NOKIA

Nokia Networks

3GPP TSG RAN Meeting #72

RP-160976

Busan, Korea, March 13 - 16, 2016

Title: New WID for enhanced LWIP operation

Source: Nokia, Alcatel-Lucent Shanghai Bell

Document for: Discussion

Agenda Item: 10.1.2

Rel-14 enhanced LWIP

RAN2 led - New Nokia WI proposal(s) to RAN#72

- Rel-13 LWIP was standardized to meet the requirement of allowing eNB-controlled WLAN aggregation in case where no impact to legacy APs is possible
- The performance of the Rel-13 LWIP is reasonable, but could be enhanced further while also considering use cases that leverage the methodology fully, e.g. using LTE UL instead of WLAN UL or allowing flow control.
- As also discussed within eLWA, the use of double encryption may in some cases be consuming for the UE. Therefore, improving on this could benefit the performance.

Rel-14 eLWIP aims to provide improved performance and address use cases not allowed by the basic functionality, similarly as eLWA WID does.

Rel-14 enhanced LWIP
Scope of the WID

Scope of the enhancements:

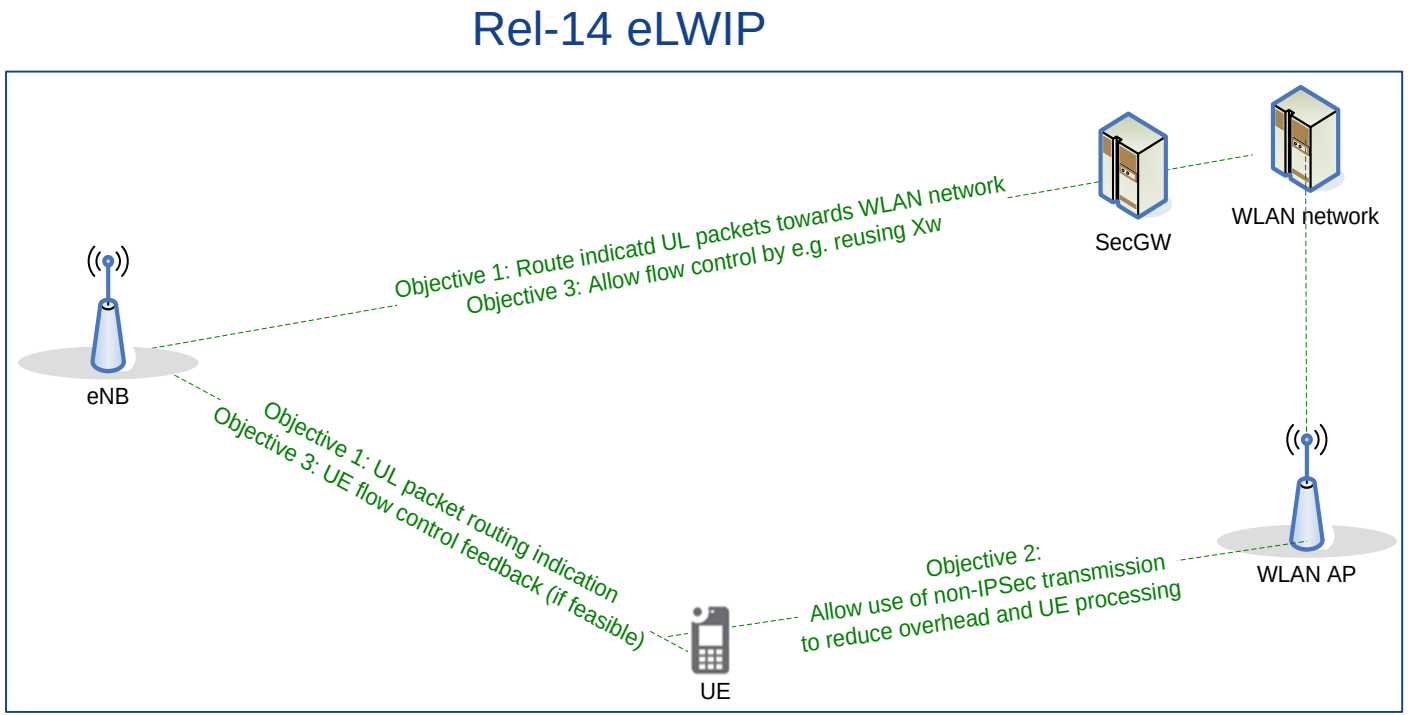
- allow access to local applications over WLAN while connected to LTE Core
- optimize user plane transport for deployments such as trusted and/or collocated WLAN
- optimize performance of LWIP by allowing flow control

Objectives of the WID:

- Support for WLAN-anchored services using LTE access by allowing WLAN UL transmissions to be fully offloaded to LTE (RAN2)
- Enhancements for LWIP performance for trusted and/or collocated deployments by removing requirement of IPSec (SA3, RAN2, RAN3)
- Optimized LWIP performance, e.g. via 1) reuse of Xw for LWIP flow control and WLAN measurements and/or 2) UE feedback if feasible with current LWIP protocol architecture(RAN2, RAN3)

Rel-14 enhanced LWIP

Overview picture of all objectives



Rel-14 enhanced LWIP

1st objective: Local access to WLAN services via LTE UL

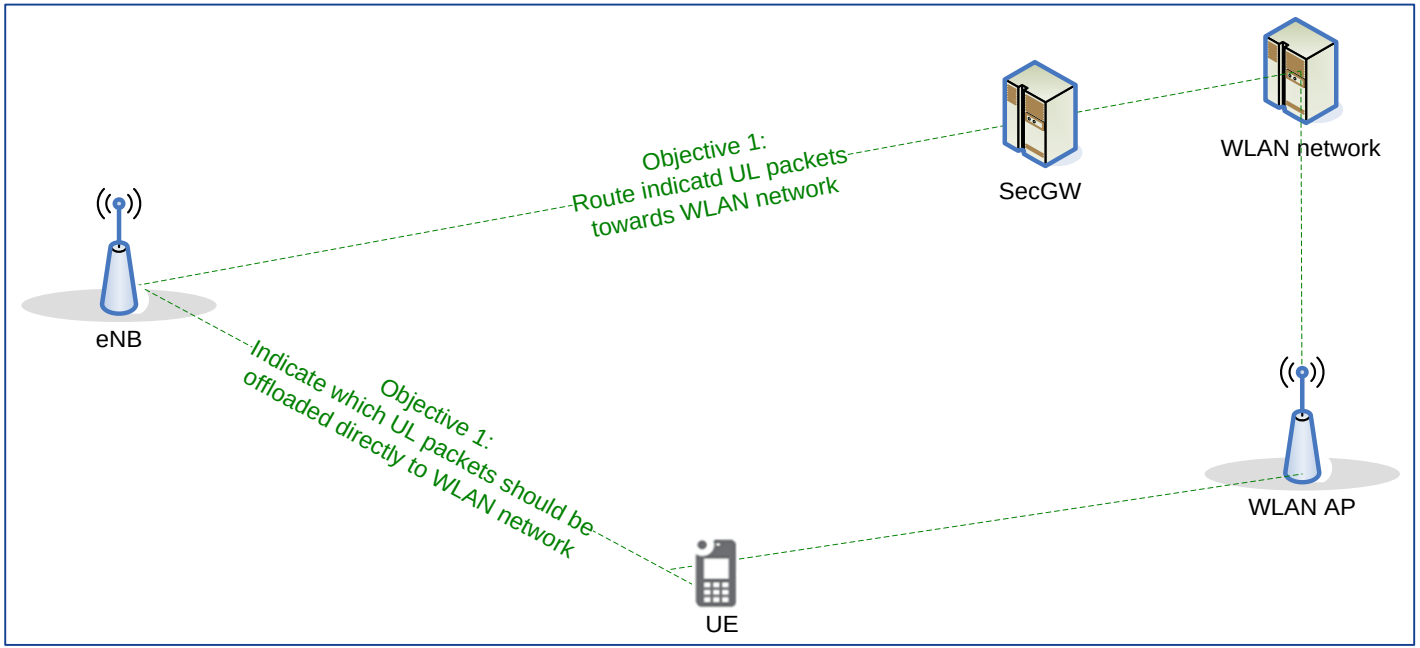
1st Objective:

- Support for WLAN-anchored services using LTE access by allowing WLAN UL transmissions to be fully offloaded to LTE (RAN2)
  - Currently, for accessing enterprise apps, UL IP packets are sent over Wi-Fi access using Wi-Fi core assigned IP addresses.
  - To fully allow WLAN-anchored services also for the case when WLAN UL is sent over LTE, UE can indicate which packets to route towards the WLAN network instead of LTE core
  - This allows use of LTE UL for enterprise Apps, while not requiring any change to Wi-Fi infrastructure

Rel-14 enhanced LWIP

1st objective: Local access to WLAN services via LTE UL

Rel-14 eLWIP



Rel-14 enhanced LWIP

2nd objective: Enhancements in trusted networks or collocated deployments

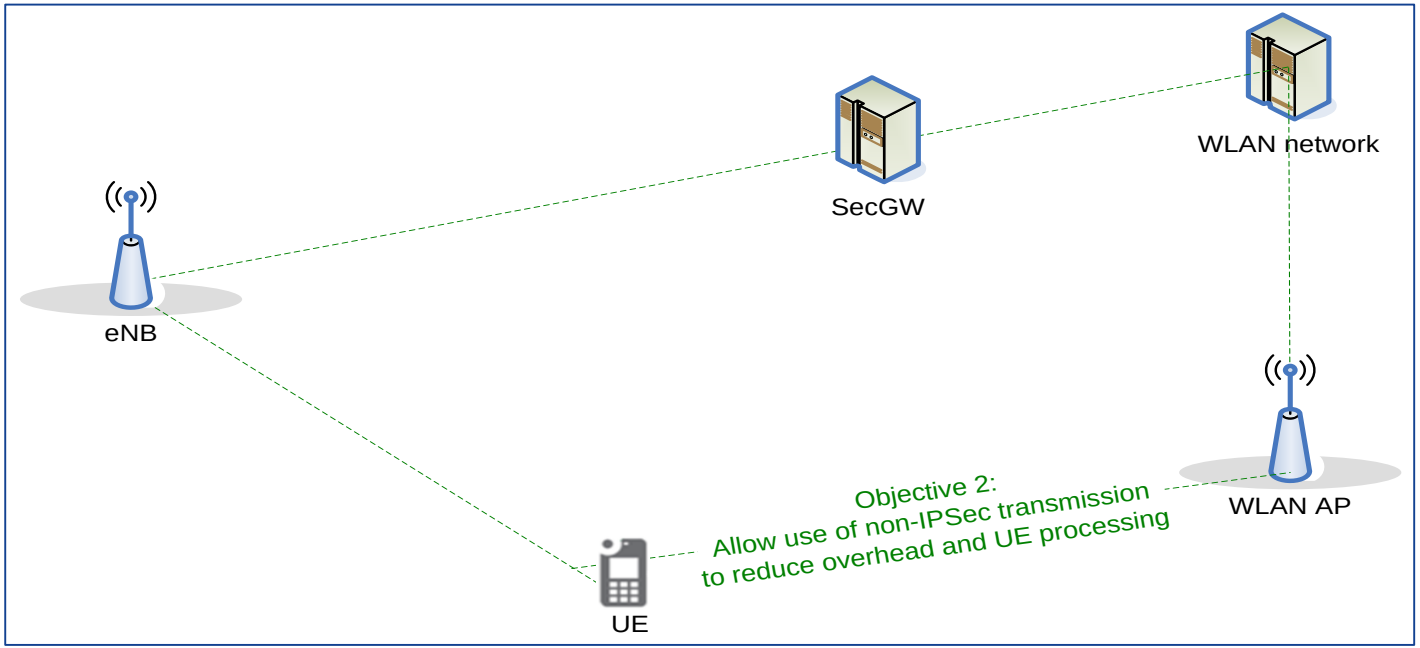
2nd objective:

- Enhancements for LWIP performance for trusted and/or collocated deployments by removing requirement of IPSec (SA3, RAN2, RAN3)
  - LWIP uses IPSec to secure UP transmissions towards UE for general cases, but WLAN air interface also always uses encryption if it is allowed to use LWIP → Double encryption is used, similar to LWA where both PDCP ciphering and WLAN encryption are used
  - In trusted WLAN deployments (e.g. enterprise environments), the path from eNB to AP does not need to be encrypted and therefore the IPSec mainly causes overhead.
  - Hence, use of IPSec could be avoided in some cases in trusted networks (similarly as is done for TWAG)
  - Note: This objective is dependent on SA3's decision whether the removal of IPsec is acceptable from a security point of view.

Rel-14 enhanced LWIP

2nd objective: Enhancements in trusted networks or collocated deployments

Rel-14 eLWIP



Rel-14 enhanced LWIP

3rd objective: Optimized LWIP performance

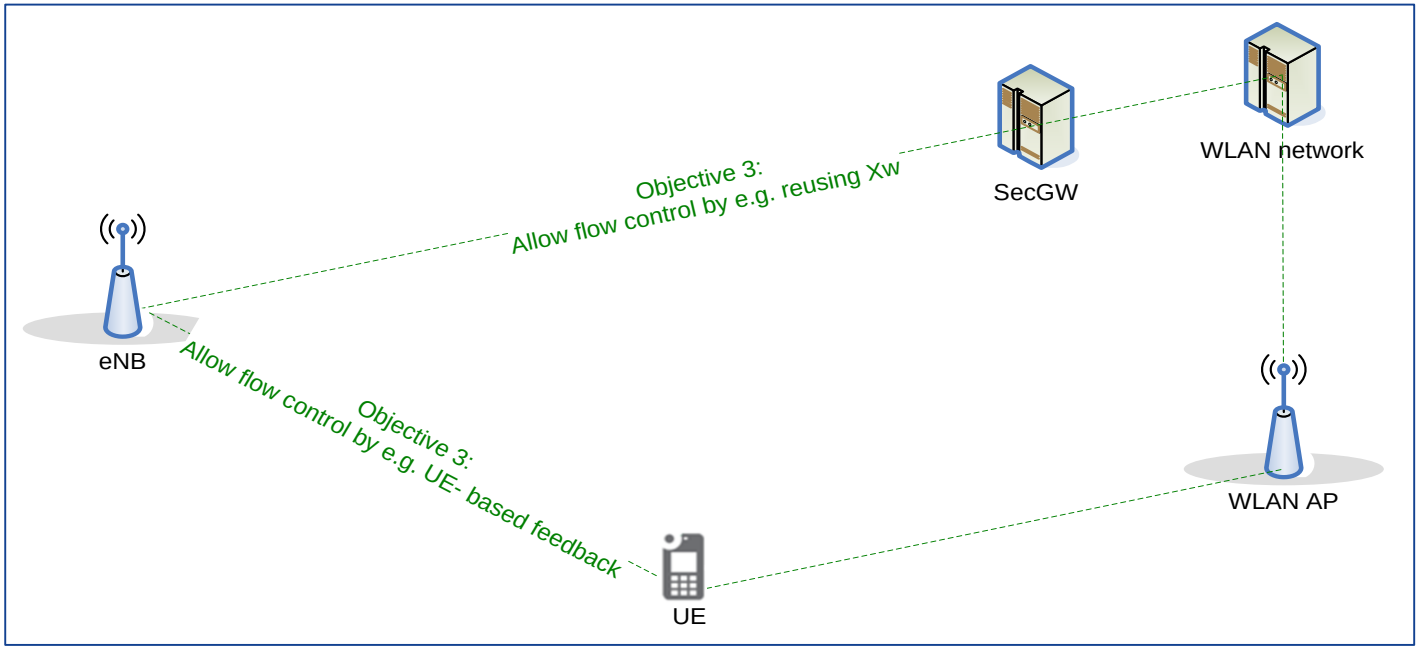
3rd objective:

- Optimized LWIP performance, e.g. via 1) reuse of Xw for LWIP flow control and WLAN measurements and/or 2) UE feedback if feasible with current LWIP protocol architecture(RAN2, RAN3)
  - No flow control was specified in Rel-13 due to limited time and protocol model (i.e. above PDCP). This limits the performance of LWIP.
    - For example, Xw interface was standardized in REl13 for LWA and allows for flow control feedback
    - UE-based feedback would also be possible if seen feasible with the current LWIP protocol architecture.

Rel-14 enhanced LWIP

3rd objective: Optimized LWIP performance

Rel-14 eLWIP



Rel-14 enhanced LWIP
Conclusions

Motivation for the WID:

- Evolution of the LWIP method to support improved performance – flow control feedback and overhead reduction can help the performance
- Addressing use cases like local offloading that are not possible with Rel-13 method – allowing UL routing from eNB to WLAN network opens up efficient offloading of uplin
- Optimized UE processing when possible – eschewing use of IPSec reduces UE processing load and allows higher data rates

Conclusions

- **New work item in Rel-14 needed for enhanced LWIP to improve performance and allow new use cases**