Advanced Security Protocols - Kerberos

Design and Verification of Security Protocols and Security Ceremonies

Programa de Pós-Graduacão em Ciências da Computacão
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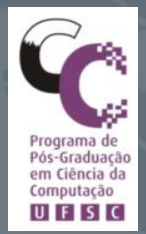

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- The protocol is based on the earlier Needham–Schroeder symmetric key protocol;
- Several versions of the protocol exist; versions 1–3 occurred only internally at MIT.

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- Version 5 appeared as RFC 1510, and was made obsolete by RFC 4120 in 2005.

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- This is done infrequently, typically at user logon;
- The TGT expires at some point, though may be transparently renewed by the user's session manager while they are logged in.

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- After verifying the TGT is valid and the user is permitted to access the requested service, the TGS issues a ticket and session keys, which are returned to the client;
- The client then sends the ticket to the service server (SS) along with its service request.

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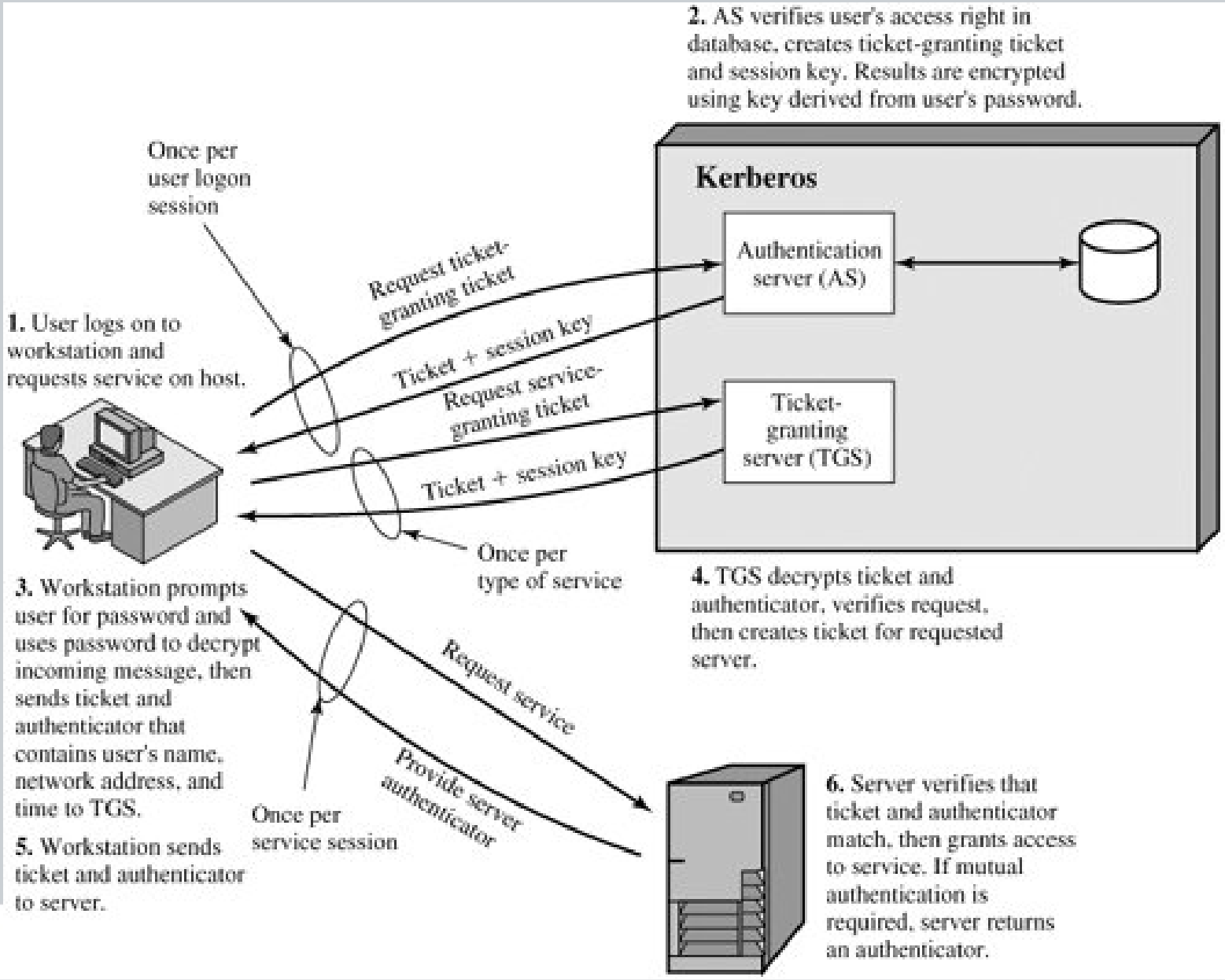
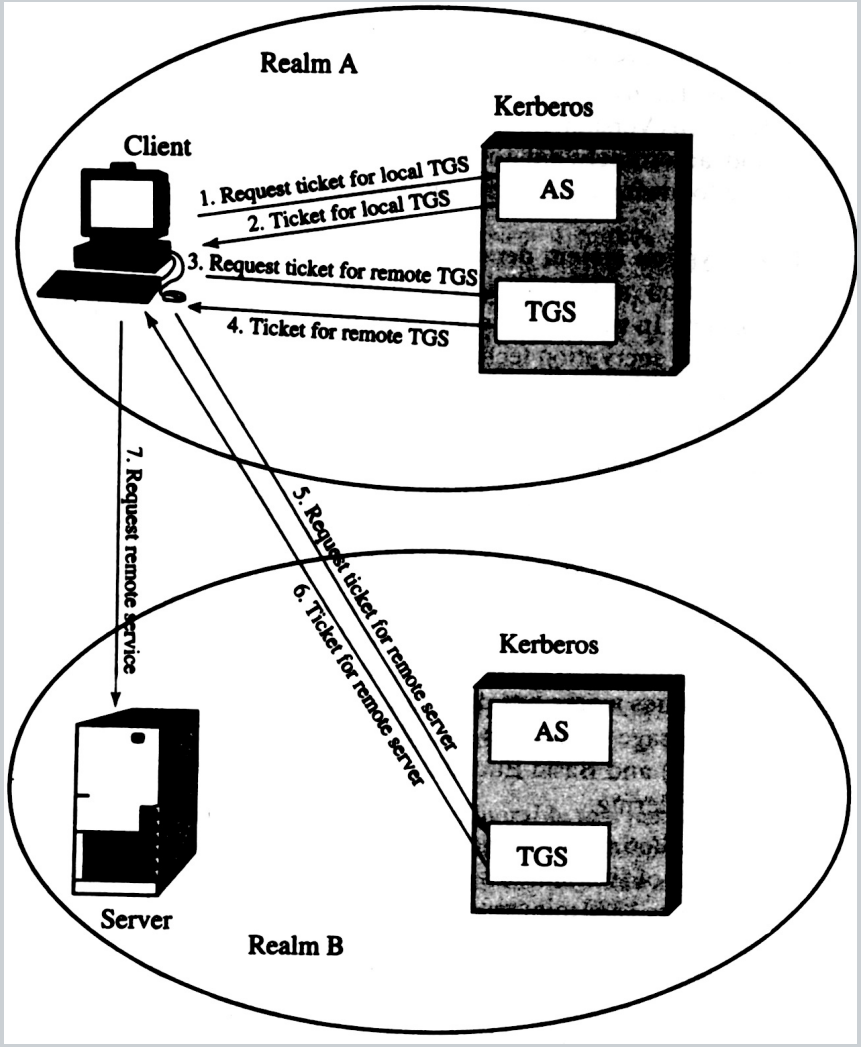


Kerberos - Inter-Realms



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- Everything is garanteed by K_C and K_{TGS};
- Everything is timestamped;
- It is built to reduce load on AS.

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$$Ticket_V = E(K_V, (K_C, V, C, AD_C, V, TS_4, TTL_4))$$
$$Authenticator_C = E(K_{C,TGS}(C, AD_C, TS_3))$$

- K_V is shared between V e TGS
- $TS_4 + TTL_4 < TS + TTL$

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2. V $\rightarrow$ C: $E(K_{C,V}, TS_5 + 1)$

$$AuthenticatorC = E(K_{C,V}, (C, AD_C, TS_5))$$

- $TS_5 + 1$ is for mutual authentication.

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- It was part of a big EPSRC project;
- The verification demonstrates that some methods have a lot of difficulty on dealing with time-stamps and counting over channels.

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- How can we overcome the shortcomings of Kerberos?

Questions????

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