EAP-GPSK

draft-ietf-emu-eap-gpsk-01

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Current Status

- draft-clancy-emu-shared-secret-02.txt became draft-ietf-emu-eap-gpsk-00.txt
- -00 available on IETF site
- -01 submitted

From draft-clancy-emu-eap-gpsk-01.txt to draft-ietf-emu-eap-gpsk-00.txt

Issue Tracker: **http://www.tschofenig.com:8080/eap-gpsk/**

- Issue#4: Delimiter for Identities in KDF
- Issue#3: KDFData
- Issue#6: Ciphersuites
- Issue#5: Error Handling
- Issue#2: Channel Binding
- Issue#1: Protected Results Indication

Thanks to Lakshminath Dondeti, David McGrew, Bernard Aboba, Michaela Vanderveen and Ray Bell for their input to the ciphersuite discussions . Thanks to Lakshminath for his detailed draft review.

Issue#4: Delimiter for Identities in KDF

- Lakshminath suggested change for KDF:
- From:

  RAND_Client || *RAND_Server* || *ID_Client* || *ID_Server*
- To:

  RAND_Client || *ID_Client* || *RAND_Server* || *ID_Server*

- Accepted.

Issue#3: KDFData

- KDFData_Client and KDFData_Server provided ways to include arbitrary data in the KDF.

- Concept removed.

Issue#6: Ciphersuites

- Changed from:

CSuite/ Specifier	KS	Encryption	Integrity	Key Derivation Function
0x000001	16	AES-EAX-128	AES-CMAC-128	GKDF-128

- To:

CSuite/ Specifier	KS	Encryption	Integrity	Key Derivation Function
0x000001	16	AES-CBC-128	AES-CMAC-128	GKDF-128

Issue#2: Channel Binding

- Removed from draft
- Possible through extensions

KDF Inconsistencies

- Fixed in submitted -01
- KDF updated in chapter 4 but not chapter 6
- Allows use of arbitrary-length input key to KDF, rather than just truncating it to a certain size

Still Open

- Issue#5: Error Handling
  - What to do if MAC error?
  - Return EAP-Failure (i.e. PSK mismatch)
  - Silently discard packet

- Issue#1: Protected Results Indication
  - Define PRI within the document, rather than as something that could be added later
  - What results should be returned?

Next Steps

- Resolve remaining open issues
- Editorial polishing needed

- Target for WGLC: Late November 2006

Backup Slides

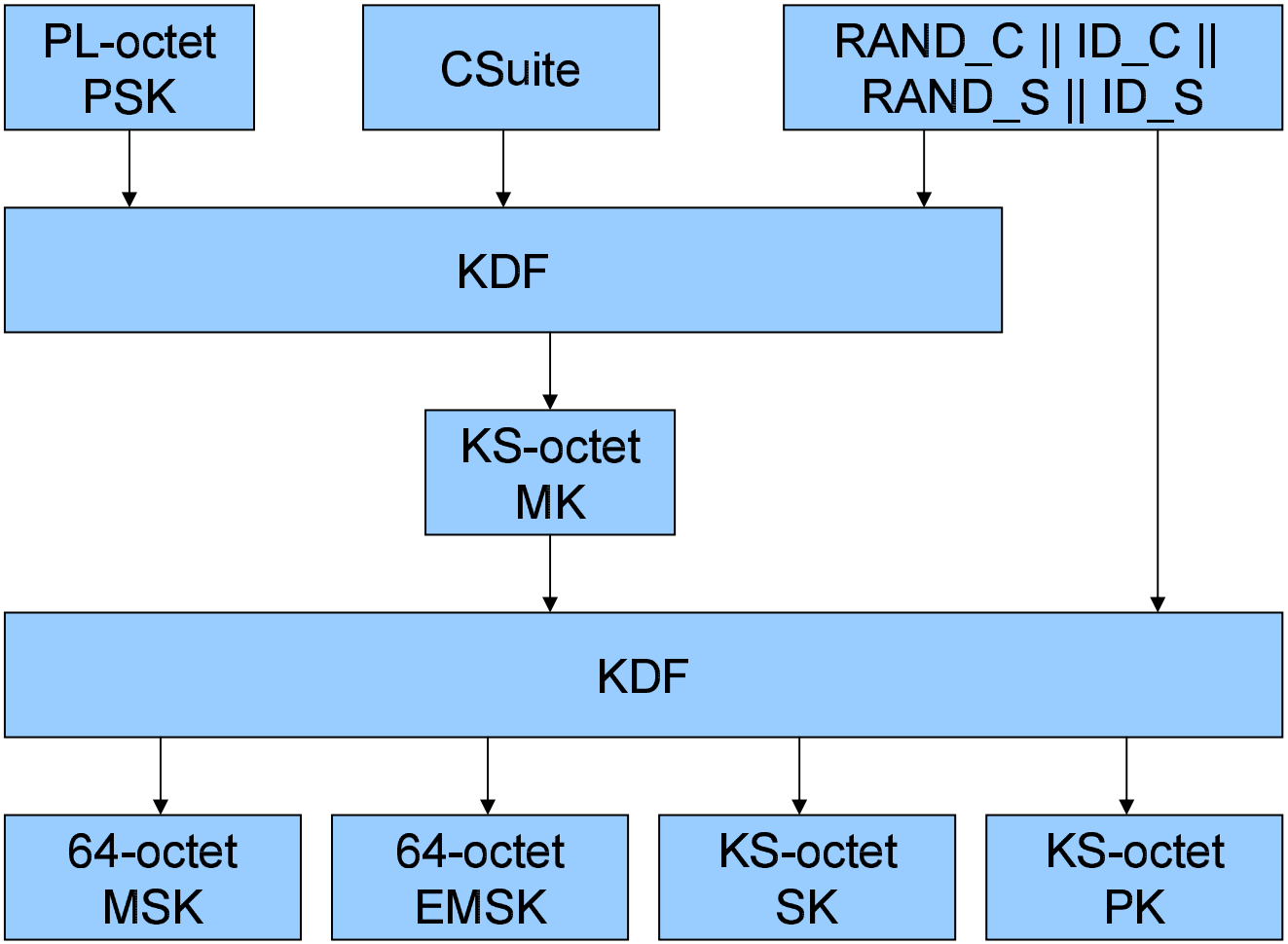
Design Goals

- **Simplicity:** easy to implement
- **Wide Applicability:** secure, embedded devices
- **Efficiency:** no PK ops, 2 round trips
- **Flexibility:** multiple ciphersuites
- **Extensibility:** secure data exchange with many applications

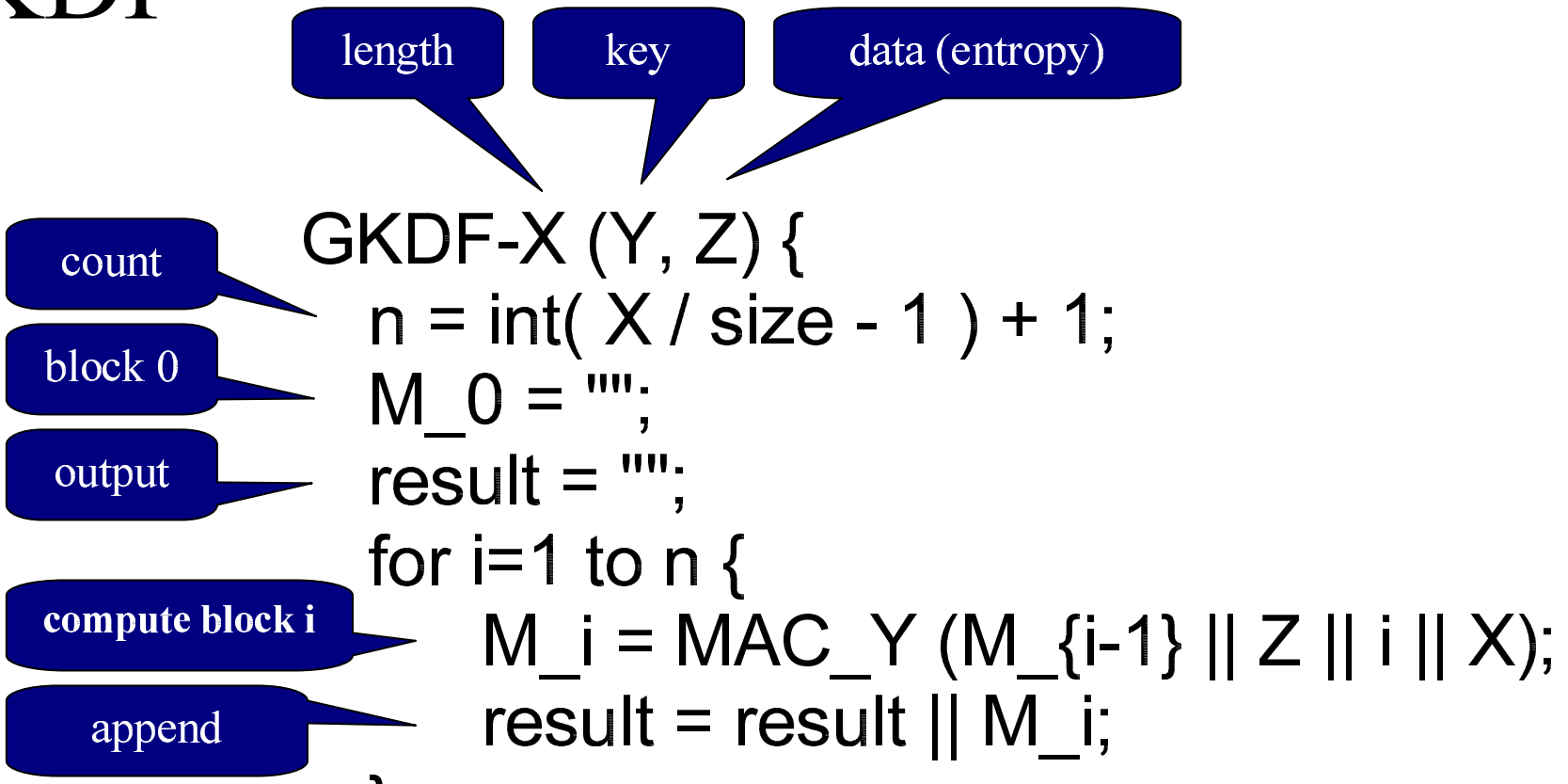
Protocol Overview

- 2 round trips
- Supports both HMAC and AES-based ciphersuites
  - AES: CBC-128, CMAC-128
  - HMAC: SHA256
- Authenticated data exchange
  - If AES used, also confidential

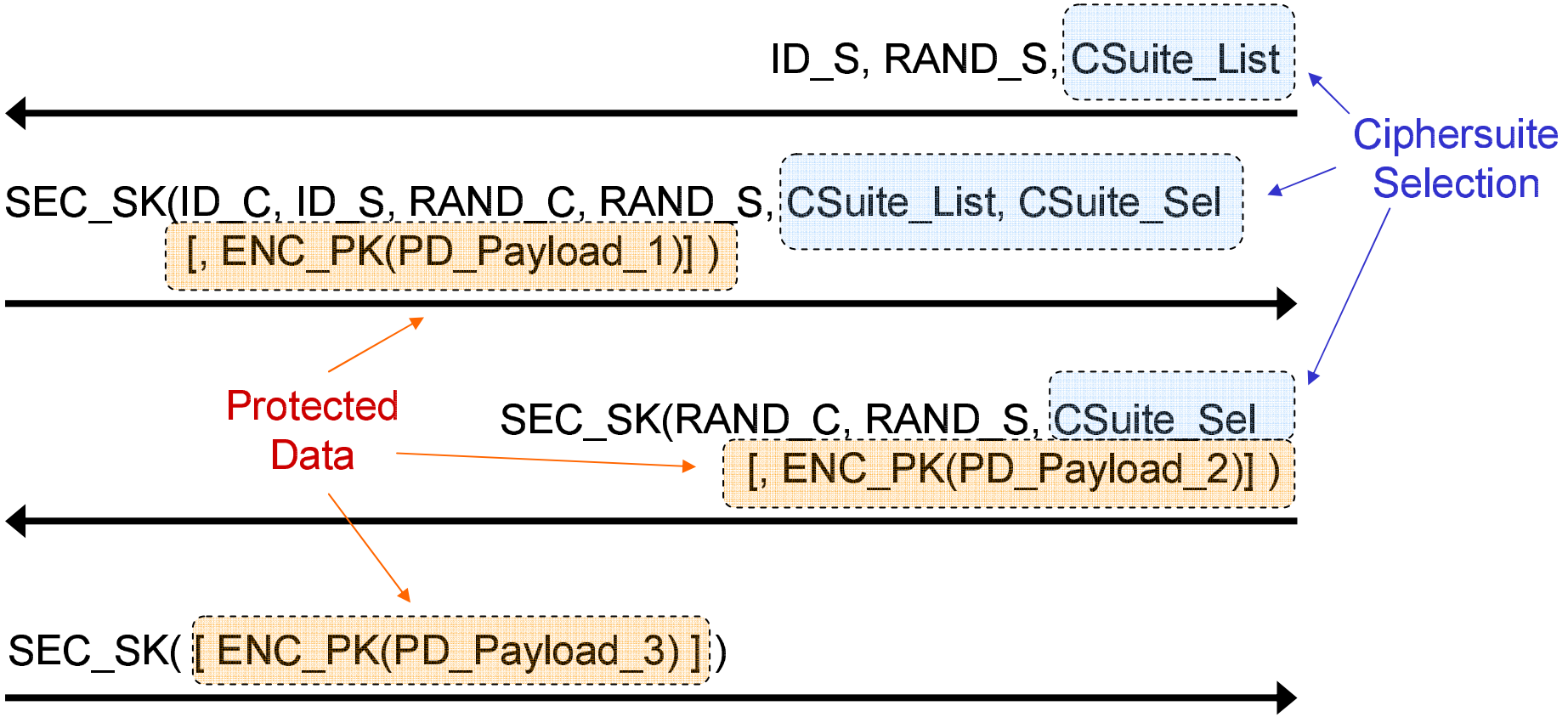
Keying Hierarchy



KDF


length
key
data (entropy)
count
block 0
output
compute block i
append
GKDF-X (Y, Z) {
n = int(X / size - 1) + 1;
M_0 = "";
result = "";
for i=1 to n {
M_i = MAC_Y (M_{i-1} || Z || i || X);
result = result || M_i;
}
return truncate (result; X);
}

Protocol


ID_S, RAND_S, CSuite_List
Ciphersuite Selection
SEC_SK(ID_C, ID_S, RAND_C, RAND_S, CSuite_List, CSuite_Sel
[, ENC_PK(PD_Payload_1)])
Protected Data
SEC_SK(RAND_C, RAND_S, CSuite_Sel
[, ENC_PK(PD_Payload_2)])
SEC_SK([ENC_PK(PD_Payload_3)])

Packet Formatting

- Protected data payloads are a series of TLV-encoded items
- Ciphersuite and PD types are 6 bytes
  - First 3 are vendor OID, IETF = 0x000000
  - Last 3 are the type specifier

Security Properties

√	Mutual Authentication
+	Protected Result Indications
√	Integrity Protection
√	Replay Protection
√	Reflection Attack Protection
√*	Dictionary Attack Protection
√	Key Derivation
√	Denial of Service Resistance
√	Session Independence
X	Perfect Forward Secrecy
N/A	Fragmentation
+	Channel Binding
X	Fast Reconnect
+	Identity Protection
√	Protected Ciphersuite Negotiation
√	Confidentiality
N/A	Cryptographic Binding

√	Supported
+	Use PD Channel
X	Unsupported
N/A	Not Applicable
*	If the shared secret is randomly created.