

Towards a Generic Slice Template using GSMA NEST GST

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5G Riders on the Storm Catalyst
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<https://projects.tmforum.org/jira/browse/ODA-150>

- After consulting many operators and vertical industry sectors the GSMA network slicing task force has derived and documented the network slice template concept. Today this is a set of approximately 40 parameters that may be required to populate a network slice creation request.
- Upon closer examination of these parameters we note
- the parameters contained with the template are a mixture of high level and low level details. from a user (and usability) perspective we think this could be optimised.
- there are inter-dependencies between some of these parameters, such that, if you populate one parameter, the values of some other parameters should be derivable.
- the template as-is is not really suitable for programmatic use, that is: its not a template that be can used to drive some automation around provisioning
- there may be some missing items (we are in discussions with GSMA about this)
- This contribution attempts to put some structure on the GST as defined, using TMF SID type thinking (CFS v RFS), and bring it to a point where a programmatic artifact can be produced.
- The initial slides attached are an opener on this topic.

- Riders on the storm catalyst – 1 page intro
- Operational experience with slice mgt so far (Huawei) (with illustration from early product work)
- Goal
- Proposal outline
- Open discussion

5G Riders on the Storm Catalyst

- Catalyst explores dynamic network operations required to cater for an extreme weather event.

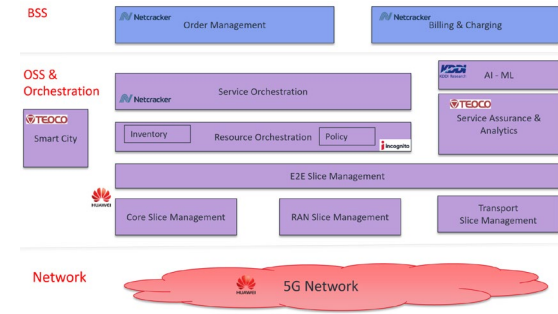
- Main services focused on will be

- Emergency/first responder comms services
- Video streaming services for media companies
- Network slicing is used for these, and other services



- Goals:

- Demonstrate agility, closed loop orchestration, test with ONAP
- create concrete API for slice management suitable for discussion with (and later adoption by) 3gpp
- contribute to GSMA network slice template work, if applicable

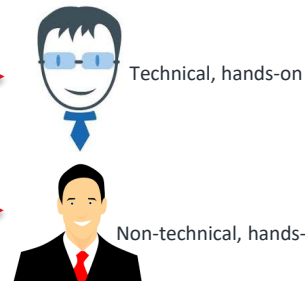


- Huawei has conducted various slicing trials and PoCs across Europe, largest publically known one was with BT/EE
 - whilst these projects were successful, if they were put into production “as is” they would not be satisfactory from OPEX management and usability perspectives

Key learnings

1. Slice creation parameters were too limited, and in most cases much too technical

- e.g. Why ask users for throughput, latency packet loss rates, these items are going to be service specific.
- Majority don't know the right values to select, and “just want service ABC it to work well”
- Two personas are needed to cater for very different needs re: slice templates



2. Device and device settings were not focused on enough, or at all!

- Several practical issues occur as a result: poor experience, constant SLA violations, security concerns,

3. Projects to date have focused too much on slice creation

- We think create operations will be fairly infrequent in practice, rather: most daily operations will be focused on allocating new service orders to existing slices

4. Much more simplicity is needed to help slicing adoption

Goal: elaborate NSMF and NSSMF APIs for i1 and i3 interfaces

Produce concrete API endpoints

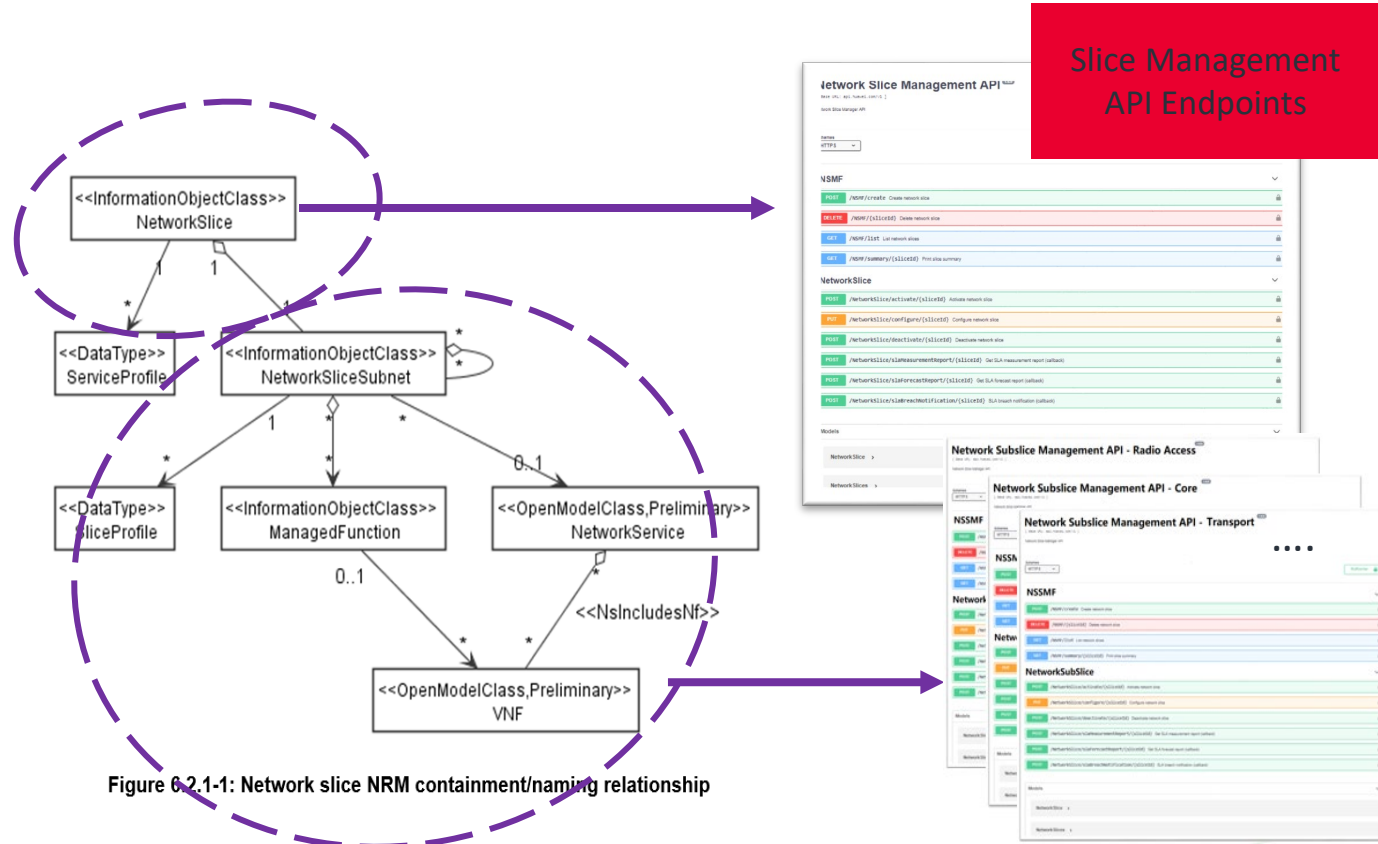


Figure 6.2.1-1: Network slice NRM containment/naming relationship

Proposal: enhance the GST

- 1. Improve abstractions
- 2. Increase usability

- GST proposal to date is excellent and includes the right pieces....from technical perspective
- We think it can benefit from SID thinking to become more usable however
 - TMF SID enables the merits of partitioning CFS (customer facing service) and RFS (resource facing service) concerns
 - GST as currently structured isn't doing that – it is a technical artifact mixing CFS and RFS together
 - Suggestion: use CFS/RFS thinking to further simplify GST and make it customer facing

What do I need
on **what devices**?



Where do I need it?

CFS

When do I need it?

RFS



Match and balance customer needs with network and organizational capabilities.

Assure we deliver on “what”, “where”, “when” commitments at reasonable cost.

Customers view of “what/where/when” (draft, incomplete)

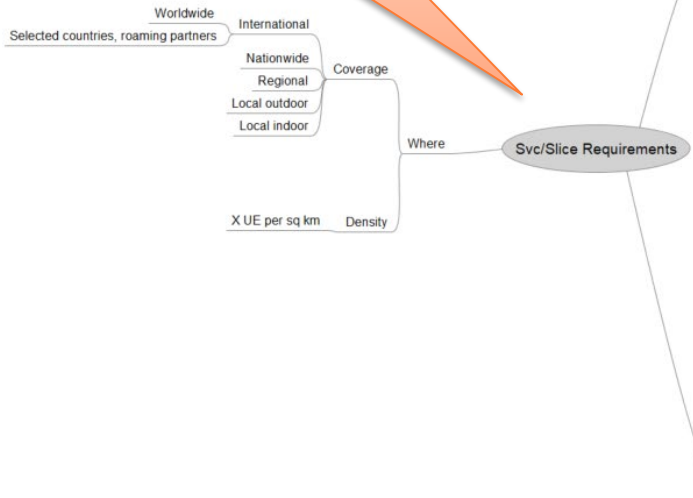
but much of this data is not interesting or known by customer

GST Status	GST Attribute
Stable	MaximumSupportedPacketSize
Stable	DeterministicCommunication
Stable	DownlinkThroughputPerUser
Stable	UplinkThroughputPerUser
Stable	DownlinkThroughputPerSlice
Stable	UplinkThroughputPerSlice
Stable	TerminalDensity
Stable	Reliability
Stable	SupportedDeviceVelocity
Stable	RadioSpectrum
Stable	PerformanceMonitoring
Stable	RealTimeChargingBilling
Stable	UserManagementOpenness
Stable	DelayTolerance
Stable	PerformancePrediction
Stable	Synchronicity
Stable	CloudSupport
Stable	PositioningSupport
Stable	LocationBasedMessageDelivery
Stable	SupportedAccessTechnologies
Stable	Isolation
Stable	UserDataAccess
Stable	TunnelingMechanism
Stable	SupportForNon-IPTraffic
Stable	SessionAndServiceContinuity
Stable	NumberOfTerminals
Stable	RootCauseInvestigation
Beta	Coverage
Beta	PrivateOperation
Beta	Multicast
Beta	Security
Beta	SliceQualityOfServiceParameters
Beta	EnergyEfficiency
Proposal	SlicePriority
Proposal	MMTel support
Proposal	Mission-criticalServiceSupport
Proposal	GroupCommunicationSupport
Proposal	V2XcommunicationSupport
Proposal	3rd Party Network Functions
Proposal	Energy efficient communication support
Suggestion	SliceType (test, production)
Suggestion	TrafficFlow

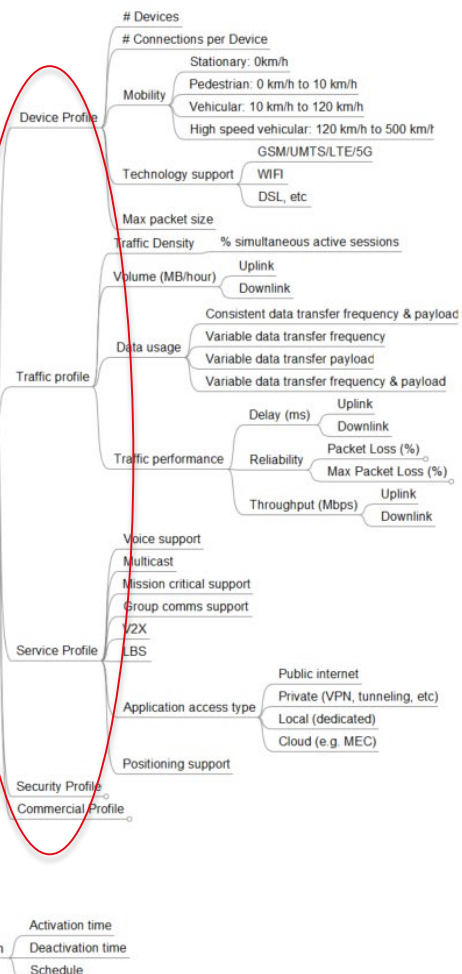


A More Generic Template can be achieved by making template more “customer focused”
Evolve Template with TMF style
CFS/RFS Split

Re-Classify attributes into “profiles”



GST (XLS) from GSMA



Templates (JSON)

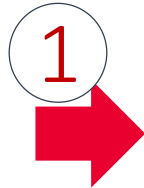
Suggested approach



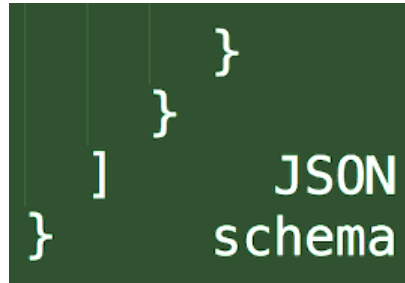
Apply Catalyst Ideas
(this deck, etc)

Flat GST

GST Status	GST Attribute
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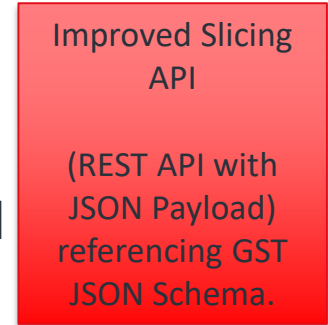
Still Flat,
But has a "schema"



Structured "schema"

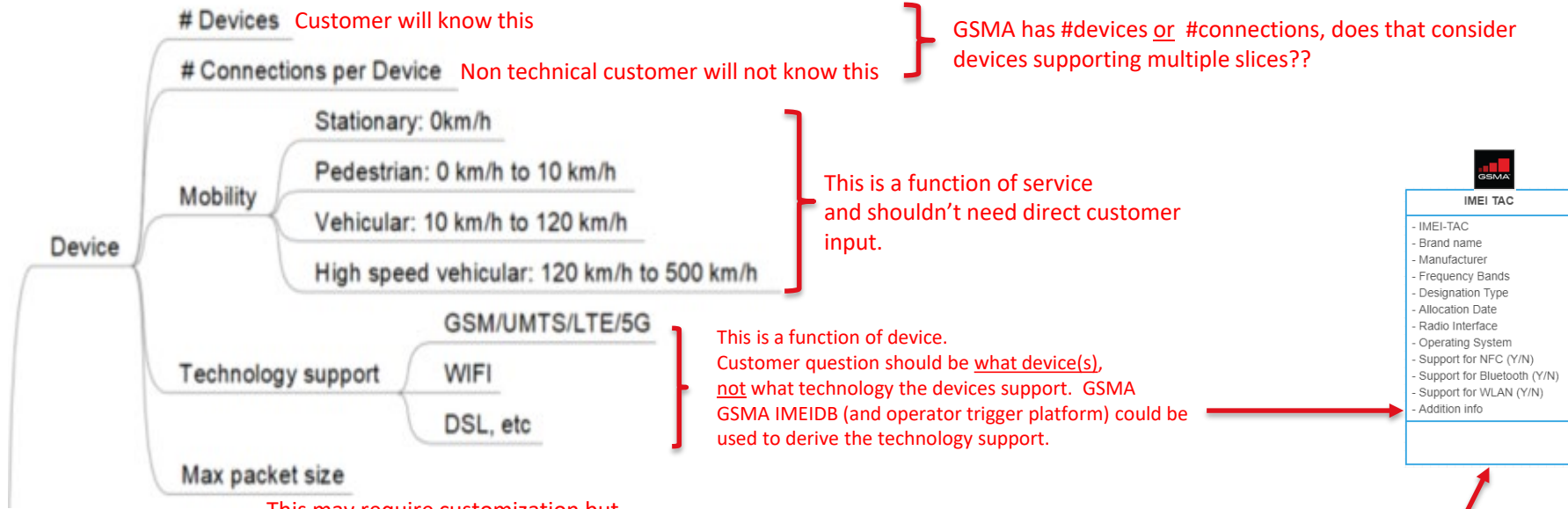


An Enhanced
GST



As payload to
TMF /ODA
conformant API

Device profile (1)



This may require customization but non-technical customer will not know this – needs to be hidden for some services.

Question: Does GSMA have plans to better prepare IMEI dB?

Device profile (2)

- Suggest to use GSMA IMEIDB as basis for device “search space”
 - Customers already use this data along with their own IMEI trigger platforms
- Service selected would dictate search candidates for “designation type”
 - Service → Designation Type(+) → Manufacturer, Brand Name →...
 - Service → Designation Type(+) → Freq Bands →...
 - Service → Designation Type(+) → Radio Interface →...
 - etc

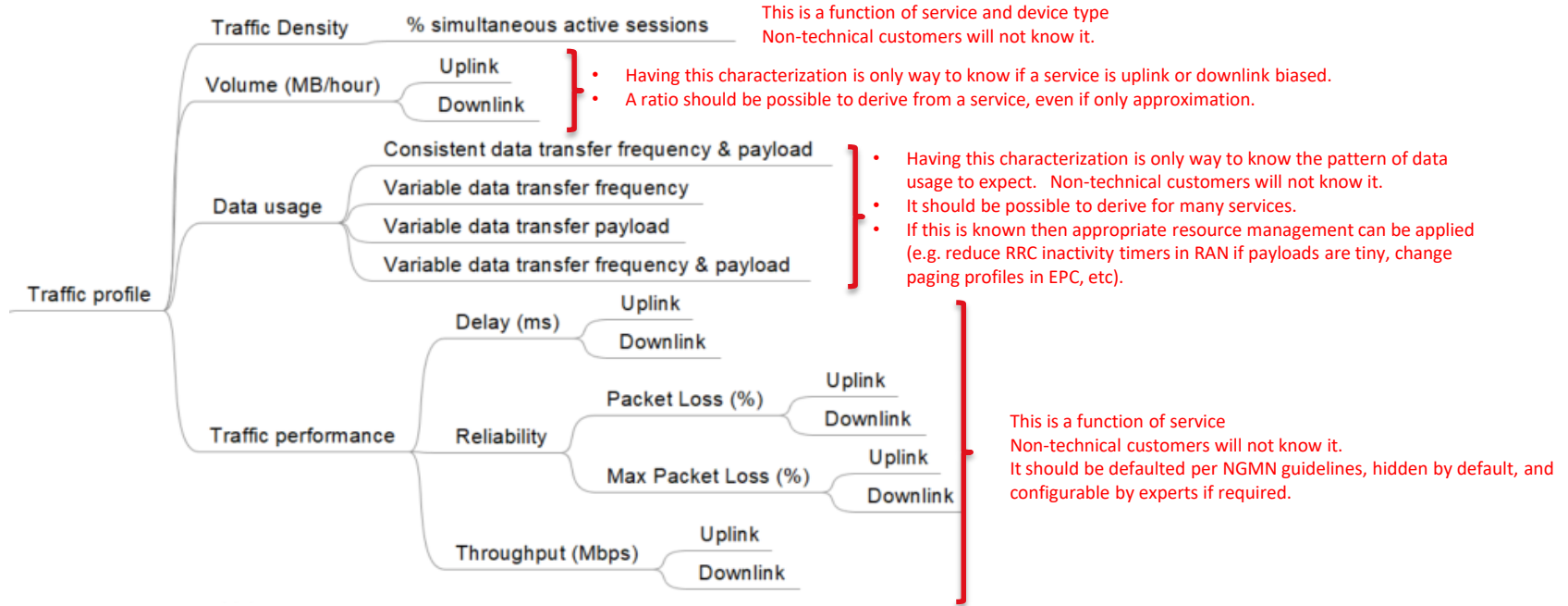
Smartphone, Feature Phone, Tablet, IOT Device, Wearable, Dongle, Modem, WLAN Router

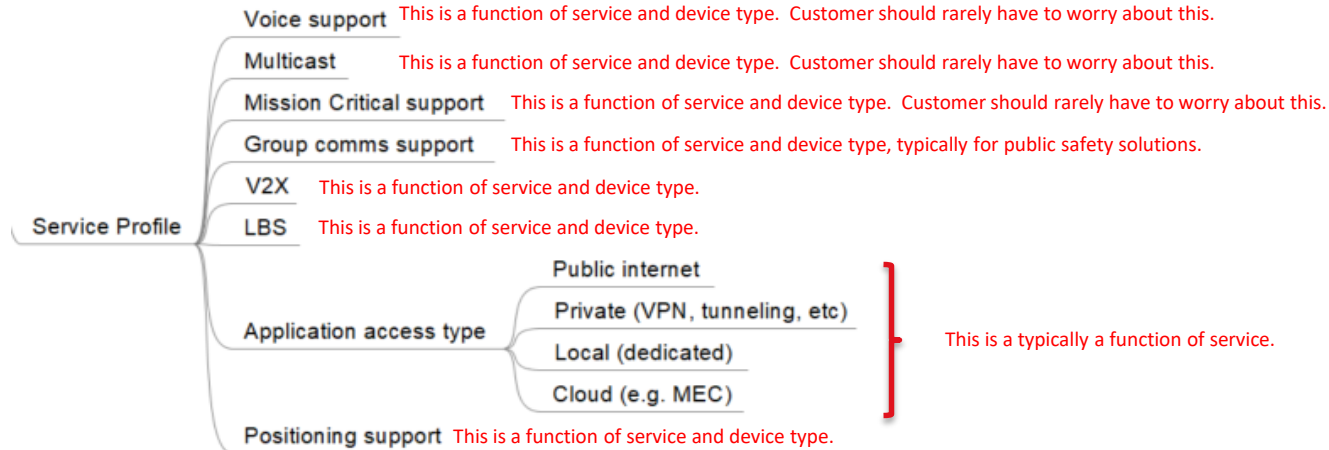
IMEI TAC
- IMEI-TAC
- Brand name
- Manufacturer
- Frequency Bands
- Designation Type
- Allocation Date
- Radio Interface
- Operating System
- Support for NFC (Y/N)
- Support for Bluetooth (Y/N)
- Support for WLAN (Y/N)
- Addition info

Service	Service Family	Candidate Designation Type
Mobile video surveillance	Massive IOT	IOT Device Modem WLAN Router
Smart wearables Sensor networks	Massive IOT	Wearable IOT Device WLAN Router
Pervasive video Operator cloud services Dense urban society	High density MBB	Smartphone Dongle WLAN Router Modem
Smart office	High density MBB	Dongle WLAN Router Modem
HD video/photo sharing in stadium /open-air gathering	High density MBB	Smartphone
50+ Mbps everywhere	Low density low cost MBB	Smartphone WLAN Router Modem Dongle
Ultra-low cost networks	Low density low cost MBB	Smartphone WLAN Router Modem Dongle

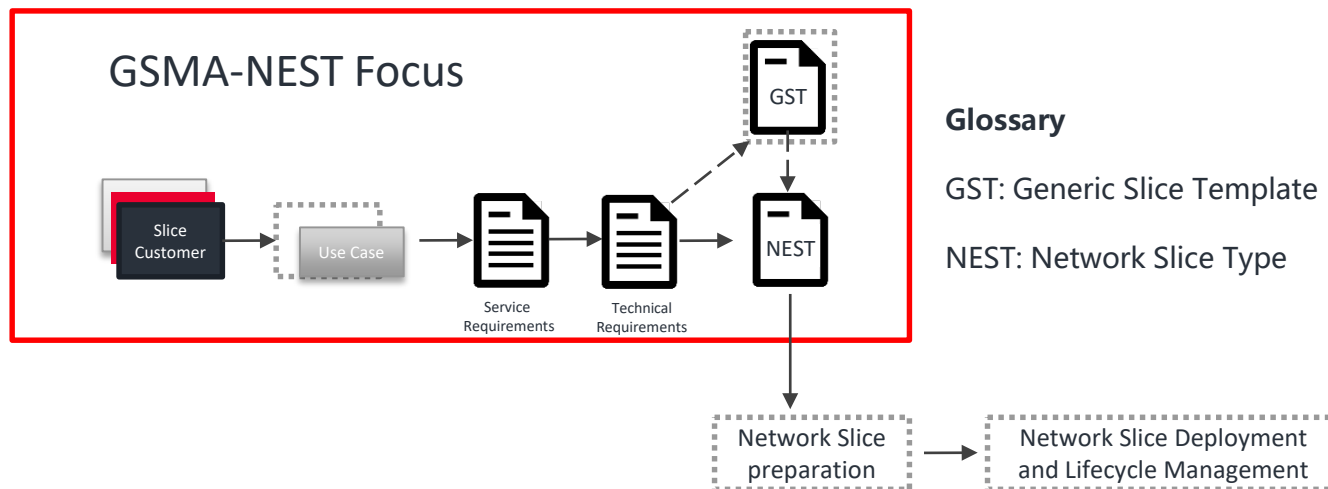
Service	Service Family	Candidate Designation Type
Automatic traffic control/driving Collaborative robots Remote object manipulation – Remote surgery	Reliable communications	Modem
eHealth: Extreme Life Critical Public safety 3D Connectivity: Drones	Reliable communications	Modem Smartphone
High speed train Moving Hot Spots Remote computing	High velocity MBB	Modem WLAN Router
3D Connectivity: Aircrafts	High velocity MBB	Modem
News and information Broadcast like services: Local, Regional, National	Broadcast	Modem WLAN Router Smartphone

We mention this here as 2 of the 3 items appear not to be covered by GSMA NEST work to date.



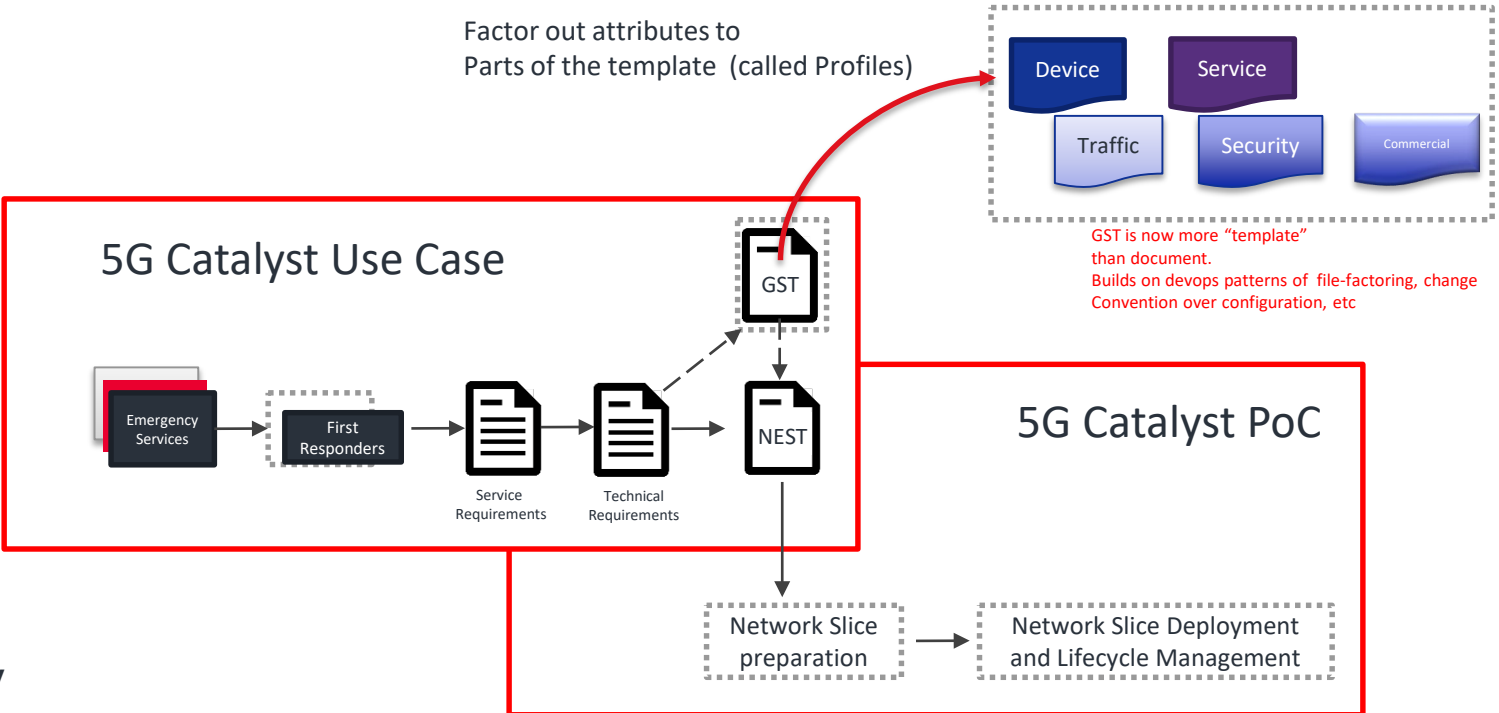


GSMA Network Slicing Taskforce



Catalyst : Enhance the GST

Catalyst Contribution to GSMA



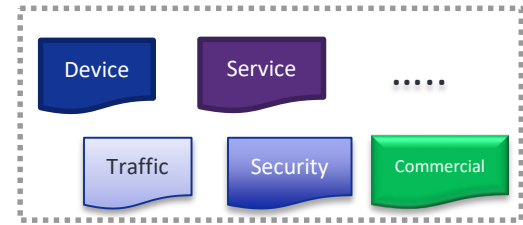
Glossary

GST: Generic Slice Template

NEST: Network Slice Type

Template profiles

- In essence we believe that abstracting away some, or in some cases, all, of the service details makes sense for the vast majority of users.
- It should be possible to use template profiles (or fragments) to populate the vast majority of parameters when that is needed.
- We think a core set of “leading questions” can be used, followed by auto-population using profiles.



Use of slice types – we think this is wrong at CFS level

- Every UI (and API) we have seen in the industry for slice management has selection capabilities about eMBB, uRLLC, mMTC
 - These are meaningless to users of services (other than the most technical of users), and shouldn't be needed
 - uRLLC as a categorization is also a very blunt instrument that arguably should have been split up by 3GPP as follows
 - Ultra reliable
 - Low latency
 - Ultra reliable and low latency
 - The result of the “catch-all” uRLLC will be that some KPIs may not make sense, depending on the service.
- We don't believe the user needs to be asked about slice type at all, the service family (term used by NGMN) should drive the selection of profiles, and different profiles will be pulled in as appropriate.