

KERBEROS

NETWORK AUTHENTICATION PROTOCOL

Presented by:

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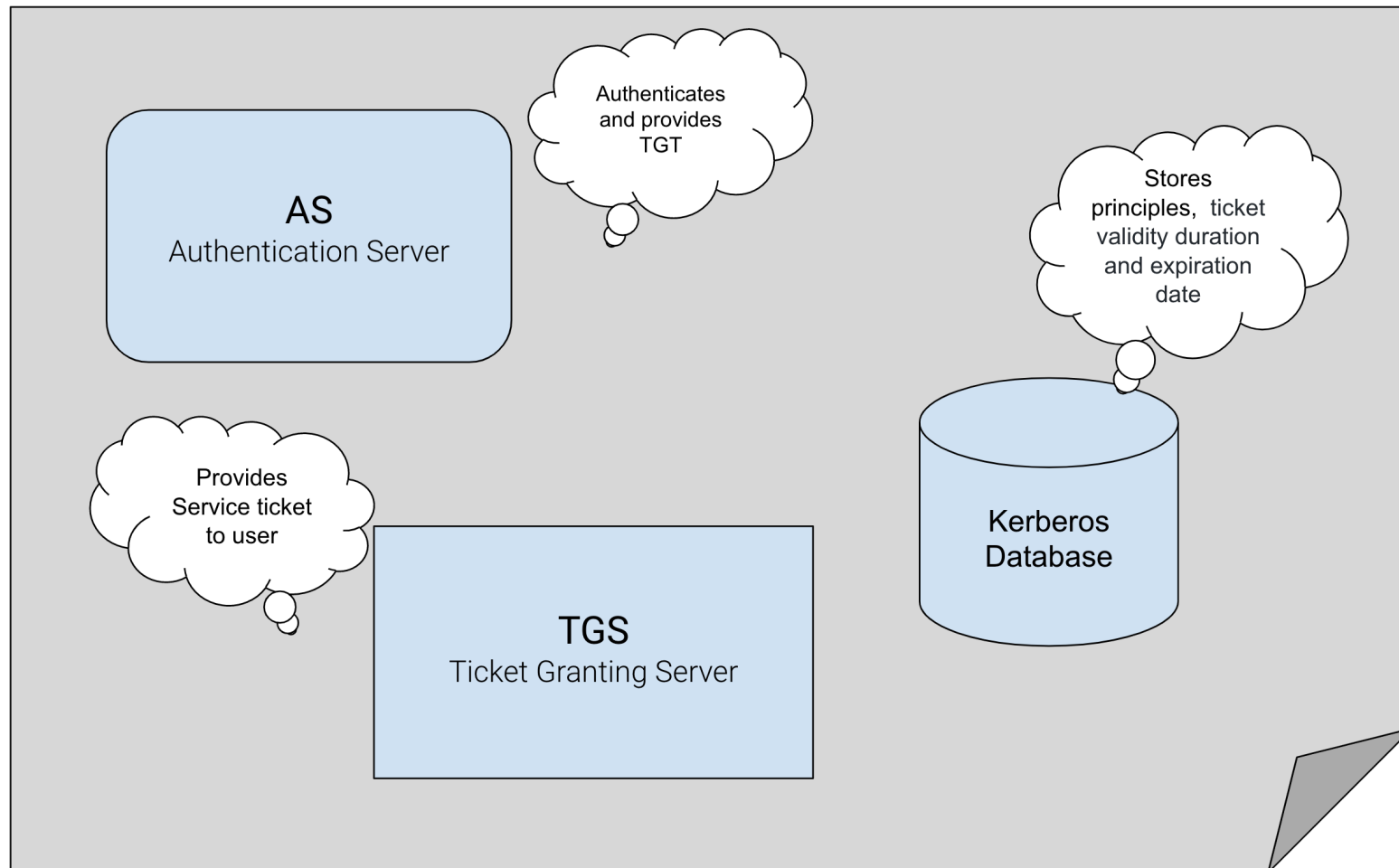
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About Kerberos

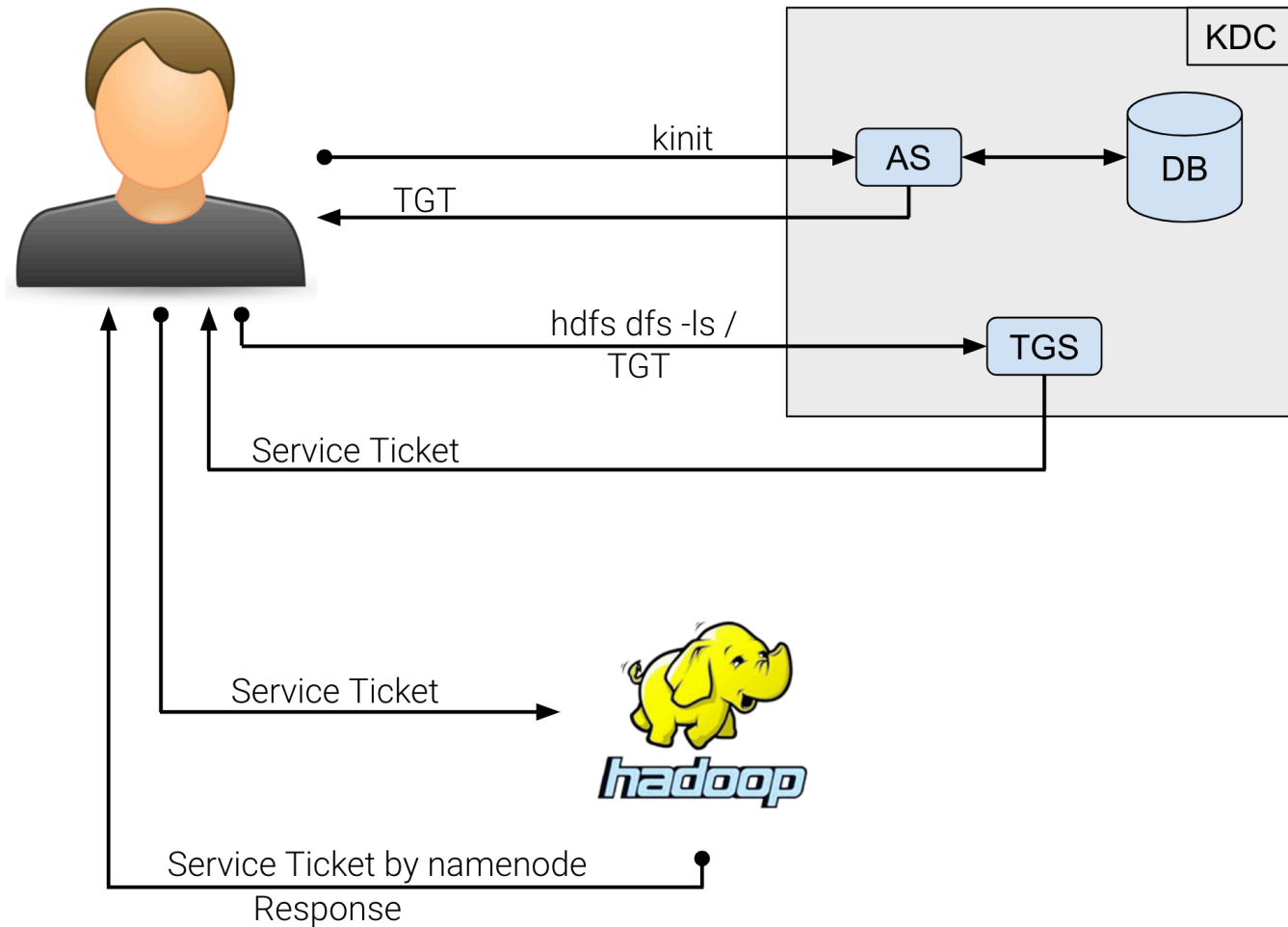
- Kerberos is a network authentication protocol developed by MIT.
- which eliminates the need for transmission of password across the network and removes the threat of any attack.

KDC

Key Distribution Center



How Kerberos Works



Installation of Kerberos

- Install Kerberos workstation on **all hosts** of the cluster using the following command:

```
yum install krb5-workstation krb5-libs krb5-auth-dialog
```

- Install Kerberos Server on any one host of the cluster:

```
yum install krb5-server
```


Configuring kadm5.acl

Perform this step only on the host in which Kerberos server is installed

- To configure kadm5.acl file, use the following command:

```
vi /var/kerberos/krb5kdc/kadm5.acl
```

- Make the following changes as shown below:

 root@master:/var/kerberos/krb5kdc

```
*/admin@EXAMPLE.COM *
```

```
~  
~  
~  
~
```

 root@master:/var/kerberos/krb5kdc

```
*/admin@METIS.COM*
```

```
~  
~  
~  
~  
~  
~
```

Configuring kdc.conf file

Perform this step only on the host in which Kerberos server is installed

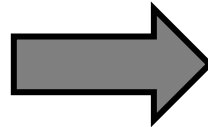
- To configure kdc.conf file, use the following command:

```
vi /var/kerberos/krb5kdc/kdc.conf
```

- Make the following changes as shown below:

```
[kdcdefaults]
kdc_ports = 88
kdc_tcp_ports = 88

[realms]
EXAMPLE.COM = {
    #master_key_type = aes256-cts
    acl_file = /var/kerberos/krb5kdc/kadm5.acl
    dict_file = /usr/share/dict/words
    admin_keytab = /var/kerberos/krb5kdc/kadm5.keytab
    supported_encetypes = aes256-cts:normal aes128-cts:normal des
c:normal
}
~
~
~
```



```
[kdcdefaults]
kdc_ports = 88
kdc_tcp_ports = 88

[realms]
METIS.COM = {
    #master_key_type = aes256-cts
    acl_file = /var/kerberos/krb5kdc/kadm5.acl
    dict_file = /usr/share/dict/words
    admin_keytab = /var/kerberos/krb5kdc/kadm5.keytab
    supported_encetypes = aes256-cts:normal aes128-cts:normal de
c:normal
}
~
~
~
```

Configuring krb5.conf file

Perform this on all the hosts of the cluster

- To configure krb5.conf file, use the following command:

```
vi /etc/krb5.conf
```

Make the following changes as shown below:

```
# Configuration snippets may be placed in this directory as well
includedir /etc/krb5.conf.d/

[logging]
default = FILE:/var/log/krb5libs.log
kdc = FILE:/var/log/krb5kdc.log
admin_server = FILE:/var/log/kadmind.log

[libdefaults]
dns_lookup_realm = false
ticket_lifetime = 24h
renew_lifetime = 7d
forwardable = true
rdns = false
pkinit_anchors = FILE:/etc/pki/tls/certs/ca-bundle.crt
# default_realm = EXAMPLE.COM
default_ccache_name = KEYRING:persistent:%{uid}

[realms]
# EXAMPLE.COM = {
#   kdc = kerberos.example.com
#   admin_server = kerberos.example.com
# }

[domain_realm]
# .example.com = EXAMPLE.COM
# example.com = EXAMPLE.COM
~
Wednesday, November 18, 2020
```



```
# Configuration snippets may be placed in this directory as well
includedir /etc/krb5.conf.d/

[logging]
default = FILE:/var/log/krb5libs.log
kdc = FILE:/var/log/krb5kdc.log
admin_server = FILE:/var/log/kadmind.log

[libdefaults]
dns_lookup_realm = false
ticket_lifetime = 24h
renew_lifetime = 7d
forwardable = true
rdns = false
pkinit_anchors = FILE:/etc/pki/tls/certs/ca-bundle.crt
default_realm = METIS.COM
default_ccache_name = KEYRING:persistent:%{uid}

[realms]
METIS.COM = {
  kdc = master.metis.com
  admin_server = master.metis.com
}

[domain_realm]
metis.com = METIS.COM
metis.com = METIS.COM
~
```


Create Database

Perform this step only on the host in which Kerberos server is installed

- To create a Kerberos database, use the following command and set the master password:

```
kdb5_util create -r METIS.COM -s
```

- After running the following command, it will ask you to set a master password.

Start Kerberos services

Perform this step only on the host in which Kerberos server is installed

- Use the following commands on the host in which Kerberos server is installed to start the services:

```
systemctl start krb5kdc
```

```
systemctl start kadmin
```

Install JCE policy files

Perform this on all the hosts of the cluster

- To install JCE Policy files, use the following wget command to download the required file:

```
wget --no-check-certificate --no-cookies --header "Cookie: oraclelicense=accept-securebackup-cookie" "http://download.oracle.com/otn-pub/java/jce/8/jce_policy-8.zip"
```

- Now use the following command to unzip the file on the correct directory:

```
unzip -o -j -q jce_policy-8.zip -d /usr/java/jdk1.8.0_141-cloudera/jre/lib/security/
```

Adding Principal

Perform this step only on the host in which Kerberos server is installed

- To add principal, use the following command to enter the kadmin CLI to add the required principle:

```
kadmin.local
```

- Once entered the kadmin.local CLI, use the following command to add the principal named **root/admin**:

```
addprinc root/admin
```

- Once that is done, it will ask you to set the password for the principle

Listing all Principals

Perform this step only on the host in which Kerberos server is installed

- To add principal, use the following command to enter the kadmin CLI to list all principals:

```
kadmin.local
```

- Once entered the kadmin.local CLI, use the following command to list the principals :

```
listprincs
```

- Once that is done, it will ask you to set the password for the principle

Getting Kerberos Ticket (TGT)

- Use the following command to get the Kerberos ticket for the principal root/admin:

```
kinit root/admin
```

View Kerberos Tickets (TGT)

- Use the following command to view the Kerberos tickets available for the current user:

```
klist
```

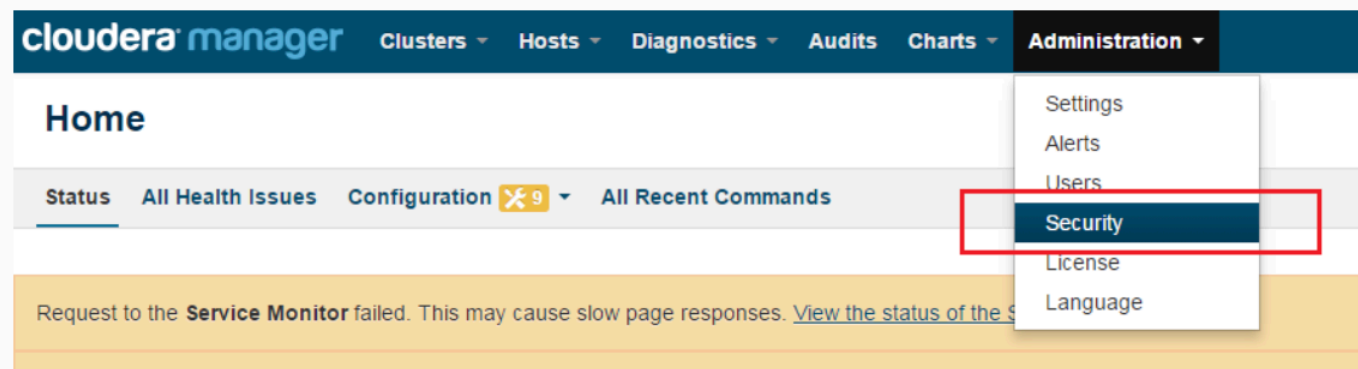
Delete all Kerberos tickets (TGT)

- To delete all the tickets for the current user, log in as the user and run the following command:

```
kdestroy
```


Enabling Kerberos on Cloudera Manager

1. Login to Cloudera Manager and Select Security option from Administration tab.



2. Click on Enable Kerberos.



Getting Started

Getting Started

Setup KDC

Manage krb5.conf

Setup KDC Account

Command Details

Configure Principals

Restart Cluster

Command Details

Summary

Getting Started

This wizard walks you through the steps to configure Cloudera Manager and CDH to use Kerberos for authentication. All services in the cluster, as well as the Cloudera Management Service, are restarted as part of the wizard. Before proceeding with the wizard, read the [documentation](#) about enabling Kerberos.

Before using the wizard, ensure that you have performed the following steps:

Set up a working KDC. Cloudera Manager supports MIT KDC and Active Directory.

☒ Yes, I have set up a working KDC.

The KDC should be configured to have non-zero ticket lifetime and renewal lifetime. CDH will not work properly if tickets are not renewable.

☒ Yes, I have checked that the KDC allows renewable tickets.

OpenLdap client libraries should be installed on the Cloudera Manager Server host if you want to use Active Directory. Also, Kerberos client libraries should be installed on ALL hosts.

☒ Yes, I have installed the client libraries.

Cloudera Manager needs an account that has permissions to create other accounts in the KDC.

☒ Yes, I have created a proper account for Cloudera Manager.

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Setup KDC

✓ Getting Started

Setup KDC

○ Manage krb5.conf

○ Setup KDC Account

○ Command Details

○ Configure Principals

○ Restart Cluster

○ Command Details

○ Summary

Setup KDC

Specify information about the KDC. The properties below are used by Cloudera Manager to generate principals for CDH daemons running on the cluster.

KDC Type

☒ MIT KDC
☐ Active Directory

?

Kerberos Encryption Types

rc4-hmac

?

Kerberos Security Realm
default_realm

METIS.COM

?

KDC Server Host
kdc

192.168.56.52

?

KDC Admin Server Host
admin_server

192.168.56.52

?

Domain Name(s)

?

Maximum Renewable Life for Principals

5

day(s)

?

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Manage krb5.conf

✓ Getting Started

✓ Setup KDC

Manage krb5.conf

○ Setup KDC Account

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○ Summary

Manage krb5.conf

Specify the properties needed for generating the krb5.conf file for the cluster. You can use the Advanced Configuration Snippet to specify configuration of an advanced KDC setup; for example, with cross-realm authentication.

Manage krb5.conf through Cloudera Manager ☐ ?

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Setup KDC Account

✓ Getting Started

✓ Setup KDC

✓ Manage krb5.conf

● Setup KDC Account

○ Command Details

○ Configure Principals

○ Restart Cluster

○ Command Details

○ Summary

Setup KDC Account

Enter the credentials for the account that has permissions to **create** other users. Cloudera Manager will store the credentials in encrypted form and use them whenever new principals need to be generated.

Username

root/admin @ METIS.COM

Password

.....

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Command Details

✓ Getting Started

✓ Setup KDC

✓ Manage krb5.conf

✓ Setup KDC Account

● Command Details



○ Configure Principals

○ Restart Cluster

○ Command Details

○ Summary

Import KDC Account Manager Credentials Command

Status ✓ Finished  Nov 17, 2:54:44 PM  5.09s

Successfully imported KDC Account Manager credentials.

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Configure Principles

✓ Getting Started

✓ Setup KDC

✓ Manage krb5.conf

✓ Setup KDC Account

✓ Command Details

Configure Principles

Restart Cluster

Command Details

Summary

Configure Principles

Specify the Kerberos principal used by each service in the cluster. Additional steps may be required if you decide to change these principals from their default values. Please read the [documentation](#) about custom principals before making changes on this page.

Kerberos Principal	
HDFS (Service-Wide)	<input type="text" value="hdfs"/>
Hive (Service-Wide)	<input type="text" value="hive"/>
Hue (Service-Wide)	<input type="text" value="hue"/>
Oozie (Service-Wide)	<input type="text" value="oozie"/>
Spark (Service-Wide)	<input type="text" value="spark"/>
YARN (MR2 Included) (Service-Wide)	<input type="text" value="yarn"/>
ZooKeeper (Service-Wide)	<input type="text" value="zookeeper"/>

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Configure Ports and request restart

✓ Getting Started

✓ Setup KDC

✓ Manage krb5.conf

✓ Setup KDC Account

✓ Command Details

✓ Configure Principals

● Restart Cluster

○ Command Details

○ Summary

Configure Ports

Configure the privileged ports required by DataNodes in a secure HDFS service.

DataNode Transceiver Port

1004

Port for DataNode's Xceiver Protocol. Combined with the DataNode's hostname to build its address.

DataNode HTTP Web UI Port

1006

Port for the DataNode HTTP web UI. Combined with the DataNode's hostname to build its HTTP address.

The cluster needs to be restarted for the changes to take effect.

☒ Yes, I am ready to restart the cluster now.

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Restart Cluster

✓ Getting Started

✓ Setup KDC

✓ Manage krb5.conf

✓ Setup KDC Account

✓ Command Details



✓ Configure Principals

✓ Restart Cluster

● Command Details

○ Summary







Enable Kerberos Command

Status ✓ Finished Context [cdh_osama](#)  Nov 17, 2:55:36 PM  8.7m

Successfully enabled Kerberos.

✓ Completed 7 of 7 step(s).

☒ Show All Steps
 ☐ Show Only Failed Steps
 ☐ Show Running Steps

> ✓ Stop cluster	cdh_osama 	Nov 17, 2:55:36 PM	2m
> ✓ Stop Cloudera Management Services	Cloudera Management Service 	Nov 17, 2:57:36 PM	21.47s
> ✓ Configure all services to use Kerberos	cdh_osama 	Nov 17, 2:57:58 PM	3ms
> ✓ Wait for credentials to be generated		Nov 17, 2:57:58 PM	1.72s
> ✓ Deploy client configuration	cdh_osama 	Nov 17, 2:58:00 PM	28.03s
> ✓ Start Cloudera Management Services	Cloudera Management Service 	Nov 17, 2:58:28 PM	40.16s
> ✓ Start cluster	cdh_osama 	Nov 17, 2:59:11 PM	5.1m

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Summary

✓ Getting Started

✓ Setup KDC

✓ Manage krb5.conf

✓ Setup KDC Account

✓ Command Details

✓ Configure Principals

✓ Restart Cluster

✓ Command Details

● Summary

Summary

You have enabled Kerberos for all your cluster(s).

Cluster	Status
cdh_osama	Successfully enabled Kerberos.

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Finish

Documentation Link

Official Documentation:

https://docs.cloudera.com/documentation/enterprise/latest/topics/cm_sg_intro_kerb.html

GitHub Repository:

<https://github.com/gitosamakhan/Multinode-Cloudera-Cluster>