5G North East England Programme

5G NEE – NFV SIG
Presentation deck

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DIGITAL CATAPULT CENTRE
NORTH EAST & TEES VALLEY

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North East
Local Enterprise Partnership

UNIVERSITY OF SURREY
5G INNOVATION CENTRE

SERVICE DIRECT

“Anyone for a Segment?”

This session will explore emerging use-cases: some involving end to end co-ordination of the user journey across multiple domains and some with more limited requirements. Can they all add up to better monetisation of available spectrum?

The concept of Segment

- Market segmentation
- New service models link multiple market segments (Innovation)
- Slices serve market requirements (continuously evolving)
- Brokerage based on market intelligence
- Map to NFV dynamism

Some Use Cases involving Passenger Journey

- Home – Transport – Work – Transport – Home
- Home – Transport – Shopping – Transport – Home
- Home – Transport – Leisure (Tourism) – Transport – Home
- Home – Transport – Leisure (Sport Venue) – Transport – Home
- Home – Transport – Health – Transport – Home
- …

➢ what do they have as common requirements?

Today

- Passengers face multiple networks, preventing them from having a uniform and continuous experience of services
- Their journey is then a multi-network, multi-segment, non organized/orchestrated journey, both at user experience and network levels
- This is partly due to fix boundaries of networks, physical network equipment not scaling up according to demand, disjointed and not coordinated operations of several operators covering the geographical area traversed by the passenger
- A still too strong separation in silos both at technical level and business level between involved operators and service providers

Tomorrow

- Passengers should face ONE virtual network, allowing them to get a uniform and continuous experience of services
- Their journey will start and end in the same virtual network since
  - fix boundaries of networks will be removed,
  - physical network equipment will be replaced by scalable VNFs,
  - physical operators networks resources will form a single virtual slice covering the geographical area traversed by the passenger
- Both SDN/NFV (incl. in 5G) technologies and innovative business models will remove silos between involved operators and service providers

An example between a transport operator and a large retail operator

- Home – Transport – Shopping – Transport – Home

- Today, a consumer will start his journey connected at his home over his home Wi-Fi connection (relayed over DSL or Fibre). He will then move outdoor under the coverage of his Mobile Operator. He will then get to the Metro station (Transport Operator). There he might loose the MNO connectivity but enter the coverage of the Transport Operator (Public Wi-Fi bound to his ticket or open in this closed area). Then he will quit at the destination Metro station, losing the Transport Operator's coverage to return if available to his MNO connectivity, whereby possibly not if the Metro Station is directly in the indoor of the large Retail Operator's shopping mall where free Wi-Fi is offered by this last one. The phone makes the decision between MNO and free Wi-Fi based on pre-provisioned rules (either from user or from MNO or phone manufacturer).
- The various networks do not cooperate, the user device is only a display for information searched by the user, "some" coordination of information may be achieved based on the Retail App or the Transport Operator App, but there is no unified, user-centric, experience for the end-user.
- FNO, MNO, Transport Operator, Retail Operator, Delivery/Fulfilment Operator are separated entities not collaborating for the Quality of Experience of the Consumer.

An example between a transport operator and a large retail operator

- Home – Transport – Shopping – Transport – Home

- Tomorrow, a consumer will be associated to a joint slice between the FNO, the MNO, the Transport Operator and the Retail Operator based on E2E SLICING and its orchestration which is enabled by NFV and SDN.
- FNO, MNO, Transport Operator, Retail Operator and Fulfilment Operator are separated entities COLLABORATING for the Quality of Experience of the Consumer.
- This kind of scenario brings a dimension of “ephemeral” bandwidth and connectivity requirements.
- Beside the QoE for the Consumer, new business models can be enabled now : joint ticketing and purchasing experience (transport ticket as a reward for the purchase of goods at the Retail operator), Park&Go – Travel - Purchase – Fulfilment (collection and delivery of purchased goods) models removing traffic jam from towns and commercial centres while increasing passengers rates for the Transport Operator during off-peak periods (even creating new peak periods).
- Enablers : SDN/NFV, Slices and joint location based Business app.

Ephemeral Use Cases

One-off and periodic events like:

- Festivals, Exhibits, Airshows…
- Games & sports events
- Open-air Music Concerts
- Communities events
- …

will require “ephemeral” networks. This means dynamicity, ad-hoc instantiation, accommodation with existing long terms use cases/networks.

They may have to or choose to use other spectrum bands when possible.

They are today demanding too long provisioning and complex business processes.

Tomorrow they should be able to come to life in minutes thanks to SDN/NFV/5G slicing…

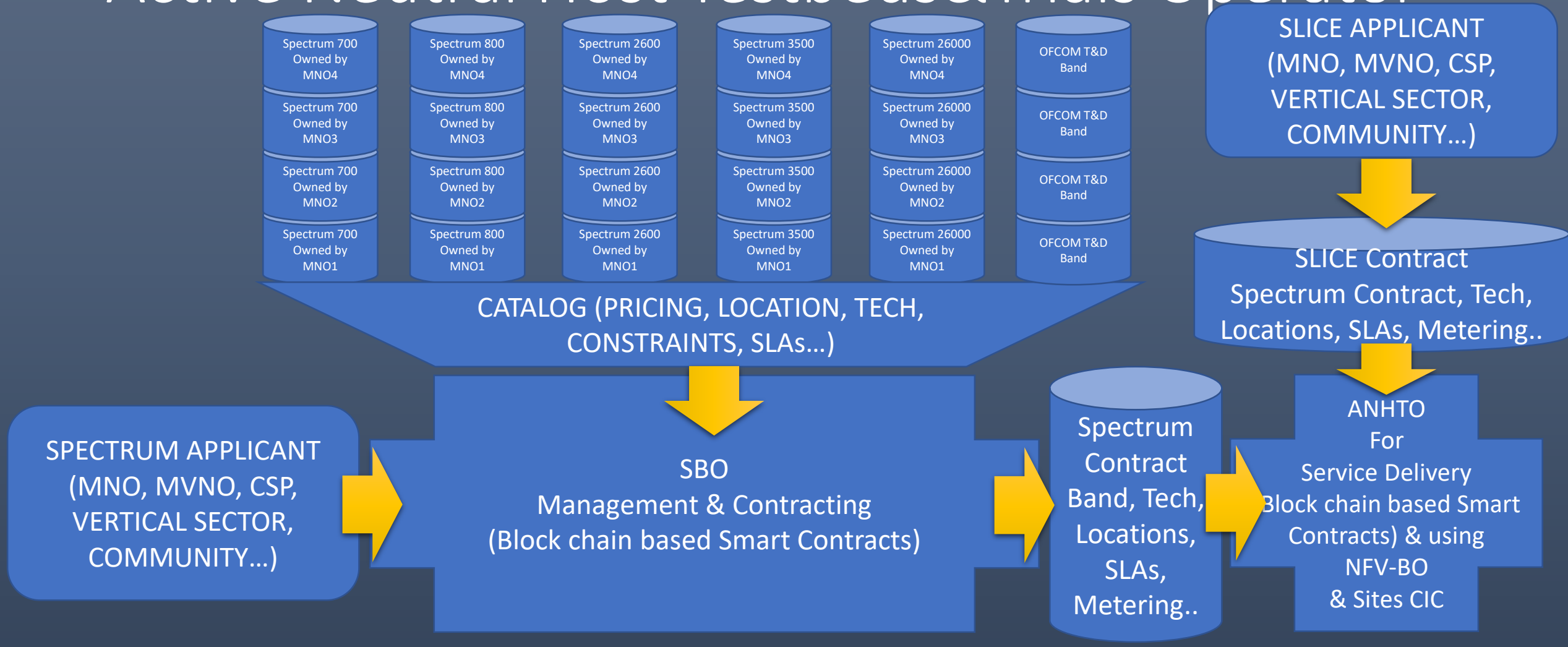
Why do we speak about “Segment(s)”

- Segments are geographical network segments; they represent a network coverage unit under a single authority
- Remote communities, mobile communities, ephemeral communities may want to get coverage earlier than the time set by the first MNO planning to serve their needs => they may fund their own “segment” of the network in exchange to gaining a discounted access to the larger network (Smart Grid like model)
- How those communities interests can be taken into account in the larger marketplace and won’t be forgotten due to lack of direct clear ROI for operators?

How can we bring Spectrum Management and SDN/NFVs together to enable those new use cases?

- Make Spectrum usage more flexible and affordable, less concentrated
- Enable Spectrum leasing and pooling
- Enable new marketplace for Slices (using SDN/NFV) and derived spectrum requirements (due to Slices SLAs and geopolitical constraints)
- Create new roles in the value chain:
  - Spectrum Brokering Operators
  - Active Neutral Host Tower Operators
  - NFV Brokering Operators (VNFs Stores)

Spectrum Brokering Operator + Active Neutral Host Testbeds&Trials Operator



Conclusion

- NFV monetization will be supported by the arrival of commercial 5G deployments, specially in non legacy eMBB scenarios
- SDN + NFV are the warrants of the 5G + Fibre wider deployments enabling e2e slicing and according NSaaS business models.
- 5G NE has the ambition to implement a large network of testbeds/slices to explore many use cases, using the regional assets like its Metro network, its fibre networks, radio sites and a carrier grade data centre.
- 5G NE will engage with its local communities to let them explore those models and services together, reflecting national communities of same kind.
- 5G NE has the ambition to implement an innovation process enabling the exploration of new use cases and new business cases including those new operators models (SBO, ANHTO and NFV BO)
- 5G NE has the ambition to create new market places and more effective demand for NSaaS (and its underlying SDN/NFV)
- 5G NE envisions the effective creation of those operators in its region

➢ Will you join?

THANK YOU

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Backup

NFV Brokering

- E2E Slices will need to use VNFs due to their dynamic nature in terms of capacity demand and even lifecycle
- SLA requirements, diversity and economic viability of slices (including TCO/ROI) will need a large choice of VNFs and VNF providers working together to provide E2E tested chains of VNFs with different SLAs and pricing models
- Some VNFs will be owned, some will be leased, some will be shared
- Catalogues and stores will provide a new marketplace enabling new business models and value chains
- This Marketplace and the demand side requirements need to be organized and advertised to enable even smaller communities to access to this market in new innovative business models, which are strategic even if they do not exhibit today a clear short term ROI