VoWifi

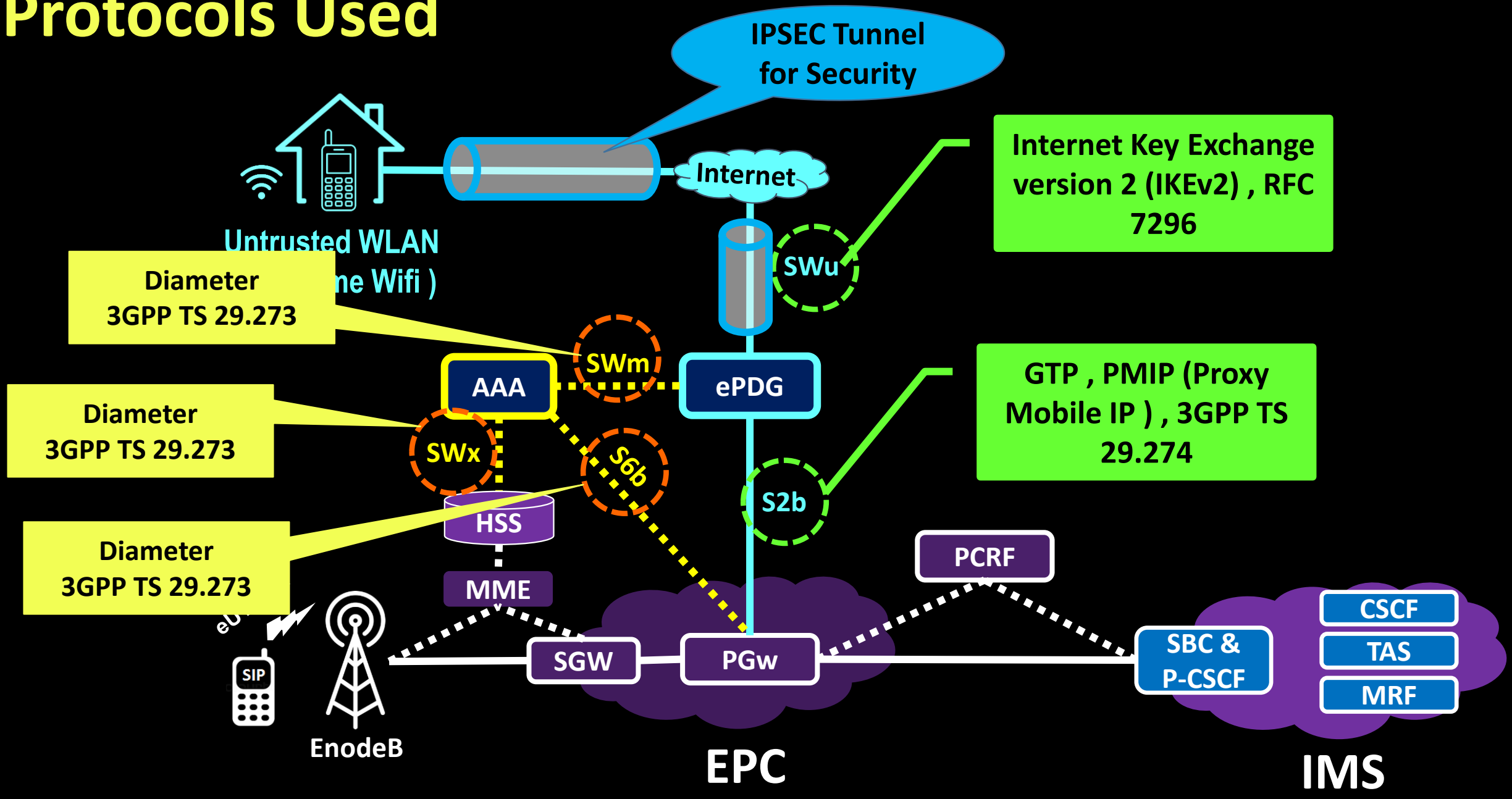
04

- Interfaces
- Links
- Protocols

VoWiFi Series

Wifi Calling Architecture

Protocols Used



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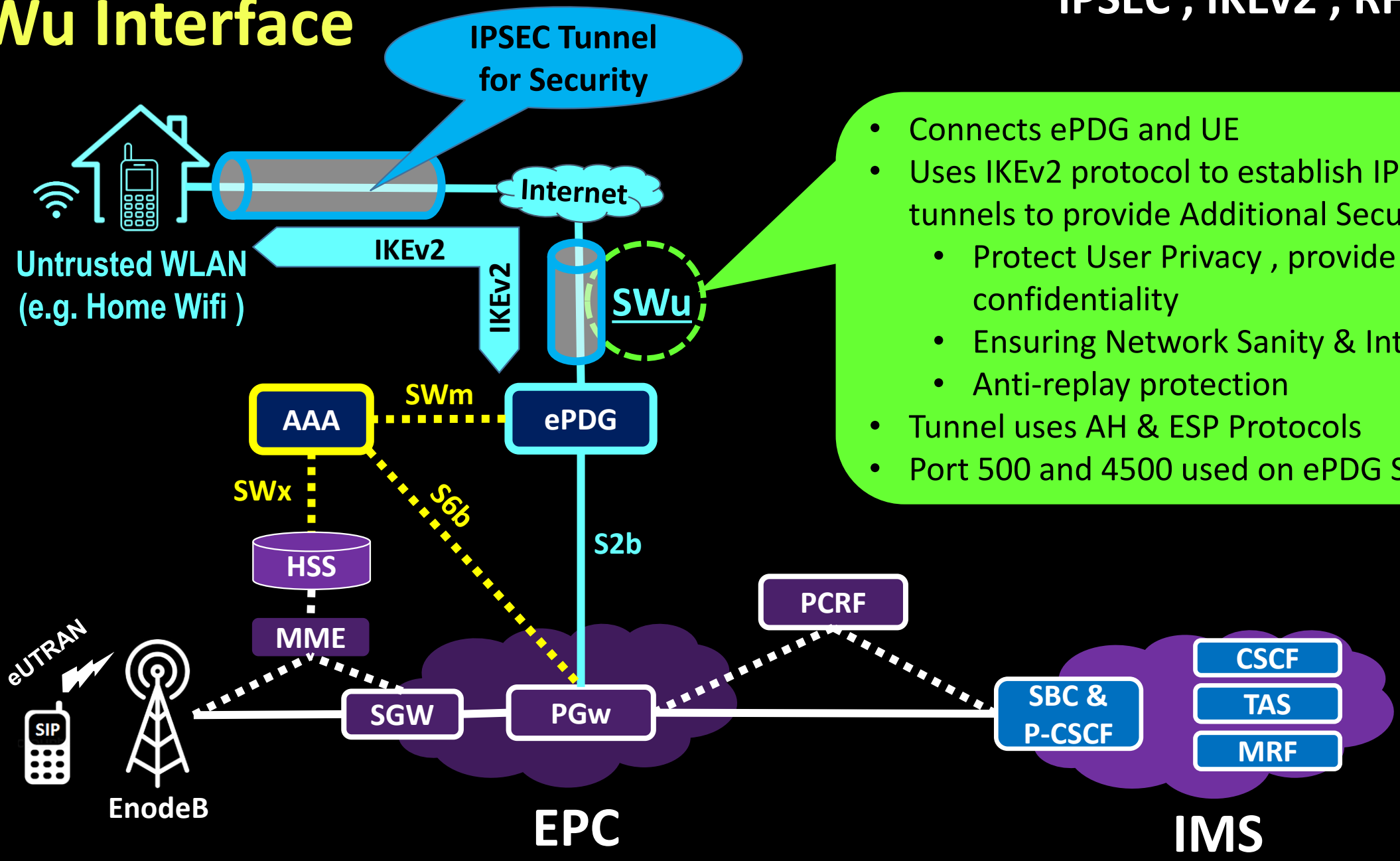
SWu Interface

IPSEC , IKEv2 , RFC 7296



- Connects ePDG and UE
- Uses IKEv2 protocol to establish IPSec tunnels to provide Additional Security for :-
  - Protect User Privacy , provide confidentiality
  - Ensuring Network Sanity & Integrity
  - Anti-replay protection
- Tunnel uses AH & ESP Protocols
- Port 500 and 4500 used on ePDG Side

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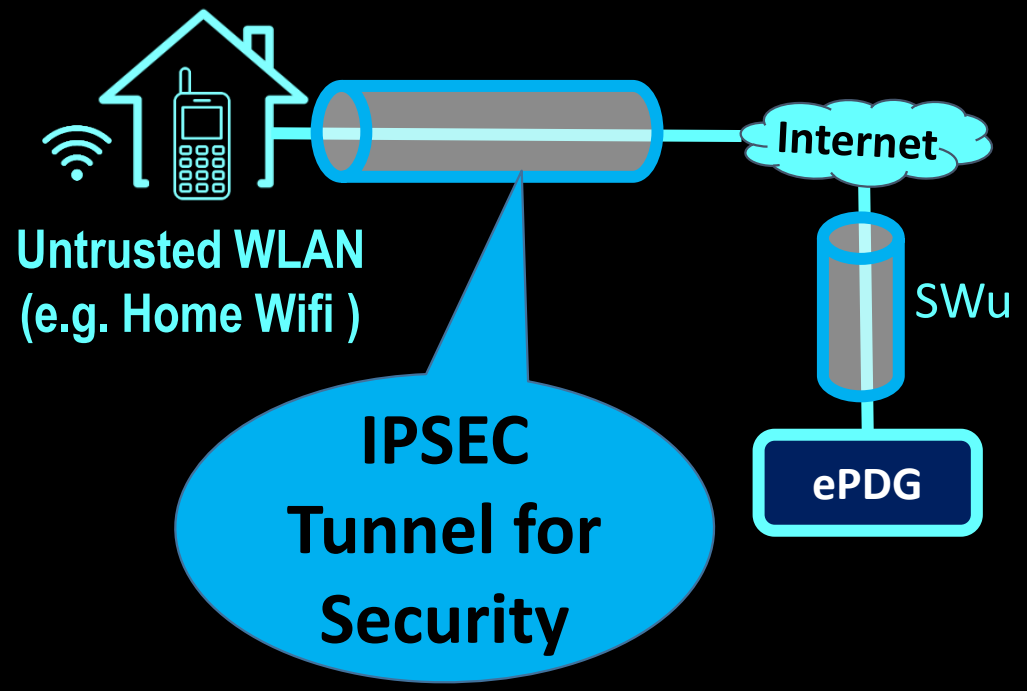
What is IP Sec ?



- ✓ Confidentiality
- ✓ Integrity
- ✓ Authentication
- ✓ Anti-replay

Authentication Header (AH)

- Data integrity
- Data origin authentication
- Replay protection

Encapsulating Security Payload (ESP)

- Encryption only
- Authentication only (Integrity , Origin authentication , Replay protection)
- Both Encryption and authentication

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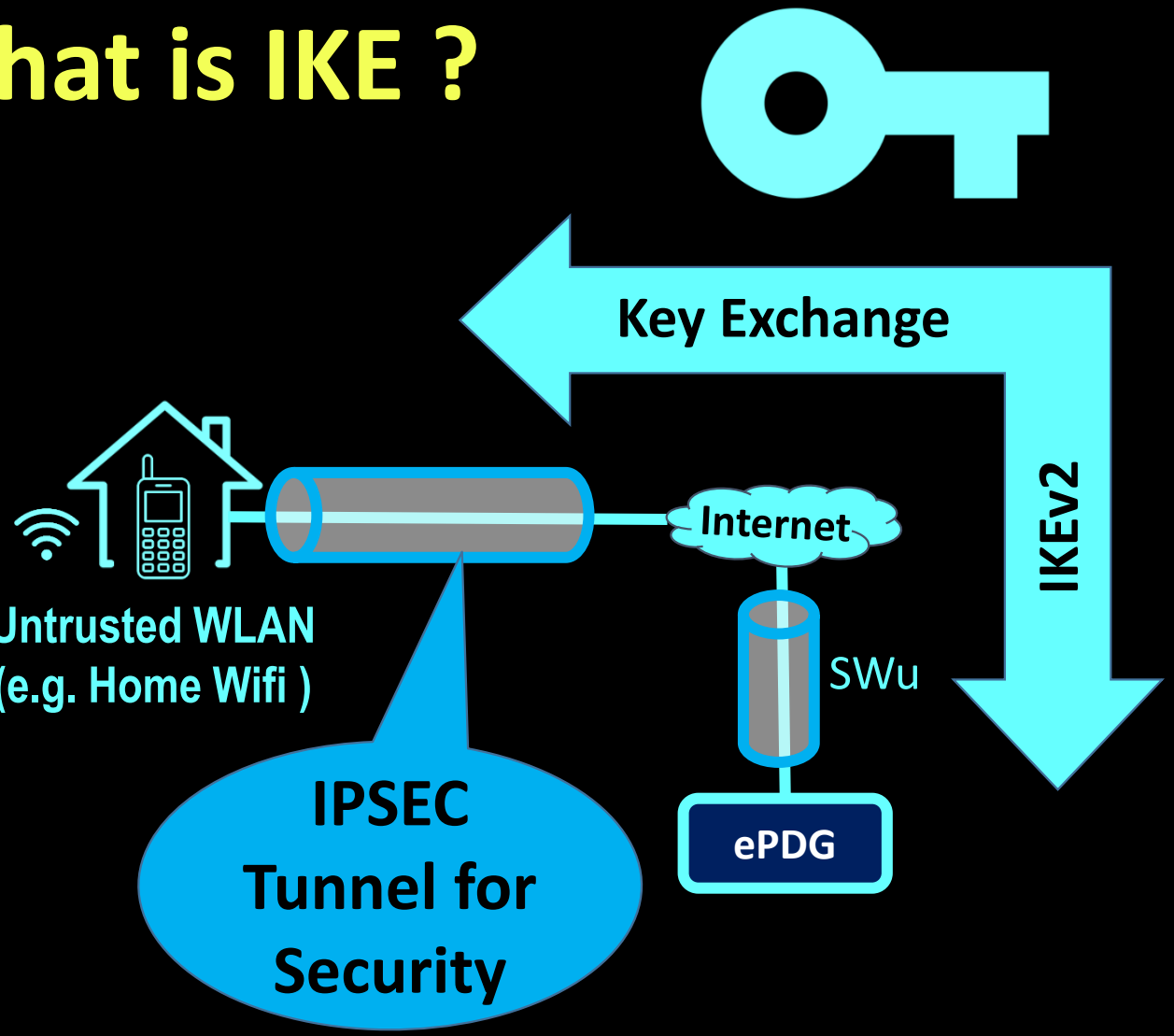
What is IKE ?



- Use of **Internet Key Exchange** (IKE) is
  - To generate the same symmetrical key independently for both Party
  - Key is used for encrypts and decrypts packets passing in tunnels
  - A Security Association (SA) is the outcome of an IKE negotiation
- IKE establish SA (security association) for either ESP or AH (IPSec)

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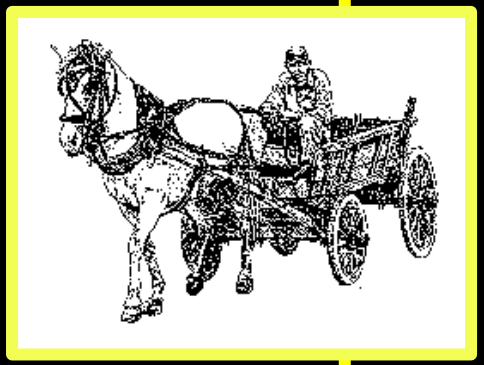
S2b Interface

GTP PMIP

3GPP TS 29.274

Bearer



VoLTE

SIP

Radio

QCI-5 , SIP

QCI-1 , Voice

QCI-2 , Video

S1

SGW

PGW

S5 / S8

QCI-5 , SIP

QCI-1 , Voice

QCI-2 , Video

VoWifi

SIP

Internet

IPSEC Tunnel

SIP , Voice , Video

SWu

ePDG

S2b

QCI-5 , SIP

QCI-1 , Voice

QCI-2 , Video

Untrusted WLAN

(e.g. Home Wifi)

Internet

SWu

ePDG

S5 , S8 , S2b are similar , All do Bearer Management with PGW

S2b

eUTRAN

SIP

EnodeB

MME

S5/S8

SGW

PGw

PCRF

SBC & P-CSCF

CSCF

TAS

MRF

EPC

IMS

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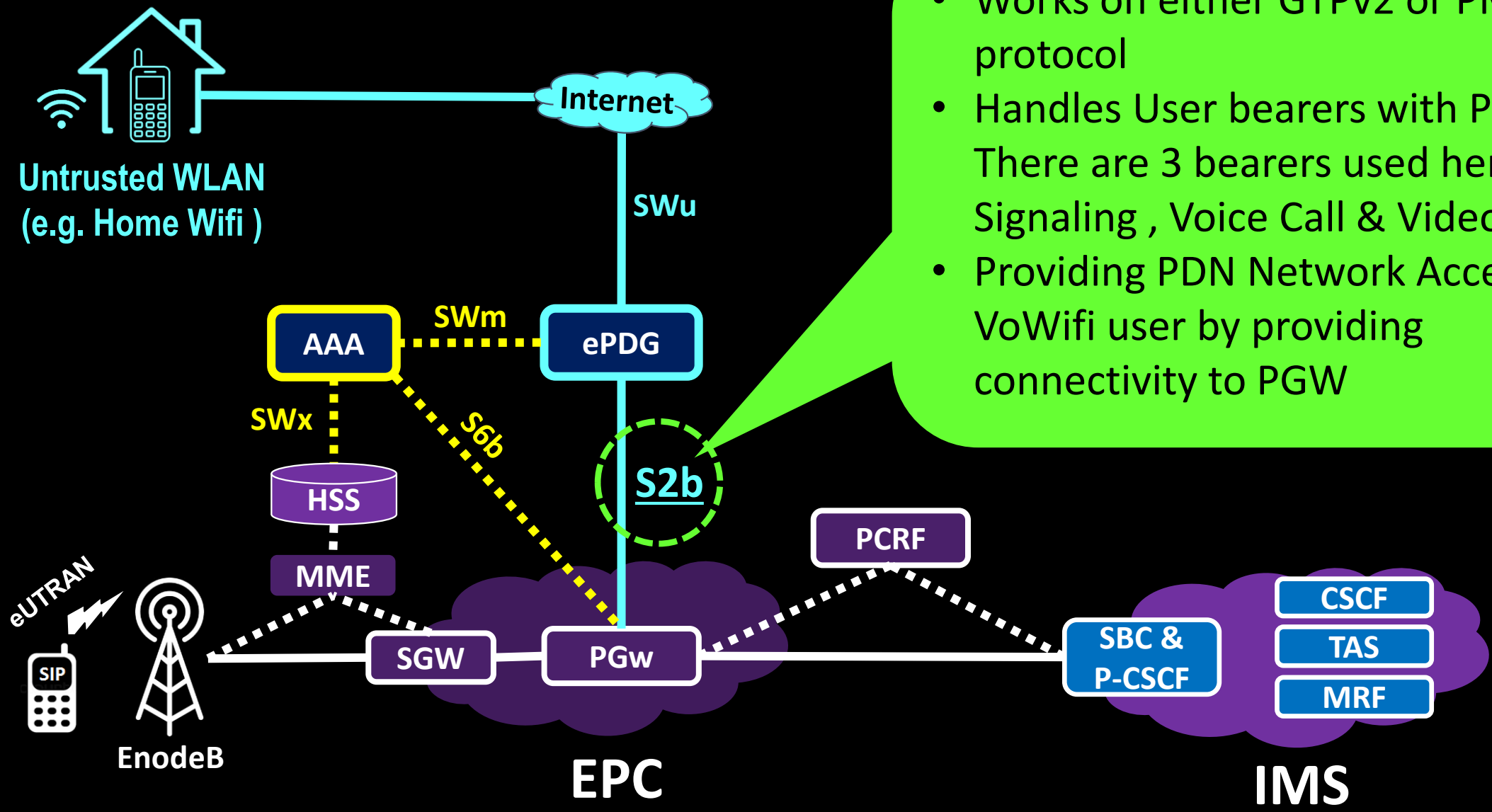
S2b Interface



- Works on either GTPv2 or PMIPv6 protocol
- Handles User bearers with PGW , There are 3 bearers used here .. SIP Signaling , Voice Call & Video Call
- Providing PDN Network Access for VoWifi user by providing connectivity to PGW

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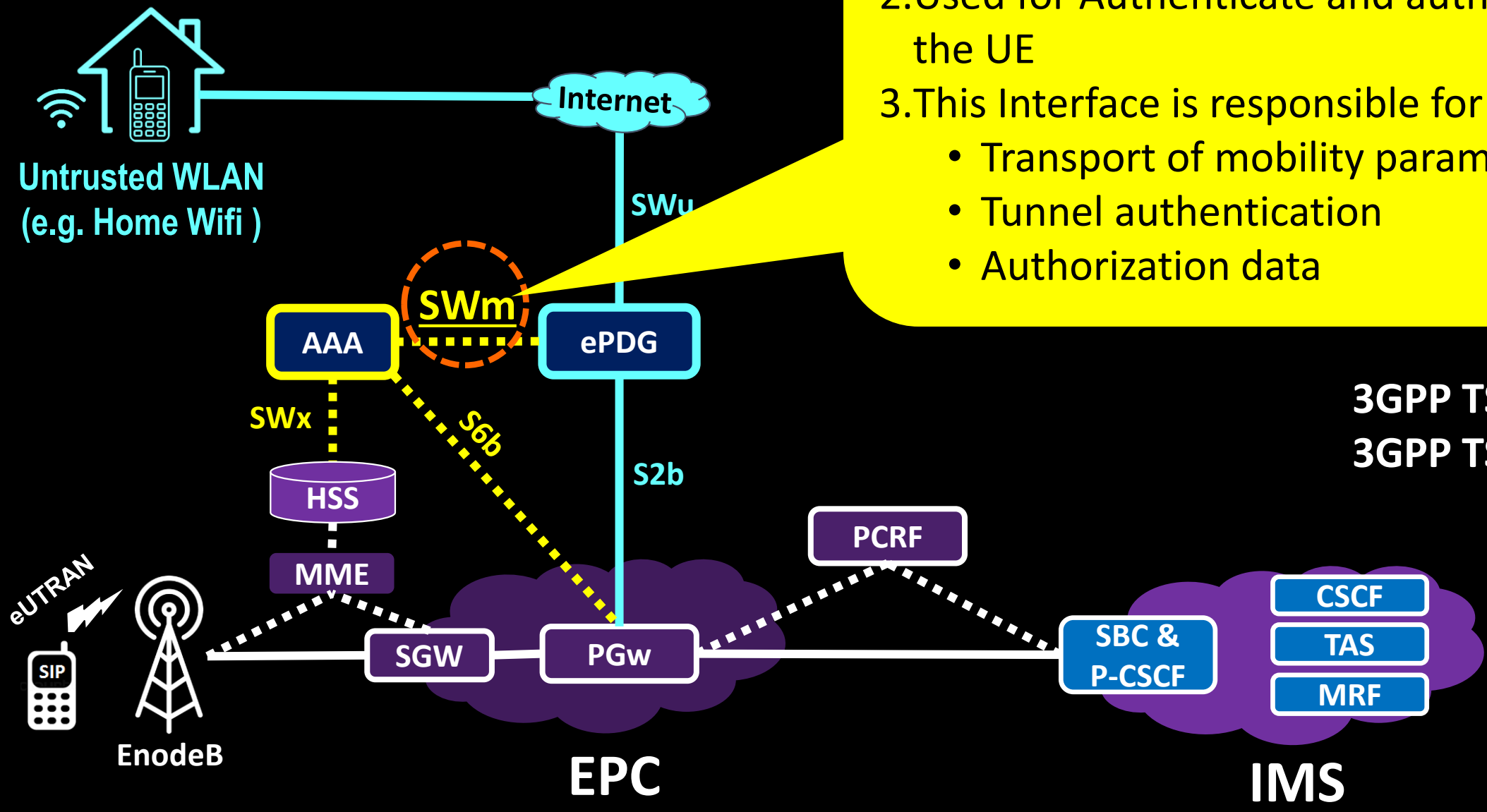
SWm Interface

Diameter



1. Connects ePDG to AAA
2. Used for Authenticate and authorize the UE
3. This Interface is responsible for
   - Transport of mobility parameters
   - Tunnel authentication
   - Authorization data

3GPP TS 29.273
3GPP TS 23.402

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SWm Interface
Diameter

3GPP TS 29.273
3GPP TS 23.402

- DEA / DEA : Diameter-EAP-Request
- AAR / AAA : Authorization-Authentication-Request
- ASR / ASA : Abort-Session-Request
- STR / STA : Session-Termination-Request
- RAR / RAA : Re-Auth-Request

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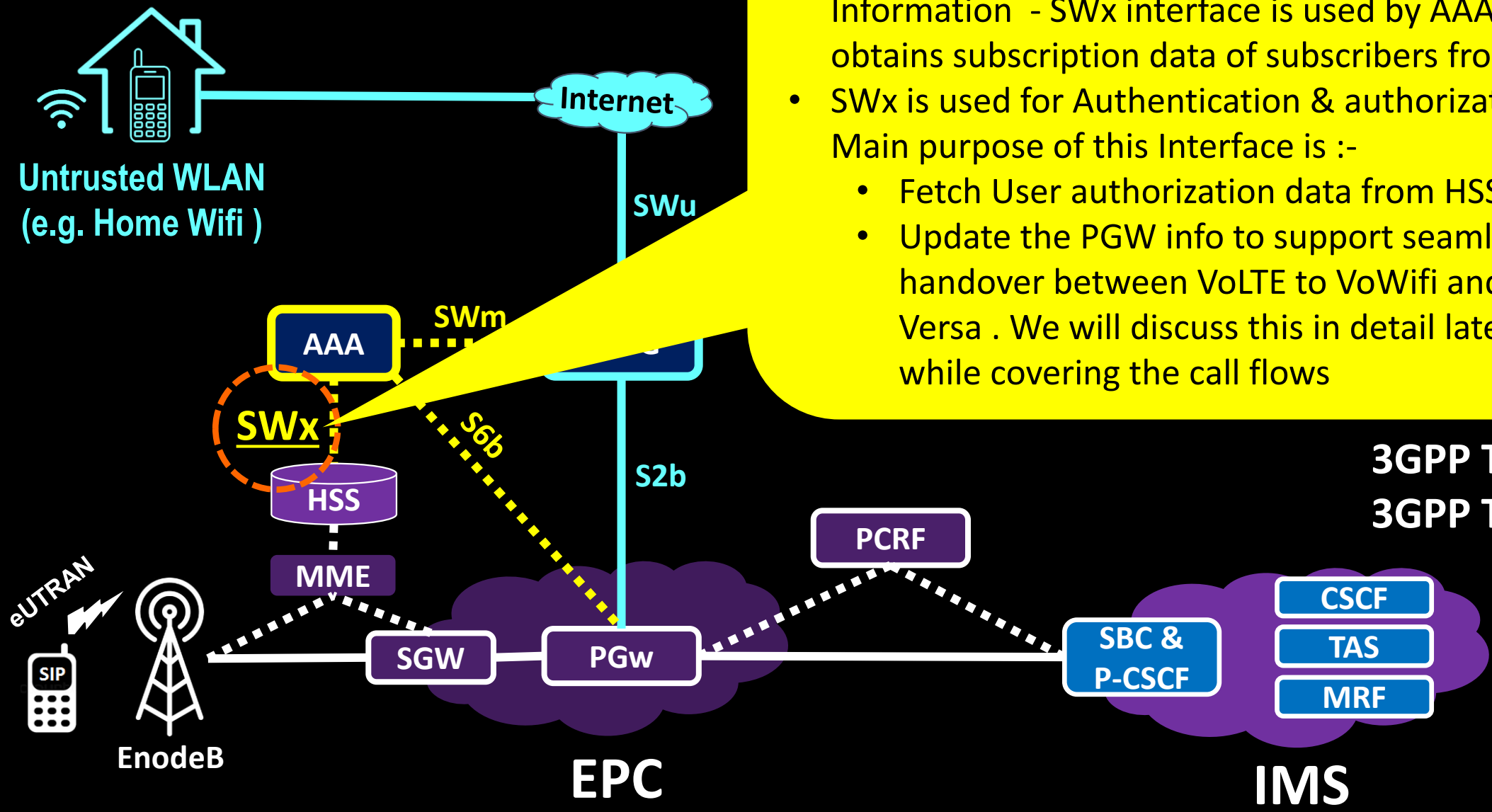
SWx Interface

Diameter



- Connect AAA to HSS
- HSS is repository and Database for all user Information - SWx interface is used by AAA to obtains subscription data of subscribers from HSS
- SWx is used for Authentication & authorization , Main purpose of this Interface is :-
  - Fetch User authorization data from HSS
  - Update the PGW info to support seamless handover between VoLTE to VoWifi and Vice Versa . We will discuss this in detail later on while covering the call flows

3GPP TS 29.273
3GPP TS 23.402

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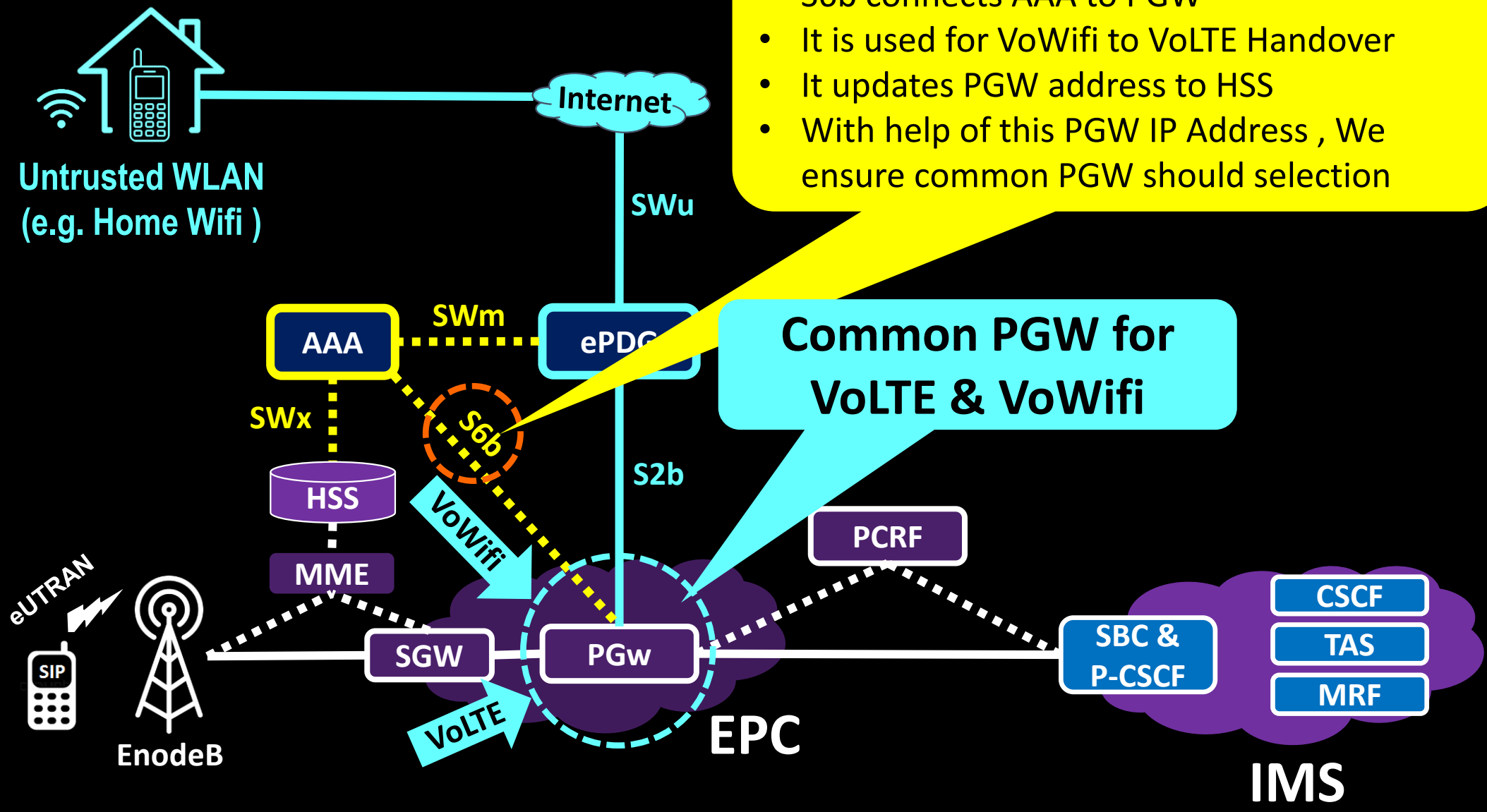
S6b Interface

Diameter

3GPP TS 29.273
3GPP TS 23.402

- S6b connects AAA to PGW
- It is used for VoWifi to VoLTE Handover
- It updates PGW address to HSS
- With help of this PGW IP Address , We ensure common PGW should selection



Common PGW for VoLTE & VoWifi

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Future Reading & References

- **RFC 7296**
  - Internet Key Exchange Protocol Version 2 (IKEv2)
  - Basics of SWu Interface

- **3GPP TS 29.274**
  - S2b interface by the ePDG to the PGW

- **3GPP TS 29.273**
  - 3GPP EPS AAA interfaces
  - AAA Links , Descriptions , Format & Usage

THANK YOU

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