

02

**VoWifi**



# Architecture



**Wifi Calling Framework**

# Contents

- **VoWiFi Architecture**
  - Framework & Overview
- **Various Options**
  - Untrusted
  - Trusted
  - IMS Direct Access
- **3GPP Vs Non-3GPP Access**
- **VoWifi Nodes overview**





# VoWifi Architecture

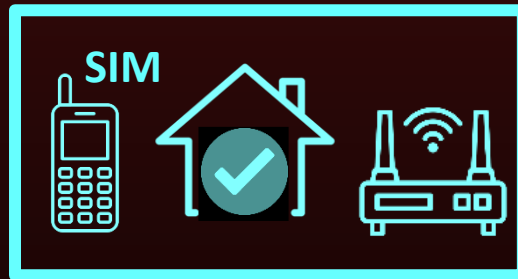
## SECTION

# 1

## Type of VoWifi Access

**A**

Untrusted WLAN  
Non-3GPP Access  
(e.g. Home AP )



**B**

Trusted WLAN  
Non-3GPP Access  
(e.g. Enterprise AP )

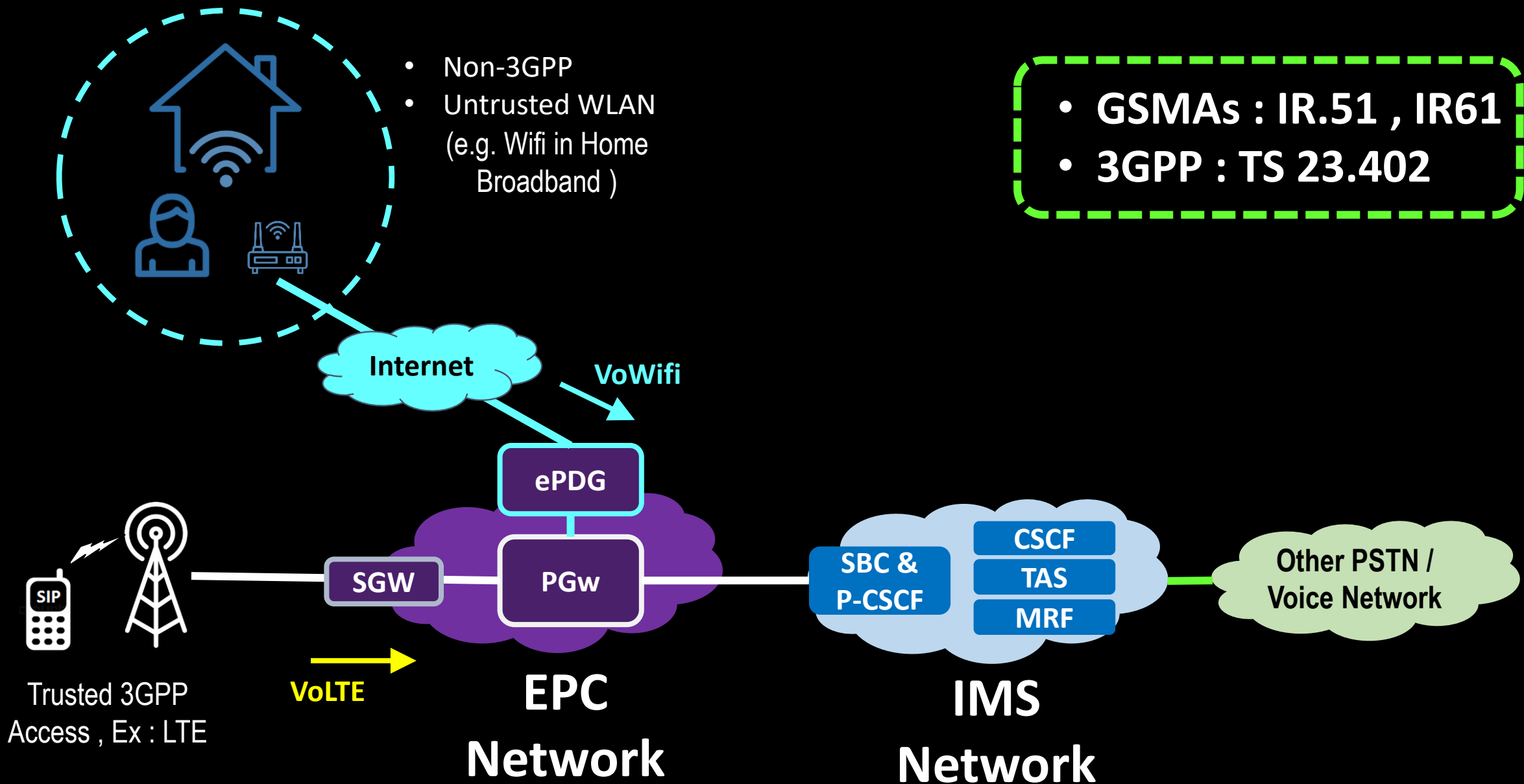


**C**

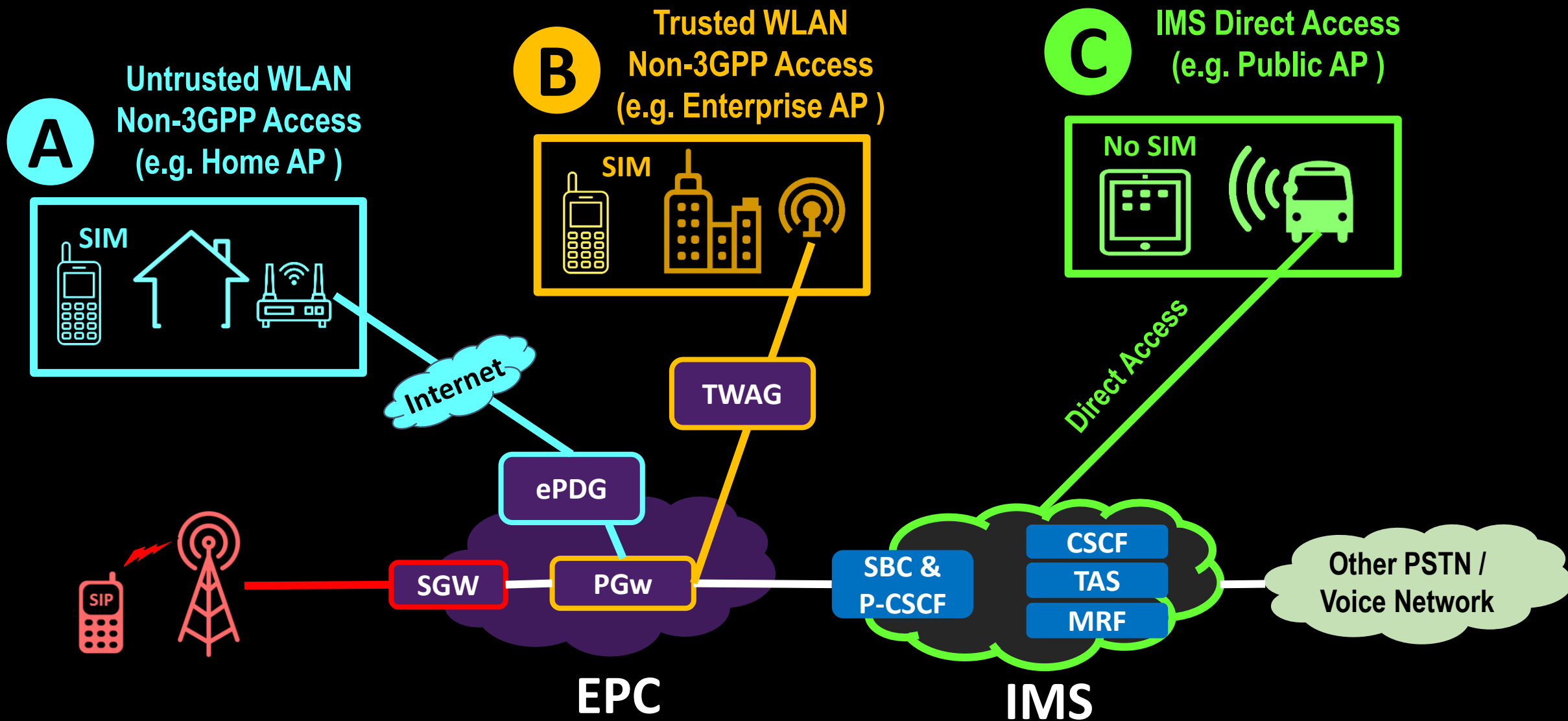
IMS Direct Access  
(e.g. Public AP )



# VoWiFi Architecture - Basics



# Overview of VoWifi Solution



# 3GPP Vs Non-3GPP Access



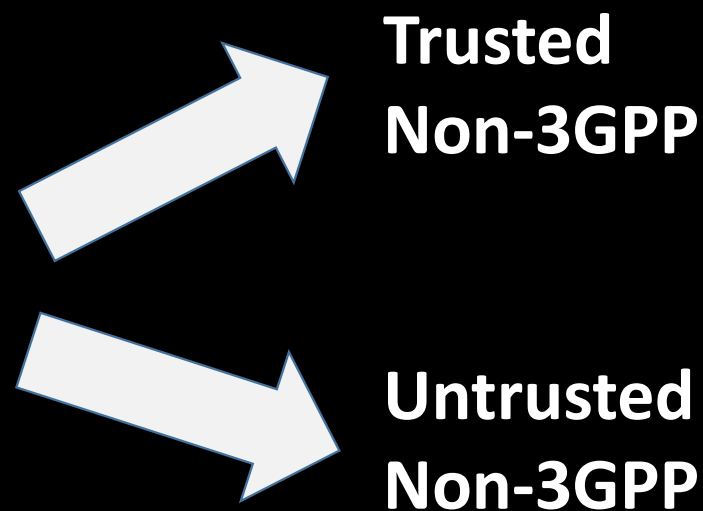
## 3GPP Access

- 4G : E-UTRAN (LTE and LTE-Advanced)
- 2G : GERAN (GSM / GPRS radio access network)
- 3G : UTRAN (UMTS-based WCDMA and HSPA radio access network)



## Non-3GPP Access

- Fixed networks
- WiMAX
- CDMA2000
- WLAN
- etc ..



# Non-3GPP : Trusted Vs Untrusted Access

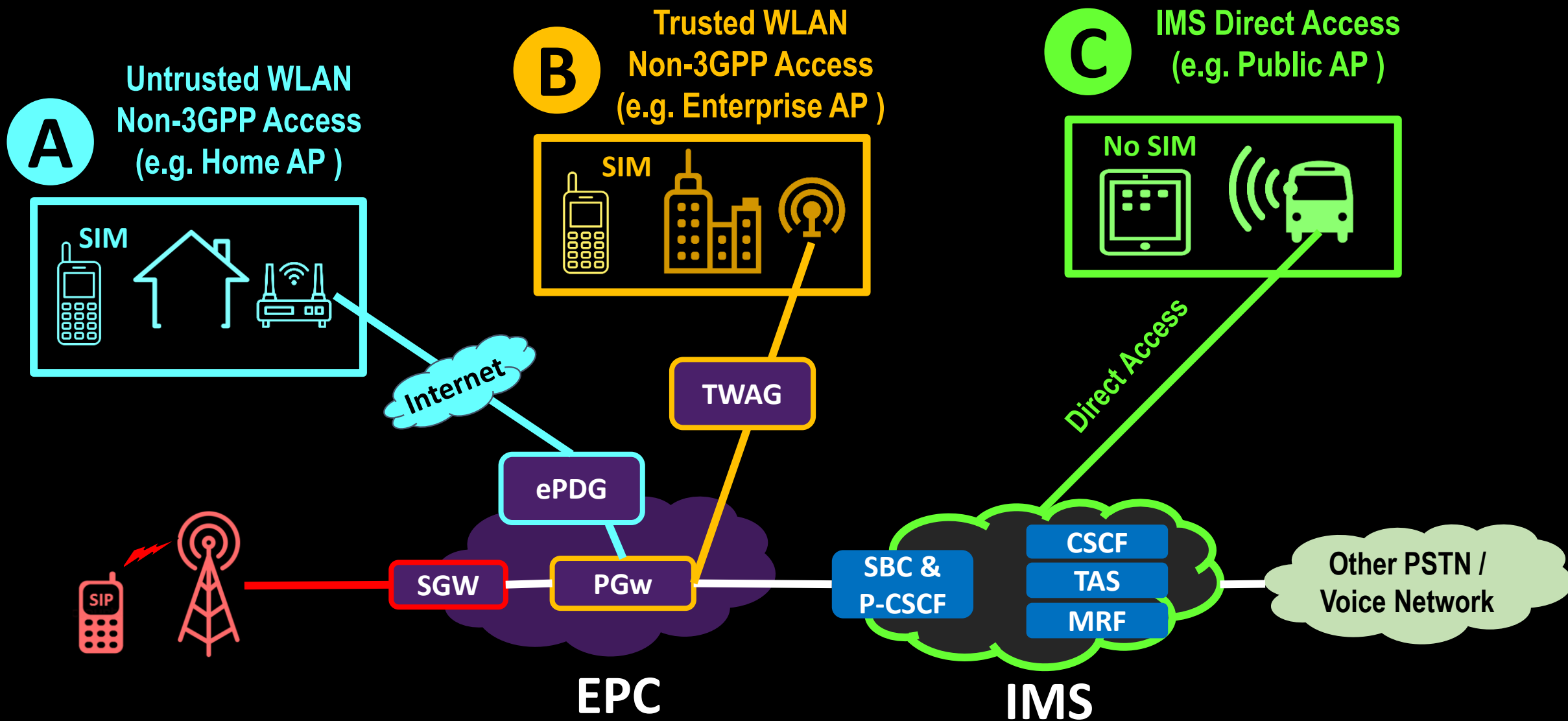


## Non-3GPP Access

- Fixed networks
- WiMAX
- CDMA2000
- WLAN
- etc ..



# Type of Non-3GPP Access





# Selection Criteria



**A** Untrusted WLAN  
Non-3GPP Access  
(e.g. Home AP )



**B** Trusted WLAN  
Non-3GPP Access  
(e.g. Enterprise AP )

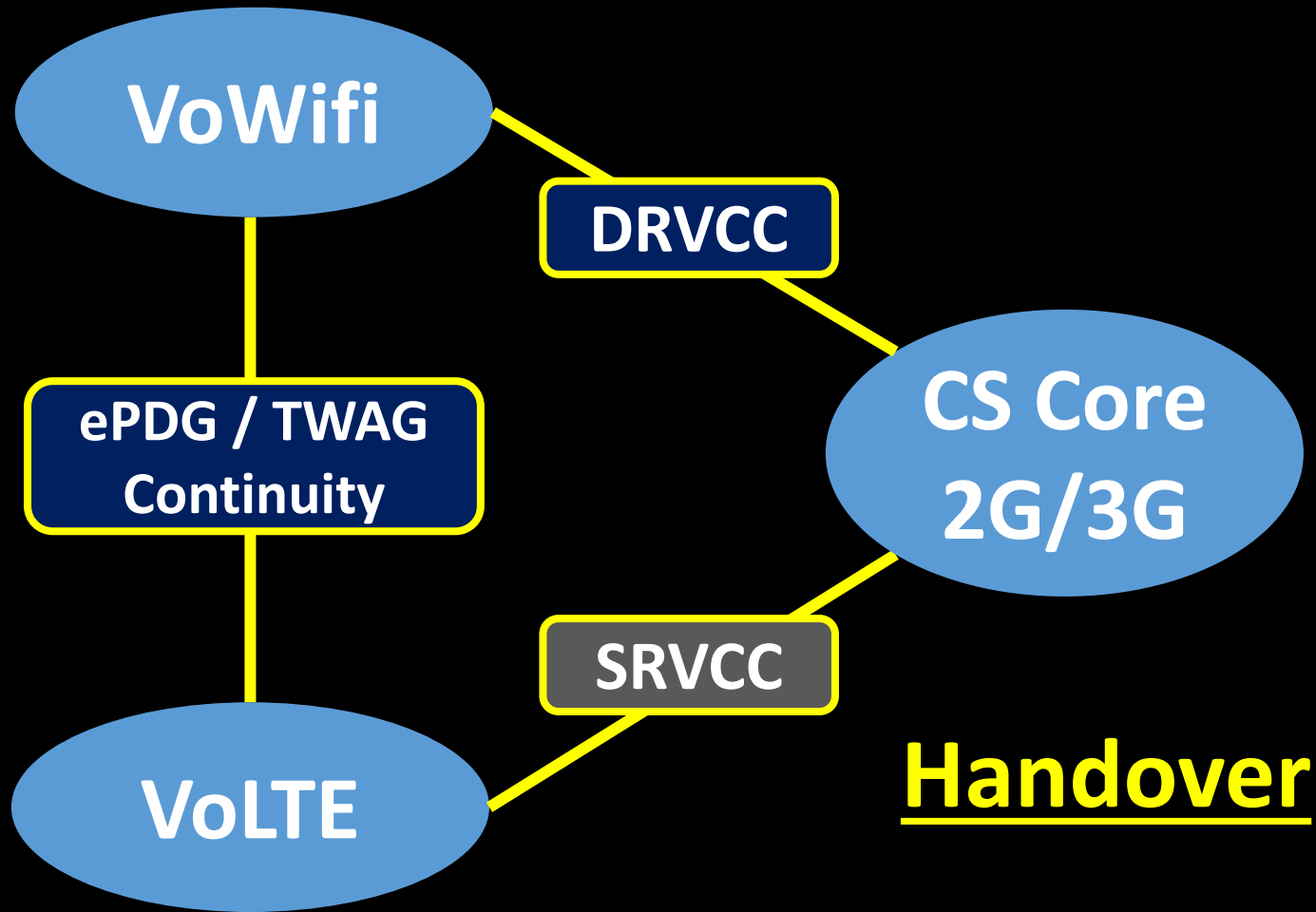


**C** IMS Direct Access  
(e.g. Public AP )



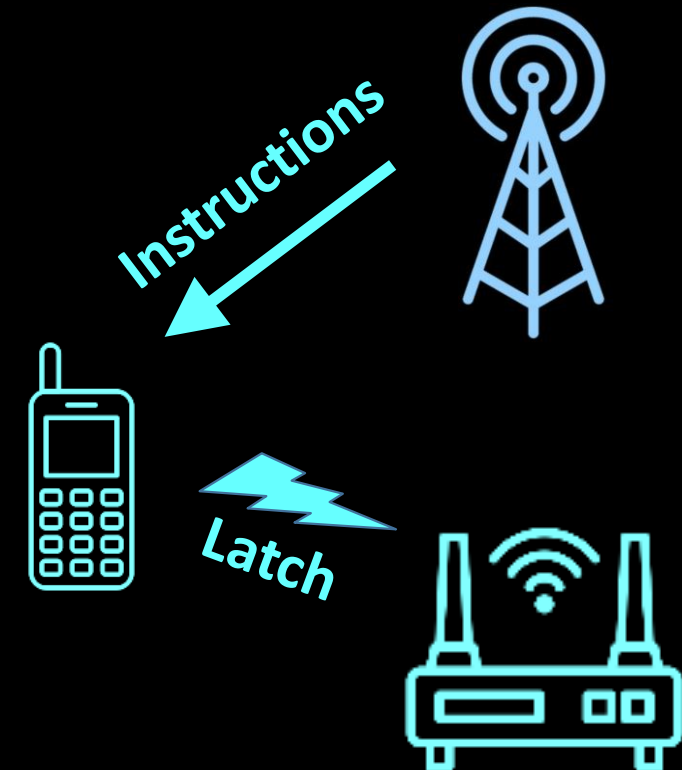
Which one should be used ?

# Other Aspects of VoWifi



## ANDSF

Access Network  
Detection and  
Selection Function



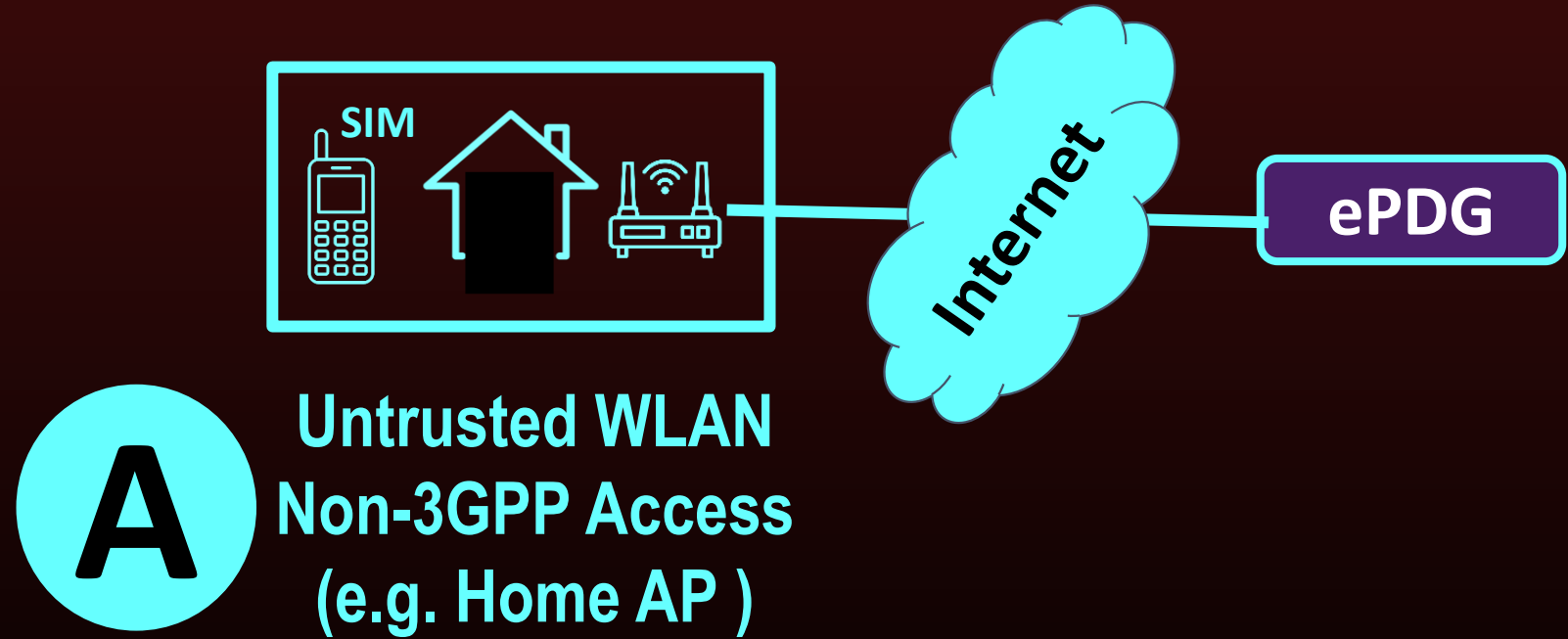


# SECTION

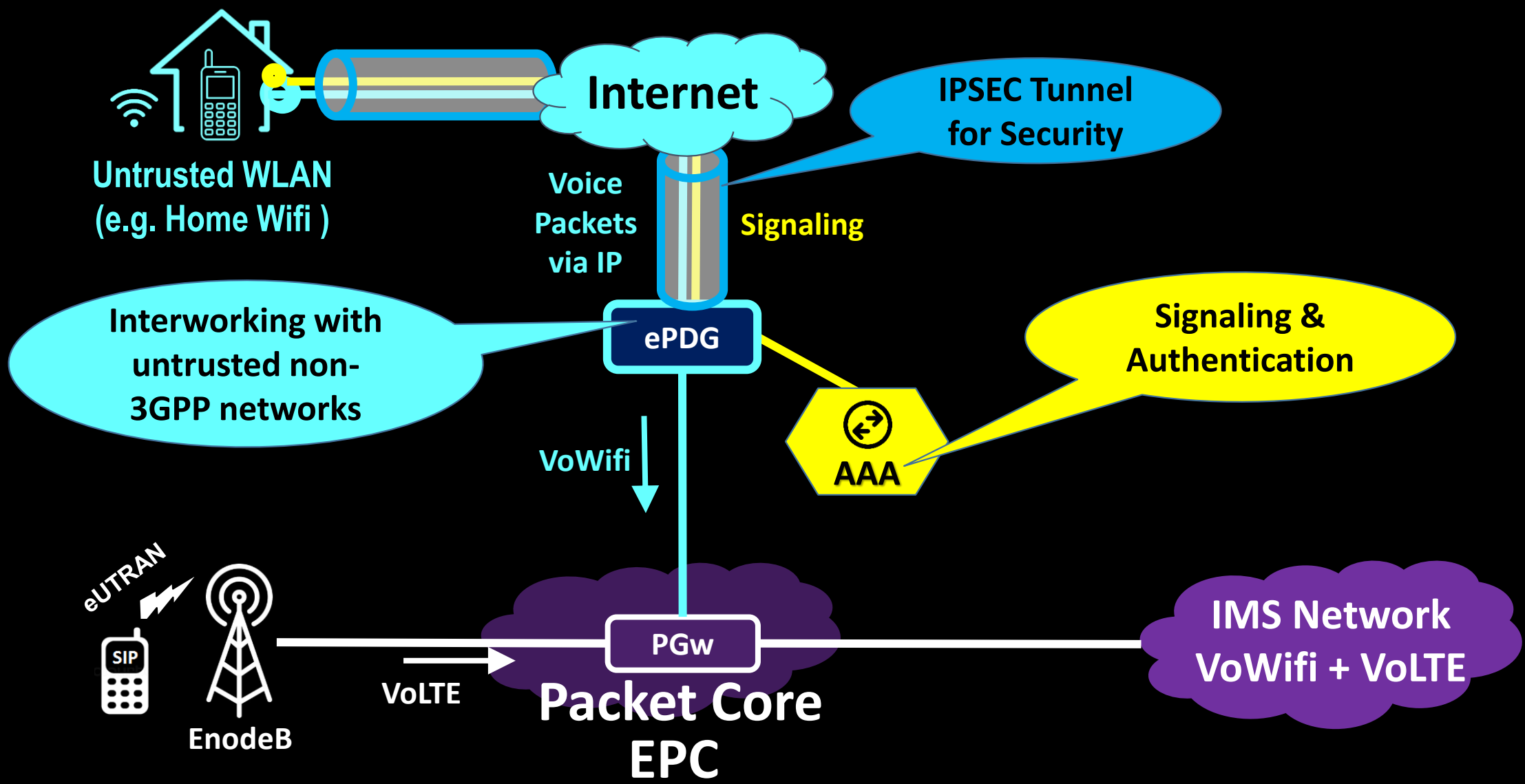
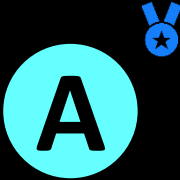
# 2

## Untrusted WLAN Access

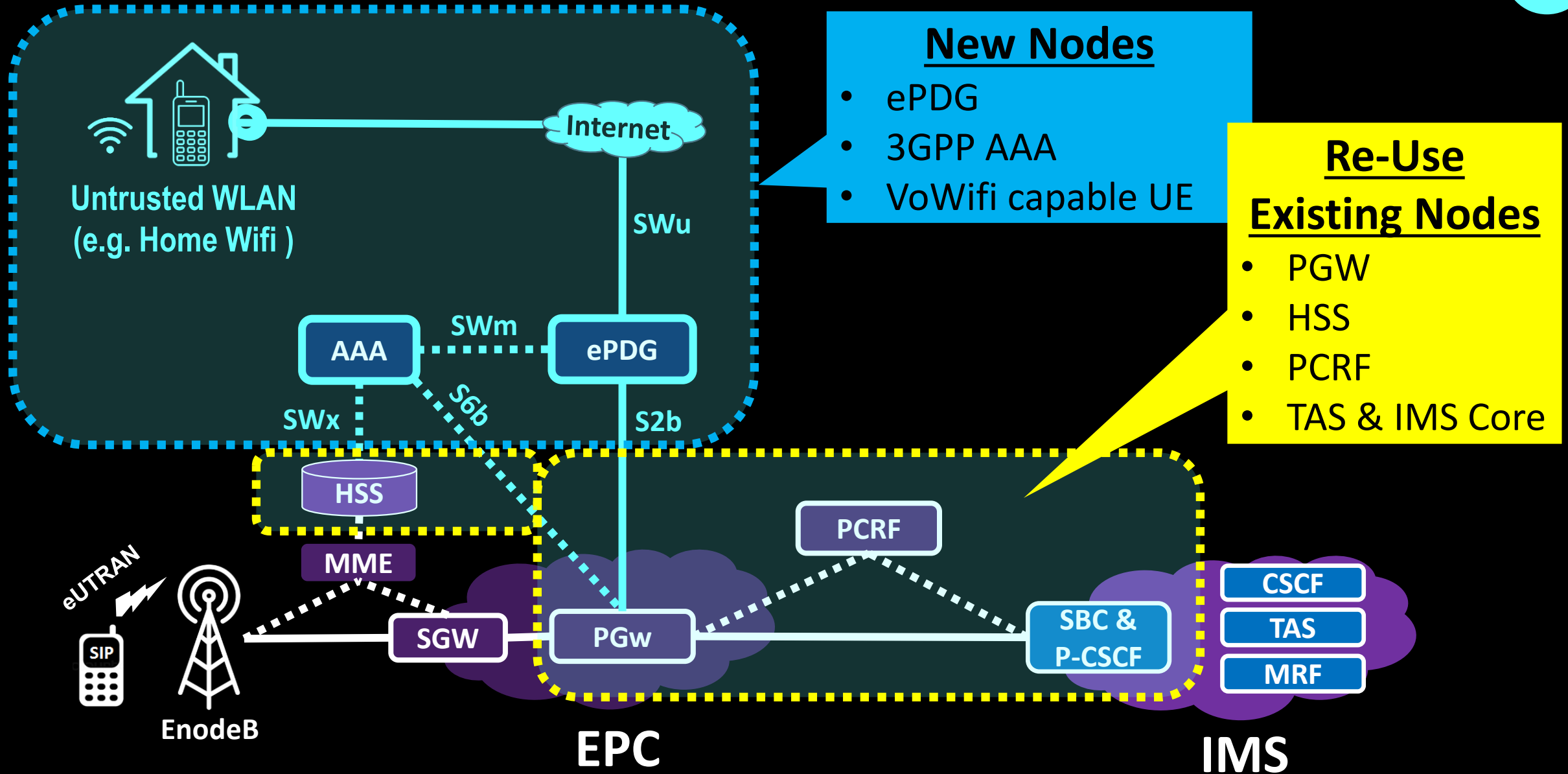
# Untrusted WLAN Access



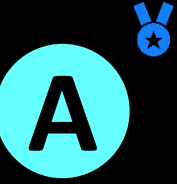
# VoWiFi Architecture – Untrusted WLAN



# VoWiFi Architecture – Untrusted WLAN



# Technology in Play – Untrusted WLAN



## Wifi selection

- Handset / Operator Controlled  
- ANDSF , Hotspot 2.0



## Authentication

- SIM Card based Authentication  
- EAP AKA , EAP Based



## Quality of Service

- Prone to Congestion
- No End to End QOS on Internet



## Security

- IPSEC tunnel between User and ePDG



## Handovers of VoWifi

- With VoLTE
- With 3G PS using DRVCC



# SECTION

# 3

# Trusted WLAN

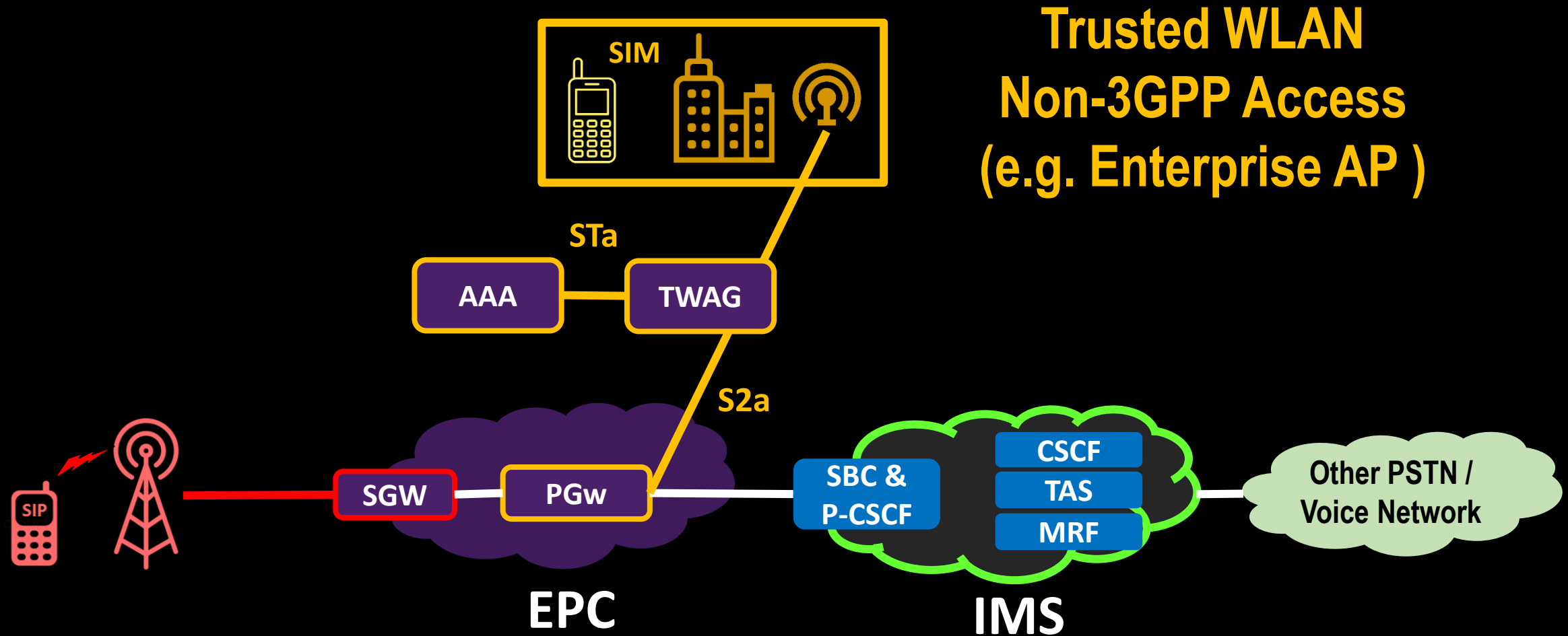
# Trusted WLAN



**B**

Trusted WLAN  
Non-3GPP Access  
(e.g. Enterprise AP )

# Trusted WLAN Access - The TWAG

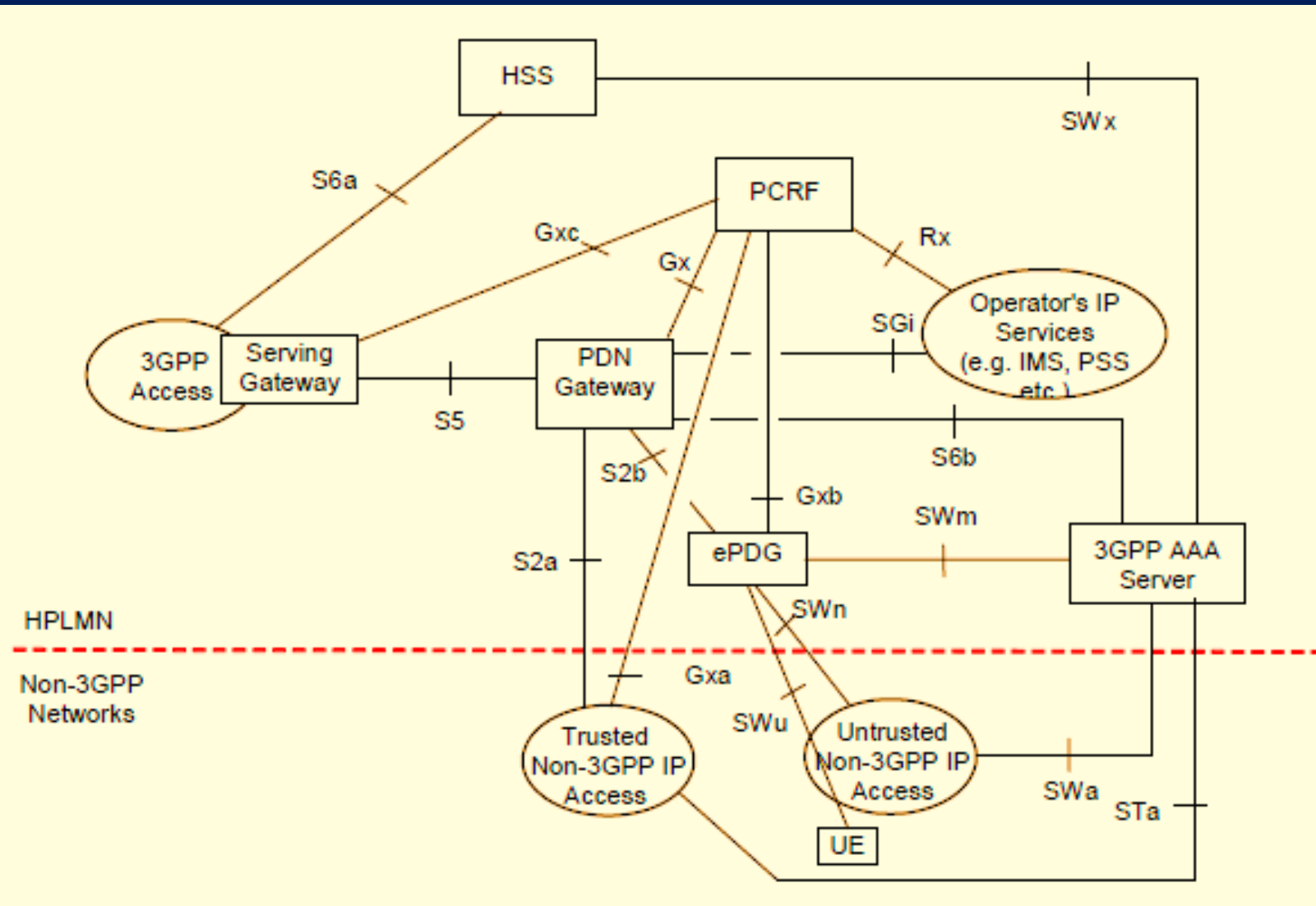






# Summary

# 3GPP TS 23.402





# Re-Cap

## VoWiFi Architecture - Basics

- VoWifi is all about accessing IMS infrastructure from Any type of Wifi ..  
Unlicensed, untrusted and trusted Wifi networks
- VoWifi is covered under GSMA IR.51 , IR.61 & 3GPP's TS 23.402
- VoWifi technology is now available on all Leading Operators
- VoWi-Fi is a complementary technology to VoLTE and utilizes IMS as parent Technology
- There is deep integration between 4G VoLTE & VoWifi where calls are seamlessly handed over between LTE and Wi-Fi and vice versa



# Re-Cap

## 3GPP Vs Non-3GPP Access

- 3GPP Access supports existing 3GPP radio access networks which are defined as part of 3GPP specifications , This includes
  - E-UTRAN (LTE and LTE-Advanced)
  - GERAN (GSM / GPRS radio access network)
  - UTRAN (UMTS-based WCDMA and HSPA radio access network)
- The EPC Network also permits the interconnection of non-3GPP technologies between the UE and the EPC Core
- Non-3GPP Access includes technologies such as Fixed networks, WiMAX, cdma2000 , WLAN, etc..
- Non-3GPP accesses can be classified into two categories: Trusted accesses and Untrusted accesses



# Re-Cap

## Untrusted WLAN

- No trust of Operator in Wifi Network and Its - Access Path
- Operator has no control over Wifi , for example , public hotspots
- The VoWifi Access from Home Broadband or DSL is classic example
- Traffic goes from UE to Internet & then it reaches Mobile Operator Network
- Network would require UE to go through an additional authentication and security process
- A special IP tunneling mechanism example IPSec for making it secure
- The service is offered to SIM based mobiles & Tabs where Complete Authentication is done for users



# Re-Cap

## Key elements for VoWifi Service

### New Nodes

- ePDG
- 3GPP AAA
- VoWifi & IPSEC capable UE

### Re-Use Existing Nodes

- PGW with s2b Support
- HSS with SWx Support
- Re-use existing PCRF with VoWifi Support ( NPLI etc.. )
- IMS Core infrastructure with support for Wifi Access type
- TAS with support for Wifi Access type



# Re-Cap

## Trusted WLAN

- Trusted WLAN Wifi is managed or Controlled directly by the operator
- Classical Example is Corporate Operator Deployed Hotspots in Markets , Airports and Shopping Malls
- Uses 802.1x & EAP authentication method
- The UE is connected via TWAG (Trusted Wireless Access Gateway) in the Wi-Fi core
- TWAG is then connected directly to the P-GW (Packet Gateway) in the Evolved Packet Core (EPC) via GTP
- Here communication is happening using IMSI of user , therefor this technique is Typically offered only to SIM based users, However there are other ways of Authentication used by few Operators as well



# Future Reading & References

## - 3GPP TS 23.402

- Architecture enhancements for non-3GPP accesses
- Covers Complete Architecture in Detail , important Document for enhancing knowledge on VoWifi

## - 3GPP TS 33.402

- 3GPP System Architecture Evolution (SAE); Security aspects of non-3GPP accesses
- Covers Security & Authentication related Call Flows



  
**THANK**  
**YOU**

**SUBSCRIBE**  


**LIKE**  


**SHARE**  


**COMMENT**  




**Vikas Shokeen**

**Get PPT Now**



**[www.TelecomTutorial.info](http://www.TelecomTutorial.info)**