Splunk Multi-Deployment Server Architecture

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What are we talking about today?

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Kate

- Almost 20 years experience in infrastructure management, systems operations, security & big data architecture.
- Spent 6 years with Comcast
  - Principal Engineer (Splunk)
  - Senior Manager of Engineering & Software Development
    - Focus on open source integrations with existing data platforms
- Inaugural SplunkTrust member & 2013 Revolution Award Winner (Innovation)
- Joined Splunk ~18 months ago as Platform Architect in the Global Engineering team.

Joe

- 8 years at Comcast
  - Principal Engineer (Splunk)
- < 2 years at Splunk
  - Premium Cloud Support Engineer
  - Pre-Sales Engineer
- 2014 & 2015 Presenter at Splunk .conf
- 2015 Splunk Ninja Revolution Award Winner

What is this presentation going to cover?

- Covered
  - Simplified model for deploying & operating multiple Splunk Deployment Server nodes
  - A Git based method for using version control with multiple Splunk Deployment Servers
  - High-level usage of Ansible playbooks to update multiple Splunk Deployment Servers with changes from Git
  - Trade-offs between an multiple Deployment server method vs single-host systems
- Not Covered
  - Intro to Git
  - Intro to Ansible
  - Tiered Deployment servers (no longer supported after 7.0+)
  - Forwarder Management UI

Deployment Server at Scale

Topic breakdown

- Introductions
- Deployment Server Overview & Single node limitations
- Implementing a Multi-DS strategy
  - Architecture Overview
  - DNS vs Load Balancers
  - Using Git & Ansible for changes & updates
- Reporting & Monitoring
  - Peering & Monitoring Console
  - Reports & APIs
- Conclusion & QA

What is Deployment Server?

You use the Splunk **deployment server** to distribute content and configurations (collectively called **deployment apps**) to **deployment clients**, grouped into **server classes**.

Deployment apps can be full-fledged **apps**, such as those available on Splunkbase, or they can be just simple groups of configurations.

What is Deployment Server?

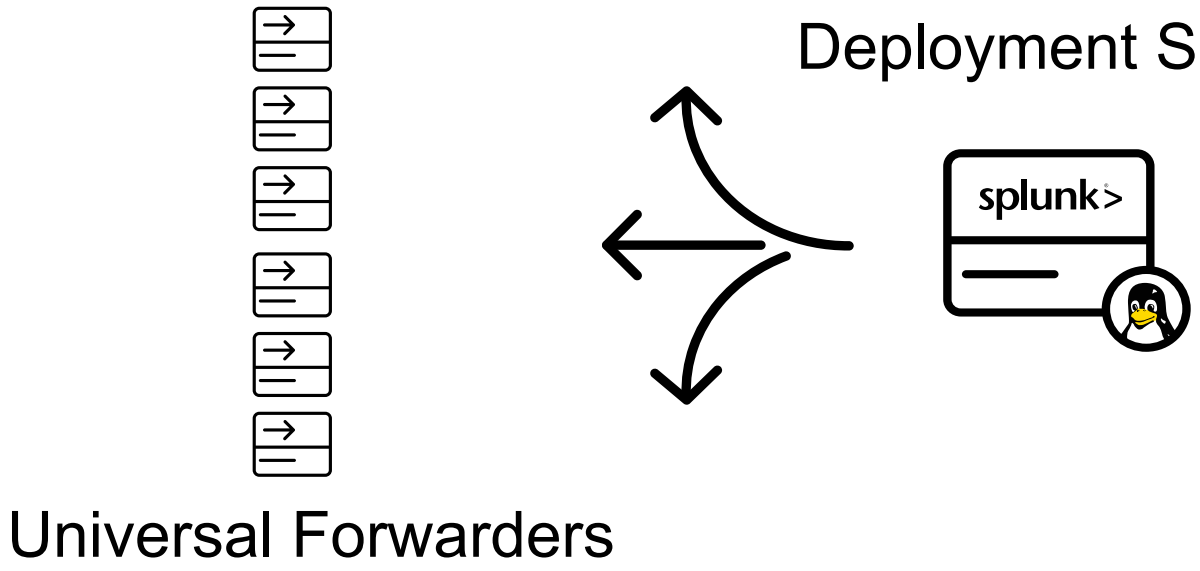
continued…

Splunk's deployment server is Publisher/Subscriber application that uses an (internal) Broker to negotiate sessions with Universal Forwarders.

The Universal Forwarder will PhoneHome to a Deployment Server node & validate the latest app/configuration against the current checksum value to determine if there are changes

Single Deployment Server

Topology

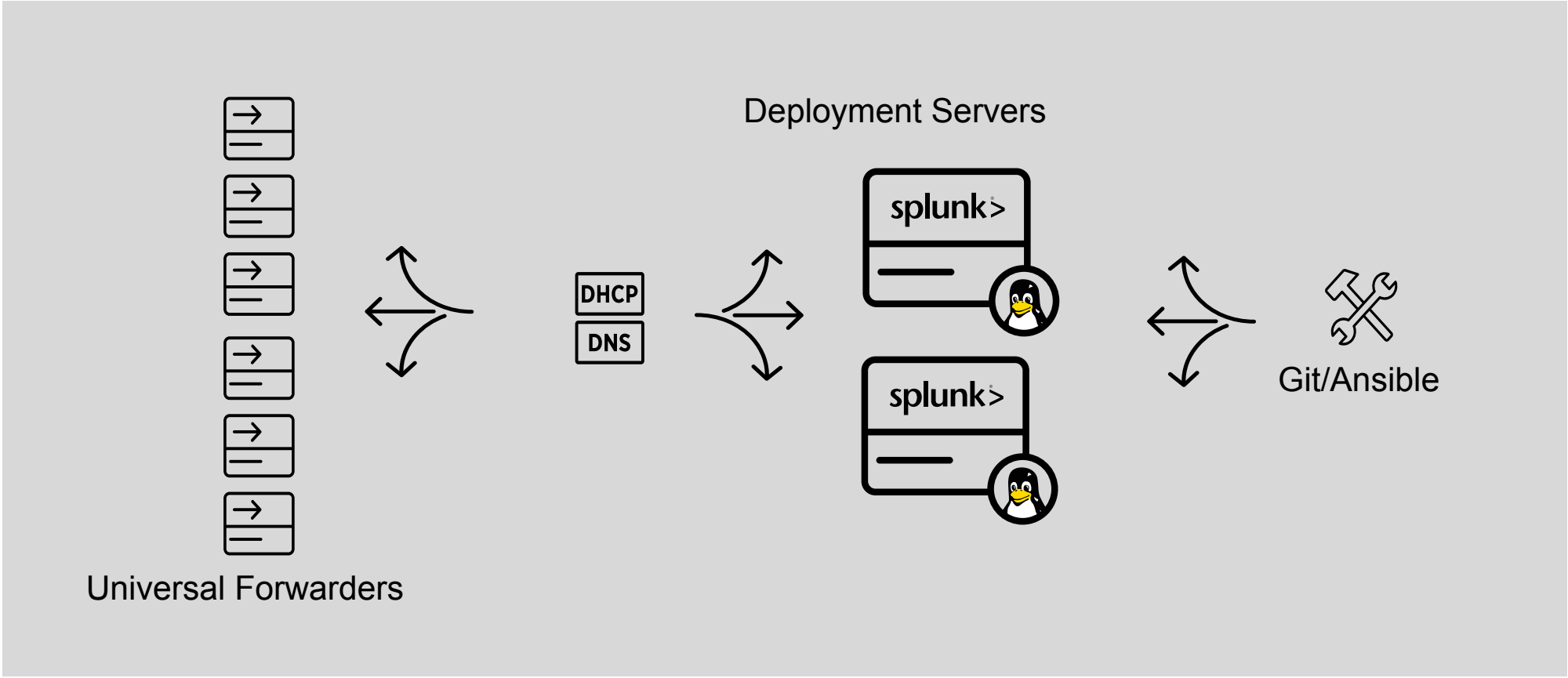


Limits:

- Single Threaded
- # of Inbound TCP Connections
- Capacity:
  - Linux DS – **5000 UFs**
  - Windows DS – **2500 UFs**

Multi-Deployment Server (MDS)

Topology



Multi-Deployment Server (MDS)

Topology

- Universal Forwarders have a **targetUri** (deploymentclient.conf) that is set to to a **DNS RR A record**

```
[deployment-client]
[target-broker:deploymentServer]
targetUri=deploy.klgsplunk.com
```

- Deployment Server nodes are configured with
  - **crossServerChecksum=true**
  - This is disabled by default
  - In this configuration UI components should not be used.

- Git/Ansible is used on the backend to store the deployment server content
  - This requires familiarity with version control & automation frameworks
  - These components should also feed output/logs into Splunk for monitoring

Multi-Deployment Server Architecture

DNS vs LB Configurations

- Splunk's recommendation is to use a DNS Round Robin A record to rotate between multiple DS nodes.
  - This approach has been shown to work more consistently than using a Load Balancer/VIP
  - Load Balancers *can* certainly be used but additional network review is typically required since:
    - DS nodes need to be able to negotiate sessions with the client at layer 3
    - NAT/Firewall configurations can cause Universal Forwarders to fail phoneHome actions
    - The Universal Forwarder (currently) doesn't send the appropriate "x-FWD" headers for HTTP proxies to work consistently

Multi-Deployment Server Architecture

DNS vs LB Configurations

```
$TTL 86400
@   IN  SOA     ns1.klgsplunk.com. root.klgsplunk.com. (
        2013042201  ;Serial
        3600        ;Refresh
        1800        ;Retry
        604800      ;Expire
        86400       ;Minimum TTL
)
; Specify our two nameservers
                IN      NS              ns1.klgsplunk.com.
; Resolve nameserver hostnames to IP, replace with your two droplet IP addresses.
ns1             IN      A               10.0.0.19

; Define hostname -> IP pairs which you wish to resolve
sds1    86400    IN  A 10.0.0.82
sds2    86400    IN  A 10.0.0.156
sds3    86400    IN  A 10.0.0.127
deploy  3600     IN  A 10.0.0.156
                 IN  A 10.0.0.127
```

Figure 1 - local named zone configuration

```
[deployment-client]
clientName=dc
phoneHomeIntervalInSecs=3600
[target-broker:deploymentServer]
targetUri=deploy.klgsplunk.com:8089
```

Figure 2 - local deploymentclient.conf configuration

- Example:
  - Universal Forwarders are configured to use a DNS – Round Robin A record deploy.klgsplunk.com
  - This A record will rotate the host record on an 1 hour (3600 second) schedule between hosts sds2 & sds3
  - This should match or be less than the polling interval set at the UFs
    - 1 hour or longer works well consistently in testing

Multi-Deployment Server

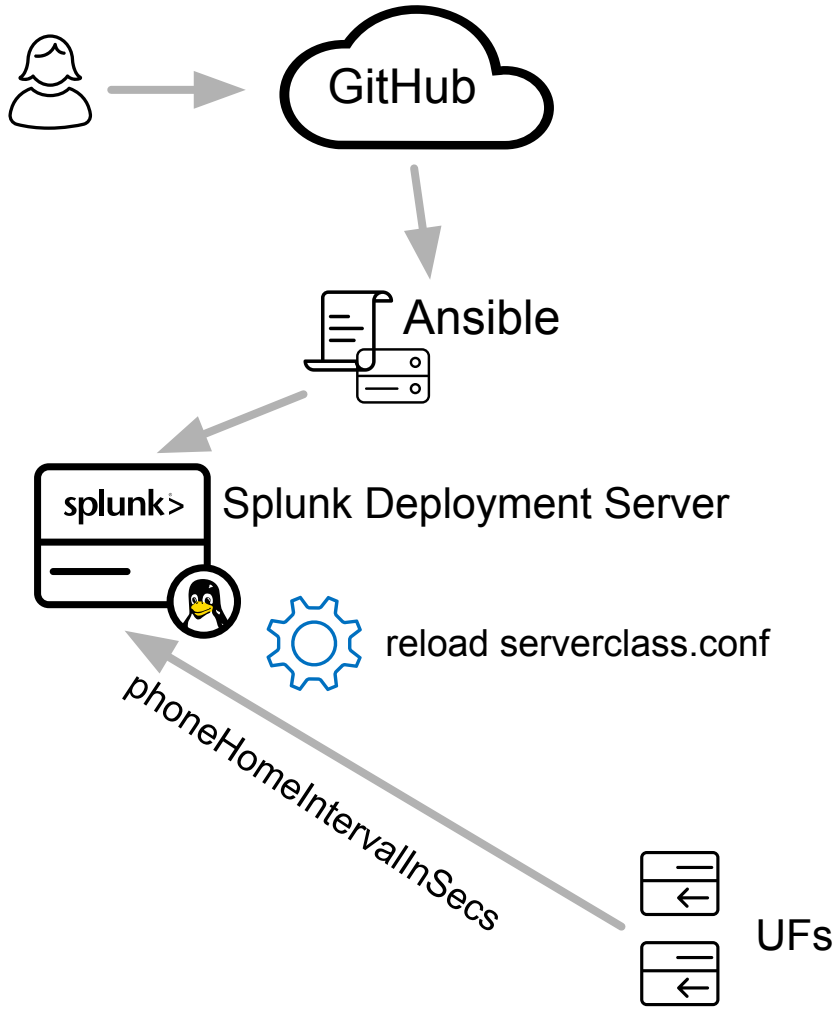
Considerations

- Pros
  - MDS nodes can be scaled up to support 10s of thousands of hosts
  - Splunk UF & Deployment Server node reporting available via logs & REST API
  - Introduction of Git repository allows for
    - Version control of deployment-apps & configurations
    - Rollback features
    - Peer Review & Change Control
- Cons
  - Managing multiple DS nodes requires the use of tooling outside of Splunk:
    - Integration of Git repository requires additional checks on configurations prior to deployment
    - Ansible playbooks & SSH keys required
  - The DS nodes are still single-threaded
  - Forwarder Management UI should not be used in this model.
  - Managing the serverclass.conf directly through the file
  - Requires additional checks & balances

Multi-Deployment Server

Sample Workflow

- All changes are checked into Git & merged to a golden or master branch
  - Ansible playbook (on a per DS node basis)
    - pulls configurations from the Git repository
    - update all DS nodes with the same configuration
    - reload the deployment server
  - UFs check-in based on phoneHome intervals
    - UFs are provided updates based on the serverclass.conf configuration



MDS Monitoring

Peering & Monitoring

- Use A Monitoring Console Server

  - All Splunk Deployment Server nodes should be peered & designated as deployment-servers
  - All Splunk Deployment Servers nodes should have a custom group name assigned to them, for example: **mds**
    - REST command searches can be targeted to all MDS nodes (splunk_server_group)

	Instance (host)	Instance (serverName)	Machine	Server roles	Custom groups	Indexer Cluster(s)	Search Head Cluster(s)	Monitoring	State
>	ip-10-0-0-127.ec2.internal	ip-10-0-0-127.ec2.internal	ip-10-0-0-127.ec2.inte...	Deployment Server	mds			✓ Enabled	Configured
>	ip-10-0-0-156.ec2.internal	ip-10-0-0-156.ec2.internal	ip-10-0-0-156.ec2.int...	Deployment Server	mds			✓ Enabled	Configured

What Should We Monitor For?

CHECKSUMS!

- All serverclass.conf use **crossServerChecksum=true**
- All deployment server **apps have the same checksums**
- All deployment servers have the same **serverclass.conf**

REST ENDPOINTS FTW!

Monitor serverclass.conf uses crossServerChecksum = true

/services/configs/conf-serverclass

Example REST command search from Monitoring Console:

| rest splunk_server_group="dmc_customgroup_mds" /services/configs/conf-serverclass

crossServerChecksum enabled on both deployment servers

deployment_server	crossServerChecksum
ip-10-0-0-127.ec2.internal	Enabled
ip-10-0-0-156.ec2.internal	Enabled

REST ENDPOINTS FTW!

Monitor all deployment server apps have the same checksums

/services/deployment/server/applications

Example REST command search from Monitoring Console:

| rest splunk_server_group="dmc_customgroup_mds" /services/deployment/server/applications

Matching app checksums across deployment servers

Deployment Server Application Checksums

title	deployment_servers	checksum	status
fwd-app	ip-10-0-0-127.ec2.internal ip-10-0-0-156.ec2.internal	8830064211521554482	Matching
fwd-app-2	ip-10-0-0-127.ec2.internal ip-10-0-0-156.ec2.internal	7713279339441192731	Matching

What About serverclass.conf?

Monitor all deployment servers have the same serverclass.conf

- Checksums are not available from any endpoint for serverclass.conf
- Could use the /services/configs/conf-serverclass endpoint and do some SPL foo to do a stanza by stanza setting comparison

What About serverclass.conf?

Monitor all deployment servers have the same serverclass.conf

- **Put serverclass.conf in its own app and let Splunk take care of creating a checksum for it, just like any other app.**

- **Leverage the same endpoint that we used for**

Example REST command search from Monitoring Console:

| rest splunk_server_group="dmc_customgroup_mds" /services/deployment/server/applications

Severclass Checksum

title	deployment_servers	checksum	status
serverclass	ip-10-0-0-127.ec2.internal ip-10-0-0-156.ec2.internal	14628466518199378430	Matching

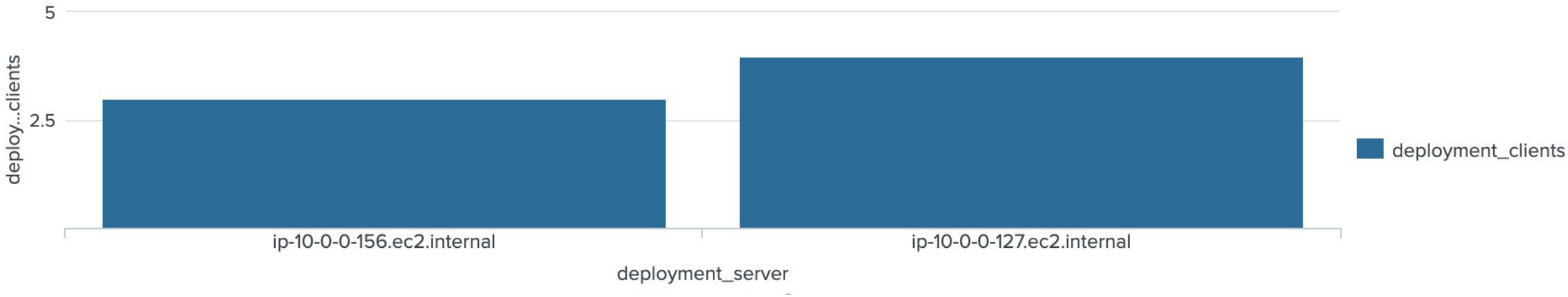
What Should We Monitor For?

Deployment Client Distribution

/services/deployment/server/clients

Example REST command search from Monitoring Console:

| rest splunk_server_group="dmc_customgroup_mds" /services/deployment/server/clients



Reference Links

- https://github.com/klawrencegupta-splunk/splunk_mds
- https://docs.splunk.com/Documentation/Splunk/7.3.2/Updating/Deploymentserverarchitecture
- https://docs.splunk.com/Documentation/Splunk/7.3.2/Updating/Deploymentserverarchitecture#Summary_of_key_terminology
- https://docs.splunk.com/Documentation/Splunk/7.3.2/RESTREF/RESTdeploy

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