A Basic Introduction to Kerberos

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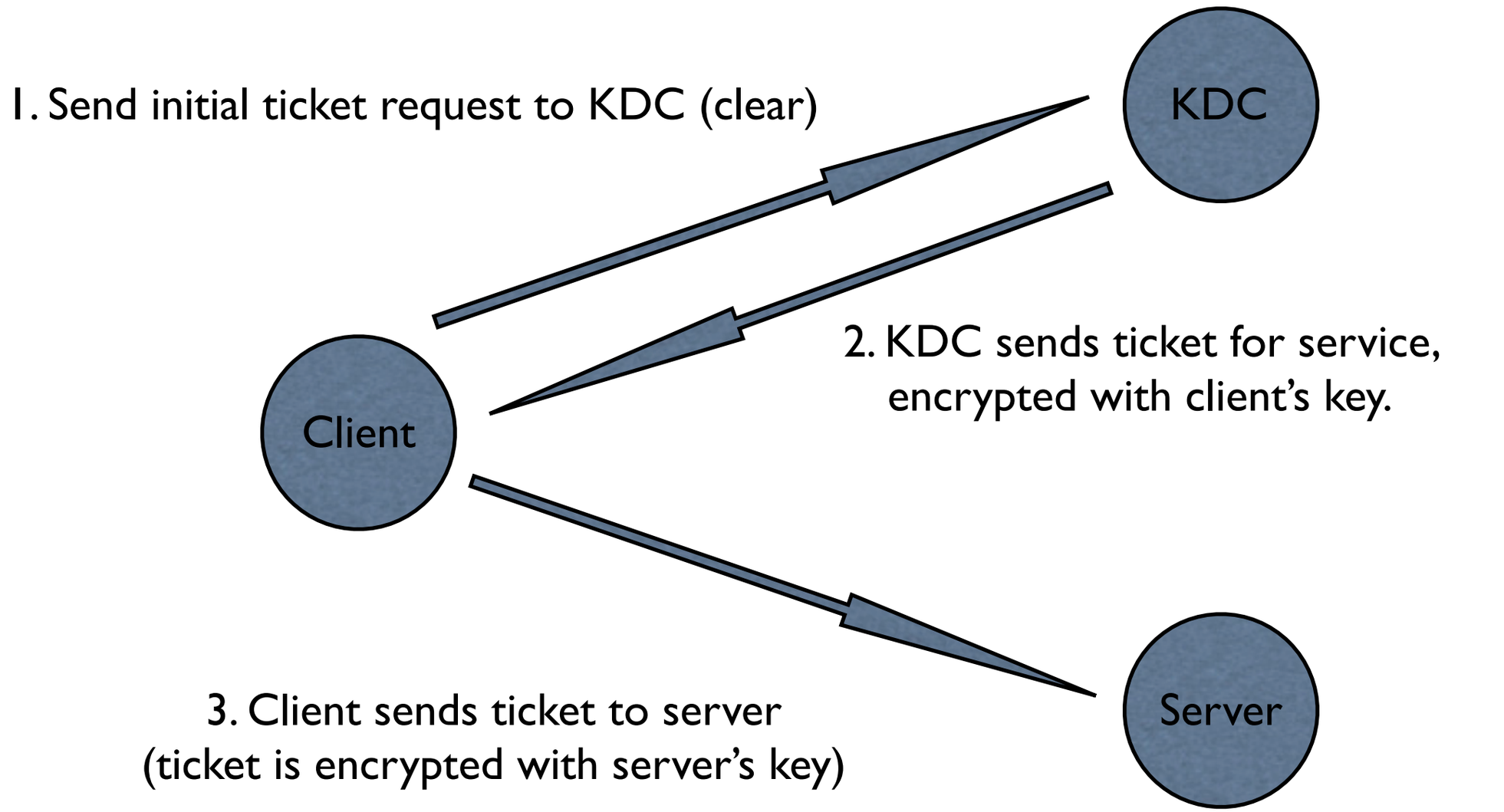
Kerberos Introduction

- A network protocol developed at MIT as part of Project Athena.
- Is a shared-secret, trusted third party authentication system.
- Uses encryption to provide authentication between peers.
- Designed to be used by third-party programs (like OpenAFS).

Basic Kerberos Concepts

- Designed to provide secure authentication (not authorization) between two entities on a network (called principal identifiers or principals for short).
- Every principal is assigned an encryption key (password for users).
- All encryption keys are registered with the Key Distribution Center (KDC).
- Kerberos services (like AFS, IMAP) are referred to as application servers.
- A zone of Kerberos administrative authority is called a realm.

Kerberos Protocol Diagram



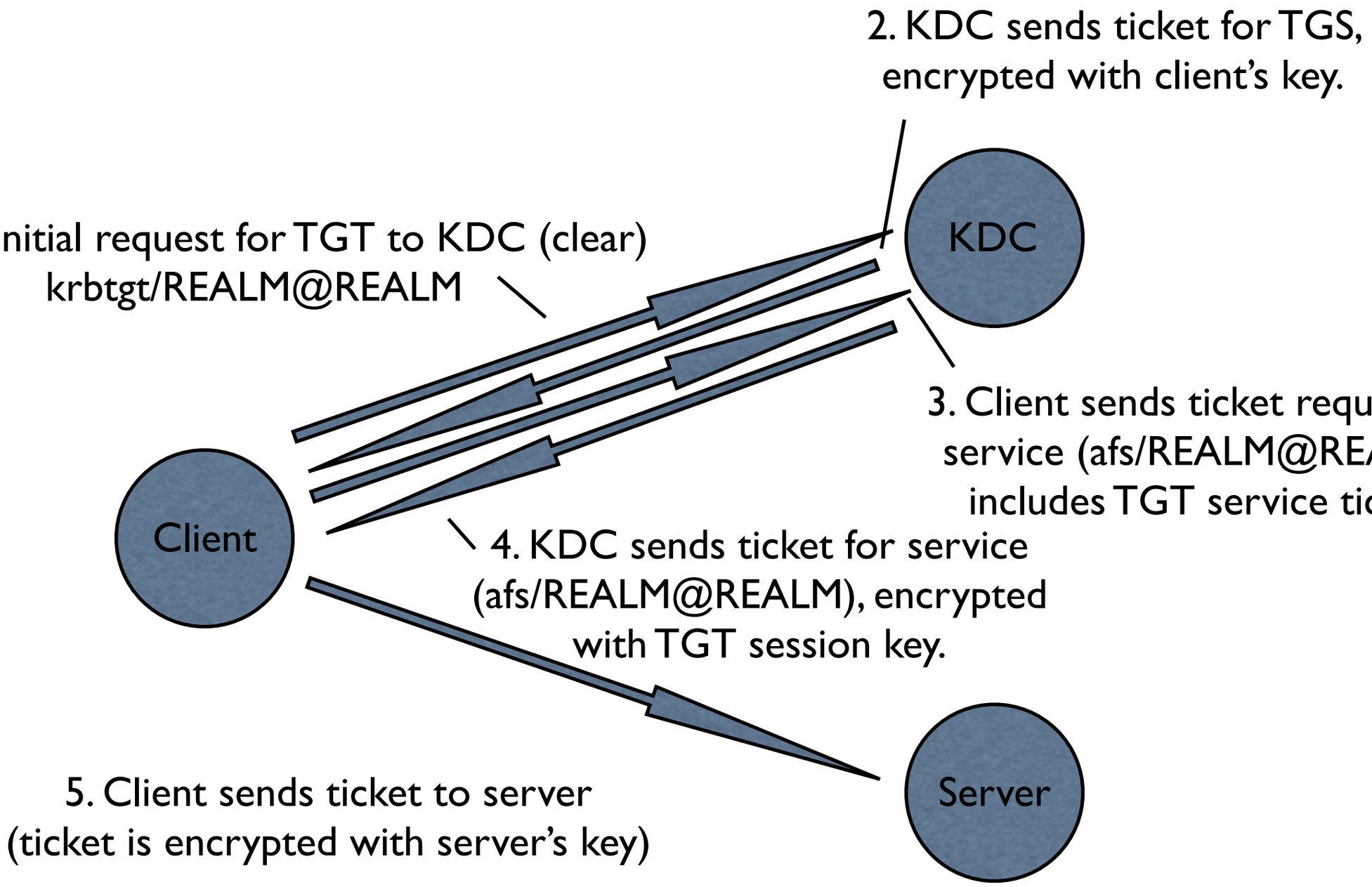
Kerberos Ticket

- Contains the following information:
  - Client identity (kenh@ATHENA.MIT.EDU)
  - Server identity (afs/sipb.mit.edu@ATHENA.MIT.EDU)
  - Expiration time.
  - Session key (for encryption between the client and server)
  - Various other bits.
- Encrypted with a key the client does not know.

The Ticket-Granting Ticket

- Problem with the basic Kerberos scheme is users have to keep entering their password repeatedly.
- Solution to this problem is to create a new service - the Ticket Granting Service (TGS). This service allows a user to acquire tickets for other services.
- Users acquire a Ticket-Granting Ticket at login time, then talk to the KDC to get additional service tickets.

Kerberos Protocol Exchange with TGT



Steps 1-2 are done at login time, steps 3-5 done for each new service ticket (user password not required).

Kerberos & AFS

- AFS is a Kerberos application service, with a few slight differences.
- In the Unix implementation, the service ticket is placed in the kernel by klog/aklog.
- One service key is shared across all AFS services in a single realm.
- The "traditional" AFS Kerberos (kaserver) doesn't use the standard Kerberos transport protocol.