MIKEY-TICKET

DRAFT-MATTSSON-MIKEY-TICKET-00

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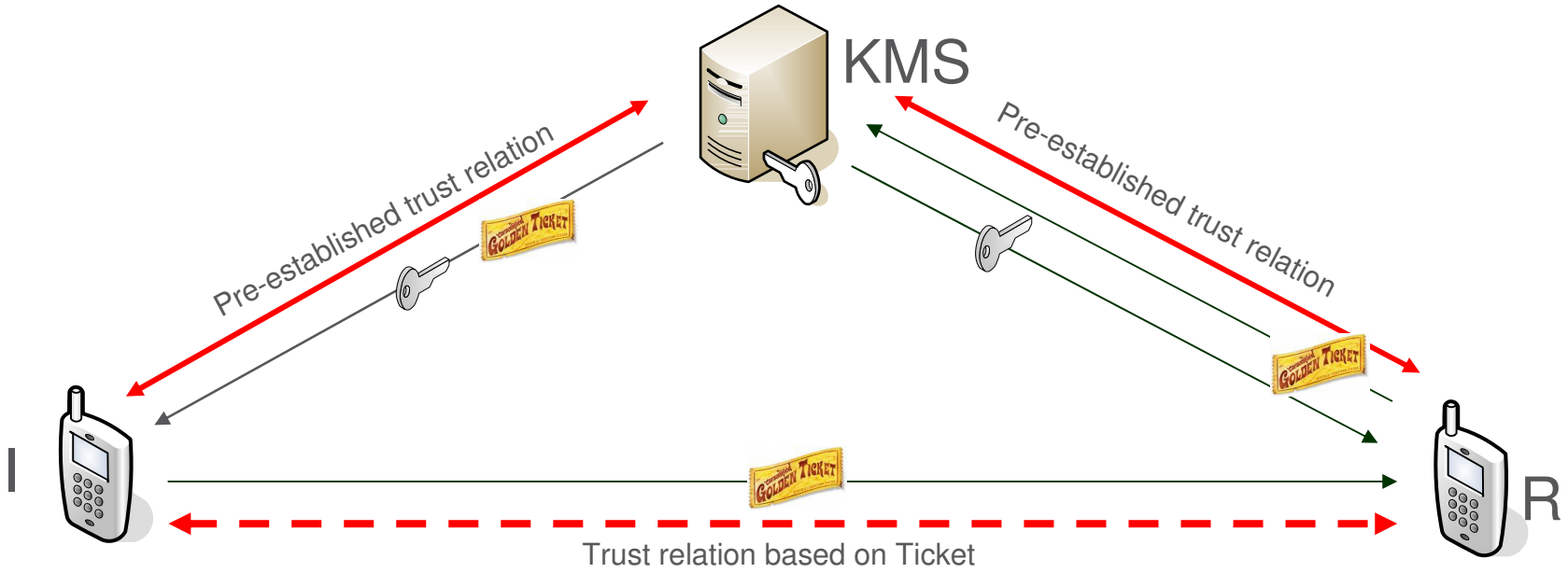
ORIGIN OF IDEA FOR MIKEY-TICKET

- IMS media plane security (3GPP) for users requiring high security, e.g. enterprises and national security and public safety organizations.

- Requirements
  - Anchoring of trust/security external to IMS/SIP possible, i.e. trust/security is independent of trust/security in operator.
  - Central policy control.
  - Scalable and efficient.
  - Group key management.
  - Secure forking – late binding of keys to users.
  - Remote-end user identity assurance.
  - Pre-distribution of tickets.
  - Support of deferred delivery.

SOLUTION BY TICKET BASED KEY MANAGEMENT

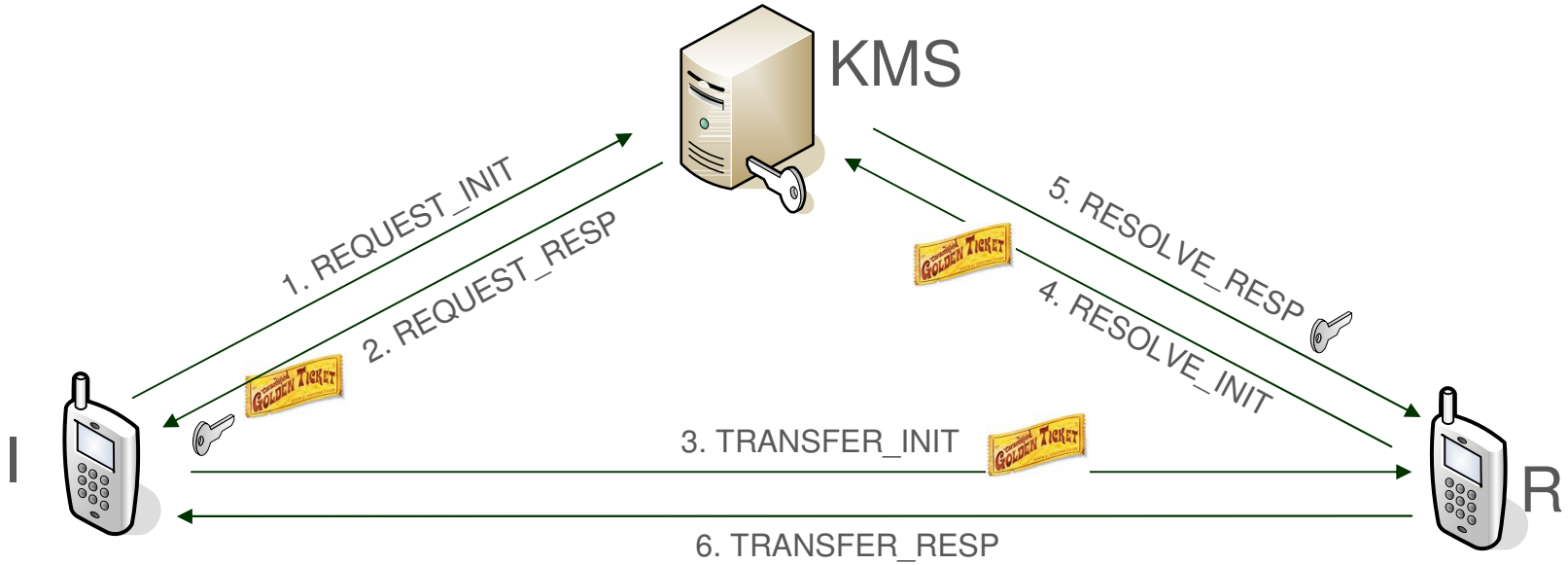
- Making the solution an extension to MIKEY should be credited to Lakshminath Dondeti who suggested this during the 3GPP work by.



- The KMS resolves the ticket and modifies the keys, making them cryptographically unique for each responder targeted by forking.

MIKEY-TICKET

- Extends MIKEY with a set of new modes that uses a trusted KMS (Key Management Service) and a ticket concept, similar to Kerberos.
- MIKEY-TICKET consists of up to three roundtrips
  - Ticket Request, Ticket Transfer, Ticket Resolve



TICKET REQUEST

- This exchange is used by the Initiator to request keys and a ticket from a trusted Key Management Service, with which the Initiator have a pre-established trust relation.
- The initiation message REQUEST_INIT comes in two variants corresponding to the pre-shared key (PSK) and public-key encryption (PK) methods of [RFC3830].
- TP is the desired ticket policy.

```
Initiator                                   KMS

REQUEST_INIT_PSK =                  ---->
HDR, T, RANDi, [IDRi],
   [IDRkms], TP, [KEMAC],            <----  REQUEST_RESP =
   [IDRpsk], V                              HDR, T, [IDRkms],
                                               TICKET, KEMAC, V

REQUEST_INIT_PK =                   ---->
HDR, T, RANDi, [IDRi], {CERTi},
   [IDRkms], TP, [KEMAC],            <----  REQUEST_RESP =
   [CHASH], PKE, SIGNi                      HDR, T, [IDRkms],
                                               TICKET, KEMAC, V
```

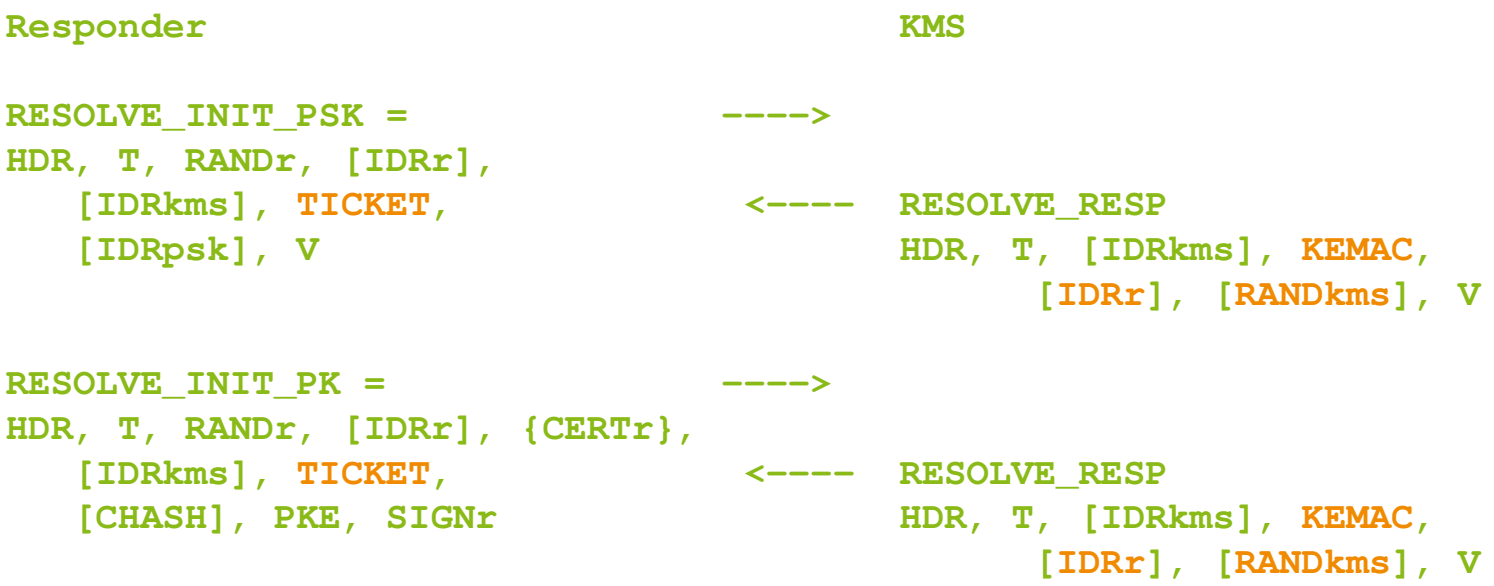
TICKET TRANSFER

- This exchange is used to transfer the ticket as well as session information from the Initiator to a Responder.
- Similar to MIKEY-PSK but
  - TICKET instead of KEMAC
  - RANDi and RANDr gives mutual key freshness guarantee
  - IDRr, RANDkms is used to modify keys, making them cryptographically unique for each responder targeted by the forking.

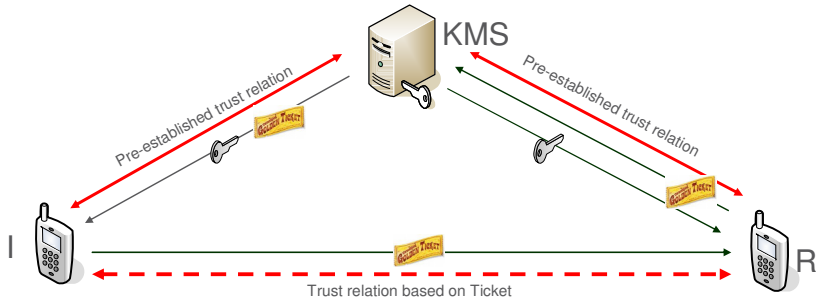
```
Initiator                                   Responder

TRANSFER_INIT =                  ---->
HDR, T, RANDi, [IDRi], [IDRr],
   {SP}, TICKET, V                < - -   TRANSFER_RESP =
                                          HDR, T, [RANDr],
                                             [IDRr], [RANDkms], V
```

TICKET RESOLVE

- This exchange is used by the Responder to request the KMS to return the keys encoded in a ticket.
- The initiation message RESOLVE_INIT comes in two variants corresponding to the pre-shared key (PSK) and public-key encryption (PK) methods of [RFC3830].

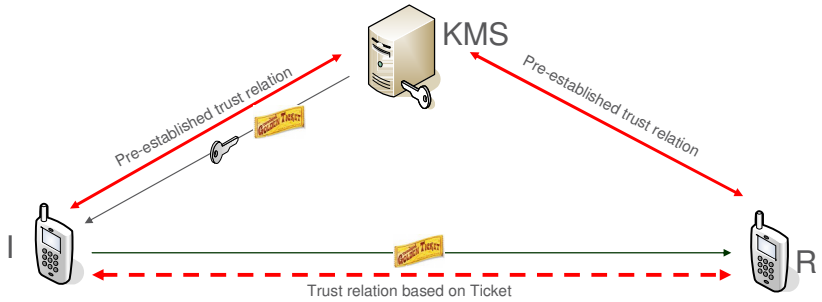


3 MAIN MODES OF OPERATION



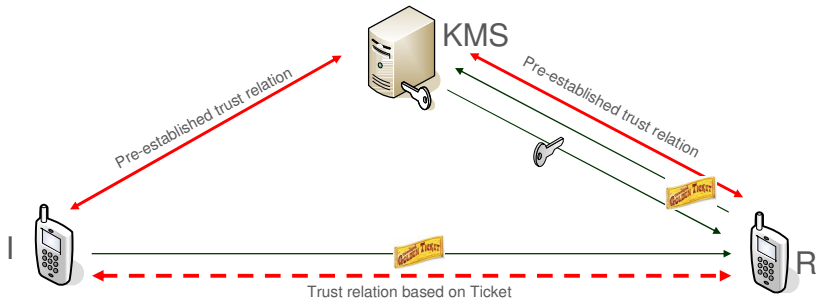
Full three roundtrip

- Ticket generated by KMS
- Policy enforcement when ticket is generated
- Allows pre-distribution of tickets



Kerberos like

- Ticket generated by KMS
- Policy enforcement when ticket is generated
- Cannot handle secure forking/retargeting



Otway-Rees like

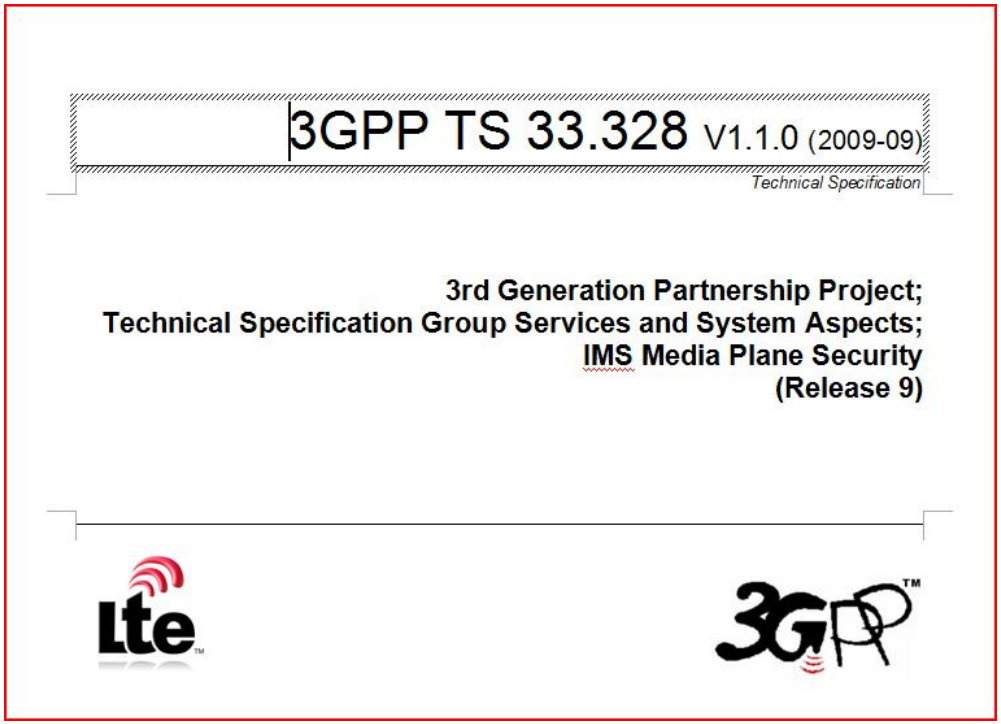
- Ticket generated by Initiator
- Policy enforcement when ticket is resolved

KEY FEATURES

- Trust is anchored in KMS, which can be independent of network operator.
- Allowed message exchanges and ticket options are determined by policy and can be adapted for different deployment scenarios: Policy enforcement is performed by the KMS.
- By defining groups of recipients, group key management becomes simple; 3GPP allows wildcarding for user group definitions. KMS verifies group membership.
- Secure forking and assurance of remote-end user identity
- “Reusable” tickets can be pre-distributed.

3GPP STATUS

- Specification is being finalized.
- MIKEY-TICKET based key management for high security applications.
- SDES based key management for other applications.



3GPP TS 33.328 V1.1.0 (2009-09)

Technical Specification

3rd Generation Partnership Project;
Technical Specification Group Services and System Aspects;
IMS Media Plane Security
(Release 9)