CN414
Computer Network Security

Week 4:- Key Distribution Center

By

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(Modified from Lawrie Brown Network Security Chapter 7)

Key Distribution Center

- **What is Key Distribution Center ?**
- KDC Concept & Architecture
- KDC Application

What is Key Distribution Center?

- symmetric schemes require both parties to share a common secret key
- issue is how to securely distribute this key
- often secure system failure due to a break in the key distribution scheme

What is Key Distribution Center?

- given parties A and B have various **key distribution** alternatives:
  1. A can select key and physically deliver to B
  2. third party can select & deliver key to A & B
  3. if A & B have communicated previously can use previous key to encrypt a new key
  4. if A & B have secure communications with a third party C, C can relay key between A & B

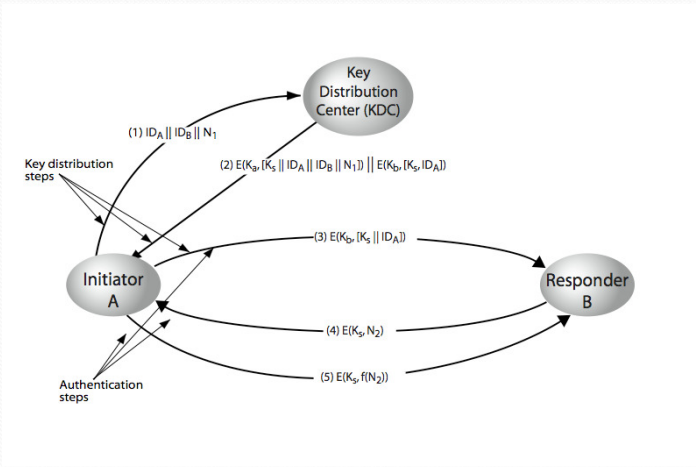
What is Key Distribution Center?

- typically have a hierarchy of keys
- session key
  - temporary key
  - used for encryption of data between users
  - for one logical session then discarded
- master key
  - used to encrypt session keys
  - shared by user & key distribution center

Key Distribution Center

- What is Key Distribution Center ?
- **KDC Concept & Architecture**
- KDC Application

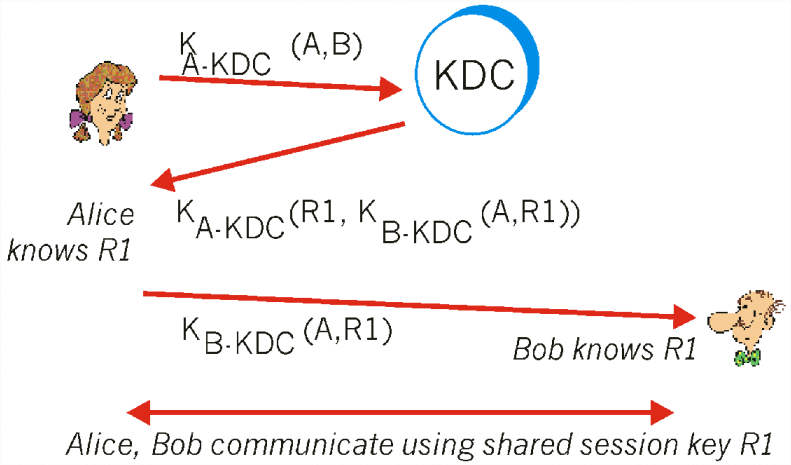
KDC Concept & Architecture



KDC Concept & Architecture

- hierarchies of KDC's required for large networks, but must trust each other
- session key lifetimes should be limited for greater security
- use of automatic key distribution on behalf of users, but must trust system
- use of decentralized key distribution
- controlling key usage

KDC Concept & Architecture

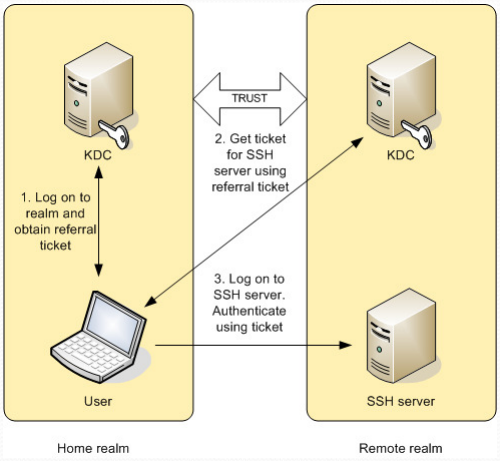


KDC Concept & Architecture

- **Kerberos**
- Kerberos is an authentication service developed at MIT that uses symmetric key encryption techniques and a Key Distribution Center.
- Kerberos is framed in the language of users who want to access network services (servers) using **application-level** network programs such as Telnet (for remote login) and NFS (for access to remote files), rather than human-to-human conversant.
- **The most recent version of Kerberos (V5)** provides support for multiple Authentication Servers, delegation of access rights, and renewable tickets.

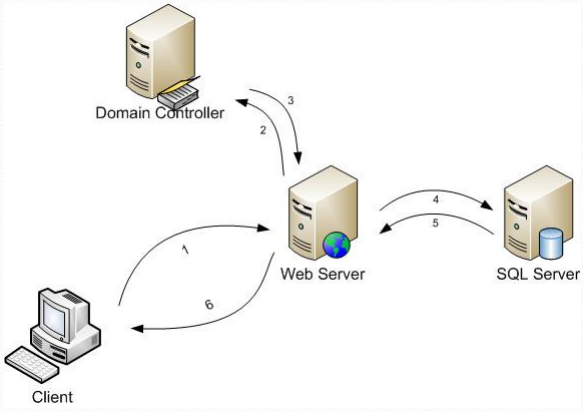
KDC Concept & Architecture

- **Kerberos**



KDC Concept & Architecture

- **Kerberos(IIS)**



Key Distribution Center

- What is Key Distribution Center ?
- KDC Concept & Architecture
- **KDC Application**

KDC Application

- **Key Distribution Center Configuration**
- **Use**
  - The Kerberos authentication process uses a Key Distribution Center (KDC) to authenticate a client and to issue the *Kerberos Client/Server Session Ticket*, which is used for the communication between the Web client and the AS Java. For this reason, the KDC maintains a directory of the users that can access AS Java resources for a Kerberos Realm.
  - You can use this topic for information about the KDC configuration requirements that have to be in place to use *SPNego* for Kerberos authentication with the AS Java.

KDC Application

- **Features**
  - The configuration steps are specific to the KDC that you use. For more information, see the documentation provided by your KDC vendor.
  - If you use a Sun JDK to run the J2EE Engine and the KDC is a Windows 2000 Domain Controller with ADS, you also have to disable delegation in the ADS to avoid errors during ticket verification.

KDC Application

- **Example**

  The following example shows the configuration steps when the KDC is a Microsoft Windows 2000 Domain Controller (DC) that uses an Active Directory Server (ADS) for a user store.
- **Assumptions**

  For the purpose of this example we assume that:
  - The KDC is a Microsoft Windows 2000 Active Directory Server
  - The Windows Domain Name is IT.CUSTOMER.DE
  - The fully qualified host name of the AS Java is hades.customer.de.
  - The AS Java has an additional alias su3x24.customer.de.

KDC Application

- **Configuration steps on the DC**
- 1. Create a service user **j2ee-jd1-hades** with a password for this example **secret12**. Enable the Password Never Expiresoption for this user.
- 2. In the options for the user account, choose the option *Use DES encryption types for this account*.
- 3. From a command line, enter the following command to register service principal names (SPNs) for the AS Java host name and alias and map them to the service user j2ee-jd1-hades.

```
setspn –A HTTP/hades.customer.de j2ee-jd1-hades
setspn –A HTTP/su3x24.customer.de j2ee-jd1-hades
```

- In this case both aliases hades.customer.de and su3x24.customer.de is registered as SPNs and associated with the AS Java service user on the Windows DC.

KDC Application

- **Result**
  - To check the result of the configuration, enter the following command line for each SPN you registered:
  - ldifde -r **serviceprincipalname=HTTP/hades.customer.de -f out.ldf**
  - The output of this command is one entry which points to the previously created service user.

Reference

- http://userpages.umbc.edu/~dgorin1/451/security/dcomm/keydist_files/kdc.gif @ 28 OCT 2008
- http://rnd.feide.no/doc/resources/feide-ssh/kerberos-1.png @ 28 OCT 2008
- http://userpages.umbc.edu/~dgorin1/451/security/dcomm/keydist_files/kdc.gif @ 28 OCT 2008

Q & A