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Splunk Best Practices

The recommendations in this document were compiled by Aplura's staff over there more than 5-years of Splunk administration and professional services engagements. Many of these items come up time and time again during engagements and consideration of these items will result in a more successful implementation. A successful implementation is one that is efficient, scalable, follows information security best-practice, and is, most importantly, useful.

Although everything here is valuable, some of it does not apply for very small or specific implementations of Splunk. Largely, most of this applies to most environments we see.

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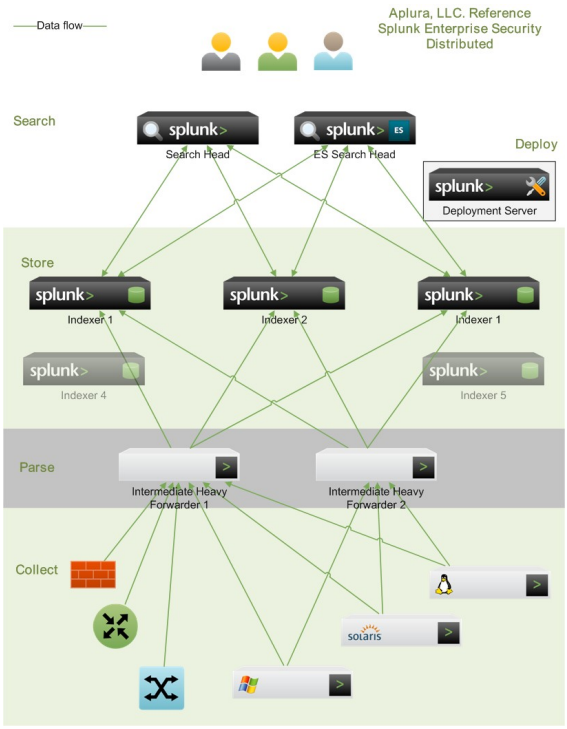
Common Splunk Topology



This architecture has several key components such as:

- Multiple Intermediate Heavy Forwarders for increased load, High Availability, and improved speed of processing in coming events
- An Indexer tier of multiple systems. Multiple search-peers (indexers) improves performance both during data-ingest and search. This strategy reduces search time and provides some redundancy of data-ingest should a single server fail
- One or more separate search heads. This separate system will distribute any search request across all configured search-peers improve search performance.
- A separate search head is shown here to support Splunk's Enterprise Security (ES) application
- Deployment Server. This system can be collocated with other Splunk services, or stand-alone. For large deployments, a stand-alone system is important.

Architecture and Design

- Plan indexes and sourcetypes. These two things will be difficult to change later. Indexes and sourcetypes assist in data management. See Defaultfield and Indexed Fields
- Use sourcetypes to group data by their similarity. If the events are generated by the same device and are in the same format, they should most likely be one sourcetype.
- Try to collect events as close (in terms of geography and network location) as possible. These events can be collected with an *Intermediate Heavy Forwarder*, and then sent to indexers which may be a central location.
- Try to keep search heads as close to indexers as possible. This will improve the search head's speed in accessing the events.
- Use separate IP addresses whenever possible. Such as: management, log collection, web UI/search head and use separate IPs for different major sourcetypes. All of this makes your Splunk deployment more extensible, provides better access control options, and allows for fine-grained troubleshooting and analysis
- Use a consistent naming scheme on the Splunk *Search Heads*, *Indexers* to ensure accuracy and reduce troubleshooting time.
- Carefully plan the deployment of Windows event collection (Event logs and Performance data) to ensure success.
- Single team accountability. A single team should be responsible for Splunk instead of having this split across multiple departments, divisions, or entities. Additionally, much of the deployment of Splunk requires an intimate understanding of its intended use and therefore it is recommended that the team who will be the major user of Splunk should also manage its deployment. This generally equates to a more successful implementation.
- Splunk License Management
    - **PRE-4.2** Use a different Splunk license on each indexer. Re-using a Splunk license violates the AUP and breaks distributed search as well as other *Splunk-to-Splunk* activities

    - **POST-4.2** Use a Splunk License Master to control the licensing of your indexers and don't forget to include you search heads and any heavy/full forwarders in that license.

  If you are in a distributed deployment, with multiple Splunk search heads, indexers or forwarders, strongly consider using Deployment Server. Using deployment server can help keep consistent configuration across Splunk systems, and make configuration changes much easier (no having to touch every system).
- Carefully and consistently use Splunk's listening ports which bind to specific back-end processes. Some of these are referenced when Splunk starts. Generally speaking here are the standard ports, if they have not been altered:
    - tcp/8089 - splunkd - Splunk's daemon port used for distributed search and deployment server
    - tcp/8000 - splunkweb - Splunk's web port used for web UI access
    - tcp/9997 - splunktcp listener - Port commonly used to send events from a Splunk forwarder to a Splunk listener (indexer or another forwarder). Note: This can be any permissible port, 9997 is just an example.
- Plan your 4.2 migration. There are many new features and enhancements in Splunk-4.2 and a migration to it from previous Splunk versions warrant careful consideration and planning.
- Plan your 4.3 migration. There are many new features and enhancements in Splunk-4.3 and a migration to it from previous Splunk versions warrant careful consideration and planning.
- Perform integrity checks. Splunk is incredibly precise in how it collects and represents your data; however, if you send it bogus or duplicate data it may index this as well. Occasionally review your inputs and ensure your data is accurate, time stamps are good, and there are no mistakes such as incorrect or duplicated events.
- Integrate AD for authentication. Splunk integrates fairly well with Active Directory to authenticate users. This configuration allows you to assign a user to a group in AD then map this group to a *role* in Splunk. When this user logs in to Splunk, they are given their specific capabilities and rights assigned by the role. This is granular RBAC (Role Based Access Controls). See this step-by-step video for Integrating AD. The MS AD tool adsiedit.msc is great to browse an AD domain for valuable items necessary to setup AD auth on Splunk. This tool is installed by default on 2008 AD systems, but would need to be installed manually as part of the RSAT package on other versions of Windows.
- Use a separate OU for Active Directory Integration. When configuring AD, you can specify a list of one or more bindgroupDN for Splunk to look for groups in AD. If you just give the root dir of all of the groups then Splunk could return hundreds/thousands of Groups. Additionally, if leverage existing groups there could be many other users in that group that you don't want to have access to Splunk. If you created a new base_ou (e.g. OU=splunkgroups) in AD, then create your access groups under this, e.g. OU=unix_admins,OU=splunkgroups, OU=network_admins,OU=splunkgroups), then you can set the bindgroupDN to *splunkgroups* to minimize returned groups as well as users who have access to Splunk.
- Migrating Index Data. This can be very tricky and you need to be careful since you could destroy and disable your data. It is advised that you call Splunk support or have PS help you. If you must do this manually, read and understand the docs and how the bucket structure works, and you can take a look at this answers post on the subject.
- Avoid parsing raw data on the Indexers. Although the Splunk Indexer is perfectly capable of parsing raw data sent to it from a Universal Forwarder or a non-Splunk source such as syslog, this effort could have an undesirable impact on your performance and administrative overhead such as"
    - Alleviates parsing load from your *Indexer* allowing it to focus on indexing and retrieving events
    - *Indexers* have more code, more components/configurations, and therefore often get patched more frequently. A simple forwarder might not need to be patched for months or more, making it a more stable platform to receive unreliable syslog data (UDP) with minimal loss.
    - The Splunk forwarder will *store and forward* events when the indexer is down (e.g. during a restart)
    - If an *Indexer* is also parsing raw data, then you will have to maintain all of your parse-time rules on it as well. Not only are these additional configurations that your *Indexer*

must parse and hold in memory, but these are configurations that you must maintain as well. Most parse-time configurations require a restart to make effective, which could mean more frequent restarts of your Indexer.
    - See the item below titled "*Intermediate Heavy Forwarder* for data ingest" for additional considerations.

- *Intermediate Heavy Forwarder* for data ingest. Although end-nodes can send their data directly to Splunk indexers, in a distributed Splunk environment, an Intermediate Heavy Forwarder provides many advantages such as:

- Two or more Heavy Forwarders can be used for fault-tolerant ingest of incoming data
    - *AutoLB* (Auto Load-Balance) incoming data across the Splunk Indexers ensuring that Real-time alerts will never fail due to a single-server outage
    - Dedicates systems to the task of collecting the raw-data helping to ensure the data gets forwarded off of the original system that generated it (e.g. A servers with a Universal Forwarder on it, such as a MS Exchange Server, Oracle Database, or MS AD server, or Intrusion Detection System) as quickly as possible to minimally impact that critical system.
    - Parses the raw data minimizing the work/effort that must be done by the Indexers
    - Terminates the TCP connections from the many Universal Forwarders minimizing the work/effort that must be done by the Indexers. Note, this also has a dramatic affect in the *restart* time of a system. If a system has to terminate dozens, hundreds or even thousands of TCP sessions from connected forwarders it could take 10+ minutes for a restart. Having the *Intermediate Heavy Forwarder* terminate these sessions and not the *Indexers* means that when the *Indexers* do a restart, they can come back online much more quickly.
    - Provides a more clear/linear flow of data to the Indexers. This could be useful in many ways but especially to support data collection from a remote location.
    - Index-time configuration changes can be applied to the *Intermediate Heavy Forwarder* and therefore you are not constantly restarting the Indexers **and** losing valuable summary data.

Hardware

- **Information**: To spec out hardware with Splunk requires more than just a quick guide, but the following list may help you to get started. This is not intended to replace a scoping discussion with a Splunk Sales Engineer, but rather to assist a customer in preparation for a professional services engagement.
- Splunk hardware planning. Answering these three questions will suffice for the average deployment, but not all deployments.
    - **Splunk hardware planning**: Know what the size/scope of your deployment is. You must know the amount you expect to index/day. Additionally, you should have a rough idea of how many Splunk users there will be, and what their intensity/usage will be. Finally, you should understand your data sources and either their load/volume or the complexity required to collect data from them.
    - **Splunk hardware planning**: Determine what components you need. Read about Splunk components to better understand what exists. In general, most deployments would benefit from having the following:
        - (1) Search Head
        - (2) Indexer
        - (1) Heavy Forwarder
    - **Splunk hardware planning**: Determine number of indexers. According to Splunk's Documentation, a single (non-ES) indexer can accommodate up to about 100GB/day. An indexer, when used in an ESS deployment, can accommodate up to 34GB/day (according to the sizing documentation). Please see Splunk's documentation for updates to these numbers as they can vary at times.
- Splunk doesn't prescribe exactly what hardware you must purchase; however, you should read through the following documentation to better understand their **minimum** specs:
    - High-Level System Requirements
    - Hardware Capacity Planning

- CPU Spec. CPU is somewhat varied depending on what component you are talking about. For indexers, the current sweet spot for servers has been the 8-12 core machines (I.e. dual socket quad or six core boards). Splunk can work with either AMD or Intel architecture on x86 systems.
- Memory Spec. Memory is somewhat varied depending on what component you are talking about. Generally speaking indexers do particularly well with 16+ GB of memory, meanwhile other components might require less.
- Scale by adding more Indexers. In a well-configured distributed Splunk environment, you can scale simply by adding more indexers. The *Intermediate Heavy Forwarder* can forward data to the new indexer, and your search heads will request data from the new indexer. Generally speaking, this scales linearly resulting in a situation where double the indexers cuts the search time in half.
- Methodically plan storage needs for a new deployment, prior to implementation.
- Drive speed makes a difference. Splunk has informally documented that an increase in drive-speed will have a dramatic improvement on performance.
- Architecture type. Splunk works well with both 32 and 64 bit platforms; however, there is a considerable performance improvement for 64 bit and this should be selected (both for Hardware and Operating System) whenever possible.

Data Routing

- **Information:** Data routing allows the Splunk administrator to selectively determine what incoming data gets ingested, what gets forwarded, and what gets dropped.
- Drop incoming data with the nullQueue. Beware not to go *nullQueue*-happy and drop too much. Many events while insignificant by themselves provide useful information when trended or otherwise analyzed.
- Forward to a Splunk system whenever possible, but if there is a Use Case to send to an external system, following these instructions to Forward data to third party systems. Beware there are some caveats of doing this.
- Use Splunk AutoLB (Load Balancing) to distribute data to multiple indexers/forwarders. Much of this configuration must be done with the outputs.conf file.

Inputs

- Ensure all critical systems have consistent time configuration. Systems generating events should have the proper time to ensure the events they create will be able to be correlated when analyzed. Consider NTP use throughout the enterprise as well as frequent time audits of the most critical systems to ensure accuracy.
    - Consider doing regular *time-audits.* This is where, you evaluate the time of your most critical systems to ensure they are consistent. If the data is in Splunk, then this task might just take a few minutes every month or so and is well worth it.
- Explicitly configure Splunk to read time stamp information from incoming events. Splunk's reads the time stamp from incoming events, which it then associates to the event in the index and the underlying buckets. It is imperative that time stamps and timezone offsets be parsed and set correctly both for usability and efficiency purposes.
- Test new inputs. When new inputs will be created, test the data first by ingesting some of it and determine if it requires adjustments such as for time stamps, event-processing (such as breaking).
- Syslog before Splunk. Traditional syslog technologies (syslogd, syslog-ng, rsyslogd) are simple and featureless compared to Splunk, but this is their advantage. Since these packages rarely change and require a small amount of resources, they are perfect for being the initial recipient of syslog data on the network. When network devices send syslog messages, this data is frequently UDP (connectionless) and therefore vulnerable in-transit. Even TCP syslog can be lost if the receiving host is unreachable. Place a syslog application (e.g. syslog-ng) on the network to receive the syslog feeds and configure the application to write the data out to files. Ideally, have the files be application-specific (e.g. firewall.log, router.log, maillog.log, etc.). Splunk can be installed as a forwarder on the same host to read these files and forward them on. If Splunk requires a restart or is otherwise unavailable (i.e. during an upgrade), it can pick up where it left off reading the files on disk. Please see other recommendations for managing these files.

- Too many files. Ensure a single instance of Splunk does not monitor more than a few hundred active files. If there are more than this, consider implementing a process (i.e. cron) to move the previous day's (or week perhaps) syslog directory out of the monitored directory-structure to an archive location. You know you have a problem with too many files if the Splunk instance involved has something like this in its logs: *File descriptor cache is full*. You might also benefit here by increasing the *ulimit* (see *Adjust ulimit* in this document).
- Avoid overwriting or hard-coding the "source" field in the data. Doing so can make troubleshooting problematic inputs more difficult.

Syslog Input

- Strip priority out of *TCP* inputs. In accordance with RFC3164 a Syslog *priority* message is prepended to each syslog event. By default, Splunk will strip this out on incoming *UDP* see inputs.conf documentation regarding the *no_priority_stripping* directive. The problem is, that many devices still prepend this priority when sending events via *TCP*. Splunk expects the events to be *RFC-compliant* and not contain the priority so does not know to remove it. Here is an example of what an event looks like:

```
<30>Sep 29 09:41:51 192.168.250.7 named[19706]...
```

    - To strip this out, add the following to the appropriate stanza of the props.conf for the target sourcetype:

```
SEDCMD-pristrip=s/^<[0-9]+>//
```

- Watch out for chained syslog time stamps. If an event is relayed through multiple syslog servers (for example the local syslog on a Linux system sending events to a remote syslog server), there may be two time stamps at the start of the event. Carefully configure your Splunk props.conf to ensure the correct time stamp is extracted for the event.

High Performance Syslog

The Linux UDP input buffer has a fixed amount of memory allocated to it. When the amount of incoming data exceeds this buffer, packets are dropped. On a very busy server, this could happen frequently or in some cases continually.
The memory allocated to the UDP input buffer is distribution-specific. This means, that depending on your flavor/version of Linux, this buffer size can vary. Be sure to understand what it is, and how it operates. Syslog systems should be tested and tuned to perform as needed.

- **Information**: Calculate Capacity by Messages
    - Imagine a device that generates messages that are 250-450 bytes with most being over 350.
    - If we average conservatively that the messages are 400 bytes big, how many EPS could be processed before saturating half the link such as in the *Syslog-NG Example* below
    - A 100/mbs link is capable of 100000000/8=12500000 bytes/sec
    - Half of this is 6250000 (what the Syslog-ng folks could do)
    - Divide this by 400 (average bytes/message) and you get 15625 which is the total amount of messages we could possibly receive if optimally configured with tcp given the parameters.
    - Syslog-NG Example
        - The syslog-ng developers have a blog where they discuss possible volumes with the 2.0 OSE:
            - 100mbs net
            - TCP messages
            - 44000 messages/sec all 150 bytes long
        - This means they are processing 44000*150=6600000 bytes per second
        - Multiply 6600000*8 to get bandwidth: 52,800,000
        - So syslog-ng optimally configured (by its developer) can use about half of the 100/mbs Ethernet connection without dropping packets
- **Information**: Calculate Capacity by License Size
    - Imagine a 50GB license

- Divide by seconds per day 86400 to see an average of how much data could be pushed through the network on average:
    - 50000000/86400=578 (bytes/second)
- Divide the above by 8 to get bits per bytes
    - (50000000/86400)*8=4624 (bits/second)

Application or Data Specific

- SEP Data import. For Symantec Endpoint Protection, you can put the SEP server in a configuration where it will write out temp files that a Splunk Universal Forwarder can read. Here is the Symantec knowledge-base document on how to configure this. While it is possible to configure SEP to send data via syslog, in some cases this data is incomplete, and unreliable.
- Cisco IronPort Help
    - Splunk IronPort App
    - Splunk IronPort Mail Add-on
    - Video on how to use the IronPort App
- Avoid reading Windows raw EVT(X) files if at all possible. Instead, Configure a Splunk *Forwarder* to access *Windows Event Manager* directly to ingest Windows Events.
    - If your use case requires direct reads of the Windows EVT(X) binary files then consider the following information:
        - EVT(X) files are the raw binary-format files that Windows uses to store its logs on the file-system. These files are nothing like normal log files and therefore present some challenges to any attempt to reconstitute them back into usable logs (Note: These issues have nothing to do with Splunk):
        - They reference GUID/SIDs in lieu of system/user names. This means that the "EVT(X) File Parsing Host" must have access to make AD queries to the Domain Controllers that can provide details and convert the codes referenced by the "Logging Host."
        - They reference DLL files that contain the pertinent information instead of placing it in the actual log. This means any DLL referenced by the "Logging Host" MUST be available on the "EVT(X) File Parsing Host" in order to interpret the logs.
        - Since the EVT(X) files are a subset of the information they represent, a 99MB EVTX file converts to almost 500MB of indexed data. There are TB of logs stored on the CIFS share. The volume both to the Splunk license, system storage, and AD/DC calls should be considered before fully-integrating this.
        - Ingest time is slow since many AD calls are necessary for GUID/SID queries.
        - In our tests, many GUIDs and some DLL references didn't convert in the event logs, leaving lots of useless events. This may be a result of either inconsistent AD details or missing DLLs on the "Log Parsing Host"
        - Splunk on Windows can natively ingest EVT(X) files
- Splunk Enterprise Security
    - Implementation
        - Adjust VM Swap. Lower the vm.swappiness in 'sysctrl' to something like: 'vm.swappiness=10'
        - Adjust ulimit. Adjust the ulimit if necessary.
    - Administration
        - Manage Assets Lists. Continue to manage your ES Asset List to always get the most value out of your deployment.
        - Manage Identities. Manage your ES Identities to always get the most value out of your deployment.

Forwarder Deployment

Change the admin password on forwarders. All Splunk systems have a default username of *admin* and password of *changeme* and this includes Forwarders (Universal Forwarders and Full Forwarders).

- Take time to Plan your deployment prior to implementation to ensure the most success.

- Centrally-manage Splunk configurations. Ensure you have a way to consistently and accurately manage configurations across the enterprise, such as with the Splunk deployment server
    - **Information**: Configure Deployment Server
    - **Information**: Define Server Classes
    - **Information**: Configure Deployment Clients
    - **Information**: Define Deployment Apps
    - **Information**: Deployment Example

Windows Deployment

- **Information**: Custom EventLogs on Splunk for Windows are discussed here.
- Before activating Splunk Windows Forwarders configure custom indexes
- **Information**: Monitor files and directories
- Windows Deployment Help
- Scripted deployment for Windows UFs. You can script your deployment of Universal Forwarders for Windows depending on what tools you have available at your disposal. There are a few things to keep in mind though such as:
    - On a version with UAC (User Access Controls) such as Visa, 2008 or Windows 7, you must be in an admin shell to install software
    - Although it is much easier to have the Splunk MSI files in a UNC that you can mount/reach from any system, sometimes windows security policy prevents this from working. If msiexec is failing consider copying the MSI installer local and try it again.
    - There are a few things to keep in mind though, specifically that you want to pass the following *msiexec* arguments: AGREETOLICENSE, INSTALLDIR (since many sites want to install to some drive besides *c*
    - Below is an example content that you can put in a script/package-management and it is based on having a Splunk deployment server in place

```
msiexec /i \\system\share\path\splunkforwarder-4.3*
DEPLOYMENT_SERVER="DS-host_or_IP:8089" \
AGREETOLICENSE=Yes INSTALLDIR="c:\Program
Files\SplunkUniversalForwarder" MIGRATESPLUNK=1 \quiet
```

Linux Deployment

- Scripted deployment for Linux UFs. You can script your deployment of Universal Forwards for Linux depending on what tools you have available at your disposal.
    - There are a few things to keep in mind though, specifically that you probably want to pass the following Splunk start-time arguments: --accept-license, --answer-yes, --no-prompt
    - Below is an example content that you can put in a script/puppet/rpm and it is based on having a Splunk deployment server in place. Note: that this hard-codes a downloads of the Splunk UF RPM at each invocation. It would be much smarter to use a local repo and replace that portion of the script with a call to this location with something simple like: *yum install splunkforwarder*

```
uname -a
echo
SPLUNKHOME="/opt/splunkforwarder"
wget -O splunkforwarder-4.3-115073-linux-2.6-x86_64.rpm \
'http://www.splunk.com/index.php/download_track?
file=4.3/universalforwarder/linux/splunkforwarder-4.3-115073-linux-2.6-
x86_64.rpm&ac=&wget=true&name=wget'
rpm -Uvh ./splunkforwarder-4.3-115073-linux-2.6-x86_64.rpm;
echo -e '[target-broker:deploymentServer]\ntargetUri =
SPLUNK.DEPLOYMENT.SERVER.HOSTNAME_or_IP:8089' >
$SPLUNKHOME/etc/system/local/deploymentclient.conf;
$SPLUNKHOME/bin/splunk restart --accept-license --answer-yes --no-
prompt;
```

```
$SPLUNKHOME/bin/splunk enable boot-start;
[ -f "$SPLUNKHOME/etc/system/local/outputs.conf" ] && mv
$SPLUNKHOME/etc/system/local/outputs.conf
$SPLUNKHOME/etc/system/local/outputs.conf.remove;
[ -f "$SPLUNKHOME/etc/system/local/outputs.conf.remove" ] &&
$SPLUNKHOME/bin/splunk restart;
sleep 3
watch "ls $SPLUNKHOME/etc/apps"
echo
```

Performance

- Use Summary Indexing for increased reporting efficiency. As you add more data and more users to Splunk, you will benefit from Summary Indexing.

Search Help

- Print the Splunk Cheatsheet (PDF or Manual) for users. This is a great resource for learning the search language.

Storage and Data Management

- New Index. It is almost always appropriate to use multiple indexes and not just *main/default*. Create a new index if the answer of either of the following questions is *yes*:
    - Does the target data require separate retention controls from other data?
    - Does the target data require separate access controls from other data?
    - Will Splunk users wish to either search the target data by itself or search other data and omit this target data?
- Storage Needs. Methodically plan storage needs for a new deployment, prior to implementation. Consider moving your Splunk database (*SPLUNKDB*) to its own volume to ensure clean separation of the binary/configuration structure and the data. This is not necessary, but there are advantages in high-volume environments.
- Data retention. Implement data retention and disk usage controls explicitly and early instead of waiting for a disk to fill. Configure retention in indexes.conf to push older data to remote volumes such as NFS mount for data archive.
    - **Caution**: Changes to the retention policy (*indexes.conf*) can be perilous and the effect is not always immediate. Be sure you know what you are changing and have tracked changes and the results appropriately to ensure it has the desired effect.
- DRP/BCP. Configure a Disaster Recovery and Business Continuity Plan for your Splunk deployment. This will include implementing a backup plan. In addition to these items, consider backing up the *$SPLUNK_HOME/etc/deployment-apps* directory and *$SPLUNK_HOME/etc/system/local/serverclass.conf* on the Deployment Server
- Distributed Architecture. Carefully plan Splunk Distributed Architecture to ensure the most accurate and efficient processing.
- Drive speed makes a difference. Splunk has informally documented that an increase in drive-speed will have a dramatic improvement on performance.
- RAID Level. Use RAID1+0 whenever possible for the Splunk datastore. Little impact will be seen at low volumes; however, at higher data volumes you will see performance improvement with RAID1+0 over RAID 5.

Deployment Server

- Deployment Server Selection
    - The DS can be collocated with any other full Splunk instance; however, there are also some reasons why it might need to be stand-alone.

    - Since the DS requires so many active TCP sessions (at least one for each connected client), choose a system that already has a limited number of open TCP sessions to other systems, such as a Search Head.
    - Ensure the DS server has plenty of memory.
    - Consider a stand-alone system if the number of deployment-clients will exceed 300-500
    - Consider one Deployment Server instance for every 2000 polls per minute.
    - Create a DNS host name specific to the DS (e.g. splunk-ds.yourfoo.fqdn) and use this name for all communication from the deployment-clients. This will make it much easier to migrate later, if you choose to.
    - Adjust the polling period on clients to make a single server scale further.
- Use the clientName directive in the deploymentclient.conf to ease whitelisting and blacklisting in your serverclass.conf
- Only deploy configuration and parsing apps, such as Technology Addons (TA's). There is very little value in deploying dashboard based apps, and in some cases may cause complications.
- Prepend deployed configuration apps (not TA's) with "DS-". This distinction can help tremendously when troubleshooting problems with deployment clients.

App Development

- Ensure all (if possible) searches call saved searches or use other knowledge-items such as Macros or Eventtypes. Containing all of these knowledge-items helps with manageability of the data across an enterprise deployment. Managing bare searches across apps or called externally via scripts does not scale well and can create a big problem during upgrades, migrations, and other maintenance.
- When creating fields/eventtypes refer to the Splunk Common Information Model to ensure forward-compatibility with Splunk and Splunkbase built-ins.
- When developing an app, ensure that any log or pid files are not stored in the app's directory. If the app is distributed via deployment server, the files and directory structure in the app will be replaced with those from the deployment server, which would include any log or pid files.

Analytics

- Use GetWatchList. GetWatchList is a free Splunk app on Splunk-base that allows users to manage lookup tables on the system without requiring shell or administrative access. These lookups can be used in various ways but the most popular method is as watchlists.

OS Configuration or Hardening

- Linux Kernel Tuning Info
- Implement a central software management system (e.g. RPM repo, Puppet, Satellite Server) to manage packages and configurations to forwarders and other related systems. Managing Splunk instances on these remote systems always has problems and leads to issues such as:
    - Very old (out of date) versions of Splunk throughout the enterprise
    - Forwarders that have not had Splunk configured properly or locked down (e.g. changing the admin password and turning off Splunk web)
    - Inconsistent configurations leading to similar systems setting different metadata on the same type of logs.
- Architecture type. Splunk works well with both 32 and 64 bit platforms; however, there is a considerable performance improvement for 64 bit and this should be selected (both for Hardware and Operating System) whenever possible.
- Partitions and Volumes
    - Use LVM to manage underlying file-system space. Only allocate storage space to an LVM from a Volume Group as necessary and preserve the extra for emergencies or future use. Make better use of LVM partitioning by creating discrete logical volumes for each major portion of the system such as /, /var, /tmp, /opt/splunk and maybe even /splunkdata