



CO-OPETITION IN 5G MARKETS: Innovation, Standards and IPRs

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Summary

- I. 5G creates large opportunities for our economies, but to fully exploit them telecom operators may need to change the way networks are built
- II. Some “native” technology companies are starting to use an alternative network architecture paradigm, similar to the one used today by Cloud providers
- III. The move to Network Clouds could deeply change the competitive landscape and the overall industry structure
- IV. New network architectures as well as the development of new products and services might require a scale that operators are not able to achieve individually
- V. New forms of cooperation and “Co-opetition” will be developed in the near future that will need to be addressed from the regulatory/antitrust point of view
- VI. The review of the Horizontal Guidelines will be an important opportunity



5G opens new use cases with significant potential for improving people's lives

There are 3 key areas where 5G can radically improve internet connectivity, globally

Enhanced Mobile BB



- Mobile Broadband (Faster)
- Capacity:
 - ✓ Video
 - ✓ IP Comms

New BB markets (FWA)

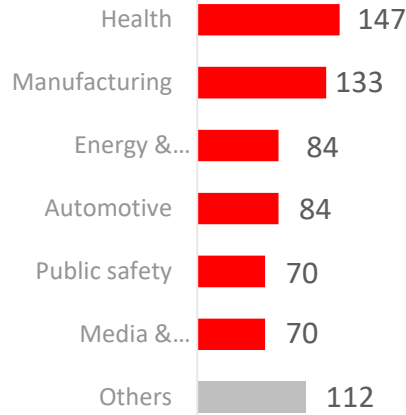


- Connecting the unconnected
- Replacing copper / DSL (e.g. universal high speed BB?)
- Backup Broadband
- Base Station backhaul

New enterprise use cases

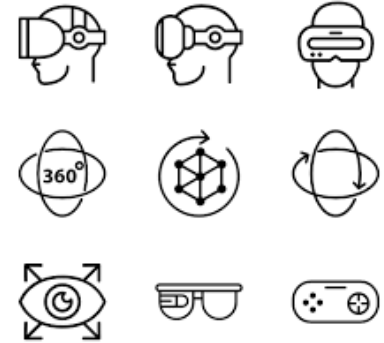
A \$700bn opportunity¹?

\$bn 2030E



New consumer use cases

E.g. Wireless cloud AR/VR



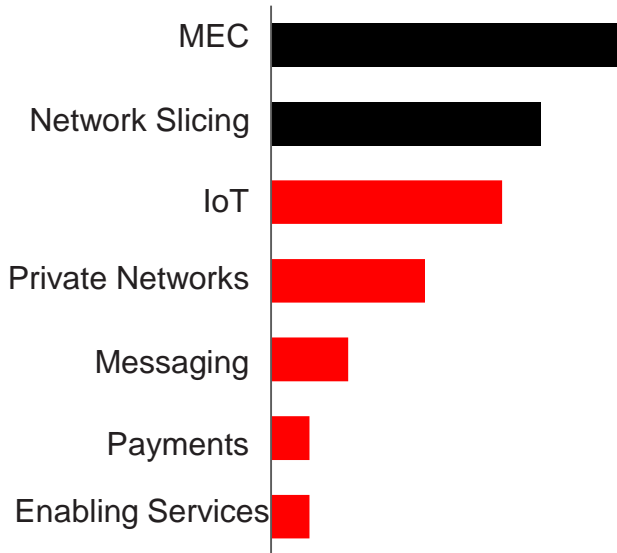


Potential collaborative actions

1

“Collaborative actions to unify some of the operator platforms that can be used globally”

MEC and slicing will include 1) alignment of APIs 2) development of common technical enablers and 3) contractual and commercial models



Areas where clear customer needs have been identified that can be addressed solely through some form of cooperation

Cooperation is crucial to be competitive with Hyperscalers' solutions

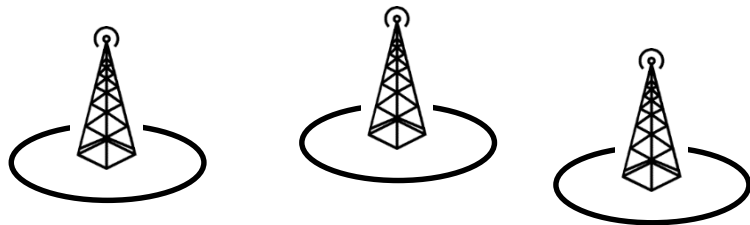
As the competitive landscape is changing rapidly, new forms of cooperation might challenge consolidated regulatory/antitrust paradigms



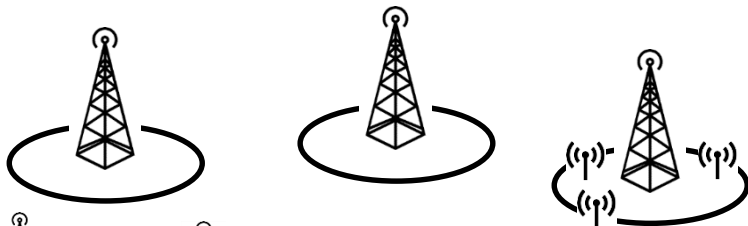
One example: Virtualised Networks

Deep & fast” deployments of 5G implies significant investments in new sites (+ backhaul)

1. Capacity optimization



2. Enterprise-focused deployments



3. Rapid, full 5G deployments



Macro densification

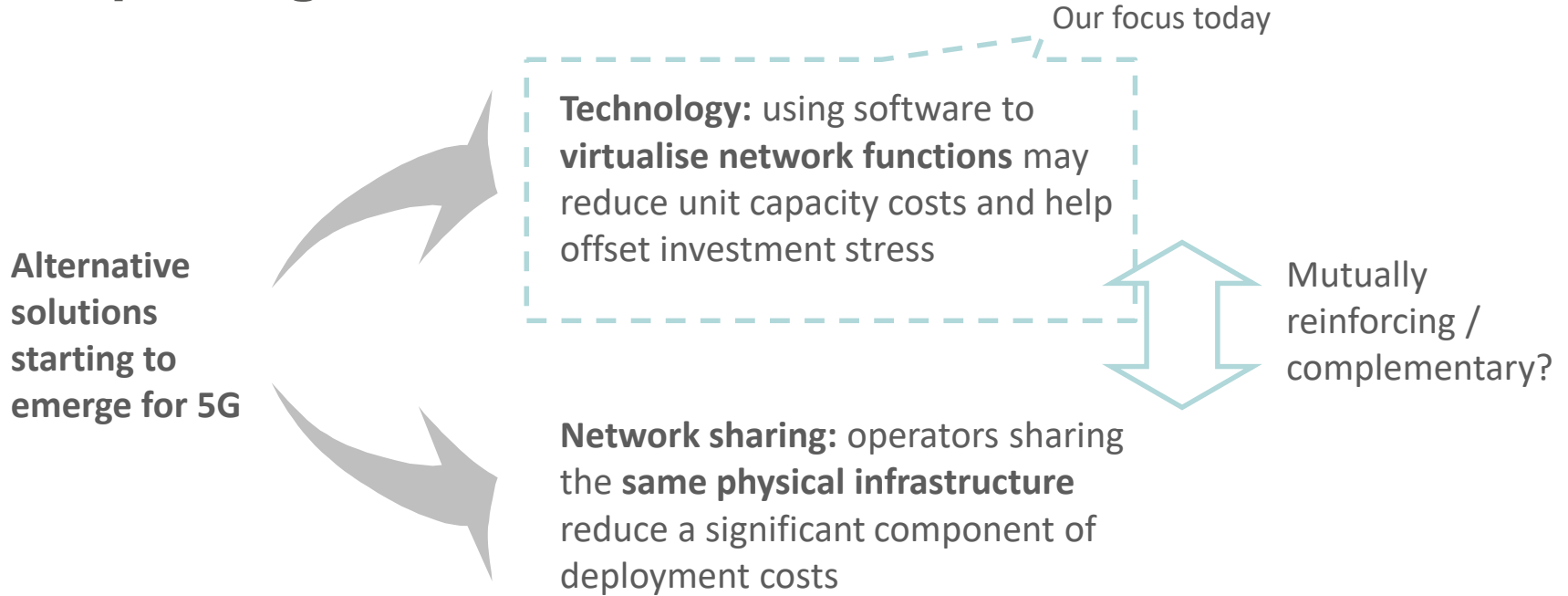
Micro densification

- Based on existing macros
- Expanding capacity on existing bands
- Potentially adding new bands (on existing sites)

- Based on densification (more sites)
- Can be focused on specific “hotspots” (e.g. enterprise-based) or massive
- Implies investment in real estate + (fiber) backhaul



We may need a new network architecture paradigm to solve this issue

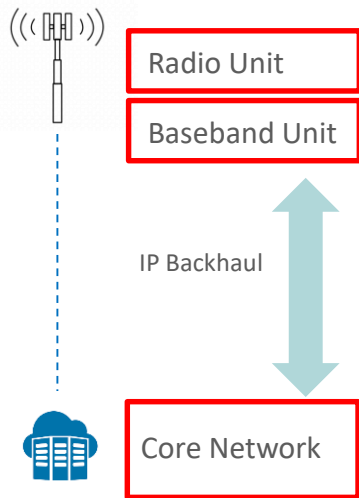




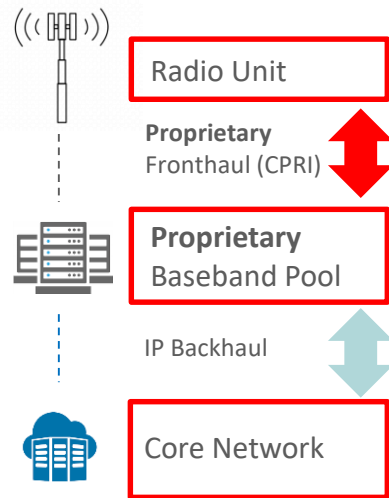
Cloud architectures are starting to be applied to the Radio Access Network

E.G. RAKUTEN (Japan) – Deploying an “open radio access network”: a next step in Cloud RAN Architectures

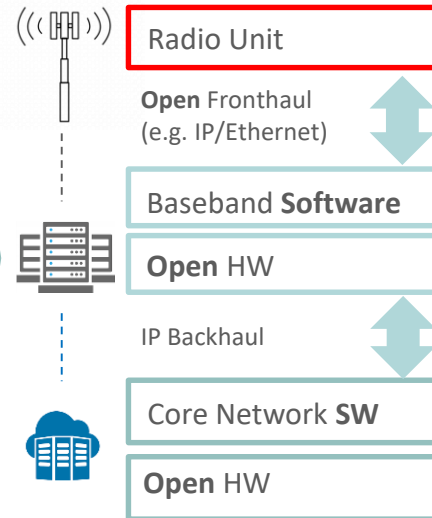
FULLY DISTRIBUTED RAN
E.g. 3G networks



CENTRALIZED “CLOUD” RAN
E.g. 4G networks



OPEN “CLOUD” RAN
(enabled by 5G)



Open fronthaul protocol:
Reduces switching costs
between different vendors

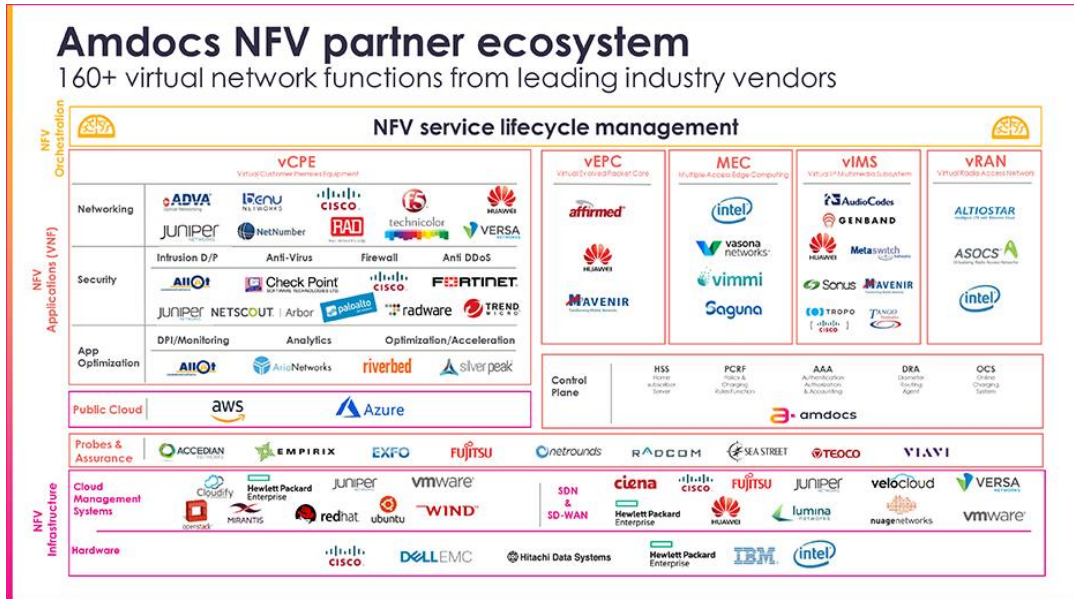
Baseband processing
implemented as **software**
applications (on top of
off-the-shelf hardware):
more competition &
innovation

Virtualization of the core
also driving innovation



The new architecture opens the door to new suppliers and more supply chain competition

E.G. Integrators like Amdocs are building a portfolio of partners to offer competitive network functions software



- In “vRAN”, this includes the providers that **Rakuten** is using for its new access network (Altiostar, Intel)
- These dynamics go much further than the RAN, affecting most functions across the network



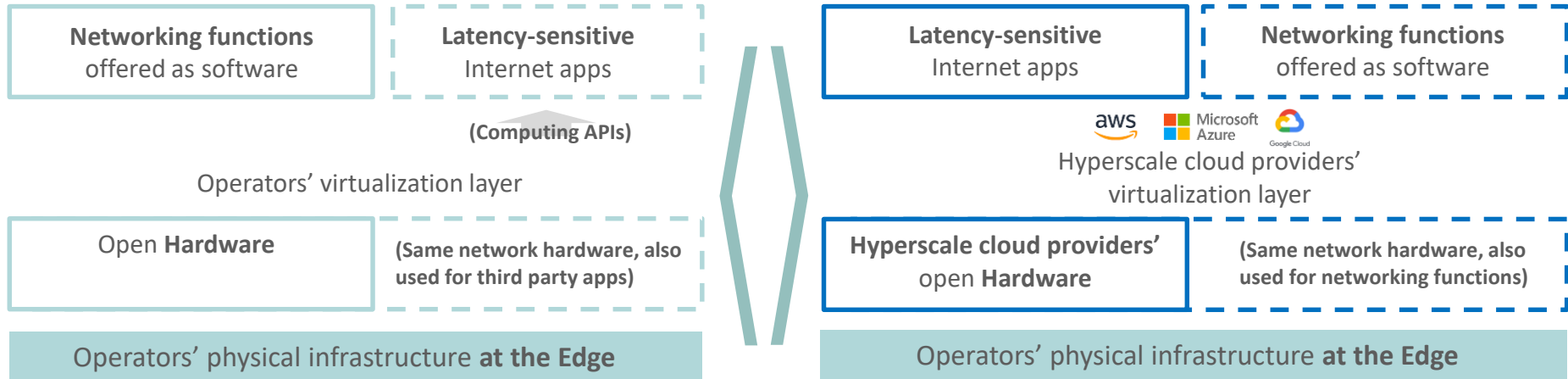
So in the coming years we expect an increasing convergence of telecoms with the tech industry

EXAMPLE: THE FUTURE COMPETITIVE LANDSCAPE IN EDGE CLOUD SERVICES?

TELECOMS WORLD:
EXPANDING INTO IT



IT WORLD:
EXPANDING INTO TELECOMS

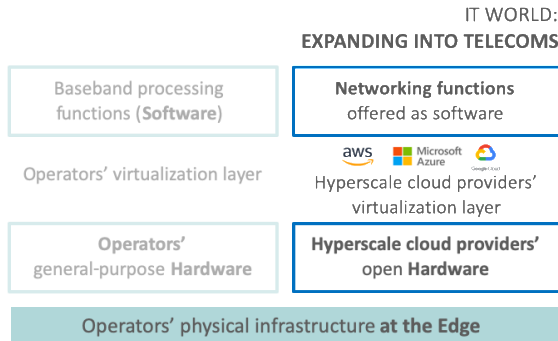




A convergence of Telecoms and IT could also have regulatory and commercial implications

Future competitive scenarios include the convergence of the Telecom and Technology industries

... and could start offering networking functions as an additional cloud service



This has implications both for Regulation and for operators' value propositions



Regulation will need to be consistent with the Telecom-Technology convergence



Operators' value propositions will need to be more **global**, to compete in a global market (like Tech companies do today)



For any further question.....

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Thank you!

