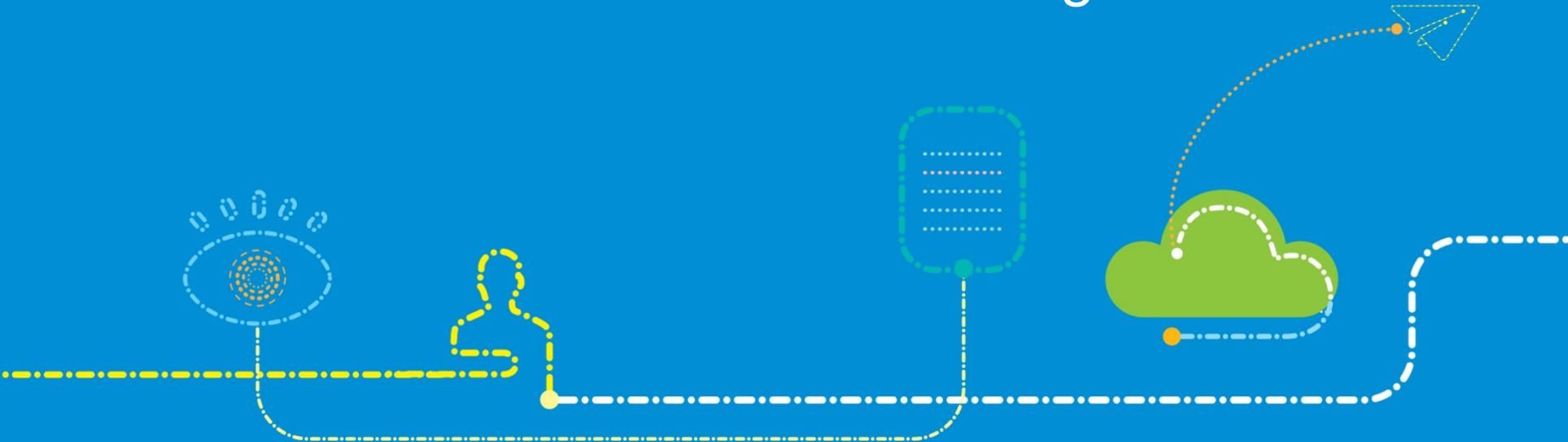


Source: ZTE, Sanechips
Agenda: 8A.5

Further enhancement of RAN slicing in Rel-18



Rel-18 network slicing progress in SA1 and SA2

- SA1: Have finished study on Enhanced Access to and Support of Network Slice (FS_EASNS) with the Rel-18 requirements added in chapter 6.1 in TS22.261.
- SA2: Study on Enhancement of Network Slicing Phase 3 (S2-2109356) has been technically endorsed.

New requirements identified by SA1 SI FS_EASNS (1)

New requirements identified by SA1 SI FS_EASNS	Potential RAN impact
<p>For a UE authorized to access multiple network slices of one operator which cannot be simultaneously used by the UE (e.g. due to radio frequency restrictions), the 5G system shall be able to support the UE to access the most suitable network slice in minimum time (e.g. based on the location of the UE, ongoing applications, UE capability, frequency configured for the network slice).</p>	<ul style="list-style-type: none"> • Slice remapping by NG-RAN or CA DC enhancement UE to access the slice not available in the current RA via CA or DC [RAN3,RAN2] • Slice aware cell reselection or redirection [RAN2] • Slice specific Random access for MT triggered access with the intended slice information indicated to UE [RAN2]
<p>5G system shall minimize signaling exchange and service interruption time for a network slice, e.g. when restrictions related to radio resources change (e.g., frequencies, RATs).</p>	
<p>For a roaming UE activating a service/application requiring a network slice not offered by the serving network but available in the area from other network(s), the HPLMN shall be able to provide the UE with prioritization information of the VPLMNs with which the UE may register for the network slice.</p>	/
<p>The 5G system shall be able to minimize power consumption of a UE (e.g. reduce unnecessary cell measurements), in an area where no authorized network slice is available.</p>	Provision of the availability area of slices and RRM relaxation [RAN2]
<p>When a UE moves out of the service area of a network slice for an active application, the 5G system shall be able to minimize impact on the active applications (e.g., providing early notification).</p>	Provision of early notification or slice remapping[RAN2, RAN3]
<p>The 5G system shall support a mechanism for a UE to select and access network slice(s) based on UE capability, ongoing application, radio resources assigned to the slice, and policy (e.g., application preference).</p>	<ul style="list-style-type: none"> • Evaluate whether the R17 slice based cell reselection and RACH can meet such requirement or new enhancement needed. [RAN2] • Slice specific Random access for MT triggered access with the intended slice information indicated to UE [RAN2]

New requirements identified by SA1 SI FS_EASNS (2)

New requirements identified by SA1 SI FS_EASNS	Potential RAN impact
<p>The 5G system shall support a mechanism to optimize resources of network slices (e.g., due to operator deploying different frequency to offer different network slices) based on network slice usage patterns and policy (e.g., application preference) of a UE or group of UEs.</p>	<ul style="list-style-type: none">• Evaluate whether the R17 slice based cell reselection and RACH can meet such requirement or new enhancement needed. [RAN2]• Slice remapping [RAN3]
<p>For UEs that have the ability to obtain service from more than one VPLMN simultaneously, the following requirements apply:</p> <ul style="list-style-type: none">--When a roaming UE with a single PLMN subscription requires simultaneous access to multiple network slices and the network slices are not available in a single VPLMN, the 5G system shall enable the UE to:--be registered to more than one VPLMN simultaneously; and--use network slices from more than one VPLMN simultaneously--The HPLMN shall be able to authorise a roaming UE with a single PLMN subscription to be registered to more than one VPLMN simultaneously in order to access network slices of those VPLMNs.--The HPLMN shall be able to provide a UE with permission and prioritisation information of the VPLMNs the UE is authorised to register to in order to use specific network slices. <p>NOTE: The above requirements assume certain UE capabilities, e.g. the ability to be connected to more than one PLMN simultaneously</p>	UE capability

Technically endorsed network slicing study item in SA2 (1)

Objectives in technically endorsed network slicing study item in SA2	Potential RAN impact
<p>Study whether and how to address the following scenario in order to provide service continuity: an existing network slice or network slice instance cannot serve the PDU session in current TA (due to OAM reasons or slice congestion) or target TA (due to mobility), or if the existing network slice instance cannot meet the performance requirements of the applications. The study should investigate whether deployment optimization is sufficient. System optimisations can be considered if valuable.</p>	<p>Service continuity due to non-supported slices or existing slice instance cannot meet the performance requirement of the applications, e.g. slice remapping by NG-RAN or CA DC enhancement UE to access the slice not available in the current RA via CA or DC [RAN3]</p>
<p>Study whether and how to initiate a registration for a rejected S-NSSAI that was rejected in a first TA of the RA but may be available in another TA of the RA.</p>	/
<p>Study whether and how to support the following stage one Rel-18 EASNS requirements related to roaming specified in TS22.261 clause 6.1.2.1, i.e. Requirement on enhancement the information available to the UE in roaming scenarios regarding the availability of network slices in VPLMNs available in the roaming country, in order to allow the UE to select and obtain services from the VPLMN supporting the network slices which UE may wish to use.</p>	/
<p>Study whether and how to enhance the system to ensure network controlled behaviour of network slice usage including UE registration and PDU Session establishment (e.g. so that when performing NSAC the network slice can serve UEs/PDU Sessions with actual activity).</p>	/

Technically endorsed network slicing study item in SA2 (2)

Objectives in technically endorsed network slicing study item in SA2	Potential RAN impact
Study deployment considerations when a service provided has a Service Area that does not overlap with the already deployed Tracking Areas and/or have a limited life time, and how existing mechanisms including network slicing can help support such scenarios. If existing mechanisms are concluded to be not sufficient to achieve the scenarios, study whether and how additional mechanisms can resolve the analysed gap.	Enhancement on measurements and/or mobility in Idle/inactive mode and/or connected mode when the usage of slice is limited within certain area or time range [RAN2, RAN3]
Study whether and how to support AMF re-allocation due to new S-NSSAI requested by the UE in connected state	/
Study whether and how to enhance support of networks with multiple NSACFs covering different service areas, and enhance Network Slice Admission Control for roaming scenarios.	/
Study how to support the RAN work on enabling Slice Groups for AS and the slice prioritization mechanism	Potential impact in AS layer, NAS-AS interaction, and interaction among network nodes after slice grouping and prioritization is enabled by SA2 [RAN2, RAN3]

Proposal on further enhancement of RAN slicing in Rel-18

- **Observation:** Clear impact on RAN can be seen from the new requirements identified in SA1 FS_EASNS and the objectives in technically endorsed study on Enhancement of Network Slicing Phase 3 in SA2.
- **Proposal:** If SA1 FS_EASNS is approved in SA2, then a WI will be required in Rel-18 late package to address the corresponding impact on RAN

Thanks



Tomorrow never waits

