



Empowering Enterprise Use Cases Through Slices

Future Networks Seminar – MWC Americas

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Here is an Interpretation of the Importance of 5G

Put simply ...

The 5G network is an enablement platform for innovative services and applications introduced by the operator, third-party partners or vertical industry customers.

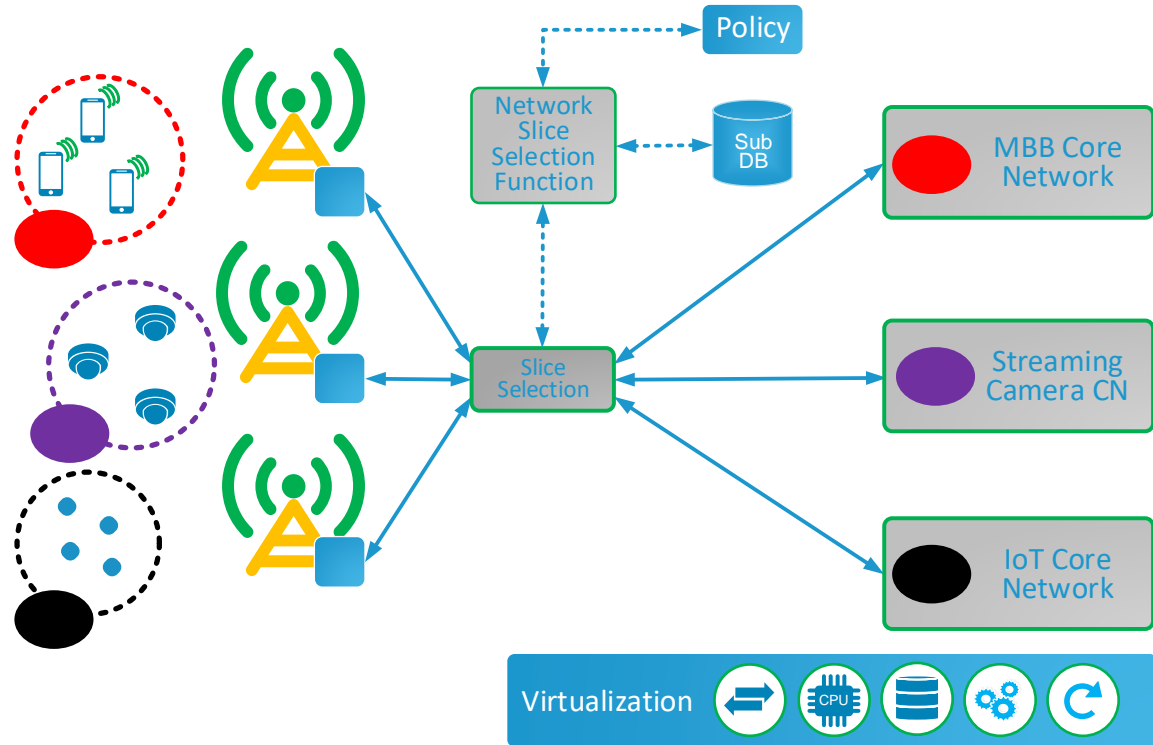
The unifying network fabric ties together the access, transport, core and services with end-to-end advanced automation, user-friendly interfaces, management, orchestration, security and telemetry.

The key phrase: **Unified Enablement Platform**
... and **Slicing** will be an important part of it

Network Slicing is fundamentally an end-to-end **partitioning of the network resources and network functions** so that selected applications/services/ connections may **run in isolation** from each other

Reviewing the Basics of Network Slicing

- Network slicing: virtually independent business operations on a common physical infrastructure
- Three essential components:
 - Control points in the user plane for steering
 - Policy enablement: the traffic flow path selection can be controlled by policy dip
 - Multi-tenant IaaS + orchestration



Today's complex networks

■ Complexity in the core

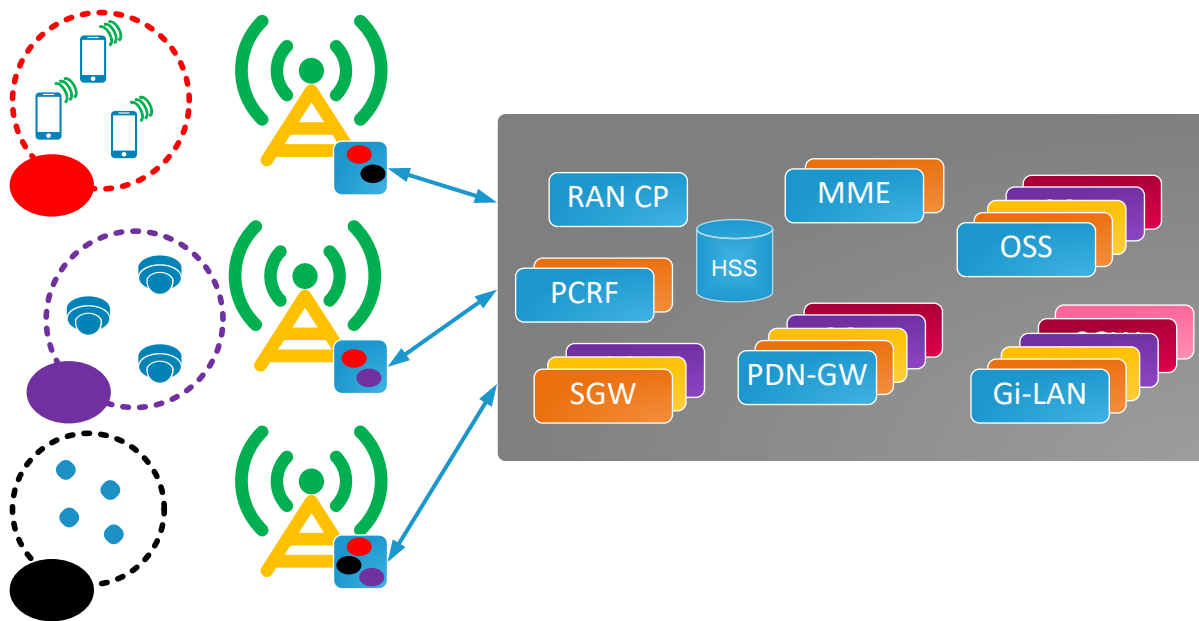
- Each node carries 1,000's of legacy tariffs, corporates, PMBs, M2Ms, and associated network configurations

■ Multi-RAT RAN

- Programmability in the radio
- NB-IoT, URLLC, ...

■ Problem

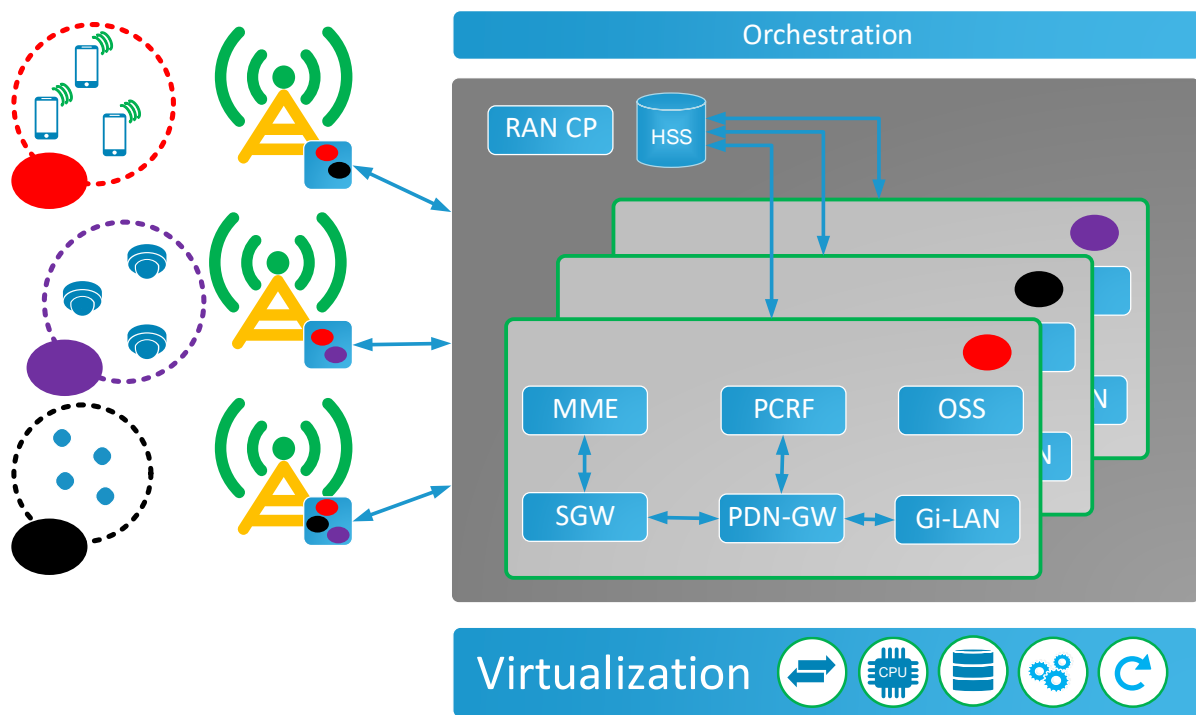
- Service introductions or modifications can incur significant legacy regression testing impacting Time-to-Market



“Zero defects” policy implies reducing change. So how can a network be innovative and agile ?

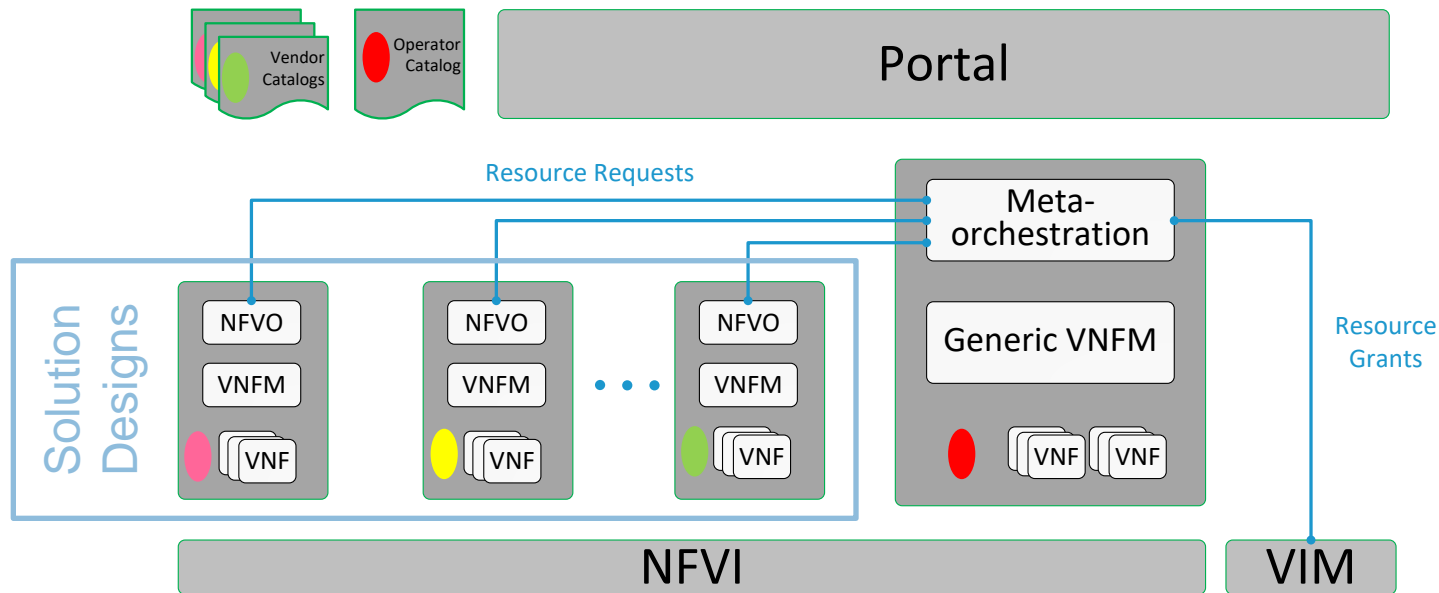
5G Sliced Network: Introduces Order

- Each separable business operations can be more efficiently run on a network slice
- Orchestration manages the complexity driven by the number of slices
 - MANO for every slice
- New service introductions can have a significant reduction in regression testing cycles
 - Easier to debug configs limit “collateral damage”
 - Isolation effects of rogue applications (E.g. M2M)
 - Smaller failure groups imply no single “too big to fail” node



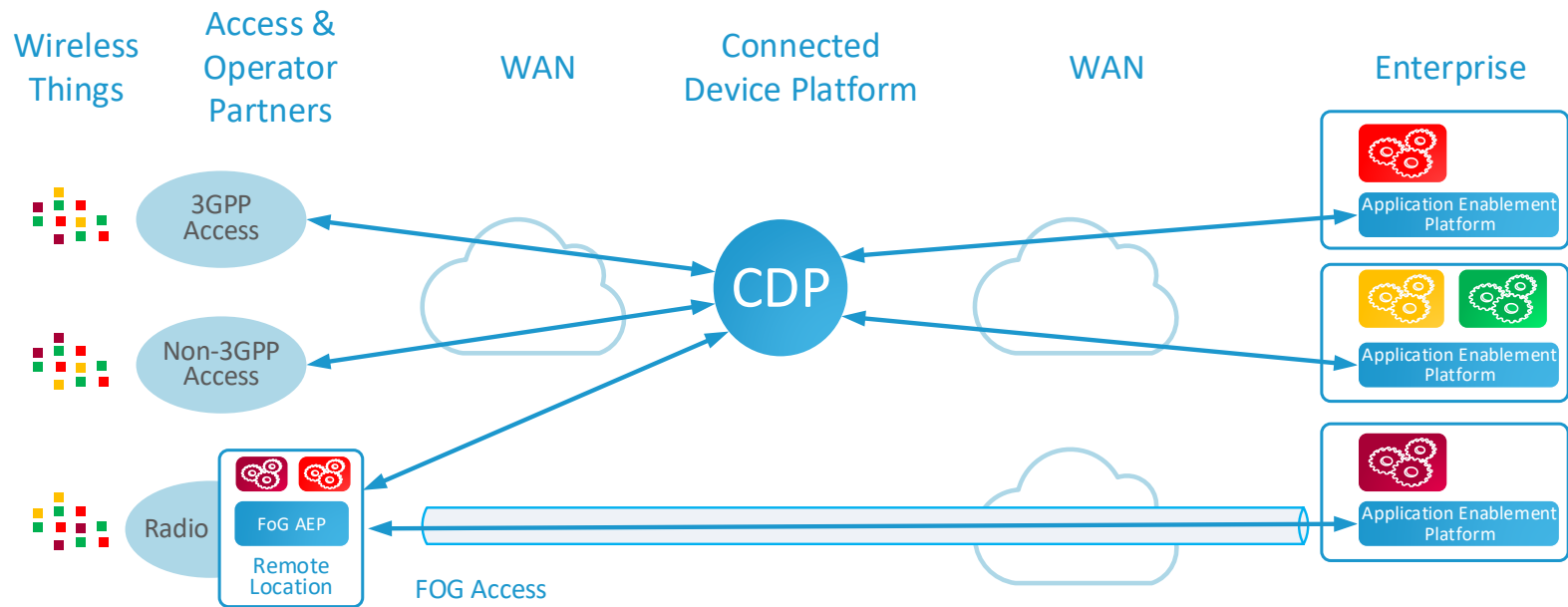
Slice-aaS: Multitenancy and Orchestration

Introducing Hierarchy and Information Hiding



Network Slicing has implications for the virtualization architecture. “Slicing” may actually simplify as operators and vendors can focus attention on validated solution designs “within” a slice which can be separately procured

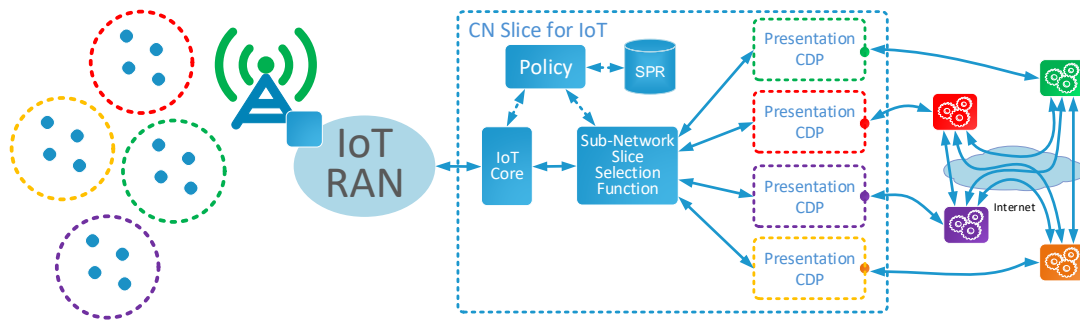
IoT Taxonomy for Wireless Use Cases in SP Market



Horizontals include the CDP and AEP. The AEP also has a FoG component.

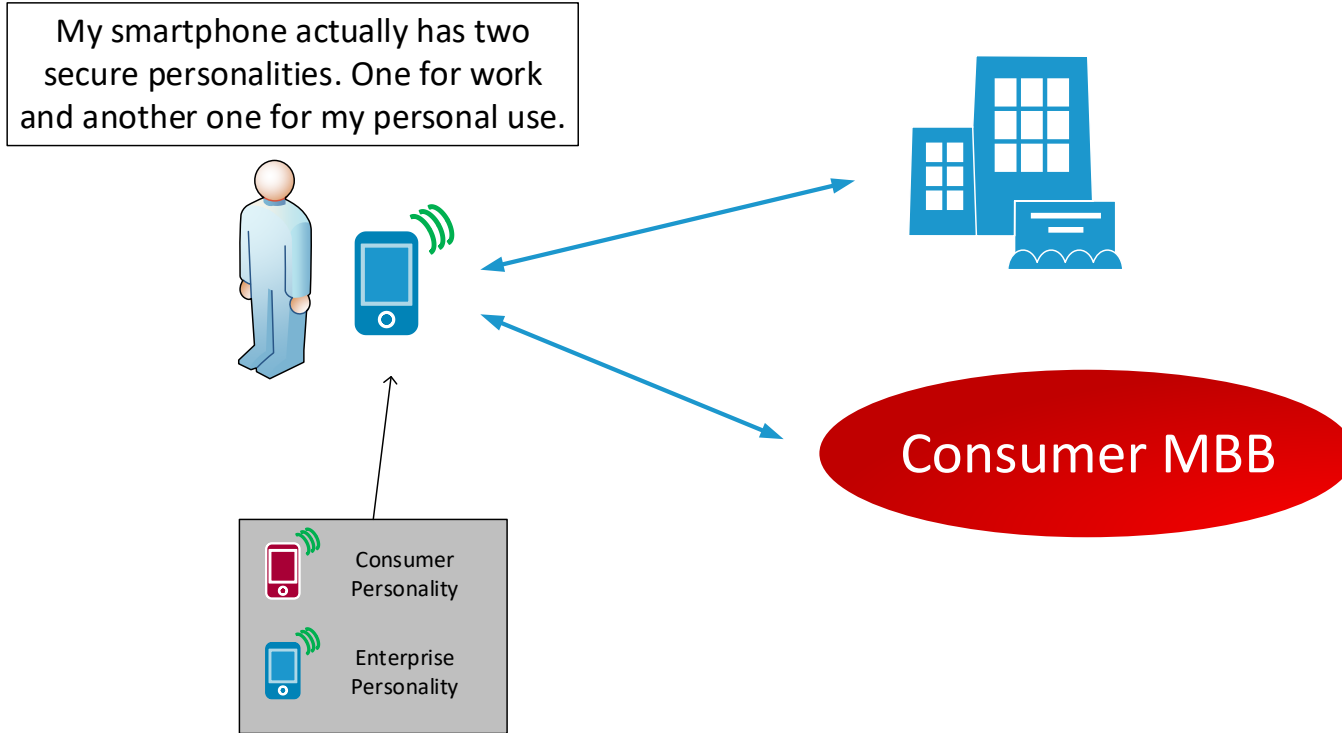
Massive IoT and Network Slicing

- Massive IoT and Network Slicing go hand-in-hand
- Network slicing solves the problem of directing traffic from enterprise-owned devices to the enterprises themselves
- Via policy interaction, a virtualized packet core/service core can
 - Steer enterprise traffic to the appropriate set of enterprise connectivity functions
 - Apply services as needed

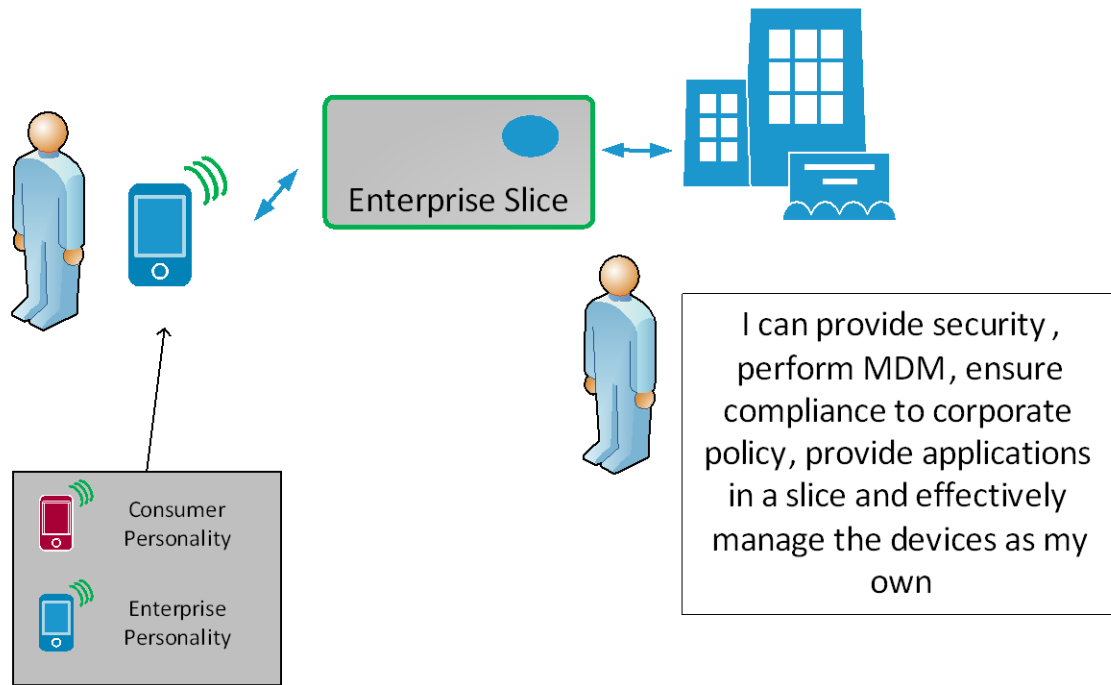


Network slicing (subnetwork slices) applied to enabling massive IoT

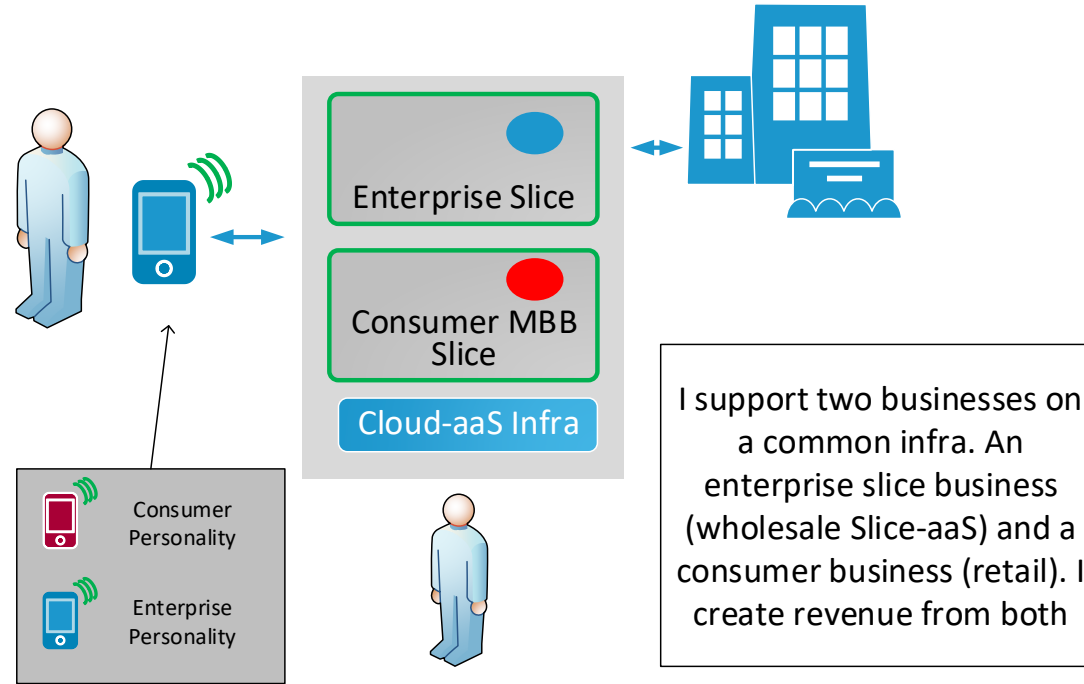
From the Point of View of the **User**



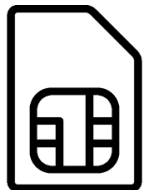
From the Point of View of the **Enterprise IT Manager**



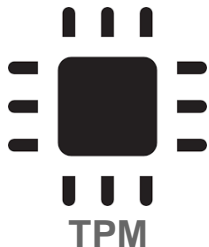
From the Point of View of the **Network Operator**



Device Identities



SIM



TPM



Certificate

- **IoT**

- IoT devices cannot be provisioned with enterprise identity but must be bootstrapped with manufacturer identity or use a permanent embedded identity
- IoT devices may have multiple identities (manufacturer, enterprise, SP,...) and can communicate to multiple entities (segmentation!)
- There will be multiple identity providers the enterprise needs to integrate with
- EAP is the framework of choice that already supports these credentials

- **Mobile**

- Device identity (SIM) is strong credential that can be leveraged by the enterprise
- Seamless 'consumer grade' experience (3GPP-style) requires federated identity
- Leveraging device credentials will allow seamless onboarding for employees, guests and partners
- 3GPP also moving to EAP as framework of choice

Tomorrows need: Device Identity



1 IT Admin

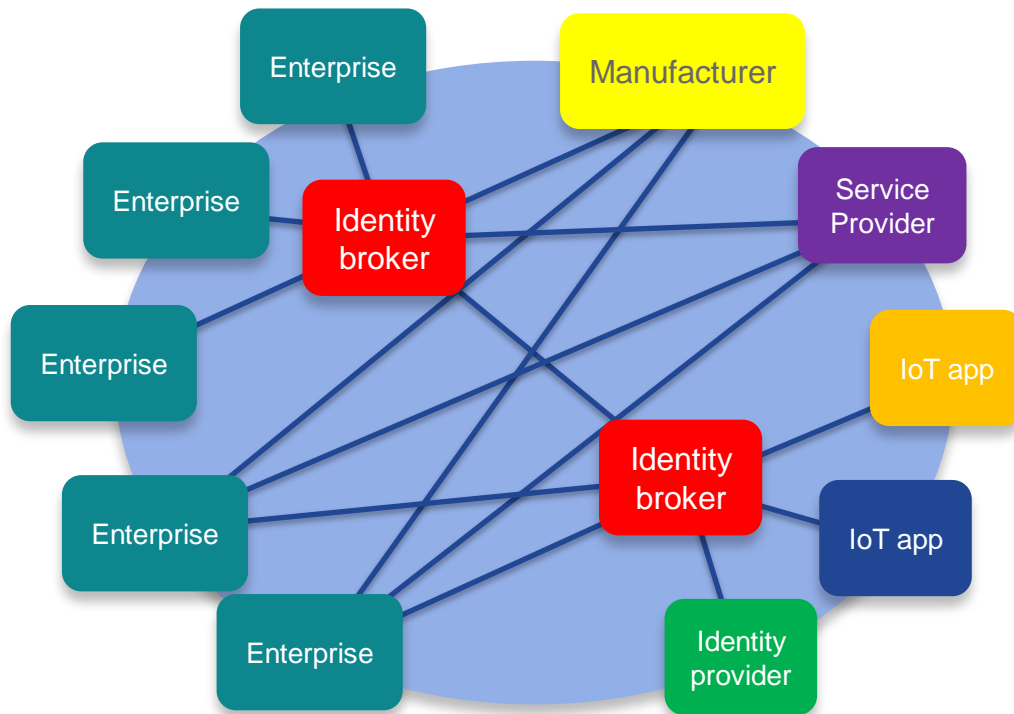
100.000's to 1.000.000's of devices

- Devices need to operate without user onboarding
- Massive increase of number of devices per admin, needs automatic credential provisioning or 'bootstrapping process' and authorization by relevant enterprise departments (control what comes on the network no longer performed by IT department)
- Devices will have narrower access to enterprise apps, security is needed on a per-device basis (e.g. MUD). IT admin will be responsible for what devices can do on the enterprise network (security and segmentation)

Neded: Cross Domain Identity Brokerage

Use Cases

- Federating enterprise and service provider identities
- Enabling Indoor VoWi-Fi and MuLTEfire
- Identity-as-a-Service (SIMaaS)
- Scaling IoT
- Security
- ...
- **Multiple technology options**
 - MobileConnect
 - ...



Why you need Network Slicing

- **Deliver new services including B2B: Slice-aaS**
 - Tune the network for specific applications and services for better customer experience
 - Eliminate complexity arising out of interaction between various services and applications: Fault containment
 - Independent upgrade/downgrade for different services and applications
- **Injects order into chaos**
 - Rationalizes mobile network by service type
 - Tackle Enterprise with IT-friendly products and with flexibility for IoT



CISCO

TOMORROW starts here.