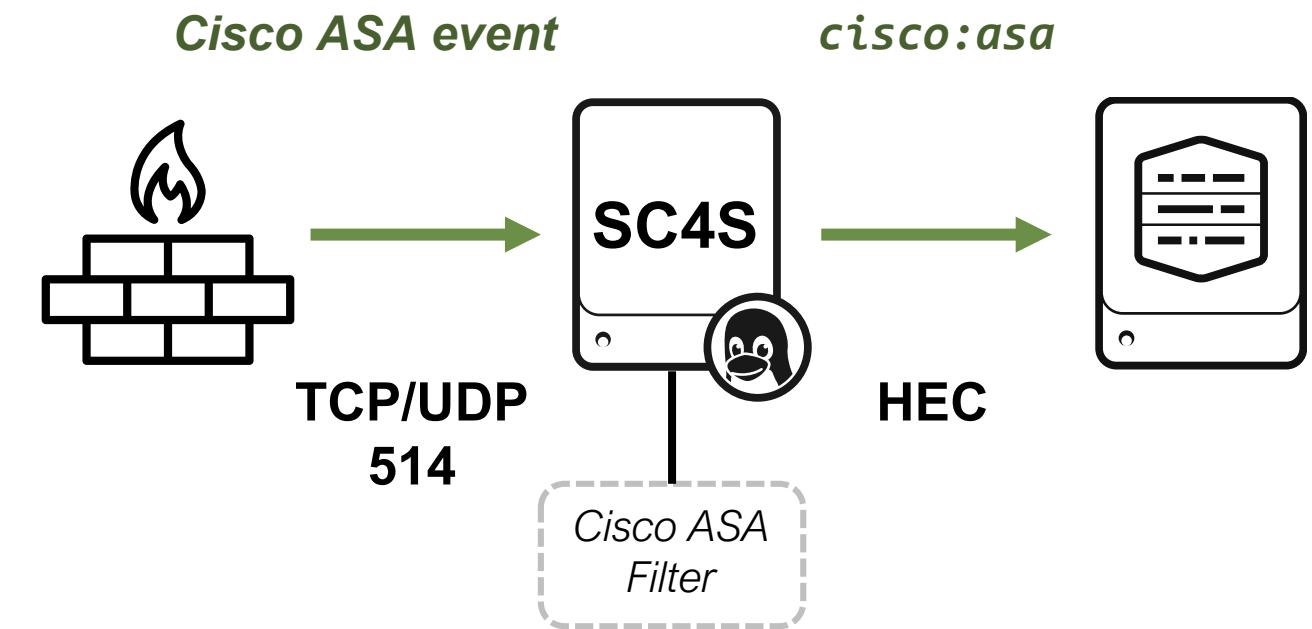
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# Understanding Splunk Connect for Syslog (SC4S)



## Splunk Connect for Syslog

- Lower burden of getting syslog into Splunk
- Consistent, documented, repeatable
- Turnkey data ingestion for common source types
- Lower Splunk overhead for improved scaling and data distribution
- Containerized Syslog appliance



## Identify / Parse / Format

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# Module 6 Knowledge Check

---

- Why is it a Best Practice to send data to a syslog collector that writes into a directory structure and then have a UF/HF ingest the data from the directory structure?
- Is it possible to use the host value and not the DNS name or IP address for a TCP input? How?

# Module 6 Knowledge Check – Answers

---

- ❑ Why is it a Best Practice to send data to a syslog collector that writes into a directory structure and then have a UF/HF ingest the data from the directory structure?

If the UF has to be restarted, the **\_fishbucket** will prevent data loss.

- ❑ Is it possible to use the host value and not the DNS name or IP address for a TCP input? How?

Yes, it is possible. Under the stanza in **inputs.conf** set the **connection\_host** to none and specify the host value.

# Module 6 Lab Exercise

**Time:** 15 minutes

**Description:** Network Inputs

**Tasks:**

- Create and test a simple TCP-based network input
- On the deployment/test server, add a test network input
- Modify the host value for the test network input

Note 

Your instructor will run a script to send TCP data ports on the forwarder.

Use your assigned port to listen for the TCP data.

# Module 7: Scripted Inputs

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# Module Objectives

---

Create a basic scripted input

# Scripted Inputs



## Scripted Inputs

- Schedules script execution and indexes the output
- Used to collect diagnostic data from OS commands (such as **top**, **netstat**, **vmstat**, **ps** etc.)
- Used by many Splunk apps to gather information from the OS or other server applications
- Can gather transient data that cannot be collected with Monitor or Network inputs (Examples: APIs, message queues, Web services, custom transactions)
- Supports Shell (**.sh**), Batch (**.bat**), PowerShell (**.ps1**) and Python (**.py**) scripts

### Files & Directories

Upload a file, index a local file, or monitor an entire directory.

### HTTP Event Collector

Configure tokens that clients can use to send data over HTTP or HTTPS.

### TCP / UDP

Configure Splunk to listen on a network port.

### Scripts

Get data from any API, service, or database with a script.

### Warning



Splunk only executes scripts from:

- **SPLUNK\_HOME/etc/apps/<app\_name>/bin**
- **SPLUNK\_HOME/bin/scripts**
- **SPLUNK\_HOME/etc/system/bin**

# Defining a Scripted Input

---

1. Develop and test the script
2. Test your script from the context of a Splunk app
  - Copy the script to the app's **bin** directory on a test/dev server
  - Run script using the **splunk cmd *scriptname*** command  
Example: **splunk cmd SPLUNK\_HOME/etc/apps/<app>/bin/myscript.sh**
3. Deploy the script to production servers, for example if using a deployment server:
  - Copy script to **SPLUNK\_HOME/etc/deployment-apps/<app>/bin/**
  - Deploy script using **Add Data > Forward** from Splunk Web
4. Verify the output of the script is being indexed

# Scripted Input Stanza

```
[script://<cmd>]  
passAuth = <username>  
host = <as indicated>  
source = <defaults to script name>  
sourcetype = <defaults to script name>  
interval = <number in seconds or cron syntax>
```

## inputs.conf

Use **passAuth** to run the script as a specified OS user; Splunk passes an authorization token via stdin to the script

Interval is the time period between script executions (default: 60 seconds)

### Warning



Splunk only executes scripts from:

- **SPLUNK\_HOME/etc/apps/<app\_name>/bin**
- **SPLUNK\_HOME/bin/scripts**
- **SPLUNK\_HOME/etc/system/bin**

# Scripted Inputs Example

## Files & Directories

Upload a file, index a local file, or monitor an entire directory.

## HTTP Event Collector

Configure tokens that clients can use to send data over HTTP or HTTPS.

## TCP / UDP

Configure the Splunk platform to listen on a network port.

## Scripts

Get data from any API, service, or database with a script.

```
[script://./bin/myvmstat.sh]
disabled = false
interval = 60.0
source = vmstat
sourcetype = myvmstat
```

## inputs.conf

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Configure this instance to execute a script or command and to capture its output as event data. Scripted inputs are useful when the data that you want to index is not available in a file to monitor.

[Learn More ↗](#)

Script Path

\$SPLUNK\_HOME/bin/scripts ▾

Script Name

myvmstat.sh ▾

Command ?

\$SPLUNK\_HOME/bin/scripts/myvmstat.sh

Interval Input ?

In Seconds ▾

Interval ?

60.0

In Seconds

Cron Schedule

Source name override ?

vmstat

# Editing Scripted Inputs

The screenshot illustrates the process of editing a scripted input in Splunk. It consists of two main panels: a left panel showing a list of scripts and a right panel showing the configuration details for a selected script.

**Left Panel (Script List):**

- Header:** Script
- Breadcrumbs:** Data inputs » Script
- Text:** Showing 1-1 of 1 item
- Search Bar:** filter
- Table Headers:** Command, Interval, Last run, Status
- Table Rows:** One row containing the command `$SPLUNK_HOME/etc/apps/_server_app_devserver_vmstat/bin/myvmstat.sh`, interval 30.0, last run 30.0, and status OK.

**Right Panel (Script Configuration):**

- Title:** \$SPLUNK\_HOME/etc/apps/\_server\_app\_devserver\_vmstat/bin/myvmstat.sh
- Breadcrumbs:** Data inputs » Script » \$SPLUNK\_HOME/etc/apps/\_server\_app\_devserver\_vmstat/bin/myvmstat.sh
- New Remote Script:** (green button)
- Source:**
  - Interval:** 120.0 (Number of seconds to wait before running the command again, or a valid cron schedule.)
  - Source name override:** (If set, overrides the default source value for your script entry (script:path\_to\_script).)
- Source type:**
  - Set sourcetype:** Manual
  - Source type \***: vmstat (If this field is left blank, the default value of script will be used for the source type.)
- Host:** Host field value: (empty input field)
- Index:**
  - Set the destination index for this source:**
  - Index:** (dropdown menu) Options: default, history, itops (selected), main, summary, test

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# Scripted Input Buffering

---

- Potential loss of data
  - Forwarder running the script is not able to connect to the indexer due to networking problems
- Workaround
  - The **queueSize** and **persistentQueueSize** attributes can be set for scripted input (in the **[script://...]** stanza)
  - Buffers data on the forwarder when the network or indexer is unavailable

# Alternates to Using Scripted Input

## Monitor a file containing the output of the script

- Allows the use of Splunk's simple configuration of monitoring files
- Takes advantage of the file system and Splunk's robust file monitoring capabilities
- Can easily recover even when forwarder goes down
- Configured with a scripted log file:
  1. Schedule the script to run using an external scheduler (such as cron)
  2. Append script output to a log file
  3. Set up a monitor input to ingest the log file

## Use Splunk's modular input

- Simple UI for configuring a scripted input
- Appears as its own type of input
- [docs.splunk.com/Documentation/Splunk/latest/AdvancedDev/ModInputsScripts](https://docs.splunk.com/Documentation/Splunk/latest/AdvancedDev/ModInputsScripts)

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# Module 7 Knowledge Check

---

- True or False. Persistent Queue and Memory Queue can be applied to Network as well as Scripted inputs.
- True or False. An interval setting for scripted inputs can be specified in **cron** syntax.

# Module 7 Knowledge Check – Answers

---

- ❑ True or False. Persistent Queue and Memory Queue can be applied to Network as well as Scripted inputs.

True.

- ❑ True or False. An interval setting for scripted inputs can be specified in **cron** syntax.

True. You can specify the interval in either number of seconds or cron syntax.

# Module 7 Lab Exercise

---

**Time:** 10 minutes

**Description:** Scripted Inputs

**Tasks:**

- Add a scripted input on your deployment server
- Deploy the scripted input to your forwarder

# Module 8:

# Agentless Inputs

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# Module Objectives

---

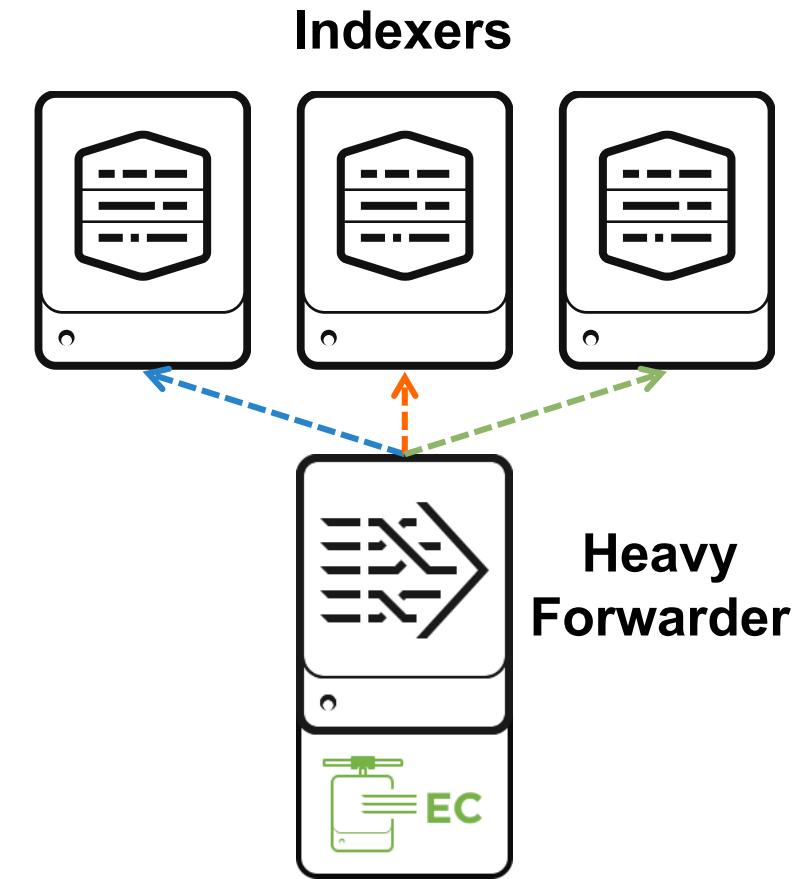
- Configure Splunk HTTP Event Collector (HEC) agentless input
- Describe Splunk App for Stream

# HTTP Event Collector (HEC) Agentless Inputs



## HTTP Event Collector (HEC)

- A token-based HTTP input that is secure and scalable
- Sends events to Splunk without the use of forwarders (such as log data from a web browser, automation scripts, or mobile apps)
- Can facilitate logging from distributed, multi-modal, and/or legacy environments

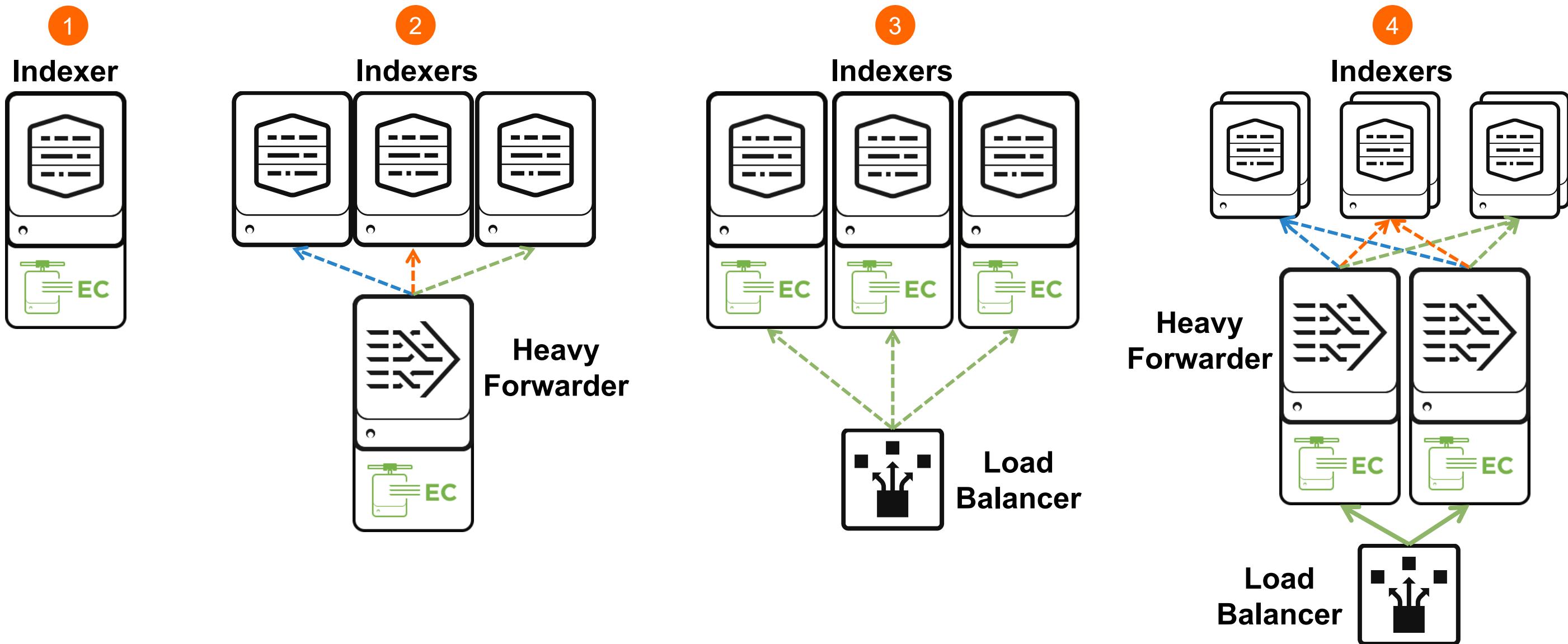


Event collector enabled to receive HTTP events

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# Distributed HEC Deployment Options

HEC can scale by taking advantage of Splunk distributed deployment



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# Configuring HTTP Event Collector

1. Enable the HTTP event collector (disabled by default)
  - Navigate to **Settings > Data inputs > HTTP Event Collector**
  - Click **Global Settings > Enabled**
2. Generate a HTTP-input token by clicking **New Token**
  - The **Add Data** workflow starts
  - Name the input token and optionally set the default source type and index

The screenshot shows the Splunk 'HTTP Event Collector' configuration page. At the top right, there are three buttons: 'Global Settings' (disabled), 'New Token' (highlighted with a red circle labeled '1'), and a button with a question mark icon. Below these are two orange circular buttons labeled '1' and '2'. The main table displays one token entry:

Name	Actions	Token Value	Source Type	Index	Status
iot_sensors	Edit   Disable Delete	af58d9a4-4df6-4fda-a209-1c3988e1ceaf	test		Disabled

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# Sending HTTP Events from a Device

- Create a request with its authentication header to include the input token
  - Can send data from any client
  - Simplify the process by using the Splunk logging libraries
    - ▶ Supports JavaScript, Java and .NET
- POST data in JSON format to the token receiver

```
curl "http[s]://<splunk_server>:8088/services/collector"
-H "Authorization: Splunk <generated_token>"
-d '{
    "host": "xyz",
    "sourcetype": "f101_S2",
    "source": "sensor125",
    "event": {"message": "ERR", "code": "401"}
}'
```

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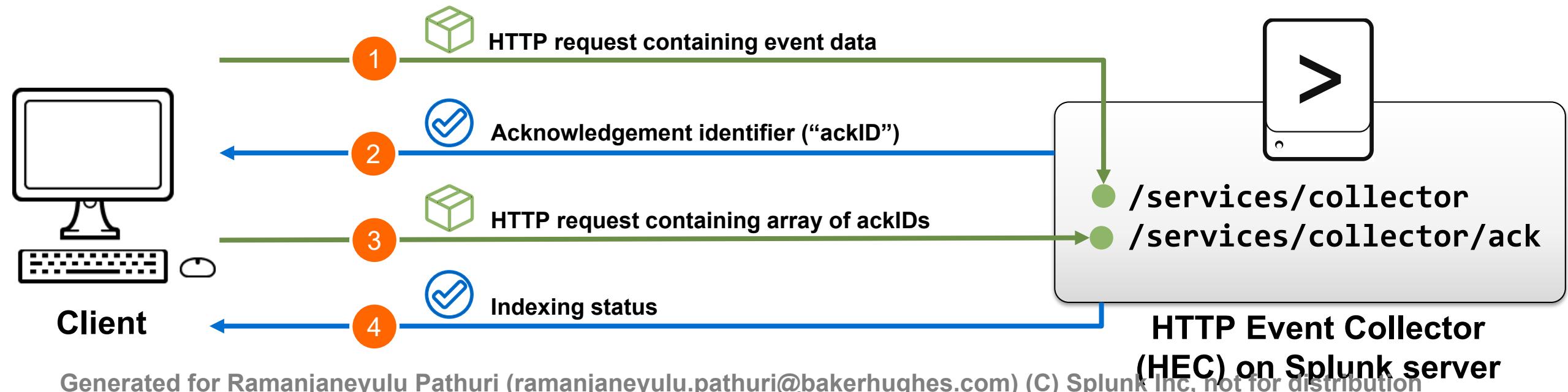
# HTTP Event Collector Options

---

- Enable HEC acknowledgments
- Send *raw* payloads
- Configure dedicated HTTP settings

# HEC Indexer Acknowledgement

1. Request sent from client to the HEC endpoint using a token, with indexer acknowledgement enabled
2. Server returns an acknowledgement identifier (**ackID**) to client
3. Client can query the Splunk server with the identifier to verify if all events in the send request have been indexed (HTTP request containing array of **ackID**'s)
4. Splunk server responds with status information of each queried request



# HEC Indexer Acknowledgement Notes

- **ACK** is configured at the token level
- Each client request must provide a *channel* (a unique identifier created by the client)
- When an event is indexed, the channel gets the **ackID**
- Client polls a separate endpoint using one or more **ackID**'s
- After an **ACK** has been received, it is released from memory
- Client polling functionality is not built into Splunk and requires custom programming

Configure a new token for receiving data over HTTP. [Learn More](#)

Name

Source name override?

Description?

Output Group (optional)

Enable indexer acknowledgement

[docs.splunk.com/Documentation/Splunk/latest/Data/AboutHECIndexerAcknowledgements](https://docs.splunk.com/Documentation/Splunk/latest/Data/AboutHECIndexerAcknowledgements)

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# Sending Raw Payloads to HEC

- Example:
  - Application developers want to send data in a proprietary format
- Solution:
  - HEC allows any arbitrary payloads, not just JSON
- Configuration Notes:
  - No special configuration required
  - Must use channels similar to ACK
    - Supports ACK as well
  - Events MUST be bounded within a request

```
curl "http[s]://<splunk_server>:8088/services/collector/raw?channel=<client_provided_channel>"  
-H "Authorization: Splunk <generated_token>"  
-d 'ERR,401,-23,15,36'
```

# Configuring Dedicated HTTP Settings

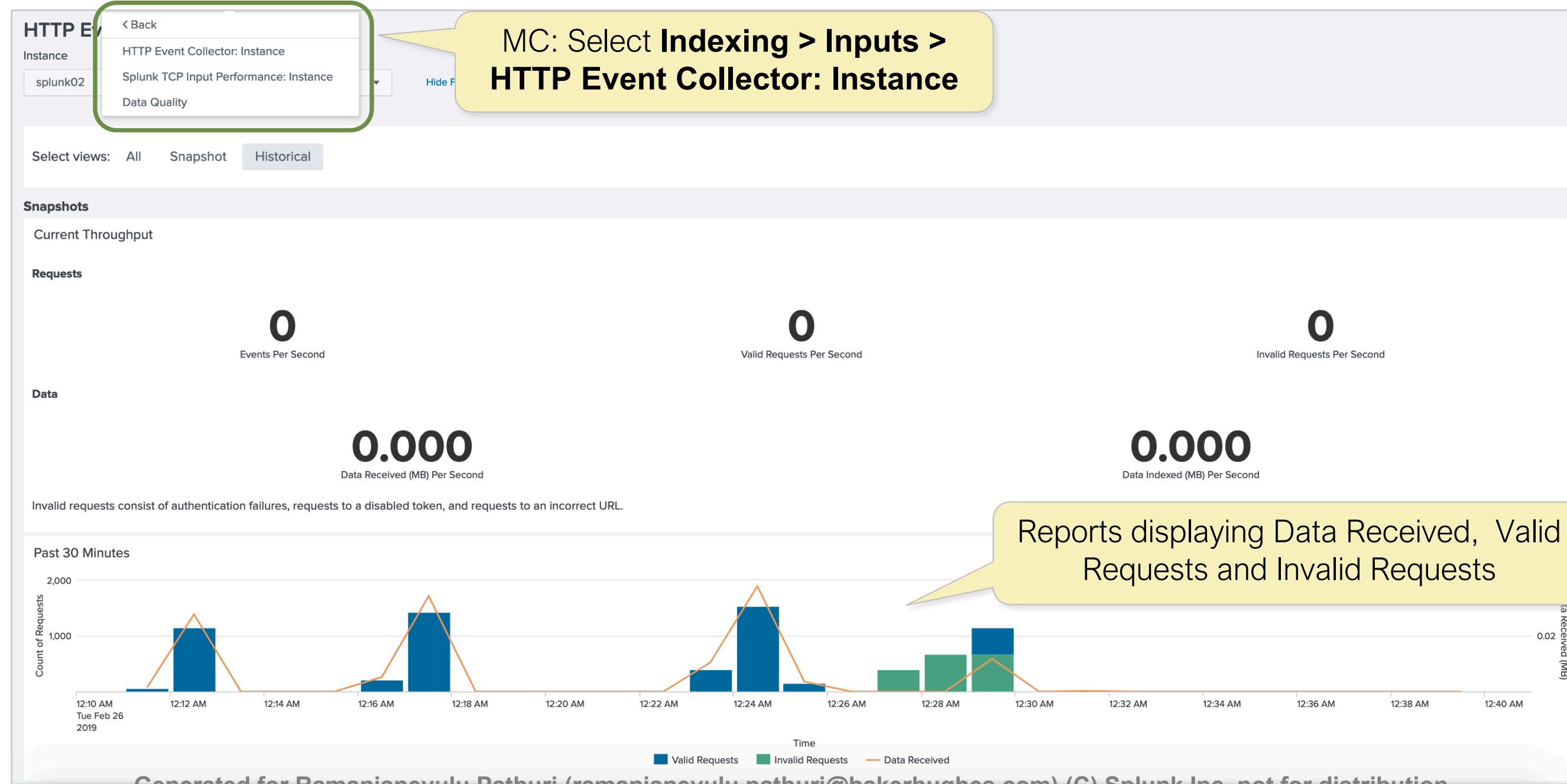
- Example:
  - Splunk admins want to limit who can access the HEC endpoints
- Solution:
  - Manually add the dedicated server settings in **inputs.conf**
- Configuration Notes:
  - Available attributes under the **[http]** stanza
    - Configure a specific SSL cert for HEC and client certs
    - Enable cross-origin resource sharing (CORS) for HEC
    - Restrict based on network, hostnames, etc.

## **inputs.conf**

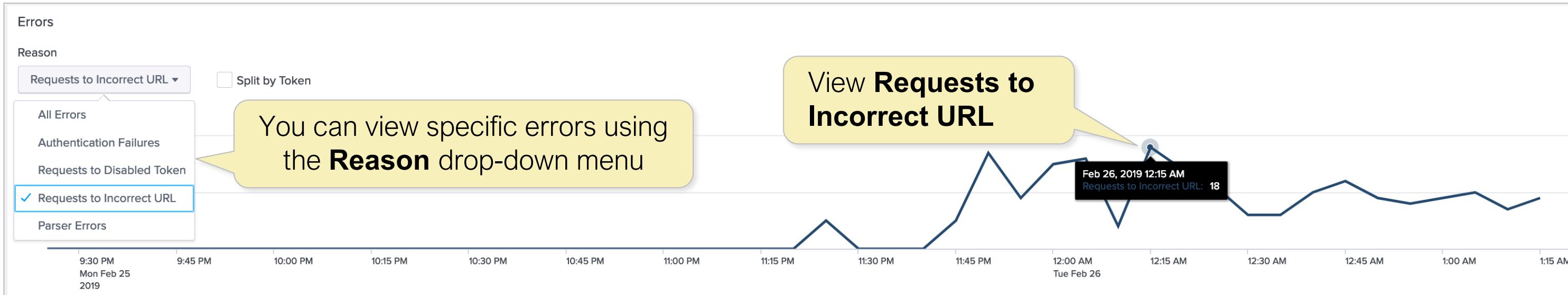
```
[http]
enableSSL = 1
crossOriginSharingPolicy = *.splunk.com
acceptFrom = "!45.42.151/24, !57.73.224/19, *"
```

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# Monitoring HEC with MC



# Monitoring HEC with MC – Viewing Errors



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# HTTP Event Collector (HEC) Documentation

---

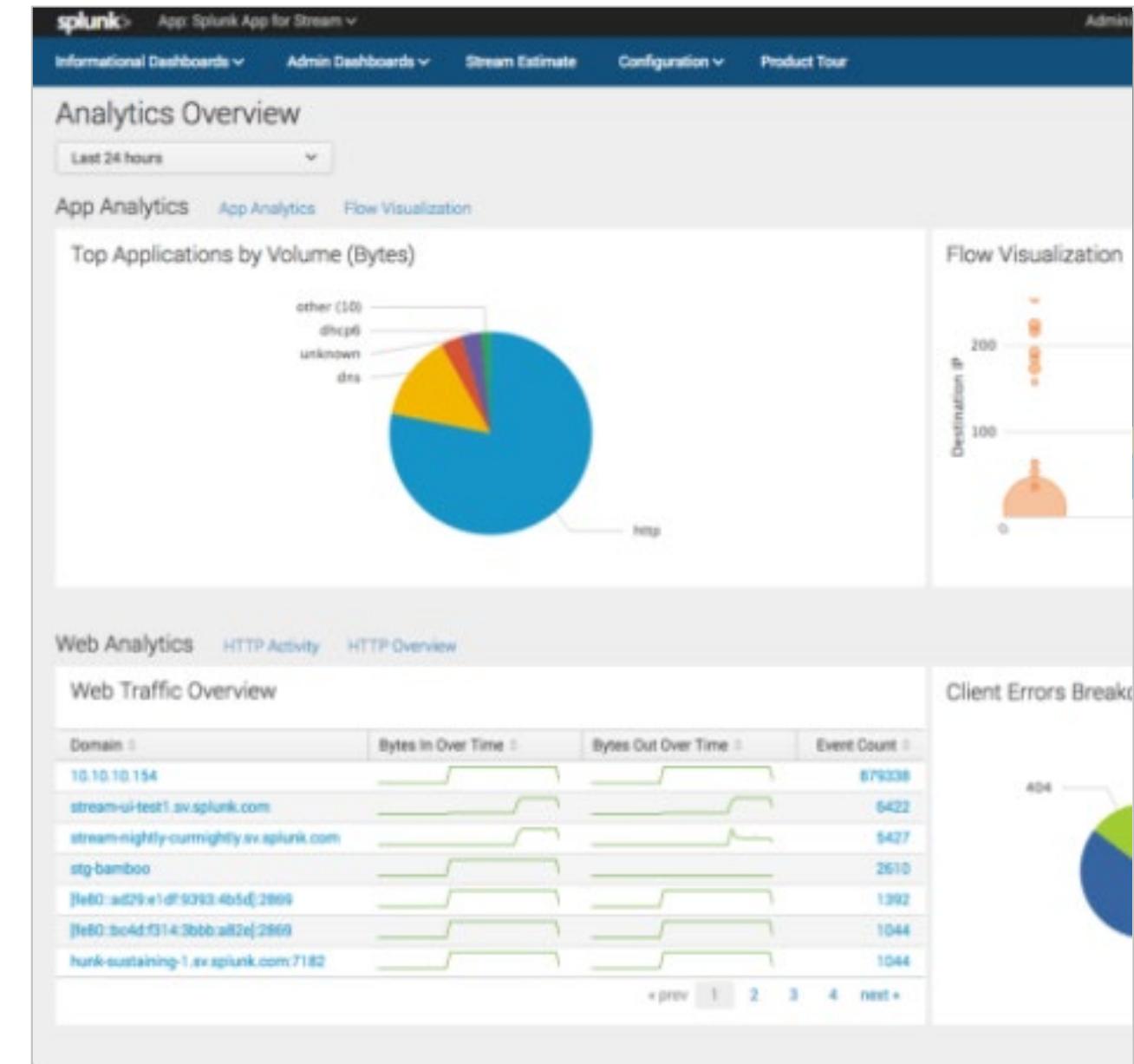
- Refer to:
  - Introduction to Splunk HTTP Event Collector  
[dev.splunk.com/view/event-collector/SP-CAAAE6M](https://dev.splunk.com/view/event-collector/SP-CAAAE6M)
  - Blogs: Tips & Tricks on HTTP Event Collector  
[www.splunk.com/en\\_us/blog/tips-and-tricks/http-event-collector-your-direct-event-pipe-to-splunk-6-3.html](https://www.splunk.com/en_us/blog/tips-and-tricks/http-event-collector-your-direct-event-pipe-to-splunk-6-3.html)

# Understanding Splunk App for Stream



## Splunk App for Stream

- Part of purpose-built wire data collection and analytics solution from Splunk
- An alternative way to collect “difficult” inputs
  - Database servers without forwarders
  - Network traffic not visible to web logs
- Able to read data off the wire
- Supports Windows, Mac, and Linux



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# Module 8 Knowledge Check

---

- True or False. Event Collector can be set up on a UF.
- True or False. Data can be sent in **json** or any raw data format to the event collector.

# Module 8 Knowledge Check – Answers

---

- True or False. Event Collector can be set up on a UF.  
**False.** Event collector can be set up on an Indexer or HF.
- True or False. Data can be sent in **json** or any raw data format to the event collector.  
**True.**

# Module 8 Lab Exercise

---

**Time:** 15 minutes

**Description:** HTTP Event Collector

**Tasks:**

- Enable HTTP event collector on the deployment/test server
- Create a HTTP event collector token
- Send HTTP events from your UF1 (**10.0.0.50**)

# Module 9:

# Operating System Inputs

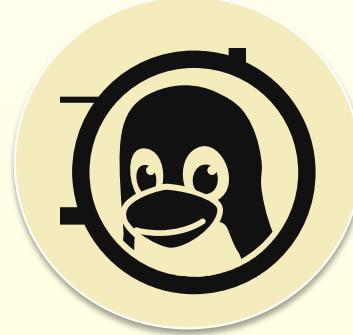
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# Module Objectives

---

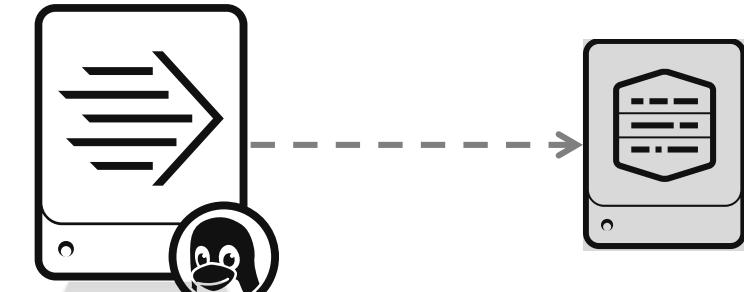
- Identify Linux-specific inputs
- Identify Windows-specific inputs

# Identifying JournalD Inputs For UF



## JournalD Inputs on Linux

- Natively supports **journalctl** command for viewing logs collected by **systemd**
- Collects thousands of events per second with minimal impact
- Only requires **inputs.conf** configuration
- Supported in Splunk 8.1 and later



**journalctl**

**inputs.conf**

```
[journald://my-stanza]
journalctl-include-list = PRIORITY, CMD, EXE
journalctl-exclude-list =
journalctl-filter = _SYSTEMD_UNIT=my.service
    _PID=232 + _SYSTEMD_UNIT=sshd
journalctl-grep = ^WARN.*disk,
    .*errno=\d+\$+restarting
journalctl-user-unit = unit1, unit2
```

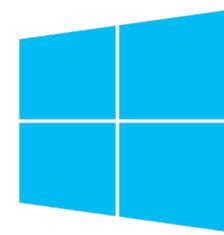
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# Windows-Specific Inputs

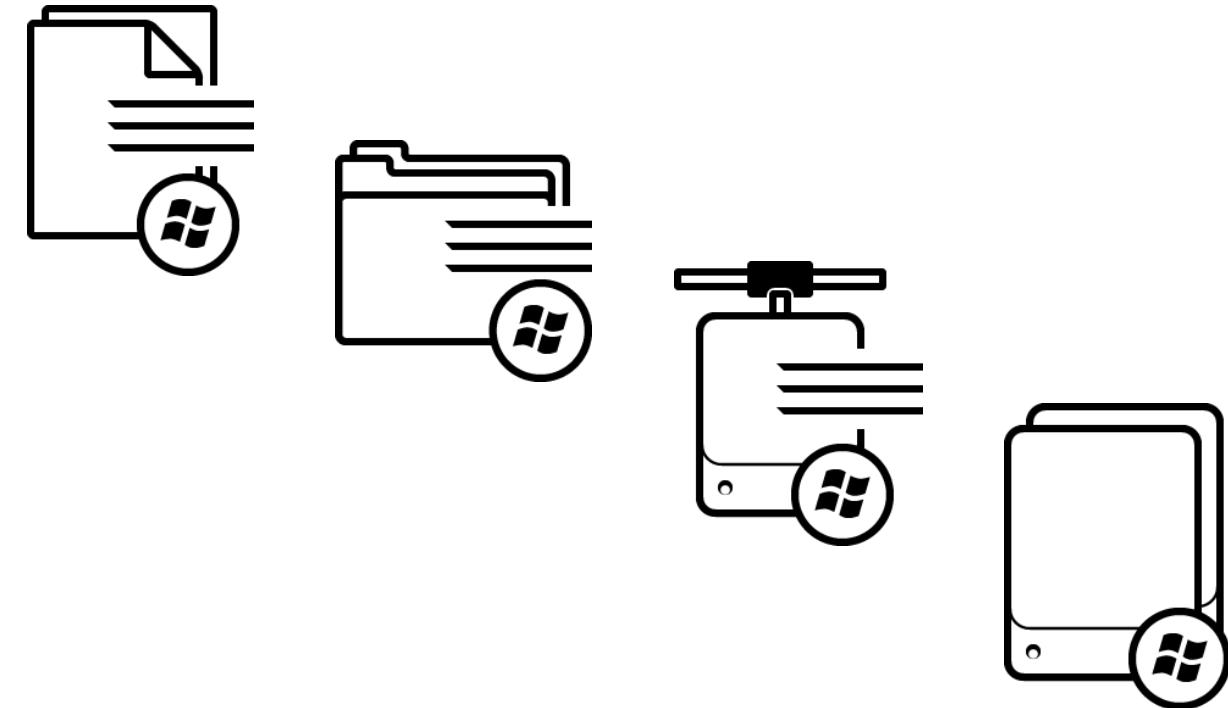


## Windows-Specific Inputs

- Generally stored in binary format (for example some state data and logs)
- Accessed using Microsoft APIs
- Use special Splunk input types
- Can be forwarded to an indexer running any OS platform
- May require that Windows Universal Forwarder run as a domain user



Windows



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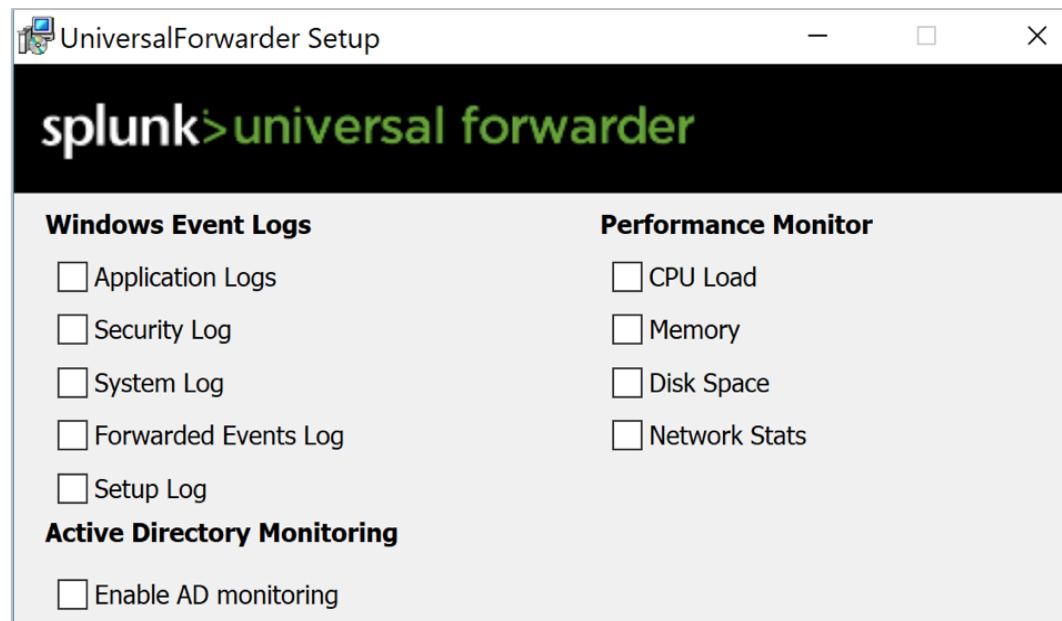
# Windows-Specific Input Types

Input Type	Description
<b>Event Log*</b>	Consumes data from the Windows OS logs
<b>Performance*</b>	Consumes performance monitor data
<b>Active Directory</b>	Monitors changes in an Active Directory server
<b>Registry</b>	Monitors changes in a Windows registry
<b>Host</b>	Collects data about a Windows server
<b>Network</b>	Monitors network activity on a Windows server
<b>Print</b>	Monitors print server activity

\* Supports both local and remote (WMI) data collection

# Options for Configuring Local Windows Inputs

- During the Windows forwarder install
  - Easy to use for testing and proof of concept (PoC)
  - Entries created in the app **SplunkUniversalForwarder**
  - Presents issues when centrally managing configuration with Deployment Server (DS)
- Manually (Best Practice)
  - Create entries in custom app or use **Splunk Add-on for MS Windows**:  
[splunkbase.splunk.com/app/742/](https://splunkbase.splunk.com/app/742/)
  - Easy to manage using a DS
  - For details refer to:
    - **inputs.conf.spec**
    - **inputs.conf.example**



```
[admon://name]
[perfmon://name]
[WinEventLog://name]
[WinHostMon://name]
[WinNetMon://name]
[WinPrintMon://name]
[WinRegMon://name]
```

# Configuring Local Windows Inputs Using Add Data

The screenshot shows the 'Add Data' wizard with four steps: 'Select Source', 'Input Settings', 'Review', and 'Done'. The 'Select Source' step is active, indicated by a green dot above it. The 'Local Event Logs' option is selected and highlighted with a green border. To the right, there is descriptive text about monitoring local Windows Event Log channels. Below the options, there is a configuration interface for selecting event logs. It includes a 'Select Event Logs' button, a list of 'Available item(s)' (Application, Security, Setup, System, ForwardedEvents, Els\_Hyphenation/Analytic, EndpointMapper, FirstUXPerf-Analytic, Analytic), and a 'Selected item' section containing 'Security'. At the bottom, there is a note: 'Select the Windows Event Logs you want to index from the list.'

**Add Data**

Select Source   Input Settings   Review   Done

**Local Event Logs**  
Collect event logs from this machine.

**Remote Event Logs**  
Collect event logs from remote hosts. Note: this uses WMI and requires a domain account.

**Files & Directories**  
Upload a file, index a local file, or monitor an entire directory.

**HTTP Event Collector**  
Configure tokens that clients can use to send data over HTTP or HTTPS.

**inputs.conf**

```
[WinEventLog://Security]
checkpointInterval = 5
current_only = 0
disabled = 0
start_from = oldest
```

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# Windows Input Filtering Options

- Filter out non-essential events
  - Use include lists (**whitelist**) and exclude lists (**blacklist**)
  - Configure up to 10 entries for each list per stanza
  - Set entries based on event field names and regex:
    - **whitelist[1-9]** = <List> | **key=regex** [**key=regex**]
    - **blacklist[1-9]** = <List> | **key=regex** [**key=regex**]
  - In case of a conflict, the exclude lists (**blacklist**) prevails

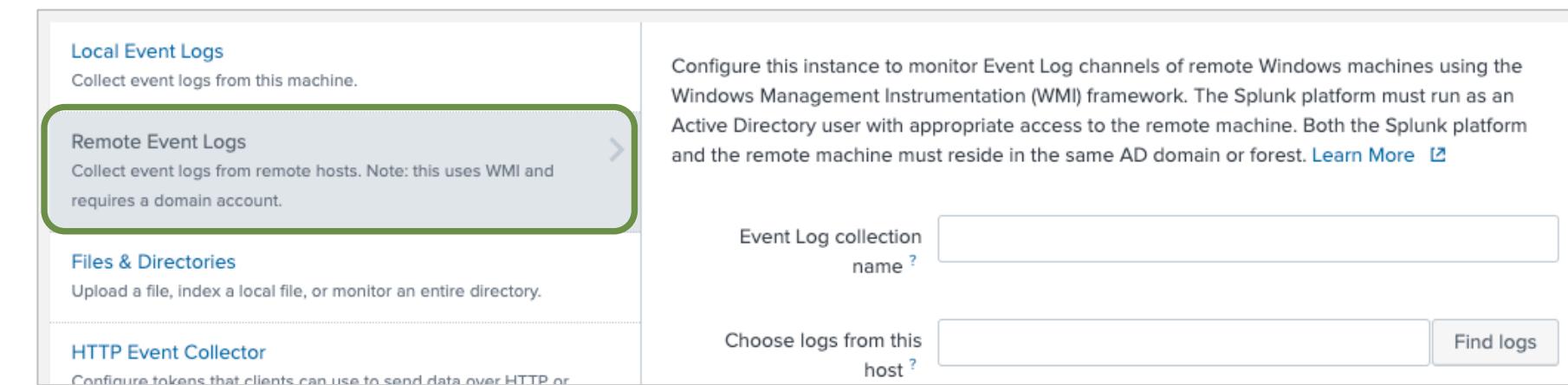
**inputs.conf**

```
[WinEventLog://Security]
disabled=0
whitelist1= EventCode=/^4|5.*$/ Type=Error|Warning/
whitelist2= TaskCategory=%^Log.*%
blacklist = 540
```

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# Windows Remote Inputs With WMI

- Available for two types of Windows inputs:
  - Event logs
  - Performance monitor
- Advantage:
  - Collect input without a forwarder
- Disadvantage:
  - Uses WMI as a transport protocol
  - Not recommended in high latency networks
  - Requires Splunk to run as a domain account



# Configuring WMI Inputs

- Remote inputs are configured in **wmi.conf**
- See **wmi.conf.spec** and **wmi.conf.example** for full details

**wmi.conf**

```
[WMI:remote-logs]
interval = 5
server = server1, server2, server3
event_log_file = Application, Security, System

[WMI:remote-perfmon]
interval = 5
server = server1,server2, server3
wql = Select DatagramsPersec
```

# Special Field Extractions

---

- Several Microsoft products use a special multi-line header log format
  - Examples: IIS/W3C, JSON, and other delimited/structured sources
- Challenges:
  - These logs often get re-configured by the product administrator
  - Requires coordination between source administrator and Splunk administrator to sync the field extraction
- Solution:
  - Use indexed field extraction on the Windows forwarder
    - ▶ Normally the field extraction magic happens on the index/search tier

# Powershell Input

- Uses built-in **powershell.exe** scripting facility in Windows
  - No custom external library dependencies

The screenshot shows the 'Add Data' interface in Splunk. On the left, a sidebar lists various monitoring options: TCP / UDP, Remote Performance Monitoring, Registry monitoring, Active Directory monitoring, Local Windows host monitoring, Local Windows network monitoring, Local Windows print monitoring, Scripts, and Powershell v3 Modular Input. The 'Powershell v3 Modular Input' option is selected. The main configuration area has the following fields:

- Name:** RunningProcesses (highlighted with a yellow callout: 'PowerShell v3 or higher')
- Command or Script Path:** (highlighted with a yellow callout: 'Command or a script file')
- Cron Schedule:** \*/10 \* \* \* \* (highlighted with a yellow callout: 'Blank field executes once only')
- Source type:** Set sourcetype: Automatic (Set to automatic and Splunk will classify and assign sourcetype automatically. Unknown sourcetypes will be given a placeholder name.)
- Host:** Host: splunk01
- Index:** Index: default

**inputs.conf**

```
[powershell://<name>]
script = <command>
schedule = [<number>|<cron>]
```

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# Windows Inputs Resources

---

- Monitoring Windows data with Splunk Enterprise

[docs.splunk.com/Documentation/Splunk/latest/Data/AboutWindowsdataandSplunk](https://docs.splunk.com/Documentation/Splunk/latest/Data/AboutWindowsdataandSplunk)

- Microsoft: Diagnostics - Windows Event Log

[docs.microsoft.com/en-us/windows/desktop/wes/windows-event-log](https://docs.microsoft.com/en-us/windows/desktop/wes/windows-event-log)

- Microsoft: Diagnostics - Performance Counters

[docs.microsoft.com/en-us/windows/desktop/PerfCtrs/performance-counters-portal](https://docs.microsoft.com/en-us/windows/desktop/PerfCtrs/performance-counters-portal)

- Microsoft: Diagnostics - Performance Counters Reference

[docs.microsoft.com/en-us/windows/desktop/PerfCtrs/performance-counters-reference](https://docs.microsoft.com/en-us/windows/desktop/PerfCtrs/performance-counters-reference)

# Module 9 Knowledge Check

---

- True or False. JournalID input only requires Splunk Enterprise 8.1 and **inputs.conf** settings.
- True or False. Windows input from a Windows UF must be forwarded to an Indexer running Windows.
- True or False. You can collect Active Directory data from a Windows Server remotely using **wmi.conf**.

# Module 9 Knowledge Check – Answers

---

- True or False. JournalID input only requires Splunk Enterprise 8.1 and **inputs.conf** settings.

True.

- True or False. Windows input from a Windows UF must be forwarded to an Indexer running Windows.

False. Any platform indexer can be used.

- True or False. You can collect Active Directory data from a Windows Server remotely using **wmi.conf**.

False. Only event logs and performance monitoring logs can be collected using **wmi.conf**.

# Module 10:

# Fine-tuning Inputs

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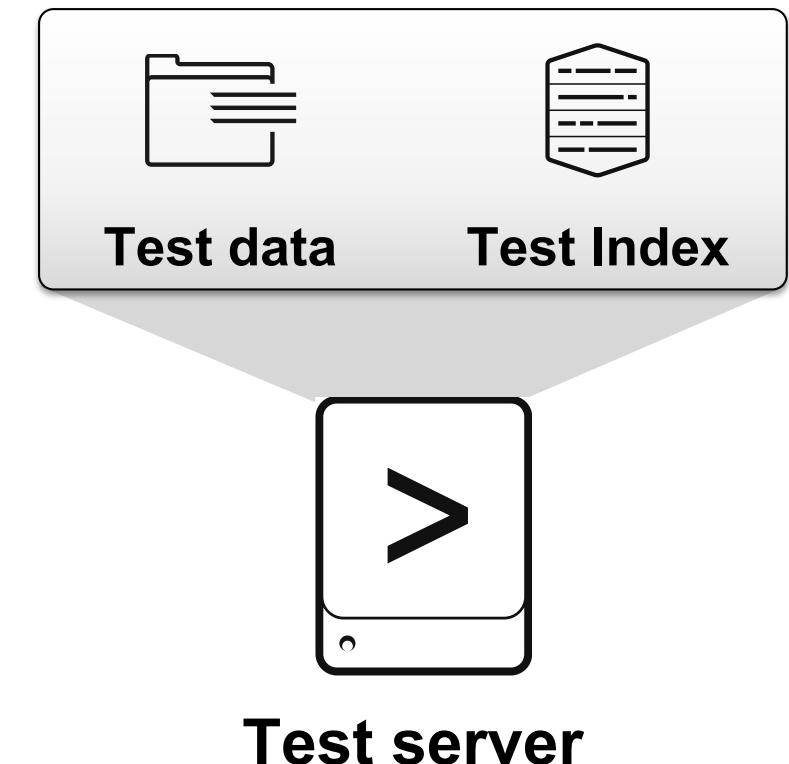
# Module Objectives

---

- Understand the default processing that occurs during input phase
- Configure input phase options, such as source type fine-tuning and character set encoding

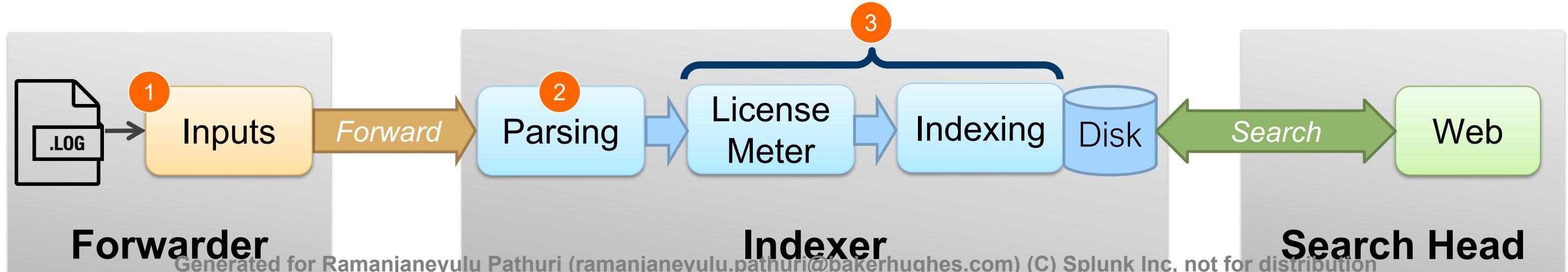
# Review: Initial Data Input Testing

- Use a Splunk test server
  - Should be running same version as production
- Use test indexes
- Procedure:
  1. Copy production data to test server
  2. Use Splunk Web > Add Data
  3. Check to see if **sourcetype** and other settings are applied correctly
  4. Delete the test data, reset fishbucket if needed, change test configuration, and repeat as necessary



# Index-Time Process

1. **Input phase:** Handled at the source (usually a forwarder)
  - The data sources are being opened and read
  - Data is handled as streams; configuration settings are applied to the entire stream
2. **Parsing phase:** Handled by indexers (or heavy forwarders)
  - Data is broken up into events and advanced processing can be performed
3. **Indexing phase:** Handled by indexers
  - License meter runs as data is initially written to disk, prior to compression
  - After data is written to disk, it **cannot** be changed



# Things to Get Right at Index Time

## Input phase

- Host
- Source type
- Source
- Index

## Parsing phase

- Line breaking (event boundary)
- Date/timestamp extraction
- Adjust meta fields\*
- Mask raw data\*
- Eliminate events\*

\* Optional

# What if I Don't Get It Right?

## On a testing / development server

- This is what a test/dev server is for!
- Clean or delete+recreate test index, change configuration, try again
- May need to reset the fishbucket

## On a production server

- Leave erroneous data in the system until it naturally “ages out” (reaches the index size or retention time limits)
- Attempt to delete the erroneous data
- Only re-index when it is absolutely necessary

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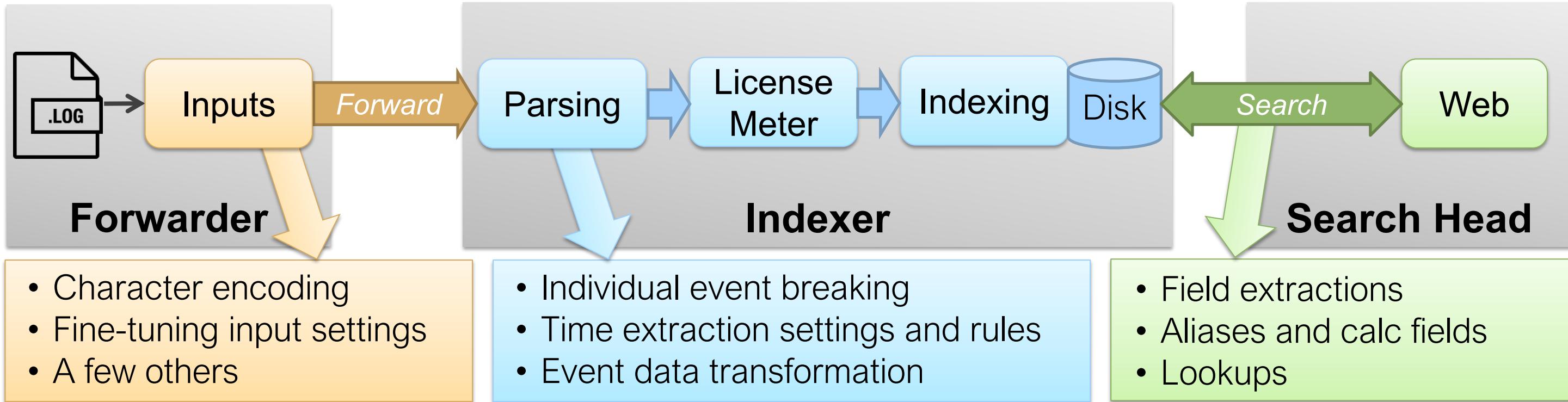
# The props.conf File

---

- Config file referenced during all phases of Splunk data processing (inputs, indexing, parsing and searching)
- Documentation:
  - The **props.conf.spec** and **props.conf.example** files in **SPLUNK\_HOME/etc/system/README**
  - [docs.splunk.com/Documentation/Splunk/latest/admin/Propsconf](https://docs.splunk.com/Documentation/Splunk/latest/admin/Propsconf)

# Phases and `props.conf`

- Settings from `props.conf` applied during phases:



- Configure `props.conf` on the appropriate Splunk instances

[wiki.splunk.com/Where do I configure my Splunk settings](https://wiki.splunk.com/Where_do_I_configure_my_Splunk_settings)

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# Stanzas in props.conf

- All data modifications in **props.conf** are based on either source, sourcetype, or host

syntax

```
[source::source_name]  
attribute = value
```

```
[host::host_name]  
attribute = value
```

```
[sourcetype_name]  
attribute = value
```

example

```
[source::/var/log/secure*]  
sourcetype = linux_secure
```

```
[host::nyc*]  
TZ = US/Eastern
```

```
[sales_entries]  
CHARSET = UTF-8
```

- You can use wildcards (\*) and regex in the **source::** and **host::** stanzas

# Character Encoding

- During the input phase, Splunk sets all input data to UTF-8 encoding by default
  - Can be overridden, if needed, by setting the **CHARSET** attribute

```
[source:::/var/log/locale/korea/*]
```

```
CHARSET=EUC-KR
```

```
[sendmail]
```

```
CHARSET=AUTO
```

- Use **AUTO** to attempt automatic encoding based on language

[docs.splunk.com/Documentation/Splunk/latest/Data/Configurecharacterencoding](https://docs.splunk.com/Documentation/Splunk/latest/Data/Configurecharacterencoding)

# Fine-tuning Directory Monitor Source Types

- When you add a directory monitor:
  - Specify a **sourcetype** to apply it to all files (contained recursively under that directory)
  - Omitting the **sourcetype** causes Splunk to try to use automatic pre-trained rules
- Override specific source types selectively in **props.conf**
  - Identify input with a **[source::<source>]** stanza and set the **sourcetype** attribute
  - Place this configuration on the source server, as this is an input phase process

## inputs.conf

```
[monitor:///var/log/]
```

## props.conf

```
[source::/var/log/mail.log]
sourcetype=sendmail
```

```
[source::/var/log/secure/]
sourcetype=secure
```

...

### Note

If you explicitly set the source type in **inputs.conf** for a given source, you cannot override the source type value for the source in **props.conf**

# Module 10 Knowledge Check

- In the **props.conf** example below, what is **sendmail**?

```
[sendmail]  
CHARSET=AUTO
```

- Examine the **props.conf** example below. Is this an acceptable format for the stanzas?

```
[source:::/var/.../korea/*]  
CHARSET=EUC-KR
```

```
[sendm*]  
CHARSET=AUTO
```

# Module 10 Knowledge Check – Answers

- ❑ In the **props.conf** example below, what is **sendmail**?

```
[sendmail]  
CHARSET=AUTO
```

It is a source type in **props.conf**. Source types are specified as a string value in the stanza without the **sourcetype::** prefix.

- ❑ Examine the **props.conf** example below. Is this an acceptable format for the stanzas?

```
[source:::/var/.../korea/*]  
CHARSET=EUC-KR
```

```
[sendm*]  
CHARSET=AUTO
```

No. You cannot use a wildcard with source types in **props.conf**.

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# Module 10 Lab Exercise

**Time:** 10-15 minutes

**Description:** Fine-tuning Inputs

**Tasks:**

- Add a test directory monitor to sample the auto-sourcetype behavior
  - Make note of the source type value
- Override the auto-sourcetyping of a specific source by adding a source type declaration in **props.conf**
- Deploy it to your forwarder and check again

Note



These input files are not being updated. Therefore, you must reset the file pointer and re-index the files.

# Module 11: Parsing Phase and Data Preview

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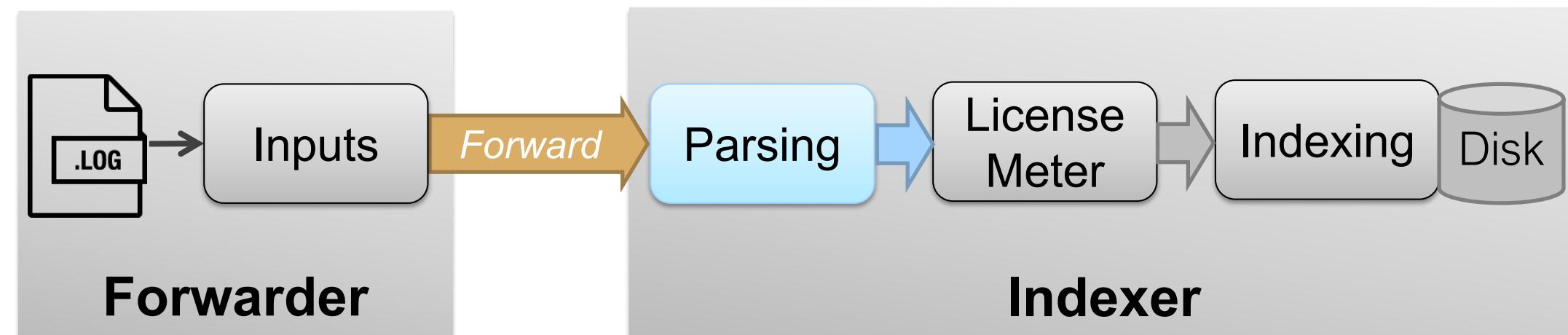
# Module Objectives

---

- Understand the default processing that occurs during parsing
- Optimize and configure event line breaking
- Explain how timestamps and time zones are extracted or assigned to events
- Use Data Preview to validate event creation during the parsing phase

# The Parsing Phase

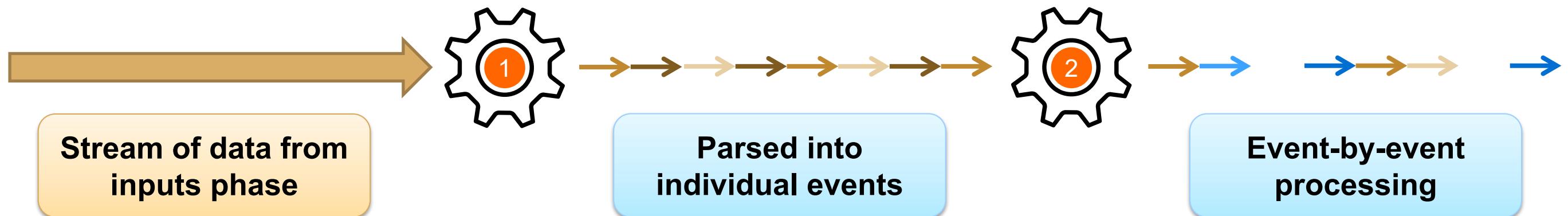
- Occurs as data arrives at the indexer (or heavy forwarder)
- Breaks up input data stream into discrete **events**, each with a **timestamp** and **time zone**
- Creates, modifies, and redirects events
  - Applies additional transformation steps to modify the metadata fields or modify raw data



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# Event Creation

- Occurs during the parsing phase
  1. Data from input phase is broken up into individual events
  2. Event-level processing is performed



- Relies on **event boundaries**: distinguishing where events begin and end
  - Usually determined by line breaks
  - May be determined by other settings in **props.conf**
- Should be verified using **Data Preview**, with new source types

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# Determining Event Boundaries

## Step 1: Line breaking

- Splits the incoming stream of bytes into separate lines
- Configured with **LINE\_BREAKER** = <*regular\_expression*>
- Default is any sequence of new lines and carriage returns: `([\r\n]+)`

## Step 2: Line merging (optional)

- Merges separate lines to make individual events
- Configured with **SHOULD\_LINEMERGE** = **true** (default)
- Uses additional settings to determine how to merge lines (such as **BREAK\_ONLY\_BEFORE**, **BREAK\_ONLY\_BEFORE\_DATE**, and **MUST\_BREAK\_AFTER**)
- If each event is a separate line, disable (set to **false**) to improve performance

[docs.splunk.com/Documentation/Splunk/latest/Data/Configureeventlinebreaking](https://docs.splunk.com/Documentation/Splunk/latest/Data/Configureeventlinebreaking)  
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# Event Boundary Examples

Monitored input: Single line input with 3 events

```
[19/Sep/2020:18:22:32] VendorID=7033 Code=E AcctID=4390644811207834 ↵
[19/Sep/2020:18:22:48] VendorID=1239 Code=K AcctID=5822351159954740 ↵
[19/Sep/2020:18:22:59] VendorID=1243 Code=F AcctID=8768831614147676 ↵
```

`props.conf`

```
[sourcetype1]
LINE_BREAKER = ([\r\n]+)
SHOULD_LINEMERGE = false
```

Monitored input: Multi-line input with 3 events

```
Sep 12 06:11:58 host1.example.com storeagent[49597] <Critical>: Starting update scan ↵
Sep 12 06:11:58 host1.example.com storeagent[49597] <Critical>: UpdateController: Message tracing {
    "power_source" = ac; ↵
    "start_date" = "2018-08-21 20:10:39 +0000"; ↵
} ↵
Sep 12 06:11:58 host1.example.com storeagent[49597] <Critical>: Asserted BackgroundTask power ↵
```

`props.conf`

```
[sourcetype2]
LINE_BREAKER = ([\r\n]+)
SHOULD_LINEMERGE = true
BREAK_ONLY_BEFORE_DATE = true
```

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# Using Splunk Data Preview

---

- Splunk attempts to auto-detect a source type
  - Alternatively select from a list or define your own source type
  - Supports both unstructured and structured data sources
  - CSV, JSON, W3C/IIS, XML, etc.
- Event breaking and date/timestamp settings are evaluated
  - Use test environment to determine settings before taking a new data input into production
- Use Data Preview configuration settings to create new source types

# Setting Event Breaks in Data Preview

## Set Source Type

This page lets you see how the Splunk platform sees your data before indexing. If the events look correct and have the right timestamps, click "Next" to proceed. If not, use the options below to define proper event breaks and timestamps. If you cannot find an appropriate source type for your data, create a new one by clicking "Save As".

Source: /opt/log/crashlog/dreamcrusher.xml

View Event Summary

Source type: default ▾

Save As

Event Breaks

Define event boundaries for incoming data.

Event-breaking Policy

Auto   Every Line   Regex

Pattern `([\r\n]+)\s*<Interceptor>`

\* Specifies a regular expression that determines how the raw text is broken into initial events, before line

= false and = true for regular expressions

= a is broken into an any number of lines.

= a capturing group -- a pair of identified subcomponents of the match.

\* Wherever the regex matches, Splunk considers the start of the first capturing group to be the end of the previous event, and considers the end of the first capturing group to be the start of the next event.

\* The contents of the first capturing group are discarded, and will not be present in any event. You

List ▾ Format 20 Per Page ▾ < Prev 1 2 3 4 5 6 7 8 ... Next >

	Time	Event
1	12/3/19 4:49:04.000 AM	<?xml version="1.0" encoding="UTF-8" ?> <dataroot> timestamp = none
2	12/3/19 4:49:04.000 AM	<Interceptor> <AttackCoords>-80.33100097073213,25.10742916222947</AttackCoords> <Outcome>Interdiction</Outcome> <Infiltrators>23</Infiltrators> <Enforcer>Ironwood</Enforcer> <ActionDate>2019-11-20</ActionDate> <RecordNotes></RecordNotes> <NumEscaped>0</NumEscaped> <LaunchCoords>-80.23429525620114,24.08680387475695</LaunchCoords> <AttackVessel>Rustic</AttackVessel> </Interceptor> Collapse timestamp = none
3	12/3/19 4:49:04.000 AM	<Interceptor> <AttackCoords>-80.1462234 <Outcome>Interdiction</Outcome> <Infiltrators>6</Infiltrators> <Enforcer>Cunningham</Enforcer>

Show all 11 lines

View Event Summary

Enter event pattern prefix (**LINE\_BREAKER**) to parse events correctly

Note

Although **Event Breaks** have now been set correctly, notice that the timestamp is not yet properly captured for this input.

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# Date/timestamp Extraction

---

- Correct date/timestamp extraction is essential
  - Splunk works well with standard date/time formats and well-known data types
- Always verify timestamps when setting up new data types
  - Pay close attention to timestamps during testing/staging of new data
  - Check UNIX time or other non-human readable timestamps
- Custom timestamp extraction is specified in **props.conf**

# Incorrectly Determined Timestamps

The screenshot shows a Splunk interface for analyzing a crash log. On the left, a detailed stack trace and system information are displayed. On the right, a timeline of events is shown.

**Left Panel (Crash Log Details):**

- [167154] 2019-03-06 00:46:26 (1) Received fatal signal 6 (Aborted).
- Cause:**  
Signal sent by PID 6241 running under UID 5
- Crashing thread:** Main Thread
- Registers**
  - RDI: [0x00000B0500000C09]
  - RSI: [0xF0097000009A300]
  - RBP: [0x0000000000002000]
  - RSP: [0x004B00000000D000]
  - RAX: [0x00042000010D0000]
  - RBX: [0x3005000000100000]
  - RCX: [0xE0E00000C010000]
  - RDX: [0x0000000A00000C00]
  - EFL: [0x0000000000002000]
- OS:** Linux  
**Arch:** x86-64
- Backtrace:**
  - [0x04050A000000D000] gsignal + 53 (/lib64/libc.so.6)
  - [0x0600000000000000] abort + 373 (/lib64/libc.so.6)
  - [0x000C000000000000] ? (/lib64/libc.so.6)
  - [0x8000000090300B0] \_\_assert\_perror\_fail + 11
  - [0x0F000000E00B000] \_ZN11XmlDocument8addChildERK7XmlNode + 61 (dcrusherd)
  - [0x0800000070500C00] \_Z18getSearchConfigXMLR11XmlDocumentPKPKc + 544 (dcrusherd)
  - [0x0000100000000000] \_Z22do\_search\_process\_impliPKPKcP12BundlesSetupb + 6141 (dcrusherd)
- Linux / usr13.eng.buttermcupgames.com / 2.6.32-279.5.2.el6.x86\_64 / #1 SMP Fri Aug 24 01:07:11 UTC 2018 / x86\_64
- /etc/redhat-release: CentOS release 6.3 (Final)
- glibc version: 2.12
- glibc release: stable
- Last errno: 2

**Right Panel (Event Timeline):**

Splunk makes its best attempt to identify event boundaries and timestamps; however, if you are more familiar with the data, provide more info

Time	Event
3/6/19 12:46:26.000 AM	[167154] 2019-03-06 00:46:26 Received fatal signal 6 (Aborted). Cause: Signal sent by PID 6241 running under UID 5 Crashing thread: Main Thread Show all 25 lines
8/24/18 1:07:11.000 AM	Linux / usr13.eng.buttermcupgames.com / 2.6.32-279.5.2.el6.x86_64 / #1 SMP Fri Aug 24 01:07:11 UTC 2018 / x86_64 /etc/redhat-release: CentOS release 6.3 (Final) glibc version: 2.12 glibc release: stable Last errno: 2 Show all 20 lines

**Annotations:**

- Annotation 1: A red circle highlights the timestamp [167154] 2019-03-06 00:46:26 in the log details.
- Annotation 2: A red circle highlights the timestamp Fri Aug 24 01:07:11 UTC 2018 in the event timeline.

# Failed To Parse Timestamps

Add Data

Select Source Set Source Type Input Settings Review Done

Next >

## Set Source Type

This page lets you see how Splunk sees your data before indexing. If the events look correct and have the right timestamps, click "Next" to proceed. If not, use the options below to define proper event breaks and timestamps.

Source: /opt/log/crashlog/dreamcrusher.xml

Source type: default ▾

Save As

List ▾

1

2

View Event Summary

< Prev 1 2 3 4 5 6 7 8 ... Next >

When an event is not being parsed correctly, use the warning indicator to help identify possible solutions

• Breaking event because limit of late source type for your data, 256 has been exceeded

- Changing breaking behavior for event stream because MAX\_EVENTS (256) was exceeded without a single event break. Will set BREAK\_ONLY\_BEFORE\_DATE to 3/6/18, and unset any MUST\_NOT\_BREAK\_BEFORE or MUST\_NOT\_BREAK\_AFTER <Interceptor> rules. Typically this will amount to treating this data as single-line only.

Show all 257 lines

- Failed to parse timestamp. timestamp = none Defaulting to file modtime.

3/6/18 8:16:05.000 PM timestamp = none

Sebastiano&#32; Jim&#233; nez,

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# Using TIME\_PREFIX

- Syntax: **TIME\_PREFIX = <REGEX>**
- Matches characters right BEFORE the date/timestamp
  - Use this syntax to specify where the timestamp is located in the event

[167154] 2019-03-06 00:46:26  
Received fatal signal 6 (Aborted).  
Cause:  
Signal sent by PID 6241 running under UID 5898.

Event

**props.conf**

*[my\_custom\_source\_or\_sourcetype]*

**TIME\_PREFIX = [\d+]\s+**

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# Using MAX\_TIMESTAMP\_LOOKAHEAD

- Syntax: **MAX\_TIMESTAMP\_LOOKAHEAD = <integer>**
- Specifies how many characters to look for a timestamp
  - Generally, starts from beginning of the event
  - If **TIME\_PREFIX** is set, starts from the point the **TIME\_PREFIX** indicates
  - Improves efficiency of timestamp extraction

[167154] 2019-03-06 00:46:26  
Received fatal signal 6 (Aborted).  
Cause:  
Signal sent by PID 6241 running under UID 5898.

Event

props.conf

[*my\_custom\_source\_or\_sourcetype*]

TIME\_PREFIX = [\d+]\s+

MAX\_TIMESTAMP\_LOOKAHEAD = 30

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Note



The complete timestamp string must be present within the specified range.

# Using Timestamp Lookahead In Splunk Web

Add Data           < Back      Next >

## Set Source Type

This page lets you see how the Splunk platform sees your data before indexing. If the events look correct and have the right timestamps, click "Next" to proceed. If not, use the options below to define proper event breaks and timestamps. If you cannot find an appropriate source type for your data, create a new one by clicking "Save As".

Source: /opt/log/crashlog/crash-2019-03-06-00\_46\_26.log      [View Event Summary](#)

Source type: Select Source Type      [Save As](#)

> Event Breaks  
▼ Timestamp

Determine how timestamps for the incoming data are defined.

Extraction                       

Time Zone      -- Default System Timezone --

Timestamp format        
A string in strftime() format that helps Splunk recognize timestamps. [Learn More](#)

Timestamp prefix        
Timestamp is always prefaced by a regex pattern eg:  
\d+abc123\d[2,4]

Lookahead            Timestamp never extends more than this number of seconds into the future

**Timestamp > Advanced**

**Event**

Time	Event
1 3/6/19 12:46:26.000 AM	[167154] 2019-03-06 00:46:26 Received fatal signal 6 (Aborted). Cause: Signal sent by PID 6241 running under UID 5898. Crashing thread: Main Thread <a href="#">Show all 45 lines</a>

List ▾      Format      20 Per Page ▾

• Allows Splunk to ignore timestamps found later in data  
• May update the number of events extracted  
• Warns if it cannot find a timestamp within the range

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# Using TIME\_FORMAT

- Syntax: **TIME\_FORMAT = <strptime-style format>**
- Examples:

Timestamp	TIME_FORMAT entry
2020-10-31	%Y-%m-%d
January 24, 2003	%B %d, %Y

- For more detail and other options, check:
  - **SPLUNK\_HOME\etc\system\README\props.conf.spec**
  - [docs.splunk.com/Documentation/Splunk/latest/Data/ConfigureTimestampRecognition](https://docs.splunk.com/Documentation/Splunk/latest/Data/ConfigureTimestampRecognition)
  - [docs.splunk.com/Documentation/Splunk/latest/Data/Handleeventtimestamps](https://docs.splunk.com/Documentation/Splunk/latest/Data/Handleeventtimestamps)

# Splunk Web: Advanced Timestamp Extraction

## Set Source Type

This page lets you see how the Splunk platform sees your data before indexing. If the events look correct and have the right timestamps, click "Next" to proceed. If not, use the options below to define proper event breaks and timestamps. If you cannot find an appropriate source type for your data, create a new one by clicking "Save As".

Source: /opt/log/crashlog/dreamcrusher.xml View Event Summary

Source type: default Save As

Event Breaks

**Timestamp**

Determine how timestamps for the incoming data are defined.

Extraction Auto Curr... Adva... Conf...

Time Zone -- Default System Timezone --

Timestamp format %Y-%m-%d  
A string in strftime() format that helps Splunk recognize timestamps. [Learn More](#)

Timestamp prefix <ActionDate>  
Timestamp is always prefaced by a regex pattern eg:  
\d+abc123\d[2,4]

Lookahead 128  
Timestamp never extends more than this number of characters into the event, or past the Regex if specified above.

List ▾ Format 20 Per Page ▾ < Prev 1 2 3 4 5 6 7 8 ... Next >

	Time	Event
		timestamp = none
2	11/20/19 12:00:00.000 AM	<Interceptor> <AttackCoords>-80.33100097073213,25.10742916222947</AttackCoords> <Outcome>Interdiction</Outcome> <Infiltrators>23</Infiltrators> <Enforcer>Trenwood</Enforcer> <span style="border: 1px solid #ccc; padding: 2px; background-color: #ffffcc;">&lt;ActionDate&gt;2019-11-20&lt;/ActionDate&gt;</span> <RecordNotes></RecordNotes> <NumEscaped>0</NumEscaped> <LaunchCoords>-80.23429525620114,24.08680387475695</LaunchCoords> <AttackVessel>Rustic</AttackVessel> </Interceptor> <a href="#">Collapse</a>
3	11/29/19 12:00:00.000 AM	<Interceptor> <AttackCoords>-80.14622349209523,24.53605142362535</AttackCoords> <Outcome>Interdiction</Outcome> <Infiltrators>6</Infiltrators> <Enforcer>Cunningham</Enforcer>
4	11/14/19 12:00:00.000 AM	<Interceptor> <AttackCoords>-80.75496221688965,24.72483828554483</AttackCoords> <Outcome>Interdiction</Outcome>

[Show all 11 lines](#)

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# Setting Time Zone Rules

- Use time zone offsets to ensure correct event time **props.conf**
- Splunk applies time zones in this order:
  1. A time zone indicator in the raw event data
    - ▶ **-0800, GMT-8 or PST**
  2. The value of a TZ attribute set in **props.conf**
    - ▶ Checks the **host**, **source**, or **sourcetype** stanzas
    - ▶ [en.wikipedia.org/wiki/List\\_of\\_zoneinfo\\_timezones](https://en.wikipedia.org/wiki/List_of_zoneinfo_timezones)
  3. If a forwarder is used, the forwarder-provided time zone is used
  4. If all else fails, Splunk applies the time zone of the indexer's host server

```
[host::nyc*]  
TZ = America/New_York  
  
[source::/mnt/cn_east/*]  
TZ = Asia/Shanghai
```

# Splunk Event Timestamp Processing

- 1 • Use **TIME\_FORMAT** (from **props.conf**) to identify a timestamp in event
- 2 • If no **TIME\_FORMAT** configured: Try to automatically identify timestamp from event
- 3 • If identify time+date, but no year: Determine a year
- 4 • If identify time, but no date: Try to find date in source name or file name
- 5 • If cannot identify a date: use file modification time
- 6 • Else no timestamp found:
  - If any timestamp from same source, use the most recent timestamp
  - If no timestamps, use the current system time when indexing the event

<http://docs.splunk.com/Documentation/Splunk/latest/Data/HowSplunkextractstimestamps>

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# Saving New Source Type

The screenshot illustrates the process of saving a new source type in Splunk. On the left, the 'Advanced' configuration page for a source type is shown, featuring various settings like CHARSET, INDEXED\_EXTRACTI, KV\_MODE, SHOULD\_LINEMERG, category, description, disabled, pulldown\_type, and TIMESTAMP\_FIELDS. A green arrow points from the 'Save As' button to the 'Save Source Type' dialog on the right. This dialog allows setting a Name (geojson), Description (JavaScript Object Notation format. For more information, visit <http://json.org/>), Category (Application), and App (Search & Reporting). A yellow callout notes that the source type becomes a custom source type. Another green arrow points from the 'Copy to clipboard' button in the configuration page to the 'props.conf' text area in the dialog, which contains the generated configuration text.

Source type: \_json ▾

Save As

Timestamp

Advanced

Name	Value
CHARSET	UTF-8
INDEXED_EXTRACTI	json
KV_MODE	none
SHOULD_LINEMERG	false
category	Structured
description	JavaScript Object Notation for
disabled	false
pulldown_type	true
TIMESTAMP_FIELDS	time

New setting

Copy to clipboard

Apply settings

Save Source Type

Name: geojson

Description: JavaScript Object Notation format. For more information, visit <http://json.org/>

Category: Application

App: Search & Reporting

Save

Cancel

Copy and paste this props.conf text:

```
[_json]
CHARSET=UTF-8
INDEXED_EXTRACTS=json
KV_MODE=none
SHOULD_LINEMERGE=false
category=Structured
description=JavaScript Object Notation format. For more
information, visit http://json.org/
disabled=false
pulldown_type=true
TIMESTAMP_FIELDS=time
```

When saved, the source type becomes a custom source type that can be re-used

- Copy and deploy sourcetype settings manually to your forwarders
- Alternately get settings from **props.conf** stanza for the new source type

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# Source Type Manager

Settings > Source types allows access to configured sourcetypes independent of the Add Data wizard

## Source Types

New Source Type

Source types are used to assign configurations like timestamp recognition, event breaking, and field extractions to data indexed by Splunk. [Learn more](#)

12 Source Types  Show only popular Category: Application ▾ App: All ▾ filter  20 per page ▾

Name ▾	Actions	Category ▾	App ▾
catalina Output produced by Apache Tomcat Catalina (System.out and System.err)	Edit Clone	Application	system
dc_mem_crash Dream Crusher server memory dump	Edit Clone Delete	Application	search
dcrusher_attacks Dream Crusher user interactions	Edit Clone Delete	Application	search
dreamcrusher.xml	Edit Clone Delete	Application	search
log4j Output produced by any Java 2 Enterprise Edition (J2EE) application server using log4j	Edit Clone	Application	system

Custom sourcetypes can be edited, deleted, and cloned

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# Module 11 Knowledge Check

---

- True or False. Time extraction can be done using **props.conf** on the UF and the HF.
- True or False. Event boundaries can be defined using **props.conf** at the UF.
- True or False. When extracting a timestamp, if the parser finds the indexer's OS time, it will use that as the first preference.

# Module 11 Knowledge Check – Answers

---

- ❑ True or False. Time extraction can be done using **props.conf** on the UF and the HF.

False. You will learn how to specify Time Extraction if the file contains a header line. But if it does not contain a header line, then time has to be extracted on the HF/ Indexer.

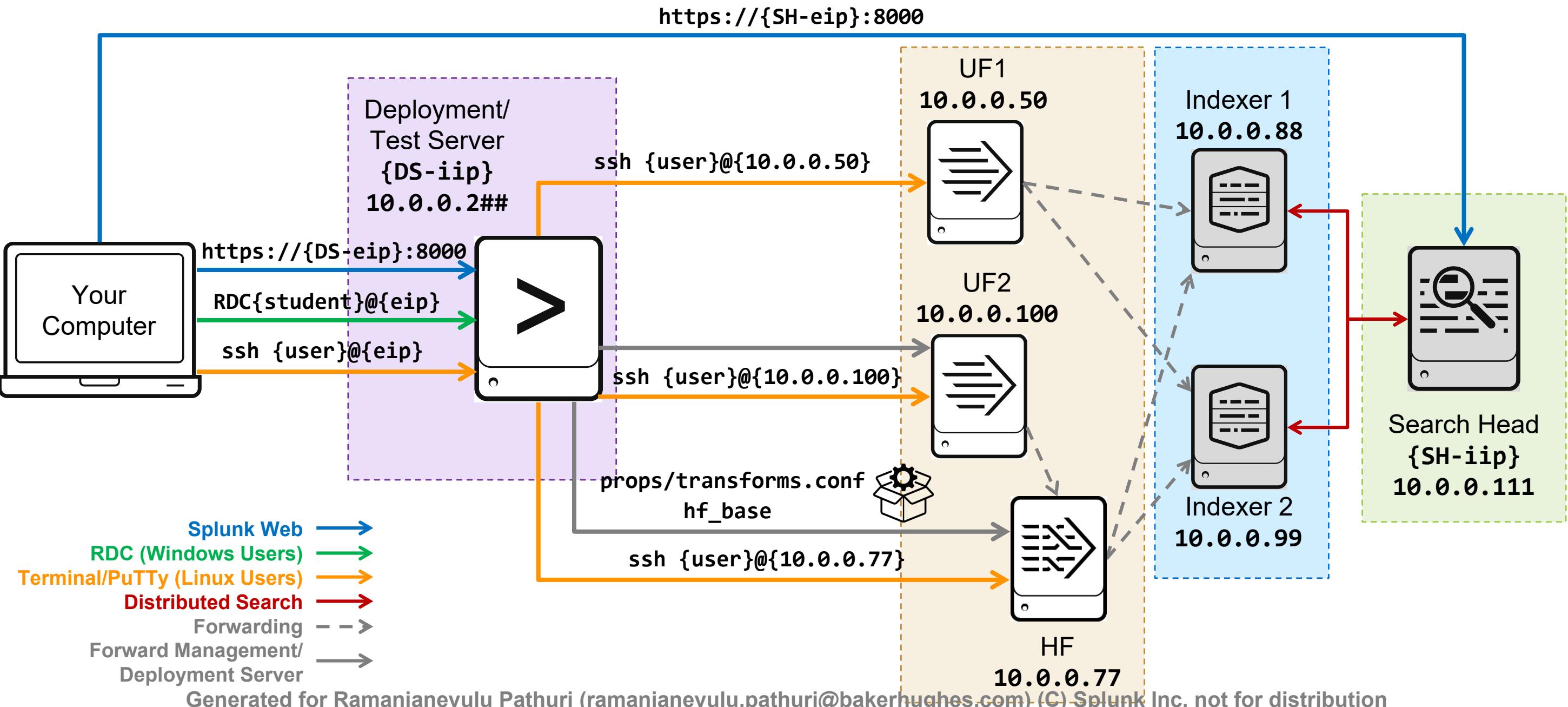
- ❑ True or False. Event boundaries can be defined using **props.conf** at the UF.

True. You may want to define event boundaries for certain event types at the UF level. Remember the more you do at the UF level, the more resources you will need.

- ❑ True or False. When extracting a timestamp, if the parser finds the indexer's OS time, it will use that as the first preference.

False. When all else fails, the Indexer's OS time is used as the *last* preference.

# Module 11 Lab Exercise – Environment Diagram



# Module 11 Lab Exercise

---

**Time:** 20-25 minutes

**Description:** Create a New Source Type

**Tasks:**

- Use preview to evaluate two custom file types:
  - A new log sample that contains multiple timestamps
  - A new log sample that contains multi-line events in XML format
- Apply a custom line breaking rule and custom timestamp rules and save as a new sourcetype

# Module 12:

# Manipulating Raw Data

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# Module Objectives

---

- Explain how data transformations are defined and invoked
- Use transformations with **props.conf** and **transforms.conf** to:
  - Mask or delete raw data as it is being indexed
  - Override sourcetype or host based upon event values
  - Route events to specific indexes based on event content
  - Prevent unwanted events from being indexed
- Use **SEDCMD** to modify raw data

# Modifying the Raw Data

## Sometimes necessary prior to indexing

- In cases of privacy concerns
  - **Healthcare**: Patient information
  - **Finance**: Credit card or account numbers
  - **Globalization**: Data transported across international borders
- According to business use cases
  - **Audit and security**: Route all events to the **web** index, except credit card transactions which are sent to the **credits** index

## Should be performed with *extreme* care

- Unlike all other modifications discussed, these changes modify the raw data (**\_raw**) before it is indexed
- Indexed data will not be identical to the original data source

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# Splunk Transformation Methods

- When possible, define meta field values during the input phase
  - Most efficient to use **inputs.conf**
- Splunk provides two methods of raw data transformations:

## SEDCMD

- Uses only **props.conf**
- Only used to mask or truncate raw data

## TRANSFORMS

- Uses **props.conf** and **transforms.conf**
- More flexible
- Transforms matching events based on source, source type, or host

# Using SEDCMD

- Per event simplified data modifications using UNIX "sed-like" syntax
  - Provides “search and replace” using regular expressions and substitutions
  - Supported on both Linux and Windows
- Example: Hide first 5 digits of account numbers in **vendor\_sales.log**:

```
[22/Oct/2014:00:46:27] VendorID=9112 Code=B AcctID=4902636948  
[22/Oct/2014:00:48:40] VendorID=1004 Code=J AcctID=4236256056  
[22/Oct/2014:00:50:02] VendorID=5034 Code=H AcctID=8462999288
```

Replace with  
**AcctID=xxxxx99288**

```
[source::.../vendor_sales.log]  
SEDCMD-1acct = s/AcctID=\d{5}(\d{5})/AcctID=xxxxx\1/g
```

**props.conf**

\1 Indicates the  
capture group

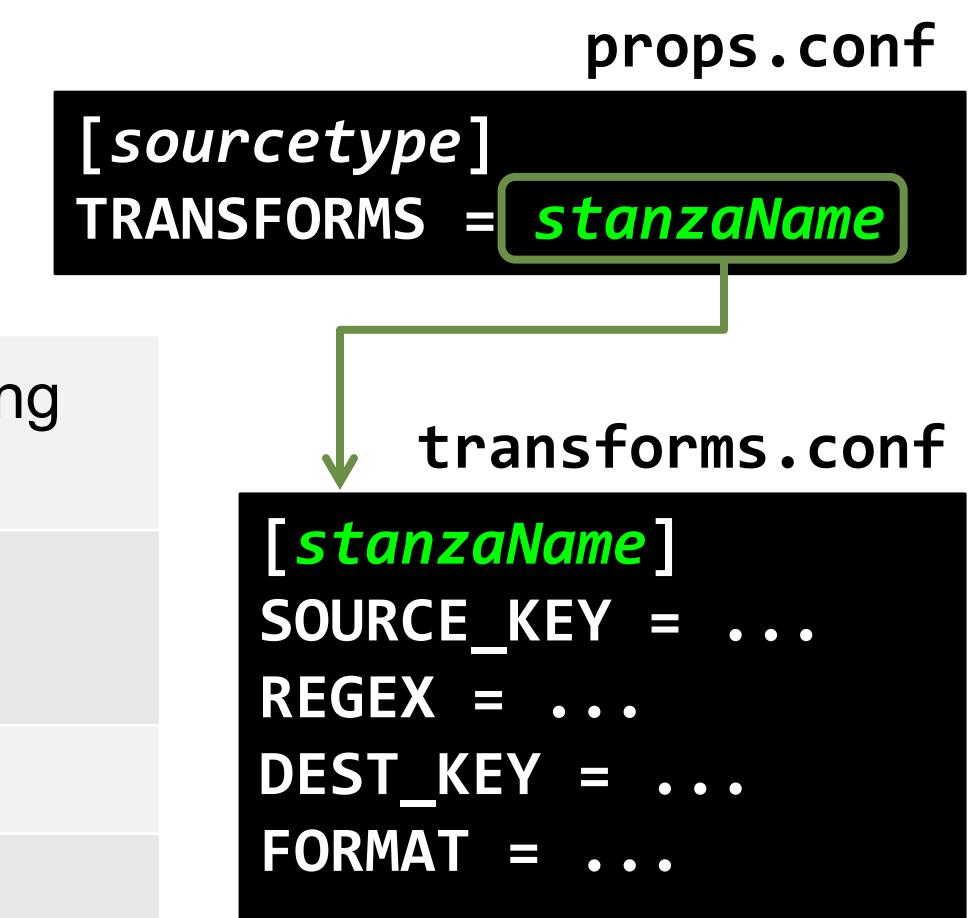
- Refer to: [docs.splunk.com/Documentation/Splunk/latest/Data/Anonymizedata](https://docs.splunk.com/Documentation/Splunk/latest/Data/Anonymizedata)

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# Using TRANSFORMS

- Per event transformation based on REGEX pattern matches
- Invoked from **props.conf**
- Defined in **transforms.conf**
- Based on attributes:

SOURCE_KEY	Which field to use as source for pattern matching (default: _raw: unprocessed text of all events)
REGEX *	Events from the SOURCE_KEY that will be processed, with optional regex capture groups
DEST_KEY *	Where to write the processed data
FORMAT *	Controls how REGEX writes the DEST_KEY



\* required

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# Masking Sensitive Data

```
[22/Apr/2014:00:46:27] VendorID=9112 CC_Num: 4217656647324534 Code=B  
[22/Apr/2014:00:48:40] Sent to checkout TransactionID=100763  
[22/Apr/2014:00:50:02] VendorID=5034 CC_Num: 6218651647508091 Code=H
```

props.conf

```
[source::....\\store\\purchases.log]  
TRANSFORMS-1ccnum = cc_num_anon
```

transforms.conf

```
[cc_num_anon]  
REGEX = (.*CC_Num:\s)\d{12}(\d{4}).*  
DEST_KEY = _raw  
FORMAT = $1xxxxxxxxxxxx$2
```

- For the purchases.log source, send to the cc\_num\_anon transformation processor.
- The label -1ccnum identifies this transform namespace and is used to determine sequence.

- When SOURCE\_KEY is omitted, \_raw is used.
- REGEX pattern finds two capture groups and rewrites the raw data feed with a new format.

```
[22/Apr/2014:00:46:27] VendorID=9112 CC_Num: xxxxxxxxxxxxxxxx4534 Code=B  
[22/Apr/2014:00:48:40] Sent to checkout TransactionID=100763  
[22/Apr/2014:00:50:02] VendorID=5034 CC_Num: xxxxxxxxxxxxxxxx8091 Code=H
```

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# Setting Per-Event Source Type

Should be your last option because it is more efficient to set the sourcetype during the inputs phase

```
[29/Apr/2017:07:08:32] VendorID=4119 Code=E AcctID=1808937180466558 Custom  
[29/Apr/2017:07:09:42] VendorID=5012 Code=N AcctID=7905045242265135  
[29/Apr/2017:07:11:10] VendorID=7015 Code=G AcctID=3283196485834211 Custom
```

**props.conf**

```
[source::udp:514]  
TRANSFORMS = custom_sourcetype
```

**transforms.conf**

```
[custom_sourcetype]  
SOURCE_KEY = _raw  
REGEX = Custom$  
DEST_KEY = MetaData:Sourcetype  
FORMAT = sourcetype::custom_log
```

- Check events in network input source
- If an event contains “Custom” at the end, assign the new sourcetype value **custom\_log**
- When **MetaData:** key is used, its **FORMAT** value must be prefixed by:
  - **host::**
  - **source::**
  - **sourcetype::**

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# Setting Per-Event Host Name

```
[22/Apr/2014:00:46:27] sales accepted server:A01R2 SID=107570  
[22/Apr/2014:00:48:40] sales rejected server:B13R1 SID=102498  
[22/Apr/2014:00:50:02] sales accepted server:A05R1 SID=173560
```

## props.conf

```
[sales_entries]  
TRANSFORMS-register = sales_host
```

## transforms.conf

```
[sales_host]  
SOURCE_KEY = _raw  
REGEX = server:(\w+)  
DEST_KEY = MetaData:Host  
FORMAT = host::$1
```

- Check each events in the **\_raw** source
- If an event contains “**server:**”, capture the word and rewrite the value of the **MetaData:Host** key with the captured group
- When **MetaData:** key is used, its **FORMAT** value must be prefixed by:
  - **host::**
  - **source::**
  - **sourcetype::**

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# Per-Event Index Routing

Again, if possible, specify the index for your inputs during the input phase (**inputs.conf**)

**props.conf**

```
[mysrctype]
TRANSFORMS-itops = route_errs_warns
```

**transforms.conf**

```
[route_errs_warns]
REGEX = (Error|Warning)
DEST_KEY = _MetaData:Index
FORMAT = itops
```

If **Error** or **Warning** is found in the incoming `_raw`, change its **index** field value to **itops**

# Filtering Unwanted Events

- You can route specific unwanted events to the **null queue**
  - Events discarded at this point do NOT count against your daily license quota

**props.conf**

```
[WinEventLog:System]
TRANSFORMS = null_queue_filter
```

**transforms.conf**

```
[null_queue_filter]
REGEX = (?i)^EventCode=(592|593)
DEST_KEY = queue
FORMAT = nullQueue
```

- The **(?i)** in the **REGEX** means “ignore case.”
- Events with an **eventcode** of **592** or **593** should not be indexed
- Route to **queue** and use **nullQueue** format to discard events

# Routing Events to Groups using HF

You can route specific events to different groups using the HF (another use case for HF)

`props.conf`

```
[default]
TRANSFORMS-routing=errorRouting
```

```
[syslog]
TRANSFORMS-routing=syslogRouting
```

`transforms.conf`

```
[errorRouting]
REGEX = error
DEST_KEY=_TCP_ROUTING
FORMAT = errorGroup
```

```
[syslogRouting]
REGEX = .
DEST_KEY=_TCP_ROUTING
FORMAT=syslogGroup
```

`outputs.conf`

```
[tcpout]
defaultGroup=everythingElseGroup
```

```
[tcpout:errorGroup]
server=10.1.1.200:9999
```

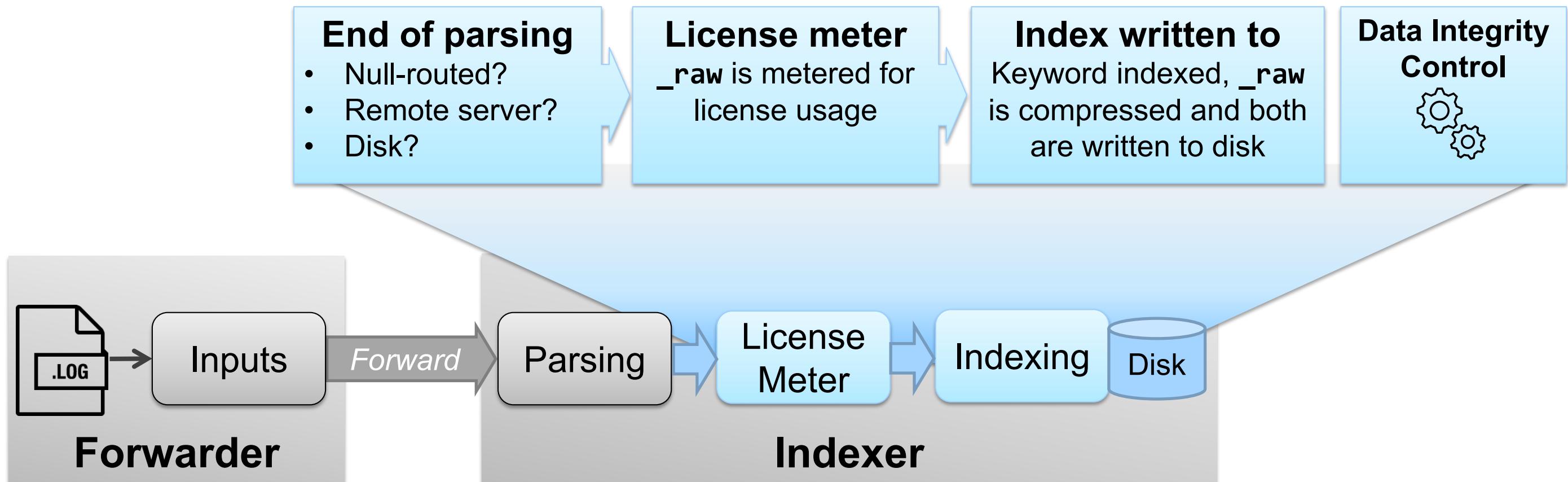
```
[tcpout:syslogGroup]
server=10.1.1.197:9996,10.1.1.198:9997
```

```
[tcpout:everythingElseGroup]
server=10.1.1.250:9998
```

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# Indexing Phase Details

After the parsing phase, Splunk passes the fully processed events to the index processor



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# Persisted to Disk

---

- Indexed data is written to disk
  - Includes all modifications and extractions
  - Includes raw data (`_raw`) and metadata (source, sourcetype, host, timestamp, punct, etc.)
- Changes to **props.conf** or **transforms.conf**
  - Only applies to new data
  - Requires restarting the indexer, or re-loading by visiting:  
<http://servername:splunkwebport/debug/refresh>
- Re-indexing is required to index old data with new settings

# Module 12 Knowledge Check

- True or False. **sedcmd** can be used to eliminate unwanted events.
- True or False. When using **transforms.conf**, the **SOURCE\_KEY** is set to **\_raw** by default.
- In the **props.conf** file example below, what is **itops**?

```
[mysrctype]
TRANSFORMS-itops = route_errs_warns
```

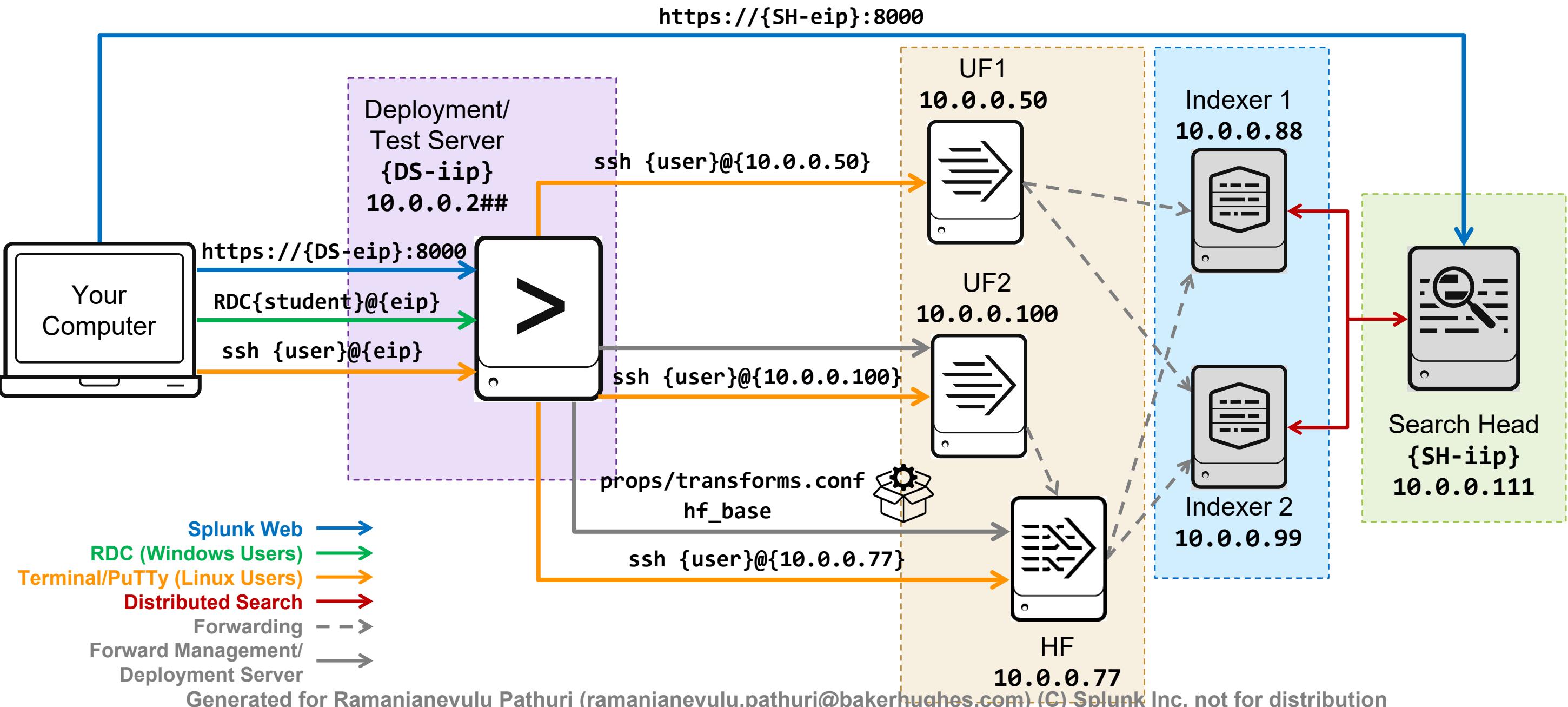
# Module 12 Knowledge Check – Answers

- ❑ True or False. **sedcmd** can be used to eliminate unwanted events.  
False. You have to use **transforms.conf**. **sedcmd** can only be used to mask or truncate data.
- ❑ True or False. When using **transforms.conf**, the **SOURCE\_KEY** is set to **\_raw** by default.  
True. If you do not specify the **SOURCE\_KEY** in **transforms.conf**, it defaults to **\_raw**.
- ❑ In the **props.conf** file example below, what is **itops**?

```
[mysrctype]
TRANSFORMS-itops = route_errs_warns
```

Itops is the namespace and is used to determine the sequence.

# Module 12 Lab Exercise – Environment Diagram



# Module 12 Lab Exercise

---

**Time:** 10-15 minutes (20-25 minutes with optional lab)

**Description:** Manipulating Data

**Tasks:**

- Use **props.conf** and **transforms.conf** to:
  - Mask sensitive data
- (Optional lab exercise)  
Use **props.conf** and **transforms.conf** to:
  - Redirect events to specific indexes
  - Drop unwanted events

# Module 13: Supporting Knowledge Objects

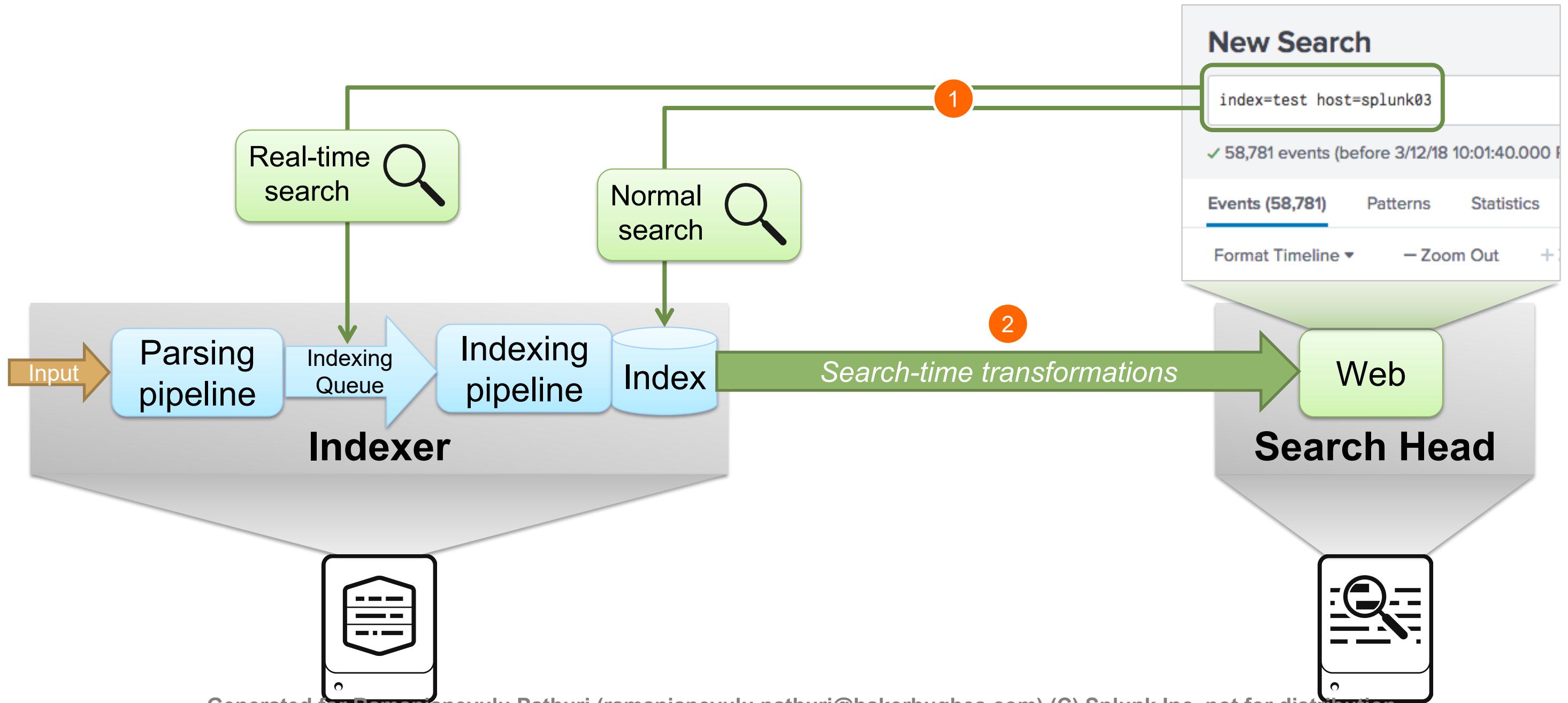
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# Module Objectives

---

- Define default and custom search time field extractions
- Identify the pros and cons of indexed time field extractions
- Configure indexed field extractions
- Describe default search time extractions
- Manage orphaned knowledge objects

# Search Phase: The Big Picture



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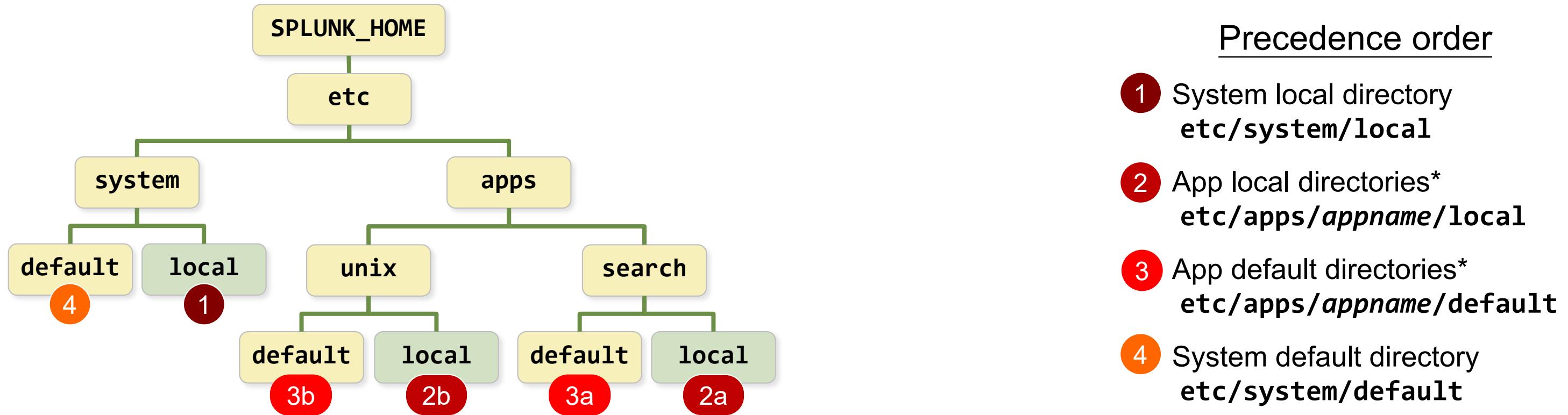
# File Context and Index-time versus Search-time

	Global Context	App/User Context
<i>Used during:</i>	Index-time	Search-time
<i>Used by:</i>	<ul style="list-style-type: none"><li>• User-independent tasks</li><li>• Background tasks</li><li>• Input, parsing, indexing</li></ul>	<ul style="list-style-type: none"><li>• User-related activity</li><li>• Searching</li><li>• Search-time processing</li></ul>
<i>Example use-case:</i>	A network input to collect syslog data	Mary's private report in the Search app
<i>Example files:</i>	<b>inputs.conf</b> <b>outputs.conf</b> <b>props.conf</b>	<b>macros.conf</b> <b>savedsearches.conf</b> <b>props.conf</b>

[docs.splunk.com/Documentation/Splunk/latest/Admin/Wheretofindtheconfigurationfiles](https://docs.splunk.com/Documentation/Splunk/latest/Admin/Wheretofindtheconfigurationfiles)

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# Review: Index-Time Precedence (Global Context)

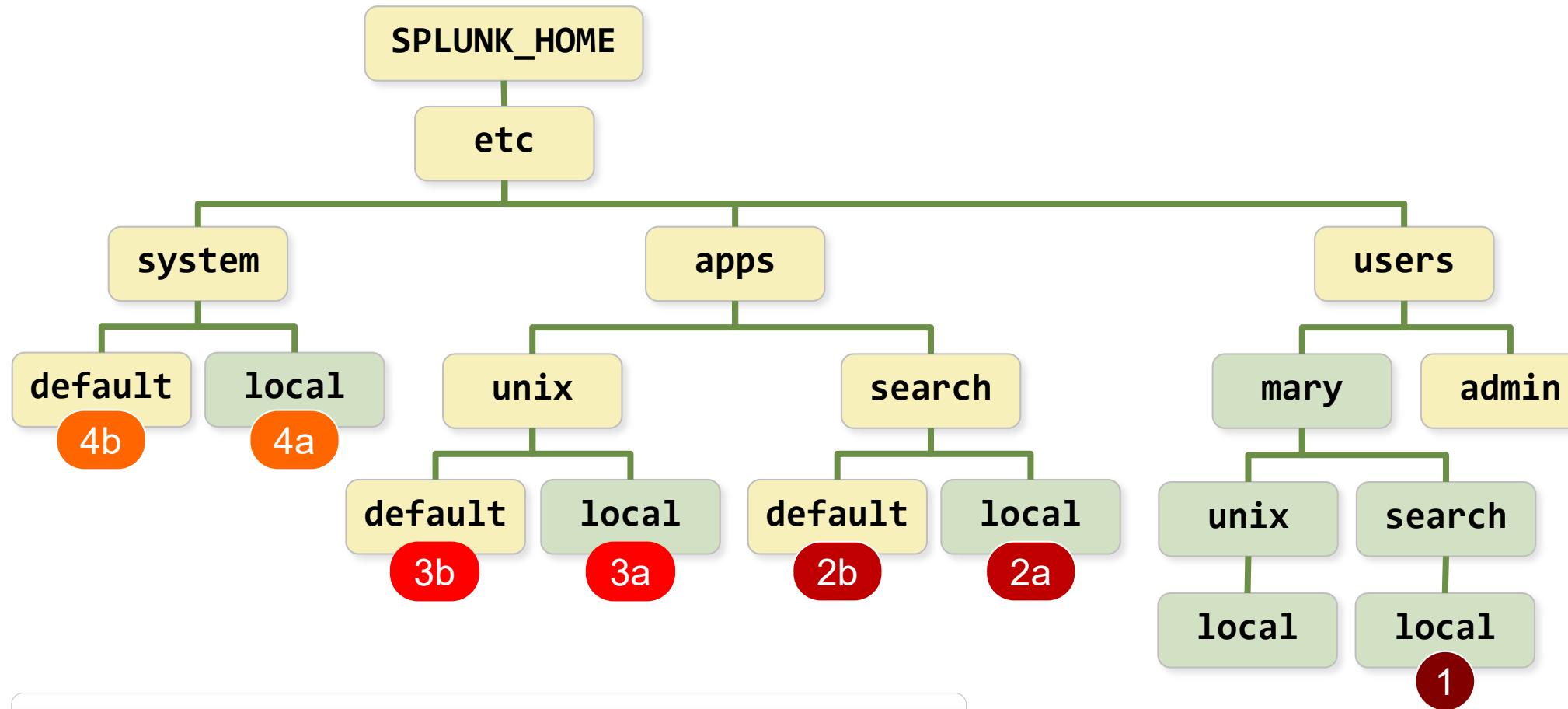


Note

\* When determining priority of app directories in global context (for steps 2 and 3), Splunk uses *lexicographical* order. (Files in apps directory "A" have higher priority than files in apps directory "B".)

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# Search-Time Precedence (App/User Context)



## Precedence order

- 1 Current user directory for app  
etc/users/user/appname/local
- 2 App directory - running app  
etc/apps/appname/local  
etc/apps/appname/default
- 3 App directories - all other apps\*  
etc/apps/appname/local  
etc/apps/appname/default
- 4 System directories  
etc/system/local  
etc/system/default

Note

\* If objects from the app are exported globally with .meta file setting, evaluate all other app directories using *reverse lexicographical* order. (Files in apps directory "B" have higher priority than directory "A".)

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# Indexed Field Extraction

---

- Fields are generally extracted at search-time
- During index-time, event data is stored in the index on disk
  - **Default fields** are extracted and added automatically
  - **Custom fields** are added based on customizations (by the administrator)
- Certain use cases result in indexed fields
  - Inputs phase (usually on the forwarder) for structured inputs
  - Parsing phase (usually on the indexer) for fields that may be negatively impacting search performance
- Add custom indexed fields only if necessary
  - Can negatively impact indexing performance and search times
  - Increases the size of the searchable index

# Pros/Cons of Indexed Field Extractions

PROs	CONs
<ul style="list-style-type: none"><li>• Provision the extraction during the <b>input</b> or <b>parsing</b> phase</li><li>• Can configure on the universal forwarder</li><li>• Auto-formatting</li><li>• Can drop useless headers and comments</li></ul>	<ul style="list-style-type: none"><li>• Increased storage size (2-5x the original size consumed on the indexer)</li><li>• Static field names: additional step required for late-binding use cases</li><li>• Possible performance implications</li><li>• Less flexible: changes to fields require a re-index of the dataset, or only apply to new data</li></ul>

- Recommendations:
  - For frequently re-configured delimited sources, use indexed extractions (example: **IIS**)
  - For static CSV, use **REPORT** and **DELIMS**, or other search-time extractions
  - Use a dedicated index

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# Configuring Indexed Field Extractions

Define additional attributes in **props.conf**, **transforms.conf**, and fields in **fields.conf**

File	Splunk instance	Example
<b>props.conf</b>	Indexer, Heavy Forwarder	<pre>[testlog] TRANSFORMS-netscreen = netscreen-error</pre>
<b>transforms.conf</b>	Indexer, Heavy Forwarder	<pre>[netscreen-error] REGEX = device_id=\[\w+\](?&lt;error_code&gt;[^:]++) FORMAT = error_code::"\$1" WRITE_META = true</pre>
<b>fields.conf</b>	Search Head	<pre>[error_code] INDEXED=true</pre>

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# Structured Data Field Extraction Example

- Indexed extractions are input phase **props.conf** settings
  - In this scenario, the settings belong on forwarder
  - Check **props.conf.spec** for more options

```
[my_structured_data]
INDEXED_EXTRACTION = w3c
HEADER_FIELD_LINE_NUMBER = 4
TIMESTAMP_FIELDS = date, time
```

```
#Software: Microsoft Internet Information Services 7.5
#Version: 1.0
#Date: 2015-06-08 00:00:00
#Fields: date time cs-method cs-uri-stem cs-uri-query c-ip cookie referer cs-host sc
2015-01-08 00:00:00 POST AutoComplete.asmx/GetCompletionList - 10.175.16.79
cApproved=1;+fParticipant=000000695607440|urn:System-Services:GatewayTokenService_n
format:persistent|http://www.acme.com/2015/06/attributes/credentialidentifier; &nest
fc2df5;+style=normal https://search.acme.com/Account/Account.aspx?redirect=https://d
200 1113 0
...
```

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Source type: iis ▾ Save As

> Event Breaks

> Timestamp

▼ Advanced

Name	Value
CHARSET	UTF-8
INDEXED_EXTRACTI	w3c
MAX_TIMESTAMP_L	32
SHOULD_LINEMERG	false
category	Web
description	W3C Extended log format pro
disabled	false
pulldown_type	true

# Previewing Structured Data

Add Data

Select Source Set Source Type Input Settings Review Done

< Back Next >

## Set Source Type

This page lets you see how Splunk sees your data before indexing. If the events look correct and have the right timestamps, click "Next" to proceed. If not, use the options below to define proper event breaks and timestamps. If you cannot find an appropriate source type for your data, create a new one by clicking "Save As".

Source: **Traffic\_Violations.csv**

View Event Summary

Source type: csv ▼ Save As

Timestamp

Extraction: Auto, Current time, Advanced...

Time zone: Auto

Timestamp format:  A string in strftime() format that helps Splunk recognize timestamps. [Learn More ↗](#)

Timestamp fields:

Table ▾ Format 20 Per Page ▾ ◀ Prev 1 2 3 4 5 6 7 8 ... Next >

	_time	Accident	Agency	Alcohol	Arrest Type	Article	Belts	Charge	Color	Commercial License
1	9/24/13 5:11:00.000 PM	No	MCP	No	A - Marked Patrol	Transportation Article	No	13-401(h)	BLACK	No
2	8/29/17 10:19:00.000 AM	No	MCP	No	A - Marked Patrol	Transportation Article	No	21-201(a1)	GREEN	No
3	12/1/14 12:52:00.000 PM	No	MCP	No	A - Marked Patrol	Transportation Article	No	21-403(b)	SILVER	No

Splunk automatically identifies structured data and parses the event boundaries and field names

- Produces an **indexed extraction** stanza
- If you see a timestamp warning, indicate where to find a timestamp by specifying a field name

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# Indexed Field Extractions – Caveat

---

- Splunk software does not parse structured data that has been forwarded to an indexer
  - If you have configured **props.conf** on the targeted forwarder with **INDEXED\_EXTRACTIONS** and its associated attributes, the forwarded data skips the following queues on the indexer:
    - ▶ Parsing
    - ▶ Aggregation
    - ▶ Typing

[http://docs.splunk.com/Documentation/Splunk/latest/Forwarding/Routeandfilterdata#Caveats for routing and filtering structured data](http://docs.splunk.com/Documentation/Splunk/latest/Forwarding/Routeandfilterdata#Caveats_for_routing_and_filtering_structured_data)

# Default Search Time Field Extractions

- Provided by Splunk for common source types
- Can be discovered by Splunk from your search results
  - Automatically detects key/value pairs (e.g. **a=1**)
- Can be added with add-ons and apps

*NIX app	Has many search time fields for standard UNIX logs, such as <b>secure.log</b> , <b>messages.log</b> , and so on
Windows app	Has many defaults for Windows data
For other data	Look for an app on <a href="https://splunkbase.splunk.com">splunkbase.splunk.com</a> specifically designed for that type of data

# Custom Search Time Field Extractions

## SPL

- Use **rex** (or similar) commands in the search language
- Requires knowledge of regular expressions (REGEX)
- All roles can use this command

## Field Extractor

- Found in Splunk Web
- Handles REGEX-based and delimiter-based extractions
- Knowledge of regular expressions helpful, but not required

## Configuration files

- Provides additional advanced extraction options
- Knowledge of REGEX required
- Available only to admins

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# Field Extractions and `props.conf`

- Field extraction happens during index-time (indexed fields) and/or search-time (extracted fields)
- Search-time extractions can be inline or a field transform
- Use extraction directives
  - **EXTRACT** (inline extraction)
    - Defined in **props.conf** as single field extraction
  - **REPORT** (field transform)
    - Defined in **transforms.conf**
    - Invoked from **props.conf**



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# REPORT Extractions in props.conf

---

- **REPORT** references a transform defined separately in **transforms.conf**
- In **transforms.conf**, you can
  - Define field extractions using delimiters
  - Apply other advanced extraction techniques
- For full details on **REPORT**, see:

[docs.splunk.com/Documentation/Splunk/latest/Knowledge/Createandmaintainsearch-timefieldextractionsthroughconfigurationfiles](https://docs.splunk.com/Documentation/Splunk/latest/Knowledge/Createandmaintainsearch-timefieldextractionsthroughconfigurationfiles)

# Using EXTRACT and REPORT in props.conf

- Applies to this sourcetype
- The REGEX pattern defines extracted field

Arbitrary namespace you assign to this extraction.  
Useful for ordering multiple transactions

props.conf

```
[tradelog]
EXTRACT-1type = type:\s(?:<acct_type>\S+)
```

Extracted field name

```
[sysmonitor]
REPORT-sysmon = sysmon-headers
KV_MODE = none
```

Process this stanza in transforms.conf

transforms.conf

```
[sysmon-headers]
DELIMS = ","
FIELDS = Time,EventCode,EventType,Type,ComputerName,LogName,RecordNumber
```

# Lookups

- A Splunk data enrichment knowledge object
  - Uses stanzas defined in **transforms.conf** and **props.conf**
  - Used *only* during search time
- Four types:

Lookup type	Description
File-based	Uses a CSV file stored in the lookups directory
KV Store	Requires <b>collections.conf</b> that defines fields
External	Uses a python script or an executable in the <b>bin</b> directory
Geospatial	Uses a <b>kmz</b> saved in the lookups directory to support the choropleth visualization

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Add new

Lookups » Lookup definitions » Add new

Destination app: search

Name \*:

Type:  File-based  
 External  
 KV Store  
 Geospatial  
geo\_audt\_countries.csv

Lookup file \*:

Create and manage lookup table files.

Configure time-based lookup  
 Advanced options

# Other Search Time Knowledge Objects

- KOs are stored in configuration files:
  - **macros.conf**, **tags.conf**, **eventtypes.conf**, **savedsearches.conf**, etc.
  - See docs and **\*.spec** files in **SPLUNK\_HOME/etc/system/README**
- Create or modify KOs using:
  - Splunk Web (automatically updates **.conf** files)
  - Editing **.conf** files manually (requires admin rights)
    - Use **btool** to verify changes
  - Splunk Web: Advanced edit (supports some system settings)

Search name	RSS feed	Scheduled time	Display view	Owner	App	Alerts	Sharing	Status	Actions
quake_L24h	None	None	emaxwell	search	0	Private   Permissions	Enabled   Disable	Run   Advanced edit	Clone   Move   Delete
quake_L24H	None	None	admin	search	0	Private   Permissions	Enabled   Disable	Run   Advanced edit	Clone   Move   Delete
Top five sourcetypes	None	None	No owner	search	0	App   Permissions	Enabled   Disable	Run   Advanced edit   Clone	

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# Orphaned Knowledge Objects (KOs)

## What are orphaned knowledge objects?

- KOs without a valid owner
- Occurs when a Splunk account is deactivated and the KOs associated with that account remain in the system

## Issues with orphaned knowledge objects

- Can cause performance problems and security concerns
- Searches that refer to an orphaned lookup may not work
- Search scheduler cannot run a report on behalf of a nonexistent owner

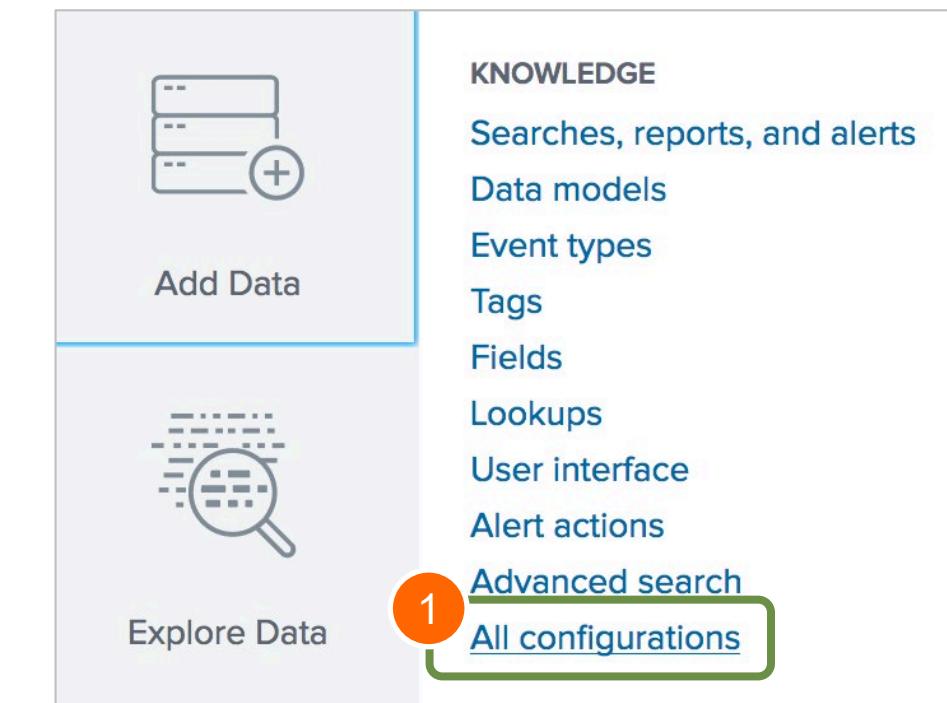
# Locating Orphaned Knowledge Objects

---

- Splunk runs a default search on a daily schedule to detect orphaned scheduled reports
- Report on orphaned KO using any of these methods:
  - Click **Messages**, then click the message link to access the alerts dashboard
  - Run the search from **Search > Dashboards > Orphaned Scheduled Searches, Reports, Alerts**
  - Run the MC Health Check search to detect orphaned knowledge objects

# Reassigning Knowledge Objects

- Requires **admin** role capability
- Possible for both orphaned and owned KOs
- Performed in Splunk Web with:
  1. Select **Settings > All configurations**
  2. Click **Reassign Knowledge Objects**



The screenshot shows the 'All configurations' page in Splunk Web. At the top, it says 'All configurations' and 'Showing 1-25 of 263 items'. Below that are several filter options: 'App' set to 'Instrumentation (splu...)', 'Owner' set to 'Any', 'Visible in the App' set to 'Visible in the App', and a 'filter' input field with a search icon. There's also a '25 per page' dropdown. At the bottom, there are navigation links: '< Prev', page numbers 1 through 10, and 'Next >'.

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# Reassigning Knowledge Objects (cont.)

## Reassign Knowledge Objects

Select knowledge objects and reassign them to another user. [Learn more](#)

263 Knowledge Objects All Orphaned Object type: All ▾ All Objects ▾ App: Instrumentation (splunk\_instrumentation) ▾ Filter by Owner ▾ filter 10 per page ▾

Edit Selected Knowledge Object (0) ▾

Name	Actions	Object type
ActiveDirectory : EXTRACT-GUID	Reassign	props-extract
ActiveDirectory : EXTRACT-SID	Reassign	props-extract
ActiveDirectory : REPORT-MESSAGE	Reassign	props-extract
PerformanceMonitor : REPORT-MESSAGE	Reassign	props-extract

**Note** You can also reassign multiple knowledge objects by selecting the check boxes next to the objects, then selecting Edit Selected Knowledge Objects > Reassign.

• Use the filter options at the top to locate the objects you want to reassign  
• The **Orphaned** button displays all shared, orphaned objects

1. Click **Reassign**  
2. Select a new owner from the **New Owner** drop-down menu  
3. Click **Save**

**Reassign Entity**

⚠️ Knowledge object ownership changes can have side effects such as giving saved searches access to previously inaccessible data or making previously available knowledge objects unavailable. Review your knowledge objects before you reassign them. [Learn more](#)

Name ActiveDirectory : EXTRACT-GUID  
Type props-extract  
Owner nobody  
New Owner Select an owner ▾ 2

Lookup an owner 3 Save

Administrator (admin)  
SH\_alf (alf)  
SH\_beta (beta)  
(emaxwell)  
SH\_nic (nic)

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# Module 13 Knowledge Check

---

- True or False. **props.conf** and **transforms.conf** are used to store Field Extractions, Lookups, Saved Searches and macros.
- True or False. Any user belonging to any user role can reassign any KO.
- True or False. When you select the REGEX option in the Field Extractor in the GUI, it uses **props.conf** and **transforms.conf** in the background.

# Module 13 Knowledge Check – Answers

---

- ❑ True or False. **props.conf** and **transforms.conf** are used to store Field Extractions, Lookups, Saved Searches and macros.  
False. They are used only for Field Extractions and Lookups.
- ❑ True or False. Any user belonging to any user role has the ability to reassign any KO.  
False. Only users belonging to the **admin** role can assign any KO.
- ❑ True or False. When you are using Splunk Web and select the REGEX option in the Field Extractor, it uses **props.conf** and **transforms.conf** in the background.  
False. It only uses **props.conf**. Delimiter based extractions entries in **props.conf** and **transforms.conf** are manually created.

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# Module 13 Lab Exercise

---

**Time:** 5-10 minutes

**Description:** Knowledge Object (KO) Administration

**Tasks:**

- Create a knowledge object (report)
- Search for orphaned knowledge objects
- Assign the report to the user, **emaxwell**

# Wrap-up Slides

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# Community

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- **Splunk Community Portal**

[splunk.com/en\\_us/community.html](https://splunk.com/en_us/community.html)

- **Splunk Answers**

[answers.splunk.com](https://answers.splunk.com)

- **Splunk Apps**

[splunkbase.com](https://splunkbase.com)

- **Splunk Blogs**

[splunk.com/blog/](https://splunk.com/blog/)

- **Splunk Live!**

[splunklive.splunk.com](https://splunklive.splunk.com)

- **.conf**

[conf.splunk.com](https://conf.splunk.com)

- **Slack User Groups**

[splk.it/slack](https://splk.it/slack)

- **Splunk Dev Google Group**

[groups.google.com/forum/#!forum/splunkdev](https://groups.google.com/forum/#!forum/splunkdev)

- **Splunk Docs on Twitter**

[twitter.com/splunkdocs](https://twitter.com/splunkdocs)

- **Splunk Dev on Twitter**

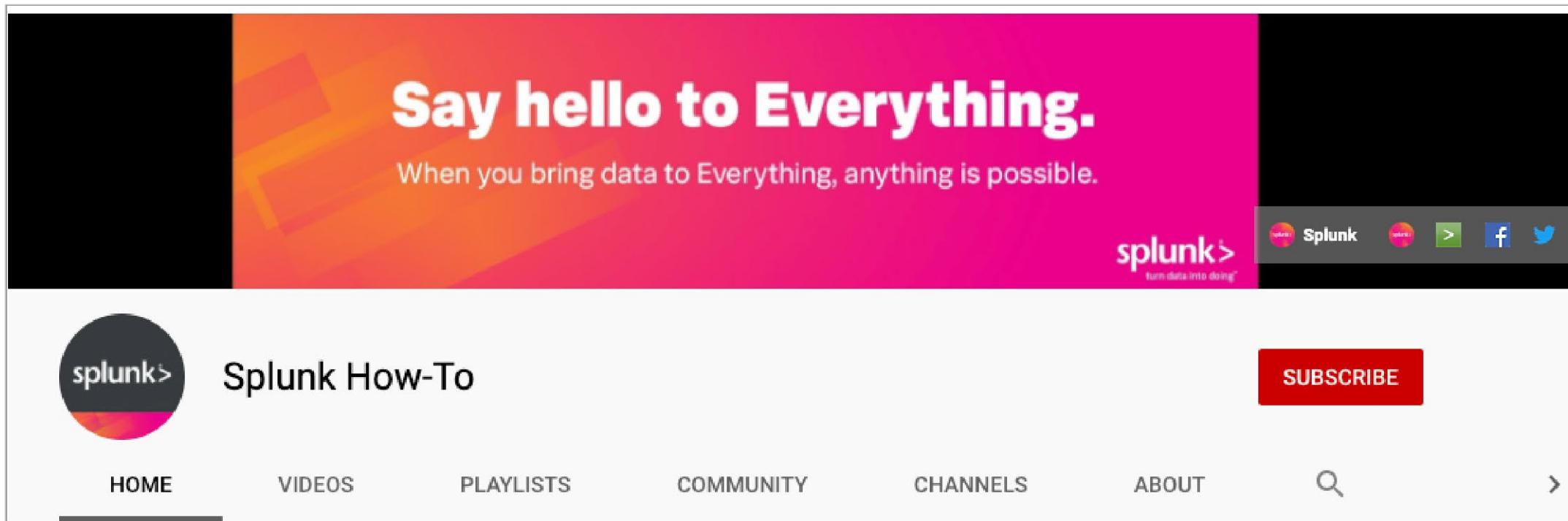
[twitter.com/splunkdev](https://twitter.com/splunkdev)

- **IRC Channel**

#splunk on the EFNet IRC server

# Splunk How-To Channel

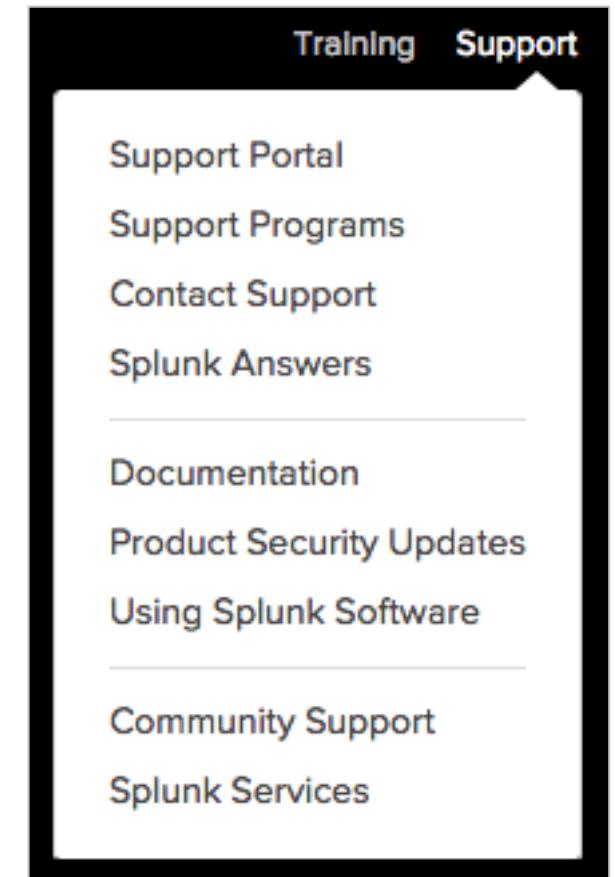
- Check out the Splunk Education How-To channel on YouTube:  
[splk.it/How-To](https://splk.it/How-To)
- Free, short videos on a variety of Splunk topics



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# Support Programs

- **Web**
  - Documentation: [dev.splunk.com](https://dev.splunk.com) and [docs.splunk.com](https://docs.splunk.com)
  - Wiki: [wiki.splunk.com](https://wiki.splunk.com)
- **Splunk Lantern**  
Guidance from Splunk experts
  - [lantern.splunk.com](https://lantern.splunk.com)
- **Global Support**  
Support for critical issues, a dedicated resource to manage your account – 24 x 7 x 365
  - Web: [splunk.com/index.php/submit\\_issue](https://splunk.com/index.php/submit_issue)
  - Phone: (855) SPLUNK-S or (855) 775-8657
- **Enterprise Support**
  - Access customer support by phone and manage your cases online 24 x 7 (depending on support contract)



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# splunk®>

# .conf21

**.conf21 Las Vegas**  
October 18–21

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**.conf21 Virtual**  
October 19–20

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**Splunk University**  
October 16–18

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# Thank You

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