

The background is a high-angle, night-time photograph of a city skyline, likely Shanghai, with numerous illuminated skyscrapers and a river. Overlaid on this image is a network of glowing blue and white lines that form a complex web of connections, symbolizing telecommunications or IoT technology.

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COMMUNICATION FOR DEVICES

Trenger IoT-kundene 5G?

Inside Telecom conference, October 6th 2020.

Martin Nord, CTO Com4 AS.

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Outline

- Intro
- IoT
- Mobile-IoT / LPWAN
- Mobile IoT Adoption
- Mobile IoT and 5G
- Mobile-IoT coverage and roaming
- Enhanced SIM for IoT
- IoT and Cloud
- Conclusions



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Com4 is a fast-growing global IoT service provider

Com4 was founded in 2011

- IoT specialist - dedicated to professional data services for the B2B M2M/IoT market segment.
- Full Mobile Virtual Network Operator
- Strategy based on Innovation and Customer centricity.
- Excellent global coverage.

Com 4 Successful offering in our home market

- International growth strategy
- Addresses all verticals.
- Captured 50-60 % market growth in Norway last 3 years.
- Expansion of sales offices to Nordics and Europe.

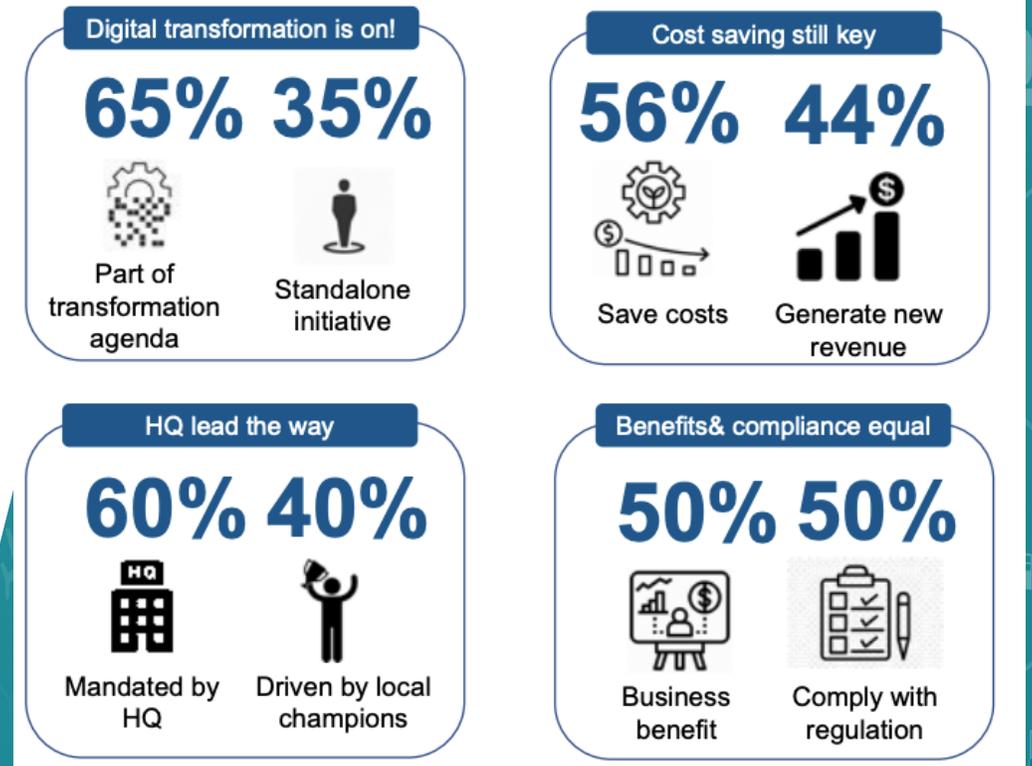


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IoT enhances and transforms business

IoT enables “digitalization” and “transformation” - the sky is the limit

- *Core IoT*: improve business performance, reduce cost.
- *Adjacent IoT*: enable new offers, recognized by existing market.
- *Transformational IoT*: New offers for new markets



Fit-for-purpose IoT connectivity is required to make IoT happen.

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Industrial Handhelds



Wearables



Vending machines



Asset trackers



Health monitors



Security systems



Parking meters



Sensors



Agriculture monitors



Industrial sensors



City infrastructure



HVAC controllers

LTE IoT - Complementary narrowband technologies for low-power, wide-area IoT use cases

LTE-M is a scaled down version of LTE

- 1.4 MHz
- Peak data rate 1 Mbps
- Good indoor coverage
- Good battery life
- Mobility
- Voice support
- Responsive / lower latency
- Roaming as 4G

NB-IoT is standard built for meters and sensors

- 200 kHz
- Peak data rate 100 kbps
- Very good coverage
- Very good battery life

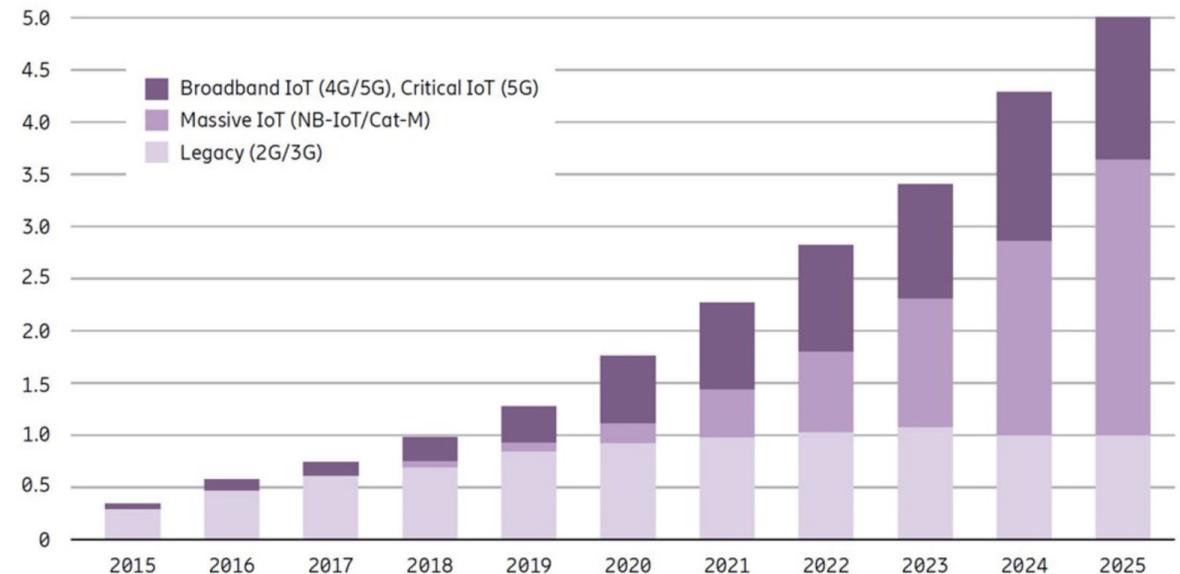
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Mobile IoT - growth, volumes - yet untapped potential

Segment	2018	2019	2020
Utilities	0.98	1.17	1.37
Government	0.40	0.53	0.70
Building Automation	0.23	0.31	0.44
Physical Security	0.83	0.95	1.09
Manufacturing & Natural Resources	0.33	0.40	0.49
Automotive	0.27	0.36	0.47
Healthcare Providers	0.21	0.28	0.36
Retail & Wholesale Trade	0.29	0.36	0.44
Information	0.37	0.37	0.37
Transportation	0.06	0.07	0.08
Total	3.96	4.81	5.81

Source: Gartner (August 2019)

- Total connected IoT units (bns).
- Sector break-down.



- Total IoT connections estimates 2020 in the 5-10 bn range.
- Mobile IoT standards have so far added 100-150 million connections. High potential towards 2025.
- Some Covid-19 effect expected.

Source: Ericsson outlook for Mobile IoT, 2020.

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5G benefits and maturity

For sure we need 5G !

- Customer perspective: 5G bears the promise of scalability and future proofness.
- Operator perspective: 5G offers new business models, use cases, operational flexibility & scale.

However - 5G still early in maturity cycle.

- IoT projects on 5G networks in 2022.
- Good news - IoT on 4G is fit for purpose and future proof.

5G is an umbrella standard - Mobile IoT standard part of 5G

- No need to wait for 5G - even if your project has a long life cycle cycle.
- Most IoT use cases can be delivered on 4G

Instant Responses (URLCC)

Unprecedented speeds (eMBB)

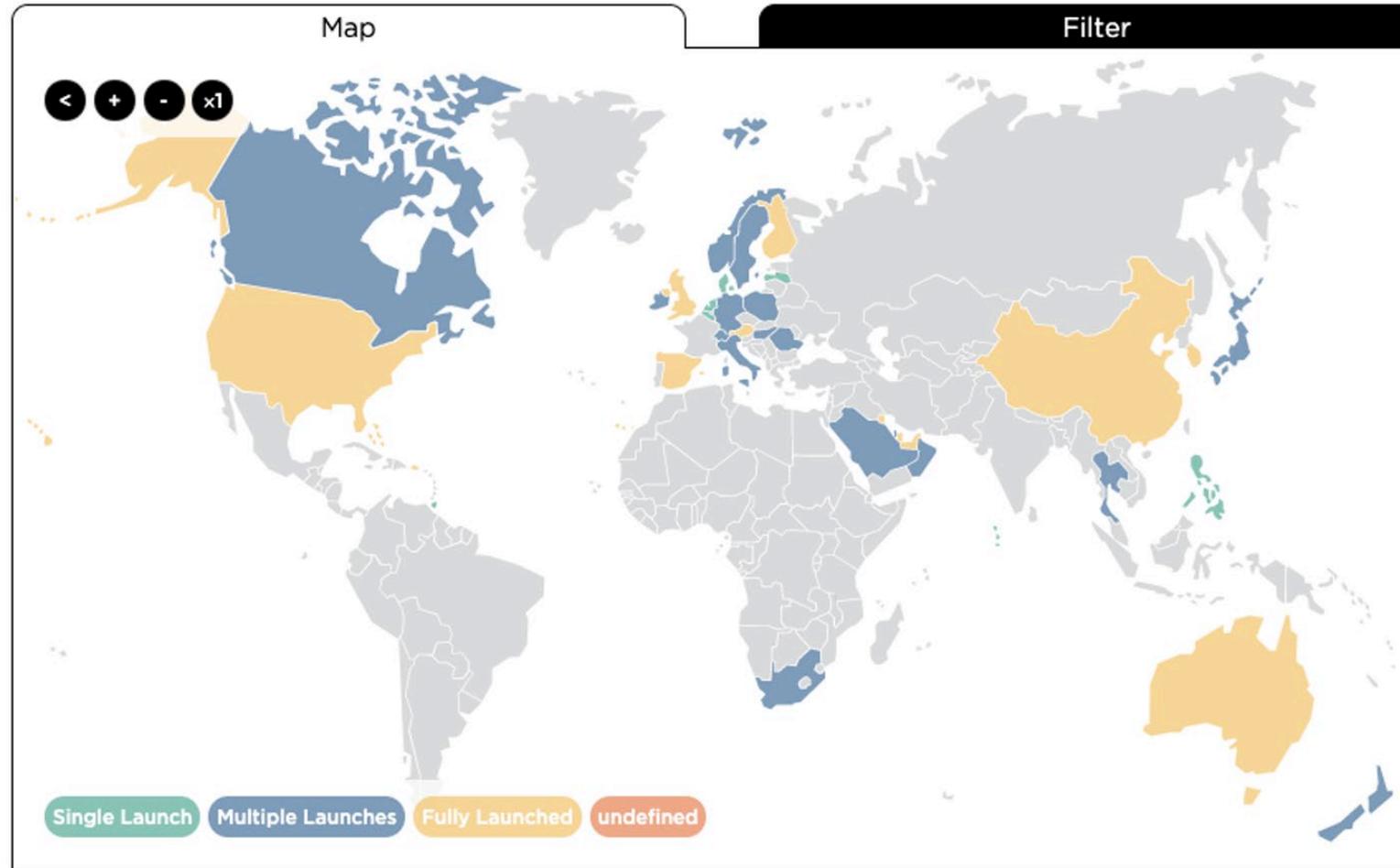
Connections everywhere (mMTC)



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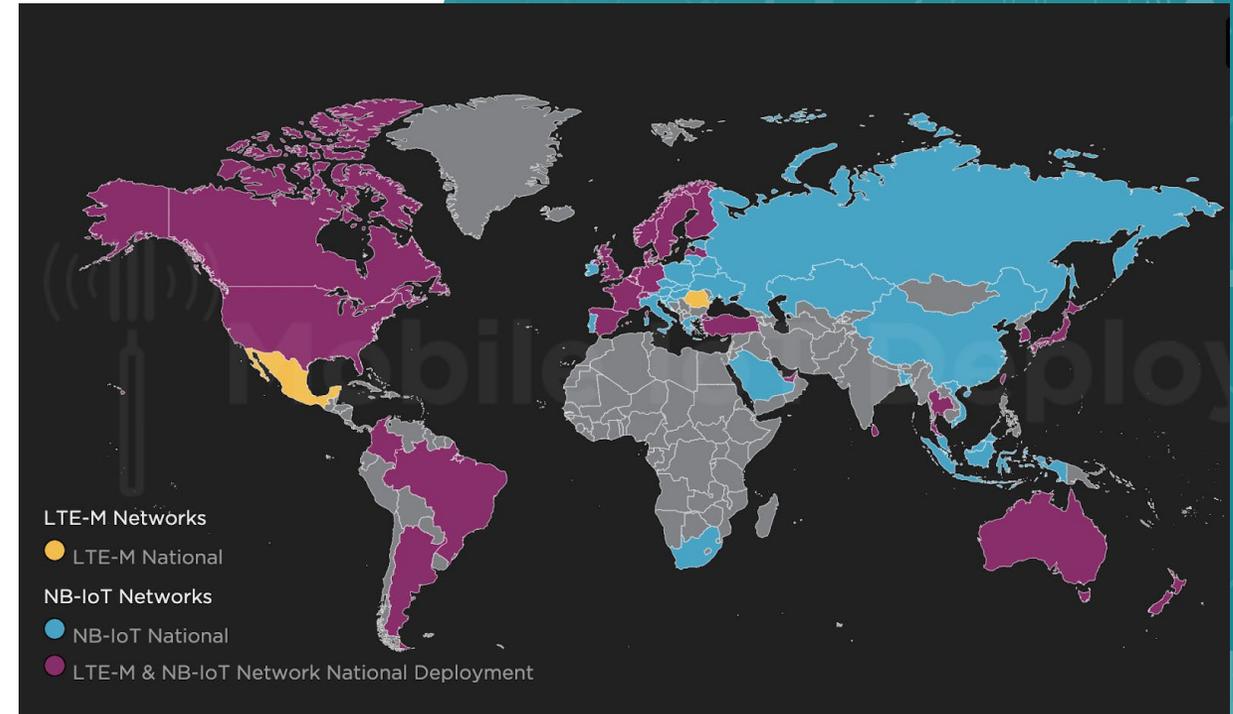
5G launches

5G will account for as many as 1.2 billion connections by 2025



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Mobile IoT network deployments



Number of LTE-M Networks	Number of NB-IoT Networks	Total Number of Mobile IoT Networks
46	96	142

Last Update: August 2020

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From local to regional and global use cases

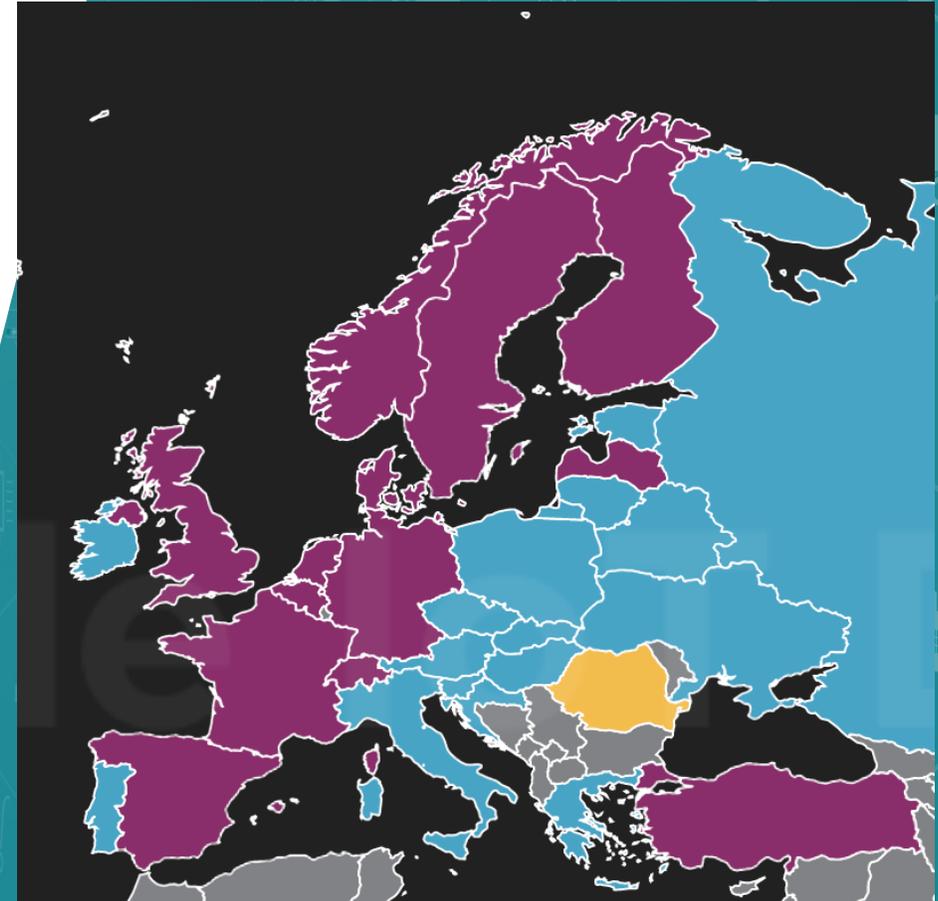
National and International use cases

- National coverage is sufficient for some use cases.
- Most use cases are regional or global.

2G/3G/4G roaming widely available. LTE-M via LTE.

Still early days for NB-IoT roaming agreements.

- Some recent announcements in Europe
- Expect good progress in 2020Q4 and 2021
- Global IMSIs. IoT vs Consumer transparency measure.



<https://www.gsma.com/iot/deployment-map/#deployments>

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IoT SIMs

Complete portfolio of industrial-grade SIM cards optimised for different usage scenarios for the IoT.



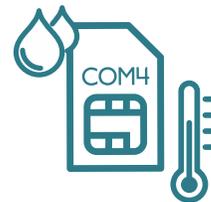
A pioneer in advanced SIM technologies, with first profile swap in Europe and first nuSIM operator partner.



INDUSTRIAL-GRADE SIMs.
FROM WORLD RENOWNED
SIM MANUFACTURER.



**SHOCK AND
VIBRATION
RESISTANT**



**TEMPERATURE &
HUMIDITY TOLERANCE**
-40°C UP TO +105°C



**ALL FORM FACTORS:
INCLUDING
EMBEDDED SIM: eSIM
(MFF2)**



REWRTABLE.
eUICC PROFILE SWAP
OTA (Over The Air)

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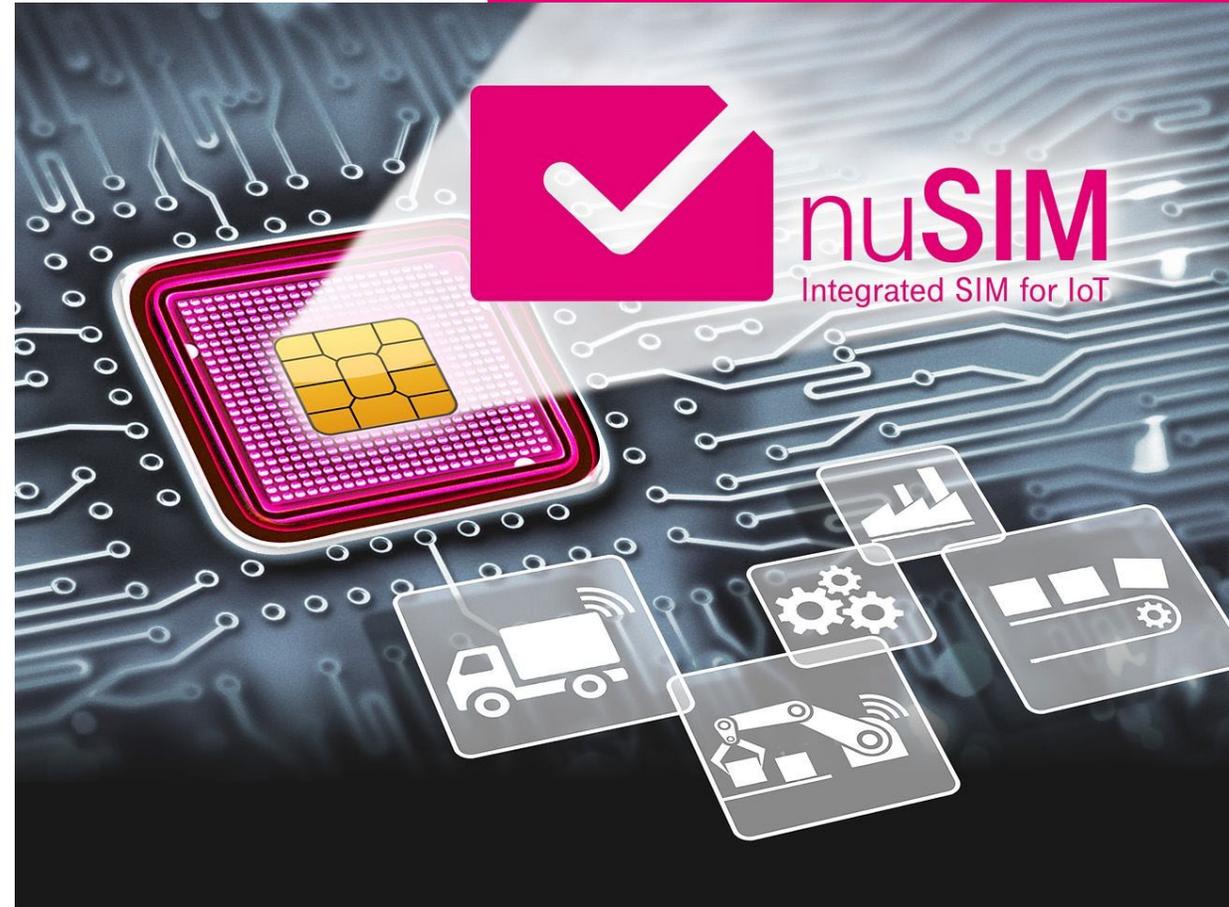
Pioneering nuSIM

Com4 is the first operator partner
for Deutsche Telekom's nuSIM initiative

nuSIM is a strictly optimized integrated SIM solution
aiming to bring several new attributes to the IoT value
chain, e.g. significant cost reduction, battery savings,
space savings and increased overall simplicity

Moves the SIM functionality from the physical SIM directly
into the modem chip and is specifically designed for low-
cost devices used in mobile IoT applications.

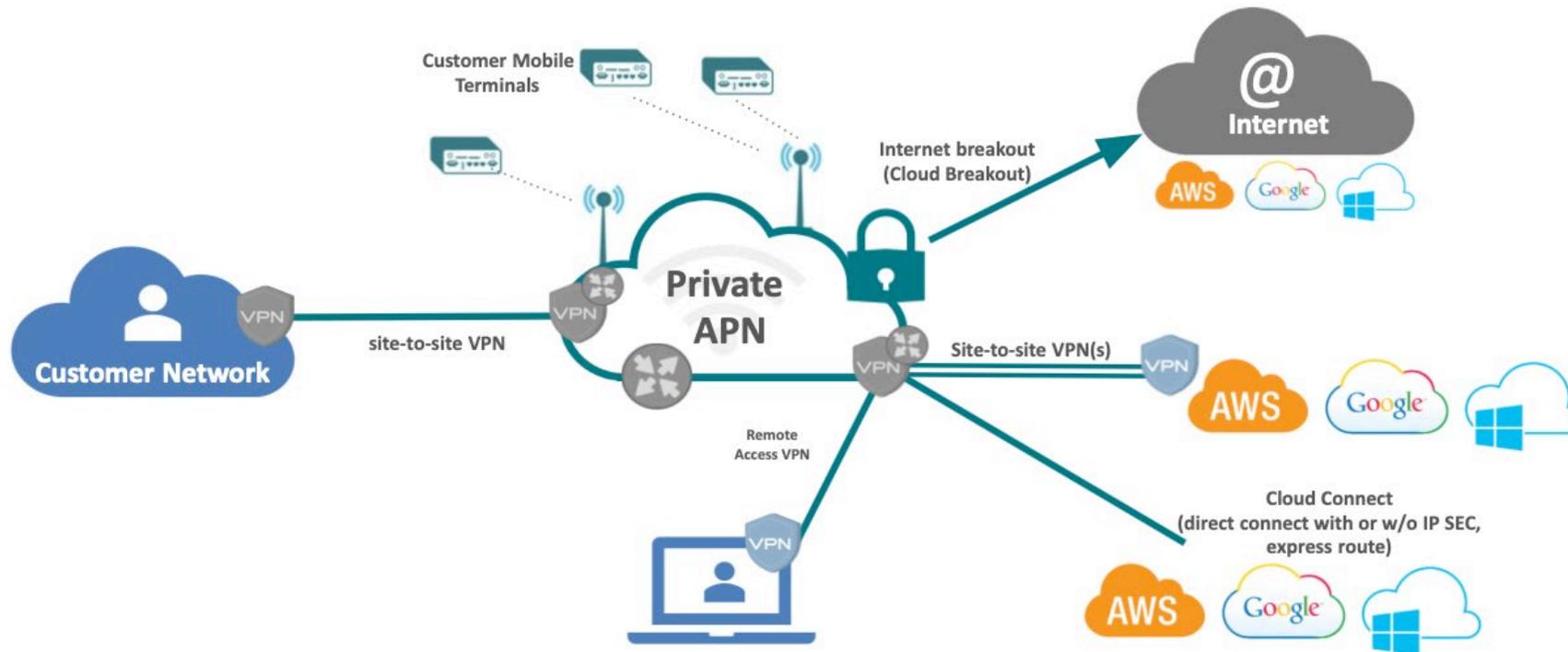
Expect further evolution and 5G support.



nuSIM
Integrated SIM for IoT

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Cloud connectivity



- Several options to control and protect customer connectivity.
- Advice on Cloud & Connectivity for latency and robustness.
- IoT protocol translation.

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Summary

To make IoT reach its full potential, MNOs and MVNOs should strengthen their offering, by innovation and industry collaboration.

Com4 strategic focus areas going forward:

- Mobile-IoT protocols adoption and roaming.
- Enhanced SIMs for IoT
- Cloud offerings
- 5G

4G supports most use case requirements today.

Mobile IoT protocols supported by 5G, providing future proof solutions.





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Questions? Get in touch !
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Takk for meg!