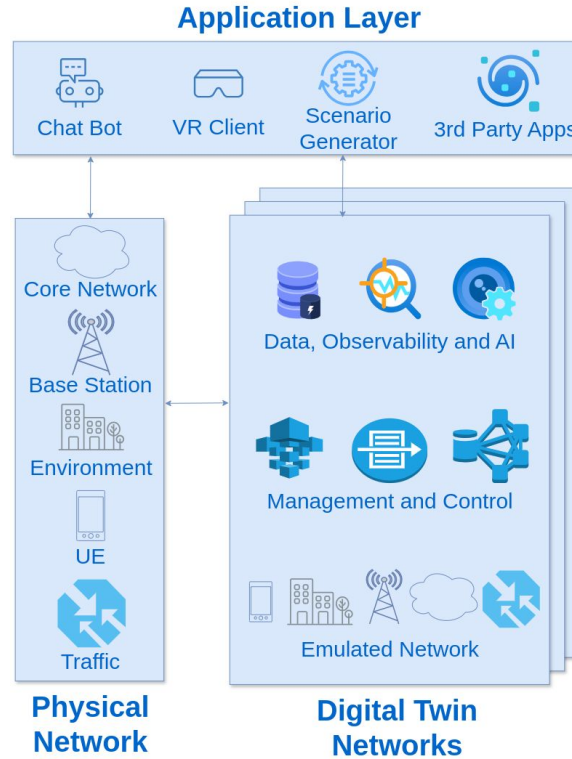


Intelligent Digital Twin

6G Summit
14th - 15th November 2024
Abu Dhabi, UAE

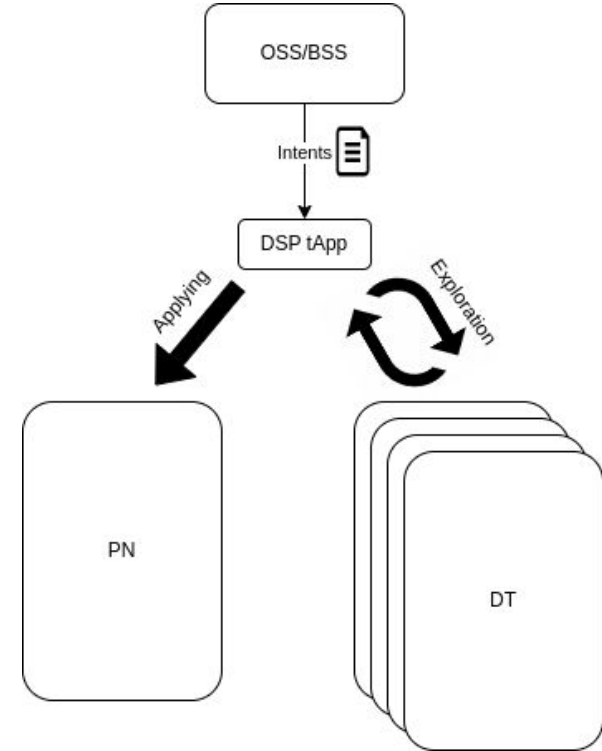


Architecture

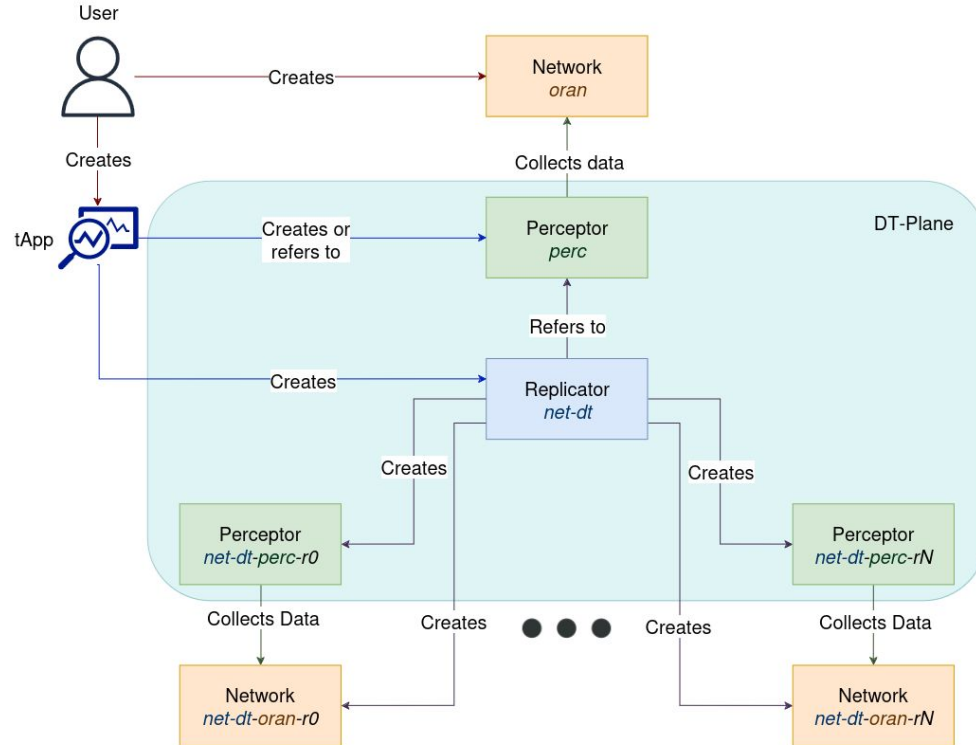


Dynamic SLA Provisioner twin App

- ★ Maximizes resource utilization and Minimizes SLA violation
- ★ Real-time SLA adjustments in response to network conditions
- ★ Interacts with OSS/BSS to align with service intent
- ★ Explores optimal solution in DTs
- ★ Deploys the optimal solution derived from DT exploration to the PN

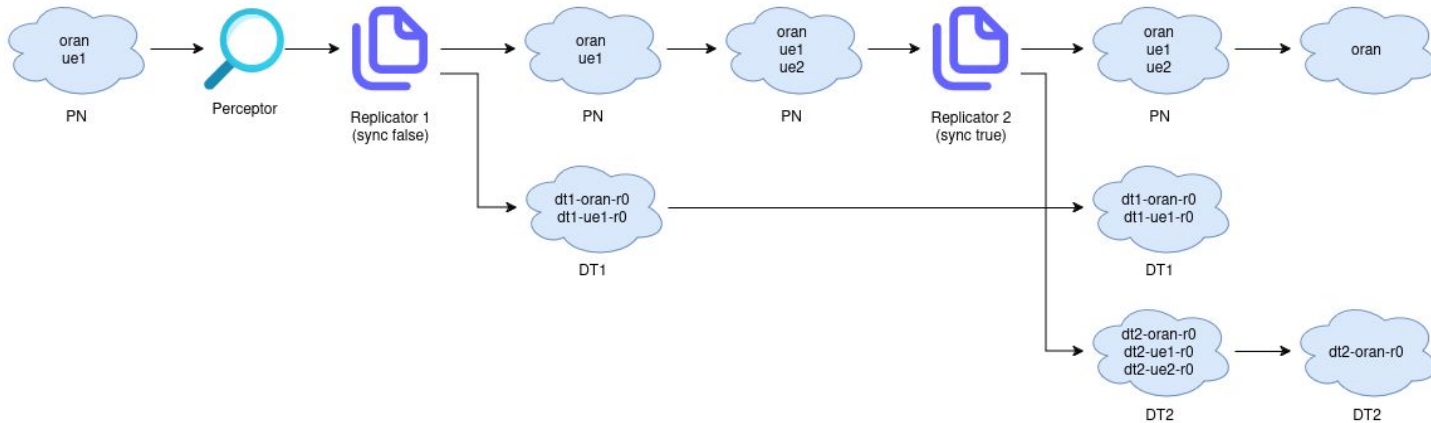


Architecture



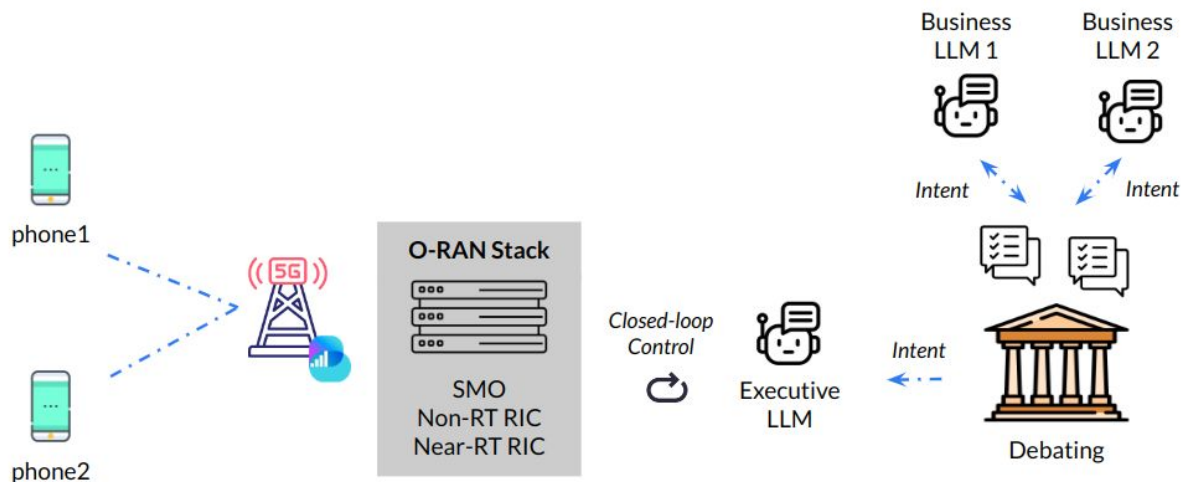
Demo

- ★ Physical Network (PN) deployment
- ★ Digital Twins (DTs) deployment
- ★ Show end-to-end connection in the DT
- ★ Demonstrate DTs evolution with respect to PN





Collaborative LLMs/LAMs on DT



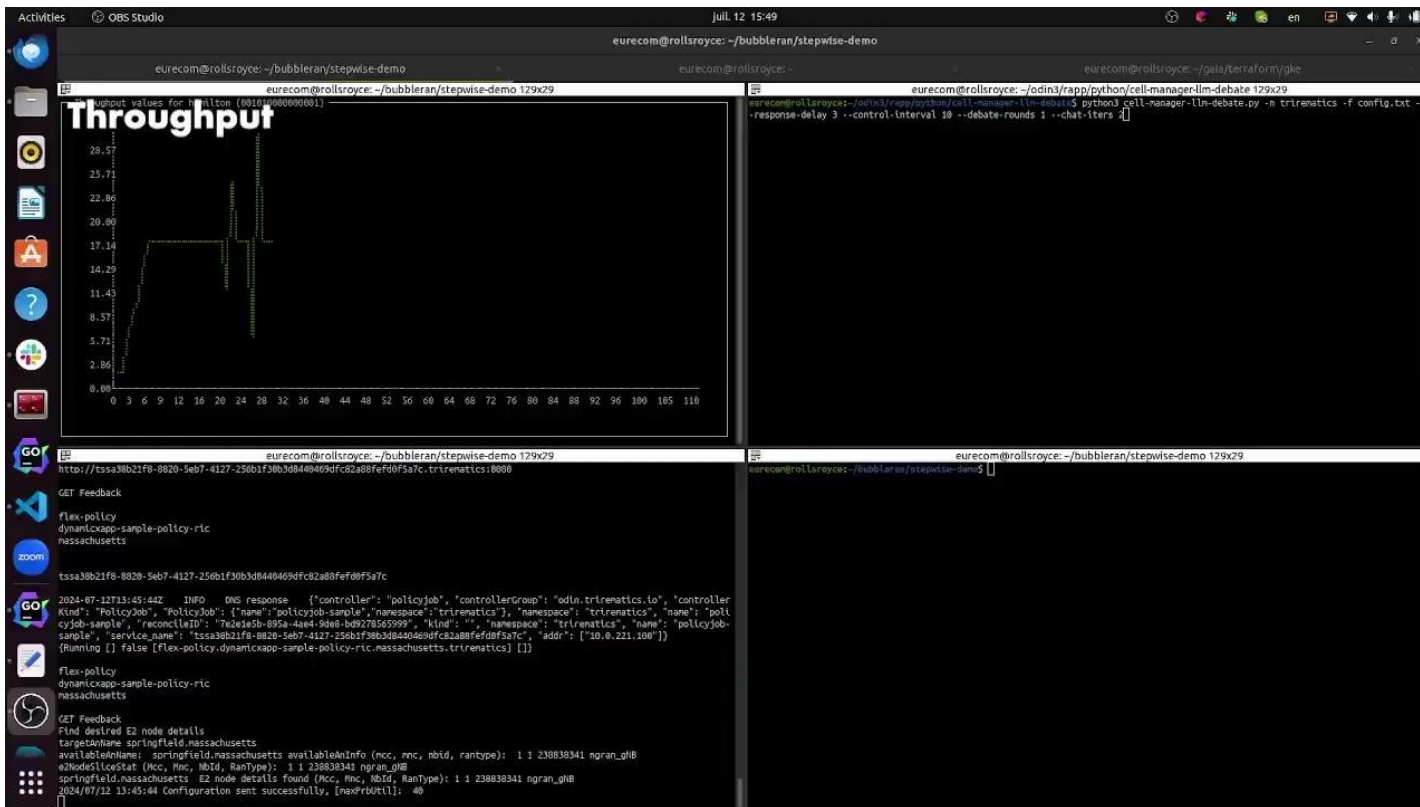
- ★ GenAI Automation on top of DTN or PN
- ★ Intent-Based Networking (IBN)
- ★ Multi-level O-RAN APIs
- ★ Shared Network across many Business Parties
- ★ Resource Negotiation - Debating
- ★ Conflict Resolution (Consensus)
- ★ Closed-loop Operation
- ★ End-to-end Automation

Demo Video (Architecture)

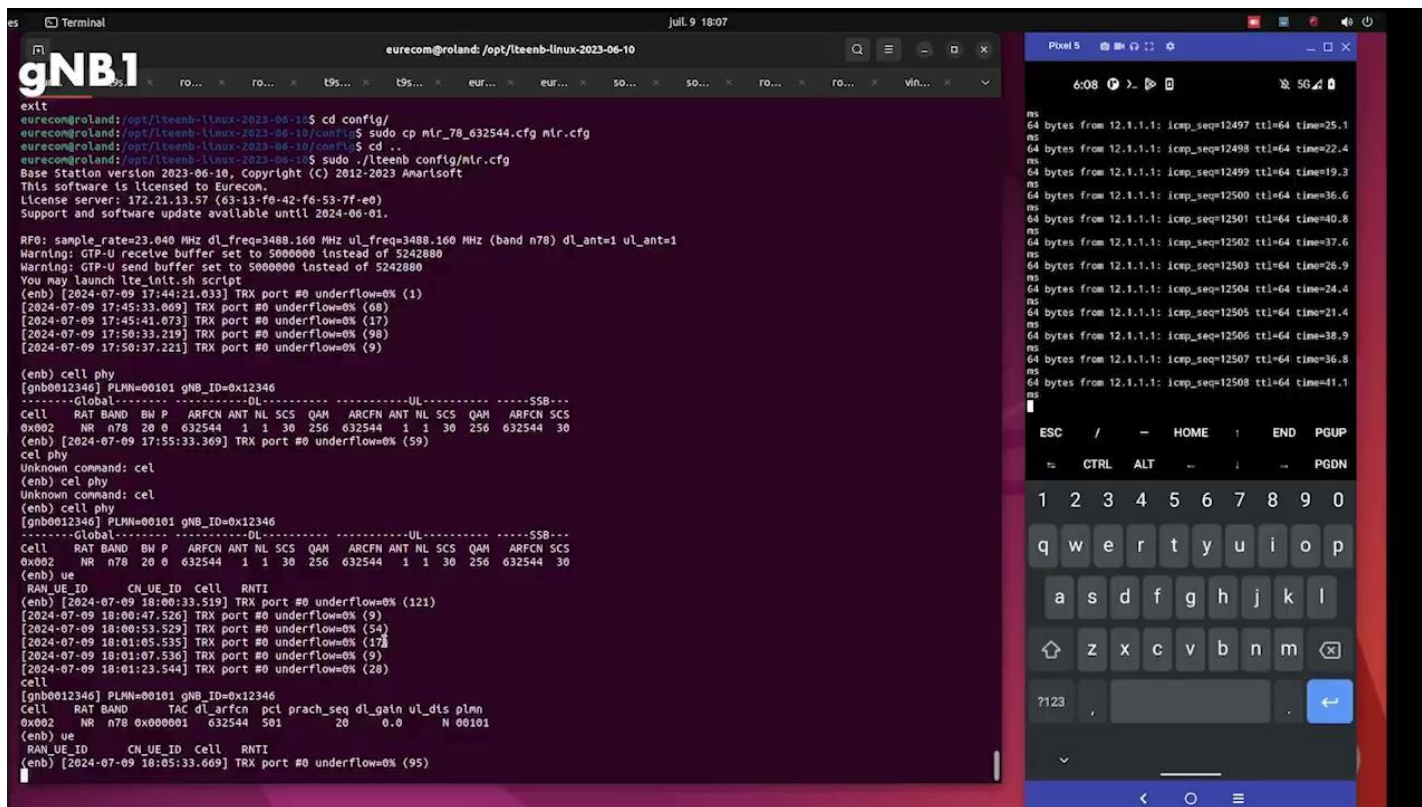
Digital Twin Architecture Showcase



Demo Video (LLM SLA)



Demo Video (LLM)



The screenshot displays a terminal window titled "eurecom@roland: /opt/ltsehb-linux-2023-06-10" with a search bar and window controls. The terminal shows the execution of a script for configuring a gNB1 (Base Station). The output includes version information (2023-06-10), license details, and various configuration parameters such as sample_rate, dl_freq, and dl_ant. It also shows log messages for TRX port underflow and cell phy status. A virtual keyboard overlay is visible on the right side of the terminal, featuring a numeric keypad, QWERTY keys, and function keys like ESC, CTRL, ALT, HOME, END, PGUP, and PGDN. The keyboard is styled with a dark background and light-colored keys.

```
gNB1
exit
eurecom@roland: /opt/ltsehb-linux-2023-06-10$ cd config/
eurecom@roland: /opt/ltsehb-linux-2023-06-10/config$ sudo cp mlr_78_632544.cfg mlr.cfg
eurecom@roland: /opt/ltsehb-linux-2023-06-10$ cd ..
eurecom@roland: /opt/ltsehb-linux-2023-06-10$ sudo ./ltsehb config/mlr.cfg
Base Station version 2023-06-10, Copyright (c) 2012-2023 Anarsoft
This software is licensed to Eurecom.
License server: 172.21.13.57 (63-13-f0-42-f6-53-7f-e0)
Support and software update available until 2024-06-01.

RF0: sample_rate=23.040 MHz dl_freq=3488.160 MHz ul_freq=3488.160 MHz (band n78) dl_ant=1 ul_ant=1
Warning: GTP-U receive buffer set to 5000000 Instead of 5242880
Warning: GTP-U send buffer set to 5000000 Instead of 5242880
You may launch lte_init.sh script
(enb) [2024-07-09 17:44:21.033] TRX port #0 underflow=0% (1)
[2024-07-09 17:45:33.069] TRX port #0 underflow=0% (69)
[2024-07-09 17:45:41.073] TRX port #0 underflow=0% (17)
[2024-07-09 17:50:33.219] TRX port #0 underflow=0% (98)
[2024-07-09 17:50:37.221] TRX port #0 underflow=0% (9)

(enb) cell phy
[gnb0012346] PLMN=00101 gNB_ID=0x12346
-----Global-----DL-----UL-----SSB---
Cell RAT BAND BW P ARFCN ANT NL SCS QAM ARFCN ANT NL SCS QAM ARFCN SCS
0x002 NR n78 20 0 632544 1 1 30 256 632544 1 1 30 256 632544 30
(enb) [2024-07-09 17:55:33.369] TRX port #0 underflow=0% (59)
cel phy
Unknown command: cel
(enb) cel phy
Unknown command: cel
(enb) cell phy
[gnb0012346] PLMN=00101 gNB_ID=0x12346
-----Global-----DL-----UL-----SSB---
Cell RAT BAND BW P ARFCN ANT NL SCS QAM ARFCN ANT NL SCS QAM ARFCN SCS
0x002 NR n78 20 0 632544 1 1 30 256 632544 1 1 30 256 632544 30
(enb) ue
RAN_UE_ID CN_UE_ID Cell RNTI
(enb) [2024-07-09 18:00:33.519] TRX port #0 underflow=0% (121)
[2024-07-09 18:00:47.526] TRX port #0 underflow=0% (9)
[2024-07-09 18:00:53.529] TRX port #0 underflow=0% (54)
[2024-07-09 18:01:05.535] TRX port #0 underflow=0% (17)
[2024-07-09 18:01:07.536] TRX port #0 underflow=0% (9)
[2024-07-09 18:01:23.544] TRX port #0 underflow=0% (28)
cell
[gnb0012346] PLMN=00101 gNB_ID=0x12346
Cell RAT BAND TAC dl_arfcn pci_prach_seq dl_gain ul_dls plmn
0x002 NR n78 0x000001 632544 501 20 0.0 N 00101
(enb) ue
RAN_UE_ID CN_UE_ID Cell RNTI
(enb) [2024-07-09 18:05:33.669] TRX port #0 underflow=0% (95)
```



Thanks!

Do you have any questions?

contact@bubbleran.com

bubbleran.com





Q&A

contact@bubbleran.com
bubbleran.com

