



LFN Developer & Testing Forum

E2E Network Slicing use case : Overview & Istanbul Release Demo

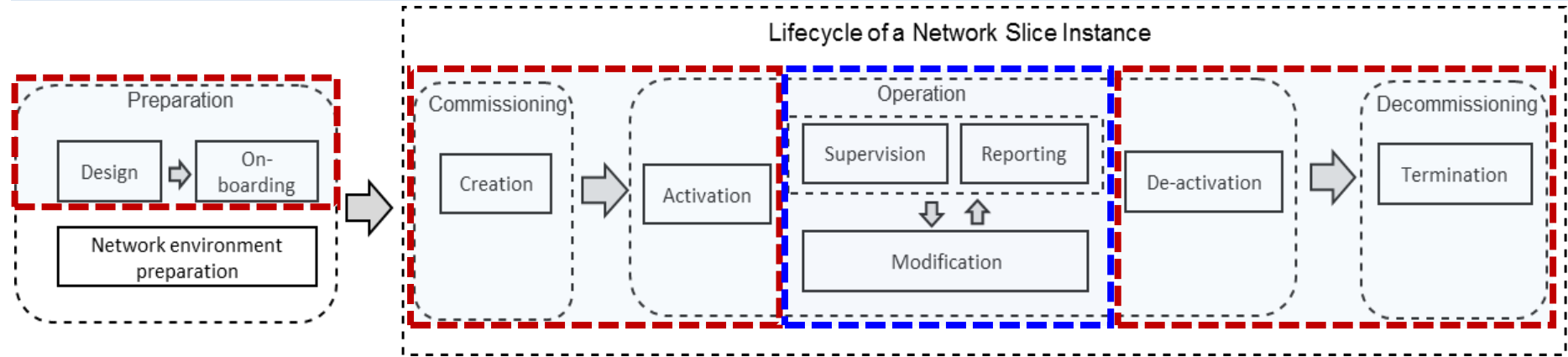
Participants: CMCC, Wipro, STL, Huawei, AT&T, IBM, LTTS, DT, TIM, QCT, Amdocs, Tech Mahindra, Reliance Jio, Tencent, China Telecom, highstreet technologies

Presenters: Lin Meng (CMCC), Ahila P (Wipro),

E2E Network Slicing: Objectives


Objectives

1. Implement ONAP-based Slice Management functions defined by 3GPP (CSMF + NSMF + NSSMF)
2. Demonstrate e2e slice design, instantiation and operation, including RAN, Core and Transport slice sub-nets
3. Provide flexible architecture choices to operators for deployment scenarios (ONAP based xMF or 3rd party xMF)



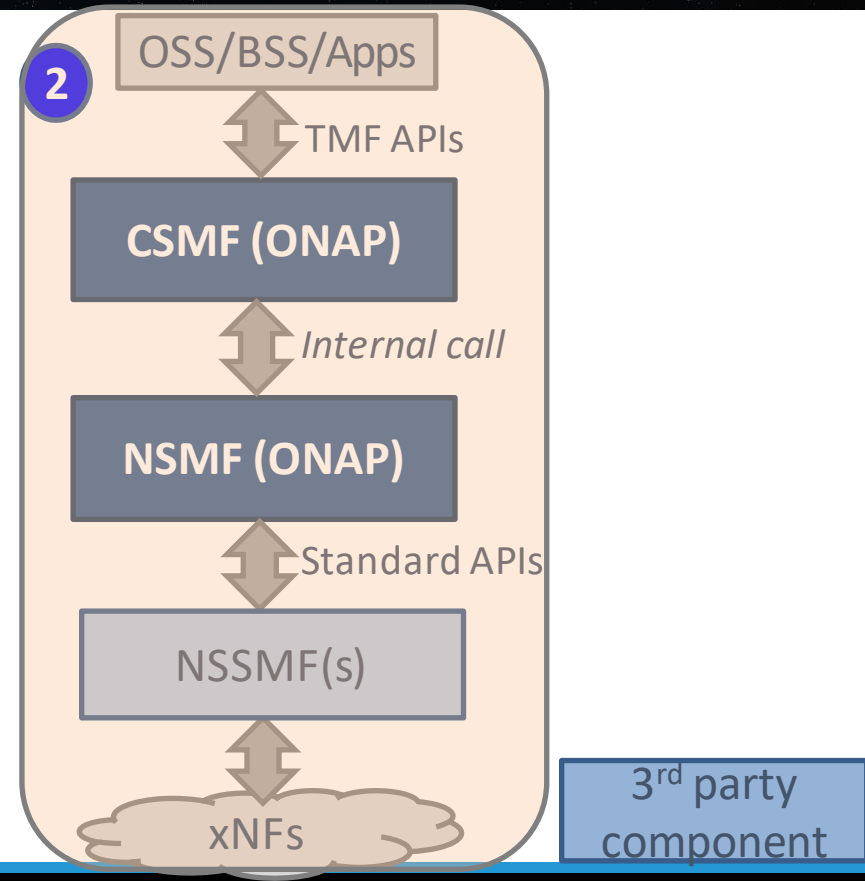
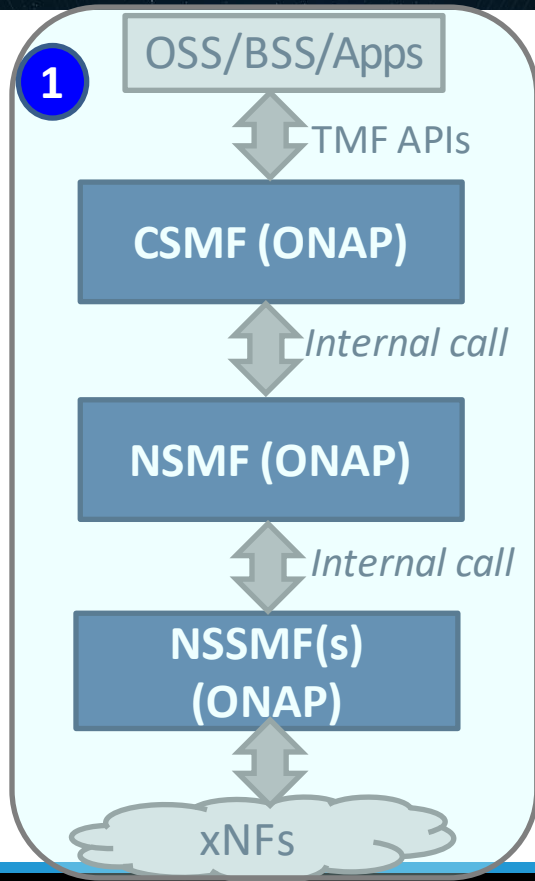
Ref.: 3GPP TS 28.530

 Frankfurt/Guilin scope

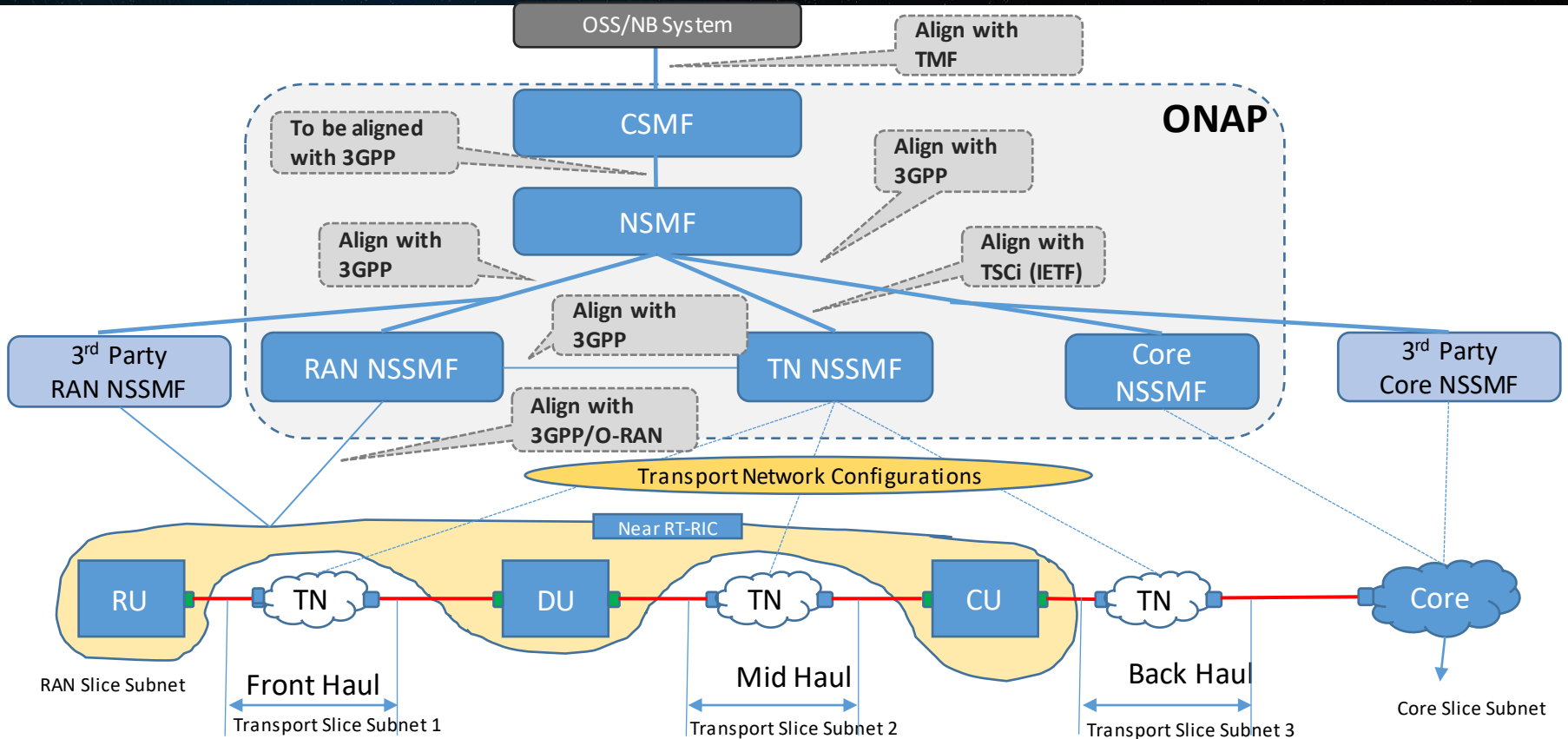
 Focus area for Honolulu, Istanbul and beyond

- **Design and pre-provision:** Creation of necessary slice/slice sub-net templates.
- **Instantiation/Configuration, Activation/Deactivation and deallocation/termination** of NSIs, including its constituent NSSIs (RAN, Core and Transport).

E2E Network Slicing - Supported Architectures

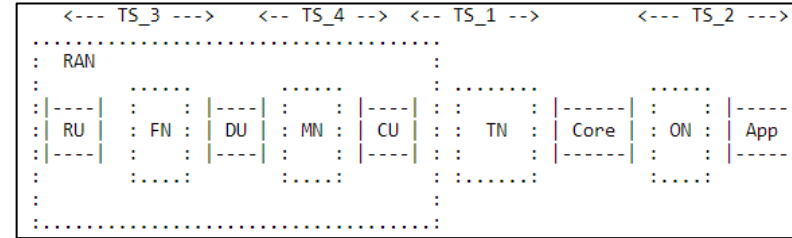
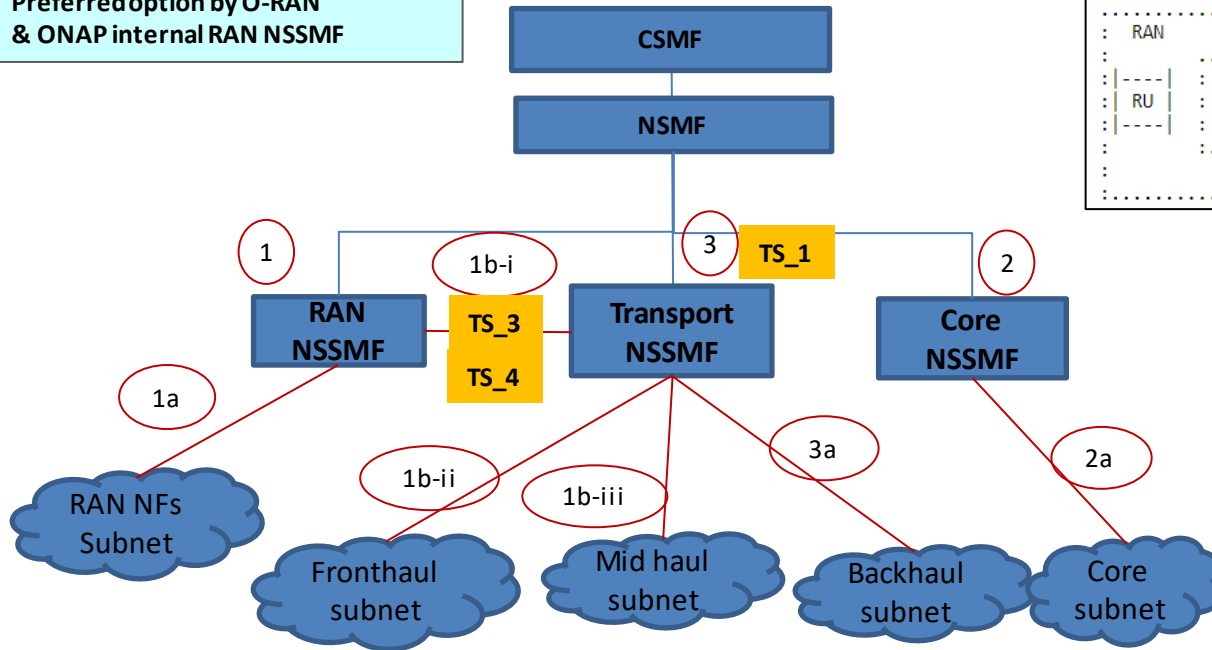


E2E Network Slicing: Architecture & Interfaces



RAN & Transport Subnet: Interaction Scenario 1

Preferred option by O-RAN & ONAP internal RAN NSSMF



- TS_1 is backhaul transport slice; TS_3, fronthaul; TS_4, midhaul.
- TN MD (T-NSSMF) receives TS_1 from NSMF (step 3), and TS_3 and TS_4 from RAN NSSMF (step 1b-i).
- TN MD then configures backhaul (3a), fronthaul (1b-ii), and midhaul (1b-iii), respectively.

- RAN NSSMF shall be responsible for determination of Slice Profile of FH, MH and RAN NFs.
- RAN NSSMF shall be responsible for entire RAN subnet comprising FH and MH (stitching together, CL actions, etc.)

Istanbul Release Highlights

- E2E Network slicing with internal NSSMFs (**Option 1**)
 - **Istanbul Release Update:** Integration with NSMF and NSSMFs for shared and non-shared slices is completed; Integration with the ACTN Simulator is done
 - **Achieved in Honolulu Release:** E2E Slicing with external Core NSSMF Simulator was done, ACTN Simulator was bypassed.
- E2E Network slicing with external Core & RAN NSSMFs (**Option 2**)
 - **Istanbul Release Update:** Slice reuse is implemented and tested; OOF solution is incorporated and considered for E2E Slice termination
 - **Achieved in Honolulu Release :** E2E Slice creation was done; termination was completed without OOF involvement
- NSMF driven Transport (FH, MH) Slices (**New**)
 - NSMF is responsible for E2E slice including the TN - FH & MH slices

Istanbul Release Highlights

- **CPS Integration (New)**
 - CPS is used in place of Config DB for RAN slice reuse, activate/deactivate and terminate scenarios
- **Closed Loop**
 - **Istanbul Release Update:** E2E Closed loop testing is completed. CPS is integrated in the closed loop flow except for applying the new configurations to RAN slice.
 - **Achieved in Honolulu Release:** Closed loop with Config DB was completed; PM data generation was skipped, directly data was fed to PM Mapper
- **KPI Monitoring**
 - **Istanbul Release Update:** Policy driven KPI computation is implemented
 - **Achieved in previous releases:** KPI computation formula was read from app-config

H-release:

https://wiki.onap.org/download/attachments/93011484/E2E_Network_Slicing_LFN_Jun_2021_Demo.mp4?version=1&modificationDate=1623170076000&api=v2

Demo Items

S.No	Scenarios	Lab Environment
1	E2E Slice creation with internal CORE, RAN and TN NSSMFs	Win Lab, Rutgers University
2	E2E Slice Reuse with CPS integration (with internal CORE, RAN and TN NSSMFs)	Win Lab, Rutgers University
3	Option2 (External NSSMFs) - E2E slice reuse, termination	Win Lab, Rutgers University
4	NSMF driven TN Slices - E2E slice creation	Internal Lab, Wipro

Operation Guidance: <https://wiki.onap.org/display/DW/User+Operation+Guidance+-+Istanbul+Release>

Internal Demo Artifacts: <https://wiki.onap.org/display/DW/Istanbul+Release+Tracks+-+Demo+Artifacts>



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E2E Network Slicing - Demo

Pending Commits or JIRAs

- <https://jira.onap.org/browse/SDNC-1654>
- <https://gerrit.onap.org/r/c/so/+/125737>
- <https://jira.onap.org/browse/SO-3835>

E2E Network Slicing Alignment with SDOs

Standards Body	Alignment Reference(s)
3GPP (Rel. 16)	<ul style="list-style-type: none">○ TS 28.530 (Concepts, requirements)○ TS 28.531 (Slice and Slice sub-net LCM)○ TS 28.541 (Network Resource Models)○ TS 23.501 (Procedures in Control Plane)○ TS 28.552 and TS 28.554 (PM and KPIs)
TMF	<ul style="list-style-type: none">○ TMF 641 (Service Order – CSMF NB)○ TMF 628 (PM and KPI monitoring – just started)
ETSI	<ul style="list-style-type: none">○ ZSM 002 ZSM Framework○ ZSM 003 E2E Network Slicing Architecture○ ZSM 009 Closed-loop Automation
IETF	<ul style="list-style-type: none">○ draft-rokui-5g-ietf-network-slice-00○ draft-ietf-teas-actn-vn-yang○ RFC 8795: YANG models for TE topologies
O-RAN	<ul style="list-style-type: none">○ O1 (RAN Configuration, notifications, PMdata) – in progress○ O2 (not started yet)○ A1 – just started○ RAN architecture and functional split (Non-RT RIC, Near-RT RIC, SMO) – in progress



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Thank You