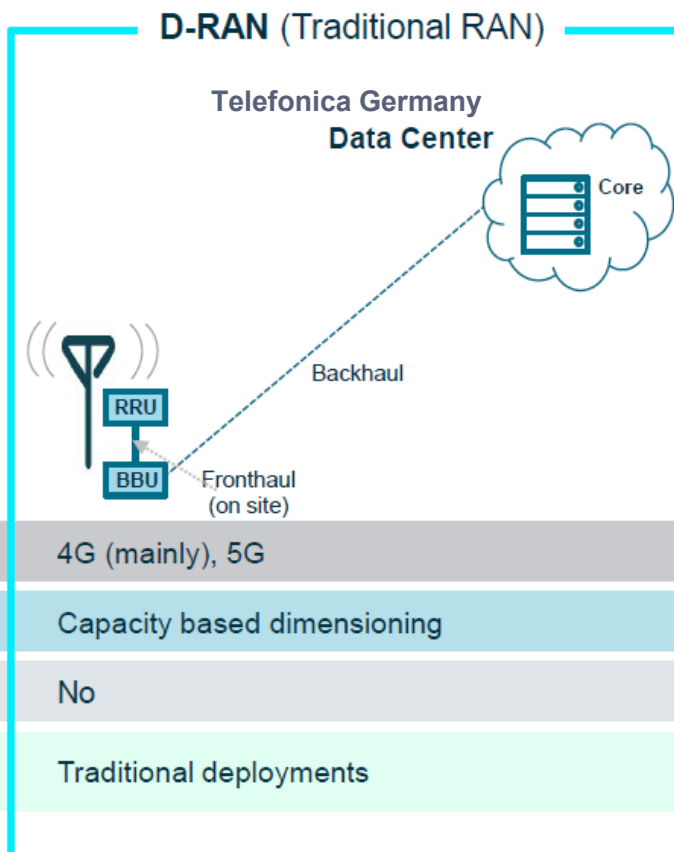# Telefónica

Open RAN

Benefits and opportunities: An operator view
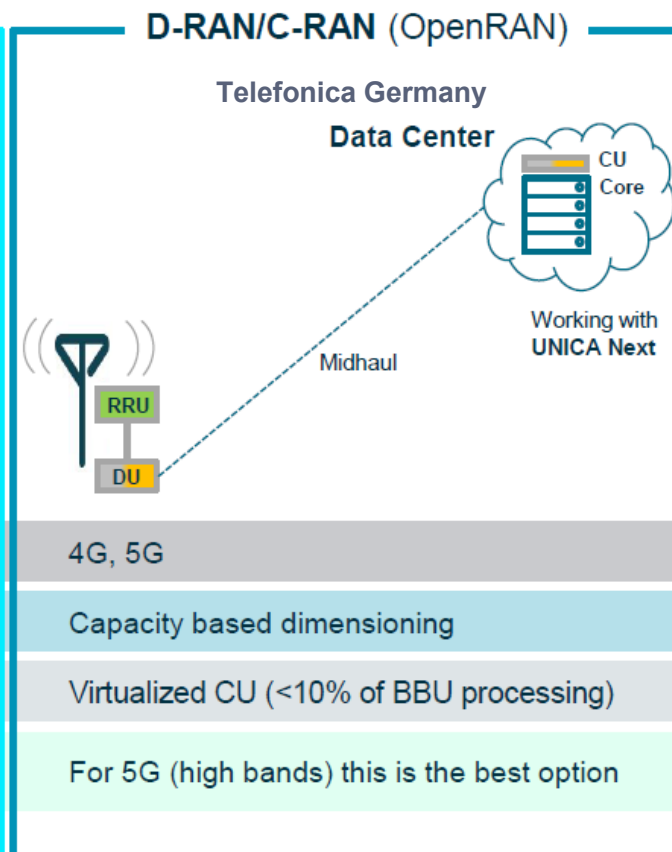
Gerald Huber
Telefónica Germany GmbH & Co. OHG

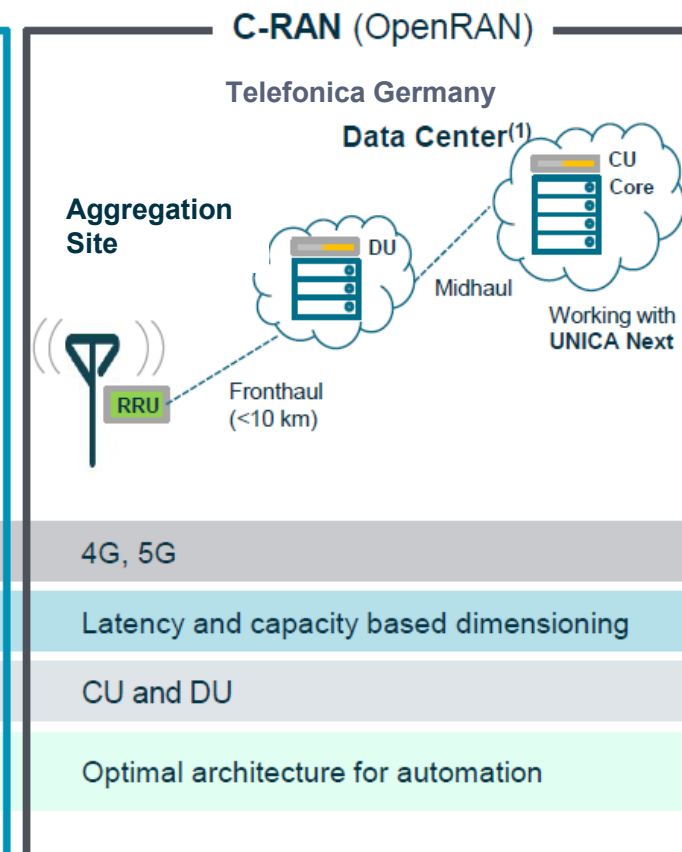# Open RAN cloud architecture - Split options

Split Option 1

D-RAN (Traditional RAN)

Telefonica Germany
Data Center

Core

Backhaul

RRU

BBU

Fronthaul (on site)

Split Option 2

D-RAN/C-RAN (OpenRAN)

Telefonica Germany
Data Center

CU
Core

Midhaul

Working with **UNICA Next**

RRU

DU

Split Option 7-2x

C-RAN (OpenRAN)

Telefonica Germany
Data Center[1]

CU
Core

Aggregation Site

DU

Midhaul

Working with **UNICA Next**

RRU

Fronthaul (<10 km)

RRU: Remote Radio Unit
BBU: Baseband Unit
DU: Distributed Unit
CU: Centralized Unit
DU+CU = BBU
D-RAN: Distributed RAN
C-RAN: Centralized RAN
Fronthaul: RU-BBU link
Midhaul: DU-CU link
Backhaul: BBU-Core link

	Split Option 1	Split Option 2	Split Option 7-2x
Technology	4G (mainly), 5G	4G, 5G	4G, 5G
Transport	Capacity based dimensioning	Capacity based dimensioning	Latency and capacity based dimensioning
Virtualization	No	Virtualized CU (<10% of BBU processing)	CU and DU
Comments	Traditional deployments	For 5G (high bands) this is the best option	Optimal architecture for automation

Split Options 2 and 7-2x will be applied in Telefónica Germany pilots

Open RAN Macro Pilot – overview

First selection of sites in Landberg am Lech

- The Open RAN pilot is in the **live network of Telefónica Germany** with live customers

- **Security features like IPSec and Telefónica certificates** are implemented between DU and CU

- **Rudimentary RAN features** must be supported

- The **performance of the Open RAN sites must be comparable to the existing RAN** network (network and customer view)

- A multi phase approach was chosen including i.e. 4G Open RAN and 5G Open RAN

- **First 4G Open RAN Call (VoLTE and data) in the Telefónica live network has been performed at 14. December 2020**

- Additional sites in Landsberg will follow the next weeks

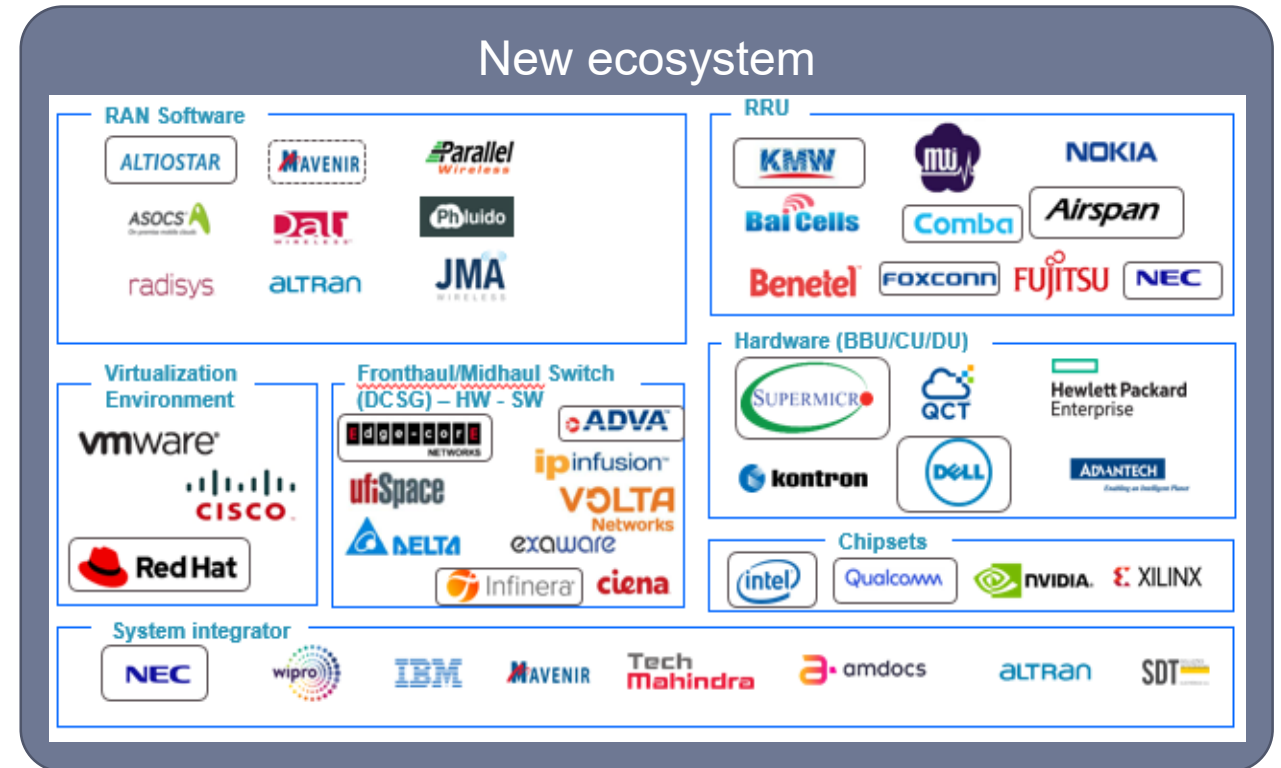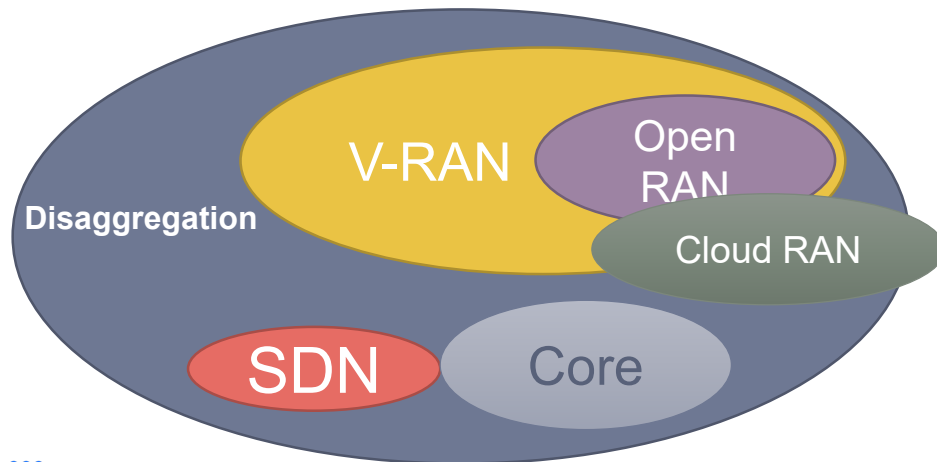- Depending on hardware and software availability other sites will follow.

First 4G Open RAN Call in the Telefóncia live network
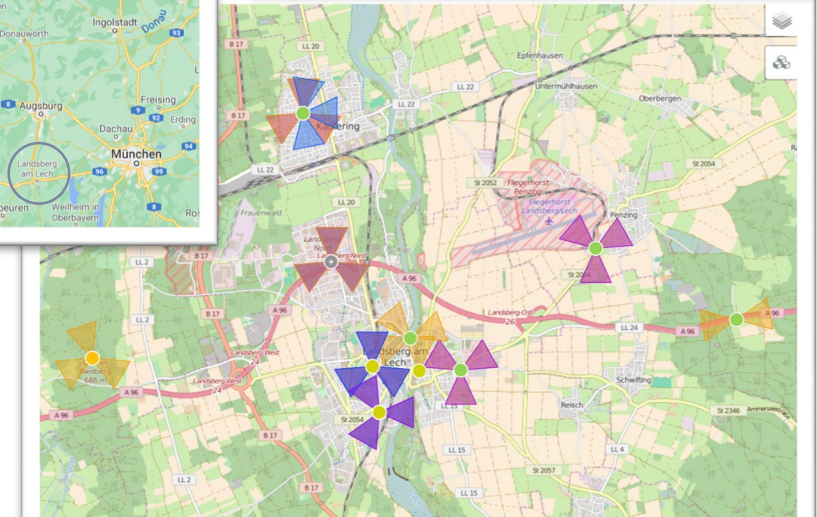
BEREC WORKSHOP ON OPEN RAN
Framework for new opportunities

- New ecosystem (interoperability, maturity, IT focused partners)

- Virtualization / Containerization

- Legacy network / interworking

- Automation

- RAN functionalities

- HW/SW availability / stability

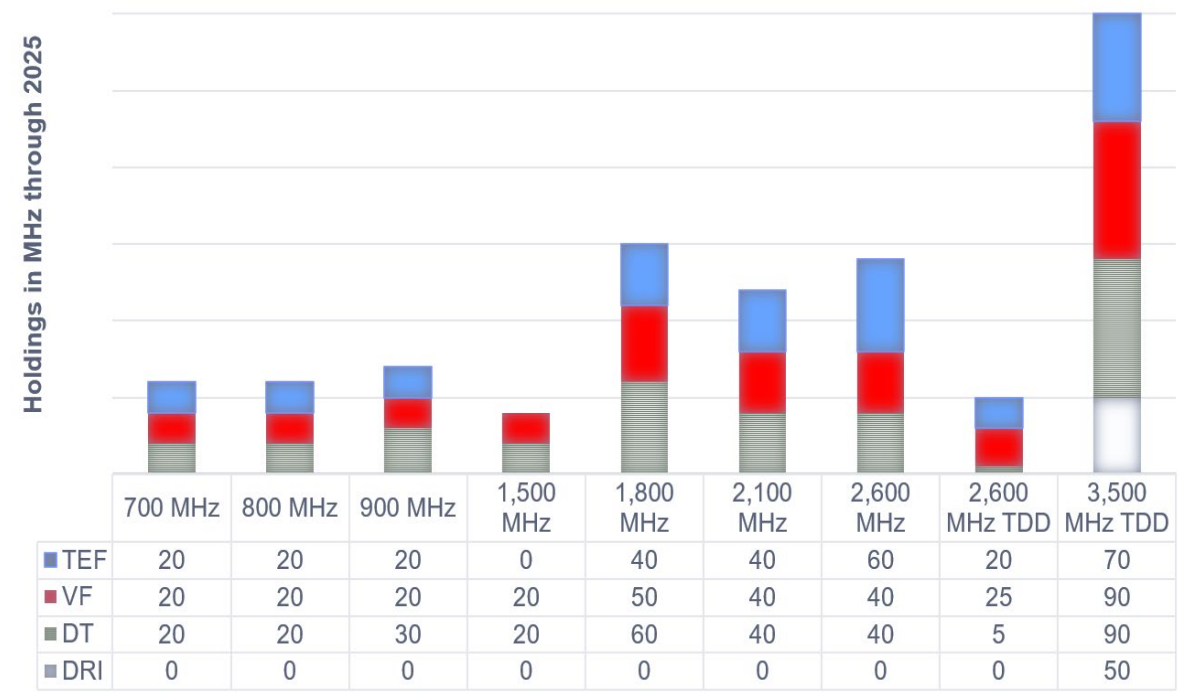- Disaggregation is not "just" radio

New ecosystem

Telefónica runs already a live cluster in Landsberg (close to Munich) and some small cells in Munich city center with Open RAN hard- and software.

Telefónica

Opportunities & benefits: The situation today

- Big opportunities for all. Existing and new vendors also small business can exist in niche markets.

- Complexity of the 2G and 4G "legacy" networks

- Containerization

- Accelerator cards needed for COTS hardware

- Public networks have a lot of customers with different phone tariffs and use cases

- The system integrators take over the role of the radio vendor (interoperability tests between different HW & SW components)

- We will have classic RAN and disaggregated RAN for quite some time, but we expect tools to deal with both and want to extend the automation to both.

- As a network operator, we are building O-RAN where it is beneficial for our customers and not as a technological gimmick

- Automation is key

Public frequency utilization example Germany

Holdings in MHz through 2025

	700 MHz	800 MHz	900 MHz	1,500 MHz	1,800 MHz	2,100 MHz	2,600 MHz	2,600 MHz TDD	3,500 MHz TDD
TEF	20	20	20	0	40	40	60	20	70
VF	20	20	20	20	50	40	40	25	90
DT	20	20	30	20	60	40	40	5	90
DRI	0	0	0	0	0	0	0	0	50

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Opportunities & benefits: Expectations

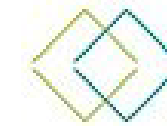Standard interfaces will open the market

Certification for all components is needed to support plug-and-play scenarios

All companies need easy access to lab infrastructure

Operators are well prepared to build and operate private networks (Daimler etc.)

Telefónica is a consortium member of the "i14y" lab in Berlin, Germany, which has been funded by the German government to promote interoperability

- For example, plug fests are supporting and enabling the access to simulators and test facilities for any company

- i14y Lab – Open Lab for test, validation and integration (of disaggregated networks) (i14y-lab.com)

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