5G IoT Summit
MWC23 Las Vegas

MWC GSMA | In partnership with ctia

LAS VEGAS
SEPTEMBER 26 – 28
2023

State of the IoT Nation

**Las Vegas Convention Center,
West Hall 300, Theatre 2, W220
Tuesday 26 September 2023,
09:00-11:35**

Matt Hatton

Founding Partner,
TRANSFORMA INSIGHTS

Gold sponsor: AT&T Business | Showcase Partner: Valid

State of the IoT Nation

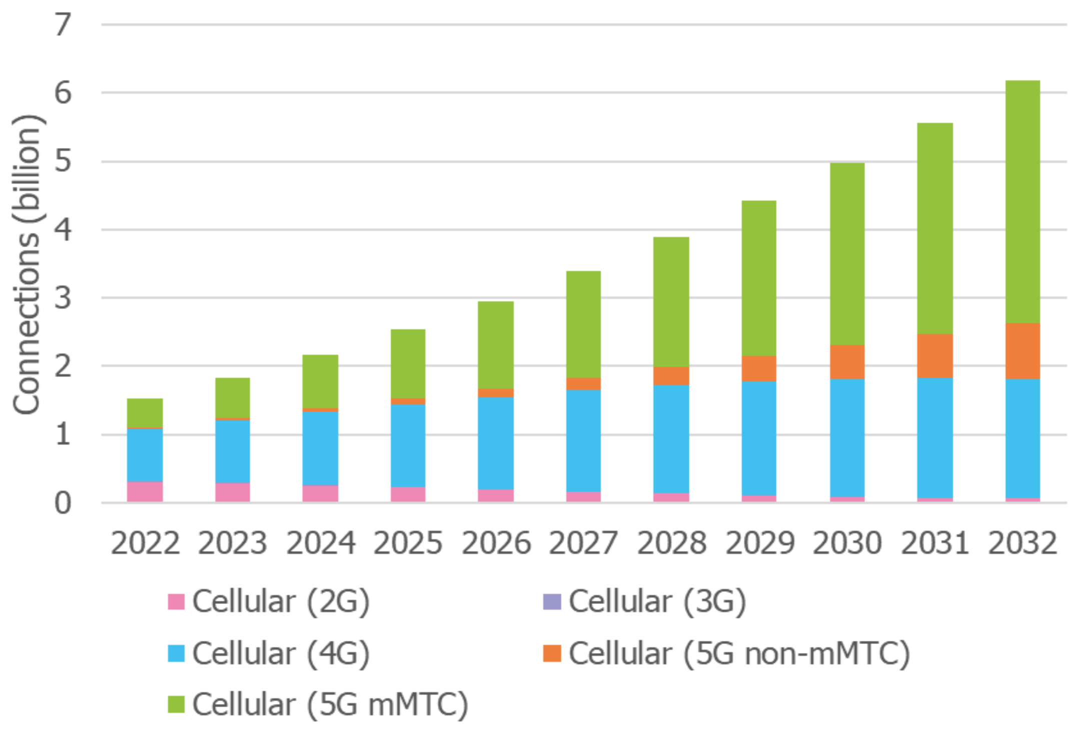
Mobile World Congress Las Vegas

5G IoT Summit

September 2023

Cellular IoT connections growth driven by mMTC

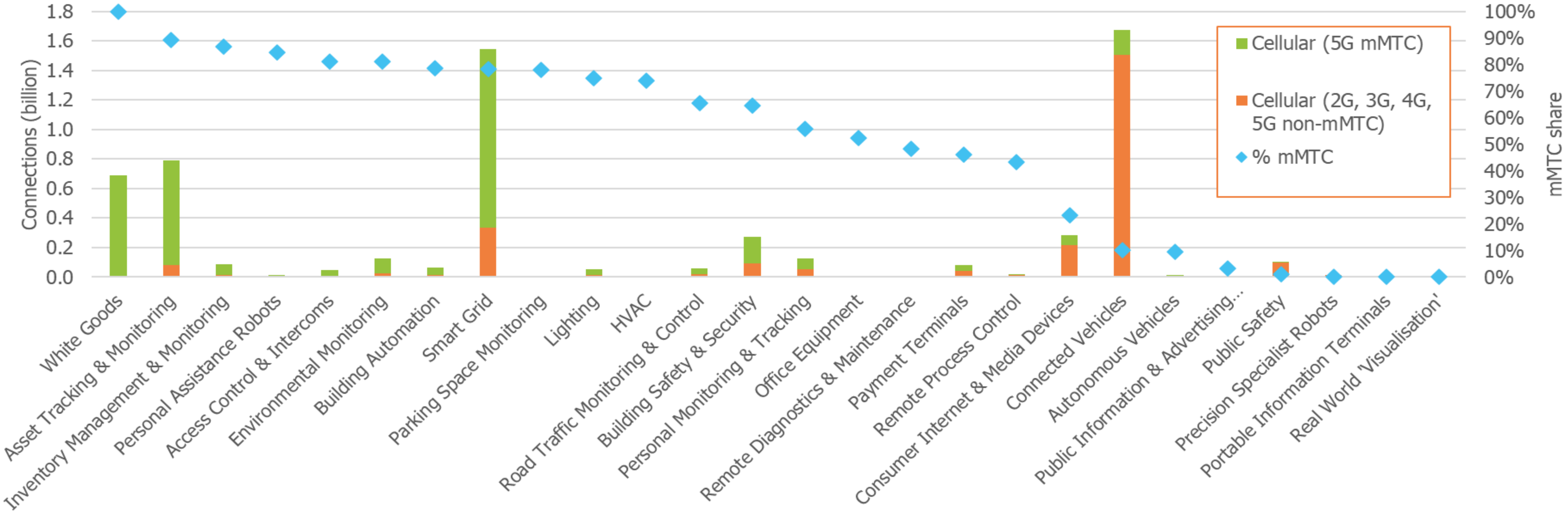
Global cellular IoT connections by generation
Source: Transforma Insights, 2023



- From 1.5 billion cellular-based IoT connections in 2022 to 6.2 billion in 2032 (15% CAGR)
- 5G mMTC (incl. NB-IoT, LTE-M, RedCap and evolutions) from 28% of connections to 57%. 23% CAGR.
- Dominated by China today (>70%) but falling to <40% in 2032. 33% CAGR outside China.
- 2G/3G switch-off will continue to create challenges.
- A bifurcated market…more on this later.

mMTC critical for energy/environmental use cases

Global IoT connections for top tier use cases, cellular and mMTC LPWA, 2032
[Source: Transforma Insights IoT Forecasts, 2023]



Internet of Things
Hyperconnectivity
Data Sharing
RPA
3D Printing
Distributed Ledger
AI
HMI
Edge
Robotics
PLM
Future Tech

TRANSFORMA INSIGHTS

Headwind: price erosion

Data4Life Simcard - 10MB p/m for 30 years

JUSTWORX

$26.00 USD

Quantity

1

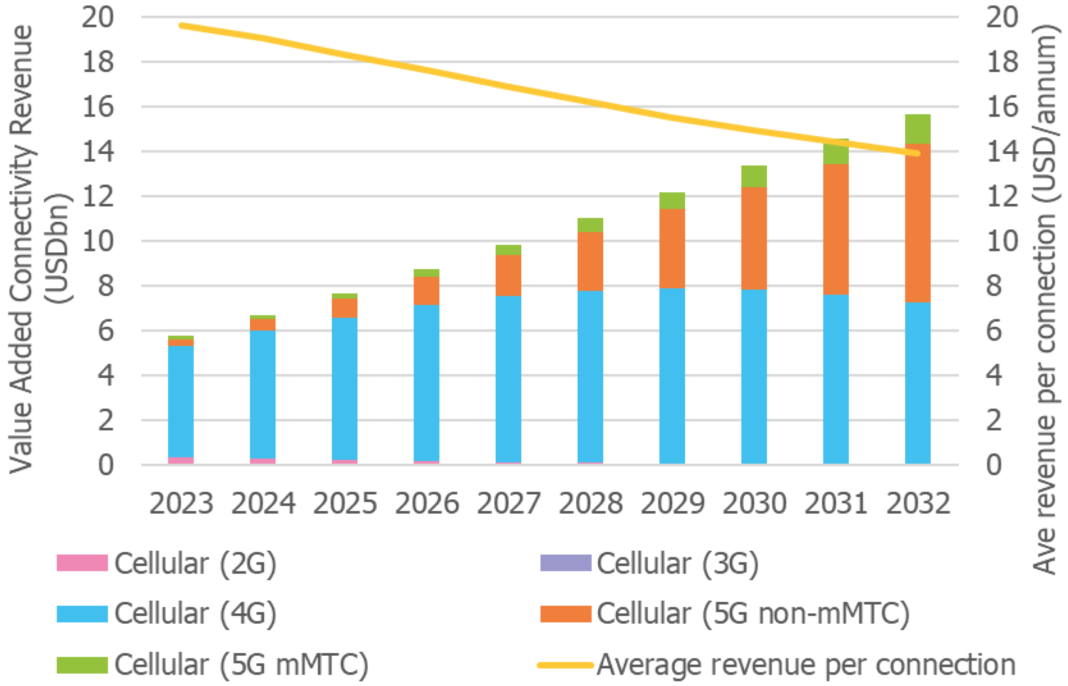
ADD TO CART

THE ONLY SIM CARD YOU'LL EVER NEED FOR YOUR IOT OR M2M PRODUCTS. 30 DAY MONEY-BACK GUARANTEE.

- Never pay for IoT or M2M data again.
- Effective rate of $0.006 per MB ($0.05p/m)
- No monthly fees. No subscriptions.
- No "Recharge Service" fee.
- Multi-Network in each country. Automatically connects to the strongest local signal.
- Ultra-Secure VPN's available.
- Perfect for Credit card terminals, POS systems, Alarm systems, GPS trackers, Cellular sensors and any other Cellular based product that uses M2M (machine to machine) technology.
- Coverage on over 205 networks in 105 countries.
- Works on 2G, 3G and 4G (LTE) networks.

IoT value added connectivity (VAC) revenue North America 2022-32 (USDbn)

[Source: Transforma Insights IoT Forecast Database 2023]



Mitigating connectivity revenue price erosion

Move 'up-the-stack'

- Most the value is in the application.
- BUT it's fiercely contested by established companies…approach with extreme caution.

Utilities

Health

Transport

Consulting/advisory

- Horizontal support capability spanning pre- and post-sales support, consulting and/or systems integration.
- This can either be low level, what we term 'knowhow-as-a-service', or it can be sophisticated consulting and systems integration.

Horizontal capabilities

- A 'platform' play. Application enablement platform, data analytics and data exchange are the most prominent options.
- Others: Cybersecurity, hyper-precise positioning, edge computing, device certification etc.

ng/Systems Integration/Knowhow-as-a-Service

Horizontal value-added

Consolidation

- MVNO roll-ups are commonplace.
- MNOs acquiring MVNOs as well as reassessing position in the market.

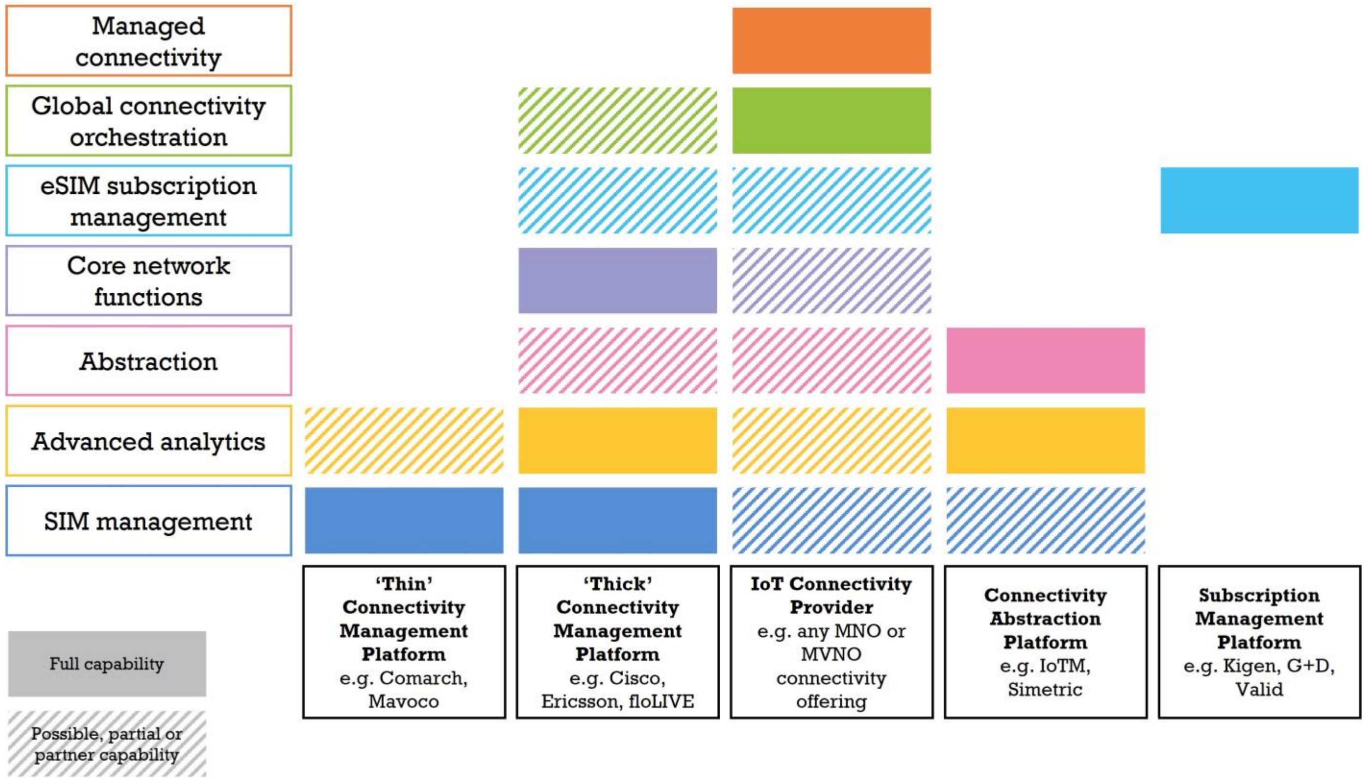
Multi-client

Hyperscaling

- Ensure systems and techs are aligned to deliver streamlined and low-touch onboarding and connectivity management capability.
- Able to support 10-100x the number of connections.

Connectivity

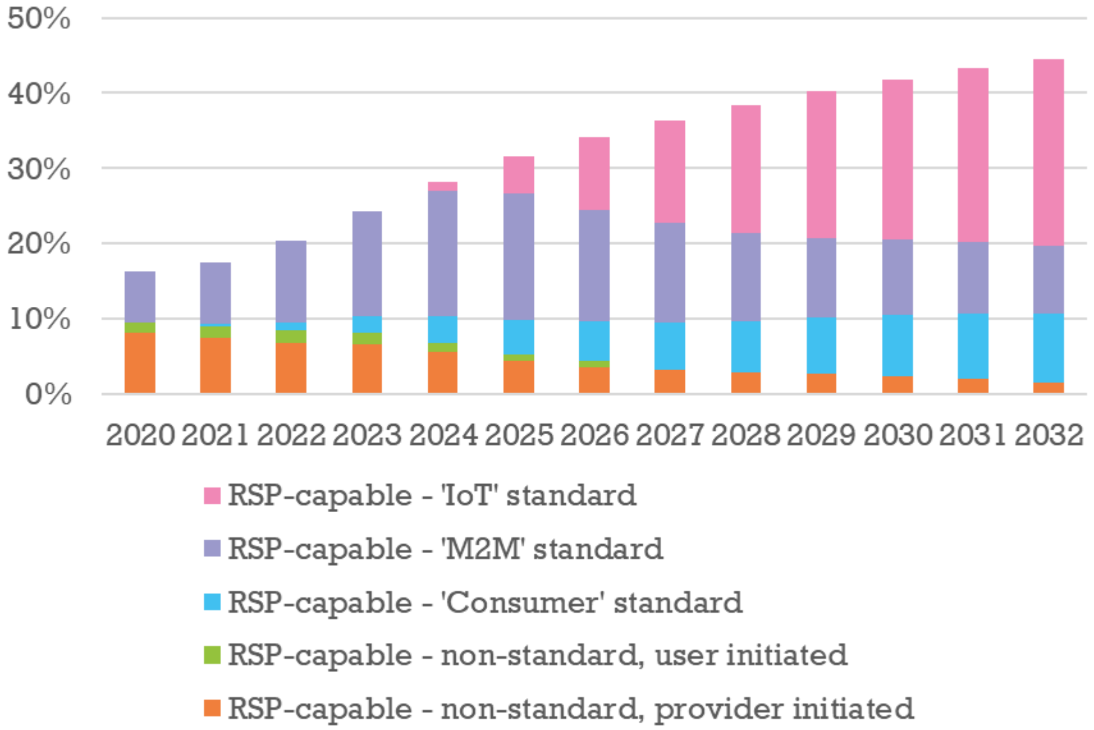
Connectivity Management Platform (CMP) changes



- Highly disrupted market currently, illustrative of push for hyperscale
- Many MNOs and MVNOs are reassessing their approach here in a fundamental way.
- Differentiate 'Thin' and 'Thick' CMPs based on functionality.

Evolution in multi-country support

Cellular IoT connections annual shipments of RSP-capable, split by form of RSP, 2022-32
[Source: Transforma Insights, 2023]



- Period of transition for multi-country connectivity options.
- From laissez-faire roaming to clamp down, to eSIM, plus other variations. Carriers applying restrictions. Finding its level.
- eSIM often used as a marketing tool (vs multi-IMSI)
- eSIM/RSP IoT SGP.32 variant imminent, with devices in late 2024. Potential game-changer but commercial models unclear and carriers reticent.
- Interesting options include Emnify direct access agreements, Telia via IoTA.
- Trade-off depending on where hosted/managed.

Migration to the software domain

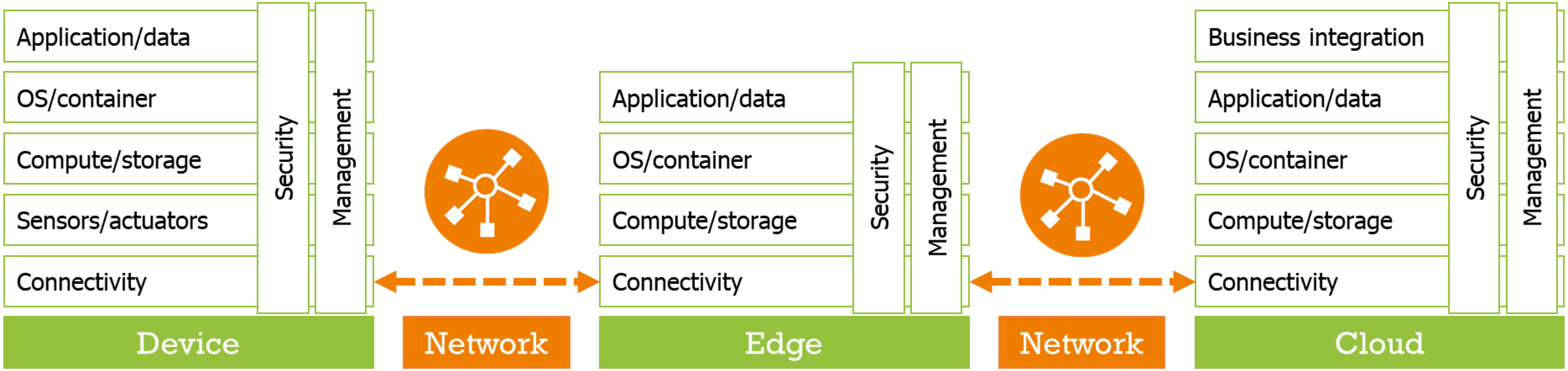
Hardware/infrastructure domain

eSIM/RSP	Core network	Connectivity management platform	IoT applications move to the cloud/edge	Device management
Historically based on the removable SIM card	Historically tied to the running of a telecoms network	Historically the preserve of major CSPs and infrastructure vendors	Historically based on on-premises data management	Historically proprietary DM platforms from vendors
Control of the subscription moves to remote SIM provisioning.	Increasingly virtualised with distributed cloud-based PoPs, SD-WAN etc.	Increasingly democratised with multiple players and aggregation across multiple platforms	Delivery of IoT data to AWS/Azure becomes increasingly important, edge compute orchestration	Becoming more standardised and separated from vendors

Software Domain

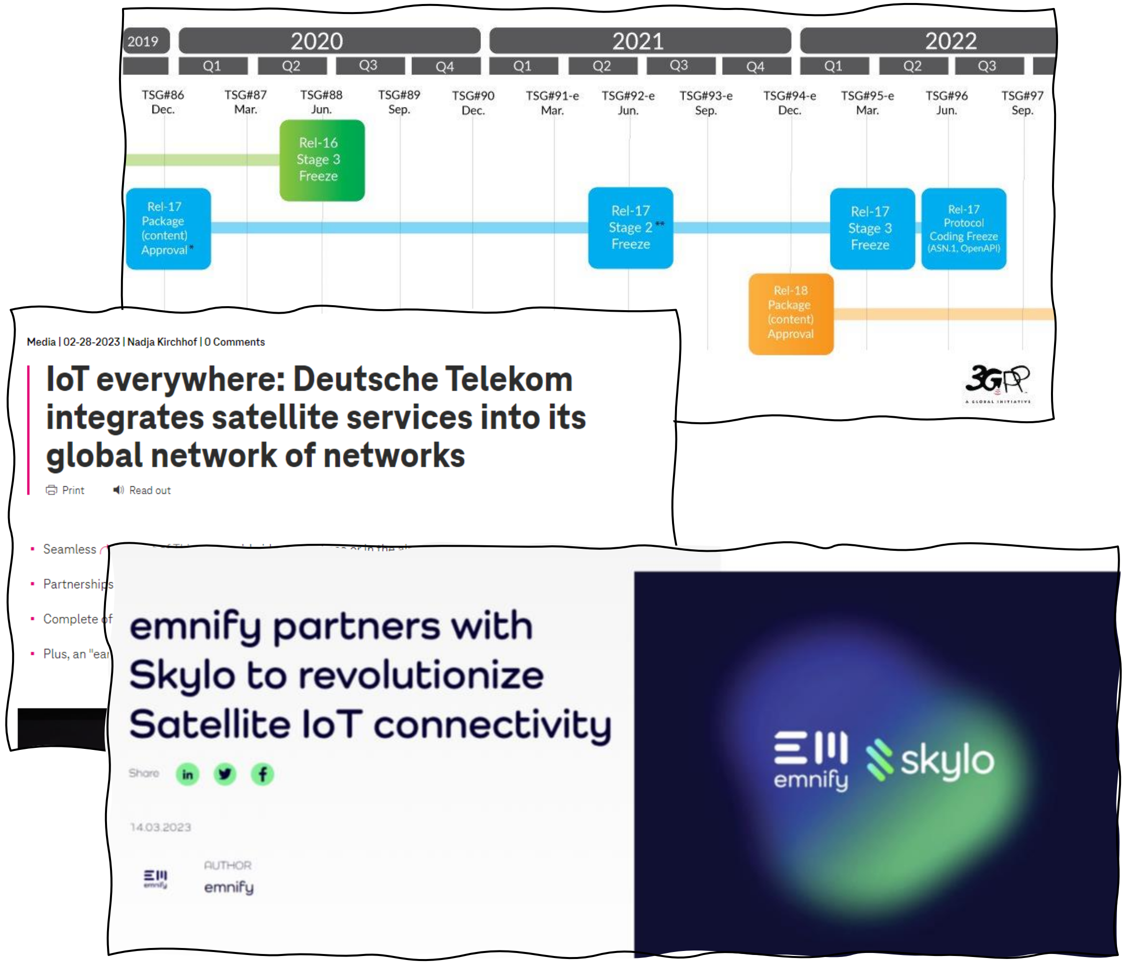
Cross-optimisation and ‘Connected-by-Design’

- The availability of IoT optimised elements creates increasing requirement for the constituent elements of the application to be cross-optimised with each other, particularly devices.
- Connectivity is the most critical element in the proposition, needing to be optimised to handle the compute/storage stack: Connected-by-Design.



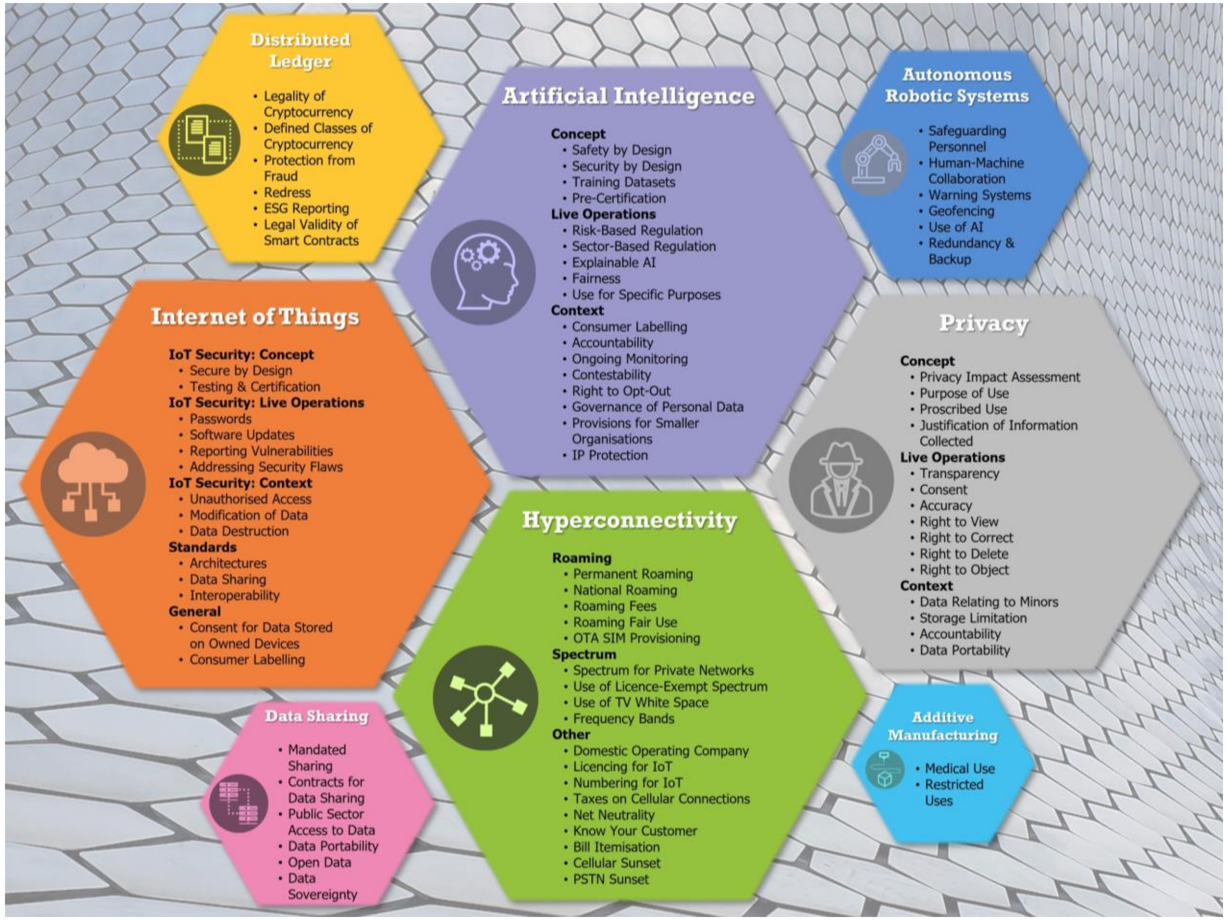
NTN satellite

- Flurry of announcements of LEO satellite deployments.
- Non-Terrestrial Network support within 3GPP progressing.
- Likely to be some consolidation in the space and some drop-outs.
- Commercial approaches are starting to be resolved: coverage enhancement/guarantee.



Increasing regulatory obligations

- IoT Security: Concept (Secure by Design, Testing & Certification)
- IoT Security: Live Operations (Passwords, Software Updates, Reporting Vulnerabilities, Addressing Security Flaws)
- IoT Security: Context (Unauthorised Access, Modification of Data, Data Destruction)
- Standards (Architectures, Data Sharing, Interoperability)
- General (Consent for Data Stored on Owned Devices, Consumer Labelling)
- Hyperconnectivity (Permanent Roaming, Spectrum, KYC, Sunsetting)
- Data Sharing (Access to Data, Data Sovereignty)



Finally…everything else: Key trends for CSPs in IoT

Organisational changes
- Recent years: Deutsche Telekom IoT, Telefonica Tech, Telenor IoT.
- Last 12 months/imminent: Aeris/Ericsson, AT&T, T IoT, Vodafone.
- MPN often shifting out of IoT.
- More consolidation coming.

Strong showing from MVNOs
- Base line functionality (e.g. CMP) is easy to develop. Alongside low-cost cloud-native offering and flexible commercial models.
- Telefonica imitates MVNO. Others following.
- Last benchmarking report: 2/12 MVNOs, this year 9/23.

Out with roaming?
- Period of transition for multi-country connectivity options.
- From laissez-faire roaming to clamp down to eSIM, plus other variations. Finding its level.
- Interesting options include Emnify direct access agreements, Telia via IoTA.

Manageable multi-country connectivity
- Compliant, transparent and manageable connectivity.
- Trade-off depending on where hosted/managed.
- Global network infrastructure, e.g. BICS, Emnify, Eseye.
- Regional expertise e.g. Singtel with Bridge Alliance.

Counter-party risk
- Brand/reputation comes top in vendor selection.
- MVNOs need to focus on anything that bolsters brand.
- Features including bring your own connectivity, eSIM/RSP.
- Also beneficial to be associated with larger vendor.

Alternative networks
- KORE, KPN, Orange in LoRaWAN. Sierra Wireless/Semtech.
- Others on ad hoc basis, e.g. for projects.
- Many testing LEO satellite.
- Soracom using several, and >1m Sigfox connections out of 5m total.

2G/3G switch off
- Impacting success in the US.
- AT&T down 4.4m in Q1 2022. Verizon and KORE both saw growth slowing. Aeris stalled.
- Will also be significant in Europe in the mid 2020s. Lessons to be learnt.

NB-IoT/LTE-M a bit slow
- Growth of mMTC techs is generally fairly limited, although some doing well.
- Smart metering is stand-out for NB-IoT, e.g. Telefonica and Telia. Verizon at 40% of connections for LPWA (incl. Cat1).
- Little movement on roaming.

Cloud-nativity
- Increasing requirement to be cloud native in platforms and core network functions, e.g. distributed packed gateways.
- Typically led by MVNOs, e.g. Emnify, Soracom, 1NCE.

CMP disruption
- Connectivity Management Platform less of a differentiator.
- Ericsson/Aeris status still to be resolved.
- Many CSPs looking at diversifying CMP approach.
- Roadmap has been strong for GDSP, Thingspace.

Device and connectivity transparency
- Device Management is increasingly a standard feature in connectivity offerings.
- Ability to combine for full device/connectivity transparency, e.g. BICS, Wireless Logic.

Hardware offerings
- Get in early as a manufacturer to ensure early consideration. Plus eSIM bootstrap.
- BICS Device Lab, Eseye, Telefonica Thinx lab.
- And, of course, Sierra Wireless, Telit.

Device lifecycle management
- Inventory, warehousing and fulfilment, including disposal.
- Devices as a managed service.
- And potentially another platform to handle supply chain, inventory, etc. such as KORE MODGo.

Optimisation of IoT elements
- Ensure all the various elements (network, application, protocols etc.) work with each other.
- Telit Mobilogix, DT Solution Optimizer.
- Includes overlay such as network probes.

Service wrap around everything
- Consultative selling and enhanced pre/post-sales.
- NTT Data global Center of Excellenc with >1,000 consultants.
- DT tariffs and platforms, Telit Mobilogix acquisition.

Customer success managers
- From 'cradle to gravy', ongoing customer support.
- Reflection of understanding that IoT is not a product-based transaction but a managed service.
- BICS, DT, Emnify, Telia, Tele2.

Cloud integration
- Cloud connectors for seamless data integration into AWS, Azure etc.
- Protocol conversion and application of appropriate transport layer security.
- BICS, Emnify, Telefonica and many more.

Service tiering
- Tiering increasingly used (e.g. DT, Tele2, Eseye, Vodafone).
- Low-cost prepaid offering (possibly as lead gen).
- Associated with CMP. But functions are subordinate to service tier.

Contextualistion
- Adding thin layer onto horizontal capabilities.
- Healthcare, EV charging, smart building, etc.
- Vodafone with IoT.nxt.
- Also horizontal e.g. NTT for operational excellence, sustainability, worker enablement.

Security
- Enterprise requirement.
- Differentiation and pricing are a challenge.
- Basic features of private APNs, IP VPNs, IMEI lock.
- IoT SAFE very common.
- Strong features from BICS, Orange, Singtel, Verizon.

Compliance
- Increasingly complex regulatory environment.
- Starting to register, particularly in terms of connectivity.
- Self-service regulatory zoning from 1NCE, regulatory practice with Vodafone.

Analytics
- Richer set of services combining IoT with the associated data analytics.
- Telefonica Tech combines IoT and big data lines of business.
- Telia Division X includes Insights business.

End solutions
- Be wary about 'moving up the stack'. Vertical is generally out of style.
- But Verizon in fleet, Telia mid-market offering, and Telefonica vertical moves.
- T-Mobile US with Advanced Network Solutions.

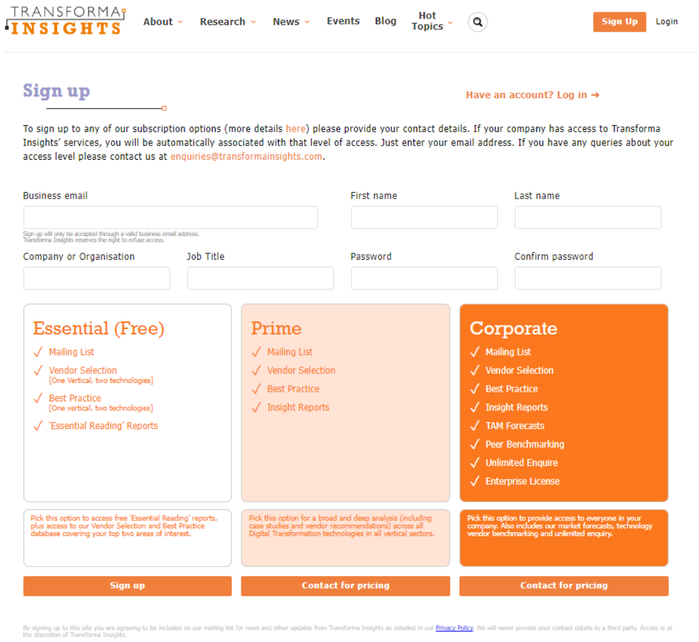
Sustainability
- Several CSPs are emphasising sustainability as a key differentiator for IoT.
- NTT has it as one of its horizontal 'outcomes'.
- Also Deutsche Telekom, Tele2, Telefonica, and Telia talk about it quite prominently.

Source: Transforma Insights Communications Service Provider (CSP) IoT Peer Benchmarking Report 2023

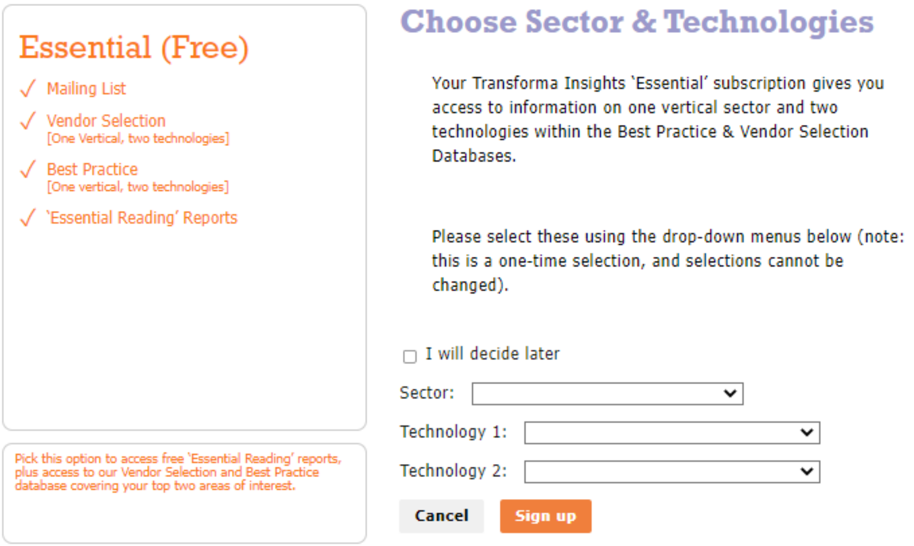
Find out more about Transforma Insights' research

Visit transformainsights.com/signup/essential

Step 1: Enter name, email, company and password and select 'Essential'



Step 2: Pick one vertical and two technologies



Internet of Things | Hyperconnectivity | Data Sharing | RPA | 3D Printing | Distributed Ledger

AI | HMI | Edge | Robotics | PLM | Future Tech

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Thank you

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