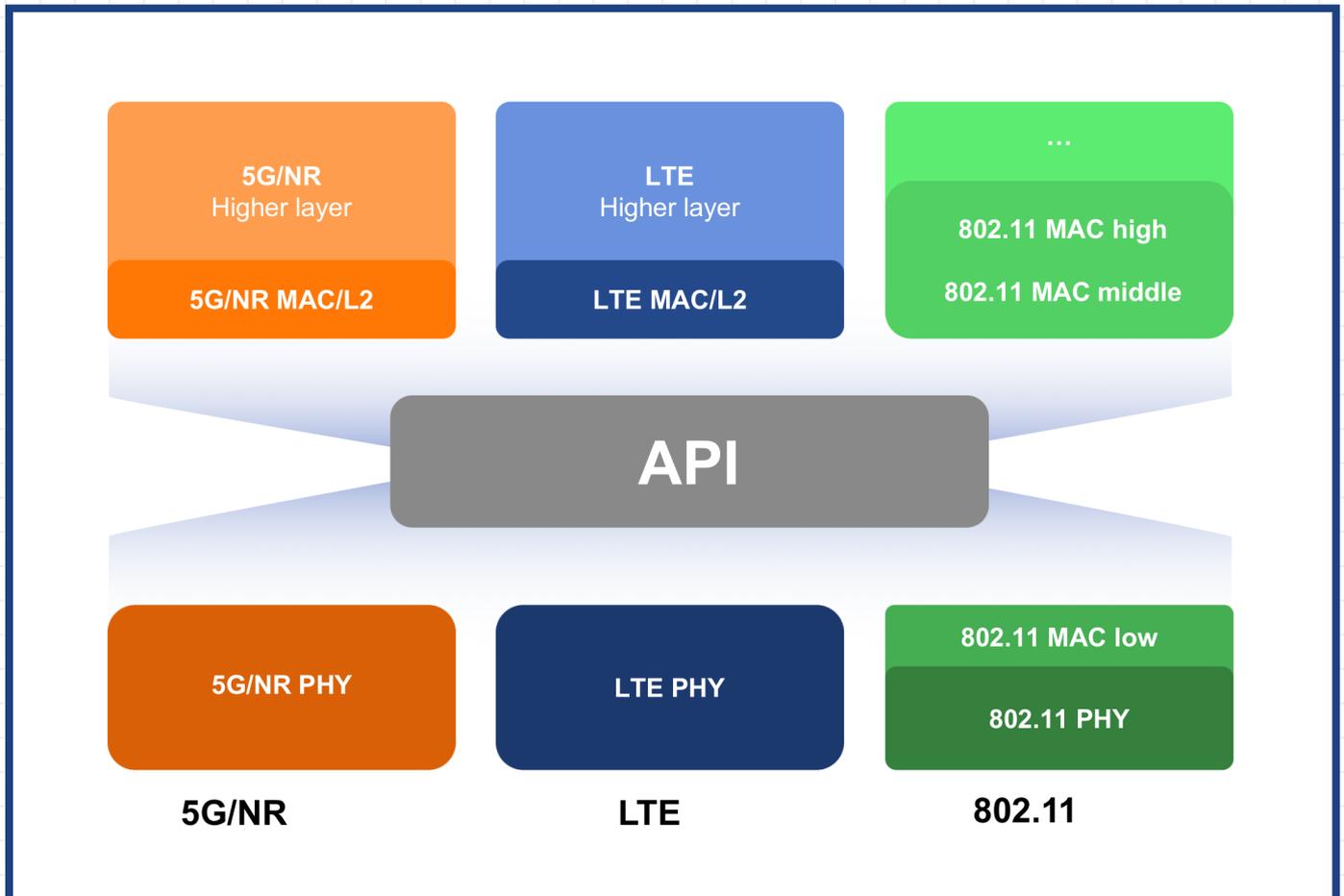


SDR DATA PLANE FUNCTIONALITY

Integration of PHY and upper layer protocols:
Proposal for a generic PHY and MAC API of multi-RATs



Common type of interface between physical layer functionality and higher layer protocol stack.

PHY implementations offer the same ease of use and mechanisms.

Enables fast adoption and extension of PHY prototyping systems towards protocol and network level research & applications.



SDR DATA PLANE FUNCTIONALITY

Integration of PHY and upper layer protocols: Proposal for a generic PHY and MAC API of multi-RATs

CONTEXT

In today's networks, multiple radio access technologies (RATs) are available and one specific challenge that is addressed is to understand better the different interfacing options of those RATs. Therefore, application programming interfaces (APIs) are very important, because they offer clearly defined methods of communication between various software components.

UNIQUE SELLING POINT

This ORCA offer embraces the coordination strategies using different RATs such as 3GPP LTE and 802.11 WLAN but also future 5G - New Radio (5G-NR). In order to realize a prototype platform for RAT interworking studies a common API between heterogeneous physical layer implementations and higher layer protocol stacks is crucial. Therefore, subsequent components are connected via the API:

- Physical layer implementation on NI's FPGA based SDR platform in LabVIEW. [1]
- Upper layer implementation of adapted NS3 C++ code running on NI's Linux RT. [2]

OPPORTUNITIES

The common API is an enabler for ORCAs RAT interworking prototype platform, because it:

- Offers the same ease of use and mechanisms for different physical layer implementations.
- Enables very flexible configuration and E2E user data transmission.
- Enables faster adoption, extension, migration and integration of physical layer prototyping systems towards protocol and network level research & applications.
- Increases the level of system abstraction, because of no need to understand all details of the underlying physical layer.
- Offers a high level of re-use and increases the transparency of a complex wireless system.

REFERENCES

- Common API on inter-RAT prototyping platform available at TUD macro scale testbed.

¹ National Instruments, "LabVIEW System Design Software", Product Website, <http://www.ni.com/labview/>, March 2017.

² NS-3 Project, "Overview - What is NS-3", Website, <https://www.nsnam.org/overview/what-is-ns-3/>, March 2017.