

**Busan, Korea, June 13 – 16, 2016**

**Title: AT&T Views on Phase 1 Acceleration of Next Generation Systems**

**Agenda Item: 9.3**

**Document for: Discussion**

**Source: AT&T**

# AT&T Views on Phase 1 Acceleration of Next Generation Systems

Note: This contribution is being provided to both TSG-RAN #72 and TSG-SA #72.



# Introduction

- AT&T is aware of some discussions regarding accelerating the timelines on Next Generation Systems
- One proposal circulated is being termed “Phase 0”
- A “Phase 0” is not an appropriate approach for 3GPP
- AT&T DOES support consideration of an accelerated Phase 1 in 3GPP and offers its views

# 3GPP Timeline – Next Gen (NG) System Architecture and NG CN

## Any phased NG approach needs to address NG system architecture and NG CN in the initial phase

- Work on NG System Architecture and NG CN needs to be aligned with NG radio work for timing and content
- We believe a baseline NG System Architecture and CN work can be completed in Release 15 and in synch with first phase of normative work for NG RAN. Its features can further be enhanced in Release 16
- Launching of a NG RAT without a NG CN will impact target timelines for a deployment of a NG CN
  - Increases dependency of new NG RAT on legacy EPC and creates complex roaming scenarios for NG

## Any phased approach that results in fragmentation of 5G ecosystem should be avoided

- A phased approach towards NG work should not result in non-compatible NG UEs and base stations for different phases of NG
- Operator expectations for the launch of NG networks are:
  - UE's and NG RAN will be compatible for different NG phases
  - A solution that allows independent evolution of core network and RAN, and minimizes access dependencies

# Suggested Areas of Contribution Focus for Rel-14 Study

- (to help specify accelerated Phase 1 NG system in Rel-15)

## Functionality needed

Note: This is an SA2 snapshot view on their work priorities for Rel-14

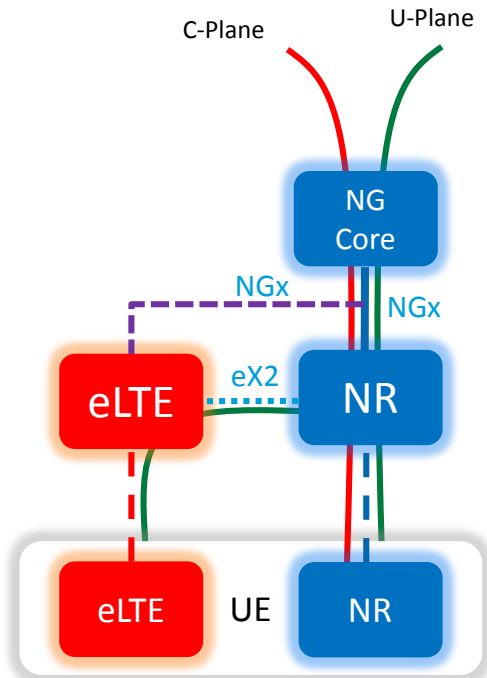
- **QoS**
- **Charging**
- **Policy**
- **Authentication**
- **Mobility management**
- **Session continuity**
- **Session management**

Any Phase 1 acceleration plan should be end-to-end and NOT just RAN centric.

## Architectural enablers to be addressed

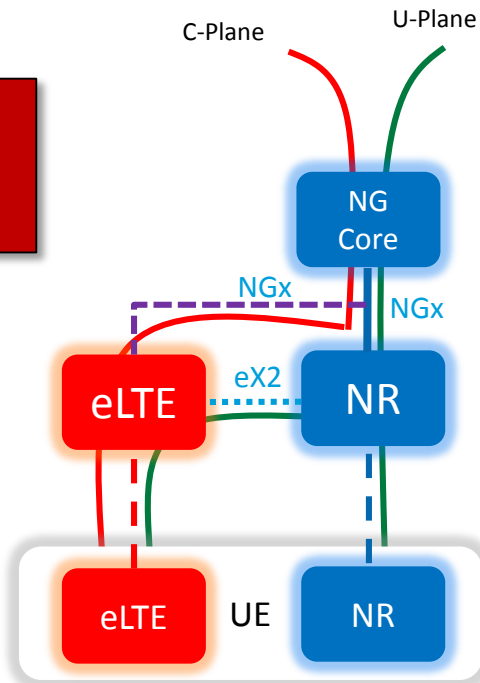
- **Minimizing access dependencies (incl. non-3GPP access integration aspects).**
- **Shared network and roaming scenarios**
- **CP/UP separation**
- **RAN-CN functional split**
- **Architectural impacts of scaling**
- **Network slicing**
- **Co-existence, migration and interworking**
- **Details of Network functions and interaction between them**

# AT&T Interpretation of Non-Accelerated Phase 1 System Model



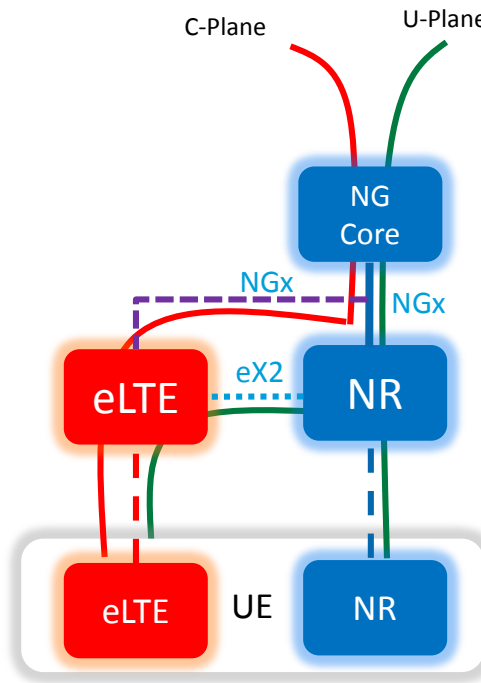
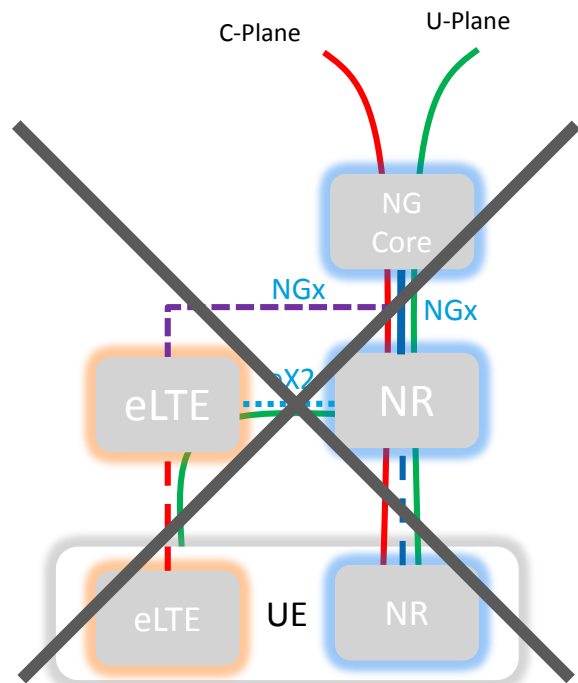
- Stand-alone model anchored on NR
- Likely deployment model if NR is first put on macro cell bands (e.g. 600MHz, 1900MHz)

eLTE evolution and NR  
MUST happen in  
parallel



- Model with C-Plane Anchored on eLTE
- Likely deployment model if NR is first put on small cell bands (e.g. 2300MHz, 3700MHz, >6Ghz)

# AT&T View on Accelerated Phase 1



- For an accelerated Phase 1 we could make the NR RAT non-standalone.
  - C-plane procedures happen on eLTE which is also connected to the NG core
- Stand alone might be supported in accelerated Phase 1 and must be included in Phase 2

# Accelerated Phase 1 Impact on Functionality

Any acceleration will likely come at the cost of some features/functionality not being available in the accelerated Phase 1

Evolution of eLTE also must happen in parallel with accelerated NR evolution

## What might NOT be supported in an accelerated Phase 1

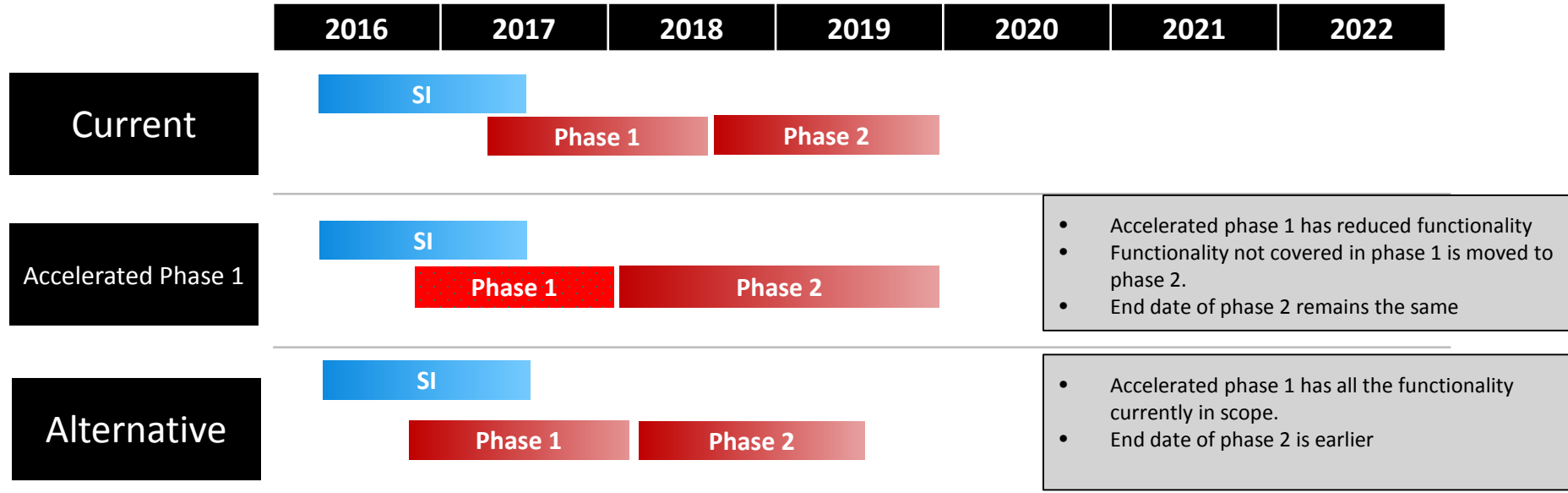
- Standalone operation not supported
- For MIMO framework (transmission modes, feedback framework, codebook) can be based on eFD-MIMO (same as eLTE)
- Non orthogonal access mechanism is not supported (mostly needed for UL mMTC)
- Dynamic TDD
- Self Backhauling (Phase 2)

## What MUST be supported in an accelerated Phase 1

- eLTE/eE-UTRAN
- NR anchored on eLTE
- Dual connectivity with eLTE
- 5G Waveform (e.g. filtered or windowed OFDM)
- Forward compatible numerology
- Self-contained frame structure
- Channel coding
- Frequency 700MHz – 40GHz
- ALL signals and physical channel (synchronization, discovery, broadcast, RACH, sounding, DL/UL control DL/UL data)



# Next Generation Phase 1 Acceleration Timeline



# Proposal for Coordination Between SA & RAN

- Since any Phase 1 acceleration must necessarily take into account aspects of RAN and CORE as noted in this contribution, it follows that RAN and SA must be on the same “page” with regard to acceleration
- To this end, RAN and SA must have on-going tight coordination and dialog on their respective programs in support of acceleration
- Why?
  - To identify from an end-to-end perspective any items that might have been missed or overlooked
  - To ensure synchronized completion of relevant deliverables necessary for accelerated Phase 1
  - To avoid missteps and ensure acceleration of Phase 1 is successful
  - To ensure the 5G work post Phase 1 is appropriately considered and coordinated
- Proposal:
  - It might be useful to have an Ad Hoc/Coordination session between SA and RAN at the June Plenary (*possibly even ahead of and in anticipation of discussions/conclusions in the individual TSGs*) on Phase 1 acceleration
  - On-going coordination dialog amongst the TSG leadership should be maintained on accelerated Phase 1 and downstream impacts as the plan and program unfolds