xFAPI Blueprint
Reference Architecture

Intel FlexRAN

WLS

xFAPI

nFAPI

OAI L1

RA 1

RA 2

nFAPI

xSM

xSM

xFAPI

OSC DU-High

STM
xFAPI Scenarios
Scenario 1: Disaggregated L1-L2

Server1

FlexRAN

WF

WS

P5, P7

xFAPI

Server2

xFAPI

WF

WS

P5, P7

OSC DU-High
Scenario 2: FlexRAN with OAI DU
Scenario 3: OAI with OSC DU-High

OAI L1 \(\xrightarrow{\text{P5, P7}}\) xFAPI \(\xrightarrow{\text{P5, P7}}\) OSC DU-High
xFAPI

- xFAPI is an intermediate component that establishes the connections b/w any L1 and L2 layers and operates in both FAPI and nFAPI modes
- Used xFAPI as a universal connector to connect OSC DU-High with various versions of FlexRAN successfully
- Includes a debugging capability that provides message statistics for analysis after each connection establishment
- Integrated capability for OAI L1 in nFAPI mode, which can be activated on runtime based on compilation flags
- Adding connectivity support b/w OAI L1 and OSC DU-High
Development and Testing

- Developed support in the xSM library of xFAPI to access the shared memory region filled by the OSC DU-High WLS Lib
- Established the xFAPI-OAI L1 (PNF) connection at the nFAPI interface
- Enhanced xFAPI to support message translation functionalities for P5 messages
- Successfully facilitated the exchange of P5 messages b/w OAI L1 & OSC DU-High through xFAPI
- Simultaneously working on API support for debugging and log display on the dashboard
- Continuously refining xSM and xFAPI log outputs for clearer, more actionable insights
- Enhanced debugging capabilities, now include support for both horizontal and vertical log levels, which represent component/message types and their respective log levels
P5 Messages
Integration and Enhancement Plans

- Plan to integrate the Nvidia Aerial support with the xFAPI intermediary to expand its capabilities
  - Integrate nvIpc support into the xSM Lib of xFAPI to access the shared memory b/w Nvidia Aerial and xFAPI
  - Perform E2E testing of Nvidia Aerial in FAPI and nFAPI mode:
    - Topology: 5G Core + CU + DU-High + xFAPI + Aerial + O-RU + UE
- Enable multiple L1 instances to run alongside L2 with xFAPI support in nFAPI mode, increasing xFAPI scalability and flexibility
- Add the support for the operation of FlexRAN in nFAPI mode on separate servers using xFAPI, with adjustable settings for greater deployment versatility
Reference Architecture Enhancements