SNMP V3

Eng. Maha Jeha

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SNMPv3

1. OVERVIEW:
2. DESIGN DECISIONS
3. ARCHITECTURE
4. SNMP MESSAGE STRUCTURE
5. SECURE COMMUNICATION
    1. USER SECURITY MODEL (USM)
6. ACCESS CONTROL
    1. VIEW BASED ACCESS CONTROL MODEL (VACM)
7. IMPLEMENTATIONS
8. RFCs

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DESIGN DECISIONS

ADDRESS THE NEED FOR SECURY SET SUPPORT

DEFINE AN ARCHITECTURE THAT ALLOWS FOR LONGEVITY OF SNMP

ALLOW THAT DIFFERENT PORTIONS OF THE ARCHITECTURE MOVE AT DIFFERENT SPEEDS TOWARDS STANDARD STATUS

ALLOW FOR FUTURE EXTENSIONS

KEEP SNMP AS SIMPLE AS POSSIBLE

ALLOW FOR MINIMAL IMPLEMENTATIONS

SUPPORT ALSO THE MORE COMPLEX FEATURES, WHICH ARE REQUIRED IN LARGE NETWORKS

RE-USE EXISTING SPECIFICATIONS, WHENEVER POSSIBLE

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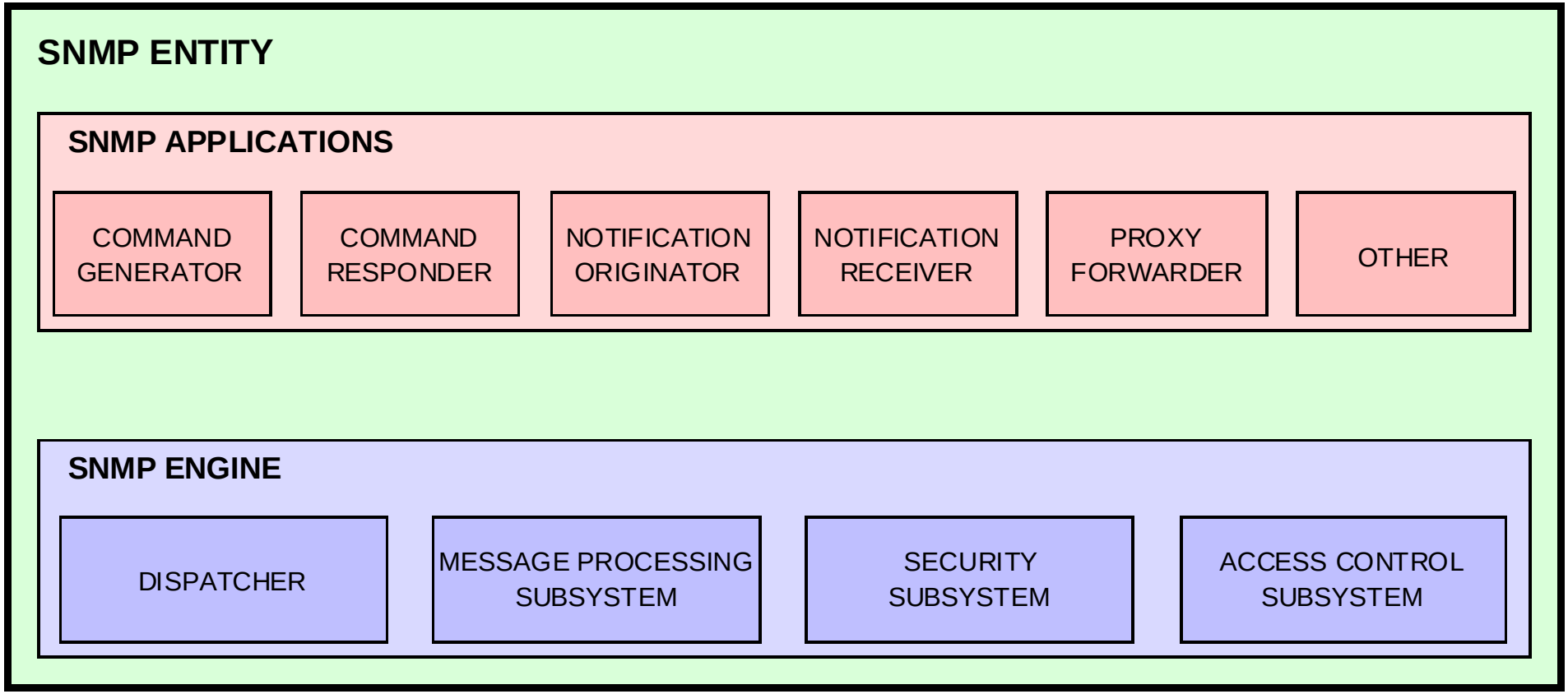
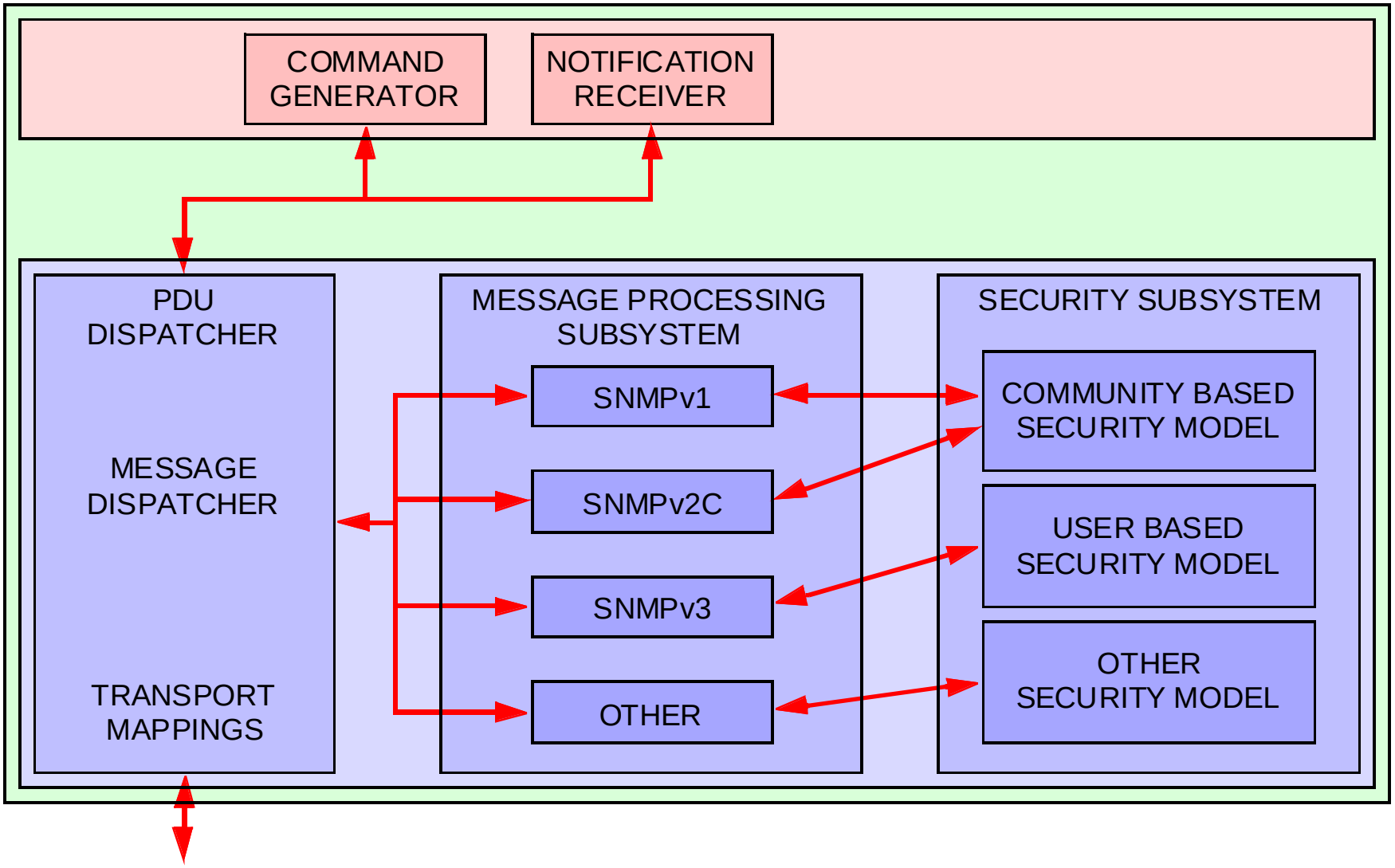
SNMPv3 ARCHITECTURE



SNMPv3 ARCHITECTURE: MANAGER



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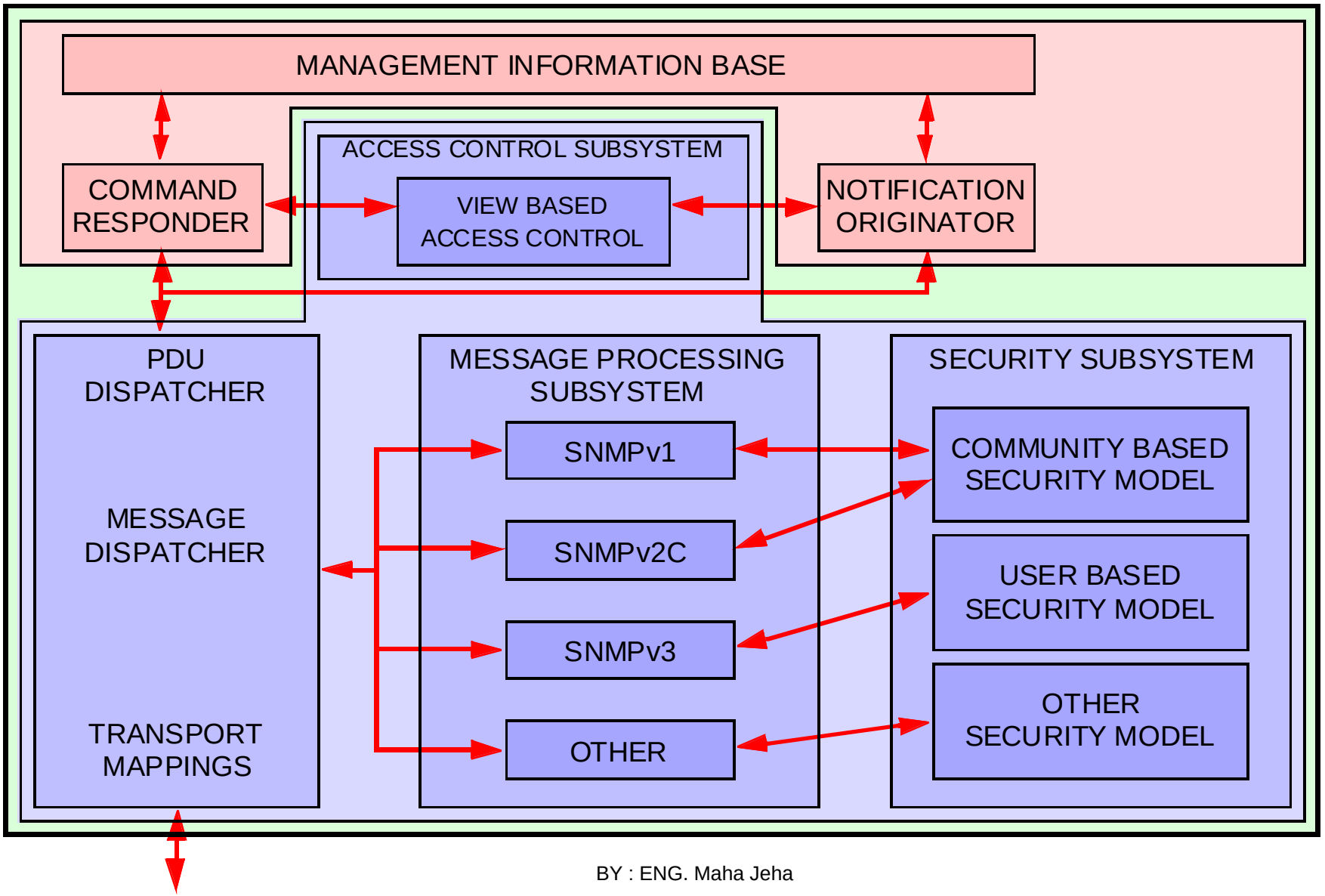
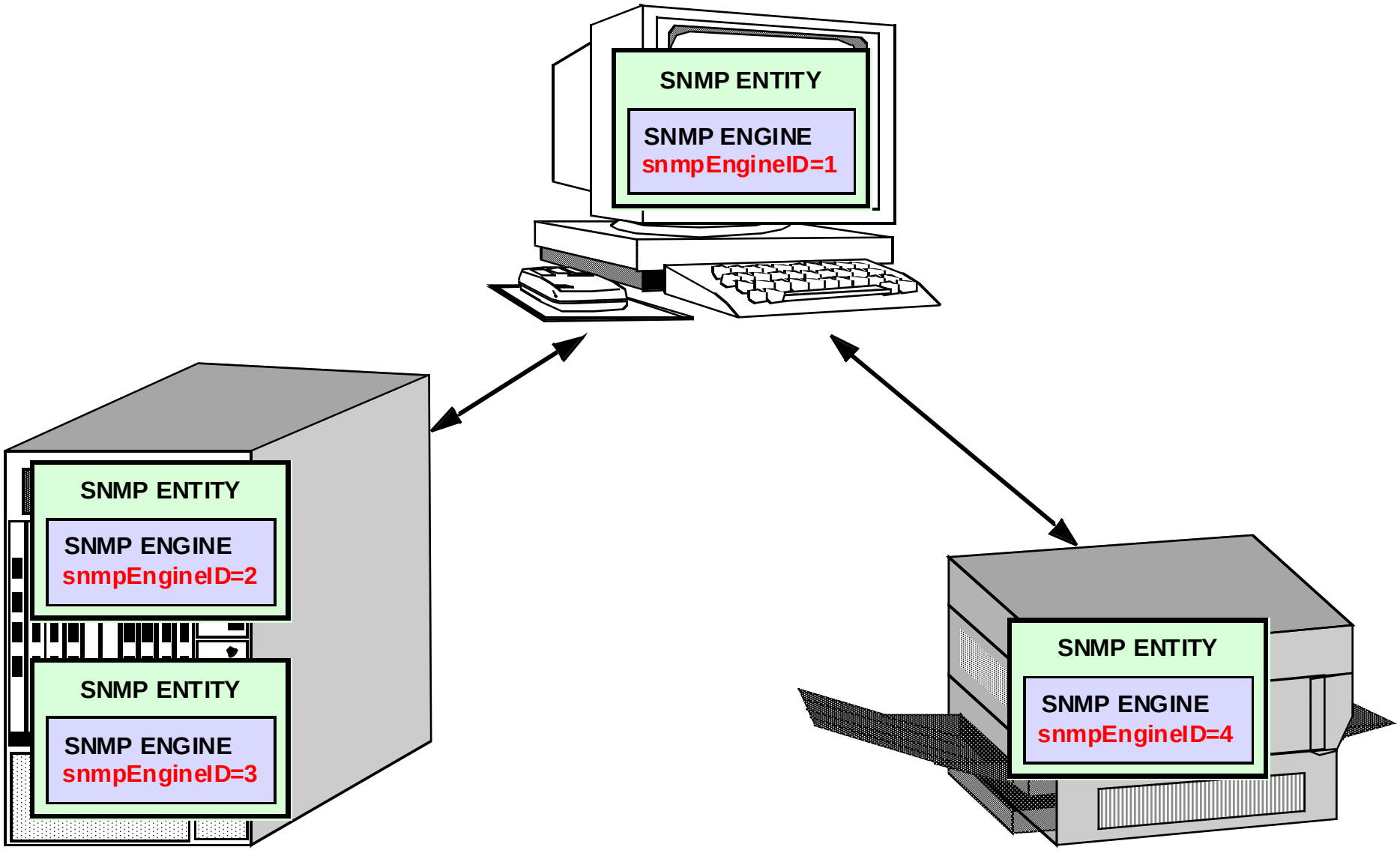
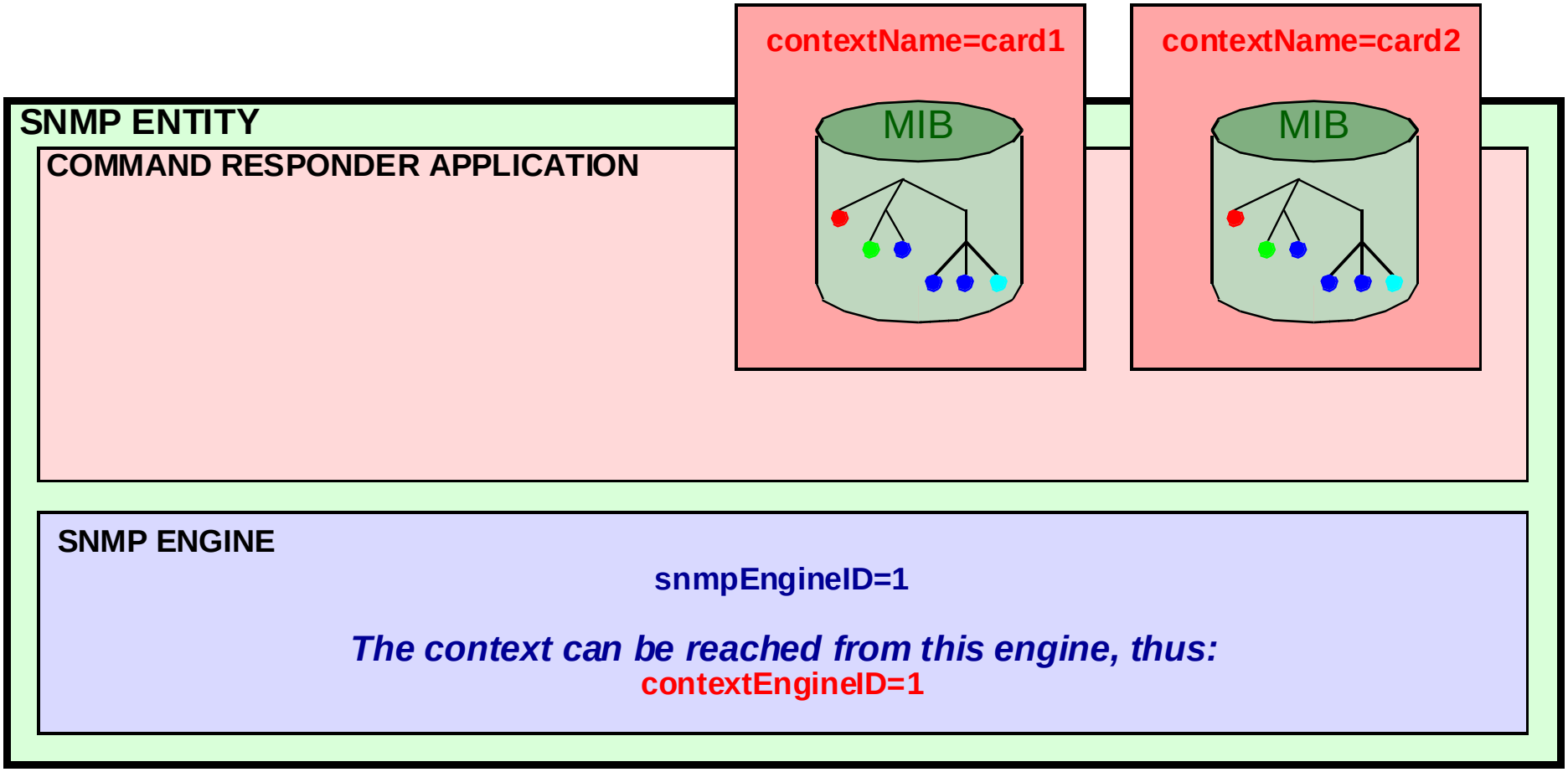
SNMPv3 ARCHITECTURE: AGENT



CONCEPTS: snmpEngineID



CONCEPTS: Context



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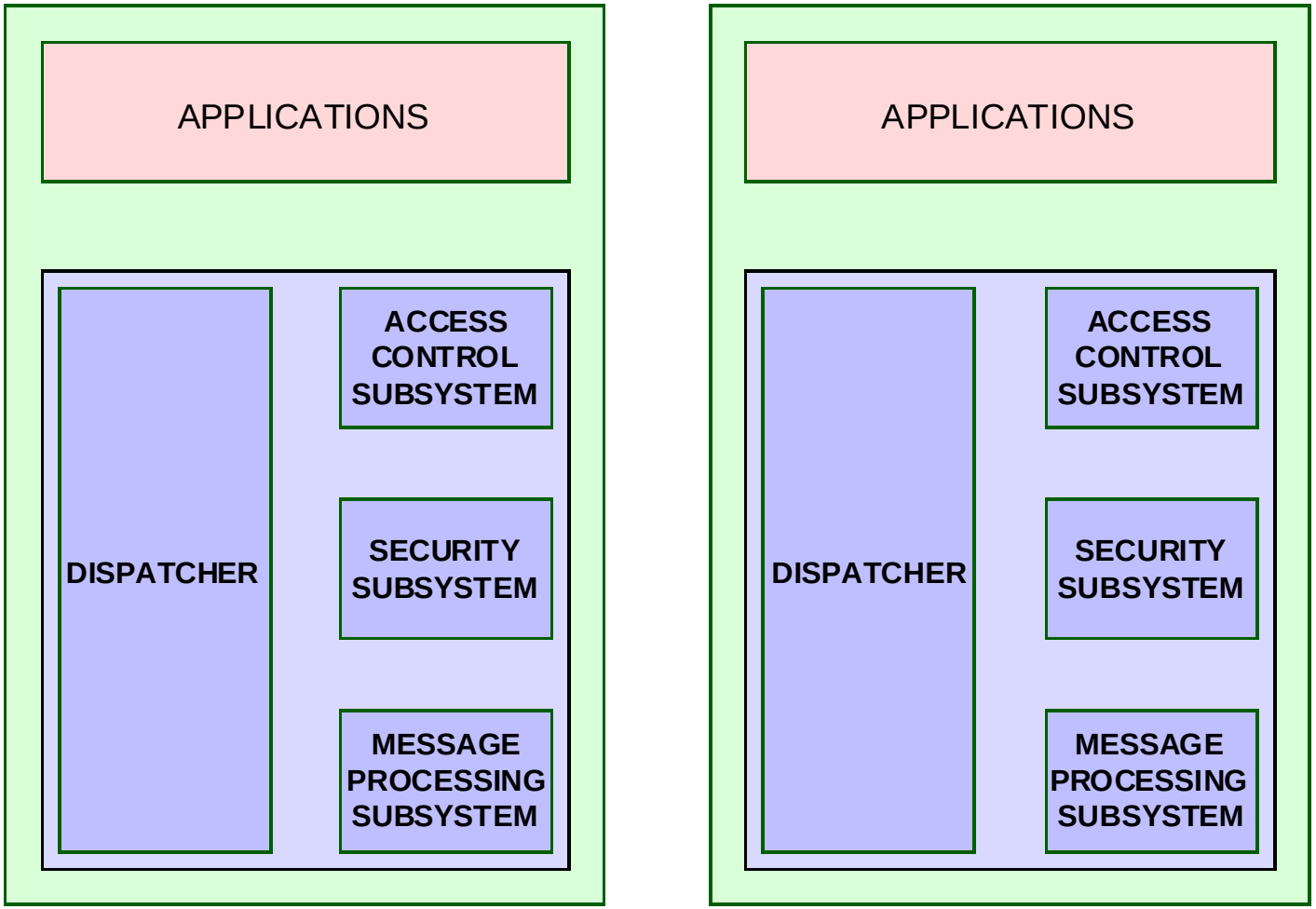
PRIMITIVES BETWEEN MODULES



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messageProcessingModel
outgoingMessage
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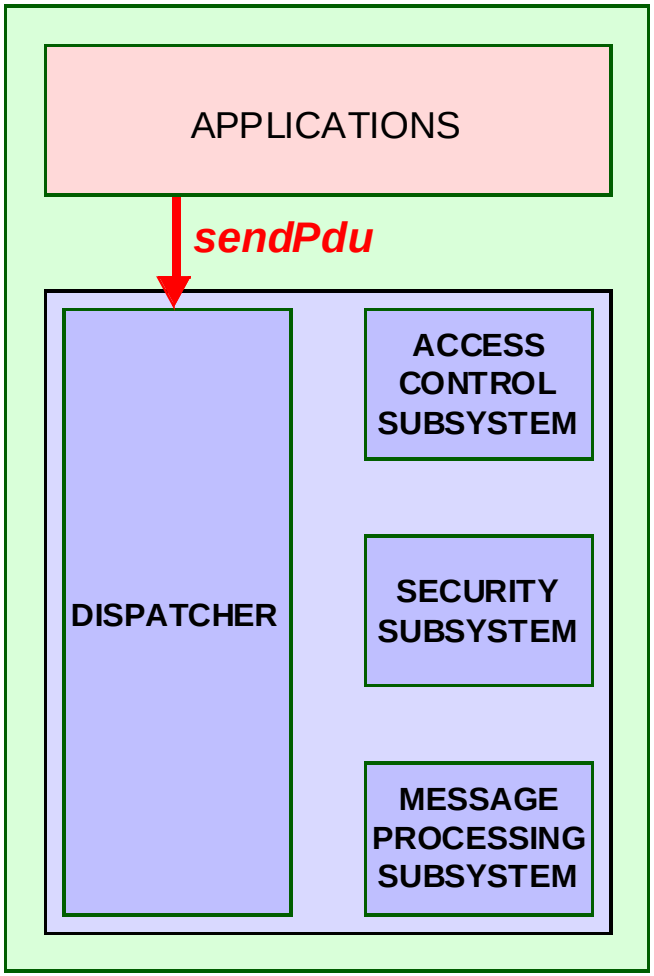
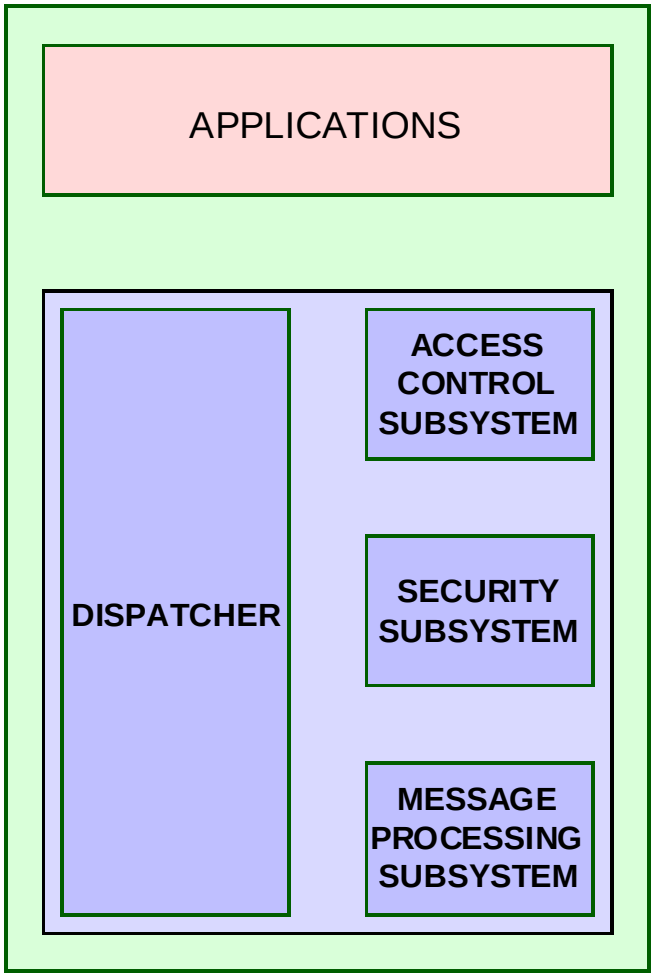
sendPdu





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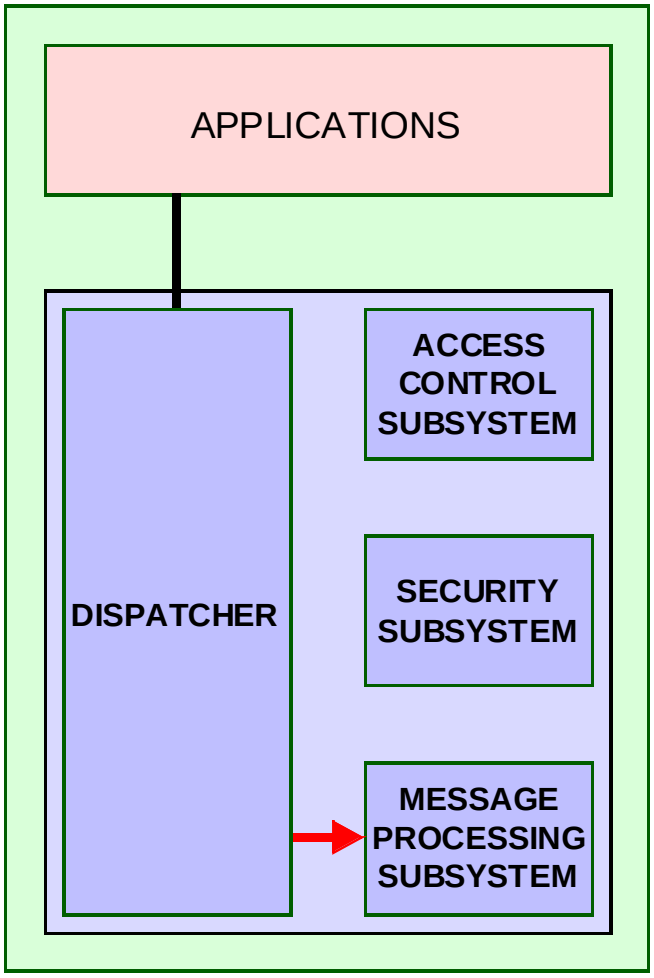
prepareOutgoingMessage



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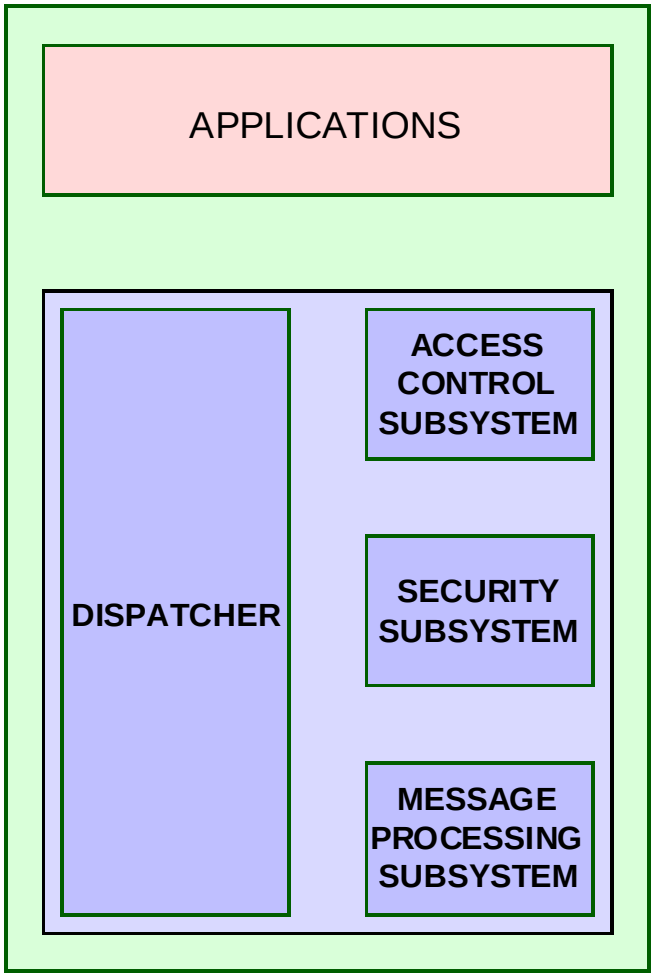

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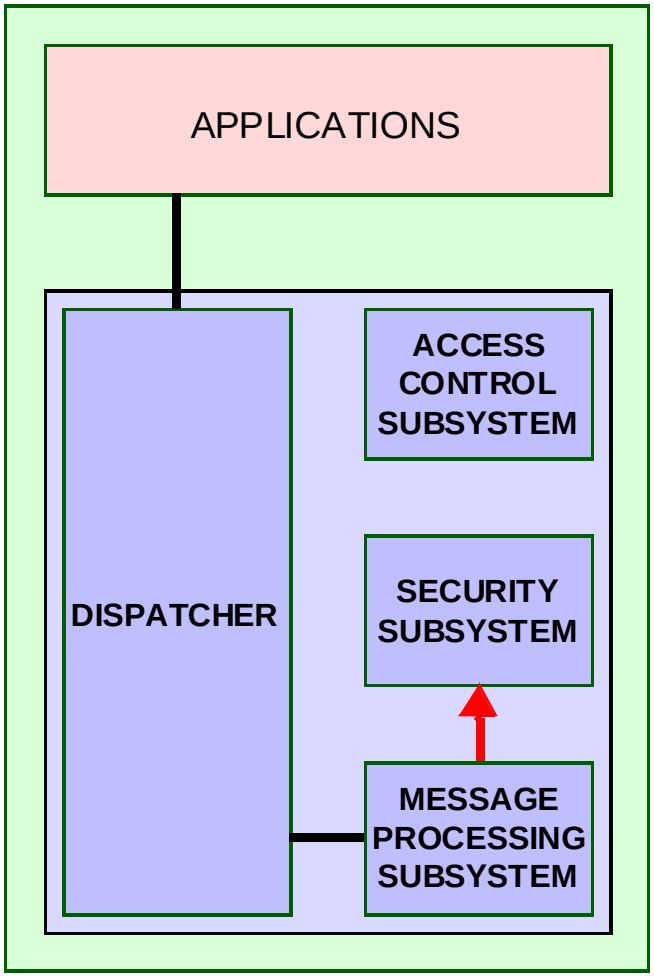
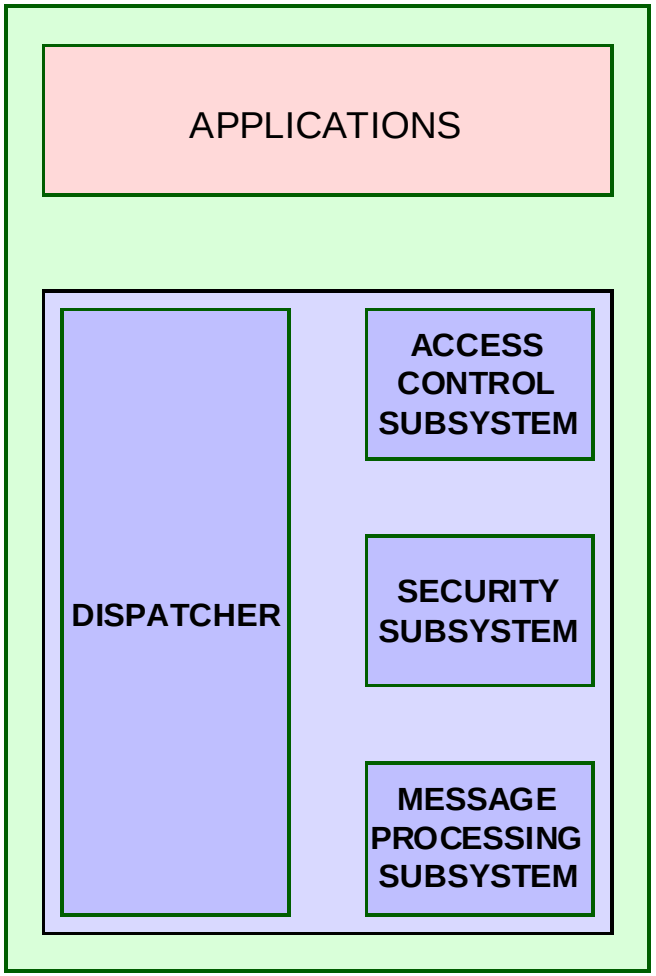
generateRequestMsg





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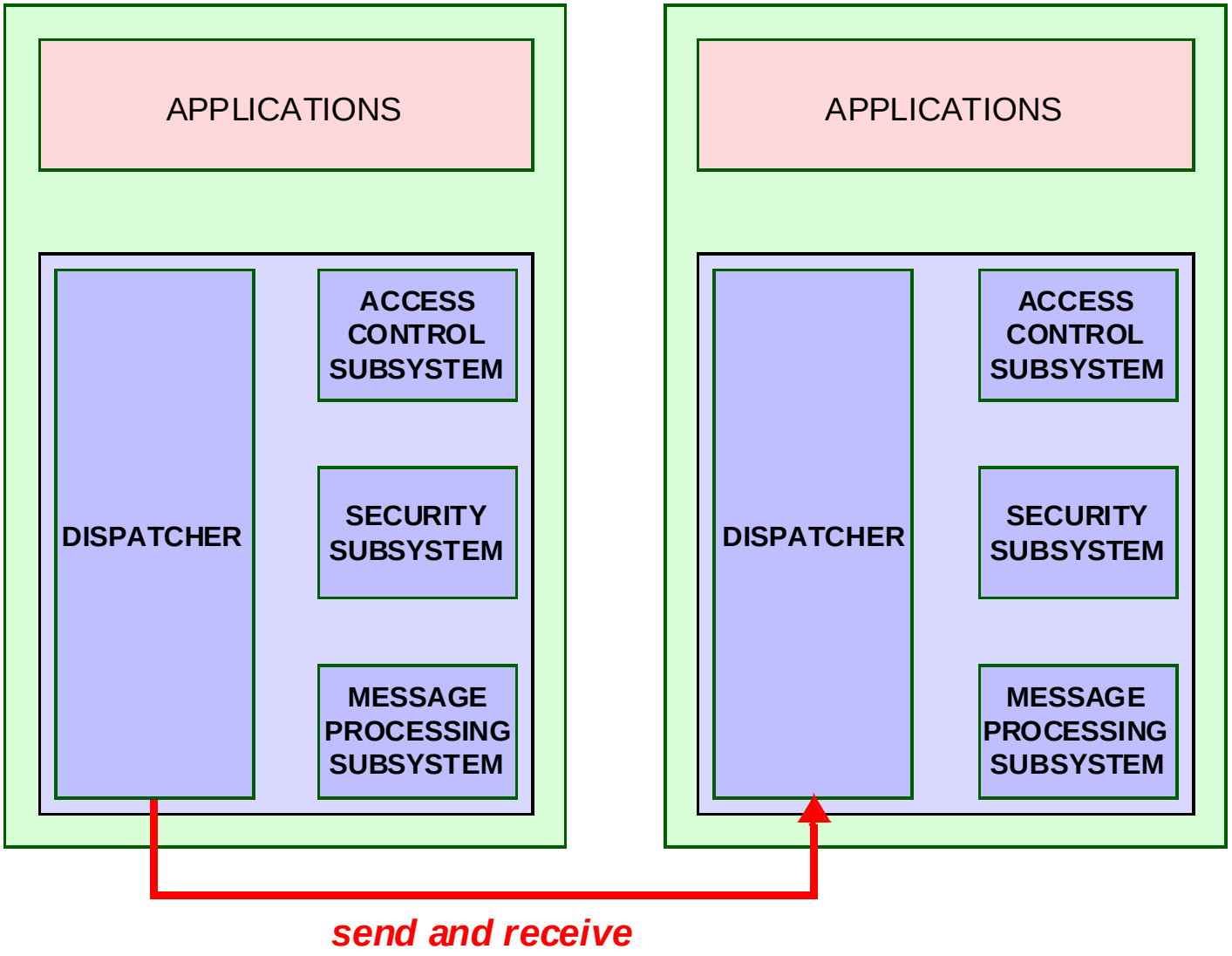
send / receive



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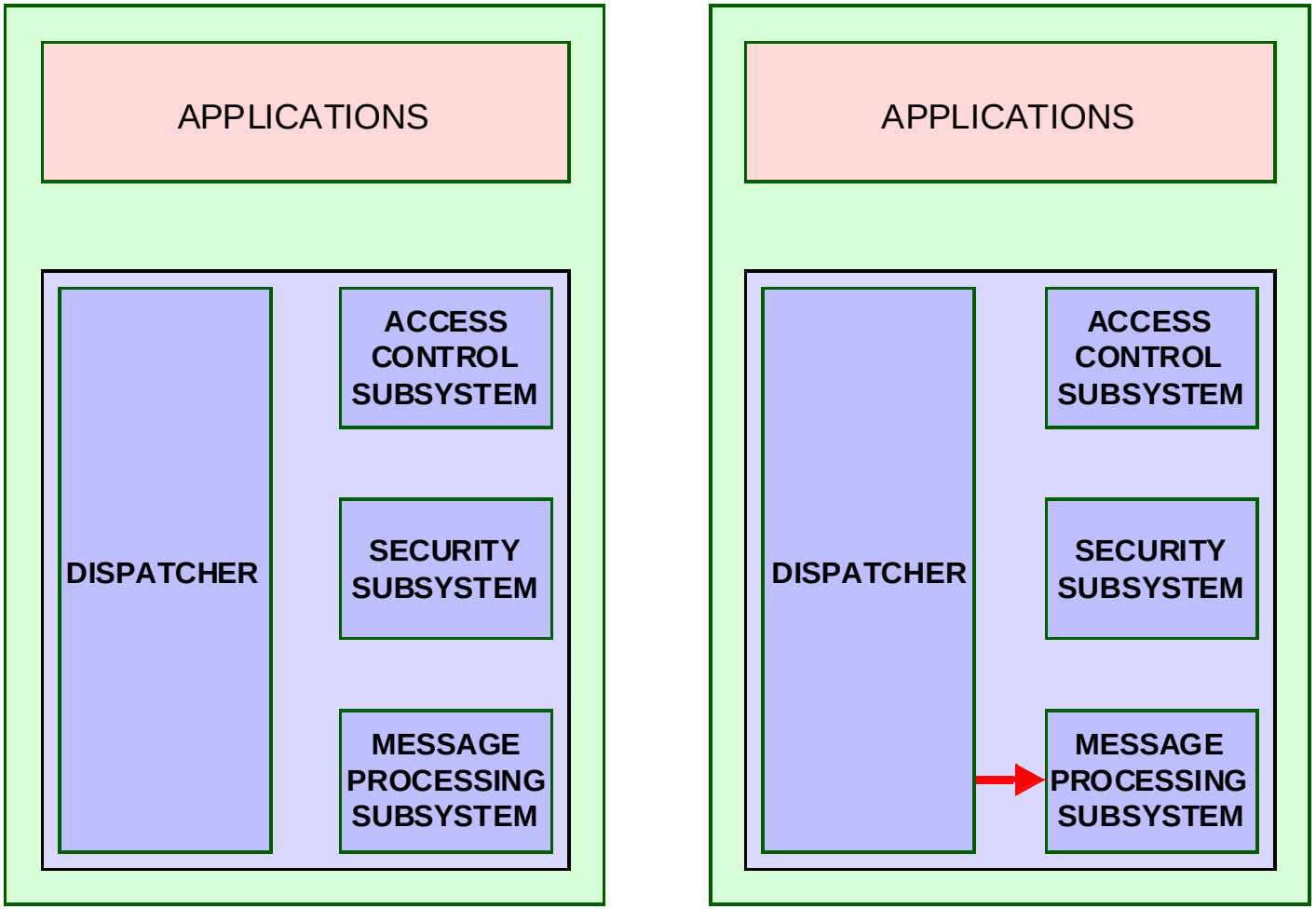
prepareDataElements



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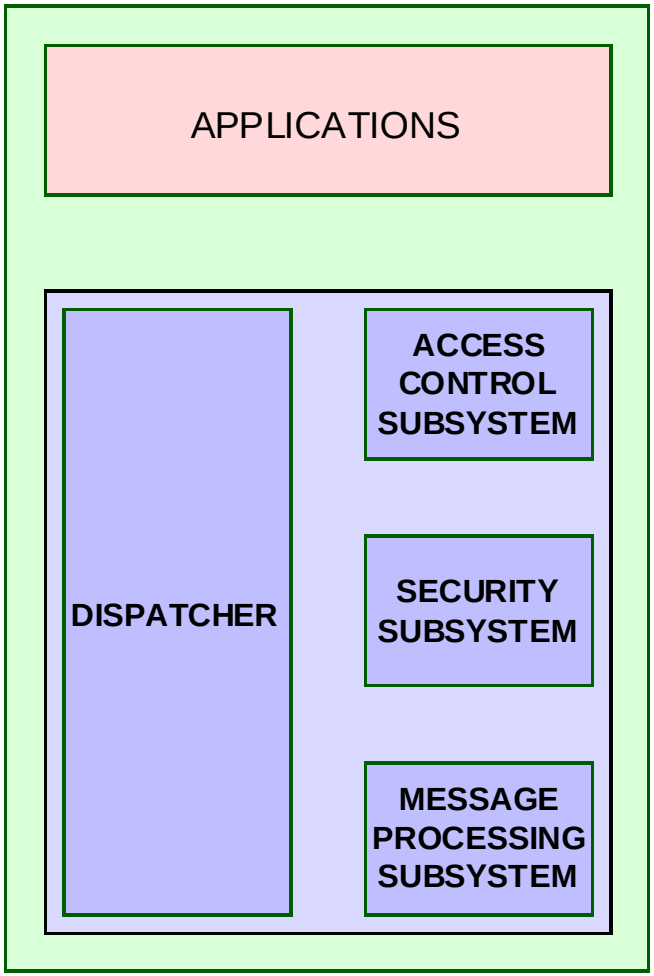
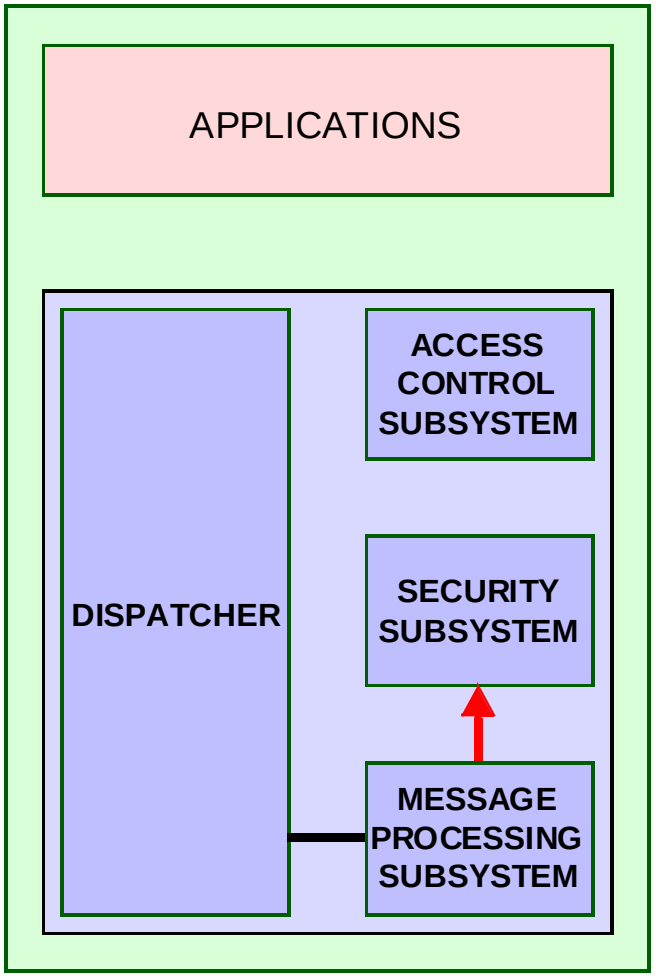
processIncomingMsg





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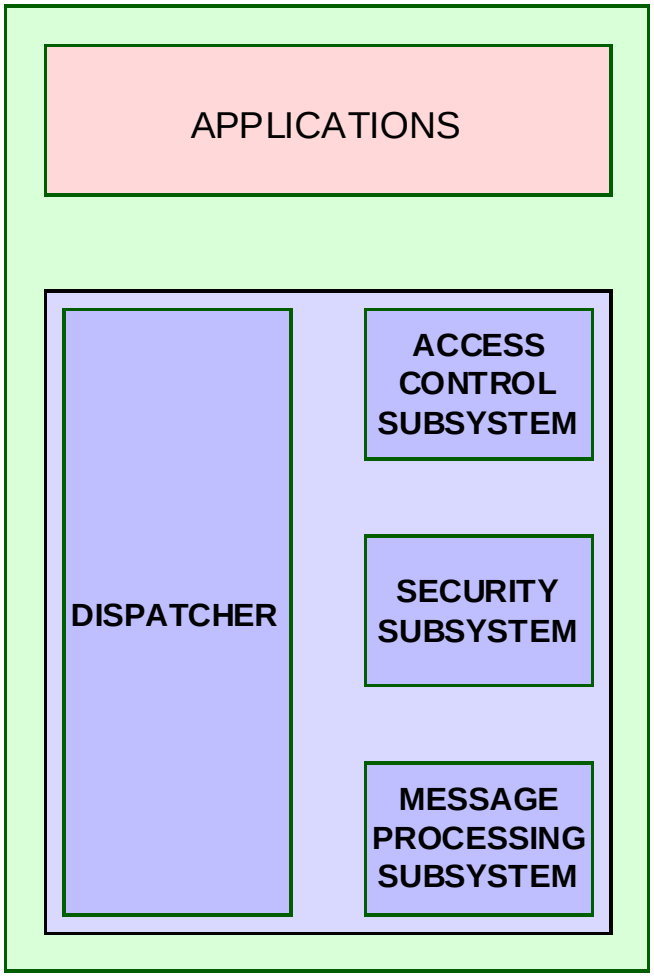
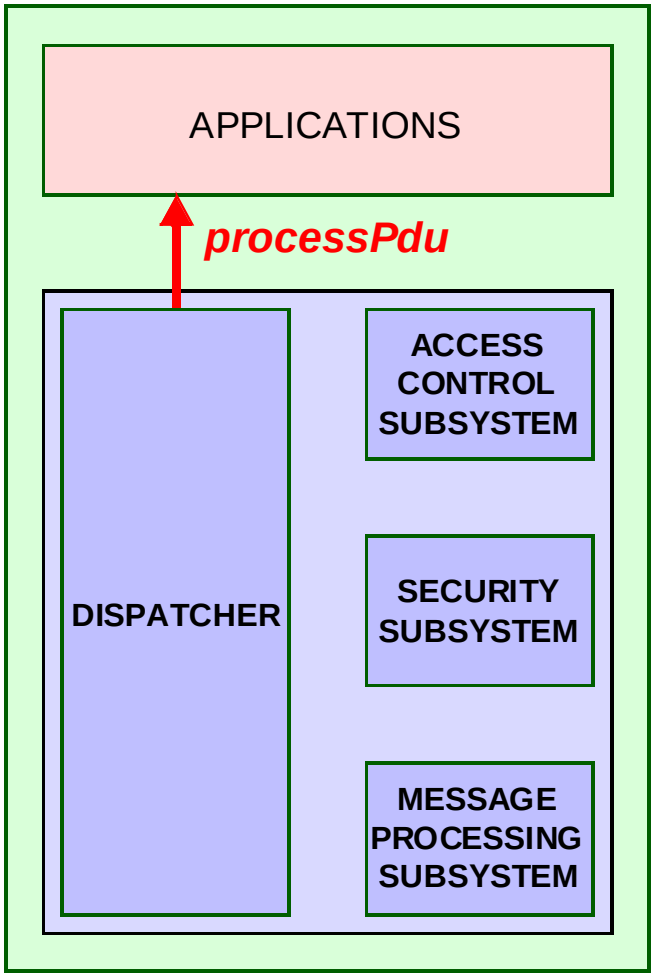
processPd





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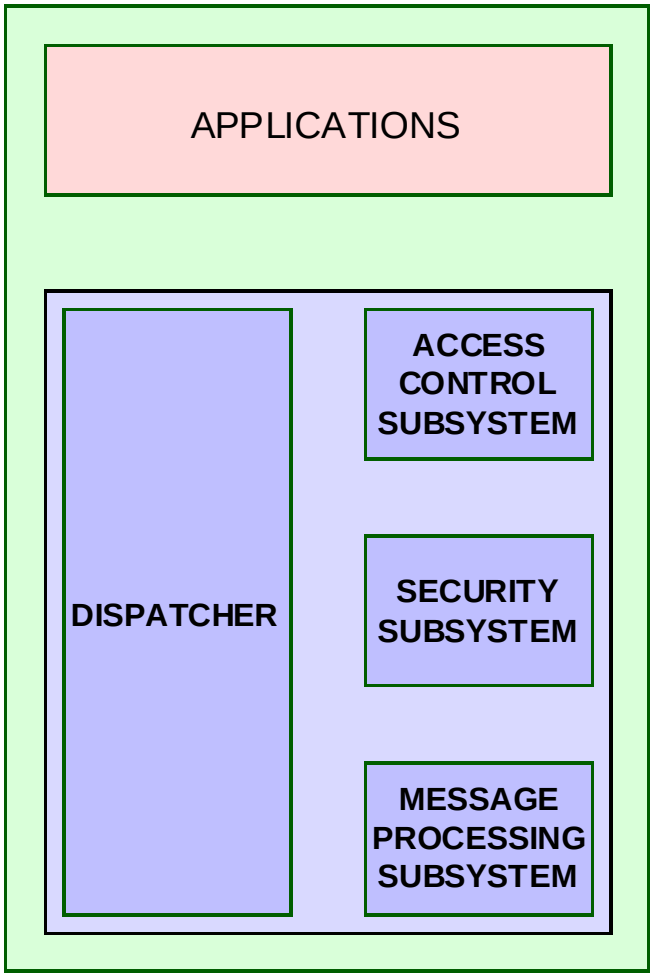
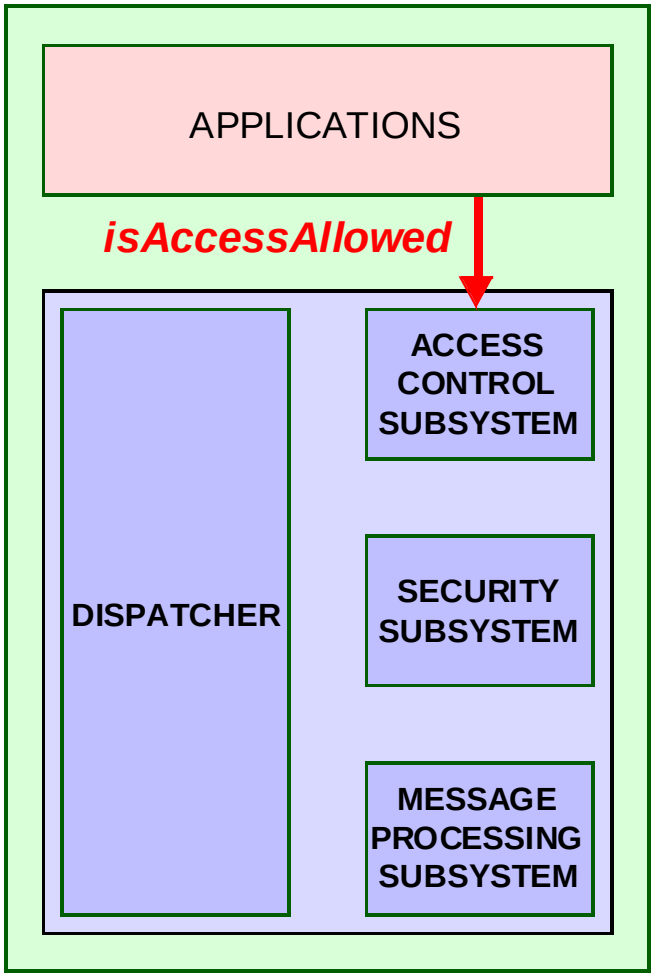
isAccessAllowed





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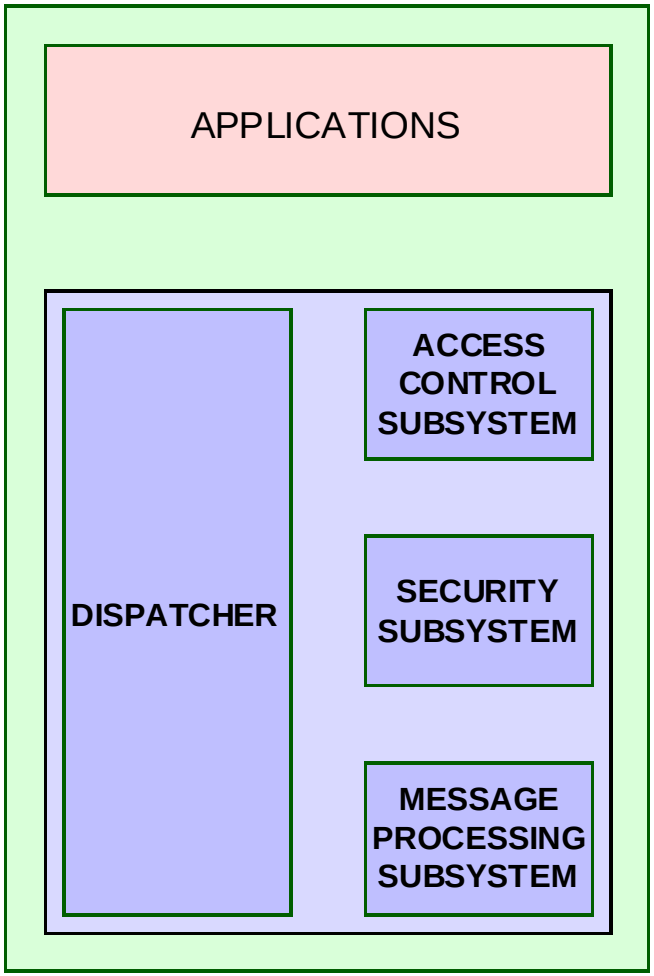
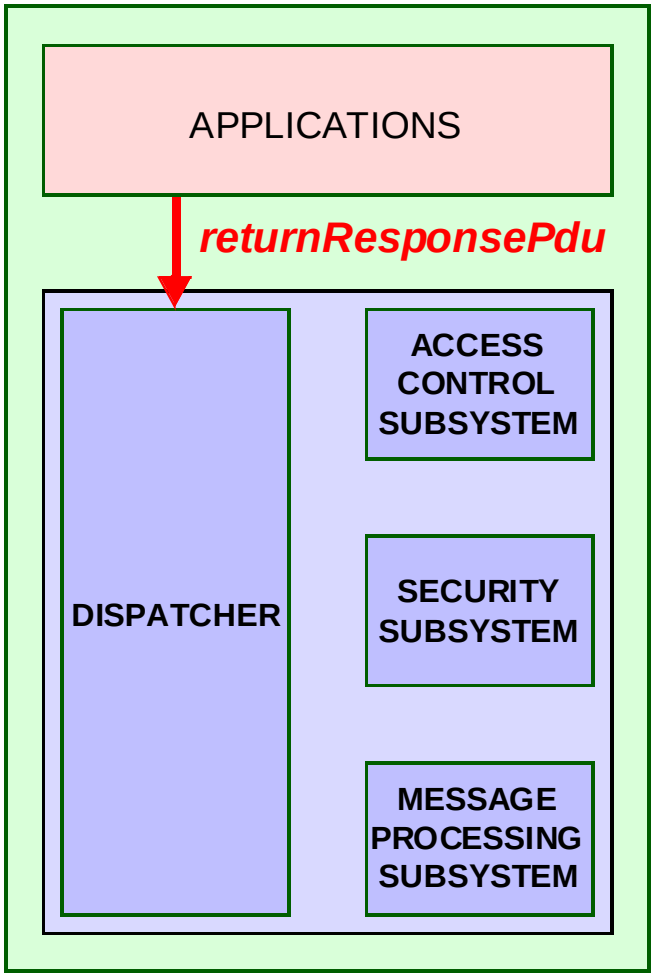
returnResponsePdu





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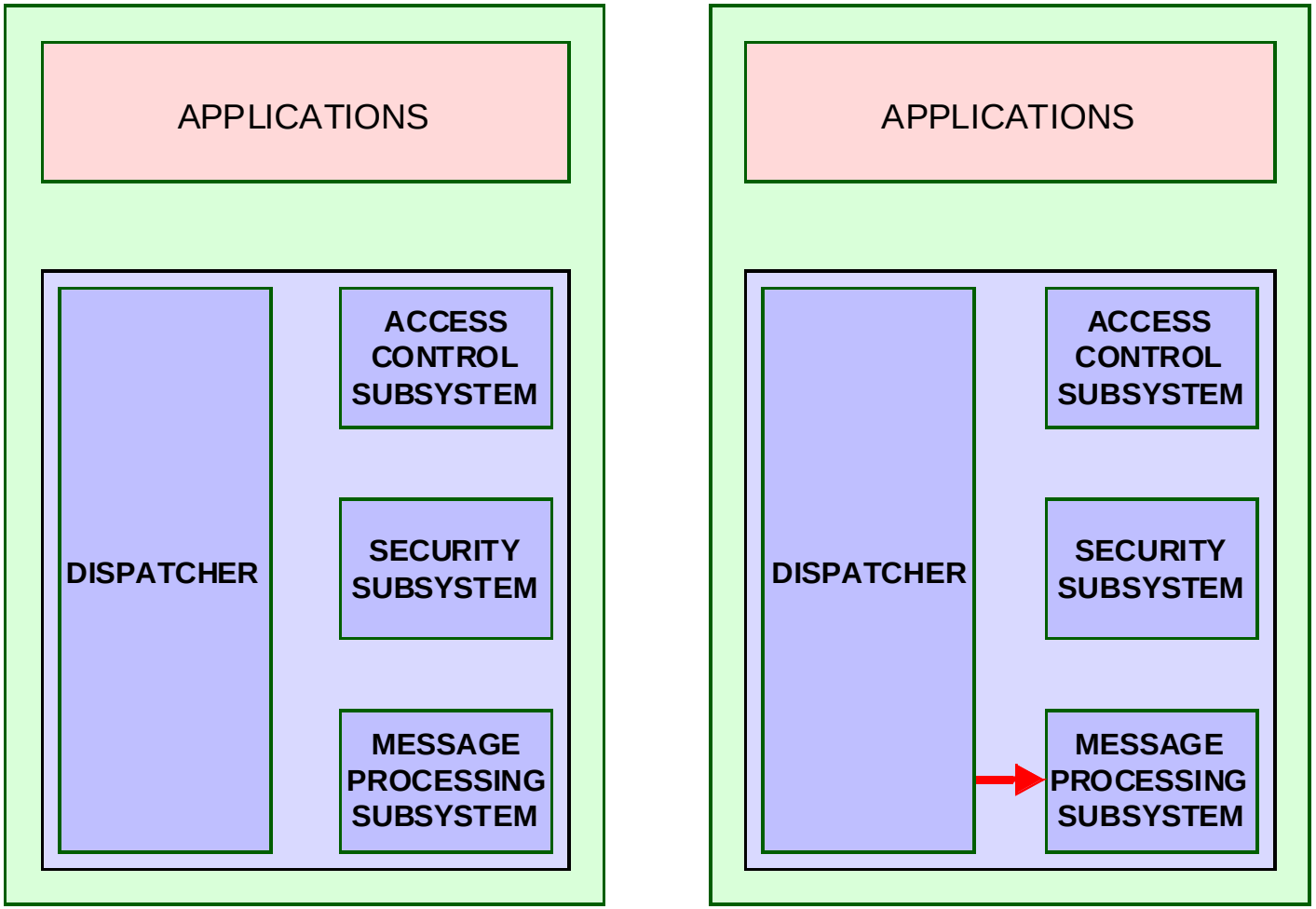
prepareResponseMessage



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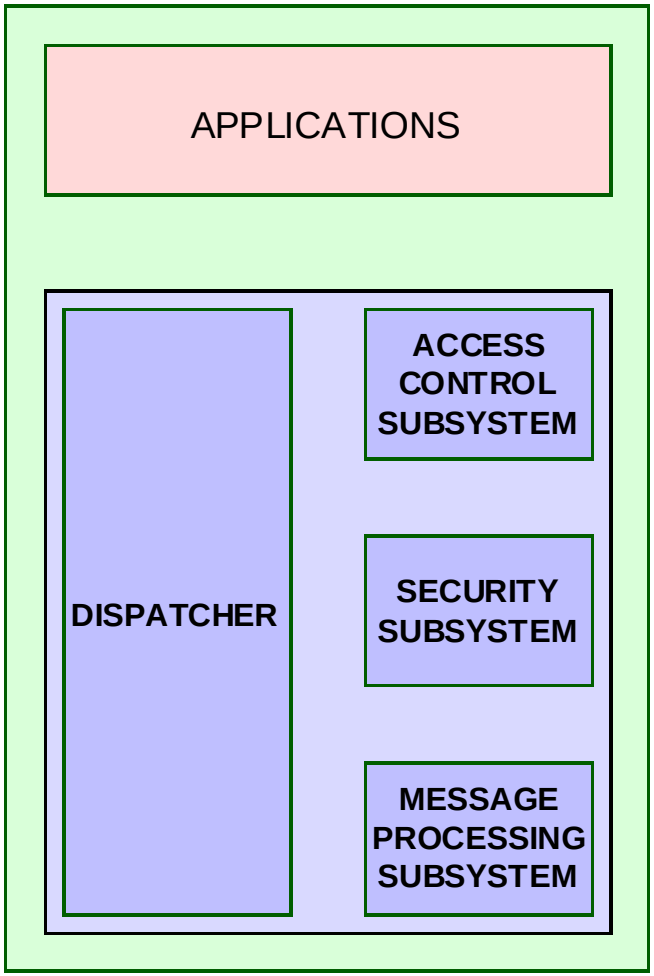
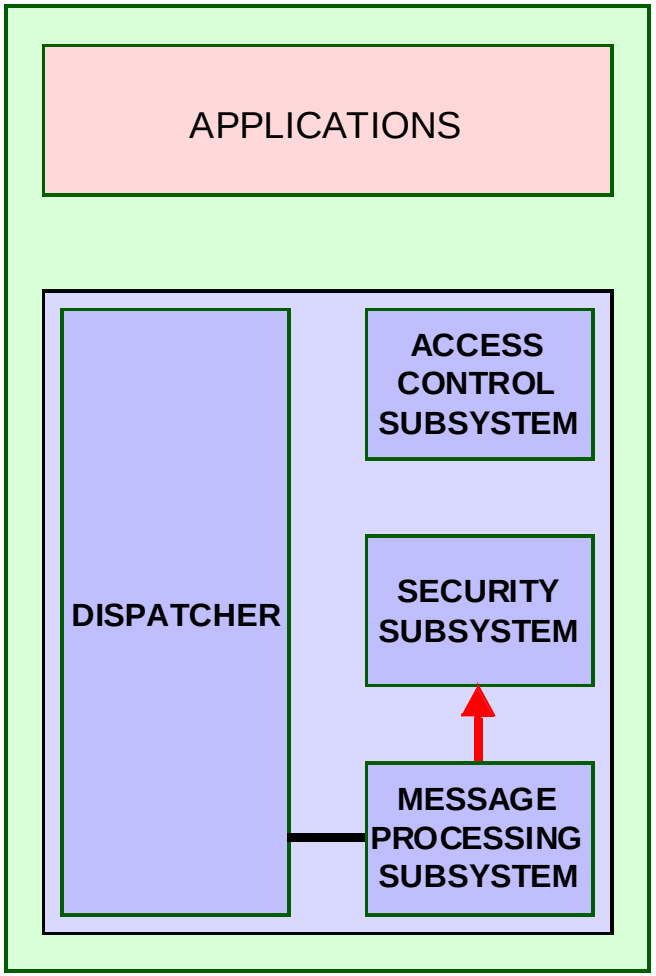
generateResponseMsg





generateResponseMsg

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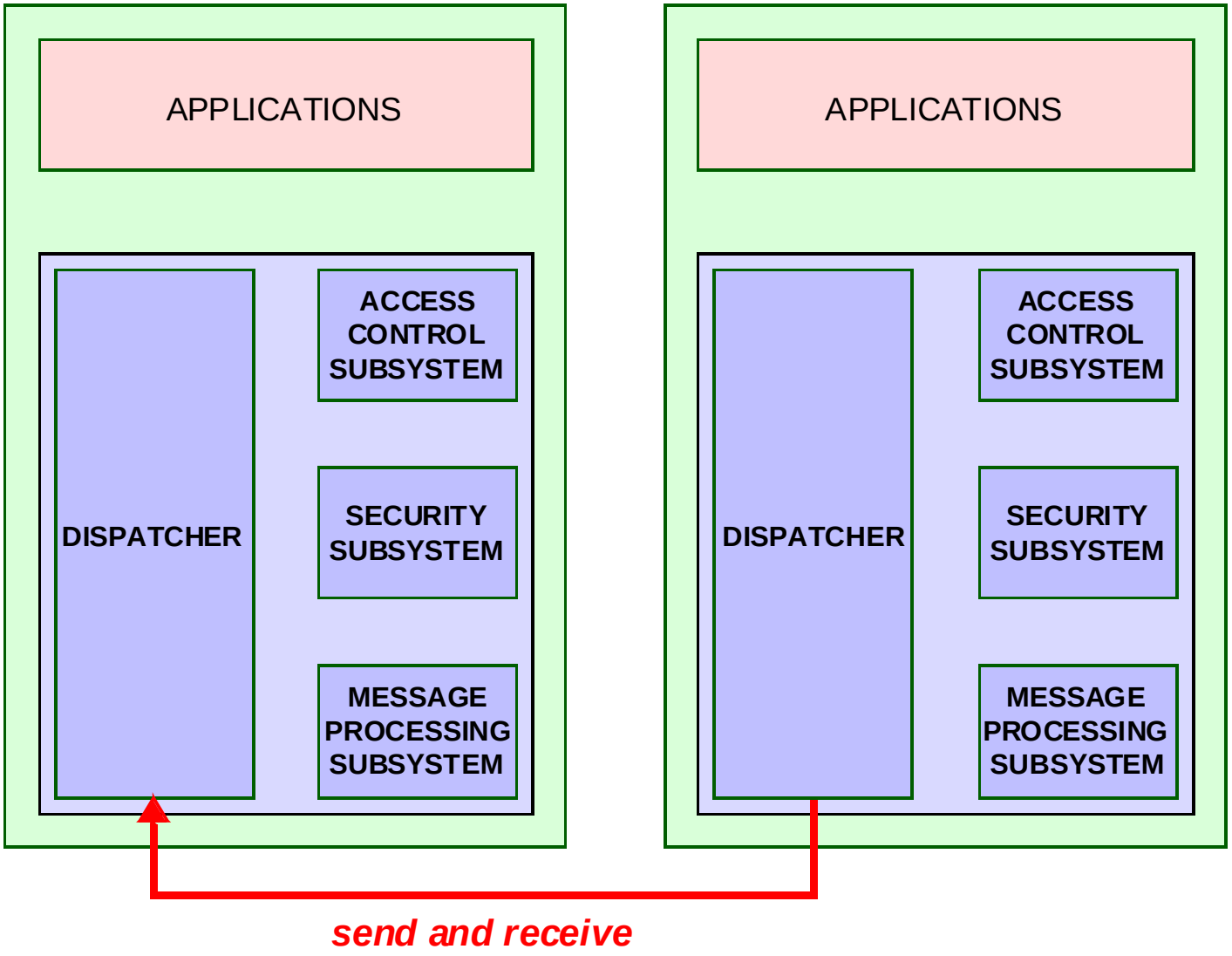
send / receive



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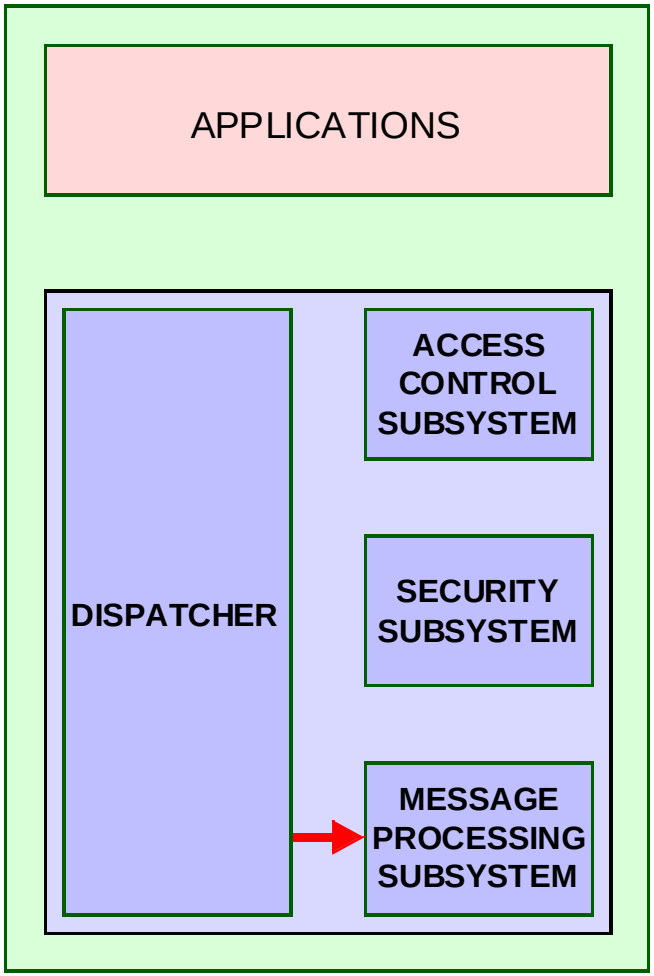
prepareDataElements



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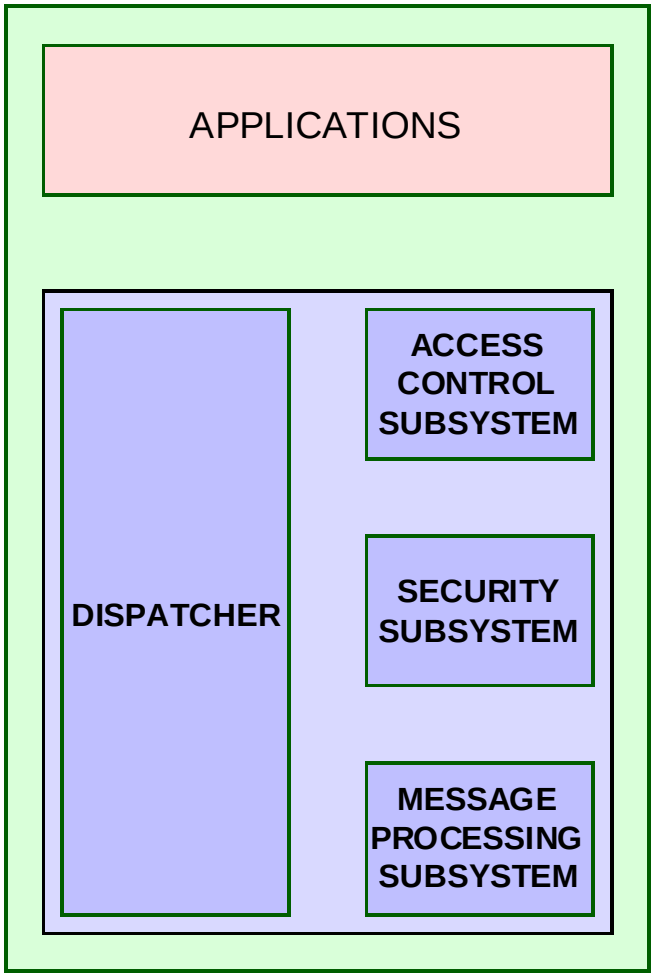

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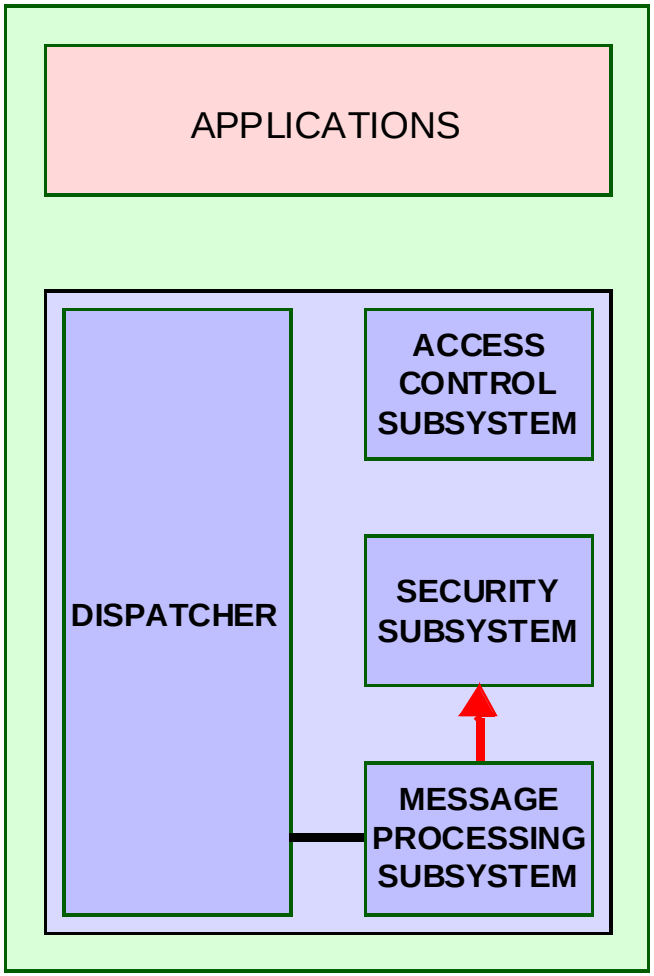
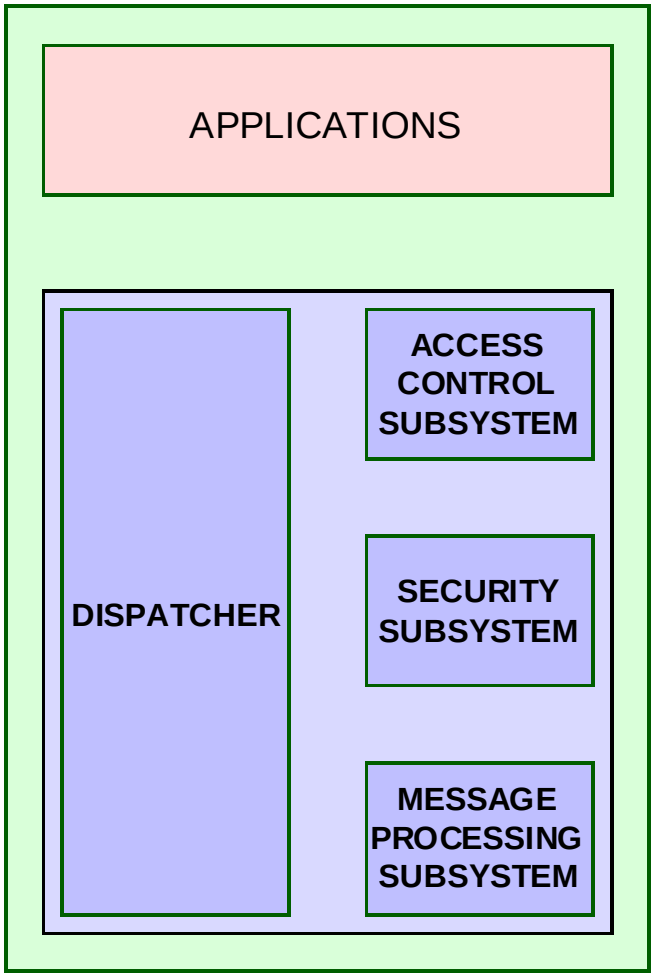
processIncomingMsg





processIncomingMsg

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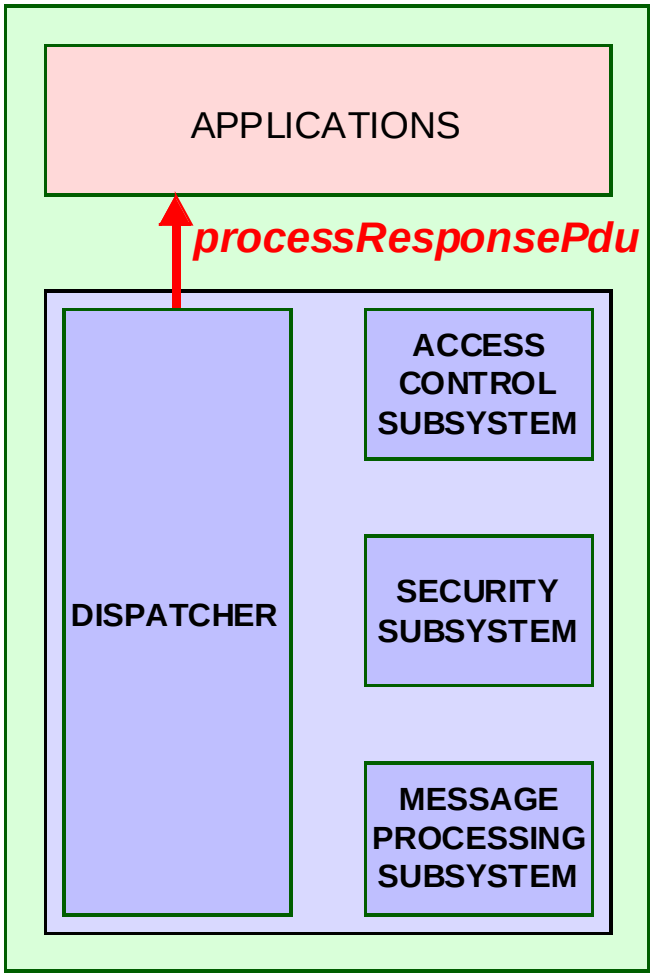
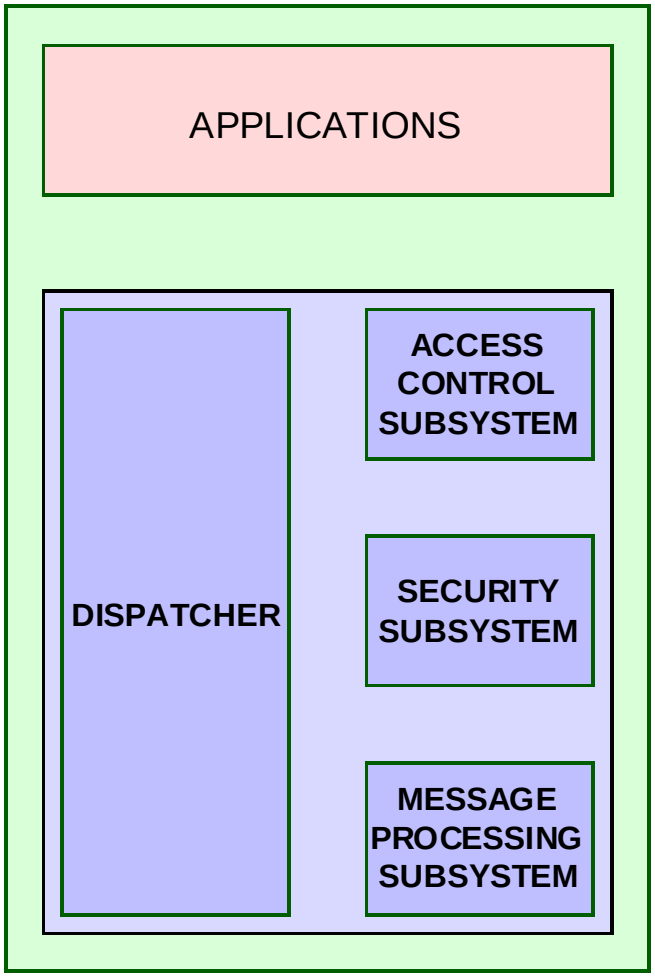
processResponsePdu





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MODULES OF THE SNMPv3 ARCHITECTURE

DISPATCHER AND MESSAGE PROCESSING MODULE

- SNMPv3 MESSAGE STRUCTURE
- snmpMPDMIB
- RFC 2572

APPLICATIONS

- snmpTargetMIB
- snmpNotificationMIB
- snmpProxyMIB
- RFC 2573

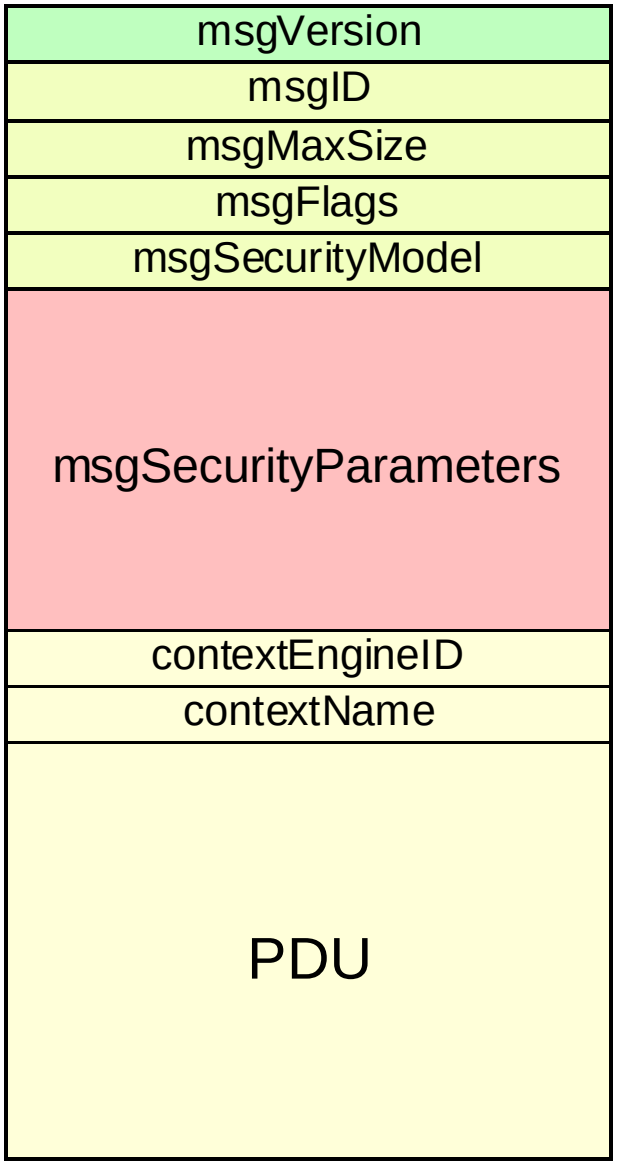
SECURITY SUBSYSTEM

- USER BASED SECURITY MODEL
- snmpUsmMIB
- RFC 2574

ACCESS CONTROL SUBSYSTEM

- VIEW BASED ACCESS CONTROL MODEL
- snmpVacmMIB
- RFC 2575

SNMPv3 MESSAGE STRUCTURE



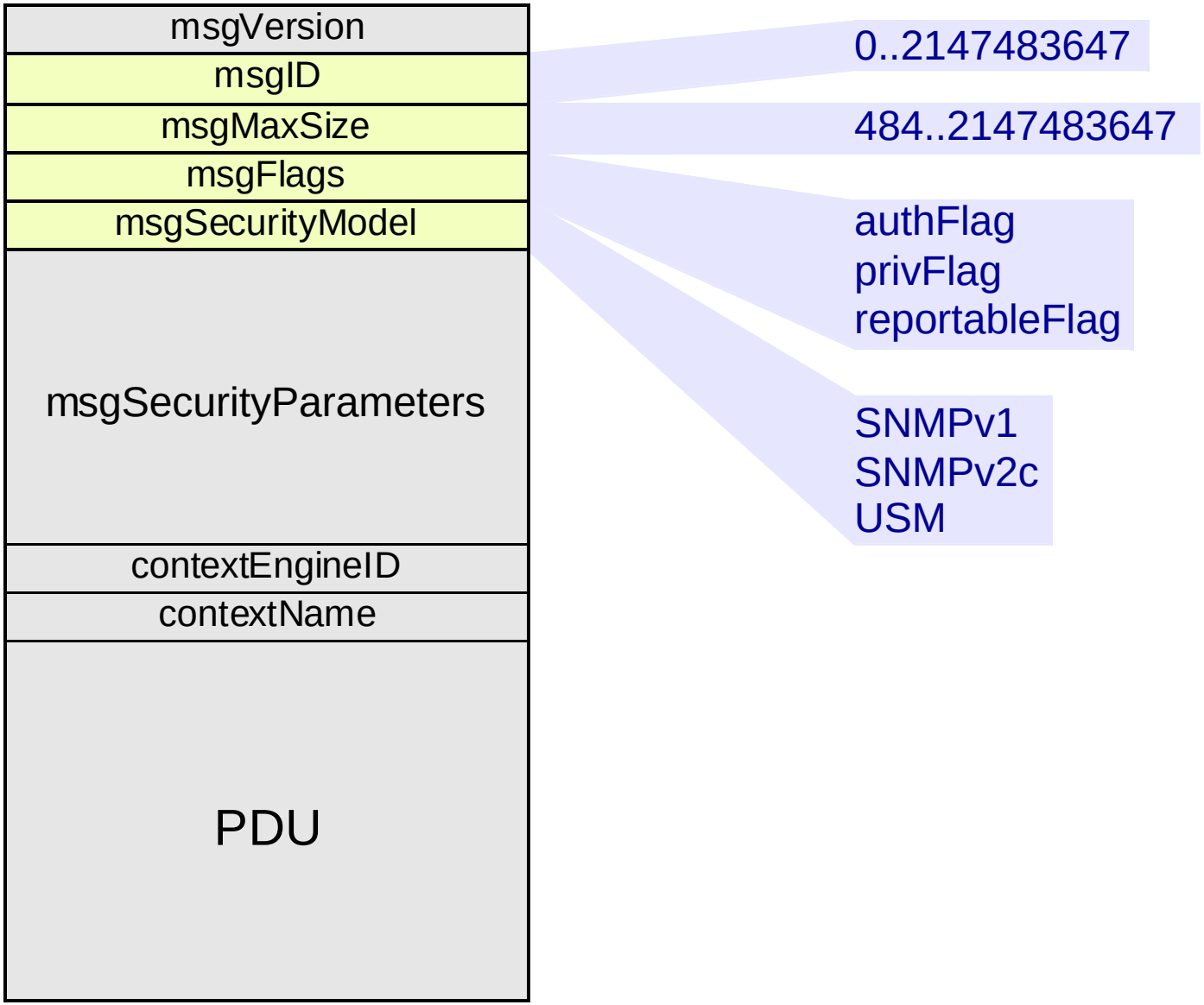
USED BY MESSAGE PROCESSING SUBSYSTEM

USED BY SNMPv3 PROCESSING MODULE

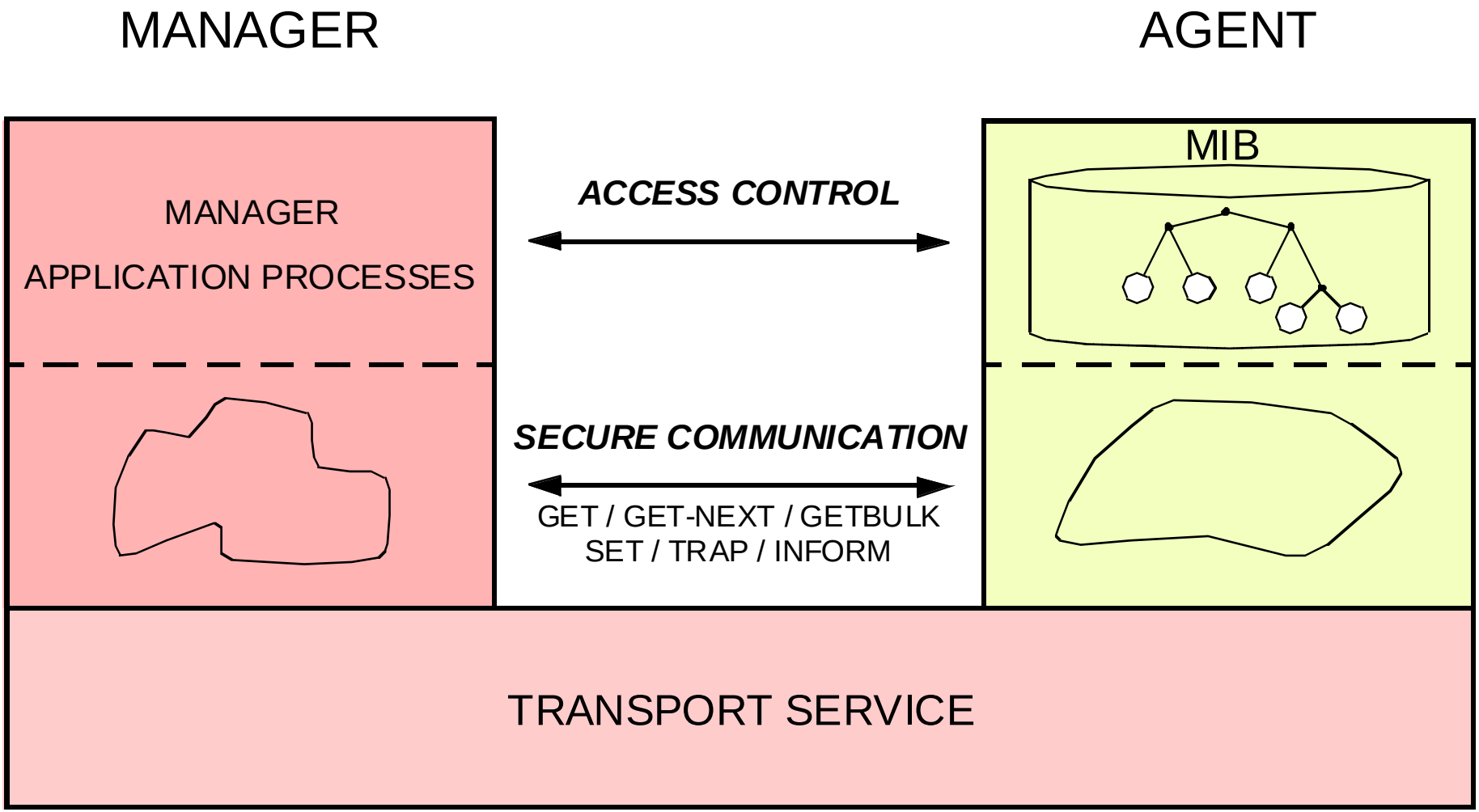
USED BY SECURITY SUBSYSTEM

USED BY ACCESS CONTROL SUBSYSTEM AND APPLICATIONS

SNMPv3 PROCESSING MODULE PARAMETERS



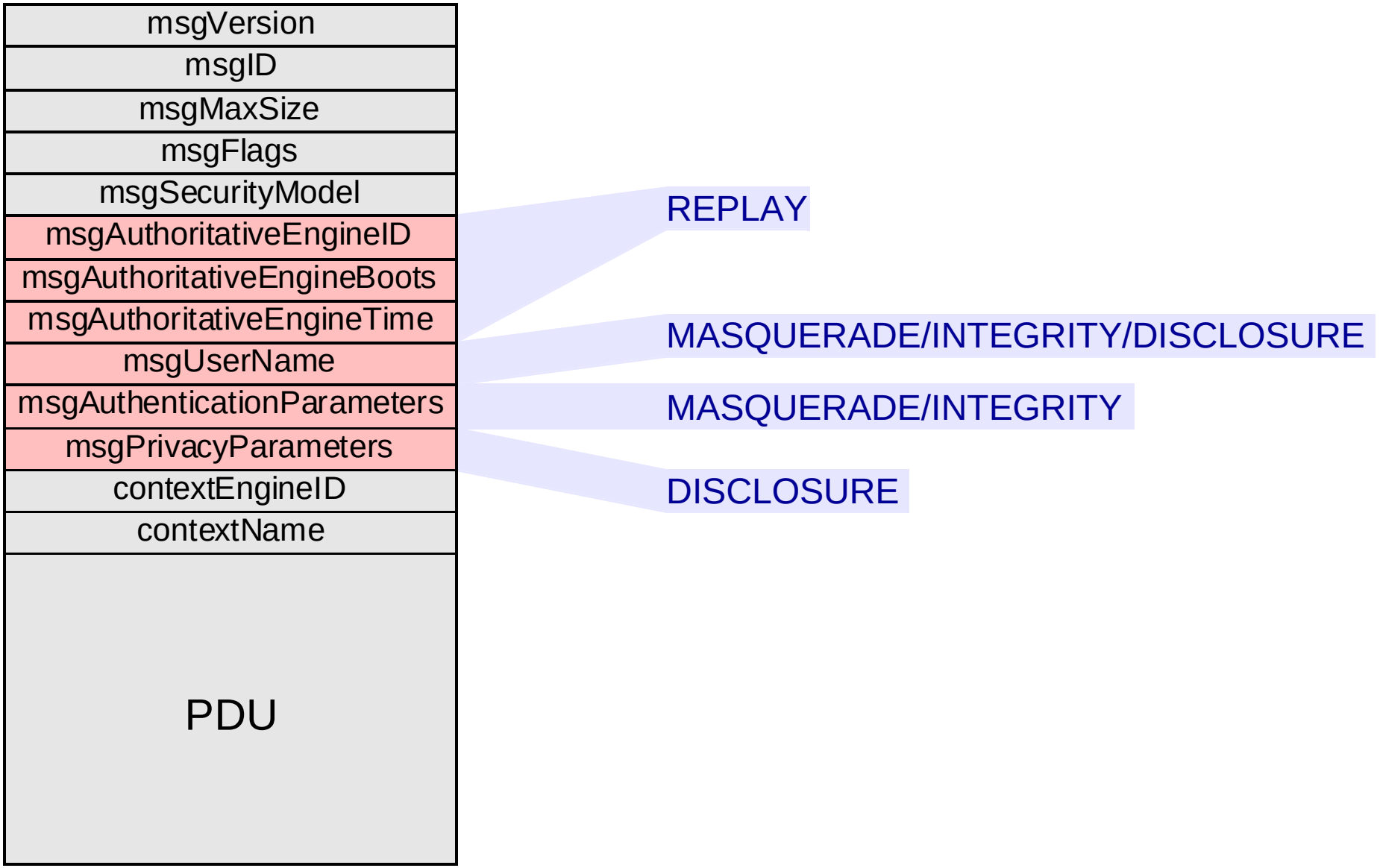
SECURE COMMUNICATION VERSUS ACCESS CONTROL



USM: SECURITY THREATS

THREAT	ADDRESSED?	MECHANISM
REPLAY	YES	TIME STAMP
MASQUERADE	YES	MD5 / SHA-1
INTEGRITY	YES	(MD5 / SHA-1)
DISCLOSURE	YES	DES
DENIAL OF SERVICE	YES	
TRAFFIC ANALYSIS	YES	

USM MESSAGE STRUCTURE



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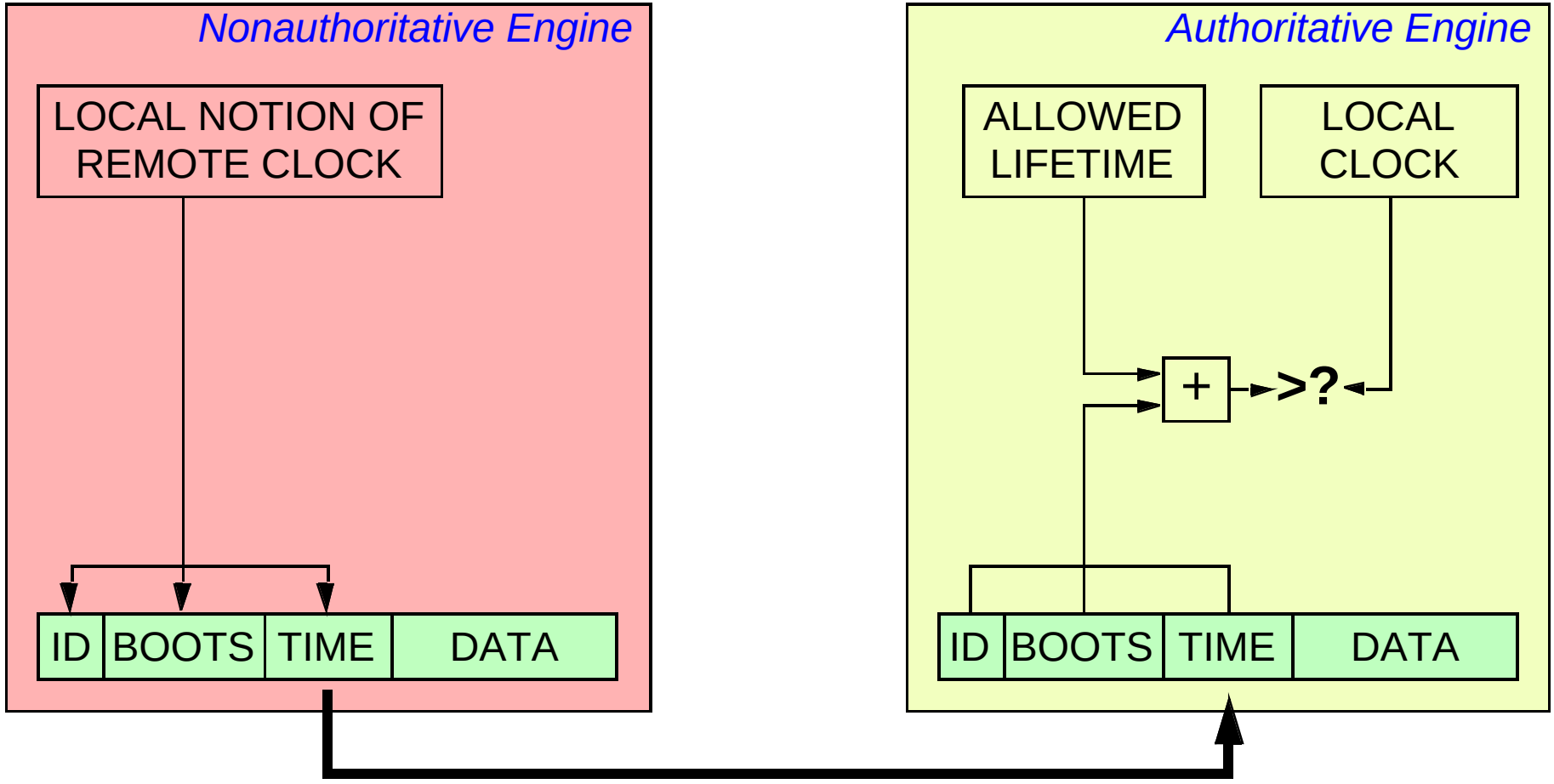
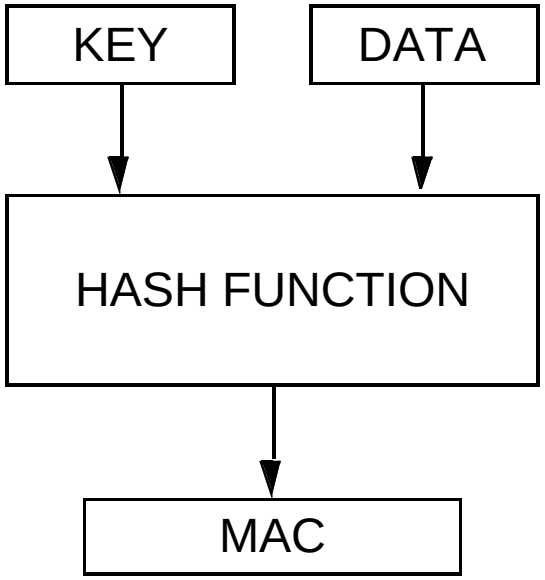
IDEA BEHIND REPLAY PROTECTION



IDEA BEHIND DATA INTEGRITY AND AUTHENTICATION



ADD THE MESSAGE AUTHENTICATION CODE (MAC) TO THE DATA AND SEND THE RESULT

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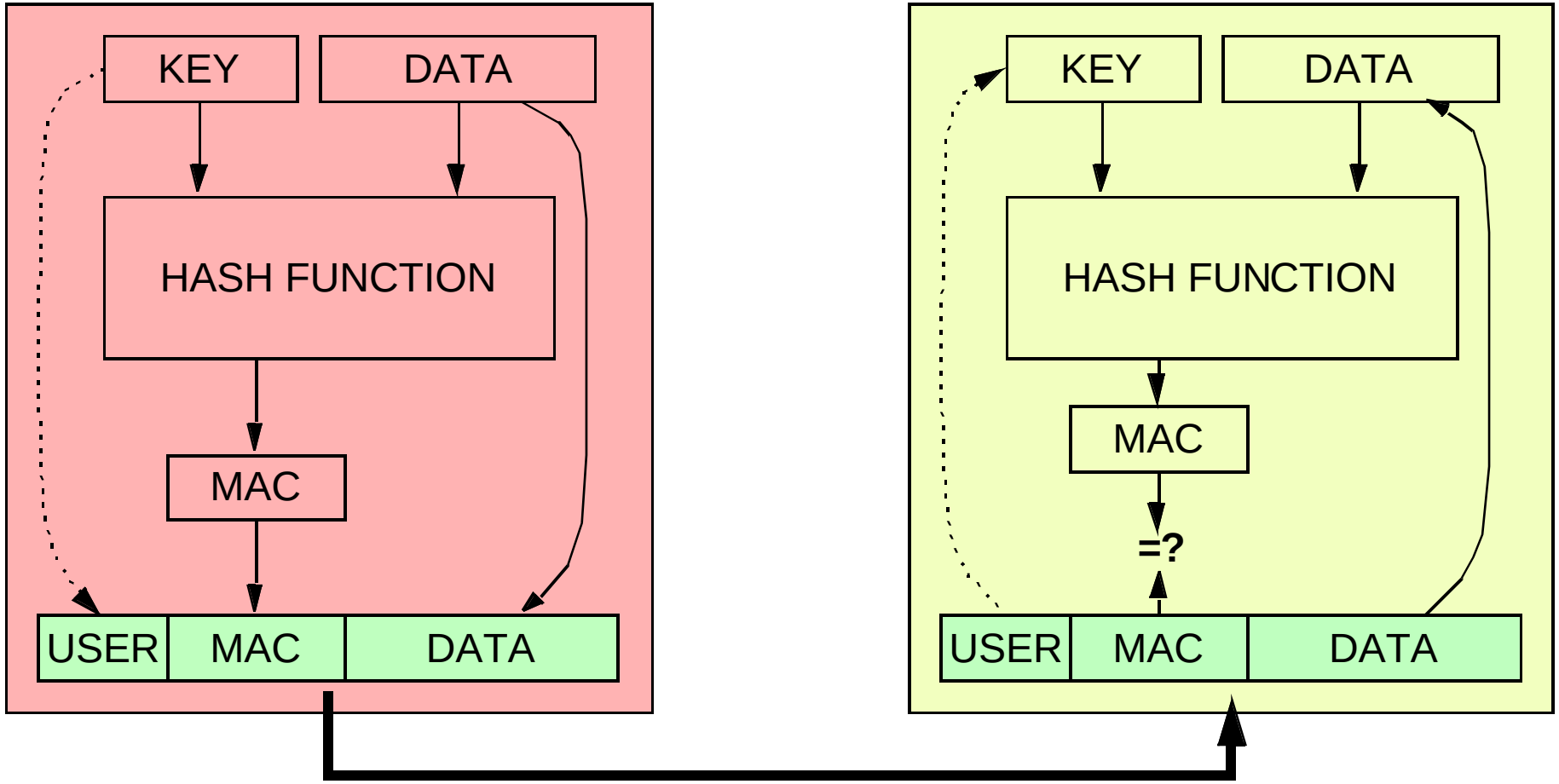
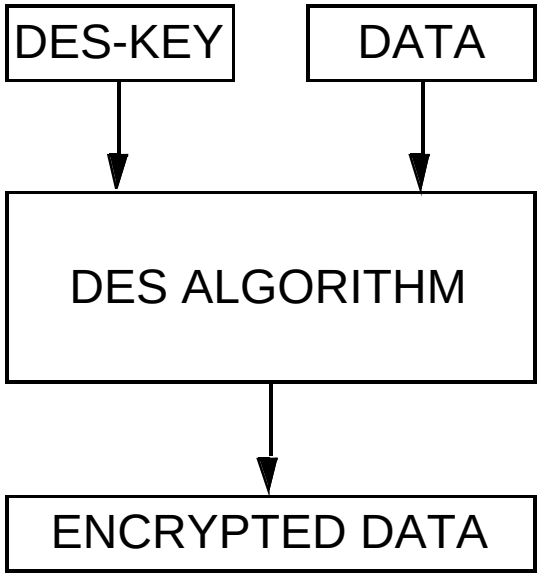
IDEA BEHIND AUTHENTICATION



IDEA BEHIND THE DATA CONFIDENTIALITY (DES)



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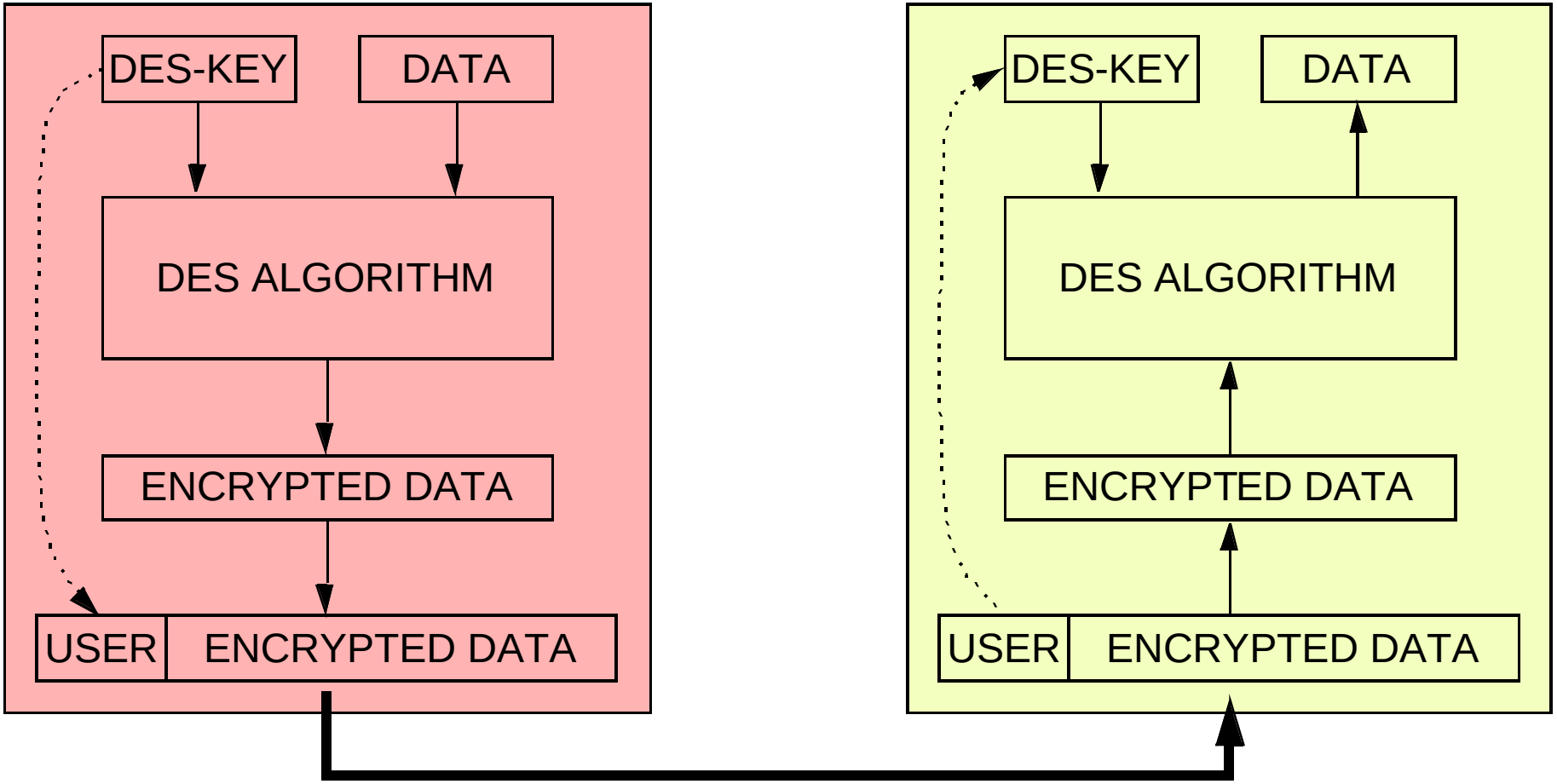
IDEA BEHIND ENCRYPTION



VIEW BASED ACCESS CONTROL MODEL

ACCESS CONTROL TABLE

MIB VIEWS

BY : ENG. Maha Jeha

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ACCESS CONTROL TABLES

MIB VIEW	ALLOWED OPERATIONS	ALLOWED MANAGERS	REQUIRED LEVEL OF SECURITY
Interface Table	SET	John	Authentication Encryption
Interface Table	GET / GETNEXT	John, Paul	Authentication
Systems Group	GET / GETNEXT	George	None
•••	•••	•••	•••
•••	•••	•••	•••
•••	•••	•••	•••
•••	•••	•••	•••

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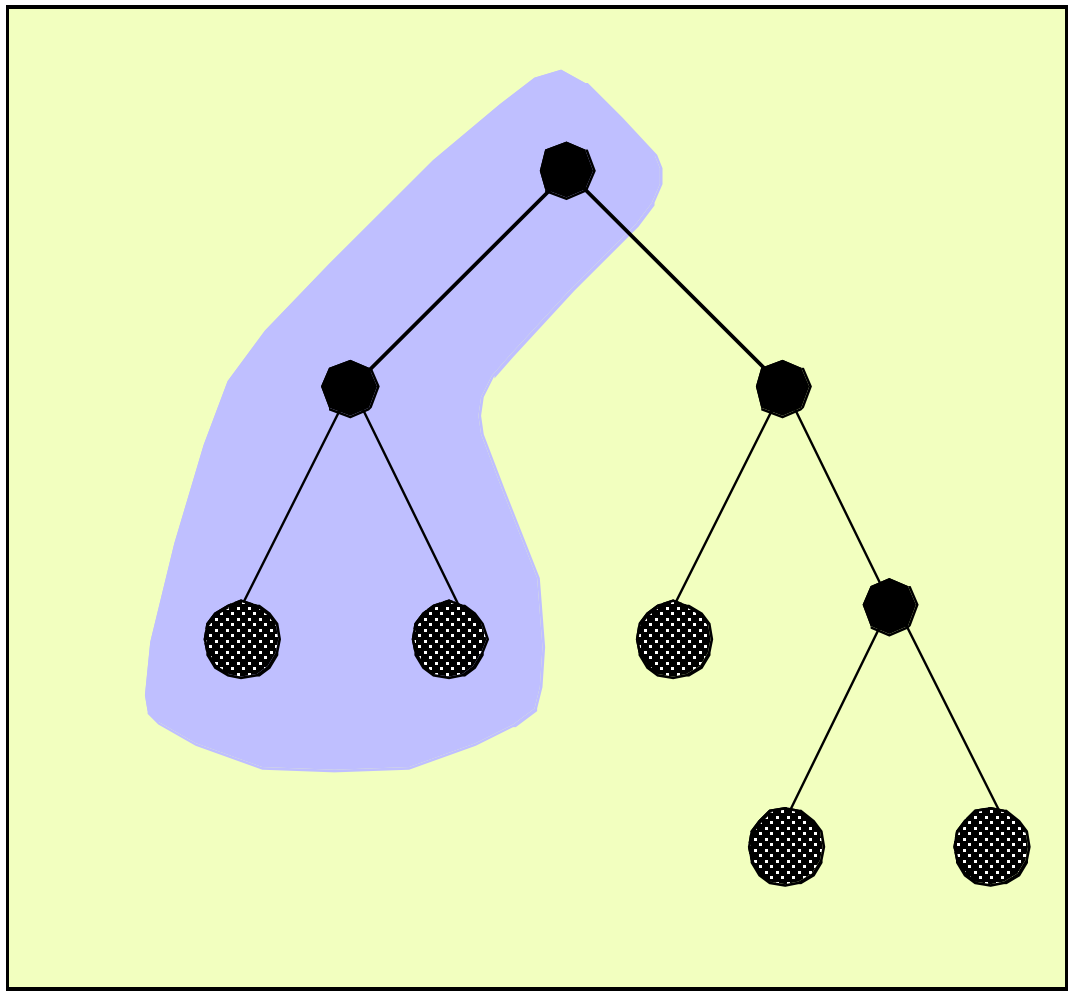
MIB VIEWS



SNMPv3 IMPLEMENTATIONS

ACE*COMM
AdventNet
BMC Software
Cisco
Epilogue
Gambit communications
Halcyon
IBM
ISI
IWL
MG-SOFT
MultiPort Corporation
SimpleSoft
SNMP Research

SNMP++
TU of Braunschweig
UCD
University of Quebec

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SNMPv3 RFCs