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# Evolution of Private 5G Network Standards

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BRKSPG-1003

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# Introduction



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Technical Leader

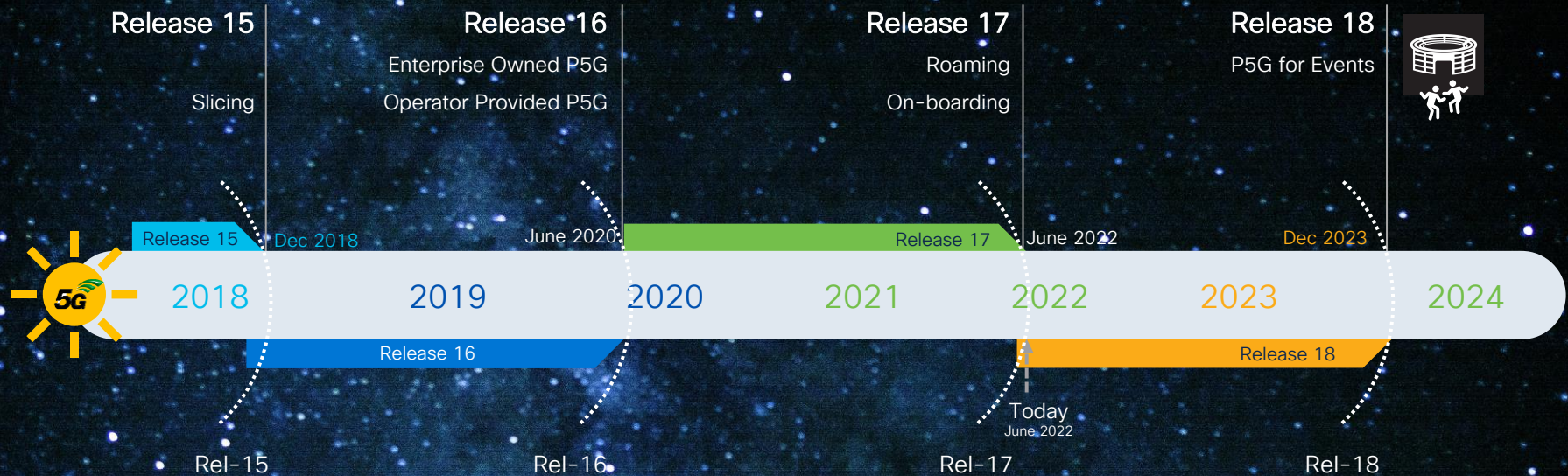
[vimsriva@cisco.com](mailto:vimsriva@cisco.com)  
[www.linkedin.com/in/vimalsrivastava](https://www.linkedin.com/in/vimalsrivastava)



# Agenda

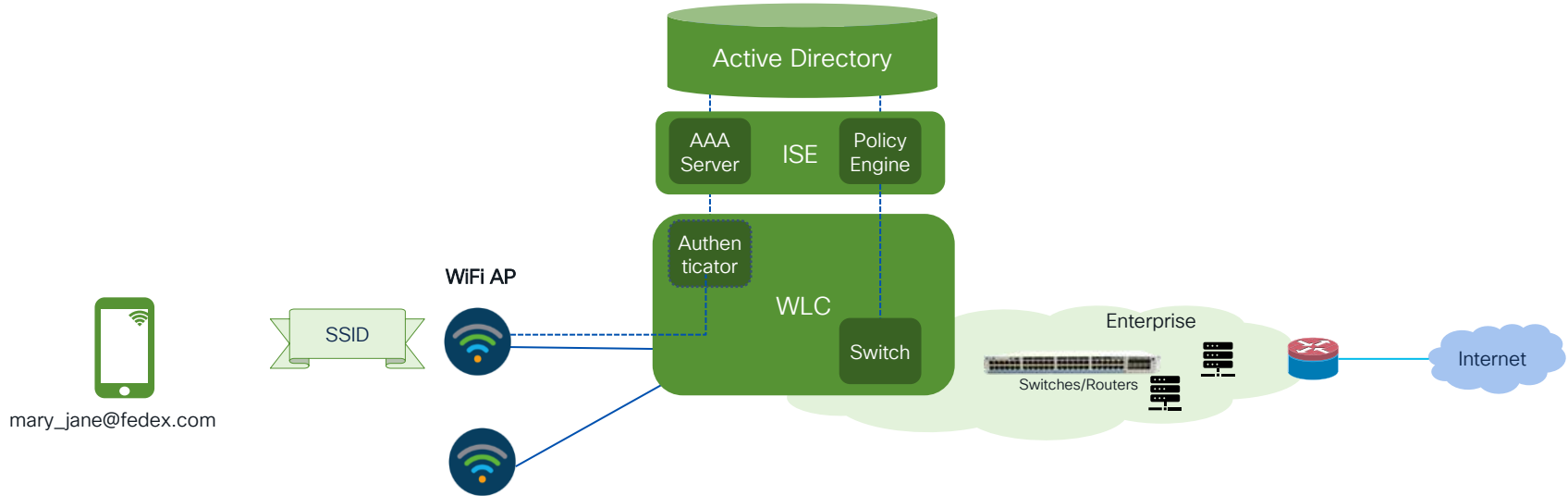
- 3GPP Releases for Private 5G Networks
  - Release-16
  - Release-17
    - Roaming
    - Onboarding
  - Release-18
  - Conclusions

# 3GPP Private 5G Standards Evolution



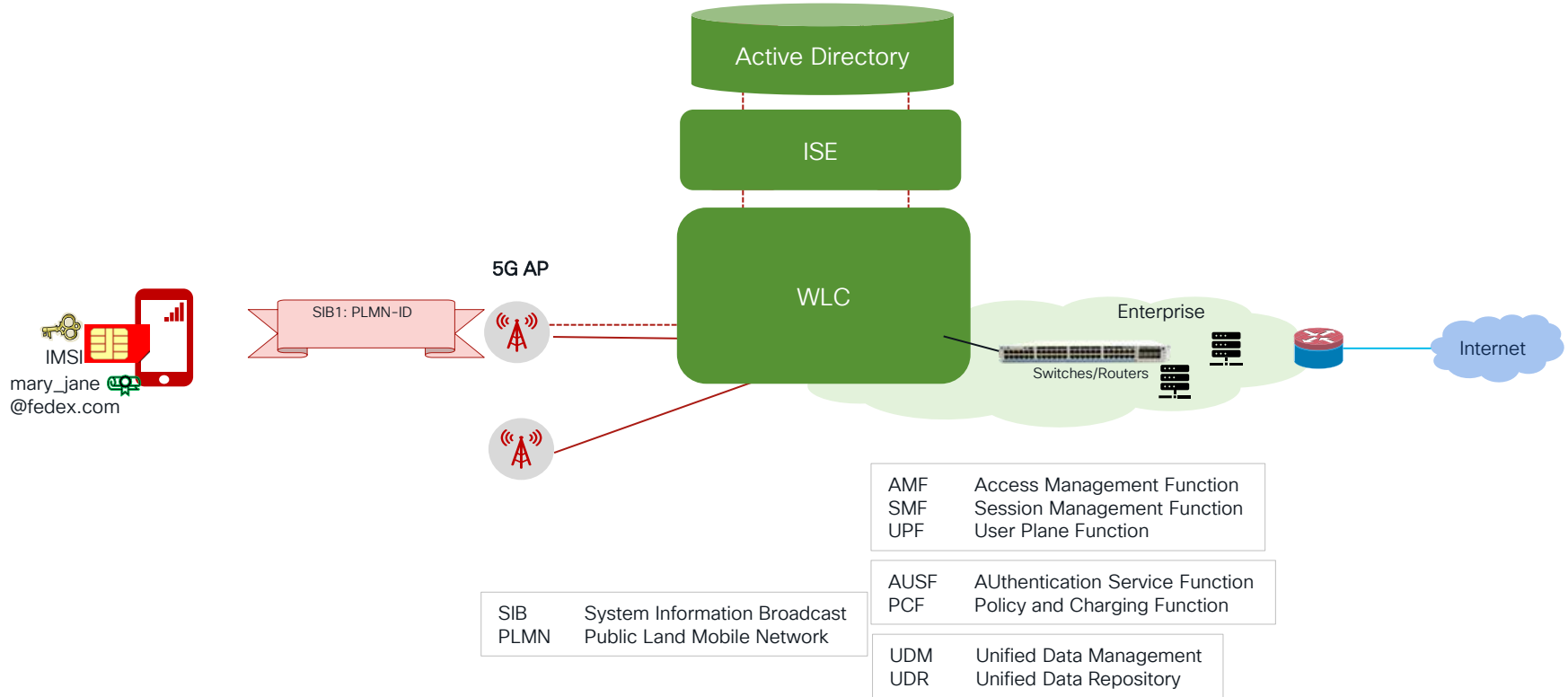
# Rel-16 P5G Networks

# Enterprise WiFi Architecture



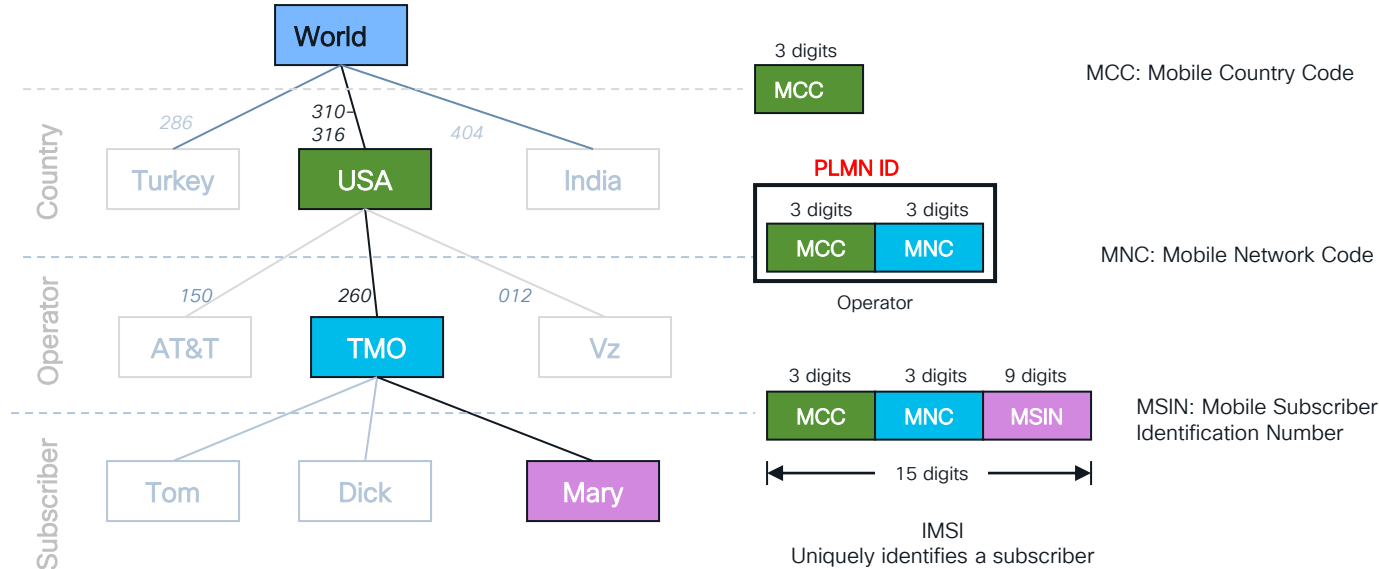
WLC    Wireless LAN Controller  
ISE    Identity services Engine

# 5G Architecture

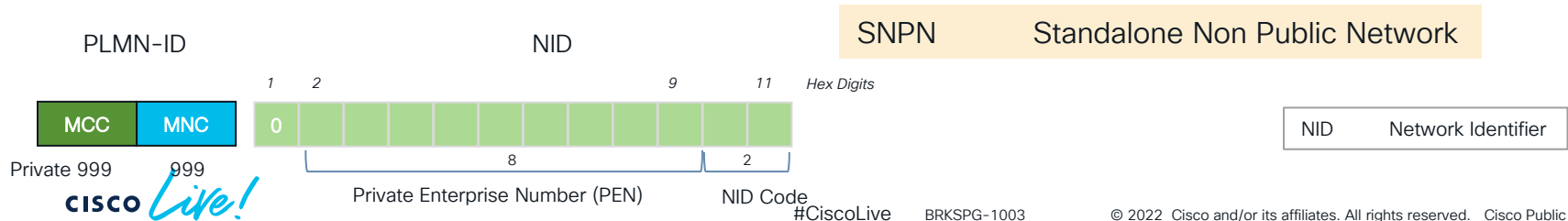
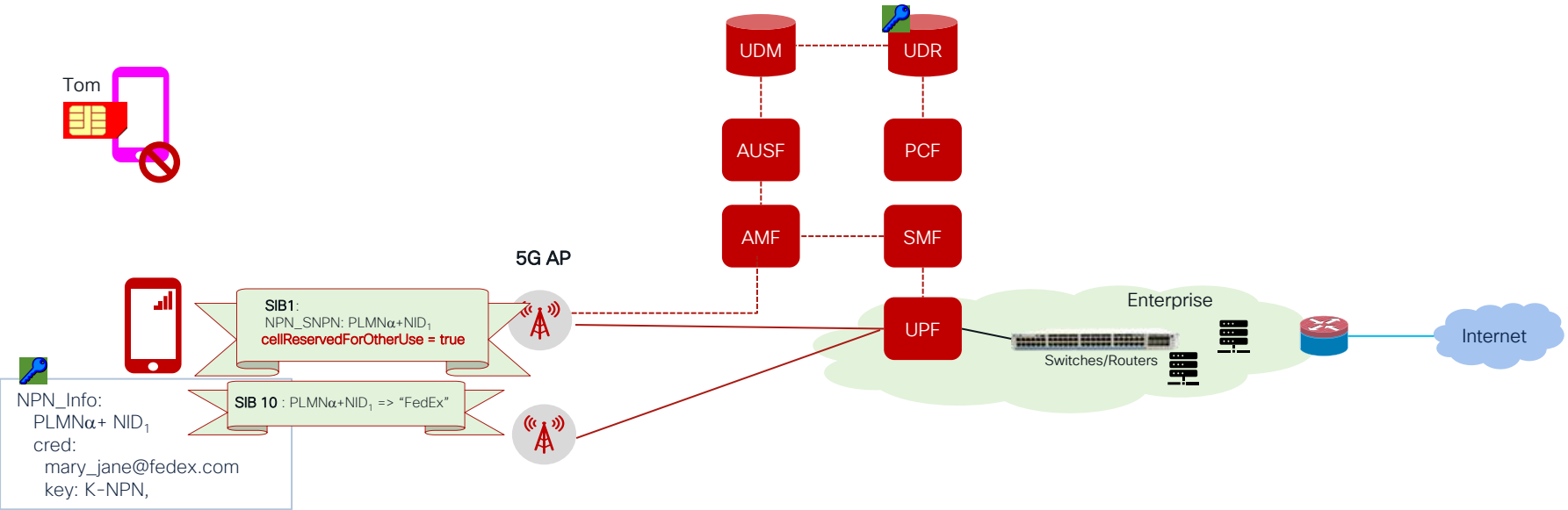




# Identity of a Service Provider Network



# Rel-16 Private 5G: Enterprise Provided

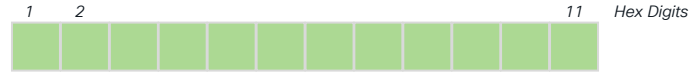


# Identity of a P5G SNPN: PLMN ID and NID

PLMN-ID

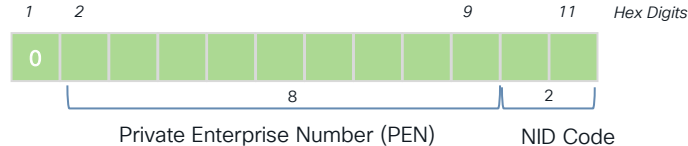


NID



1 – Self assignment

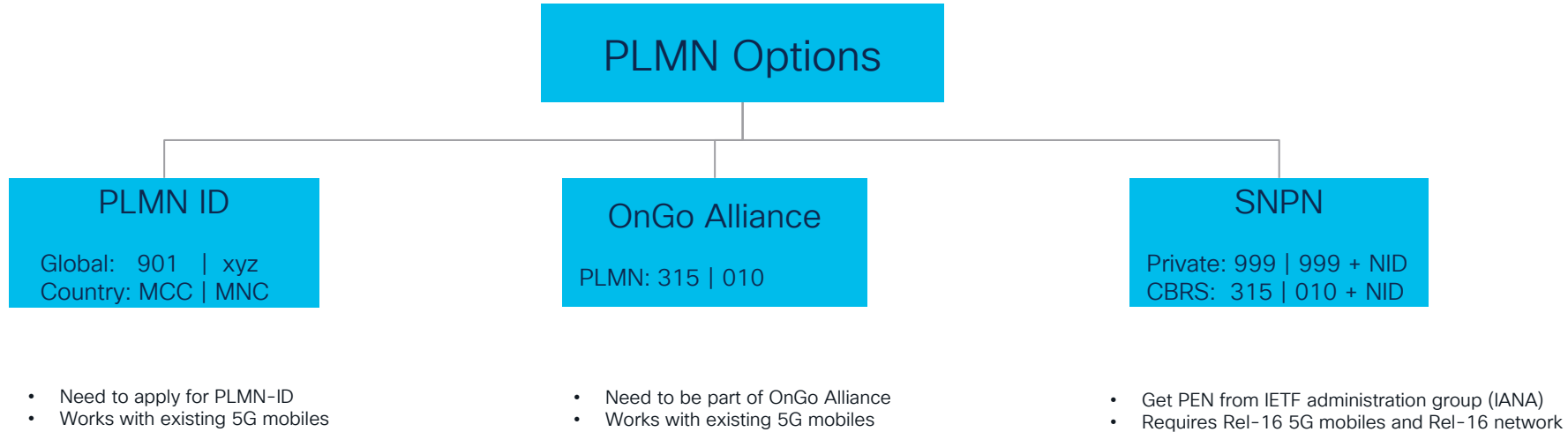
0 – Coordinated assignment: NID globally unique independent of PLMN-ID



2 – Coordinated assignment: PLMN + NID globally unique  
eg. used by CBRS Alliance

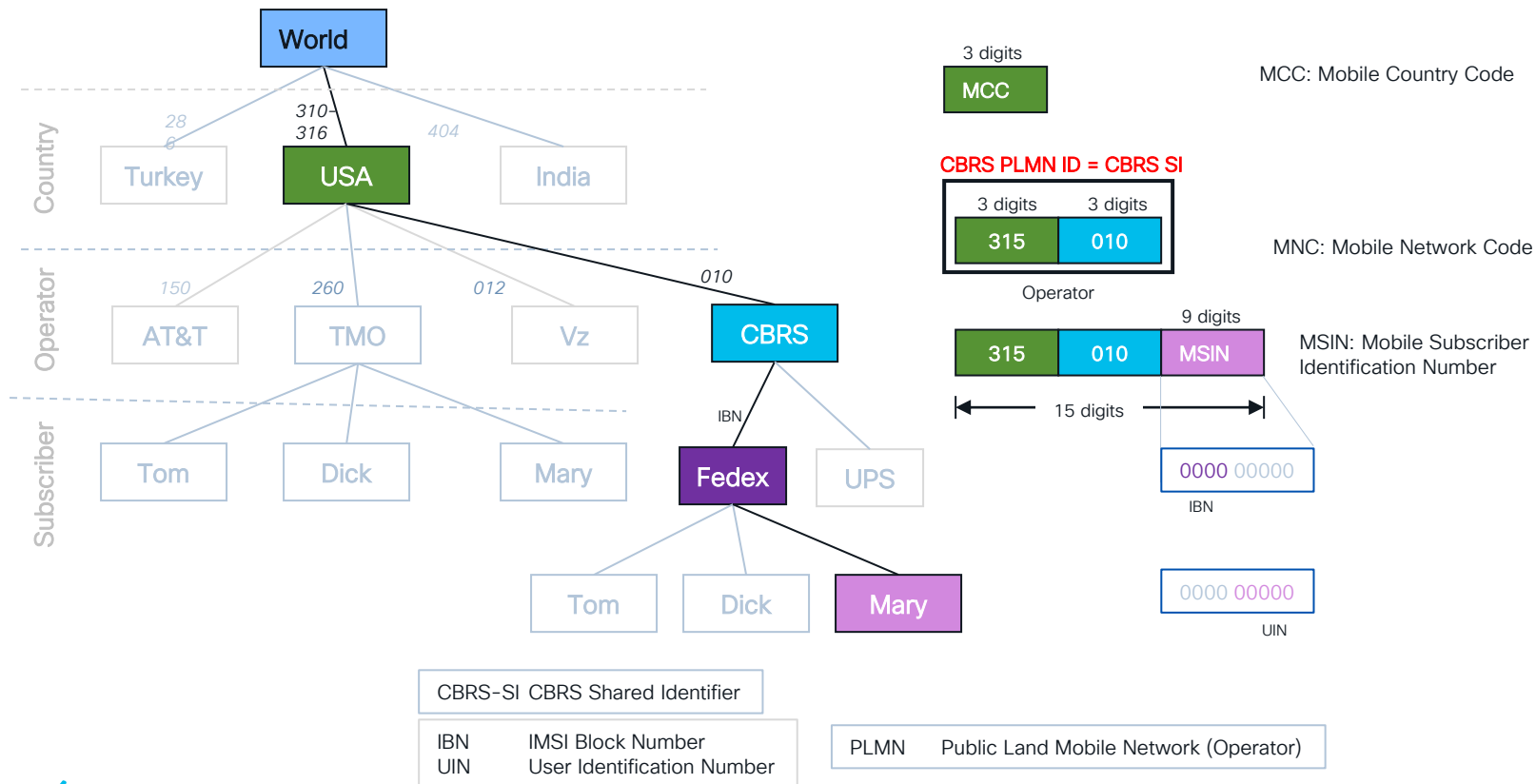
Decimal	Organization
0	Contact Email
Reserved	
Internet Assigned Numbers Authority	iana&iana.org
1	NxNetworks Michael Kellen OID.Admin@NxNetworks.com
2	IBM ( <a href="https://w3.ibm.com/standards">https://w3.ibm.com/standards</a> ) Glenn Daly gdaly@us.ibm.com
3	Carnegie Mellon Mark Poeppling host-master@andrew.cmu.edu
4	Unix Keith Sklower sklower@oakeffe.berkeley.edu
5	ACC Art Berggreen art@SALT.ACC.COM
6	TWG John Lunny jlunny@eco.twg.com
7	CAYMAN Beth Miaoulis beth@cayman.com
8	PSI Marty Schoffstahl schoff@NISC.NYSER.NET
9	ciscoSystems Dave Jones davej@cisco.com

# P5G PLMN Deployment Options



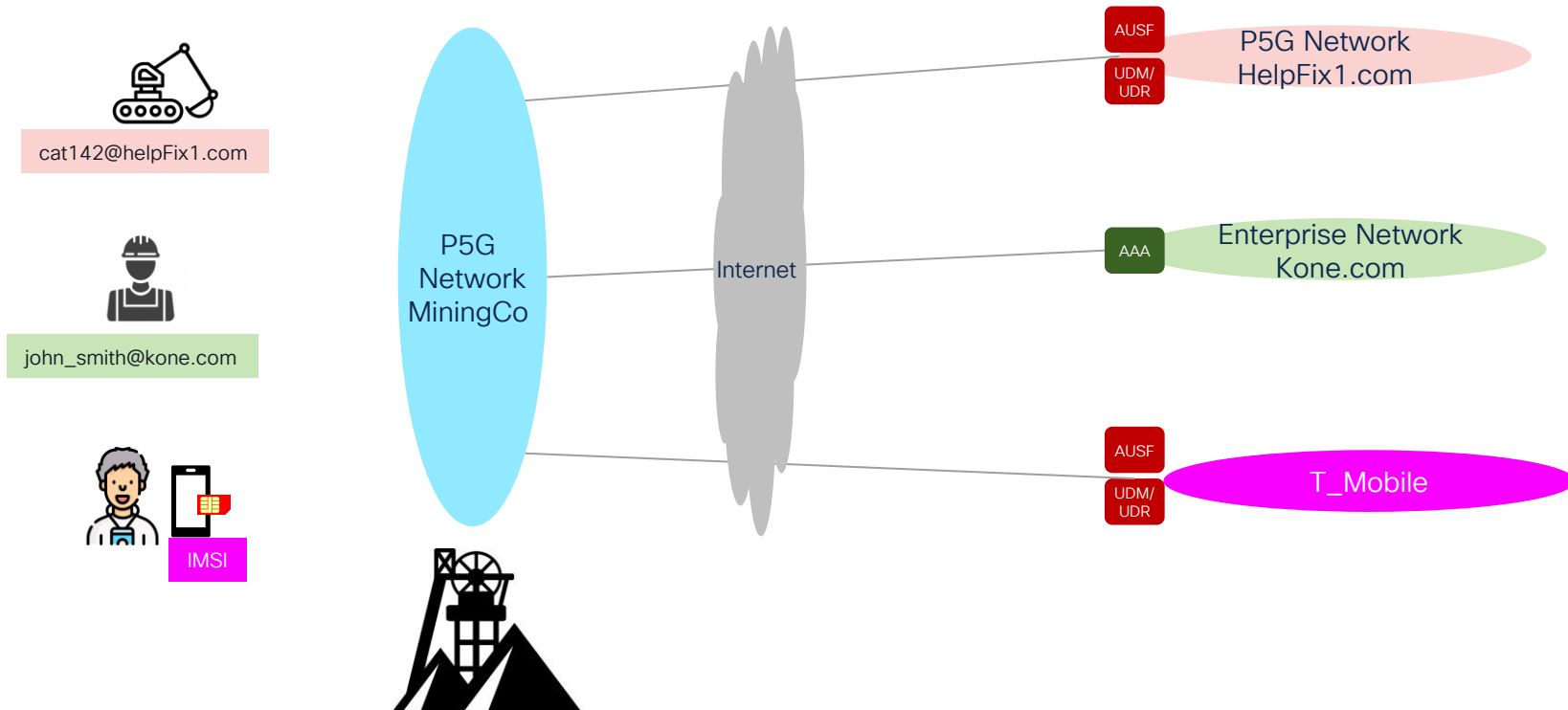
PEN Private Enterprise Number

# CBRS PLMN-ID



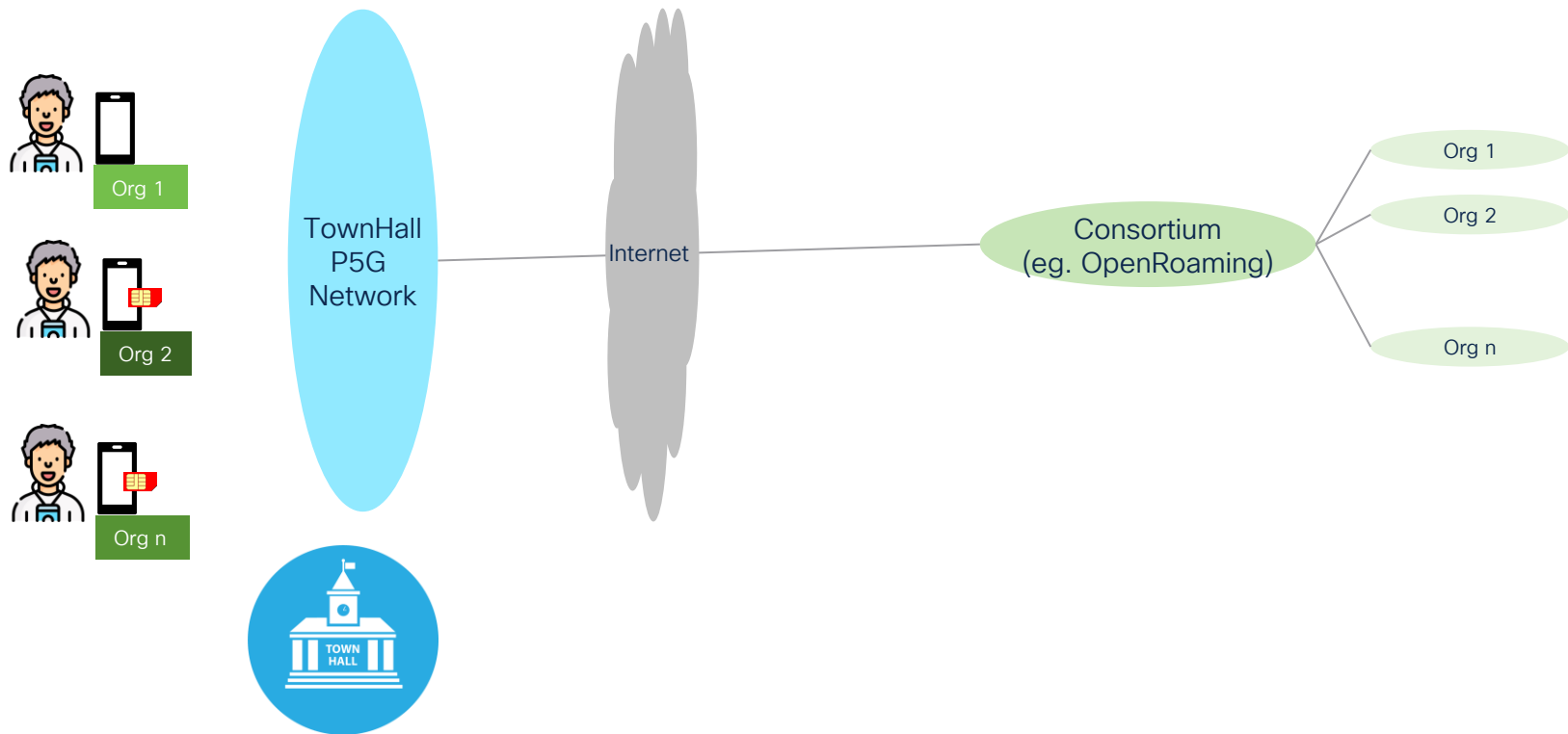
# Rel-17 Roaming

# Roaming Use-Cases 1-3



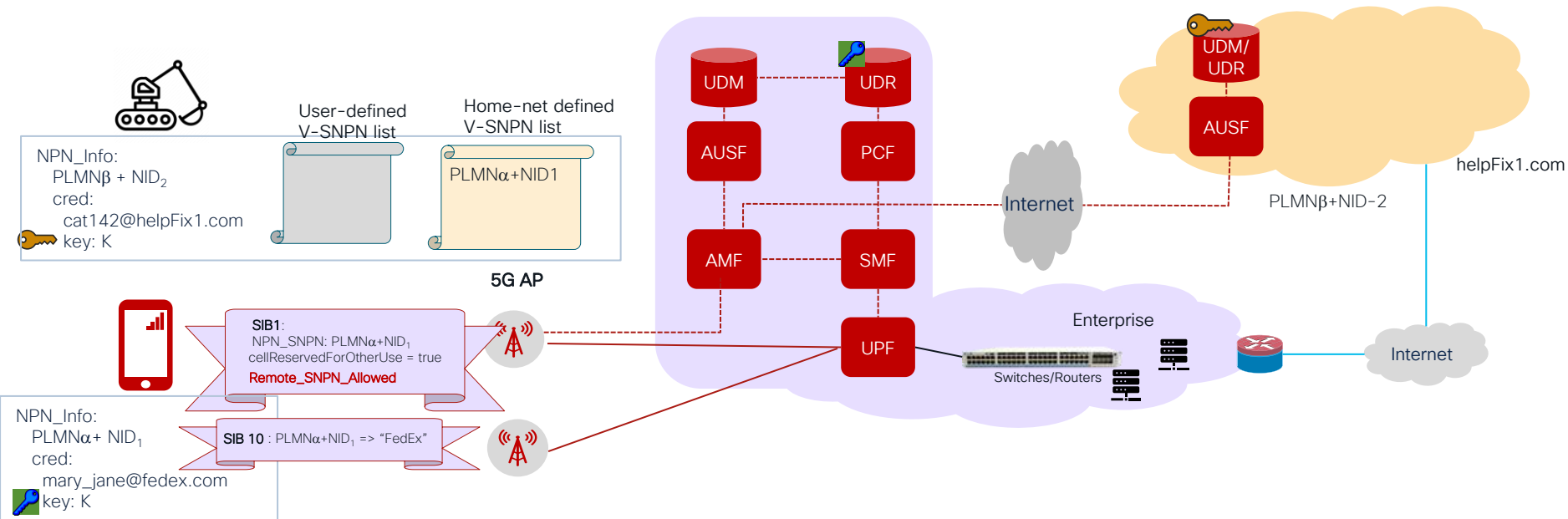
# Roaming Use-Case 4

Home-networks

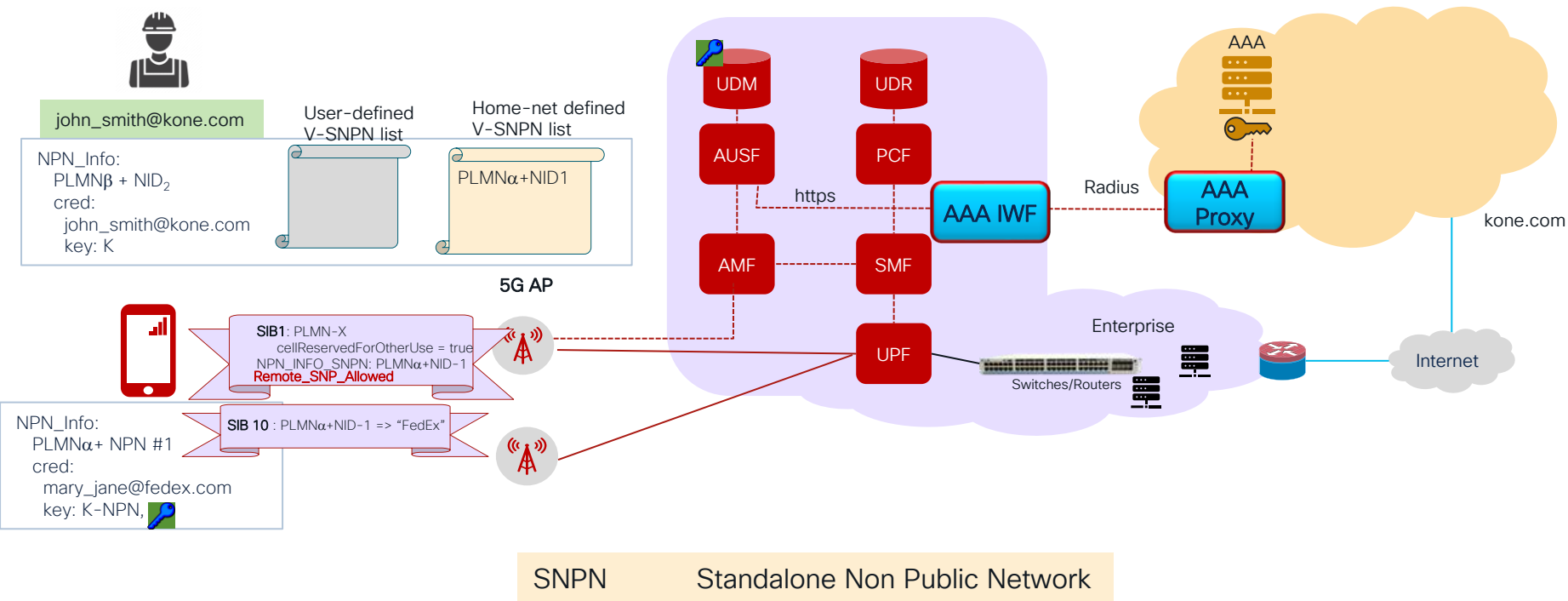




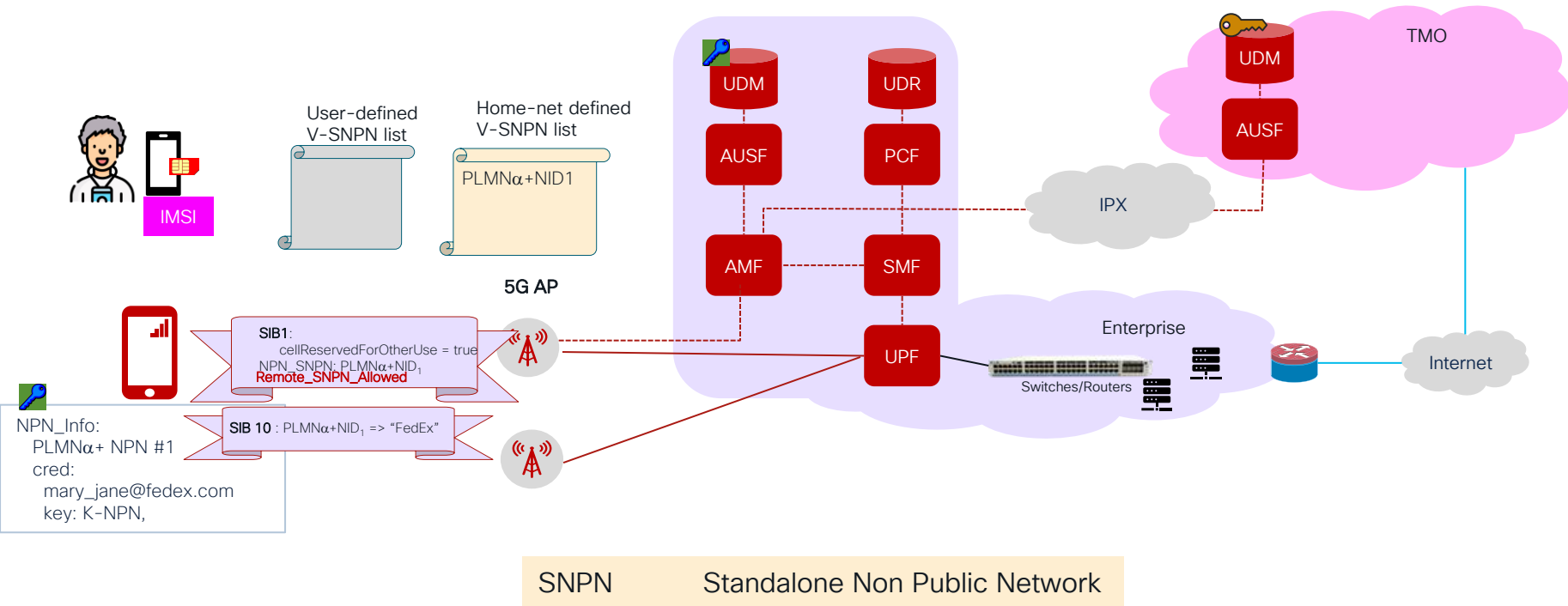
# Use-case 1: Home-network = SNPN



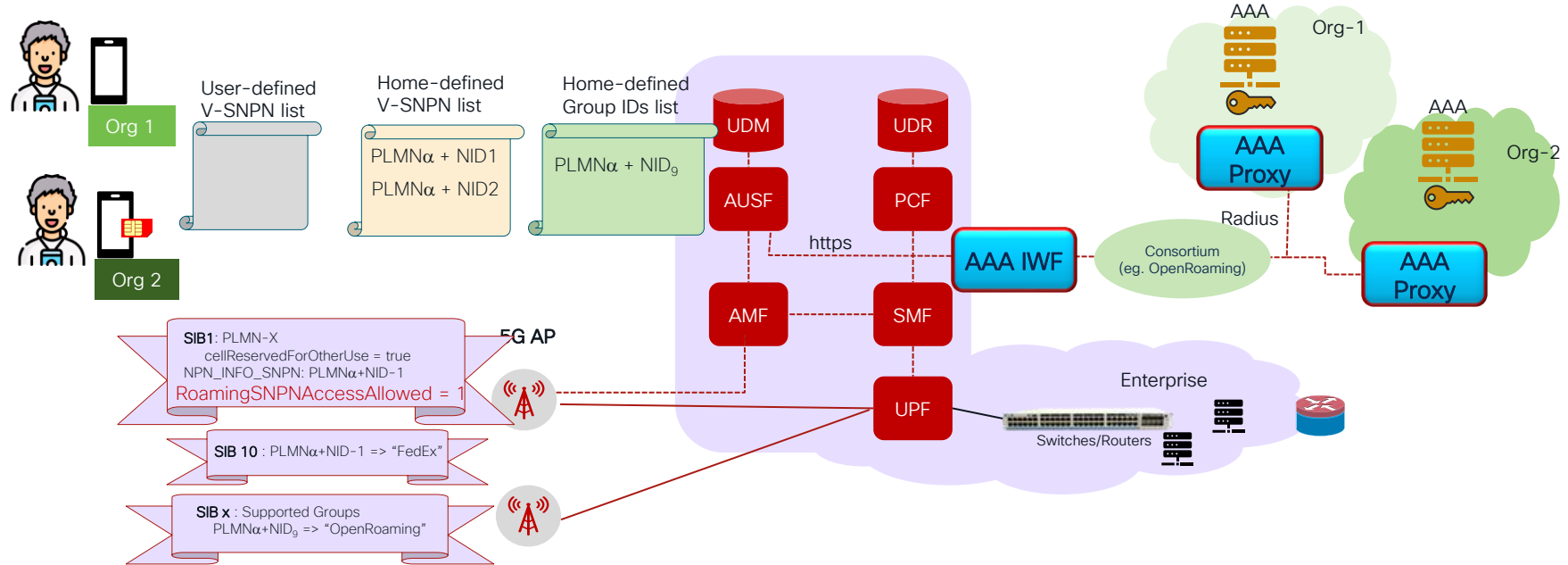
# Use-case 2: Home-network = AAA Server



## Use-case 3: Home-network = MNO

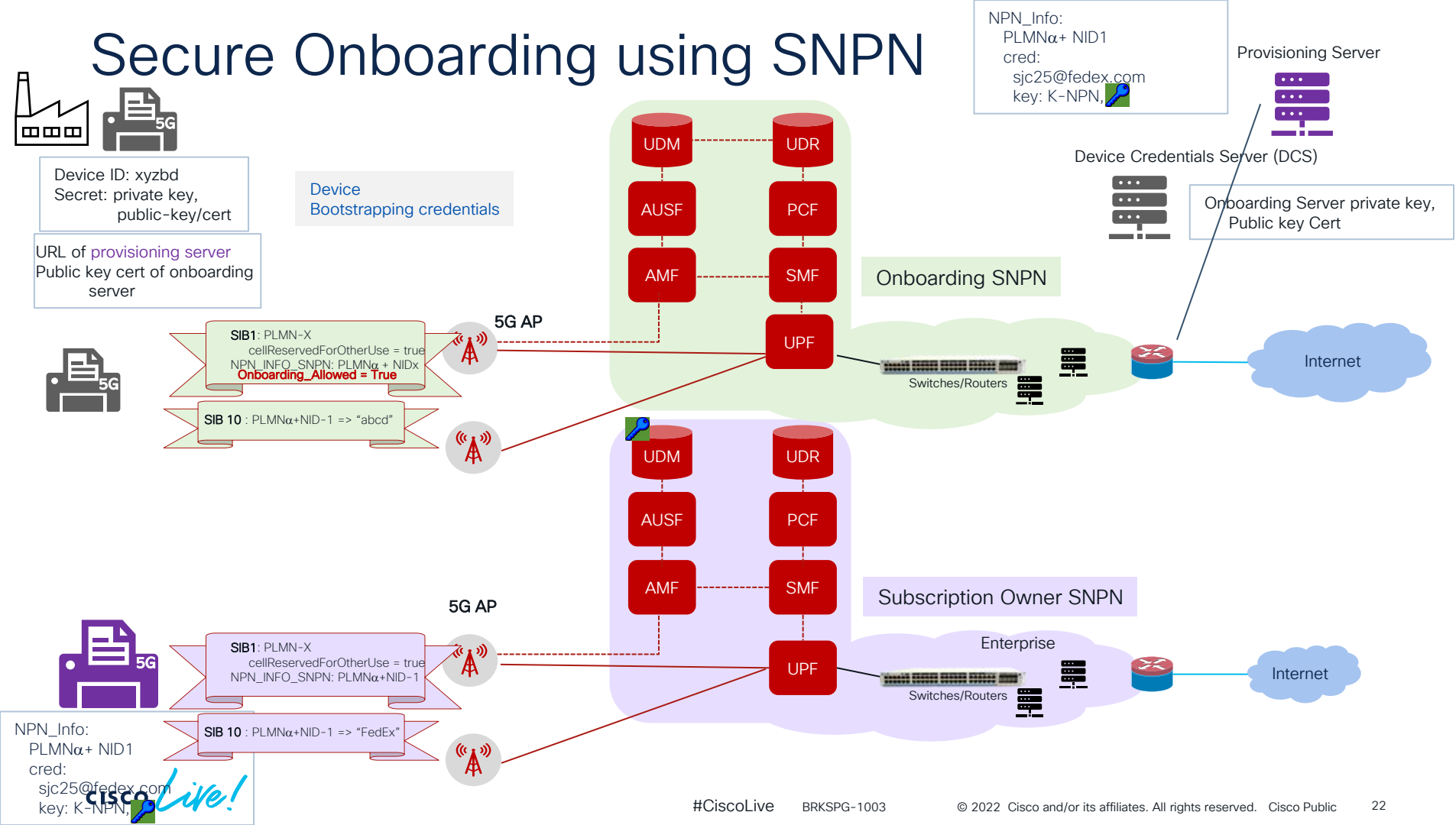


# Use-case 4: Roaming when Home network in Consortium



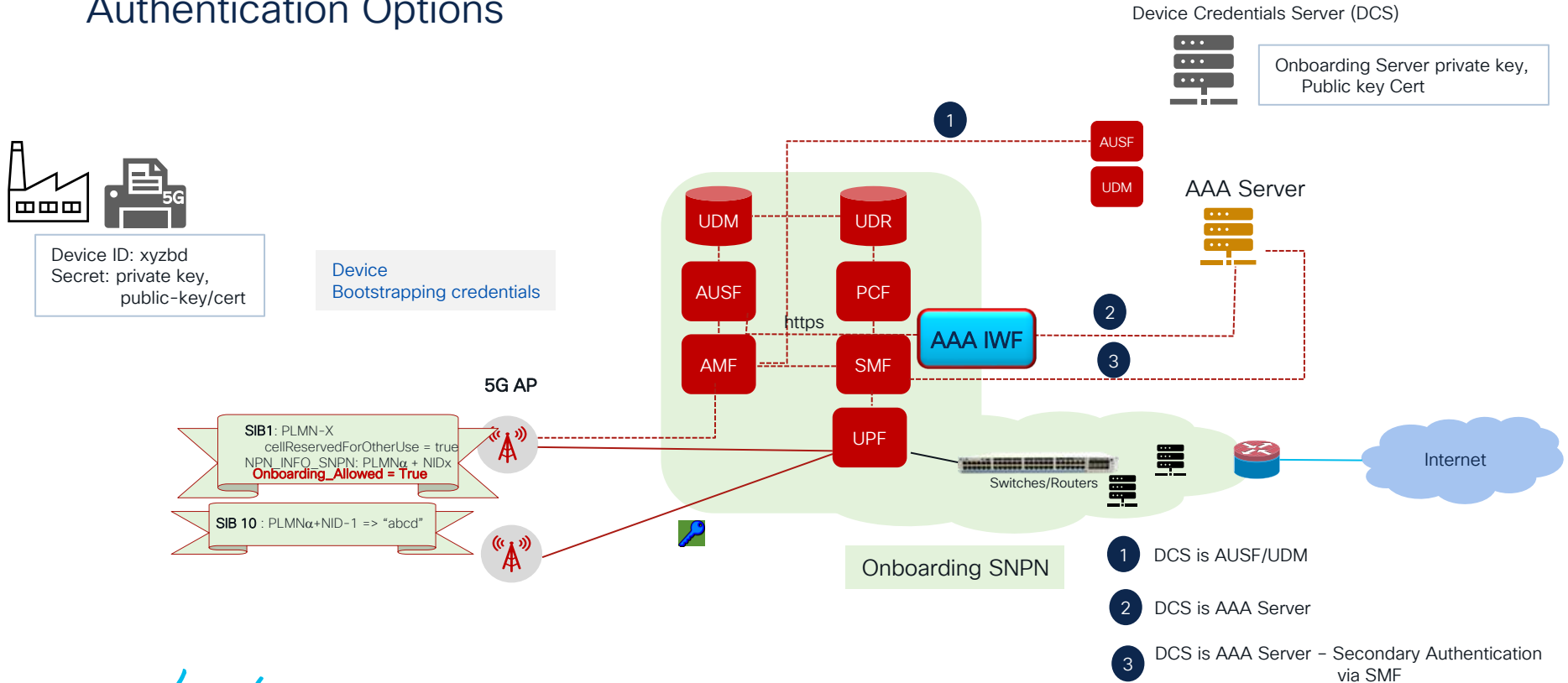
# Rel-17 Onboarding

# Secure Onboarding using SNPN



# Secure Onboarding using SNPN

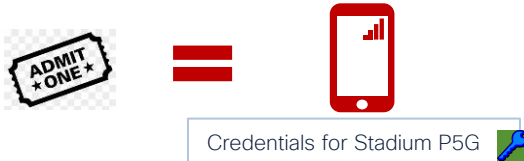
## Authentication Options



# Rel-18 P5G for Events



# P5G Access on Events



## Problem Statement:

*Support for enabling UE to discover, select, access the local hosting NPN and the localized services via the hosting NPN with proper authorization.*

- Work Progressing in 3GPP with specifications to be finalized by end of 2023 (Rel-18)

# Conclusions

# Conclusions

- 3GPP has progressively added features to Private 5G networks
  - Rel-16 introduced support for enterprise Private 5G networks
  - Rel-17 introduced several key new features, the two key ones being:
    - Enabling **roaming** from private or public network to another private network, and
    - Enabling **on-boarding** of devices onto private networks using pre-configured credentials
  - Rel-18 adds features to enable **access to local content during events** such as football games or concerts using private 5G networks.

# Cisco Private 5G Learning Map

Learn More about Technical Seminars & Breakouts

Start

June 12 | 2:00 pm

## TECSPG-2432

New Adventures in Wireless: The Journey of WiFi6 and Private 5G Networks for the Enterprise

June 13 | 11:00 am

## BRKSPG-1003

Evolution of Private 5G Networks Standards

June 13 | 4:00 pm

## BRKSPM-2842

Industry enablers making Private 5G a viable private networking option

Continue

June 14 | 4:00 pm

## BRKXAR-2004

Unified Identity & Policy Across Private 5G and Wi-Fi

June 16 | 8:00 am

## BRKEWN-2030

WiFi6 and Private 5G for the Enterprise – a ‘Better Together’ Journey

June 16 | 8:45 am

## BRKSPM-3169

Customer Challenges and Practical Design Consideration for 5G Transformation

# Cisco Private 5G Learning Map

Learn more about Solution Overviews and Interactive Design Sessions

Start

June 14 | 2:00 pm

## **PSOGEN-1029**

Private 5G as-a-Service is Here: Get Ready

June 15 | 11:00 am

## **PSOIND-1004**

Private 5G and its role in Healthcare Infrastructure

June 14 | 4:00 pm

## **PSOIND-1003**

Private 5G in Education: Innovation and Opportunity

June 16 | 4:00 pm

## **PSOSPG-1002**

Leading Your Digital Transformation with Cisco Private 5G Network Offer

June 14 | 10:30 am

## **IBOSPG-2004**

5G Customer Success Story: US Marine Corps Smart Warehouse

June 13 | 4:00 am

## **IBOSPG-2010**

Getting Started with Enterprise Private 5G: An Interactive Design Workshop

June 15 | 4:00 pm

## **IBOSPG-2004**

5G Customer Success Story: US Marine Corps Smart Warehouse

June 16 | 11:00 am

## **IBOSPG-2010**

Getting Started with Enterprise Private 5G: An Interactive Design Workshop

Finish

# Technical Session Surveys

- Attendees who fill out a minimum of four session surveys and the overall event survey will get Cisco Live branded socks!
- Attendees will also earn 100 points in the Cisco Live Game for every survey completed.
- These points help you get on the leaderboard and increase your chances of winning daily and grand prizes.



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(CLCs) are prepaid training vouchers redeemed directly with Cisco.



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### Cisco U.

IT learning hub that guides teams and learners toward their goals

### Cisco Digital Learning

Subscription-based product, technology, and certification training

### Cisco Modeling Labs

Network simulation platform for design, testing, and troubleshooting

### Cisco Learning Network

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### Cisco Instructor-led and Virtual Instructor-led training

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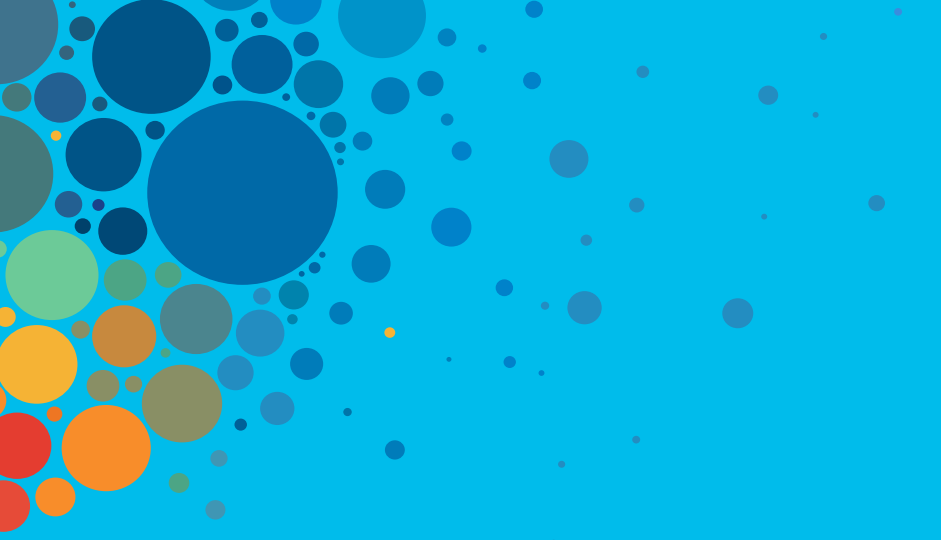
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# Thank you

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