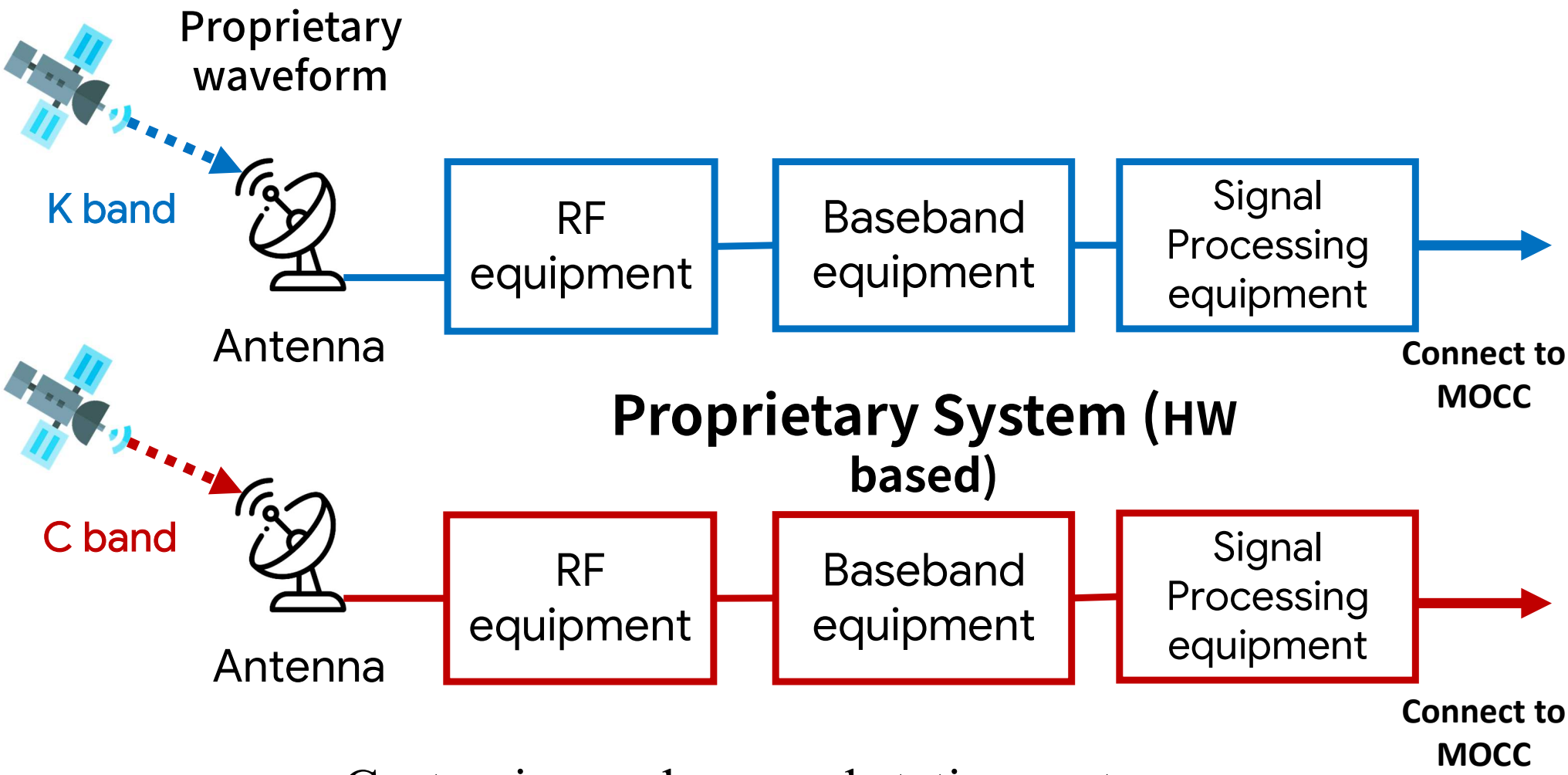
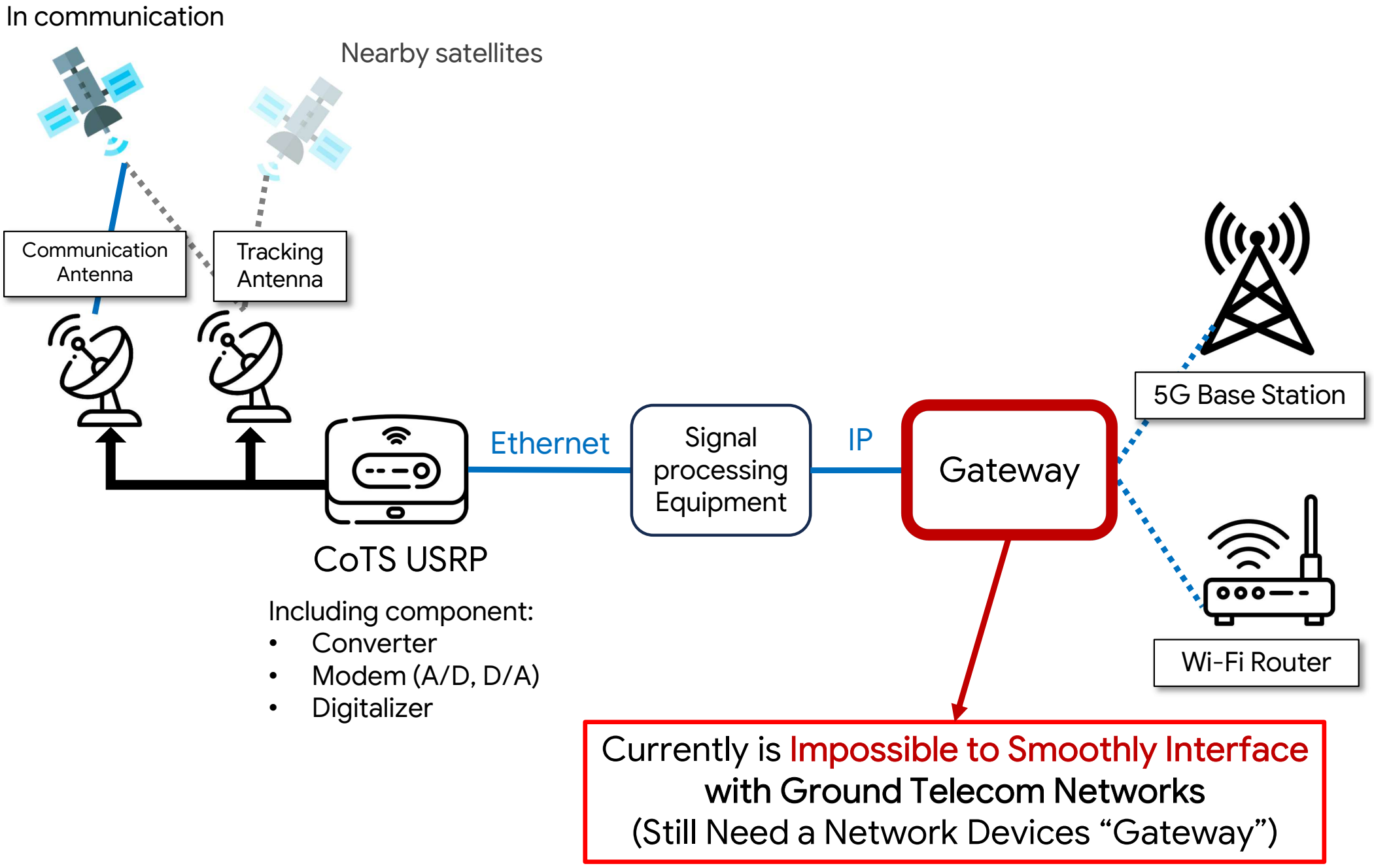
The Cloud-Native Solution of Integrate Satellite Ground Station System and Telecommunication Network System

The Design of Traditional Satellite Ground Station

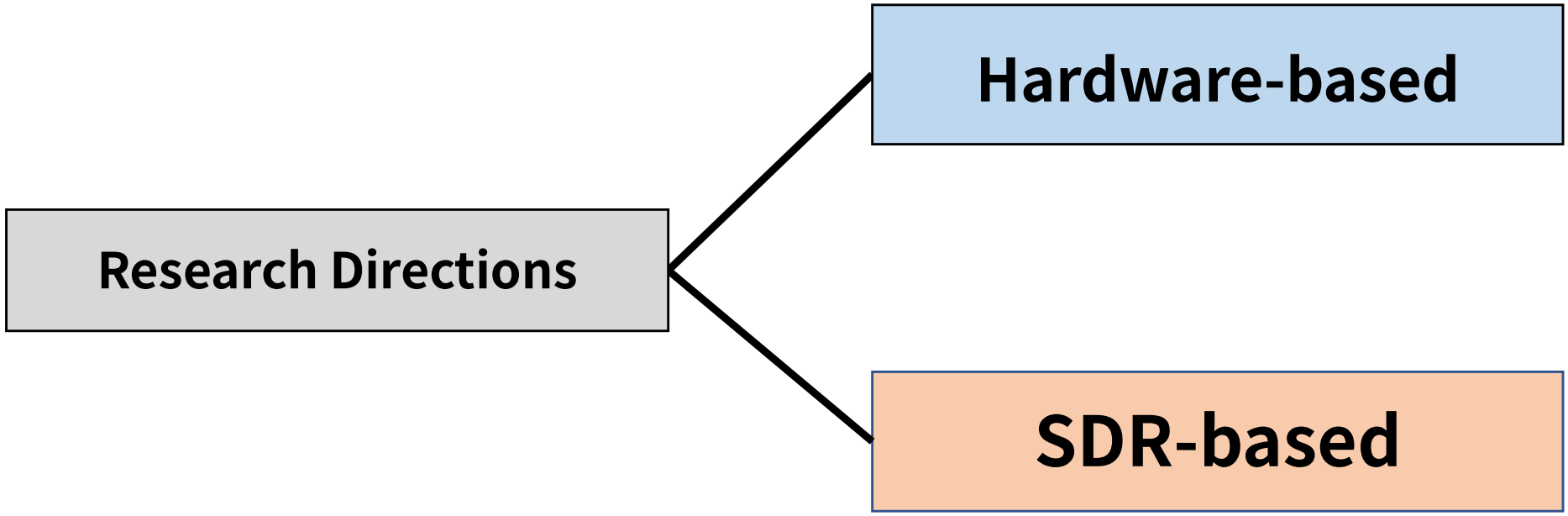


Customize each ground station system
for each different frequency band

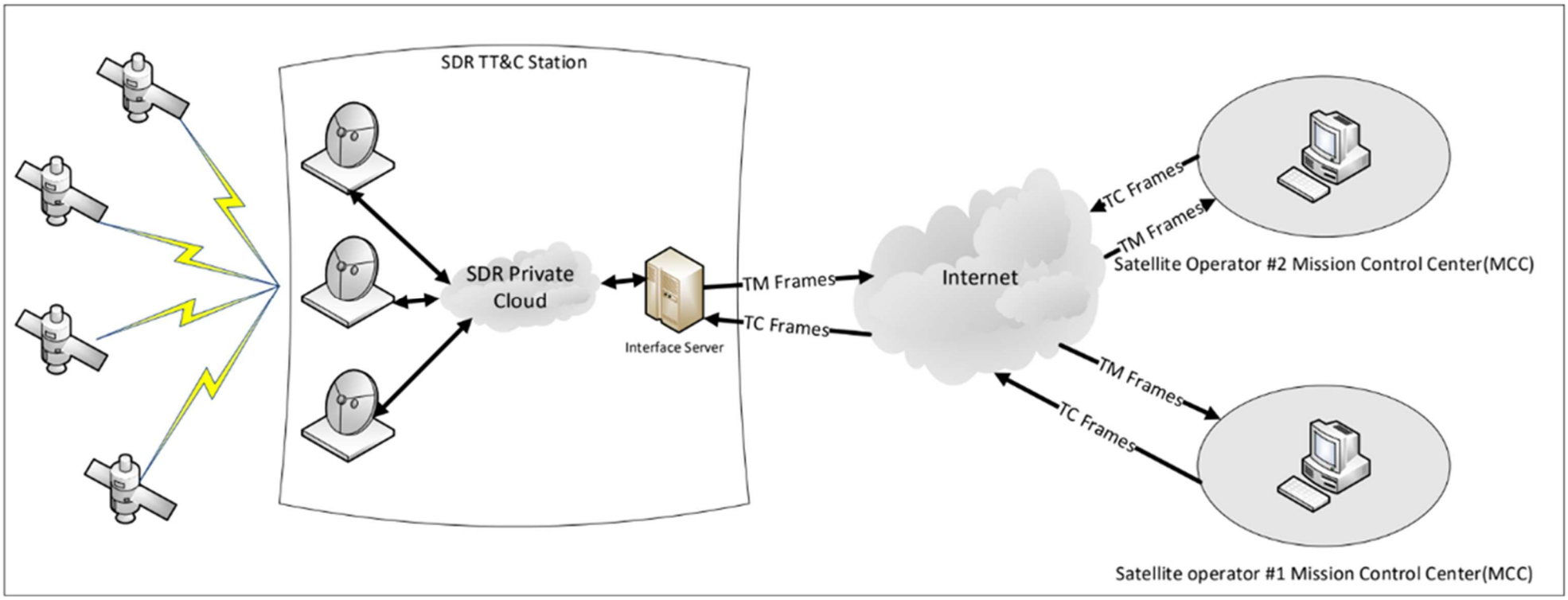
Cannot Smoothly Interface with Ground Telecom Networks



Solutions of Reduce Satellite Ground Station Development

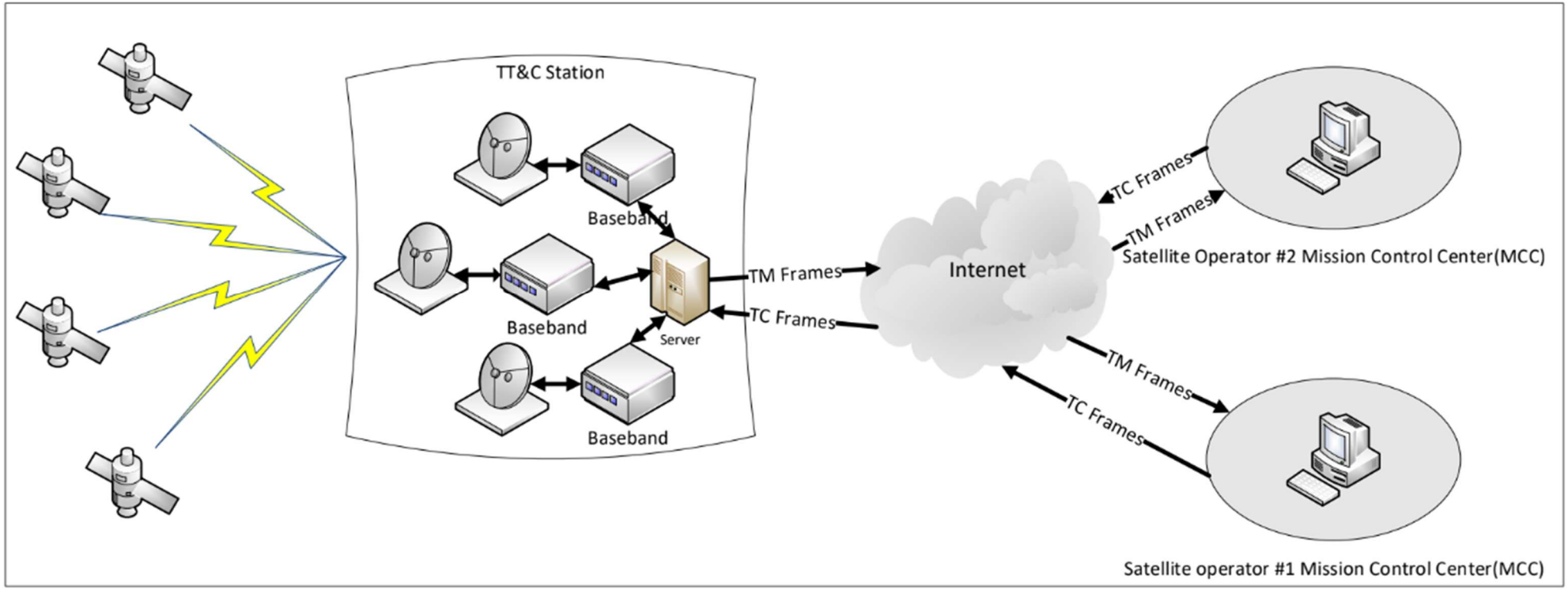


Because the development cost of customizing each ground station system for each different Satellite band is too high.
Therefore, various ground station solutions have been designed one after another.



Hardware-based satellite ground operations architecture

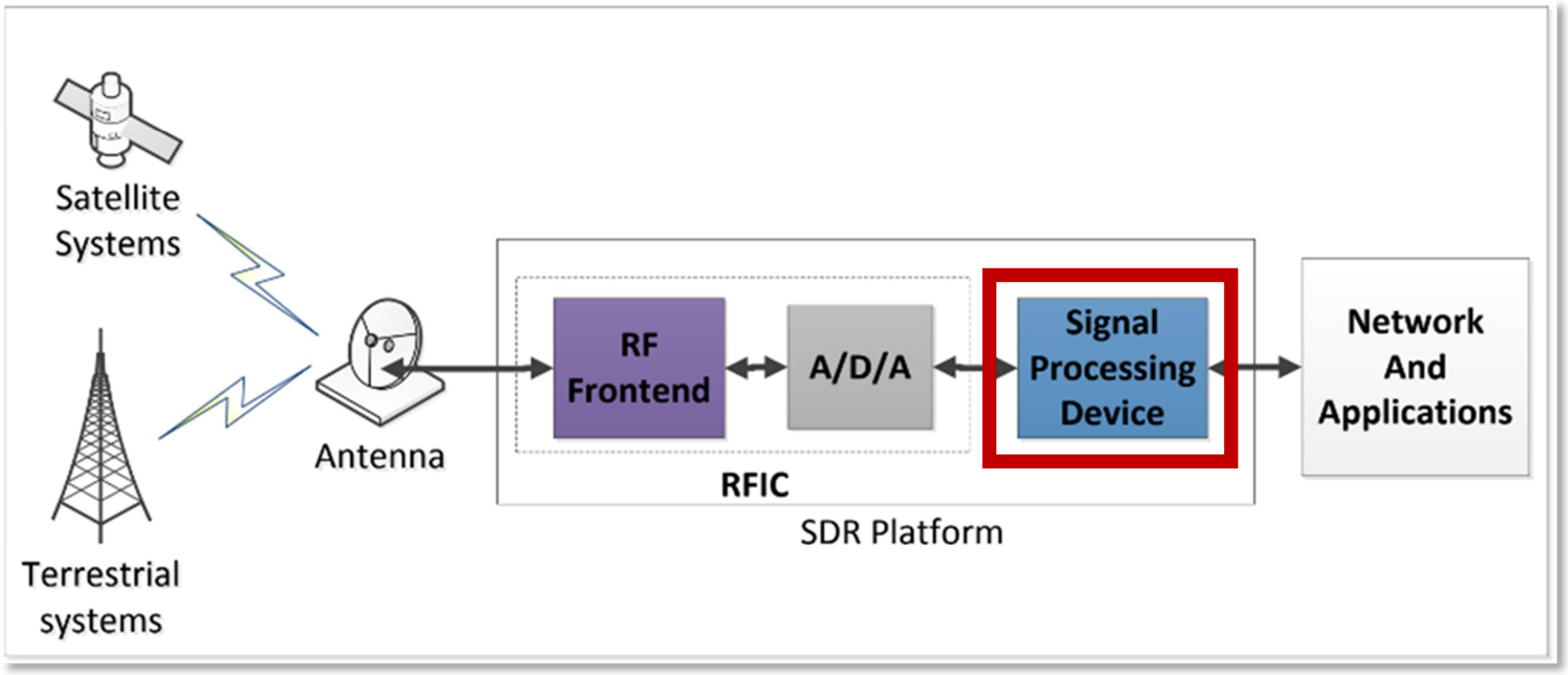
Source: A Software-Defined Baseband for Satellite Ground Operations



SDR-based satellite ground operations architecture

Source: A Software-Defined Baseband for Satellite Ground Operations

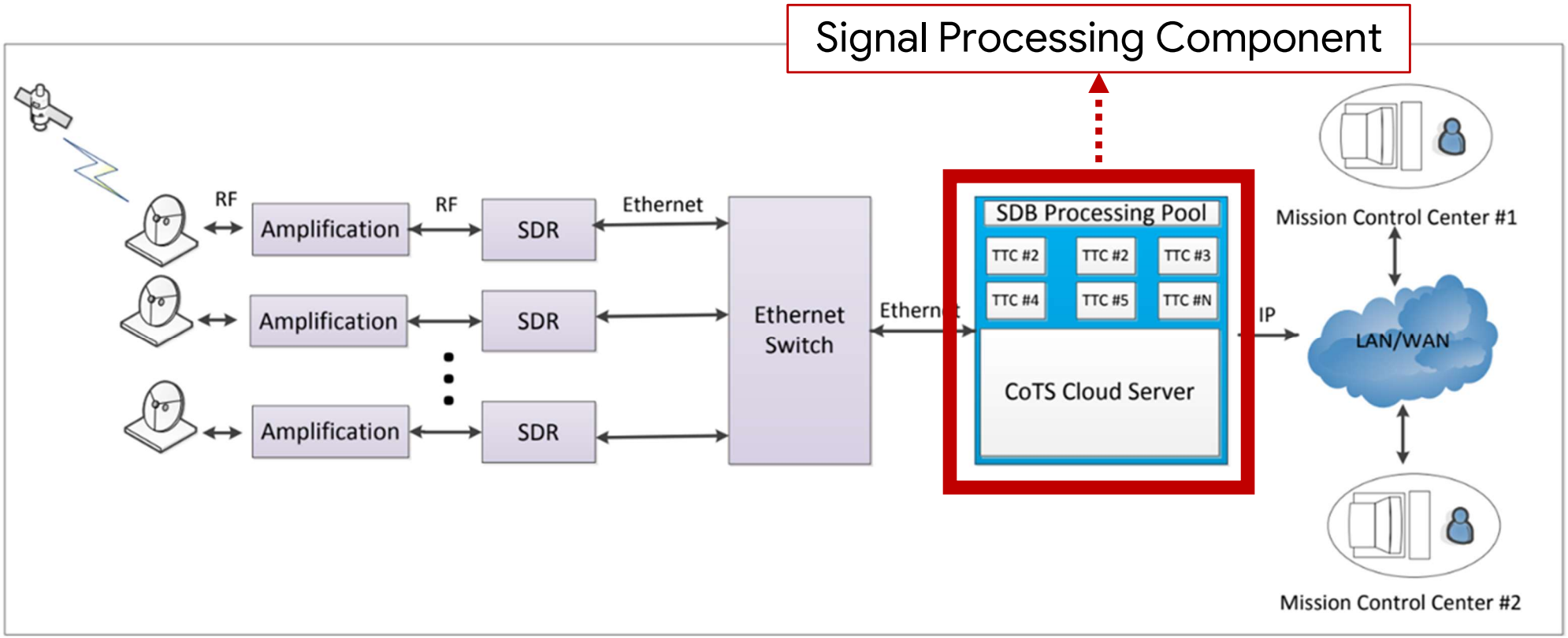
SDR-based Satellite Ground Operations Architecture



The signal processing part of the SDR-based satellite ground operations architecture can use a more powerful GPP or a VM/**Private cloud** of GPPs to realize a full software-defined TT&C ground station.

Source: A Software-Defined Baseband for Satellite Ground Operations

SDR-based Satellite Ground Operations Architecture

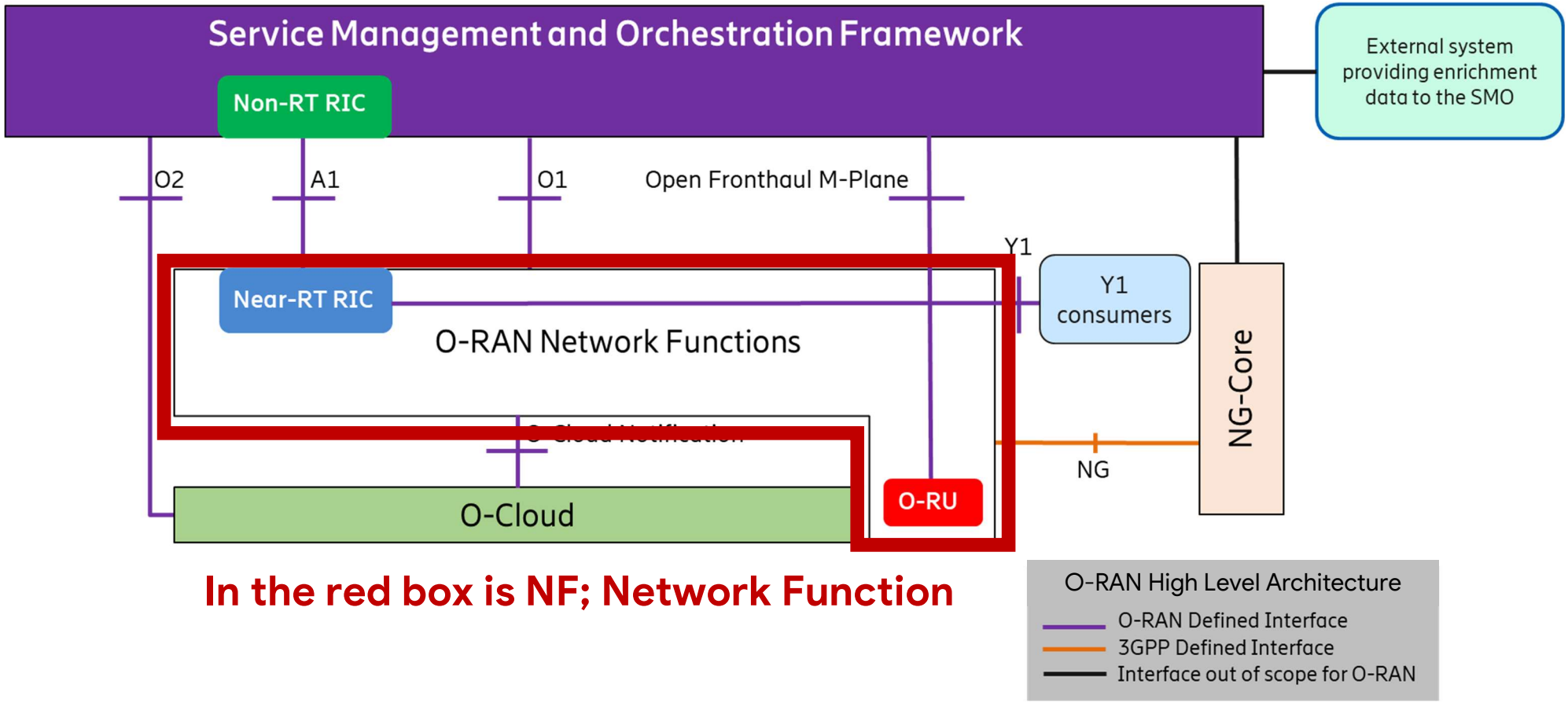


The most advanced solution for the **"Signal Processing Component"** part of SDR-based satellite ground stations currently uses VNF.

However, Cloud-Native Architecture has become a Future Trend.

Source: A Software-Defined Baseband for Satellite Ground Operations

Ground Telecom Network (O-RAN) also Moving Toward to Cloud-Native

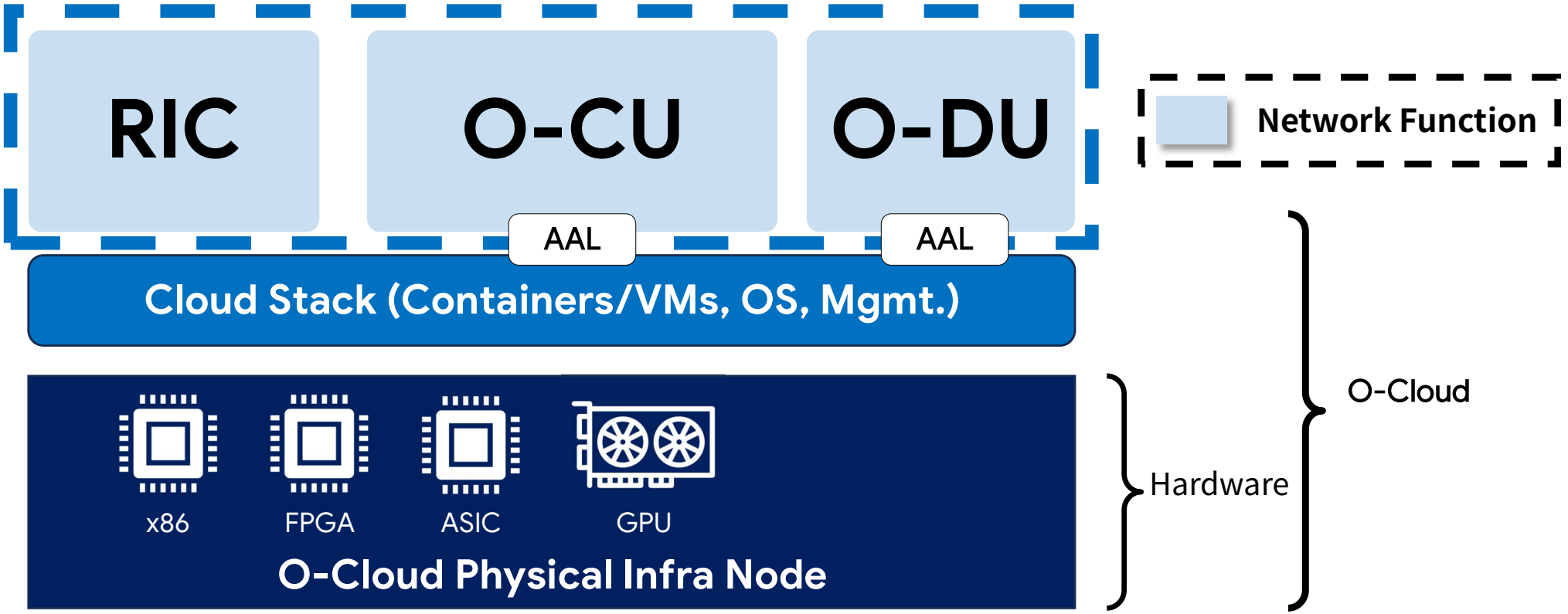


In the red box is NF; Network Function

O-RAN NF is Moving from Physical to Virtual And Moving Toward Cloud-Native!

Source: O-RAN.WG6.O2-GA&P-R003-v04.00

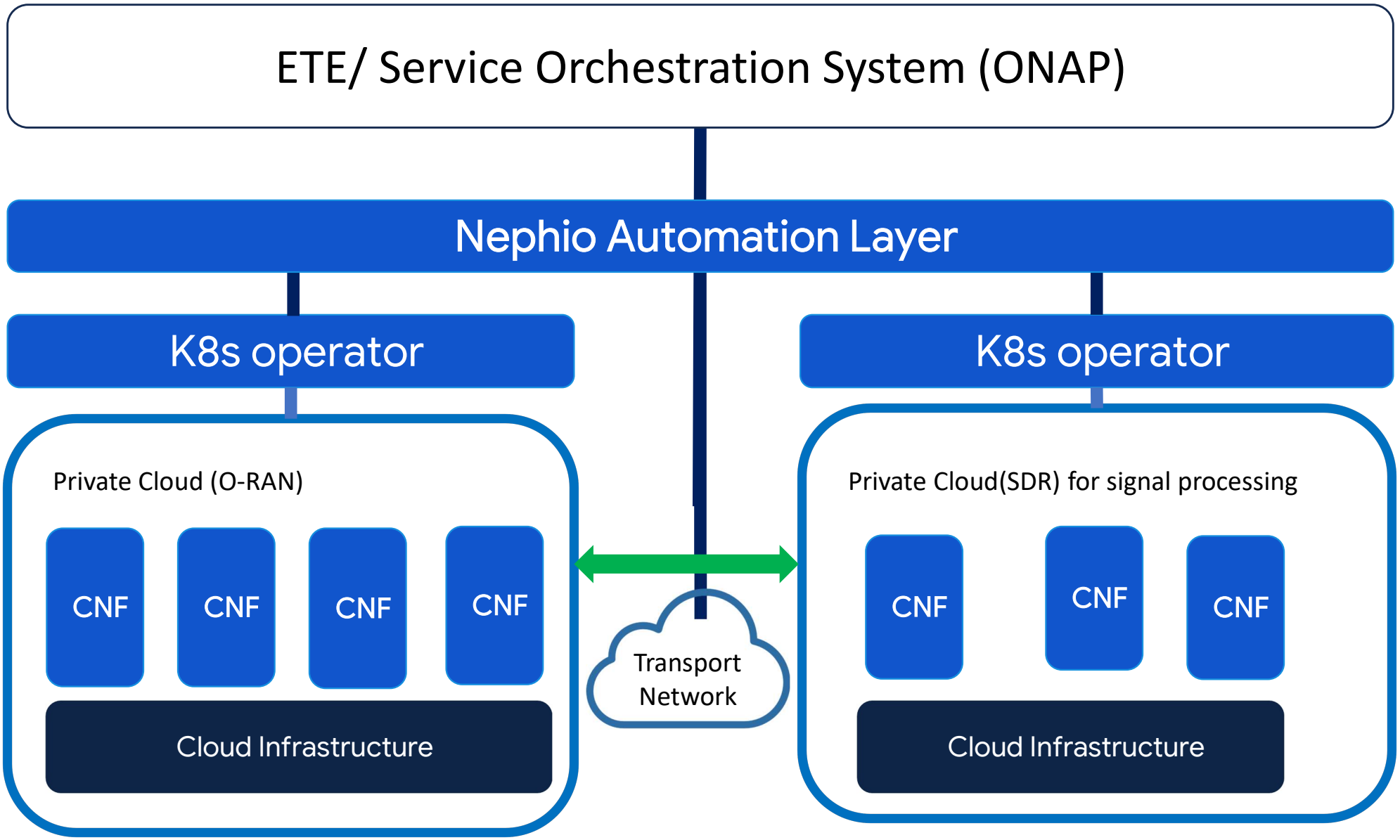
O-RAN O-Cloud
Support Deployment with Container NF



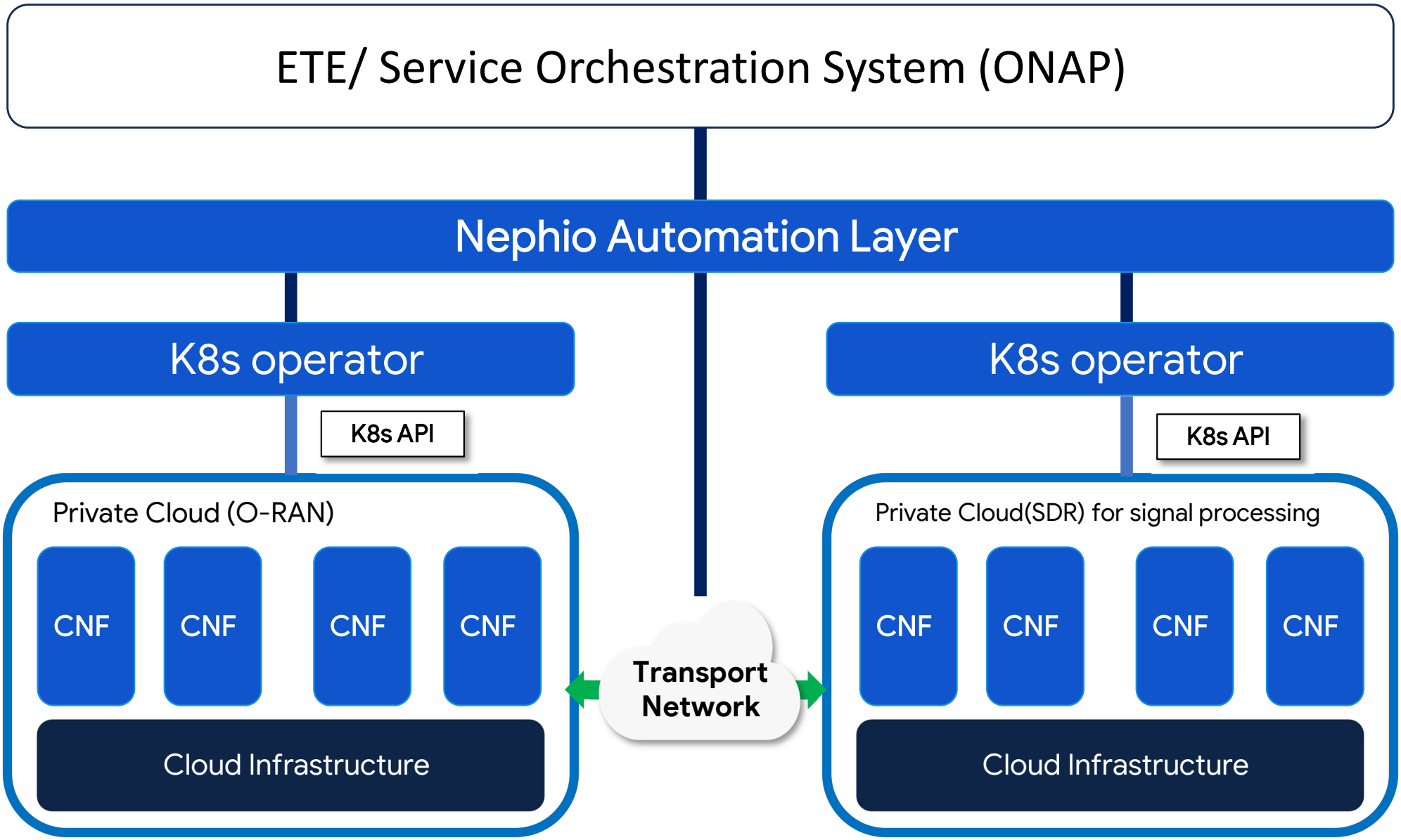
O-Cloud provides NFs basic management services

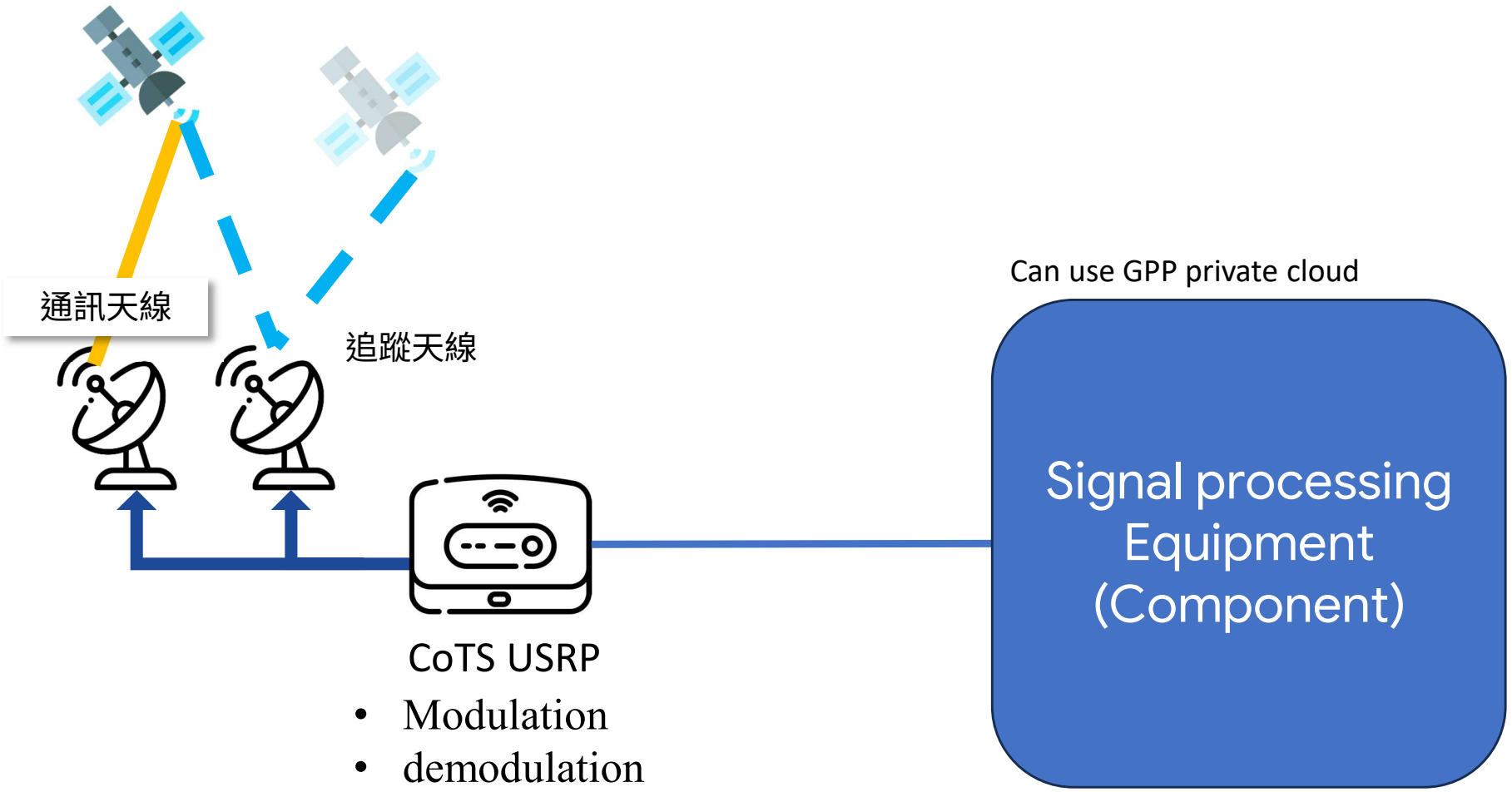
//Radio unit Not yet virtualized or cloud native

Reimagining the Use of Cloud-Native to Integrate Ground station System and Telecom Networks



Reimagining the Use of Cloud-Native to Integrate Ground station System and Telecom Networks

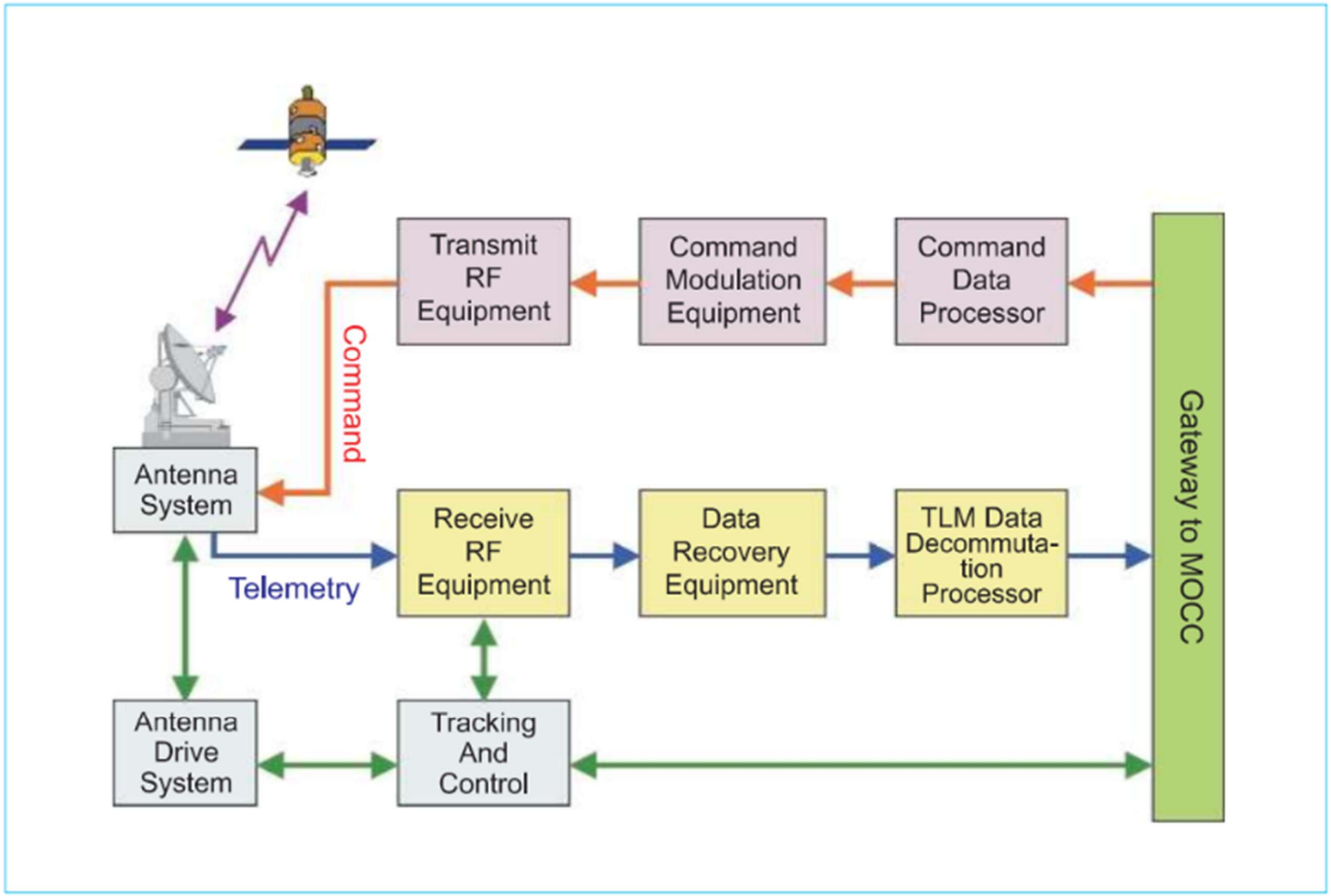




意思就是說

RF frontend 的部分，如果頻率相差太大，還是需要專門為該頻段設計專門的天線

Reimagining Radio Access Networks with Google Cloud


Transmit RF Equipment
Command Modulation Equipment
Command Data Processor
Gateway to MOCC
Command
Antenna System
Receive RF Equipment
Data Recovery Equipment
TLM Data Decommuta-tion Processor
Telemetry
Antenna Drive System
Tracking And Control